



Routledge Frontiers of Political Economy

DEMOCRATIC ECONOMIC PLANNING

Robin Hahnel



Democratic Economic Planning

Democratic Economic Planning presents a concrete proposal for how to organize, carry out, and integrate comprehensive annual economic planning, investment planning, and long-run development planning so as to maximize popular participation, distribute the burdens and benefits of economic activity fairly, achieve environmental sustainability, and use scarce productive resources efficiently. The participatory planning procedures proposed provide workers in self-managed councils and consumers in neighborhood councils with autonomy over their own activities while ensuring that they use scarce productive resources in socially responsible ways without subjecting them to competitive market forces.

Certain mathematical and economic skills are required to fully understand and evaluate the planning procedures discussed and evaluated in technical sections in a number of chapters. These sections are necessary to advance the theory of democratic planning and should be of primary interest to readers who have those skills. However, the book is written so that the main argument can be followed without fully digesting the more technical sections.

Democratic Economic Planning is written for dreamers who are disenamored with the economics of competition and greed and want to know how a system of equitable cooperation can be organized and also for skeptics who demand “hard proof” that an economy without markets and private enterprise is possible.

Robin Hahnel is Professor Emeritus from American University in Washington, DC, where he taught for 33 years. During the past 14 years he taught as a visiting professor at Portland State University, Lewis and Clark College, and Willamette University in Oregon.

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Robin Hahnel

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This book is dedicated to all who have believed in and fought for a better economic system than those humans have managed to devise so far. It is also dedicated to my children and grandchildren – Jesse, Ilana, Sara, Tanya, Dylan, Aidan, Eleanor, Beckett, and Ida – who I hope will enjoy the many benefits of a better economic system during their lifetimes.

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Preface

The authors

Robin Hahnel is the main author of this book and takes full responsibility for its content. However, there are co-authors for some parts, and others whose contributions should be recognized.

Most specifically, Peter Bohmer and Savvina Chowdhury are co-authors of Chapter 10 on reproductive labor in Part III, and Allison Kerkhoff is co-author of Chapters 11 and 12 on investment planning in Part IV. With the help of startup funding from the Institute for Solidarity Economics in Oxford England, Michael Weisdorf, Mitchell Szczepanczyk, Christan Echt, and Nick Gilla all worked on computer simulations of the annual participatory planning procedure, and Michael and Mitchell are co-authors with me of Chapter 9 in Part III. More broadly, members of four different collectives devoted to promoting the vision of a participatory economy over the past 20 years – Jason and Christopher Chrysostomou in England; Elizabeth Meade and Fintan Bradshaw in Ireland; Antti Jauhiainen, Joonas Mäkinen, and Aki Tetri in Finland; and Anders Sandström in Sweden – have commented on and affected the content of this book in innumerable ways.

Finally, and most importantly, the “model” of a participatory economy is the *joint creation* of Michael Albert and Robin Hahnel, who worked together to develop the vision and model in the 1970s, and have published numerous books and articles about a participatory economy both jointly and separately ever since.

While the main author takes full responsibility for all content, the term *we* is often used throughout the book to refer to all these co-authors, as well as others over the past 30 years who have helped develop, support, and advocate for the vision of a post-capitalist economic system known as a “participatory economy.”

About the main author

The main author is now 75 years old, and this will be the last book he writes on the intellectual subject that has consumed more of his time and energy

than any other for 50 years. He was raised in the Midwest of the United States in a family of “Adlai Stevenson Democrats.” This meant that when he “went East” to college in 1964, he believed it was important to eliminate the vestiges of historic discrimination based on race and sex that still afflicted his country, and adopt economic reforms to make our economy more fair and efficient. It also meant he believed that his country usually intended to behave like a good global citizen, but sometimes erred out of ignorance. In short, when he went to college at Harvard in 1964 he was an American “social democrat,” but like most Americans was unfamiliar with this name for his political beliefs. By 1966 the author had joined the Harvard SDS chapter – which as a freshman he had shunned as an insignificant coterie of obnoxious, East coast, know-it-alls – and by the time he graduated in 1968 he described himself as an “anti-imperialist” and “libertarian socialist.”

In those three years the author discovered that racism was more than a historical vestige that could be expected to disappear as older, less educated generations of Americans died out. Witnessing firsthand the depth of the opposition to busing for school integration in “Southie,” in what many considered to be the most liberal city in the country, was quite an eye-opener!

The author discovered that the United States was not reluctant to intervene in the internal political affairs of other countries to advance the interests of US corporations and US dominance abroad. What first caught his attention was when Lyndon Johnson sent the US Marines into the Dominican Republic in 1965 to prevent Juan Bosch – whose program was little different from Johnson’s own War on Poverty – from regaining the presidency he had won in a fair election in 1962, only to be ousted by a military coup. The second clue was more personal: Every day that passed meant his college deferment was one day closer to ending – which was disconcerting since his government showed every intention of drafting him to kill or be killed in Vietnam fighting against a popular national liberation movement whose cause and heroism he had come to admire.

And finally, the author’s economics classes at Harvard affected him differently than most of his fellow economics majors. He learned why active use of Keynesian stabilization policies, industrial planning, and redistributive taxes were necessary to render capitalism more efficient and fair – which was all part of the mainstream economics curriculum at the time, unlike today where one must study a “heterodox” curriculum to learn about how to improve outcomes in capitalism in these and other ways. But unlike most of his fellow economics majors at Harvard in the 1960s, he also became convinced that humans must be capable of organizing our economic affairs in an altogether better way than to trust our fates to the dictates of for-profit corporations and market forces. Instead of sending the vast majority to work under the dictatorial rule of capitalist employers who are legally obliged and hard driven by competitive forces to maximize profits even when that is often contrary to the social interest, why could people not instead work in self-managed worker cooperatives and coordinate their division of labor with consumer cooperatives – democratically,

fairly, and efficiently? By the late 1960s modern programming theory and computers seemed to make rational, democratic economic planning possible. And heroic leaders like Che Guevara were fighting at the time to help Bolivians free themselves from US imperialism and oligarchic rule in order to launch a fresh, participatory version of socialist planning unlike the ossified system of authoritarian planning in the Soviet Union and its Eastern European satellites – a system that increasingly served the interests of the “vanguard” political elite and a new “coordinator class” of central planners and plant managers at the expense of ordinary workers.

The author’s political transformation between 1965 and 1968 had a profound impact on his life over the next 50 years. A social democrat willing to countenance “humanitarian intervention” abroad can sometimes be accepted by the US political establishment. However, to this day there is no place in mainstream American politics for anyone who rejects the myth of “American exceptionalism” and resolutely opposes US imperialism, much less anyone who advocates for libertarian socialism over capitalism. On the other hand, the author himself did not experience his political transformation as a dramatic change from his previous intellectual perspective. His values remained the same as they had always been: He had always been committed to (1) self-determination for all nations; (2) eliminating all forms of discrimination; (3) “deep,” participatory democracy, regarding both political and economic decisions; and (4) distributing the burdens and benefits of economic cooperation fairly. Intellectually all that changed for the author was that he had refined his understanding of what these goals require; deepened his understanding of why current international, political, and economic institutions were ill-suited to achieving them; and had begun to learn more about what kinds of alternative institutions might better achieve these goals.

In any case, the author’s underlying politics changed little over the past half century. He has remained a staunch anti-imperialist and become ever more convinced that libertarian socialism is the most promising path for humanity – even as he has had to reassess what will be required to achieve these desirable outcomes in light of many failures.

Intellectual challenges

In brief, I see the intellectual challenges we must overcome if we are to replace the economics of competition and greed with the economics of equitable cooperation as follows.

The political challenge is to arrange for people to have decision-making input regarding different economic decisions in proportion to the degree they are affected by those decisions. This goal is often referred to as “economic democracy,” but since it differs from more common conceptions such as economic freedom and majority rule, it is useful to give it a different name, *collective economic self-management*, as explained in Chapter 1. Put differently, how can we reconcile democratic economic decision-making with autonomy?

The economic challenge is to (a) identify what information decision makers need in order to be able to make various choices sensibly; (b) design procedures so those who have this information will be induced to reveal it truthfully; (c) create incentives for decision makers to use the information to maximize social well-being – that is, to harmonize individual interests and the social interest; (d) develop procedures to identify when information proves to be inaccurate; and (e) take advantage of opportunities to revise plans based on new, more accurate information.

And finally, there is a “practical” challenge. Taking part in making economic decisions is not all there is to life. There are many other roads to human fulfillment. Of course, this is so obvious to most people it hardly needs stating. But citizen activists need to be reminded that besides achieving economic democracy, economic justice, environmental sustainability, and dynamic as well as static efficiency, a desirable economy must leave people ample time to pursue life’s pleasures. People should not have to spend inordinate amounts of time in meetings – particularly, meetings without well-designed agendas.

This book presents the conclusions I have come to over the past half century about how an economic system that promotes the economics of equitable cooperation might best be organized. Some parts cover subjects I have written about previously – hopefully, presenting matters more clearly, including some refinements and reappraisals. Other parts break new ground. For the first time this book presents new concrete proposals for how to incorporate an incentive compatible, demand revealing mechanism for pollution damages into the participatory annual planning procedure; how to level the playing field for public and private goods; how to organize and compensate reproductive labor to overcome gender discrimination; how to overcome missing information problems inherent to investment and long-run development planning; and how best to engage in long-run education planning, environmental planning, and strategic international economic planning. It also presents for the first time results of simulation experiments testing the practicality of the participatory annual planning procedure.

Intended audiences and readers’ guide

I hope this book will be of interest and use to several different audiences. Unfortunately, that means not all parts of the book are equally appropriate for, or of equal interest to all readers.

Certain mathematical and economic skills are required to fully understand and evaluate the planning procedures discussed in technical sections in a number of chapters. These sections of the book are necessary to advance the theory of democratic planning and should be of primary interest to readers who have those skills. However, the book is written so that the main argument can be followed without fully digesting the more technical sections. Therefore, readers without this training can easily follow the main argument of the book while skimming, or even skipping, technical sections.

Some readers will be less interested in debates that have consumed socialists over the past two centuries about how to organize a socialist economy, and will be more interested in our proposals for how to make investment and long-term development planning more efficient and democratic. Much in our proposals in Parts IV and V for how to organize and carry out investment planning, education planning, environmental planning, and strategic international economic planning could be applied in market socialist or capitalist economies, not only in the kind of fully functioning participatory economy we espouse in Part III.

However, many readers will be primarily interested in our contributions to debates that have raged over the past two centuries among advocates for socialism about how socialist economies can best be organized. Parts I, II, and III, as well as the Appendix on other democratic planning proposals, discuss at length what we believe socialists have got right and wrong and what kind of economic system 21st-century socialists should now be promoting.

This book is written for both dreamers and skeptics. It is written for people who are thoroughly disenchanted with the economics of competition and greed, and are ready to dig their teeth into the nitty-gritty of how a system of equitable cooperation can be organized. It is also written for skeptics inclined to doubt whether anything better than social democratic capitalism is possible, and who demand “hard proof” that an economy without either markets or private enterprise is both feasible and better.

Whether dreamers or skeptics, this book is written for readers with an open mind who are willing to explore a concrete, comprehensive proposal for how democratic economic planning might be conducted and judiciously weight its pros and cons without prejudice. Depending on their mathematical and economic training, their political background and inclinations, and their particular interests, people will find different parts of the book of greater and lesser interest. I hope that this brief “readers’ guide” will help readers navigate to find what they want, and I apologize in advance for the inconvenience of having to share a book with readers with different backgrounds and interests.

In the years ahead as more and more people become increasingly dissatisfied with the consequences of allowing private corporations and the market system to decide our economic fates and ask themselves whether humans might not be capable of organizing our economic affairs in a far better way than we have up to now, I hope this book will give them more to chew on than was available to the author in 1966, when becoming a libertarian socialist required a greater leap of faith than he realized at the time.

About the contributors

Robin Hahnel is Professor Emeritus at the American University in Washington, DC, and has also taught at the University of Maryland at College Park, James Madison University, Lewis and Clark College, Portland State University, Willamette University, the Catholic University in Lima Peru, the Catholic University in Panama, the University of Havana in Cuba, and Manchester University in England. His most recent books are *Economic Justice and Democracy: From Competition to Cooperation*, *Green Economics: Confronting the Ecological Crisis*, *The ABCs of Political Economy: A Modern Approach*, and, with Erik Olin Wright, *Alternatives to Capitalism: Proposals for a Democratic Economy*.

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member of CAPES, the Chicago Area Participatory Economics Society, and has worked on behalf of the participatory economy vision for many years. He has also produced radio and television shows for the Chicago Independent Media Center and works on media issues with Chicago Media Action. He lives in Chicago with his son, Zachary, and his personal website is www.szcz.org.

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Introduction

Semantics

The phrase “economic planning” sometimes refers to the use of fiscal and/or monetary policies to combat recessions or inflation in private enterprise, market economies. This is known as *Keynesian macroeconomic planning*. Other times “planning” refers to the use of differential tax, subsidy, and credit policies to stimulate bottleneck sectors retarding growth in capitalist economies. This is known as *indicative planning*. And still other times when people discuss economic planning, they mean programs to promote the growth of key industries in capitalist economies, known as *industrial policy*, policies to promote greater international competitiveness, known as *strategic international economic planning*, or policies to overcome economic underdevelopment known as *development planning*.

In the three decades after World War II economists studied and governments practiced many of these kinds of planning. However, over the past 40 years, planning for capitalist economies has fallen out of vogue, as *laissez-faire* approaches to economic policy, popularly known as *neoliberalism*, have emerged triumphant. I believe that governments can often improve the performance of capitalist economies by engaging in these kinds of planning and that there is compelling evidence that the turn away from more “planned” capitalism toward more *laissez-faire* capitalism over the past decades has diminished economic performance. Moreover, much of what is discussed in Parts IV and V of this book is relevant to how indicative planning, industrial policy, international strategic planning, and development planning can all be made not only more efficient but also more democratic. However, as helpful as parts of this book may be to those attempting to improve performance in capitalist economies, planning in capitalist economies is not the primary subject of this book.

This book is about how to organize comprehensive economic planning when all productive resources are socially owned, in ways that are thoroughly democratic and permit workers and consumers to influence different economic decisions to the degree that they are affected.

2 Introduction

Just as this book is not primarily about different kinds of planning that can be used in capitalist economies, it is also *not* about the kind of comprehensive, centralized, authoritarian planning used in the Soviet Union, China, Cuba, North Korea, and a number of Eastern European countries at various points during the 20th century. In Part II we discuss *central planning* at some length, but only to elucidate important features relevant to any kind of comprehensive economic planning, only to explain why even “best case” central planning would be authoritarian and undesirable, and only to distinguish the kind of participatory planning we propose in this book from authoritarian central planning – which has now, thankfully, passed into the dustbin of history.

Instead, our subject is how we can do comprehensive, *democratic* economic planning in a way that maximizes participation by workers and consumers, uses resources efficiently, protects the natural environment, and distributes the burdens and benefits of economic cooperation equitably. Part III discusses how we propose to coordinate interrelated economic activities through a *participatory annual planning* procedure. Part IV discusses how we propose to make investment decisions democratically and efficiently through a *participatory investment planning* process. Part V discusses how we propose to carry out different kinds of long-run, development planning – human resource, or education planning, environmental planning, and strategic international economic planning – in ways that facilitate popular participation. And throughout the book, which presents and defends our proposals popularly known as the *participatory economy model*, we discuss how to coordinate planning procedures that address different issues over different time frames so that when new information is revealed as shorter-term plans are implemented, it can be used to modify longer-term plans to improve outcomes.

Political context

Interest in *any* kind of government planning has shrunk considerably over the past half century as faith in the wisdom of the titans of industry and the magic of the market remains high even as anti-establishment sentiment grows. However, it is very possible that as neoliberal capitalism generates increasingly unacceptable outcomes, more interventionist policies and different forms of capitalist planning will once again come back in vogue. For example, even in the United States, where “planning” has long been a dirty word, if the fossil fuel industry and its climate denialist political supporters are defeated, a Green New Deal may begin to change public sentiment about the benefits of economic planning in general. In any case, it is possible that renewed interest in different forms of *capitalist* planning will precede and encourage more widespread interest in democratic, participatory, comprehensive, *socialist* planning than there is today.

It is also a fact that most critics of neoliberal capitalism today have become convinced that even if more planning and a larger public sector are needed, a useful role remains for private enterprise and markets in any desirable, modern economy. In order to motivate interest in what this book proposes, Chapter 2 spells out the case for why we must *eventually* go beyond what many opponents of neoliberal

capitalism content themselves with today if we are ever to fully achieve the goals spelled out in Chapter 1, and protect advances toward those goals from being eroded. In short, before proceeding to describe how a *participatory economy* might work in Parts III, IV, and V, Chapter 2 spells out the case for why we should not settle for a “mixed” economy where markets are “tamed” – even though such an economy would be a vast improvement over neoliberal capitalism and may well play an important role in the transition to a truly desirable economic system.

Socialist planning in the history of economic thought

Historians of economic thought identify three “periods” when economists have engaged in theoretical debates about socialist planning. The first, which came to be known as the *socialist calculation debate*, began in 1908 and continued during the years between the two world wars. The second period began after WWII and extended up to the fall of the Berlin wall in 1989. The most recent period began in 1990 and continues to the present day.

First socialist calculation debate

The first debate was triggered by Enrico Barone’s essay titled “The Ministry of Production in a Collectivist State.” Prominent participants on the “pro-socialist” side included Otto Neurath, Otto Bauer, Emil Lederer, Fred Taylor, Jacob Marschak, Abba Lerner, Oskar Lange, Maurice Dobb, and Evsy Domar. Vilfredo Pareto, Ludwig von Mises, and Friedrich Hayek were the most prominent economists on the “anti-socialist” side who argued first that socialism was incapable of allocating resources efficiently *even in theory* and, later, that because of the “tacit knowledge problem,” socialism was incapable of allocating resources efficiently *in practice*.¹

Post–World War II debate

After World War II, economists in the Soviet Union and several Eastern European countries proposed various changes to overcome what they criticized as “overcentralization” in the planning system of *material balances* pioneered under Stalin in the 1930s. In the Soviet Union, Leonid Kantorovich, who helped develop the mathematics of linear programming theory, explained how programming theory allowed for important improvements over the system of material balances. And Janos Kornai and Tamas Liptak worked to implement what they called “two level planning” in Hungary in the 1950s to overcome the detrimental effects of overcentralization. But the most interesting work responding more directly to the “tacit knowledge critique,” was done by some prominent economists living in the West. Edmond Malinvaud, George Danzig, Philip Wolfe, Leonid Hurwicz, William Baumol, Tibor Fabian, Stephen Marglin, Geoffrey Heal, Masahiko Aoki, Kenneth Arrow, Martin Weitzman, Charles Jean de la Valle Poussin, and Jean Dreze are among those who

contributed to a rich theoretical literature on price-guided, quantity-guided, and gradient iterative procedures for overcoming information problems in central planning that had become widely recognized by the 1960s. This literature is reviewed in Chapter 3, where we examine central planning in depth.

Post-Soviet debate

Soon after the fall of the Berlin Wall in 1989, the Communist governments in Eastern Europe and the Soviet Union were overthrown, and central planning was abandoned there. Since then the third, or modern, debate about *21st-century socialism* has pitted those who argue for some version of market socialism against those who argue for some version of democratic planning. As the longtime editor of *Science & Society*, David Laibman was responsible for the publication of three special issues of that journal devoted to exploring alternative visions and models of socialism – the first in 1992, the second in 2002, and the last in 2012.² These three special issues, spaced a decade apart, faced two major obstacles that Laibman deserves credit for overcoming:

- (1) The surprisingly quick demise of the planned economies in Eastern Europe and the Soviet Union in the early 1990s not only sent advocates for socialism everywhere into shock but also brought promising work on theoretical planning procedures by prominent economic theorists to a halt as well. As a result, many pro-socialists concentrated almost exclusively on critiques of capitalism or turned to models of market socialism. In short, the demise of the centrally planned Communist economies had a chilling effect on theoretical work about socialist planning.
- (2) *Science & Society* has been published continuously since 1936, which makes it the longest-lasting journal anywhere in the world publishing theoretical work on socialism. As its editor, David Laibman had to convince a distinguished editorial board that publishing theoretical work on how to organize a socialist economy was a worthy project, many of whom regarded such work as “utopian” and useless, if not counterproductive. Overcoming opposition from his own editorial board was not an easy task, as demonstrated by publication in the 1992 issue of an unprecedented “Dissenting Opinion” where board members issued a public “disclaimer” spelling out their reasons for objecting to the special issue, which ended with the following sentence: “This is no time to draw blue prints for castles in the air.”

Needless to say, not only the authors of this book, but all who contributed to the three *Science & Society* special issues on theoretical models of socialism disagree with this sentiment, and agree wholeheartedly with Professor Laibman that more, not fewer “blue prints for [socialist] castles in the air” are needed. We owe Professor Laibman a debt of gratitude for serving as midwife at *Science & Society* over the past four decades to help overcome obstacles and advance this project.

In these special issues of *Science & Society* many of the diminished group of economists who continue to work on models of socialism after the demise of Communism not only present their own proposals but comment on each other's proposals as well. In the 1992 issue titled *Socialism: Alternative Visions and Models*, David Laibman and Michael Albert and I presented our (different) approaches to democratic planning, while David Schweickart and Diane Flaherty presented their (different) versions of market socialism. Participation in the special issues in 2002 and 2012 was limited to advocates for democratic planning, who, as much as we might disagree with one another about how to plan, are united in our rejection of market socialism.³ Pat Devine served as guest editor for the special issue in 2002 titled *Building Socialism Theoretically*, where Michael Albert and I; Al Campbell; Paul Cockshott and Allin Cottrell; Pat Devine, David Kotz, David Laibman, and John O'Neill elaborated on our different proposals and responded to comments by one another. Al Campbell served as guest editor for the 2012 special issue titled *Designing Socialism*, where all participants – Paul Cockshott, Allin Cottrell, Pat Devine, Xiaogin Ding, Peihua Mao, Xing Yin, Marta Harnecker, David Laibman, and I – were asked to address five issues posed by Campbell: (1) Why socialism? (2) Feasibility and coordination, (3) Incentives and consciousness, (4) Stages and productive forces, and (5) Social and long-term planning.

While *Science & Society* has most consistently hosted the modern, post-Soviet debate on models of socialism, the *Review of Radical Political Economics*, *Capitalism*, *Nature Socialism*, and *Monthly Review* have also published articles on this subject from time to time.⁴ In any case, *Democratic Economic Planning* is my contribution to this modern debate, which has now been percolating for over three decades. Given all we have learned, both theoretically and from historical experience, what can and should “socialism” mean in the 21st century?

Notes

- 1 For an excellent short description of the first “socialist calculation debate,” including full references for many seminal articles, see the History of Economic Thought website: www.hetwebsite.net/het/essays/paretian/socialcalc.htm.
- 2 A fourth special issue of *Science & Society* on theoretical models of socialism is planned for 2022.
- 3 It would be negligent not to acknowledge that since the “fall of the wall” among those who continue to advocate for socialism, more write in support of market socialism than write in support of democratic planning. David Schweickart, John Roemer, Pranab Bardhan, Michael Howard, Thomas Weisskopf, Erik Olin Wright, Dianne Elson, David Ellerman, Saul Estrin, David Miller, and Richard Wolfe are among the best known who have continued the work of the earlier proponents of market socialism such as Oskar Lange, Abba Lerner, Fred Taylor, Evsey Domar, Benjamin Ward, Jaroslav Vaneck, Włodzimierz Brus, and Branko Horvat.
- 4 I summarize and comment on the proposals of Pat Devine, David Laibman, and Paul Cockshott and Allin Cottrell, as well as a more recent proposal by Dan Saros in the appendix to this book.

Part I

Preliminaries

Introduction to Part I

Before proceeding to examine our proposals for how a new, different economic system of comprehensive, democratic economic planning might work, there are two “preliminary” matters of business to attend to.

The first is straightforward: We need to clarify exactly what goals we are trying to achieve. How should we judge the performance of any economic system? How should we measure whether results are desirable or undesirable? People may disagree over goals, or in the case of multiple goals, disagree over priorities. People may also define goals differently. What exactly does one mean by economic democracy, economic efficiency, or environmental sustainability? Confusion and ambiguity about goals is often an obstacle to communicating clearly about evaluating economic performance. In Chapter 1 we clarify and justify the goals we set for ourselves.

The second preliminary matter of business is less straightforward. It has to do with why anyone should be interested in considering a qualitatively different economic system in the first place. Don’t we know enough by now about the strengths and weaknesses of different options to limit debate to when we need more or less private, social, or state ownership, when and how markets should be regulated in some way, and when some sort of planning in a market system is helpful? When political parties flying the banner of socialism won the chance to replace capitalism with an altogether different economic system based on public ownership and comprehensive planning during the 20th century, didn’t we discover how badly that worked out?

The Communist Party in the Soviet Union did preside over a new economic system based on public ownership and comprehensive planning for over 50 years. And after WWII Communist parties in a number of Eastern European countries propped up by the Soviet government imitated this new system for many decades, as did successful revolutionaries inspired by the promise of socialism in China and Cuba. We analyze that “new system” in Part II, where we come to the conclusion that *authoritarian central planning* does indeed suffer from fatal flaws, even if not those most often emphasized by its mainstream critics. But that is *not* the “new system” we propose and explore in this book.

What we propose instead is a system where productive resources are socially owned, but democratic worker and consumer councils allocate user rights over

these resources among themselves through participatory planning procedures. This means we propose not to limit our ambitions to taming market excesses and allowing some social ownership alongside private ownership – as beneficial as these reforms may be. We propose going beyond reforming capitalism. Therefore, to motivate interest in what we discuss in the core of this book in Parts III, IV, and V, we first make the case in Chapter 2 for why private enterprise and markets have no role to play in a truly desirable economy and, therefore, why a mixed, regulated, market, “social democratic” economy will inevitably prove inadequate to meet the goals argued for in Chapter 1.

1 Defining goals

It is important when thinking about designing a desirable economy to be clear about goals. In this chapter we define and defend our goals. In brief, the goals of a participatory economy are to achieve *economic democracy*, defined as decision-making power in proportion to the degree one is affected by any economic decision; *economic justice*, defined as economic reward commensurate with effort, sacrifice, and need; and *solidarity*, defined as concern for the well-being of others – all to be achieved without sacrificing economic *efficiency* and while promoting a *variety* of economic lifestyles. Moreover, we understand that intergenerational equity and efficiency together imply that a participatory economy must be *environmentally sustainable*.

These goals guide us in designing rules and procedures for economic decision-making. We want to design economic institutions and procedures that empower us to manage our own affairs and yield fair outcomes, while promoting concern for the well-being of others, protecting the environment, and providing a diverse range of options for what to produce and consume, where and how to work, and who and how to be. And we want to do all this without wasting people's time and energy or using scarce productive resources other than where they are most valuable.

But we need to be more specific about how we define key goals. Sometimes disagreements about what institutions and procedures are suitable stem from different ways of defining what economic justice, economic democracy, or sustainability means. In short, ambiguity about goals can prevent clear thinking about what is necessary to fulfill them and come back to bite us.

Efficiency

No word is as dear to economists – and off-putting to non-economists! – as “efficiency.” As soon as efficiency is mentioned, many progressive activists tune out and head for the exits. While this is understandable, it is unfortunate. It is understandable because many incorrectly use the word *efficiency* as if it were synonymous with profitability – which it is not. It is also understandable because mainstream economists who know full well that efficiency is not synonymous with profitability often concentrate on efficiency and ignore,

or say comparatively little about, other important criteria such as economic justice, economic democracy, and solidarity. And finally, it is understandable because we are forever being told that whatever its other failings, free market capitalism is efficient – when, in fact, both common sense and careful analysis tell us it is not.

However, rejecting efficiency as *one* important goal among others is unfortunate, because as long as resources are scarce relative to human needs, and some socially useful labor is burdensome, efficiency is preferable to wastefulness. Activists should acknowledge that people have every reason to be resentful if their sacrifices are wasted, and dissatisfied if scarce productive resources are squandered. In any case, at the risk of belaboring something, readers who are trained economists should already know, we review the two conceptions of efficiency economists use, which we will apply to evaluate the outcomes of the procedures we consider.

Economists prefer to define economic efficiency as *Pareto optimality*.¹ A Pareto optimal outcome is one where it is impossible to make anyone better off without making someone else worse off. The idea is simply that it would be inefficient, wasteful, petty, nonsensical, or even vindictive not to implement a change that makes someone better off and nobody worse off. Such a change is called a *Pareto improvement*, and another way to define a Pareto optimal, or Pareto efficient outcome, is as an outcome where all Pareto improvements have been implemented, or exhausted, and therefore, no further Pareto improvements are possible.

As any well-trained economist should know, this does not mean a Pareto optimal outcome is necessarily a desirable outcome. If I have ten units of happiness and you have two, and if there is no way for me to have more than ten unless you have less than two, and no way for you to have more than two unless I have less than ten, then me having ten units of happiness and you having two is a Pareto optimal outcome. But you would be right not to regard it very highly, and being a reasonable person, I would even agree with you. Moreover, there are usually *many* Pareto optimal outcomes. For instance, if I have seven units of happiness and you have six, and if there is no way for me to have more than seven unless you have less than six, and no way for you to have more than six unless I have less than seven, then me having seven and you having six is *also* a Pareto optimal outcome. And I might even agree with you that this second Pareto optimal outcome is better than the first. So the point is not that achieving a Pareto optimal outcome is necessarily wonderful – that often depends on *which* Pareto optimal outcome we achieve. Instead the point is that *non*-Pareto optimal outcomes are undesirable because we could make someone better off without making anyone worse off, and it seems “inefficient” not to do so. In short, it is hard to deny there is something wrong with an economy that systematically yields non-Pareto optimal outcomes – that is, fails to make some of its participants better off when doing so would make nobody worse off.

It is important to recognize that the Pareto criterion is not going to settle most important economic issues. Most policy choices will make some people

better off but others worse off, and in these cases the Pareto criterion has nothing to say. Consequently, if economists confine themselves to the narrow concept of efficiency as Pareto optimality and recommend only policies that are, in fact, Pareto improvements, economists would have to remain mute on many issues. For example, reducing greenhouse gas emissions makes sense because the future benefits of stopping global warming and avoiding dramatic climate change far outweigh the present costs of reducing emissions. But if even a few people in the present generation will be made slightly worse off, even though many more people in future generations will be much, much better off, we cannot recommend policies to prevent climate change as Pareto improvements – that is, on efficiency grounds in the narrow sense.

The usual way around this problem is to broaden the notion of efficiency from Pareto improvements to changes where the benefits to some outweigh the costs to others. This broader notion of efficiency is sometimes called the *efficiency criterion* and serves as the basis for cost-benefit analysis. Simply put, the efficiency criterion says if the overall benefits to any and all people of doing something outweigh the overall costs to any and all people of doing it, it is efficient to do it. Whereas, if the overall costs to any and all people outweigh the overall benefits to any and all people of doing something, it is *inefficient* to do it.²

Mainstream economists do not like to draw attention to the fact that policies recommended on the basis of the efficiency criterion are usually *not* Pareto improvements since they *do* make some people worse off. The efficiency criterion and all cost-benefit analysis necessarily (1) “compare” different people’s levels of satisfaction and (2) attach “weights” to how important different people’s levels of satisfaction are when we calculate overall *social* benefits and costs. Notice that when I stipulated that a few in the present generation might be worse off if we reduce greenhouse gas emissions while many will be benefited in the future, I was implicitly giving each person equal weight. When discussing climate change I think it is perfectly reasonable to do this, and do not hesitate to do so. Nonetheless, I am attaching weights to the well-being of different people. If one refuses to attach weights to the well-beings of different people, the efficiency criterion cannot be used.

I also stipulated that the benefits of preventing global warming to each person in the future were large compared to the cost of reducing emissions to each person in the present. In other words, I was willing to compare how large a gain was for one person compared to how small a loss was for a different person. If one refuses to compare the size of benefits and costs to different people, the efficiency criterion cannot be used. In sum, unlike the Pareto principle, the efficiency criterion requires comparing the *magnitudes* of costs and benefits to different people and deciding how much importance to attach to the well-being of *different* people.

In other words, applying the efficiency criterion requires *value judgments* beyond what are required by the Pareto criterion. So whenever mainstream economists pretend they have made no value judgments, and have separated

efficiency from equity issues when they apply cost-benefit analysis and recommend policy based on the *efficiency criterion*, they misrepresent themselves. While a Pareto improvement makes some better off at the expense of none – and therefore does not require comparing the sizes of gains and losses to different people or weighing the importance of well-being to different people – policies that satisfy the efficiency criterion generally make some better off precisely at the expense of others, which necessarily requires comparing the magnitudes of costs and benefits to winners and losers and making a value judgment regarding how important the interests of the winners are compared to the interests of the losers.

It is unfortunate that so many confuse economic efficiency with profitability even though they are not the same thing at all, and unfortunate when mainstream economists pretend they have made no value judgments when they engage in cost-benefit analysis. However, since it is undesirable when sacrifices we make when we work go wasted, or when scarce resources are misused, we do want our economy to be efficient as well as democratic, fair, and sustainable. While one must apply both the Pareto and efficiency criteria with care – which includes taking into account the preference development as well as preference fulfillment effects of choices – those will be the tools we use when considering whether or not outcomes are efficient or inefficient.

Economic self-management

Who would dare come out and say they don't want economic decision-making to be democratic? Who would say they are not in favor of people having control over their economic destinies? But what exactly does “economic democracy” mean? Does it mean everyone should be free to do whatever they want with their person and property, including the right to enter into any contract they wish with anyone else? Does it mean every person should have one vote on every economic decision?

In our view the concept of *economic freedom* is an inappropriate conception of economic democracy because many economic decisions affect more than one person. There are too many important situations where the economic freedom of one person conflicts with the economic freedom of another person. If polluters are free to pollute, victims of pollution are not free to live in pollution-free environments. If employers are free to use their productive property as they see fit, their employees are not free to use their laboring capacities as they like. If the wealthy are free to leave their children large bequests, new generations will not be free to enjoy equal economic opportunities. If those who own banks are free from a government-imposed minimum-reserve requirement, ordinary depositors are not free to save safely. In sum, the goal of maximizing people's economic freedom over the “choice sets” that affect them is only meaningful in a context where people's choice sets do not intersect. So it is not enough simply to shout “let economic freedom ring,” as appealing as that may sound.

But we believe the alternative of *majority rule* is also an inappropriate conception of economic democracy. When a decision has a greater effect on some people than others, by giving each person an equal say or vote, those more affected by a decision can find themselves overruled by those who are less affected. Even in the political sphere of social life where there are many decisions that do affect all citizens more or less equally, there are some political decisions that clearly affect the lives of some citizens more than others and some choices individuals should be allowed to make regardless of how much others may disagree and claim to be affected. In these circumstances political scientists sensibly amend the principle of majority rule with other concepts like a bill of rights, civil liberties, and supermajority voting rules.

But in the case of economic decisions the probability of unequal effects is much greater and more widespread than in the case of political decisions. While there are some economic decisions that affect only a single person, and there are some economic decisions that affect us all roughly to the same extent, *most* economic decisions affect more than one person and affect some people a great deal more than others. *And therein lies the rub!* While the concept of economic freedom works well for economic decisions that only affect one person, and the concept of majority rule works well for economic decisions that affect us all equally, neither conception of economic democracy works well for the overwhelming majority of economic decisions that affect some of us more than others.

This is why supporters of participatory economics think economic democracy should be defined as *decision-making input, or power, in proportion to the degree one is affected by different economic choices*. We call this *collective economic self-management* and believe that thinking about how to achieve economic self-management for everyone is the best way to think about achieving economic democracy.

Obviously it will never be possible to arrange for all decisions to be made so that every person enjoys perfect economic self-management. However, the goal of maximizing economic self-management as defined earlier is always meaningful, whereas the goal of maximizing people's economic freedom is not whenever an economic decision affects multiple parties, as it often does. Of course, agreeing on a definition and a goal is not the same as achieving the goal. Just because we have a clear definition for economic self-management, and just because this gives us a coherent goal to shoot for, does not mean we know how to achieve it. But getting clear about the goal is a first step. As long as the phrase "economic democracy" remains vague, and is used to mean different things by different people, it is difficult to make progress toward achieving it. And as long as people labor under a misconception about what economic democracy means, we will continue to search in the wrong directions. As we will see, thinking of economic democracy as individual economic freedom can blind us to ways in which private enterprise and markets often disenfranchise affected parties, while thinking of economic democracy as majority rule can blind us to the fact that even the most democratic version of central planning

conceivable would still fail to let those who are more affected by an economic decision have more say over that choice.

Economic justice

What is a fair, or equitable, distribution of the burdens and benefits of economic activity? What reasons for compensating people differently are morally compelling, and what reasons carry no moral weight? While mainstream economists and politicians and the corporate media long preferred to keep it off stage, the occupy movement recently moved economic justice to center stage in the United States where it clearly belongs.

Four distributive principles, or “maxims,” span the range of answers people gravitate toward, whether consciously or unconsciously, to the question of how people should be compensated for their part in economic cooperation: **Maxim 1:** *To each according to the social value of the contribution of her human **and** physical capital.* **Maxim 2:** *To each according to the social value of the contribution of **only** her human capital.* **Maxim 3:** *To each according to her effort, or personal sacrifice.* And, **Maxim 4:** *To each according to her need.* Roughly speaking, you can think of maxim 1 as the way conservatives would like us all to agree to define economic justice; maxim 2 as the way liberals tend to define economic justice; maxim 3 as how many economic justice activists define economic justice; and maxim 4 is the distributive principle that hopefully someday will blossom in a new world basking in the brilliant sunlight of resolute human solidarity founded on mutual trust. We consider each in turn.

Maxim 1: *To each according to the social value of the contribution of her physical **and** human capital.* The rationale behind maxim 1 is that people should get out of an economy what they and their productive possessions contribute to the economy. If we think of economic goods and services as a giant pot of stew, the idea is that individuals contribute to how plentiful and rich the stew will be by their labor and by the non-human productive assets they bring to the economy kitchen. If my labor and productive assets make the stew bigger or richer than your labor and assets, then according to maxim 1, it is only fair that I eat more stew, or richer morsels, than you.

While this rationale has obvious appeal, it has a major problem we call the *Rockefeller grandson problem*. According to maxim 1, the grandson of a Rockefeller with a large inheritance of productive property *should* eat a thousand times more stew than a highly trained, highly productive, hardworking son of a pauper – even if Rockefeller’s grandson doesn’t work a day in his life and the pauper’s son works for 50 years producing goods of great benefit to others. This will inevitably occur if we count the contribution of productive property people own, and if people own different amounts of machinery and land – or what is the same thing, different amounts of stocks in corporations that own the machinery and land – since bringing an acre of fertile land, a stirring spoon, a cooking pot, or a stove to the economy “kitchen” increases the size and quality of the stew we can make just as surely as hoeing the field, peeling the

potatoes, and stirring the pot does. So anyone who considers it *unfair* when the idle grandson of a Rockefeller consumes many times more than a hardworking, productive son of a pauper cannot accept maxim 1 as her definition of economic justice. But what if, unlike Rockefeller's grandson, those with more productive property acquired it through some merit of their own? Wouldn't contribution from productive property deserve reward in this case?

Besides inheritance, sometimes people acquire productive property through good luck. But unequal distributions of productive property that result from differences in luck are not the result of unequal sacrifices, unequal contributions, or any conceivable difference in merit between people. Good luck, by definition, is precisely *not* deserved, so any unequal incomes that result from unequal distributions of productive property due to differences in luck must be inequitable as well.

Another way people come to have more productive property is through unfair advantage. Those who are stronger, better connected, have insider information, or are more willing to prey on the misery of others can acquire more productive property through a variety of legal and illegal means. Obviously, if unequal wealth is the result of someone taking unfair advantage of another, it is inequitable.

However, those who argue that owners of productive property deserve their reward base their case on a different scenario. They consider the case where someone earned their productive property "fair and square." However, *even if justly acquired*, productive property creates a dilemma because it can give rise to additional income year after year. Absent a labor or credit market, it appears inevitably that at some point the reward that grows arithmetically must become greater than what is required to compensate for any initial greater merit. And if those with more productive property can use it to hire others in labor markets, or can lend it to borrowers in credit markets, the excessive compensation will increase exponentially instead of arithmetically.³

In any case, for purposes of argument we concede that *if* unequal accumulations of productive property were the result *only* of meritorious actions, and *if* compensation ceases when the meritorious action is fully compensated, rewards to property need not be unfair. But in return, we would appreciate it if those who defend rewards to property concede that *if* those who own more productive property acquired it through inheritance, luck, unfair advantage, or because once they have more productive property than others they continue to accumulate even more with no further meritorious behavior; that unequal outcomes resulting from differences in wealth are unfair. It should be noted that every empirical study of the origins of wealth inequality concludes that differences in ownership of productive property that accumulate within a single generation due to unequal sacrifices and/or unequal contributions people make themselves are quite small compared to the differences in wealth that develop due to inheritance, luck, unfair advantage, and accumulation. In which case the vast majority of returns to property cannot be considered fair. Edward Bellamy put it this way in his famous utopian novel, *Looking Backward*: "You

may set it down as a rule that the rich, the possessors of great wealth, had no moral right to it as based upon desert, for either their fortunes belonged to the class of inherited wealth, or else, when accumulated in a lifetime, necessarily represented chiefly the product of others, more or less forcibly or fraudulently obtained.”

Maxim 2: *To each according to the social value of the contribution of **only** her human capital.* While those who support maxim 2 find most property income unjustifiable, advocates of maxim 2 hold that all have a right to what they call the “fruits of their own labor.” The rationale for this has a powerful appeal: If my labor contributes more to the social endeavor, it is only right that I receive more. Not only am I not exploiting others, they would be exploiting me by paying me less than the value of my personal contribution.

As economists know, the marginal productivity, or contribution to output of an input, depends as much on the number of units of that input already in use, and on the quantity and quality of other complementary inputs, as on any intrinsic quality of the additional input itself. This fact undermines the moral imperative behind any “contribution based” maxim of distributive justice. But besides the fact that the marginal productivity of different kinds of labor depends largely on the number of people in each labor category in the first place, and on the quantity and quality of non-labor inputs available for use, most differences in people’s personal productivities are due to intrinsic qualities of people themselves over which they have little or no control. No amount of eating and weight lifting will give an average individual a six-foot eight-inch frame with 380 pounds of muscle. Yet professional football players in the United States receive hundreds of times more than an average salary because those attributes make their contribution outrageously high in the context of US sports culture.

The famous British economist, Joan Robinson, pointed out long ago that however “productive” a machine or piece of land may be, its productivity hardly constitutes a moral argument for paying anything to its owner. In a similar vein, one could argue that however “productive” a 380-pound physique, or, for that matter a high IQ may be, that doesn’t mean the owner of this trait deserves more income than someone less gifted who works as hard and sacrifices as much. The bottom line is that both the conditions of supply and the “genetic lottery” greatly influence how valuable a person’s contribution will be. Yet the conditions of supply and genetic lottery are no fairer than the inheritance lottery, and therefore, maxim 2 suffers from the same flaw as maxim 1.

In defense of maxim 2 it is frequently argued that while talent may not deserve reward, talent requires training, and herein lies the sacrifice that merits reward. For example, it is often argued that doctors’ high salaries are compensation for all their extra years of education. But longer training does not necessarily mean greater personal sacrifice. It is important not to confuse the cost of someone’s training to society – which consists mostly of the *trainer’s* time and energy and scarce social resources like books, computers, libraries, and classrooms – with the personal sacrifice of the *trainee*. If teachers and educational

facilities were paid for at public expense – that is, if we had a universal public education system, and if students were paid a living stipend so they forego no income while in school – then the personal sacrifice of the student would consist only of her discomfort from time spent in school.

But even in this case any personal suffering students endure must be properly compared. While many educational programs are less personally enjoyable than time spent in leisure, comparing discomfort during school with comfort during leisure is not usually the relevant comparison. In a universal public education system with living stipends like we propose in Chapter 10, the relevant comparison would be between the discomfort students experience and the discomfort *others* experience who are working instead of going to school. If our criterion is greater personal sacrifice *than others*, then logic requires comparing the student's discomfort to whatever level of discomfort others are experiencing who work while the student is in school. Only if schooling is more disagreeable than working does it constitute a greater sacrifice than others make, and thereby deserve greater reward. So to the extent that the cost of education is borne at public rather than private expense, including the opportunity cost of foregone wages – as we propose in a participatory economy – and to the extent that the personal discomfort of schooling is no greater than the discomfort others incur while working, extra schooling merits no compensation on moral grounds.

In sum, we call the problem with maxim 2 the *doctor–garbage collector problem*. How can it be fair to pay a brain surgeon who is on the first tee at his country club golf course by 2 PM even on the four days a week he works, ten times more than a garbage collector who works under miserable conditions 40 plus hours a week, if education is free and students are paid living stipends all the way through medical school?

Despite the fact that many continue to search for reasons that returns to human capital are more justified than returns to physical capital, in our view, no reason holds up under careful scrutiny. But then where does this difference in attitude many have toward rewards to physical and human capital come from? No doubt the fact that the value of the contribution of our labor is the “joint product” of our human capital *and* our effort is responsible in part for the confusion. People *do* have some control over how valuable their labor contribution will be because we *do* have some control over our effort. Whereas most people have little, if any, control over how much physical capital they own or how valuable its contribution will prove to be. Moreover, because our human capital only contributes when *we* work, and work often entails sacrifice, human capital cannot make any contribution unless its owner makes some sacrifice. On the other hand, when physical capital makes its contribution, it is generally *not* its owner who makes any sacrifice, it is the owner's employees who work with the machinery and equipment and who make the sacrifices associated with the contribution of the physical capital. But none of this is a reason to reward people according to the value of the contribution their human capital makes possible.

If we reward effort, we reward the only thing people have control over, and if we reward people according to their sacrifices, then we precisely compensate people for the sacrifices they make when their human capital makes a contribution. In other words, if we reward people according to their efforts and sacrifices, we have already taken care of the two reasons people rightly feel that reward for the value of the contribution their labor makes is more just than reward for the value of the contribution of the physical capital one happens to own. However, once rewards have compensated people for differences in effort and sacrifice, to pay somebody more whose efforts were more productive *because* they were expended alongside greater amounts of human capital is no more fair than paying somebody more than others because the physical capital they own makes a more valuable contribution.

Maxim 3: Which brings us to maxim 3: *To each according to her effort, or personal sacrifice.* Whereas differences in contribution will be due to differences in talent, training, job assignment, luck, and effort, the only factor that deserves extra compensation according to maxim 3 is extra effort. By “effort” is meant personal sacrifice for the sake of the social endeavor. Of course effort can take many forms. It may be longer working hours; less pleasant work; or more intense, dangerous, unhealthy work. Or it may consist of undergoing training that is less gratifying than the training experiences of others or less pleasant than time others spend working who train less. The underlying rationale for maxim 3, which seems to be at least the implicit conception of economic justice of most social justice activists, is that people should eat from the stew pot according to the sacrifices they made in cooking the stew. Compensation for above average sacrifices “evens things out” overall. According to maxim 3, no other consideration, besides differential sacrifice, can justify one person eating more stew than another.

One argument for why sacrifice deserves reward is because people have control over how much they sacrifice. I can decide to work longer hours, or work harder, whereas I cannot decide to be six foot eight or have a high IQ. It is commonly considered unjust to punish someone for something she could do nothing about. On those grounds paying someone less just because she is not large or smart violates a fundamental precept of fair play. On the other hand, if someone doesn’t work as long or hard as the rest of us, we don’t feel it is inappropriate to pay her less because she *could* have worked longer or harder if she had chosen to. In the case of reward according to effort, avoiding punishment is possible, whereas in the case of reward according to contribution it is largely unavoidable.

But are all people equally able to sacrifice? Or is it easier for some to make sacrifices than it is for others, just as it is easier for some to perform difficult and valuable physical or mental tasks than it is for others? Questions such as these make me happy I am not a philosopher! What can one say, except, “perhaps.” But even if it is only a matter of degree, is it delusional to think it is usually easier for people to affect how much effort they put into a task, or how much they sacrifice for the common good, than it is for them to affect how valuable a

contribution they make will be? We can leave philosophers to debate free will, but it is hard to believe we have no more control over our efforts and sacrifices than we do over how valuable our contribution will be.

In any case, there is no reason for society to frown on those who prefer to make fewer sacrifices as long as they are willing to accept less economic benefits to go along with their lesser sacrifice. Just because people enter into a system of equitable cooperation with others does not preclude leaving the sacrifice/benefit trade-off to personal choice. Maxim 3 simply balances any differences in the burdens people choose to bear with commensurate differences in the benefits they receive.

This may be the strongest argument for reward according to sacrifice. Even if all were not equally able to make sacrifices, extra benefits to compensate for extra burdens seem fair. When people enter into economic cooperation with one another, for the arrangement to be fair, should all participants not benefit equally? Since each participant bears burdens as well as enjoys benefits, it is equalization of *net* benefits – that is, benefits enjoyed minus burdens born, that makes the economic cooperation fair. So if some bear more of the burdens, justice requires that they be compensated with benefits commensurate with their greater sacrifice. Only then will all enjoy equal *net* benefits. Only then will the system of economic cooperation be treating all participants equally – that is, giving equal weight or priority to the interests of all participants. Notice that even if some are more able to sacrifice than others, the outcome for both the more and less able to sacrifice is the same when extra sacrifices are rewarded. In this way all receive the same net benefits from economic cooperation irrespective of any differences in their abilities to contribute *or* to sacrifice.

Many who object to maxim 3 as a distributive principle raise questions about measuring sacrifice or about conflicts between reward according to sacrifice and motivational efficiency. Since reward according to sacrifice and need is the distributive principle in a participatory economy, we will have to consider these criticisms of maxim 3 very carefully in Part III. But notice that measurement problems or conflicts between equity and motivational efficiency are *not* objections to maxim 3 as a conception of what is *fair* – that is, they are *not* objections to maxim 3 *on equity grounds*. To reject maxim 3 because effort or sacrifice may be difficult to measure or because rewarding sacrifice may conflict with “motivational efficiency” is not to reject maxim 3 because it is unfair. No matter how weighty these arguments may or may not prove to be, they are not arguments against maxim 3 on grounds that it somehow fails to accurately express what it means for the distribution of burdens and benefits in a system of economic cooperation to be just, or fair. Even should it turn out that economic justice is difficult to achieve because it is difficult to measure something accurately, or costly to achieve because to do so generates inefficiency, one presumably would still wish to know exactly what this elusive and costly economic justice *is*.⁴

In any economy there are always some who are unable to make contributions or sacrifices, and some who we believe should be exempted from doing so even if they are able. Disabilities prevent some people from being able to work,

and we choose to exempt children and retirees from work as well. Whether we decide to base reward on contribution or sacrifice, we must decide if some are exempt from whatever our general rule may be. Obviously, there are issues of fairness to consider in any system of exemptions: (1) Are the rules for exempting people fair? (2) Are the rewards for those exempted fair? We discuss rules for those exempted from work in Chapter 6.

Of course, proponents of maxims 1 and 2 reject maxim 3 because it fails to reward people according to the value of their contribution. Some whose contributions are of greater value may well receive no more than others whose contributions are less valuable in an economy where distribution is according to maxim 3. But we have found compelling reasons why contribution-based theories of economic justice fail to hold up under scrutiny: (1) Contribution-based notions of equity will necessarily punish some people for something they are powerless to do anything about. (2) Reward according to contribution – whether of one’s productive property *and* person, or *only* of one’s person – inevitably awards greater benefits to some who sacrificed less than others and distributes less benefits to some who sacrificed more than others. In sum, there *is* a good answer to the question: “Why should those who sacrifice more benefit more?” The answer is: “Because otherwise people do not receive equal *net* benefits from the system of economic cooperation. Because otherwise the economic system does not give equal priority to everyone’s interests. Because otherwise the economy does not treat people equally.” But we know of no good answer to the question: “Why should those who contribute more benefit more?” The only answer to this question is the proverbial child’s response – “Because.”⁵

Maxim 4: *To each according to her need.* Of course, the more familiar phrasing of this maxim is “From each according to ability, to each according to need,” and it was not only the maxim Karl Marx used to describe the distributive principle in a truly communist society but also the maxim endorsed historically by many pre-Marxian socialists and by many anarchists ever since. The “official” distributive principle of a participatory economy is to reward people according to effort, or sacrifice, *and* need, which is different from distribution on the basis of need *only*. We discuss how we propose to take “need” into account in Chapter 6 as well.

Environmental sustainability

It took a massive movement to raise the issue of whether or not today’s economies are “environmentally sustainable,” or instead on course to destroy the natural environment upon which they and we depend. But it sometimes seems there are as many different definitions of “sustainability” and “sustainable development” as people who use the words. There are even some in the environmental movement who, with good reason, have suggested that “sustainable development” has become the enemy, rather than the friend, of the environment.

It is also not clear that if we leave aside the question of how to popularize important ideas, there is anything in the notion of “sustainability” that is not already implicit in the goals of efficiency, equity, and variety. If an economy uses up natural resources too quickly, leaving too little or none for later, it is inefficient. If an economy sacrifices the basic needs of future generations to fulfill desires for luxuries of some in the present generation, it has failed to achieve intergenerational equity. If we chop down tropical forests with all their biodiversity and replace them with single species tree plantations, we have destroyed, rather than promoted, variety.

Be this as it may, perhaps it is wise to adopt a principle the environmental movement has made famous: the *precautionary principle*. According to the precautionary principle, when there is fundamental uncertainty with very large downside risk, it is best to be proactive. In this case, it is by no means clear that the concepts of efficiency, equity, and variety include everything we need to consider regarding relations between the human economy and the natural environment. Since it is riskier to leave out the criterion of environmental sustainability than include it, it is best to include sustainability among our goals.

Weak sustainability requires only leaving future generations a stock of natural and produced capital that is as valuable in sum total as that we enjoy today. *Strong sustainability* requires, in addition, leaving future generations a stock of natural capital that is as valuable as that we enjoy. *Environmental sustainability* requires, in addition, leaving stocks of each important category of natural capital that are as large as those we enjoy. Obviously these are different notions of sustainability. The first allows for complete substitution between and within produced and natural capital. The second allows for substitution between different kinds of natural capital, as well as different kinds of produced capital, but not between natural and produced capital. The third does not permit substitution between different major categories of natural capital. After a lengthy discussion in two previous books⁶ about why defining sustainability is problematic, I offered the following conclusion:

- WHEREAS the natural environment provides valuable services both as the source of resources and as sinks to process wastes,
- WHEREAS the regenerative capacity of different components of the natural environment and ecosystems contained therein are limited,
- WHEREAS ecosystems are complex, contain self-reinforcing feedback dynamics that can accelerate their decline, and often have thresholds that are difficult to pinpoint,
- WHEREAS passing important environmental thresholds can be irreversible:
- WE, the present generation, now understand that while striving to meet our economic needs fairly, democratically, and efficiently, we must not impair the ability of future generations to meet their needs and continue to progress.
- IN PARTICULAR, WE, the present generation, understand that intergenerational equity requires leaving future generations conditions at least

as favorable as those we enjoy. These conditions include what have been commonly called produced, human, and natural capital, ecosystem sink services, and technical knowledge.

- SINCE the degree to which different kinds of capital and sink services can or cannot be substituted for one another is uncertain, and SINCE some changes are irreversible, WE, the present generation, also understand that intergenerational equity requires us to apply the precautionary principle with regard to what is an adequate substitution for some favorable part of overall conditions that we allow to deteriorate.
- THEREFORE, the burden of proof must lie with those among us who argue that a natural resource or sink service that we permit to deteriorate on our watch, is fully and adequately substituted for by some other component of the inheritance we bequeath our heirs.

Solidarity

When proponents of participatory economics use the word *solidarity*, we simply mean *concern for the well-being of others and granting others the same consideration in their endeavors as we ask for ourselves*. Empathy and respect for others has been formulated as a “golden rule” and “categorical imperative,” and solidarity is widely considered to be a powerful creator of well-being. Solidarity among family members, between members of the same tribe, or within an ethnic group frequently generates well-being far in excess of what would be possible based on material resources alone. But in mainstream economics, concern for others is defined as an “interpersonal externality” – a nasty sounding habit! – and justification is demanded for why it is necessarily a good thing.

Sociability is an important part of human nature. Our desires develop in interaction with others. One of the strongest human drives is the never-ending search for respect and esteem from others. All this is a consequence of our innate sociability. Because our lives are largely joint endeavors, it makes sense we would seek the approval of others for our part in group activities. Since many of our needs are best fulfilled by what others do for/with us, it makes sense to want to be well regarded by others.

Compare two different ways in which an individual can gain the esteem and respect from others. One way grants an individual status by elevating him or her above others, by positioning him or her in a status hierarchy that is nothing more than a pyramid of relative rankings according to established criteria, whatever they may be. For one individual to gain esteem in this way, it is necessary that at least one other (and usually many others) lose esteem. We have at best a zero-sum game, and most often a negative sum-game since losers in hierarchies usually far outnumber winners.

The second way grants individuals respect and guarantees that others are concerned for their well-being out of group solidarity. Solidarity establishes a predisposition to consider others’ needs as if they were one’s own and to recognize the value of others’ diverse contributions to the group’s social endeavors. Solidarity is a positive-sum game. Any group characteristic that enhances

the overall well-being members can obtain from a given set of scarce material resources is obviously advantageous. Solidarity is one such group characteristic. Clearly economic institutions that enhance feelings of solidarity are preferable to economic institutions that undermine solidarity among participants.⁷

Variety

We define *economic variety* as *achieving a diversity of economic lifestyles and outcomes*, and we believe it is desirable as an end as well as a means. The argument for variety as an economic goal is based on the breadth of human potentials, the multiplicity of human natural and species' needs and powers, and the fact that people are neither omniscient nor immortal.

First of all, people are very different. The fact that we are all human means we have certain genetic traits in common, but this does not mean there are not differences among people's genetic endowments. So the best life for one is not necessarily the best life for another. Second, we are each individually too complex to achieve our greatest fulfillment through relatively few activities. Even if every individual were a genetic carbon copy of every other, the complexity of this single human entity, their multiplicity of potential needs and capacities, would require a great variety of different human activities to achieve maximum fulfillment. To generate this variety of activities would in turn require a rich variety of social roles even in a society of genetic clones. And with a variety of social roles we would discover that even genetic clones would develop quite different derived human characteristics and preferences.

While these two arguments for the desirability of a variety of outcomes are "positive," there are also "negative" reasons that make variety preferable to uniformity. Since we are not omniscient, nobody can know for sure which development path will be most suitable for him or her, nor can any group be certain what path is best for the group. John Stuart Mill astutely pointed out long ago in *On Liberty* that this implies that rather than repress heresy, the majority should be thankful to have minorities testing out different lifestyles, because every once in a while every majority is wrong! Therefore, it is in the interest of the majority to have minorities testing their dissident notions of "the good life" in case one of them turns out to be a better idea. Finally, since we are not immortal, each of us can only live one life trajectory. Only if others are living differently can each of us vicariously enjoy more than one kind of life.

Now that we are clear about what our goals are – what we mean by economic democracy, economic justice, sustainability, efficiency, solidarity, and variety – we are ready to think about what kind of economic system can help us achieve them.

Notes

- 1 Named after Vilfredo Pareto, 1848–1923. As already mentioned, Pareto was an anti-socialist protagonist in the "socialist calculation debate," which is a further reason that those who are critical of capitalism bristle when efficiency is defined as Pareto optimality.

- 2 As stated, only consequences affecting the well-being of humans in all generations are considered. We acknowledge that some argue that the well-being of other sentient beings should also be taken into account but offer no defense of our admittedly anthropocentric approach here.
- 3 This dilemma is flagged in a simple model in Hahnel 2006 and spelled out more rigorously in a dynamic model in sections 1 and 2 in Hahnel 2020.
- 4 Section 5 in Hahnel 2020 subjects maxim 3 to the strongest objection we can imagine.
- 5 For further discussion of how maxim 3 fits in modern debates among philosophers about distributive justice, see Appendix B in Hahnel 2017.
- 6 See chapter 2, “Environmental Sustainability in a Sraffian Model,” in Hahnel 2017, and chapter 3, “What on Earth Is Sustainable Development?” in Hahnel 2011.
- 7 Only in societies as socially disoriented as ours is it necessary to “prove” something this obvious!

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2 Social democratic capitalism

Better than neoliberal capitalism, but not good enough

Most who call themselves socialist today believe that in the most desirable economy that is possible there is a useful role for markets – if properly “tamed” – and some private enterprises – along with worker-owned cooperatives and some state enterprises. In other words, most socialists today believe that what is often referred to as a “mixed” economy is the best economy possible, and that replacing private enterprise and markets altogether with social ownership and comprehensive planning is a “bridge too far.” Let me be clear: As stipulated in the introduction to Part I:

- (1) Social democratic capitalism is an *immense* improvement over today’s neoliberal capitalism, and market socialism in which private enterprise is eliminated entirely would be an even greater improvement.
- (2) Moreover, in all probability in many countries, both will play an important role in the *transition* to a truly desirable economy

Nonetheless, this chapter makes the case that neither social democratic capitalism nor market socialism can ever fully achieve the goals just spelled out in Chapter 1. And that is why we should not “stop short” and “settle” for social democratic capitalism or market socialism but instead forge ahead to build the kind of economic system described in Parts III, IV, and V of this book.¹

Why not private enterprise?

Private Enterprise Is Incompatible with Economic Self-Management: Anti-capitalists have long argued that production in privately owned enterprises dooms employees to the status of “alienated labor” and prevents workers from “self-managing” their own labor as they choose. For almost as long mainstream economists have rejected this criticism, arguing that as long as labor markets are competitive, workers have control over the work process and its products through their supply of labor functions, which will be different for activities whose “process” or “products” the workers evaluate differently.

Mainstream economists argue that if work is debilitating or boring, workers will insist on a sufficient wage premium to compensate for their greater displeasure. And if workers deem the work product unworthy in some way, presumably here as well, employees will demand “compensating wage differentials.” As a matter of fact, traditional theory contends that the influence permitted workers over the work process and product through their supply of labor functions backed by their freedom to “vote with their feet” is all the influence they should be permitted.

Mainstream economists also argue that even within the framework of working for an employer, different kinds of jobs and occupational categories permit varying degrees of self-direction over one’s laboring efforts. Carpenters engage in more self-directed work than assembly-line workers, and if self-management is important to people, this should be reflected in compensating differentials between jobs that differ in this regard.

Finally, mainstream economists point out that contrary to what anti-capitalists would have people believe, the barrier between employer and employee in private enterprise economies is not impermeable.² Presumably, if self-directed labor were sufficiently important to someone, he or she would become self-employed, as many do in all private enterprise economies, and if needs be, accept lower income to work for themselves. And if the desire to conceive and coordinate activities involving more than one’s own efforts is strong enough, as the story goes, perfectly competitive capital markets permit people to take out loans and start their own businesses hiring others who care less than they do about participating in management. In fact, in the traditional view, to allow any greater control over the work product by individual workers would rob consumers of their say over what they will consume – that is, if we “de-alienate” workers from their products, we necessarily “alienate” consumers from the objects of their consumption!

In sum, in the traditional view as long as labor markets are competitive, the worker has “practical” control in the same sense that the consumer has “practical” control over what products private employers “choose” to produce as long as goods markets are competitive. In effect, as soon as one concludes that private employers’ freedom of maneuver is nil because they are completely hemmed in by competitive labor and product markets, the “problem” of worker “alienation” vanishes. In the traditional view, producer and consumer “sovereignty” are the appropriate concepts concerning influence over decision-making, and the anti-capitalist concept of alienation is rejected as inappropriate for evaluating effective influence over decision-making in modern economies. However, a careful reworking of what is known as the *conflict theory of the firm* casts doubt on these traditional conclusions and suggests instead that private enterprise economies *do* have a bias against worker self-management *even* when labor and goods markets are competitive.

Employers and their employees have an obvious conflict of interest over how high the wage rate will be and how hard workers will work for their wage. But unless labor turnover rates are 100% in every time period, they also have a conflict

of interest over at least some of the human characteristic transforming effects of the production process. The conflict between employer and employee in private enterprise economies is a complicated battle waged over time. In any period what is at stake is not only the present outcome in terms of wage rates and effort extracted, but changes in employee characteristics that can change the terrain for future battles. While the conflict of interest is ultimately over extraction and division, there is also an all-important conflict of interest over the *human characteristic transforming effects of laboring activity*, since these will affect the advantages and disadvantages of employees and employers in their future struggles over extraction and division. What human characteristics would be likely to reduce employee bargaining power, and what traits would be likely to increase employee bargaining power?

Regarding “group characteristics,” anything that reduces solidarity among employees would rebound to the benefit of employers during negotiation over wages and effort. So aggravating racial and gender antagonisms, for example, by engaging in discrimination in hiring, promotion, or pay, or choosing technologies that isolate employees from one another might be expected to increase profits. Even if society were devoid of racial, religious, and sexual divisions for employers to manipulate, creating entirely artificial hierarchies might also undermine employee solidarity. But what is germane to the issue at hand regarding individual human characteristics is that a careful remodeling of the conflict theory of the firm reveals that it would be rational for profit-maximizing employers to favor technologies and labor management practices that decrease their employees’ desire for, and capacity to engage in self-managed labor, and as a result, it is predictable that in capitalist economies over time workers’ capacity for economic self-management will decrease and atrophy.

While it is true that more competition in labor markets reduces employers’ room for maneuver, as do higher turnover rates, nonetheless there is good reason to believe that the institution of private enterprise is biased against providing as much self-management in work as is warranted by people’s preferences and known technologies, which in turn will cause people’s preferences for economic self-management to atrophy. Specifically, theorems 8.1 and 8.2 are proved in Hahnel and Albert 1990, leading to the aforementioned conclusions if self-managed work is employee empowering to some degree.

Theorem 8.1: *Wage Bias:* Under private enterprise production, unless there is 100% labor turnover each time period, even if labor markets are competitive any kind of laboring activity that generates employee-empowering traits will receive an actual market wage that is less than the socially optimal wage, and therefore be undersupplied. And any kind of labor activity that weakens employee-empowering traits will be paid more than the socially optimal wage and therefore be oversupplied.

Theorem 8.2: *Snowballing Non-optimality:* Not only will production under private enterprise fail to deliver optimal job mixes in some initial time period, oversupplying work conditions that empower employers

vis-a-vis employees; there will be a cumulative divergence away from optimal allocations in future time periods as individuals “rationally” adjust their personal characteristics to diminish their desire for work opportunities that are underpaid and enhance their preference for work opportunities that are overpaid.

In sum, a careful modeling of the conflict theory of the firm rebuts the standard mainstream argument that private enterprise contains no bias against self-management provided labor and goods markets are competitive, and instead confirms the criticism that private enterprise is fundamentally at odds with worker self-management.

Private enterprise is incompatible with economic justice

While *in theory* we could intervene and redistribute income any way we wish, different economic systems tend to generate different patterns of income distribution. Or, put differently, the “default” patterns of income distribution for different economic systems are quite different. In this regard the first question to ask is if an economic system’s “default” distribution of income coincides with what is a fair, or equitable, distribution of income. If the answer to this first question is no, the second question is what if any obstacles would arise to prevent interventions required to make the “default” distribution more fair from being implemented?

If there were no externalities and no public goods, if all markets were competitive and in equilibrium, if the uniform rate of profit were zero, and if there were no discrimination in labor or credit markets, it can be argued that a private enterprise market economy would distribute income according to maxim 1: To each according to the social value of one’s labor and the contribution of the productive property one owns. In which case, if one believes that maxim 1 also describes a fair distribution of income, one could argue that people would be rewarded fairly in a capitalist economy – provided all the above assumptions are met.

Similarly, it can be argued that if there were no externalities and no public goods, if all markets were competitive and in equilibrium, and if there were no discrimination in labor or credit markets, a public enterprise market economy in which all receive an *equal share* of the social value of the contribution of all alienable productive assets, would distribute income according to maxim 2: To each according to the social value of one’s labor. In which case, if one believes that maxim 2 describes a fair distribution of income, one could argue that people would be rewarded fairly in such a market socialist economy – again, provided all of the above assumptions hold.

However, if one believes that neither maxim 1 nor maxim 2 describes a fair distribution of income – as was argued in Chapter 1 – and instead that what is fair is better described by maxim 3: To each according to his or her effort, or sacrifice in work, then the default outcomes in both private and public

enterprise market economies are *not* fair, and intervention would be required to make them more fair. In which case, what remains to be discussed is this: If neither maxim 1 nor maxim 2 is fair, what obstacles would any attempts to intervene to make outcomes more fair in either a private or public enterprise market economy face, and how likely would it be that these obstacles would be overcome?

There are three obstacles to consider: (1) Will there be a positive correlation between economic and political power that obstructs necessary correctives? (2) Does uncertainty mean that instead of making one single adjustment, continual readjustments will prove necessary to maintain a desired distributive outcome, which will in turn create counterproductive effects on incentives? And (3) do people engage in a psychological process to minimize *cognitive dissonance*, which would undermine popular support for intervention?

We need only think about tax policy to understand the first problem. To render the default distribution of income in a private enterprise economy more fair arguably requires taxing dividend income more heavily than labor income. But when people can affect political outcomes not only by their own vote, or by donating their own time to canvassing for candidates, but also by financial donations to political campaigns and causes, it is apparent why those with greater dividend income can often exert disproportionate political influence over tax policy, and thwart intervention to move the default distribution of income in a private enterprise economy in a more fair direction at their expense.

Regarding the second problem, in theory if policy makers had perfect foresight, they could devise an appropriate one-time-only system of lump-sum (positive and negative) assessments to achieve any desired distribution of income without negatively affecting people's behavior. But lacking perfect foresight, policy makers must engage in multiple interventions – new “assessments” every year – to achieve a desired outcome. Not only does this mean that intervenors must remain forever vigilant and support for intervention must be constantly renewed – it also creates perverse incentives. When people discover that higher dividend income leads to higher taxes on dividends, or higher labor income leads to higher taxes on labor income, they will invest and work less than is socially optimal – which political opponents of intervention are always quick to point out!

Finally, the theory of cognitive dissonance suggests that psychological forces lead people to rationalize their behavior as sensible and fair. Since competitive pressures will push people to maximize the income they receive from their alienable productive assets and their human capital, they will come to see the income they receive from these assets as just and fair, and consequently, they will look on interventions that take income from these assets away as unfair. This psychological dynamic will predictably decrease popular support for interventions to alter the default pattern of income distribution in both private and public enterprise market economies.

Why Not a Mixed Economy? Many have argued that there is a legitimate role for *some* private enterprise in a socialist economy. Bernie Sanders was

willing to carry the label of being a democratic socialist his entire political career at considerable political cost but was always clear that what “democratic socialism” meant to him was a *mixed economy*, – that is, an economy with a mixture of public and private enterprises (Sanders 2019). Alec Nove (1983) argued explicitly for a mixed economy in his model of “feasible socialism.” Both David Schweickart (2017) and John Roemer (1994) support privately owned startups in their (quite different) models of market socialism in order to provide competition and promote innovation, and discuss when and how to convert them into public ownership as they grow in size. And the vision of many today who call themselves anti-capitalists is an economy that contains not only enterprises owned by local, state, and national governments, as well as many worker- and consumer-owned cooperatives, but also *some* individual proprietorships and limited liability corporations. In short, many self-declared socialists today see a mixed economy as the best of all possible worlds and say to those like us who insist on abolishing private enterprise entirely: “*Methinks thou doth protest too much!*”

But what are the implications for a mixed economy of the arguments outlined earlier against private enterprise? If it is true that private enterprises – whether proprietorship or corporation, whether small or large – are incompatible with economic democracy and economic justice, then there can be no role for private enterprise in a truly desirable economy. And advocates for a participatory economy *do* believe that is where logic leads. In other words, we believe that only *full* social ownership of *all* productive resources is capable of achieving economic democracy and distributive justice.³

However, this does not mean it is necessarily wrong to campaign for a mixed economy. First of all, every capitalist economy in the world today is a mixed economy to some degree, and today’s economies would be even more dysfunctional if *all* production were carried out in privately owned enterprises. Second, a strong case can be made that moving the “ownership mix” more in the social/public direction would vastly improve the performance of capitalist economies today. And third, it is quite possible that the most likely path to full social ownership travels through a transition period that is a mixed economy for a number of reasons:

- Many people today believe that private ownership is best, or inevitable, and most of them are employees not employers! To convince these workers otherwise it may be necessary to demonstrate in a mixed economy that cooperatives and publicly owned enterprises perform well before people will be willing to support full social ownership.
- One of the premises of this book is that meaningful economic self-management is neither simple to arrange nor simple to practice. In light of historical experiences over the past 100 years, it should now be apparent that early socialist visionaries were overly optimistic to believe that once workers were freed from the yoke of their employers that the “associated producers” would find it easy to organize and manage production

themselves. Instead, to be successful, extensive experience in what we might call the “art” of collective economic self-management is required. Producer and consumer cooperatives, as well as publicly owned enterprises in a mixed economy, are places where people can develop knowledge, habits, attitudes, and the experience necessary to practice the “art” of economic self-management successfully.

- The principal reason advocates for market socialism like Nove, Schweickart, Roemer, and others argue for some private enterprise to be tolerated is they understand that it is important to stimulate innovation. *And until alternative ways to accomplish this have been implemented*, limited tolerance for private enterprise to stimulate innovation may be useful. We take the problem of stimulating innovation seriously, and invite readers to scrutinize our proposals in Parts III, IV, and V regarding innovation to see if we provide adequate means for doing so in a participatory economy. But the point here is that until those procedures are operative, other means of encouraging innovation must be found.
- Finally, and most obviously, immediate socialization of all private enterprise is likely to prove politically impossible. Not even Communist parties that rose to power in the 20th century through violent revolution ever pulled it off. And it is even less likely that 21st-century socialists who rise to power through a democratic process would be able to do so.

So let us be clear about our argument concerning a mixed economy: After more than three decades of capitalist triumphalism, it is hardly surprising that many socialists now champion a mixed economy. And as just explained, there are reasons socialists may be well advised to make the fight for a mixed economy part of a transition strategy and program. *However*, the lure of a mixed economy fails to face up to the necessity of ultimately choosing between incentives that rely on and encourage competition and greed and incentives that instead promote self-management and equitable cooperation – and therefore the necessity of *eventually* replacing *all* private ownership with social ownership of *all* productive resources. In short, we remain convinced there is no role for private enterprise in a truly desirable economy. Moreover, there is always a danger that a mixed economy can move backward toward more private enterprise instead of forward toward more social ownership, as was the case most notably in the Scandinavian economies, but in other European economies as well over the past four decades.

Why not markets?

David Miller and Saul Estrin stated the case for market socialism as follows:

Markets are an efficient way of producing and distributing a very large number of mundane items. Market incentives are a dependable way of getting our bread baked. Markets allow us to make the best use of the

information dispersed throughout a society. Markets give their participants a certain kind of freedom – expanding the range of choices and giving each person a variety of partners with whom to deal.⁴

Michael Albert and I stated the case against markets equally succinctly:

Rather than efficiency machines, optimal incentive systems, cybernetic miracles, and human liberators, when we examine markets we find institutions that generate increasingly inefficient allocations of resources, unleash socially destructive incentives unnecessarily, bias and obstruct the flow of essential information for economic self-management, substitute trivial for meaningful freedoms, and lead to irredeemable inequities in the distribution of income and power.⁵

What I now call the *dispassionate case against markets* has three parts:⁶

- 1 Contrary to what most economists would have people believe, markets do *not* allocate scarce productive resources efficiently.
- 2 Markets distribute the burdens and benefits of economic cooperation unfairly.
- 3 Markets fail to provide economic democracy and subvert political democracy as well.

Markets are inefficient

It is well known among professional economists that markets allocate resources inefficiently when they are out of equilibrium, when they are non-competitive, and when there are external effects. As a matter of fact, what economists call the fundamental theorem of welfare economics says as much when read carefully. But despite clear warnings in our most sacred theorems about necessary conditions, market enthusiasts continue to insist that if left alone, or perhaps with a little assistance, markets generally allocate resources very efficiently. This could only be true if disequilibrating forces were always weak; if non-competitive market structures were uncommon; and most importantly, if externalities were the exception, rather than the rule. Unfortunately, there are good reasons to believe exactly the opposite in all three cases and, moreover, that policy correctives will inevitably prove inadequate.

Externalities are pervasive

Markets *do* permit people to interact in ways that are convenient and often mutually beneficial for buyers and sellers. But convenience and beneficial for buyer and seller do *not* imply economic efficiency. In fact, the reasons markets are convenient and beneficial for buyers and sellers are precisely why they generate inefficient outcomes.

Increasing the value of goods and services produced and decreasing the unpleasantness of what we have to do to produce them are two ways producers can increase their profits in a market economy – and competitive pressures will drive producers to do both. But maneuvering to appropriate a greater share of the goods and services produced by externalizing costs onto others and internalizing benefits without compensation are also ways to increase profits. And competitive pressures will drive producers to pursue this route to greater profitability just as assiduously. Of course, the problem is while the first kind of behavior serves the social interest as well as the private interests of producers, the second kind of behavior serves the private interests of producers at the expense of the social interest. All economists agree that when sellers or buyers promote their private interest by externalizing costs onto those not a party to the market exchange or by appropriating benefits from other parties without compensation, their behavior introduces inefficiencies that lead to a misallocation of productive resources and, consequently, a decrease in welfare. When car manufacturers fail to take into account the damage their sulfur dioxide emissions impose on those damaged by acid rain, they offer to supply more cars than is efficient from society's perspective. When consumers of cars have no incentive to take into account the damage their emissions of greenhouse gases inflict on victims of climate change, they offer to buy more cars than is socially efficient. Because negative external effects associated with both car production and consumption go ignored in the market decision-making process in which buyers and sellers weigh the consequences of their choices only on themselves, we are led to produce and consume many more cars than is efficient. In general, it is well known that markets will underprice and overproduce goods and services when there are negative external effects associated with either their production or consumption and overprice and underproduce goods and services when there are positive external effects associated with either their production or consumption.

The positive side of market incentives has received great attention and praise dating back to Adam Smith who coined the term *invisible hand* to describe it. The darker side of market incentives has been relatively neglected and grossly underestimated. A notable exception is Professor E.K. Hunt who coined the less famous, but equally appropriate term, *invisible foot* to describe the socially counterproductive behavior markets drive participants to engage in (Hunt and D'Arge 1973).

Market enthusiasts seldom ask: Where are firms most likely to find the easiest opportunities to expand their profits? How easy is it usually to increase the size or tastiness of the economic pie? How easy is it to reduce the time or discomfort it takes to bake the pie? Alternatively, how easy is it to enlarge one's slice of the pie by externalizing a cost or by appropriating a benefit without payment? Why should we assume that in market economies, it is infinitely easier to expand private benefits through socially productive behavior than through socially counterproductive behavior? Yet this implicit assumption is

what lies behind the view of markets as guided by a beneficent invisible hand rather than a malevolent invisible foot.

Market admirers fail to notice that the same feature of market exchanges primarily responsible for their convenience – excluding all affected parties other than the buyer and the seller from the transaction – is also a major source of potential gain for the buyer and the seller. When the buyer and the seller of an automobile strike their convenient deal, the size of the benefit they have to divide between them is greatly enlarged by externalizing the costs onto others of the acid rain produced by car production and the costs of urban smog, noise pollution, traffic congestion, and greenhouse gas emissions caused by car consumption. Those who pay for these costs, and thereby enlarge automobile manufacturer profits and car consumer benefits, are easy marks for car sellers and buyers for two reasons: (1) They are dispersed geographically and chronologically, and (2) the magnitude of the effect on each negatively affected external party is small, yet not equal. Consequently, individually external parties have little incentive to insist on being party to the transaction. The external effect on a single party is seldom large enough to make it worthwhile for one person to try to insert himself or herself into the negotiations. But there are formidable obstacles to forming a coalition to represent the collective interests of all external parties as well.

Organizing a large number of people who may be dispersed geographically and chronologically, when each has little but different amounts at stake, is a difficult task. Who will bear the transaction costs of approaching members when each has little to benefit? When approached, who will report truthfully how much they are affected when it is to their advantage to either over- or under-exaggerate, depending on who has the law on their side. In sum, when there are multiple victims, they face formidable transaction costs, and we believe even more importantly they face what economists call free rider and hold out incentive problems to acting collectively.⁷

One way to see the problem is that markets reduce the transaction costs for buyers and sellers but do nothing to reduce the transaction cost of participation in decision-making by externally affected parties. It is this inequality in transaction costs that makes external parties easy prey to rent-seeking behavior on the part of buyers and sellers. Even if we could organize a market economy so that buyers and sellers never face a more or less powerful opponent in a market exchange, this would not change the fact that each of us has smaller interests at stake in many transactions in which we are neither buyer nor seller. Yet the sum total interest of all external parties is often considerable compared to the interests of the buyer and the seller. It is the transaction cost and free rider and hold out incentive problems of those with lesser interests that create an unavoidable inequality in power between those who make an exchange and those who are neither buyer nor seller but are affected by the exchange nonetheless. This is the power imbalance that allows buyers and sellers to benefit at the expense of disenfranchised external parties in ways that cause inefficiencies. Since this opportunity to increase private benefits is readily available in market

economies, there is every reason to believe that particularly actors who must maximize profits or be competed out of business will take advantage of it – leading to significant inefficiencies.⁸

Markets are often not competitive

It is well known that when markets are not competitive they lead to inefficient allocations of resources. When sellers are few, it is in their interest to produce an output that is, collectively, less than the amount that is socially efficient. In other words, just as it is often easier to make profits at the expense of disenfranchised external parties than through socially productive behavior, it is also often easier for a small group of sellers to make profits by restricting supply than producing the socially efficient amount of their product. All empirical evidence indicates that many goods today are sold in non-competitive markets, and that market structures are growing less, not more competitive. This means that non-competitive market structures are a serious and growing source of inefficiencies in modern market economies.

Markets often fail to equilibrate

Real markets do not always equilibrate quickly, much less instantaneously. The famous “laws” of supply and demand, which predict that when market price rises, quantity supplied will increase and quantity demanded will decrease, leading markets toward their equilibria, are based on a highly questionable assumption about how market participants interpret price changes. Standard analysis implicitly assumes that sellers and buyers believe that when the market price rises, the new higher price will be the new price going forward. Or, put more carefully, that after a rise in price, it is equally likely that any further change in price will be down as up. If this is truly the case, then it is sensible when market price rises for sellers to offer to sell more than before and for buyers to offer to buy less than before – as the so-called laws of supply and demand say they will. However, sometimes buyers and sellers quite sensibly interpret price changes as indications of further price movements in the same direction. In this case, it is rational for buyers to respond to an increase in price by increasing the quantity they demand before the price rises even higher and for sellers to reduce the quantity they offer to sell waiting for even higher prices to come. When buyers and sellers behave in this way, they create greater excess demand and drive the price even higher, leading to a market “bubble.” When buyers and sellers interpret a decrease in price as an indication that the price is headed down, it is rational for buyers to decrease the quantity they demand, waiting for even lower prices and for sellers to increase the quantity they offer to sell before the price goes even lower. In this case, their behavior creates even greater excess supply and drives the price even lower, leading to a market “crash.”

In other words, if market participants interpret changes in price as *signals* about the likely direction of further price changes, and if they behave

“rationally,” they will not only fail to behave in the way the “laws” of supply and demand would lead us to expect, they will behave in exactly the opposite way from what these “laws” predict. When this occurs and markets move away from, not toward their equilibria, economic inefficiency increases.

Economists who argue that bubbles and crashes only occur in a few markets where many players are speculators should remember their own explanation for why all units of a good tend to sell at a uniform market price. Only when people are free to engage in arbitrage do we get “well ordered” markets and uniform prices in the first place. This means mainstream economists must expect and welcome players who are motivated purely by hopes of profiting from trading rather than because they have any use for the particular good being bought and sold. Since those who engage in arbitrage have no interest in the usefulness of the good in question, it seems likely that they would be particularly sensitive to the implications of a change in price on the likely direction of further price changes and, therefore, on their profits from trading. In sum, market bubbles and crashes, which all economists agree cause efficiency losses, are generally the result of rational, not irrational, behavior and much more likely to occur than mainstream economists would have us believe.

Practical problems with policy correctives

When faced with theoretical reasons to believe that externalities, non-competitive market structures, and disequilibrium dynamics are neither rare nor trivial problems, supporters of the market system respond in different ways. There is a clear divide between “free market fundamentalists” whose influence has grown significantly over the past 50 years, and more pragmatic supporters of the market system who favor market interventions to create what the most progressive among them call “socialized markets.” The ideologues’ enthusiasm for a *laissez-faire* market system literally knows no bounds as they brush aside qualifying assumptions in theorems as if they did not exist. Market pragmatists, on the other hand, concede that we must sometimes intervene in markets with policies to internalize external effects, curb monopolistic practices, and counter dis-equilibrating forces. However, those who give qualified support to market intervention conveniently ignore practical problems that inevitably arise whenever we attempt to “socialize” markets.

- The job of correcting for external effects is daunting, because, as explained, there is every reason to believe externalities are the rule rather than the exception – as market enthusiasts commonly assume without providing empirical evidence.
- Alfred Pigou proved long ago that when there are negative external effects in a market, a corrective tax is required to eliminate the inefficiency and when there are positive externalities, a corrective subsidy is called for. But how are we to know what the size of the external effect is and therefore *how high* to set the tax or subsidy? The market offers no assistance whatsoever

in this regard, forcing us to resort to very imperfect measures. Stop-gap procedures for trying to estimate the magnitude of external effects like contingent valuation surveys – where economists survey a random sample of those affected and ask them how much they would be willing to pay not to be damaged – and hedonic regression studies – where economists try to deduce how much people are adversely affected by their purchase of related goods that are sold in markets – are notoriously unreliable and therefore highly subject to manipulation by interested parties.

- Because they are unevenly dispersed throughout the economic matrix the task of correcting the entire price system for the direct and indirect effects of externalities is even more daunting. Even if the negative external effects of producing or consuming a particular good could be estimated accurately and the corrective tax were applied, if the external effects of producing or consuming goods that enter into the production of the good in question are not also accurately corrected for, the theory of the second best warns us that the Pigovian tax we place on the good in question may move us farther away from an efficient use of our productive resources rather than closer.
- In the real world, where private interests and power take precedence over economic efficiency, the beneficiaries of accurate corrective taxes are all too often dispersed and powerless compared to those who would be harmed by an accurate corrective tax. As Mancur Olson (1965) explained, this makes it very unlikely that full correctives would be enacted even if they could be accurately calculated.
- People also learn to adjust to the biases created by external effects in the market price system. Consumers increase their preference and demand for goods whose production and/or consumption entails negative external effects but whose market prices fail to reflect these costs and are therefore too low. And consumers will decrease their preference and demand for goods whose production and/or consumption entails positive external effects but whose market prices fail to reflect these benefits and are therefore too high. While this reaction, or adjustment, is individually rational, it is socially counterproductive since it leads to even greater demand for the goods that market systems already overproduce and even less demand for the goods that market systems already underproduce. As people have greater opportunities to adjust over longer periods of time, the degree of inefficiency in the economy will grow or “snowball.”⁹
- In theory, inefficiencies due to non-competitive market structures can be solved by breaking up large firms – that is, through anti-trust policy. But true economies of scale provide good reasons for sometimes not doing so, and corporate power always provides bad reasons for not doing so. Non-competitive market structures are routinely tolerated simply because large firms are politically powerful and successfully pressure the political system to permit them to continue their profitable but socially inefficient practices. An alternative to anti-trust action is to regulate large firms in

non-competitive industries. But this practice is also, regrettably, in decline, as regulatory agencies are increasingly “captured” by the companies they are supposed to regulate and turned into vehicles for promoting industry objectives.

- There are well-known policies to ameliorate inefficiencies due to market disequilibria. Both fiscal and monetary policies can be used to stabilize business cycles. Indicative planning and industrial policies can be used to eliminate both disequilibria between sectors of an economy. Regulation of foreign exchange and financial markets particularly prone to bubbles and crashes are almost always an improvement over *ex post* damage control consisting mostly of bailouts for powerful economic interests most responsible for creating problems in these markets in the first place. Unfortunately, neoliberal ideologues and the corporate interests they serve have waged a relentless campaign against these policies, and over the past 50 years, both national economies and the global economy have experienced huge losses in economic efficiency as a result.¹⁰

Labor markets are unfair

When capitalists hire workers, the profits capitalists receive for no work on their part are testimony to the fact that *collectively* their employees were not paid wages sufficient to buy all the goods their work produced.¹¹ But besides the fact that capitalist income is unfair because they deny their employees some of what they produce, what should we make of *differences* in wage rates for different categories of workers? And what happens if capitalist enterprises are replaced by worker-owned enterprises who hire members in labor markets where the laws of supply and demand remain free to operate?

