ROUTLEDGE FRONTIERS OF POLITICAL ECONOMY

The Irreconcilable Inconsistencies of Neoclassical Macroeconomics

A false paradigm

John Weeks

ROUTLEDGE

Even after the global economic calamities tied to the Wall Street Crash and Great Recession of 2008–2009, the view still prevails among both professional economists and policy makers that free market economies work best. In this book, Professor John Weeks powerfully demolishes neoclassical macroeconomic theory, the intellectual foundation for all such free-market celebrations. Weeks also goes further, by clearing the ground for us to think in fresh ways about a macroeconomic framework capable of delivering full employment, stable financial markets and a sustainable environment.

Robert Pollin, Professor of Economics and Co-Director, Political Economy Research Institute (PERI), University of Massachusetts-Amherst, USA

John Weeks has written a passionate indictment of mainstream macroeconomics. His audience is sceptical students (and their teachers) who are puzzled about the lack of contact between what their textbooks and "learned" journals say about how things happen and what should be done about them, on the one hand and what they observe in the day-to-day happenings of the world in which they live, on the other. Weeks has absorbed the approach and details of the mainstream literature, reduced it to its essentials and examined its internal logic, which he often finds either wanting, or so dependent on special assumptions for which there is little economic justification as to be of limited applicability, or none at all. He contrasts these findings with the more relevant approach to be found in the writings of Marx, Keynes, and Weeks' own institutionalist teachers of long ago. This is the best sort of textbook – clear, honest, challenging and relevant.

G. C. Harcourt, School of Economics, University of New South Wales, Australia

My heart goes out to those young people who, spurred on by the financial crisis, embark on a course in economics. Invariably they confront an orthodoxy taught by a profession that failed to predict the crisis, failed to explain it and failed to offer remedies. Indeed the economics profession, with very few notable exceptions, has stood aloof, disdaining to offer society, and in particular young people, an understanding of, and a way out of the crisis. Not so John Weeks. This book applies academic rigour to shed light and understanding. It is for anyone with a sceptical mind wanting to understand and make sense of today's financial mayhem – and keen to challenge the discredited economics that precipitated the crisis of August 2007 – a crisis that is still ongoing.

Ann Pettifor, Executive Director of Advocacy International

With intellectual rigour and passion for human progress, this book shows how much the dominant economic approach is based on false premises, faulty logic and ideological blindness. Even more important than its sharp and profound criticisms of all aspects of orthodox macroeconomics is its ability to develop the faculty for critical reflection in the reader. It is a must-read for everyone who is interested in understanding what is happening in the world economy today.

Ha-Joon Chang, University of Cambridge, UK

The Irreconcilable Inconsistencies of Neoclassical Macroeconomics

This book is intended to be a complement to a standard neoclassical textbook on undergraduate macroeconomics; to serve as an analytical antidote to the neoclassical inflection. Much of the presentation runs roughly parallel to such a textbook. The emphasis is different and the reader will find critiques that few undergraduate or graduate students would encounter in their careers, though these would have featured in textbooks prior to the 1980s. The intention is to make these critiques as understandable and directly applicable to the orthodox model presented at the advanced undergraduate level. Written for students, the book critiques neoclassical macroeconomics as it is taught, and the reader will find many references to standard macroeconomic textbooks past and current.

This book is inspired by two convictions. The first is that almost all textbooks in undergraduate courses have theoretical errors and misrepresentations of considerable significance. These errors and misrepresentations are not wholly accidental, and have strong ideological implications. The second conviction is more fundamental. The strictly 'macro' aspects of the theories of both Marx and Keynes have slipped from sight. Each the foremost theorist of his century, both men inspired schools that claim the heritage of the master; but what made the analysis macroeconomic in both cases has largely been abandoned.

John Weeks is Professor Emeritus and Senior Researcher at SOAS, University of London, UK.

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For Alex Izurieta and Alemayehu Geda

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Preface and acknowledgments

It is not unusual for people to reflect on who and what had the most influence on the development of their ideas and approach to economics. In my case it requires only a moment's thought to identify one person above all, Clarence Ayres (though I am unlikely to be listed along with his famous students, Talcott Parsons and C. Wright Mills). In 1959 as a rather feckless and intellectually confused freshman at the University of Texas I took his introductory course, using his 1952 book, *The Industrial Economy*. I was also in his advanced undergraduate course as a senior. I came to know him personally in as far as an undergraduate can do so a distinguished professor, and was invited to his home on Shoal Creek Boulevard in Austin.

His great contribution to my intellectual development, and to many, many other students, was to convey the importance of a skeptical mind. From Dr. Ayres (as he was always addressed even in his absence) I learned that very little of what we see, hear or read should be accepted without critical inspection. On a more human level, he conveyed the importance of maintaining a sense of humor even in the most heated arguments. I recall in the senior seminar a far right-wing student launched a scurrilous attack on him, ending by saying, "with communists and their sympathizers, we need to fight fire with fire!" To this Dr. Ayres replied, "I prefer to fight fire with the fire department". This book is an attempt to fight the neoclassical fire with the fire department of rigorous logic.

Several books have strongly influenced my thinking. Chronologically the first among these Karl Polanyi's *The Great Transformation* (1944) assigned by Ayres, which made me realize that labor, land and capital were not commodities, though it would be twenty years before I realized why they were not and what they were. As a graduate student my political economy was in part molded by four important works which should be read still though they are fifty years old: John Kenneth Galbraith's *The Great Crash*, on the economic depression of the 1930s; *The Worldly Philosophers* by Robert Heilbroner, which may still be the best guide to economic thought and gives the neoclassicals the meager treatment by deserve; *The Other America* by Michael Harrington about the invisibility of the American poor; and Rachel Carson's *The Silent Spring*, a moving and powerful exposé of the despoiling of the environment.

After receiving my PhD economics at the University of Michigan, a solidly Keynesian department, two works had substantial influence on my thinking.

First, Marx's *Capital*, all three volumes and especially the first. Chapter 25 of volume one, "The General Law of Capitalist Accumulation", should be essential reading in every macroeconomics course (which, of course, it is not, quite the contrary). Finally, for reasons explained in Chapter 11, an important spur to writing this book was Axel Leijonhufvud's *Keynesian Economics and the Economics of Keynes*. More recent influences have been several works by Post-Keynesians, to which I refer in the text.

Discussion with colleagues is essential to any intellectual project, and I thank Anwar Shaikh, Ben Fine, Alfredo Saad Filho and Costas Lapavitsas. This book represents a re-write of *A Critique of Neoclassical Macroeconomics*, published in 1989, the first eleven chapters substantially re-written and chapters 12–17 entirely new.

Introduction

This book is directed and dedicated to the many economics students who, confronted with *prima facie* incredible analytical conclusions carrying reactionary policy implications, have thought to themselves, there must be something wrong with this logic. And, there almost always is an element of faulty logic that invalidates the argument even if all assumptions are accepted.

I can quite clearly remember my first encounter with the politics of neoclassical economics. When at the University of Texas in Austin in the early 1960s, my microeconomics professor, H. H. Liebhofsky (known to all as "Lieb") used partial equilibrium analysis to show the standard reactionary parable that a minimum wage causes unemployment. Lieb, a political progressive who wrote a quite sensible microeconomics textbook, dismissed the conclusion as logically valid but of no empirical importance. I felt the matter should not be left at that. If unchallenged analytically, the logical argument might assert its latent power in a more politically reactionary period, which, of course, it did with vengeful aggression beginning in the 1980s.

That minimum wages cause unemployment, either in a partial or a general equilibrium framework, is logically wrong. To state the matter stronger and more polemically, it is analytically false, betraying the underlying technical sloppiness and even incompetence of most of neoclassical economic theory. Almost every generalization of neoclassical economics is logically false except under analytical constraints ("assumptions") so restrictive as to be absurd even in the abstract. To list a few faulty conclusions, it cannot be demonstrated in logic that:

1 real wages and the aggregate level of employment are negatively related;
2 unregulated markets automatically equilibrate to bring about full utilization of resources ("full employment"), nor that they equate supply and demand in single markets;
3 the aggregate price level is determined by the supply of money, and inflation is the result of changes in the supply of money; and
4 floating exchange rates equilibrate the balance of payment

The function of this book is to provide those skeptical and inquiring economics students a demonstration of the fallacy these, the most fundamental parables of

Economics: Reactionary by method?

In the European Middle Ages the dogmas of the Catholic Church enforced daunting barriers to scientific inquiry. The pernicious effect of neoclassical economics is worse. It is a virus of the mind. Once implanted in the mental processes, it systematically destroys the ability to conduct rational thought. Its intellectual method does not reveal underlying truths and relationships. Quite the contrary, it renders the complexities of life into ahistorical trivia obscured by cabalistic mathematics.

The social nature of human existence is rejected by the neoclassicals in favor of the absurdity that each person is an isolated individual, stripped of the interpersonal responsibility that makes people human. "Individuals" are driven by pure personal greed, defined as "rational" behavior. This irresponsible greed allegedly results in the general welfare. It is difficult to imagine a doctrine more flagrantly in the interest of the rich.

During the first half of the nineteenth century people who identified themselves as political economists actively challenged the fundamental questions of capitalist society: distribution, growth and human welfare. They fiercely debated trade policy, monetary policy (including the nature of money), public debt, and regulation of conditions of work.

The re-branding of the discipline from political economy to "economics" by W. S. Jevons (1835–1882) marked a major step towards a systematically reactionary and intellectually intolerant dogma. Jevons' contribution became sacred writ in the next century with the distinction between "positive" and "normative" economics, frequently attributed to the right-winger Milton Friedman, though it can be found at least two decades before his famous article (for example, in the work of the neoclassical founding father and nominal Keynesian, Paul Samuelson).

By the 1950s the professional guidelines were clear. When acting "scientifically", economists reached conclusions that were "value free". Being a member of the professional was contingent upon accepting this conclusion. For example, an economist was free to be supportive of trade unions in private life, as long as he/she accepted the theoretical dogma that trade unions caused unemployment and/or inflation. The vast majority of policy-oriented (and usually more progressive) economists accepted these guidelines because they did not appear to weaken the *de facto* hegemony of the neoclassical Keynesians.

A few committed progressives challenged the intellectually vacuous positive/normative distinction. They sought to shift the profession from its acceptance of the moribund "microfoundations" that were little more than mathematical elaboration of the Jevonian marginalist banalities. These progressives (among the prominent were Joan Robinson and John Kenneth Galbraith) fought a lonely struggle, largely ignored within the profession, though they had considerable influence outside its dogma boundaries.