If the last hour of welding labor hired raises output and revenue by more than the last hour of floor sweeping labor does, when employers compete with one another in labor markets for welders and sweepers, they will bid the wage rate for welders up higher than the wage rate for sweepers – whether they are capitalist employers trying to maximize enterprise profits, or worker-owned enterprises trying to maximize profits per member.¹² This means that when labor is hired in labor markets, those who have more human capital, and therefore contribute more to enterprise output and revenues, will receive higher wages than those with less human capital. As explained in Chapter 1, this is problematic. Suppose our welder and sweeper work equally hard in equally unpleasant circumstances. If there is a labor market, they will not be rewarded equally even though they make what we might call equal “sacrifices.” If there is a labor market, those with more human capital will receive more, even if they make no greater sacrifices, and those with less human capital will receive less, even if they sacrifice just as much.¹³

Some who argue for market socialism agree that this is unfair and therefore suggest that labor markets be eliminated, but that markets for goods and services be retained. However, if we intervene in the labor market and legislate wage

rates we consider to be fair, but allow markets to determine how other resources are allocated, not only will different kinds of labor be allocated inefficiently, the entire price structure of the economy will fail to reflect the opportunity costs of producing different goods and services, leading to further inefficiencies because the actual cost of labor that goes into determining the cost of products will no longer be equal to its opportunity cost. There is no getting around the dilemma: In a market economy we must *either* allow the market system to reward people *unfairly* – that is, pay people according to their marginal social products, *or*, if we try to correct for inequities, we must accept a price system that will allocate scarce productive resources *inefficiently*.

Markets subvert democracy

Confusing the cause of free markets with the cause of democracy is as astounding as it is widespread given the overwhelming evidence that the latest free market jubilee has disenfranchised ever larger segments of the world body politic. The cause of economic democracy is not being served when 30-year-olds with a master of business administration degree working for multinational financial companies trading foreign currencies, bonds, stocks, and derivatives in their New York and London offices affect the economic livelihoods of billions of ordinary people who toil in third-world economies more than their own elected political leaders.

First, markets undermine rather than promote the kinds of human traits critical to the democratic process. As Samuel Bowles (1991) explained:

If democratic governance is a value, it seems reasonable to favor institutions that foster the development of people likely to support democratic institutions and able to function effectively in a democratic environment. Among the traits most students of the subject consider essential are the ability to process and communicate complex information, to make collective decisions, and the capacity to feel empathy and solidarity with others. As we have seen, markets may provide a hostile environment for the cultivation of these traits. Feelings of solidarity are more likely to flourish where economic relationships are ongoing and personal, rather than fleeting and anonymous; and where a concern for the needs of others is an integral part of the institutions governing economic life. The complex decision-making and information processing skills required of the modern democratic citizen are not likely to be fostered in markets.

Second, those who are wealthier generally benefit more than those who are less wealthy from market exchanges. As long as capital is scarce – that is, as long as more capital can make someone's labor more productive than it is currently – it is predictable that those with more capital will capture the lion's share of any efficiency gains from exchanges not only in labor and credit markets, but in goods markets as well. Moreover, this is not only true in non-competitive

markets but even when market structures are competitive.¹⁴ In other words, economic liberalization breeds concentration of economic wealth, and in political systems where money confers advantages, it leads indirectly to the concentration of political power as well.

Those who deceive themselves and others that markets nurture democracy ignore the simple truth that markets tend to aggravate disparities in wealth and economic power. It is true that the spread of markets can undermine the power of traditional, non-capitalist elites, as it did three centuries ago in Europe where it undermined the power of feudal lords, but this does not imply that markets will cause power to be more equally dispersed and democracy enhanced. If old obstacles to economic democracy are being replaced by new, more powerful obstacles in the persons of chief executive officers of multinational corporations and multinational banks, the new global mandarins at the World Bank and International Monetary Fund, and the chairs of adjudication commissions for the North American Free Trade Association and the World Trade Organization, and if these new elites are more effectively insulated from popular pressure than their predecessors, it is not the cause of democracy that is served.

Support for the theory that markets promote democracy stems from the dominant interpretation of modern European history in which the simultaneous spread of markets and political democracy is assumed to be because the former caused the latter. It is hardly surprising that perhaps the most intrusive social institution in human history would have disrupted old, pre-capitalist obstacles to democratic rule in pre-capitalist Europe. The question, however, is not whether markets undermine old structures of domination – which they clearly do – but, if the new patterns of economic power that markets create are supportive or detrimental to democratic aspirations. I am skeptical that markets deserve nearly as much credit as mainstream interpretations award them for the emergence of representative political democracy in Europe. I suspect this interpretation robs Europeans who fought against the rule of monarch and feudal lord in the 16th, 17th, 18th, and 19th centuries, Europeans who fought for universal popular suffrage in the 19th and 20th centuries, and all who fought against fascism in Europe during the 20th century of much of the credit they deserve. But a worthy rebuttal to the thesis that we owe advances in political democracy to the spread of markets requires more historical knowledge than I pretend to have.

Nonetheless, the idea that we could dispense with markets entirely in a modern economy seems so incredible to most people today that even those who are well aware of the dispassionate case against markets and, largely concede it, nonetheless conclude something similar to what Erik Olin Wright wrote in his dialogue with me on this subject:

I do not see market transactions as such as intrinsically undesirable. What is undesirable are two things that are generally strongly linked to markets: first, the ways in which markets can enable people and organizations with specific kinds of power to gain advantages over others, and second, the way markets *if inadequately regulated*, generate all sorts

of destructive externalities and harms on people. But if those problems are minimized through various mechanisms, then the sheer fact of buyers and sellers of goods and services agreeing to exchange things at a mutually agreed-upon price is not, in and of itself, objectionable.¹⁵

I believe the problem with this attitude – which the dispassionate case against markets seems powerless to affect – is that it is *insufficiently fearful*. It fails to appreciate a fourth reason that markets should be avoided in a desirable economy, and indeed are inimical to the goals described in Chapter 1 – namely, that markets undermine solidarity and promote egotistical attitudes and behavior.

Markets undermine the ties that bind us

Disgust with the commercialization of human relationships is as old as commerce itself. The spread of markets in 18th-century England led Edmund Burke to reflect: “The age of chivalry is gone. The age of sophists, economists, and calculators is upon us; and the glory of Europe is extinguished forever.” Thomas Carlyle prophesied:

Never on this Earth, was the relation of man to man long carried on by cash-payment alone. If, at any time, a philosophy of laissez-faire, competition, and supply-and-demand start up as the exponent of human relations, expect that it will end soon.”

And of course running through all his critiques of capitalism, Karl Marx complained that markets gradually turn everything into a commodity and, in the process, corrode social values and undermine community.

With the spread of markets there came a time when everything that people had considered as inalienable became an object of exchange, of traffic, and could be alienated. This is the time when the very things which till then had been communicated, but never exchanged, given, but never sold, acquired, but never bought – virtue, love, conviction, knowledge, conscience, etc. – when everything, in short passed into commerce. It is the time of general corruption, of universal venality. . . . It has left remaining no other nexus between man and man other than naked self-interest and callous cash payment (Marx 1955, chapter 1, section 1).

In my reading what the oldest critique of markets amounts to broadly speaking is an objection to the organization of economic cooperation in a way that is personally distasteful and demeaning and unnecessarily sours human relations. It is an objection to forms of interaction that are mean spirited and hostile and a nostalgic cry for alternative forms of cooperation that are respectful and empathetic. And it is a gnawing dread that the detrimental effects of markets on human relations will prove to be far from trivial.

In effect, markets say to us: You humans cannot consciously coordinate your interrelated economic activities efficiently, so don't even try. You cannot come to equitable agreements among yourselves, so don't even try. Just thank your lucky stars that even such a hopelessly socially challenged species such as yourselves can still benefit from a productive division of labor, thanks to the miracle of the market system. In effect, markets are a no-confidence vote on the social capabilities of the human species.

If that daily message were not sufficient discouragement, markets harness our creative capacities and energies by arranging for other people to threaten our livelihoods. Markets bribe us with the lure of luxury beyond what others can have and beyond what we know we deserve. Markets reward those who are the most adept at taking advantage of his or her fellow man or woman, and penalize those who insist, illogically, on pursuing the golden rule – do unto others as you would have them do unto you. Of course, we are told we can personally benefit in a market system by being of service to others. But we also know we can often benefit more easily by taking advantage of others. Mutual concern, empathy, and solidarity are the appendices of human capacities and emotions in market economies – and like the appendix, they continue to atrophy.

In every market transaction, the seller is trying to take advantage of the buyer, and the buyer is trying to take advantage of the seller. If we play “word association” and say “market,” economists are likely to respond with “mutual benefit,” whereas most people would be more likely to respond with “haggle.” The problem is not that one response is right and one is wrong. The problem is that *both* responses are correct! Moreover, in every market transaction, both the buyer and the seller have every incentive to ignore the interests of anyone else besides themselves who might be affected by their decision. This disenfranchises parties who are “external” to the negotiations between the buyer and the seller and is therefore undemocratic. It is demonstrably inefficient, as professional economists have long known. And finally, it fails to provide a buyer and seller with the information necessary to take the interests of others into account and systematically punishes any who attempt to do so. In short, markets “work” by stimulating greed and fear while undermining trust and solidarity needed to build the economics of equitable cooperation. Markets are cancer to the socialist project.

I use the word *cancer* not only to evoke powerful negative emotions, but because cancer begins as a small malignancy, a cellular dysfunction, that spreads until it destroys an entire organism. And that is the image I wish to convey for why we should fear permitting markets to continue to play a role in a truly desirable economy. That is why we should search for other ways to respond to situations that make markets tempting. People *will* spontaneously engage in market behavior, and using markets for particular purposes will often appear convenient even in an economy where what to produce and how to produce it is first determined by a comprehensive production plan. So it is easy to understand why people may feel that objecting to even “a dash” of markets is overzealous and inflexible, which would indeed be true if a dash of markets were

like a dash of salt, or even a dash of pepper. But if instead, a dash of markets is like a dash of cancer that can grow and destroy the social basis for equitable cooperation, that is quite another matter altogether.

But there is no need to take the word of pre-capitalist romantics like Burke and Carlyle, or the word of the most famous critic of capitalism, Karl Marx. Samuel Bowles, who strongly supports a “socialized” market system, gives eloquent testimony to this last failure of markets:

Markets not only allocate resources and distribute income, they also shape our culture, foster or thwart desirable forms of human development, and support a well-defined structure of power. Markets are as much political and cultural institutions as they are economic. For this reason, the standard efficiency analysis is insufficient to tell us when and where markets should allocate goods and services and where other institutions should be used. Even if market allocations did yield efficient results, and even if the resulting income distribution was thought to be fair (two very big “ifs”), the market would still fail if it supported an undemocratic structure of power or if it rewarded greed, opportunism, political passivity, and indifference toward others. . . . As anthropologists have long stressed, how we regulate our exchanges and coordinate our disparate economic activities influences what kind of people we become. Markets may be considered to be social settings that foster specific types of personal development and penalize others. The beauty of the market, some would say, is precisely this: It works well even if people are indifferent toward one another. And it does not require complex communication or even trust among its participants. But that is also the problem. The economy – its markets, workplaces and other sites – is a gigantic school. Its rewards encourage the development of particular skills and attitudes while other potentials lay fallow or atrophy. We learn to function in these environments, and in so doing become someone we might not have become in a different setting. By economizing on valuable traits – feelings of solidarity with others, the ability to empathize, the capacity for complex communication and collective decision making, for example – markets are said to cope with the scarcity of these worthy traits. But in the long run markets contribute to their erosion and even disappearance. What looks like a hard headed adaptation to the infirmity of human nature may in fact be part of the problem (Bowles 1991).

Conclusion

Contrary to both popular and professional opinion, “free” markets lead to a very inefficient use of our scarce productive resources, and even when “socialized” or tamed by policy correctives, a great deal of inefficiency inevitably remains. Inefficiency due to external effects is significant. Hope for an entire system of reasonably accurate Pigovian correctives in a market system is a pipe

dream. Market prices diverge ever more widely from true social opportunity costs as individuals have every reason to adjust their desires to accommodate significant institutional biases in the market system. Efficiency losses also mount as real markets become less competitive, with no sign of meaningful anti-trust or regulatory correctives in sight. And, as financial regulation, Keynesian stabilization policies, and industrial policies fall out of vogue, efficiency losses due to market disequilibria escalate further. As a result, any dispassionate evaluation would conclude that the invisible foot is steadily gaining ground on the invisible hand.

Meanwhile, market exchanges continue to empower those who are better off relative to those who are worse off – undermining economic and political democracy – and the anti-social biases and incentives inherent in the market system continue to tear away at the tenuous bonds that bind us. For all these reasons, *if possible*, we must replace bilateral, adversarial negotiations altogether with a different context, different expectations, and a different mind-set about what we are attempting to do when we coordinate our interrelated activities. This book makes the case that it is, indeed, possible, to do this.

Notes

- 1 The major goal of this book is to explain what a concrete alternative to both social democratic capitalism and market socialism looks like. Therefore, the case presented in this chapter for why neither can fully achieve the goals we strive for is necessarily abbreviated. For a more extensive critique of social democracy and market socialism, see Hahnel 2005a, 2005b, 2006, 2007, 2008, 2009, 2017a, 2019, 2020; Hahnel and Wright 2016; Hahnel and Albert 1990.
- 2 In traditional Marxist analysis, it was simply assumed that some relatively small group owned the means of production and everyone else who did not was free only in the sense that they were free to work for whichever of these employers would have them. John Roemer rendered the decision of who would be employers and who would be employees endogenous, showing how “class” position can be determined by where people fall in the initial distribution of wealth, rather than arbitrarily, or because of differences in people’s preferences for self-managed vs. other-directed work (Roemer 1982).
- 3 As will become abundantly clear in Parts III, IV, and V, when we say “social ownership,” we do not mean “state ownership,” and that even though productive resources are socially owned, we propose that self-governing enterprises be given full “user rights” over productive assets they need. As we explain in Chapter 6, what we advocate is simply the absence of private ownership of productive assets.
- 4 Miller and Estrin 1994: 187.
- 5 Hahnel and Albert 1990: 218.
- 6 For a more comprehensive critique of markets, see Hahnel 2005a: 170–181; Hahnel 2007, 2008, 2009, 2017a, and chapter 5, in Hahnel and Wright 2016: 114–120.
- 7 These issues are explored at greater length in Chapter 7 when we discuss the “pollution demand revealing mechanism” we incorporate into our participatory annual planning procedure.
- 8 Although now it is simply ignored by “free market fundamentalists,” Ronald Coase made clear at the end of his seminal article that what came to be known as the “Coase theorem” did *not* apply when there are multiple victims of pollution. However, even in the case where there is a single victim, there is every reason to assume that “Coasian

- negotiations” between a polluter and single victim will *not* lead to an efficient outcome, as Coase suggested. See Hahnel and Sheeran 2009.
- 9 See theorem 7.2 in Hahnel and Albert 1990 for a formal proof of this result.
 - 10 See Hahnel 1999 for a discussion of huge losses from international economic crises.
 - 11 For proof of this result, which I call “the fundamental Sraffian theorem,” see theorem 11 in Hahnel 2017b.
 - 12 Worker-owned cooperatives may well have goals other than maximizing profits per member, but as long as this is *one* of their concerns, the conclusion holds.
 - 13 Most fail to understand how arbitrary differences in the marginal revenue product of different categories of labor actually are. Not only do differences in talent, education, and training come into play, differences in the scarcity of different categories of labor and different complementary inputs are equally important in determining differences in marginal revenue products. Moreover, changes in technology and/or consumer preferences can increase or decrease marginal revenue products of different categories of labor as well. The important point is that all these influences are largely beyond an individual’s control and completely independent of the amount of effort an individual puts into his or her work.
 - 14 See Hahnel 2006, and Appendix B in Hahnel 1999.
 - 15 Hahnel and Wright 2016: 118.

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Part I: conclusion

Preliminary sections, like hors d'oeuvres, can become tiresome when it postpones getting to the main course too long. And since Part II that follows is devoted to explaining first how to do “best case” central planning, before then explaining why we should *not* do central planning, the main course still lies one full course away! However, we believe taking care of preliminaries was necessary, and hopefully readers will have found it useful.

As explained, before trying to design a desirable economic system, clarifying and justifying goals is important both because we need clear yardsticks against which to measure the proposals served up as the main course in Parts III, IV, and V, and because differences in what people actually mean when they use the same words to define goals, often explains differences about what procedures people believe are desirable or undesirable. Hopefully readers now understand:

- We define *economic efficiency* as most economists do – at least when they are being careful! We find both the Pareto and efficiency criteria useful when properly applied. However, we have pioneered a way to take into account the fact that when people consume and work, there are preference “development” as well as preference “fulfillment” effects without making arbitrary value judgments. In short, while we do not treat efficiency as the “be all and end all” as some economists do, when properly treated we consider efficiency to be an important goal for a desirable economy to achieve.
- We define *economic democracy* as decision-making power in proportion to the degree one is affected by a decision – which is not the same as either “economic freedom” or majority rule.
- We define *economic justice* as economic reward commensurate with effort, sacrifice, and need – which is not the same as reward commensurate with the value of one’s contribution.
- We define *solidarity* as concern for the well-being of others and believe a desirable economy should encourage solidarity and discourage antipathy.
- We believe a desirable economic system must not only produce a wide variety of different goods and services but facilitate and support a *variety* of different lifestyles.

- And last but not least, we understand that intergenerational equity, efficiency, and variety together imply that a desirable economy must be *environmentally sustainable*.

Finally, since many who are dissatisfied with neoliberal capitalism today favor social democratic capitalism instead, we felt it necessary to devote some “preliminary time” to explain why it is important to consider a concrete, comprehensive proposal for how an economic system that *goes beyond social democracy* might function. The purpose of Chapter 2 was to explain to those who support social democratic reforms why they should *also* take interest in what “beyond social democracy” might look like. To motivate interest in our proposals presented in Parts III, IV, and V, we felt it was useful to remind readers why – even though it may well be an important part of a transition to a truly desirable system – a mixed, regulated market economy will (a) inevitably fail to fully achieve our economic goals and (b) always be at risk of backsliding into corporate-dominated neoliberal capitalism.

Part II

Central planning

Introduction to Part II

I come to bury Caesar, not to praise him. The evil that men do lives after them; The good is oft interred with their bones.

These words which William Shakespeare wrote for Mark Antony to speak at Julius Caesar's funeral aptly express why we begin our search for a desirable economic system with a review of central planning: For reasons we explain in Chapter 4, we come to bury central planning, not to praise it. Why then delay presenting our proposal for how to go about organizing a system of participatory, democratic, economic planning in Parts III, IV, and V by first taking up central planning in Part II?

- Because what we propose is a system of comprehensive economic planning, it can easily be confused with central planning, which is a *different way* to go about creating a comprehensive economic plan. We want to make clear all the ways in which what we propose differs from central planning because, in one respect, it is similar: Both central planning and our procedures for carrying out participatory, democratic planning create a “detailed,” or “comprehensive,” economic plan.
- During the 20th century centrally planned economies were launched and administered by authoritarian political systems governed by a single, “vanguard” political party practicing “democratic centralism” – which was the antithesis of internal party democracy. In addition, often economic decisions that *might* have been made democratically were instead made in authoritarian ways in these centrally planned economies. Therefore, it is reasonable to speculate that *if* the political system were democratic, and *if* key choices in central planning were made democratically, centrally planned economies need not have suffered from the ills of authoritarianism. And indeed, there are some who have argued this case, including some whose proposals we examine in the appendix to this book. However, we believe this is *not* the case. We believe that while “best case central planning” would have been a significant improvement over real-world central planning, even if decisions about how much people value different goods and services were made democratically, and even if the political system overseeing central

planning were democratic, central planning would nonetheless still be wanting for the reasons we spell out in Chapter 4. However, to do so, we must first explain in Chapter 3 what the most democratic and efficient version of central planning possible would look like.

- Many criticisms of central planning are not compelling. In their rush to celebrate the triumph of capitalism much of the major media and many mainstream economists failed to focus on the most important reasons to reject central planning, and instead dismissed central planning for reasons that, on careful inspection, turn out not to be nearly as compelling as is commonly presumed. So, like Mark Antony, in order to prevent the evil central planning does from living even after its demise, we want to bury it for the right, not the wrong reasons.
- Finally, there are economic concepts and mathematical tools that are necessary for studying comprehensive, national economic planning of any kind. Those concepts are traditionally introduced in the context of explaining how a planning agency might calculate an efficient, comprehensive national economic plan as the solution to a constrained optimization problem. Not only will we need these concepts and mathematical tools to analyze our own proposals in Parts III, IV, and V, we can use them first to create a best-case version of central planning and then to explain various possible responses to the “tacit knowledge” critique of central planning that was central to the “socialist calculation debate.”

3 Central planning

How to do it

We begin our discussion of comprehensive economic planning with central planning not because we recommend it, but (1) because it serves as a useful introduction to important concepts necessary to understand comprehensive economic planning of any kind and (2) because it is an example of the kind of comprehensive planning we should be at pains to *avoid*. In this chapter we explain the logic of central planning and how it can be done. And in the process we subject the original criticism that it is impossible to calculate an efficient comprehensive plan even in theory, as well as the “tacit knowledge critique” that argues that it is impossible for planners to calculate an efficient plan in practice which many accept as definitive, to intense scrutiny. Next chapter we spell out what we believe is a better practical and a better substantive case against central planning. In other words, after explaining in this chapter what a “best case” version of central planning might look like, in Chapter 4 we explain why it is fortunate that central planning rests in the dustbin of history.

A multi-good, one-year model

Suppose there is no future, just this year. Suppose there are given stocks of capital goods, natural resources, and supplies of different kinds of labor available for use. Suppose there are *multiple* “activities” or “techniques” that can be used to produce each good. How could a central planning board (CPB) decide how much of each good to produce using each activity or technology? Let:

\mathbf{x} be a column vector of activity levels, where each activity produces a single good, some of which are final goods and some of which are intermediate goods

\mathbf{A} be the input coefficient matrix of intermediate goods for those activities

\mathbf{K} be the capital good input coefficient matrix – that is, the amount of each capital good that must be on hand to carry out each activity

\mathbf{k}^* be the column vector of capital goods available for use

\mathbf{R} be the input coefficient matrix of different natural resources needed to carry out each activity

\mathbf{r}^* be the column vector of natural resources available for use

\mathbf{L} be the input coefficient matrix of different kinds of labor needed to carry out each activity

\mathbf{l}^* be the column vector of different kinds of labor available for use

\mathbf{v} be a row vector of the relative “social values” of produced goods

\mathbf{I} be the identity matrix

So $\{\mathbf{A}, \mathbf{K}, \mathbf{R}, \mathbf{L}\}$ constitute the technical input coefficients of production, which include multiple techniques, or “activities,” for producing each good.¹ In which case the *primal programming problem* for this economy is:

Primal Problem: Choose \mathbf{x} to maximize $\mathbf{v}(\mathbf{I}-\mathbf{A})\mathbf{x}$

s.t. $\mathbf{K}\mathbf{x} \leq \mathbf{k}^*, \mathbf{R}\mathbf{x} \leq \mathbf{r}^*, \mathbf{L}\mathbf{x} \leq \mathbf{l}^*$ and $\mathbf{x} \geq \mathbf{0}$

In words, the job of a CPB is to calculate how much of each good to produce, using each technique or activity available, to maximize the social value of net output without using anymore of any capital good, natural resource, or category of labor than is available. If a CPB knew $\mathbf{k}^*, \mathbf{r}^*$, and \mathbf{l}^* , if a CPB knew all the technical coefficients of production for all the different possible techniques, or activities for producing each good, $\{\mathbf{A}, \mathbf{K}, \mathbf{R}, \mathbf{L}\}$, and if a CPB knew the social value of each final good produced, \mathbf{v} , then the CPB could solve this “central planning problem” and find \mathbf{x}^o , the optimal level of each production activity to carry out to maximize economic well-being.

Two important concepts we will use extensively throughout this book are the *opportunity cost* of using any productive input and the *social cost* of producing any output. We can clarify exactly what opportunity and social costs are using this one-year model. Let $\mathbf{p}(k)$ be a row vector of “prices” for different capital goods, $\mathbf{p}(r)$ be a row vector of “prices” for different natural resources, and $\mathbf{p}(l)$ be a row vector of “prices” for different kinds of labor. Then $\{\mathbf{p}(k)^o, \mathbf{p}(r)^o, \mathbf{p}(l)^o\}$ is the solution to the *dual programming problem* for the economy:

Dual Problem: Choose $\mathbf{p}(k), \mathbf{p}(r), \mathbf{p}(l)$ to minimize $\{\mathbf{p}(k)\mathbf{k}^* + \mathbf{p}(r)\mathbf{r}^* + \mathbf{p}(l)\mathbf{l}^*\}$
s.t. $\mathbf{p}(k)\mathbf{K} + \mathbf{p}(r)\mathbf{R} + \mathbf{p}(l)\mathbf{L} \geq \mathbf{v}(\mathbf{I}-\mathbf{A}), \mathbf{p}(k) \geq \mathbf{0}, \mathbf{p}(r) \geq \mathbf{0}, \mathbf{p}(l) \geq \mathbf{0}$

The solution to the dual problem, $\{\mathbf{p}(k)^o, \mathbf{p}(r)^o, \mathbf{p}(l)^o\}$, sometimes referred to as the “shadow prices” for each capital good, category of natural resource, and type of labor, are the *opportunity costs* of using each of these inputs when the economy is producing the optimal plan. If an opportunity cost is positive, it is because it is scarce, given technologies and preferences. If an opportunity cost is zero, it is because it is abundant, given technologies and preferences. In either case the shadow price, or opportunity cost, tells us how much social welfare could be increased if we had one more unit of the input available.

What is the *social cost* of producing a unit of good j when the economy implements the optimal production plan, \mathbf{x}^o ? In the optimal plan only activities

that minimize the social cost of producing a unit of output j will be used. For any activity used to produce good j the social cost of producing one unit is $p(j)^o = \mathbf{p}(k)^o \mathbf{k}(j) + \mathbf{p}(r)^o \mathbf{r}(j) + \mathbf{p}(l)^o \mathbf{l}(j) + \mathbf{p}^o \mathbf{a}(j)$, where $\mathbf{k}(j)$, $\mathbf{r}(j)$, and $\mathbf{l}(j)$ are the column vectors of capital goods, natural resources, and labor used; $\mathbf{a}(j)$ is the column vector of intermediate goods used, which together define the activity; and \mathbf{p}^o is the row vector of social costs of producing each produced good. These n equations for $j = 1, 2, \dots, n$ can be solved for the social costs of producing one unit of our n outputs: $\mathbf{p}^o = (p(1)^o, p(2)^o, \dots, p(j)^o, \dots, p(n)^o)$.

A multi-good, multi-year model

While the one-year model is useful to illustrate the underlying logic of central planning and how opportunity and social costs are defined, in real-world settings, a central planning authority would of course face the problem of planning over a number of years. The model in this section is useful for thinking about how a central planning board (CPB) might do this.²

- (1) The time horizon for the plan is $t = 1, 2, \dots, T$ years
- (2) $a_{jp}(t)$ is the number of units of good i needed to make one unit of good j using process p in year t
- (3) $x_{jp}(t)$ is the number of units of good j produced in year t using process p
- (4) The total amount of good j produced in year t is therefore:

$$x_j(t) = \sum_p x_{jp}(t)$$
- (5) There are $l = 1, 2, \dots$ different types of labor. The number of hours of labor type l available for use in year t is $L_l(t)^*$, and the amount actually used in year t is $L_l(t)$
- (6) $a_{lp}(t)$ is the number of hours of labor type l needed to make one unit of good j using process p in year t
- (7) There are $r = 1, 2, \dots$ different types of natural resources. The number of units of resource type r available for use in year t is $R_r(t)^*$, and the amount actually used in year t is $R_r(t)$
- (8) $a_{rp}(t)$ is the number of units of natural resource type r needed to make one unit of good j using process p in year t
- (9) $S_s(t)$ is number of units of capital good s in existence at the outset of year t
- (10) $\Delta S_s(t)$ is the number of units of capital good s added to the stock of capital good s in year t
- (11) $\delta S_s(t)$ is the *fraction* of the stock of capital good s that physically depreciates in year t , which for convenience we assume to be independent of usage
- (13) $S_{sjp}(t)$ is the number of units of capital good s we must have on hand to produce one unit of good j using process p in year t
- (14) I_{isk} stands for the total number of units of good i that must be set aside (invested) *in all previous years* to obtain a one unit increase in the stock of capital good s using process k

- (15) $i_{isk}(t/t')$ stands for the fraction of I_{isk} that must be invested in year t to help produce one more unit of capital good s in later year t' using process k . Therefore $[i_{isk}(t/t')][I_{isk}]$ is the amount of i that must be set aside in year t to help get one more unit of stock of s in year t' via process k , where: $\sum_{t \neq t'} i_{isk}(t/t') = 1$
- (16) $q_i(t)$ is the number of units of good i available for final consumption in year t
- (17) $v_i(t)$ is the social value (utility) of consuming one unit of good i in year t
- (18) $w_l(t)$ is the social disutility of working one hour of labor type l in year t
- (19) $y_s(T)$ is the social value assigned to a unit of capital stock s in the final time period T

To calculate an optimal production/investment plan over $t = 1, 2, \dots, T$ for this economy a CPB would need to solve the following programming problem:

$$\text{Maximize } SW = \sum_t \sum_i v_i(t) q_i(t) - \sum_t \sum_l w_l(t) L_l(t) + \sum_s y_s(T) S_s(T)$$

subject to the following constraints:

- (A) Enough of each good is produced each year to meet its intermediate, investment, and final consumption uses. There is an inequality constraint for each produced good, i , and each year, t

$$\sum_p x_{ip}(t) \geq \sum_j \sum_p a_{ijp}(t) x_{jp}(t) + \sum_k \sum_{t'} \sum_s i_{isk}(t/t') I_{isk} \Delta S_s(t') + q_i(t)$$

- (B) There is enough of each kind of labor available each year to produce all goods produced each year. There is an inequality constraint for each kind of labor, l , and each year, t

$$L_l(t) = \sum_j \sum_p a_{ljp}(t) x_{jp}(t) \leq L_l(t) *$$

- (C) There is enough of each category of natural resource available each year to produce all goods produced each year. There is an inequality constraint for each category of natural resource, r , and each year, t

$$R_r(t) = \sum_j \sum_p a_{rjp}(t) x_{jp}(t) \leq R_r(t) *$$

- (D) The minimum amount of all necessary capital stocks must be available at the beginning of each year to produce all the goods produced each year. There is an inequality constraint for each capital good produced, s , and each year, t .

$$\sum_j \sum_p S_{sjp}(t) x_{jp}(t) \leq S_s(0) + \sum_t \Delta S_s(t) - \sum_t \Delta S_s(t) S_s(t)$$

If the objective function and the constraints are all linear, this is a linear programming problem. If the objective function and/or constraints are not linear, it is a nonlinear programming problem. The givens are:

- (1) The production coefficients: $a_{ijp}(t)$, $a_{ljp}(t)$, $a_{rjp}(t)$, and $S_{sjp}(t)$
- (2) The investment coefficients: $i_{isk}(t/t')$, and I_{isk}
- (3) The depreciation coefficients: $\delta S_s(t)$
- (4) The quantities of different types of labor and natural resources that become available each year: $L_l(t)^*$ and $R_r(t)^*$
- (5) The initial stocks of capital goods: $S_s(0)$
- (6) The utility of different consumption goods: $v_i(t)$
- (7) The disutility of different kinds of labor: $w_l(t)$
- (8) The social values assigned to the final stocks of different capital goods: $y_s(T)$

The “decision variables” that the CPB solves for are the $x_{jip}(t)$'s and the $q_{li}(t)$'s, which imply the $\Delta S_s(t)$'s, $L_l(t)$'s, and $R_r(t)$'s.

As in the case of the single-year model, the solution to the dual problem in the multi-year model yields the opportunity costs of using (a) each type of labor, l , in each year, t , (b) each category of natural resource, r , in each year, t , and (c) each kind of capital stock, s , available at $t = 0$. And these opportunity costs are sufficient to calculate the social cost of producing every good, i , in every year, t , when the optimal plan is carried out, whether it be a final consumption good, an intermediate good, or a capital good.³

Before proceeding, we pause to acknowledge a theoretical problem that has been analyzed at great length in the planning literature. Namely, when planning over a finite horizon how does one value the size of terminal capital stocks at the end of the last year, T ? Notice that we included the term $\sum_s y_s(T) S_s(T)$ in our objective function and simply assumed that the CPB knew how much value society places on having a unit of capital stock s when the planning horizon ends in year T , $y_s(T)$. If we choose $y_s(T) = 0$ for all s , this produces an intuitively unsatisfying reduction in investment as we approach T known as the “truncation problem,” because it effectively ignores the well-being of all future generations after T .

How planners might go about balancing the welfare of generations before T and after T in their choice of positive values for $y_s(T)$'s in order to “solve” this truncation problem is an interesting issue that has been much explored in the theoretical literature on long-term planning. However, we wish to concentrate on how to cope with missing information during the planning horizon – that is, for $t = 2, 3, \dots, T$, rather than lack of post- T information. Readers interested in an excellent explanation of the truncation problem and the pros and cons of various solutions should see chapters 11 and 12 in Heal (1971). Heal ends by endorsing a solution proposed initially by Hammond and Mirrlees (1973) known as an “agreeable plan,” which strikes us as the most theoretically satisfying way to handle truncation problems. In any case, we will offer no further suggestions with regard to dealing with truncation.⁴

Information issues in central planning

The initial criticism of central planning was that *even if* the central planning board knew all of the “givens” above, it could never solve the programming problem for even a moderate-size real-world economy. This objection, that the calculation problem was simply overwhelming, initially raised by Enrico Barone, was valid early in the 20th century, and gave rise to the practical necessity of using the method of *material balances* discussed below to arrive at plans in the early years in the Soviet Union. However, advances in mathematical programming theory and computer technology have rendered this original critique obsolete. Why the Soviet Union, and other countries that began to use central planning after WWII, did not take advantage of advances in mathematical programming theory and computer capabilities as they became available but persisted in using the method of material balances to generate plans, is an interesting question we need not go into here. However, there can be no doubt that as we enter the third decade of the 21st century, the original criticism of comprehensive socialist planning – namely, that due to the size of the programming problem it is technologically impossible for a CPB to calculate an efficient, detailed, comprehensive plan for a modern economy – is no longer valid.

The second criticism focuses on whether the CPB could ever discover all the “givens” it needs to solve the planning problem. Consider only the single-year model: It should not be difficult for the CPB to determine the size of stocks of capital goods, natural resources, and labor supplies available at the beginning of the year – \mathbf{k}^* , \mathbf{r}^* , and \mathbf{l}^* . But what about the value to society of different goods we can produce? How can the CPB know \mathbf{v} ? And what about all the different production technologies? How can the CPB discover $\{\mathbf{A}, \mathbf{K}, \mathbf{R}, \mathbf{L}\}$, which includes multiple techniques for producing each good? We consider these “information problems” at the center of the “tacit knowledge” critique of central planning in turn.

Finding the social welfare function

There are three ways the central planning board might find \mathbf{v} , the social values for the different final consumption goods: (1) Some political authority could provide the CPB with \mathbf{v} . (2) The CPB could use information from prices in retail outlets to find \mathbf{v} . Or (3) citizens could vote for \mathbf{v} .

The social values of different goods could be given to the CPB by an omniscient, vanguard revolutionary socialist leadership. The authoritarian implications of any such undemocratic political process for deciding \mathbf{v} are obvious. And in combination with the inherently authoritarian role structures of central planning discussed in the next chapter, the results are predictably disastrous. The tension we expect between preference fulfillment and human development might suggest the desirability of combining political determination with market or voting procedures discussed below. More than a few socialists have

imagined that revolutionary “philosopher kings,” a.k.a. the political vanguard who are presumed to have an advanced state of consciousness, would represent a positive, transformational, developmental counterweight to the fulfillment pole expressed by “the masses” through market or voting procedures. But we can think of *no* good reason to grant a political group *any* authority beyond its ability to influence outcomes through persuasion, backed by whatever credibility it may have earned due to demonstrated wisdom.

Alternatively, the CPB could use prices from retail outlets to find \mathbf{v} .⁵ We can use the heuristic model for a single time period to illustrate how this might be done.

- 1 The CPB solves the primal programming problem using an arbitrary initial vector of social values, \mathbf{v}
- 2 Producers deliver their net output, $\mathbf{y} = (\mathbf{I} - \mathbf{A})\mathbf{x}$, to retail outlets
- 3 With whatever income they have, citizens purchase goods in these retail outlets
- 4 Managers of retail outlets adjust the price of every final good, $p(j)^m$ until demand equals supply

Since the initial \mathbf{v} used by the CPB was arbitrary, there is no reason to expect the market clearing price in the retail outlets, $p(j)^m$, to be equal to the marginal social cost of producing good j , which was calculated using \mathbf{v} as the vector of relative social values. Nonetheless, as already explained, the CPB can calculate $p(j)^o = \mathbf{p}(k)^o \mathbf{k}(j) + \mathbf{p}(r)^o \mathbf{r}(j) + \mathbf{p}(l)^o \mathbf{l}(j) + \mathbf{p}^o \mathbf{a}(j)$ using \mathbf{v} even though $p(j)^o$ is not “optimal.”

- 5 If $p(j)^m > p(j)^o$ the CPB increases $v(j)'$. If $p(j)^m < p(j)^o$ the CPB decreases $v(j)'$
- 6 The CPB then *replaces* the initial, arbitrary vector of social values, \mathbf{v} , with a new vector \mathbf{v}' and solves the primal programming problem again using \mathbf{v}' instead of \mathbf{v}
- 7 Steps 1–6 are repeated until $p(j)^m = p(j)^o$ for all j

Eventually $p(j)^m$ will equal $p(j)^o$ for all j , and we will have an optimal production plan, \mathbf{x}^o , given consumers' preferences and the distribution of income.

In market economies, demand affects supply by influencing price in individual markets. As just explained, in central planning, demand expressed in retail markets would influence supply via repeated recalculation of the entire economy production plan eventually using a \mathbf{v} that yields $\mathbf{p}^m = \mathbf{p}^o$. Clearly, in any real-world setting beginning with last year's prices from retail outlets as this year's \mathbf{v} would be a big improvement over starting with an arbitrary \mathbf{v} . But our purpose here was simply to explain how it is possible, at least in theory, for a CPB to use information from retail outlets to determine relative social values they need for their objective function, at least for private goods. We do *not* recommend this or any other way to practice central planning.

Finally, a third way to determine \mathbf{v} is to give every citizen “points” to use to vote for different goods, where voters would assign more points to goods they like more. The CPB would then simply add up all the points people voted for each good to find \mathbf{v} . It is worth pointing out two things in passing:

- While using prices from retail outlets to find \mathbf{v} provides no solution for valuing public goods, voting faces no such obstacle. There is no reason voters could not signal preferences for public goods by assigning them some of their points.
- Clearly, if some citizens are given more points than others to use when voting – for whatever reason – they would have a greater impact than others on \mathbf{v} and, therefore have a greater impact, or say in what the economy produces than others do.

There are a host of problems that have been analyzed with voting mechanisms for social welfare functions. But we want to give voting every benefit of the doubt in order to focus on our primary concern in the next chapter – namely, that even at its best, voting for the planning objective function in central planning is not the same as economic self-management. So for now we will assume: (1) Perfect democracy – every member of society has the same number of points to vote. (2) Voting is well informed, based on the fullest possible discussion of the merits of different arguments in the social welfare function and complete knowledge of both the fulfillment and development effects of all goods by all voters. (3) Voting is not corrupted by “gamesmanship” or “coalition formation.” And finally, (4) we rule out all manner of complications much discussed in the literature on majority voting such as the problem of “cyclical majorities” and the “paradox of voting.”⁶

Under all these generous assumptions we can imagine that \mathbf{v} might be found by simply allowing citizens to vote. For the record, while we may be less daunted than some others by the formidable literature detailing conceivable difficulties with majority voting, we by no means deny these problems. For an excellent interpretation of this technical literature, see MacKay 1980. But for now we waive all such objections in order to focus in the next chapter on a different problem with voting specific to central planning.

Responding to the tacit knowledge critique

The second “information problem” for central planning is how the CPB can discover all the different productive technologies available to different production units to produce their goods – $\{\mathbf{A}, \mathbf{K}, \mathbf{R}, \mathbf{L}\}$ in our one-year model. This, of course, is the famous *tacit knowledge critique* of central planning initially expounded by the Austrian economists Ludvig von Mises and Friedrich Hayek, but has been accepted as definitive by many economists, including economists who support market socialism in part because they believe the tacit knowledge critique of comprehensive planning is valid. According to this criticism:

*While it may be possible for a central planning authority to calculate an optimal plan if it knows $\{A, K, R, L\}$ which include multiple different “activities” for producing each good; it is impossible **in practice** because only local personnel know the technological capabilities of their own production units, i.e. what all these different possible production “activities” are, and it is impossible for the CPB to obtain this vast quantity of “tacit knowledge” from production units.⁷*

Like the first criticism of central planning, which was valid at one point in time, the tacit knowledge critique of central planning carried weight prior to the advent of a theoretical literature in the late 1960s, when an interesting collection of economic theorists set out to address the challenge to central planning posed by the tacit knowledge critique. Edmond Malinvaud stated the problem squarely:

The planning bureau cannot be aware of all the information needed for a perfect description of techniques. These are too numerous, complex, and diverse. Only the individual firms or highly specialized industry offices can have precise knowledge of the conditions governing production in their particular field. Some way must, therefore, be found for these firms and offices to participate in the preparation of the plan (Malinvaud 1967: 170).

What Malinvaud means here by “participate” is to provide information about production capabilities (the multiple different recipes available to production units) to the CBP, which will then allow the CPB to calculate an optimal production plan. In this section we investigate procedures for accomplishing this. We begin our analysis with the method of “material balances” because it was the most common way central planners gathered information in the actual practice of central planning, although it is least interesting from our point of view because, as we will see, it is demonstrably inefficient. We then consider various iterative procedures involving trial prices, trial quantities, and a gradient search that are more interesting because they can, in theory, provide the information about different production technologies the CPB needs to calculate an efficient plan.

Material balances

Benjamin Ward explains the procedure of material balances as follows: The planning bureau starts with a known bill of final demands for each sector. Its task is to find a bill of gross outputs for each sector that is consistent with this bill of final demands and with the production technology. The procedure is as follows:

- 1 The bureau reports to each sector its corresponding final demand.
- 2 Each sector calculates its input requirements if it is to produce this final demand. To do this, each sector simply multiplies each coefficient in its

column of \mathbf{A} [the intermediate good input coefficient matrix for the economy]⁸ by the final demand. [Ward assumes that each sector, or industry, knows its own technology – that is, its own column in the $(n \times n)$ economy input-output matrix \mathbf{A} but no other columns, and that the central planning board does not know any of the columns at all.] The results are reported to the bureau.

- 3 The bureau adds the input requirements for each good in each sector together and reports these to the sectors as additions to the previously assigned output level [the final demands in the first round].
- 4 The process continues until further additions to requirements become insignificant. The bureau then takes its total requirements for each sector as the desired plan and assigns these as production targets to the individual sectors (Ward 1967: 45).

Ward observes that “this process is equivalent to the power series expansion solution to a system of linear equations” in which it is assumed there is only one way to produce each good, and that “the process converges for reasonable technologies.” But whereas “the calculations are extremely simple,” and “a minimal amount of communication is involved . . . the scheme is inflexible (in that) there are assumed to be no technological options for the sectors . . . no account is taken of limitations on the attainable level of production,” and most importantly, “there is no optimizing (since) the final demands are given a priori, and opportunities that may exist for achieving higher performance levels are ignored” (Ward 1967: 45–56).

Nonetheless, the method of material balances allows the CPB to come up with a plan without knowing in advance the production technologies being used by any of the individual sectors. But regardless of some of the practical advantages pointed out by Montias (1959) in his analysis, as Ward points out, the process is inherently inefficient because (a) it does not take advantage of alternative technological processes available to firms and sectors, and (b) it does not take advantage of opportunities to substitute goods that cost society less to produce for goods that cost society more to produce. It also requires repeating the entire process over and over until a gross output vector is found that does not require more of any category of labor, natural resource, or capital stock than is available. Despite all these shortcomings, the method of material balances remained the most common way of planning in centrally planned economies right up to the time when central planning was abandoned in the Soviet Union and Eastern Europe.

Trial prices

Danzig and Wolfe (1961) were the first to propose an iterative procedure where “the center proposes tentative resource prices, the producing units develop corresponding profit-maximizing production programs (with prices treated parametrically),” and the center then proceeds to revise its proposed

prices in light of the production programs received. An optimal solution to the economic programming problem can be reached using this procedure although it is necessary to assume that there are no technological externalities; that all constraints are linear, both at the level of single production units and at the overall level of the economy; and that “the objective function and the overall constraints are ‘additively separable.’” It is because of the assumed linearity of individual unit constraints that the units can use linear programming techniques to solve the “primal” problems posed to them at each iteration by the CPB. And it is because of the assumed linearity of economy-wide resource constraints that the CPB can use linear programming techniques to solve the dual problems posed at each successive iteration. The presumed absence of externalities and assumption of “additive separability” guarantees that the solution reached in a finite number of steps will be an economy-wide optimum.

Baumol and Fabian (1964) extended Danzig and Wolfe’s procedure “to situations where constraints pertaining to single producing units are nonlinear, while the overall constraints pertaining to resources needed by all units remain linear.” Obviously, the individual units can no longer use any of the well-known algorithms for solving linear programming problems but must instead use some effective algorithm for solving nonlinear programming problems to calculate their individual production plans at each iteration.

However, the best-known procedure for arriving at an optimal production plan through the use of trial prices is that of Edmond Malinvaud. In Malinvaud’s procedure:

The center proposes prices to the producing units which, in turn, determine production plans maximizing the value of the firm’s output in terms of those prices. The center then builds up its picture of each unit’s production set by taking all convex mixtures of its previous proposed input-output vectors, together with the initial feasible vector, assumed known to the center. . . . Treating its pictures of the production sets as if they were the actual sets, the center then maximizes its utility function [the social welfare function] subject to the resource availability constraint and proposes a new set of prices corresponding to the relevant marginal rates of substitution (Malinvaud 1967: 174).

In this manner the CPB can formulate an optimal plan under the following conditions:

The bureau knows the set X of acceptable final consumption, the vector representing available resources, and the utility function $u(x)$ [the social welfare function]; but . . . it does not know a priori the specifications of the sets Y_k (the production possibility sets for the individual production units). On the other hand, firm k has perfect knowledge of its own set of technical possibilities Y_k , but does not know the sets

which apply to other firms; nor the set X , the [resource] vector, or the function $u(x)$ (Malinvaud 1967: 175).

The assumptions necessary are that the individual production sets are closed, bounded, and convex; the set X is closed, convex, and bounded from below; the function $u(x)$ is continuous and concave; and the planning bureau knows a feasible program to begin with. Under these conditions, Malinvaud's procedure of trial prices yields a feasible plan at every iteration, is "well defined," "monotonic," and "convergent." "Well defined," meaning that "there always exist solutions to the operations according to which the firms' proposals, the prospective indices, and the plan can be determined," yielding a feasible program. "Monotonic," meaning that the value of the social welfare function is never lowered in any successive iteration. And "convergent," meaning that as the iterations increase indefinitely, the value of the social welfare function "tends to the value u^* , the least upper bound of $u(x)$ over the set of feasible programs."

Trial quantities

Kornai and Liptak make very similar assumptions concerning the economy as in the Danzig and Wolfe model – namely, that there is "block angularity" or subsets of constraints each pertaining to a given sector as well as resource constraints affecting the whole economy. In the Kornai and Liptak procedure, however, the kind of proposals made by the center and the units are reversed.

In the dialogue, the center proposes allotments of scarce resources to the various sectors: then each sector responds with shadow prices (marginal rates of substitution) minimizing the value of the allotment subject to sectoral dual constraints (nonprofit condition for every sectoral activity). The center's aim, on the other hand, is to maximize the contributions of the sectors to the objective function, i.e., to maximize the value of the allocated resources at the shadow prices received from the sectors, subject to the limitation of available resource totals (Kornai and Liptak 1965: 141–142).

Although Kornai and Liptak are able to establish convergence with any desired degree of accuracy by structuring the dialogue as a fictitious game, they are not able to guarantee that the solution will be achieved in a finite number of steps, nor is their procedure completely informationally decentralized "since each sector's resource sectoral allotments must be large enough ('evaluable') to assure the existence of a feasible solution for that sector." A number of other "quantity-guided" procedures are designed specifically for nonlinear economies. One of Stephen Marglin's (1969) mechanisms requires "the center to allocate the scarce resources on the basis of information obtained from the producing units concerning their marginal productivities and their excess demands, adjustment ceasing when aggregate excess demand is zero and the

marginal productivities of producers are equalized.” GM Heal (1969) developed a similar process in which:

The CPB proposes an allocation of inputs amongst firms, and these latter respond by informing it of the outputs that these would make possible, and of the marginal productivities of the inputs at this allocation. In the light of this data the CPB proposes a new allocation of inputs in which, by comparison with the previous one, resources have been shifted towards the uses where they are most marginally productive, and away from those where their marginal contribution is least (Heal 1969: 347).

Heal’s first procedure (1969) is capable of handling both intermediate goods and joint products. Dreze and de la Vallee Poussin (1969) and Malinvaud (1970) also developed “quantity-guided” procedures that are interesting in their ability to handle mixtures of public and private goods. Weitzman developed a quantity-guided procedure that is a dual to that of Malinvaud.

While Malinvaud’s center is rather timid and only considers plans known to be feasible for the units, Weitzman’s central planning agency constructs imaginary production sets it knows to be too ambitious, formulates targets that are, in general, infeasible and then lets the units scale down the proposals to feasible levels. . . . Convergence is assured even in a finite number of steps when the production sets are polyhedral (Hurwicz 1974).

Whereas the procedures of Marglin, Heal, and Dreze and de la Vallee Poussin all maintain feasibility, are convergent, and monotonic, Malinvaud’s “quantity-guided” mechanism does not maintain feasibility or monotonicity, and Weitzman’s procedure fails to maintain feasibility. Finally, none of the procedures that are of a pure “price-guided” or pure “quantity-guided” variety are applicable in cases where individual production units’ possibility sets are nonconvex and are specifically not applicable in the presence of increasing returns to scale. This is not the case with some of the procedures that mix price-guidance with quantity-guidance, discussed next.

It is also possible to combine price-guidance with quantity-guidance. Heal (1971) describes a procedure using mixed price and quantity guidance that “locates a local maximum of the objective function even in the presence of increasing returns to scale, that satisfies Malinvaud’s feasibility and monotonicity criteria and has some of the informational economy of price-guided procedures.” The “essential informational feature” of Heal’s second procedure “is that certain functions of each producing unit’s marginal productivities (roughly, its shadow prices for particular resources) must be conveyed to the center.” But whereas in Heal’s first mechanism the center’s only response was to “calculate improved resource allotments” and issue them as new trial quantities, in his second method, the center may also “calculate and send to the units a resource price (the same for all units) and so enable them to determine their

respective resource requirements” (Hurwicz 1974: 12). This added flexibility at the center, combined with a procedure requiring agents in the economy “only to raise rather than maximize the magnitudes in which they are interested (is what) gives . . . the procedure added stability and allows it to converge to an optimum even in the presence of increasing returns” (Heal 1971: 281).

The interesting feature of Aoki’s 1970 procedure is that it can handle mixtures of private and public goods by using “price-guidance for private goods and quantity-guidance for public goods.” In Aoki’s procedure, producers

develop production plans that maximize net revenue given the central “guidelines” (prices for the private goods and quantities for the public goods), and convey to the center their demands for private goods and marginal evaluations, including marginal cost, for public goods. The center, in turn, adjusts the price of each private good according to the difference between its marginal utility and price. . . . The targets for public goods are increased in proportion to the net aggregate of marginal valuations (users’ minus producers’) (Hurwicz 1974: 14).

Gradient procedures

We conclude with a brief description of a particular kind of price-guidance, gradient procedures. For a linear economy, Koopmans (1951) described an

allocation game to be played . . . by a helmsman (setting the prices of final goods) . . . commodity custodians (adjusting the prices of resources according to excess demand), and activity managers who determine the production programs. Koopman’s adjustment rule . . . is that managers expand profitable activities and curtail those bringing losses (Hurwicz 1974: 14).

Unfortunately, Samuelson (1966) demonstrated that this procedure yields non-convergent results in constant returns economies. However,

in an economy where all functions (including the utility indicator) are strictly concave similar rules produce a process with the desired stability properties. Utilizing the notion of a gradient approach to the saddle point of the Lagrangian expression, Arrow and Hurwicz (1960) used the following rules: the helmsman, taking the prices of desired commodities as given, changes each final demand at a rate equal to the difference between its marginal utility and price; each manager, again taking prices as given, changes the scale of his process in proportion to its marginal profitability; each commodity custodian varies the price of his commodity in proportion to excess demand (Hurwicz 1974: 14).

Although this gradient process converges to an optimum, the strict concavity assumptions are critical, and none of the intermediate plans are feasible. The

original gradient process of Arrow and Hurwicz was formulated in continuous time, but Uzawa (1958) constructed a discrete time parameter counterpart that overcame this undesirable feature of the Arrow-Hurwicz process.

In conclusion, we have gone to great lengths to describe different ways in which a CPB might arrive at an optimal plan without being aware, initially, “of all the information needed for a perfect description of techniques, [since] only the individual firms . . . can have precise knowledge of the conditions governing production in their particular field.” Our immediate purpose was to demonstrate that information problems are not as daunting as critics have claimed and, at least in theory, might be overcome. In particular, the widening of the set of iterative procedures explored by an innovative literature to cope with situations ever farther from “classical” conditions is sufficiently impressive to suggest that there are indeed ways to overcome the tacit knowledge critique of central planning that so many today consider definitive.

In short, just as the advent of mathematical programming theory and modern computers rendered the first objection to central planning obsolete – that it is technologically impossible to calculate an efficient detailed, comprehensive plan for a modern economy – the iterative procedures reviewed earlier cast doubt on the second objection raised to central planning by critics in the “socialist calculation debate” – that it is impossible, even in theory, for a CPB to discover the tacit knowledge about production possibilities that only personnel in production units possess.

However, the various iterative procedures for solving the “information problem” of transferring knowledge about productive potentials from local units to the CPB raise a new problem: Are these procedures “incentive compatible?” Or are there perverse incentives for managers to report untruthfully? We address these “practical” questions and also explore what we consider to be a more fundamental problem with central planning in the next chapter – namely, that *even if* planners gather accurate information about the capabilities of production units, and *even if* the social welfare function is determined democratically, central planning is antithetical to worker self-management.

Notes

- 1 To be clear: One “activity” to produce one unit of good j would be to use all the inputs listed in the following column vectors: $[a(1j), a(2j) \dots a(nj)]$, $[k(1j), k(2j) \dots k(mj)]$, $[r(1j), r(2j) \dots r(sj)]$, and $[l(1j), l(2j) \dots l(uj)]$. One entry in the vector of “activity” levels, \mathbf{x} , $x(j)$, tells us how many times we want to use this activity and therefore how many units of j we want to produce using this activity or technology. A second “activity” to also produce one unit of good j would be to use the inputs listed in a different set of column vectors: $[a'(1j), a'(2j) \dots a'(nj)]$, $[k'(1j), k'(2j) \dots k'((mj)]$, $[r'(1j), r'(2j) \dots r'(sj)]$, and $[l'(1j), l'(2j) \dots l'(uj)]$. And a different entry in the vector of activity levels, \mathbf{x}' , $x(j')$, tells us how many times we want to use this second activity or technology and therefore how many units of j we want to produce using this second activity.
- 2 This model of central planning ignores problems we deal with later when we discuss long-run development planning in Part V. One way to interpret this model is that every year particular quantities of different kinds of labor and particular quantities of different

natural resources and environmental sink services simply become available – like manna from heaven – and the planners' job is to draw up the best production/consumption/investment plan possible for whatever exogenous annual supplies of these “primary” inputs appear every year. Another way to interpret the model is to imagine that long-run educational and environmental planning has determined the “primary” inputs in this model. In this interpretation the supplies of different primary inputs available each year are not supplies that drop like manna from heaven, but instead the result of efficient long-term educational and environmental plans.

- 3 Notice that only initial capital stocks have an opportunity cost in a multi-year planning problem. Capital goods for $t = 1 \dots T$ have social costs of production, just as intermediate and final goods in all years do.
- 4 Besides the truncation problem, there are a host of other issues not addressed here. All our multi-good, multi-year model has illustrated is how a CPB might calculate an efficient production/consumption/investment plan under certain assumptions. For a discussion of ways to distribute final goods and assign workers to production units efficiently and how one might make central planning efficient even if preferences are endogenous, see sections 9.2.2, 9.2.3, 9.2.4 and 9.2.5 in Hahnel and Albert 1990.
- 5 Using prices from retail outlets does not solve the problem of finding the social values of public goods or goods where there are external effects associated with their consumption. But we leave those problems aside for the moment to explain how prices in retail outlets could be used to at least estimate the social values of private consumption goods.
- 6 What if, after giving everyone the same number of points to vote to determine \mathbf{v} , and the CPB then uses that \mathbf{v} to calculate its production plan, \mathbf{x}^o , people were given *different* incomes with which to buy goods in retail outlets? This would create discrepancies between \mathbf{p}^m and \mathbf{p}^o . But in this case there is no reason to change \mathbf{v} and recalculate a production plan. As long as managers of retail outlets follow step #4 above, \mathbf{p}^m will eliminate excess demands and supplies. Discrepancies between \mathbf{p}^m and \mathbf{p}^o simply reveal that when we give some people more votes than others by giving them more income to vote with, we will predictably get a different social welfare function than when all have the same number of votes to cast. There is no reason this different social welfare function should be considered superior to or more valid than the one where all had the same points to vote and therefore no reason to recalculate \mathbf{x}^o as there was when the initial \mathbf{v} used by the CPB was arbitrary.
- 7 Recall that $\{\mathbf{A}, \mathbf{K}, \mathbf{R}, \mathbf{L}\}$ are matrices that represent *all* the *different* ways each good can be produced. In other words, there are *multiple* columns in each matrix for producing *each* good, not just a single “recipe.” What must be decided is not only how much of each good to produce but how much of each good to produce using each recipe or activity. If there were only one way to make each good, there would be no “tacit knowledge problem.”
- 8 This input-output matrix for the economy, which is traditionally called the \mathbf{A} matrix, is *not* the same as the \mathbf{A} matrix in the economy production possibility set we have described as $\{\mathbf{A}, \mathbf{K}, \mathbf{L}, \mathbf{R}\}$. Here the \mathbf{A} matrix contains only a single column listing the quantities of the various produced inputs actually, or currently used, per unit of output produced by an entire industry. So if there are n produced goods, this input-output matrix \mathbf{A} is an $(n \times n)$ matrix. The \mathbf{A} matrix in $\{\mathbf{A}, \mathbf{K}, \mathbf{L}, \mathbf{R}\}$ discussed previously has *many* columns listing different combinations of produced inputs that any and all enterprises in an industry might use to produce a unit of each output. In other words, the \mathbf{A} matrix in $\{\mathbf{A}, \mathbf{K}, \mathbf{L}, \mathbf{R}\}$ has many, many more columns than rows and is an (m, n) matrix with $m \gg n$ because there are many possible technologies for producing each of the n goods. The \mathbf{K} , \mathbf{L} , and \mathbf{R} matrices in $\{\mathbf{A}, \mathbf{K}, \mathbf{L}, \mathbf{R}\}$ also all have $m \gg n$ columns.

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4 Central planning

Why *not* to do it

While neither the “impossible to calculate” nor “tacit knowledge critique” of central planning proves to be as convincing as most critics of central planning would have people believe, we believe there are more compelling and more important arguments against central planning. First of all, there are practical reasons to conclude that any and all procedures a CPB might deploy to elicit information about productive capabilities from units will always meet with resistance because under central planning truthful reporting is inherently difficult to render “incentive compatible.” More importantly in our view, putting all information problems aside, and even if decision-making is as democratic as possible, central planning is inherently incapable of providing workers with economic self-management. This chapter elaborates on these two problems in turn.

Central planning: an information game of cat and mouse

Only those in local production units know what they are truly capable of. Under central planning this knowledge must be transferred to the CPB, so the CPB can calculate an efficient production plan. Real-world CPBs used the system of material balances to elicit information even though it failed to adequately address the complications of multiple techniques and substitution in consumption and was therefore demonstrably inefficient. And while economic theorists in the 1960s and early 1970s devised a variety of clever iterative procedures that a CPB might deploy to elicit information about multiple techniques from production units, no real-world central planning system ever took full advantage of them.

However, the iterative procedures we reviewed last chapter rely on units to *respond truthfully*. What if it is in the interest of units to disguise their true capabilities and mislead the CPB? What if units stand to benefit from making the CPB believe they are capable of less than they truly are? While the CPB can be more or less sophisticated and clever in how it goes about eliciting information, we are inevitably left with a game of “cat and mouse” between a CPB “cat” – who wants accurate information about units’ multiple productive

capabilities – and production unit “mice” – who want the CPB cat to believe they are less capable than they truly are.

In the end, under central planning, production units know that the CPB is going to assign them production targets and inputs they will be allocated to meet them. And units know the CPB would like them to work up to their maximum capabilities – that is, produce the very most they can with the inputs they are assigned and not use any more inputs than necessary to produce their output. But this means working hard. This means taking every precaution not to waste inputs. And while this may well be in the social interest since everyone benefits if everyone works hard and economizes on the use of scarce productive resources, it is not usually how a particular group of workers can most enjoy the time they spend on the job. Working at a more relaxed pace is generally more pleasant than exerting maximum effort. And it is often convenient to have extra inputs on hand just in case things go wrong.

But even more importantly, it is dangerous for managers of production units for the CPB to know what their unit is truly capable of. What if their unit underperforms? In central planning, promotions or demotions, bonuses or fines for managers, all hinge on whether the unit they are responsible for meets its production target with the resources it is allocated. In this situation it is advantageous for managers if the CPB can be induced to give them a production target well within the unit's reach and assign them more resources than they truly need to meet their target. Which is why central planning is essentially a game of cat and mouse: Managers of production units have an interest in the CPB believing they are capable of less than they truly are. The CPB knows it must take information conveyed by units with a grain of salt. And the “back and forth” that goes on between the CPB and the production units is the cat and mouse game that results.¹

As explained in the last chapter, under price-guided and gradient mechanisms, the CPB attempts to gather ever more information about the production possibility sets of individual units by issuing prices and receiving back from units feasible production plans that maximize the value of the unit's net output in terms of those prices. The CPB retains unit responses and formulates what it hopes is an ever more accurate picture of each individual unit's production possibility set by forming the convex hull of all previous proposals. Quantity-guided procedures scale down infeasible productions to feasible ones, rather than expanding an initial feasible production into the set of all feasible productions, but the end result, and the problem, is the same. As Martin Weitzman wrote about his own proposal:

The approach taken . . . views the planning procedure as a learning process whereby the center iteratively comes to understand more and more exactly the relevant parts of the production possibility sets without ever requiring any firm to transmit the entire set (Weitzman 1970: 54).

While this is undoubtedly what the CPB seeks, unfortunately it is not in the interest of units for the CPB to “understand more and more exactly” what their production possibility sets truly are. Instead, there are *perverse incentives* for managers to try to deceive the CPB about their unit’s capabilities in order to influence the production targets and input allocations they receive and, thereby, their possibilities of winning reward and avoiding punishment.

In our view, treating this “principal-agent” problem as the key problem central planners face is on the mark. Abram Bergson (1978) seems to be the first to have posed the relationship between central planners and plant managers as a principal-agent relationship. While Bergson did not work out the implications of moral hazard in this setting, Pak-Wai Liu (1986, 1987), Kent Osband (1987), and Pamela Brown, Jeffrey Miller, and James Thornton (1987) took up Bergson’s challenge and examined central planning as a principle-agent problem. And Keren (1972), Weitzman (1976, 1980), Bonin (1976), Bonin and Marcus (1979), Holmstrom (1982), and Granick (1983) all provide ample evidence that in the decades before its demise, Soviet authorities spent considerable energy trying to combat attempts by units to misinform central planners.

Admittedly, the incentive for management to dissimulate to “higher authorities” is not unique to centrally planned economies. As Pak-Wai Liu observed, “The nature of the problem of the socialist planner in motivating and rewarding socialist managers . . . bears much similarity to the problem of motivating branch or divisional managers of a capitalist corporation” (Liu 1986). Moreover, it is not obvious that the problem is structurally any different from the problem stockholders in private corporations have knowing whether the managers they hire are really maximizing profits. Is there not an incentive for managers of privately owned enterprises to “downplay” potentials and expectations to stockholders in order to enhance their rewards and avoid punishment? But just because corporate capitalism suffers from a similar perverse, principle-agent incentive does not make it any less of a problem for central planning, where given the importance of the “principle” as the agency planning the entire economy, its negative effects are far greater.

The outcome of the central planning principal-agent game and, in particular, the accuracy of information transferred depend on the ability of the CPB to (a) judge the veracity of information provided and (b) punish managers for providing false information. Real-world CPBs used a variety of tools to encourage truthful reporting and punish false reporting such as technical departments within the planning ministry to better enable the CPB to challenge the veracity of information conveyed by production units; cross comparison of responses from similar units; moral and material incentives; and sometimes, most notably under Stalin, draconian tactics such as purges of managers and “group punishment” for all workers in units when the CPB felt betrayed. More importantly, there is now a large amount of theoretical literature on mechanisms any “principle” who lacks information might use to

induce an “agent” who has information to reveal it more truthfully. And with the benefit of hindsight, it may well be that nowhere could these mechanisms have been more useful than to address the principle-agent problem between the CPB and production units endemic to central planning. Nonetheless, in the end, what all this would have amounted to would have been more clever stratagems for the cat.

Early socialists assumed that once workers were freed from capitalists devoted only to their private profits and from the “anarchy” of markets, aided by a well-meaning planning ministry, workers would cooperate to seek to promote the social interest. But instead what evolved under the incentives inherent in central planning was an adversarial “game” pitting mice in production units against a CPB cat, in which the mice had a perverse incentive to mislead the cat, forcing the CPB “cat” to devote ever more resources and energy to uncovering and punishing rodent transgressors.

Proponents of central planning interpret the “up and down” interactions between production units and the CPB – which they sometimes describe as “back and forth” to avoid suggesting a hierarchy – as evidence that workers are participating actively in the generation of an economic plan with the aid of the CPB. But in fact this is not what is going on in central planning at all. Instead what is happening during all the “up and down” interactions is the CPB is attempting to seduce production units into supplying information, so the CPB can calculate a plan for the units to carry out. Moreover, the back and forth is not a straightforward exchange of simple questions posed by the CPB and honest answers from units, as is sometimes assumed. It is a strategic game played between players with different interests, at the conclusion of which the only “management” central planning leaves to individual production units is to “manage” to fulfill the production targets they are assigned by the CPB with the inputs they are allocated. In other words, after playing a cat-and-mouse game in which the CPB attempts to trick production units into revealing their capabilities, the true relationship between the CPB and production units is revealed for what it is – a *command relationship* between a superior and inferior. Benjamin Ward described the central planning hierarchy as follows:

There is a partial ordering of participants . . . such that each is either a superior to or a subordinate of some other participant . . . and such that no participant, directly or indirectly, is both superior to and a subordinate of another (Ward 1967: 58).

Moreover, the authoritarian character of the relationship between the CPB and production units is likely to spread inside production units for two reasons. First, an authoritarian relationship requires that a superior agent have effective means for holding a subordinate agent accountable for carrying out directives. This entails establishing methods of surveillance and verification as

well as incentives for subordinates to obey orders. Historical evidence suggests that it quickly became evident to CPBs that it is easier to hold a unit manager accountable for carrying out directives than to try and establish complicated methods of surveillance, verification, and incentives sufficient to hold an entire democratic council of workers in the production unit accountable. Of course, once the CPB chooses to deal with a unit manager whom they appoint, rather than a democratic worker council, it is only logical to grant the manager authority over the workers. In this way, the hierarchy spreads downward in a centrally planned economy, as plant managers appoint assistant managers and supervisors, creating an authoritarian hierarchy with ordinary workers at the bottom. Second, once these hierarchies are established, they will eventually affect people's consciousness and personalities: Apathy among the ranks of subordinates is the flip side of the authoritarian coin. So just as authoritarian hierarchies became the institutional hallmark of centrally planned economies, apathy became the salient behavioral characteristic of workers under central planning, as we now explain.

Central planning obstructs worker self-management

Last chapter we described three different ways a CPB might go about finding the objective function it needs to calculate a plan. Real-world central planning always used either the first or second method. Either political authorities told the CPB what the economic objectives were, or the CPB used prices in retail outlets as guides. Or, more often, a combination of these two methods was used, with the relative emphasis varying during different political periods. Since our goal is to demonstrate why even best-case central planning – that is, central planning that is as democratic as possible – is nonetheless problematic, we will assume \mathbf{v} is determined by democratic voting. And as explained in the last chapter, to give voting every benefit of the doubt, we will assume away a host of potential problems with voting for social welfare functions discussed in the literature.

As explained in Chapter 1, the effects of different economic activities are not usually confined to single individuals or units in the economy, but neither are they evenly spread over all members of society. With this in mind, we defined ***economic self-management*** as *decision-making input, or power, in proportion to the degree one is affected by different economic choices*. Consider the choice of what to produce where you work and how to produce it. Even if there were no externalities associated with production, those decisions will affect consumers, other workers who produce various inputs you need, and everyone more broadly since any scarce resources used where you work will not be available for use elsewhere. Nonetheless, the decision about what you produce and how you go about it will affect you and your coworkers *more* than it affects others. Which is why *you* should have *more* say than others over the decision of what you and your coworkers produce, and how you go about it – although

others should have *some say* over those decisions as well, since they will also be affected, albeit to a lesser degree.

How is the decision about what is produced and how it is produced in your workplace made in central planning? Even in the most democratic version of central planning we can imagine, those decisions will be made when people vote for \mathbf{v} . Once the CPB has \mathbf{v} , it will calculate a production plan, which includes a plan for how much your workplace must produce and what inputs you will be allocated to do this. So if everyone has the same number of points to vote for \mathbf{v} , everyone will have an equal say over what your workplace produces and how you go about it – that is, *everyone else will have as much say as you do*.² Clearly if people have a different number of points to vote for \mathbf{v} , central planning will be less democratic. But even if it is completely democratic, it does not provide economic self-management.

Another way to see the problem is this: I want “extra” authority in the decision-making process when it comes to questions about my workplace. And in return, I am willing to grant more authority to others concerning what goes on in their workplace. Also, to the extent that what others decide affects me, I want some say; and to the extent that what I and my coworkers do affects others, I am willing to grant them some say. Moreover, this is not simply because of differences in information about what the consequences of outcomes are likely to be. Yes, I probably better understand the consequences of decisions about what goes on in the factory where I work, while others understand consequences better in the factories where they work. So we could make an efficiency argument for self-managed decision-making. But more fundamentally, in the case of my workplace, I am more affected – so my preferences and opinions should count for more – and in the case of others’ workplaces, they are more affected – so their preferences and opinions should count for more.

Some of the bias against self-managed work can be alleviated in central planning by including different categories of work activities along with different consumption goods in the social welfare function, as we did in the objective function of the multi-good, multi-year model last chapter. But this in no way solves the problem discussed earlier. To the extent that a skilled carpenter has more power to define the nature, organization, and pace of his or her work activities than an assembly-line worker, people could record their preference for self-managed work by voting fewer negative points for carpentry than assembly-line work when distributing their points among different arguments in the social welfare function. And of course anyone with a strong preference for more self-managed jobs could become a carpenter and avoid work on an assembly line. But even in the most democratic version of central planning imaginable, whether I am a carpenter or an assembly-line worker in a particular workplace, this gives me no more say over choice of product and technology in my workplace than a carpenter or assembly-line worker in a workplace thousands of miles away. *That* problem cannot be overcome by including the

list of different labor activities in the social welfare function, permitting people to indicate their preferences for occupational categories characterized by more self-management when voting on the social welfare function the CPB will use, and choosing what kind of jobs to apply for themselves. For readers interested in a more formal treatment of this problem, chapter 9 in Hahnel and Albert (1990) elaborates on this bias against self-management inherent to central planning, where we prove the following theorems in a dynamic model in which people have endogenous preferences:

Theorem 9.1: Centrally planned economies will “charge” individual job seekers more for self-managed work activities compared to other activities than is socially optimal, resulting in less self-managed work being performed than is socially optimal.

Theorem 9.2: In a centrally planned economy not only will self-managed laboring activities be under paid and under supplied at some initial point in time, but the degree of divergence from optimality will grow, or “snowball” over time. Accompanying the snowballing non-optimal allocations will be a “snowballing” apathy consisting of “warped” human characteristics which undervalue self-managed work activity.

Conclusion

Even if the CPB knows all the primary resource availabilities and initial stocks of capital goods, *even if* the CPB overcomes incentives for local management to dissimulate and discovers the true production possibility sets of all individual units, *even if* every member of society votes an equal number of points in determining the planning objective function and makes no mistakes in their evaluations of both the fulfillment and development effects of different consumption and work activities, *even if* there are no problems with voting paradoxes, *even if* we include different kinds of labor activities or occupations in the social welfare function; central planning *still* has an inherent bias against providing self-managed work opportunities, eventually leading to snowballing apathy among its participants. While this would be true for even best-case, highly democratic versions of central planning, what eventually transpired in all real-world versions of central planning was far worse. Together with a vanguard political elite, a *coordinator class* of central planners and plant managers increasingly came to rule over ordinary workers who became ever more apathetic. And like any political elite, and any ruling class, the political vanguard and coordinator class in centrally planned economies awarded themselves ever more perks and material rewards as well.

The “Achilles heel,” or “fatal flaw,” in central planning lies *not* in its inability to cope with information problems however considerable those may be – the focus of most mainstream critiques – but instead in the fundamental inability of central planning to provide workers with self-managed work opportunities – ironically what socialism initially promised workers, above all else.

Notes

- 1 As readers will discover in Part III, this is *not* the case for the participatory planning procedure we propose. We were at pains when designing a planning procedure not only to avoid this principle-agent, cat-and-mouse character of central planning, but to *reverse* the incentives for production units. Whereas in central planning it is in the interest of production units to underreport their productive capabilities, as readers will discover in participatory annual planning it is in the interest of worker councils to reveal, or even exaggerate, their capabilities in order to get other councils to approve their proposals.
- 2 As already explained, under the system of material balances, your workplace in all likelihood will be ordered to do something that is inefficient. Whereas if the cat-and-mouse game played by the CPB and units induces units to report their capabilities truthfully, so the CPB has accurate information when it solves the economy programming problem, in theory your workplace might be ordered to do what is efficient. But that is beside the point with regards to who has had how much decision-making authority over what your production unit will do: *Everyone else will have had as much say as you did.*

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Part II: conclusion

In Part I we explained why, however much social democratic versions may improve upon neoliberal versions of capitalism, even “best case” capitalism is inherently incapable of achieving the goals we should aspire to. In Part II we argued that however much democratic versions of central planning might improve upon authoritarian versions, even “best case” central planning is also intrinsically incapable of achieving these goals.

First, we explained in Chapter 3 why the “impossible to calculate” and “tacit knowledge” critiques of central planning are not as compelling as is commonly assumed. Mathematical programming theory and modern computer capabilities have now invalidated the claim that it is technologically impossible to calculate an efficient comprehensive plan for a modern economy even in theory. And various price-guided, quantity-guided, gradient, and mixed iterative procedures published in major economic journals in the 1960s and 1970s, combined with more recent theoretical work on solutions to principle-agent problems considerably weakened the tacit knowledge critique by demonstrating a variety of ways a central authority might try to elicit information about the capabilities of production units that it needs to calculate an efficient plan. However, after “giving Caesar his due” – creating a best-case version of central planning in Chapter 3 and rescuing it from misguided critiques – we proceeded to bury Caesar at the funeral he deserves in Chapter 4.

We first pointed out that all the iterative procedures to solve the tacit knowledge problem reviewed in Chapter 3 assume truthful reporting and explained why there is a perverse incentive for production units to attempt to deceive central planners into thinking they are capable of less than they truly are. And while there are both practical and theoretical ways to ameliorate this perverse incentive between the central planning “principle” and production unit “agents,” the “cat and mouse game” that results remains inherently problematic.

However, in Chapter 4 we proceeded to argue that this “practical problem,” which can be ameliorated but not eliminated, pales in comparison to a more fundamental problem with central planning. Even if we give central planning every benefit of the doubt by assuming that the social welfare objective function is decided democratically, planners get all the information they need about the true productive capabilities of production units, and planners have

sufficient computational capacities to calculate an efficient, detailed, comprehensive economic plan, this would still fail to provide workers with meaningful self-management – leading to worker apathy, and eventually self-serving rule by a *class of coordinators* comprising central planning bureaucrats and plant managers, which is why it is fortunate that central planning appears to now rest in the dustbin of history, even if most speeches at its funeral fell considerably short of the high standard set by Mark Antony.

Part III

A participatory economy

Introduction

Answer to Auntie Tina

[Capitalism] is not a success. It is not intelligent, it is not beautiful, it is not just, it is not virtuous – and it doesn't deliver the goods. In short, we dislike it, and we are beginning to despise it. But when we wonder what to put in its place, we are extremely perplexed.

– John Maynard Keynes (1933)

With all the work we must do responding to economic crises and protecting people and the environment, why is it important to take the time to think through how a desirable alternative to capitalism can work? There is no shortage of scathing indictments of capitalism, and serious anti-capitalist movements have been around since capitalism first burst on history's stage. Yet capitalism has survived despite its many flaws. Why is it so hard to get rid of this bad penny?

The people who profit most from capitalism have developed an arsenal of weapons to disempower the rest of us. There are bright lights flickering in Times Square, clever consumer goods to buy us off, the alluring myth that we are all middle class, as well as the contradictory myth that anyone willing to work hard can climb up into the middle class or beyond. There are various social cleavages that pit us against one another, a sophisticated corporate media that lulls us into a stupor, and the illusion of democracy because we are free to buy, apply for employment, and vote as we please. Ultimately, there is the violence of the police and military if we step too far out of line – or simply belong to a more threatened community. Together, all this forms a brutally efficient system of domination that protects the privileges of the few at the expense of the many.

But these are not the only reasons capitalism has been with us this long. We have argued that capitalism is incompatible with the best of human potentials – which is why we should replace it with an economic system that is not! But unfortunately capitalism is compatible with some of our worst potentials. No economic system totally at odds with human nature could possibly survive as long as capitalism already has if it did not resonate with some part of what human beings can become. Defenders of capitalism play on this fact by claiming

that humans can *only* be reliably motivated by greed and fear, that most people are *incapable* of making good economic decisions and must be told what to do by others who are wiser, and therefore, we can only hope that placing most under the command of a few and forcing the greedy and fearful to compete against one another in markets will yield reasonably desirable outcomes. This is the time-honored “human nature” defense of capitalism. What it amounts to is the defense of a sorry-assed economic system as our destiny because we are a sorry-assed species.

The fallacy in this argument is that it fails to acknowledge that humans have *other* potentials as well – potentials that cannot be fulfilled under capitalism but can become the basis for an economic system in which people manage their own economic activities democratically, fairly, sustainably, and efficiently. The fallacy in the “human nature” defense of capitalism is not that people are not capable of acting out of greed and fear and sheepishly obeying orders – because in an economic system that systematically rewards greedy and fearful behavior, many of us will often behave in these ways. The fallacy is in asserting that in a system where people are given the opportunity to make their own decisions, where people are positively rewarded for embracing a fair distribution of the burdens and benefits of economic activity, where people are rewarded, not punished, for acting in solidarity with others, that in such a system we are incapable of doing so. The fact that we can see people behaving in these positive ways every day despite disincentives to do so is clear evidence that such behavior is not beyond human capabilities.

The “ugly side of human nature is all there is to human nature” lie is the launching pad for the TINA defense of capitalism. In the early 1980s British Prime Minister Margaret Thatcher turned a rejoinder long used by self-serving ruling elites whenever their victims begin to grumble – “There Is No Alternative” – into an unforgettable acronym, TINA. In the middle third of the last century, many on the left responded to the TINA defense of capitalism by pointing to the Soviet Union, or Maoist China, or Castro’s Cuba. Others who could not ignore the increasingly obvious deficiencies in Communist societies succumbed to TINA and resigned themselves to trying to make capitalism a little more humane. *Both responses were mistakes.* As we argued in Part II, Communism was never a desirable alternative to capitalism and, therefore, never a compelling response to TINA. On the other hand, TINA is nothing more than a desperate assertion made by those who are hard pressed to defend capitalism on its merits.

In Part III we begin the process of spelling out a feasible alternative to capitalism in which workers manage themselves instead of working for an employer or a commissar, and worker and consumer councils and federations plan their own interrelated activities themselves without submitting to the dictates of either central planners or markets. We explain how this “participatory economy” can work efficiently and fairly, why it need not tie us up in endless debates at interminable meetings, why it can motivate people to work hard and enterprises to innovate, and why it can protect the natural environment

better than any economic system before it. The remainder of this book is an answer to any who, like Lord Keynes, are increasingly disgusted with capitalism but find themselves “perplexed about what to put in its place.” What follows demonstrates that TINA is not only an empty assertion, it is the ultimate “big lie.” There *is* a highly desirable alternative to capitalism that builds on the best rather than the worst of human potentials, and it is perfectly feasible.

We need a compelling response to TINA because without a vision of something worth fighting for, we cannot expect people to take the risks necessary to change things. We need a response to TINA because without a clear idea of where we want to go, we cannot forge a strategy for how to get from here to there. And finally, we need a response to TINA because *you can't beat something with nothing!*

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5 A participatory economy in brief

This chapter provides an overview of our proposal for how a “participatory economy” would function. Because we have made concrete suggestions to address a very large number of issues that will inevitably arise, because we have responded rather than ignored criticisms raised over the past quarter century, and because our proposal is quite different from more common proposals for how to do comprehensive, detailed democratic economic planning including those evaluated in the appendix to this book, there is a lot for us to present and for readers to digest. This chapter is a first “walk through” what a participatory economy looks like to help readers grasp its major features. We anticipate that many questions will occur to readers as they read this chapter . . . which is good! Hopefully, the chapters to follow in Part III, as well as the proposals for how to do investment and various kinds of long-term development planning in Parts IV and V, will address readers’ questions as well as questions others have raised.

Social ownership

In a participatory economy, everything needed to produce our way of life belongs to everyone, no more to one person than any other. While individuals own personal belongings, everything we need to produce goods and services is owned in common. This includes: (1) natural resources and “sinks” (the *natural commons*); (2) an increasingly complex array of useful manufactured artifacts (the *produced commons*); (3) productive knowledge, technology, or “know-how” (the *information commons*), and all the useful talents and skills people have that allow us to deploy all this natural and produced wherewithal to productive ends. All this *productive commons for modern times* is treated as a joint inheritance, and nobody has any more right to decide how it is used, or benefit from its use, than anyone else. We elaborate further on what we mean by social ownership and how it differs from both state ownership and cooperative ownership in Chapter 6.

Major institutions

The major institutions that comprise a capitalist economy are proprietorships, limited liability corporations, and markets. In a participatory economy the

main institutions are councils – *worker councils* and *neighborhood consumer councils*, who, together with *federations* of consumer and worker councils, coordinate their interrelated activities through a *participatory planning procedure* rather than through a central plan or through market exchange.

Worker councils

We ought to be able to participate in the process of deciding how our work will be organized and carried out. We ought to be able to decide together with our workmates how much to work, under what conditions, at what times, to what ends, and how to divide up various tasks among us. In order for all to have a say in how their workplace runs, everyone who works there is a member of its worker council. In a participatory economy the *worker council* where every worker has one vote is the ultimate decision-making body in any workplace. Just as stockholder meetings, where each stockholder votes as many times as the number of shares of stock he or she owns, is “sovereign” in a capitalist corporation, the worker council, where each worker-member has one vote, is “sovereign” in workplaces in a participatory economy.

In a participatory economy all who work, and *only* those who work in the enterprise, have voice and vote in its governing body, the worker council, where all members irrespective of seniority, have full and equal rights. In large enterprises worker councils will presumably find it helpful to establish smaller councils giving workers in different sub-units some decision-making autonomy over decisions that mostly concern them. But whether or not to do this, and how to go about it, is ultimately up to the worker council where each worker has one vote. Again, we discuss the whys and wherefores in Chapter 6 where we also consider, but reject, the alternative of trying to give outside “stakeholders” seats on the governing boards of enterprises.

Balanced jobs

Every economy organizes work into jobs that define what tasks a single individual will perform. In other economies most jobs contain a number of similar, relatively undesirable, and relatively un-empowering tasks, while a few jobs contain a number of relatively desirable and empowering tasks. But why should work empower only a few? If we want everyone to have an equal opportunity to participate in economic decision-making, and if we want to ensure that a *formal* right to participate equally in worker councils translates into an *effective* right to participate equally, doesn’t this require balancing work for empowerment? We expect the education system in a desirable society to prepare everyone to take part in social decision-making effectively, and we expect a democratic political system to accustom people to participate effectively as well. But if some people sweep floors all week, year in and year out, while others evaluate new technological options and attend planning meetings all week, year in and year out, is it realistic to believe they have an equal opportunity to affect workplace decisions

simply because they each have one vote in the worker council? Doesn't taking participation seriously require balancing jobs for empowerment? Proponents of participatory economics believe it does.

Similarly, why should some people's work lives be less desirable than others? Doesn't taking equity seriously require balancing jobs for desirability? Or, if jobs are not balanced for desirability, then should not those who work in less desirable jobs be compensated for their greater sacrifice? Proponents of participatory economics believe they should be.

In a participatory economy, worker councils are advised to create *job balancing committees* to distribute and combine tasks in ways that make jobs more "balanced" with regard to empowerment and desirability. Over the past three decades, the reaction against balancing jobs in these ways from not only mainstream but many progressive economists and activists as well has been fierce. We take those concerns seriously and address them in Chapter 6.

Neighborhood consumer councils

While not all of us are workers, we are all consumers, and not just consumers of personal items like shirts, video games, and vacations at the beach. We are also consumers of neighborhood public goods like sidewalks and playground equipment in our neighborhood park; citywide public goods like libraries and mass transit; and state, regional, and national public goods like port facilities, bridges, national and state parks and forests, an interstate highway system, and national defense. In a participatory economy every household in a neighborhood is a member of the neighborhood consumer council, where every household (1) submits its personal, household consumption request for approval; (2) all members of households participate directly in discussions about what neighborhood public goods to ask for; and (3) all members vote for recallable delegates to higher level federations of consumer councils at the ward, city, county, state, regional, and national levels.

To be clear, households can be traditional households, with two heterosexual parents who are legally married and their biological children. But households can also be non-traditional households of all kinds – single-parent households; multi-generation households; households of gay couples, lesbian couples, bisexual couples, transgender couples; households where adults are married, or not; households with children, or not; and households whose underage members are biologically related to one another and/or any adults, or not. They can also be "communes" of individuals who simply want to live in a household together. With the exception of households comprising entirely minors – like Peter Pan's "Lost Boys" – every conceivable kind of household will be welcomed and treated equally by their neighborhood consumption council.

Federations

All neighborhood consumer councils will belong and send delegates to the federation of neighborhood councils in a city ward, the federation of neighborhood councils in a city or rural county, the federation of neighborhood councils in a

state, and the national federation of neighborhood consumer councils as well. The purpose of these federations is to allow people to express demands for public goods – that is, goods that people consume jointly. Delegates to federations discuss and vote on what public goods their constituents want to ask for. While a neighborhood council might request new swing sets for its neighborhood park, it would be up to the city federation to request an extension to the city's mass transit system, up to the state federation to request new campsites at state parks, and up to the national federation to request upgrades for the national railway system and new weapon systems for national defense. While participation is via direct democracy in neighborhood councils, participation is necessarily via representational democracy in federations, as discussed further in Chapter 6.

Income based on effort and need

In a participatory economy every worker council must provide each of its members with what we call an “effort rating.” As discussed in Chapter 1, the purpose is to recognize that not everyone always makes equal sacrifices in work, and those who make greater sacrifices are entitled to compensation in the form of extra consumption rights. While we recommend that worker councils establish *effort rating committees* to do this, worker councils need not go about rating members in the same way, any more than they have to organize their work and balance jobs in the same way. In a participatory economy, there is only one restriction placed on how a worker council can assign members effort ratings. In order to avoid the temptation for workers to award each other higher ratings than they truly believe each other deserve in exchange for like treatment by their workmates, the *average* effort rating councils award their members needs to be capped. One could set the same average cap for all worker councils. Or, alternatively, one could set each council's average effort rating equal to 100 times the ratio of the social benefits of its outputs to the social costs of its inputs. The advantages and disadvantages of each approach are discussed in Chapter 6. But as we explain there, as long as average effort ratings of councils are capped, we need not fear “effort rating inflation.”