In the late 1970s and 1980s, as politics in the Anglo Saxon countries shifted decisively to the right, the neoclassical fundamentalists made their move: if the profession accepted the validity of self-adjusting, general equilibrium full employment, wasn't it time that the true believers took control of the profession? In ideological terms, the subsequent purge of all non-neoclassical tendencies, no matter how mild, closely tracked the Spanish Inquisition.

> Like the central purpose of the Inquisition, the consolidation of the Spanish nation state through the purging of Islamic and Jewish influence in Iberia, the neoclassical purpose was to create a reactionary, pseudo-intellectual bastion in defense of capitalism in its most vulgar and anti-social form. The transformation of the economics profession from a field of intellectual inquiry into a closed, dogmatic servant of the *status quo* is unprecedented in academia, equivalent to Creationism taking over the field of genetics.

neoclassical economics. The presentation parallels the typical mainstream textbook, providing a heterodox antidote to the neoclassical virus of the mind.

This book is not unique in pointing out the fallacies of neoclassical analysis and the policies allegedly derivative from that analysis. It differs from those in that it presents an "internal critique" of neoclassical economics, and makes no attempt to develop an alternative framework. Excellent presentations of alternative views can be found, for example, in Heilbroner and Galbraith (1990), and Galbraith and Darity (2005) and Lavoie (2007). Geda (2002) provides a pathbreaking application of a Keynesian framework to the problems of sub-Saharan Africa. Collections and summaries of more advanced work in the analytical tradition of Keynes are readily available, albeit ignored by the mainstream.[1] Readers are urged to treat this book as a complement and stepping stone to those alternative presentations.

The five parts of this book provide a critique of the neoclassical logic of aggregate economic activity, "macroeconomic" theory. There are two broad approaches to aggregate economic analysis, those of Marx and Keynes.[2] The neoclassical school no more accepts the contributions of the latter than those of the former. These two macro traditions both analyze aggregate economic relations with concepts developed at the aggregate level. Their aggregates are not the summation of behavior at the microeconomic level. Neither tradition is "neoclassical" in the accepted sense.[3] The primacy of aggregate behavior over the activity of individual economic agents is explicit in Marx. It also is a fundamental characteristic of Keynes's analysis in *The General Theory of Employment, Interest, and Money* (1936). The significance of this distinction, between aggregates that are macro relations and those that are the sum of micro relations, will emerge as the analysis proceeds.

Some of the issues of theory I treat are complex, often restricted to advanced treatments of economic theory (when included at all). The presentation is designed to be comprehensible to someone who has taken an introductory course in economics. The "income–expenditure" model of Chapter 1 will be quickly recognized by a first year student of economics. One need not be a specialist in economic theory to read this book, only a student of economic theory.

The book is intended to be a complement to a standard neoclassical textbook on undergraduate macroeconomics; to serve as an analytical antidote to the neoclassical inflection. Much of the presentation runs roughly parallel to such a textbook. The emphasis is different and the reader will find critiques that few undergraduate or graduate students would encounter in their careers, though these would have featured in textbooks prior to the 1980s. The intention is to make these critiques as understandable and directly applicable to the orthodox model presented at the advanced undergraduate level. Written for students, the book critiques neoclassical macroeconomics as it is taught, and the reader will find many references to standard macroeconomic textbooks past and current.

In the presentation of neoclassical method in Chapters 1–4 many of the references refer to publications prior to the 1990s. These authors are cited, for example Frank Hahn and Harry Johnson, because subsequent neoclassicals are much less likely to show concern for method. This lack of concern itself reveals an intellectual arrogance, the confidence that the theory is so generally and uncritically accepted that developing or defending its methodological foundations is unnecessary. Therefore, one must reach back to an earlier, less hegemonic time, to find neoclassicals concerned with their analytical foundations.

This book is inspired by two convictions. The first is that almost all textbooks in undergraduate courses have theoretical errors and misrepresentations of considerable significance. These errors and misrepresentations are not wholly accidental, and have strong ideological implications. The second conviction is more fundamental. The strictly "macro" aspects of the theories of both Marx and Keynes have slipped from sight. Each the foremost theorist of his century, both men inspired schools that claim the heritage of the master; but what made the analysis macroeconomic in both cases has largely been abandoned.

In the course of this book I argue that the loss of what is essentially "macro" in Keynes is the result of a preference for a form of equilibrium analysis that gives unqualified support to the ideology of free markets. In the case of Marx, his theory of exploitation and from this the stress on class struggle, led to an almost complete neglect of his contribution to the analysis of the aggregate demand and supply of commodities.[4]

Over the last 30 years, the cull of Keynesians from the profession in North America has been almost as thorough as for Marxists. The essentially aggregate character of Keynes's contribution has not survived the "neoclassical synthesis". The loss of the macroeconomic element is closely related to what Leijonhufvud identified as the implicit bargain struck in the mid-twentieth century between the defenders of pre-Keynesian theory and the Keynesians: the latter would accept the abstract validity of the automatically-adjusting, general equilibrium view of a capitalist economy, if the former would concede its limited applicability in practice (Lejonhufvud 1968, 7–8). This proved a Faustian bargain. After being dominant in the profession for three decades, from the 1980s Keynesians could no longer claim the mainstream of economics as theirs,[5] nor even be accepted as part of it.

Macroeconomics can be divided into three parts: the analysis of aggregate reproduction, of cycles, and of growth. I deal almost exclusively with the first, which in neoclassical theory is called static equilibrium analysis. In my interpretation, Marx and Keynes were not equilibrium theorists. To include them along with the neoclassicals, the more general term "aggregate reproduction" might be used. This refers to the analysis of what determines the level of aggregate economic activity in the absence of certain qualitative changes or disturbances, the most important of these being technological change. Textbooks on neoclassical macroeconomics deal with technical change hardly at all. Because the purpose of this book is to provide a critique of the internal logic of mainstream theory, the effect of technical change is not considered.

Developing a theory of aggregate reproduction does not require equilibrium analysis, though it is a central characteristic of neoclassical macroeconomics. Aggregate analysis must incorporate the fundamental empirical generalization that capitalist economies are not for the most part racked by continuous and violent fluctuations. The extreme method for doing this is to begin with a model of aggregate reproduction that is both relatively stable (does not tend to extreme values), and absolutely stable (no tendency to move from a position uniquely determined by certain exogenous factors). Such stability requires an equilibrium model. When there are a number of variables and relationships that are determined simultaneously, one has a general equilibrium model.

General equilibrium is the point of departure of the neoclassical macroeconomic model, with the added characteristic that the stable position is also one of full and efficient utilization of all economic resources. Investigation of the neoclassical general equilibrium macroeconomic model is the central theme of this book. Chapters 1 and 2 present the basic model without money. This method of presentation allows for emphasis of the pre-Keynesian influence in the theory. Chapter 1 treats the "income–expenditure" framework without a "supply side". From this restricted version of the model I obtain the condition that aggregate economic activity is in equilibrium if "saving equals investment", well known to first year students of economics.

Chapter 2 fills in the supply side, which provides the model with a solution for the wage level and employment. With a neoclassical labor market, I can derive the basic conclusions (or "parables" as some call them) about the tendency towards full employment of resources and the impossibility of unemployed resources (especially labor) in unregulated markets. The presentation has two purposes. First, it provides a clear exposition of the neoclassical model, comparable and complementary to that found in standard textbooks. Second, it emphasizes certain aspects of the model in anticipation of the critiques by mainstream economists presented in Part III of the book.

Introduction of money creates the formal distinction between "real" and "nominal" variables, and a number of complications follow. Among these is that the process of adjustment to equilibrium requires a general equilibrium solution. Chapter 3 develops the concept of market clearing, particularly Walras' Law, which will have a prominent role in subsequent discussion. The "real/nominal" distinction was a fatal flaw of the pre-Keynesian economists, a contradiction known as the "classical dichotomy" or the "false dichotomy".

As shown later, this false dichotomy persists in neoclassical models. The dichotomy leads to the famous "neutrality" of money argument, which plays a central role in the debate over the uniqueness and stability of the neoclassical general equilibrium model when at full employment. Particularly at issue is the adequacy of Walras' Law as the mechanism for automatic self-adjustment of the system, and its compatibility with the quantity theory of money. The concept of money itself comes under close scrutiny in Chapter 4, where the famous quantity theory is introduced.

Chapters 5 to 7 explore in considerable detail variations of the neoclassical model with interactive labor, commodity and money markets. The presentation is analogous to what is in a neoclassical textbook. The purpose is to demonstrate the extremely restrictive assumptions required in order to construct an internally consistent macro model that tends automatically (without state intervention) to full employment. In Chapter 7 the discussion goes beyond that found in most textbooks by treating the impact of aggregate wealth on the commodity and money markets.

These seven chapters provide an "internal critique" of the synthesis model, pointing out contradictions and inconsistencies when all of its assumptions are granted. Because much is covered in these chapters, it is useful to pause and summarize the critique, as well as to extend it along lines only briefly considered during presentation of the models. This is done in four chapters, 8 to 11, each of which considers a particular aspect of the conclusion that capitalist economies tend automatically to full employment. In earlier chapters a particular property of most neoclassical models, the "neutrality" of money, was treated. Chapter 8 explores the relationship between the theory of money and full employment, particularly the implications of the "neutrality" of money. This property of neoclassical models is as ideologically important as, and essential for, the allegation of automatically-adjusting full employment.

Chapter 9 turns to the neoclassical treatment of expectations of the future by economic agents. For Keynes and those who followed his lead, expectations represent a source of instability in the economic system. By contrast, the tendency in neoclassical theory is to introduce expectations in a manner that makes models more stable. The extreme form of this, *reducto ad absurdum* one might say, is the use of the rational expectations hypothesis by the New Classical Economics. All neoclassical treatments of expectations make the impossible assumption that the future is known.

In an unusual excursion for a book on short-run macroeconomic models, Chapter 10 considers the debate over the aggregate production function. The critique of this function, initiated by Joan Robinson in the early 1950s, calls into question the entire supply side of the synthesis model. My interest is in its implications for labor market adjustment in the short-run neoclassical model. From the Capital Controversy I turn in Chapter 11 to the work of the "disequilibrium Keynesians" (primarily Clower and Leijonhufvud in the 1960s and 1970s), with emphasis upon the methodological and analytical inadequacies of Walras' Law as an equilibrium mechanism. A centre-piece of their school is the attack upon the neoclassical formulation of the market for labor services, itself an extension of the critique of the nominal/real distinction. The chapter ends by discussing more recent contributions to macroeconomics.

The various critiques are brought together in Chapters 8–11, with emphasis on four theoretically unsatisfactory elements in synthesis macroeconomics: (1) treating aggregate reproduction as value added instead of commodities; (2) analyzing production in a one-commodity framework; (3) formulating monetary theory with valueless money; and (4) integrating markets through general equilibrium theory. The simplification to value added categories and one-commodity production reflects an attempt to resolve what is perhaps the principal analytical problem of macroeconomics. This is the problem of relating the aggregate value of commodities to the material output of the commodities arising from actual production processes. The solution to this problem defied Keynes and is rendered trivial by the neoclassical one-commodity model. Not since Ricardo and Marx has any major economic theorist seriously attacked the problem of relating values to material production, with the exception of Piero Sraffa.

Chapter 12 begins the analysis of the neoclassical open economy, an extension of the closed model that carries forward the logical inconsistencies revealed in Parts I and II, and adds some unique to itself. The open model, like the closed version, has only one product, yet pretends to analyze a multi-commodity context. Equally serious, the open economy model applies to less than full capacity, yet uses Walrasian equilibrium adjustment that is valid only at full employment. Chapter 13 ignores these failings to present the standard analysis of fiscal and monetary policy with fixed and flexible exchange rates, the Mundell-Fleming model. The standard conclusion is that under fixed exchange rates fiscal policy is effective and monetary policy is not, and the reverse for flexible exchange rates. These analytical conclusions produce the policy judgment that flexible exchange rates should be preferred to fixed rates.

Chapter 14 demonstrates that the adjustment logic and policy conclusions of the Mundell–Fleming model are incorrect. The model fails to include impact of changes in exchange rates on the domestic price level. As a result, it makes no distinction between nominal and real outcomes for the exchange rate, nor the difference between the nominal and the real money supply. When domestic price effects are included, the appropriate policy conclusion is that the relative effectiveness of monetary and fiscal policy with a flexible exchange rate depends on two key parameters, the marginal propensity to import and the sum of the import and export elasticities with respect to the real exchange rate. The effectiveness of fiscal and monetary policies is an empirical question and no theoretical generalization is possible.

The penultimate chapter stresses the central message of the neoclassical macro model, that markets are efficient and public sector intervention is unnecessary and counter-productive. I have sought to demonstrate that the analysis supporting this anti-interventionist dogma is unsound. Full employment in a market economy requires active fiscal policy supported by monetary accommodation and exchange rate management. In addition, a humane capitalist system needs a universal basic income to prevent employers using unemployment as a social disciplining instrument, and public control of the financial sector to prevent economic crises. The final chapter reviews the arguments of the book to show why these policy conclusions are not only justified but necessary.

Before beginning, a disclaimer is necessary. Practitioners of the synthesis model might maintain that many of the arguments found in this book are based not on the neoclassical macroeconomic model in its most sophisticated form, but on a "straw man", chosen for its simplicity and vulnerability to theoretical attack. Three points can be made in anticipation of such a defense. First, at many points the argument considers the more sophisticated defenses of the model, so I do not restrict myself to simplistic formulations. Second, in all economic theory it is the analysis in its simplest form that is most representative, and best encapsulates the basic insights of the discipline. While increasing sophistication enhances the theory, it is frequently at the cost of losing the fundamental vision in a wealth of special cases. Third, if there are errors in the simple version, which there are, more complex models built on these errors are no improvement.

The objective reader would do well to refer to any standard textbook on neoclassical macroeconomics, whether at the undergraduate or graduate level. There he or she will find that the version of the closed synthesis model presented in Chapters 5–7 and the open version in Chapter 12–14 are true to what is offered as the summarized and synthesized wisdom of the mainstream of the economics profession.

Chapter 15 addresses what in the last decades of the twentieth century and into the twenty-first became the obsession of neoclassical economics, inflation. The themes in Chapter 4 on money are pursued further, to demonstrate that despite its obsession with it, neoclassical economics has no theory of inflation. What passes for inflation theory is little more than an exercise in full employment general equilibrium, which is presented as an analogue of actual economies. The most important aspects of the process of rising prices, distributional effects, differential rates across commodities, and quality change, play no role in neoclassical inflation. Because neoclassical inflation occurs only at full employment, the ideological implications of the analysis are reactionary: fighting inflation is the greatest priority for macroeconomic policy.

The simple form of the neoclassical model, on which I spend considerable time, provides the basis for many policy recommendations. To take but one example, it is common for neoclassical economists, and non-economists who hold to neoclassical parables, to argue that lower wages, "other things equal", will result in more employment of labor. This conclusion derives from the neoclassical model in its simplest form. One of the main purposes of this book is to investigate conclusions of this type, almost invariably deduced from the basic model. Those who make such assertions rarely have more than the simplest theoretical formulations in mind.

I hope that the reader who completes this book will, if nothing else, emerge at the end with sufficient skepticism about the neoclassical model to be open to an alternative vision of aggregate economic theory, and to accept at least in principle that the model which dominates the economics profession is not necessarily the source of all insight.[6]

Part I

Methodology of the neoclassical macro model

Main points

Chapter 1: The demand side of the neoclassical model

1 In combining and reconciling pre-Keynesian theory and the contributions of Keynes in the "neoclassical synthesis", very little of Keynes survived.
2 The circular flow diagram (income–expenditure model) is an ideologically-laden misrepresentation of market economies.
3 The demand driven model is internally consistent if prices are constant until near full employment. However, this assumption is inconsistent with the neoclassical model.

Chapter 2: The neoclassical model with a supply side

1 An aggregate supply side requires all neoclassical macroeconomic models to be one product system.
2 The one commodity model produces the assertion that market economies have an automatic tendency to full employment. This is the basis of arguments for the benefits of unregulated markets. More complicated versions of the model re-assert this conclusion without qualification.
3 Equilibrium in the simple model is achieved without consideration of money through an improbable process of one-commodity barter.
4 Automatic full employment derives from the labor market adjustment.

Chapter 3: Comparative statics and equilibrium

1 The neoclassical macroeconomic analysis is comparative statics, comparisons of positions of general equilibrium, in which all variables have stable values.
2 Equilibrium analysis abstracts from chronological time. The terms short run and long run do not refer to time periods. They are timeless abstract categories.
3 The simplest neoclassical model has three markets, for labor, output and money, and these markets must equilibrate simultaneously, not sequentially.

4 If there are disequilibrium trades no automatic adjustment to full employment can occur. The possibility of such trades is eliminated by Walras' Law.
5 Walras' Law implies that no solution to the real values in the model is possible without a general equilibrium of all three markets, labor, money and output.

Chapter 4: Money in the neoclassical model

1 The assumptions of rationality and full knowledge of markets imply there is no theoretically valid explanation of either the existence or the supply of money.
2 The argument that public sector intervention creates inefficiencies requires that the quantity of money have no impact on the real variables at full employment ("the neutrality of money").
3 Invoking Walras' Law and treating money as neutral requires an intervening variable between money and output, the real balance effect. A money economy has its specific adjustment process simultaneous clearing of all three markets.
4 The hypothesis that increases in the money supply generates proportional increases in prices cannot be theoretically confirmed.

1 The demand side of the neoclassical model

1.1 Introduction

In economics, scientific development has closely reflected the political temper of the times. One would expect this from a subject intimately involved in the welfare of people and the distribution of wealth. As a separate, clearly-defined field of study, economics emerged in the eighteenth century. From that point until the late nineteenth century it was usually called “political economy”. The first great figure in political economy was Adam Smith, and all economists from Smith to J. S. Mill, who wrote about ninety years later, are identified collectively as the “classical” economists. This group of writers had an important common characteristic that contrasts to the “economics” that succeeded it: all the members used a value or price theory based on the labor content in commodities.

The classical school dissolved rapidly before the analytical onslaught of the “marginalists”. This name derives from their theory of value, based upon subjective utility and substitution among what they called “factors of production”. By the end of the nineteenth century, the marginalists commanded the mainstream of economic theory without challenge. The dissidents were few and usually not considered professionally respectable, for example John A. Hobson in Britain and Thorstein Veblen in the United States (Heilbroner 1999, Chapters VII and VIII), unless they were solidly on the political right (ibid., Chapter X) Modern microeconomics descends from the marginalists with little fundamental alteration, only elaboration. Keynes took the marginalist school of his time as his straw man and confused terminology by referring to them as the “classicals”.

Keynes adopted the method of his marginalist contemporaries as his point of critical and frequently polemical departure. Basic to his critique of the marginalist school was the argument that a capitalist economy had no automatic tendency towards full employment of resources. Full employment equilibrium had been the hallmark of pre-Keynesian analysis, rejuvenated in the 1970s, and is so widely accepted in the profession that it has no distinguishing name; because of its dominance it boldly and arrogantly calls itself “economics”.

After World War II several prominent economists, especially in the United States (e.g., Paul A. Samuelson) proposed a “synthesis” of Keynes and his critics. This reconciliation emerged as the orthodoxy in the profession, and was called the "neoclassical synthesis". "Classical" here comes from Keynes's use of the term, and "synthesis" refers to the alleged reconciliation of the analysis of *The General Theory* with what that work had sought to replace.

Very little of Keynes survived that synthesis. In 1965 when I began graduate school at the University of Michigan, Ann Arbor, everyone studying economics read at least part of *The General Theory*. In 2011 few economics departments anywhere in the English-speaking world had any book or article by Keynes on any reading list at any level, except for the increasingly rare courses in history of economic thought. In this chapter I begin the analysis of the macroeconomics after the synthetic exile of Keynes.

1.2 The circular flow and its aggregates

The neoclassical analysis of aggregate behavior begins with a specification of the circulation of money and commodities, called the circular flow of income. This "circuit" provides the basis for the subsequent treatment of aggregate variables. By breaking into the circuit at an arbitrary point, one can follow the process of circulation. In the circular flow the emphasis is on the income generated from production, rather than on production itself, though it is production that is the basis of the flow. The economic system is presented with two types of "agents", households that sell services of various types, and businesses that purchase these services. Consumer commodities are destined for households, and investment commodities for business. Businesses derive their revenues from the sale of commodities, then distribute the revenues as payments for services. This interpretation of aggregate circulation is shown in Figure 1.1, which is typical of what one finds in an elementary textbook (for example, see Sloman 2007).

The first and perhaps most fundamental characteristic of the circular flow model is its implicitly ideological nature. It presents the social process of production, exchange and distribution as a phenomenon of markets to which the role of government can be added at a later point. A critique of the political philosophy that produces such an extreme dichotomy of public and private lies beyond the scope of this book. It should be sufficient to make two points. No private production, exchange or distribution is possible without public intervention, at the minimum to guarantee contracts and private property. Second, in all but a few countries, the single largest provider of economic services is the public sector, the most obvious being the security services of the military and the police, for which there is only a small privately marketed counterpart. A representation of economic activity that treats the part the government generates as an "add-on" is theoretically invalid to the point of absurd.