Allowances for those who do not work for a variety of reasons must be established by a democratic political process, and provisions must also be made for those with special needs, all of which is discussed at length in Chapter 6. But as explained in Chapter 1, the *distributive maxim* for a participatory economy is that *income should be based on effort, or sacrifice, as determined by coworkers, as well as need*. As in the case of our proposal to balance jobs, many have raised objections to our proposal for coworkers to provide one another effort ratings, which become the basis for workers' consumption rights. We take these concerns seriously and address them at length in Chapter 6.

Participatory planning

Chapter 7 is devoted to a rigorous discussion of various aspects of the annual participatory planning procedure, while Chapters 11 and 12 in Part IV discuss

the investment planning procedure, and Chapters 13, 14, and 15 in Part V are devoted to different kinds of long-run, development planning. So this section is intended only to provide readers with an overview of participatory planning, highlighting its main and unique features. We begin by reviewing the challenges we face when designing a desirable mechanism to coordinate the interrelated activities of different worker and consumer councils and federations.

The challenge

How can we empower worker and consumer councils while protecting the interests of others in the economy who are affected by what these councils do? How can we give groups of workers *user rights* over parts of *society's* productive commons without allowing them to benefit unfairly from productive resources that belong to and should benefit everyone?

What socialists have long understood is that what any one group in an economy does will inevitably affect many others. The conclusion many socialists have drawn from this fact is that democratic economic planning must allow all to have a voice and say regarding all economic decisions. This, of course, is correct as far as it goes. But as we have explained, different decisions do not usually affect everyone to the same extent. One might call this the *fundamental dilemma* faced by those of us who want to organize a system of economic decision-making that gives people decision-making power *to the degree* they are affected by different economic decisions: Most economic decisions do affect many people, but to differing degrees. The challenge is how to give workers and consumers in their own councils an appropriate degree of autonomy over what they do.

Moreover, encouraging popular participation in economic decision-making faces tough challenges. Those who actually do the work have been discouraged from participating in decision-making ever since humans “ascended” from more egalitarian hunting and gathering societies to class systems with ruling elites. And for the past 300 years, workers have been taught they are incapable of making important economic decisions, and to thank their lucky stars they have capitalist employers and managers to do their thinking for them. Developing a participatory culture that encourages those who have long been a silenced majority inside their workplaces to actively participate in deciding what they will produce and how they will produce it is difficult enough, even though these decisions have immediate and palpable impacts on workers’ daily lives. Encouraging popular participation in coordinating the interrelated activities of millions of different workplaces and neighborhoods, and in investment and long-run development planning, where the relevance to one’s personal life is more attenuated and less obvious, is even more difficult. Yet this is the historical legacy of capitalist alienation we must overcome.

And make no mistake about it, the price of failure is monstrous. Biologists teach us that nature abhors an ecological vacuum, by which they mean that in complex ecological systems, any empty niche will quickly be filled by some

organism or another. If there is a single lesson we should learn from human history it is that society abhors a power vacuum. If people do not control their own lives, then someone else will. Capitalists have been only too happy to fill this vacuum and tell their employees what to produce and how to produce it for over 300 years. And the most important lesson we should learn from the history of 20th-century Communist economies is that if workers and consumers do not run the economy themselves, an economic elite of central planners and plant managers will rise to do it for them.

How can we give workers and consumers in their councils the autonomy necessary to stimulate them to become and remain active participants in economic decision-making, while ensuring that worker and consumer councils do not make choices that are socially irresponsible? How is it possible to grant small groups of workers and consumers enough autonomy to encourage them to put time and effort into participating, without disenfranchising others who are affected by the decisions they make, even though it be to a lesser extent? How can we grant groups of workers the right to use some of society's productive resources as they would like without allowing them to benefit unfairly from doing so? How can we convince ordinary workers and consumers who have been discouraged in every conceivable way from trying to participate in economic decision-making that things will now be different and their participation will finally be worthwhile? The participatory annual planning procedure described briefly here and in more detail in Chapter 7, and the participatory investment and long-run development planning procedures described in Parts IV and V were designed to answer these challenges.

The annual planning procedure in brief

Certain decisions will have already been made when annual planning begins. The amount of each capital good that must be produced during the year will have already been determined by the participatory investment planning procedures described in Chapters 11 and 12 in Part IV. The amount of different productive inputs needed this year to modify the supplies of different kinds of labor and environmental services available in the future will have already been determined by the long-run education and environmental plans as explained in Chapters 13 and 14 in Part V. And the amounts of different goods that will be exported and imported during the year will have already been determined by the strategic international economic plan as explained in Chapter 15 in Part V.

The participants in the annual planning procedure are worker councils and federations, consumer councils and federations, and an *Iteration Facilitation Board* (IFB), which plays a perfunctory role. Conceptually, annual participatory planning¹ is quite simple: The social, iterative planning procedure works as follows:

- (1) At the beginning of each round of planning the IFB announces current estimates of the opportunity costs of using all natural resources, all categories of labor, and all capital goods available for use, as well

as current estimates of the social cost of producing different capital goods, intermediate goods, and consumption goods and services. These estimates can be thought of as “indicative prices” since they provide useful “indications” of what it costs society when we use different primary inputs, and what it costs society to produce different goods and services. In other words, the phrase “indicative prices” refers to estimates of opportunity costs and social costs.

- (2) Neighborhood consumer councils respond by making consumption proposals. That is, they propose what goods and services their households want to consume. Worker councils respond by making production proposals. That is, they propose what “outputs” they want to produce and what “inputs” they want permission to use to accomplish this – including not only intermediate goods they need from other worker councils and capital goods they want to use, but any natural resources and different kinds of labor they would need as well.
- (3) The IFB adds up all the demands for and supplies of each final good, intermediate good, capital good, natural resource, and each category of labor and adjusts its estimate of the opportunity or social cost of the good – its “indicative price” – up or down in proportion to the degree of its excess demand or supply.

These three steps are repeated in subsequent rounds, or “iterations,” until there is no longer any excess demand for any final or intermediate good, capital stock, natural resource, or category of labor.

As we demonstrate in Chapter 7, under assumptions about technologies and preferences that are standard in the literature, each round in this social, iterative procedure will begin with new, more accurate estimates of opportunity and social costs, followed by revised proposals from all councils and federations in light of new information the changed “indicative prices” signal about how their desires affect others. Each council must revise and resubmit its own proposal until it meets with approval from other councils and federations. This planning procedure repeats until a feasible, comprehensive plan for the year is reached – that is, a plan where everything someone is counting on will actually be available.

Consumption council proposals are evaluated by multiplying the quantity of every good or service requested by the estimated social cost of producing a unit of the good or service, to be compared to the average effort rating plus allowances of the households in the consumption council requesting the goods and services. If, for example, the average effort rating plus allowances for members of a neighborhood consumption council is equal to the social average, this should entitle them to consume goods and services whose production costs society an amount equal to the average cost of providing a neighborhood consumption request. A neighborhood council whose members have higher than average effort ratings plus allowances is entitled to a neighborhood consumption bundle that costs society more than the average; a neighborhood

council whose members have lower than average effort ratings plus allowances should only be entitled to a consumption bundle that costs less than the average.

The important point is that the estimates of opportunity and social costs generated during the planning procedure make it easy to calculate the social cost of consumption requests. This is important information for councils making consumption requests since otherwise they have no way of knowing the extent to which they are asking others to bear burdens on their behalf. It is also important for councils that must approve or disapprove consumption requests of others, since otherwise they have no way of knowing if a request is fair (consistent with sacrifices those making the request have made) or unfair (in excess of sacrifices made).

Production proposals from worker councils are evaluated by comparing the estimated social benefits of outputs to the estimated social cost of inputs. In any round of the planning procedure the social benefits of a production proposal are calculated simply by multiplying quantities of proposed outputs by their “indicative” prices and summing, and social costs of a production proposal are calculated by multiplying quantities of inputs requested by their “indicative” prices and summing. If the social benefits exceed the social costs – that is, if the *social benefit to cost ratio* of a production proposal exceeds one, $SB/SC > 1$, everyone else in the economy is presumably made better off by allowing the worker council to do what they have proposed. On the other hand, if the social benefit-to-cost ratio is less than one, $SB/SC < 1$, the rest of society would presumably be worse off if the workers went ahead to do what they have proposed, unless there is something “the numbers” fail to capture. Again, the “indicative” prices make it easy to calculate the social benefit-to-cost ratio for any production proposal, allowing worker councils to make proposals to determine if their own proposals are socially responsible and giving all councils an easy way to know whether other council’s proposals are socially responsible as well.

This procedure “whittles down” overly ambitious proposals submitted by worker and consumer councils about what they would like to do to a “feasible” plan where everything someone is expecting to be able to use will actually be available. Consumer councils requesting more than their effort ratings and allowances warrant are forced to either reduce the amounts they request or shift their requests to less socially costly items if they expect to win the approval of other councils who have no reason to approve consumption requests whose social costs are not justified by the sacrifices of those making them. Similarly, worker councils are forced to either increase their efforts, shift toward producing a more desirable mix of outputs, or shift to a less socially costly mix of inputs to win approval for their proposals from other councils who have no reason to approve production proposals whose social costs exceed their social benefits.

Efficiency is promoted as consumers and workers attempt to shift their proposals in response to updated information about opportunity and social costs in order to avoid reductions in consumption or increases in work effort. Equity is promoted when further shifting is insufficient to win approval from

fellow consumers and workers that can only be achieved through consumption reduction or greater work effort. As iterations proceed, consumption and production proposals move closer to mutual feasibility, and estimates more closely approximate true opportunity and social costs as the procedure generates equity and efficiency simultaneously. In the coming chapters, all this will be discussed in much greater detail. But this is what it boils down to:

When worker councils make proposals, they are asking permission to use particular parts of the productive resources that belong to everyone. In effect their proposals say: "If the rest of you, with whom we are engaged in a cooperative division of labor, agree to allow us to use these productive resources belonging to all of us as inputs, then we promise to deliver the following goods and services as outputs for others to use." When consumer councils make proposals, they are asking permission to consume goods and services whose production entails social costs. In effect their proposals say: "We believe the effort ratings we received from our coworkers, together with allowances members of households have been granted, indicate that we deserve the right to consume goods and services whose production entails an equivalent level of social costs."

The planning procedure is designed to make it clear when a worker council production proposal is inefficient and when a consumption council proposal is unfair and allows other worker and consumer councils to deny approval for proposals when they seem to be inefficient or unfair. However, initial *self-activity proposals*, and *all revisions* of proposals, are entirely up to each worker and consumer council itself. In other words, if a worker council production proposal or neighborhood council consumption proposal is not approved, the council that made the proposal and nobody else can revise its proposal for resubmission in the next round of the planning procedure. As far as we know, this aspect of the participatory planning procedure distinguishes it from all other planning models, which we believe is crucial if workers and consumers are to enjoy meaningful self-management.

A participatory economy and self-management

Verifying that a planning procedure will promote efficient use of productive resources is of great concern to economists. And we will be at great pains to explore efficiency issues in the chapters to follow. However, we should also be concerned with whether or not a planning procedure promotes popular participation in economic decision-making. Of course, a participatory economy cannot give every person decision-making authority *exactly* to the degree they are affected in every decision that is made. Instead the idea is to devise procedures that *approximate* this goal.

We close this brief introduction by reviewing the features of a participatory economy designed to achieve the goal of economic self-management:

- 1 Every worker has one vote in his or her worker council.
- 2 In workplaces with large numbers of workers and many sub-units, the worker council can choose to make sub-units semi-autonomous if it wishes.
- 3 Consumers are free to consume whatever kinds and amounts of goods and services they prefer as long as their effort rating and/or allowance is sufficient to cover the overall cost to society of producing the goods and services they request.
- 4 Consumers each have one vote in their neighborhood consumption council regarding the level and composition of neighborhood public good consumption as well as one vote in choosing delegates to represent them in federations of consumer councils requesting higher-level public goods.
- 5 *Most importantly, in the participatory planning procedure, worker and consumer councils not only propose what they, themselves, will do in the initial round of the participatory planning procedure, they alone make all revisions regarding their own activity during subsequent rounds of the planning procedure.*

Does all this guarantee that if a particular decision affects me 1.13 times as much as it affects someone else, I will have exactly 1.13 more say than they do? Of course not. But I will get to decide what private goods I consume. My neighbors and I will get to decide what local public goods we consume. Along with my fellow citizens I will get to decide what regional and national public goods we consume. And my coworkers and I will get to decide what we produce and how we produce it – as long as we propose to use society's scarce productive resources efficiently. In any case, that is the "big picture." We are now ready to dig deeper, mindful that the devil is often in the details.

Note

- 1 In order to focus on the main contours of the planning procedure, the description here abstracts from features incorporated into the annual planning process for public goods and pollutants that involve federations of consumer councils and "communities" affected by different pollutants. These important features of participatory annual planning are explained in Chapter 7.

6 Digging deeper into a participatory economy

This chapter begins the process of further explaining and defending the features of a participatory economy that were presented only briefly in Chapter 5. We examine the annual participatory planning process in greater depth in Chapter 7, take up investment planning in Part IV, and development planning in Part V.

Social ownership

We propose social ownership, which is different from both private ownership and state ownership. What exactly does social ownership mean?

Indigenous cultures and the natural commons

It has often been remarked that the notion of owning land was foreign to Native Americans. In the Northwest watershed of the Salish Sea where I live, when Native Americans negotiated treaties with new European arrivals, it seldom occurred to them to negotiate over what land they would be left to *own*. Instead, they negotiated for rights to fish, hunt, and gather native plants in particular places at particular times of year. Those were the kinds of agreements Northwest tribes had always worked out among themselves for many thousands of years before Europeans arrived on the scene, because that was what was essential to their way of life. So in the 19th and early 20th centuries that is what they tried to secure through unequal treaties with their new white adversaries who were long accustomed to treating land as a commodity to be owned. While native tribes, nations, federations, and alliances may have battled among themselves from time to time over who would have access to particular parts of the North American natural commons during particular seasons of the year, it seems clear from all accounts that, for the most part, North American indigenous societies treated the land and its fauna and flora as comprising a sacred “commons” to be used and preserved for the benefit of all generations.

Socialism and the productive commons

Historically, socialists depart from the conviction that the “means of production” should not belong to private owners, who can then extract tribute from workers

in exchange for allowing them access to what they need to use to produce their “means of subsistence.” Instead, socialists have long argued that the “means of production” must become the common property of all, to be managed by workers for the benefit of all. As a longtime socialist, I am quite familiar with this tradition and what I believe to be its impeccable logic. However, I believe the traditional notion of the “socialist commons” – machines, tools, and factories we need to produce things – is too limited and needs to be expanded.

A productive commons for modern times

Indigenous and socialist perspectives both provide important insights about the productive commons. While they focus on very different objects, they are in fact remarkably similar: *Whatever is needed to support a people's way of life should be the common property of all, managed by all, for the benefit of all.* For pre-agrarian, pre-industrial indigenous societies, this consists principally of access to native fauna and flora. For traditional socialists born to an industrial age, this consists principally of the machines, tools, and factories produced by those who worked before them.

But a great deal has changed since both pre-industrial and early industrial times, and it is becoming increasingly apparent that some early notions about the defining features of the coming age were off the mark. Assuming we manage to avoid committing ecocide in the next few decades – which is by no means certain – it is increasingly apparent that we are not headed for a “post-industrial society” at all. If there is to be a modern age, it will be an ever more “industrial” society in the sense that increasingly complex manufactured “artifacts” will become ever more important. Nor are we headed for a “post-scarcity society.” Even if we are wise enough to use future productivity increases mostly to expand leisure after meeting everyone’s basic needs, there will remain burdensome tasks to be done and scarce resources to be used efficiently. Instead, “modern times” means coping with ever tighter constraints imposed by key ecosystems at the same time that information, knowledge, and the array of useful manufactured “artifacts” they make possible continue to expand.

Based on the research by Richard Sutch, William Nordhaus, Angus Maddison, William Baumol, Nathan Rosenberg, Moses Abramovitz, and others, Gar Alperovitz and Lew Daly summarized the consensus among economic historians as follows:

A person working today the same number of hours as a similar person in 1800 – and working just as hard and no harder – can produce many, many times the economic output. Recent estimates suggest that national output per capita has increased more than twentyfold since 1800. Output per hour worked has increased an estimated fifteen fold since 1870 alone (Alperovitz and Daly 2009: 3).

But if individuals do not really improve – that is, if individual intelligence and effort change little over time, where does all this increase in productivity come

from? Robert Solow opened economists' eyes to how little our models explain when he estimated that growth in the supply of capital and labor explained perhaps as little as 10%, and at most 20% of the growth in US output in the first half of the 20th century, leaving a "residual" of as much as 80%–90% – which Solow observed could only be explained by technical change in the broadest sense. Those who have tried ever since to pin down exactly what this technical change consists of emphasize the extraordinary role knowledge plays in generating economic growth. When Paul Romer searched for an answer to the puzzle that a college-educated engineer today is far more productive than one working a hundred years ago, despite the fact that they each have the same human capital, he concluded that the reason was obvious: "He or she can take advantage of all the additional knowledge accumulated as design problems that were solved during the last 100 years" (Romer 1990: 83–84).

While we can refer to this as "known technologies," in reality it is, of course, much more complicated. In reality "technology" is not only the known "recipes" for making goods and services but also the knowledge and skills necessary to use them, the elaborate divisions of labor they require, and all the institutions, both formal and informal, necessary for maintaining and coordinating this elaborate division of labor – all of which was worked out by countless people, going back countless years. Economic historian Joel Mokyr refers to all this as a "gift from Athena," explaining that "technological progress . . . has provided society with what economists call a 'free lunch,' that is, an increase in output that is not commensurate with the increase in effort . . . necessary to bring it about" (Mokyr 2002: 3). A character in Edward Bellamy's famous utopian novel explained it in simple terms to a time traveler from a capitalist past:

How happened it that your workers were able to produce more than so many savages would have done? Was it not wholly on account of the heritage of the past knowledge and the achievements of the race, the machinery of society, thousands of years in contriving, found by you ready-made to your hand? How did you come to be possessors of this knowledge and this machinery, which represent nine parts to one contributed by yourself to the value of your product? You inherited it, did you not? (Bellamy 2000: 88)

In any case, whatever we call it, the important point is that what allows us to be as productive as we are is something that each generation inherits collectively from all who went before us – irrespective of whether or not some among us manage to appropriate parts of our common inheritance and extract tribute from others before they are permitted to use it. In sum, a modern perspective on the commons must include an expanded understanding of how we rely on the natural environment – the focus of indigenous societies – as well as a broader view of the "means of production" – the focus of earlier socialists.

So, what does this modern commons include, and who owns it in a participatory economy? Our answer to the second question is simple: *The*

productive commons belongs to everyone and no one. It belongs no more to one person than to any other person. While individuals own personal property, everything we need to produce our way of life is owned in common in a participatory economy.

Our answer to the second question is more expansive: The modern commons includes an expanded understanding of what we might call the *natural commons*, which includes everything non-agrarian indigenous societies treated as part of their commons – the land, water, and native flora and fauna they used to support their way of life – as well as things needed as “inputs” in modern agrarian/industrial societies like top soil, aquifers, oil, minerals, forests, and the land where they are found, sometimes referred to as “natural capital.” However, the natural commons in a participatory economy also includes things that do not fit neatly into the category “natural capital,” but whose health is crucial to sustaining life today and in the future. Genetic diversity, a stable climate, key ecosystems that support all life, and various ecosystems that serve as “sinks” that store and decompose wastes from human economic activity are all treated as part of the natural commons in a participatory economy.

The modern commons also includes what we might call the *produced commons*, all the machines, tools, equipment, and buildings we use to produce things, which socialists traditionally called “the means of production” and mainstream economists call “capital stocks.” The produced commons also includes what economists have long called “technology” or “technical know-how.” If we imagine a giant recipe book describing every way we know how to “cook” every good we make, this recipe book is also treated as part of the commons in a participatory economy.

And finally, the commons includes all the useful talents and skills people have – both as individuals and groups – that allow us to deploy all this natural and produced wherewithal to productive ends. Mainstream economists refer to this as “human capital,” and some development economists now add the category “social capital” to describe aspects that cannot be identified with particular individuals.

In short, a participatory economy treats everything we need to produce our way of life – whether it be part of an expanded understanding of our natural environment, part of an increasingly complex array of useful manufactured artifacts, or part of the information and knowledge embodied in us, individually or collectively – as belonging to all of us, (i.e., as part of what we might call the *modern commons*). But does this mean that nothing is ever *mine*?

What Is Mine? Many think of human capital as *my* human capital – as something that belongs to me and no one else. As a lifelong teacher in the higher education system, I can testify that students who are busy acquiring human capital, and faculty who have usually accumulated a great deal of human capital themselves, are prone to think in this way! However, in a participatory economy, human capital is treated as part of the productive commons – just as an acre of fertile bottom land that helps us grow corn, or a drill press that helps us manufacture metal parts, or a computer code that helps us sort data quickly are considered part of the commons. Whatever natural talents and learned skills

you may have that are helpful in producing goods and services of value, will be treated as part of the modern commons in a participatory economy – to be used, like every other part of the modern commons, to the best advantage and benefit of all. In a participatory economy extra effort or sacrifice will earn you extra consumption rights, but simply being more talented or educated than someone else – that is, having more human capital – will not.

None of this means you don't own your shoes, or as one advocate for a participatory economy once put it, that some guys in off-white jumpsuits are going to storm Grandma's apartment and confiscate her beloved 50-year-old radio. There will still be what is referred to as "personal property," which people "own" just as they do today. Instead, it simply means that everything we need to produce all the goods and services we enjoy, including the knowledge of how to use them, belongs to all of us and is treated as a gift from all who went before to all alive today. It means we do not have a system where the vast majority do not own their necessary means of production and, therefore, have no choice but to go to work for a tiny minority who owns what we need to work at a level of productivity our ancestors made possible. It means we don't have a handful of people who, because they own what the rest of us need to work, have a disproportionate say over what and how we will produce. It means no one gets to extract a tribute from others before allowing them access to what they need to work productively: It means no profits and no rents. It means just because someone was born with a higher IQ, or had more years of education, they will get to consume more than others who work just as hard and sacrifice just as much. Instead it means everyone's income is determined by the sacrifices they make in work as well as any special needs they may have.

Because there are no owners of the productive commons in a participatory economy, this can be a difficult notion to grasp for those who have always lived in an economy where everything has an owner. Everybody, and nobody, owns whatever is necessary to sustain our way of life. Instead, worker and consumer councils and federations grant *user rights* over particular parts of the productive commons to one another through the participatory planning process in a way that ensures that all benefit equally from its deployment. Admittedly, humanity had a very bad experience with collective ownership of the means of production in 20th-century Communist economies. However, what collective ownership meant in those economies was that the state owned everything on behalf of the people, who then worked for the state under the direction of a small group of central planners and plant managers who eventually became a *coordinator ruling class*. As readers should realize by now, that is not at all the kind of economy we are talking about.

Worker councils

As explained in Chapter 5, we propose that the worker council is "sovereign" for a workplace, that everyone who works there have one vote in the worker council, and that nobody who does not work there has either voice or vote in

the worker council. But doesn't this disenfranchise other constituencies that are affected by what a worker council does? We also noted that many have raised objections to our proposal to balance jobs for empowerment and desirability. And finally, we have not explained how workers councils are created or disbanded. It is time to dig deeper into these issues.

Outside stakeholders

Others have suggested giving "outside stakeholders" seats on enterprise councils because people who do not work at an enterprise are often affected by enterprise decisions.¹ It is certainly the case that what a worker council does will affect constituencies other than council members. Moreover, since winning outside stakeholders a seat at the table in corporate boardrooms today is a reform often worth fighting for, many progressive activists assume it is how the issue of enterprise effects on the broader "community" should be addressed in a desirable, post-capitalist economy as well. Why have we rejected this suggestion? There are two disadvantages to addressing the problem of community effects in this way:

- 1 How does one decide which other constituencies are affected and how many seats to give them? It seems naïve to assume there would be no differences of opinion on these matters, and in absence of any objective criteria, decisions would be arbitrary even if not contentious.
- 2 If outsiders have seats, workers in an enterprise have no place where they can discuss what they want to do free from outside interference. Giving stakeholders seats on the enterprise council requires workers to hear from and convince outsiders before they can even formulate a proposal about what they want to do. In order to motivate workers to embrace their own self-management, we want their worker council to be a "space" for them and them alone.

If the only way to enfranchise outsiders who are affected were to give them seats on enterprise councils, it might be necessary to achieve self-management as we understand it. But we believe the participatory planning procedure provides others who are affected an appropriate degree of influence over enterprise decisions without infringing on the autonomy of workers in the enterprise. The planning procedure empowers others to reject any proposal a group of workers makes that fails to benefit those outside the worker council at least as much as it costs them, and does so without arbitrarily deciding which outsiders are affected and to what degree. Limiting membership in worker councils only to workers in an enterprise does not mean they get to do whatever they want irrespective of its effects on others. If a worker council votes to use productive resources belonging to everyone inefficiently, their proposal will not be approved during the participatory planning procedure. In other words, proponents of participatory economics believe the legitimate interests of others outside a workplace can be better protected through the participatory planning

procedure than by giving outsiders seats on enterprise councils, which denies workers the opportunity to function in a council where only they have voice and vote.

Birth and death of worker councils

How are new enterprises born, and how do they die in a participatory economy? Enterprises die, and their members must search for work elsewhere, when a worker council fails to make a proposal approved by others during the participatory planning procedure. This may seem harsh at first, but this “discipline” is necessary to ensure that scarce productive resources are not misused. If a worker council cannot come up with a proposal whose social benefit-to-cost ratio is at least one, this means that others can use the productive resources they are asking for, which belong to everyone, more efficiently than they can. Since we don’t want resources used less efficiently than they could be, we should disband worker councils who cannot use them as efficiently as others.

However, there may be situations where “the numbers lie,” and a worker council whose proposal has a social benefit-to-cost ratio less than 1 is actually not using resources inefficiently. This is why we need appeal procedures, which should ordinarily be conducted by the industry federation a worker council belongs to. Moreover, any council in danger of being disbanded should be provided help by their industry federation. After all, there must be some reason a particular group of workers are not coming up with proposals to use resources as effectively as other groups of workers in their industry. Before disbanding the council and sending their members to work elsewhere permanently, some workers from the council in danger of being disbanded should be sent as guest workers in more successful worker councils in the industry to see how they are doing things, and the industry federation should send members from successful councils to consult and work as guest workers in the council in trouble. Sometimes this will prevent the need to disband a worker council.

But what happens when all efforts to correct what is wrong fail and a worker council must be disbanded? Does this mean its members must suffer personally? Since the annual production plan provides for full employment, there will be jobs for them in more successful worker councils, if not in their own industry, then in others. Moreover, their expected income working elsewhere should be as high, or higher than it was in the council that was disbanded, which apparently was struggling to come up with a proposal with a SB/SC ratio as high as one. And finally, a participatory economy can and should provide the kind of generous stipends for retraining and relocation provided by labor market boards to laid-off workers in Sweden and Norway during the heyday of social democracy in Scandinavia during the 1970s.

Notice there is no issue of selling off enterprise assets when a worker council is disbanded in a participatory economy. Worker councils do not “own” the resources they use in the first place. They only have “user rights” premised on the assumption that they were making efficient use of social resources. So any

factory buildings, machines, or inventory stocks in the possession of a council that is disbanded are simply reallocated through the participatory planning procedure to enterprises whose bids to use them are accepted in the annual planning procedure and can use them more efficiently.

How are new enterprises born in a participatory economy? In capitalism, any enterprising group of people can start up a company. In a participatory economy, any enterprising group of people can start up a new worker council. In capitalism, entrepreneurs put up the money needed to start an enterprise. In a participatory economy, new worker councils bid for the resources they need to get started in the participatory planning process. If they submit a proposal that is accepted, they're good to go. Otherwise not. They do not put up any "capital" of their own, nor do they enjoy any rights or privileges beyond the rights and privileges of any other members of the worker council who are hired later. What we might call the initial entrepreneurial group has no extra financial risk and receives no extra compensation. They simply enjoy the benefits of starting a new worker council with others they like to work with, and agree with about what to produce and how to produce it.

However, in the real world, the actual birthing process for new enterprises is more complicated. Banks, bond, and stock markets are the effective midwives for new corporations in capitalism. Even the smallest new business requires a bank loan, or line of credit, to get started. But not only must loan officers deem a business proposal sufficiently promising to provide startup loans, to grow small companies requires the services of banks to manage "public offerings" to sell bonds and shares of stock in the fledgling enterprise.

In a real-world participatory economy, industry federations would serve as midwives for new worker councils. First of all, it is industry federations who know how much expansion has been authorized for the industry as a whole by the investment plan as explained in Part IV. Industry expansion can be handled by increasing output in existing worker councils, creating new worker councils, or both. But just as banks judge the "credibility" of new entrepreneurs' business plans in capitalism, industry federations judge whether or not a group that has proposed to form a new worker council are "credible." The industry federation will need to check to make sure the people involved do not have a track record of starting worker councils and getting proposals accepted during the planning procedure only to fail to deliver what they promised. Presumably, the industry federation will also make sure at least some in the group have the requisite training and experience. So in real-world participatory economies, groups who want to start up a new worker council will apply to the appropriate industry federation to be certified as "credible," after which they can participate in the planning procedure and try to acquire permission to use the resources they need.

Objections to balanced jobs

As explained in Chapter 5, we recommend that every worker council create a *job balancing committee* to distribute and combine tasks in ways that make jobs

more “balanced” with respect to empowerment and desirability. And we noted that many have questioned the wisdom of this proposal. For example:

Apart from their inhibition of personal freedom, balanced job complexes designed to avoid specialization seem likely to deprive society of the benefits of activities performed well only by people who have devoted a disproportionate amount of time and effort to them.

– Thomas Weisskopf

Personal endowments as well as preferences differ greatly. Up to a point, specialization provides important efficiency gains. A certain level of specialization and hierarchy seems necessary and functional to me.

– Nancy Folbre

Balanced jobs are designed to avoid disparate empowerment and thereby protect the freedom of those who otherwise would not have equal opportunity to participate in economic decision-making. Balanced jobs are designed to prevent class divisions, for example, between those who do mental and manual labor. But balanced jobs do *not* eliminate specialization. The proposal is not that everyone spend some time working at every task in their workplace – which is ridiculous, and impossible in any case. People will still perform a small number of tasks in their particular balanced jobs. For example, some will still specialize in brain surgery, others in electrical engineering, others in high voltage welding, and so on. But if the specialized tasks in a job are more empowering than tasks are on average in a workplace, those who perform them will perform some less empowering tasks as well. And if the specialized tasks in a job are more desirable than tasks are on average, those who perform them will also perform some less desirable tasks – unless they wish to work more hours or consume less because they have made fewer sacrifices.

Moreover, the tasks each person performs only need to be balanced over a reasonable period of time. Jobs do not have to be balanced every hour or every day or every week or even every month. The balancing is also done in the context of what is practical in particular work situations. Technologies and worker capabilities and preferences must all be taken into account when balancing jobs in any worker council. Finally, the balancing is done by committees composed of workers in each workplace and done as they see fit. We do not propose that jobs be balanced by an external bureaucracy and imposed on workplaces. Instead, proponents of a participatory economy believe there is every reason to expect that job balancing committees composed of workers in a workplace will take ample leeway in organizing work to accommodate technological, skill, and psychological considerations while eliminating the kind of large, persistent differences in empowerment and desirability that characterize work life today. Nonetheless, critics have repeatedly raised two objections that deserve consideration:

- 1 Talent is scarce, and training is socially costly; therefore, it is inefficient for talented people, or people with a great deal of training, to do “menial” tasks

The “scarce talent” argument against balancing jobs makes a valid point. However, proponents of a participatory economy believe the objection is often overstated. It is true not everyone has the talent to become a brain surgeon, and it is true there are social costs to training brain surgeons. Therefore, there is an efficiency loss whenever a skilled brain surgeon does something other than perform brain surgery. Roughly speaking, if brain surgeons spend X% of their time doing something other than brain surgery, there is an additional social cost of training X% more brain surgeons. And it is even possible that the average native talent of a pool of brain surgeons that is X% larger will be slightly less than it would have been had the pool been smaller.

However, virtually every study confirms that participation not only increases worker satisfaction, it increases worker productivity as well. So if balanced jobs enhance effective participation, as they are intended to, the efficiency loss because they fail to economize fully on “scarce talent,” must be weighed against the productivity gain they bring from greater participation of all workers. Then, if there is still a net efficiency loss, this would have to be weighed against the importance of balancing jobs for empowerment in giving people equal opportunities to exercise self-management in work.

- 2 For everyone to participate equally in economic decisions ignores the importance of expertise

The “expertise” argument against balancing jobs for empowerment fails to distinguish between a legitimate role for expertise and an unwarranted usurpation of decision-making power by experts. In circumstances where the consequences of decisions are complicated and not readily apparent, there is an obvious need for experts. But economic choice entails both determining *and* evaluating consequences. Presumably those with expertise in a complicated matter can predict the consequences of a decision more accurately than non-experts. But those affected by a choice know best whether they prefer one outcome to another. So, while efficiency requires an important role for experts in predicting consequences of choices in complicated situations, efficiency also requires that those who will be affected determine which consequences they prefer. This means that just as it is inefficient to prevent experts from explaining consequences of complicated choices to those who will be affected, it is also inefficient to keep those affected by decisions from making them after considering expert opinion. Self-management, defined as decision-making input in proportion to the degree one is affected by the outcome, does not mean there is no role for experts. Instead it means confining experts to their proper role and preventing them from usurping a role that it is neither fair, democratic, nor efficient for them to play.

In sum, proponents of participatory economics believe there is ample leeway in organizing work to accommodate practical considerations while eliminating *persistent* differences in empowerment and uncompensated differences in desirability.²

Incentives

Throughout history many people have chosen to behave in ways they deemed to be in the social interest despite the fact that they had good reason to believe their behavior was contrary to their own, personal, self-interest. Moreover, recent research in evolutionary biology and evolutionary game theory suggest that not only have successful societies developed social norms to induce such behavior, but there is reason to believe natural selection would have favored genetic dispositions toward behavior that helped the group, not just the individual, survive.

However, it is highly unlikely that natural selection failed to reward what we should think of as a “healthy self-regard” in a species capable of purposeful action. Moreover, any dispassionate review of human history would be hard pressed to deny that people often *do* act according to their perceptions of what serves their self-interest. While social norms and circumstances can greatly affect the degree to which people favor self-interest over social-interest when the two are in conflict, we should not see our goal as eliminating self-interest through rhetorical appeal or social pressure.

The question is not if people serve the social interest *or* their self-interest. Humans are genetically programmed to serve *both* the social interest *and* their self-interest, and it is unrealistic to believe that a significant portion of the body politic will behave in ways they have good reason to believe are contrary to their self-interest, no matter how strong calls for self-sacrifice may be. People do have a regard for the social interest, and *all things being equal*, there is good reason to believe we can rely on most people to act in the social interest. But it is quite another thing to expect people to serve the social interest when they must do so to the detriment of their own personal well-being. *Our job is to find ways to no longer put people in this quandary. If we want socially responsible behavior, then we must design an economy that no longer punishes people who behave in socially responsible ways and rewards people for behaving in socially irresponsible ways.*

Fairness, trust, and solidarity

As we have been explaining, a participatory economy is designed to eliminate conflicts between social and self-interest. This does not mean proponents of a participatory economy do not value solidarity; we even measure social progress in large part by the growth of solidarity. But we see solidarity as a product of people’s historical experience. Too often people could not trust others to treat them fairly or behave in socially responsible ways. Only when there is a new track record of people being treated fairly do we expect people to overcome

their historic mistrust of one another. In short, trust is a prerequisite for solidarity, and trust must be earned, not simply assumed or demanded. Yes, increasing solidarity is an important measure of social progress, but it will be strengthened primarily by creating a different historical legacy, rather than by exhortation or heroic example by a faithful few, and the different historical legacy will be created by eliminating the conflict between social and self-interest, not by eliminating people's self-regard.

Measuring effort and sacrifice

As in the case of balancing jobs for empowerment and desirability, many critics have expressed concerns about attempting to reward effort, and problems that may arise when efforts are judged by one's workmates.

First, it is very difficult to observe and measure an individual's sacrifice or work effort. Moreover, people would have an interest in understating their natural talents and abilities. Second, while it would elicit greater work effort and sacrifice, it would do nothing to assure that such effort and sacrifice were expended in a desirable way.

– Thomas Weisskopf

A society seeking optimum production needs to discourage clumsy effort and encourage proficient effort so as to avoid waste. Otherwise, the less successful have no material incentive to modify bungling methods.

– Mark Hagar

Maximizers would have incentives to perform at less than their best in early stages in order to maximize a later effort score. . . . A standard strategic move to maximize winnings over a series of handicap races is to intentionally perform badly in early races in order to get a better handicap in later ones.

– John O'Neill

Anyone who has participated in a workplace with more than two or three workers knows the problem of cliques and rivalries that tends to arise. It is not clear how one would prevent cliques and rivalries from intruding into the effort evaluation process.

– David Kotz

Before addressing these concerns, it is important to dispose of a common misconception about a participatory economy and what socialists have long referred to as "material incentives." Many critics have jumped to the conclusion that there are no material incentives for workers in a participatory economy. *This is simply not true.* People do not receive equal consumption for unequal efforts in a participatory economy. People's efforts are rated by their coworkers, and people are awarded consumption rights according to those effort ratings. To each according to her effort means there are material rewards for above average efforts and material consequences for below average efforts.

However, differences in people's efforts will not lead to the extreme income differentials characteristic of all economies today, nor the degree of income inequality predictable in market socialist economies. Therefore, material incentives will play a smaller role in participatory economies than they do in other economies. Moreover, supporters believe a participatory economy can *eventually* lead to more and more distribution on the basis of need – that is, to a gradual reduction of material incentives. What reasons are there to expect any of this to be the case?

In a society that awards esteem mostly on the basis of what Thorsten Veblen famously termed “conspicuous consumption,” it is hardly surprising that large income differentials are considered necessary to induce effort. But to assume that only conspicuous consumption can motivate people because under neoliberal capitalism we have strained to make this so is unwarranted. There is plenty of evidence that people can be moved to great sacrifices for reasons other than a desire for personal wealth. Family members often make sacrifices for one another without the slightest thought of material gain. Patriots die to defend their country for little or no pay. And there is good reason to believe that for people who are not pathological, wealth is generally coveted only as a *means* of attaining other ends such as economic security, comfort, respect, status, or power. If accumulating disproportionate consumption opportunities is often a means of achieving more fundamental rewards, there is good reason to believe a powerful system of incentives need not be based on widely disparate consumption opportunities when basic needs are guaranteed and fundamental desires are rewarded directly rather than indirectly.

If expertise and excellence are accorded social recognition directly, as we propose they should be in a participatory economy, there should be less need to employ the intermediary of conspicuous consumption. If economic security is guaranteed, for everyone, as it is in a participatory economy, there should be no need to accumulate out of fear for the future. If the material, medical, and educational needs of one's children are provided for at public expense, as they are in a participatory economy, there should be no need to accumulate to guarantee one's children the opportunities they deserve. Moreover, if people design their own jobs and participate in economic decision-making, as they do in a participatory economy, they should carry out their responsibilities with less need for external motivation of any kind. And if the distribution of burdens and benefits is fair, as it is in a participatory economy, people's sense of social duty should be a more powerful incentive than it is today.

In other words, while a participatory economy does have material incentives, it is designed to maximize the motivating potential of many non-material incentives as well. Supporters think there is good reason to believe these non-material incentives can play a much bigger role in a participatory economy than they do today. But there is no way to “prove” that material rewards may be less necessary to motivate effort in different social circumstances than we are accustomed to. Nor do we expect to convince skeptics in a few paragraphs. But it is important to pose the question skeptics raise accurately: *If* medical, retirement,

and children's expenses are taken care of at social expense; *if* valuable contributions are awarded public recognition; *if* people plan and agree to their tasks themselves; *if* a fair share of effort and personal sacrifice is demanded by workmates who must otherwise pick up the slack; and *if* extra effort is rewarded by commensurate increases in consumption opportunities; then will people still be insufficiently motivated to do what needs to be done without larger income differentials than are permitted in a participatory economy? In any case, *that* is the relevant question. Now to address critics' specific concerns.

Weisskopf gives voice to the common assumption that effort is difficult, if not impossible to measure, while the value of a worker's contribution can be measured easily. But neither half of this proposition is as compelling as usually presumed. Assigning responsibility for outcome in group endeavors is often ambiguous. Sports teams are more suited to such calibration than production teams. And compared to football, soccer, and basketball, it is easiest to calibrate the value of individual contribution to group achievement in baseball. But even in baseball, debates over different measures of offensive contribution, like batting average, on base percentage, runs batted in, slugging percentage, and so on, as well as disagreements over the relative importance of pitching versus hitting versus fielding, not to speak of arguments over what are called "intangibles" and "team chemistry," testify to the difficulty of assigning individual responsibility for group success. Moreover, it is often more difficult, not less, to assign individual responsibility to different workers than to different athletes for the accomplishments of their "teams."

Nor is measuring effort as impossible as Weisskopf and others presume. Anyone who has taught and graded students for long knows there are two different ways to proceed. Teachers can compare students' performances on tests and papers to some abstract standard in the teacher's head or, more realistically, to each other's performances. Alternatively, teachers can compare a student's performance to how well we expect the student to be able to do on an assignment. We can ask: Given the student's level of preparation when she entered the class, given the student's natural ability, is this an A, B, or C effort on the assignment *for this student*? This kind of question is not one teachers find impossible to answer.

Moreover, it should be easier for workmates to judge one another's efforts than it is for teachers to judge students' efforts. By and large, teachers do not observe their students' efforts. On the other hand, in a participatory economy, a worker's effort is judged by people who do the same kind of work, people who often work next to and in collaboration with her, and people who are familiar with how she has worked in the past. For all these reasons, it should be easier for workmates to judge one another's efforts than it is for teachers to judge students' efforts.

While we believe worker councils would take the task of effort rating seriously since it affects how much consumption each is entitled to, we do not expect all worker councils to approach the task of effort rating in the same way. Some groups of workers may decide they only want to make rough

distinctions between people's effort – and simply rate below average, average, and above average. While other groups might want to draw much finer distinctions – perhaps giving everyone a score between zero and 200, with 100 the average score. And no doubt, worker councils will use different procedures to judge one another's efforts. The number of people on the effort rating committee, their term of office, rules for rotation, the grievance procedure, and the amount of time spent observing others versus collecting testimony from workmates versus self-testimony will no doubt vary from worker council to worker council.

Presumably, one thing people will consider when deciding where they want to apply to work in a participatory economy will be whether they feel comfortable with the way a worker council they join goes about rating effort. Do I like the degree of gradation? Do I trust the system? Do I think they spend too much or too little time judging one another's efforts? Proponents of a participatory economy expect these are questions job applicants will ask about alternative places to work, just as we expect dissatisfaction with the effort rating process will be among the reasons people leave employment in one worker council and seek it in another. Ultimately, the question is not whether people's efforts, or personal sacrifices in work, will be perfectly estimated because, of course, they will not be. Instead, the question is if most people will feel they are being treated fairly most of the time, and if not, whether people will feel they have reasonable opportunities for redress.

Weisskopf, Hagar and O'Neill all ask if there are sufficient incentives in a participatory economy to ensure that people will exert themselves in socially useful ways. But why would one's coworkers reward clumsy, bungling, or misdirected effort rather than proficient effort? Why would fellow workers have any less incentive to discourage ineffective and encourage effective effort on the part of coworkers than capitalist employers do? Every effort rating committee is constrained by a fixed average effort rating for all workers in their council. Therefore, rewarding inefficient effort on the part of a coworker is just as detrimental to the interests of other workers in the council as it would be if they deliberately overstated a worker's effort. While those serving on effort rating committees will surely consider coworkers' contributions as *one piece of evidence* in estimating how hard a workmate is trying to be effective, the difference is that in a participatory economy they will take other factors into account as well, because simply rewarding the value of someone's contribution is not always fair.

Who are better than her coworkers to know if a worker is charging off at breakneck speed without checking to see if her exertions are effectively directed? Who is in a better position to judge if someone habitually engages in "clumsy effort?" Who can better tell if someone only gives the appearance of trying? Not only are coworkers in the best position to make these judgments, fellow workers in a worker council in a participatory economy have just as much incentive to discourage these kinds of behaviors as do capitalist employers or managers of market socialist enterprises.

Weisskopf and O'Neill also worry that people will try to disguise their true abilities to trick workmates into giving them higher effort ratings than they deserve. It is true that competitors in a series of races that they know will be handicapped may have an incentive to go slow in early races to inflate their handicap advantages in later ones. But again, remember who is judging effort in a participatory economy. Who is in a better position to know if someone is deliberately underperforming in the beginning than the people working with her in the same kind of task? We should also ask how much damage is done if someone does pull the wool over her workmate's eyes through this stratagem. There is an efficiency loss from deliberate underperformance in early races as well as an injustice because later efforts are overestimated and overrewarded. But rewarding place of finish is even more unfair because it penalizes the less able for something they cannot do anything about. Rewarding place of finish is also less efficient since it provides no incentive to improve performance if an improvement is insufficient to pass a rival. Is it really a fatal flaw if some devilous-minded worker in a participatory economy tries to underperform early in order to be overpaid later?

Finally, Kotz worries that cliques and rivalries will lead to inequities and mistrust in participatory workplaces. Why might this be true? Cliques attempt to bias judgments that are the basis for reward. If reward were according to weight, and if all workers were weighed on the same scale, in public view, there would be no reason for cliques to arise because it would be impossible to contest judgments. Or, if reward were according to personal whim, but there was no way to discover the identity of the judge whose whim a clique would have to influence, there would also be no basis for cliques. So the problem with reward according to effort as judged by one's coworkers is that people's efforts *are* subject to question, and everyone knows whose opinion matters. Moreover, if all rotate on to and off the effort rating committee, those serving now know those they judge will judge them later. "Payback" and "tit-for-tat" are phrases that spring to mind. Can the problem of cliques be avoided?

I don't think it is possible to eliminate differences of opinion about effort or sacrifice. And, unfortunately, economic justice requires compensating for differences in effort or sacrifice, not differences in weight! So unless we are prepared to forswear attempts to reward people fairly, the best that can be done in this regard is to explore ways to diminish problems that arise due to differences of opinion. Many assume the only way to reduce disagreement about workers' relative efforts is to improve the accuracy of measurement. This is one strategy: (1) Collect more and better evidence, and weigh it more judiciously. However, there are two additional strategies that can be pursued as well: (2) Improve "due process," so people are less resentful even when they disagree with judgments. Disagreements are problematic to the degree that they breed resentment. (3) Reduce the importance of the entire issue relative to other issues. Even if there are disagreements over judgments, and even if there is dissatisfaction over the process, if the question of effort rating is farther down people's list of priorities, the consequences will be less problematic. I recognize that these are palliatives

rather than cures. I began by admitting that perfect measurement is impossible. Moreover, I realize that my second suggestion amounts to searching for ways to make people more accepting of what they believe to be unfair, and my third suggestion amounts to trying to make people worry less about economic injustice in general.

However, there is an important difference between economies that systematically practice injustice and an economy that is organized to distribute the burdens and benefits of economic activity as fairly as is possible. And there is good reason to believe people's attitudes about distributive justice would be somewhat different in those different contexts. If people believe the economic system is fair, might they not be inclined to attach less importance to disagreements over distributive outcomes in general? If workers believe their own council practices due process, might they not be more tolerant when they disagree with their effort rating committee? More concretely, is there no reason to believe people might be less inclined to form cliques and engage in rivalry when the overall system is fair and when workers in every council have it within their power to modify procedures until they are satisfied there is "due process," if not perfect justice? In general, is it unreasonable to hope that the more economic justice people experience, and the longer justice prevails over injustice, the less people will choose to spend their time and energy in invidious comparisons, at least regarding the distribution of consumption rights over material possessions?

It is possible to immunize judges from pressures coming from those they judge, but we fear the disadvantages of doing so in this context would far outweigh the advantages and, therefore, do not recommend it. Outsiders could be brought in to judge efforts – workers from other worker councils in the same industry federation being obvious candidates. But outside judges reduce self-management for workers in their councils. In other words, the main problem with outside judges is precisely that they are outsiders. Do we want self-management or not? Alternatively, the identity of coworkers serving on the effort ratings committees could be kept secret to protect them from influence. While secrecy may appear attractive, I am deeply skeptical that this would minimize rather than maximize the problem of cliques. Besides a host of theoretical reasons that open and easy access to information for all is good policy, and besides the fact that good legal systems recognize the importance of those charged being able to know the identity of their accusers, there is a major practical reason that secrecy is bad policy. Namely, it doesn't work! More often than not it turns out that what one blithely assumed could be kept secret, actually was not kept secret. So what we usually must choose between is openness versus pretense of secrecy, whether we realize it or not. In this case, the advantages of openness over pseudo-secrecy *vis-à-vis* cliques and rivalries seem obvious.

In sum, critics raise important issues proponents of participatory economics do not wish to belittle. In the end we can only say: (1) Estimating the value of people's contributions to collaborative outcomes is also an imperfect science and subject to question. (2) While proponents of participatory economics

recommend rewarding effort as an equitable social norm that is compatible with efficiency, in the end we *propose* that individual worker councils rate their members as they see fit and expect they will go about it in very different ways. (3) Finally, perhaps the best defense for having coworkers judge one another's efforts at work is the defense attributed to Winston Churchill for democratic government: "No one pretends that democracy is perfect. . . . Democracy is the worst form of government . . . except for all the others." In a similar vein, while effort rating by coworkers will no doubt prove difficult and quarrelsome at times, failing to monitor and reward effort or judging workers on some basis other than their effort, or assigning someone other than one's workmates as judges would be worse. In short, our critics no doubt are right: Remuneration according to effort, or sacrifice, as judged by one's coworkers is the worst possible system of compensation . . . except for all the alternatives!

Finally, Mark Hagar raises a further question about incentives to train oneself worthy of consideration:

Society needs to encourage people to prepare themselves to work where their comparative advantage in contribution is greater. For efficiency, one must reward efforts to improve the success of efforts, and rewarding contribution may be the only feasible way to do so.

— Mark Hagar

Hagar is absolutely correct that efficiency requires that people educate and train themselves in ways they can be most socially useful. Taken to its logical extreme, we could even say there is both an efficient *amount* of education and training each person should receive and an efficient *distribution* of that training and education over particular programs of study. Of course, when put this way the implications of efficiency for education and training might seem frightening since most of us like the idea that we should be able to *choose* to study what we like. Regarding education and training, how are personal choice and efficiency reconciled in a participatory economy?

As we explain in Chapter 10 on reproductive labor, all education and training is paid for at public expense, including appropriate living stipends for students. All are free to apply to any educational and training programs they wish. In a participatory economy applicants are admitted on the basis of merit using the best predictors available for success in a program, tempered, of course, by affirmative action quotas when necessary to correct for racial and gender biases due to historical discrimination as discussed in Chapter 10. The key questions are how the number of positions in different educational programs are determined, and what the personal consequences of acceptance and rejection are.

Education is both a consumption and an investment good, so the number of positions in programs should be determined both by how much people enjoy different kinds of education *and* by how much different kinds of education improve people's social productivity as explained further in Chapter 13. But

how should acceptance or rejection into educational programs affect people? When answering this question, it is important to ask who is paying for people's education and what those who do not spend more time in educational programs are doing instead. As explained, in a participatory economy education is at public rather than private expense. If those who spend less time in educational programs were enjoying more leisure time, and if studying were less desirable than leisure, then those who study longer would deserve extra compensation commensurate with their extra sacrifice. However, as is more often the case, if those who spend less time in educational programs are working while other members of their age cohort are going to school longer, then those who study longer deserve no extra compensation, except in the unlikely event that time spent studying is more undesirable than time spent working.

Since remuneration is based on effort and sacrifice rather than productivity in a participatory economy, the expected income of those who spend more time in education will not be higher than the expected income of those with less. In other words, acceptance or rejection into education and training programs – beyond the years of education all receive – should have no appreciable effect on people's income prospects in a participatory economy. However, this does not mean that acceptance or rejection does not affect people's lives in other ways.

If I am accepted into a program of study I like, presumably this improves the quality of my life. If I am accepted into an educational program that qualifies me for a job with tasks I prefer, this improves the quality of my work life. Finally, if I am accepted into an educational program that makes my contributions more valuable this will earn me greater social recognition and appreciation from my fellow workers and the consumers we serve. Since there is good reason to believe a participatory economy will not be an "acquisitive" society where people are judged by their belongings, but a society in which esteem and respect are more often won through "social serviceability," there should be strong social incentives to develop one's most socially useful potentials through education and training. In sum, while there are no material incentives in the form of extra consumption privileges to be gained from pursuing more years of socially useful education and training, there are no material *disincentives*, and there are significant personal benefits.

No doubt some will worry that even under these circumstances the absence of material rewards for accumulating "human capital" in a participatory economy will fail to lead people to sufficiently pursue their education and training, while others may complain that those who are rejected by educational programs in a participatory economy are unfairly penalized by non-material losses. I seriously doubt there would be a dearth of applicants to colleges, graduate programs, or medical schools in a participatory economy. When it is apparent that the alternative to more education is more work, not more leisure, study suddenly has a way of appearing less burdensome! While those who do not qualify for extra education and training may suffer unfairly because they cannot pursue a course of study they would enjoy, or work at a job with tasks they prefer, this injustice is much less than occurs in economies where remuneration is based on

the value of one's contribution which, in turn, depends greatly on education, rather than only on the sacrifices one makes. Moreover, we know of no way to avoid this inequity, and it may be necessary to ensure that people do seek to educate themselves in socially useful ways as Hagar reminds us.

Capping average effort ratings

How should average effort ratings in worker councils be capped? As already explained, as long as the average effort rating for a worker council is capped, there is no perverse incentive for members to award one another higher ratings than they deserve in expectation of like treatment. But how should average caps be set?

If one believes that for workplaces with large numbers of people, differences in average efforts among them cannot be significant, then the average effort rating for all worker councils should be the same. However, if there are many worker councils with few members so the law of large numbers does not apply, and/or one believes there may be significant differences in effort, on average, even among large workplaces, this would be unfair to workers in councils who do work harder on average.

An obvious alternative is to cap average effort ratings at 100 times the social benefit-to-cost ratio for each enterprise. For example, a worker council with a social benefit-to-cost ratio of 1.01 would have its average effort rating capped at 101, while a worker council with a social benefit-to-cost ratio of 1.15 would have its average effort rating capped at 115. This would be fair if we believe the participatory planning process estimates social costs and benefits accurately. Because if it does, then any differences in the quality of resources, machinery, produced inputs, or skills of workers will already be reflected in differences in estimates of the opportunity and social costs of the inputs they work with, and therefore, any differences in social benefit-to-cost ratios *must necessarily* be due to differences in effort. However, if we don't think the process of estimating opportunity and social costs is accurate enough to sufficiently "level the playing field" among worker councils, this procedure for setting caps risks being unfair to councils with inputs whose lower quality is not fully reflected in lower estimates of their opportunity or social costs. Which procedure for capping average effort ratings in worker councils is something that will have to be discussed and debated by people in real-world participatory economies to be decided as they see fit.

A Market for Labor? In a participatory economy, everyone is free to apply for work in any worker council of her choice, or form a new worker council with whomever she wants. And worker councils are free to select or reject applicants for membership from those who apply. But how does this really work? How would it be different from labor markets today?

One advantage of planned economies compared to market economies is they can more easily provide full employment. The participatory planning procedure generates an annual plan that contains jobs for everyone in the labor force who

wants to do socially useful work they are trained and qualified for. There is no “cyclical unemployment” due to too little demand for goods and services to warrant hiring everyone. And there is no “structural unemployment” because people’s skills do not match job qualifications. These reasons that labor is often unemployed or underemployed in market economies are ironed out during the participatory planning process, rather than left to chance to be sorted out imperfectly in “real time.”

But how do people get matched with jobs in a participatory economy? An approved production plan authorizes a worker council to employ a certain number of members with particular skills. Given who is already working there and the skills they have, this means the council may have to add members, layoff members, or exchange members for others with different skills. The personnel department lists any new openings they have and chooses from among those who apply. New entrants to the labor force, workers who have been laid off, and workers simply interested in exploring moving to a different worker council consult the list of new jobs offered by worker councils hiring, and apply wherever they want. But isn’t this just a labor market?

In some ways, it is. But in what we believe are crucial ways, it is not. It is like a labor market because everyone is free to apply for work wherever they wish, and worker councils are free to hire whomever they wish from whoever applies – subject to laws against discrimination in hiring and affirmative action programs as discussed in Chapter 10. But it is not like a labor market in two important respects.

First, in a capitalist labor market, people are hired as employees, who must then do what they are told by those who own the enterprise – who are not them! In a participatory economy, people are hired as members of worker councils with full and equal rights from the moment they arrive, not as employees. In other words, they work for themselves. This is also the case in worker self-managed market socialist models where there are no employees, only members of worker councils. But in market socialism, as in capitalism, wage rates are determined by the laws of supply and demand for different kinds of labor. This is *not* the case in a participatory economy, which is the second important difference compared to economies with labor markets. Because compensation is determined by committees of coworkers based on the efforts and sacrifices one makes during work, in a participatory economy, wages are not, indeed, cannot be, negotiated as part of the hiring process. This means that the process of matching people with jobs is not only different from capitalist labor markets, but different from labor markets in worker self-managed market socialist economies as well. In a participatory economy, compensation is not determined by the law of supply and demand.

Motivational efficiency

As explained, workers are compensated according to personal sacrifice or work effort in a participatory economy because this is just and fair. One’s effort and

sacrifice are assessed by coworkers because as problematic as this may be, any other system of evaluation would be far worse.

In truth, economic productivity is largely the result of scientific and technological knowledge accumulated over decades and centuries, embodied in equipment and organizations of work that are also inherited. What any one of us could produce absent this “gift” from the past, and absent the cooperation of others, is miniscule compared to what we can produce, on average, by using this gift together. What is absurd is the notion that some deserve to appropriate thousands of times more than others from the bounty this public good of social economic productivity provides. When we understand that each generation inherits its productive potential, it is easier to see why only differences in the efforts and sacrifices people make when setting this productive potential in motion should serve as the basis for any differences in rewards. In any case, while the quantity and quality of non-labor inputs one has to work with, how many others there are with the same skill set one has, talent, and luck all influence how productive people’s work will be; the only factor over which people have any control is how much effort they exert. So not only is rewarding effort the fair thing to do, it is also the best way to motivate people to perform up to their abilities. In sum, rewarding effort as judged by workmates aligns individual interest with the social interest quite nicely, particularly when “effort” includes any above average sacrifices incurred in education and training.

Allocative efficiency

It is in the self-interest of individual worker councils to have more and higher quality inputs to work with, while it is in the social interest to allocate scarce productive resources to wherever they are most socially valuable. Particularly in light of the fact that only a worker council can propose and revise its requests for inputs, how does the planning procedure reconcile the self-interest of worker councils with the social interest?

As already explained, in the participatory planning process, worker councils are asking permission from others to be allowed to use scarce productive resources that belong to everyone as well as intermediate products and capital goods others must produce, in exchange for a promise to deliver certain amounts of socially valuable goods and services. Since the planning procedure generates ever more accurate estimates of social costs and benefits, it is easy to see if the social benefits expected from the outputs a worker council promises to deliver exceed the social costs of the inputs it is requesting. Only in this case is it in the interest of all the other worker and consumer councils to approve the proposal. So in order to obtain the resources they want to work with – that is, in order to serve their own interests, worker councils are required to serve the social interest as well. In Chapter 7 we prove that the annual participatory planning procedure will achieve Pareto optimal outcomes under fewer assumptions than needed to prove the “fundamental theorem of welfare economics” for a private enterprise market economy.

Dynamic efficiency

However, with regard to rewarding innovation, there is a possible conflict of interest between two goals – dynamic and static efficiency. To achieve static efficiency, we propose that all productive innovations be made available immediately to all workplaces, which have every incentive to immediately put them to good use. When innovations are produced as “outputs” in industry and consumer federation research and development units, where workers are rewarded for their efforts toward developing innovations, there is no conflict between static and dynamic efficiency. And since R&D is a public good, and as we will explain, a participatory economy tends to allocate more resources toward the production of public goods than market economies, this should increase the pace of innovation. However, since innovations are shared with all immediately, where is the incentive for individual worker councils to innovate rather than wait for special R&D units or other worker councils to do so? In particular, will it prove desirable to provide material rewards to innovating workplaces above and beyond what their members’ sacrifices otherwise entitle them to?

There is good reason to believe in an economy where it is unlikely that status will be achieved through conspicuous consumption, and where social serviceability will be more highly esteemed, that rewarding workers in highly innovative enterprises with consumption rights in excess of sacrifices may not be necessary. However, if people in a participatory economy come to the conclusion that extra rewards for workers in innovating enterprises are needed, any such rewards can be determined democratically by all citizens. However, unlike patents that provide material rewards for innovation in private enterprise economies by prohibiting others from using the innovation, which generates a great deal of “static” inefficiency as consumers of drugs in the United States can attest, any material rewards for innovating enterprises will not limit their use by others. However, as it became apparent that 20th century, centrally planned economies were not as “dynamic” as many of their capitalist competitors, one of the most powerful arguments against *any* socialist economy was that it could not match the dynamism of capitalist economies. How can a participatory economy stimulate innovation?

Any group of workers who can submit a proposal during the planning procedure that is approved as socially responsible – that is, whose social benefit-to-cost ratio is at least one, will receive the inputs it requests to start producing when the year begins. That could be a group composed mostly of students exiting the educational system. It could be a group of disgruntled members of an existing worker council who have been consistently outvoted about how to do things, and who want to start up a new operation to try and do things their own way. So in many ways, it is easier for a new, innovative group to put their idea into motion than in capitalism, where they would either have to save up enough themselves or convince a lender to finance their operation.

However, we must protect others from negative consequences if a group of crackpots submits a proposal that looks good and is approved but in fact is a fantasy because they will not be able to fulfill their promise. If this happens, at a minimum, resources will be wasted, and in all likelihood, other worker councils who rely on deliveries from the crackpots that do not arrive will be unable to fulfill their plans through no fault of their own. So a “gatekeeper” is needed in a participatory economy, and we initially recommended empowering industry federations to certify the credibility of new groups asking to participate in the planning process. But what if industry federations are too conservative in these judgments and act like old fuddy-duddies who stifle creative new ideas and innovation?

There are other ways groups who want to start up new enterprises might demonstrate their credibility. If a group comes with an impressive display of crowdsourcing support, this can demonstrate credibility.³ If members of the group have relevant educational credentials, this can demonstrate credibility. If members of the group have worked in the industry elsewhere, this demonstrates credibility. Finally, there is no reason a review board separate from all the industry federations cannot be created where groups who were turned down for accreditation by their industry federation can appeal for approval. This board could even be ordered to overturn rulings from the industry federation until the number of new firms they approve who turn out to be crackpots reaches some specified percentage – demonstrating that the review board was no longer being too conservative in accrediting startups.

Consumption

Less than half of Americans have full-time jobs. On what basis will those not working as members of worker councils have consumption rights, or income? How can people save (consume less than they are entitled to during a year) and borrow (consume more than they are entitled to during a year)? Are there any provisions for special circumstances giving rise to either special or unanticipated needs? And what if a consumer changes his or her mind and wants to change something from what the plan approved them for?

Allowances

We assume that rules for who qualifies for living allowances, stipends, or benefits, and the size of allowances and benefits will all be decided by a democratic political process. In particular we assume:

- There will be allowances for those who worked in the past but have now reached retirement age. What the retirement age is, and whether the size of retirement benefits is the same for all, or depends to some extent on years worked and/or effort ratings over one’s work life, is one question to be decided democratically by the political system when the time comes.

- There will be allowances for the disabled. Rules for eligibility and size of disability payments to prevent anyone from being penalized due to disability will be decided through a democratic political process when the time comes.
- A participatory economy takes responsibility for the economic welfare of all children. This does not mean that parent/guardians do not also have responsibilities or that parent/guardians do not have certain decision-making rights *vis-à-vis* children as explained below and discussed further in Chapter 10. But it does mean that the financial well-being of children, the infant care, childcare, and educational opportunities open to children, and the healthcare available to children will not be dictated by who a child's parents/guardians happen to be. The size of allowances for children, whether this varies by age, and whether there are living stipends for young adults older than 18 who continue their formal education beyond the minimum number of years mandated, must all be determined by a democratic political process when the time comes.
- There will also presumably be living allowances for those who society believes should be working, but who nevertheless decide not to work. Whether a participatory society guarantees a "universal basic income" so that nobody's total income falls below a certain level, and the size of any UBI will also be decided through a democratic political process when the time comes.
- Individuals' effort ratings and/or allowances are expected to be sufficient to cover the social costs of producing their private consumption, as well as their share of the social cost of producing all public goods available to them. However, unless members of a consumer council or federation decide otherwise, individuals pay no "user fees" for public goods, and all educational and healthcare services provided by the public education and healthcare systems are free of charge, as explained in Chapter 10 where we discuss reproductive activity at length.

Saving and borrowing

Anyone can save by consuming less than her consumption allowance for the year, deferring the remainder for later use. Borrowing, however, raises the issue of credibility. As long as someone who wishes to consume more this year than her consumption allowance warrants can be trusted to pay society back by consuming less than her allowance warrants in the future, there is no problem. In these normal cases, borrowing is as simple and straightforward as saving. However, what if a person borrows year after year and in amounts that cast doubt on her ability to pay society back all she owes?

In capitalism loan officers in banks and those who approve credit limits on credit cards make these judgment calls. In a participatory economy, we propose to leave monitoring the credibility of personal loan requests up to neighborhood consumption councils since they are also in charge of approving and aggregating household consumption requests, reviewing special need requests

and handling adjustments to consumption requests throughout the year. In all likelihood neighborhood councils will need to create a credit committee, and credit committees in different neighborhood councils will need to coordinate lending activity among themselves as well. But with regard to saving and borrowing for consumers, we propose something similar to what a system of community credit unions would be like today.

Should there be an interest rate paid on personal savings and charged on personal loans? We will return to the subject of interest in Chapters 11 and 12 where we take up investment. But for now we can give a simple answer: There would be little harm done if no interest were paid or charged on personal savings and loans. And since this is delightfully simple, it may well be the best choice. However, there would also be nothing wrong with a rate of interest for consumers equal to the annual rate of increase in per capita economic well-being, perhaps with a small “risk premium” sufficient to cover losses for defaults.⁴

Who Determines Special Need? How might an economy fail to distribute goods and services in a way that is beyond moral reproach? Proponents of a participatory economy believe that ignoring differences in sacrifice would be immoral. We also believe that ignoring differences in need is morally unacceptable. But there are two ways to think about and pose these objections. One is to describe either failure as “unjust.” In effect, this makes “economic justice” and “morally acceptable” synonymous. The other way is to draw a distinction between what it means for an economy to be *just* and what it means for an economy to be *humane*. In this usage it is conceivable that a just economy – which provides compensation commensurate with people’s efforts and sacrifices – might fail to be humane by denying those with greater needs what they require. In this usage it is also possible that a humane economy – which compensates all with greater needs appropriately – might fail to treat people fairly; for example, by otherwise rewarding people on the basis of the value of the contribution of their person and property rather than on the basis of their efforts and sacrifices.

The important thing is to agree that any economy that fails on *either* account is morally unacceptable, in which case the policy implications are the same no matter whether or not one chooses to draw a distinction between “just” and “humane.” Since proponents of a participatory economy endorse an economy that is both just and humane – that is, an economy beyond moral reproach of either kind – we support distributing consumption rights according to effort, or sacrifice, *and* need, which is the “official” distributive principle in a participatory economy. This “official principle” is implemented by tasking worker councils with deciding if there are any differences in the efforts of their members they wish to report, by establishing allowances for those who do not work through the democratic political process, and lastly, by tasking neighborhood consumption councils with deciding if there are any special circumstances regarding needs of their members that should be taken into account.

Household consumption requests are approved by their neighborhood consumption council. In most cases, the process is straightforward: Do the

effort ratings and official allowances of a household's members justify the social cost of producing the household's private consumption request? Moreover, the system of allowances for those too young or old to work and those with disabilities is designed to account for many differences in need. In any case, this is a simple calculation requiring no discretion on the part of the neighborhood council. However, in addition to various allowances determined by a democratic political system, and opportunities to borrow, we propose that households also be allowed to apply to their neighborhood consumption council for permission to consume more than they would otherwise be permitted to do because of some special need or circumstance. In such a case the neighborhood council would have to decide if the request was warranted by some special need or consideration that standard procedures had failed to account for.

Some anarchists have criticized the model of a participatory economy because they favor the distributive principle "to each according to need" – even if "from each according to ability" cannot be assumed. Fortunately, I do not believe this disagreement matters for two reasons. First of all, it doesn't matter because in a participatory economy what is proposed is that each worker council decide for itself how to rate its members' efforts. As already explained, proponents of a participatory economy are under no illusions that every group of workers will decide to go about this in exactly the same way. Not only will different worker councils decide on different procedures – rules for who serves on the rating committees, what information the committee collects, grievance procedures, and so on – they may also decide to apply different criteria. So any group of workers who wished to accept members' self-declarations about their own efforts, or who wished to report no differences of effort among their members, is free to do so. Nobody will interfere or think any worse of them for doing so.

It also doesn't matter because in a participatory economy what is proposed is that beyond making some goods and services like education, medical care, and access to recreational facilities free of charge, each neighborhood consumption council decides for itself how to take any differences in the needs of its members into account when approving special need consumption requests. So if neighbors are willing to accept one another's self-declarations regarding special needs, they are free to do so. And again, nobody will interfere or think the worse of them for doing so.

So there is no need to speculate about what people in general will feel like doing when the time comes. If people have sufficient trust in one another to allow their fellow neighbors to self-declare what their needs are, such a neighborhood council is free to go ahead and do so. And if people have sufficient trust in their coworkers to accept their self-declarations about their efforts, then such a worker council will go ahead and do so. If, on the other hand, people want to protect themselves against the possibility of socially irresponsible behavior of others – as I suspect many will, at least in the beginning – then they will do so by linking consumption rights to effort and sacrifice in work as judged by coworkers, and by reviewing special requests for consumption due to need in consumption councils rather than accepting peoples' self-assessments without question.⁵

*Can I Change My Mind?*⁶ A participatory economy is a planned economy. This means we must have some idea what people want to consume in order to formulate a plan for how to produce it. In market economies, for the most part, consumers do not “pre-order,” and instead producers are left to guess what consumers will eventually demand. Not only do corporations expend a great deal of resources trying to estimate (and influence!) what people will want to buy, the extent to which they guess wrong generates market disequilibria and “false trading,” while market prices adjust – all of which generates inefficiency. Of course those who want us to believe markets are God’s gift to the human species don’t go out of their way to remind us that when markets are out of equilibrium, inefficiency is necessarily the result. However, as argued in Chapter 2, simply reading the necessary assumptions behind the fundamental theorems of mainstream economics “high theory” makes this quite clear to any who care to notice. In other words, the convenience for consumers of not having to pre-order in market economies is actually bought at the expense of a significant amount of economic inefficiency as resources are wasted producing more of some goods and less of others than it turns out people want. Not to speak of the waste during economic slumps like the Great Depression of the 1930s, the Asian Economic Crisis in the 1990s, the Great Recession of 2008–2009, and most recently, the recession that followed in the wake of the COVID-19 pandemic when a significant portion of global productive resources sat idle, not because people didn’t want the goods and services they would produce, but because it was unsafe for people to go to work to produce them and also because producers therefore guessed correctly there would be insufficient “effective demand” to buy them.

A participatory economy provides a remarkably cheap way to mobilize as much information about what consumers will want as possible to avoid all this “macro” inefficiency that plagues market economies. Neighborhood consumption councils and consumer federations make consumption desires known for both private and public goods during the participatory planning process by entering proposals on behalf of their members.

However, neighborhood proposals for private consumption are really just neighborhood-wide best guesses. In other words, nobody is going to hold households to their consumption requests when it turns out they want to consume more of some things and less of others than they pre-ordered. We simply ask households to place a pre-order so neighborhood consumption councils can participate in the planning process. What we envision is consumers spending a couple of hours of their time going over their consumption from the previous year and making adjustments up and down where they think they will want to. That is less time than it takes the average person to prepare his or her tax return every year.

We are well aware that consumers will misestimate what they ask for and need to make changes during the year, and that some consumers will prove more reliable and others more fickle. The easiest way to think about this is to imagine each consumer with a debit swipe card that records what they consume during the year as they pick it up and compares their rate of consumption for

items against the amount they had asked and been approved for. If one's rate of consumption for an item deviates by say 20% from the rate implied by the annual request, consumers could be "prompted" and asked if they want to make a change. In any case, if at the end of the year the total social cost of someone's actual consumption differs from the social cost of what they had asked and been approved for, they would simply be credited or debited appropriately in their savings account.

One of the functions of consumer councils and federations is to coordinate changes in consumption among themselves. If another consumer wants more of an item I pre-ordered but no longer want, there is no need to change the amount the agreed upon production plan called for. Whenever consumer councils and federations that will function like clearing houses for adjustments discover that changes do not cancel out, the national consumer federation will have to discuss adjustments with industry federations of worker councils. Computerized inventory management systems and "real time" supply chains are already fixtures in 21st century economies, which makes adjustments much smoother than they would have been only a few decades ago.

In any case, to whatever extent consumers do foresee their needs, a participatory economy is positioned to capture the efficiency gains of planning over market disequilibria. To the extent that consumers cannot accurately gauge their desires, councils and federations will have to negotiate mid-course adjustments, as discussed further in Chapter 8. But a participatory economy is certainly not powerless to respond to changes in consumer desires. Is it possible that some consumers may not receive some particular item exactly when they want it if it was not in their original order? Yes. But as explained in greater detail in Chapter 8, that need not occur often, and if memory serves, not all children found a Cabbage Patch Kid doll under their tree the first Christmas those dolls became all the rage.

Consumer councils and federations also afford consumers much greater clout *vis-à-vis* producers over quality and defects than consumers have in market economies. Critics of participatory economics have mistakenly assumed it is no different from Soviet-style command planning in this regard. It is true consumers were even more disenfranchised in the centrally planned economies than they are in market economies. Soviet, Chinese, Cuban, and Polish consumers not only confronted a huge state distribution system alone but faced a "take it or take nothing" proposition. In market economies individual consumers face powerful corporations that devote significant resources to manipulating us. The advantage is we can often walk away from one corporate behemoth and buy from another – which mouths the double-speak mantra "the customer is always right" with equal insincerity! But in a participatory economy, neighborhood consumer councils and federations put consumers on an even playing field with producers, *and* each consumer has freedom of exit. Instead of relying for information on shopping displays and advertisements from profit-seeking producers, consumers in a participatory economy will surf websites and roam malls run by consumer federations responsible to them, and

get product information from their consumer councils and federations rather than from producers. It is the difference between getting information about the likelihood of a washing machine breaking down from Consumer Reports instead of from GE, Sears, or Home Depot. It is the difference between getting information from “Nader’s Raiders” instead of from GM and Ford about automobile safety.

Finally, if a consumer is unsatisfied with a product, she only has to refuse it and return it as unacceptable to her consumer council. Then the question of whether or not the product delivered was up to standards, and the producer deserves credit or not, is settled between the consumer council, or federation, and the worker council who made it, or their federation. Won’t it be nice when all of us can hand over our customer complaints to a powerful player to handle on our behalf?

Councils and federations

Councils

Groups of people discussing and deciding together – councils – have emerged during many social upheavals. However, invariably, those councils did not survive as permanent features of a new economic system but were soon abandoned or destroyed. In the Russian revolution *Soviets* (Russian councils) and factory committees (where every worker in a workplace had a vote) were replaced within a few years by rule by Bolshevik commissars and central planners. Neighborhood councils in cities, communal councils in rural areas, and factory committees in workplaces in Republican-held territory in Spain were crushed and outlawed when Franco’s troops won the Spanish Civil War. In 2001 neighborhood councils called “*asambleas*” sprang up in Argentina along with factory takeovers, and worker councils ran enterprises after “*ocupaciones*” by workers in response to an economic and political crisis created by extreme neoliberalism, only to disappear in little more than a year. And more recently, Occupy Wall Street led to encampments governed by a “general assembly” in which every participant had equal voice and vote in over a thousand cities in the United States during the Great Recession, only to disappear even more quickly.

Whereas the major institutions that comprise a capitalist economy are limited liability corporations and markets, in a participatory economy, the main institutions are two types of councils – worker councils and what we call neighborhood “consumer” councils – who together with federations of consumer and worker councils coordinate their interrelated activities through participatory planning procedures. Our proposal can be thought of as creating a planning process that will empower and sustain these councils and federations as permanent building blocks of a new, more desirable economy – because history demonstrates all too clearly that absent a coherent plan for what councils and federations of councils can and should do, they will continue to disappear whenever a revolutionary surge subsides.

Governance of federations

As explained in Chapter 2, one of the liabilities of market economies is that while they reduce the transaction costs people have to bear for individual consumption, they do nothing to lower the transaction costs of expressing one's preferences with regard to collective consumption, which generates an unfortunate bias against collective consumption in favor of private consumption. While everyone can participate personally in deliberations over local public goods in their neighborhood consumer council, unfortunately, it is impractical for everyone to participate directly in deliberations over higher-level public goods in consumer federations. Instead, neighborhood councils must send delegates to deliberate in federations on behalf of those they represent. For example, every neighborhood will send representatives to the city federation of neighborhood consumer councils, and these representatives will discuss the relative merits of extending the public transit system versus repairing the city sewage system or doing neither because city residents want to spend more of their income on private consumption goods.

This still leaves much to be determined regarding how delegates represent their constituencies. How will delegates be selected? What will be their terms of service? What, if any procedures will there be to recall delegates? Will delegates be free to vote as they see fit or be required to remand decisions to binding referenda by those they represent? And finally, will the answers to these and other questions be left up to each council represented by a delegate in a federation to decide regarding its own delegates, or will federations establish rules that apply to all their delegates?

We leave all that to be determined by the constituents of different federations when the time comes. However, while deliberation in worker and neighborhood consumer councils can and should be conducted through direct democracy, the deliberative work, although not necessarily the final decisions of federations, must be done through representative democracy.⁷

Assessments for public goods

Households consume public as well as private goods. For example, if a neighborhood consumption council requests a new swing set for its park, all neighborhood residents are assessed their share of the social cost of the swing set. Likewise, if the city federation of consumer councils builds a new extension to its mass transit system, all city residents are assessed their share of the social cost of extending the line. People's share of the cost of all public goods requested by consumer councils and federations of which they are members are subtracted from their individual consumption allowance, and it is the remainder of their allowance that is available to cover their individual consumption.

What share of the costs of providing public goods different members of consumption councils and federations should pay can be left up to those councils and federation to decide. However, since a participatory economy goes to great lengths to make consumption allowances fair, and since public goods,

by definition, are available to be consumed by all, one can make a strong case for equal shares. For example, if there are 1,000 members of my neighborhood consumption council, each of us would be assessed one-thousandth of the cost of a swing set for our neighborhood park.

On the other hand, consumer councils and federations may wish to deviate from equal assessments. For example, in some cases, user fees may be fairer than equal assessments for all. And even when there is no way to prevent those who do not pay a user fee from benefiting, federations may want to experiment with some “incentive compatible demand revealing mechanism” pioneered by a number of economic theorists in the 1970s, as discussed in Chapter 7, where we now proceed to discuss different aspects of annual planning more fully.

Notes

- 1 See the appendix for a discussion of Pat Devine’s proposal in this regard.
- 2 Looking ahead, in Chapter 10, where we discuss reproductive labor, we propose that jobs be balanced for caring labor as well as for empowerment and desirability.
- 3 Here “crowdsourcing support” simply means testimony from credible witnesses supporting the group’s seriousness and promise. A new worker council does not need start-up financing because if it is approved to participate, it can bid on any capital goods needed during the participatory planning procedure, and no “crowd funder” in a participatory economy is permitted to receive what amounts to dividend income.
- 4 It is important to note that investments by worker councils to expand and improve their productive capacities are decided during the investment planning process described in Chapters 11 and 12, and these investments are *not* financed out of personal savings. So the rate of interest we are discussing here is merely a payment by consumers who wish to consume earlier to consumers willing to consume later.
- 5 As an aside: As far as I am personally concerned, the sooner people develop more solidarity, and are therefore willing to dispense with protective procedures, the better, and I know of no advocate for a participatory economy who does not feel the same way. But while individual councils are free to abandon protective measures when they feel they are no longer necessary, we believe it is important to provide protective measures for councils whose members do feel a need for them, for as long as they feel a need.
- 6 Procedures and different options for making adjustments to the annual plan are discussed at greater length in Chapter 8.
- 7 Note, consumer federations make and revise proposals only about public goods all neighborhoods that comprise the federation consume. Delegates do not meet to discuss, much less decide, how all economic activities within their geographic jurisdiction will be carried out.

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7 The participatory annual planning procedure

In Chapter 6 we dug deeper into a number of issues – fleshing out and clarifying different parts of our proposal and responding to some questions and criticism others have raised about a participatory economy over the years. This chapter digs deeper into the annual participatory planning procedure. It begins by clarifying a vital issue: Who will say no to proposals submitted by consumer councils that are too greedy? Who will say no to proposals submitted by worker councils that fail to use productive resources efficiently or proposals where workers are being too lazy? After addressing these central concerns, we move on to explain: (1) how we propose to handle capital goods during annual planning; (2) how we propose to treat public goods during annual planning; and finally, (3) how we propose to treat emissions of different pollutants during annual planning. After which we can finally perform a standard welfare theoretic analysis of the participatory planning procedure. The chapter closes with a summary of how participatory planning differs from central planning, from common conceptions of comprehensive democratic economic planning, and from a market system with a Walrasian auctioneer.

Who says no?

Who decides if proposals from worker and consumer councils and federations about what they want to do are acceptable? In central planning, this decision resides with the central planning authority. The justification given for this is that only a central planning authority can gather the necessary information and wield sufficient computational power to determine if proposals from production units would use scarce productive resources efficiently. In other words, it is presumed that a central planning authority, and only a central authority, can protect the social interest. But leaving aside the more general question of whether or not any authority can be trusted to protect any interest other than its own, it turns out upon careful examination that both parts of the traditional rationale for giving central planners power to approve or disapprove work proposals are false.

As we explained in Chapter 4, central planning authorities must overcome powerful perverse incentives for workplaces to mislead central planners about their true capabilities. This may not be as impossible to prevent as critics of central planning have claimed, but it is an unending struggle at best. However, what is more relevant to present purposes is that a *different* planning procedure can not only eliminate

these and other perverse incentives, but also provide *all councils* with a quick way to decide whether or not the proposal of *any council* is socially responsible.

In our annual participatory planning procedure, worker councils would only harm themselves by failing to reveal their true capabilities because pretending they can do less than they can, only lowers the likelihood of being allocated the productive resources they want. As we will soon see, the participatory planning procedure also eliminates perverse incentives regarding pollution and public goods that are endemic to market economies. Now that we have incorporated our pollution demand revealing mechanism (PDRM) into the participatory annual planning procedure, it is in the best interests of pollution victims to reveal how much they are truly affected by pollution, and these negative effects are fully accounted for in the social costs of producing different goods and services. And finally, because requests for different levels of public goods are treated simultaneously and in the same way as requests for private goods and services in the annual participatory planning procedure, as we will discover, there is no bias in favor of individual consumption requests at the expense of collective consumption. Neither is true in market economies. By eliminating perverse incentives endemic to both central planning and markets, the annual participatory planning procedure is able to generate estimates of the opportunity costs of scarce productive resources, the social damage from harmful emissions, and the full social costs of producing goods and services that are as accurate as can be hoped for.

But most importantly, what this means is that our annual participatory planning procedure generates the necessary information to make informed judgments about work and consumption proposals *which can be made available to everyone*. Except in rare cases there is no need to look at the details of what any worker council proposes to make, or what inputs they propose to use to produce it. If the SB/SC ratio is one or greater, there is every reason to believe a worker council is behaving in a socially responsible way, i.e. its members are not using scarce productive resources inefficiently or being too lazy. In which case there is no reason for other councils to object. On the other hand, if the SB/SC ratio is less than one, there is good reason to believe the proposal is not socially responsible, and it is in the interest of other councils to reject it.

As long as every worker council knows that other councils have *the power* to accept or reject their proposal – that is, they have the power to “say no” – and will do so based on their SB/SC ratio, it is in the interest of every worker council to eventually find some way to submit a proposal whose SB/SC ratio is equal to or greater than one. If they do not, one of two things will happen: (1) Their proposal will be rejected, their workplace will be shut down, any assets will be reallocated to other worker councils whose proposals are accepted, and their members will have to seek employment elsewhere. While being laid off will not be nearly as disagreeable as it is in capitalist economies for reasons we explain below, nonetheless worker councils have a powerful incentive to find some way to submit a proposal whose SB/SC ratio is at least as high as one. Or, (2) they will have to file an appeal in which they argue that somehow the estimates of opportunity and social costs for some of their inputs, or the estimates of the social benefits of some of their outputs are inaccurate and misleading, i.e. that “the numbers lie” in some way, which we discuss further below. But

the important points for now are: (a) We do not simply leave it to the consciences of individual WCs to submit proposals which are socially responsible. There is someone to “say no” to irresponsible proposals. (b) That “someone” is *not* a central planning authority. It is *other councils*. (c) Other councils *can* do this quickly. Councils could even program an automatic reject for any proposal from other councils whose SB/SC ratio is less than one. (d) There is good reason to believe it will not be necessary for worker councils to ever exercise their power to “say no” because every worker council will know that is what they will do if necessary, and therefore has every incentive to “police” itself and modify their proposals to raise their SB/SC ratio to one or higher.

Members of each worker council will have to meet to discuss and decide what *they* want to propose to produce and what inputs they want to request. But participation in these meetings is part of people’s job, not something they do after hours, and not something monopolized by only a few members of the worker council. Members of each neighborhood consumption councils will have to meet to discuss what neighborhood public goods *they* want to ask for. Delegates from councils that comprise a federation of consumer councils will have to meet to discuss what public goods *their* federation of consumer councils want to request. However, these are all meetings *within* worker and consumer councils, of ordinary workers and consumers, and meetings *within* federations of delegates to deliberate over the federation’s own collective consumption requests. They are *not* meetings attended by delegates from different councils and different federations to discuss and approve one another’s proposals.

This part of our proposal is apparently so unique that it has been widely misunderstood. To prevent further confusion, let me state for the record: While our stated goal is for decisions to be made in a way where people have influence over economic decisions in proportion to the degree they are affected; during annual participatory planning we do *not* propose that representatives from *different* worker and consumer councils meet to discuss how to accomplish this, nor do we propose that delegates to *different* federations meet to discuss matters between them. Meetings during annual participatory planning are only concerned with what a council or federation wants to do itself. Discussion is only about what we might call “self-activity” proposals. The discussion is not about what anyone thinks the overall plan for the economy should be. Workers in one council needn’t discuss what they think workers in any other council should or should not do, much less how to coordinate the division of labor among them. Instead, because they would use their power to “say no” to proposals with SB/SC ratios less than one they should never have to do so, leaving any council who believes their SB/SC which is less than one is misleading to decide whether or not to file an appeal.

In other words, discussions inside each council or federation are only about their own self-activity proposals, and approval or disapproval for other councils’ proposals is a routine and mundane matter, not a subject requiring discussion, and certainly not a matter for discussion, debate, or coordination in meetings with other councils. Now that this is hopefully clear, we are ready to move on to explain how capital goods, public goods, and pollution are all handled during annual planning.

Treatment of capital goods during annual planning

The decision about how much of each capital good to produce each year is decided by the participatory investment planning process, which we explain at length in Chapters 11 and 12 in Part IV.¹

Treatment of capital goods during participatory annual planning is quite simple: The investment plan decides how much of each capital good to produce each year. So when we begin the participatory annual planning process, we already know how much of each capital good must be produced during the year. In effect, the demand for each capital good produced during the year, which only becomes available for use at the beginning of the following year, is fixed by the results of the investment plan that covers the year in question. In other words, the *demand* for capital goods produced during the year is infinitely inelastic, and their indicative prices adjust during iterations of the annual planning procedure until the supply is equal to that fixed demand.

However, the capital goods produced during the year are not the same as the capital goods available for use at the beginning of the year. The supplies of those capital goods available at the beginning of the year are just like the supplies of different categories of labor and different natural resources available at the beginning of the year. For each of them, there is a known fixed supply when annual planning begins. In other words, the *supply* of each capital good available before the year begins is infinitely inelastic, and their indicative prices adjust during iterations of the planning procedure until the demand is equal to that fixed supply.

This means there will be *two* indicative prices at the end of the annual planning process for each capital good – one is the opportunity cost of using one unit of the capital good available at the beginning of the year, and the second is the social cost of producing a unit of the same capital good during the year, which only becomes available for use at the beginning of the following year. Those two prices for the same physical capital good need not be the same because the same physical object available at two different times will not generally have the same social value. This will all become clearer as we proceed.

Public goods

Worker councils in industries producing public goods are no different than worker councils in industries producing private consumption goods, intermediate goods, or capital goods. For worker councils producing public goods, we can model their production and worker well-being functions exactly as we do the production functions and worker council well-being functions for all other worker councils. In short, there is nothing different about producing public goods than there is about producing any other good.

Nor is there any difference in how we model consumer preferences for public goods. People gain well-being from consuming public goods just as

they gain well-being from consuming private goods, so public goods enter as arguments into neighborhood consumer council well-being functions just like private consumption goods. Moreover, we can assume people experience diminishing marginal utility from public good consumption just as they do from private good consumption and that different consumer councils appreciate different public goods to different degrees.

What *is* different about public goods is that their consumption is “non-rival.” That is, when one person consumes a public good, this does not prevent others from consuming the same public good as well. And of course this difference is what creates the well-known “free-rider” incentive problem: Since everyone who benefits from a public good knows that when others purchase it, they will be able to benefit as well, there is a perverse incentive for everyone to wait for others to purchase the public good, generating too little effective demand for public goods compared to private goods in market economies.

Put differently, in market economies everyone can express their preferences for private goods anytime they want simply by going out and buying them, whereas the process for expressing preferences for public goods is more complicated and more frustrating. In the case of private goods we can simply walk into a store and buy the pair of shoes we like, or place an order on Amazon.com for a book to be delivered by UPS within 48 hours. But to express our preferences for public goods, we must try to influence elected political representatives who decide (1) which public goods will be provided, and which will not; (2) how much of each public good will be provided; and (3) how taxes will be levied to pay for them. If this were not frustrating enough, our personal experience with public goods is also more frustrating than with private goods because just as people have different preferences for what private goods they want to consume, they have different preferences for what public goods they would like to consume as well. But in the case of public goods, we must all end up consuming the same bundle of public goods, whereas we can each satisfy ourselves by consuming whatever bundle of private goods we like. So while I have only myself to blame if I am dissatisfied with the private goods I purchased, there are always a host of others I can blame when the public goods available to me are invariably different from what I would have ordered up myself. We cannot change the fact that public goods are non-rival, and therefore, nobody will be fully satisfied with the bundle of public goods they consume. But we can eliminate the perverse free-rider incentive, and make it less difficult and frustrating to express one’s preferences for public goods – and thereby help “even the playing field” between expressing preferences for private and collective consumption.

There are different “levels” of public goods. Some public goods are consumed by everyone in the nation, some are consumed only by those who live in a region, some by residents of a state, some by residents of a county, some by residents of a city, some by residents of a ward, and some are consumed only by those who live in a particular neighborhood. We recommend that requests for higher-level public goods be drawn up and announced in each round of

the planning procedure *before* requests for lower-level public goods and private goods are drawn up and submitted for three reasons:

- 1 The inefficient bias favoring private over collective consumption in market economies has been affecting human attitudes, expectations, and behavior for centuries and will only be overcome by a major change in how people approach consumption decisions. To help facilitate this change in approach we want people to think about their collective consumption first and their private consumption second.
- 2 Before I can know how much of a lower-level public good I want, I need to know how much of all higher-level public goods will be available. For example, before making a decision about state highways, residents of a state need to know what the federal highway system will look like. And before I can know how much private goods I want, I need to know what bundle of public goods of all levels will be available to me. For example, before deciding if I want a swing set for my kids in my backyard, I need to know whether or not there will be swing sets in the neighborhood park only a block away.
- 3 Finally, there is a practical reason to proceed in this way: In any round of proposals, before a household can know if its private consumption request is socially responsible – that is, warranted by the effort ratings and allowances of household members – it needs to know how much of household income is left to cover private goods, which means it needs to know how much of household income has already been allocated to pay for the household's fair share of all of the public goods that would be available to its members.

As discussed in Chapter 6, while proposals for neighborhood public goods can be handled by direct democracy, proposals for all higher-level public goods must be handled by federations – where we do *not* recommend mass membership meetings of all federation members to discuss and debate different options. Instead we propose that lower-level consumer councils send delegates to consumer federations to deliberate over what public goods the federation will propose in each round of the planning procedure, and as explained in Chapter 6, leave decisions about how constituents hold their delegates responsible up to people living in a participatory economy. What remains to be discussed here are options other than equal assessments or user fees that federations might opt for. Prior to the 1970s the consensus among public finance theorists was this:

- Because people's preferences differ regarding public goods, just as they differ regarding private goods, not all people will benefit equally from a public good.
- We need to know how much people benefit from a public good in order to provide the efficient amount. It is efficient to increase the supply of a public good up to the point where the cost to society of the last unit

provided is equal to the *sum* of the benefits *all* consumers derive from the last unit they consume: $MSC(Q^*) = \sum_i MPB(i)[Q^*]$ $i = 1, 2 \dots n$ is the familiar optimality condition where Q^* is the optimal quantity of the public good to provide, and n is the number of people able to consume it.

- But unlike the case for private goods where consumers reveal how much they think they will benefit from consuming a private good by purchasing up to the point where their $MPB(i)[q]$ for private good q is equal to the price of q , $p(q)$, there is no similar behavioral indicator of how much consumers benefit from a public good. What if we just ask them their $MPB(i)[Q]$?
- Ignoring a host of problems with willingness-to-pay surveys – not the least of which is that while people living in market economies decide every day how much they value private goods compared to their prices, people seldom have to think about how much they value public goods – the critical issue is if people think their answer to such a question will affect how much they will be charged for the public good. Many believe that all other things being equal, it is fair if those who actually benefit more pay more than those who benefit less.
- But here's the rub: If people believe they will be assessed more if they report a higher willingness to pay, they have a perverse incentive to under-report their true willingness to pay. In which case people will provide inaccurate information about their true benefits, leading authorities to provide less than the efficient amount of the public good.
- Therefore, prior to the 1970s, the consensus among economists was that in situations where it was not possible, not practical, or too costly to deny people access to a public good once it exists, it was *impossible* to provide and finance public goods in a completely satisfactory way – that is, in a way that (a) provides the efficient amount based on accurate information about how much people benefit and (b) also charges people who derive higher benefits more than people who derive lower benefits.

Before summarizing the results of some ingenious theoretical work in the field of public finance that flourished in the 1970s designing “incentive compatible demand revealing mechanisms” for public goods, we first examine a simple tax system: *Charge all eligible to consume a public good an equal share of the cost of producing it:* $t(i) = SC(Q)/n$ for all i . While this may not be entirely fair because it charges those who truly benefit less just as much as those who truly benefit more, it is incentive compatible, and it is efficient.

If we do a willingness-to-pay survey to help determine how much of the public good is efficient to supply, and ask people how much they would be willing to pay for another unit of a public good, under the assumption that they will be charged their proportionate share, there is no incentive for them to lie, and instead an incentive for them to do their best to tell the truth. If they very much like the public good, they should say so because this will have the effect of increasing the amount provided. And they need not fear that by revealing

that they like the good a great deal, they will be charged any more than if they had said they liked it less, since all will be charged the same amount. If they don't like the good very much they should say so, because this will have the effect of moving the supply decision in the direction they prefer, even if it doesn't mean they will pay less than everyone else. What this means is that what we might call the "tried and true" or standard solution – charge everyone an equal amount to pay for the cost of providing all the public goods that they consume – which we recommend as the standard solution in a participatory economy as well – is, in fact, incentive compatible. And since it induces people to report their true $MPB(i)[Q]$'s, it allows us to discover the efficient level to supply, Q^* such that $MSC(Q^*) = \sum_i MPB(i)[Q^*]$ $i = 1, 2, \dots n$.²

As explained in Chapter 6, we recommend equal shares as the default option in a participatory economy because it is not only incentive compatible and simple, but also because we believe income will be distributed fairly in a participatory economy. In other economies where pre-tax income distribution is not fair, one important function of the tax system should be to render after-tax income distribution fairer than pre-tax income distribution. But we will not need taxes to do this in a participatory economy, so equal assessments for users of public goods seems *reasonably* fair. However, even when income distribution is fair, it may be *somewhat* unfair to charge those who truly benefit less from the package of public goods available to them in a participatory economy the same amount as others who truly benefit more. For this reason, federations might want to consider if it is worth the extra trouble to take advantage of one of a number of ingenious demand revealing mechanisms developed in the 1970s, which we now discuss briefly.³

The key to incentive compatibility is not to permit a respondent's reported willingness to pay affect how much she will be assessed. Once your response has no effect on the tax you will pay, there is every incentive to respond truthfully. And since equal payments for all accomplishes this, it is incentive compatible as just explained. But what if there are other tax systems where a person's tax does not depend on what they report as their willingness to pay. Then those tax systems will also be incentive compatible. So the trick is to devise a tax system where an individual's reported willingness to pay does not enter into the formula for calculating their taxes, *but* the tax assessment for those who are willing to pay more will nonetheless be higher than the assessment for those who are willing to pay less.

Theodore Groves proposed such a formula in his doctoral dissertation proposal at the University of Chicago, only to be told by his faculty advisor that it was well known that what he was proposing was impossible. To his credit, when his advisor realized his mistake years later, he went to the trouble of tracking down Groves and arranged to have him awarded the doctorate degree his advisor had come to realize he richly deserved for having proved generations of public finance economists wrong. Groves' mechanism, which was finally published in 1977 (Groves and Ledyard 1977; Groves 1979), was this: Each individual should be charged (1) her proportionate share of the

cost, (2) *minus* the sum reported consumer surplus of all *other* people, where an individual's consumer surplus is her reported willingness to pay minus her proportionate share, (3) *plus* a budget balancing sum unrelated to what the individual reports.

Nowhere in this formula does the individual's *own* willingness to pay appear, so it is incentive compatible, and all have an incentive to report truthfully. However, consider two people, Jill with a high willingness to pay, and Jack with a low willingness to pay. What is *subtracted* from equal pay for Jill is a sum that does *not* include her own high consumer surplus, but does include Jack's low consumer surplus. Whereas what is *subtracted* from equal pay for Jack is a sum that does not include his own low consumer surplus, but does include Jill's high consumer surplus. So Jill with the high willingness to pay ends up with a tax assessment that is higher than the assessment for Jack with the low willingness to pay. Ingenious! Others who contributed to the early literature devising mechanisms that achieve incentive compatibility even while those who benefit more are charged more were Dreze, de la Vallee Poussin, Malinvaud, Hurwicz, Vickery, Loeb, Green, Laffont, Gibbard, Hammond, Milleron, Clark, and Walker.

So our complete proposal is this: Any federation concerned that when denying access is either impossible or inefficient, the true difference in benefits enjoyed by different members from public goods requested by the federation is large enough to warrant unequal assessments, should feel free to explore any of a number of incentive compatible demand revealing taxation mechanisms that are now available. Because they are all more trouble to administer than equal assessments for all; presumably, federations would only choose to use them when they have reason to believe that members benefit *very* unequally from the public goods the federation requests and will become available to all members.

Pollution

A critical failing of market economies is they provide no quantitative information about how much damage pollution causes. As a result they provide no signals about how high to set corrective Pigovian taxes. Consequently, in market economies this gives rise to the necessity of trying to generate quantitative estimates of the damage pollution causes through stop-gap measures like contingent valuation surveys and hedonic regression studies that inspire less confidence the more one knows about them.⁴ However, just because markets are not likely to induce people to reveal truthfully how much they are damaged by environmental degradation does not mean we cannot incorporate a pollution demand revealing mechanism (PDRM) in our annual participatory planning procedure, which, at least in theory, will generate reasonably accurate quantitative estimates of the damage from pollution and thereby lead to efficient levels of pollution.

There is every reason to be skeptical of claims to have "solved" the problem of achieving efficient levels of pollution even at the theoretical level. The Coase

theorem is commonly interpreted as implying that once property rights are specified, in theory, voluntary negotiations between polluters and pollution victims can be relied on to yield efficient levels of pollution. However, Hahnel and Sheeran 2009 demonstrate that this interpretation of the Coase theorem, peddled by free market environmentalists but found in mainstream economics textbooks as well, is *not* warranted, but in fact a grievous *mis*interpretation even at the abstract theoretical level. We draw on lessons learned about perverse incentives from a close examination of the Coase theorem to construct a PDRM that either avoids or ameliorates perverse incentives. When this PDRM is incorporated into the annual participatory planning procedure, the plan arrived at should achieve reasonably efficient levels of emissions for different pollutants.

The pollution demand revealing mechanism

First, we must add pollutants to our list of produced “goods,” and in each iteration of the planning procedure, the IFB must quote the current estimate of the damage caused by releasing a unit of each pollutant along with current estimates of all other opportunity and social costs. Just as the estimates of opportunity and social costs for resources, capital goods, labor, and produced goods can be arbitrary in round 1, the initial estimates of damages from pollutants can be arbitrary as well.

The whole point is that nobody needs to calculate what damages from different emissions are, any more than anyone needs to calculate opportunity and social costs of different resources, capital goods, labor, and produced goods in a participatory economy. Instead, once the PDRM described in this section is incorporated into the participatory planning process, arbitrary initial damage figures will be modified in successive iterations until reasonably accurate estimates of actual damages for pollutants are achieved when a feasible plan is finally reached, just as initially arbitrary estimates of opportunity and social costs are modified to achieve reasonably accurate estimates of the opportunity costs of using scarce resources, capital goods, and labor, and the social costs of producing different goods and services during the planning process.⁵

In other words, just as there are no bureaucracies that attempt to calculate opportunity and social costs, there are no bureaucracies that attempt to calculate estimates of damages from pollution. This is an important difference between our proposal and some others, including some discussed in the appendix to this book. Many advocates for socialism assume, implicitly, if not explicitly, that if the government hired a group of trained economists to calculate opportunity costs, social costs, and damages from emissions, they could do so. In our view, this is simply naïve.

Second, when worker councils make proposals, they must also include the amount of any pollutants they wish to emit. The damages from emissions will then be calculated by multiplying the number of units of a pollutant the worker council proposes to emit times the current estimate of the damage from one unit announced by the IFB. These damages will be added to the cost of using

the inputs the enterprise has requested when calculating the overall social cost of the enterprise's proposal to be compared with the social benefits of the outputs it proposes to produce. Enterprises wishing to emit more than one pollutant will be charged according to the current estimate of damage from each pollutant they propose to emit, just as enterprises supplying multiple products are credited for each product according to its indicative price. It is not necessary for enterprises to know in advance the effects of various pollutants because that information is provided by the estimates of damages in each round of the planning procedure, which become increasingly more accurate as the planning procedure proceeds. Just as worker councils are guided by indicative prices for outputs what to produce, and by indicative prices for inputs used in production, they will be guided by estimates of damages quoted for how much of different pollutants to emit.

Third, we create *Communities of Affected Parties*, or CAPs, which comprise all who are damaged by the emission of a particular pollutant. For example, there would be a CAP for volatile organic compounds and nitrous oxide emissions that cause smog in the Los Angeles area. There would also be a CAP for coarse particulate matter affecting Angelinos. Whether or not, those two CAPs include the same or somewhat different populations would depend on any differences in dispersal patterns. There would also be a CAP for pollutants contributing to smog and a CAP for coarse particulate matter pollution in the Kansas City area where wind and temperature conditions are quite different than they are in Los Angeles, and demand by worker councils in Kansas City for permission to release these pollutants may be different as well.⁶

Now we are ready to include CAPs along with worker and consumer councils and federations as "actors" who participate in each round of the planning procedure. Enterprises who wish to emit a pollutant and CAPs who are damaged by a pollutant participate in the planning procedure by responding to the "signal" from the IFB about the current estimate of the damage caused by a unit of a pollutant⁷ as follows:

Enterprises propose how much of a pollutant they want to emit, knowing they will be charged for those emissions an amount equal to the current estimate of the damages per unit times the number of units they propose to emit. This means damage from emissions becomes part of production costs and is included in estimates of the social costs of producing goods and services.

Communities of Affected Parties propose how many units of a pollutant they are willing to allow to be released, taking into account that the CAP will be compensated by an amount equal to the current estimate of the damages per unit times the total number of units the CAP allows to be released. In other words, the CAP has a right *not* to be polluted at all if it so chooses. On the other hand, if the CAP chooses to authorize a given quantity of emissions, members of the CAP will receive "credit" for damages suffered. This "sacrifice" from exposure to pollution is added to whatever "sacrifices" CAP members made as workers when calculating how much consumption it is fair for them to enjoy.

Why would this procedure yield reasonably accurate estimates of the damage caused by different pollutants and therefore lead to reasonably efficient levels of pollution? In most cases, it is reasonable to assume that as emissions increase, the cost to victims of *additional* pollution rises, and the benefit to producers of *additional* pollution falls. In which case the efficient level of pollution is the level at which the cost of the last unit emitted (the damages to all victims) is equal to the benefit from the last unit emitted – the satisfaction consumers gain from the additional goods and services that can be produced because an additional unit of emission was permitted.

What will happen if the IFB quotes an estimate of damages that is *less* than the amount at which the last unit of emission for some pollutant causes damages equal to benefits? In this case the CAP will not find it in its interest to permit as much pollution as sources would like to emit, – that is, there will be excess demand for permission to pollute – and consequently, the IFB will increase its estimate of the damage caused by the pollutant in the next round of planning. If the IFB quotes an estimate of damages that is *higher* than the amount at which the last unit of emission causes damage equal to benefits, the CAP will offer to permit more pollution than sources will ask permission to emit – that is, there will be excess supply of permission to emit, and the IFB will therefore decrease its estimate of the damage caused by the pollutant in the next round.

So when the IFB adjusts its estimate of the damages for a unit of emissions until the sum total of requests to emit a pollutant is equal to the permission granted by the CAP to emit that pollutant, it appears we will end up with a reasonably accurate estimate of the true damages caused by different pollutants and also come reasonably close to the efficient level of emission for each pollutant. We now examine possible perverse incentives that might conceivably interfere with this happy result.

Overcoming perverse incentives

It is instructive to begin an examination of hurdles that must be overcome if we are to achieve efficient levels of pollution by reviewing perverse incentives that prevent voluntary negotiations in market economies, including “Coasian negotiations,” from doing so. There are two crucial perverse incentives that prevent voluntary negotiations between polluters and pollution victims from achieving efficient levels of pollution – neither of which has to do with the transaction costs of carrying out negotiations.⁸

Multiple victims

The first problem was recognized by Ronald Coase himself and by many who have cautioned that Coasian negotiations are not the panacea that free market environmentalists would have us believe. Coase explicitly warned that his argument applied only in the case where there is one pollution victim, and

not to situations where there are multiple victims since this introduced additional complications (Coase 1960). While free market enthusiasts simply ignore their hero's cautionary caveat, many who argue that efficient levels of pollution are unlikely to emerge from voluntary negotiations even if property rights are clarified, emphasize the frequency of multiple victims as the primary reason.

However, most analysts, following Coase, treat the problems introduced by the existence of multiple victims of pollution as an addition to the transaction costs associated with negotiation. The rationale for doing so is that when there are multiple victims there will be additional costs of negotiation – either because there are many more negotiations if the polluter must negotiate separately with each victim or because there will be costs associated with identifying and inviting victims to join a coalition to negotiate with the polluter on behalf of all victims. But multiple victims create far more serious obstacles to reaching efficient agreements through voluntary negotiations than simply increasing the amount of time spent in negotiations and lawyer fees. The more serious problem with multiple victims is that because of perverse free rider and hold out incentives, separate negotiations with individual victims are unlikely to occur, even if the potential efficiency gain is large; and because of a perverse incentive for victims to misrepresent damages, negotiations with a victim's coalition will predictably yield inefficient outcomes as well.

When there are multiple victims, we should not expect separate negotiations between the polluter and each individual victim to lead to an efficient outcome. If the polluter has the property right, each victim has an incentive to deny any harm in hopes that other victims will step forward and pay the polluter to abate – the “free-rider” problem. If the victims have the property right, each victim, and some who are not truly victims, have an incentive to exaggerate harm and threaten to veto any deal unless she receives the entire payment the polluter is willing to offer all victims collectively – the “hold out” problem. In both cases, separate negotiations will end in failure, and there will be too little abatement and too much pollution. But this is not because the transaction costs of multiple negotiations are prohibitive. It is because the existence of multiple victims creates perverse free rider or hold out incentives for victims that will lead separate negotiations predictably to break down.

Therefore, when there are multiple victims, the only hope for successful negotiations lies in organizing a coalition of victims to negotiate with the polluter as a group. But there are two reasons multiple victims of pollution are predictably unable to organize a coalition to negotiate effectively with a polluter – again, neither of which has anything to do with the transaction costs of identifying victims and issuing them invitations to join a victim's organization. The first problem arises even when each true victim is damaged to the same extent, but there is no easy way to verify who is truly a victim and who is not. If the polluter has the property right, every victim has an incentive to deny their true status as a victim and hope other victims will join the coalition and contribute money to pay the polluter to cut back on emissions. On the other

hand, if the victims have the property right, everyone has an incentive to claim they are a victim even if they are not, in order to receive part of the payment the polluter will offer.

In either case, there is an incentive for people to lie about whether they truly are victims. When the polluter has the property right, a voluntary coalition will have fewer members than it should, lack the funds it should have to pay for abatement, and consequently there will be too little abatement. When victims have the property right, a voluntary coalition will have more members than it should, the demand for compensation will be inflated, and consequently there will be too little pollution.

Even if the problem of distinguishing between who should be included in a voluntary coalition of victims is solved, there is another problem if it is clear that victims are affected unequally but there is no objective way to determine who is affected more or less. In this situation it is in the interest of members of a coalition of victims to misrepresent how much they are truly affected if individual contributions (when the polluter has the property right), or payments (when victims have the property right), are allocated according to how much one is affected. If polluters have the property right and victims who are more damaged are expected to contribute more to pay the polluter to abate, people will underreport their damage and there will be too little abatement. If victims have the property right, and victims expect to receive higher payments if they report higher damages, people will overreport their damages and there will be too little pollution. Again, these problems are qualitatively different from inefficiencies that arise because the transaction cost of negotiations is greater than the benefit from correcting the inefficiency, and it is misleading to treat them as such.

Misrepresentation

The second problem has gone largely unnoticed in the literature on the Coase theorem, which applies even to the case of a single pollution victim. The problem stems from two mistakes common in the literature: (1) Many misrepresent negotiations between a polluter and a single victim as a “market based solution” to environmental problems. But in Coasian negotiations, the whole point is that there is no market, and therefore, there are no market forces to drive outcomes to an agreement where emissions are adjusted to the point where the price paid per unit of emissions equates to the marginal damage to the victim and the marginal benefit to the polluter. If the polluter and victim arrive at the efficient outcome through negotiations, it must be for some reason other than that they are driven to do so by market forces. (2) Those who correctly analyze Coasian negotiations as one-on-one negotiations over how to divide a potential efficiency gain have failed to notice that Coase’s conclusion that the parties will settle on the efficient outcome hinges on an implicit assumption that is highly implausible – namely, that both parties have what game theorists call “complete information” – an assumption that is far more restrictive and less

plausible than the “perfect knowledge” assumption familiar to microeconomic theorists.

In effect, Coase assumes that both the polluter and the victim not only know what their own true marginal benefit or cost curve looks like, but also know what the other party’s true curve looks like as well. Hahnel and Sheeran (2009) demonstrate that *only* when this is the case – that is, when both parties have “complete information” – is there any reason to believe that voluntary negotiations between a polluter and a single victim *might* reach an efficient outcome. In the far more likely event that this assumption does not hold, Hahnel and Sheeran (2009) demonstrate that if the true curve of the party with the property right is unknown to the other party, the party with the property right stands to gain by overexaggerating how much pollution affects their interests, and as a result, Coasian negotiations will predictably yield too much pollution if the polluter has the property right or too little if the victim has the property right.

In light of the widespread mistaken conclusions about what voluntary negotiations – including Coasian negotiations – can be expected to achieve, it is wise to carefully examine the PDRM we propose for possible perverse incentives. Specifically: (1) Are there incentives for worker councils who emit pollutants to underreport actual emissions? (2) Are there incentives for either worker councils or CAPs to misrepresent how much they are affected in order to influence how the IFB will adjust estimates of pollution damages in subsequent rounds of the planning procedure? (3) Are there incentives for individuals to claim they are adversely affected, and therefore deserve to be included in CAPs, even when they are not injured? (4) Are there incentives for people who are truly adversely affected, and therefore deserve to be members of CAPs, to misrepresent the degree to which they are affected? We answer these questions in turn:

(1) *Are there incentives for worker councils who emit pollutants to underreport actual emissions?* When workers in a council benefit from higher social benefit-to-cost ratios for their enterprise because this allows them to award themselves higher effort ratings on average, there is an incentive to underreport emissions whose damages form part of social costs and therefore appear in the denominator of the SB/SC ratio. And even if workers in all councils are assumed to have exerted the same effort *on average*, it is easier to get a proposal approved if its SC is lower, so there is still an incentive for WCs to underreport emissions in order to increase the size of their SB/SC ratio. Therefore, relying entirely on worker councils to self-report emissions absent adequate monitoring and enforcement procedures is not advisable.

To the extent that workers live closer to their enterprise than stockholders do, members of worker councils in a participatory economy may have *more* incentive to take damage from *local* pollutants into account than private owners would. However, this is not to say that worker councils do not have an incentive to underreport emissions. The participatory planning procedure “charges” enterprises for the damage their emissions cause. Therefore, to the

extent that their emissions damage any who are *not* members of the worker council, there is an incentive for enterprises in a participatory economy to disguise emissions, just as there is in market economies where emissions are regulated, taxed, or emission permits are required.⁹ If a worker council feels there is a low probability of detection, and/or penalties for underreporting are insufficient, it might be tempted to underreport emissions to increase its social benefit-to-cost ratio – making it easier to get a proposal accepted during the participatory planning process and/or increasing the average effort rating they can award members.

In sum, there may be reason to believe that absentee owners interested only in profits, operating in a social environment where anti-social, greedy behavior is expected, might be *more* inclined to pursue their private interest at public expense than worker councils functioning in an environment where social responsibility and solidarity are highly valued. But this does not mean a participatory economy eliminates the need for monitoring and enforcement with regard to emissions of pollutants.

(2) *Are there incentives for either worker councils or CAPs to misrepresent how much they are affected in order to influence how the IFB will adjust estimates of pollution damages in subsequent rounds of the planning procedure?* If both enterprises asking for rights to emit pollutants and Communities of Affected Parties granting emission rights behave as “price takers” – that is, treat prices “parametrically” in the participatory planning procedure – *as all worker and consumer councils, federations, and CAPs are instructed and required to do when submitting proposals during the participatory planning process* – neither will misrepresent how they are affected by emissions, and the procedure will settle on the efficient level of emissions, as already explained. So the issue reduces to whether or not either polluters or CAPs are likely to violate the directive to treat indicative prices quoted during a round of the planning procedure “parametrically,” and if so, what the consequences would be.

In most cases, there will be many different enterprises asking to emit a pollutant in an area, none of which is likely to have information about how much the members of the CAP supplying the emission rights are truly affected. So not only would polluters lack information about the supply curve for emission rights necessary for strategic maneuvering, their status as one among many seeking emission rights would prevent them from taking advantage of any such information even if they had it, unless they were able to form a “polluters cartel.”

On the other hand, in a participatory economy there is a single supplier of emission rights for any pollutant – the Community of Affected Parties. If a CAP knew what the aggregate demand curve for emission rights looked like, instead of treating the indicative price quoted by the IFB as a given, it might be tempted to behave like a monopolist in a market where the monopolist knows the market demand curve. In this case, the CAP would supply fewer emission rights than are socially optimal to gain what is traditionally called “monopoly profits or rent,” even though this means the loss of some of what

is traditionally called “producer surplus” due to failure to grant permission to emit additional units for which the CAP would have been paid more than the damage they caused its members.¹⁰ Therefore, *if* a CAP is willing to ignore the directive to behave as a price taker, and *if* a CAP knows what the aggregate demand for emission rights looks like, a CAP *might* restrict emissions below the optimal level. While this would be undesirable, one must admit that at least it would be an interesting *new* problem to contend with – an economic system with a potential tendency to pollute too little. It is worth noting, that while most economists consider this problematic, most environmentalists find it attractive!¹¹

(3) *Are there incentives for individuals to claim they are adversely affected, and therefore deserve to be included in CAPs, even when they are not injured?* Since membership in a CAP entitles one to extra consumption rights, a more serious problem than failure to treat prices parametrically might be that people would claim to be adversely affected and deserve membership in a CAP even though they are not. This means the process of defining CAPs – deciding who should, and who should not be included – must be carefully monitored. In all likelihood it would be necessary to create an environmental “judicial” system for settling disputes over membership in CAPs. Presumably, expert testimony of scientists and medical personnel would be relevant, along with testimony on the part of individuals petitioning for membership, as well as testimony from current members contesting their claims.

(4) *Are there incentives for people who are truly adversely affected, and therefore deserve to be members of CAPs, to misrepresent the degree to which they are affected?* In other words, even after membership is settled, might there not be a perverse incentive for members of a CAP to exaggerate the degree to which they are adversely affected by a pollutant? This depends on how CAPs decide to distribute their extra consumption rights among members.

If extra individual consumption rights are distributed equally to all members of a CAP, there is no incentive for anyone to exaggerate damages. Only if a CAP tried to distribute more individual consumption rights to members who were presumed to be more adversely affected is it possible that individuals would seek to take advantage by exaggerating their damages.

As already discussed, conventional wisdom in public economics long held that there was no way around this perverse incentive to “report untruthfully.” However, as already discussed, pathbreaking work by Groves, Ledyard, and others in the 1970s revealed that, surprisingly, this turns out not to be the case. As before, the key is to break the link between an individual’s reported damage and how much she receives by using a formula to assign compensation based not on her own declared damages, but instead on the damages reported by others in the CAP. For example, an individual’s payment could be set equal to the average payment *minus* the sum total consumer surplus reported by all others in the CAP. In this way: (1) An individual cannot affect the size of her own payment by her own reported damages because her reported damages do not appear in the formula for calculating her compensation.

(2) By misreporting damages, an individual would only cause the total amount of emissions to deviate farther from what she would truly prefer. (3) Yet an individual reporting more damages than others would receive a higher payment since what is subtracted for her is lower than what is subtracted for others because what is subtracted for others includes her higher damages; while an individual reporting less damages than others would receive a lower payment since what is subtracted in her case is higher than what is subtracted for others because what is subtracted for others includes her lower damages. In any event, as explained in the case of public goods and consumer federations, a CAP that wished to award more consumption rights to members who are more damaged could also avoid creating perverse incentives to exaggerate claims by using any of a half dozen incentive compatible mechanisms now available.

In sum: Monitoring emissions and enforcement of agreements is necessary in a participatory economy, just as it is in any economy for restrictions on pollution to be taken seriously. If a community of affected parties willfully ignored the rule to treat indicative prices parametrically during planning, *and* if the CAP had a great deal of knowledge about the demand for emission rights upon which to base strategic maneuvering, it *might* restrict emissions somewhat below efficient levels. Therefore, monitoring and penalizing participants for failure to treat prices parametrically seems advisable. Incentives for members of CAPs to exaggerate damages can be overcome either by equal awards or using any of a number of incentive compatible mechanisms for differential awards. Which leaves only the perverse incentive to illegitimately claim membership in a CAP as a serious issue to be dealt with, presumably through some appropriate adjudication process.

Before concluding, it is helpful to review why problems that arise in voluntary negotiations in market economies, including Coasian negotiations, are less likely to arise in the participatory planning procedure with the PDRM just described. There are two lessons to be learned from a careful analysis of problems that arise when there are multiple victims: (1) It is unrealistic to leave it up to multiple injured parties to self-organize to defend their interests. They need help to overcome the transaction costs of self-organizing. (2) They also need help to prevent them from falling victim to perverse incentives to misrepresent themselves. The proposed PDRM confronts these problems head on. First, it creates a powerful incentive for affected parties to apply for membership in a CAP since victims receive compensation in a participatory economy. But since this creates a perverse incentive for people to falsely claim damage, it is proposed that time and resources be allocated to where they are most needed: Scientific and medical testimony must be marshaled, along with testimony by those whose status as victims is well established, to review petitions for membership that may be exaggerated.

The PDRM also deals with potential perverse incentives to exaggerate damages by people who legitimately belong to a CAP. CAPs must allocate benefits to individual members in one of two ways: (1) Either give all members equal benefits or (2) Use an incentive compatible formula for calculating individual

benefits that does not include a person's own self-declared damages. The first is much simpler, and in most cases, where degrees of damage are similar, should be acceptable. Whenever members of a CAP do not find this satisfactory, they are free to engage in a more elaborate system of dividing compensation among themselves, provided truthful reporting is incentive compatible with the formula they use.

The major lesson to be learned from a careful analysis of incentives in Coasian negotiations is that private information generates perverse incentives in one-on-one adversarial negotiations. The participatory planning procedure attempts to overcome this problem by substituting a parametric procedure for one-on-one negotiations. Instead of two players engaged in an adversarial game of divide the pie, where private information can be used to one's advantage, the planning procedure directs players to respond to price signals "parametrically." Monitoring and enforcement of this rule – "respond to price signals parametrically" – for CAPs as well as other participants in the planning process is recommended. Although, if players have no way of knowing that the current round may not be the final round, manipulative behavior may prove counterproductive in any case.

Conclusion

Under traditional assumptions, an annual participatory planning procedure that includes the PDRM will: (1) Reduce pollution to reasonably "efficient" levels – that is, allow emissions up to the point where the marginal social cost of emissions is equal to the marginal social benefit. (2) Satisfy the "polluter pays principle" since worker councils are charged for the damage their emissions cause, which is incorporated into the price consumers of their products must pay. (3) Compensate the victims of pollution for damage suffered since members of each CAP receive consumption credit for damages suffered from each pollutant. And (4) induce polluters and victims to truthfully reveal the benefits and costs of pollution because the PDRM is "incentive compatible." Uncorrected markets accomplish none of these four goals. And while in theory markets *could* reduce pollution to efficient levels *if* corrective Pigovian taxes were set equal to the magnitude of the negative external effect, or *if* emissions were capped at socially efficient levels and emitters were required to own permits; because markets are *not* incentive compatible for polluters and pollution victims, markets provide no reliable way to estimate quantitatively how high corrective taxes should be, or at what level to cap emissions.

However, we should not be overly enthusiastic about our results. In the real world the PDRM described here would be most relevant and therefore most useful for local pollutants whose effects are not lethal, are relatively well understood by victims, and do not extend far into the future where people who are not in the CAP will also be affected. Obviously, there are many pollutants that do not fit this description for which different policies would presumably be more suitable. Nor is this PDRM any help whatsoever in addressing our most

pressing environmental problem today – incipient climate change due to an over accumulation of greenhouse gases in the upper atmosphere. Unless some means is found to overcome powerful free-rider incentive problems associated with reductions in national emissions, unless countries can soon agree on fair reduction quotas, unless the advanced economies launch a massive Green New Deal to make their economies carbon neutral in the most rapid technological “reboot” in human history, and unless lesser developed countries are helped to pursue a path to development not powered by fossil fuels, solutions to all other environmental problems may soon become irrelevant.¹² Nonetheless, coming up with a procedure that would induce victims to reveal truthfully what they believe their true damages are from pollution is not a trivial accomplishment.

An important caveat

As readers are aware, the PDRM is part of an overall economic system that is *very* egalitarian. So while there may be some differences in the average incomes of different Communities of Affected Parties, those differences will be much smaller than in any historical economy to date. This is important, because unfortunately if used in a less egalitarian economy, the PDRM would unfairly allocate pollution to poorer communities. Consequently, it would *not* be advisable to append the PDRM described here to economies that are not highly egalitarian. If there are rich and poor communities, poor communities would be more inclined to bolster their income by offering to tolerate more pollution than rich communities would agree to tolerate *even if their preferences for environmental amenities and for income were identical*.

Only if communities have comparable incomes, is it advisable to allow them to express whatever differences of opinion they may have about the dangers of different pollutants and whatever differences in preference they may have for income versus environmental protection, as the above procedure allows them to do. In *The Political Economy of the Environment* James Boyce (2002) elaborates on a number of ways that a more egalitarian distribution of wealth and income would benefit the environment. One more environmental advantage of egalitarianism should be added to his excellent list: Namely, an egalitarian economy creates an opportunity to implement a pollution damage revealing mechanism that is sorely needed if we are to manage our relations with the natural environment sensibly, whereas non-egalitarian economies make this impossible because they would turn any such mechanism into a transmission vehicle for increasing environmental injustice.

Welfare theoretic analysis

One of the advantages of our proposal compared to many others is that our model is amenable to rigorous welfare theoretical analysis. Absent a concrete proposal – that is, a formal model, it is impossible to determine under what conditions particular outcomes can or cannot be deduced. In this section

we prove the first and second fundamental theorems of welfare economics for an economy using the annual participatory planning procedure. Just as it has been proved that under certain assumptions there will be a general equilibrium of a private enterprise market economy, we will prove that under certain assumptions, the participatory planning procedure will reach a feasible plan. And just as it has been proved that under certain assumptions a general equilibrium of a private enterprise market economy will be a Pareto optimum, we will prove that under certain assumptions, the feasible plan reached by the participatory planning procedure will be a Pareto optimum. After which we compare the lists of necessary assumptions for a private enterprise market system and a participatory economy to see why a participatory economy is more likely to achieve allocative efficiency.

As just explained, the annual participatory planning procedure is designed to treat public goods and externalities efficiently, while market systems do not. Whereas market systems contain a bias against expressing desires for public goods relative to private goods and a bias in favor of goods whose production and/or consumption generate negative externalities, the participation of federations of consumer councils, FCCs, and Coalitions of Affected Parties, CAPs, in the participatory planning procedure correct for those biases during annual planning. However, the question addressed in this section is if the annual planning procedure is capable of handling what we might call “standard” issues – namely, leaving aside public goods and externalities that we have already taken care of, what assumptions are necessary to ensure that our iterative planning procedure will arrive at a feasible plan? What assumptions are necessary to ensure that the feasible plan arrived at will be a Pareto optimum? To address *these* questions we consider only worker and consumer councils and an iteration facilitation board, IFB.

A heuristic model

In order to illustrate the underlying logic of what councils attempt to do, we return to a model introduced back in Part II, Chapter 3, which we reproduce here for readers’ convenience. Recall for simplicity we assume production technologies are linear, and there is no need to replace capital goods used in production. We let:

- x** be a column vector of activity levels, each of which produces a single good, some of which are final goods and some of which are intermediate goods, and **A** be the input coefficient matrix of intermediate goods for those activities;
- K** be the capital good input coefficient matrix – that is, the amount of each machine that must be on hand to carry out each activity, and **k**[★] be the column vector of capital goods available for use;
- R** be the input coefficient matrix of different natural resources needed to carry out each activity and **r**[★] be the column vector of natural resources available for use;

\mathbf{L} be the input coefficient matrix of different kinds of labor needed to carry out each activity and \mathbf{l}^* be the column vector of different kinds of labor available for use;

\mathbf{v} be a row vector of relative social values of produced goods;

So $\{\mathbf{A}, \mathbf{K}, \mathbf{R}, \mathbf{L}\}$ constitute the technical input coefficients of production that include multiple techniques for carrying out each activity, and the *primal* programming problem for this economy is:

Primal Problem: Find \mathbf{x} to maximize $\mathbf{v}(\mathbf{I}-\mathbf{A})\mathbf{x}$

s.t. $\mathbf{K}\mathbf{x} \leq \mathbf{k}^*$, $\mathbf{R}\mathbf{x} \leq \mathbf{r}^*$, $\mathbf{L}\mathbf{x} \leq \mathbf{l}^*$ and $\mathbf{x} \geq \mathbf{0}$ (where \mathbf{I} is the identity matrix)

Let $\mathbf{p}(k)$ be the row vector of shadow prices for different capital goods, $\mathbf{p}(r)$ be the row vector of shadow prices for different natural resources, and $\mathbf{p}(l)$ be the row vector of shadow prices for different kinds of labor. Then $\{\mathbf{p}(k), \mathbf{p}(r), \mathbf{p}(l)\}$ is the solution to the *dual* programming problem for the economy:

Dual Problem: Find $\{\mathbf{p}'(k), \mathbf{p}'(r), \mathbf{p}'(l)\}$ to minimize $\{\mathbf{p}(k)\mathbf{k}^* + \mathbf{p}(r)\mathbf{r}^* + \mathbf{p}(l)\mathbf{l}^*\}$
s.t. $\mathbf{p}(k)\mathbf{K} + \mathbf{p}(r)\mathbf{R} + \mathbf{p}(l)\mathbf{L} \geq \mathbf{v}(\mathbf{I}-\mathbf{A})$, $\mathbf{p}(k) \geq \mathbf{0}$, $\mathbf{p}(r) \geq \mathbf{0}$, $\mathbf{p}(l) \geq \mathbf{0}$

The dual constraint can also be written: $\{\mathbf{p}(k)\mathbf{K} + \mathbf{p}(r)\mathbf{R} + \mathbf{p}(l)\mathbf{L}\}[\mathbf{I}-\mathbf{A}]^{-1} \geq \mathbf{v}$, which simply says that shadow prices, or opportunity costs, must be such that the opportunity cost of all the resources and labor used both directly and indirectly in any activity engaged in, plus the opportunity cost of all the capital goods committed to the activity both directly and indirectly, must be at least as great as the social benefit from the activity.

Suppose $\mathbf{y}(h)$ is a column vector of particular quantities of produced goods requested by consumer council h . Then: $\{\mathbf{p}(k)\mathbf{K} + \mathbf{p}(r)\mathbf{R} + \mathbf{p}(l)\mathbf{L}\}[\mathbf{I}-\mathbf{A}]^{-1}\mathbf{y}(h)$ would be the social cost of consumption proposal $\mathbf{y}(h)$.¹³

Consumer councils

Assume there are $h = 1, 2, \dots, H$ consumer councils each with an equal number of members. Assume each consumer council, $\text{CC}(h)$, has a preference ordering over the vector of all final goods, $\mathbf{y} = [y(1), y(2) \dots y(n)]$, which can be represented by what we call an overall, *consumer council well-being function*, $W(h)[\mathbf{y}(h)]$. Assume this well-being function takes into account both the present satisfaction that members of the consumer council get from consuming different final goods and also any enhanced future satisfaction members will get because consumption this year will change a vector of members' human characteristics, $\mathbf{C}(h)$, in ways that alter their ability to gain satisfaction from consumption in the future. In other words, $W(h)[\mathbf{y}(h)]$ includes both the effects on present and future satisfaction members of the consumer council expect to result from consuming any vector of final goods this year.¹⁴

Assume the goal of every consumer council is to maximize $W(h)[y(h)]$. What constraint does the consumer council face?

Assume for convenience, that the average effort rating plus allowances for every consumer council is the same. In which case any request from any $CC(h)$ will be approved by other councils as long as the social cost of producing the vector of final goods it requests, $y(h)$, is no greater than the social cost of producing the average vector of final goods requested by all consumer councils, $y(a) = \sum_h y(h) / H$:

$$\{p(k)K + p(r)R + p(l)L\}[I-A]^{-1}y(h) \leq \{p(k)K + p(r)R + p(l)L\}[I-A]^{-1}y(a)$$

Which is the “income constraint” consumer council h faces when it tries to maximize $W(h)[y(h)]$.

Worker councils

With two exceptions, we model consumption very much as it is modelled traditionally. One exception is we include preference development effects as well as preference fulfillment effects. The second exception is that because individual households, much less individual people, do not participate as actors in our annual participatory planning procedure – only neighborhood consumer councils participate – we talk of well-being functions for consumer councils, rather than utility functions for individual people. As readers will see, we do not believe either difference proves crucial to our analysis. However, there are more significant differences in how we model work.

In Debreuvian, neoclassical models different production units are distinguished by different production functions, or production possibility sets, but not because different firms begin with different stocks of machinery or workers with different skills or knowledge. In Debreuvian models, each firm has a unique book of technological blueprints – hence, the different “profits” that accrue to different firms in competitive Debreuvian solutions.¹⁵ But since the first thing a participatory economy would do is publish all these books of technological blueprints to make them available to all worker councils, we cannot distinguish between different worker councils in that way. Sraffian and VonNeuman models are also no help in this regard since they assume all firms in an industry have access to the same technology and are also indistinguishable from one another in any other way. For us, what distinguishes different worker councils from one another is the combination of human and physical assets they begin with. These consist of the plant and machines the worker council has when planning begins as well as the productive capabilities and the preferences for different kinds of work of the council members.

Let $\mathbf{l}(j)$ be the vector of the number of hours of each category of labor present in the initial membership of $WC(j)$. (Note: $\sum_j \mathbf{l}(j) = \mathbf{l}^*$)

Let $\mathbf{k}(j)$ be the vector of initial capital stocks (plant and equipment) that, together with $\mathbf{l}(j)$, characterize $WC(j)$ and differentiate it from other worker councils. (Note $\sum_j \mathbf{k}(j) = \mathbf{k}^*$)

Let $\Delta\mathbf{k}(j)$ be the vector of the number of units of each capital good that $WC(j)$ proposes to *add* to or *release* from its initial stocks. (Note $\sum_j \Delta\mathbf{k}(j) = \mathbf{0}$)

Let $\Delta\mathbf{l}(j)$ be the vector of the number of hours of each category of labor $WC(j)$ proposes to hire or release. (Note $\sum_j \Delta\mathbf{l}(j) = \mathbf{0}$)

Let $\mathbf{r}(j)$ be the vector of the number of units of each natural resource $WC(j)$ requests. (Note $\sum_j \mathbf{r}(j) = \mathbf{r}^*$)

Let $\mathbf{a}(j)$ be the vector of the number of units of each intermediate good $WC(j)$ requests.

And finally, let $y(j)$ be the number of units of output $WC(j)$ proposes to produce as its single output and \mathbf{p} be the price vector for all produced goods, whether intermediate or final.

As long as $p(j)y(j) \geq \mathbf{p}(k)[\mathbf{k}(j) + \Delta\mathbf{k}(j)] + \mathbf{p}(l)[\mathbf{l}(j) + \Delta\mathbf{l}(j)] + \mathbf{p}(r)\mathbf{r}(j) + \mathbf{p}\mathbf{a}(j)$, other councils will vote to approve the proposal because everyone who is *not* in $WC(j)$ will either be better off, or not worse off, if $WC(j)$ does what they have proposed. So this is the constraint $WC(j)$ faces if it wants a proposal to be approved. But what do we assume is the goal of $WC(j)$?

We assume that just as consumer council h is trying to maximize the well-being of its members from consumption, $W(h)[\mathbf{y}(h)]$, workers are trying to maximize their well-being from the work they do, $W(j)[\mathbf{l}(j) + \Delta\mathbf{l}(j)]$. And just as $W(h)[\mathbf{y}(h)]$ includes both the effects on present and future satisfaction members of the consumer council expect to result from consuming any vector of final goods this year, we assume that $W(j)[\mathbf{l}(j) + \Delta\mathbf{l}(j)]$ includes both the effects on present and future satisfaction members of the worker council expect to result from engaging in any vector of work activities they carry out this year.¹⁶ To summarize: What do we assume that the “actors” in our planning procedure are attempting to do?

- 1 Each consumer council is attempting to maximize $W(h)[\mathbf{y}(h)]$ subject to the constraint: $\{\mathbf{p}(k)\mathbf{K} + \mathbf{p}(r)\mathbf{R} + \mathbf{p}(l)\mathbf{L}\}[\mathbf{I} - \mathbf{A}]^{-1}\{\mathbf{y}(h) - \mathbf{y}(a)\} \leq 0$.
- 2 Each worker council is attempting to maximize $W(j)[\mathbf{l}(j) + \Delta\mathbf{l}(j)]$ subject to the constraint: $p(y(j)) \geq \mathbf{p}(k)[\mathbf{k}(j) + \Delta\mathbf{k}(j)] + \mathbf{p}(l)[\mathbf{l}(j) + \Delta\mathbf{l}(j)] + \mathbf{p}(r)\mathbf{r}(j) + \mathbf{p}\mathbf{a}(j)$

If the well-being functions of consumer councils had all the convexity properties traditionally assumed in formal analyses for individual consumers with exogenous preferences, the consumption constraint above, read as an equality, would be a separating hyperplane between $CC(h)$'s “at least as preferred consumption set” and the “socially non-abusive” (not too greedy) consumption set. And if the well-being functions of worker councils had similar convexity properties, and worker council's production possibility sets had the

same convexity properties usually assumed, then the production constraint above, read as an equality, would be a separating hyperplane between WC(j)'s “at least as preferred production set” and its “socially non-abusive” (not too lazy) production set. Under these assumptions, as we will see, the objectives of the CCs and WCs would be integrated by our annual planning procedure to yield familiar convergence and optimality properties.

A formal model

The only actors in our formal model of the annual participatory planning procedure are consumer councils, CC(h)'s, worker councils, WC(j)'s, and the iteration facilitation board, IFB, which, as will be seen, can be replaced by an algorithm. The social, iterative planning procedure is a variant of a price-guided procedure originally developed by Arrow, Hurwica, and Uzawa 1958. Our “actors” – WCs and CCs – and our assumptions about the motives of production units differ from theirs. Nonetheless, the conclusions they demonstrate about the convergence and optimality properties of their model are applicable to our model as well.

- 1 Each CC(h) makes an arbitrary, initial consumption proposal, $\mathbf{y}(h)'$.
- 2 Each WC(j) makes an arbitrary, initial production proposal – that is, the amount it wants to produce, $\mathbf{y}(j)'$ and the amounts of all inputs it wants to use, $\{\mathbf{a}(j)', \mathbf{r}(j)', \mathbf{k}(j) + \Delta\mathbf{k}(j)', \mathbf{l}(j) + \Delta\mathbf{l}(j)'\}$.
- 3 The IFB announces an arbitrary initial vector of initial “indicative” prices:

$$\mathbf{P} = (\mathbf{p}, \mathbf{p}(r), \mathbf{p}(k), \mathbf{p}(l)) = \{\mathbf{1}, \mathbf{1}, \mathbf{1}, \mathbf{1}\}.$$

- 4 Each CC(h) changes its request for good i according to the following rule:

$$\begin{aligned} \Delta y(ih) &= 0 \text{ if } y(ih)' = 0 \text{ and } \{\delta W(h)/\delta y(ih) - q(h)p(i)\} < 0 \\ \Delta y(ih) &= \alpha \{\delta W(h)/\delta y(ih) - q(h)p(i)\} \text{ otherwise} \end{aligned}$$

Where $q(h) = \delta W(h)/\delta I(a)$; $I(a) = \mathbf{p}\mathbf{y}(N)/H$; $\mathbf{y}(N) = \Sigma[\mathbf{y}(j)' - \mathbf{a}(j)']$, total net production as proposed by WCs in step 2, and α is an adjustment coefficient between zero and one.

What this says is that if a CC estimates that the increase in its well-being from consuming the first unit of good i is less than the value of what it will be “charged” for the inputs required to produce good i , it should not consume any of good i . However, if a CC estimates that the change in its well-being from obtaining an additional unit of good i is greater (less) than what it will be charged for the inputs required to produce good i , the CC should increase (decrease) its consumption of good i by some fraction of the discrepancy. If CCs propose no changes, it is because they have reached a consumption

request that is a local optimum satisfying the necessary and sufficient Kuhn-Tucker conditions.

- 5 Each WC(j) changes its proposal by increasing, decreasing, or leaving unchanged its $\mathbf{a}(j)'$, $\mathbf{r}(j)'$, $\Delta \mathbf{k}(j)'$, $\Delta \mathbf{l}(j)'$, and implicitly, its $\mathbf{y}(j)'$ according to the following rules:

$$\begin{aligned} \Delta a(ij) &= 0 \text{ if } a(ij)' = 0 \text{ and } \{\delta W(j)/\delta a(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta a(ij) - p(i)\} < 0 \\ \Delta a(ij) &= \beta \{\delta W(j)/\delta a(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta a(ij) - p(i)\} \text{ otherwise} \\ \Delta r(ij) &= 0 \text{ if } r(ij)' = 0 \text{ and } \{\delta W(j)/\delta r(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta r(ij) - p(i)\} < 0 \\ \Delta r(ij) &= \beta \{\delta W(j)/\delta r(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta r(ij) - p(i)\} \text{ otherwise} \\ \Delta k(ij) &= 0 \text{ if } k(ij) + \Delta k(ij)' = 0 \text{ and } \{\delta W(j)/\delta k(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta k(ij) - p(i)\} < 0 \\ \Delta k(ij) &= \beta \{\delta W(j)/\delta k(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta k(ij) - p(i)\} \text{ otherwise} \\ \Delta l(ij) &= 0 \text{ if } l(ij) + \Delta l(ij)' = 0 \text{ and } \{\delta W(j)/\delta l(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta l(ij) - p(i)\} < 0 \\ \Delta l(ij) &= \beta \{\delta W(j)/\delta l(ij) + \mathbf{p}\delta \mathbf{y}(j)/\delta l(ij) - p(i)\} \text{ otherwise} \end{aligned}$$

Where β is an adjustment coefficient between zero and one.

These rules together express the idea that if changing the input/output mix increases net social benefits, a worker council will implement the change. Put differently, if the increased well-being of the workers involved outweighs any excess of social cost over social benefits to others that accompany the change, the change will be enacted. Together, these conditions imply that whenever a WC can adjust production in any way to generate a positive net social benefit including the effects on their own members, they will.

- 6 The IFB changes prices $\mathbf{P} = \{\mathbf{p}, \mathbf{p}(r), \mathbf{p}(k), \mathbf{p}(l)\}$ according to the following rules:

$$\begin{aligned} \Delta p(i) &= 0 \text{ if } p(i)' = 0 \text{ and } \{\Sigma y(ih)' + \Sigma [a(ij) - y(ij)]\} < 0 \\ \Delta p(i) &= \gamma \{\Sigma y(ih)' + \Sigma [a(ij) - y(ij)]\} \text{ otherwise} \\ \Delta p(ri) &= 0 \text{ if } p(ri)' = 0 \text{ and } \{\Sigma r(ij)' - r(i)\star\} < 0 \\ \Delta p(ri) &= \gamma \{\Sigma r(ij)' - r(i)\star\} \text{ otherwise} \\ \Delta p(ki) &= 0 \text{ if } p(ki)' = 0 \text{ and } \{\Sigma k(ij)' - k(i)\star\} < 0 \\ \Delta p(ki) &= \gamma \{\Sigma k(ij)' - k(i)\star\} \text{ otherwise} \\ \Delta p(li) &= 0 \text{ if } p(li)' = 0 \text{ and } \{\Sigma l(ij)' - l(i)\star\} < 0 \\ \Delta p(li) &= \gamma \{\Sigma l(ij)' - l(i)\star\} \text{ otherwise} \end{aligned}$$

Where γ is an adjustment coefficient between zero and one.

These rules raise prices for goods in excess demand and lower prices for goods in excess supply, thereby moving proposals toward a feasible plan. The rest of the annual planning procedure simply repeats steps 4, 5, and 6 until there are no further changes.

The proof that this procedure – which, as already mentioned, is a variant of a procedure developed by Lange, Arrow, and Hurwicz – will converge to a feasible and optimal plan under the usual convexity assumptions can be found in chapter 4 of Heal 1973. The proof hinges on stability properties of gradient procedures for finding saddle points that are studied in LaSalle and Lefschetz 1961. An extension of the stability theorem to cover discontinuities in the rate of change of variables when boundaries are reached and when non-negativity constraints can become binding can be found in Henry 1972.

While it is mathematically equivalent, economically, our procedure differs substantially from the Lange-Arrow-Hurwicz procedure as discussed by Heal. We have consumer councils maximizing their well-being subject to constraint, while Heal stipulates an overall social welfare function. And we have worker councils maximizing their well-being subject to constraint, whereas Heal stipulates profit maximization. However, these economic differences notwithstanding, the convergence proof Heal describes for the Lange-Arrow-Hurwicz procedure applies to our procedure as well.

To review: What our social iterative procedure does is “whittle down” infeasible proposals from consumer and worker councils in two different ways. As prices are adjusted to eliminate excess demands and supplies, consumer councils are induced to substitute less socially costly goods for more costly goods, and worker councils are induced to substitute less socially costly inputs for more costly inputs and produce more socially valuable outputs rather than less valuable outputs. When this kind of “shifting” proves insufficient to get proposals accepted, consumer councils are forced to reduce consumption until the social cost of their request is justified by the effort ratings and allowances of their members, and worker councils are forced to increase their effort until the social benefits of their outputs are at least as great as the social cost of the inputs they use.

In technical terms, convergence and optimality hinge on the convexity properties of our consumer and worker council well-being functions as well as the production possibility sets of producers. But while convexity of production possibility sets has been much studied, the convexity properties of our neighborhood consumer council well-being functions has not. Our *council* well-being functions differ from traditional utility functions in two ways: (1) Our councils have many members, with different preferences. (2) While we could have treated preferences as exogenous and considered only “preference fulfillment effects,” we insisted on treating preferences as endogenous and consider “preference development effects” as well. Does aggregating many individual preferences make our council preferences more or less likely to be convex? Does treating preferences as endogenous rather than exogenous make our council preferences more or less likely to be convex?

I acknowledged that treating preferences as endogenous might increase the likelihood of non-convexity in chapter 6 of Hahnel and Albert 1990. On the other hand, it seems to me that aggregating many different preference orderings might have the opposite effect. However, since non-convexities are certain to

arise in real-world settings, whether in consumption or production, we test how sensitive convergence of our planning procedure is to non-convexities in simulation experiments discussed in Chapter 9 by introducing increasing returns to scale in 20% of our worker councils.

Comparing assumptions

What assumptions are necessary to prove the first and second fundamental welfare theorems for a market economy?¹⁷ What assumptions are necessary to prove these theorems for a participatory economy? In both cases, convexity of both production possibility sets and consumer preferences are necessary to prove the first theorem – that there will be a general equilibrium in the case of a market economy, or that our participatory planning procedure will eventually converge to a feasible plan. And in both cases, convexity assumptions are *not* necessary to prove the second theorem – that any general equilibrium of a market economy will be a Pareto optimum, or that if our planning procedure reaches a feasible plan, it will be a Pareto optimum. This may seem strange, but the reason convexity assumptions are not needed for the second welfare theorem is that the existence of a general equilibrium, or alternatively convergence of the planning procedure to a feasible plan, is *assumed* in the formulation of the second theorem. Of course, absent convexity, the first theorem tells us this assumption may not be warranted, which in effect renders the second theorem vacuous.

But while convexity assumptions are not needed to prove the second theorem, there are important assumptions that are necessary to prove the second theorem for a market economy which are *not* needed to prove the theorem for our participatory economy. One must assume that markets are complete, all markets are competitive, and there are no externalities or public goods in order for the general equilibrium of a market economy to be a Pareto optimum. As we have shown in this chapter, provided federations of consumer councils, FCCs, participate on an equal footing with consumer councils in the planning procedures, and provided coalitions of affected parties, CAPs, participate in the planning procedure; our procedure will yield an efficient plan even when there are public goods and externalities. Moreover, provided worker councils and CAPs treat the indicative prices announced by the IFB parametrically, our planning procedure will yield an efficient plan even if industries comprise only a few worker councils. In short, when the participatory annual planning procedure includes FCCs and CAPs, and actors treat indicative prices quoted by the IFB during iterations of the planning procedure parametrically, it avoids the major pitfalls that cause market economies to be inefficient even if they reach a general equilibrium. And since a participatory economy does not begin to function until after a feasible plan is reached, it also avoids inefficiencies common to market economies due to false trading that takes place when markets are out of equilibrium. We close this long chapter with a reminder of what participatory planning is *not*.

What participatory planning is not***Participatory planning is not central planning***

Our iteration facilitation board plays a completely perfunctory role. Next chapter where we report on computer simulations of the annual participatory planning procedure, we explain why we recommend that personnel working in the IFB sometimes exercise discretion when deciding how to adjust prices during the planning procedure to reduce the number of iterations needed and cope with problems that will inevitably arise. However, in theory we could replace personnel with an algorithm like those we explore in Chapter 9 – which we have pointed out to anarchist critics of participatory economics who incorrectly jump to the conclusion that our IFB is a central planning board in disguise. Participatory planning is also not central planning because worker and consumer councils propose and revise their own self-activity proposals, and there are no central planners, or anyone else, who tell councils what they must do.

Participatory planning is not one big meeting

We have not proposed that delegates from worker and consumer councils meet together to hammer out a plan to coordinate their various activities. In fact, as we explain in the introduction of our appendix we believe this would prove to be a disaster. Delegates attending such a meeting would lack the necessary information to evaluate different plans because they would have no estimates of opportunity and social costs. The plan they came up with would not only not be efficient, it would suffer from the same political problem that plagues central planning. Namely, because all would presumably have an equal say at the “one big meeting,” those more affected by different decisions would have no more say than those less affected by those decisions. And finally, all economic decisions would be made by a small number of delegates, as ordinary workers and consumers are disenfranchised. During participatory planning, consumer and worker councils do not send delegates to meetings to discuss a plan. Meetings take place only *within* consumer councils, *within* worker councils, and *within* federations and CAPs to discuss and revise *self-activity* proposals. And the only delegates are delegates councils send to federations to discuss and decide on federation self-activity proposals.

Participatory planning is not a Walrasian auctioneer

Because our IFB announces “indicative prices,” and adjusts “indicative prices” to reduce excess supplies and demands, one might call our IFB a Walrasian auctioneer. Leon Walras created a fictitious auctioneer as part of his attempt to do a formal analysis of the logic of a system of many interconnected *markets*. Walras wanted to go beyond partial equilibrium analysis to general

equilibrium analysis of a market system, and he found the fiction of an auctioneer who adjusts prices helpful in that endeavor. Later, Oskar Lange, Abba Lerner, and Fred Taylor proposed a real auctioneer to adjust prices in their model of market socialism and opined that such an auctioneer could more rapidly achieve equilibrium than the laws of supply and demand were likely to do on their own, and thereby avoid a great deal of inefficiency because of false trading. But in both cases the auctioneer was an auctioneer in a *market* economy, and the actors responding to the auctioneer's price signals were individual consumers and firms. Our IFB, on the other hand, helps councils and federations find reasonably accurate estimates of the opportunity and social costs of using different parts of the productive commons so they can determine if their self-activity proposals are efficient and fair. In short, a participatory economy is a planned economy, not a market economy. But if people want to honor one of the great economic theorists of all time by pointing out that our IFB does something Walras once described as an auctioneer, we have no objection.

Appendix on efficient levels of emissions¹⁸

In Figure 7.1, line IJKD is the aggregate demand curve for permission to emit a pollutant, and line IMB is the associated marginal revenue curve. Line EMKN is the marginal damage curve for the CAP. In which case the efficient level of emissions is OC, and the damage caused by the last unit emitted is OF. If both polluters and the CAP respond truthfully to indicative prices for the pollutant, the participatory planning process will eventually settle on OC units of emissions and an indicative price equal to OF.

However, if the CAP ignores the directive to treat indicative prices as givens, and the CAP knows what the demand, and therefore the marginal

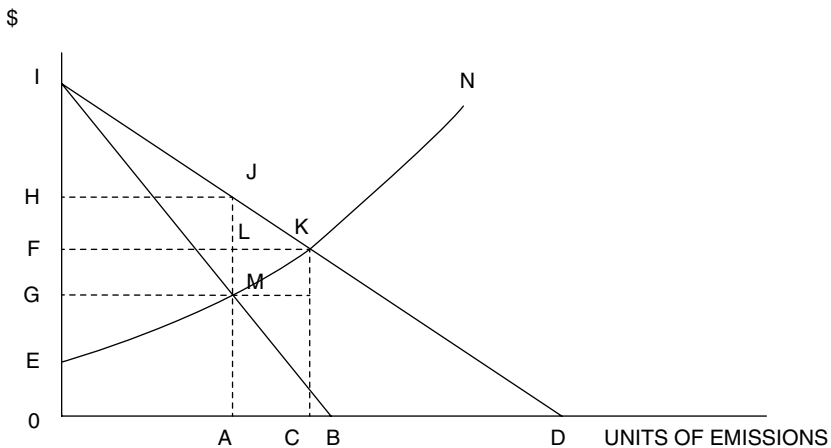


Figure 7.1 Appendix on efficient levels of emissions

revenue curve looks like, it can calculate how to reap a “monopoly profit” equal to the area of rectangle GMJH by setting the supply of emission permits equal to OA no matter what indicative price the IFG quotes. As long as the CAP sticks to OA as its response, eventually the IFB will adjust the price until it is equal to OH where demand will equal supply and the CAP will reap the monopoly profit. In which case, society will suffer a welfare loss equal to the area of triangle MJK. The area of triangle LJK is the lost “consumer surplus” – where the “consumers” in this case are the worker councils emitting the pollutant. And the area of triangle MLK is the lost “producer surplus” – where the “producer” in this case is the CAP. Together, the lost consumer and producer surplus add up to the social loss, the area of triangle MJK.

In sum: If the CAP knows what the demand curve for permission to pollute looks like, and if the CAP is willing and able to violate the directive to treat indicative prices as givens without fear of penalty, it will grant too little permission to pollute, $OA < OC$; society will suffer a loss of well-being equal to the area of triangle MLK; and by engaging in strategic maneuvering, the CAP will gain the monopoly profit, the area of rectangle GMJH, but lose some of its producer surplus, the area of triangle MLK.

Notes

- 1 The investment plan not only decides how much of each capital good to produce each year over a five-year investment planning horizon; it also comes to a “preliminary” decision about how those capital goods are expected to be allocated among different worker councils in different industries. However, the actual allocation of different capital goods that is determined during the annual participatory planning process each year may end up being somewhat different from the expected allocation as envisioned in the investment plan, as will become clear.
- 2 Those who object that this cannot be efficient because providing Q^* and taxing everyone $t(i) = SC(Q^*)/n$ makes anyone for whom $MPB(i)[Q^*] - SC(Q^*)/n < 0$ worse off, confuse Pareto optimality with Pareto improvement. The outcome $A: \{Q^*, t(i) = SC(Q^*)/n \text{ all } i\}$ is a Pareto optimum and is therefore efficient. What outcome A is *not* is a Pareto improvement over the outcome $B = \{Q = 0, t(i) = 0 \text{ all } i\}$. Because if we begin at B and change to A some will be made worse off – those who truly do not benefit greatly from the public good and therefore for whom $MPB(i)[Q^*] - SC(Q^*)/n < 0$. What the consensus among economists prior to 1970 amounted to was that there was no incentive compatible way to arrange for a *different* efficient outcome, which they believed was more fair, namely: $C: \{Q^*, t(i) \leq MPB(i)[Q^*] \text{ all } i\}$.
- 3 For a fuller discussion of the early literature on incentive compatible, demand revealing mechanisms, see chapter 3 in Hahnel and Albert 1990: 59–73. For a review of recent work on dynamic mechanism design, see Bergemann and Valimaki 2019.
- 4 There is a large literature about different kinds of “biases” that plague contingent valuation surveys and hedonic regression studies. For a succinct evaluation of these problems, see Hahnel 2011: 24–30.
- 5 In the real world, beginning with the final estimates of opportunity costs, social costs, and damages from the previous year is obviously an improvement on beginning with

arbitrary initial estimates to be taken advantage of, as we demonstrate in Chapter 9 with our computer simulations.

- 6 How to create CAPs and the difficulties associated with this process are discussed below. For now, we simply assume that all affected by an emission, but none who are unaffected, are included in the CAP for that pollutant.
- 7 Following our examples, there would be estimates of (1) the damage caused by releasing a unit of nitrous oxide in LA, (2) the damage caused by releasing a unit of coarse particulate matter in LA, (3) the damage caused by release of a unit of nitrous oxide in KC, and (4) the damage caused by release of a unit of coarse particulate matter in KC. Note that the two damage estimates for KC might well be different than the two damage estimates in LA for reasons already mentioned, or because KC residents have different preferences regarding environmental amenities vs. income than LA residents.
- 8 See Hahnel and Sheeran 2009 for a more thorough explanation of intractable perverse incentives that prevent voluntary negotiations between polluters and victims from achieving efficient levels of pollution, despite claims to the contrary by free market environmentalists and authors of many mainstream economic textbooks.
- 9 John Roemer (1994) based his claim that the incentive for firms to pollute in his model of market socialism would be less than in a capitalist economy where enterprise ownership was more highly concentrated on this argument. Nonetheless, a strong, even if somewhat diminished, tendency to underreport remains in his model as well as in a participatory economy, requiring adequate monitoring and enforcement to prevent excessive pollution in either case.
- 10 See the appendix at the end of this section for a diagrammatic demonstration of this result.
- 11 Recent work in auction theory suggests that *if* all proposals are treated as contractual obligations if accepted, and *if* CAPs have no way to know whether or not there will be further iterations in the planning procedure, and therefore whether their current proposal will be their last, it *may* still be advisable for CAPs to treat prices parametrically even if they have information about the aggregate demand function for permission to pollute. Nonetheless, devising procedures to monitor, and penalize all participants for failure to treat prices parametrically during the planning procedure seems advisable.
- 12 We will have more to say about these issues in Chapter 14 where we discuss long-range environmental planning.
- 13 Note that if the shadow prices for different kinds of labor were derived from the solution to the linear programming problem outlined here, while they would reflect the productivities of different kinds of work – the combined result of labor supplies, technologies, and preferences for goods – they would not reflect different disutilities from workers' point of view. In which case the above equation in our heuristic model would not be a completely accurate indicator of the social cost of a consumption proposal. However, the shadow prices generated by the iterative annual participatory planning procedure *will* incorporate this component, as we demonstrate below using our formal model of the planning procedure.
- 14 See chapters 4 and 6 in Hahnel and Albert 1990 for how to incorporate “endogenous preferences” into welfare theoretical analysis in order to account for both the “preference fulfillment” and “preference development” effects of consumption and work activity. While unnecessary for present purposes – that is, we could simply assume a traditional utility function for each consumer council that did not take preference development effects into account – since we think these effects are important, and it is easy to include them, we do so.
- 15 It would be more accurate to describe these different “profits” as technological “rents,” but that is beside the point here.
- 16 Of course, maximizing well-being from work consists largely of attempting to minimize negative impacts, often referred to as the disutility of labor.

- 17 See chapter 6 in Hahnel and Albert 1990 for an exhaustive treatment of how endogenous preferences do and do not affect proofs of the fundamental welfare theorems for private enterprise market economies.
- 18 I wish to acknowledge the help of Evgeniya Rudneva, an economics major at Portland State University, in preparing this appendix on efficient levels of emissions.

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8 Dispelling common confusions

Up to now we have been concerned with how to formulate a comprehensive annual plan democratically and efficiently. In Chapter 9 we will present results of computer simulation experiments in response to concerns that the annual participatory planning procedure may be impractical because it would take worker and consumer councils too much time to carry out. In Chapter 10 we discuss proposals for how “reproductive labor” might be handled. And in Parts IV and V we will propose concrete procedures for how to formulate an investment plan and three different kinds of long-term development plans democratically and efficiently, and how to integrate these different plans to mitigate welfare losses due to inevitable inaccuracies in initial estimates of various parameters. But before proceeding further we want to address two objections critics have raised to *any kind* of comprehensive economic planning.

Some critics have dismissed our proposal on grounds that it is impractical to expect consumers to express their desires in sufficient detail to provide producers with the level of detail they require to know what to produce. And some critics have dismissed our proposal on grounds that when, in the words of the poet Robert Burns, “the best-laid plans of mice and men often go awry,” unlike market economies, planned economies cannot respond when new developments arise.

The size 6 purple women’s high-heeled shoe with a yellow toe problem

David Schweickart ridiculed household consumption planning as “nonsense on stilts” in his 2006 book review of Michael Albert’s *Parecon: Life After Capitalism* (Verso, 2003).

Unless requests are made in excruciating detail producers won’t know what to produce. In any event, they have little motivation to find out what people really want.

Seth Ackerman dismissed participatory economics for this reason alone in “The Red and the Black” published in *The Jacobin* (9) in 2013.

There are more than two million products in Amazon.com’s “kitchen and dining” category alone!

And in *Alternatives to Capitalism: Proposals for a Democratic Economy* (Verso, 2016), Erik Olin Wright put it this way:

The problem is that the gross categories provide virtually no useful information for the actual producers of the things I will consume. It does not help shirt-makers very much to know, based on the aggregation of individual household consumption proposals, that consumers plan to spend a certain per cent of their budget on clothing; they need to have some idea of how many shirts of what style and quality to produce since these have very . . . different opportunity costs.

Since this concern is so prominent in critics minds, let’s give it a name. Let’s call it the “Size 6 purple women’s high-heeled shoe with a yellow toe problem.” Quite simply the problem is this: A shoe producer must know to produce a size 6 purple women’s high-heeled shoe with a yellow toe. The producer must know that size 5 will not do, a red toe will not do, a low heel will not do. However, it is unreasonable to expect the consumer who will eventually discover she wants a size 6 purple women’s high-heeled shoe with a yellow toe to specify this at the beginning of the year as part of her annual consumption request.

How does a shoe producer in *any* economy know to produce a size 6 purple women’s high-heeled shoe with a yellow toe, rather than a slightly different shoe? In a market economy, shoe producers guess what shoe consumers will want when they decide to go shoe shopping. They guess based on past sales. They guess based on any consumer research they engage in, perhaps including information culled from focus groups. They guess based on government projections of changes in relevant economic variables such as the distribution of income among households.

And recently, many large companies have started to use newly available data gathering and processing capabilities to predict what products particular customers will want in the future. When I go to the Amazon website to inquire about some book, Amazon now tells me what other books I might be interested in buying. Only when I go on the internet from my wife’s email address does Amazon provide me with book suggestions that do not match my preferences. In our brave new market economy producers often know what we will want before we do! In market economies producers also try to influence what I will want to buy through advertising. In other words, a shoe company will decide to produce a certain style shoe and use advertising to make people want to buy the style they have decided to produce.

In sum: In market economies producers guess what to produce – because most sales are not arranged through pre-orders – and producers use advertising to try to influence consumers to buy what they have produced. New technologies of automated inventory supply management and consumer database mining have made their guesswork more accurate, but *in the end producers in market economies are still guessing.*

There is often a great deal of inefficiency that results from this guessing game that is an intrinsic feature of market economies. Unlike planned economies, in market economies, there is no attempt to coordinate all the production and consumption decisions actors make before those decisions are translated into actions. As a result a great deal of what economists call “false trading” occurs. False trades are trades individual parties make at prices that fail to equate supply and demand – which actually occurs more often than not! While seldom emphasized, competent economic theorists know that all false trading generates inefficiency to some extent, and dis-equilibrating forces operate in market systems alongside equilibrating forces when quantities adjust as well as prices. The notion that in market economies the convenience consumers enjoy of not having to pre-plan their consumption with producers comes at no price is based on the grossly unrealistic assumption that market economies are always in general equilibrium. For all their faults, 20th-century planned economies did not experience major depressions, or even significant recessions, caused by mutually reinforcing dis-equilibrating forces in markets that all too often go unchecked by appropriate countervailing fiscal and monetary policies in market economies. But how will all this work in a participatory economy where there *is* a self-conscious attempt to coordinate production and consumption decisions *before* production begins?

Let’s begin with information consumers will have about what is available. Ironically, the two million products in the Amazon.com “kitchen and dining” section is not an insurmountable problem rendering comprehensive economic planning of any kind impossible at all. Instead, it is a wonderful example of how consumers today can easily be made aware of the tremendous variety of products that will be available in a participatory economy. Just as Amazon.com can list millions of products – providing pictures and details about their characteristics – consumer federations can provide this service to consumers in a participatory economy for any who wish to shop online. And for those who prefer what some of my students once told me were “the pleasures of malling it,” consumer federations can host shopping malls where anyone who wishes can go to see and be seen, and walk away with whatever strikes their fancy. Information about product improvements can be provided by consumer federations as well. The fact that it will be consumer federations providing information about products rather than producers singing their own praises as is the case in market economies should be a significant change for the better. But, how, critics ask, will consumers pre-order?

It is important to distinguish between what we need to accomplish and what we do not need to accomplish in the annual participatory planning process.

Just as we do not have to eliminate every last bit of excess demand for every good and service in order to start the year, when the year starts, any shoemaking worker council with an approved proposal knows it should start making shoes. It also knows how much cloth, leather, rubber, and so on it has been pre-authorized for during the year and how many shoes it has said it can make. It also knows that X% of the shoes it made last year were women's shoes, and Y% of the women's shoes it made last year were size 6. How does it know whether to start making size 6 purple women's high-heeled shoes with a yellow toe, or size 6 purple women's high-heeled shoe with a red toe? It does just what a shoemaking company in a market economy does: *It makes an educated guess.*

Then, as soon as actual consumption begins, new information becomes available. Suppose purchases of size 6 purple women's high-heeled shoes with a yellow toe are lower than producers expected while the red toed shoes are disappearing like hot cakes. This kind of new information is what helps worker councils answer the question: Exactly what kind of shoe should I be producing, just as it does in market economies. So much for the claim that a planned economy has no answer to the size 6 purple women's high-heeled shoe with a yellow toe problem. It has the same answer a market system does with regard to moving from a "coarse" decision about shoe production to a "detailed" decision about size 6 purple women's high-heeled shoes with a yellow toe production as the year progresses.

This first kind of new information fills in the details producers need to know about exactly what kinds of shoes people want, which is why consumers do *not* need to specify these details when submitting their personal consumption requests during the planning procedure. Submitting personal consumption requests during planning is not impossibly burdensome because the form would only need to have an entry called "shoes" for one to put a number after, not an entry called "size 6 purple women's high-heeled shoes with a yellow toe!" Those kinds of details are revealed by actual purchases as the year proceeds. In other words, Erik Olin Wright misread our proposal when he wrote: "Since the coarse categories would not be useful for planning by federations of workers councils, and this is the fundamental purpose for pre-ordering consumption, I will assume that the finest level of detail is required." Consumption proposals during planning are made using what Erik calls "coarse categories" because the fine level of detail producers require is revealed as the plan is actually implemented. Whether filling out even this reduced list of items is beyond people's capabilities or desires, we will return to shortly.

What about David Schweickart's claim that worker councils "have little motivation to find out what people really want," disenfranchising consumers as the centrally planned Soviet economy certainly did for decades? Here it is important to distinguish between the worker council production plan that was approved as "socially responsible" before the year began and what the worker council is credited for at the end of the year. Plan approval is based on *projected* social benefit-to-cost ratios. However, worker councils are credited for the social benefit-to-cost ratio of *actual* outputs delivered and accepted and *actual*

inputs used during the year. It is last year's *actual* social benefit-to-cost ratio that serves as a cap on average effort ratings worker councils can award members. So if their approved production plan had an SB/SC ratio of 1.09 but their actual ratio at year's end turns out to be 1.03, the cap on average effort ratings for workers in the council next year is 103 not 109. Therefore, a worker council that failed to reduce yellow toed shoe production and increase red toed shoe production in response to signals that become available during the year about what consumers truly like would in all likelihood end up with a lower actual social benefit-to-cost ratio and consequently a lower average effort rating for the following year. Similarly, consumers and consumer councils and federations are charged for what they actually consume during the year, not what was approved for them in the plan. Any differences are recorded as increases or decreases in the debt or savings of individual consumers, neighborhood councils, and consumer federations.

There are endless details one could pursue in this, as in other areas, regarding exactly how a participatory economy would actually function. Suppose a worker council delivers yellow toed shoes to the consumer federation. Suppose the consumer federation accepts them anticipating that they will sell, only to discover later that nobody bought them because they bought red toed shoes instead. Who takes responsibility? Does the worker council get credit for them because they were accepted by the consumer federation? Or does the consumer federation notify the worker council at the end of the year that it does not get credit for some of the yellow toed shoes it produced? As any business knows, selling is different from selling on consignment.

However, the important question is not which option will be chosen – because that will be decided by the people who live in a participatory economy. The issue is simply whether or not there are perfectly straightforward answers that allow producers to turn “coarse” categories in the annual plan into more “refined” categories as the year proceeds, so an economy that begins the year with a comprehensive annual plan is a practical possibility, and cannot be dismissed as “nonsense on stilts.”

Post-plan adjustments

Actual purchase patterns during the year reveal more than needed details about consumer desires. They also signal when consumers have changed their minds. At the individual level people reveal by their purchases that they want more of some things and less of others than they indicated during planning. At the aggregate level, individual increases and decreases sometimes cancel out and therefore require no changes in production. When they do not cancel out, how to increase or decrease production of shoes because consumers have changed their minds must be negotiated between the shoe industry federation and the national consumer federation. Again, there are different ways these adjustments might be handled, each with its pros and cons. But the relevant point is that adjustments can be made. When making adjustments in production, the crucial

questions are: (1) To what extent will the shoe producers and shoe industry or consumers bear the burden of adjustments? And (2) will shoe customers who change their demand for shoes be treated any differently from shoe customers who do not?

In the case of excess supply, the issue reduces to whether or not producers will be credited for shoes that are added to inventories, and if so how much. The case of excess demand is more complicated. To raise shoe production, more resources will have to be drawn away from industries experiencing excess supply. Beyond crediting shoe workers for working longer hours, will the indicative prices of shoes and those resources be increased above their levels in the plan, or not? If shoe production is not raised sufficiently to satisfy all who now want shoes, will those who did not increase their demand above what they ordered be given preference? While those living in a participatory economy will have to debate the pros and cons of different answers to these questions, our point is simply that these questions all can be answered.

The difference between a planned economy and an unplanned market economy is that to the extent that consumers submit proposals that reflect changes they anticipate in their tastes, and to the extent that worker councils submit proposals that reflect anticipated changes in their technologies and work preferences, the approved annual plan is our best guess of what should be done and therefore reduces the number and size of adjustments necessary. All mechanisms for making adjustments in a market economy are available if wanted in a planned economy as well, although presumably a participatory economy would put a higher priority on mechanisms that distribute the costs of adjustments more fairly.

Finally, how burdensome is it for consumers to put numbers next to a list of "coarse categories?" Perhaps I was too flip when I once explained how a lazy person such as myself might spend *no* time submitting a new consumption request, but what would happen in such a case? If a person does not fill out and submit a consumption request form, his or her neighborhood council can simply use the person's actual consumption last year as their new consumption request for this year. If their effort rating for this year warrants this level of consumption, their request will be approved and included in the neighborhood proposal. If not, and if a person continues to fail to respond to requests for a new proposal, the neighborhood council can reduce every item in their last year consumption by the same percentage until the reduced request is covered by their lower effort rating this year. In this way neighborhood consumption councils, who must submit neighborhood proposals during the planning procedure, can do what they have to do even if some of their irresponsible members fail to provide personal consumption proposals.

At the end of our dialogue book, Erik Olin Wright seems to understand how signaling necessary details to producers and making adjustments because consumers change their minds can work in a participatory economy. He wrote:

Production . . . in effect would be done pretty much as . . . now: producers would examine the sales and trends of sales in the recent past,

and make their best estimate of what to produce . . . on that basis. Indeed, since producers and their sector federations can continually and efficiently monitor these trends, they are in a position to make updates to plans in an on-going way on the basis of the actual behavior of consumers, rather than mainly organize their planning activities around annual plans animated by uninformative household pre-orders.

This is accurate enough, although I don't see why Erik dismisses household pre-orders as "uninformative." They certainly provide industry federations more useful information at the start of the year than the limited information market systems provide producers about changes in consumer intentions.

In sum: From year to year consumers' incomes change, and consumers' desires change. Signaling producers about how these changes are likely to affect their demands for different goods and services is what pre-ordering is for, and why it is quite useful for producers. Necessary details can be filled in from consumer profiles and actual purchases during the year, and adjustments can be negotiated with the aid of instantaneous inventory supply line prompts at the disposal of worker councils and federations. *But just because pre-ordering lacks detail and people change their minds does not mean the planning process is pointless.* If we want consumers to influence what is produced in the economy, and if we are going to decide what is produced in large part through a planning procedure, then we need consumers to provide their best guesses about what they will want. We don't need them to agonize over their proposals, and we certainly can accommodate them when they change their minds.

Erik Olin Wright also asked a related question about consumption in a participatory economy that is convenient to address here:

I don't understand why my personal consumption should be the business of a neighborhood council, even apart from the problem already discussed of the usefulness of the procedures involved.

This question had been raised before, and therefore fortunately we already had a name for it. We call it the "kinky underwear problem." One may not want one's neighbors gossiping about what kind of underwear one has ordered.¹ In more recent expositions, we tried to explain that it was never our intent that one's neighbors sit in judgment over one's consumption requests and offered several suggestions for how consumer privacy could be protected. The bottom line is that personal consumption requests must be approved or disapproved, and this must occur before neighborhood consumption councils can submit their aggregate neighborhood consumption requests during the annual planning procedure. Since neighborhood councils must aggregate their members' approved requests we talked about them as also approving them. But even in our earliest presentation, we specified that as long as one's effort rating plus any allowance was sufficient to cover the social cost of one's request, it could not be rejected. In 1991 we also wrote of neighbors' having

the opportunity to provide constructive feedback and suggestions about particulars, which in retrospect was probably overly enthusiastic on our part. Over the years it has become apparent to me that for most people today concern for privacy is far greater than any desire for constructive feedback from one's neighbors.

In any case, there are a number of ways to protect privacy. (1) Eliminate review and make approval or disapproval of individual consumption requests automatic based on effort rating and allowances – which seemed to be Erik's preference. (2) There is no reason to attach names to personal consumption proposals. Review only requires an effort rating, any allowance, and a personal consumption request form that is filled out. Submissions can be by number, not name. (3) Personal requests – with or without names attached – could be reviewed by consumption councils that are not geographically based. So any information about one's consumption request would be available only to strangers. In this case the decision to approve or disapprove would have to be passed on from the non-geographical council to one's neighborhood consumption council, so it could be added to other individual requests and requests for neighborhood public goods.

Similar issues arise regarding who approves special needs requests and requests for loans. To enhance building strong, local, neighborhood communities we suggested that special need requests, and loan applications be handled by one's neighborhood consumption councils through credit units managed by neighborhood consumption councils. But that is not the only option. These functions could be de-localized; credit unions could be managed by federations of consumer councils, if people felt that was better.

If it looks like a market, and smells like a market . . .

Finally, is the adjustment process really just a market after all, as Erik Olin Wright suggested when he asked: "Aren't mid-year adjustments really just forms of market behavior?" Clearly, approved consumption plans are not treated as binding contracts since individuals are free to change their minds as the year proceeds. One possible option for making adjustments would allow indicative prices to rise when excess demand for something appears during the year, and indicative prices to fall in the case of excess supply. In which case, if it looks like a market, and smells like a market, doesn't that mean it is a market?

The answer is an emphatic "no!" for three reasons:

- (1) In market economies there is no plan that has been agreed to at the beginning of the year. There is no plan where people had an opportunity to affect production and consumption decisions at least roughly in proportion to the degree they are affected. There is no plan that incorporates effects on "external parties" that are ignored by buyers and sellers who make the decisions in market economies. There is no plan that would be

efficient, fair, and environmentally sustainable if carried out. Instead, in a market economy all decisions about how to organize a division of labor and distribute the benefits from having done so are settled by agreements between buyer-seller pairs – which predictably leads to outcomes that are inequitable, inefficient, and environmentally unsustainable as argued in Chapter 2.

- (2) Even when adjustments are made during the year in a participatory economy, individual buyers and sellers do not negotiate adjustments between themselves however they see fit, including any adjustment in prices. Instead, adjustments are negotiated socially. Industry and consumer federations negotiate adjustments in production. And whether or not to adjust indicative prices is also a social decision, so that fairness as well as efficiency can be taken into account.
- (3) Markets are the aggregate sum of haggling between many self-selected pairs of buyer-sellers. Neither participatory planning nor the adjustment procedures I have discussed above permit self-selected buyer-seller pairs to make whatever deals they want because the consequences of allowing this are unacceptable.

In conclusion, ironically perhaps, the most common objection people have raised to our proposal is a simple confusion about what a comprehensive economic plan is, and is not. It is *not* a detailed plan of the kind that David Schweickart, Seth Ackerman, and initially Erik Olin Wright assumed, and which Schweickart rejected as “nonsense on stilts.” Once that misunderstanding about comprehensive plans is dismissed, the question is simply if it is possible to (a) fill in the necessary details producers need and (b) adjust to changes that were not foreseen when the plan was agreed to. Hopefully we have explained enough in this chapter about how details can be filled in and adjustments made during implementation to dissuade people from dismissing our proposal out of hand. There are reasonable questions critics can raise, and have raised, about the wisdom of our proposal – objections that we have acknowledged and responded to as best we can in the different chapters in Part III. But dismissing any kind of comprehensive economic planning as simply impossible is not one of them.