By accepting the absurdity of economic activity without a public sector, we can proceed to Figure 1.1, which is an interpretation or theoretical presentation of the circulation of commodities,[1] not an empirical representation. Nor is it a simplification, if by that term one means the schematic representation of the most important aspects of a real system. The counter-intuitive and counter-empirical

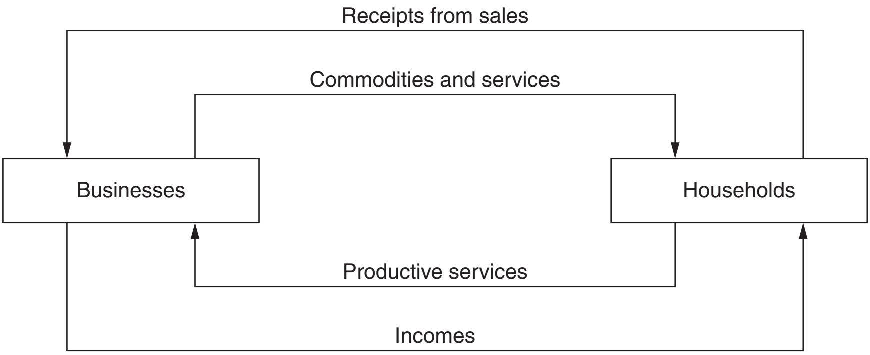


Figure 1.1 The neoclassical circular flow of income.

character of the circular flow diagram becomes obvious on closer inspection, even if one accepts the absence of the public sector.

In the top loop of the diagram are commodity and service flows and the payments for these, which go to and from households. This specification of exchange does not describe an actual economy. Perhaps a majority of the money value of exchanges is among businesses, not households. There are the commodities that are consumed in the production of other commodities, "intermediate" products or commodities.[2] Other commodities are used as instruments in production, machinery, buildings and equipment. Marx gave these two categories the self-evident names, "circulating means of production" and "fixed means of production". The former are excluded from the circular flow, to avoid "double-counting",[3] but the latter are not. This seems an inconsistency, because both circulating and fixed means of production are exhausted in the process of creating other commodities and services. The role of sales of fixed means of production, investment, is treated in detail in subsequent chapters.

Treating investment as a "final" commodity can be understood by looking again at the flow of services and incomes. At the top, "services" include activities such as haircuts, banking, and other outputs of production. In the bottom loop, "services" refer to so-called factors of production: the renting of land, selling of laboring activity, lending of money, and holding formal ownership through equities. These "services" twin with the payment of rent, wages and salaries, interest, and profits, which together constitute "incomes" (lowest line). In the standard circular flow all of these categories of income are assigned as payments to people. By definition these payments are a return for something someone sells. The circular flow diagram is the first signal the student receives that the concept of classes has been expelled in favor of the category "households" and its familiar, "consumers".

The diagram can be, and in some textbooks is, expanded to take account of the exchange of investment commodities within the business sector (Stiglitz and Walsh 2006, 142, 158). It is never expanded to include the exchange of circulating means of production that would enable the diagram to include at least a rudimentary treatment of the production process. However, my purpose at this point is to understand the synthesis macro model, not actual economies. The very simple version of the circular flow shown in Figure 1.1 is a true representation of the formal synthesis model, as will be seen in the next section.

How is one to rationalize a schema in which all sales of commodities are from businesses to households, and all income payments accrue directly to households? The first and most fundamental step is to eliminate all sales involving material inputs into production. When this is done, the money flow at the top of the diagram is no longer sales receipts, but income payments, wages, profits, interest, and rent (value added). As mentioned, this is justified by what is called the double-counting argument.

In order to eliminate material inputs from consideration in an analytically consistent manner, I assume than the commodities produced in the model require only workers and machinery. While one might think this is an absurd assumption (and it is), I shall show that is true to the supply side of the synthesis model, which involves what is called an aggregate production function. Alternatively, I could assume that commodities represent a stock at the beginning of a time period, and the only economic activity which engages capital and labor is their distribution. This also may seem a strange assumption: that commodities appear magically at the outset in fixed supply. It is the assumption made in one of the fundamental building blocks of neoclassical economics, Walrasian general equilibrium theory, that generates Walras' Law of market clearing.

Justifying the inclusion of expenditure upon plant and machinery in the exchange between businesses and households requires a more involved and subtle set of assumptions. The argument begins at the bottom of the diagram, where it is assumed that all business receipts accrue to households. This implies that there are no retained profits by businesses. In effect business enterprises are treated as conduits, the passive intermediaries between sales receipts and income payments. People receive income payments as a result of their property relations, or to use the neoclassical term, their endowments.

For reasons not explained or treated seriously in the model, some people own land, some hold corporate assets, or lend money, and others obtain the vast majority, if not all, of their incomes by working for employers. Each group is treated as providing a service: landlords supply the use of land, stockholders offer the services of plant and machinery (capital); lenders sell the service of postponing consumption; and employees deliver their laboring capacity. The assumption of no retained corporate profits now reveals its bizarre logic. Because profits are the payment for a service rendered, they can be treated analytically as accruing to households even if they never leave corporate balance sheets. If profits are retained by the business, this is interpreted as a choice made by households.

Treating income as payment for services explains investment expenditure in the diagram. When all income accrues to households, businesses do not purchase anything. What appeared as common sense and obvious (businesses buy machines), is rejected in the model in favor of an esoteric relation (households buy machines) that is implied by the passive role of business enterprises in neoclassical theory. The exchange relationships can be listed as follows: some households are net savers, and these receive interest payments; others are net borrowers, and make investment purchases for which they receive profits (the return to the services of capital flowing form the machines). As contrary to common sense as this may be, few indeed are the economists who have expressed any doubts about the descriptive validity of the circular flow on income model.[4]

1.3 The income–expenditure model (demand side)

The circular flow views commodity exchange in a specific manner that minimizes any role for classes or instability. This view is formalized and made explicit in the income–expenditure model. At this point we consider the demand side only, introducing the supply side in the next chapter. First considering demand is not merely a convenience of exposition. It corresponds to the emphasis of a school of macroeconomics, usually called "Keynesians". Of the many theoretical propositions that are common to all Keynesians, perhaps the most central is that market economies are driven by aggregate demand.

The demand side of the model is constructed with aggregate concepts, which must be defined and clarified prior to developing the mechanics of the model. The method of aggregation, the abstract constructs and their relationship to reality, is central to theory.[5] Beginning with no role for government and no foreign trade, the demand side of the model has the following aggregates: income, consumption, investment and savings. The aggregate demand for commodities is by definition consumption plus investment, and the income of households is divided between consumption and saving.

Consumption refers to the expenditure of households on commodities. These commodities need not be exhausted within the period that the expenditure is made. Commodities whose useful life coincides with the expenditure period are "non-durables" and those with a longer life are as "durables". While this distinction is of considerable importance in empirical work, it plays no role in the basic model. Expenditure on commodities that go to produce other commodities is investment. It is necessary, however, to define investment in such a way that materials used up in production are excluded. This is not as straightforward as it may seem. As noted above, over time the value of machinery is passed on to the commodity it helps produce. It might be argued that machines represent an intermediate cost no less than more short-lived inputs such as electricity and iron ore.

This ambiguity could be avoided in a purely formal way by the assumption mentioned in the previous section, that commodities are not produced, but only distributed with no material inputs except machinery. While this eliminates the problem of distinguishing among inputs by their duration, it does not explain why plant and machinery are not treated as intermediate. The basic justification is one of aggregate consistency rather than high theory. If investment were treated as intermediate expenditure, then aggregate demand is reduced to consumption. It would not be equal to income unless saving were arbitrarily excluded. The equality of aggregate demand with income (value added) is the equilibrium condition for the commodities market (see below). Therefore, investment is defined as expenditure upon elements of production that last longer than one time period.

Consumption and investment together are by definition expenditure on "final commodities". I accept the validity of this last category for purposes of presentation. In the annex on Keynes that follows Chapter 7 "final commodities" (aka "final goods") is subjected to analytical critique. In equilibrium, aggregate demand ($C+I$) equals aggregate income (Y), with the latter representing the total receipts of businesses from the sale of final commodities. This income is completely disbursed to households, becoming disposable income in the absence of any taxes, and household disposable income is either spent upon consumption commodities or saved. It follows that $Y=C+S$. Before going further, it can be noted that all final commodities produced in a time period will be sold if $(C+I)=(C+S)$, assuming that business have no desire to accumulate inventories. This condition reduces to $I=S$, the well-known statement that the commodity market is in equilibrium, sales and production tending neither to expand nor to contract, when household savings equals expenditure on investment commodities.

At this early stage in the presentation, it only remains to specify two further relationships. I treat investment expenditure as independent of the current level of income, though in more complex models it could be a function of levels in the past and expected in the future. To use a word common in the literature, investment is "exogenous" with regard to the other variables in the model. Following Keynes, I specify consumption expenditure to be a function of the level of current income, which can be written as $C=C(Y)$. The rate of change of consumption expenditure with respect to household income ($\Delta C/\Delta Y$) is the marginal propensity to consume (*MPC*), bounded to be greater than zero but less than one. In the simplest case, the *MPC* is assumed constant over the relevant range of income levels in the short run. What is not spent on consumption is saved, so, $Y=C(Y)+S(Y)$, and the sum of the marginal propensity to consume and marginal propensity to save is unity. Then the equilibrium condition becomes the following.

$$Y=C(Y)+I$$

or

$$S(Y)=I$$

The mechanics of this simple model are simple. A given level of investment expenditure generates a level of income such that the associated level of savings is brought into equality with the exogenous investment. Assuming no other exogenous elements of aggregate demand, the equilibrium level of income associated with a given investment expenditure is determined by the size of the parameter relating consumption to income (or saving to income). This ratio at the margin (($\Delta Y/\Delta I$) is called the investment multiplier, or "the multiplier" without modifier in this simple case. If the *MPC* is constant, the multiplier is easily derived by simple algebra to be [1/(1 – *MPC*)], or (1/*MPS*).

This simple model has no time dimension, only "time periods", when it is in equilibrium. The model "out of equilibrium" has no analytical meaning. For disequilibrium to be relevant, one would need to incorporate some explicit adjustment behavior that corresponds to situations in which saving and investment are not equal. As is common in standard textbooks, I suspend the formal restrictions of equilibrium analysis to follow a stylized version of how investment generates income.

Assume that from an initial position of equilibrium, investment rises. As a result, aggregate demand exceeds income (value added). Since income equals the value of final commodities, there is excess demand for commodities. This excess demand calls forth a greater value of sales, which corresponds to an increase in income payments. Part of this increase in income payments is saved, dropping out of the circular flow. The other part, consumption expenditure, adds a further increment to aggregate demand, which calls forth more sales and generates further income payments. This process continues until the newly-generated income is sufficient to create an increase in savings equal to the initial increase in investment.

There is one obvious difficulty with this argument: an increase in aggregate demand may result either in increased prices or an increased volume of commodities in circulation. The model must be specified to distinguish price changes and quantity changes. This is done by distinguishing between the "real" and "nominal" values of the variables so far treated. It should be noted that Keynes rejected this dichotomy, arguing that the concept of "real" variables has no scientific content (see the annex on Keynes).

The problem would seem to have a simple solution: measure the variables in terms of constant prices drawn from some reference period. This is done in all empirical work, for the simple reason that there is no alternative. However, it is not a measure of something anyone can directly observe. While commodities exist and their prices exist, commodities at constant prices aggregated over time do not exist. Neoclassical theory has devoted considerable attention to this problem, under the term the "index number problem". It cannot be assumed that an increase for all or most prices will leave relative prices unchanged. Neoclassical consumer theory requires that households change their consumption patterns in response to changes in relative prices. However, the aggregation procedure for the income–expenditure model is internally consistent only if the weights used to combine the commodities into an aggregate do not change.

One is at a theoretical impasse: consumer theory and aggregation theory are in conflict. In empirical work the inconsistency may be of little practical importance, for one seeks specific results whose reliability has internal and external statistical checks. For purposes of theorizing, the aggregation problem is quite important, because theory reaches for general conclusions based upon logic, not on the basis of *ad hoc* adjustments. When faced with the intractable index number problem, more than one economist must have shared Hamlet's famous lament, "O cursed spite/That ever I was born to set it right" (*Hamlet*, Act I, Scene 2). A famous comment by Keynes captures the nature of the problem,

> To say that net output to-day is greater, but the price-level lower, than ten years ago or one year ago, is a proposition of a similar character to the statement that Queen Victoria was a better queen but not a happier woman than Queen Elizabeth – a proposition not without meaning and not without interest, but unsuitable as material for the differential calculus.
>
> (Keynes 1936, Chapter 4)

The difficulty can be demonstrated by reference to the income–expenditure model in the simple form presented above. Again assume an increase in investment. The initial consequence will be an increase in the demand for investment commodities relatively to consumption commodities. The microeconomic theory of market behavior predicts that in such a case the price of investment commodities should rise relatively to the price of consumer commodities, which is the signal for resources to shift. Within the model a change is required which contradicts the basis upon which the real variables are constructed. The model is specified in terms of constant relative prices, but changes in the level of aggregate demand result in relative price shifts.

Keynesians argue that this contradiction arises only when the model is very close to full employment of resources. When there is unemployed labor and under-utilized plant, they argue, supply of all commodities can be treated as forthcoming at constant prices. Whether this is correct or not is an empirical question, and it is a useful working hypothesis. On the basis of this hypothesis, one can reformulate the multiplier process as described above.

If the model is initially at less than full employment with no scarcities of complementary inputs, an increase in investment expenditure will result in falling inventories of investment commodities or a rise in production for order, inducing businesses to increase capacity utilization and hire more workers. As a result, payments of wages and profits will increase, raising household incomes. Part of the increase will be spent by households on consumer commodities, inducing greater capacity utilization and employment in the consumption commodities sector. The feedback process continues until new saving is generated equal to the initial increase in investment spending.

The above sequence is the essence of the Keynesian view of aggregate circulation, in which autonomous expenditure determines the level of income subject to certain key parameters, such as the marginal propensity to consume. From such an argument flows the policy prescriptions associated with Keynesian analysis that were characterized by their emphasis upon fiscal policy (government expenditure and taxation). If government expenditure is treated as exogenous, then its role is analogous to that of investment in determining aggregate demand, and increases in government expenditure call forth increases in income. If taxes are specified in the model as in part induced by income, then the multiplier is no longer the simple expression, $[1/(1-MPC)]$, but the principle is the same. Should the model be at a position in which resources are not fully utilized with no production or distribution bottlenecks, it can reach the full employment level by appropriate selection of an expenditure and tax package.

It is useful at this point to present the simple model in algebraic form, with variables measured in current prices.

Y = national income

C = consumption expenditure

I = investment expenditure

S = income not spent

G = government expenditure

T = tax revenue of government

Identities:[6]

$\mathrm{Y} \equiv C+I+G$ (aggregate demand)

$Y \equiv C+S+T$ (aggregate supply)

The only new element in the model is the description of the last equality, $(C+S+T)$, as "aggregate supply". This income flow is equal to the total value of final commodities (consumer commodities plus investment commodities). It should be noted that this treatment of the income paid out by businesses skips the step in which it appears as the functional distribution among classes, wages, profits, rent and interest. All income payments go into an undifferentiated household sector. This omission of categories of income recipients is formally rectified when the supply side of the model is introduced. The demand-side model is completed by specifying the behavior of consumers and businesses.

$C = C^* + aY_d$, where a is the marginal propensity to consume, and

$Y_d = Y - T$, disposable income, total income minus tax.

$T = hY$, where h is the marginal propensity to tax.

$I = I^*$ and $G = G^*$

The stars indicate that the variables are exogenous, of given values. Through substitution, one gets the following.

$$Y = C^* + a[Y - hY] + I^* + G^*$$

$$Y[1 - a(1 + h)] = C^* + I^* + G^*$$

The multiplier, which I designate as μ, is the inverse of $[1 - a(1 + h)]$. Therefore,

$$Y = \mu[C^* + I^* + G^*]$$

Increases in government expenditure result in an increase in the equilibrium level of income *via* the feedback of induced consumption. The multiplier is less than in the simpler case because of the dampening effect of induced taxes. As before, only equilibrium values of the variables are consistent with the model's logic. An excess of aggregate demand over aggregate supply involves a logical contradiction. It implies that the sales of commodities exceed the supply of commodities. This in turn implies that the value added in these commodities (Y) is less than what is required to generate the consumption that is part of the aggregate demand with which we began.

In describing the feedback mechanism of the multiplier we implicitly introduced time (adjustments were not instantaneous). The simplest way to formalize this is to specify time lags. For example, one can make consumption in the current period a function of income in a previous period or periods. One possibility is $C = C(Y_{t-1})$. Similarly, one can introduce a lag between aggregate demand and the level of production; e.g., businesses set their output level in the current period equal to sales in the previous period.[7] The first type of lag has been called the Robertsonian lag and the second the Lundbergian lag, though these terms have fallen out of use. A unique equilibrium solution remains once lags are introduced, but the values of the variables are no longer defined for equilibrium positions alone. In the past it was common to specify econometric models in terms of simple time lags.

Discussion of lags indicates a fundamental feature of the synthesis model as a whole and the demand side of it in particular: there is no treatment of production. A third potential lag in this simple system is that between the moment when inputs are gathered in readiness for production and the subsequent moment when the completed commodities flow off the assembly line. So little is this possible lag treated that unlike the other two it has no specific name.[8] In almost every textbook treatment of macroeconomics it is asserted that sales receipts from final commodities and value added are equal by definition, so a lag is impossible. Keynes explicitly rejected this view (see annex on Keynes). For Marx this lag contained the source of economic crises (Weeks 2011, Chapters IX–XI).

The demand driven model is an analysis of quantity changes because of the assumption of unemployed resources. This assumption allows increases in the demand for consumption and investment commodities to be met by expansion of production at constant prices. The view that changes in demand are accommodated by quantity adjustment rather than price adjustments is the central characteristic of the demand side model. It is based implicitly or explicitly upon the assumption that businesses set their prices by a given mark-up over unit costs which are constant up to the region of full employment.[9] In the context of a model with no material inputs, constant unit cost implies a given money wage and constant marginal productivity of labor services.

In the full neoclassical synthesis model the fixed price assumption is rejected in favor of the opposite extreme: that prices adjust instantaneously to clear markets (Walrasian general equilibrium). In the 1950s and 1960s the quantity-adjustment view was tolerated as a first approximation for empirical work. Neoclassicals such as Milton Friedman never showed any tolerance for this approach, arguing that the perfectly-flexible-price model is suited to reality. Toward the end of the twentieth century his intolerance became the theoretical and policy orthodoxy. In the next chapter we introduce the supply side of the synthesis model, which provides the rational for the belief that capitalist economies tend automatically to adjust to a position of full employment stability. Simple as it is, the model with a supply side is the basis for powerful ideological arguments.

2 The neoclassical model with a supply side

2.1 Aggregate one commodity production

To create a supply side the synthesis model introduces an aggregate relationship between inputs and output. For those who believe that *The General Theory* achieved its claim of generality by focusing analysis upon a capitalist economy under conditions of less than full employment of resources, this relationship, "the aggregate production function", is an anathema, rather like a virulent computer virus that infects and degrades entire models and undermines Keynes's insights. The full implications of the aggregate production function will be explored in Chapter 10. In this chapter I show that it is the keystone of the neoclassical model, establishing the equilibrium solution to the system.

If we accept the analytical fiction that the value of final commodities equals the value added generated in production (see appendix on Keynes for an explanation of its fictitiousness), then the aggregate supply of final commodities is simultaneously income to households. Ignoring any material inputs, production (income) is a function of currently expended labor and the means of production used by that labor, with these means referred to as "capital".

The output of this labor and capital must be measured in units which are unaffected by absolute or relative changes in prices. Labor and capital produce commodities, not the market value of commodities. The expedient used in the previous section, assuming constant costs at less than full employment, is no longer adequate. To make this explicit, I change notation, now using lower-case letters to indicate "real" variables. In its most general form, the aggregate production function is written as follows.

$$y = y(k, n),\ y'(n) \text{ and } y'(k) > 0$$

$$y''(n) \text{ and } y''(k) < 0$$

The functions noted with a single prime are the first partial derivates or marginal products of labor (n) and capital (k). They are constrained to be greater than zero, so that more of either input results in more output/income. The functions with double primes are the second derivatives of income with respect to labor and capital, respectively. They are less than zero, indicating that the aggregate production function obeys the principle of diminishing returns to the variable input. This familiar principle of marginal productivity theory states that when one factor of production is held fixed and the other increases, output/income increases at a diminishing rate. Following common practice, I assume that equal proportional changes in both inputs result in an equal proportional increase in output/income, or "constant returns to scale".

The introduction of the aggregate function places severe restrictions upon the model. Commodities differ because they are produced with different processes. In the production function formulation, that means with different combinations of capital and labor. If we accept this obvious definition of why commodities differ, it follows that when the commodity composition of a given level of y changes, the k and n necessary to produce the different combinations also change.