While we do not endorse procedures used in real-world centrally planned economies during the 20th century where consumers were disenfranchised – unnecessarily in our view – as anyone who lived in those economies knows necessary details producers need *can* be added to comprehensive economic plans drawn up in “coarse” categories. And adjustments *can* be made during implementation. We have explained how coarse categories become more detailed as comprehensive plans are implemented during the year, and made some practical suggestions about how adjustments might be made after a comprehensive plan has been agreed on. However, our primary purpose in this book is to present concrete proposals for how to create and integrate

comprehensive annual plans, investment plans, and long-run development plans in a participatory, democratic way, rather than address ways to fill out necessary details and adjust annual plans during the year at any length.

Note

- 1 Since one simply puts a number after the category “underwear” when submitting personal consumption requests, kinky underwear is really not an issue – although the point remains: Why should one’s neighbors pass judgment on one’s consumption request?

9 Computer simulations of participatory planning

Purpose

The purpose of this chapter is to begin to explore how practical and robust a real-world version of our annual participatory planning procedure is likely to be. We make no claim that the simulation work we have carried out to date and report on here is definitive.¹ Whether the picture that emerges from our simulation “experiments” is representative of what might happen if a national economy of workers and consumer councils and federations carried out the annual planning procedure we have proposed is debatable. However, until some government implements planning procedures similar to what we have proposed to generate a comprehensive annual plan; or until some government authorizes an experiment where councils of real workers and consumers simulate a trial run of our procedure, we are left with computer simulations to explore how our participatory annual planning procedure might work in practice. While results so far are encouraging, there is more simulation work to do, and we close this chapter with a list of suggestions for future computer simulation research.

To review where we are: It is well known that there is a difference between the following propositions regarding market systems, and what assumptions are necessary to prove them: (1) There will be a general equilibrium for a market system. (2) There will be a unique general equilibrium for a market system. (3) A general equilibrium for a market system will be globally stable. Regarding our model of a participatory economy, what we proved in Chapter 7 is that under traditional assumptions a version of our annual participatory planning procedure will eventually reach a feasible plan beginning from any initial price vector. In other words we have already proved the equivalent of propositions 1, 2, and 3 for our annual planning procedure.² But most importantly, we have demonstrated why, unlike the case for market economies, *the feasible plan our procedure reaches will be efficient even when there are public goods, externalities, and industries have only a few firms*. In other words, in traditional terms, we have proved that the fundamental theorem of welfare economics holds for a participatory economy under far less restrictive assumptions than is the case for market economies.³

The goal of this chapter is to begin the process of exploring:

- How we might improve upon the very simple price adjustment algorithm in Chapter 7 to hasten convergence.
- How much faster convergence is likely to be if, instead of beginning with an arbitrary price vector, we begin with the final price vector from the previous year's plan.
- How robust our planning procedure is when different assumptions are violated.

Other contributors to the debate about socialism in the 21st century have proposed various ways to carry out investment and development planning but argue that the only practical way to coordinate the activities of workers and consumers during a year in modern economies is through market exchange. We present our own proposals for how best to carry out investment and development planning in Parts IV and V. However, unlike many others, we also argue that those who give up on coordinating relations among worker and consumer councils and federations through annual planning do so unnecessarily. We have demonstrated that it is perfectly possible to carry out annual planning while empowering worker and consumer councils to self-manage their own affairs *in theory*. And we believe we have explained both in Part I of this book and elsewhere why the benefits of avoiding anti-social dynamics that market competition unleashes are considerable. However, our convergence proof does not tell us *how many iterations* it might take our councils and federations to reach a feasible plan. And therefore skeptics might ask: *Is our proposal to fully replace market coordination **practical**?*

It is also true that we made a number of assumptions that are necessary to prove that our procedure would converge to an optimal annual plan. Of course, as we just reminded readers, proofs about the existence, uniqueness, stability, and optimality of general equilibria of market systems also require assumptions, and it is widely acknowledged that these assumptions are frequently violated in the real world, even if additional problems caused by “false trading” in market economies often go ignored. Nonetheless, market economies are very much a “practical reality,” while the same cannot be said for our participatory economy. So where does this leave us?

It is hardly surprising that our proof that the annual participatory planning procedure will reach a feasible and efficient plan also requires assumptions. And we readily acknowledge some of these assumptions will be violated to some degree in the real world. Therefore, it is understandable that skeptics might also ask: *Is the annual participatory planning procedure sufficiently **robust**?* The work we report on in this chapter begins to explore and shed light on the answers to both the practicality and robustness of annual participatory planning until such time as real-world experiments are possible.

Platforms

We wrote an early version for our simulations in the computer programming language Netlogo – “a multiagent programmable modeling environment.”⁴ For our purposes, the “environment” being modeled was the annual participatory planning procedure, and the worker councils and consumer councils were the agents in the system. Netlogo has a number of advantages. It has some moderately advanced functionalities for tasks like building iterators and generating charts and graphics. In Netlogo, each loop in an iterator is referred to as a “tick.” For our purposes, each tick represented a new round of proposals from all councils and federations in response to an indicative price vector announced by the IFB – that is, another iteration in the annual participatory planning procedure.

As programming languages go, Netlogo is easy to learn, easy to work with even with little previous experience, and comes with ample elementary tutorials. In addition, Netlogo comes with a self-contained platform for development so users can simply download and run the app and begin to program right away. There is little in the way of additional infrastructure work required, and Netlogo is built atop of the widely available Java Virtual Machine, so Netlogo can run anywhere Java can run. For all these reasons, beginning analysis in Netlogo is a common start, and we began with Netlogo ourselves.

However, Netlogo, for all its strengths, has some key limitations. Netlogo code only runs on the Netlogo platform, and among programming domains, Netlogo is restricted to agent-based modeling; it’s not a general-purpose programming language. Moreover, Netlogo would not easily scale up the number of goods, natural resources, and different kinds of labor, nor the number of worker and consumer councils to approximate the size, scale, and complexity of any real economy. If we wanted to increase the size of the economy, we would be struggling against the memory and processing limits of the platform. For these and other reasons, we adapted the code for Netlogo into that of a general-purpose programming language, Clojure.⁵

Clojure is built atop the Java Virtual Machine, as is Netlogo. Yet unlike Netlogo, Clojure is able to leverage the Java API and hence utilize the Java ecosystem – all the code written in and for Java, developed and tested over more than 20 years that is at its disposal. Moreover, Clojure is able to leverage this ecosystem without the bloat that Java is notorious for. In Java, one must write a great deal of code to do relatively little, whereas Clojure, being a mature variant in the LISP (list processor) family of programming languages, is able to do the same and more with much less code.

Clojure has other advantages as well. It is a concurrent programming language, with no mutable state by default – the defining characteristic of the suite of computer programming languages under the rubric of *functional programming*. When necessary, Clojure *can* bring mutability through use of mutable data structures sourced from the Java ecosystem. Also, being a LISP, Clojure can write code that writes code – an attribute known as

“homoiconicity” – through Clojure (and LISP) tools called macros. Clojure also has a variant called Clojurescript, which compiles Clojure code into Javascript for the web.⁶ Thus, Clojure code can easily and robustly compile for use and deployment publicly on a web server or locally with a web browser. In fact, much of our later work exploring the participatory planning procedure came courtesy of a Clojurescript app.

The simulations reported here were for an economy with 30,000 consumer councils, 30,000 worker councils, 100 different private consumption goods, 100 different intermediate goods, 100 different public goods, 100 different categories of labor, and 100 different non-produced inputs from the natural environment. In all cases we simulated what might happen during annual participatory planning 40 times in order to get enough data points to draw statistically meaningful conclusions.⁷

The algorithm

In our Clojure program we load in a set of worker councils (WCs) and a set of consumer councils (CCs) as key-value pairs, which Clojure refers to as a “map.”

Each worker council produces a single good and decides how much output to supply and how much of every input to request by solving an optimization problem in which it minimizes the disutility of its members’ from their work “effort,” while being rewarded for producing outputs whose social value exceeds the cost to society of using the inputs needed to produce them. Each WC has a Cobb–Douglas production function, $z = q\mathbf{x}^a\mathbf{r}^b\mathbf{l}^ce^d$, where output, z , is a function of some number of intermediate goods, \mathbf{x} , natural resources, \mathbf{r} , kinds of labor, \mathbf{l} – all chosen randomly from lists of each category – and of the “effort” level of its members, e . Every WC requests a vector of intermediate inputs, a vector of raw materials from the natural environment, and a vector of hours of different kinds of labor, and decides how much effort to exert to produce its output so as to maximize its members’ well-being, WB_{WC} , which is a positive function of their income and a negative function of their disutility from work:

$$\text{Maximize } WB_{WC}(\mathbf{x}, \mathbf{r}, \mathbf{l}, e) = \left\{ p_z q \mathbf{x}^a \mathbf{r}^b \mathbf{l}^c e^d - \left[\mathbf{p}_x \mathbf{x} + \mathbf{p}_r \mathbf{r} + \mathbf{p}_l \mathbf{l} \right] \right\} - e^f$$

When members of a WC exert more effort, there are two effects: (1) It increases output, and therefore, the first term in their well-being function in braces, which is an estimate of the size of the net social benefit they create, and therefore the average income WC members will be awarded. (2) It also increases the second term in their well-being function because it increases their disutility from greater effort expended in work. What makes WCs different from one another in our simulations is that they have different production functions – that is, different values for q , \mathbf{a} , \mathbf{b} , \mathbf{c} , and d , and they have different preferences for income vs. disutility from work, f . We give WCs different production functions by randomly assigning them different values for q , \mathbf{a} ,

b, **c**, and **d** where the sum of the exponents range from 0.80 to 0.95, so that initially all WCs have decreasing returns to scale. We give WCs different tradeoffs between income and disutility from work by randomly assigning them different values for f between 3 and 4.

Each consumer council maximizes a Cobb-Douglas well-being function, WB_{CC} , whose arguments are the different private goods it consumes, \mathbf{y}_1 , and the different public goods it consumes, \mathbf{y}_2 . CCs maximize their well-being subject to the constraint that the social cost of their consumption must be equal to their income, I_{CC} , which is determined by the average effort ratings and allowances of their members.⁸

$$\text{Maximize } WB_{CC}(\mathbf{y}_1, \mathbf{y}_2) = \mathbf{y}_1^\alpha \mathbf{y}_2^\beta \text{ subject to } \mathbf{p}_{y1}\mathbf{y}_1 + \mathbf{p}_{y2}\mathbf{y}_2 = I_{CC}$$

We randomly assign different CCs values for the 100 exponents for the different private consumption goods, α , and the 100 exponents for the different public consumption goods, β , where each exponent varies between 0.025 and 0.05 so the sum of the exponents never exceeds 1. In a real-world version of a participatory economy, consumer council income, I_{CC} , would be determined by the average effort ratings and allowances of its members. However, in our simulations, we simply assume that all CCs have the same number of members, the same average effort rating and allowances, and therefore the same income.⁹

After the WCs and CCs for a given experiment have been loaded into memory, along with the current vector of “indicative prices” for all goods, natural resources, and categories of labor, the algorithm proceeds as follows:

- 1 For each CC: Solve its optimization problem to update its demands for private goods and its demands for public goods based on the latest indicative prices.
- 2 For each WC: Solve its optimization problem to update its output level, effort level, and demands for all inputs based on the latest indicative prices.
- 3 Calculate the new aggregate excess demands for all goods, natural resources, and categories of labor, and apply the price adjustment formula being tested to update all indicative prices.¹⁰
- 4 Increase the iteration counter by one.
- 5 Check all excess demands to see if they fall within the specified threshold. If the excess demand for *every* good is within the threshold, stop. If not, return to step 1 above and repeat.

Practicality: how many iterations will it take?

“Curious minds” will want to know how many iterations will this take? Sensible people do not want to spend endless time submitting, revising, and resubmitting proposals for councils where they work, and neighborhood councils where they live. If all this can be done in a reasonably expeditious way, that is

well and good. But what if it cannot? Four different considerations bear on the answer to how many iterations will be required to reach a feasible annual plan.

- 1 How far do we have to go to reduce excess demands and supplies before we can stop and launch a plan for the year? Or, put differently, what is a reasonable *threshold* for excess demands and supplies?
- 2 How efficient is our price adjustment rule?
- 3 What initial price vector is it reasonable to use in simulations of annual planning?
- 4 What “human intervention” might be of further assistance?

Our simulation experiments shed light on the answers to the first three questions.

Threshold

A feasible plan means there is *no* excess demand for anything. However, in the real world, a plan to eliminate excess supplies and demands *completely* is not required. After all, what we are talking about is having a comprehensive production/consumption plan for a year ready to go before the year begins. But as discussed last chapter, as soon as the year begins, we will discover that something has changed, and therefore, adjustments will have to be made. So at some point continuing to do additional rounds of the planning procedure to eliminate every last drop of excess demand for every final, intermediate, and capital good, and for every category of labor and every input from the natural environment before we stop, is not worth the extra time and energy it would take. And therefore, quite sensibly people would choose some *threshold* to achieve for excess demands and supplies, after which they would stop. Once we had settled on a price adjustment rule, as explained below, we experimented to see how different thresholds affect the number of iterations required and report on those results for a threshold of 5% and a threshold of 3% excess demands in Tables 9.1 and 9.2.

Table 9.1 Results for a 5% threshold

<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>
1	12	11	12	21	12	31	11
2	12	12	11	22	12	32	11
3	12	13	12	23	12	33	12
4	12	14	12	24	12	34	12
5	12	15	12	25	12	35	12
6	12	16	12	26	12	36	11
7	12	17	12	27	12	37	13
8	11	18	12	28	12	38	12
9	11	19	12	29	11	39	12
10	13	20	12	30	11	40	12

Table 9.2 Results for a 3% threshold

<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>
1	19	11	20	21	19	31	19
2	19	12	19	22	20	32	19
3	20	13	19	23	19	33	19
4	19	14	18	24	20	34	19
5	19	15	19	25	19	35	19
6	19	16	19	26	19	36	19
7	20	17	19	27	19	37	20
8	19	18	19	28	19	38	19
9	19	19	19	29	19	39	19
10	20	20	22	30	19	40	19

Table 9.1 lists the number of iterations it took in 40 different “experiments,” or trial runs, to reach a 5% threshold from an initial price vector where all prices were arbitrarily set equal to 700.

As readers can see, beginning from an arbitrary initial price vector, the most iterations it took was 13, and the least it took was 11, and on average, it took 11.85 iterations until the excess demand or supply for every good was 5% or less.

Table 9.2 lists the number of iterations it took in the same 40 “experiments” to reach a 3% threshold.

As readers can see, the most iterations it took was 22 and the least it took was 18. On average, it took 19.2 iterations for excess demand or supply for every good to be reduced to 3% or less, which is 7.35 more iterations than the 11.85 iterations it took on average to reach the 5% threshold. This confirmed our hypothesis that there are eventually diminishing returns from additional iterations.

We chose the 5% threshold for most of the experiments reported on in the remainder of this chapter. To be clear, what a 5% threshold means is we continue until the excess demand for *each and every* produced good, category of labor, and type of natural resource is less than 5%. Which means for the results we report, the excess demand for *most* things in the plans we settle on and would use to start a year is less than 5%.

Price adjustment rule

Our annual participatory planning procedure requires the iteration facilitation board (IFB) to adjust estimates of the opportunity costs of using different categories of labor, different inputs from the natural environment, and different capital goods and the social costs of producing different final goods, intermediate goods, and capital goods in each round of the planning procedure to reduce excess demands and supplies.¹¹ To be clear, all the options we explored and report on here are rules, or formulae, that might be applied

without intervention by personnel working at the IFB. In fact, the IFB would need no personnel to use any of the price adjustment rules we explored.¹²

In the formal model in Chapter 7 used to prove our procedure will converge to a feasible and efficient plan, we used a price adjustment algorithm in which the change in any individual price was equal to a constant, γ , between zero and one, times the size of the excess demand or supply.¹³ However, this price adjustment rule – change price by some fraction of excess supply or demand – is not particularly efficient. And since it is important to save participants' time and energy to reduce the number of rounds, or iterations, it takes the annual planning procedure to converge, we explored a number of different price adjustment options.

The first modification we introduced was to base the price adjustment on the *percentage* excess demand or supply for a good rather than the *absolute magnitude* of the excess demand or supply. Otherwise the change in price would be the same for a good whose current supply is 10,000 units and current demand is 10,010 units as for a good whose current supply is 100 units and current demand is 110 units. Since we most likely need a smaller rise in price in the first case than we do in the second case to eliminate the excess demand, we began by making the percentage change in price proportional to the percentage excess supply or demand.

We would have liked to introduce a second modification to take differential elasticities of demand into account – making the percentage change in price smaller for goods whose price elasticities of demand are more elastic, and the percentage change in price larger for goods whose price elasticities of demand are more inelastic. In the real world, this would require IFB personnel to estimate elasticities of demand for different goods, which is certainly possible. However, we could not simulate this with the production functions we chose for worker councils and the well-being functions we chose for consumer councils. Cobb-Douglas functions have properties that nicely reflect important aspects of real-world production technologies and consumer preferences and are convenient to work with – which is why like many others we chose them for our simulation work. However, unfortunately the elasticities of demand for variables in Cobb-Douglas functions are all the same. Therefore, since there are no differences in the elasticities of demand for the arguments in our WC production functions and CC well-being functions, we could not test how much one obvious modification in our price adjustment rule might hasten convergence.

Next we decided that while the percentage change in price should be proportional to the percentage excess demand or supply, we should vary the size of the coefficient of proportionality depending on the size of the percentage excess demand or supply. If the percentage excess demand for a good is small, a price increase that is too “aggressive” can turn excess demand into excess supply, and in the next round turn the excess supply back into excess demand – thereby prolonging the planning process. However, when the percentage excess demand or supply is still quite large, there is less chance

Table 9.3

For excess demand or supply in excess of 50%: the % change in price is 0.18 times the percentage excess demand or supply.
For excess demand or supply between 10% and 50%: the % change in price is 0.12 times the percentage excess demand or supply.
For excess demand or supply between 5% and 10%: the % change in price is 0.06 times the percentage excess demand or supply.

of doing this, and therefore, presumably it is safer to make a more aggressive price adjustment and, therefore, safer to make the coefficient of proportionality larger. Our first approach to address this issue was to make several discrete adjustments in our price adjustment rule. After some experimenting, we settled on three reductions in our coefficient of proportionality as the percentage excess demand or supply fell below three thresholds as described in Table 9.3.

However, after working with this “discrete” price adjustment rule for a few weeks, we finally decided to make the percentage change in price a continuous function of the percentage excess supply. After experimenting with different functional forms, we settled on $w = v\{k - u^v\}$, where w is the percentage change we make in the price of a good for the next iteration in the planning procedure, $\% \Delta P$, and v is the percentage excess supply for the good in the iteration just completed, $\% \text{ExS}$. However, for any $v > 0.25$ we substituted 0.25 for v where it first appears in the price adjustment formula, but not where it appears as an exponent. After experimentation with different values for k and u we settled on $k = 1.05$ and $u = 0.5$ as the values that seem to reduce the number of iterations required to reach our threshold as well as any others. In sum, all results we report on here are for the price adjustment rule: $w = v\{1.05 - (0.5)^v\}$, with the *proviso* mentioned earlier when v exceeds 0.25.

Initial prices

In our formal convergence proof in Chapter 7, we assumed an arbitrary initial price vector. And in our experiments with different thresholds, we began with every price set to 700. However, since an arbitrary initial price vector, or one that is chosen randomly, will most likely be very different from the final price vector that reduces all excess supplies and demands to less than 5%, such a starting point will obviously require more iterations than starting from an initial price vector that is closer to where we end up. *Moreover, when real-world annual planning begins a better candidate for initial price vector for any year is obvious. Namely, the final indicative price vector from the previous year.* Considering that changes in technologies; consumer preferences; and supplies of natural resources, labor, and capital goods will only change so much from year to year, any real-world version of annual participatory planning would be far better off beginning with last year’s final price vector than an arbitrary price vector or one generated

randomly. The question is how we can model this in our simulations to see how much it is likely to reduce the number of iterations required.

We can specify technologies, preferences, and supplies of labor, natural resources, and capital goods and run our simulation program to find the indicative price vector that yields a feasible plan and take that price vector as last year's final price vector. The problem, however, is how to simulate *how much* economic conditions might reasonably change in the subsequent year. Fortunately, there are two different ways in which simulation experiments can shed light on this question, which provide two, not just one, window into how much beginning with last year's final price vector might reduce the number of iterations required in the real world.¹⁴

Changing exponents in production and well-being functions

In our simulations we use Cobb-Douglas production functions. Therefore, the most natural way to model changes in technology is to change the exponents for different inputs in those production functions. We can model an *overall* improvement in technology by increasing the sum of the exponents in any production function. And we can model *variations* in how technologies change for different WCs and different industries by increasing individual exponents in a production function to different degrees. In our simulated economy, output is the product of a number of inputs, each with an exponent, where the number of inputs is not the same for each WC; all exponents are between zero and one; and for any individual WC, the sum of its exponents is between 0.80 and 0.95. We can simulate *uneven* technological *progress* among WCs by increasing their exponents by different amounts chosen randomly. The problem was how to change the exponents to simulate the amount of overall technological progress that typically occurs from one year to the next.

We tried two very different modifications: First, we added one of the following amounts to each exponent in every WC production function [0.0000, 0.0001, 0.0002, 0.0003, 0.0004] chosen randomly. Next we added one of the following amounts to each exponent in every production function [0.000, 0.001, 0.002, 0.003, 0.004] again, chosen randomly. To see which simulation of "technological progress" was more in line with historical increases in economic productivity, we calculated the percentage increase in real GDP in both scenarios.¹⁵ The first, smaller adjustments in exponents in our Cobb-Douglas production functions yielded increases in real GDP in the range of 0.1% to 1.1%. The second, larger adjustments in exponents yielded increases in real GDP between 2.178% and 2.659%, with an average of 2.446%. The results we report here are for the *larger* increases in exponents, which yield *larger* annual increases in real GDP than has normally occurred historically over the past 40 years in most countries. Moreover, historical increases in real GDP are due not only to improvements in technologies but also to increases in the supply of labor and other inputs. So, if anything, our simulation of technological change with the larger increases in exponents *over exaggerates* how much conditions of

Table 9.4 Changes in technologies and preferences

Exp.	#I	GDP	Exp.	#I	GDP	Exp.	#I	GDP	Exp.	#I	GDP
1	6	2.6%	11	7	2.577%	21	5	2.326%	31	7	2.211%
2	7	2.549%	12	5	2.554%	22	5	2.263%	32	7	2.534%
3	7	2.528%	13	7	2.609%	23	6	2.275%	33	7	2.373%
4	7	2.271%	14	7	2.609%	24	8	2.6%	34	6	2.21%
5	7	2.32%	15	5	2.218%	25	7	2.236%	35	8	2.264%
6	6	2.534%	16	5	2.567%	26	5	2.62%	36	7	2.558%
7	7	2.628%	17	7	2.551%	27	7	2.201%	37	5	2.659%
8	7	2.571%	18	7	2.227%	28	7	2.597%	38	6	2.239%
9	7	2.282%	19	7	2.282%	29	7	2.58%	39	5	2.603%
10	7	2.603%	20	7	2.649%	30	7	2.178%	40	7	2.587%

production typically change in most years in most countries. In which case, however many iterations it takes us to reach the 5% threshold, should *overestimate* what would most likely be required.

We also use Cobb-Douglas well-being functions for consumer councils in our simulations. Therefore, we can model changes in consumer preferences by changing the exponents on the private and public goods in those well-being functions. In this case we simply increase some exponents and decrease other exponents to simulate changes in preferences. We added one of the following amounts to each exponent in a CC utility function $[-0.002, -0.001, 0.000, +0.001, +0.002]$ chosen randomly.

Table 9.4 lists the number of iterations it took to reach the 5% threshold when starting from the final prices from the previous year after making the changes to exponents in WC production functions and CC well-being functions described earlier in 40 different trial runs, or “experiments.” It also lists the annual rate of growth in real GDP in each experiment. As readers can see, beginning from the price vector from the previous year, it never took more than eight iterations or less than five, and on average it took only 6.575 iterations to reduce excess demand or supply for every good to 5% or less. The rate of growth of real GDP simulated ranged from a low of 2.178% to a high of 2.659%, and the average rate of growth of real GDP was 2.446%.

Tracking when different thresholds are achieved

However, as mentioned in footnote 14, before we could simulate changes from year to year, by changing exponents in production and utility functions we stumbled on a different way to estimate the effect of beginning with last year’s prices instead of an arbitrary price vector. As already explained, we were curious to see how many iterations it took to reduce excess demands and supplies below different benchmarks.

We were displaying in a Clojurescript app the excess supplies and demands for goods grouped into five categories that we could see after each iteration:

(1) the excess demands and supplies for the private consumption goods were in one box, (2) the excess demands and supplies for the public consumption goods were in a second box, (3) the excess demands and supplies for the intermediate goods were in a third box, (4) the excess demands and supplies for the different categories of labor were in a fourth box, and (5) the excess demands and supplies for the different inputs from the natural environment were in a fifth box.

We color-coded the boxes as follows: As long as the excess supply or demand for *any* of the goods in a box was still greater than 20%, the entire box was colored red. As soon as *all* excess demands and supplies in a category box fell below 20%, the box color turned from red to orange. When all excess supplies and demands in a box fell below 10%, the box turned from orange to yellow. When all excess supplies and demands in a box fell below 5%, the box turned from yellow to green. And when all excess supplies and demands in a box fell below 3%, the box turned from green to blue.

We initially did this to get some idea how fast we were making progress in different phases of the convergence process. In particular we wanted to see if, when we were already close to meeting our threshold, it still required many iterations to get the excess supplies and demands for all goods under the threshold because our price rule was too aggressive at that point, and we were wasting planning time skipping back and forth from excess supplies to excess demands. However, when we viewed our results, we realized that if we believe that conditions only change by so much from year to year, what a real economy might go through would resemble *only* those iterations we were observing between when our boxes were changing from yellow to green for a 5% threshold, or from yellow to blue (for a 3% threshold).

In other words, we realized that since the IFB could always begin the annual participatory planning process with last year's final indicative prices, no economy should have to go through the iterations that occurred when all our boxes were still red or orange. In any case, we report on the results of these experiments in Table 9.5. We think of this as a "second window"

Table 9.5 From 10% excess supplies (Yellow) to 5% excess supplies (Green)

<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>	<i>Exp.</i>	<i>#I</i>
1	4	11	4	21	4	31	3
2	4	12	3	22	4	32	3
3	4	13	4	23	4	33	4
4	4	14	4	24	4	34	4
5	4	15	4	25	4	35	4
6	4	16	3	26	4	36	3
7	3	17	4	27	4	37	5
8	3	18	4	28	4	38	3
9	3	19	4	29	3	39	4
10	5	20	4	30	3	40	4

into *how much* beginning with last year's final price vector might shorten the annual participatory planning process, as compared to the number of iterations it takes to reach the 5% threshold when we begin from an arbitrary initial price vector.

Table 9.5 lists the number of iterations it took in 40 different trial runs, or "experiments," to go from 10% excess demands (all yellow boxes) to 5% excess demands (all green boxes). On average, it took only 3.77 iterations and never took more than five iterations to reduce excess demands or supplies as large as 10% to excess demands or supplies of 5% or less for every good.

Robustness: sensitivity to relaxing assumptions

We have barely begun to test our procedure for "robustness," and there is much work still to be done in this regard as described in the next section. However, we did begin to test how sensitive our annual planning procedure is to violations of the assumption of decreasing returns to scale in production. We repeated the 40 experiments whose results are reported in Table 9.4 allowing 20% of our WCs to have increasing returns to scale by adding 0.10 to each exponent in 20% of our WCs' production functions, chosen at random. Since WCs have different numbers of inputs, and therefore exponents, this raises the sum of the exponents in these 20 WCs to somewhere between 1.1 and 1.75. We report on the results in Table 9.6.

We were surprised that allowing 20% of our WCs to violate the assumption of decreasing returns to scale did not seem to noticeably effect the efficiency of our annual planning procedure by increasing the number of iterations required, much less lead to a breakdown altogether preventing convergence. The procedure converged in all 40 experiments, the largest number of iterations required was eight, the smallest was five, and the average number of iterations was 6.275. Not surprisingly, the WCs with increasing returns to scale were among those that produced large outputs. But it appears that rising

Table 9.6 Effects of increasing returns to scale

Exp.	#I	GDP	Exp.	#I	GDP	Exp.	#I	GDP	Exp.	#I	GDP
1	6	1.712%	11	5	1.905%	21	5	1.818%	31	7	1.779%
2	7	1.825%	12	7	1.739%	22	5	1.916%	32	7	1.659%
3	7	1.819%	13	8	1.882%	23	7	1.882%	33	5	1.901%
4	5	1.805%	14	7	1.749%	24	7	1.883%	34	5	1.801%
5	7	1.833%	15	5	1.866%	25	7	1.715%	35	5	1.83%
6	7	1.804%	16	6	2.101%	26	5	1.98%	36	7	1.761%
7	7	1.973%	17	7	1.771%	27	7	1.898%	37	7	2.062%
8	7	2.082%	18	7	1.905%	28	7	1.803%	38	7	1.819%
9	5	1.966%	19	5	1.835%	29	7	2.02%	39	5	1.834%
10	7	2.016%	20	7	1.971%	30	5	1.724%	40	5	1.747%

disutility from greater effort required to increase output acted as a break to prevent the 20% of WCs with increasing returns to scale from completely dominating production.

Intervention by IFB personnel

In our simulation work to date, we have worked only with different price adjustment rules or formulae that might be applied without an IFB staff at all. But in any real-world version of annual participatory planning presumably there would be an IFB with a professional staff, which might well improve the efficiency of the price adjustment process above and beyond what any price adjustment algorithm can accomplish. What kind of useful things might a professional IFB staff do? On the other hand, what is the danger that IFB staff might usurp decision-making authority and reduce worker and consumer self-management to benefit themselves?

Benefits of human intervention

There are several ways in which IFB staff intervention to “tweak” the annual planning procedure would predictably improve outcomes by reducing the number of iterations worker and consumer councils and federations must go through. The most obvious is that IFB staff will know how the stocks of different capital goods, the supplies of different categories of labor, and the supplies of different inputs from the natural environment will differ from what they were at the beginning of the previous year.¹⁶ This should allow them to adjust the final vector of indicative prices for different capital goods, categories of labor, and different inputs from the natural environment from last year’s plan to be closer to what those indicative prices will turn out to be at the end of this year’s planning process.

This information will not tell them how much to increase or decrease the initial indicative price for some capital good, category of labor, or natural resource, but it will at least tell them in what direction to change it. And for personnel experienced in watching how much previous changes in the supplies of those inputs changed their final indicative prices from year to year, it is not unreasonable to assume that over time they might improve their guesses about how much to adjust their indicative prices in the price vector to begin planning with for the upcoming year. Moreover, just as businesses today estimate the elasticities of demand for their products, IFB personnel assigned to monitor different capital goods, categories of labor, and natural resource supplies, and who will know how much their supplies have changed from the previous year, could formulate estimates of their elasticities of demand to better determine how much to change their prices from the previous year before annual planning begins.

IFB personnel might also be able to make useful modifications in last year’s final indicative price vector based on information about the extent of any

increases in productivity in different industries that industry federations provide and information about any changes in consumer preferences provided by consumer federations. Admittedly, adjustments based on this kind of information might prove to be less effective on average than adjustments based on “hard” information about changes in the supplies of capital goods, labor, and natural resources. Nonetheless, one does not have to be a cockeyed optimist to believe adjustments of this kind might also reduce the number of iterations needed on average during annual participatory planning.

Dangers of human intervention

Libertarians and anarchists have antennae that are highly sensitive to anything that might usurp people’s right to govern themselves. And given the history of socialism to date, we believe it wise to listen carefully to these canaries in our coal mines! In other words, we should pause and carefully consider if some proposal may not give rise, even if inadvertently, to some new form of illegitimate power or corruption.

Clearly, if the initial price vector for annual planning were the final vector from last year’s annual plan without adjustments, and if all price changes during annual planning were made strictly according to a formula so there was no need for an IFB with personnel, there would be no danger that an agency we named the iteration facilitation board might turn out instead to be an authoritarian central planning board in disguise. And we have pointed out to anarchist critics that people could implement our planning procedure without an IFB if they wished to do so. However, in our opinion, it is unnecessary to forswear all human intervention by IFB staff to prevent the IFB from usurping power and privilege. Moreover, to do so might pose a greater threat to the cause of democratic self-management by unnecessarily increasing the amount of time and energy people have to devote to annual planning and thereby discourage them from participating.

Finally, notice what we propose to empower IFB personnel to do and what we do *not* propose they be empowered to do. All we have suggested they *might* do is play a secondary role with regard to the price *signals* sent to councils and federations. We do *not* propose that IFB personnel formulate any work or consumption proposals for any councils or federations. We do *not* propose that IFB personnel have any say over whether proposals submitted by worker and consumer councils are accepted or rejected. We do *not* propose that IFB personnel take proposals submitted by worker and consumer councils and federations, modify them, and send them back to the councils and federations for them to reconsider. We do *not* propose that IFB personnel take proposals from worker and consumer councils and federations and modify them to formulate a few alternative comprehensive plans to be voted on in a national referendum. And we certainly do *not* propose that IFB personnel take proposals submitted by worker and consumer councils and federations and modify them to make a comprehensive plan that workers and consumers are then ordered to carry out.

Instead, we propose *only* that IFB personnel make minor changes in the final indicative prices from the previous year's annual plan before using it to initiate this year's annual participatory planning process, where the purpose is simply to move this year's initial price vector closer to where the final price vector will end up at the end of this year's annual planning procedure. And we propose *only* that IFB personnel intervene on occasion to improve slightly on the price adjustment formula used during the annual planning procedure. We believe that "empowering" IFB personnel to intervene in these two ways does not give them power over any decisions about what anybody does or does not do, does not infringe on workers and consumers self-management, and does not allow them to benefit personally in any way.

Future simulation research

As explained, we chose to use Cobb-Douglas production and well-being functions because of their many useful properties, but unfortunately, they generate constant elasticities of demand for all goods. This makes it impossible when adjusting prices to take advantage of the fact that in the real-world different goods often have very different elasticities of demand. One obvious thing that should be explored in future simulation research is choosing production functions that do not generate constant elasticities of demand for their inputs and well-being functions that do not generate constant elasticity of demand for final goods. Presumably, in the real world if IFB personnel calculated elasticities of demand for different goods and modified price adjustments accordingly, this might reduce the number of iterations required below what the simulation work we reported on in this chapter suggests.

While all the results reported in this chapter are based on what our experiments suggested was the most efficient continuous price adjustment rule we could identify based on trial and error, clearly another area for future research is to carry out a more systematic search – testing more functional forms and different values for key parameters – for ways to make the price adjustment algorithm even more efficient.

We have also barely scratched the surface of testing our annual participatory planning procedure for robustness. We have only begun to explore how sensitive convergence is to violations of decreasing returns to scale in production technologies, and further testing in that regard is needed. But we also need to test the robustness of our procedure to violations of other assumptions needed to prove that our procedure will necessarily converge to a feasible plan – where the keyword here is *necessarily*.

It is well known that for market systems, the existence, uniqueness, and stability of a Walrasian general equilibrium (WGE) *may* occur even when an assumption necessary to *prove* existence, uniqueness, or stability is violated. For example, as Hal Varian explains regarding the existence of a WGE: "In a large

economy in which the scale of non-convexities is small relative to the size of the market, there will generally be a price vector that results in demand being close to supply. *For a large enough economy small non-convexities do not cause serious difficulties.*¹⁷ (Italics added)

For similar reasons, even if some production functions and utility functions are not convex, our planning procedure will often converge. And the same holds for violations of other assumptions such as the assumption that all goods are gross substitutes or the assumption that all excess demand functions are continuously differentiable. In short, just because an assumption necessary to *prove* convergence to a feasible plan is violated, this does not mean that we will not converge nevertheless.

However, there are three questions we need to ask and answer regarding violations of assumptions: The first is: How likely is our procedure to still converge, as opposed to how likely it is that violation of some assumption will prevent our procedure from converging altogether? The second question is: Even when our procedure does converge, how many more iterations is it likely to take? And the third question is: In the event that some assumption is violated to the point where more iterations are required than is practical, or disrupts convergence altogether, what kinds of human intervention in the planning process might identify the problem and intervene successfully to bypass the difficulty in order to generate a plan that is nonetheless “serviceable,” even if not ideal? A great deal more simulation work is needed to answer these and other questions about robustness.

Conclusion: a practical possibility?

Market systems do not have to prove that they are a practical possibility.¹⁸ Unfortunately, however, as the 21st century is poised to enter its second quarter, we cannot point to any example where something resembling the kind of participatory annual planning we have proposed has ever had a chance to prove its viability in a real-world setting. This is not to say that libertarian socialism has never risen beyond the status of a proposal or protest movement. I discuss notable historical examples of where libertarian socialists were able to briefly put their ideas into practice in chapter 6 of *Economic Justice and Democracy*, “Libertarian Socialism: What Went Wrong” – for which Noam Chomsky wrote a postscript titled: “In Defense of Libertarian Socialism.” Nonetheless, it is not possible to point to any example where something like the participatory planning system we espouse ever functioned long enough so that its “practicality” cannot be questioned.

The Soviet experience demonstrated that a different kind of comprehensive economic planning – an authoritarian system of central planning – was indeed a practical possibility whatever its deficiencies might be.¹⁹ Centrally planned economies functioned for many decades in the 20th century before

being abandoned almost everywhere. And in some respects they were even “real world” success stories. No country had ever overcome underdevelopment and industrialized as rapidly as the centrally planned Soviet economy did during the 1930s. This by no means justifies the human suffering inflicted during Stalin’s reign. Nonetheless, had the Soviet Union not industrialized at an unprecedented rate, it is hard to imagine it would have been able to break the back of the Nazi war machine during WWII, in which case the remainder of the 20th century might have looked very different indeed.²⁰

But our point is simply this: No . . . we cannot “prove” that participatory planning is a practical possibility by pointing to some real-world example, as one can in the case of market and centrally planned economies. Nor has any government yet been willing to test its practicality by simulating the participatory planning procedure as a real-world laboratory experiment to see what would happen. So until such time as the practicality of annual participatory planning can be tested in one of these ways, what we are left with are computer simulation experiments like those reported on in this chapter. We have acknowledged the limitations of what computer simulations of worker and consumer councils can tell us. And we have also acknowledged that there is much more simulation work to be done, so any conclusions here are provisional. But do the results presented here *suggest* that annual participatory planning is a “practical possibility?” Or do they instead lend credence to the opinions of skeptics that this much popular participation by workers and consumers in formulating annual plans is overly ambitious from a purely practical point of view and, therefore, simply “a bridge too far?”

The purpose of the experiments whose results are reported in the tables in this chapter was to shed light on the practicality and robustness of our annual participatory planning procedure. “Practicality” meaning how many iterations we might expect to have to do each year. “Robustness” meaning that when different properties of production and utility functions in our simulations are relaxed or violated, we can no longer be assured that our procedure will converge. However, that does not mean our procedure might not converge, nonetheless, if violations are small and few enough.

No doubt, people will read our results differently. There will always be pessimists as well as optimists, and there will be evidence for both to point to. However, to be frank, we were pleasantly surprised by our results. We did not expect our computer simulations to suggest that our annual participatory planning procedure was as practical, and perhaps as robust as our reading of the preliminary evidence presented here suggests it may be. In particular:

- We did not expect to find a price adjustment rule as efficient as the one we have already found. We assumed the traditional price adjustment rule used in theoretical work where the only concern is proving eventual

convergence was not particularly efficient. But we did not expect to improve as dramatically on a price adjustment rule as it appears we have with very little effort.

- When we simulated technological change by making random additions to the exponents in our WCs' Cobb-Douglas production functions, we were pleased to discover that additions to exponents that correspond to annual increases in real GDP that are, if anything, greater than historical increases on average due to technical change, only required a number of iterations to reach a feasible plan for the new year, which seem quite "practical." And we were also pleasantly surprised that when we began from an arbitrary initial price vector, the number of *additional* iterations required to move from excess demands in excess of 10% to excess demands less than 5%, which is also more in line with what would be required in the real world, yielded results very consistent with those findings.
- Because our early work was done in Netlogo, which greatly limits the size of the economy one can study, we were uncertain how "scaling up" the size and complexity of the economy would affect convergence. Increasing the number of worker and consumer councils is easily done in Clojure, as is increasing the number of different goods produced, inputs from nature, and categories of labor. But while it is easy to increase the number of goods any CC consumes, increasing the number of goods in any single WC production function is not easily done. For WCs solving the optimization problems in specialized mathematical processing software for much larger numbers of variables is problematic, and that task will have to be left to future research. However, we were pleased to discover that increasing the number of WCs to 30,000, the number of CCs to 30,000, and the number of goods, inputs from nature, and kinds of labor to 100 did not appear to render participatory annual planning any less practical. Assuming 1,000 people in a consumer council, 30,000 CCs represents a population of 30 million people – which is three times larger than the populations of Sweden, Austria, Portugal, or Cuba; approximately the same size as the populations of Venezuela, Peru, Poland, Canada, or Australia; and roughly half the population of the United Kingdom, France, Italy, or Thailand.
- Testing for robustness is clearly where further research is most needed. However, even in that regard, we found the preliminary results of relaxing the assumption of decreasing returns to scale to be quite promising.

In sum, until there is further evidence, until there is a real-world example of comprehensive participatory planning permitted to function for a number of years, in normal conditions and not under extreme duress, until there is a government willing to sanction a test run with real people in WCs and CCs, or until there is further evidence from more computer simulation

experiments, based on the work reported in this chapter, we believe our annual participatory planning procedure *cannot* be summarily dismissed as a practical impossibility – a “bridge too far” – as some have done. Moreover, we remind readers that all results reported here assume no intervention by personnel in the IFB, who presumably might further reduce the need for iterations, or at least iterations that require all councils and federations to participate.

Notes

- 1 As explained in the preface, Michael Weisdorf and Mitchell Szczepanczyk are co-authors of this chapter, and Christan Echt and Nick Gilla are “honorary” co-authors as well. We want to thank the Systems Science Program at Portland State University under the leadership of Wayne Wakeland for supporting this research. Michael Weisdorf, Christan Echt, and Nick Gilla received financial aid while working on our simulations over a number of years, and feedback was offered on several occasions by Systems Science faculty and students during department seminars. We also thank Colm Massey and the Institute for Solidarity Economics in Oxford, England, who provided financial support without which early work on developing a Netlogo prototype of the planning procedure would not have been possible.
- 2 Assumptions for production functions of our worker councils are no different from those traditionally assumed for private enterprises. However, as explained, because consumers do not participate individually in our annual participatory planning procedure, in our case, the necessary assumptions for consumers are for neighborhood consumer councils and federations.
- 3 It bears mentioning that because our plan is not implemented until demands are equal to planned supplies for all goods and categories of labor, a host of problems that “false trading” create in market systems are avoided. Theorems about general equilibria in market economies assume no trading takes place until the final equilibrium price vector is found, and the critical importance of the assumption of “no ‘false’ trading” often goes unnoticed. However, we do not wish to mislead readers about our own system, or any system of comprehensive planning. In the real world as soon as any annual plan is launched it will soon be discovered that things have changed, and therefore, there will have to be appropriate procedures for updating and modifying plans during the year, as we explained in the previous chapter.
- 4 See the main Netlogo page at <https://ccl.northwestern.edu/netlogo/>.
- 5 www.clojure.org.
- 6 www.clojurescript.org.
- 7 The Clojure and Clojurescript source code for the algorithm in this chapter is available at <https://github.com/msszczep/pequod-cljs>. The data for the experiments in his chapter can be downloaded as gzip compressed files from www.szcz.org/depexperiments. A copy of the original Netlogo code and model is available at <https://github.com/msszczep/pequod2>.
- 8 The social benefits of WCs producing a public good are calculated by multiplying the amount they propose to supply times the full indicative price for the public good in any round of the planning procedure. However, since all CCs will consume the public good “collectively,” each CC is charged only for its proportionate share of the indicative price the WCs that produce the public good are credited for.
- 9 To be clear: We use the letter *z* to represent the output produced by any WC and assume each WC produces only one such output. Therefore, the vector **z** contains *all* produced

goods – which include all intermediate goods, \mathbf{x} , all private consumption goods, \mathbf{y}_1 , and all public goods, \mathbf{y}_2 .

- 10 To be clear: When we speak of reducing, or eliminating, “excess demands,” this includes “excess supplies,” which are defined as negative excess demands.
- 11 As already explained, for short, we refer to the estimates of all these opportunity and social costs as “indicative prices.”
- 12 Later in the chapter we discuss how personal interventions by IFB professional staff might further reduce the number of iterations required to converge. But here we are reporting on what price adjustment rules we considered and the rule we finally used to generate most of the results presented in this chapter.
- 13 See point 6 in the section titled “A Formal Model” in Chapter 7.
- 14 The first approach we describe here is the one that most naturally comes to mind and was the only approach we initially thought possible. However, even before we began to experiment with the first approach, we realized from something else we were exploring at the time that there was, in fact, a second “window” into how much beginning with final prices from the previous year might reduce the number of iterations required. We present results from that approach below as the “second approach” because it is less intuitive, although in fact it was how we first discovered, by accident, we might use our simulations to shed light on how much beginning with last year’s prices might help reduce the number of iterations.
- 15 Different base years will yield somewhat different estimates of the rate of growth of real GDP. What we report are the averages of the two percentage increases in real GDP using each year as a base year. For each year we multiply the amount of each private good and each public good produced times its final indicative price in year 1 – giving an estimate of real GDP in each year using year 1 as our base year – and then calculate the percentage increase in real GDP from year 1 to year 2. Then, for each year we multiply the amount of each private good and each public good produced times its final indicative price in year 2 – giving an estimate of real GDP in each year using year 2 as our base year – and calculate the percentage increase in GDP from year 1 to year 2. We then calculate the average of our two estimates to yield a better estimate of the rate of growth of real GDP caused by the changes in the exponents in our WC production functions.
- 16 How the stocks of different capital goods will change over the years is determined by the investment planning process we explore in Part IV. And how the supplies of different categories of labor and the supplies of different inputs from the natural environment will change over the years are determined by the long-run education and environment planning procedures we explore in Part V. But, for present purposes, the important point is that everyone, including IFB personnel, will always know how the supplies of different capital goods, different categories of labor, and different natural resources differ from what they were in the previous year before annual planning begins for the following year.
- 17 Varian (1992): 394.
- 18 As hard as it is for us to imagine today, this was not always the case. One of Adam Smith’s goals in *The Wealth of Nations* was to convince an audience that was still skeptical in 1776 that the spread of markets to govern ever greater domains of human interaction would not lead to chaos or disaster, but instead be reasonably stable and beneficial.
- 19 Hopefully, readers realize by now that the authors of this book do not approve of central planning and do not mourn its demise!
- 20 It is commonly assumed that during the 1970s and 1980s the Soviet economy stopped growing and became a kind of “zombie” economy, while Western capitalist economies continued to grow. After growing faster than any economy in the world during the 1930s and faster than the US economy for two decades after WWII, the best evidence shows that, while the Soviet economy did grow more slowly after 1975 and began to fall

behind the US growth rate, it continued to grow every year until 1990 when political changes led to the beginning of the dismantling of central planning. See Kotz and Weir, 1997.

Reference

- Kotz, D. and F. Weir. 1997. *Revolution from Above: The Demise of the Soviet Union*. New York, NY: Routledge.
- Varian, Hal. 1992. *Microeconomic Analysis*, 3rd edition. New York, NY: W.W. Norton and Co.

10 Reproductive labor¹

All human activity consumes material inputs and generates material outputs. And all human activity reproduces or transforms those who participate in the activity. So any dividing line between “economic” activity and “reproductive” activity is necessarily arbitrary. Nonetheless, the primary purpose of some activity is to transform material inputs into more useful material outputs, while the main purpose of other activity is to nurture, care for, educate, or socialize – that is, to “reproduce” – a population of human mortals.

Conceptualizing reproductive activity

How to conceptualize reproductive activity and its relation to other kinds of human activity is important but can be contentious. Without diving deeply into this debate between mainstream feminists, radical feminists, socialist feminists, and Marxist feminists, it is useful to say a few words about our approach and use of language.² Most importantly, we make no assumption about the relative importance of economic activity versus reproductive activity, or the importance of what we call the *economic and reproductive spheres of social life* – except to assume that they are both important and intertwined. We believe it can be useful to refer to “reproductive activity” as “reproductive labor” to emphasize that it often requires sacrifices, and is in that sense burdensome, or when it takes place in workplaces in the formal economy where human activity is usually called “labor.” However, we see no need to call “reproductive activity” “reproductive labor” to emphasize its importance, because we assume that reproductive activity is just as necessary as economic activity, and their relative importance depends on the overall social formation and must be determined empirically. In this chapter we sometimes use one phrase and sometimes the other largely for variety.

A large feminist literature highlights the unequal distribution of costs and benefits of reproductive activity, or labor, and points out that this is a crucial part of inequality that is often overlooked. Socialist feminists argue that not only has capitalism historically discouraged caregiving, and penalized those who provide it, capitalism has also undermined values that promote caregiving such as empathy and solidarity, and weakened cultures that encourage us to

consider collective well-being as well as our own. They argue that by penalizing caregiving, capitalism has been gradually eroding social cohesion as well as the health and overall well-being of our communities. And they argue that by excusing men from most caregiving, it has encouraged them to be less empathetic than they might otherwise be. This chapter makes no attempt to review this vast literature.³ Instead, drawing on insights from this literature, and in order to stimulate discussion about positive solutions, this chapter proposes concrete policies to organize and reward reproductive labor in a post-capitalist society with a participatory economy.

Reproductive activity takes place in what we might call “public” settings – in the education system, the healthcare system, and the economic system – where activity is governed by formal institutions and procedures. Reproductive activity also takes place in more “private” settings, such as households – where activity is governed less by formal institutions and regulations and more by customs and norms. How do we propose that reproductive labor be organized and rewarded (1) when it takes place in worker councils in the participatory economy and (2) when it takes place in households? Our argument here is limited because we make no attempt to spell out how either the education or healthcare system should function in any detail. While a great deal of reproductive activity will go on in the education and healthcare systems of a future, desirable society, concrete proposals in these regards fall outside the scope of this book.⁴ Below we merely stipulate minimal assumptions we make about the education and healthcare systems that are necessary to explain how we propose to organize and compensate reproductive activity that takes place in worker councils or in households.

Different kinds of reproductive labor

There are at least three different categories of reproductive labor we need to consider.

Caring labor: *Physical and emotional labor most obviously provided to infants, the ill, and the elderly, but also to everyone throughout their lives.* Caring labor can be provided either inside households or outside households in the healthcare system, the education system, or in worker councils in the participatory economy. And when provided inside households, it can be provided by household members or by non-members working for the healthcare system.

Domestic labor or housework: *Cooking, cleaning, washing, straightening, lawn care, home maintenance, shopping, and so on.* Although domestic labor necessarily takes place in households, it might be done by household members or by non-members who work in a worker council in the participatory economy.

Socialization labor: *Broadly speaking, this is the “educational” work of preparing the next generation to take its place in society.* Socialization labor might take place inside households, or outside households in either the education system or as training in the participatory economy.

Feminist literature teaches us all the ways – some blatant and others more subtle – in which the organization, performance, and compensation for those providing caring labor, domestic labor, and socialization labor, both inside and outside households, has historically been gender biased, unfair, and inefficient. In short, much of feminist literature can be read as an “object lesson” about outcomes we should be at pains to avoid. Bearing these lessons in mind, where will all this reproductive labor be done in a participatory society? To what extent will the choice be left up to individuals whether it is done “publicly” in the education system, the healthcare system, and the participatory economy, or “privately” within households? Who will decide how it is to be done? Who will actually do it? And how will those who do it be compensated? Before proposing concrete answers to these questions, we first stipulate assumptions we make about the education and healthcare systems.

Assumptions about education and healthcare

We assume there will be a robust public education system. We assume this will include not only mandatory K–12 education for all children between the ages of 5 and 18, but also public infant-care and pre-K programs for any parent/guardian who wishes to use them; public associate, bachelors, masters, doctorate, and professional degree programs that anyone is free to apply to, and a variety of educational programs for adults to pursue “lifetime learning.” We also assume *all* education, whether mandatory or optional, will be free of charge as will all educational materials and food consumed during the school day for students at least through high school. Finally, we assume the question of living stipends for students pursuing non-mandatory higher education after the age of 18 has been decided along with decisions about living allowances of all kinds through a democratic political process as explained in Chapter 6.

Because income is based on effort, sacrifice, and need in a participatory economy, there is no reason to expect lifetime earnings will be correlated with how much education or what kind of education one receives. For that reason, admission to all educational programs, mandatory or otherwise, can be based strictly on merit without risk that this might create inequitable income differentials. Admissions committees for all educational programs will be free to select from applicants according to their best estimate of which applicants will be most likely to excel in the program, with no need to worry that applying this criteria will create economic injustices later in life.⁵

While admissions committees need not fear that merit-based selection will create economic injustice in a participatory economy, they will need to take appropriate measures to assure that admission is truly based only on merit and prevent race and gender bias from adversely affecting the admission process. Anti-discrimination legislation and affirmative action programs are warranted for two reasons: (1) Even if nobody any longer discriminates, affirmative action is necessary to correct for the effects of historical discrimination, which are

long lasting. (2) It is unrealistic to assume that discrimination will not persist if not actively prevented. While “raw” educational talents along various dimensions will vary among people, often greatly, there is no reason to believe there are significant variations in *average* genetic intellectual capabilities among different races, ethnic groups, or genders. Therefore, disproportionate representation among races, ethnic groups, and genders in different educational programs should be treated as *prima facie* evidence of some form of discrimination – whether personal or institutional, conscious or unconscious – and warrant appropriate legal and affirmative action in response.⁶

Similarly, we assume there will be a robust public healthcare system where medical treatment, medicine, hospital stays, and professional nursing care are provided to anyone who needs them free of charge. Whether patients receive healthcare services in hospitals, neighborhood clinics, or “outpatient” healthcare is provided in patients’ homes will be entirely up to patients and healthcare providers working in the healthcare system to sort out. But it is *public* healthcare wherever it is delivered, and there is never any charge for any service provided by the healthcare system.

To be clear: We assume all this, whether education is provided as a national public good, as it is for example in France and Cuba, or as a local public good, as it is in the United States. In a national system average class sizes and curricula are the same no matter where one lives. In a local system class sizes may vary from one locale to another because different locales make different choices about how much to prioritize education compared to private goods and other local public goods. In theory the same holds true for healthcare. Healthcare might be treated as a national public good, in which case things like doctor-patient ratios and treatments available would not vary depending on where one lived. Or, alternatively, healthcare may be treated as a local public good, in which case the quantity and quality of healthcare services available might depend on where one lived. Even if education or healthcare were treated as a local public good, presumably there would be national minimal standards that apply everywhere.⁷ In any case, these are our assumptions about terms on which education and healthcare are available to people living everywhere, whether or not the system is national or local.

The public vs. private choice

Just because our goals may be the same with regard to reproductive activity and economic activity – we want high-quality outcomes, the decision-making procedures to be self-managed, the distribution of burdens and benefits to be fair, and we want to economize on the use of scarce productive resources – does not mean that we should always organize and carry out reproductive and economic activity in the same way. In particular, the choice of how much of an activity should be carried out in public settings where formal institutions and procedures are well elaborated, or in private settings where they are less so, may well be different for reproductive and economic activities. Of course, no activity is

truly “private” if we mean by that it is outside the law and unaffected by social norms. However, it is not inaccurate to think of reproductive activity that takes place within households as being more “private” than reproductive activity that takes place in the “public” economic system, education system, or healthcare system. *The question this chapter attempts to answer is how reproductive activity should be carried out in the participatory economic system and in households, assuming there are robust public education and healthcare systems with the features just outlined.*

It is our belief that: (1) *some* reproductive activity can best be carried out as reproductive labor governed by the institutions and procedures of a participatory economy; (2) *some* should be carried out in the “public” education and healthcare systems as outlined earlier; and (3) some should be carried out within households – that is, in ways that are often thought of as more “private.” Moreover, it is our belief that with some exceptions, individuals should be allowed to choose whether to use “public” or “private” options and that when free to do so, people will often make different choices in this regard. Which means, deciding how to treat people fairly who make different “public” vs. “private” choices regarding reproductive activity is an important issue to be considered.

Reproductive labor in the participatory economy

In a participatory economy people will be free to form worker councils that do *domestic labor* of different kinds that households consume and pay for just like they consume and pay for food, clothing, or any other consumption good or service. For example, a worker council might provide garden and lawn care to households who wish to hire others to do this whom they pay from household effort ratings and allowances. Another worker council might provide home cleaning services households would pay for.

Similarly, while a great deal of *socialization labor* will be provided by the public education system free of charge, worker councils may provide services to households who demand *supplemental* educational services such as extra tutoring, music lessons, art classes, sports training, and so on, paid for out of household effort ratings and allowances. Neighborhood consumption councils and federations of neighborhood councils may also demand supplemental educational programs beyond those available in the public education system in the form of youth orchestras, sports leagues, and so on, as local public goods. Whenever supplemental educational services such as these are provided to neighborhood councils or federations by worker councils in the economic system, they are paid for collectively out of members’ effort ratings and allowances (which include children allowances) in one of the ways we discussed previously regarding public goods in general. Similarly, households, neighborhood consumer councils, or federations of neighborhood councils are free to demand *caring labor* services from worker councils providing them, above and beyond what are provided free of charge by the public healthcare system, and pay for them out of effort ratings and allowances.

Obviously demand for supplemental education and healthcare services from worker councils in the economy that recipients must pay for, even if collectively, raises the question of whether or not services provided by the public education and healthcare systems are adequate or should be expanded. But we believe the option to demand and supply additional educational and healthcare services in the participatory economy provides a useful way to explore where people want to draw the line between education and healthcare services that are *covered* because they are part of the education and healthcare system, from those that are *supplemental* and provided by worker councils in the economic system. For example: Dentistry includes routine checkups, x-rays, filling cavities, extractions, cleanings, different orthodontic procedures, and different cosmetic treatments. Presumably the level of economic development will affect what dental services are deemed essential, or “standard” and therefore free of charge, and what services are considered cosmetic. But whatever is not provided by the public healthcare system free of charge will be left for worker councils to provide and for people to pay for with their effort ratings and allowances.⁸

However, these are all cases where some kind of supplemental reproductive service may be supplied by a worker council in the participatory economy because it is not provided by the public education or healthcare system. Reproductive activity often takes place jointly with activity that is self-consciously economic in nature. And there is every reason to believe that absent structured intervention, reproductive activity that takes place along with economic activity in worker councils in the participatory economy would continue to suffer from a gender bias with two adverse consequences: (1) If women continue to perform more than their share of caring and socialization labor in worker councils, women might continue to be compensated less than they should be. (2) If men continue to perform less than their share of caring and socialization labor in worker councils, men will be underexposed to positive “human development effects” of caring labor, which tend to sensitize people toward the well-being of others and develop a caring culture of solidarity. We propose four concrete policies to avoid these predictable outcomes in workplaces in a participatory economy.

Women’s caucuses

The first proposal is to empower women’s caucuses in worker councils to challenge any and all kinds of gender bias in their workplace. If a women’s caucus believes the job balancing committee has combined tasks into jobs in a gender-biased way, if a women’s caucus believes there was gender bias in assignment to different jobs in the workplace, if a women’s caucus believes gender bias has affected workplace effort ratings, or any other aspect of life in the workplace; we propose to empower the women’s caucus to not only raise their criticism and trigger a motion to reconsider, but more importantly, to issue a temporary “stay” order against the offending practice until a full review of the policy is completed. Moreover, if after a full review, a majority of worker council

members vote to retain the policy that its women's caucus deems offensive, and thereby overrule the "stay," we propose that the women's caucus have the right to appeal that decision, first to the women's caucus of an appropriate regional or industry federation of worker councils, and should the federation women's caucus agree with the workplace women's caucus, to the appropriate regional or industry federation of worker councils itself.

Formally this procedure amounts to kicking a decision up the federation ladder if the women's caucus and full membership in a worker council continue to disagree. And we understand why this solution is worrisome. However, we see no other way to remain true to the principle of democratic rule. Moreover, we feel there is reason to hope that active use of this process can provide the kind of "soul searching" debate and reconsideration needed to overcome gender biases that date back millennia. In any case, we welcome debate on other options.

Balance jobs for caring labor

The second proposal is to balance jobs for caring labor as well as for empowerment and desirability. Incorporating caring tasks into all jobs in a workplace so that men will necessarily perform their share can help combat the vestiges of patriarchal norms and foster new "other-oriented" notions of masculinity. Historically, reproductive labor has been "feminized" – linked with femininity as biological determinists argue that women are inherently better suited for these tasks than men. Balancing jobs for caring labor can not only help overcome this stereotype and teach men that they too can be caring, empathetic, and solicitous of the well-being of others, but can also chip away at toxic notions of masculinity that justify selfishness, violence, and misogyny.

However, neither of these first two policies addresses occupational and industry gender segregation. Will most nurses continue to be women, and most carpenters continue to be men? Will most members of worker councils providing house cleaning services continue to be women and most members of worker councils providing home repair and lawn maintenance services continue to be men?

Consider an occupation that is majority male. If the proportion of females admitted to an educational or training program for this occupation is lower than the proportion of qualified females who applied, and if this difference is statistically significant, we have *prima facie* evidence of discrimination in the admission process. Or, consider a worker council that is majority male. If the proportion of females hired as new members is lower than the proportion of qualified female applicants who applied, and if this difference is statistically significant, we have *prima facie* evidence of discrimination in the hiring process.

Anti-discrimination legislation

Presumably an active women's movement, including women's caucuses in all places of employment, will investigate such cases, insist on internal reform, and

failing that, file anti-discrimination cases through the criminal justice system seeking both remedy and compensation for victims. So our third recommendation is robust legislation outlawing discrimination in hiring with serious penalties for violators, which active gender caucuses can help enforce aggressively. We recommend that caucuses for people of color, the LGBTQ community, and the disabled be similarly empowered in all places of employment and support extending anti-discrimination legislation to designate all groups who have been historically discriminated against as “protected classes.”⁹

However, feminist research has conclusively demonstrated that discrimination in hiring – which can be prevented by anti-discrimination legislation targeting under selection from applicant pools as explained earlier – is not the only way gender bias is perpetuated. All too often applicant pools for education programs for different occupations and applicant pools for enterprises in different industries display a gender bias *for which there is no biological explanation*. As previously explained, we propose that people be free to apply to whatever educational and training programs they wish. And we propose that people be free to apply for membership in whatever worker council they want. However, we do not recommend doing nothing if those who apply to be carpenter apprentices continue to be disproportionately male, those who apply for admission to nursing schools continue to be disproportionately female, applicants to worker councils providing house cleaning services continue to be disproportionately female, and applicants to worker councils providing lawn care services continue to be disproportionately male.

Affirmative action

Fortunately there is a remedy for this that does *not* violate the principle that everyone should be free to apply to whatever educational programs workplaces they want. Where evidence of historic bias is strong, we recommend *gender quotas* for educational programs and hiring. To be clear, what this means is sometimes requiring that the fraction of females admitted or hired be higher than the fraction of female applicants. We anticipate that such measures, popularly known as affirmative action programs, will be necessary to overcome historic gender biases.¹⁰

It is impossible to predict to what extent gender bias will still plague a society when its citizens decide to replace capitalism with something like a participatory economy. However, given how resilient gender discrimination has proven to be, it would be unrealistic to assume that any society adopting a participatory economy would be immune to gender discrimination – which is why we propose that the above measures be applied in a participatory economy.

Reproductive activity in households

With the exception of mandatory public education for children between the ages of five and 18, we believe people should be free to choose how much

reproductive labor to do themselves “privately” in their households as opposed to having it done by others in the “public” economic, healthcare, or education system. How should reproductive activity performed in households be monitored and compensated?

In-home domestic labor

It may not be possible for men to carry half of all fetuses through nine months of pregnancy, but it is certainly possible for men to share the burdens of housework equally with women. Of course, the problem is how to get men to do it!

As discussed, when monitored by active women’s caucuses armed with the power to issue “stays,” job balancing committees in worker councils can do a great deal to eliminate gender bias in traditional job structures in the economy by combining tasks in new ways so that every job contains tasks previously performed almost exclusively by women, thereby guaranteeing that in the workplace men will also have to do what has traditionally been “women’s work.” In other words, just as committees that combine tasks into jobs can balance jobs for empowerment (to promote economic democracy) and desirability (for economic justice), they can also balance jobs for caring labor as well – the rationale being that failure to do so would permit historic gender biases that are both unfair and inefficient to persist. Similarly, anti-discrimination laws and affirmative action programs, backed by powerful women’s caucuses, provide effective ways to challenge gender bias in hiring, firing, assignment, and evaluation in a participatory economy and the public education and healthcare systems as well. But there are no caucuses within households to empower women, nor do anti-discrimination laws and affirmative action programs reach inside households. This implies that organized social pressure must be even more intense if men are to be induced to do their share of housework. Where can organized social pressure come from?

Women’s caucuses in neighborhood councils should provide moral support for women who would otherwise be isolated in their struggles to convince male partners to do their fair share of housework. Women’s caucuses in neighborhood councils can also confront men who are particularly wayward. Women’s caucuses in neighborhood councils can also organize cooking and cleaning classes for men in the neighborhood who fail to participate in these tasks sometimes for lack of necessary skills rather than lack of desire to change their ways. And women’s caucuses in neighborhood councils can also make sure that consumption furthers gender equality when decisions about private versus public goods and kinds of public goods are made. But we do not believe it would be wise to empower women’s caucuses in neighborhood councils to issue stays or dictate behavior within households as we have proposed they be able to do in public settings.

Admittedly, this is a difficult issue. Just as we had to reconcile combating gender discrimination with the principle of democratic rule in public settings, here we must reconcile combating gender discrimination with the principle of

protecting people's privacy within households. And again, we welcome further debate on this subject. But we recommend combating gender bias within households through social pressure and moral suasion because we believe empowering neighborhood women's caucuses or government agencies to intervene in decisions made by household members would infringe too heavily on people's privacy.¹¹

However, even when limited to moral suasion, there is a danger to be avoided we should learn from current campaigns that "preach" political correctness. Many organizations today suspend normal work one day a year so members can attend consciousness raising sessions around race or gender issues – which are often led by "professional" facilitators – all with the best of intentions. But while it is true that racist and sexist norms at work and within organizations need to be acknowledged and challenged, when sessions become formulaic and preachy, they can become counterproductive, and participation can become hypocritical when lip-service wins praise while honesty draws rebuke.¹²

In sum, there is no magic answer to this dilemma that plagues all exercises in moral suasion. But we should realize that when done badly, exercises in moral suasion can increase cynicism rather than reduce prejudice. We raise this issue here because we believe that confronting sexism inside households must rely more heavily on moral suasion, whereas more powerful tools like those we have discussed can be brought to bear on sexism in the economic, education, and healthcare systems. The key is to learn from available evidence about what kind of consciousness raising campaigns are most likely to be effective.

In-home caring labor

Children have allowances to cover their expenses. But children also have an additional income in kind: Children have a right to childcare and education free of charge. Similarly, elders have retirement or disability allowances to cover their expenses. But in addition, elders have an income in kind: Elders have a right to eldercare free of charge. Both children and elder allowances are set in light of the fact that they must cover room, board, and other expenses, but they do *not* have to cover the cost of providing free childcare or eldercare, just as they do not have to cover medical care since that is provided free of charge to everyone.

However, we believe parents/guardians should be free to provide infant care and pre-K education themselves, in the home, if they so wish, rather than send their children to "public" infant/childcare facilities in the education system. And we believe the choice of whether eldercare is provided in assisted-living centers run by the healthcare system, by personnel from the healthcare system who come to the home where an elder lives, or by members of an elder's household, should be up to elders and members of their households.

Whenever childcare or eldercare is provided in-home by a household member, rather than by the education or healthcare system, the provider is foregoing income he or she could have earned working outside the home, and therefore,

compensation is in order. And whenever care is provided in-home by a household member, the cost of providing the care in the education system – which the child has a right to – or the healthcare system – which the elder has a right to – is defrayed. We propose that when caring labor is provided in-home by household members, they be treated as *ex-officio employees* of the education or healthcare system, working “offsite” so to speak.

But even if household members providing in-home care are treated as *ex-officio* offsite workers in the education or healthcare system, in-home provision of childcare and eldercare creates a problem: There are no coworkers onsite to monitor and evaluate what they do. Compensation in the participatory economy is determined by a committee of coworkers who provide effort ratings for all members. We assume that somewhat different, but similar, procedures will be established for workers in the public education and healthcare systems. Moreover, the participatory economy and, presumably, the education and healthcare systems as well, will have built-in features that guarantee the quality of the goods produced and services performed. Unfortunately, no such features are available to determine how much to compensate household members who provide in-home childcare or eldercare. Nor are there institutional mechanisms to monitor the quality of service.

We see no alternative but to establish a standard payment for household members who provide in-home childcare and elder care. And we see no better alternative to the kind of monitoring for at least minimal quality provided by social service agencies today. The alternative of empowering a committee of stay-at-home adults within each neighborhood council to monitor for quality and provide effort ratings for stay-at-home childcare and eldercare providers in their neighborhood seems to us to be an undesirable infringement on privacy without providing the kind of professionalism that successful monitoring and intervention requires.¹³

This is not to say that stay-at-home childcare and eldercare providers may not benefit from self-help groups in their neighborhood councils. But we do not think it wise to empower such groups to monitor one another for quality of care provided nor to provide one another with effort ratings. Instead, we recommend standard income credits for stay-at-home care providers be determined by the education and healthcare systems. This includes standard rates that may vary according to the number of pre-K children or elders being cared for, and that might take into account that as the number being cared for increases, this does not generally mean that the efforts and sacrifices of the provider increase proportionately. Up to some point there may be economies of scale, or, as the title of a once popular book suggested, children may be “cheaper by the dozen.”

In sum: Society fulfills its responsibilities to the new generation when the public education system provides infant care and childcare for all children, free of charge, just as it provides all children free primary and secondary education. But children’s guardians can choose instead to provide care themselves in the home for children from zero to five years old if they wish – becoming *ex-officio*

workers in the education system, for which they receive compensation from the education system as “off-site educators” according to established rules. Society fulfills its responsibilities to those who are disabled or retired when the public healthcare system provides eldercare in its own facilities for all who qualify free of charge. But elders can choose to remain at home if they prefer, and receive care from household members who receive compensation from the healthcare system as “off-site caregivers” and ex-officio workers in the healthcare system who receive payment according to established rules. So even when in-home care labor is performed by members of a household, they are affiliated, even if loosely, with either the education or healthcare system. Children reside in households, so all of their allowance is added to whatever effort ratings or allowances a household has. And if an elder remains in a household, all of his or her allowance becomes part of household income as well. If instead an elder resides in an eldercare facility, the part of his or her allowance intended to cover room and board is credited as payment to the facility.

In-home socialization labor

According to an African proverb that Hillary Clinton popularized in her title to a 1996 book, “It takes a village to raise a child.” The point of the proverb is that the socialization of the next generation is done in many settings, at many times, by many people. A popular old saying, “Chickens are raised but children are reared,” makes a similar point – namely, that socialization labor for humans is a complicated process, requiring considerable skill, mental energy, and ingenuity. In any case, “socialization” of succeeding generations is undeniably one of the most important activities in any society, as much as it has often been demeaned, underappreciated, and undercompensated. Much more socialization labor is now done in school systems than was the case until 200 years ago, and as explained, we assume there will be a robust public education system. Nonetheless, a great deal of “rearing” of children of all ages does, and should, take place inside households. Who should do it? How should they be compensated?

Anytime a parent stays home to “rear” a child between the ages of five and 18 is time he or she cannot be working in a worker council earning an effort rating. Moreover, taking childrearing seriously means acknowledging the immense value to society of socialization labor. It means abandoning the stereotype of adults lying on a couch watching soap operas or playing video games while eating bonbons or swilling beers whenever an adult stays home once children are in school full-time. All of which points toward compensation for an adult providing socialization labor in-home. On the other hand, even though it benefits society greatly, unlike the case when infant and pre-K care/education is provided at home, in-home socialization labor does not relieve the educational system of the cost of educating children ages 5 to 18 who participate in mandatory education regardless.

One solution is to simply account for in-home socialization labor in children’s allowances. Just as children’s allowances should be sufficient to cover their

food, clothing, living space, toys, entertainment, and so on, allowances should be sufficient to cover their in-home socialization as well. And just as food, clothing, living space, toys and entertainment needs might vary for children of different ages, so the costs of socialization labor might vary by age. In effect, this proposal reverses the second shift penalty feminists criticize today when women who work in the labor market come home to work a second shift providing in-home socialization for school-age children, which goes unpaid. Through children's allowances, the household budget would include payment for someone working the second shift even if no adult stays home to work it.

Of course, this does nothing to combat gender bias regarding *who* stays home to provide socialization labor – men or women. More attractive parental leave options for females than males should be illegal. And if other policies discussed earlier are successful at eliminating any gender pay gap, the foregone household income from a stay-at-home mom would be no less on average than for a stay-at-home dad. Nonetheless, because caucuses and committees are unavailable inside households, moral pressure must be organized to combat gender bias regarding in-home socialization labor that will no doubt remain, with all of the problems that exercises in moral suasion present.

Overcoming gender bias regarding who takes parental leave in a participatory society would continue to be important for two reasons. (1) There is no biological reason that renders men less able to perform socialization labor, which means that any observed gender bias implies that socialization is being done inefficiently. (2) While absences from work outside the home should not affect a person's expected income since compensation is based on effort and sacrifice, it might continue to adversely affect whether someone is likely to be hired or bid successfully on a job in their workplace. So while we would expect no "mommy track" pay penalty for stay-at-home moms in a participatory economy, there may still be an adverse effect on women's access to jobs they prefer if they continue to perform more in-home socialization than men.

Conclusion

We fully understand that it will be those who replace our current dysfunctional social systems with new and better ones who will decide concretely how to organize both economic and reproductive activity. Moreover, their decisions will be based on a great deal more knowledge and experience than we have at present. So why bother now to propose concrete ways that reproductive activity might be better organized, carried out, and rewarded in some future society?

There are two problems with limiting ourselves to further elaborating a feminist critique of patriarchal capitalism. The first is that we need to convince people there *is* a better alternative that is perfectly feasible. And you can't do that if you don't formulate concrete proposals. The second is that until there are concrete proposals on the table, it is impossible to evaluate the pros and cons of different options.

Hopefully, making concrete proposals will help stimulate productive debate about how best to accomplish this in a post-capitalist setting. But this much is certain: If women are to be liberated from “the feminized ghetto of care work,” men will have to change more diapers, prepare more meals, feed more children, and care for more people with disabilities, more children with autism, and more elders with dementia. And this is important for two reasons. (1) Most importantly, as long as women do more reproductive labor than men, and are insufficiently compensated for doing so, half of humanity will continue to be oppressed and exploited. (2) Because the work we do, day-in and day-out, has a transformative effect over the years on who we become, time spent in caring labor helps promote empathy for those who are vulnerable in society. So unless men perform their fair share, half of humanity will continue to fail to realize their empathetic potentials.

Notes

- 1 Peter Bohmer and Savvina Chowdhury are co-authors of “Reproductive Labor in a Participatory Socialist Society,” *Review of Radical Political Economics*, published online in January 2020: <https://doi.org/10.1177/0486613419869369>, which serves as the basis for much of this chapter, and are therefore also honorary co-authors of this chapter.
- 2 For a fuller explanation of our approach to these issues and social theory in general, see our presentation of *complementary holism* in Albert *et al.* 1986, and chapter 1 in Hahnel 2014.
- 3 Some of the feminist literature that inform our work are Folbre 1994a, 1994b, 1995, 2001; Donath 2000; Ehrenreich and Hochschild 2002; Barker and Feiner 2004; Power 2004; Blau, Ferber, and Winkler 2006; Bezanson and Luxton 2006; Ferber and Nelson 2009; Hochschild 2012; Ronsen and Kitterod 2015; Yoon 2014; Quick 2016; Bhattacharya 2018; Arruzza, Bhattacharya, and Fraser 2019. We also state, for the record, that while our discussion focuses on men and women, we realize there are more than two genders, which needs to be incorporated in further analysis.
- 4 They also fall outside our areas of expertise! “Rethinking” schools and healthcare we must leave to others.
- 5 When we say “excel” in the program we mean take best advantage of the program not only to achieve proficiency in an area of study, and not only to enhance one’s personal abilities to enjoy life deeply, but also to become a socially productive member of society. In the early years of the Cuban revolution when the country was too poor to offer everyone as much education as they wanted, the prevailing ethos was that the fortunate few who became medical doctors or engineers had a special obligation to serve society. So, for example, graduates of Cuban medical schools were expected to spend years practicing medicine in rural clinics where needs were greatest. In the United States, graduates of our military academies – who pay no tuition, room, or board – are obliged to serve at least four years in the military after graduation. And many law schools forgive student debt for graduates who practice public interest law. In short, there is a compelling moral logic to attaching social service obligations for those who receive more education than others, especially when their extra education is provided at society’s expense.
- 6 We discuss how anti-discrimination laws and affirmative action programs function in the participatory economy at greater length below.

- 7 Even in the United States where differences in per-pupil expenditures in different local school districts can be considerable, the US Department of Education and state governments set minimal standards that must be met everywhere.
- 8 Alternatively, the public healthcare system may charge fees for what are deemed elective treatments.
- 9 “All places of employment” includes not only worker councils in the participatory economy, but also workplaces in the public education and healthcare systems and government agencies.
- 10 Again, we also support affirmative action programs and quotas for people of color, the LGBTQ community, and the disabled.
- 11 We recognize there is good reason to be skeptical about how effective moral suasion will sometimes prove to be. A discouraging example was how little rewriting the Cuban constitution to include passages stipulating that men bear an equal responsibility with women for housework and childcare, accompanied by a major educational campaign carried out by the Cuban Federation of Women, affected the attitudes and behavior of Cuban men.
- 12 See Kalinoski *et al.* 2013; Bezrukova, Jehn, and Spell 2012. While supportive of the purposes of diversity training, these large sample studies remark on the lack of evidence that diversity training has any significant effect on what they call “affective based” outcomes.
- 13 This should not be read as a “vote of confidence” in how social service agencies often function today. All too often social service programs are underfunded, poorly staffed, overly bureaucratic, inefficient, and inhumane. What we are arguing is that monitoring in-home provision of infant care, childcare, and eldercare by household members for quality is best done by departments in the education and healthcare systems that are adequately funded and staffed and where both caretakers and those cared for have considerable input into designing procedures. In other words, we see no better alternative to a high-quality social service agency to carry out this task. Treating household members who provide childcare and eldercare as ex-officio workers in the education or healthcare system working off-site seems to be the best option.

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Part III: conclusion

The six chapters in Part III present and defend our “model” of a participatory economy. Chapter 5 laid out the main features of the model. Chapter 6 dug deeper into different aspects of the model and responded to various criticisms that have been raised over the past 30 years. Chapter 7 elaborated further on important features of the annual participatory planning procedure. Chapter 8 clarified what a comprehensive plan is . . . and is not . . . and thereby rebutted criticisms that any kind of comprehensive annual planning requires a level of detail that is impractical, and responded to concerns that adjusting annual plans will prove impossible. Chapter 9 reported on the results of computer simulations of the annual planning procedure and what they suggest about its “practicality.” And finally, Chapter 10 presented concrete proposals for how to overcome trenchant historical biases regarding “reproductive labor” in a participatory economy. In sum total, Part III lays out a concrete, comprehensive proposal for readers to consider. In this short conclusion to Part III, we highlight how unique features of our participatory planning proposal overcome the main dangers democratic economic planning faces.

Dangers to be avoided

Authoritarian planning discourages worker and consumer participation because it disenfranchises them. But poorly designed systems of democratic planning might continue to discourage worker and consumer participation in a different way. There is a serious danger that some forms of democratic planning can discourage participation on the part of ordinary workers and consumers by requiring them to engage in too much negotiation with others, especially if most of these negotiations are conducted by representatives and information necessary to make informed decisions quickly is lacking. But perhaps more importantly, if worker and consumer councils have no *autonomous* area of action regarding their *own* work and consumption activities, but must instead engage in seemingly endless discussion, debate, and negotiations with others in many different planning bodies about what they want to do, ordinary workers and consumers may well lapse back into apathy even if there is no authoritarian planning procedure to disenfranchise them.

In this case, ordinary workers and consumers would no longer be disenfranchised, as they are under authoritarian planning, but if procedures for involving all who are affected are cumbersome and clumsy, if necessary information for informed decision-making is lacking, and if procedures rely primarily on representatives; all this may become a practical barrier to participation that only the most dedicated and determined workers and consumers will be willing to fight through. In other words, when poorly organized, democratic planning can become just another bureaucratic maze from the perspective of ordinary workers and consumers, leading to what the socialist feminist economist Nancy Folbre warned can devolve into a “dictatorship of the sociable.”

Participatory planning is designed so worker and consumer councils can decide what they want to do as long as it does not misuse productive resources that belong to all, or take unfair advantage of others. It is designed to help worker and consumer councils demonstrate to one another that their proposals are socially responsible by generating the information necessary to make such judgments. It is designed to avoid unproductive and contentious meetings where representatives from different councils make proposals and decisions not only about what those they represent will do, but about what workers in other councils will do as well. And except in rare cases where more deliberation is needed, it is designed so decisions about approving other councils’ proposals can be made very quickly. The participatory planning procedure will take a number of rounds before proposals are confirmed as fair and not wasteful of social resources and before excess demands are eliminated and a feasible plan is reached. But results from simulation experiments reported in Chapter 9 suggest that the number of iterations required need not be excessive. In short, evidence from computer simulations suggests that our annual participatory planning procedure is far more practical and robust than critics warned.

But most importantly, rounds in the planning procedure are *not* rounds of increasingly contentious meetings between representatives from different councils to debate the merits of different comprehensive national plans without information necessary to make informed decisions. Instead they are meetings *inside* each worker and consumer council and federation to formulate and revise its *own* proposal about what the members of each council want to do themselves, with clear guidelines about what will win approval from others. Unlike other models of democratic planning, (1) councils never have to engage someone else’s ideas about what they should do; (2) only in rare and special circumstances do councils have to plead their case for what they want to do in meetings with others; and (3) there is always a clear agenda for any meetings required to adjudicate special appeals.

Unique features of participatory planning

Broadly speaking, the goal is to arrive at an economic plan through deliberative democracy. But deliberation can take two very different forms: Deliberation can be over competing comprehensive annual plans and take place at meetings

attended by only a few representatives from different councils to then be voted on either by those representatives or in a national referendum. Alternatively, deliberation can be over what each worker and consumer council wants to do itself and take place among members of each worker and consumer councils who formulate and revise their own “self-activity” proposals in response to feedback from others and more accurate estimates of opportunity and social costs.

The difference between these two ways to carry out deliberative economic democracy cannot be overestimated. While the first conception of deliberative democracy may be more common among those who have historically advocated for democratic economic planning, it has three disadvantages: (1) Only a few people from each council benefit from the deliberations – those sent as representatives – who then bear the burden of trying to convey their deliberative experience to those they represent. (2) Members of a worker council never formulate proposals for what they want to do themselves. Instead, their representatives, together with representatives from other councils, formulate and pass a proposal about what everyone, including them, must do. And (3) meetings of representatives proposing different comprehensive economic plans do not generate quantitative estimates of opportunity and social costs, without which sensible discussion of the merits of different proposals and plans is severely hampered, if not impossible. Our participatory planning procedure, on the other hand, empowers ordinary workers and consumers, not representatives, to formulate and revise their own work and consumption proposals, and generates estimates of opportunity and social costs that are as accurate as can be hoped for and allow all to easily judge whether different councils’ proposals are socially responsible.

Unfortunately, the importance of procedures that can be relied on to generate reasonably accurate information necessary for making informed social choices is often lost on activists who have little or no economic training. While an aversion to putting prices on things is understandable in the context of capitalism, which, in the words of Oscar Wilde, “knows the price of everything and the value of nothing,” unfortunately, without reasonably accurate estimates of opportunity and social costs, it is impossible for ordinary people to participate in planning sensibly and in a timely way. If we want ordinary people to participate, we must not only give them voice and vote in our planning procedures, we must also give them easy access to the essential information they need to arrive at sensible decisions quickly.

Unless I know the opportunity costs of scarce resources and categories of labor a work proposal requires, unless I know the social costs of producing the intermediate inputs needed, and unless I can compare these costs to the social benefits of the outputs the workers propose to deliver, how can I sensibly decide if a work proposal is socially responsible? If it is a work proposal my workmates and I are preparing for ourselves, I need to know this in order to be able to ascertain whether we are proposing to do something that is socially responsible or irresponsible. I also need to know this to determine whether

our work proposal will be quickly approved by others or is likely to be turned down pending special appeals we would have to go through. If the work proposal is one that another council has proposed, I need to know the opportunity and social costs to figure out quickly whether or not I find it socially responsible.¹ Without reasonably accurate estimates of opportunity and social costs, there is no way to make these judgment calls. On the other hand, with this information, necessary calculations can be done quickly, results can be made immediately available to everyone, and ordinary people can rapidly make all necessary decisions in each round of the planning procedure.

As far as we know, the annual participatory planning procedure we have presented, elaborated on, and defended against criticisms in Part III, is the only proposal that avoids these pitfalls of comprehensive economic planning.

Note

- 1 The same holds for consumption proposals. To know if my own neighborhood consumption proposal is fair, and if other neighborhood councils' consumption proposals are fair, I need to know the social costs of producing the goods and services requested to compare to the effort ratings and allowances of those making requests.

Part IV

Investment planning

Introduction to Part IV

We have covered a lot of ground. We have explained how a participatory economy “works,” what we believe are its many advantages, and responded as best we can to a number of questions and criticisms others have raised over the past 30 years. However, we have yet to talk about any of the decisions most economists consider when they think about economic *planning*!

We have discussed how worker and consumer councils and federations can create a feasible, efficient, annual plan themselves to coordinate their interrelated economic activities, rather than relegate coordination to market forces or a central planning bureau. But we have yet to talk about planning for the future. We have yet to talk about how to *plan investment* – producing capital goods instead of consumption goods in order to be able to produce even more goods in the future. We have yet to talk about investing in various kinds of infrastructure necessary to support a great deal of economic activity in modern economies. Nor have we discussed different kinds of long-term, *development planning*. How do we propose to do what used to be called “manpower planning,” but is now better known as education planning – that is, investing in both formal and informal education and training programs to teach people the skills they need to perform at their best? How do we propose to do environmental planning and protect the environment from deterioration that unfairly harms future generations? How do we propose to do long-run, strategic international economic planning to change a country’s patterns of international trade and investment? And how do we propose to *integrate* all these kinds of planning that cover different time periods?

Investment and development planning over many years raise new issues and problems. In Parts IV and V, we propose how all these kinds of planning can be organized, carried out, and integrated in order to maximize democratic participation and efficiency. Here, in Part IV, we discuss participatory investment planning – first in Chapter 11 in a simple, single-good context sufficient to explore key issues about deciding on the appropriate level of *aggregate* investment, and then in Chapter 12 in a multi-good world where decisions must be made about how much of *different* capital goods to produce and how to distribute them among *different* firms in *different* industries. In Part V we discuss three different kinds of long-run development planning. In Chapter 13 we treat

participatory educational planning, in Chapter 14 we take up participatory environmental planning, and in Chapter 15 we tackle participatory international economic planning, followed by an appendix to Part V, where we discuss infrastructure planning. We will discover that all these different kinds of plans, concerning different aspects of how people want their economy to “develop” over time, have some things in common as well as some unique problems to be addressed.

11 Aggregate investment planning¹

A one-good, three-year model

We begin with a particularly simple model in order to focus on key issues that arise when deciding how much of aggregate output should be saved and invested as opposed to consumed over a sequence of years.

There are three years, $t = 1, 2, 3$, after which planners know our world ends.²

There is a single good, corn, which is both the sole consumption good, and as seed corn, is the only other input into the production of corn beside labor.

The amount of homogeneous labor available each year, $l(t)$, is exogenous.

There are no primary inputs from nature used in production.³

The amount of corn available at the beginning of year 1, $\text{corn}(1)$, is given. For convenience, we assume $\text{corn}(1)$ cannot be consumed but can only be used as an input into the production of corn in year 1.