It follows logically that assuming the prices of commodities are constant is no longer a sufficient basis for aggregating income. This assumption does not ensure that y is unique for a given combination of capital and labor. If all production can be summarized by this single function, then for every value of y all commodities must be produced in the same proportions. It is for this reason that the term "composite commodity" is sometimes used in presentations of the aggregate production function.

But a constant composition of production is inconsistent with the demand side of the model. On the demand side we have two types of expenditure, for consumption commodities and investment commodities. In general, shifts in the output level of the model will result in changes in the ratio of these expenditures. The equilibrium condition that aggregate demand be equal to aggregate supply now is complicated by the further condition that consumption expenditure be equal to the production of consumer commodities, and investment expenditure be equal to the production of investment commodities. These conditions will not in general hold if commodities are always produced in the same proportions.

The solution to this difficulty is to assume that only one commodity is produced. Operating in a single commodity world tremendously simplifies the model as well as removing some major internal contradictions, though I demonstrate that it create others. An irony of the synthesis model is that its practitioners claim that one of its strengths is its ability to analyze the role of prices. However, the assumption of a single commodity eliminates any important role for relative commodity prices.

For the reasons given above and more technical ones pursued in Chapter 10, the aggregate production function necessarily requires the extremely restrictive assumption that the economy being modeled produces only one commodity. This fundamental characteristic of the neoclassical "aggregate" model often goes unmentioned in standard macroeconomic textbooks, coming as a revelation to the student who continues on to higher study in the discipline. Gordon, for example, in a textbook once widely-used, wrote, "The aggregate supply curve is just the horizontal sum of the supply curves for the individual firms" (Gordon 1981, 176). One does not have to know much economics to see that this statement is wrong. Consider an economy with two commodities, apples and oranges. When one moves to sum the supply of apples and oranges, in what units will output be measured on the horizontal axis? No such units exist that make economic sense. Sad to say, casual treatment of aggregate supply is common in macroeconomic texts, so it is unfair to single out Gordon.[1]

Ignoring the single commodity character of the neoclassical macro model is no minor omission. This characteristic of the synthesis model renders it incapable of dealing with important categories of economic relationships. At this point I identify two: 1) the process by which the demand for different commodities is matched with their supply in the aggregate, and 2) lags and changes associated with the production process, occurring between the sale of one period's output and the subsequent manufacture of the next set of commodities. Because there is only one commodity in the system, the price adjustments alleged to play such a central role in the neoclassical model must do their work outside of the market for commodities.

Before turning to the role of prices, it is necessary to reassess the variables of the model in the context of the aggregate production function. Income must be measured in units of a single commodity, which serves both as an article of consumption and is accumulated as the capital stock. Because income is the sum of consumption and investment, and also the sum of consumption and saving, these variables must be measured in units of the single commodity. If government enters the model, public expenditure and tax revenue are denominated in units of the single commodity.

The model takes its user a long way from the economy one observes. First, real commodities are produced with material inputs (other commodities), as well as labor, and their prices are the sum of materials costs and value added. This fundamental characteristic of commodities is rejected in favor of an abstraction that production occurs with fixed capital and labor alone, and that price is the sum of the components of value added. Second, many if not most exchanges are among businesses in a capitalist economy. In place of this, all exchanges are treated as sales from businesses to households. Third, every society is characterized by a multitude of products, each achieving its uniqueness by virtue of the labor process from which it arises. The neoclassical macroeconomic model simplifies to a one commodity world. This vision of commodity producing and exchanging societies is sufficiently at variance with reality that it is questionable whether it can be called a simplification of the complexities of the real world.

Broadly speaking, there are two methods for the construction of economic models. The first might be called "abstract-simplified". The theorist begins with the concrete as it appears and extracts what he or she judges, correctly or incorrectly, to be the most important aspects of reality. On this basis the actual economy is modeled in simplified form. The elaboration this type of model is a process of moving closer to the concrete, from the simple to the complex. To an extent, this method has an internal check, because the initially-selected elements should be abandoned if they cannot be elaborated to incorporate the complexities that were initially ignored.

A second method, used by the neoclassical school, is "abstract-ideal", though the synthesis literature prefers the term *a priori*. A model is constructed on the basis of simplifications that directly contradict reality; e.g., an economy with only one commodity. Elaboration involves developing the logical aspects of the simplifications rather than approaching concrete reality.

Understanding the method of reasoning is important, because many of theoretical difficulties of the synthesis model arise not from the complexities of reality, but from the contradictions of its internal logic. To put it simply, the problems that undermine neoclassical analysis come from the difficulty of understanding its concepts, not the difficulty of understanding reality. As a consequence, one tends to deal with purely theoretical problems: i.e., problems that arise because of the inadequacies of the model rather than the complexities of the phenomena to be explained. This approach is "ideal" because the elements of the model are creations of the mind, and their relationship to observed phenomena is not obvious. In this type of theorizing, actual outcomes enter only at the end of the process and are compared against the ideal constructions, usually in a statistical test.

2.2 Constructing the "real" system

In the circular flow the hypothetical neoclassical economy was one in which commodities were distributed without being produced. The implication of ignoring production should be clear. Assuming no production is an explicit endorsement of considering the world in terms of a single commodity that has no material inputs. It would be more accurate to call, $y = (k, n)$, a value added function rather than a production function, because its characteristics conform more closely to

$$Y = (\text{wages} + \text{profits}),$$

than to

$$Q = (\text{some collection of commodities aggregated in some appropriate manner})$$

With this in mind, the synthesis model can be specified with a supply side. The lower case letters now indicate that the variables are measured in units of the single commodity.

Commodity market:

$$y = c + i \text{ (aggregate demand)} \tag{1}$$

$$y = c + s \text{ (aggregate supply)} \tag{2}$$

$$c = \mathrm{c}(y),\ s = s\ (y) \text{ (consumption and savings functions)} \tag{3}$$

$i = i(r)$ (investment function) (4)

$y = y(k, n)$ (aggregate production function) (5)

$y'(n)$ = marginal product of labor

$y'(k)$ = marginal product of capital

Factor markets:

$w = y'(n)$ or $n_d = n_d(w)$ (labor demand) (6)

$n_s = n_s(w)$ (labor supply) (7)

$r = y'(k)$ (interest/profit rate) (8)

$k = k^*$ (supply of capital) (9)

$y = rk + wn$ (total income = value added) (10)

Relationships 1–3 and 5 have been explained. Relationship (4) specifies that investment is a function of the interest rate. The remaining five define the conditions for the markets for labor and capital. The symbols w and r refer to the wage and interest/profit rate, respectively, and k^* indicates that the supply (stock) of capital is invariant during the period under analysis. A well-known conclusion of microeconomic theory is, under conditions of perfect competition, businesses will minimize their costs when factors are paid according to their marginal products. This rule produces the demand schedules for factors, relations (6) and (8). The supply of labor is specified in terms of the wage measured in units of the only output (the "real wage"), of which it is an increasing function. The market for labor services is cleared when $n_d = n_s$. Because the capital stock is given, r is determined by the wage that equilibrates the labor market.

The last relationship (10) is the "adding-up" equation.[2] Previous assumptions, diminishing marginal productivity and perfect competition, plus constant returns to scale, yields $y = rk + wn$. Constant returns to scale imply that proportional increases in factor inputs yield the same proportional increase in output/income. This assures that output/income is exactly equal to factor payments when capital and labor are paid their marginal products. Proof of the adding-up equation is part of what is called "Euler's Theorem".

However, whatever may be the assumptions, there is a tautological aspect to the equality, $y = y(k, n) = rk + wn$. On the one hand, money income in the simplest case is by definition equal to value added, or wages plus profits. Factor income is just another name for value added. The relationship, value added equals wages plus profits, remains a definition when measured in real terms, by whatever method of deflation.

On the other hand, $y=rk+wn$ also holds by definition as a production relationship, since an "assumption" (constant returns to scale) is one aspect of defining a function. There is an important difference between the two equalities, though they appear as the same equation. First case, $y=rk+wn$ is a definition which carries with it no implications for the behavior of the economy. In the second case, the same equality involves a very specific view of how the economy operates: the demand for factors is determined by a single commodity production function; factor payments are set in perfectly competitive markets; and production of the single commodity is subject to constant returns to scale. There is the risk that a non-behavioral identity might be taken as evidence that the behavioral relationship is valid.

Tautologies or definitions have a respectable position in all sciences. In themselves they are unobjectionable. The problem with ($y=rk+wn$) is that there is no empirical way to distinguish its purely tautological character (value added) from its theoretic behavioral character (output of the single commodity). The basic difficulty, and source of endless confusion, is that in the synthesis model it is not possible to consider income without simultaneously meaning output, because they are the same thing. Not even in theory can one separate the purely tautological from the theoretic behavioral definition. This limitation becomes more serious later in the analysis when we discover that the behavioral definition is consistent only in equilibrium. The result is an equilibrium solution in which the key behavioral relationship, the clearing of the labor market, is indistinguishable from a tautology. The next section shows just how key it is.

Prior to showing this, a further relationship must be added to the ten equation model presented above. When I considered the demand side of the model, investment was exogenous. With the introduction of the aggregate production function this will no longer do, or the model becomes inconsistent. Assume a fixed real wage, w, measured in terms of the single commodity. On the basis of this wage rate, the demand for labor is determined, and with k fixed at k^*, the level of output/income is also determined. *Via* the consumption function, relation (3), the level of income sets the level of savings. This level of savings must be equal to the level of investment for commodity market equilibrium. If exogenous investment (i^*) is above or below the level of savings implied at the fixed wage rate, a logical inconsistency results. Should it be that $i^*>s$, then there is apparently excess demand, requiring an expansion of income to generate further savings, and the reverse if $i^*<s$.

The generation of income in disequilibrium is the multiplier process of the demand side model. However, more income/output will only be produced, given k^* and the production function, if the wage falls (law of diminishing returns). The multiplier mechanism presumes constant unit costs up to the vicinity of full employment, so no wage adjustment, real or monetary, is necessary for an expansion of employment. With the introduction of the aggregate production and its diminishing returns to labor, a fall in the wage rate (measured in the single commodity) must accompany any increase in employment. It follows that with the introduction of the aggregate production function, it is no longer possible to specify a simple scenario in which excess demand generates increases in output and employment.

The inconsistency does not arise when the consumption function and investment function are redefined to include the interest rate as a variable. The exogenous investment relationship is replaced with

$$c = c(y, r),\ s = s\ (y, r) \tag{3}$$

$$i = i(r) \tag{4}$$

With the new consumption function all variables are endogenous. In the absence of assumptions that restrict variables, the labor market determines the general equilibrium solution, with aggregate demand playing a passive role. When the wage measured in the single commodity equates the demand for and supply of labor, output/income is determined, at its full employment level by definition. If at this level of income saving exceeds investment, then the interest rate falls. The fall in the interest rate induces a movement along the savings and investment schedules such that the former decreases and the latter increases.

Since full employment was previously assured by the labor market equilibrium, an increase in investment induces no increase in output/income. The multiplier is zero. The consequence of the increase in investment prompted by a fall in the interest rate is to reduce consumption by an amount equal to the increase in investment, because aggregate demand cannot change. Should one begin at any point in the story other than the labor market, it would always lead to a level of output/income consistent with labor market equilibrium, which is full employment.

The characteristic of the "real" system that every variable's value derives from the equilibrium wage rate measured in the single commodity indicates a surprising anomaly in the model. The supply and demand for labor are specified independently of the interest rate. Consider the supply of labor. For a theorist inspired by the pre-marginalist economists, most prominently Ricardo and Marx, the absence of the interest rate is appropriate. In the pre-marginalist tradition, economic society is viewed in terms of classes. Workers sell their labor services because they have no capital and no prospects of obtaining any. Their income can be treated as wages only. Capitalists, on the other hand, are the owners of capital, and their incomes derive from profits and interest.

In neoclassical theory the population of economic agents is not divided on the basis of class. All agents have a certain "endowment", and while this endowment varies across agents, there is nothing in the theory to suggest that the population is divided among those who have capital and those who do not. Capital is acquired in the neoclassical world by deferring consumption (saving). Neoclassical theory is quite clear in arguing that whether one is a capitalist or a worker has no impact on saving behaviour,[3] even more, that the categories have no meaning. If workers save, then the neoclassical model implies that they must also invest. If they invest, they must receive interest and profit payments.

Because the supply of labor reflects the tradeoff between leisure and income, it must logically be a function of the interest rate, which partly determines income.

Yet no common or influential rendition of the neoclassical labor market in a macro context includes the interest rate as an influence upon the supply of labor. I can venture two explanations for this oversight. First, the neoclassical model in effect treats wages as a cost to the capitalist, a payment for a commodity like any other, and the worker is a commodity seller like any other. In so far as what workers sell is viewed as disembodied labor services, the interest rate is irrelevant. The rate of return on bonds, for example, does not in the short run have an impact upon how many apples a farmer sells on a given market day. Thus, the omission may arise from an analogy with commodity sellers in general, an issue pursued further in the next section.

The analogy is false. If an apple farmer can use the same resources to grow pears, how many apples are offered for sale will be determined by the relative price of apples to pears. Similarly, the seller of labor services is simultaneously a seller of "capital services" if he or she saves. In a neoclassical world workers should determine their offers on the basis of the relative price of labor services and "capital services". But this does not show itself in the model.

A second possible explanation for the omission of the interest rate from the supply of labor function is that this is a rare case in which neoclassical theory begins not from an ideal abstraction, but from an abstraction drawn from the world as it is. An overwhelming proportion of households in advanced capitalist countries derive no substantial income from sources other than wages (and public sector transfer payments). Therefore, the presumption that the decision of how much to work is not influenced by the interest rate or profit rate is a quite reasonable and empirically valid simplification. But when one makes such an abstraction based upon the world as it, the abstraction enters in an ad hoc manner into the neoclassical model, conflicting with the method of the theory. Ad hoc treatment of the supply of labor as independent of the interest rate is an implicit acceptance of the pre-marginalist view that people are divided between the owners of capital and those who have no source of income but the capacity to work.

To return to the principal theme of this section, the introduction of the aggregate production function into the synthesis model apparently brings total theoretical defeat of the argument that unemployment could result from insufficient aggregate demand, "effective demand" in Keynesian terminology. At this point the defeat is purely formal. It results from a system of simultaneous equations that yields a unique solution in which the components of aggregate demand are derivative from the determination of output/income in the labor market. Not yet discussed is the behavioral adjustment process by which this formal solution is reached. But an aggregate demand story can no longer be told once the neoclassical model has its supply side.

A labor market without constraints on the value of the wage measured in the single commodity implies that an increase in investment cannot generate an expansion of output/income and employment. One can go further and say that the neoclassical specification of the labor market partitions the model between the market for labor services, that determines output and employment, and the savings-investment market, where the interest rate determines the composition of aggregate demand. This treatment is quite close to that of pre-Keynesians, who tended to view these markets as separate. In the synthesis model there is a formal link, because savings, consumption, and perhaps investment are in part a function of the level of income. But this functional link between the labor market and the commodity market is of no significance, because income is held invariant at its full employment maximum, leaving only the interest rate to operate. I consider the implications of this approach for the theory of aggregate employment in the next section.

2.3 Equilibrium in the "real" system

The next step is to consider the mechanism in the synthesis model by which one moves from a hypothetical situation in which the labor market is not in equilibrium to one in which it is in equilibrium. The argument is clarified by first contrasting the variables used in a simple Keynesian-type analysis to those in the pure neoclassical model. Income/output, consumption, investment, saving, labor and capital are in both models. The first four of these assume both "real" and "money" values, though I have yet to show the synthesis transformation from the former to the latter. In both models calculations of the type, $C=pc$, $c=C/p$, are made, where C is the money value of consumption expenditure, p a price deflator, and c the "real" value.

The similarity is only apparent. In the Keynesian case, C is observed and directly measured consumption expenditure, p an empirically derived price index, and c the result obtained when C is divided by p. In this treatment, the C that we observe is the independent category, and c exists only as a calculation useful for policy purposes. In the synthesis model, the reverse is the case. The consumption component of aggregate demand has no direct empirical or observable analogue. It is the non-saving of households measured in units of the single commodity, determined by income (also measured in the single commodity) and the interest rate. It exists theoretically prior to the determination of C, and the latter, via a concept called "the price level", is the result of an arbitrary determined money supply (see Chapter 4). The same is true for savings, investment, and income itself in the synthesis model. This is another aspect of the "abstract-ideal" method of neoclassical theory. The basis of the model is a set of variables that are constructions of the theorist, not simplified expressions of what one observes.

In summary, Keynesian-type models are based on nominal variables. To keep to the same example as above, consumption expenditure in money units is a function of money income. Price changes complicate this relationship, requiring some deflation procedure. Therefore, c, "real" consumption expenditure, exists only as derivative from the empirical category, C, consumption expenditure in money terms. In the synthesis model, all flow variables are defined in terms of the single commodity, generated by the aggregate income/output function. Consumption in money units exists only as a derivative of "real" consumption.

No deflation is involved, merely a conversion of units, from the single commodity to units of money, with money as yet defined. This characteristic of the synthesis model, that its basic concepts are specified independently of money, is of particular importance to the analysis of labor market equilibrium. The nature of the labor market in the neoclassical model cannot be fully appreciated without grasping this point.

In the Keynesian-type, demand driven model there could be less than full employment equilibrium. In formal mathematical terms this is possible because the equilibrium condition is that aggregate demand equal income/output. This equilibrium is based implicitly on a presumption of constant unit costs in production. In the synthesis model this type of equilibrium is excluded by the more fundamental condition that the demand for labor must equal the supply. While this is a formal mathematical condition, it implies a vision of economic behavior radically different from that of Keynes and the Keynesians. For Keynesians, economic agents are viewed as income constrained. For households, this means that their incomes are given in the short run, and income constrains their consumption decisions. In the case of businesses, the decision to set the level of output is constrained by anticipated sales.

Implicit in the neoclassical specification of the labor market is a reversal of the Keynesian constraint. For households, income is not given; it is a decision variable. The constraint is the wage, fixed in units of the single commodity. On the basis of the wage households determine their optimal mix of work and leisure. Analogously, businesses are presumed to believe that they can sell as much as they wish at the prevailing price. All agents are "price-takers". The demand and supply schedules for labor can be specified without reference to the price of the single commodity in monetary units. Some have called these "notional" schedules, meaning the quantities of labor demanded by businesses and supplied by households on the presumption that expectations will be fulfilled and all markets will clear. To put the matter succinctly, notional demands are the demands generated by general equilibrium full employment.

With a single commodity and no money, the labor market is cleared through barter exchange. The "real wage" is a certain amount of the single commodity, for which workers barter their labor services. Treating the exchange between capital and labor as barter is central to the equilibrium solution, because it makes the calculations of both workers and capitalists extremely simple. The reward for work is a certain amount of the single commodity, and the cost of hiring labor is the same. Further, labor services are sold in a manner completely parallel to the way capitalists sell their produced commodities.

Consider a situation in which the demand for a commodity is less than its supply at the prevailing price. Neoclassical theory has a particular story to tell. If the market for the commodity is a competitive one, sellers will respond by reducing their offer price. If the demand for the commodity is negatively related to price and the supply positively related, the consequence of reducing the offer price will be to eliminate the initial excess supply. This apparently simple adjustment process is considered in more detail in the next two chapters with reference to Walras' Law.

In anticipation of that discussion, it can first be noted that the onus for adjustment falls upon the seller in the case of excess supply. Figure 2.1 shows this in a four part presentation of the equilibrium solution of the simplest version of the

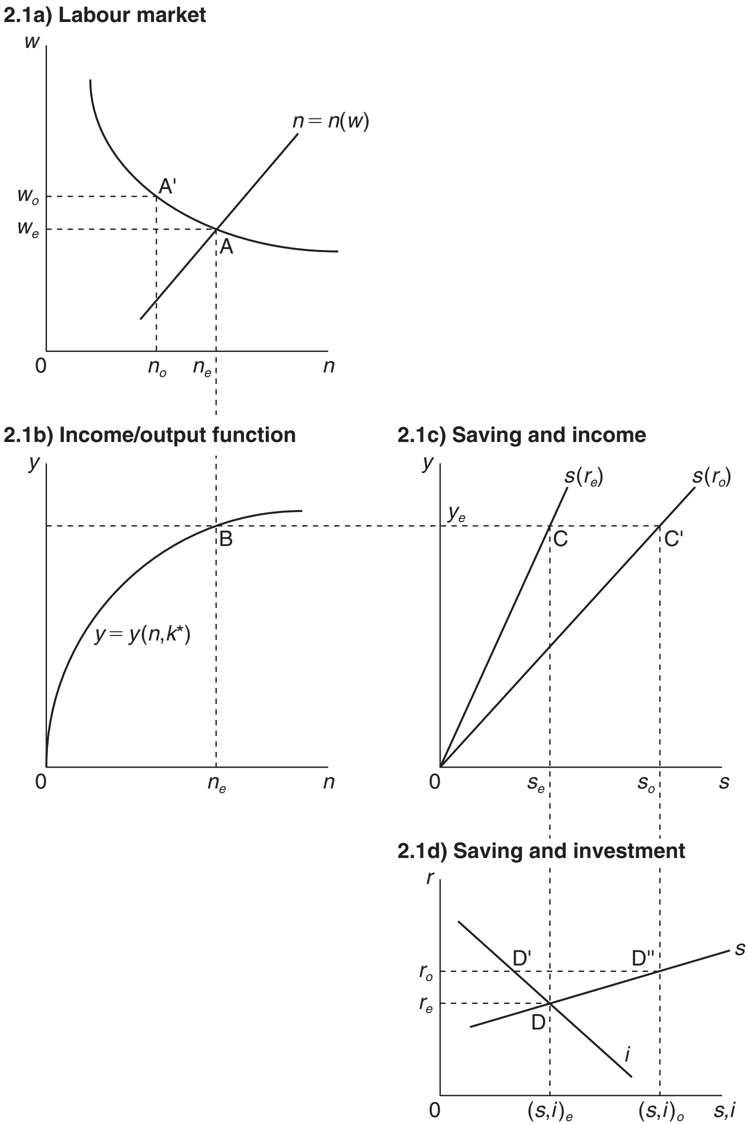


Figure 2.1 General equilibrium in a single product barter model.