To be used in production during a year corn must be available at the beginning of the year. Corn produced during any year cannot be used for production during the same year it is produced. All corn produced in year t is either consumed in year t or used as an input to produce corn in year $t+1$. And all corn produced in year t that is used as an input in year $t+1$ is entirely used up and disappears by the end of year $t+1$. In traditional terms, corn is both the sole consumption good and also a *capital* good – not an *intermediate* good. But it is a capital good that depreciates entirely in the year after it became available.

All corn produced during a year, $x(t)$, is either consumed that year, $c(t)$, or saved and invested, $s\&i(t)$. Therefore, in year 1 the amount of corn available for production is $\text{corn}(1)$, a given. In year 2 the amount of corn available for production is $s\&i(1)$, the amount of corn produced in year 1 that was not consumed, but instead saved and invested to be used in production in year 2. Similarly, the amount of corn available for production in year 3 is $s\&i(2)$.

Because the world ends after year 3, in an optimal plan $s\&i(3)^* = 0$, and therefore $x(3)^* = c(3)^*$ where $*$ indicates the optimal value for a variable.

Utility each year is a function of the amount of corn consumed that year, $U(t)[c(t)]$.

The production function for corn, $F(t)$, is a function of how much seed corn is used and how much labor is used during the year: $x(t) = F(t)[\text{corn}(t), l(t)]$.

For convenience we assume that social welfare, SW , is simply the sum of utility in the three years: $SW = \sum_t U(t) \ (t = 1, 2, 3)$ – that is, that the social rate of time discount is zero.

An omniscient investment planner

How would a benevolent, omniscient investment planner decide how much to save and invest in $t = 1, 2, 3$?

Assume such a planner knows:

The utility functions for each year: For simplicity, we assume these are the same for all three years: $U(t)[c(t)] = \sqrt{c(t)}$, $t = 1, 2, 3$.

Note that $U(t)$ increases as $c(t)$ rises, but at a diminishing rate, because $dU(t)[c(t)]/dc(t) = 1/[2\sqrt{c(t)}]$.

The production function for each year: Again, we begin by assuming these are the same for all three years: $x(t) = F(t)[\text{corn}(t), l(t)] = \sqrt{\text{corn}(t)}l(t)$ $t = 1, 2, 3$.

Note that $x(t)$ rises whenever $\text{corn}(t)$ or $l(t)$ rises but at a decreasing rate since $\delta F(t)/\delta \text{corn}(t) = \sqrt{l(t)}/[2\sqrt{\text{corn}(t)}]$ and $\delta F(t)/\delta l(t) = \sqrt{\text{corn}(t)}/[2\sqrt{l(t)}]$.⁴

We begin by assuming that the amount of corn available at the beginning of year 1, $\text{corn}(1)$, is 4 units, and the amount of labor that becomes available for use at the beginning of each year is the same for all three years: $l(t) = 8$, $t = 1, 2, 3$.

Armed with all this information, an omniscient planner can calculate an optimal plan – a production, saving/investment, consumption plan for all three years – which maximizes SW .

The first thing the omniscient planner will do is maximize production in year 1 by using all of $\text{corn}(1) = 4$ and all of $l(1) = 8$ to produce $x(1)^* = \sqrt{(4)(8)} = 5.65685$ bushels of corn.

After which the planner must calculate how to divide $x(1)$ between $c(1)$ and $s \& i(1)$, and how to divide $x(2)$ between $c(2)$ and $s \& i(2)$. Once $s \& i(1)^*$ is decided that will determine $x(2)^*$ since $\text{corn}(2) = s \& i(1)^*$ and $l(2) = 8$. And once $s \& i(2)^*$ is decided that will determine $x(3)^*$ since $\text{corn}(3) = s \& i(2)^*$ and $l(3) = 8$, which also determines $c(3)^*$ since $s \& i(3)^* = 0$ as explained. Our omniscient planner will do this by requiring the optimal plan to satisfy the following two first order conditions for maximizing $SW = \sqrt{c(1)} + \sqrt{c(2)} + \sqrt{c(3)}$

- (A) The last bushel of corn consumed in year 1 increases utility in year 1 by the same amount as the last bushel of corn saved/invested in year 1 increases corn production in year 2 *times* the amount the last bushel of corn consumed in year 2 increases utility in year 2:

$$dU(1)[c(1)]/dc(1) = \{\delta F(2)[\text{corn}(2), l(2)]/\delta \text{corn}(2)\} \{dU(2)[c(2)]/dc(2)\}$$

$$A \quad 1/[2\sqrt{c(1)}] = \{\sqrt{1(2)}/[2\sqrt{\text{corn}(2)}]\}\{1/[2\sqrt{c(2)}]\}.$$

- (B) The last bushel of corn consumed in year 2 increases utility in year 2 by the same amount as the last bushel of corn saved/invested in year 2 increases corn production in year 3 *times* the amount the last bushel of corn consumed in year 3 increases utility in year 3:

$$dU(2)[c(2)]/dc(2) = \{\delta F(3)[\text{corn}(3), l(3)]/\delta \text{corn}(3)\}\{dU(3)[c(3)]/dc(3)\}$$

$$B \quad 1/[2\sqrt{c(2)}] = \{\sqrt{1(3)}/[2\sqrt{\text{corn}(3)}]\}\{1/[2\sqrt{c(3)}]\}.$$

We know:

$$c(1) = x(1) - s\&i(1) = [5.65685 - s\&i(1)]$$

$$\text{corn}(2) = s\&i(1) \text{ and } \text{corn}(3) = s\&i(2)$$

And for $l(2) = l(3) = 8$ we have:

$$x(2) = F(2)[\text{corn}(2), l(2)] = \sqrt{8s\&i(1)} = 2.82843\sqrt{s\&i(1)}$$

$$c(2) = x(2) - s\&i(2) = [2.82843\sqrt{s\&i(1)} - s\&i(2)]$$

$$x(3) = c(3) = F(3)[\text{corn}(3), l(3)] = \sqrt{8s\&i(2)} = 2.82843\sqrt{s\&i(2)}$$

Substituting all this into equations A and B, yields two equations in two unknowns, $s\&i(1)$ and $s\&i(2)$ – the number of bushels of corn we should save and invest in year 1 and year 2 respectively:

$$(A) \quad 1/\{2\sqrt{[5.65685 - s\&i(1)]}\} = \{\sqrt{8}/[2\sqrt{s\&i(1)}]\}\{1/\{2\sqrt{[2.82843\sqrt{s\&i(1)} - s\&i(2)]}\}\}$$

$$(B) \quad 1/\{2\sqrt{[2.82843\sqrt{s\&i(1)} - s\&i(2)]}\} = \{\sqrt{8}/[2\sqrt{s\&i(2)}]\}\{1/\{2\sqrt{[2.82843\sqrt{s\&i(2)}]\}\}$$

Solving these two equations in two unknowns yields the optimal values for saving/investment in years 1 and 2: $s\&i(1)^* = 2.36628$, $s\&i(2)^* = 1.56968$.⁵

Which gives the following optimal production, saving/investment, and consumption plan for all three years, and the maximum possible social welfare:

$$t = 1: x(1)^* = 5.65685, s\&i(1)^* = 2.36628, c(1)^* = 3.29057$$

$$t = 2: x(2)^* = 4.35089, s\&i(2)^* = 1.56968, c(2)^* = 2.78121$$

$$t = 3: x(3)^* = 3.54365, s\&i(3)^* = 0.00000, c(3)^* = 3.54365$$

$$SW^*(\max) = U(1)[c(1)^*] + U(2)[c(2)^*] + U(3)[c(3)^*] = \sqrt{c(1)^*} + \sqrt{c(2)^*} + \sqrt{c(3)^*} = \sqrt{3.29057} + \sqrt{2.78121} + \sqrt{3.54365} = 1.81399 + 1.66770 + 1.88246 = 5.36415$$

Reality vs. theory***Missing information***

While it has long been tempting for economists to think about investment planning this way, it is *impractical* because investment planners are not omniscient. It is impossible for planners to know what technologies and preferences will be in years 2 and 3. Nor is there any way to know for certain what the supply of labor will be in future years.

But what about preferences, technologies, and the supply of labor in year 1? Clearly, along with the initial supply of corn, the supply of labor in year 1 can be known to planners at the beginning of year 1. And, as we demonstrated in Part III, our participatory annual planning procedure can induce consumers and producers to truthfully reveal their preferences and technological capabilities for year 1 as well.

But obtaining accurate information about future preferences, technologies, and labor availabilities is another matter. The practical takeaway is that when an investment plan is created, it must be based on *estimates* of what preferences, technologies, and the supply of labor will be in years 2 and 3.

Missing people

Moreover, some of the people who will be affected by the plan in future years are not available to take part in investment planning at the beginning of year 1. So we must ask who will speak for those who cannot be present during investment planning. To highlight this problem, we will assume shortly that people live only one year, so those alive in years 2 and 3 are completely different generations than those alive in year 1 when the three-year investment plan is drawn up. Who will speak for these future generations when we do investment planning?

Inherently undemocratic

Even if our planner were benevolent and omniscient, it is politically unacceptable to allow a planner, or central planning agency, to create our investment plan for us as we explained in our critique of central planning in Part II. The calculations our omniscient planner performed in the previous section did not involve workers and consumers in deciding what *they* would produce, consume, save, and invest in any way whatsoever. In short, this is how authoritarian central planning functions and certainly not a model for how participatory, democratic investment planning should be done.

Participatory aggregate investment planning

How do we propose to overcome the practical problem that investment planning must be initiated before future preferences, technologies, and labor

supplies can be known and before some who will be affected are born? How do we propose to make investment planning democratic and participatory?

Challenges

There is no getting around the problem that future preferences, technologies, and labor supplies must be estimated in order to do investment planning. That is, that investment planning must be based on *guesses* about the future. And there is no getting around that someone else will have to represent the interests of future generations who cannot be present when investment plans are drawn up. Moreover, all this is true whether or not investment planning is done democratically or autocratically.⁶

To illustrate, what if our investment planner estimated *incorrectly* that future labor supplies in year 2 and 3 were going to be nine units each year? Using equations A and B with $\sqrt{l(2)} = \sqrt{l(3)} = \sqrt{9} = 3$ instead of $\sqrt{l(2)} = \sqrt{l(3)} = \sqrt{8} = 2.828427$, the planner would decide to save and invest 2.43603 bushels of corn in year 1 (instead of 2.36628 bushels) and 1.70747 bushels of corn in year 2 (instead of 1.56968 bushels.) When actual future labor supplies in years 2 and 3 turn out to be eight instead of nine, this mistake to over save and invest in years 1 and 2 will result in a loss of 0.00169 units of social welfare over the three years compared to what social welfare could have been had investment planners correctly anticipated future labor availabilities and not overinvested.

Inaccurate estimates of future preferences, $U(t)$ $t = 2, 3$, or future technologies, $F(t)$ $t = 2, 3$, would result in similar losses of potential welfare because the investment plan would invest either too little or too much in years 1 and 2. Soon we will explore (a) what would happen if planners fail to anticipate that while $F(1) = \sqrt{\text{corn}(1)l(1)}$ in year 1, technologies will improve in years 2 and 3 and become $F(2) = \sqrt{2\text{corn}(2)l(2)}$ and $F(3) = \sqrt{2\text{corn}(3)l(3)}$ and (b) how to mitigate welfare losses by updating the investment plan based on information revealed by annual planning for year 1. In sum, the goal is to make *best guesses* about future parameters during initial investment planning and then to take advantage of opportunities to update investment plans when more accurate information is revealed by results from annual plans.

Who Should Participate? How do we propose to make investment planning democratic and participatory and enhance the accuracy of initial estimates of future parameters? As we have just seen, we will need to formulate estimates of what $U(t)[c(t)]$ $t = 2, 3$ will be in order to do this efficiently. Who better than the national federation of consumer councils, NFCC, to estimate how future preferences may change? This consumer federation will be overseeing R&D activity concerning new products and services, so the NFCC will be in charge of finding out what kinds of new products consumers want. Combining information from that work with data on historic trends in consumption patterns, the NFCC is ideally suited to estimate changes in consumer preferences once it is provided an estimate of likely increases in economic productivity and therefore average incomes.

We will also need to estimate what $F(t)[\text{corn}(t), l(t)]$ $t = 2, 3$ will be. Who better to estimate likely improvements in technology than the national federation of worker councils, NFWC? Since the NFWC oversees a large R&D department researching new technologies, this federation is best situated to provide the best guess in this regard. We propose that R&D developing *new products* be overseen by the national federation of *consumer* councils, but that the national federation of *worker* councils be in charge of R&D developing *new technologies*.⁷ Of course, the NFWC can call on industry federations of worker councils for help since they will also oversee R&D for their individual industries. In any case, this division of research labor seems to us to be the best way to take advantage of who is likely to have access to the information most critical to each problem.⁸

Since the business of these two national federations is conducted by recallable, elected delegates from all neighborhood consumer councils and from worker councils in all industries, we believe this procedure for formulating estimates of changes in consumer preferences and productive technologies is democratic as well as effective. Once we have these best guesses about future $U(t)$'s and $F(t)$'s, as well as best guesses about future $l(t)$'s, how should participatory investment planning proceed?⁹

At the aggregate level under consideration here, investment planning is about the trade-off between more consumption now versus more saving and investment now, and therefore more consumption later. Between years that are not far apart, this is mostly a trade-off between present and future consumption for the same people. However, for years farther apart, this is a trade-off between well-being for different generations of people. Unfortunately, future generations are not available to participate when we draw up investment plans, so their interests must somehow be represented by somebody else.

Our simple model can help clarify critical issues raised by the fact that "people" are not a single group of immortals but instead a sequence of generations of different people. Up to now we have implicitly been assuming that the utility functions $U(1)$, $U(2)$, and $U(3)$ represent the utilities of the same people that may change somewhat over time in ways that people may not anticipate. To highlight the generational problem, we now assume people are born and die in a single year, so those whose utilities we express as $U(1)$, $U(2)$, and $U(3)$ are the utilities of different people or generations.

Since only the first generation will be present when we do investment planning, the first question is: Who will speak for and protect the interests of the second and third generations of consumers? If those present during investment planning, the first generation, take only their own interest into account, they will choose $s_i(1) = 0$ to maximize $c(1)$ and $U(1)$, which would render $x(2)$, $x(3)$, $c(2)$, $c(3)$, $U(2)$, and $U(3)$ all zero. *While the case of extreme selfishness is farfetched, nonetheless there is clearly a problem. How do we propose to induce the present generation to act as "honest brokers" with regard to the interests of future generations?*

The second issue is that depending on how productive saving and investment turns out to be, the most efficient investment plan – that is, the plan that maximizes social welfare over all time periods for given preferences, technologies, labor supplies, and initial corn stock – may be ethically unacceptable because it unfairly advantages one generation over another. For example, if saving/investment is extremely productive, say for example $F(2) = \sqrt{100\text{corn}(2)l(2)}$, and therefore the marginal productivity of saving and investing in year 1, $[5\sqrt{l(2)}]/\sqrt{s\&i(1)}$, is extremely high, the optimal plan will call for a very high $s\&i(1)^*$, and consequently, $c(1)^*$ may be so low it almost starves the first generation. Or, if saving/investment is very unproductive, say, for example, $F(2) = \sqrt{0.01\text{corn}(2)l(2)}$, and therefore the marginal productivity of saving and investing in year 1, $0.05\sqrt{l(2)}/[\sqrt{s\&i(1)}]$, is extremely low, the optimal plan will call for a very low $s\&i(1)^*$, and consequently, $c(2)^*$ may be so low it almost starves the second generation. In other words, for some changes in production functions over time, we *may* find that the “efficient” saving/investment plan is ethically unacceptable even if the social welfare function weighs utility of all generations equally. *What do we propose to do about that?*

If the marginal utility of consumption in all years diminishes fast enough, this problem that investment may be either super productive or super unproductive will take care of itself, and we will not require any additional constraint beyond the first-order optimality conditions. But what if this is not the case, what if the actual utility functions and production functions in each year yield an optimal plan where $c(t)$ and $c(t+1)$ are simply too far apart? That might be an outcome where $c(t)$ is so far below $c(t+1)$ that we consider this morally unacceptable because it is unfair to generation- t . Or it might be because $c(t+1)$ is so far below $c(t)$ that we consider this morally unacceptable because it is unfair to generation- $(t+1)$.

One can make a strong case that while the incredibly high levels of investment in the Soviet Union under Stalin in the 1930s produced record rates of growth of GDP, the suffering of hundreds of millions of peasants whose consumption was severely curtailed was unconscionable. Of course, if the aggregate investment decision is made democratically, and not autocratically as it was under Stalin in the Soviet Union, generation- t should be able to protect its own interest. But the point is it might have to do so by imposing some constraint on how much less $c(t)$ can be compared to $c(t+1)$ rather than let the first-order conditions for the investment optimization problem determine the outcome if the social rate of return on investment is extremely high. However, solving the problem in the opposite case where the social rate of return on investment is so low that the “optimal” level of $c(t+1)$ is too low is more difficult because generation- $(t+1)$ is not at the table to protect its own interest. How do we propose to guard against this danger?

A Generational Equity Constraint: We propose to place limits on how much any $c(t)$ can deviate from any $c(t+1)$. For example, suppose we stipulate:

$$A: c(t+1) < 1.3c(t), \text{ and } B: c(t) < 1.3c(t+1) \text{ for all } t.$$

This *generational equity constraint* will prevent consumption in any adjacent years from differing by more than $\beta\%$ even if the utility and production functions are such that in the “optimal” saving/investment plan, they differ by more than $\beta\%$. As the philosopher John Rawls (1971) famously taught, ideally, we would like to have everyone vote on β behind a *veil of ignorance* in his *original position*, which prevents people from knowing what generation they will be part of when they vote. So obviously, having everyone *knowing they are in generation-t* when they vote on β is not ideal. Nonetheless, since the β generation- t votes for will be used in part B as well as part A in the generational equity constraint, the outcome seems reasonably satisfactory.

Consider: If the actual utility and production functions yield optimal values for $c(t)^*$ and $c(t+1)^*$, which are close together, say within 3%, there is no problem because the optimal solution is reasonably equitable. But suppose they differ by 30% and this is deemed morally unacceptable. If $c(t)^*$ is 30% smaller than $c(t+1)^*$ because the social rate of return on investment is extremely high, generation- t will wish they had voted for a small β , say .05. But if they vote for $\beta = .05$ this same β appears in part B of the generation equity constraint and thereby also protects the interest of generation- $(t+1)$ in the eventuality that $c(t+1)^*$ is 30% smaller than $c(t)^*$ because the social rate of return on investment is extremely low.

So even though those voting on what β will be in the generational equity constraint know they are in generation- t when they choose β , whatever level of protection they secure for themselves against an outcome that would be disadvantageous and unfair to them, they extend the same level of protection to generation- $(t+1)$ against an outcome that would be disadvantageous and unfair to them. To summarize: With the generational equity constraint there are two possible outcomes:

- (1) For the actual $U(t)s$, $F(t)s$, $I(t)s$, and $\text{corn}(1)$ in the economy, neither constraint is binding. In which case consumption in adjacent years will differ by less than $\beta\%$, and the investment plan that maximizes SW is also morally acceptable.
- (2) For the actual $U(t)s$, $F(t)s$, $I(t)s$, and $\text{corn}(1)$ in the economy, one of the two constraints is binding. In which case consumption in adjacent years will differ by $\beta\%$ because one of the two generational equity constraints prevents any larger deviation. In which case the investment plan that emerges will yield a value for SW that is somewhat less than $SW(\max)$, but the plan will be morally acceptable.

We now consider who should be charged with formulating estimates for key terms in the investment optimality conditions and how investment planning should be carried out.

The investment planning procedure

As explained, the NFCC, aided by the R&D department under its control, seems best informed to estimate what future preferences will be. And the

generational equity constraint should reduce – although admittedly not eliminate – any perverse incentive for the NFCC to either underestimate how much satisfaction future generations will get from consumption or over discount the well-being of future generations on grounds that average consumption will rise over time. Also as explained, the NFWC, aided by its R&D arm, seems best informed to estimate future changes in production technologies, which will affect how fast average consumption will rise over time.

But who is the natural “voice” to argue the case for more consumption in years 1 and 2? And who is the natural “voice” to argue the case for more saving and investment in years 1 and 2? Clearly, today’s consumers have an interest in arguing for more consumption in year 1, next year’s consumers have a like interest in arguing the merits of more consumption in year 2, and consumers in year 3 have an interest in advocating for more consumption in year 3. But while the natural constituency to speak for the value of investment is future consumers, unfortunately they cannot be present when investment decisions must be made. So we must improvise.

The generational equity constraint is our first step to improvise and limit perverse incentives for the only generation present when we make investment decisions to prioritize its own interest both unfairly and inefficiently at the expense of future generations. To immunize themselves against a low level of consumption because an extremely high social rate of return on investment might make the optimal level of investment very high, the present generation of consumers would be wise to choose a β that is not too high. However, by doing so they will also protect the interest of future generations against any possibility that a low social rate of return on investment might leave them with an unreasonably low level of consumption. However, that does not solve the problem of who will speak forcefully for the value of saving and investment. Our second attempt to improvise is to take advantage of any “can do” tendency that producers in WCs may have. All other things being equal, presumably workers would like to have more and better capital goods to work with, which in our present context translates into a higher level of saving and investment.

One might well ask why? In a planned economy where WCs will be charged for the social cost of producing any capital goods they use, why would they care if they get more or fewer capital goods to expand their productive capabilities? Particularly, if we remember that what we are considering here is saving and investing more corn *for all* WCs, rather than allocating more capital goods to one WC than another, it may seem that collectively, WCs as represented by the NFWC, have no material interest in a higher or lower level of saving and investment. However, while they may not be as strong an advocate for more saving and investment as future consumers, at least the NFWC has no material disincentive to call for less saving and investment than is socially optimal and may have a psychological inclination to be optimistic about its value. And in a more realistic setting where individual WCs are bidding for user rights to particular capital goods as we discuss in Chapter 12, they do have an incentive to present a forceful case for why they can put capital goods to better use than

other WCs can, and therefore, WCs should become motivated spokespersons for the benefits of investment. However, returning to our simple corn model, given the absence of future generations at the discussion table, leaves us with the NFWC as the best available “voice” to present the case for saving and investing more corn. Consider the debate over how much to save and invest in year 1, which is a debate over what level of saving and investment, $s\&i(1)$, satisfies equation A.¹⁰

$$A: dU(1)[c(1)]/dc(1) = \{\delta F(2)[\text{corn}(2), l(2)]/\delta \text{corn}(2)\} \{dU(2)[c(2)]/dc(2)\}$$

If the NFWC wants to make a convincing case that more should be saved and invested in year 1, it must argue that at the level of saving and investment currently under consideration the right side is greater than the left side in equation A. Regarding equation A: The NFWC has no influence over $U(1)[c(1)]$, and therefore $dU(1)[c(1)]/dc(1)$, because $U(1)[c(1)]$ will be revealed by the previous annual planning process. Nor does the NFWC have any influence over $U(2)[c(2)]$, and therefore $dU(2)[c(2)]/dc(2)$, since $U(2)[c(2)]$ will be estimated by the NFCC as explained earlier, not by the NFWC. So the only way the NFWC could agitate for more saving and investment than is socially optimal would be to pretend that $\delta F(2)[\text{corn}(2), l(2)]/\delta \text{corn}(2) = \delta F(2)[s\&i(1), l(2)]/\delta s\&i(1)$ is greater than it truly believes it will be.

Therefore the crucial questions regarding any perverse incentive for the NFWC to over exaggerate the benefits of saving and investment in year 1 during the participatory investment planning process are: (1) Will any overestimate of how productive saving and investing truly is be subsequently revealed as an over exaggeration? And (2) would the NFWC be sufficiently punished if an over exaggeration were revealed to prevent the NFWC from being tempted to exaggerate its enthusiasm to win more investment for WCs? We will return to these questions shortly.

If the NFCC wants to make a convincing case that more should be consumed and less saved and invested in year 1, it must argue that at the level of saving and investment currently proposed, the left side is greater than the right side in equation A. The NFCC has no influence over $U(1)[c(1)]$, and therefore $dU(1)[c(1)]/dc(1)$, for the same reason the NFWC has no influence – because $U(1)[c(1)]$ will be revealed by the previous annual planning process. Nor does the NFCC have any influence over $F(2)[\text{corn}(2), l(2)]$ and therefore $\delta F(2)[\text{corn}(2), l(2)]/\delta \text{corn}(2)$, because the NFWC is charged with estimating what those functions will be. So the only way for the NFCC to agitate for more consumption in year 1 than is socially optimal, and therefore less saving and investment than is socially optimal in year 1, would be to underestimate how much satisfaction future consumers will get from consumption – that is, to underestimate $U(2)[c(2)]$, and therefore $dU(2)[c(2)]/dc(2)$ in equation A.

Again, the crucial questions regarding any perverse incentive for the NFCC during the participatory investment planning process are: (1) Will any underestimation of how much satisfaction in year 2 consumers get from consumption

be subsequently revealed? And (2) would the NFCC be sufficiently punished if an underestimation were revealed to prevent the NFCC from being tempted to lie in order to win less saving and investment, and therefore more consumption in year 1. We are now ready to address these questions about perverse incentives for the NFWC and NFCC.

The good news is that mistaken estimations will be revealed, and the investment plan can be revised accordingly. Shortly it will be shown (a) how results from the annual plan for year 2 will reveal if assumptions about $\delta F(2) [\text{corn}(2), l(2)] / \delta \text{corn}(2)$ made during investment planning were accurate and (b) how the investment plan can then be revised to mitigate welfare losses. So if the NFWC attempts to exaggerate how productive saving and investing will be, this deception will be revealed, and appropriate corrections can be made. Similarly, results from annual planning will (a) reveal if the NFCC has underestimated future consumers' ability to gain satisfaction from consumption and (b) how to revise the investment plan accordingly.

The bad news is that designing penalties for misestimation is less straightforward. How can one effectively penalize the NFWC or NFCC? Remember who and what the NFWC and NFCC are. As national federations they represent *all* members of *all* worker councils, and *all* members of *all* neighborhood consumer councils. Clearly "collective punishment" for all workers or all consumers is neither desirable nor possible in this case. However, the work of these federations is carried out by elected and recallable delegates. If it is revealed that the delegates at the NFWC overestimated future productivity gains, which led to overinvestment, or that the delegates at the NFCC underestimated future consumer preferences, which led to underinvestment; it is possible to replace them, bar them from ever serving as delegates again, or even punish delegates personally if it can be proved that a delegate engaged in a deliberate deception rather than made an honest mistake.

Sequencing investment and annual planning

The sequencing of participatory annual planning and participatory investment planning is important for two reasons:

- (1) Annual plans require data provided by the results of investment plans. For present purposes, those engaged in annual planning must know the division of output between consumption and investment before creating a plan for the year. As a matter of fact, they must know how much of each kind of capital good must be produced during the year. Next chapter we explain how the aggregate investment decision can be turned into a comprehensive investment plan that provides exactly that information – how much of each capital good must be produced in each annual plan.
- (2) Information from annual planning in years subsequent to drawing up a multi-year investment plan reveals how investment planners initially erred because their estimates of certain parameters was off the mark. This new

information can be used to update and modify the investment plan for years still to come and thereby mitigate welfare losses.

Participatory annual planning was explained and examined at length in Part III. The relevant aspects for present purposes are that the procedure (a) induces worker councils to reveal their true productive capabilities in any given year and (b) generates accurate estimates of the social opportunity costs of using all inputs when the optimal production plan is carried out in any given year. In our present context this means annual planning reveals the true production functions, $F(t)[\text{corn}(t), l(t)]$ and accurate values for $\delta F(t)[\text{corn}(t)^*, l(t)^*]/\delta \text{corn}(t)^*$ and $\delta F(t)[\text{corn}(t)^*, l(t)^*]/\delta l(t)^*$ for $t = 1, 2, 3$.

Bearing all this in mind, the timing and sequencing of investment planning, annual planning, and modifications of investment planning can be arranged as follows for an investment plan that covers three years.

- 1 Every third year, participatory investment planning takes place during November, to create an investment plan covering the next three calendar years.
- 2 Participatory annual planning takes place during December every year, to determine an annual plan to be carried out from January through December of the calendar year that follows.
- 3 On December 31 of every year we receive the results of what happened during the previous year, which for convenience, we will assume become immediately available.
- 4 Every three-year initial investment plan is revised twice: It is revised for the first time in January after the first year is over and the actual results of what happened in the economy during the first year of the three-year investment plan are available. While it is too late at this point to change investment for the first year, it is not too late to revise the levels of investment for years 2 and 3. After which an expedited version of participatory annual planning takes place using the new values from the updated investment plan, which yields some revisions to the annual plan for year 2, which has already been launched.
- 5 The initial investment plan is revised for a second time in January after the second year is over and the actual results of what happened in the economy during the second year of the three-year investment plan are available. This “second bite of the apple” cannot change investment for years 1 or 2, but it can again revise the level of investment for year 3. After which an expedited version of participatory annual planning takes place using the new values from the updated investment plan, which yields some revisions to the annual plan for year 3.

To grasp how all this might work, let's see what would happen under our simplifying assumptions – namely, that (a) there is only one good, corn, which can

either be consumed or saved and invested, and (b) investment planners know the world will end after the third year. We assume the economy producing only corn has been running for a number of years, but now planners know the economy will function for three more years, after which the world will end on December 31 of the third year. It is November 1 of the year prior to year 1, which we will call year zero, and implementation of the annual plan for year zero, which was revised somewhat in February of year zero, is drawing to a close. The last three-year investment plan covered the two years prior to year zero and year zero, so we no longer have an investment plan going forward after December 31 of year zero. What must we do?

During November in year zero we need to engage in participatory investment planning to come up with a new three-year investment plan for years 1, 2, and 3. That plan decides what $s_i(1)^*$, $s_i(2)^*$, and $s_i(3)^*$ will be. Since planners know the world will end on December 31 of year 3, the optimal choice for $s_i(3)^*$ is zero, and there will never be any need to revise this choice. It will also be impossible to revise $s_i(1)^*$ because it will have been implemented before we discover that we may have wished to have revised it. *But there will be both motive and opportunity to revise the amount to save and invest in the second year of the investment plan, $s_i(2)^*$, after results from the economy are known on December 31 of year 1.*

During December in year 0, we need to engage in participatory annual planning to come up with an annual plan for year 1, to be implemented starting January 1 of year 1. Notice that in a more realistic, multi-good world like the one we explore in Chapter 12, where there are many different capital goods, when participatory annual planning takes place in December of year 0, we know the amount of each capital good that must be produced during year 1 because that has already been determined by the investment planning process that took place in November. However, in our one-good world it is simply $s_i(1)^*$, the amount of corn that must be saved and invested that has been decided by the investment plan, which annual planners now take as a “given” when formulating the annual plan for year 1 during December of year 0.

From January 1 through November 30 of year 1, no more planning takes place, and the annual plan for year 1 is launched; what actually happens will differ in some respects from what the annual plan called for, and various adjustments will be made. So what actually happens will differ to some extent from what was initially planned for year 1; however the results of what actually occurred during year 1 are known and available on December 31 of year 1.

Starting on December 1 of year 1, even before these results are known, participatory annual planning for year 2 takes place and is completed by December 31 of year 1. In our one-good world it is the amount of corn that must be saved and invested in year 1, $s_i(1)^*$, as well as the amount that must be saved and invested in year 2, $s_i(2)^*$, which was determined by the initial investment plan ($s_i(3)^* = 0$). However, there is now an opportunity to revise the amount

of corn to be saved and invested during year 2, $s_i(2)^*$, in light of evidence from actual outcomes in year 1.

During January of year 2, the three-year investment plan will be revised and corrected in light of actual results during year 1. In our one-good, three year model, it is $s_i(2)^*$ that we have the opportunity to revise. And since the adjustment will be known by February 1 of year 2, there is still time to repeat an expedited version of participatory annual planning for year 2 using the revised amount for $s_i(2)'$ and make the appropriate adjustments to the annual plan for year 2.

Starting on December 1 of year 2, participatory annual planning for year 3 takes place and is completed by December 31 of year 2. This time there is no need to revise $s_i(3)^*$ because $s_i(3)^* = 0$ is still optimal, given the fact that planners know the world will end on December 31 of year 3. If this were not the case, we would take advantage of the fact that there is a second opportunity to revise $s_i(3)^*$ in a second revision of the three-year investment plan during January of year 3 based on the actual results in the economy during year 2.

Welfare gains from updating investment plans

To illustrate how this can work, in this section we explore an example of how to adjust for assumptions about future increases in productivity that prove to be inaccurate.¹¹ Suppose investment planners *underestimate* technological improvements in years 2 and 3 when drawing up the initial investment plan. Suppose technological change will actually increase economic productivity in years 2 and 3 compared to year 1 as follows: $F(1) = \sqrt{\text{corn}(1)l(1)}$, $F(2) = \sqrt{2\text{corn}(2)l(2)}$, and $F(3) = \sqrt{2\text{corn}(3)l(3)}$. But investment planners fail to anticipate these improvements in productivity in years 2 and 3 and believe instead that productions functions will remain the same in years 2 and 3 as they were in year 1: $F(1) = \sqrt{\text{corn}(1)l(1)}$, $F(2) = \sqrt{\text{corn}(2)l(2)}$, and $F(3) = \sqrt{\text{corn}(3)l(3)}$.

November year 0: As we calculated before, when participatory investment planning takes place based on what is now *incorrect* information about future productivity, it will arrive at the following production, saving/investment, and consumption plan:

$$t = 1: x(1)^* = 5.65685, s_i(1)^* = 2.36628, c(1)^* = 3.29057$$

$$t = 2: x(2)^* = 4.35089, s_i(2)^* = 1.56968, c(2)^* = 2.78121$$

$$t = 3: x(3)^* = 3.54365, s_i(3)^* = 0.00000, c(3)^* = 3.54365$$

December year 0: When participatory annual planning for year 1 takes place, the annual plan will be required to save and invest 2.36628 units of corn out

of however much corn is produced in year 1. Assuming participatory annual planning is efficient, it will call for production of $F(1) = \sqrt[4]{\text{corn}(1)l(1)} = \sqrt[4]{(4)(8)} = 5.65685$ units of corn and therefore have $5.65685 - 2.36628 = 3.29057$ units left over for consumption in year 1, which will generate $\sqrt[3]{3.29057} = 1.81399$ units of welfare.

December year 1: When participatory annual planning for year 2 takes place, the annual plan for year 2 will be required to save and invest 1.56968 units of corn out of however much corn is produced in year 2. As explained in Part III, because participatory annual planning is designed to induce producers to reveal their true capabilities – which are $\sqrt[2]{\text{corn}(2)l(2)}$, and *not* $\sqrt[4]{\text{corn}(2)l(2)}$ as investment planners in November of year 0 believed they would be – the annual plan for year 2 will call for production of $F(2) = \sqrt[2]{\text{corn}(2)l(2)} = \sqrt{(2)(2.36628)}(8) = 6.15309$ units of corn, leaving $6.15309 - 1.56968 = 4.58341$ units of corn for consumption in year 2, which will generate $\sqrt[4]{4.58341} = 2.14089$ units of welfare.

December 31 year 1: At this point when the annual plan for year 2 is complete, it will become apparent that something is amiss because according to the annual plan for year 2, the marginal productivity of corn will be different from the marginal productivity of corn in year 2 according to the initial investment plan. Given the fact that saving and investing corn was actually more productive than investment planners initially anticipated, and therefore the initial investment plan called for too little saving and investment, the marginal product of corn in year 2 will be higher according to the annual plan for year 2 than it was anticipated to be by the initial investment plan:

According to the annual plan for year 2, calculated during December of year 1 where the correct production function will be revealed as $x(2) = \sqrt[2]{[\text{corn}(2)]l(2)}$, the marginal product of corn in year 2 will be $\delta x(2)/\delta \text{corn}(2) = \sqrt[4]{l(2)}/[\sqrt[2]{\text{corn}(2)}] = \sqrt{8}/\sqrt[2]{s\&i(1)\star} = \sqrt{8}/\sqrt{(2)(2.36628)} = 1.30016$. But according to the initial investment plan, calculated during November of year 0 where it was assumed that $x(2) = \sqrt[4]{[\text{corn}(2)]l(2)}$, the marginal product of corn in year 2 was projected to be: $\delta x(2)/\delta \text{corn}(2) = \sqrt[4]{l(2)}/[2\sqrt[4]{\text{corn}(2)}] = \sqrt{8}/[2\sqrt[4]{s\&i(1)\star}] = \sqrt{8}/(2\sqrt[4]{2.36628}) = 0.91935$.

This discrepancy reveals that when we initially formulated the investment plan, we incorrectly assumed that $\delta x(2)/\delta \text{corn}(2)$ was lower than it turned out to be. And since we now know that $\delta x(2)/\delta \text{corn}(2) = 1.30016$ when $\text{corn}(2) = 2.36628$, we know that $F(2)$ must, in truth, be equal to $\sqrt[2]{[\text{corn}(2)]l(2)}$ and not $\sqrt[4]{[\text{corn}(2)]l(2)}$. If we assume that $F(3)$ will also be $\sqrt[2]{[\text{corn}(3)]l(3)}$ and not $\sqrt[4]{[\text{corn}(3)]l(3)}$, we can recalculate a new investment plan for years 2 and 3 to mitigate the welfare loss from our initial underestimation of $F(2)$ and $F(3)$. We designate optimal values for the revised investment plan with a single apostrophe.

January year 1: It is too late to go back and increase $s\&i(1) = 2.36628$, and under our assumptions the optimum choice for $s\&i(3)$ remains zero. But it is not too late to change $s\&i(2)$ in light of our new information about $F(2)$ and $F(3)$.

We know $\text{corn}(2) = s\&i(1) = 2.36628$, and therefore $x(2) = \sqrt{2}[s\&i(1)\star][l(2)] = \sqrt{2}(2.36628)(8) = 6.15309$. Which means that $c(2) = [6.15309 - s\&i(2)]$. We also know that because $s\&i(3) = 0$ that $c(3) = x(3) = \sqrt{2}[s\&i(2)](8) = \sqrt{16}[s\&i(2)] = 4\sqrt{[s\&i(2)]}$. As always $dU(2)[c(2)]/dc(2) = 1/2\sqrt{c(2)}$ and $dU(3)[c(3)]/dc(3) = 1/2\sqrt{c(3)}$. And finally, with $F(3)$ actually equal to $\sqrt{2}[\text{corn}(3)][l(3)] = \sqrt{2}s\&i(2)(8) = \sqrt{16}s\&i(2) = 4\sqrt{s\&i(2)}$, we have $\delta F(3)[\text{corn}(3), l(3)]/\delta \text{corn}(3) = 4/2\sqrt{s\&i(2)} = 2/\sqrt{s\&i(2)}$.

Only optimality condition B is relevant or necessary:

$$dU(2)[c(2)]/dc(2) = \{\delta F(3)[\text{corn}(3), l(3)]/\delta \text{corn}(3)\} \{dU(3)[c(3)]/dc(3)\}$$

Substituting in two steps:

$$1/[2\sqrt{c(2)}] = \{2/\sqrt{s\&i(2)}\} \{1/[2\sqrt{c(3)}]\}$$

Substituting $c(2) = [6.15309 - s\&i(2)]$ and $c(3) = 4\sqrt{s\&i(2)}$:

We have:

$$1/\{2\sqrt{[6.15309 - s\&i(2)]}\} = \{2/\sqrt{s\&i(2)}\} \{1/\{2\sqrt{[4\sqrt{s\&i(2)]}\}\}$$

And finally:

$$1/\{2\sqrt{[6.15309 - s\&i(2)]}\} = \{1/\{2[s\&i(2)]^{3/4}\}$$

Using www.wolframalpha.com to solve this single equation in our single unknown yields $s\&i(2)' = 2.4105$, our new optimal value for saving and investment in year 2, based on our new more accurate information about how productive saving and investing actually is. Not surprisingly $s\&i(2)' = 2.4105 > 1.56968 = s\&i(2)\star$ when planners did not anticipate any increase in productivity in years 2 and 3.

Our new, revised plan, which consists of the same plan for year 1 that was too late to change, but adjustments in our plans for years 2 and 3 is now:

$$t = 1: x(1)' = 5.65685, s\&i(1)' = 2.36628, c(1)' = 3.29057$$

$$t = 2: x(2)' = 6.15309, s\&i(2)' = 2.41050, c(2)' = 3.74259$$

$$t = 3: x(3)' = 6.21031, s\&i(3)' = 0.00000, c(3)' = 6.21031$$

To help readers understand how our updating process works, we compare social welfare in three scenarios: (1) How high would SW be if a benevolent, omniscient planner drew up our three-year plan based on accurate information about future productivities? (2) How high would SW be if the initial plan based on incorrect information about $F(2)$ and $F(3)$ were carried out *without adjustment*? And (3) how high will SW be if the initial plan *is adjusted* after year 1 when new information becomes available about what $F(2)$ and $F(3)$ actually are?

We begin with $SW(c(1)', c(2)', c(3)')$ for the adjusted plan we just calculated:

$$SW' = \sqrt{3.29057} + \sqrt{3.74259} + \sqrt{6.21031} = 1.81399 + 1.93458 + 2.49205 = 6.24062$$

What would happen if we did *not* correct for mistaken assumptions about $F(2)$ and $F(3)$ and simply implemented the initial investment plan without adjustment? This would *not* yield the same result we calculated in section 2 because the actual production functions for years 2 and 3 will be different from those assumed in that calculation. To see what would happen if we did not correct the initial investment plan, we need to use the same investment plan, $s\&i(t) \star t = 1, 2, 3$ as calculated in section 2, but use the *true* production functions: $F(1) = \sqrt{\text{corn}(1)l(1)}$, $F(2) = \sqrt{2\text{corn}(2)l(2)}$, and $F(3) = \sqrt{2\text{corn}(3)l(3)}$: This uncorrected plan is:

$$t = 1: x(1)'' = 5.65685, s\&i(1)'' = 2.36628, c(1)'' = 3.29057$$

$$t = 2: x(2)'' = 6.15309, s\&i(2)'' = 1.56968, c(2)'' = 4.58341$$

$$t = 3: x(3)'' = 5.01147, s\&i(3)'' = 0.00000, c(3)'' = 5.01147$$

In which case, we would have $SW(c(1)'', c(2)'', c(3)'')$:

$$SW'' = \sqrt{3.29057} + \sqrt{4.58341} + \sqrt{5.01147} = 1.81399 + 2.14089 + 2.23863 = 6.19351$$

Clearly, making the adjustment – increasing $s\&i(2)$ from 1.56968 to 2.41050 – was worthwhile since it increased welfare by $6.24062 - 6.19351 = +.04711$ units. However, while our adjusted investment plan gives better results than the unadjusted investment plan, the adjusted plan is not as good as the plan that a benevolent, omniscient planner with *correct* information about future production functions would have calculated:¹²

$$t = 1: x(1)^\wedge = 5.65685, s\&i(1)^\wedge = 2.78902, c(1)^\wedge = 2.86783$$

$$t = 2: x(2)^\wedge = 6.68014, s\&i(2)^\wedge = 2.56710, c(2)^\wedge = 4.11304$$

$$t = 3: x(3)^\wedge = 6.40887, s\&i(3)^\wedge = 0.00000, c(3)^\wedge = 6.40887$$

In which case we would have had: $SW(c(1)^\wedge, c(2)^\wedge, c(3)^\wedge)$

$$SW^\wedge = \sqrt{2.86783} + \sqrt{4.11304} + \sqrt{6.40887} = 1.69347 + 2.02806 + 2.53157 = 6.25310$$

Since $SW^\wedge = 6.25310 > 6.24062 = SW'$, not surprisingly, an omniscient investment plan would outperform our adjusted investment plan by 0.01248 units of

welfare. The reason we cannot do as well as the omniscient planner can even when we update the investment plan is that she is able to increase saving and investment in year 1 as well as year 2 in light of her more accurate information about what $F(2)$ and $F(3)$ will be, while we are stuck with a suboptimal level of saving and investment in year 1 based on our underestimation of future technological capabilities. However, when investment planning is done initially, there will inevitably be mistaken estimates of important future parameters. So the best that can be done is to identify those mistakes as quickly as possible, update parameters accordingly, and recalculate later years in the investment plan to mitigate welfare losses – as we have just demonstrated can be done. To quote a popular saying, hopefully our proposal will prove to be *more than* “good enough for government work!”

Conclusion

A simple, one-good, three-year model is sufficient to shed light on two crucial questions regarding investment planning: (1) How can investment planning be done democratically with maximum participation by workers and consumers? (2) How can we solve the missing information problem in a way that mitigates welfare losses, since initial investment plans must, necessarily, be based on assumptions about future preferences, technologies, and labor supplies that will inevitably prove to be somewhat inaccurate? In a simple setting we proposed first, how aggregate investment planning can be carried out in a democratic and participatory way, and second, how participatory aggregate investment planning and participatory annual planning can be integrated so as to reveal and correct inevitable errors in initial investment plans and thereby mitigate welfare losses. What remains is to generalize these insights to a more realistic world where there are many goods, including many different capital goods and we must decide how much of each capital good to produce each year.

Notes

- 1 Allison Kerkhoff is co-author of “Integrating investment and annual planning” (Hahnel and Kerkhoff 2019), which establishes key results in this chapter, and is therefore also an honorary co-author of this chapter.
- 2 While the assumption that the world ends after three years does mean there are no future generations to be disadvantaged when investment is truncated, it is clearly not a real solution to the truncation problem. And indeed, as readers will see, our “optimal” solutions to this simple model do display an unsatisfying reduction in investment because the “world end” assumption renders zero investment in year 3 optimal. But as explained in Chapter 3, we ignore the truncation problem for which there are adequate solutions in the literature to focus on other issues here.
- 3 Of course land is needed to grow corn. We will introduce land and other primary inputs as well into more realistic models later. For the moment assume land is so abundant that it is like sunlight, which is also necessary to produce corn, but unlike labor and seed, corn we needn’t account for as inputs in our production functions.

- 4 $\delta F(t)[\text{corn}(t), l(t)]/\delta \text{corn}(t) = \delta/\delta \text{corn}(t) \{\text{corn}(t)l(t)\}^{1/2} = (1/2)\{\text{corn}(t)l(t)\}^{-1/2}l(t) = l(t)/2\sqrt{\text{corn}(t)l(t)} = \sqrt{l(t)}\sqrt{l(t)}/2\sqrt{\text{corn}(t)}\sqrt{l(t)} = \sqrt{l(t)}/2\sqrt{\text{corn}(t)}$. The derivation is similar for $\delta F(t)[\text{corn}(t), l(t)]/\delta l(t) = \sqrt{\text{corn}(t)}/2\sqrt{l(t)}$.
- 5 We used www.wolfram.com to solve these and other equations in this chapter. We named our key variables $s\&i(1)$ and $s\&i(2)$ in order to emphasize that what we are solving for is the amount of corn to be saved *and* invested in year 1 and year 2. However, unfortunately this notation confuses Wolfram. In order to replicate our results, readers should use simpler notation such as x for $s\&i(1)$ and y for $s\&i(2)$ before entering equations A and B into Wolfram.
- 6 The necessity of basing investment decisions on guesses applies to market economies as well. But in the case of market systems, investors must also make guesses about what competitors are deciding to do. In other words, investment decisions in market economies are based on a great deal *more* missing information and uncertainty.
- 7 In capitalist economies both kinds of research are usually carried out by producers despite perverse incentives that are seldom noted, which result from putting producers in charge of research about new products for consumers.
- 8 Note that what investment planners need to know is the likely increase in productivity that will result from improvements in technologies – changes in $F(t)[\text{corn}(t), l(t)]$ $t = 2, 3$. While this is one reason labor productivity and therefore per capita income will increase over time, increases in productivity and income will also come from capital deepening. But the optimal trajectory for capital deepening is precisely what investment planning will determine based on estimates of changes in technology, preferences, and future labor supplies.
- 9 As readers will see, education plans will provide information about future $l(t)$'s.
- 10 The same reasoning applies to the debate over how much to save and invest in year 2, so we needn't repeat what follows with regard to equation B.
- 11 The same reasoning applies to inaccurate assumptions about future preferences and labor supplies. In other words, when subsequent annual plans reveal that assumptions about future preferences and labor supplies made during investment planning were inaccurate, we could update the investment plan to mitigate welfare losses in these cases as well.
- 12 In this case our equations are (A): $1/2\sqrt{[5.65685 - s\&i(1)]} = \{2/\sqrt{s\&i(1)}\} \{1/2[\sqrt{[16s\&i(1)]} - s\&i(2)]\}$ and (B): $1/2[\sqrt{[16s\&i(1)]} - s\&i(2)] = 1/[2s\&i(2)^{3/4}]$. Using Wolfram: $s\&i(1)^{\wedge} = 2.78902$ and $s\&i(2)^{\wedge} = 2.56710$.

Reference

- Hahnel, R. and A. Kerkhoff. 2019. "Integrating investment and annual planning." *Review of Radical Political Economics* (52, 2): 222–238.
- Rawls, J. 1971. *A Theory of Justice*. Cambridge MA: Harvard University Press.

12 Comprehensive investment planning¹

The single-good corn model can be reinterpreted as a traditional macroeconomic growth model. Translating into familiar terms used in traditional aggregate macroeconomic models, our $x(t)$ represents aggregate production, $X(t)$; our $c(t)$ represents aggregate consumption, $C(t)$; our $s\&i(t)$ represents aggregate investment, $I(t)$, and therefore $X(t) = C(t) + I(t)$. And under our simplifying assumptions, $K(t)$ is always the same as investment in the previous year, $I(t-1)$, so the traditional aggregate production function, $X(t) = F(t) [K(t), L(t)]$, becomes $X(t) = F(t) [I(t-1), L(t)]$. In this interpretation our solutions in Chapter 11 become solutions for $X(t)^*$, aggregate production; $C(t)^*$, aggregate consumption; and $I(t)^*$, aggregate investment for $t = 1, 2, 3$. In short, in Chapter 11 we have already proposed how to formulate, and update, an aggregate investment plan over a series of years. This chapter addresses how to turn this decision about aggregate investment in each year, $I(t)$, into a detailed, or comprehensive investment plan that decides:

- How much of many *different* capital, or investment goods we should produce each year.
- How we should allocate, distribute, or assign “user rights” over these *different* capital goods to *different* firms in *different* industries each year.

Producing the efficient amounts of different capital goods

We begin with the results of the updated, participatory, macroeconomic, investment planning procedure – that is, the most recently updated or revised decision about what fraction of production to devote to investment and what fraction to devote to consumption every year over a sequence of years. Recall that the key optimality conditions for an efficient three-year investment plan are:

The last bushel of corn consumed in year 1 increases utility in year 1 by the same amount as the last bushel of corn saved/invested in year 1 increases corn production in year 2 **times** the amount the last bushel of corn consumed in year 2 increases utility in year 2:

$$(A) \quad dU(1)[c(1)]/dc(1) = \{dU(2)[c(2)]/dc(2)\} \{\delta F(2)[\text{corn}(2), l(2)]/\delta \text{corn}(2)\}$$

And the last bushel of corn consumed in year 2 increases utility in year 2 by the same amount as the last bushel of corn saved/invested in year 2 increases corn production in year 3 **times** the amount the last bushel of corn consumed in year 3 increases utility in year 3.

$$(B) \quad dU(2)[c(2)]/dc(2) = \{dU(3)[c(3)]/dc(3)\} \{\delta F(3)[\text{corn}(3), l(3)]/\delta \text{corn}(3)\}$$

Since $\text{corn}(2) = s\&i(1)$, and $\text{corn } 3 = s\&i(2)$, this gave us two equations in two unknowns, $s\&i(1)$ and $s\&i(2)$, which we solved for the optimal levels of saving and investment in the first two years of the plan. (The optimal level for $s\&i(3)$ is always zero because for convenience we assumed the planners knew the world would come to an end after year 3 was over.) The major problem discussed last chapter was that since planners cannot know in advance what the production technologies, consumer preferences, or labor supplies will be in years 2 and 3 when they draw up the plan initially, they must proceed based on their best guesses of what they will be, and these best guesses will turn out to be erroneous to some extent. However, we demonstrated how the annual plan in years 1 and 2 will reveal any mistakes in these regards and thereby allow planners to update their investment plan for years 2 and 3 accordingly to improve outcomes.

The result was what we might call a “best possible,” updated aggregate investment plan consisting of what was originally believed to be the optimal value of $s\&i(1)^* = s\&i(1)' = 2.36628$, which could not be updated; the revised optimal value for $s\&i(2)' = 2.41050$; and $s\&i(3)^* = s\&i(3)' = 0$. But notice that once we have these values for $s\&i(1)'$ and $s\&i(2)'$ this allows us to calculate the marginal social product of investment in seed corn each year: $\delta F(2)[s\&i(1)', l(2)]/\delta s\&i(1)'$ and $\delta F(3)[s\&i(2)', l(3)]/\delta s\&i(2)'$. (We know the marginal social product of investment in year 3 is zero since the world ends after year 3.) This information is the key to translating a decision about the optimal level of aggregate investment we find from solving equations A and B into decisions about how much of each different kind of capital good we should produce each year:

We should keep producing any capital good, in any year, up to the level at which its marginal social product is equal to the marginal social product of investment for the “best possible” level of aggregate investment for that year. In short, we have found “benchmarks” from information available from the “best possible” aggregate investment plan that tell us when we have produced the efficient amount of any capital good in any year.

What remains is to find a participatory, democratic procedure that will produce these amounts of each capital good each year. To illustrate using our model: The actual production functions for years 2 and 3 turned out to be: $F(2) = \sqrt{[2][s\&i(1)][l(2)]}$ and $F(3) = \sqrt{[2][s\&i(2)][l(3)]}$. Therefore:

$$\begin{aligned} \delta F(2)[[s\&i(1), l(2)]/\delta [s\&i(1)] &= \{\sqrt{l(2)}\}/\{\sqrt{[2s\&i(1)]}\} \\ \delta F(3)[[s\&i(2), l(3)]/\delta [s\&i(2)] &= \{\sqrt{l(3)}\}/\{\sqrt{[2s\&i(2)]}\} \end{aligned}$$

Substituting the supplies of labor in each year, $l(2) = l(3) = 8$ and the values we calculated in our revised “best possible” plan for $s(1)' = 2.36628$ and $s(2)' = 2.41050$, we find that the marginal social product of investment in year 1 is 1.30016, and the marginal social product of investment in year 2 is 1.28818.

This means that in our economy when we implement our best aggregate investment plan, at the margin, we are giving up 1 bushel of corn consumption in year 1 for 1.30016 bushels of corn produced in year 2 and 1 bushel of corn consumption in year 2 for 1.28818 bushels of corn produced in year 3. The reason it is not optimal to keep saving and investing up to the point where we are foregoing 1 bushel of consumption in an earlier year to produce exactly 1 bushel the following year is this: Even though we have assumed that the utility functions for consumers are the same in both years, we have also assumed that the marginal utility of consumption falls as consumption rises. So if consumption is higher in any year, the marginal utility of consumption will be lower in that year. In our “best possible” production, saving/investment, consumption plan $c(1)' = 3.29057$, $c(2)' = 3.74259$, and because there is no point saving and investing during year 3, so all corn produced in year 3 is consumed, $c(3)' = 6.21031$. In other words, in our “best possible” plan, consumption is higher in every subsequent year, and therefore, the marginal utility of consumption is lower in every subsequent year. So, for efficiency conditions (A) and (B) to be met, we need the marginal productivity of investment in year 2, $\delta F(2)[s(1), l(2)]/\delta s(1)$, and the marginal productivity of investment in year 3, $\delta F(3)[s(2), l(3)]/\delta s(2)$, both to be greater than one.²

Extending this logic to a “best possible” macroeconomic aggregate investment plan, what we have discovered is that whenever we invest in year 1, we need to achieve a 30.016% return on that investment, and whenever we invest in year 2, we need to achieve a 28.818% return. The implication for each capital good we can produce in year 1 is that we should keep producing more of that capital good up to the point where it allows us to produce something in year 2 that will be 30.016% more valuable than what it cost us to produce the capital good in year 1 – *not* keep producing each capital good all the way up to the point where it allows us to produce something in year 2 that is of equal value to what it cost us to produce the capital good in year 1. Similarly, the implication for each capital good we can produce in year 2 is that we should keep producing more of that capital good up to the point where it allows us to produce something in year 3 that is 28.818% more valuable than what it cost us to produce the capital good in year 2 – *not* keep producing each capital good all the way up to the point where it allows us to produce something in year 3 that is of equal value to what it cost us to produce the capital good in year 2.

This may strike readers familiar with traditional marginal efficiency conditions as counterintuitive. For example, we are taught in our microeconomic theory classes that profit maximizing firms should keep expanding output up to the point q' where marginal cost equals marginal revenue product:

$MC(q') = MRP(q')$. However, if the going rate of interest in the economy is r , the marginal cost of expanding output for the firm is $MC(q)(1+r)$ not $MC(q)$.³ In which case the firm should keep expanding output only up to the point q'' where $MC(q'')(1+r) = MRP(q'')$, or what is the same thing, where $MC(q'') = MRP(q'')/(1+r)$. And if marginal costs rise and marginal revenues decline as output increases, q'' must be less than q' . Our situation requires us to take account of something analogous. In our case the analogue of the opportunity cost of money for a firm being $(1+r)$ when the going rate of interest in the economy is r is that because consumption is higher every year in our plan, and because we assume humans experience diminishing marginal utility from consumption, our plan will require that we should only give up something worth \$1 in year 1 if we get something of at least $\$(1+.30016)$ in value in year 2, and we should only give up something worth \$1 in year 2 if we can get something of at least $\$(1+.28818)$ in value in year 3. And this is why it is efficient to produce less of any capital good in each year in our investment plan than would be the case if the marginal utility of consumption were the same in all years, – just as it is efficient for a firm to produce less output when r is positive than when r is zero. Can we devise a decision-making process that will lead to these efficient levels of production for different capital goods in years 1 and 2?

To sort all this out, consider a particular drill press. For convenience we have assumed that every drill press produced during a year becomes available for use at the beginning of the *following* year, and that every drill press physically depreciates *entirely* during the year when it becomes available and is used up, which is the year after it was produced. When the participatory annual planning procedure for this year begins, there will be a stock of drill presses, which the annual planning procedure for this year will allocate to different worker councils in different industries. As already explained, the participatory planning procedure will not only allocate these drill presses efficiently, it will generate an accurate estimate of the opportunity cost of using these drill presses this year.

However, these drill presses, and the estimate of the opportunity cost of using them this year, are *not* the drill presses that will be produced this year. Under our assumptions, the drill presses produced this year become the stock of drill presses that become available at the beginning of *next* year. Of course, when we engage in annual participatory planning again next year, those drill presses will be efficiently allocated, and a reasonably accurate estimate of the opportunity of using them next year will be generated. But our problem is how to decide how many drill presses to produce *this* year and, therefore, what the supply of drill presses will be at the beginning of next year for next year's annual plan to distribute.

We need a procedure we can engage in this year that will settle on a level of drill press production this year that equates the marginal social cost of producing

drill presses, which occurs this year, with the marginal social benefit from having additional drill presses, which will occur next year.

Worker councils that produce drill presses know everything they need to calculate the cost of producing any level of drill presses this year: They know what their production function is this year. And during this year's annual planning process, they will be signaled the opportunity cost of everything they might use to produce drill presses this year – every kind of labor, every kind of natural resource, every intermediate good, and every capital good, including drill presses, if drill presses are used to produce drill presses. Moreover, *if they were quoted an indicative price for their output, which represents an accurate measure of the future social benefit from an additional drill press produced this year that is appropriate for comparison with the social cost of producing it this year, every worker council producing drill presses will offer to produce the socially efficient number of presses this year.* However what that appropriate indicative price is, and how to generate it, are both more complicated in the case of worker councils that produce capital goods, such as drill presses, than it is for worker councils that produce consumption or intermediate goods.

The cost of producing, and the benefit from consuming a consumption good, or using an intermediate good, all occur this year. Moreover, the indicative price for a consumption good is generated by requests for consumption goods this year by CCs and FCCs who participate in this year's annual planning process. And the indicative price for an intermediate good this year is generated by requests for intermediate goods by worker councils that participate in this year's annual planning process. However, there are always *two different drill presses* to consider every year. There are drill presses available at the beginning of this year and drill presses produced this year but available for use only at the beginning of next year. The former were produced and supplied by worker councils producing drill presses in the previous year. And the demand for *these* presses will come from worker councils who wish to use these drill presses as inputs this year. The latter are produced or supplied by worker councils producing drill presses this year. But where does the demand for these second drill presses – drill presses that will only be available to use at the beginning of next year – come from? The demand for these drill presses must also come from worker councils participating in *this* year's planning process.

This means that when worker councils submit proposals this year, they must submit requests for two different drill presses: One request to use drill presses that are available to be used this year and a second, and different, request for drill presses that will be produced this year but only become available for use next year. We know how worker councils will decide how much of the first kind of drill presses to demand: They will demand to use existing drill presses up to the point where the marginal physical product of a drill press they use this year times the indicative price of their output this year is equal to the opportunity cost of using drill presses this year – that is, its indicative price in this year's planning procedure. But how are worker councils, who may want

drill presses next year, going to compare costs with benefits when deciding how many of these second category of drill presses to demand? It is going to involve some guesswork on their part. And the IFB is going to have to do something to help them compare costs that they will be charged for this year, with the benefits they expect to be credited for next year.

WCs demanding drill presses produced this year will be charged the marginal social cost of producing a drill press this year. But they will have to make some guesses about how valuable that drill press will prove to be to them next year. They will have to make a guess about how their production function may change by next year and, therefore, how the marginal physical product of a drill press for them might differ next year from what they know it to be this year. And they will have to make a guess about how the indicative price of their output may change next year as well. Once they have made these guesses, they will estimate what they expect to be credited for during next year's annual planning process because they have an additional drill press to work with next year – that is, how much an additional drill press will allow them to increase the social value of their output next year. However, they will be charged for its cost of production this year, while the benefit they expect from the extra drill press will not come until next year. And under our assumptions, *in order for worker councils to make the socially efficient choice of how many drill presses produced this year to demand, they must be induced to **discount** their best estimate of the marginal social product of a drill press to them next year when equating it to what they will be charged for it this year. And this must somehow be accomplished during the annual planning process that takes place this year.*

The problem is that during the planning process this year, while producers of drill presses are weighing the costs of producing drill presses this year, the demanders are basing their demand on what they expect the benefits of using drill presses will be next year. If productivity rises this, implies a positive rate of time discount, and those benefits next year are not worth as much this year as the demanders have estimated. We need to shift the demand curve that we can expect the demanders of drill presses produced this year to express *downward* to take the positive rate of time discount into account. The easiest way to do this is to have the IFB charge worker councils who demand drill presses produced this year a higher price than the IFB credits worker councils who produce drill presses this year. This will shift the demand curve downward and reduce the amount of drill presses produced this year appropriately from what it would have been otherwise.

The indicative price demanders are charged for drill presses produced this year should be $(1+d)$ times the indicative price producers of drill presses this year are credited for, where $(1+d) = \{dU(t)[c(t)']/dc(t)'\} / \{dU(t+1)[c(t+1)']/dc(t+1)'\}$, and is therefore something the IFB can calculate from information already available from the aggregate investment planning process.

It is helpful to clarify some issues. First, it is *not* inefficient to credit suppliers and charge demanders of drill presses produced during a year different indicative prices when doing so accounts for a positive social rate of time discount

that would otherwise go ignored by demanders. Second, it is *not* inefficient for the indicative prices for drill presses available at the beginning of a year to be different from drill presses only available a year later. There is no reason to expect drill presses available at different times to have the same value to society. And indeed, in a society experiencing an increase in productivity, they do not.

Finally, suppose a worker council responds to the indicative price the IFB quotes to demanders of drill presses produced this year by ordering x drill presses deliverable at the beginning of next year. That worker council may end up using x drill presses next year, but it may end up using more or less than x . Those x drill presses it ordered this year become part of the aggregate stock of drill presses ordered by all worker councils that become available at the beginning of next year's annual planning process. And during next year's annual planning process all worker councils will bid for user rights over those x drill presses as well as all other drill presses produced the previous year. The worker council that ordered x drill presses may decide it wants more or less than x during the annual planning process next year. Moreover, the indicative price it will finally be charged for however many drill presses it successfully bids on and uses next year will be the indicative price that emerges for drill presses available at the beginning of next year's annual planning process, not the indicative price quoted to demanders the previous year. In effect, the original demand for drill presses for use next year is a kind of pre-order, and the price quoted at the time worker councils put in their pre-orders is only a best guess at what the price will end up being. We need these best-guess indicative prices this year to generate the demand this year to produce what we hope will be the socially efficient number of drill presses this year. Any difference between the initial and final indicative prices for drill presses produced during the first year tells us how wrong worker councils who demanded those drill presses were about how much they want them when delivery time arrives.

Allocating user rights for different capital goods efficiently

Once we know how much of each capital good will be produced every year and therefore how much will be available to be allocated among users at the beginning of every year, our annual participatory planning process will allocate those capital goods among the different worker councils in different industries in the economy. Recall that at the beginning of the annual planning procedure an inventory is prepared of the available supplies of all the different "inputs" that any worker council might want to use. These include not only all the different categories of labor used in production (to be determined by the long-term education plan as will be explained in Chapter 12) and all the different non-produced, natural resources available from the natural environment, including the size of environmental sink capacities to store different emissions (to be determined by the long-term environmental plan as will be explained in Chapter 13); it also includes *all the different investment or capital goods available at*

the beginning of the year (as just explained.) And during annual planning, when the IFB announces estimates of the opportunity cost of using each of these inputs, that includes estimates of the opportunity costs of using *each capital good*. So when WCs make self-activity proposals, they not only generate a demand for different inputs from the natural environment, different categories of labor, and different intermediate goods, *they also generate a demand for different capital goods*. When the annual iterative planning procedure continues until there is no longer excess demand for anything, that includes eliminating excess demands for all the different capital goods. Moreover, *as explained in Chapter 7, under standard assumptions, our annual participatory planning procedure will allocate user rights over the stocks of all capital goods to whichever worker councils, in whatever industries, can use them most efficiently and charge worker councils the opportunity cost of using them*. In short, our annual planning procedure can be relied on to allocate whatever vector of capital good stocks is available at the beginning of any year efficiently and charge their users appropriately. As explained, this may mean that a worker council that had expressed a demand for x units of a particular capital good earlier may *not* end up being granted user rights for x units by the end of the annual planning procedure – it may end up with more or less than x – because in the end, the final allocation of capital goods, and the amount worker councils that receive them are charged, is determined during the annual planning process.

Notes

- 1 Allison Kerkhoff is co-author of this chapter as well Chapter 11.
- 2 From (A): Since $\{dU(1)[c(1)']/dc(1)\}/\{dU(2)[c(2)']/dc(2)\} > 1$, $\delta F(2)[s_i(1)', l(2)]/\delta s_i(1)'$ must also be greater than 1. From (B): Because $\{dU(2)[c(2)']/dc(2)\}/\{dU(3)[c(3)']/dc(3)\} > 1$, $\delta F(3)[s_i(2)', l(3)]/\delta s_i(2)'$ must also be greater than 1.
- 3 This is true whether or not the firm must borrow money to expand output, paying r , or can use retained earnings to expand output – in which case the opportunity cost of using retained earnings to expand output is still r since the firm could have presumably loaned their retained earnings out at that rate of interest assuming perfect capital markets.

Part IV: conclusion

In Chapter 11 we used a simple corn model to explain (1) how the division of aggregate output between consumption and investment over a number of years can be determined efficiently and democratically and (2) how decisions about aggregate investment can be updated to improve outcomes. In Chapter 12 we explained (3) how an aggregate investment plan can be transformed by worker councils during annual participatory planning into a detailed investment plan that determines the efficient amount of different capital goods to produce each year and (4) why our annual planning procedure will distribute these different capital goods efficiently to worker councils in different industries. Before moving on in Part V to consider how we propose to do different kinds of long-run “development” planning that cover much longer time horizons efficiently while also maximizing popular participation, we pause to summarize who participates and how they participate in our proposal for how to go about investment planning.

Participants in aggregate investment planning

Aggregate investment planning decides how to divide production between consumption goods and capital goods every year. Clearly, older generations benefit from more consumption now, while future generations benefit when we save and invest more. Clearly, *how much* consumers will benefit from consumption in the future, and *how much* capital goods will increase future production cannot be known with certainty when investment decisions must be made. And clearly, future effects must be estimated by someone in the present generation since future generations are not present when investment decisions must be made. We have attempted to identify who is best suited to make the case for producing more consumption goods, and who is best suited to make the case for producing more capital goods, taking both access to information and self-interest into account. And we have attempted to devise a procedure to induce participants in the present generation to be “honest brokers” regarding the interests of future generations.

As explained, based on access to information, we propose that the National Federation of Consumer Councils (NFCC) assisted by its R&D department

estimate changes in future consumers' utility functions. And we propose that the National Federation of Worker Councils (NFWC), with input from both its R&D department and industry federations of worker councils, estimate changes in future production functions. Together with information about the benefits of more consumption now from the most recent annual plan, these estimates are sufficient to allow the staff of an investment planning agency to calculate the optimal level of saving and investment for each year covered by the investment plan. We also explained how subsequent annual plans will reveal any mistakes in estimations on the part of the NFCC and NFWC. Not only does this provide opportunity to revise and update estimates and recalculate an aggregate investment plan for the remaining years to mitigate welfare losses from inaccurate estimates, it also might expose delegates who made inaccurate estimates to rebuke, replacement, or even punishment if it were determined that inaccuracies were deliberate attempts to be self-serving.

However, we made a further recommendation to help ensure that delegates to the NFCC and NFWC are motivated to behave as "honest brokers" with regard to the interests of future generations. We proposed a "generational equity constraint" limiting the difference in aggregate consumption in adjacent years to some percentage, β . We explained why it would be risky for those in the present generation to vote for a very high β in case investment turned out to be very productive. And we explained how, by voting for a reasonably low β to protect themselves against that eventuality, the present generation would also protect future generations in case investment turned out to be very unproductive. We also explained why we might expect delegates to the NFWC to emphasize the benefits of having more capital goods to work with, which in effect makes them "natural" advocates for the interests of future generations who cannot be present when investment plans are made.

Participants in detailed investment planning

Worker councils bid for "user rights" to any capital goods available at the beginning of any year during the annual participatory planning process. How much of any capital good to produce during any year is decided as follows: The iteration facilitation board quotes an indicative price, $p(k)$, for each capital good k to any worker council who might produce and supply new capital goods that become available for use only at the beginning of the following year. At the same time the IFB quotes a *higher* price, $(1+d)p(k)$, as the indicative price that any worker council who wants to demand capital good k to be delivered at the beginning of next year will be charged, where information available from the aggregate investment plan is sufficient to allow the IFB to calculate d for every year.

So, once citizens have voted on a β in the generational equity constraint; once the NFCC and NFWC have estimated future benefits from consumption and increases in the aggregate capital stock; once an investment planning agency has used these estimates to calculate an efficient *aggregate* investment

plan; once this plan has been revised, if necessary, to satisfy the generational equity constraint; and finally, once this plan has been approved either by the political legislature or a national referendum, the decision about how much of every capital good to produce during each year is decided when worker councils producing new capital goods and worker councils demanding new capital goods respond to a price signal quoted by the IFB, where demanders are charged a price that is $(1+d)$ times whatever price suppliers are credited for. Under our proposal, while everyone votes on β in the generational equity constraint, and everyone may vote on a final investment plan in a national referendum, delegates to the NFCC and NFWC play pivotal roles in estimating future consumption and production functions for an investment planning agency to use to calculate a provisional aggregate investment plan. We do not deny that this is somewhat unfortunate for two reasons:

- Future generations who are among those affected by aggregate investment decisions will have neither voice nor vote. While this is unavoidable, we have proposed a generational constraint to induce those who do participate in the aggregate investment decision to behave as more honest brokers on behalf of future generations.
- Under our proposal aggregate investment planning relies heavily on *delegates* to national federations. Again, while we believe this is unavoidable, we hasten to point out that worker councils are directly involved in decisions about how to distribute user rights over capital goods once they are available, and worker councils are directly involved in decisions about how much of every capital good should be produced every year.

Given how important it is to provide ordinary workers and consumers every opportunity to finally embrace participation in economic decision-making, the fact that delegates must play prominent roles in estimating different parameters in *aggregate* investment planning makes it all the more important that workers and consumers participate directly in *comprehensive investment planning*, and *annual planning*, as we have proposed they can, and should.

Part V

Long-run development planning

Introduction to Part V

Part V is concerned with different kinds of long-run, development planning. In all cases we consider planning horizons which cover multiple decades. Up until now we have treated the annual supplies of different categories of labor and different environmental services as givens during both annual and investment planning. These become endogenous variables during education and environmental planning. Up until now we ignored international trade and international investment. It is time to take international economic relations into consideration and explain how a participatory economy can benefit from international trade and finance and engage in strategic international economic planning. And finally, in an appendix we consider special issues related to infrastructure planning. We will discover that many lessons learned in Part IV regarding how to integrate investment and annual planning to update investment plans and improve outcomes apply to development planning as well. But we will also discover that each kind of development planning poses unique challenges.

Education serves three different purposes, only one of which is to teach people skills that enhance their productivity. Education also serves the purpose of preparing students to participate fully in social decision-making, which in our case entails a great deal more participation in economic decision-making for most people than other economic systems allow or require. And of course, education is also a “consumption good,” with particularly strong preference development benefits as well as preference fulfillment benefits. We discuss all this in Chapter 13.

The natural environment provides services necessary for production. But people also value different aspects of the natural environment as “consumers.” So, as in the case of education planning, consumption benefits must be considered along with contributions to production when we engage in environmental planning. We discuss all these issues in Chapter 14.

We also want participatory economies to benefit from opportunities that international trade and investment make available, and in so doing, we want to take both static efficiency gains, dynamic efficiency gains, and long-run strategic goals into account when engaging in international economic planning. While there is nothing analogous to the consumption benefits from education

and a healthy and wondrous natural environment, there is a special consideration participatory economies must take into account when they enter into international economic relations: As readers now understand, a participatory economy is based on the principle that economic justice demands compensation commensurate with the sacrifices people make. To apply this principle to international economic relations requires ensuring that the lion's share of efficiency gains from international trade and investment go to wherever people's efforts and sacrifices yield smaller economic benefits on average – that is, to whichever country is poorer or less developed. In Chapter 15 we explain how this can be done, while still permitting countries with participatory economies that are more developed to benefit from international trade and financial investment with less developed countries. And finally, in an appendix to Part V we explain how to apply our approach to investment and development planning to investment in infrastructure.

13 Participatory educational planning

When economists study education today, they most often focus on estimating financial returns to education: Do expected future earnings justify the additional personal costs of more education? However, economists sometimes still engage in what was once called “manpower planning,” where they try to identify skills in short supply in order to prioritize educational and training programs to increase the number of people in the labor force who have those skills. The approach we take here is more in this second tradition. It builds on insights from Chapters 11 and 12, where we developed a strategy for doing efficient investment planning in a participatory way. However, education is important for two reasons beyond its effect on economic productivity: Education develops peoples’ capacities to achieve greater fulfillment than would otherwise be possible, and education enhances peoples’ ability to participate effectively in social decision-making of all kinds. These goals are what “educators” insist – quite correctly in our opinion – are the two most important purposes of education. Which means our approach to planning “human capital” must differ in important ways from the approach to planning physical capital in Part IV.

Finally, while we are not presenting an overall program for education, we did make some assumptions about education in Chapter 10 during our discussion of reproductive labor. Before discussing educational planning, it is useful to remind readers of those assumptions:

We assume there will be a robust public education system. We assume this will include not only mandatory K-12 education for all children between the ages of 5 and 18, but also public infant-care and pre-K programs for any parent/guardian who wishes to use them, public associate, bachelors, masters, doctorate, and professional degree programs which anyone is free to apply to, and a variety of educational programs for adults to pursue “lifetime learning.” We also assume *all* education, whether mandatory or optional, will be free of charge, as will all educational materials and food consumed during the school day for students at least through high school. Finally, we assume the question of living stipends for students pursuing non-mandatory higher education after

the age of 18 has been decided along with decisions about living allowances of all kinds through a democratic political process.

We also remind readers that while time spent in the education system, as well as time spent in training programs, will vary among people, because income is based on effort and sacrifice in a participatory economy, the expected income of those with more education will not differ appreciably from that for people with less education. Finally, we mentioned in Chapter 10 that education systems can be national, as they are for example in France and Cuba, or local, as they are in the United States. For convenience in this chapter, we assume a national education system overseen by a Ministry of Education, MinEd.

What does education planning decide?

Just as investment in capital goods makes labor more productive, investment in “human capital” makes labor more productive as well. But all investment comes at the expense of more consumption and/or leisure now – that is, has an opportunity cost. So, just as there is an efficient amount to invest to increase stocks of produced capital goods, there is an efficient amount to invest to increase human capital. And just as there is an efficient distribution of any aggregate level of investment among different capital goods that increase labor productivity to different extents, there is an efficient distribution of aggregate investment in education and training among different kinds of education and training that also increase labor productivity to different degrees. So we need to know how much to invest in education and training in general and how to distribute that investment among different educational programs.

“Producing” education

Since capital goods are produced in worker councils just as final goods and intermediate goods are, production functions for capital goods are presumably similar to production functions for other goods. However, different kinds of human capital are “produced” in education “sites” that we normally do not think of in the same way as we think of production units in the economy. Nonetheless, education “sites” use different services from the natural environment and different labor services as well as different intermediate and capital goods as “inputs” to “produce” different kinds of human capital as “outputs.” So while “educational production functions” for different educational “production sites” may differ significantly from production functions for worker councils in the economy, nonetheless, they transform the same list of inputs into their outputs. What is fundamentally different is not the inputs they use, but differences in education “production functions” and differences in their outputs that include consumption and public service benefits in addition to productivity-enhancing benefits.

Benefits of education

In Chapter 12 we explained that once we have a “best possible” aggregate investment plan, we can calculate a social rate of return that justifies undertaking *any* investment. In the example we explored in Part IV, we discovered that whenever we invest in year 1, we need to achieve a 30.016% return on that investment, and whenever we invest in year 2, we need to achieve a 28.818% return. And we explained that the implication for each capital good we can produce in year 1 is that we should keep producing more of that capital good up to the point where it allows us to produce something in year 2 that is 30.016% more valuable than what it cost us to produce the capital good in year 1. And for each capital good we can produce in year 2, we should keep producing more of that capital good up to the point where it allows us to produce something in year 3 that is 28.818% more valuable than what it cost us to produce the capital good in year 2. However, unlike the case for capital goods, investment in education has benefits above and beyond increasing productive capabilities we must take into account. Broadly speaking, there are three benefits from education:

- a By increasing stocks of human capital, education can increase future production. This benefit is analogous to the benefit from increasing stocks of produced capital goods.
- b Education can also increase people’s capacity to engage effectively in “civic” activities. In a highly participatory society, this benefit is even more important than in societies where decisions are monopolized by a small elite.
- c And finally, education can increase people’s personal satisfaction in two ways: Participating in an educational program can be enjoyable, or gratifying in itself. And education can also develop peoples’ capacities to reap greater satisfaction from opportunities available to them in the future. And while there are preference fulfillment and preference development effects of all human activities, the preference development benefits of education are particularly important.

So in our example, any investment in any educational program in year 1 should produce an increase in $\{(a)+(b)+(c)\}$ which is 30.016% greater than the social cost of the program in year 1. And any investment in any educational program in year 2 should produce an increase in $\{(a)+(b)+(c)\}$, which is 28.818% greater than the social cost of the program in year 2. The only benefit from investments in capital goods are the increases in the value of production they make possible – that is, benefits in category (a). Therefore, any investment in human capital that has *any* positive effects in categories (b) or (c) need *not* achieve as high a return in category (a) as an investment in capital goods must achieve in order to be efficient and warranted.

Investing the efficient amount in education

Let $C(t)$ represent the dollar value of aggregate consumption in year t , and $Iedu(t)$ represent the dollar value of investment in education in year t . Our production function, $F(t)$, now also depends on the human capital stock in year t , which for convenience we assume is equal to the amount invested in education in the previous year, $t-1$, $Iedu(t-1)$, as well as the amount invested in produced capital in the previous year, $I(t-1)$ giving: $F(t)[I(t-1), Iedu(t-1), L(t)]$. Assume for convenience that the political benefits of more education, $Pol(t)$, also depend simply on the amount invested in education in the previous year, $Pol(t)[Iedu(t-1)]$. And even though many of the personal benefits from more education come from the preference development effects that occur for many years, assume for convenience that the personal benefits from more education in year $t-1$ accrue entirely in year t : $U(t)[C(t), Iedu(t-1)]$.

Under these simplifying assumptions, we can rewrite the two efficiency conditions for investment in education in years 1 and 2 in our three-year model as follows:

- A $\delta U(1)/\delta C(1) = \{\delta F(2)/\delta Iedu(1)\}\{\delta U(2)/\delta C(2)\} + \delta U(2)/\delta Iedu(1) + dPol(2)/dIedu(1).$
- B $\delta U(2)/\delta C(2) = \{\delta F(3)/\delta Iedu(2)\}\{\delta U(3)/\delta C(3)\} + \delta U(3)/\delta Iedu(2) + dPol(3)/dIedu(2).$

The term on the left of equation A represents the benefit from spending an additional dollar to produce consumption goods in year 1. The three terms on the right of equation A represent the benefits in year 2 from instead spending an additional dollar on education in year 1: The first benefit is the product of the increase in production in year 2, which additional education spending in year 1 generates by increasing human capital stocks in year 2, times the increase in satisfaction from consumption in year 2 this increase in output makes possible. The second term on the right of equation A represents the additional benefits a more educated populace can reap from the circumstances they encounter in year 2. And the third term on the right of equation A represents the political benefit of having a more educated populace making decisions of all kinds in year 2. Interpretations of the terms in equation B are similar. If we stipulate some actual functions for $F(t)[I(t-1), Iedu(t-1), L(t)]$, $U(t)[C(t), Iedu(t-1)]$, and $Pol(t)[Iedu(t-1)]$, the initial stocks of produced and human capital, and the expected future labor supplies, we would be able to solve the above equations for $Iedu(1)$ and $Iedu(2)$ just as we solved our equations for $s_i(1)$ and $s_i(2)$, the efficient amounts of corn to save and invest, back in Chapter 11.

A note on time frames

Before discussing how we propose to make education planning democratic and participatory, how to use information revealed by annual plans to correct misestimates of parameters and how to recalculate education plans to mitigate welfare losses, a word about time frames is in order. Real-world investment plans should cover at least five years. Whereas education, environment, and strategic international economic plans should cover much longer time periods, in some cases up to half a century or more. Clearly the three-year model we applied in Chapter 11 to illustrate critical features of aggregate investment planning, and extended to a model with multiple capital goods in Chapter 12, does not reflect this aspect of long-run development planning. Nonetheless, as before, the three-year model is sufficient to illustrate the issues we must be concerned with when drawing up plans for investment in education, the environment, and strategic international economic relations that cover many more years. In our three-year model updating takes place only once, after the first year of the plan is over. In the real world, updating would take place every year for plans covering decades. However, we remind readers that we already made one complicating aspect of planning over many decades acute in our three-year model when we assumed that those present in years 1, 2, and 3 are three entirely different generations of people, a complication that obviously becomes more important the longer the time frame of any plan.

Participants

When discussing who participates, and how they participate in education planning, it is helpful to consider different terms in our efficiency conditions. As before, when formulating a three-year education plan, participants will know what the first year utility and production functions are, as well as the labor and human capital stocks available in year 1. But participants will have to formulate estimates of (a) future labor availabilities, $L(2)$ and $L(3)$; (b) future utility functions, $U(2)[Iedu(1), C(2)]$ and $U(3)[Iedu(2), C(3)]$; (c) future production functions, $F(2)[I(1), L(2), Iedu(1)]$ and $F(3)[I(2), L(3), Iedu(2)]$; and (d) future political benefits from education, $Pol(2)[Iedu(1)]$ and $Pol(3)[Iedu(2)]$. Who is best suited to making these different estimates? As in the case of investment planning, we need to consider both access to information and motivation.

As explained in Chapter 11, we believe a generational equity constraint is the best way to make today's generation "honest brokers" on behalf of future generations – which is even more important when formulating long-run plans stretching over many decades. So presumably we already have our β for the generational equity constraint for education planning. But who can best estimate $\delta F(2)/\delta Iedu(1)$ and $\delta F(3)/\delta Iedu(2)$ – that is, how much increases in human capital will increase future production? Who can best estimate the cost of producing more human capital? Who can best estimate $\delta U(2)/\delta Iedu(1)$ and $\delta U(3)/\delta Iedu(2)$ – that is, how much satisfaction consumers will derive from

more education, either because they find their studies enjoyable, or the development effect of education on their personal characteristics permits them to extract more fulfillment from choices available to them in the future? And finally, who can best estimate $\delta\text{Pol}(2)/\delta\text{Iedu}(1)$ and $\delta\text{Pol}(3)/\delta\text{Iedu}(2)$ – that is, how much a better-educated citizenry will improve democratic decision-making in all spheres of social life?

Industry federations of worker councils are the best judges of how much additional human capital will increase production in the future, $\delta F(2)/\delta\text{Iedu}(1)$ and $\delta F(3)/\delta\text{Iedu}(2)$, while the Ministry of Education (MinEd) that oversees various education production “sites” knows best what it costs to “produce” more human capital through education. So we recommend that industry federations of worker councils work together with MinEd to estimate the production benefits and costs of more education. $U(2)[\text{Iedu}(1), C(2)]$ and $U(3)[\text{Iedu}(2), C(3)]$ encompass the human satisfaction and development benefits of education as well as future benefits from consumption. Clearly the NFCC should have insights into future consumption benefits. However, particularly in light of the human development effects of education, those who “produce” education – teachers, curriculum consultants, and administrators – have valuable insights into the long-term personal benefits from education as well. So we propose that the NFCC work in collaboration with the Ministry of Education to estimate $\delta U(2)/\delta\text{Iedu}(1)$ and $\delta U(3)/\delta\text{Iedu}(2)$. Finally, we propose that the national government in consultation with its Ministry of Education be charged with providing planners with estimates of $\delta\text{Pol}(2)/\delta\text{Iedu}(1)$ and $\delta\text{Pol}(3)/\delta\text{Iedu}(2)$, the political “capacitation” benefits of additional education.

Education planning proposal

With the additional features explained earlier, we propose that education planning and revisions of long-term educational plans be done in very much the same way we propose that investment planning be done. Just as the NFWC seemed like the best candidate to advocate for more investment in capital goods, the NFWC together with MinEd seem like the best candidates to advocate for more investment in education. Consider the debate over how much to invest in education in year 1, which is a debate over what level of $\text{Iedu}(1)$, satisfies equation A.¹

$$A \quad \delta U(1)/\delta C(1) = \{\delta F(2)/\delta\text{Iedu}(1)\}\{\delta U(2)/\delta C(2)\} + \delta U(2)/\delta\text{Iedu}(1) + d\text{Pol}(2)/d\text{Iedu}(1)$$

If industry federations and MinEd want to make a convincing case that more should be invested in education in year 1, they must argue that at the level of investment currently under consideration, the right side is greater than the left side in equation A. Neither industry federations nor MinEd have any influence

over $\delta U(1)/\delta C(1)$ because $\delta U(1)/\delta C(1)$ will be revealed by the previous annual planning process. Nor will either have any influence over $\delta U(2)/\delta C(2)$, which will be estimated by the NFCC under the generational equity constraint. However, MinEd will have some influence over $\delta U(2)/\delta Iedu(1)$ since we propose that $\delta U(2)/\delta Iedu(1)$ be estimated by the NFCC *in consultation with MinEd* who might have valuable insights about personal development benefits from education. However, the NFCC has an interest in preventing overinvestment at the expense of present consumption, so presumably it would guard against over exaggeration of benefits by MinEd in discussions about $\delta U(2)/\delta Iedu(1)$. A greater danger is that industry federations might be tempted to agitate for more investment in education than is socially optimal by claiming that $\delta F(2)/\delta Iedu(1)$ is greater than it truly believes it will be, or that MinEd might be tempted to agitate for more investment in education than is optimal by claiming that the cost of producing education is less than it truly believes it will be or by overestimating $\delta Pol(2)/\delta Iedu(1)$ and $\delta Pol(3)/\delta Iedu(2)$ in consultation with political authorities.

So the crucial questions regarding any perverse incentive for industry federations to over exaggerate the benefits of investment in education or MinEd to underestimate the costs of producing education during the participatory education planning process are: (1) Will any overestimate of how productive investment in education truly is, or underestimate of the costs of education be subsequently revealed? And (2) would industry federations and MinEd be sufficiently punished if an over- or under estimation were revealed to prevent industry federations and MinEd from being tempted to exaggerate their enthusiasm to win more investment in education? We will return to these questions shortly.

If the NFCC wants to make a convincing case that more should be consumed and less invested in education in year 1, it must argue that at the level of investment currently proposed the left side is greater than the right side in equation A. The NFCC has no influence over $\delta U(1)/\delta C(1)$ for the same reason MinEd has no influence – because $\delta U(1)/\delta C(1)$ will be revealed by the previous annual planning process. Nor does the NFCC have any influence over $\delta F(2)/\delta Iedu(1)$ because industry federations of worker councils in consultation with MinEd are charged with estimating what those functions will be. So how might the NFCC agitate for more consumption in year 1 than is socially optimal and therefore less investment in education than is socially optimal in year 1? The NFCC might try to underestimate how much satisfaction future consumers will get from consumption – that is, to underestimate $\delta U(2)/\delta C(2)$. Or the NFCC might try to underestimate the human development benefits of education, $\delta U(2)/\delta Iedu(1)$. Again, the crucial questions regarding any perverse incentive for the NFCC during the participatory education planning process are: (1) Will any underestimation of $\delta U(2)/\delta C(2)$ or $\delta U(2)/\delta Iedu(1)$ be subsequently revealed? And (2) would the NFCC be sufficiently punished if an underestimation were revealed to prevent the NFCC from being tempted to lie

in order to win more consumption at the expense of investment in education in year 1? We are now ready to address these questions about perverse incentives for MinEd and the NFCC.

As in the case of investment planning, the good news is that mistaken estimations will be revealed, and the education plan can be revised accordingly. Just as we explained in Chapter 11 that results from annual planning will reveal mistaken assumptions about how productive investment in capital goods truly is, results from annual planning will reveal mistaken assumptions about how productive investment in education truly is. And just as we demonstrated how investment plans can then be adjusted to mitigate welfare losses, education plans can be adjusted to mitigate welfare losses as well. If industry federations and MinEd attempt to exaggerate how productive investment in education will be or underestimate how much education costs to produce, this deception will be revealed, and appropriate corrections can be made. Similarly, results from annual planning will reveal if the NFCC has underestimated future benefits from education and how to revise the education plan accordingly.

The bad news is, once again, that designing penalties for misestimation is less straightforward. As before, we must devise penalties for delegates to the NFCC and industry federations and people in “positions of authority” at MinEd. If it is revealed that industry federations or MinEd overestimated future productivity gains, or underestimated education costs, which led to overinvestment, or that the delegates at the NFCC underestimated future benefits from education, which led to underinvestment; it is possible to replace them, bar them from ever serving as officials or delegates again, or even punish officials and delegates personally if it can be proved that a delegate engaged in a deliberate deception rather than made an honest mistake.

A further piece of bad news is that unfortunately nothing will reveal if estimates of the political capacitation effects of education were in error. Suppose political authorities err and assume that $dPol(2)/dIedu(1)$ is larger than it truly is? This will lead to more investment in education than is optimal. But unlike other mistakes, the results from subsequent annual plans will not reveal the error. If anticipated changes in the breadth and depth of participation in decision-making of all kinds do not materialize, the national government in consultation with MinEd may want to adjust their estimate of $dPol(2)/dIedu(1)$. However, unlike in the other cases, there will be no clear signal that they have misestimated $Pol(2)/dIedu(1)$ to guide them.

Note

- 1 Since the same reasoning applies to the debate over how much to invest in education in year 2, we needn't repeat what follows.

14 Participatory environmental planning

Unique features of environmental planning

In many ways our approach to environmental planning is similar to how we approached education planning last chapter. But it is important to consider some fundamental differences at the outset:

- In the case of human resource planning, the main objective is to manage a growth process efficiently. The goal is to make the labor force more productive over time by increasing the supply of workers with skills that are highly productive but historically in short supply. Put differently, the purpose of human resource planning is to transform a workforce that is suboptimal, given technologies and supplies of other productive inputs, into one that is more productive. To use a sports analogy, when we do human resource planning we are on offense, improving stocks of human capital. However, when we do environmental planning, we are often managing declines in stocks of productive environmental assets so we do not overexploit them. In effect, we concede that the environment will become less optimal over time, and our job is largely to play smart defense to manage the decline efficiently.
- We will speak of “production functions” that produce environmental assets, which in turn provide environmental services as outputs. But clearly these functions are often very different from the kind of production functions for capital goods we discussed in Part IV and also different from educational production functions for different skills or kinds of “human capital” we discussed in the last chapter on education planning. Sometimes the “output” of an environmental production function is to increase the size of the stock of an environmental asset, as in the case of reforestation through planting, or planting cover crops to increase soil nutrients. But sometimes an environmental production function “produces” a diminution in the rate at which an environmental asset is declining, as is the case with all activities which seek to better “conserve” what is already there.

However, there is a larger issue at stake regarding what exactly we are attempting to accomplish regarding the natural environment. Because we are often

orchestrating an efficient defensive retreat, it is easy to lapse into a mind-set that is no longer appropriate. Many environmental “champions” have fought to protect the natural environment from human activities that damage the environment in some way. And indeed, most environmental “victories” have been fought under this banner. An example was when the environmental movement in the United States used the endangered species act to protect the habitat of the spotted owl in Oregon forests through the federal courts to prevent the timber industry from not only rendering the spotted owl extinct but to stop unsustainable forestry practices on large tracts of federally owned land in Oregon as well.

However, the implicit assumption behind this approach is that absent human activity, the natural environment would take care of itself perfectly, and therefore, the goal of environmental activists should be to lighten humanity’s environmental footprint . . . to zero in the limit. Of course, activists operating with this mind-set recognize that zero human impact is possible only if there are zero human beings – or at least they should! Nonetheless, many see the goal as reducing environmental impact per person as close to zero as possible and limiting global population to a size that does not threaten major ecological systems. In short, often the natural environment is viewed as a Garden of Eden that would be perfect if no human ever set foot inside, so when humans are permitted to enter, the goal is to minimize our imprint.

We suggest a different perspective. When there were few humans, and their technologies did not exceed the ability of the environment to regenerate, or self-heal, thinking of the environment as a Garden of Eden made sense. But population size and technologies rendered this situation obsolete long ago. So instead of seeing our job as minimizing our footprint – trying to “tiptoe” through the Garden of Eden while barely touching the ground – we instead need to try to become good gardeners. Being a good gardener often requires us to protect and preserve parts of the garden from harmful human impacts. But understanding that we need to learn how to become better gardeners is fundamentally different than trying to learn how to tiptoe more lightly. In short, we approach environmental planning as embracing our role as “good gardeners.”¹

On a related note, all who have attempted to define environmental sustainability eventually face the following dilemma: It is easy to define an environmentally sustainable production program – including ones where output increases indefinitely over time, *if* it is possible for all environmental inputs to regenerate at some positive rate – as I do in section 2.4 of Hahnel 2017. As long as environmental throughput for every environmental “asset” is no greater than the regeneration rate of the asset, a production program is environmentally sustainable. And as long as the increase in environmental throughput efficiency is at least as great as the increase in labor productivity, output per capita, and therefore, material economic well-being, can continue to grow indefinitely without exceeding regeneration rates assuming a constant population.

However, if there is even a single environmental service that is non-reproducible, and is a necessary input into the production of even a single “basic good,” no positive level of production can be environmentally sustainable. Fortunately, this does not mean we cannot pursue an environmentally sustainable *strategy* as I explain at greater length in chapter 2 in Hahnel 2017. It simply means we need to understand that what an environmentally sustainable strategy reduces to is playing a successful game of “kick the can down the road.” What “kicking the can down the road” consists of is: In production (a) substitute renewable resources for non-renewable resources, (b) substitute more abundant non-renewable resources for ones that are more scarce, and (c) develop technologies that do not use non-renewable resources before they run out. In consumption (a) substitute goods produced with renewable resources for goods produced with non-renewable resources and (b) substitute goods produced with less scarce non-renewable resources for goods produced with non-renewable resources that are more scarce. Fortunately – contrary to what many in the de-growth movement seem to believe – this kind of “kicking the can down the road” can be done while increasing economic well-being far longer than humans need worry about!

What does environmental planning decide?

Once again, what our planning must decide is how much to invest in increasing the size of the stock of some productive asset or, in the present case, reducing how much the stock of a productive asset declines. We explored the logic of expanding stocks of different produced capital goods in Chapters 11 and 12 in Part IV. And we explored the logic of expanding stocks of different kinds of human capital last chapter. The logic is the same, even if in the case of environmental assets what we are planning is often the optimal rate of decumulation instead of accumulation.

As in the case of education planning, we must also take into account benefits from environmental assets that have nothing to do with production. Just as there are often personal benefits from “consuming” more education, there can also be “consumption” benefits from enjoying environmental assets. Environmental economists devote a great deal of time and energy trying to accurately estimate what we call the *use value* and *existence value* people place on environmental assets and their preservation.

Investing the efficient amount to protect the environment

Call $I_{env}(t)$ the amount we invest in the environment in year t . For convenience, assume available environmental inputs in year t are always equal to the amount we invested in the environment in year $t-1$, just as we did previously for human capital, so our production functions now become $F(t)[I_{env}(t-1), I_{edu}(t-1), I(t-1), L(t)]$. Add what environmental economists call the “use value” and “existence value” of environmental assets to consumers’ utility functions, just as

we did previously for the future consumption benefits from education, so our utility functions become $U(t)[C(t), I_{edu}(t-1), I_{env}(t-1)]$. Then the efficiency conditions with respect to investing in environmental protection/enhancement in our three-year model become:

$$A \quad \delta U(1)/\delta C(1) = \{\delta F(2)/\delta I_{env}(1)\} \{\delta U(2)/\delta C(2)\} + \delta U(2)/\delta I_{env}(1)$$

$$B \quad \delta U(2)/\delta C(2) = \{\delta F(3)/\delta I_{env}(2)\} \{\delta U(3)/\delta C(3)\} + \delta U(3)/\delta I_{env}(2)$$

As before, the term on the left of equation A represents the benefit from spending an additional dollar to produce consumption goods in year 1. The two terms on the right side of equation A represent the benefits in year 2 from instead investing an additional dollar on the environment in year 1: The first benefit is the product of the increase in production in year 2, which an additional dollar invested in protecting/enhancing the environment in year 1 generates in year 2, times the increase in satisfaction from consumption in year 2 this increase in output makes possible. The second term on the right of equation A represents the use and existence value to consumers in year 2 of an additional dollar spent on the environment in year 1.² Interpretations of the terms in equation B are similar. If we stipulate initial stocks, expected future supplies of labor, and functions for $F(t)[I_{env}(t-1), I_{edu}(t-1), I(t-1), L(t)]$ and $U(t)[C(t), I_{edu}(t-1), I_{env}(t-1)]$, we could solve the above equations for $I_{env}(1)$ and $I_{env}(2)$, just as we could have solved our equations for $I_{edu}(1)$ and $I_{edu}(2)$ in Chapter 13, and we did solve for $s\&i(1)$ and $s\&i(2)$, the efficient amounts of corn to save and invest, in Chapter 11.

Participants

As in the case of education, when discussing who participates and how they participate in environmental planning, it is helpful to consider different terms in our efficiency conditions. As before, when formulating a three-year environmental plan, participants will know what the first year utility and production functions are as well as the labor and human capital stocks available in year 1. But they will have to formulate estimates of (1) future labor availabilities, $L(2)$ and $L(3)$; (2) future utility functions, $U(2)[C(2), I_{edu}(1), I_{env}(1)]$ and $U(3)[C(3), I_{edu}(2), I_{env}(2)]$; and (3) future environmental “production” functions, $F(2)[I_{env}(1), I_{edu}(1), I(1), L(2)]$ and $F(3)[I_{env}(2), I_{edu}(2), I(2), L(3)]$. Who is best suited to make these different estimates? As before, we need to consider both access to information and motivation.

Environmental planning proposal

We propose that environmental planning, and revisions of long-term environmental plans, be done in very much the same way we propose that education planning be done. As before, we believe a generational equity constraint is

the best way to make today's generation "honest brokers" on behalf of future generations – which is even more important when formulating long-run plans stretching over many decades to prevent overexploitation of the environment than when formulating five-year investment plans. So presumably, we already have our β for the generational equity constraint for environmental planning.

Operating under the generational equity constraint, we believe the National Federation of Consumer Councils (NFCC) is best situated to estimate the existence and use value people will place on changes in the natural environment in the future, $\delta U(2)/\delta I_{env}(1)$ and $\delta U(3)/\delta I_{env}(2)$, just as the NFCC is best suited to estimating $\delta U(2)/\delta C(2)$ and $\delta U(3)/\delta C(3)$. But who can best estimate $\delta F(2)/\delta I_{env}(1)$ and $\delta F(3)/\delta I_{env}(2)$ – that is, how much an increase (or decrease) in environmental assets will increase (or decrease) future production? And who can best estimate the costs of environmental protection/enhancement?

Industry federations of worker councils are the best judges of how much changes in natural capital will affect production in the future, $\delta F(2)/\delta I_{edu}(1)$ and $\delta F(3)/\delta I_{edu}(2)$; while the Ministry for the Environment (MinEnv) knows best what it costs to protect/enhance the environment. So just as we recommended that federations of worker councils in different industries work with the Ministry of Education (MinEd) to estimate $\delta F(2)/\delta I_{edu}(1)$ and $\delta F(3)/\delta I_{edu}(2)$ and the costs of producing education, we recommend that industry federations of worker councils work with the Ministry for the Environment (MinEnv) to estimate $\delta F(2)/\delta I_{env}(1)$ and $\delta F(3)/\delta I_{env}(2)$ and the costs of environmental protection/enhancement – understanding that often what we need to know are the effects of declining stocks of environmental assets on future production.

Just as the NFWC seemed like the best candidate to advocate for more investment in capital goods and MinEd in consultation with industry federations of worker councils seemed like the best advocates for investment in education, MinEnv in consultation with industry federations of worker councils seems like the best candidate to advocate for more investment in the environment. Consider the debate over how much to invest in the environment in year 1, which is a debate over what level of $I_{env}(1)$ satisfies equation A.³

$$A \quad \delta U(1)/\delta C(1) = \{\delta F(2)/\delta I_{env}(1)\}\{\delta U(2)/\delta C(2)\} + \delta U(2)/\delta I_{env}(1)$$

If industry federations and MinEnv want to make a convincing case that more should be invested in the environment in year 1, they must argue that at the level of investment currently under consideration, the right side is greater than the left side in equation A. MinEnv and industry federations have no influence over $\delta U(1)/\delta C(1)$ because $\delta U(1)/\delta C(1)$ will be revealed by the previous annual planning process. They will also have no influence over $\delta U(2)/\delta C(2)$ or $\delta U(2)/\delta I_{env}(1)$, both of which will be estimated by the NFCC under the generational equity constraint. Therefore, the danger is that industry federations might be tempted to agitate for more investment in the environment than is socially optimal by claiming that $\delta F(2)/\delta I_{env}(1)$ is greater than they truly believe it will

be, or that MinEnv might be tempted to claim that the cost of protecting or improving the environment is less than what it truly believes it will be.

So, as before in the case of education planning, the crucial questions regarding any perverse incentive for industry federations and MinEnv to overexaggerate the benefits of investment in the environment or underestimate the costs of protecting or improving the environment during the participatory environmental planning process are as follows: (1) Will any overestimate of how productive investment in the environment truly is or underestimate of the costs of protecting or improving the environment be subsequently revealed? And (2) would industry federations and MinEnv be sufficiently punished if an over- or under exaggeration were revealed to prevent them from being tempted to exaggerate its enthusiasm to win more investment in the environment?

If the NFCC wants to make a convincing case that more should be consumed and less invested in the environment in year 1, it must argue that at the level of investment currently proposed, the left side is greater than the right side in equation A. The NFCC has no influence over $\delta U(1)/\delta C(1)$ because $\delta U(1)/\delta C(1)$ will be revealed by the previous annual planning process. Nor does the NFCC have any influence over $\delta F(2)/\delta I_{env}(1)$ because industry federations of worker councils in consultation with MinEnv are charged with estimating what those functions will be. So how might the NFCC agitate for more consumption in year 1 and, therefore, less investment in the environment than is socially optimal? The NFCC might try to underestimate how much satisfaction future consumers will get from consumption – that is, to underestimate $\delta U(2)/\delta C(2)$. Or the NFCC might try to underestimate the use and existence value of investment in the environment, $\delta U(2)/\delta I_{env}(1)$. Again, the crucial questions regarding any perverse incentive for the NFCC during the participatory environmental planning process are as follows: (1) Will any underestimation of $\delta U(2)/\delta C(2)$ or $\delta U(2)/\delta I_{env}(1)$ be subsequently revealed? And (2) would the NFCC be sufficiently punished if an underestimation were revealed to prevent the NFCC from being tempted to lie in order to win more consumption at the expense of investment in the environment in year 1? We are now ready to address these questions about perverse incentives for industry federations of worker councils, MinEnv, and the NFCC.

As before, the good news is that mistaken estimations will be revealed, and the environmental plan can be revised accordingly. Results from annual planning will reveal mistaken assumptions about how productive investment in the environment truly is, just as they reveal mistaken assumptions about how productive investment in capital goods and education are so that investment in the environment can be adjusted to mitigate welfare losses as well. If industry federations attempt to exaggerate how productive investment in the environment will be, or MinEdu attempts to underestimate how much protection or improving the environment costs, this deception will be revealed, and appropriate corrections can be made. Similarly, results from annual planning will reveal if the NFCC has underestimated the use and existence value of the environment to consumers and how to revise the environmental plan accordingly.

The bad news is, once again, that designing penalties for misestimation is less straightforward. As before, we must devise penalties for delegates to the NFCC and industry federations of worker councils and people in “positions of authority” at MinEnv. If it is revealed that industry federations overestimated future productivity gains or MinEnv underestimated the costs of protecting or improving the environment, which led to overinvestment, or that the delegates to the NFCC underestimated future use and existence value benefits to consumers, which led to underinvestment; it is possible to replace officials at MinEnv and delegates to industry federations of worker councils and delegates to the NFCC, bar them from ever serving again, or even punish MinEnv officials and NFCC and industry federation delegates personally, if it can be proved that they engaged in a deliberate deception rather than made an honest mistake.

Notes

- 1 Science fiction enthusiasts may be familiar with Kim Stanley Robinson’s Mars trilogy, *Red Mars*, *Green Mars*, *Blue Mars*, in which differences arise among settlers sent to Mars from Earth about whether their goal should be to minimize human impact on the fragile ecology of Mars or to “terraform” Mars to become more suitable for human habitation. Whatever was the “right” answer for Mars, our point is that the horses left the barn on Earth long ago, leaving us no choice now but to become *much* better gardeners.
- 2 As already explained, in the case of the environment, the increase in production may well be a reduction in the size of a drop in production, and the increase in use or existence value may be a reduction in the size of the decrease in these values to consumers.
- 3 Again, since the same reasoning applies to the debate over how much to invest in protecting/enhancing the environment in year 2, we needn’t repeat what follows.

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15 Participatory international economic planning

So far we have discussed how to do annual planning, investment planning, and long-run education and environmental planning for a national economy as if it had no economic relations with the economies of other countries. It is time to abandon the assumption of “autarky” and discuss how a country with a participatory economy can and should interact with other economies.

Should a country with a participatory economy engage in international trade (IT)? Should a country with a participatory economy engage in international financial investment (IFI)? Should a country with a participatory economy make direct foreign investments abroad (DFI) or permit DFI by foreigners in its economy? And, if a country with a participatory economy should enter into any of these international economic relationships, how should it go about doing so? Because it will be more important for a participatory economy to participate in international trade than international financial investment, we spend most of this chapter discussing IT and comment briefly on IFI in closing. However, we begin by explaining why a country with a participatory economy should *not* engage in DFI of any kind.

A country with a participatory economy will not have to decide whether any of its worker councils should make direct foreign investments abroad, or whether foreign businesses should be permitted to make direct foreign investments in its participatory economy because DFI is incompatible with a fundamental principle of participatory economics – worker self-management. For reasons already explained in Chapter 2, in a fully formed participatory economy, it is *not* permitted to form private, for-profit businesses. While a “mixed economy” where private enterprises coexist with worker and consumer cooperatives and state-owned enterprises may well be part of the transition to a participatory economy, production takes place only in worker councils and households once a participatory economy is fully established.

Applying this principle of worker self-management to foreign businesses means that DFI by foreign companies also cannot be permitted in a participatory economy because it would turn workers in a participatory economy into employees – in this case of foreign owners – and rob them of their right to self-management. And while worker councils and federations in a participatory economy may encourage and even help establish worker owned cooperatives

in other countries, the principle of economic self-management also does not allow a worker council in a participatory economy to own and operate for profit a business abroad, because that would make foreign workers into employees rather than full members of a worker council with all the rights that entails.

There is a substantial amount of literature analyzing what happened when the Mondragon cooperatives in Spain began to establish foreign subsidiaries where foreign workers were employees rather than equal members of a Mondragon cooperative. Suffice it to say, that experience teaches us why we should *not* permit worker councils in a participatory economy to do likewise, especially since worker councils in a participatory economy will not be subjected to some of the competitive pressures that pushed Mondragon into ventures that violated their defining and most important principle, worker self-management. However, a country with a participatory economy can take advantage of benefits from international trade, and even international financial investment, without violating any of its fundamental principles, provided it follows some rules, as we now proceed to explain.

International context

We assume the global economy will continue to comprise some countries that are more economically advanced and others that are less so. We also assume at least some countries will still have capitalist economies, while there may or may not be other countries practicing something similar to participatory economics. This means we must consider how a country with a participatory economy should interact with countries that are more developed, countries that are less developed, countries with very different economic systems, and eventually with other countries that have economic systems similar to its own. Since it is easier to analyze the case where a country with a participatory economy is small enough so it cannot affect the international terms of trade or international interest rates, we will examine matters for a “small country” practicing participatory economics initially and comment about complications that arise in the case of a large country at the end of this chapter.

Goals

What should be the goals of any country with regard to international trade? Differences in opportunity costs of production among countries create opportunities to benefit from specializing in the production and export of goods in which one enjoys a comparative advantage and importing goods in which trading partners have a comparative advantage. Naturally, like any other country, a country with a participatory economy will want to take advantage of these opportunities. However, those considerations consider only the short-run effects of international trade.

All countries seek to increase their economic productivity, and the pace of productivity enhancing technological change often varies between industries.

This means it is advantageous to enjoy comparative advantages in industries producing products where the pace of technological change is more rapid and productivity increases are greater, and unfortunate if one's comparative advantages lie instead in industries that are more stagnant. In other words: *Not all comparative advantages are created equal!* Moreover, by pursuing strategic trade policies over time, a country can *change* its comparative advantages to become more advantageous, rather than merely accept its historic comparative advantages as a *fait accompli*.

Like any country, a country with a participatory economy should be guided by both these short-run and long-run goals regarding its own self-interests when trading with other countries. However, unlike some other economic systems, participatory economies are based on fundamental principles that must also guide how they participate in the global economy. The two fundamental principles that undergird a participatory economy are its commitment to economic democracy – defined as economic self-management – and economic justice – defined as compensation according to effort, sacrifice, and need. As just explained, a participatory economy *cannot* engage in DFI because to do so would violate its commitment to the principle of economic self-management. But a participatory economy *can* advance its own interests by taking advantage of opportunities provided by international trade and finance without violating its commitment to economic democracy. However, when engaging in international trade and financial investment, a participatory economy must be careful not to violate its commitment to economic justice. In this chapter we explain how a country with a participatory economy can take advantage of IT and IFI in ways that are consistent with, and do not undermine its commitment to economic justice.

Issues to keep in mind

In discussing all this, there are three important issues to keep in mind:

- (1) Sometimes there are global efficiency gains from international trade, but sometimes there are not.

If opportunity costs of producing goods are different in different countries, there are always *potential* efficiency gains from specialization and trade. The theory of comparative advantage is unassailable when it concludes that global efficiency is increased when countries specialize in making goods they are relatively better at producing and import goods some other country is relatively better at producing. But contrary to what is often assumed, this does not mean free trade, or trade liberalization, will always lead to specialization and trade that improves global efficiency.

If commercial prices inside countries do not accurately reflect the true social opportunity costs of traded goods, and/or if commercial transportation costs underestimate the full social costs of international transportation, free trade can

produce counterproductive patterns of international specialization, yielding global efficiency losses rather than gains. Discrepancies between commercial prices and true social costs can send false signals and lead to what we might call *false* comparative advantages, leading in turn to international divisions of labor that are less productive than less specialized patterns of global production would be.¹ As we have explained, in a participatory economy relative prices should accurately reflect true social opportunity costs. However, we must be wary of situations where this may *not* be the case for its potential trading partners.

- (2) Sometimes pursuing short-run benefits from specializing in traditional comparative advantages comes at the expense of developing new comparative advantages in industries where productivity increases will be higher.

The theory of comparative advantage is often interpreted to imply that a country should continue to specialize in its traditional exports, since those would presumably be the industries in which the country enjoys a comparative advantage. But what if productivity increases are less likely in traditional industries than in other industries? Less developed economies are less developed precisely because they have lower levels of productivity than other economies. If less developed economies continue to specialize in traditional sectors they may be *less* likely to increase productivity. In other words, pursuing *static* efficiency gains by continuing to specialize in today's comparative advantages may prevent changes that would increase productivity a great deal more and therefore come at the expense of what we might call *dynamic* efficiency.

This second point has long been the subject of debates over strategic trade policy. The hallmark of the Asian development model, pioneered by Japan, and later imitated with great success by South Korea, Hong Kong, Taiwan, Singapore, and most recently by China, is that these countries did not accept their comparative advantages as a *fait accompli*. Instead, they aggressively pursued policies to create new comparative advantages in industries where it would be easier to achieve larger productivity increases.

Japan moved from exporting textiles, toys, and bicycles right after WWII to exporting steel and automobiles in the 1960s and early 1970s, to exporting electronic equipment and computer products by the late 1970s and early 1980s. The remarkable performance of the Japanese economy from 1950 to 1980 was not the result of *laissez-faire* trade policy by the Japanese government. Japan's successful transition to a different role in the international division of labor was accomplished through an elaborate system of differential tax rates and terms of credit for businesses in different industries at different times, planned by the Ministry of International Trade and Industry (MITI) and coordinated with the Bank of Japan and taxing authorities. The whole point of the exercise was to create new comparative advantages in high productivity industries rather than continue to specialize in industries where productivity growth

was slower. Neither Japan nor any of the other countries that followed the Asian development model allowed relative commercial prices to pick their comparative advantages and determine their pattern of industrialization and trade for them. Had they done so, it is unlikely they would have enjoyed as much economic success as they have.² In any case, the point is it will be very important for any country with a participatory economy that happens to be less developed to take all this into account when making its strategic international economic plans.

(3) Finally, when there are efficiency gains from international trade how should a country with a participatory economy seek to share them with trading partners? And when a country with a participatory economy pursues strategic policies to create new comparative advantages, how should it take its level of economic development relative to its trading partners into account?

For countries with economies lacking any moral compass, these questions never arise. For such countries the answers are simply: “Always strive to capture as large a share of any efficiency gain from international trade as you can for yourself. Always seek to build new comparative advantages in industries with the highest rate of productivity increase.” But a fundamental principle of participatory economics is that *everyone* should be rewarded according to their efforts, sacrifices, and needs. A participatory economy cannot drop this moral principle at its borders – not only because it would be wrong to do so, but also because embracing the doctrine of “dog eat dog” in international economic relations would undermine a fundamental moral principle that undergirds its own economic system. This means that a country practicing participatory economics must sometimes approach the distribution of efficiency gains from international trade and strategic trade policy differently than countries with amoral economic systems.

Three rules to guide trade policy

We propose three rules to guide a participatory economy in choices it makes regarding international trade:

Rule #1 Efficiency Gains: A participatory economy should engage in international trade when, but only when, doing so produces global efficiency gains.

This first rule prevents a country with a participatory economy from participating in international divisions of labor that are actually counterproductive and would also be contrary to its own self-interest. This rule is standard economic trade theory, and we have already discussed the only part that is not always

well understood – namely, that when commercial prices deviate from social opportunity costs, they can mislead countries into pursuing false comparative advantages that create global efficiency losses rather than gains.

Rule #2: The More Than 50% Rule: When a participatory economy negotiates terms of trade, *more* than 50% of any efficiency gain should go to whichever country is less developed.

This second rule ensures that when a participatory economy engages in mutually beneficial international trade, it will be reinforcing rather than undermining a fundamental moral principle that undergirds its own economic system.³

There are currently large differences between levels of economic development in different countries, which means that on average, people in less developed countries (LDCs) receive less for their efforts and sacrifices than people in more developed countries (MDCs). The more than 50% rule recognizes that to a great extent these differences are unjust.⁴ However, the more than 50% rule also acknowledges the practical reality that these historical unjust differences cannot, and need not, be eliminated overnight.

One could make a moral case for distributing 100% of all efficiency gains from trade to LDCs until such time as they reach the same level of development as MDCs. However, we believe to insist that a participatory economy abide by a 100% rule – particularly in a world where many countries still have amoral economic systems and continue to practice “dog eat dog” international economic politics – is unreasonable. We also hasten to point out that what we are talking about here is different from foreign aid where presumably the recipient country is made better off but the donor country is made worse off.⁵ One could argue that MDCs are morally obligated to provide foreign aid to their detriment sufficient to eliminate all differences in living standards between LDCs and MDCs. But that is not what our more than 50% rule, which is far less demanding, requires with regard to international trade and investment. Even if a richer participatory economy strictly applied a 100% rule, it would be no worse off than under autarky. It would simply receive none of the efficiency *gains* from international trade so that its poorer international trading partner might receive the entire efficiency gain. Even so, we think applying a 100% rule would be requiring a participatory economy to do more than is reasonable to expect. What the more than 50% rule does instead is commit a country with a participatory economy to *make material progress* on rectifying long-standing international economic injustices while at the same time benefiting to some extent from trade itself.

To be clear: If a country with a participatory economy is less developed than a trading partner, this frees it to fight for the most favorable terms of trade it can secure. However, when trading with less developed countries, the more than 50% rule restricts how a country with a participatory economy approaches negotiations over terms of trade in order to avoid undermining its own principle of economic justice.

Should it matter if a participatory economy is trading with a country with a capitalist economy rather than a country with an economic system similar to its own? As long as a participatory economy's trading partner is more advanced, it is free to seek the best terms of trade it can secure irrespective of what economic system its trading partner may have. And when trading with a country with an economic system like its own, a country with a participatory economy is obliged to follow rule #2 and agree to terms of trade that give the bulk of the efficiency gain to its less developed trading partner. But what should a country with a participatory economy do when trading with a less developed country with a capitalist economy?

We believe that in general a country with a participatory economy is morally obliged to apply rule #2 in this case as well. However, there may be situations where considerations dictate otherwise. The problem is that granting generous terms of trade to a lesser developed country with an immoral economic system may not benefit the majority of its population, but serve instead to further enrich a privileged minority and consolidate the power of an oppressive government representing their interests. Situations may arise where the government of a country with a more developed participatory economy should take this consideration into account.⁶

Rule #3 Climbing the Ladder of Comparative Advantage: When considering strategic trade policies to change comparative advantages over time, a participatory economy should take relative levels of economic development among trading partners into account.

This third rule is also necessary to prevent a participatory economy from violating its commitment to economic justice. As already explained, not all comparative advantages are created equal, and through strategic trade policies, countries can change their comparative advantages over time to develop new comparative advantages in industries where productivity increases are higher.

As in the case of rule #2, in some cases, rule #3 does not restrain a country with a participatory economy, but in other cases it does. If the country with a participatory economy is underdeveloped, it is free to engage in aggressive strategic trade policies to climb the ladder up to more advantageous comparative advantages as quickly as possible. On the other hand, if the country with a participatory economy is highly developed, rule #3 imposes constraints on how it approaches strategic trade policy, just as rule #2 imposes constraints on how it approaches negotiations over terms of trade. Because the relative advantages of different comparative advantages are more complicated to estimate than how terms of trade distribute efficiency gains, admittedly it will be more difficult for participatory economies to apply rule #3 than rule #2 when they seek to do so to avoid hypocrisy and undermine the moral glue that holds their participatory economy together. Nonetheless, we now explain how it can be done.

Evaluating comparative advantages

Determining how terms of trade distribute efficiency gains to trading partners is straightforward enough. However, evaluating how advantageous different comparative advantages are is more complicated because simple increases in output per hour for an industry is not the same as how much changes in technology in the industry increase *overall* economic productivity. Fortunately, a theorem proven in Hahnel 2017 allows us to calculate how much any technical change introduced in any industry increases overall labor productivity in the economy.

Let \mathbf{A} be the $(n \times n)$ input output matrix for the economy, \mathbf{L} be the $(1 \times n)$ row vector of direct labor input coefficients, and \mathbf{b}^\wedge be a $(n \times 1)$ column vector representing a real wage bundle per hour worked, which is sufficiently high to render the initial rate of profit in the economy equal to zero. Let $\{\mathbf{A}^*, \mathbf{L}^*\}$ represent the input output matrix and labor input vector for the economy *after* a new technology in some industry replaces the old technology in that industry. Part III of theorem 18 in Hahnel 2017 states: The size of the change in overall labor productivity caused by any change in technology in any industry is $\rho(l) = (1 - \beta')$ where $\beta' = \text{dom}(\mathbf{A}^* + \mathbf{b}^\wedge \mathbf{L}^*)$.

At least in theory, this theorem allows us to evaluate how much actual technical changes in different industries increase overall economic productivity. For example, we could go back over the previous ten years and perform this calculation for each industry for each year and calculate the average increase in overall economic productivity in the economy, $\rho(l)$, due to the technological changes in each industry over the ten years. Presumably we would discover that technical changes in some industries had increased overall productivity more than in other industries. While past performance is not a perfect predictor of future performance, nonetheless these calculations of historic differences in how much technological changes in different industries had increased overall productivity would provide a useful guide to *rank industries*, indicating in which industries it would be more or less advantageous to have a comparative advantage. This information could then be used to guide strategic trade policy for a country. But it could also be used to compare and *rank countries* with regard to how advantageous their actual comparative advantages are. Depending on where a country with a participatory economy fell in such an international ranking of countries, it would know how to apply rule #3 – that is, how aggressive or restrained to be in seeking to improve its comparative advantages to rise in the international hierarchy.

Finally, just as one could make the moral case for a 100% rule instead of a more than 50% rule, one could also argue that only the least developed countries be permitted to engage in strategic trade policies to build new comparative advantages in what the Japanese Ministry of Trade and Industry once called “industries of the future” – until they had caught up completely with MDCs. But as before, we recommend a less strict version of rule #3 for

practical reasons and suggest that countries with participatory economies can remain true to their principle of economic justice so long as they engage in strategic trade policies that *make material progress* in overcoming differences in economic development among their trading partners.

Achieving efficient trade during annual planning

For convenience assume there are only two tradable goods, x and m , and our country with a participatory economy is sufficiently small, so the amount it exports or imports of a tradable good will not affect the international price of either good. For convenience also assume our country with a participatory economy must achieve a zero balance on its trade account every year.⁷ Until the domestic opportunity costs of the two tradable goods in our participatory economy become the same as the terms of trade for the two tradable goods, there will be efficiency gains from further specialization and trade. This is how an efficient outcome that equalizes internal opportunity costs and terms of trade for tradable goods can be achieved using our annual participatory planning procedure:

- 1 Before annual planning begins, the IFB will set the indicative price of each tradable good equal to its going international price, $p(x_i)$ and $p(m_i)$. While the IFB will change prices of all non-tradable goods from one round to the next, the IFB will *not* change these prices for our two tradable goods.
- 2 With $p(x_i)$ and $p(m_i)$ fixed, there will initially be excess supply for the tradable good in which the participatory economy enjoys a comparative advantage, x , and excess demand for the tradable good in which the participatory economy has a comparative disadvantage, m .
- 3 The balanced trade constraint, $p(x_i)x = p(m_i)m$, means that the demand to import good m is an *implicit demand* to export enough good x to pay for the amount of m imported.
- 4 Solving for this implicit demand to export gives $x = [p(m_i)/p(x_i)]m$, which the IFB must *add* to whatever the demand is for x from domestic sources.
- 5 Similarly: $m = [p(x_i)/p(m_i)]x$ gives the supply of m from imports, which the IFB must *add* to whatever the supply is for m from domestic sources.
- 6 Now let our planning procedure continue just as it did before. In every round, the IFB adds the export demand for x to the domestic demand for x , the import supply of m to the domestic supply of m , and adjusts the prices of all *non-tradable* goods to eliminate excess supply or demand for non-tradable goods.
- 7 As stipulated, the IFB changes only the prices of non-tradable goods from one iteration to the next to eliminate excess demands and supplies for non-tradables. The IFB does *not* change the prices of the two tradable goods, which remain $p(x_i)$ and $p(m_i)$. For these two tradable goods, it is the balanced trade requirement that generates changes in offers to produce and supply x and m as well as offers to use or consume x and m from

WCs and CCs until the opportunity cost of producing x in terms of m domestically eventually becomes equal to the international terms of trade between x and m , and we have a feasible plan with exports, imports, and balanced trade.

In this way a small participatory economy can take advantage of trading opportunities to increase the average economic well-being of its members. Notice what happens if the international price of the imported good rises relative to the international price of the exported good – that is, if our participatory economy suffers a deterioration in its international terms of trade: If $[p(m)/p(x)]$ rises, the balanced trade constraint implies that $[x/m]$ must also rise – that is, our participatory economy must shift more of its resources out of producing m and into producing x , and the citizens in our participatory economy will necessarily suffer a loss in economic well-being due to a fall in the amount of goods available domestically. Of course, if the terms of trade improve, $[x/m]$ will fall and the members of our participatory economy will enjoy an increase in well-being.

International financial investment

So far we have concentrated on international trade (IT). However, for the most part, the same principles apply to international financial investment (IFI). Just as differences in opportunity costs among countries give rise to potential efficiency gains from trade, differences in propensities to save and social returns on investment among countries give rise to potential efficiency gains from IFI.

However, if rates of return on investment fail to accurately reflect true social rates of return, they can send false signals, and international financial liberalization can instead reduce global efficiency. As explained in Part IV, we believe rates of return in a participatory economy will reflect true social rates of return as accurately as can be hoped for. But this may *not* be the case in other countries with different economic systems.⁸ More importantly, as long as competent regulation of international finance is lacking, huge global losses from financial crises will continue to occur. In any case, the trick is to (a) avoid efficiency losses due to false signaling and international financial crises and (b) for a country with a participatory economy to apply rule #2A:

Rule #2A: When a participatory economy negotiates interest rates on international loans, *more* than 50% of any efficiency gain should go to whichever country is less developed.⁹

Having explained our goals, and the rules we believe should guide a participatory economy with regard to its international economic relations, how do we propose a participatory economy go about doing all this? Explaining how the annual planning procedure will automatically find the efficient levels of imports and exports of different goods and services for the year is a big step in the right

direction. And it is no mean accomplishment in our view because it provides an “organic” way to answer what otherwise simply becomes an argument over differences of opinion over how open or closed the economy should be. However, annual participatory planning and the decisions it yields about exports and imports in a year will take place in the context of a long-run, strategic international economic plan aimed at changing the country’s comparative advantages. We now turn to how we propose such a plan be created.

What does participatory international economic planning decide?

Annual planning will decide what a participatory economy exports and imports as explained earlier. But that says nothing about establishing the *context* in which those decisions are made. Will subsidies have helped an industry achieve a comparative advantage so the annual plan will call for exporting its products? Will tariffs have helped protect promising “infant” industries until such time as they can compete openly during annual planning? Will quotas be applied on non-essential consumer goods in order to prioritize imports of high-tech capital goods needed for economic development?

What strategic international economic planning will decide is (a) whether to use such policies, (b) when to use such policies, and (c) for which industries such policies should be used. Another way to pose the issue is this: If we assume that annual planning takes maximum advantage of present comparative advantages, delivers the maximum efficiency gain possible from specialization and trade in any given year, and rule #2 is applied to distribute this efficiency gain fairly; will a participatory economy sacrifice some of this static efficiency gain in order to increase dynamic efficiency gains in future years by intervening to help create new comparative advantages in sectors where productivity gains are expected to be higher? The policy tools for doing so are well known: differential taxes and subsidies for WCs in different industries, differential terms of credit for WCs in different industries, and differential tariffs on imports and subsidies for exports for products of WCs in different industries. The question is how a participatory economy will apply these tools while following rule #3.

An efficient transformation of comparative advantages

As already explained, there is a conflict between pursuing *static* efficiency in any year through specialization and trade based on current comparative advantages and pursuing *dynamic* efficiency by taking action to improve future comparative advantages – which means there is an efficient tradeoff between these two goals. Strategic trade policies should be pursued up to the point where the loss in current benefits they forego are equal to the gain in future benefits because the strategic trade policies create more favorable comparative advantages. Analysis

of this tradeoff can help guide us in deciding who is best suited to estimate the different effects that must be taken into account.

Standard discussions of trade theory first explain why a country that imposes a tariff only hurts itself because the loss in consumer surplus is necessarily greater than the gain in producer surplus plus government revenue – even if its trading partners do not retaliate. Textbooks then sometimes go on to explain the theory of “optimal tariffs”: When a large country consumes enough to be able to generate a positive “terms of trade effect” by imposing a tariff, this can outweigh the negative “dead weight efficiency loss” – again assuming its trading partners do not retaliate. And finally, a few texts cover the issue we are focused on here, which they call the “infant industry argument.” In chapters 8 and 10 of the 16th edition of his *International Economics* textbook, Thomas Pugel provides a particularly clear exposition of all three theories, where he explains the advantage for a developing country of imposing a tariff on an “infant” tractor industry as follows, referring to his diagram 10.3 A and B on his page 202:

If the country's government imposes a tariff of 33 percent, the domestic price rises to \$4,000 per tractor and domestic firms produce 20,000 tractors. Now (and for as many years as this situation persists) we know that the country incurs inefficiencies of area b and area d because of the tariff. [The standard dead weight efficiency losses]. The payoff to incurring these inefficiencies is that the infant industry grows up. As firms produce tractors, they find ways to lower their costs. Sometime in the future the domestic industry's supply curve will shift down to S_{df} . The government can then remove the tariff. As shown in the right side of the figure, the country will then have a tractor industry that can produce 50,000 tractors per year at costs that are competitive with world standards. This competitive domestic production creates producer surplus of area v, surplus that would not exist if the country had not protected the industry in its early years. . . . The cost-competitive future production must create enough producer surplus to exceed the deadweight losses of the tariff. Because this is an investment problem over time, we should carefully say that it is a valid argument if the present value of the stream of national benefits [producer surpluses created] exceeds the present value of the stream of national costs [dead weight losses].

Like most mainstream economists, Pugel makes abundantly clear that while there may be producer surplus benefits sufficient to compensate for dead weight losses *in theory*, he believes the infant industry “argument” is seldom valid, and strong political support for tariffs is largely due to self-serving lobbying by domestic firms seeking benefits from protection despite the fact that the harm to consumers is even greater. However, he makes a further valid

theoretical point we should bear in mind when considering which strategic trade policies to use.

If the goal is to induce early production even when the early firms are not cost-competitive by world standards, we know that a production subsidy is better than a tariff or other import barrier. In Figure 10.3 A, the national cost of a production subsidy is only area b, not areas b and d (Pugel 2016: 203).

This point is worth bearing in mind when choosing a policy tool to advantage “industries of the future.” However, our concern here is who is best situated to estimate both the costs – dead weight losses – and benefits – which Pugel describes as “producer surpluses” but we believe are better understood as benefits from increasing production in industries undergoing more rapid technological progress. Because when understood in this way, it is clear that strategic trade policy is not only of interest to less developed countries but is *always* an important concern for *all* countries.

Participants in participatory strategic international economic planning

Who better to estimate the magnitude of dead weight losses for consumers than the National Federation of Consumer Councils (NFCC)? As Mancur Olson (1971) explained, when benefits are concentrated and costs are diffuse, the logic of political lobbying favors those for whom there is much at stake. Putting the NFCC in charge of estimating costs empowers the group for whom effects are most diffuse and who therefore have most often had too little impact historically on trade policy.

Who better to argue the case for policies to advantage their industry than the different industry federations of worker council? While every industry federation will have an incentive to make the best case they can for why they should be awarded favorable treatment, there would be three checks on over exaggeration:

- In addition to arguing their own case, industry federations have a strong incentive to challenge over exaggerations by *other* industry federations since they are competing for who will, and will not, receive favorable treatment, and because favorable treatment for other industries increases their costs if they use imported goods as inputs.
- To be successful, an industry federation must *demonstrate*, not merely claim that technical change in its industry has increased overall productivity, $\rho(l)$, more than technical change in other industries has. As explained, we now know how to calculate $\rho(l)$ and could do so for every industry. Without offering compelling data on its $\rho(l)$ compared to the $\rho(l)$ of

other industries dating back over a number of years, no industry federation should expect to win approval for advantageous treatment.

- As explained in Part III, workers should fear losing a job in a participatory economy *far less* than in other kinds of economies. So while it may be inconvenient to lose a job because your industry was not advantaged by strategic trade policy and some other industry was instead, you will be offered employment elsewhere, you will not have to pay for relocation expenses or retraining, and if needs be further education, and your expected lifetime earnings will not be adversely affected. So in a participatory economy, there is far less incentive for industry federations to try to over exaggerate where they truly lie in the ranking of industries according to where overall productivity increases are highest.

Armed with the estimates of dead weight losses and future producer surpluses and productivity increases that emerge from this “dialogue” between the NFCC and industry federations, we recommended that the Ministry for International Economic Affairs (MinInt) be tasked with proposing tariffs and subsidies for different industries, including a schedule for their removal, to be debated and approved either by the national legislature or a national referendum. As in the case of education and environmental plans, as results from annual plans reveal errors in estimations of dead weight losses and producer surpluses and productivity increases, there will be opportunities for MinInt to make adjustments to mitigate welfare losses, also to be approved by the national legislature or referendum.

Explaining who participates in drawing up and approving a strategic international economic plan is not the same as explaining details of how it should be implemented. One simple solution is to have a currency board as the only source of foreign exchange for WCs buying imports and the only buyer of foreign exchange from WCs selling exports. And if needs be a public insurance agency could insure WCs against exchange rate risks.

Does size matter?

At the beginning of this chapter we promised to come back to the question of whether the size of a country with a participatory economy should matter in some way. Ignoring any future effects on productivity, and assuming trading partners do not retaliate, the “optimal tariff” for a small country is zero, whereas the “optimal tariff” for a large country, because it is not a “price taker,” is positive. By size we do not mean how developed or underdeveloped the country is, because we have already addressed that issue and proposed that countries with participatory economies should follow rule #2 and rule #3, which take relative levels of economic development into account. Nor do we mean population size, or size of landmass. We mean what percentage of global GDP is produced and consumed in a country, although shares of global markets can vary for different goods.

We do not see why a country with a participatory economy that produces and consumes a significant percentage of global GDP should behave any differently than a small country with a participatory economy *if they are equally developed*. While true that under standard assumptions the “optimal tariff” for a small country is zero and the optimal tariff for a large country is positive, this is due to the “terms of trade effect.” And our rule #2 already provides all the guidance any participatory economy requires regarding how it should try to influence terms of trade. To be clear, we believe a lesser developed country with a participatory economy whose population is so large that it produces and consumes a significant percentage of global GDP is justified in securing the best terms of trade it can, including using its market share to advantage as optimal tariff policy teaches it can. For example, China now accounts for 15% of global GDP and therefore can affect terms of trade for some goods. If China had a participatory economy, it would be justified in seeking the best terms of trade it can when trading with more developed trading partners like the United States and pursuing optimal trade policy to do so. But China would not be justified in treating less developed trading partners like Indonesia for example, in this way.

Conclusion

We have explained why a participatory economy cannot engage in direct foreign investment abroad or permit direct foreign investment in its own economy because it violates the principle of worker self-management. We have explained how annual participatory planning will lead to exporting goods in which the country enjoys a comparative advantage and importing goods in which it has a comparative disadvantage and thereby maximize efficiency gains from specialization and trade that year. We have explained why a participatory economy must apply rule #2 and rule #2A and agree to terms of trade, as well as interest rates on international loans, which distribute *more* than 50% of efficiency gains to whichever country is less developed in order to not violate its principle that *everyone* deserves to be compensated according to their efforts, sacrifices, and needs. But unlike mainstream economists who minimize the benefits of strategic trade policies, caution against their use, and see no justification for their use once countries have overcome underdevelopment, we believe participatory economies should actively engage in strategic international economic planning irrespective of their level of economic development as long as they follow rule #3.

We have explained how the National Federation of Consumer Councils and industry federations of worker councils are well suited to debate estimates of the costs and benefits of tariffs and subsidies; how MinInt can use the estimates provided to design an appropriate set of strategic trade policies to maximize benefits, taking both short-run losses and long-run benefits into account; how these policies can be subject to approval by the national legislature and/or referendum; and finally, how all this might be implemented by a currency board.

Notes

- 1 For further discussion of how NAFTA may have generated efficiency losses from increased specialization and trade between the US and Mexico, see chapter 8 in Hahnel 2014.
- 2 Ha Joon Chang 2002 makes a compelling historical case that none of the advanced economies whose governments preach the benefits of free trade to LDCs today followed free trade principles themselves when they were first developing. In all cases, including Great Britain and the United States, protection and subsidies played key roles in historical development success stories.
- 3 Terms of trade which give 50% of the efficiency gains to the less developed country (LDC) and 50% to the more developed country (MDC) simply maintain their relative status and do nothing to narrow the gap between them. What rule #2 does instead is to narrow the gap between MDCs and LDCs by giving what we might call “the bulk” or “lion’s share” of the efficiency gain to the less developed country, while still making the more developed trading partner better off than it would have been absent specialization and trade.
- 4 See Hahnel 2020 for a careful examination of whether or not current differences in rewards for people in the same country might be justified as compensation for differences in sacrifices people made previously. Suffice it to say that given the history of slavery, colonialism, and imperialism, it is highly unlikely that differences in average incomes between MDCs and LDCs can be justified in this way.
- 5 There is much that could be said about “foreign aid,” and how sometimes it is used to benefit the donor country in a variety of ways. But at least in theory, foreign aid can be pure altruism – that is, of material benefit only to the recipient country. Whereas any terms of trade that give less than 100% of the efficiency gain to one country necessarily materially benefits both countries.
- 6 This issue clearly requires more careful consideration, but further discussion of what are essentially political issues would take us too far afield from the subject of this book. For the record, our own view is that a more developed country with a participatory economy should abandon rule #2 *only* when asked to do so by credible progressive opposition forces inside a trading partner with an immoral economy. It should be up to credible political actors in the country with an immoral economy to weigh the disadvantages of economic hardship that a more developed country with a participatory economy would inflict on ordinary people in a less developed capitalist country by imposing more harsh terms of trade against the advantages harsh terms of trade might have in undermining an oppressive government. An important historical example of this in practice was the international economic boycott against apartheid in South Africa, which the African National Congress requested when it judged the time to be right.
- 7 Of course, there are many good reasons a country should sometimes plan to run a trade deficit and sometimes plan to run a trade surplus. Moreover, even if the annual plan achieved trade balance, when unexpected events occur during the year, the trade account might well end in deficit or surplus. But all this is irrelevant to present purposes.
- 8 Again, see chapter 8 in Hahnel 2014 for examples and further explanation for why international financial liberalization has often generated large global efficiency losses.
- 9 Since any imbalance in the participatory economy’s trade account must necessarily be matched by an imbalance of the same size but opposite sign in its international financial account, the imbalances in the two accounts are jointly determined. For example, if the country’s international economic plan calls for running a trade deficit in a given year, this means the country must also borrow more than it lends internationally that year – that is, it must “plan” to run a financial account surplus of an equal size. A net increase or decrease in the supply of the participatory economy’s currency in international currency markets is one form of international borrowing or lending.

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Appendix on investment in infrastructure

Traditionally when economists spoke of “investment,” they usually meant investment by enterprises to acquire more capital goods. Later economists also addressed investment in what they call “human capital.” We covered investment by worker councils in capital goods in Chapters 11 and 12 in Part IV. And we covered investment in human capital in Chapter 13 on education planning in Part V, after which we addressed an additional category of long-term investment to protect or enhance the natural environment in Chapter 14. However, in the United States at the moment, there is much talk – unfortunately accompanied by little action so far – about “investment in infrastructure.” Where does investment in infrastructure fit into our story about how a participatory economy might go about planning investment of all kinds? Where and how do we propose that decisions about building and repairing roads, highways, bridges, railroad tracks, transmission lines, water and sewage pipes, cell phone towers, and so on, all get made?

We have drawn a distinction between investment in durable capital goods that last more than one year before they depreciate completely and/or become obsolete, which we treated in Part IV, and different categories of long-run, development planning, which we tackled in Part V. The most obvious difference in our categorization was a difference in the length of the planning horizons. For most capital goods used by individual WCs, the planning horizon can be less than ten years, whereas education planning, environmental planning, and strategic international economic planning all require planning horizons stretching over many decades. With regard to the length of planning horizons, investment in infrastructure is more like other kinds of long-run development planning.

In Part IV the “products” of investment planning are capital goods – produced by worker councils. Whereas in Part V the “products” of education planning are different capacities and skills embodied in human beings – produced by schools and training programs. And the “products” of environmental planning are changes in the supplies of different environmental assets – “produced” by environmental agencies and programs they preside over. So in regard to both “product” and “producer,” infrastructure planning is more similar to the kind of planning we analyzed in Part IV because worker councils are the producers,

and the products are capital goods – the difference being only that infrastructure consists of capital goods that are particularly large and long-lasting *and* are “consumed” jointly by many users rather than a single worker council.

Finally, sometimes investments in infrastructure benefit consumers, sometimes they benefit producers, and sometimes they benefit both consumers and producers, and in that regard, they are similar to investments in education and the environment treated in Part V, where effects on both consumers and producers had to be taken into account. Given that investment in infrastructure is the only kind of planning even mentioned by the mainstream media in the US these days, perhaps we should have treated infrastructure planning in a separate chapter of its own. But instead we explain in this short appendix how infrastructure planning can be done much as we have proposed that other kinds of investment planning be carried out.

When we invest in infrastructure, it either makes some economic activities possible that otherwise would not be, or it makes some activities more productive. Sometimes these “other activities” are consumption activities, as when consumers drive their cars on highways and across bridges. Sometimes these “other activities” are production activities, as when a power plant sends the electricity it generates out to business customers over the electrical grid.¹ Historically, countries have handled infrastructure in different ways. For example: Trains need tracks to run on, and cars need roads to drive on. In the United States railroad companies traditionally built, paid for, and owned the “infrastructure” tracks as well as the trains that ran on them and charged passengers fares and businesses freight charges.² Whereas private automobile companies did not traditionally build, pay for, or own the “infrastructure” roads that cars drive on. Instead, automobile companies produce and sell cars to consumers and trucks to businesses, and county governments, state governments, and the federal government build and maintain the roads and highways they drive on, paying for them primarily from taxes on the fuels vehicles consume or what amounts to user fees. So how might infrastructure planning be handled in a participatory economy?

Investing the efficient amount in infrastructure

Consumers may benefit and producers may benefit from investment in infrastructure. The benefits to consumers are just like the benefits to consumers of any public good available to them. But if we are now treating spending on infrastructure as investment spending, and distinct from spending on more traditional public goods we treat as part of consumption, we need to be careful to account for any benefits to consumers from investment in “infrastructure.” The benefits to producers are just like the benefits to producers of any capital good, except in this case the capital good is also a public good because it jointly benefits many producers.

As before, let $C(t)$ represent the dollar value of spending on all private consumption goods and “traditional” public goods in year t . Let $Inf(t)$ represent

the dollar value of investment spending on infrastructure in year t . Our production function, $F(t)$, will now also depend on the stock of infrastructure in year t , which to simplify matters, we assume as we have with all investment is equal to the amount invested in infrastructure in $t-1$, $\text{Inf}(t-1)$. This now gives us a production function with five arguments: Labor applied in t , $L(t)$; investment in $t-1$ in capital goods used only by a single worker council, $I(t-1)$; investment in $t-1$ in education, $\text{Iedu}(t-1)$; investment in $t-1$ in the environment, $\text{Ienv}(t-1)$; and investment in $t-1$ in infrastructure, $\text{Inf}(t-1)$: $F(t)[I(t-1), \text{Iedu}(t-1), \text{Ienv}(t-1), \text{Inf}(t-1), L(t)]$. Our utility function will now also depend on the stock of infrastructure in year t when consumers benefit directly by consuming infrastructure as an additional category of public good distinct from other, more traditional public goods. This gives us a utility function with four arguments: $U(t)[C(t), \text{Iedu}(t-1), \text{Ienv}(t-1), \text{Inf}(t-1)]$. In which case the two efficiency conditions for investment in infrastructure in years 1 and 2 in our three-year model are:

$$\text{A} \quad \delta U(1)/\delta C(1) = \{\delta F(2)/\delta \text{Inf}(1)\} \{\delta U(2)/\delta C(2)\} + \delta U(2)/\delta \text{Inf}(1)$$

$$\text{B} \quad \delta U(2)/\delta C(2) = \{\delta F(3)/\delta \text{Inf}(2)\} \{\delta U(3)/\delta C(3)\} + \delta U(3)/\delta \text{Inf}(2)$$

As always, the term on the left of equation A represents the benefit from spending an additional dollar to produce traditional consumption goods, whether private or public in year 1. The two terms on the right of equation A represent the benefits in year 2 from instead spending an additional dollar on infrastructure in year 1: The first term on the left is the product of the increase in production in year 2 *by all producers who benefit from the increase in infrastructure* that additional spending on infrastructure in year 1 generates times the increase in satisfaction from consumption in year 2 this increase in output *from all producers affected* makes possible. The second term on the right of equation A represents the benefits to *all consumers* in year 2 from the additional infrastructure available for their use made possible by additional spending on infrastructure in year 1. Interpretations of the terms in equation B are similar.

As before, if we stipulate initial stocks, expected future supplies of labor, and some actual functions for $F(t)[I(t-1), \text{Iedu}(t-1), \text{Ienv}(t-1), \text{Inf}(t-1), L(t)]$, and $U(t)[C(t), \text{Iedu}(t-1), \text{Ienv}(t-1), \text{Inf}(t-1)]$, we would be able to solve the above equations for $\text{Inf}(1)$ and $\text{Inf}(2)$, just as we solved our equations in previous chapters for $s\&i(1)$ and $s\&i(2)$, $\text{Iedu}(1)$ and $\text{Iedu}(2)$, and $\text{Ienv}(1)$ and $\text{Ienv}(2)$. Operating under the generational equity constraint, we believe the National Federation of Consumer Councils (NFCC) is best situated to estimate the value to households of changes in infrastructure, $\delta U(2)/\delta \text{Inf}(1)$ and $\delta U(3)/\delta \text{Inf}(2)$, just as the NFCC is best suited to estimating $\delta U(1)/\delta C(1)$ and $\delta U(2)/\delta C(2)$ on the left side of equations A and B. And we believe industry federations of worker councils are the best judges of how much improvements in infrastructure will cost and how much they will increase future production, $\delta F(2)/\delta \text{Inf}(1)$ and $\delta F(3)/\delta \text{Inf}(2)$. Otherwise, there is nothing new to add to our

previous analysis of investment planning discussed earlier concerning (a) who has access to relevant information, (b) who has incentives to exaggerate, (c) how to structure debates by setting clear agendas and procedures, and (d) what the final decision-making process should be.

Notes

- 1 The difference here is analogous to the difference between producing a final good used by consumers and an intermediate good used by other producers.
- 2 Governments often helped railroad companies acquire “right of ways” and adjacent land through eminent domain, which immediately became much more valuable. Inequities were legion, as Frank Norris described in his novel, *The Octopus*, but that is beside the point here.

Part V: conclusion

This is the first time we have made concrete proposals for how a participatory economy might engage in long-run, development planning of different kinds – education planning, environmental planning, strategic international economic planning, and infrastructure planning. We have also explained how these plans, which stretch over many decades, can be updated when results of annual plans reveal that initial estimates of key future parameters turn out to be erroneous – much as we demonstrated in Part IV that shorter-term investment plans can be updated to mitigate welfare losses. We have also identified conditions that are unique to education planning, environmental planning, international economic planning, and infrastructure planning that must be taken into consideration.

In all cases our proposals are guided by two goals: (1) We want long-run development plans to be as efficient as possible and (2) we want to encourage popular participation in both the formation and approval of long-run plans. In these regards we faced three problems that do not arise during annual participatory planning, although they had already appeared during participatory investment planning:

- 1 Future technologies and preferences can only be estimated with uncertainty. Since development plans stretch over more years than investment plans, this problem is even more acute for development planning.
- 2 Future generations cannot be present when long-run plans are created, so their interests must somehow be protected as the present generation deliberates. Again, this problem is more acute for development plans with their longer planning horizons.
- 3 Federations – where deliberations are conducted by *delegates* who *represent* workers and consumers – and ministries and their staffs necessarily play a larger role in development planning. This means it is harder to stimulate popular participation by ordinary people than during annual planning.

We have already explained why updating is even more important for long-run development plans covering many decades than investment plans that usually cover less than ten years, and how that can be done to mitigate welfare

losses – so there is no need to review those arguments here. Instead we use this conclusion to Part V to highlight the problems development planning poses for popular participation. In all cases the generational equity constraint serves to induce the present generation to be “honest brokers” when they participate in all three kinds of long-run development planning that greatly affect future generations who cannot be present when plans are drawn up. But who have we proposed participate in education, environmental, international, and infrastructure planning, and how do we propose they participate?

Education planning

We recommended that delegates to industry federations of worker councils work together with officials in the Ministry of Education (MinEd) to estimate both the production benefits and the social costs of more education. We proposed that delegates to the National Federation of Consumer Councils (NFCC) together with officials from MinEd estimate the long-term personal benefits from education. And we recommended that the national legislature in consultation with MinEd be charged with providing planners with estimates of the political “capacitation” benefits of additional education. We identified MinEd and industry federations as the best advocates for more education, and the NFCC as the best advocate for more consumption and less investment of any kind. And we explained how information that becomes available from subsequent annual plans cannot only be used to update education plans to make them more efficient, but can also act as restraints on participants who might be tempted to over- or under exaggerate estimates of benefits and costs of investment in education.

Environmental planning

In the case of environmental planning we recommended that delegates to the NFCC estimate the use and existence value people will place on changes in the natural environment in the future and that the Ministry for the Environment (MinEnv) work with industry federations of worker councils to estimate the effects of investment in the environment on production – where often what we need to know are the effects of declining stocks of environmental assets on future production. We identified industry federations and MinEnv as the natural advocates for more investment in environmental protection, and explained why the NFCC is again best suited to make the case for more consumption and less investment in environmental protection. And as before, we explained how results of annual plans can be used both to update environmental plans and to restrain participants tempted to over or under exaggerate estimates they provide for planning.

International economic planning

In the case of strategic international economic planning we explained how the NFCC and federations of worker councils in different industries can act as

useful counterweights to one another. We recommended that the NFCC be made responsible for making the case that (a) dead weight losses for consumers in the present from tariffs or subsidies may be substantial and (b) future producer surpluses – or more importantly in our opinion, future increases in overall productivity from shifting resources to industries experiencing more rapid technical change – may be small. And we recommended that federations of worker councils in different industries be responsible for making the case that a tariff or subsidy for their industry may generate significant future producer surpluses and productivity increases, while dead weight losses for consumers in the present may be small.

Armed with the estimates of dead weight losses and future producer surpluses and productivity increases that emerge from this “dialogue,” we recommended that the Ministry for International Economic Affairs (MinInt) be tasked with proposing tariffs and subsidies for different industries, including a schedule for their removal, to be debated and approved either by the national legislature or a national referendum. As in the case of education and environmental plans, as results from annual plans reveal errors in estimations of dead weight losses and producer surpluses and productivity increases, there will be opportunities for MinInt to make adjustments to mitigate welfare losses, also to be approved by the national legislature or referendum.

Finally, we recommended that operating under the generational equity constraint, we believe the National Federation of Consumer Councils (NFCC) is best situated to estimate the value to households of changes in infrastructure, and we believe industry federations of worker councils are the best judges of how much improvements in infrastructure will cost and how much they will increase future production.

Notice that in all the various kinds of long-run development planning we found that various federations and ministries must be heavily involved in providing estimates of effects that are critical to determining (a) how much it is efficient to invest in education; (b) how much it is efficient to invest in protecting the environment; (c) which industries should be favored by tariffs or subsidies, for how long; and (d) how much is efficient to invest in infrastructure – before an agency uses those estimates to calculate an efficient education, environmental, international economic development, or infrastructure plan. Which means that those participating in generating crucial estimates and using them to calculate development plans are *delegates* to federations, *officials* in ministries, and *staffs* of different development planning agencies – which, to be frank, worries us!

Of course, these delegates and officials represent ordinary workers, consumers, and citizens. Of course, the selection process, terms of office, conditions for recall, and whether delegates receive instructions from those they represent about how to cast important votes are all important considerations affecting how much voice and control those who they represent will have. Of course, the staff of development planning agencies merely turn the data given them into efficient development plans. And of course, once plans have been drawn

up, they should be subjected to debate and approval by the national legislature and/or popular referenda. Nonetheless, we worry that especially for those who are long accustomed to being denied access to decision-making power, and are understandably suspicious that their participation will continue to be meaningless, the absence of more direct participation by ordinary people in the formulation of various long-term development plans is problematic. We offer three thoughts on this subject in closing:

- (1) We have not discussed the role for political movements, campaigns, and parties. Socialist visionaries sometimes give the impression that none of these social, advocacy, or political groups will be necessary in a truly desirable society – like old war horses, they are no longer needed when peace breaks out. We believe quite the opposite. We believe the assumption that political advocacy organizations will no longer be necessary in socialism is naïve and utopian in the worst sense of the word. We believe that in a society where the majority have more time and far greater opportunity to become involved in decision-making of all kinds, that both traditional and new kinds of political advocacy groups will become even larger and stronger and that passions will continue to run deep about issues they address. So we think it is important to imagine the development planning procedures we have described – and the delegates and officials who participate in them – as being subjected to intense scrutiny and agitation of all kinds by various advocacy groups of interested citizens.
- (2) Nonetheless, we believe that because delegates do play important roles in estimating effects necessary to determine efficient long-term economic development plans, because staffs in ministries use those estimates to calculate efficient long-term plans, and because popular participation is largely limited to selecting and monitoring representatives and voting in referenda on different overall long-term plans; it is all the more important that ordinary workers and consumers participate directly and actively in both investment planning and annual planning by proposing and revising self-activity proposals for their workplaces and neighborhoods – as we explained in Parts III and IV is perfectly possible.
- (3) Finally, we are open to any suggestions for how to increase popular participation in education, environmental, international economic, and infrastructure planning. While we had that goal very much in mind when designing the proposals offered here, we may have ignored opportunities to increase more direct participation by workers, consumers, and citizens. We believe we have broken new ground in demonstrating how workers and consumers can participate directly in planning their own activities and coordinate them with others efficiently and fairly during investment and annual planning. Any similar path-breaking ideas about how to involve workers and consumers more directly in the formulation of long-term development plans are welcome!

Conclusion

The socialist calculation debate a century later

Hopefully, it is now possible to see the socialist calculation debate for what it was and, more importantly, to understand what it was *not*. In capitalism what happens is the result of millions of decisions made by millions of different decision makers, none of which are consciously coordinated before they are implemented. We are now so used to this, that the idea that all these decisions might be coordinated and made consciously seems farfetched. Yet this was not always so. One can argue that economics only began to be a “scientific” field of inquiry when Adam Smith had to explain to a still skeptical public that failure for someone to be coordinating all our economic decisions consciously would not lead to chaos and disaster. Prior to capitalism, humans assumed that economic decisions must be planned out in some way or another by somebody.

The most important purpose Adam Smith had in mind when he wrote *The Wealth of Nations* in 1776 was to reassure people that permitting decisions about who produces and who consumes what in an unconscious and uncoordinated way would not result in confusion and chaos of biblical proportions, as in the tale of the “Tower of Babel.” Above all else, Smith was at pains to relieve anxieties that in a market system even though nobody was any longer consciously coordinating economic decisions, the decisions being made would be good decisions. In fact, Smith argued, they would be precisely the decisions we would have wanted to make had we sat down to make them consciously based on full information about consequences.¹ Moreover, Smith argued that it was fortuitous that the institutions of private enterprise and markets miraculously yielded efficient outcomes – as if guided by an invisible hand – because the amount of information required to make decisions that were mutually feasible, much less efficient, was in Smith’s view so overwhelming that no conscious decision-making process could possibly achieve results that were as desirable.

When the results of surrendering economic decision-making to markets appeared to be less favorable than Smith had promised, early socialists questioned Smith’s fundamental conclusion. They asked: Why are we surprised things have turned out so badly when we cease to make economic decisions consciously and allow the “anarchy” of markets to rule our destinies? But instead

of proposing that kings, lords, and their counselors be brought back to make conscious decisions and rule over their subjects, early socialists instead proposed the revolutionary idea that the “associated producers” decide their own fates – and in the present context, the keyword is “decide.” Socialists who preceded Marx asked: *Why can’t the associated producers consciously decide among and for themselves what to produce and how to produce it?* In effect, these early socialists argued that (a) spreading misery proved Adam Smith be a false prophet about the wisdom of unconscious versus conscious economic decision-making, but (b) what was needed was a change in *who* was making decisions consciously – the “associated producers” should be the deciders, not “captains of industry,” much less kings, feudal lords, or religious elites.

As explained in our introduction, the socialist calculation debate was launched in the early 20th century when anti-socialists argued first, that the amount of information *a decider* would need to allocate resources efficiently made the problem so large that it could not be solved even in theory, and second, that because of the tacit knowledge problem *a decider* could not solve the problem in practice even if it were solvable in theory. As we explained in Chapter 3, by the 1970s, advances in mathematical programming theory and computational capacity seemed to render the first objection moot. And if we ignore incentive compatibility issues for the moment, advances in the theoretical literature on planning procedures suggested promising “mechanisms” *a decider* might deploy to gather the tacit knowledge in production units needed to make efficient decisions as well. But this is the key point: While early socialists championed conscious decision-making over impersonal coordination by markets, they did *not* propose *a decider*. Instead they proposed that the *associated producers decide for, and among themselves*. And these are not the same thing at all.

In both cases conscious decision-making is being proposed to replace impersonal coordination via markets. And in both cases the product of conscious decision-making is a comprehensive plan for the entire economy. But the socialist calculation debate was always about whether it was reasonable to expect *a decider* would be capable of calculating an efficient comprehensive plan for the economy. It was not about whether associated producers – that is, worker and consumer councils and federations – could decide for and among themselves what to produce and how to produce it. After explaining in chapter 3 what “*a decider*” might accomplish in a best-case scenario, in chapter 4 we explained why this is *not* what socialists should have ever proposed, not what anyone should propose in the 21st century in light of the experience with centrally planned socialism in the 20th century, and certainly not what we have proposed in this book. Instead, what should be the object of discussion and debate is this:

Concretely, how might worker and consumer councils and federations go about creating and coordinating long-term development plans, investment plans, and annual plans that are efficient, equitable, and sustainable in ways which give participants decision-making power in proportion to the degree they are affected?

And because the “socialist calculation debate” was a debate about planning by a *central authority*, it is largely irrelevant to this discussion.

The irony is that comprehensive economic planning has always been possible if done *without* a central authority. While advances in mathematical theory, computational capacity, and theoretical “mechanisms” to gather information are all relevant to the possibility, practicality, and efficiency of central planning; they are at best tangential and at worst misleading regarding whether or not what early socialist visionaries imagined, wanted, and believed was both possible and desirable. Even before advances in mathematical theory, even before advances in computer computational capacities, even before advances in clever procedures a central authority might use to gather information from production units, it was possible to do comprehensive socialist planning *because* it was always possible for groups of workers and consumers to plan their interrelated economic activities together themselves, efficiently and equitably, as we have explained and proposed in this book. While all these intellectual and technological advances were necessary before comprehensive central planning could even make a claim to be efficient, none of them were necessary to do the kind of economic planning early socialists envisioned and we have explained how to do.

Once things have become apparent, it is sometimes difficult to understand why they remained a mystery for so long. With the benefit of hindsight, we can now see that when early thinking about democratic planning by “associated producers” was fleshed out in the 20th century – both in theory by participants in the socialist calculation debate and in practice in the Soviet Union – there was a fateful leap in thinking. It was assumed that a comprehensive economic plan in which the activities of large numbers of workplaces are coordinated with each other and with consumers *ex ante* requires a central planning authority of some kind. To borrow an analogy from Michael Lebowitz, it was assumed that such a large orchestra required a conductor.² However, in truth it does *not*, as we believe we have demonstrated in Parts III, IV, and V of this book.

Moreover, not that it matters anymore, but comprehensive socialist planning never did require a conductor. The procedures we propose do not require advanced mathematical methods for solving a large constrained optimization problem. Those mathematical tools are required to make central planning efficient, but they are not used to implement either the annual participatory planning procedure nor the participatory investment and development planning procedures we have proposed in this book. We have sometimes used these mathematical tools to explain the *logic* of the planning procedures we propose, and to demonstrate the efficiency of those procedures under certain assumptions. And we have used modern computational capabilities to simulate how worker and consumer councils and federations might behave to test the practicality of our proposals. But this should not be confused with mathematical calculations required of any participant in order to engage in participatory planning, nor computational capacities required to carry out the planning procedures we propose.³

While some libertarian socialists both noticed and objected to the fateful leap in thinking that assumed a central authority was required for comprehensive economic planning, for most socialists and economists who worked on comprehensive planning in the 20th century the fateful assumption that a planning agency was required to draw up the plan went unnoticed. And as soon as one assumes that detailed planning of a large economy requires a planning authority, both theorists and practitioners quite sensibly turned their attention to solving the problems of how such an authority could (a) calculate a comprehensive plan for a large economy, (b) gather the vast amounts of information necessary to calculate an efficient plan, and (c) induce work units to play the roles assigned to them. And as we recounted, at every step, some who opposed socialist planning argued that what is required is impossible, while others searched for and sometimes found solutions to these problems. But what if the implicit assumption of many early socialist visionaries was correct, and no central authority is needed?

Because their greatest fear was that authority thwarts autonomy, anarchists have long objected to importing a central authority into the socialist project. But anarchists have provided little more than rhetoric in response to a question that must be addressed:

Concretely, in absence of a central authority, how can associated producers plan among themselves sensibly, much less efficiently?

Even if we assume all want nothing more than to agree to whatever is in the social interest, how would they go about discovering what that is without a central authority to gather the vast amounts of information required to do so? If only a central authority can process all the information needed to make sensible and efficient decisions, who else but the central authority should make those decisions? And finally, if we descend from the world of “faith-based initiatives” to the real world where humans are often inclined to pursue their self-interest – even if they are sometimes inclined to promote the “general good” as well – how are we to avoid the necessity of a central authority imposing the “general will” on those tempted to pursue their self-interest instead? Anarchists have apparently not felt the need to provide serious answers to these questions. As readers now know, this book is an attempt to answer these and other questions that require answers – to move beyond generalities and platitudes with concrete proposals for how all the different kinds of decisions that must be made in any economy might be made.

But if we are correct, if participatory annual planning, investment planning, and development planning of different kinds as we have described them in considerable detail is possible, this not only provides concrete proposals to solve problems that are far from trivial where anarchists have not, it also suggests that a fateful leap of logic misguided most socialist thinking during the 20th century. If we have learned anything from the history of “real world” socialism in the 20th century, it should be to erect a warning sign in front of comprehensive

economic planning for those to come: NO CENTRAL AUTHORITY REQUIRED!

It is true, and helpful, that recent advances in computer capacities and modern information technology make communicating proposals, sharing information, and adjusting plans in light of new developments far easier than it would have been in the past. Without access to “virtual meetings” and instantaneous communication of proposals and decisions that computers and the internet now make possible, the kind of planning we have proposed would be more time consuming, adjustments fewer and slower, and outcomes therefore less efficient and less desirable. Nonetheless, while it no longer matters, *everything* we have proposed could have been implemented in Venezuela in 1999, in Vietnam in 1975, in Cuba in 1961, in China in 1949, in Spain in 1936, in Russia in 1917, and even by communards in the Paris Commune in 1871.

Whatever has prevented something like a “participatory economy” from already being tried, it is *not* because it required some advance in mathematical theory or computational capacities yet to come. Instead, we must search among a host of historical, political, ideological, and intellectual obstacles to understand why libertarian socialism has yet to have an opportunity to prove its merits. This book made no attempt to contribute to a historical analysis of the real-world failures of libertarian socialists to prevail over political obstacles. But hopefully it will help overcome some intellectual and ideological obstacles, so when historical and political forces evolve to the point where it is possible to launch efforts to build a more participatory, equitable, and sustainable economy, those involved will have better ideas for how to go about it. In the remainder of this conclusion, we summarize what we regard as our most important contributions, before closing with some whimsical thoughts about history and surprises.

Reconciling democratic planning and autonomy

We believe our most important contribution is to have explained concretely how to reconcile comprehensive democratic planning with autonomy, which in our view has so far proved to be the Achilles heel of socialism. In Part III we explained how annual participatory planning can be conducted without a central authority and allow worker and consumer councils to manage themselves as long as they do so in socially responsible ways. We explained how a social iterative procedure combining autonomy with social responsibility can achieve outcomes that are efficient, fair, and environmentally sustainable. And we provided evidence that computer simulations suggest that the number of times worker and consumer councils and federations would have to submit, revise, and re-submit “self-activity” proposals is not overly burdensome, but indeed quite “practical.”

In Part IV we presented for the first time a proposal for how to go about “participatory investment planning.” We explained why federations, where workers and consumers are represented by delegates, must play an important

role, but how investment planning can nonetheless be made more participatory as well as democratic and efficient. In Part V we presented proposals for three different kinds of long-run development planning, also for the first time. And while education, environmental, and strategic international economic planning all face unique problems, we explained how these planning procedures can also be organized to maximize participation by those most affected while being efficient.

Opportunity costs, social costs, and social rates of return

In our opinion no other proposal for how to conduct comprehensive, democratic, economic planning has successfully dealt with the problem of how to generate reasonably accurate estimates of the opportunity costs of using scarce productive inputs, be they different categories of labor, different “services” from the natural environment, or different capital goods – “stocks” of which at any point in time are scarce and should be allocated to wherever they are most productive, useful, and generate the greatest increase in social well-being. We believe our proposals will also generate reasonably accurate estimates of the social costs of producing goods and services, including the costs of emitting different pollutants. And finally, we believe our proposal generates reasonably accurate estimates of the social rate of return on investment in capital goods, education, infrastructure, and environmental protection and enhancement.

We believe this is important for two reasons: Without accurate estimates of opportunity costs, social costs, and social rates of return on investments, it is impossible to know how to allocate scarce productive resources efficiently – which most economists readily acknowledge. But what may be even more important is without them, it is impossible for worker councils, consumer councils, and federations to participate sensibly and without undue imposition on their time in economic decision-making. Unless they are provided with reasonably accurate estimates of opportunity and social costs and social rates of return, workers cannot know if their own proposals are socially responsible, consumers cannot know if their proposals are socially responsible, and nobody can know whether or not to approve or disapprove the self-activity proposals of others. However, with reasonably accurate estimates of opportunity and social costs and social rates of return, worker and consumer councils and federations can engage in socially responsible self-management without a central authority, without resort to markets, and without excessive burdens on their time – as we believe we have demonstrated.

There is a serious “disconnect” between mainstream economists and many heterodox economist on this issue. And frankly, we believe that on this issue mainstream economists are right for the most part. We examine the failures of other heterodox economists who argue for the feasibility and desirability of democratic economic planning with regard to opportunity costs, social costs, and social rates of return in an appendix that follows. In some cases these authors fail to acknowledge that opportunity costs, social costs, and social rates

of return are important. In some cases we argue they propose flawed procedures for formulating estimates. And in some cases they presume, without explaining precisely how, that it is possible for some agency to calculate them, when the truth is that only interaction among participants during planning procedures is capable of generating reasonably accurate estimates of opportunity and social costs and social rates of return. In any case, failure to successfully come to grips with the issue of opportunity costs, social costs, and social rates of return has long been a major obstacle to advancing the cause of democratic socialist planning. Hopefully, we have made a worthy contribution in this regard.

A level playing field for public and private consumption

For as long as we have lived in market economies, the playing field for public and private consumption has been severely tilted in favor of private consumption. In many countries this has been going on for more than 20 generations and has therefore taken a significant cumulative toll on people's attitudes, expectations, and what kind of preferences it was "rational" for people living under these biased conditions to develop. Our planning procedures level this playing field. And since the cumulative effects of this bias against collective consumption in favor of private consumption reach deep, we also proposed that at least initially, people express their desires for public goods before they express their desires for private goods during annual planning.

Externalities extinguished!

It has also become abundantly clear that private enterprise and markets have long exerted a bias in favor of production and consumption activities with negative external effects and against activities that generate positive external effects. The clearest example, which now threatens civilization as we know it, is that activities that emit greenhouse gases are favored because their negative external effects go unaccounted for in market prices, while activities that reduce greenhouse gases are discouraged because their positive external effects go unaccounted for as well. Our Pollution Demand Revealing Mechanism (PDRM), which we have now incorporated into our annual participatory planning procedure, will (a) generate reasonably accurate quantitative estimates of the damage from pollution, (b) reduce pollution to reasonably "efficient" levels, (c) satisfy the "polluter pays principle," (d) compensate the victims of pollution for damages suffered, and most importantly (e) induce polluters and victims to truthfully reveal what they believe to be the benefits and costs of pollution. While the PDRM is most useful for local pollutants, pollutants whose effects are not lethal, pollutants whose effects are relatively well understood by victims, and pollutants whose effects do not extend far into the future; we believe coming up with an "incentive compatible" procedure that induces victims to reveal truthfully what they believe their true damages are from pollution is not a trivial accomplishment. Combined with our proposal for long-run

environmental planning, we think we have done much to correct for a glaring historic weakness many socialists must answer for – namely, an inexcusable failure to come to environmental awareness sooner.

Income distribution and incentives

The debate over how to distribute the burdens and benefits of economic activity equitably has long been hotly contested. The first question is: What is a fair distribution of the burdens and benefits of economic activity? The second question is: How can this distribution best be achieved? And a third question is: Is there a tradeoff between distributing income fairly, inducing effort, and allocating labor to different workplaces efficiently? We proposed and defended concise answers to all three questions: (1) What is fair is to each according to his or her efforts and sacrifices. (2) Coworkers are best suited to estimate differences in efforts and sacrifices among them. And (3) there need be no conflict between fairness and efficiency. Rather than repeat our arguments for coming to the first two conclusions and defending them against criticism here, we comment only briefly on the third conclusion.

We have argued that if labor is to be allocated efficiently, users must be *charged* according to the opportunity cost for using it. We have also argued that if workers are to be compensated fairly, they must be *paid* according to their efforts and sacrifices. *And, we have not only admitted, but **insisted** on the fact that the two are often not the same.* What we have proposed is a solution to this dilemma, which we believe advocates for models of market socialism have ignored because they have no answer.

Our solution is this: When calculating the social cost of inputs requested by worker councils, to be compared with the social benefits of the outputs they propose to make, *charge worker councils* for the scarce labor services of their members, which they want to use *according to their opportunity costs*. This will ensure that labor is allocated efficiently to different workplaces. ***But, pay workers according to their effort and sacrifice***, as determined by an effort rating committee of their coworkers. This will ensure that workers are compensated as fairly as is possible.

Addressing concerns about impracticality

In Chapter 8 we addressed common concerns that annual participatory planning is impractical because it cannot be done at a level of detail necessary as well as concerns that adjustments cannot be made when unanticipated situations arise. We explained that concerns over the level of detail stem from a misunderstanding of what a comprehensive annual plan is and is not. And we explained how adjustments can easily be made to accommodate changes in circumstances that arise during the year. As memory of real-world centrally planned economies that engaged in comprehensive economic planning for many decades during the 20th century recedes, apparently it has become

difficult for many today to imagine how comprehensive economic planning is even possible. While details and adjustments were often *not* handled well by real-world centrally planned economies in the 20th century, those real-world experiences certainly demonstrate that comprehensive economic planning is not impossible. In Chapter 9 we addressed for the first time more legitimate concerns that participatory annual planning may prove impractical because it would require worker and consumer councils and federations to engage in too many iterations – rounds of proposals, rejections, revisions, and new proposals – to reach a feasible plan. We presented results from computer simulations of the annual participatory planning procedure, which *strongly suggest* that our iterative annual planning procedure *cannot* be dismissed as a practical impossibility as some have done, but instead seems to be quite practical.

Integrating long-run and short-run plans

While we had talked about the need to make investment and development planning more democratic, efficient, and participatory in previous publications, not until this book did we present concrete proposals for (a) how to organize investment planning, education planning, environmental planning, and strategic international economic planning, and (b) how to integrate these planning efforts with annual planning efforts to identify errors in assumptions made when longer-term plans are drawn up, and revise those plans in light of better information when it becomes available to mitigate welfare losses.

What is obvious as soon as we recognize the practical necessity of having both short-run and long-run plans is that results from long-term plans are needed by those creating annual plans. Before we do annual planning we need to know how much of each capital good must be produced. We need to know what resources must be allocated to the educational system to train and teach various skills to the present and future workforce. We need to know what resources must be allocated to environmental protection and enhancement. And we need to know what industries we are expanding or shrinking in order to transform our economy's comparative advantages in the international economic division of labor. The answers to these questions come from the results of the various longer-term plans whose formulation we discussed in the different chapters in Parts IV and V. In these ways the results from longer-term plans commit those who engage in annual planning to certain things they *must* accomplish during the year.

What is less obvious, but we have been at pains to point out, is how the results from annual planning can be used to identify mistakes in assumptions made when longer-term plans were first created so that longer-term plans can be modified to reduce losses in well-being. When investment and development plans are made, there is no alternative to formulating *estimates* of what future labor supplies will be, what consumer preferences will be in the future, and what technologies will become available in the future. We discussed who should be tasked with formulating these estimates at some length, taking both

access to information and motivation into account. But if these estimates prove to be inaccurate, as they inevitably will to some extent, then investment and development plans will fail to maximize social well-being because they will call for either too little or too much investment of different kinds. Our most important contribution to the literature on investment and long-term planning is that we demonstrate how the results from subsequent annual planning procedures reveal where errors were made when investment and development plans were initially created. At which point, we explain how investment and development plans can be revised in light of this new, more accurate information to mitigate welfare losses. The revised investment or development plan cannot do as well as an initial plan based on accurate estimates because it cannot undo the damage done by inaccurate estimates before they were caught. But we showed how revised plans can nonetheless perform better than permitting initial plans to proceed uncorrected.

We consider this a significant accomplishment. Once it is conceded that as a practical matter economic planning cannot be done in one single operation covering many, many years, but must instead be done via separate procedures – that is, there must be an annual planning procedure, an investment planning procedure, and various long-term, development planning procedures – one must deal with the question of how to integrate these different planning procedures with one another. If one cannot explain how this can be done to minimize inevitable efficiency losses due to inaccurate estimates of future parameters in longer-term plans, the argument against comprehensive economic planning is strengthened. Hopefully, Parts IV and V of this book help rebut this argument by demonstrating that different planning procedures covering different time frames that are each individually practical, can be integrated to update information quickly and thereby mitigate welfare losses.

Reproductive labor

Finally, for the first time in this book, we explicitly address how “reproductive activity” or “reproductive labor” might be treated in a participatory economy. Just as environmental preservation was long neglected in discussions about democratic comprehensive economic planning, concrete proposals for how to organize and reward people for the time and effort they devote to procreating, rearing, educating, and socializing new generations in ways that do not continue to replicate the negative consequences a rich feminist literature documents and criticizes convincingly has been long neglected as well.

In Chapter 10 we acknowledged and attempted to rectify our own neglect. After identifying different categories of reproductive labor, we offer specific proposals to stimulate further debate. We discuss why women’s caucuses, anti-discrimination legislation, and affirmative action programs are needed to combat discrimination *within worker councils* and how they might function. We discuss why jobs should be “balanced” for “caring labor” and how to balance them in this regard as well as for empowerment and desirability. And we

discuss why gender bias in domestic, caring, and socialization labor should be and could be combatted *inside households*. A major issue we identified for all to consider further is a difference between settings that are more public – and therefore, laws and social institutions for combatting discrimination and bias are possible and appropriate – versus settings that are more private and, therefore where we may, unhappily, have to rely more on education and moral suasion.

Looking forward

What remains to be seen is if the free market jubilee that has flourished for the past 50 years will finally abate and interest in economic planning will increase. What remains to be seen is if interest in not only making planning more democratic but also more participatory – giving workers and consumers more autonomy than in previous approaches to comprehensive planning – will increase. There are emerging signs of both trends that can be detected. For the moment the countries where economic performance has diminished and right-wing populist discontent is highest are the advanced economies in Europe and the United States where the anti-planning, neoliberal trend has been most pronounced. While the economic “success stories” over the past five decades are in countries that have embraced more planning, the most important example being China, which replaced Communist authoritarian planning with authoritarian capitalist planning 30 years ago, and in the process has risen to become an economic superpower. It is also clear that it will take a great deal of international and national planning, a.k.a. Green New Deals, to prevent cataclysmic climate change over the next three decades. Hopefully, humanity will rise to meet this unprecedented challenge, in which case a successful response to climate change may well enhance the reputation of planning in the public eye.

However, if improving economic performance and responding to climate change leads to a revival of economic planning, what kind of planning will it be? It is possible that a return to planning in the 21st century will be as authoritarian and undemocratic as planning was in both centrally planned and some capitalist countries during the 20th century. It is possible that since it is indisputably the biggest economic success story in recent times, China will become the new model, and other countries will abandon neoliberal capitalism for authoritarian, planned capitalism.

But there are also signs that this may not prove to be the case. Many who are coming to understand the need for planning are insistent that *this time* planning must not only be subject to democratic control, but must also be made compatible with autonomy of action for workers and consumers. Thousands of organizations and coalitions pursuing projects, programs, and ideas for how to reconcile democratic planning with autonomy have sprung up in the United States alone over the past few decades – the New Economy Coalition, the Democracy Collaborative, Demos, the Tellus Institute, the US Federation of Worker Cooperatives, and the Next System Project being some of the most notable. This book has spelled out a concrete proposal for how national,

comprehensive democratic economic planning can be reconciled with autonomy, refuting by example claims to the contrary.

A bridge too far?

Much of what we propose in this book may seem farfetched – even when understood as an effort to clarify thinking about goals and what is required to achieve them fully, even when understood as an attempt to become more clear about destination rather than a travel plan, even when not confused for an economic program or strategy for the here and now, or for anywhere in particular. In short, even when taken in the spirit it is offered, is a participatory economy still *a bridge too far*? Only time will tell.

While knowledge and technologies sometimes advance quickly, lasting social progress seldom does. Lasting social progress is always hard earned and well deserved when it finally arrives. It begins as a heretical idea, is preached for years by dissidents “shouting to the wind,” suffers many setbacks before it is ever tried, and even when tried, often fails before it succeeds and becomes well established. At which point it is often taken for granted – people cannot imagine why it took so long or what life was like before. In short, good ideas about fundamental, progressive, social change take a long time to percolate. We believe that democratic, participatory, comprehensive economic planning is such an idea. After two centuries of controversy and confusion, false starts, and detours down dead-end roads, whether its time will finally come as the 21st century progresses remains to be seen. There are certainly no guarantees . . . yet far less likely things have come to pass.

Notes

- 1 Smith did warn of possible problems. His principle concern was that his prediction of desirable results was predicated on the assumption that markets would be competitive. In Chapter 2 we pointed out that since Adam Smith’s day, a number of *additional* problems have become apparent and received considerable attention in the economic literature, even if free market fundamentalists continue to ignore both the problems and the literature that elucidates them.
- 2 Lebowitz 2012.
- 3 As all economists who teach microeconomic theory know, theoretical analysis of “the logic” of consumer behavior under capitalism requires solving a constrained optimization problem, but few if any consumers formulate and solve a Lagrangian maximization problem before they go shopping!

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Appendix

Other democratic planning proposals

Introduction

As explained in the introduction, since the collapse of the centrally planned economies in the early 1990s, the majority of those who continue to advocate for socialism support some sort of market socialism, while only a minority support some version of democratic economic planning. This appendix discusses five other approaches to democratic economic planning in the literature, highlighting areas of agreement and disagreement with the proposals elaborated in this book.

Most early socialists assumed that once freed from their capitalist employers, once productive resources belonged to all, and once there were no longer classes with antagonistic interests, ordinary people – workers and consumers – would be free to manage their own economic affairs themselves, democratically, efficiently, and fairly. Most early socialists also believed people would proceed to *plan together* how to put their productive resources to good use rather than leave decisions to the “laws of supply and demand,” or what many of them called the “anarchy of the market,” and anticipated that *planning together* would be a *liberating experience!* As readers of this book now know, we endorse this original socialist vision, including the enthusiasm that accompanied it.

However, what has become abundantly clear over the last 200 years is that exactly how “the associated producers” should go about “planning together” is *far from obvious*, and to assume that it can be done in something that amounts to “one big meeting” where everyone discusses, debates, and eventually approves a comprehensive plan for the economy is hopelessly naïve. We can make this vision less fantastical in any number of ways. Of course, those attending the meeting would have to be delegates who represent many others. There would surely have to be a series of many meetings. The delegates would have to establish task forces with professional staffs to study different “technical” issues in detail. Key issues could be put to referenda. And we could continue to flesh out more details about how this vision of democratic economic planning shared by many early socialists, as well as some today when they first become enthusiastic about socialism, might unfold.

However, as readers know by now, we believe this conception of democratic, comprehensive economic planning as essentially one big meeting is fundamentally flawed. Such a format does not generate the necessary information for making rational economic choices – estimates of opportunity costs, social costs, and social rates of return – none of which can be accurately estimated by studies carried out by experts, but must emerge instead from carefully structured social interactions among different groups of workers and consumers. Such a format does not distribute decision-making authority in proportion to the degree people are affected by different economic decisions. Such a format fails to give workers and consumers enough autonomy over what and how *they* produce and *they* consume. Such a format contains no coherent agenda for settling disagreements that will inevitably arise no matter how well intentioned and empathetic people may be, except to simply “call the question.”

In short, such a format contains no coherent agenda for how to construct a comprehensive economic plan, and in our opinion, any plan that emerged from such a process would be deficient in so many ways, people would soon refuse to put up with it. All of which is why we have proposed an altogether different approach to how the dream of early socialists can be achieved through participatory annual planning, investment planning, and long-term development planning.

However, the participatory economy “model” is not the only alternative that has been proposed to democratic economic planning as “one big meeting.” This appendix reviews five other approaches to democratic economic planning. Section 1 discusses the vision of what has come to be called “community-based economics.” Section 2 discusses what is sometimes called the “Scottish model” proposed by Paul Cockshott and Allin Cottrell. Section 3 discusses a proposal by David Laibman, which he calls “multi-level, iterative, democratic coordination.” Section 4 discusses a proposal by Pat Devine he calls “negotiated coordination.” And Section 5 discusses a proposal by Dan Saros one reviewer described as “Amazon Socialism.” We do not pretend to cover all aspects of these proposals in a single appendix. Instead we focus on key areas where these five proposals are similar to or differ from what we have proposed in this book. References for readers who wish to explore these other visions and proposals at greater length can be found at the end of this appendix.

1 Community-based economics

Supporters of community-based economics reject both markets and national economic planning. In their place they offer a vision of largely self-reliant, local economies governed by the kind of direct democracy once used in New England town meetings. Advocates argue that only reducing the scale of economic institutions and increasing the self-sufficiency of local communities can satisfy libertarian goals, reduce alienation, and promote ecological balance.¹

Supporters of community-based economics seek to avoid the negative repercussions of both markets and bureaucratic planning by eliminating the

“problem” these allocative mechanisms address – coordinating a division of labor among geographically dispersed groups. By decentralizing large national economies into small, largely autonomous economic communities, they also hope to promote face-to-face democratic decision-making and create incentives for local communities to take the environmental effects of their activities into account. They argue that while participatory democracy does not work in large groups where people do not know one another and cannot meet face-to-face, it can work in small communities where it is possible for people to know each other personally. They also reason that once the consequences of choices fall “in my backyard,” the IMBY principle will force local communities to better protect their environment.

Of course, just as there are different models of market socialism and democratic planning, community-based economics comes in many different “flavors.” Murray Bookchin was the founder of the school of social ecology and is the best known proponent of their post-capitalist vision, *libertarian municipalism* (Bookchin 1986; Bookchin and Biehl 1998). Howard Hawkins, a long-time activist and founder of the Green Party, has also written along similar lines (Hawkins 1993). David Korten (1999) and Paul Hawken (1993) have argued that an ecological society can best be achieved through democratic pluralism in books that have reached wide audiences. Gar Alperovitz and Michael Shuman have both written widely about the advantages and feasibility of what Shuman (2000) calls self-reliant communities, and Alperovitz (1973, 2005) calls a decentralized, pluralist commonwealth. EF Schumacher’s classic defense of localism in Schumacher (1973) has spawned a whole school of “Buddhist economics.” Kirkpatrick Sale (1980, 1996) is a well-known proponent of bioregionalism. Daly and Cobb (1994), founder of the school of ecological economics, argues for a less radical version of regional self-reliance, while Roy Morrison (1995) has written about a more radical vision he calls ecological democracy. These are only some of the different versions of what might more accurately be called “a community-based approach to economics” that appear in a wide-ranging literature.

Areas of Agreement: Before spelling out our criticisms of a community-based economics approach, it’s useful to identify important insights proponents bring to the discussion that we agree with wholeheartedly.

- As long as economies are dominated by giant corporations and driven by market forces, we will never achieve environmental sustainability, economic justice, or economic democracy.
- The traditional socialist response to capitalism was fatally flawed and does not serve as a positive model. As Steve Welzer (2003) aptly put it: “The socialist experiment was increasingly discredited during the twentieth century, as it became clear that the promise of egalitarianism and ‘peoples control’ was a chimera in one socialist experiment after another.”
- A desirable economy must be up to the challenge of replacing today’s environmentally destructive technologies and products with technologies

and products that are much more environmentally benign. In particular, energy and transportation systems must be completely transformed to stem rapid environmental deterioration. A desirable alternative must also eliminate perverse incentives that drive producers to engage in what ecological economists call *uneconomic* growth and consumers to seek satisfaction through what Thorstein Veblen aptly called “conspicuous consumption.”

- Desirable economies promote diversity rather than uniformity and initiative rather than passivity. This means that local communities and “direct producers” must be free to run their own economic affairs – as long as they do so in socially responsible and environmentally sustainable ways. As Welzer (2003) put it, our “vision runs counter to the civilizational trend lines which have been leading in the direction of compelled uniformity and monoculture.” Instead, we advocate “re-empowerment of communities and participatory decision making, enhanced local autonomy, and more humanly-scaled institutions and technologies.”

Areas of Disagreement: While we sympathize with the participatory and ecological goals of those who advocate for community-based economics, we believe all versions suffer from the following four problems.

(1) Unlike some versions of market socialism and democratic planning, no “vision” of a community-based economy is a coherent “model” in the sense that it specifies rules and procedures for how to make all the different kinds of decisions that must be made in any economy. Sometimes proponents are blissfully unaware that they have failed to address important issues that will inevitably arise. Sometimes proponents refer to the lack of specific, concrete answers regarding *how* something would be decided as a virtue compared to what they criticize as “deterministic” models. But this response misses the point. It is impossible to evaluate a proposal for how to run the economy until it is a full and complete proposal.

This failure should not be confused with the problem of explaining how to move from today’s capitalist system to a more community-based economy. Advocates of community-based economics often address problems of transition more extensively than they answer exactly how they propose particular issues be decided once we have a community-based economy. Nor should the failure be confused with lack of speculation about what kinds of decisions enthusiasts *imagine* people will make in a community-based economy, since proponents of community-based economics are often motivated by strong convictions that people need to choose radically different technologies and products and need to change their priorities regarding leisure versus work. Authors often write at length about differences between the decisions *they believe* will be made in their community-based economy and the decisions made in today’s capitalist economies. The problem is, as any professional economist knows, there are certain categories of decisions that must be made in any economy, and until a proposal is comprehensive enough to specify

how a proponent suggests these necessary decisions be made – that is, until we have what economists call a formal model of the economy proposed – it is impossible to evaluate whether or not the economy would do what its proponents hope and claim it would.

(2) One manifestation of this first problem is that when push comes to shove, no version of community-based economics proposes that communities be entirely self-sufficient. Joel Kovel provides an excellent critique of localism where he points this out:

A pure community, or even “bioregional” economy is a fantasy. Strict localism belongs to the aboriginal stages of society: it cannot be reproduced today, and even if it could, it would be an ecological nightmare at present population levels. Imagine the heat losses from a multitude of dispersed sites, the squandering of scarce resources, the needless reproduction of effort. . . . This is by no means to be interpreted as a denial of the great value of small-scale and local endeavors. . . . It is rather an insistence that the local and particular exists in and through the global whole; that there needs to be, in any economy, an interdependence whose walls are not confinable to any township or bioregion; and that, fundamentally, the issue is the relationship of parts to the whole (Kovel 2003: 156).

In other words, it turns out that autonomous communities are really only *semi*-autonomous for a number of valid reasons. (a) Not every local community can produce everything its members will want to consume. (b) Even were complete self-sufficiency possible, whenever there are significant differences in opportunity costs of producing goods in different communities, it is inefficient to forego a division of labor among them. (c) Whenever there are true economies of scale that surpass the customer base of a local community, it is inefficient to forego a division of labor between communities. (d) If communities were completely self-sufficient, serious inequities would arise because some communities are better endowed with natural, produced, or human capital than others.

Unfortunately, when enthusiasts acknowledge that communities will only be semi-autonomous, they fail to explain precisely how they propose that the “semi” part be handled. Instead we invariably find nothing more than what amounts to hand waving accompanied by declarations of faith that democratic communities can work this out between themselves satisfactorily. But it is not enough simply to say that relations between communities “must be nondependent, nonmonetary, and non-injurious” (Sale 1996: 483). In the likely event that communities rediscover the advantages of some division of labor, no proposal we have seen in an extensive literature promoting community-based economics provides an answer to the question of how “autonomous communities,” which are nonetheless not completely self-sufficient, should go about arranging the division of labor between them – precisely because they are not truly economic models.

How do communities decide how much of a division of labor they want to engage in? What if one community wants a greater division of labor than another community wants? Most advocates of community-based economics offer no answer to this important question. Murray Bookchin is a rare exception. In Bookchin's description of libertarian municipalism, no community must acquiesce to a greater division of labor than it prefers. For Bookchin, this is what it means for communities to be autonomous. But this rule empowers the community that wants the least division of labor among communities to impose its preference over the preferences of all other communities. And it is unclear why a community that is better endowed with natural, human, and/or physical capital would not be tempted – even if unconsciously – to take unfair advantage of this implicit veto right in Bookchin's proposal.

Even if communities can agree on how much of a division of labor they want, how do they go about deciding how to distribute the burdens and benefits of this division of labor? How do they jointly manage their division of labor? Should goods and services not produced by every community be traded between them in free markets? If so, why would this not lead to the usual litany of problems advocates of community-based economics rightly criticize in capitalism and market socialism? Some advocates of community-based economics emphasize that they do not support free markets but only "socialized markets." Besides the obvious question of exactly how they propose to "socialize" a market, as we argued in Chapter 2, "socialized markets" would only reduce, not eliminate injustice, inefficiency, and environmental damage. Other advocates of community-based economics simply claim that communities will decide all this "democratically." But how to organize planning among communities democratically is neither obvious nor trivial.

In sum, all proposals for community-based economics we have seen fail to adequately address this fundamental issue: *In the end, the problem of devising desirable allocative mechanisms to coordinate the division of labor won't go away, and advocates of community-based economics provide no satisfactory answer for how they would coordinate cooperation between communities, which, under careful cross examination, always turns out to be only "semi-autonomous."* A particularly unfortunate consequence of their failure to solve the problem of designing a desirable allocative mechanism is that markets become the implicit fall back option for many advocates of community-based economics when the need for a coordinating mechanism arises.²

(3) Advocates of community-based economics also fail to provide concrete answers to crucial questions about how local communities would make different kinds of internal decisions. Even in a community of several thousand people there will be different groups of workers and consumers, different neighborhoods, and different kinds of economic decisions to be made. It is impractical for the whole community to discuss, debate, and vote on each and every economic question that comes up. What would the agenda for such a "town meeting" look like?

Moreover, a democratic vote of an entire community does not provide its citizens with decision-making power *in proportion to the degree they are affected* in the many cases where not all members of the community are equally affected by a particular economic choice. Nor can all decisions be left entirely to the work groups who form within these communities. Many of the decisions groups of workers make affect other groups of workers and must be coordinated with consumers and community residents as well. Are relations among different groups of workers and consumers to be coordinated through markets within communities? If not, what would the community planning procedures be like? Proponents of community-based economics unfortunately have little to say about how these internal decision-making problems should be solved.

Saying that the ultimate power over all economic decisions resides in the community assembly where all have voice and one vote is not a good enough answer, because “one big meeting,” even of only of a few thousand residents, just doesn’t work. Leaving economic relations between different groups in the community to the marketplace is also unacceptable. Saying this will all be worked out by those who live in a community-based economy demonstrates an admirable faith in humanity’s ability to solve problems democratically, but misses the point. Nobody is proposing that people in future economies live by rules we lay down today. The question is whether those arguing for community-based economics can describe desirable ways of answering such questions when they inevitably arise. Otherwise, community-based economics becomes little more than a “faith-based initiative.”

(4) Finally, in a community-based economy, the “in my backyard” or IMBY principle works only for local pollutants – that is, pollutants that adversely affect only the inhabitants of the local community where they are generated. It does not work when pollution from one community fouls not only its own nest but the nests of other communities as well. What happens when sulfur dioxide from a utility plant located in a county in Ohio comes down as acid rain on hundreds of counties in Pennsylvania, New York, and Connecticut; or when run-off carrying manure from a chicken farm on a tributary of the Capon River in West Virginia contributes to dead zones in the middle of the Chesapeake Bay? In a community-based economy, there would be insufficient incentive for the community where the utility plant or the chicken farm is located to curb its polluting activities, because only part of the negative consequences would occur IMBY, and a significant part of the negative effects would take place NIMBY but in someone else’s. In other words, while community-based economics offers help in curbing local pollutants, it does nothing to solve the problem of pollutants that adversely affect multiple communities. To observe that local communities would have an incentive to negotiate with one another with regard to curbing emissions of non-local pollutants, and to point out that they are free to do so, is no more helpful than observing that nation states today have an incentive to negotiate with one another with regard to curbing carbon emissions to prevent climate change and to point out that they are free to do so.

2 The “Scottish” model³

Unlike proponents of community-based economics, Cockshott and Cottrell do propose answers to how all the decisions that must be made in any economy can be made. In other words, they do provide us with a complete proposal, or “model,” we can evaluate. We limit our discussion to three salient features of their proposal.

First, Cockshott and Cottrell argue that advances in mathematical programming theory and modern computer technology now make possible the calculation of an efficient comprehensive “detailed” plan for a large economy producing a large number of different goods. In their words:

Using modern computers it is possible to efficiently plan an economy in terms of natural units without recourse to the intermediary of money or markets. . . . The problems of calculation that seemed daunting in the past can now be readily handled by super-computers (Cockshott, Cottrell, and Dieterich 2010).

Second, they propose that in a socialist economy workers be paid one “labor token” for each hour they work. In their words: “Socialism requires the abolition of money and its replacement by a system of remuneration based on labor time” (Cockshott, Cottrell, and Dieterich 2010; Cockshott and Cottrell 1997). To their credit, they acknowledge that sometimes people work at what they call higher or lower “intensity,” which needs to be taken into account by converting actual hours and intensities into an equivalent number of hours at average intensity, to determine the number of labor tokens paid.

Third, Cockshott and Cottrell argue that the social cost of producing anything is equal to the number of hours of labor it takes to make it, both directly and indirectly – that is, its “labor value,” which, with the aid of modern computers can now be calculated even for an economy that produces a very large number of different goods. They then propose that initially goods be offered for sale at a price equal to their labor value to consumers who buy goods using their labor tokens. If there is excess demand or supply when consumers are charged labor value prices, Cockshott and Cottrell propose that authorities respond as follows: First, authorities in charge of prices must adjust prices to eliminate any excess demands or supplies. Then planning authorities must order adjustments in production – that is, how much of different goods to produce, based on discrepancies between these market clearing prices and labor values. If the price that clears the market for a good is the same as its labor value, there is no need to change the amount of the good produced. For goods whose market clearing price exceeds its labor value, planning authorities must order an increase in production until there is no longer any discrepancy and assign additional inputs to enterprises in the industry as necessary. For goods whose labor value exceeds its market clearing price, planning authorities must

order a decrease in production until there is no longer any discrepancy and reallocate inputs no longer necessary to industries where production must be increased. In their own words:

Given that supply of and demand for goods is never exactly equal, it is only average prices that should equal labor values. . . . Premiums [market clearing price exceeds labor value] and discounts [labor value exceeds market clearing price] can guide the planning authorities to decide which goods to produce more of, and which to produce less of (Cockshott, Cottrell, and Dieterich 2010).

To their credit Cockshott and Cottrell acknowledge that while this procedure will yield a production plan for private goods that consumers purchase with their labor tokens, it cannot decide how much public goods or capital goods to produce. Cockshott and Cottrell propose a popular referendum to decide the division of output between private consumption, public consumption, and investment, and a tax on labor-token wages sufficient to pay producers to produce the amounts of public goods and investment goods people voted for.

Areas of Agreement: We agree that mathematical programming theory and advances in computer computational capabilities have rendered many early arguments against what Cockshott and Cottrell call “detailed” economic planning obsolete. And we recommend to interested readers their account of how and why Soviet planners failed to take advantage of these capabilities in the decades before the demise of central planning in the Soviet Union and Eastern Europe.

Broadly speaking, we also agree with Cockshott and Cottrell’s proposal for how workers should be rewarded. They propose that people be paid according to the hours they work, but acknowledge that “intensity” should be taken into account. They see this as workers getting back – goods it took an hour to produce – exactly what they “contributed” – an hour of labor. We argue that compensation should be commensurate with effort, or sacrifice, which is *not* generally the same as the value to society of the additional goods or services a worker “contributed.” But while we can argue over methodology and philosophy, in this regard, the conclusion we come to is essentially the same: Workers should be rewarded according to how long and hard they work. The major practical difference is that we propose that effort ratings be done by those who work in the same worker council, whereas Cockshott and Cottrell seem to think it is possible for some authority to calculate how to transform the actual hours people work into what they call average hours for payment purposes.

Areas of Disagreement: We have two main areas of disagreement with Cockshott and Cottrell’s proposal for how to go about comprehensive economic planning. Most importantly, we believe their proposal reduces to a version of central planning, which suffers from all the problems we were at pains to explain in Chapter 4, and therefore is *not* at all what socialists should

be proposing in the 21st century. To be sure, the version of central planning they propose is highly democratic. Consumer preferences as expressed in retail markets, and not some political authority, determine how much of different private goods will be produced. And they propose a popular referendum to decide how to divide output between private consumption, collective consumption, and investment.⁴ Moreover, we concede that it would still be possible to leave up to the workers in an enterprise exactly how they go about using the inputs they are allocated by the planning authority to produce the output targets they are assigned. But what this means is that as a consumer and voter, *every* person has as much say over what any particular group of workers produces and what inputs they will be allocated to produce it as those workers have themselves. It means that workers do not get to exercise *meaningful* self-management. It means that Cockshott and Cottrell's proposal is simply a highly democratic version of central planning and suffers from central planning's fatal flaw – namely, it does not allow workers to engage in meaningful self-management. And because Cockshott and Cottrell's proposal would fail to give workers sufficient autonomy over their work lives, we believe it would predictably lead to the kind of worker apathy that plagued centrally planned economies in the 20th century.

While the failure to allow workers to manage themselves so long as they do so in a socially responsible way is our major criticism of their proposal, we also believe that the procedures Cockshott and Cottrell recommend for *how* to do what amounts to central planning would not lead to an efficient plan. In Chapter 3 we explained how a central planning authority *can* calculate an efficient plan *if* it has accurate information about *all* the technological capabilities of all the production units in the economy. We explained this using not only a single period model for heuristic purposes, but also using a multi-period model of the kind a real central planning authority might use. Cockshott and Cottrell's contribution to this discussion is to argue, convincingly in our opinion, that advances in the computational power of modern computers now make *these* calculations a *practical* possibility even for economies producing millions of different goods and services, and where each product can be produced in many, many different ways. But their proposal for how to calculate such a plan would fail to yield an efficient plan for two reasons.

First, Cockshott and Cottrell's procedures only successfully take into account the opportunity cost of using labor. In a few places they acknowledge that rents should be charged for environmental services that are scarce, but they propose no systematic way to determine how high rents should be, much less explain how to incorporate the opportunity costs of using scarce natural resources into their calculations of the overall social cost of producing different goods. Cockshott and Cottrell also fail to acknowledge that while more capital goods can be produced during any year, this does not change the fact that at any point in time stocks of capital goods are also scarce and therefore have an opportunity cost that must be taken into account as well when calculating social costs of production and an efficient plan for the economy. In sum, they operate from a

flawed theory of opportunity and social costs that they mistakenly insist reduce to all intents and purposes to the labor time it takes to make things both directly and indirectly – which it does not, even when planning over very long time periods. Labor is not the only input to production we need to economize on. Other inputs are scarce as well, even in the long run.

Second, they incorrectly assume that all the information planners need to know about production technologies is contained in a detailed input-output table. In their chapter on “detailed planning,” they write: “[W]e introduced input-output tables in Chapter 3, in the context of calculating the total labour content of commodities. This method of representing the economy is also very useful for formulating and understanding the problem of detailed planning” (Cockshott and Cottrell 1993a). They proceed to explain how an input-output table can be used to turn any vector of final demands into a vector of the gross outputs necessary to meet those final demands and explain that even though such an input-output table “will be colossal, with millions of rows and columns” modern computers are now capable of performing the necessary calculations to allow central planners to calculate a detailed, comprehensive plan (Cockshott and Cottrell 1993a).

However, as we explained in Chapter 3, to calculate an *efficient* plan the planning authority needs to know the $\{\mathbf{A}, \mathbf{K}, \mathbf{L}, \mathbf{R}\}$ matrices, which include *multiple* recipes for producing each good, any of which might be used. An input-output table includes only the weighted average of the actual recipes most recently used by each firm in each industry. So, while modern computers do now make it possible for central planners to calculate an efficient, detailed plan for the economy *if* we assume central planners are told the relative social values of private and collective consumption goods, *if* we assume central planners know the production possibility *sets* of all producers, $\{\mathbf{A}, \mathbf{K}, \mathbf{L}, \mathbf{R}\}$, and *if* central planners use high-powered computers to solve the mathematical programming problem as we formulated it in Chapter 3; unfortunately that is *not* what Cockshott and Cottrell propose that central planners do.

We wrote “*sets*” in italics in the sentence above to emphasize that it is not enough for central planners to know the amounts of inputs each industry is currently using to produce their outputs. That data is contained in an input-output table for the economy, which can be as detailed as one likes, as Cockshott and Cottrell point out. But they assume that is all the data central planners need to know. And while it is all that planners need to know in order to calculate the actual labor values of different goods given what technologies firms have chosen to use, it is only a tiny fraction of the data about production possibilities a central authority needs to calculate an efficient plan – that is, what different firms and industries *should* do. Central planners need to know *all* the different possible ways – that is, combinations of inputs, that firms are *capable* of using to produce their outputs. These technologies, or production possibility *sets*, can be represented as sets of linear “activity” vectors as we did in our models in Chapter 3, but the point is that any enterprise has many, many different “activity vectors” available, from which only one will be chosen. The

information contained in an input-output table for the economy is only a tiny fraction of the data central planners would need to calculate an efficient plan.

What if enterprises are not making the right choices? What if enterprises are choosing activity vectors, or technologies, that are not the most efficient ones to use, given people's preferences and the available supplies, or stocks of capital goods, different kinds of labor, and different environmental services available? Cockshott and Cottrell implicitly assume that the technologies currently being used by firms in an industry, as described in an input output table, is the most efficient one for each enterprise to use when they begin their discussion of how to calculate a detailed, comprehensive plan. Unfortunately, figuring out which of many different technologies available to each enterprise is the one it should use is an essential part of calculating an efficient plan.

Put differently, if enterprises chose different activity vectors from their production possibility sets, the weighted average of those choices would be different, the input-output table for the economy would be different, and the labor values in the economy would be different as well. Another way to see that matters are considerably more complicated than what Cockshott and Cottrell seem to understand is this: The purpose of various procedures devised in response to the "tacit knowledge critique," which we reviewed in the last section of Chapter 3, is to try to induce production units to truthfully reveal their production possibility *sets* to the central planning authority. None of which would be necessary if the information available from an input-output table was sufficient for central planners to be able to calculate an efficient production plan – which it is not.

Their discussion of detailed planning and what they call "stock constraints" makes clear that Cockshott and Cottrell conflate enterprise production possibility *sets* with the technology enterprises are currently using. They point out that when using the detailed input-output table to turn a vector of final demands into a vector of gross outputs "it may not be possible to produce the quantities of all products that are called for by the gross output computations, because of 'external' constraints in the form of stocks of means of production and labor supply." In which case, they point out some "final output targets which have the lowest social priority can be reduced, and the whole calculation repeated." But it is only possible to turn final demands into gross outputs if we assume a particular technology is being used in each industry. Of course, what Cockshott and Cottrell recommend above is exactly what Soviet planners had to do when applying the method of material balances – check whether gross outputs violate labor, resource, or capacity constraints, and reduce final (net) output targets until they no longer do. Which goes to further demonstrate: (1) What Cockshott and Cottrell are proposing is a version of central planning. And (2) their proposal for how to do central planning, like the method of material balances, suffers from inefficiencies regarding choice of technique that are well known.

3 Multi-level democratic iterative coordination

In the introduction to this book we explained how, as managing editor of *Science & Society*, David Laibman has played an important role in facilitating the modern, post-1990 history of economic thought on models of socialism. He has also contributed by making his own proposal, which he calls “multi-level, democratic, iterative coordination,” hereafter MDIC, and offering a concrete proposal for how to measure enterprise performance. We discuss each in turn. See Laibman 1992, 2011, 2015, and 2020.

Multi-level, Democratic, Iterative Coordination: While Laibman reminds us that there would be more “levels” in any real-world version of MDIC, as he notes himself, two levels suffice for most discussion purposes: a “center” and the “enterprises” where production takes place. I am still not clear from his various publications exactly what Laibman proposes that the center and these local units do, nor how his “social reproduction prices” would be calculated or emerge. So let me begin by quoting the relevant passages from what Laibman describes as his most complete presentation before formulating some questions and making a few observations.

Laibman describes the roles for local units and the center as well as the iterations between them in his MDIC planning procedure as follows:

Each enterprise prepares its own plan, and in so doing incorporates specific local knowledges: the peculiarities of its workforce, physical environment and equipment, history, etc. . . . The upward flow of these plans to the center involves aggregation; coordination for consistency of the supplies and demands, inputs and outputs; establishing optimal solutions to problems involving choice (where relevant); and vetting the emerging aggregate plan against wider criteria – environmental impacts, transportation and power grids, social goals regarding the built environment, residential development, needs for water, housing, schools, medical facilities, and in general problems that cannot be addressed, let alone solved, at the local enterprise level. In principle the upward and downward phases of this process result in *convergence* between the enterprises’ own plans and the macro social goals whose pursuit is the responsibility of the center (Laibman 2015: 309–310).

And Laibman says this about prices and their formation:

One vital role of the center is price formation. . . . A mature socialist economy must elaborate a system of *social reproduction prices* . . . [which] provide a highly sophisticated basis for comparison and decision making. . . . Their calculation, needless to say, requires massive computational power, and is necessarily an activity assignable only to a central body (Laibman 2015: 311).

Finally, Laibman has this to say about the role of the “center” in environmental planning, which sheds light on the role he envisions for the center in general.

A second area of concern for the center is management of certain overall goals and constraints that, by their nature, cannot be addressed by local units acting independently of one another. The reference here is to things like avoiding tipping points in ecological balance and resource use. If there is a social goal, for example, of keeping carbon emissions below some critical level necessary to prevent and reverse global warming, there is no way that individual enterprises can know how their own plans aggregate toward that goal. It may not be possible for the center, in advance, to impose carbon taxes or quantitative restrictions in a way that meets the needs of individual enterprises with diverse situations and requirements; the goal may only be achievable within the framework of a central plan (Laibman 2015: 312).

What are we to make of all this? Laibman clearly wishes to avoid disempowering enterprises by reducing them to simply taking orders from central planners. He recognizes that local units have important “tacit knowledge” that central planners cannot know, at least initially, and seems anxious to apportion influence and power over different decisions between center and units in a manner that is sensitive to their uneven impacts. Laibman also sees planning as having two aspects: There must be communication *back and forth* between units and the center, and the central plan must establish a *context* in which units operate.

But what exactly does he propose be done to accomplish all this? Laibman says the first step in the iterative process is for each enterprise, or unit, to propose what we have called a “self-activity” proposal for itself. But how would a unit go about formulating a plan for itself without any prices to use to evaluate all the different possible inputs they might use as well as the social value of the different possible outputs it might produce?

Presumably, what Laibman envisions is that before units are asked to formulate their own self-activity proposals and communicate them to the center, what he refers to as a “central plan” will already have established what he sees as the important elements of the context in which the units will function, and the center will have communicated at least provisional estimates of what he calls social reproduction prices. But that begs the question of how this overall context and the social reproduction prices were created.

As noted, Laibman describes the second step as follows:

The upward flow of these plans to the center involves aggregation; coordination for consistency of the supplies and demands, inputs and outputs; establishing optimal solutions to problems involving choice (where relevant); and vetting the emerging aggregate plan against wider criteria (Laibman 2015: 309).

That is quite a mouthful, but it is not obvious precisely what it means the center is to do, nor how units are allowed to respond. Clearly, Laibman is proposing that the center should aggregate all the unit plans – which is simple enough – at which point the center can also easily calculate what the excess supply or demand is for all items that must be “coordinated” among all the units. What is *not* clear is what the center would then do to establish “consistency of the supplies and demands, inputs and outputs.” Nor is it clear how the center would go about “establishing optimal solutions to problems involving choice” or “vetting the emerging aggregate plan against wider criteria.” As Laibman points out, clearly there is much that cannot be done by individual units. But that is not the same as explaining *how* the center, or the center together with the units, can accomplish these tasks.

There is an easy way for the center and the units to proceed that would eliminate excess supplies and demands and lead to an efficient plan. But it does not entail the center solving for “optimal solutions to problems” nor require “massive computational power.” All the center has to do is increase its estimate of the “social reproduction price” of any item that is in excess demand, decrease the “social reproduction price” of any item in excess supply, and ask units to submit new proposals using the new, revised estimates of “social reproduction prices” as guides in a second iteration of the planning procedure. Under certain assumptions, this iterative procedure will eventually lead to a feasible plan – that is, eliminate all excess demands for all items coordinated among units. And under certain assumptions a feasible plan that is reached will be a Pareto optimum – that is, socially efficient. However, something along these lines are what *we* have proposed in our *annual participatory planning* procedure, which Laibman has criticized and rejected as a “market-like, tatonnement process” that, according to Laibman, is incapable of taking into account much that a planning process can and should. So presumably that is *not* what Laibman has in mind, leaving us with no way to know exactly what he does have in mind instead.

Laibman talks about a “center” that deploys massive computational capabilities to solve an optimization problem. But that is quite different from an iterative process between the center and local units. So despite earlier talk of “upward and downward phases” of a process, which he says in *principle* “results in *convergence* between the enterprises’ own plans and the macro social goals whose pursuit is the responsibility of the center,” it seems that at least sometimes Laibman is proposing a much larger role for the center.

In Laibman 1992 he discusses the relation between his social reproduction prices and both Marxian labor values and Sraffian prices. Laibman seems to believe that the center can and should calculate appropriate prices, but it is unclear how he envisions them doing so. As we explained in Chapter 3, there are ways it could be done: If the center can induce the units to provide it with truthful information about their production capabilities, the center could calculate an efficient plan as the solution to its primal optimization problem

and also calculate opportunity and social costs as the solution to the dual problem. But presumably, this is not what Laibman has in mind because he has criticized and rejected the various proposals we reviewed in Chapter 3 to accomplish this as a misguided “planometrics literature” – leaving us in the dark about how Laibman proposes the center should go about calculating “social reproduction prices.”

It is also not clear if Laibman’s social reproduction prices would eliminate all excess demands and supplies unless they were subjected to a “tatonnement process” between center and units – in which case any social reproduction prices as calculated by the central authority play no essential role. The tatonnement process could begin with any set of initial prices, since they will have to be modified in any case during the tatonnement process in order to induce units to make the necessary changes in their proposals to eliminate excess supplies and demands and yield a feasible plan. And beginning with last year’s prices is both easier and more practical than having the center go through the trouble of attempting to calculate social reproduction prices to initiate the iterative process.

In other places in Laibman 1992 he appears to be proposing something more along the following lines: Based on information contained in proposals from the units about their technological capabilities, along with information readily available to the center about the aggregate stocks of natural, produced, and human capital – and perhaps “macro goals” already established – the center would somehow calculate an optimal plan for the economy and communicate back to the units how they must modify their initial proposals to implement the plan. However, as explained in Part II of this book, this is how central planning functions!

Once we acknowledge the tacit knowledge problem, and realize that central planners do not initially have accurate information about the technological capabilities of production units, it is apparent that a procedure must be devised to induce units to reveal this information before the center can calculate an optimal plan for the entire economy. But as explained in Chapter 4, in this context, any iterations back and forth between units and the center simply serve the purpose of trying to induce units to reveal their tacit knowledge to the center, which then calculates a comprehensive plan for the economy and informs the units of what they must do. As we explained, the problem with this is that even if we ignore considerable incentive compatibility issues, this does not give meaningful self-managing decision-making authority to production units, but instead leaves units to produce an output target with inputs the center assigns them. In any case, particularly in light of Laibman’s intriguing remark that some goals “*may only be achievable within the framework of a central plan,*” it may be that what he is actually proposing is a version of central planning – claims to the contrary notwithstanding.

Areas of Agreement: We are largely in agreement with Laibman about what the planning process needs to achieve – that is, what our goals should be. We believe Laibman would agree with us that both because units should have an

appropriate degree of autonomy over their own activities and because they have “tacit knowledge” about their capabilities, which a central planning authority does not, units should play an active role in proposing what they do. We believe he would agree with us that all decision makers need to be provided information about opportunity and social costs in order to make sensible and socially responsible choices. And finally, we believe Laibman would agree with us that annual plans must be consistent with both investment and longer-term plans already established before annual planning begins. We believe Laibman also recognizes that Soviet-style central planning failed to permit sufficient decision-making autonomy to production units, and various kinds of what he calls “macro planning” were insufficiently democratic as well.

Areas of Disagreement: However, we do not believe Laibman has actually proposed procedures that would accomplish any of these goals we share. Because Laibman is unclear about precisely what he proposes in crucial areas, we find MDIC to be ill-defined and therefore difficult to evaluate. As explained, it is not at all clear from Laibman’s various accounts exactly what either the center or units would do during planning, nor how his social reproduction prices would be calculated. Moreover, while he refers to “macro goals and plans,” which establish a context within which annual plans and individual units must function, he makes no concrete proposals we are aware of for how these macro goals should be established and macro plans should be arrived at.

Evaluating Enterprise Performance: In contrast to considerable ambiguity about what he proposes units and center do during MDIC and how prices should be calculated or generated by some process, Laibman proposes an explicit formula to evaluate and reward socialist enterprises (Laibman 2015). The overall, quantitative evaluation of the performance of an enterprise is what Laibman calls the “basic economic measure of performance,” adjusted (either up or down) by what he calls its “social measure of performance.” Laibman’s measure of basic economic performance is $100[1 + \alpha(r - r_0)]$, where r is the social rate of return of the enterprise, r_0 is the average social rate of return for the economy as a whole, and α is a weight given to the importance of basic economic performance compared to social performance. The measure of social performance is $\beta[\prod_i z_i \gamma_i - 1]$ where \prod is the symbol for multiplication, z_i is the i th indicator of qualitative social performance, γ_i is the weight assigned to social performance indicator i , and β is a weight given to the importance of overall social performance compared to basic economic performance.

Laibman explains that if we give a weight of 1 to each social indicator, and enterprise performance is exactly average in every way – that is, $r = r_0$, and all its z ’s are equal to 1, then $x = 100$ irrespective of whatever choice we make for α and β . But if, for example, society chooses $\alpha = 2$, $\beta = 10$, and all $\gamma_i = 1$, then if an enterprise has a social rate of return that is 1% higher than the average social rate of return – that is, $(r - r_0) = 0.01$, and if its z ratings are, for example, 1.3 for “ecology,” 1.2 for “solidarity,” 0.8 for “community,” and 1.0 for “standing within its industry,” then $x = (1.3)^1(1.2)^1(0.8)^1(1.0)^1 = 1.248$, and

$x = 100[1 + 2(.01)] + 10[1.248 - 1] = 102 + 2.48 = 104.48$. The essential idea is that workers at such an enterprise would be entitled to an average income that is 4.48% higher than average worker income nationally. Laibman discusses different possible social indicators at some length, including what kinds of “stakeholders” he believes are appropriate for serving on committees that rate enterprises in different social categories.

Areas of Agreement: Laibman’s essential idea is that there must be some quantitative evaluation of enterprise performance, and rewards for those working in enterprises should be linked to this measure of the performance of their enterprise. We believe Laibman deserves credit for recognizing the need to do this and making a concrete proposal for how to go about it.

Areas of Disagreement: The calculation of r and r_0 in his formula depends crucially on prices, which at least in our opinion must accurately represent opportunity and social costs. As already explained, we do not believe Laibman has explained how his “reproductive prices” would be calculated and suspect that his choice of this name for what he believes the appropriate prices are indicates that he seeks something other than what is actually needed, which are opportunity and social costs as traditionally defined by economists. In contrast, we believe we have explained precisely how enterprise SB/SC ratios can be calculated using opportunity and social costs to calculate the social benefit of outputs and the social costs of inputs, and why these ratios better serve the function Laibman identifies of providing quantitative signals for calculating differences in average material rewards workers in different enterprises deserve.

We agree with Laibman that sometimes quantitative measures of economic performance – SB/SC for us, r vs. r_0 for Laibman – do not always tell the whole story about enterprise performance, or, as we put it, “sometimes the numbers lie.” The question is why, and what to do about it. Laibman proposes to involve various stakeholders in an attempt to quantify non-economic goals, which are then included in the formula for calculating rewards for workers in enterprises. We propose instead to limit all such considerations to *only* the question of whether a proposal from a worker council should be accepted even though its $SB/SC < 1$ and recommend appeals procedures to consider rare cases where perhaps exceptions should be granted. But a look at Laibman’s examples of various areas of social performance reveals another difference.

Our concern is that our estimates of SB/SC ratios may not be accurate because our estimates of opportunity and social costs cannot be perfectly accurate. And in a case where an SB/SC as calculated is less than one, but in truth is greater than one, the consequences of this mistake are severe. The worker council will be disbanded, its assets will be reallocated to other worker councils that are presumed to be more productive, and its members will have to seek work elsewhere. Which is why we proposed a special appeals procedure to prevent such tragedies. Perhaps we should allow WCs where $SB/SC > 1$, but whose workers believe it should be even higher, to appeal as well, since any underestimation means workers at such an enterprise might be compensated less

than they should be on average. We did not propose this because we did not want to swamp a time-consuming appeals process with too many cases. This means we were willing to “let the cookie crumble” so to speak with regards to some economic injustice. However, if workers were sufficiently aggrieved to demand an appeal procedure even when their $SB/SC > 1$ and therefore their proposal has been approved, and if the appeals courts were not already overburdened with cases where workers challenge a SB/SC ratio that is less than one, there is no reason more cases could not be added to their dockets.

Laibman seems less concerned that his r and r_0 may not be accurate. Instead he is concerned that there are a number of reasons to reward workers above and beyond what he calls their “economic performance.” For example, Laibman proposes they should be rewarded for their above or below average contributions to “ecology,” “solidarity,” “community,” and “standing within industry.” Clearly, this list of areas of “social performance” would have a tendency to grow. Moreover, this means that (a) a list of stakeholders would have to be identified to rate every enterprise on a host of “social performance indicators” and (b) a potentially contentious debate about weights for economic vs. social indicators and weights for all the various social indicators would have to be concluded before average wages could be calculated. That is a lot of discussion and decision-making time devoted to quantifying things absent a way to settle disputes that will inevitably arise, as compared to our planning procedures that quantify and incorporate enterprise effects in some of these areas like “ecology” in the opportunity costs, social costs, and social rates of return our procedures generate.

4 Negotiated coordination

Pat Devine was the first socialist visionary to recognize *and act* on the need to provide a concrete proposal for how to do participatory democratic planning in light of the failure of 20th century Communism. Published in 1988, much of *Democracy and Economic Planning: The Political Economy of a Self-Governing Society* was developed and written well before the collapse of the Communist economies in the USSR and Eastern Europe. As someone who became active in the British Communist Party as a teenager and still proudly carried his party membership card in his wallet more than a half century later even after the party had officially dissolved, his efforts to spell out concrete ways to restore democracy, popular participation, and worker self-management to socialism are particularly admirable. Devine has continued to play an active role in debates about comprehensive democratic planning since the collapse of the Soviet Union. See Devine 1992 and 2002.

Areas of Agreement: Unlike other socialists who responded to fundamental failures of central planning, and eventually the demise of the Communist economies by embracing market socialism, Devine challenged the claim by Alec Nove and others who espoused market socialism as the only viable alternative to authoritarian

planning and capitalism, stating in his introduction that “this book is an attempt to show that there is . . . a better alternative” (Devine 1988: 5). And before presenting his alternative that he calls “negotiated coordination,” Devine spelled out the case against market socialism in great detail, which he summarized as follows:

In my view there are two fundamental problems with the model of market socialism which mean that it cannot constitute the economic part of a realistic vision of a self-governing society based on political and economic pluralism. The first is contingent. The case for planning is that it enables the conscious shaping of economic activity, in accordance with individually and collectively determined needs, and it overcomes the instability that is an endemic empirical characteristic of market-based economies. . . . Second, the invisible hand, even if it could be steadied to avoid instability and guided to achieve broad social objectives, necessarily operates through an appeal to narrow individual or sectional self-interest and the coercion of market forces. It thus reinforces individualism and atomization and precludes conscious participation by people in the taking of key decisions that affect their lives (Devine 1988: 5).

As readers of this book will recognize, we very much agree with the reasons why Devine resolutely rejects a “retreat” to market socialism, and like Devine, we also offer a rebuttal to TINA by spelling out a concrete alternative to both authoritarian planning and market socialism. We also agree with Devine about the fundamental virtues of democratic planning:

At its most general the case for planning is that, through conscious social decisions and action, it enables more effective use of society’s productive resources, in accordance with collectively and individually determined preferences, than would be possible without it. Planning provides a structure, a procedure, a form of social organization, that enables people to make most effective use of the possibilities open to them to achieve their objectives. It is a necessary condition for people individually and collectively to be able to control their lives, to exercise self-government. This planning enables the maximization of positive freedom, by contrast with the wasteful and destructive automaticity of the unregulated market in which individuals and communities are buffeted by impersonal and coercive market forces beyond their control, or anyone else’s (Devine 1988: 13).

And we agree with Devine that Marxists often had a naïve and mistaken conception of what democratic economic planning was about:

Democratic planning involves the conscious determination of social priorities. . . [and] it differs fundamentally from the classical Marxist

view that with the abolition of exploitation and oppression, when all that remains is the administration of things, politics comes to an end. *The social interest is seldom transparently evident* [italics added]. Self-activating equal subjects need to engage together . . . in order to decide themselves what . . . constitutes the social interest (Devine 1988: 210).

And finally we agree with Devine that one of the virtues of planning is that it eliminates an important kind of uncertainty, which Devine credits both Maurice Dobb and Tjalling Koopmans for pointing out:

The second argument for planning, indeed its principal technical advantage as a coordinating mechanism, arise from the fact that it enables the uncertainty associated with atomized decision-making to be overcome. Dobb, the most insistent and persuasive advocate of planning to date, has consistently stressed the significance for planning of the distinction between what he calls objective and subjective uncertainty. The former arises from our inability fully to know the future, the latter from the necessary lack of knowledge on the part of atomized decision-makers of their rivals' intended actions (Dobb 1955: 77, 1960: 7–8, 1970: 148). Koopmans refers to the same distinction as that between primary and secondary uncertainty (Koopmans 1957: 162–162).

Areas of Disagreement: But this does not mean we always agree with Devine about how the alternative to market socialism and authoritarian planning should be organized. For example, while we agree with Devine that decisions about what and how workers in an enterprise produce will affect many others, and therefore we need to enfranchise these other parties in some way, we disagree with Devine's proposal to enfranchise them by putting outside "stakeholders" on boards of directors of enterprises. As we explained in Chapter 6: (a) Absent any objective criteria, decisions would be arbitrary even if not contentious about which constituencies deserved representation and how many seats to give them. And (b) if outsiders have seats, workers in an enterprise have no place where they can discuss what they want to do free from outside interference. Instead, we believe our participatory planning procedure provides others who are affected an appropriate degree of influence over enterprise decisions without infringing on the autonomy of workers in the enterprise by (1) incorporating the effects on others into determination of opportunity and social costs and (2) empowering others to reject any proposal that fails to benefit those outside the worker council at least as much as it costs them – all without arbitrarily deciding which outsiders are affected and to what degree. In short, while we believe that Nancy Folbre's criticism that our proposals would condemn people to interminable meetings and risk devolving into a "dictatorship of the sociable" is unwarranted, her criticism might better apply to Devine's proposal in this regard.

More importantly, while we agree wholeheartedly with Devine that we must prevent markets from dictating what we do, we disagree with him on two

crucial issues about how this should be done. First, Devine argues that there is a crucial distinction between what he calls “market forces,” which he proposes to eliminate, and “market exchange,” which Devine views as innocuous.

I wish to distinguish between market exchange, on the one hand, and market forces . . . on the other. By the latter term I mean a process whereby change occurs in the pattern of investment, in the structure of productive capacity, in the relative size of different industries, in the geographical distribution of economic activity, in the size and even existence of individual production units, as a result of atomized decisions, independently taken, motivated solely by the individual decision-makers’ perceptions of their individual self-interest, not consciously coordinated by them in advance (Devine 1988:23).

Based on this distinction, Devine proposes to replace “market forces” with investment planning, but to allow enterprises and consumers to engage in “market exchange” to allocate current output.

Economic planning essentially consists of an attempt to secure a coordinated set of investment decisions *ex ante*. In the model of negotiated coordination a distinction is drawn between the use of existing capacity, which is decided by production units in response to consumer demand . . . where customers would in general be able to choose their suppliers . . . and changes in the capacity of production units which are decided in negotiated coordination bodies by those affected by them (Devine 1988: 190, 196, 197).

In other words, Devine objects to permitting what he calls market forces to make decisions about investment for us and proposes a way to plan investment decisions instead. However, once investment decisions have been made, and therefore the productive capacity of different industries and enterprises have been settled by “negotiated coordination,” Devine proposes that exchanges among enterprises and consumers be coordinated through what he calls “market exchange.”

We believe that while financial markets and markets for capital goods obviously decide *different* matters than markets for intermediate and consumption goods, the problem with markets is *how* they decide things irrespective of *what* they are deciding. So while markets may sometimes cause more damage when allowed to govern saving and investment decisions than when they govern production and consumption decisions, we believe markets are never innocuous and are problematic beyond the fact that they create “secondary uncertainty.” As we explained in Chapter 2, like Erik Olin Wright, we believe that in his desire to have his cake and eat it too, Devine is “insufficiently fearful” of the adverse effects of “market exchange” on participants, which is why we recommend replacing what Devine tolerates as “merely market exchange” to

coordinate annual production and consumption decisions with participatory annual planning.

Of course, this is a crucial issue, and our position requires substantiation, which we provided in Chapter 2, where we examine problems that would arise even if markets were permitted only to decide what is produced using existing capacities, and in Part III where we explain how annual participatory planning can be done. In our view *only if* participatory annual planning were not feasible, or were too time consuming and impractical, would there be reason to resort to markets to coordinate production and consumption as Devine proposes we do once investment has been planned.⁵

Second, we disagree with how Devine proposes to plan investment through “a democratic process . . . thought of as a political process of negotiated coordination. . . [in which] interest and cause groups would argue and campaign for their concerns to receive priority” (Devine 1988: 194). His proposal for investment planning consists of identifying different participants – the national representative assembly, national planning commissions, national chambers of interest, national negotiated coordination bodies, regional representative assemblies, regional chambers of interest, regional planning commissions, local representative assemblies, local chambers of interest, local planning commissions, and finally production units – and explaining how these different groups would “negotiate” – that is, hammer out, a comprehensive investment plan. We applaud Devine for helping to identify different constituencies that should be involved and insisting that investment decisions be arrived at through democratic procedures. However, we do not endorse his proposal for *how* they should go about coming up with a comprehensive investment plan. While Devine’s proposal would eliminate secondary uncertainty with regard to investment because it does coordinate investment decisions *ex ante*,⁶ we believe it would not generate accurate estimates of opportunity costs, social costs, and social rates of return needed by decision makers, and would fail to yield an efficient investment plan. Devine describes how he envisions the different bodies listed earlier would go about their work as follows:

Coercive coordination, whether through direction from above or the pressure of market forces, is replaced by conscious interaction and negotiation. This offers the possibility to those involved of modifying their perceptions and behavior in the light of a detailed awareness of the way in which their own interests are interdependent with those of others. Thus, while conflicts of interest are not wished away, the process incorporates a transformatory dynamic in which particular interests are viewed in relation to one another and are integrated into a socially constructed general interest (Devine 1988: 189).

While Devine does not fall victim to the naiveté of early socialists that the associated producers will easily and joyfully agree on a plan, nor the presumption of

“classical Marxism” that once exploitation and oppression are eliminated, the social interest will become transparent to all; we believe he falls victim nonetheless to a form of wishful thinking common to all of us who are leftist visionaries. Since “we leftists” *do* believe that people will begin to behave differently than they often do today after they have lived for some time with very different institutions – institutions that provide easy access to accurate information about the effects of choices on others, institutions that better reconcile serving one’s self-interest with serving the social interest – “we leftists” stubbornly refuse to renounce the possibility that participation under a different system of incentives will have a “transformatory” effect on people’s behavior. Moreover, “we leftists” have good reason to believe this is a logical, and even a likely possibility.

However, basking in the warm glow of visions of “humanity transformed” becomes problematic when it is used as a crutch to assume away problems we need to acknowledge and address. *The cold hard truth socialists must come to grips with is this: Certainly in the short-run, and more than likely in the long-run as well, people will continue to disagree and conflicts will arise!*

Conflicts will arise because sometimes even the best designed incentive systems fail to completely eliminate conflicts between self-interest and social interest. And conflicts will certainly continue to arise because people simply disagree about what is in the social interest. As a matter of fact, when more people have time and opportunity to influence outcomes, disagreements over where the social interest lies may become even more hotly contested. Therefore, it is important to design decision-making procedures for investment that function reasonably well when this occurs.

Good procedures are ones where debates over how much to invest are won by providing factual evidence that an estimated effect is more likely to be what one argues than what opponents argue. Bad procedures are ones where disagreements are resolved by force of rhetoric or greater stubbornness, even if disagreements are eventually settled by a democratic vote. With regard to investment and long-run development planning, we have attempted in Parts IV and V to propose procedures along the former lines, whereas we believe Devine’s proposal of negotiated coordination falls more along the latter lines.

In our view Devine’s proposals rely too heavily on the “transformative” effects of discussion and debate, which are limited, and fails to structure agendas for debates to improve chances of reaching more efficient decisions even as protagonists continue not to see “eye to eye.” Devine is not a “cockeyed optimist” about the transformative effects of what Michael Lebowitz (2006, 2010, 2012, 2015) embraces as “protagonistic struggle.” And Devine wisely invites interest groups and political parties with different positions on issues to weigh in and warns us not to expect negotiations to be free of conflict. We agree with Devine, and Lebowitz for that matter, that there will be conflict, which we might as well embrace, and that “protagonistic struggle” can have positive transformative effects. But we fear Devine’s “negotiations” would too often resemble freestyle wrestling matches where strength and stamina rather than facts and reason determine outcomes when “protagonistic struggle” fails to achieve a “meeting of the

minds.” While both Devine and Lebowitz do a decent enough job of identifying all the wrestlers who deserve places in the ring, we propose to impose rules and structures on the “investment wrestlemania” that then takes place. In particular:

- The context or *framework* for debate should be the efficiency condition for a particular kind of investment as we derived them in Parts IV and V. And the *topic* or “motion” for debate should be: “The best estimate of the size of a particular effect from investing in X is Y.” The motion should *not* be: “Should we invest more in X?”
- Careful consideration of both access to information and motivation should determine *who* is assigned to argue *pro* and *con* on these motions.
- Whoever presents the most compelling *fact-based evidence* for their position regarding the size of a particular effect should be declared the winner of that debate.
- After the debates on each estimated effect from some kind of investment are concluded, a professional staff can use the “winning” estimates to calculate the socially efficient amount of investment for consideration by the appropriate deliberative bodies.
- In some cases investment plans should be subject to approval by a vote of delegates, and in other cases by referendum.⁷
- Since even “winning” estimates are still estimates, and might usefully be accompanied by an error range, staffs might sometimes prepare several investment plans to be voted on – a high, low, and medium level of investment – based on different estimates for parameters within their error range.

To his credit, Devine implicitly acknowledges our concerns: “The centrality of negotiation in the model may raise in some people’s minds the potential problems of institutional sclerosis, stalemate and paralysis” (Devine 1988: 191). To be clear, we are not concerned that negotiated coordination would fail to settle on an investment plan, because it is easy to set time limits on debates and reach decisions by “calling the question.” Our concern is that Devine fails to propose procedures that provide the information necessary to make efficient investment decisions and fails to structure debate so actors we expect to be motivated to argue the case for more investment of some kind, with access to information supportive of their case, are paired off against actors we expect to be motivated to argue the case for less investment of some kind, with access to information supportive of their case.

In sum, we believe negotiated coordination helps identify who should be involved in investment decision-making. But we believe Devine fails to provide them with the information they need to make efficient investment decisions and fails to explain how they should go about making decisions except to discuss and debate until the necessity of reaching an agreement by a deadline forces a decision. Instead, we propose to structure debate around efficiency conditions for different kinds of investments and designate proponents to debate over the size of different effects based on access to information and motivation. We seek

ways to avoid debates where some “affected parties” simply say “I think we need more investment” and other “affected parties” say “I think we need less investment” – until the gavel falls and a vote is taken.

Since Devine claims that his model does generate “the necessary information for effective . . . decision-making in the social interest” (Devine 1988: 191), we close by examining Devine’s proposal about prices and rates of return, which he describes as “a combination of socially shaped demand- and cost-based prices” (Devine 1988: 191). To his credit, Devine begins by acknowledging that relative prices are important.

Government and social bodies, individuals and households, are influenced in their decisions on how to make the most effective use of their purchasing power by the relative prices of different goods and services that would meet their requirements. Similarly, functional social bodies and production units are influenced in their choice of the most efficient method of production by the relative prices of different intermediate inputs, the cost of capital in relation to the average wage, and the pattern of wage differentials (Devine 1988: 197).

He goes on to explain:

In the model of negotiated coordination the prices of goods and services would be determined by production units. The general principle would be that they should be set equal to the social cost of production. Costs of production at the level of the economy as a whole are the costs of the primary inputs used: labour, natural resources, and although there are conceptual problems here, use of part of society’s accumulated stock of productive capacity. Costs at the level of the production unit include use of these primary inputs but also the cost of bought-in intermediate inputs produced by other production units. . . . Since fixed assets are only partially used up in the production of individual units of output, a principle of depreciation is needed to spread their cost (Devine 1988: 197–198).

So far so good. But clearly units cannot calculate social costs of production until they know what price they must pay for primary inputs from nature and labor and charge for depreciation of fixed assets. How does Devine propose that primary input prices, wages, and depreciation costs be determined?

Primary input prices must be determined at the national level since they are a central influence on the way in which society’s productive resources are used and on the overall allocation of available output according to social priorities. The broad priorities arrived at through the political process will have implications for policy towards primary input prices. . . . What is involved in the determination of broad priorities is an interaction between the national planning commission

and the society-wide decision-making process. The implications for primary input prices of alternative decisions about priorities would be set out by the commission in the plan variants and would inform the eventual decision taken. National decisions about the distribution of available output between personal or household consumption, on the one hand, and social consumption and social and economic investment, on the other, have implications for the average level of real wages. At a formal level, abstracting from rent, once the rate of return is determined, the pattern of relative prices and the real wage are also determined [for which Devine cites Sraffa 1960] (Devine 1988: 198).

In our view Devine's argument here is not only obscure, but contains fundamental errors and engages in circular reasoning. The most fundamental error is this: It is fine to say that once it has been decided how to divide production between private consumption, social consumption, and investment, this decision about "broad priorities" also determines how income must be distributed to workers as wages (to buy private consumption goods), income must be distributed to government bodies (to buy social consumption goods), and income must be distributed to enterprises (to buy investment goods). But that begs the question of how those deciding on broad priorities should make these decisions in the first place. And to say this should be a democratic decision at the national level is all fine and good, but misses the point.

For example, suppose the decision is to invest very little, so little income is allocated to enterprises to purchase investment goods. There are two possibilities: The social rate of return on investment will turn out to be low, and the decision to allocate little income for investment will have been vindicated as a wise one. But what if instead the social rate of return turns out to be very high? In this case, people will regret their decision and wish they had decided to produce more investment goods and allocate more funds for investment. The point is that people need to know what the social rate of return on investment is predicted to be *before* they can make a sensible decision about how much of output to devote to investment. The same holds true for decisions about private and social consumption. Without some estimate of how much people will benefit from private consumption, compared to social consumption, compared to investment, how can decision makers make sensible choices about how much of production to devote to private consumption, versus social consumption, versus investment?

There is an old joke told to make fun of economists: A physicist, a chemist, and an economist are marooned on an island when a wooden crate of canned food washes up on shore. The physicist suggests building a fire to shoot the cans up in the air so they will open when they hit the ground. The chemist recommends putting salt water on the rim of the cans so galvanic action will erode the metal and open the cans. The economist begins his recommendation: "Assuming a can opener. . ." In effect, Devine has assumed the proverbial economist can opener. *After* a decision is made about how to divide production between private consumption, social consumption, and investment, the social

rate of return on investment and the marginal utility from both private and social consumption will be determined, as Devine explains earlier. But we need to know what the social rate of return and marginal utilities would be for different choices about how to divide production between private consumption, social consumption, and investment *before* we make the decision; otherwise, we may end up regretting having made a poor decision. The procedures we recommend for making decisions about both investment in capital goods in Part IV and investments in education and the environment in Part V tackle this problem, whereas Devine has assumed it away courtesy of circular reasoning and offered no solution for the most important information challenge investment planning faces.

The second problem is Devine never returns to any explanation whatsoever regarding how prices for scarce primary inputs from the natural environment be determined “at the national level.” Once a choice is made about how to divide production between consumption and investment that will determine average wages and the rate of return on investment, even if it is an inefficient choice we come to regret as just explained. But no choice about how to divide output implies anything about prices for inputs from nature, leaving Devine with no answer for how anyone involved in negotiated coordination should set those prices, which production units need to know to calculate the social costs of producing their outputs. As a result, in Devine’s model, prices for scarce natural resources will simply be the result of an argument based on no quantitative information between those whose instincts tell them more conservation is needed, and those whose instincts tell them that environmental conservation has already gone overboard.

The third problem with Devine’s theory of social costs has to do with relative wage rates. Devine does not recommend that wages be determined by effort rating committees of coworkers as we do. But he understands that marginal revenue product wages would be quite unfair and recommends procedures for setting relative wages that are considerably fairer. We needn’t go into what those procedures are here, but the fact that Devine’s wages are *different* from marginal revenue product wages is a problem in the present context. When calculating their costs, production units that must pay the wages Devine proposes have no choice but to use *those* wages when calculating their costs of production, which they are then directed to use as the prices they charge for their outputs. But those wages, precisely because they are fairer, are not equal to the opportunity costs of using different categories of labor. Which means that when enterprises in Devine’s model charge prices equal to their production costs, they are *not* charging prices equal to the actual social costs of producing their outputs as reflected by the actual opportunity costs of using different categories of labor.

5 Amazon socialism

Dan Saros is the most recent to contribute to the modern debate over models of democratic socialist planning. Here we review his contribution as it is

presented in part IV, chapter 7, in his book, *Information Technology and Socialist Construction: The End of Capital and the Transition to Socialism* published in 2014. Like Cockshott and Cottrell, Saros was stimulated to rethink how detailed, comprehensive, economic planning might be done in light of a new, revolutionary technological advance.

Whereas Cockshott and Cottrell recognized important implications of advances in computer capabilities, Saros is the first to recognize and explore the implications of recent advances in modern information technology for detailed, comprehensive planning. In his book review, John Willoughby (2018) referred to Saros' model as "Amazon socialism," not in reference to the river and jungle region in South America, nor to the warrior women of Greek mythology, but in reference to the corporate behemoth Amazon that has taken advantage of advances in information technology and the internet to revolutionize online marketing.

The core of Saros' proposal is contained in a dense 15-page section in chapter 7 titled "Displacing the invisible hand of the market," where he describes how individual worker councils post information in what he calls the *General Catalog*, individual consumers create *needs profiles*, and producers respond to a formula based on information in consumers' *needs profiles* to allocate scarce productive inputs so as to reach a feasible plan.⁸ I will explain the essential features of Saros' proposal as I understand it before commenting on what I believe are its strengths and weaknesses. But since he uses concepts and notations unfamiliar to most economists, I first describe his proposal in more familiar terms, before returning to features requiring more elaboration.

- (1) A visit to the Amazon.com website suggests that it may now be possible for producers to post descriptions of their products in sufficient detail for consumers to order them online. Saros proposes that every worker council do just this and post a *detailed* description of their product to what he calls the *General Catalog*. But unlike Amazon.com, producers do not include a price tag in their listings.
- (2) After consulting all producer postings in the general catalog, every consumer submits what Saros calls a *needs profile*. A needs profile is an ordered list of *all* items the consumer would like, assuming she has *no* income constraint. There is a *separate item* in a consumer's needs profile list not only for *each good* down to its smallest detail, but for *each unit* of each good, from *each producer*.
- (3) At this point, each worker council is told to assume it must produce the amount of its good that *all* consumers have indicated they would like in their needs profiles and asked to submit a list of the quantities of all the *inputs* it would need to do this. This will generate excess demand for most inputs because presumably productive resources are still scarce relative to human desires, and needs profiles put no limit on the expression of consumer desires.

- (4) Since it is impossible to send each worker council the amount of each input it has just reported that it would need, each producer will instead be allocated a *different* amount, which is usually less, and where the *total* amount of each scarce input allocated to *all* producers is equal to the amount of that scarce input that is actually available.
- (5) A unique and ingenious feature of Saros' proposal is *how* he proposes to allocate scarce inputs among producers until there is no longer excess demand for any input any producer requires and a feasible plan is reached. We discuss his formula for allocating scarce productive inputs, "I", to worker councils below. But the result is that as inputs producers receive are whittled down to eliminate excess demand for inputs, the amount worker councils are able to produce falls, eventually yielding a final production plan in which fewer units are produced by each worker council than the sum total demand in all the consumer needs profiles.
- (6) While needs profiles are based on the implicit assumption that each consumer had unlimited income, at this point consumers use their actual income to purchase whatever they want, and each worker council sets the price for its product so as to eliminate excess demand or supply.

That is essentially what Saros proposes as we understand it. What remains is to elaborate in order to clarify, before evaluating his proposal.

The General Catalog, Needs Profiles, and points 1 and 2 above: There are more of what Saros calls *use-values* listed in the General Catalog than one might first assume. If the size of a pair of shoes (or the color, the kind of leather used, or the style is different) – that is, if anything about a pair of shoes that might matter to any consumer is different, it must be registered by its producer as a different "use-value" in the catalog. Moreover, even if shoes are identical in every conceivable way, if they are produced by different worker councils they must be registered as different "use-values."

There are also more items in any consumer's needs profile than one might first assume. Recall that when consumers draw up their needs profiles, they are picking items from the listings producers have posted in the General Catalog. And as just explained, there is a separate listing in the catalog not only if there is any physical difference that might matter to consumers, but also if the good comes from a different producer. Of course, consumers will not want most of what is listed in the catalog. For example, because I wear a size 10 shoe, I will never list any of the postings in the catalog for any other shoe size in my needs profile. But while this tends to make needs profile lists shorter than the number of items listed in the general catalog, if a consumer wants multiple units of some good from some producer, *each* unit the consumer wants must be listed as a different use-value in the consumer's needs profile, which lengthens needs profile lists considerably.

Items in needs profiles are listed in a particular order. The item that gives a consumer the most satisfaction is listed at the top. The item that gives the consumer the second most satisfaction is listed second from the top, on down

to the last item at the bottom of the needs profile, which gives the consumer the least positive satisfaction. Saros avoids the term *utility* to refer to satisfaction, and talks of consumers assigning “points” to all the items (use-values) in their needs profile. There are three more things that require explanation about how consumers assign points to the items in their needs profiles.

First, suppose consumer *i* gets positive use-value from both the first and second units of some good she consumes from some particular supplier, but positive use value only from the first unit of a different good she consumes from a different supplier. Then the first good from the first supplier must appear twice in her needs profile, presumably with the first unit appearing higher than the second unit. However, those two items may not be adjacent, and the first unit of the second good from the second supplier might appear in between them.

Second, Saros assumes that the drop in points as we go down the list is exactly one point as we go down from each item to the one below it. In standard terminology, this proposal for registering consumer preferences assumes that the difference in *cardinal utility* between each entry in each consumer’s needs profile is exactly one *util*. To his credit Saros acknowledges this but argues that given the length of need profile lists, any errors should be small. We do not find his explanation compelling, but in our view it is not a necessary assumption and could easily be dropped. Saros could tell consumers to put whatever real number they wish in front of every item, as long as the real number for an item is smaller than the real number for the item above it in the needs profile.

Third, the length of different consumers’ needs profiles will be different since different consumers will gain positive satisfaction from a different number of goods and from a different number of units of each good. Saros proposes to start with the consumer with the longest needs profile – that is, the needs profile with the largest number of entries. He assigns this person’s *lowest* entry one point, putting the number 1 in parentheses in front of their lowest entry. He assigns their second lowest entry two points, putting the number 2 in parentheses in front of the second lowest entry. Suppose when Saros gets to their top entry he has reached 2,391 points, he puts 2,391 in front of their top entry, which completes their needs profile. At this point Saros assigns the highest, or *top* entry, in *every* consumer’s needs profile 2,391 points, their second highest entry 2,390 points, their third highest entry 2,389 points, and works his way down to their last entry. Since all these other needs profiles are shorter lists, with fewer items than the longest needs profile, the last entry in all of them will have some number of points in parentheses next to it that is greater than one.

By assigning every consumer’s highest or top entry the same number of points, or utils, (2,391), Saros has succeeded in weighing the preferences of all consumers equally. This is both unusual and, in our opinion, attractive. Ordinarily, consumer preferences *and* income distribution both affect consumer demand. But, as will be explained later, even though people have somewhat different incomes in Saros’ economy, and even though consumers will use their

income to purchase goods, under his proposal, all will have an *equal* voice in *signaling* producers what to produce.

Inputs for worker councils and points 3 and 4 above: Saros expects producers to find the inputs they need in what he calls the “Producers’ Section of the General Catalog.” And clearly, “inputs” include intermediate goods. This is what Saros says about inputs:

Each workers’ council has an *ideal input mix in mind* [italics added] at a particular point in time. It selects these input quantities from the Producers’ Section of the General Catalog. This section contains all physical means of production with complete descriptions of their characteristics. Many input suppliers post the use-values that they plan to produce in the General Catalog just as producers of final use-values have posted their particular use values in the General Catalog (Saros 2014:178–179).

Later, Saros makes clear that “inputs” also includes natural resources:

At some stage . . . input requests reaches the resource base. That is, requests for raw materials from producers operating in the extractive industries (e.g. minerals, petroleum) are made (Saros 2014: 181).

And to his credit, he displays a clear understanding that resource depletion is a serious issue to be contended with, even if, unlike our proposal in Chapter 14 for participatory environmental planning, Saros’ proposal fails to provide his “Council of Scientists” with the kind of information they would need to calculate optimal rates of extraction:

To avoid environmental catastrophe, it is necessary to impose resource consumption limits for a large variety of raw materials. . . . A Council of Scientists is a special workers’ council composed of the world’s most highly trained scientists. These scientists determine the quantities of raw materials . . . that can be sustainably extracted (Saros 2014: 181).⁹

In any case, let’s assume the supplies of all inputs from nature we *should* use are known and listed in the producers’ section of the catalog. Let’s assume the supplies of all the different categories of labor that we *should* use are known and listed in the producers’ section of the catalog. And let’s assume that the demand for final good production, which is generated by consumer needs profiles, generates in turn a derived demand not only for intermediate goods from worker councils, as Saros describes, but also for capital goods as well – although that is far from clear in Saros’ presentation.

Presumably, it is a planning agency that uses Saros’ formula to assign all non-labor inputs. Saros provides a separate explanation for how he proposes to reallocate scarce productive labor services among worker councils since this is a change in the composition of the memberships of worker councils and refers to

a “subcommittee of the workers’ council” that would be in charge of hiring and releasing members. But it is clear that at least one principle in the reallocation of labor services among worker councils is similar to the guiding principle for other inputs. We will return to the tantalizing phrase “*ideal input mix*” above, which I put in italics, but for now, let’s assume we know how much of every scarce, productive “input” any worker council might need is available – including different categories of labor services. We are now ready to explain Saros’ ingenious proposal for how to allocate the available supply of any scarce production input, I , among worker councils.

For good j , which remember is uniquely produced by WC_j , Saros identifies all the items in all the consumer needs profiles for good j .¹⁰ Remember, if any consumer has listed more than one unit of good j in her needs profile, all those units are now included. Saros then adds up all the “points” (utils) listed in parentheses next to all those items he has identified and calls that point total P_j . He then uses the following formula to assign the aggregate quantity of any scarce input available, I , to WC_j *instead* of the amount WC_j had reported it needed to meet *all* the demand for j expressed in all of the needs profiles: $\{P_j / \sum(j) P_j\} I$ is the amount that presumably some planning agency will allocate to WC_j .

First, notice that if every worker council receives this amount of input I , the total amount of input I distributed to all worker councils will be equal to I , the amount available, because $\sum(j) \{P_j / \sum(j) P_j\} I = [\sum(j) P_j / \sum(j) P_j] I = I$. Second, notice that this formula will assign more of the scarce input to any worker council whose P_j is higher than the average P_j . But what are these weights Saros is using to allocate scarce inputs? Translated into more conventional terminology, P_j is simply the area under the market demand curve for good j , which is uniquely produced by WC_j , also known as the *consumer surplus* that would be generated if WC_j produced all the good j all consumers would like to have if its price were zero. So Saros is allocating more of any scarce input to where consumer surplus is higher, and less to where consumer surplus is lower. That is certainly more efficient than cutting back on every worker council’s allocation by the *same* percentage to achieve a feasible production plan. However, it is less efficient than an allocation rule for scarce inputs that comes naturally to most economists. *Why not instead allocate scarce inputs so that the last unit of an input allocated to each worker council increases total utility by the same amount?*

I have created a simple version of Saros’ model and system when there is only one scarce input to compare three different allocation rules to eliminate excess demand: (1) An equal percentage cutback in the allocation of the scarce input to every worker council. (2) Saros’ own allocation, which is steeper cutbacks for worker councils whose product generates a lower consumer surplus, and less steep cutbacks for worker councils whose product generates a higher consumer surplus. And (3) cutbacks that equalize the increase in utility from the last unit of the input allocated across all worker councils. In this simple system the first allocation rule yields a production plan that generates the lowest total utility. Saros’ allocation formula generates a production plan that generates

higher total utility than the first, but less total utility than the third allocation rule that generates the maximum total utility possible.

In the simple model with only one scarce input, any of these procedures will distribute the scarce input among worker councils and achieve a feasible plan in one step or iteration. However, if there are multiple inputs in production, the situation becomes more complicated. In the case of multiple inputs, it is necessary to apply any of these three rules a number of times to reach a feasible plan. Saros assumes multiple inputs and therefore must apply his rule multiple times, beginning with the input that is in shortest supply. But since this leads to reductions in the production of other goods, which release inputs that are less scarce, the procedure must be repeated a number of times before reaching a final feasible plan where the available supplies of all scarce inputs are fully utilized.

There is one last matter that requires clarification. Where do income and prices come in, if at all? Any of the three procedures discussed earlier including Saros' formula will decide how much of every input to allocate to each worker council. And if we continue for the moment to ignore Saros' intriguing reference to an "ideal input mix," this means that the amount of every good produced by every worker council is also determined at this point. In other words, at this point everything about how to allocate scarce inputs and how much each worker council should produce has already been decided. Yet there has been no mention of income, buying, selling, or prices – which Saros points to proudly to emphasize that he has proposed how a socialist economy can make all these economic decisions sensibly, efficiently, and fairly without recourse to income, buying, selling, or prices, much less markets. However, while intermediate goods have already been distributed because they are inputs for worker councils, *all* of which have been distributed using Saros' formula, final goods have not yet been distributed among consumers. Moreover, consumers cannot simply be given everything they listed in their needs profiles because it was not possible to produce that much.

As explained in point 6 of my summary of his proposal, Saros' solution is (a) to have consumers use their income to buy whatever they want from worker councils and (b) to instruct worker councils to adjust the price for their product until demand equals supply. Notice that since the amount they produce – that is, the supply – has already been determined by Saros' plan, by changing the price they charge, a worker council will only affect the demand for their product, not the supply. All consumers had an equal effect on supply because supply was determined using consumer needs profiles, and the top entry in every consumer needs profile is given the same number of points. Nonetheless, this is the first time that income, buying, selling, and prices come up.

We have not reviewed Saros' proposals concerning how to distribute income among consumers, and in particular how he proposes workers be compensated. In these regards, we agree with some of his ideas and proposals and disagree with others, but have not discussed these matters here in order to focus on his planning proposal. In any case, consumers in Saros' model will have an income. And the distribution of income among them will be far more egalitarian

than income distribution in either a capitalist or market socialist economy. Nonetheless, some will have more income than others, and therefore, some will have a larger impact on demand than others do when consumers use their income to buy goods from producers. However, as already pointed out, even though Saros *distributes* goods in this way, each consumer will *already* have had the same impact on the supplies of all final goods – that is, the amount of different goods produced, because those supplies were already determined using needs profiles where the top entry for every consumer was the same number, thereby giving every consumer's preferences an equal weight with regard to what is produced.

This completes our presentation of what we consider the essential features of Saros' proposal for how to carry out detailed comprehensive economic planning as we understand it. What follows is our tentative evaluation.

We believe Saros' most important contribution is to call attention to the fact that new technological advances can create new possibilities for socialist planning. Just as Cockshott and Cottrell pointed out before him that dramatic increases in the speed of computer calculation capacities create new possibilities for economic planning, Saros draws our attention to equally revolutionary changes in information technology that may well make planning in greater detail more feasible.

We also appreciate the fact that his proposal gives every consumer the same degree of influence over what will be produced even if they have different incomes. In our opinion Saros gives the correct answer to a question most economists don't even bother to ask: Even if it is fair that I have more income than you, does this mean I should have more influence over how much of different goods are produced than you do?¹¹

And finally, we like the fact that his proposal presents a comprehensive, detailed picture of what it is that consumers would like "ideally." That is, if labor were no longer scarce or burdensome, if technologies had become so productive that it was possible to produce everything that everyone wanted, what would we produce? Most procedures do not elicit a large part of that information; they only reveal the tip of the iceberg so to speak. Even in our own proposal, where individual consumers and neighborhood consumption councils are free to propose whatever they want, consumers have little incentive to reveal this information by "asking for the moon" in their initial proposals because they know that in light of what is possible today, such proposals *are* too greedy and will be rejected by others – who may also take offense! Of course, much of the information toward the bottom of Saros' needs profiles is irrelevant to how we should use scarce productive resources today to best meet people's most urgent needs and desires. Nonetheless, that does not mean that the information toward the bottom of needs profiles is useless. For purposes of investment and long-run development planning, which we explored in Parts IV and V, it is useful to have information about needs and desires that go beyond those expressed in the context of what is possible today.

One might argue that one advantage of highly non-egalitarian economies is that they do provide this information. Don't the consumption choices of Bill Gates, Jeff Bezos, Warren Buffet, and Mark Zuckerberg provide information about what the bottom parts of other people's needs profiles look like? Perhaps, but they may not be very good indicators if the very wealthy are driven to engage in conspicuous consumption, or, if they actually have a social conscience and limit their consumption in order to give generously to charity. In any case, in highly egalitarian economies like the ones discussed in this book, we don't have wealthy "canaries" to possibly reveal what the bottom of people's needs profiles look like. In which case Saros' proposal is unique in providing information that may not be of paramount importance for most decisions we must make today but can be helpful for some decisions we make about long-run development issues. Finally, one way to conceptualize economic progress is as moving farther down *all* people's needs profiles. Wouldn't it be nice to know what that looks like, even if only to judge how little there is to be gained at some point from providing people with ever more "use-values." As far as I know, Saros is the only one who has proposed procedures that would reveal that information.

However, I disagree with many aspects of Saros' proposal for how to plan. The first may seem like a technical issue, but it points to a more fundamental problem as well. The technical problem is that in my view he assumes the proverbial can opener when he says "*each worker's council has an ideal input mix in mind.*" How would they know what that ideal input mix is? Presumably they have many different technologies, or "input mixes" they could use to produce their output.

Worker councils have three decisions to make: (1) Which goods, or use values should they produce? (2) How many units of each good should they produce? (3) Which of many possible technologies should they use to produce each good? As best I can tell Saros has failed to explain how worker councils would make the third decision. Instead he has described how to allocate scarce inputs *assuming* each worker council somehow knows what technology it wants to use. And once worker councils have made that choice, he explains how his proposal would reach a feasible plan in which scarce resources have been steered toward producers where consumer surpluses are larger. But nowhere does Saros explain how workers councils go about making their choice of technique, much less demonstrated that his procedure would lead producers to choose the most efficient technique available to it. What he does say is no answer:

What follows is a period of adjustment [repeated applications of Saros' formula for distributing scarce inputs] or groping towards a stable solution [a feasible plan]. . . . *This process may involve adjustments in the ideal input mix as well.* [Italics added] (Saros 2014: 180)

As explained, I believe Cockshott and Cottrell's proposal suffers from the same flaw. For most of their analyses, both Cockshott and Cottrell and Saros assume that the correct production technologies have somehow been successfully

chosen by workers. And after they are finished explaining how they propose planning be done, they make some vague comments about this issue. But in both cases their “comments” are not satisfactory answers to the question of how exactly workers would go about choosing among different techniques. And nowhere do they demonstrate why their procedures would lead workers to make socially efficient choices regarding techniques. In short, they first assume away a great deal of what must be decided for a plan to be efficient. And when multiple techniques are finally acknowledged in passing, hand-waving is offered rather than a proposal for precisely how workers are to choose one technique from among many possible techniques, much less an explanation for why their proposal would lead workers to make the efficient choice.

Of less importance, we worry that while we believe our proposal can be easily rescued from the criticism leveled at it by David Schweickart and Seth Ackerman, which we called the “size 6 purple women’s high-heeled shoe with a yellow toe problem,” we think Saros’ needs profiles are more susceptible to this criticism. While it has advantages we acknowledged earlier, consumers must provide an *awful lot* of information in their needs profiles for Saros’ planning procedure to even begin. And God forbid if a consumer wanted to buy two or more pairs of such shoes . . . from different shoemaking worker councils! While we require consumers to submit what they think they want for a year, they only need to submit “broad categories” of goods, and we don’t require them to guess about how much satisfaction they would get from anything, much less from each unit of each good.

Epilogue on prices in socialism

This lengthy appendix was devoted to reviewing and evaluating alternatives to authoritarian planning and market socialism other than our own, and where useful, comparing them to our own proposal. Since readers have already read our conclusion to the book, a conclusion to this appendix seems superfluous. Instead, at risk of putting some noses out of joint, we close with a brief comment about how Marxists think about prices in socialism. To be perfectly blunt, we believe that proponents of different models of socialism who cling to their Marxist roots struggle mightily over the question of prices that are necessary to make rational economic decisions under socialism.

Sometimes their Marxist roots lead them to dismiss the importance of getting relative prices “right” as a fetish of bourgeois economists. Sometimes their anti-neoclassical roots lead them to reject the concepts of opportunity and social costs because they are associated with mainstream economic theory. And sometimes they are misled by their belief that the amount of labor time it takes both directly and indirectly to make things is either the only “real” cost, or a special kind of cost, that must somehow be treated differently than other opportunity costs for planning purposes. It is hard for us to escape the conclusion that Cockshott, Cottrell, Saros, Laibman, and Devine all make a hash out of prices in socialism¹² because they are still clinging to attitudes about prices that prevent them from recognizing what prices are needed for people to make well-informed decisions in socialist economies.

We need procedures that will generate the most accurate estimates possible for what mainstream economists define as the opportunity costs of using any inputs to production that are scarce at any point in time. We need reasonably accurate estimates of the entire social cost of producing different final goods, intermediate goods, and capital goods and the social rate of return on investments. In our view, reluctance to “surrender” to this conclusion makes for much unnecessary confusion and only prevents clear thinking about how to generate the prices that are needed for sensible decision-making in socialist economies.

Notes

- 1 For an excellent survey and defense of community-based economics on ecological grounds, see Curtis 2003.
- 2 Gregory Albo takes those he calls “eco-localists” to task for being insufficiently critical of market relations and too willing to accept markets whenever autonomy proves impractical in Albo 2007.
- 3 Because Paul Cockshott and Allin Cottrell were both born in Scotland, their model is often referred to as the “Scottish” model. See Cockshott and Cottrell 1989, 1993a, 1993b, 1994, 1997; Cockshott, Cottrell, and Dieterich 2010.
- 4 Presumably voters would be interested in knowing something about how much investment is likely to increase future productivity before voting. But unlike our proposal in Part IV for how to conduct participatory investment planning, Cockshott and Cottrell have little to say about how they propose to estimate expected rates of return on investment.
- 5 Devine acknowledges that secondary uncertainty is not the only problem with markets when he says: “The invisible hand necessarily operates through an appeal to narrow individual or sectional self-interest and . . . thus reinforces individualism and atomization.” (Devine 1988: 5). And he implicitly acknowledges that secondary uncertainty is not a problem entirely confined to investment decision-making in the following passage. “The consequences of secondary uncertainty for capitalism are severe, *particularly* [italics added] in relation to investment” (Devine 1988: 17). Even if the adverse consequences were less severe in relation to annual production and consumption decisions, why tolerate them if participatory annual planning is possible, practical, more democratic, and more efficient . . . and also more suited to involving workers and consumers *directly* in decision-making than investment and long-run planning where delegates and experts necessarily play a larger role?
- 6 Any procedure for planning investment *ex ante* will eliminate secondary uncertainty, but that is no guarantee that even though “coordinated,” those decisions will be efficient.
- 7 In two respects we agree with Devine: (1) Because investment decisions typically have broad impacts they should ultimately be subject to democratic votes by all affected. (2) We identify similar list of “affected parties” for different kinds of investment decisions.
- 8 Usually when economists say a plan is feasible, they mean that the supply of every good is at least as great as the demand for every good. And this is what we meant when we demonstrated that under traditional assumptions, our participatory annual planning procedure will generate a feasible plan. However, it is helpful to understand that Saros’ proposal goes beyond this. The feasible plan generated by Saros’ proposal will match *particular* consumers with *particular* suppliers. In other words, Saros’ feasible plan is not only a production plan but also a delivery plan. He accomplishes this by treating goods as different goods, or what he calls *use-values*, even if they are physically identical in every way if they are produced by different worker councils. In other words, in Saros’ terms only WC_j produces good j , or use-value j .

- 9 As we explained in Chapter 14, there is no such thing as a sustainable rate of extraction for a non-renewable resource. And even for renewable resources, *optimal* rates of extraction are not always the same as *sustainable* rates of extraction, which means the problem to be solved here is more complicated than Saros (and many others) assume and requires kinds of information beyond what even the “world’s most highly trained scientists” possess.
- 10 While my explanation here is for worker councils producing a final consumption good, I do believe Saros is correct that a similar procedure can be applied to intermediate goods as well. Since consumer profiles supply the data to calculate P_i ’s only for final goods, Saros must distribute the part of this consumer surplus attributable to producers of intermediate goods used to produce consumption goods to producers of intermediate goods in order to know how much of scarce inputs to allocate to producers of intermediate goods. While Saros does not bother to explain how, I believe it is possible to do this for intermediate goods and even possible to do something similar for capital goods, which, unlike intermediate goods, are used for many years.
- 11 We agree with Saros that the correct answer is no.
- 12 Surely noses are now broken, not merely out of joint!

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