neoclassical model.[4] The diagrams make only one change from the equations previously specified, that investment is a function of the interest rate only. Nothing important is lost in the logic of the model by making this simplification, as shown in the discussion of parts (c) and (d) of Figure 2.1. The diagrammatic technique used is a common one, and the labor market is presented first, at the top of the page. Putting the labor market first is singularly appropriate because its equilibrium condition determines everything else. Indeed, the savings–investment relationship enters as little more that an afterthought.

Part (a) of the figure shows an equilibrium point A at which the supply of labor and the demand are equal. This determines the full employment level of output. While there are points to the right of the employment level n_e, and output levels above y_e in part (b), these do not exist even conceptually. Should the wage be above w_e, employment is determined by the demand curve, because the aggregate optimizing rule requires that the marginal product of labor equal the wage. If the wage is below w_e, the employment level is determined by the supply curve. Any wage, above or below the equilibrium, results in a level of employment and income/output less than the full employment level.

I have used the term "wage" repeatedly, and it is necessary to be precise about its meaning. Invariably in the context of the neoclassical model the variable on the vertical axis in Figure 2.1 (a) is identified to measure the "real wage". This is imprecise language, even misleading. Almost without exception, the neoclassical macro model involves only one commodity. Therefore, the variable w is necessarily measured in units of the single commodity, and is correctly referred to as the commodity wage. In the present context with no money, "commodity wage" and "wage" will be used interchangeably. When money is introduced the practice will not be justified.

With terms clear, consider the situation in which the commodity wage is momentarily above the equilibrium level, ($w_o > w_e$). At such a wage the supply exceeds the demand, with employment set by the latter. Were this wage to prevail, some labor would be unemployed (n_o to n_e), and y would be determined below y_e. In the synthesis model a situation with an excess supply of labor results in a fall in the wage. The argument is as follows: workers have a commodity to sell, labor services; when they are unable to sell all the units of this commodity that they wish at the prevailing price, they reduce the offer price until the amount they wish to sell matches demand.

An analogy with a producer of commodities is implied. For example, a farmer takes his or her potatoes to market and makes an offer. Unable to sell all of the potatoes, he/she offers them at a lower price, and continues to reduce the offer price until all are sold. This behavior forces other farmers to reduce their offer prices. Workers are presumed to act in the same fashion.[5]

There is a problem with the analogy, however. In the case of the farmer, it is credible to assume everyone to have similar production conditions and share of the market (infinitesimally small for perfect competition), such that each will be in a similar market position. Either all will find that they can sell all of their potatoes (with the market in equilibrium or in excess demand), or all will be burdened with potatoes they cannot sell. In this hypothetical situation, all sellers will be motivated to do the same thing, reduce the offer price of potatoes. Or, at least, such behavior is a logical possibility.

However, without additional assumptions one can not treat all workers as being in the same situation. Even if all workers were alike, an excess supply of labor would be characterized by most workers successfully selling the amount of their labor services which they wish to sell. Except in depression conditions only a minority of the labor force would be unsuccessful in doing so

While an excess supply of any non-labor commodity can reasonably imply disappointment on the part of the vast majority of sellers, excess supply of labor services is consistent with contentment for the vast majority of sellers. Further, the equilibrating adjustment which would eliminate the excess supply of labor services, a lower wage as measured in the single commodity, would leave the vast majority of satisfied sellers unambiguously worse off because they would work longer hours with less remuneration per hour.

This contrasts with the situation of the seller of a non-labor commodity who, while losing from the fall in price, gains from the rise in quantity sold. No such gain goes to the worker, who sells his commodity in an all-or-nothing package.[6] A higher level of employment in general means more workers employed for a longer time period, but at a lower wage. With these differences between workers and other commodity sellers in mind, why should the contented sellers of labor services lower the offer price which has secured them employment?

In order to achieve the clearing of the labor market, assumptions must be introduced that allow workers as sellers of their labor services to be identical to sellers of other commodities. At least two possibilities present themselves. First, one can contradict the real manner in which work is organized and contracted, and assume that workers, like potato growers, sell their services bit-by-bit, so that a 10 percent rate of unemployment, for example, can be viewed as each worker suffering from selling less than he/she wishes. Alternatively and equally counter to reality, it can be presumed that employment contracts are for an extremely short period of time, coinciding with the market period. In this case, each market day dawns with all workers without jobs and all businesses without workers. The second is the ideal abstraction made in the synthesis model, and labor market equilibrium is dependent upon it. Keynesians have sharply attacked the neoclassical treatment of the labor market (see Chapter 11).

With the nature of employment redefined to conform to the needs of equilibrium, the schedules in Figure 2.1(a) take on specific meaning. If the prevailing wage is w_o, the demand for labor will be n_o corresponding to point A′ on the demand schedule. This amount n_o is not the level of employment. It represents the job openings that businesses would offer at such a wage. It is not correct to interpret the horizontal distance from the demand curve as "employment", nor the horizontal distance from the demand curve to the supply curve as "unemployment". To use the term introduced earlier these are *notional* offers, made in the context of a logically necessary equilibrium solution. Were it possible to treat point A′ as the representation of an actual hiring process that left a certain number of workers disappointed, the logic of the equilibrium solution would be contradicted.

Armed with equilibrium in the labor market, the solution can move on. The full employment level of income/output implies a level of savings for a given interest rate, shown in part (c). If the interest rate is r_o then savings exceeds investment, by amount D′D″ (part d). The excess supply of savings leads to a fall in the interest rate, which brings about $i=s$. The fall in the interest rate rotates the homogeneous savings–income schedule to the left. The last two parts of Figure 2.1 clarify another characteristic of the synthesis macro model: the difference between consumption and investment is purely formal. Both are positive functions of income and negative functions of the interest rate, though any income influence on investment is not shown in Figure 2.1.

In the writings of Keynes and those influenced by him, consumption and investment expenditures are differentiated in several ways. First, the two types of expenditure are carried out by different agents, with different motivations and different purposes. This is completely eliminated by making both a function of the same variables, specified in general form.[7] Second, and on the basis of the first distinction, Keynes and later writers argued that investment is more volatile than consumption, which justifies treating investment expenditure as key to the explanation of economic instability. This also is lost when both are specified as functions of the same variables. And third, in static equilibrium with only one commodity, investment plays no role as a creator of productive capacity, its last claim to distinction once its role as an independent component of aggregate demand is excluded.

The theoretical decision to drop any meaningful distinction between consumption and investment also implies dropping the distinction between consumption and saving, and saving and investment. In the Keynesian view, saving is income not currently spent by households. In the strictly neoclassical treatment it becomes that portion of income spent under the name of investment. And investment expenditure itself represents the portion of the single commodity that is not consumed in this period. It is carried over into the next period, where it is lost from view. In this context the interest rate has a very limited and restricted meaning. Because there is only one commodity, variations in the interest rate by definition have no impact upon the composition of output.

The role of the interest rate, given output/income at its full employment level, is to set the division of income between consumption and savings, and the division of aggregate demand between consumption and investment. The latter division, however, is only semantic, merely two words for expenditure on the same commodity. To the extent that these two words imply any theoretical difference, "consumption" refers to expenditure that results in immediate use of the single commodity for personal gratification, while "investment" involves buying the same commodity but carrying it forward into another period. Since not consuming something in the current period means saving it, investment and saving involve the same act in the model.

If this is the case how does one justify having two words to describe the same thing (not consuming now), and associating the two words with different mathematical functions, i.e., $s=s(r)$ and $i=(r)$? This apparent redundancy is eliminated with the introduction of the IS function, as shown below. The redundancy can be justified in the present context by recalling the discussion of the circular flow. In that flow diagram, some households lend and others borrow. Because the equilibrium solution can be reached on the basis of "real" variables, the borrowing and lending must be in units of the single commodity. Borrowing involves some households deciding to consume more now and less later, while lending implies the reverse.

In the neoclassical macroeconomic model the discussion of saving and investment proceeds with no reference to the capacity-expanding effect of investment. The analysis can restrict itself to savings alone, and frequently does. Omitting reference to investment makes the model considerably more comprehensible for it eliminates at least two nagging contradictions: how two different categories of expenditure, consumption and investment, could relate to the same commodity, and how a system could be in equilibrium with unchanging aggregate demand but expanding capacity. The diagram reveals another characteristic of the model. It is equivalent to a circular flow with a consumption commodity only, analogous to a community of squirrels that makes no investment but sets aside nuts for the future. The interest rate reflects the trade-off between nuts for present and nuts for the future.

2.4 Clearing away the fog

It should be clear from the preceding discussion that unemployment in the usual sense of the term is impossible in the synthesis model. Assumptions are made to ensure that the labor market will automatically achieve an equilibrium that involves full employment by definition. If the wage measured in the single commodity rises above its full employment value, neoclassicals call the resulting fall in the level of employment "voluntary" unemployment. The level of employment is determined by notional demand and supply curves, and an increase in the wage can only be the result of workers reducing their notional supply of labor. What appears as idleness, workers without jobs, is revealed to be a choice of leisure rather than work.

This is a powerful political and ideological message: changes in the level of employment are the result of the work–leisure preferences of workers; they do not result from any systemic malfunctions of the market system of production, distribution and circulation. This conclusion is inherent in the one-commodity model. The abstract-ideal assumptions governing the labor market are unnecessary to reach this ideological conclusion; nor is any mathematical specification of equilibrium conditions required. These provide faux-scientific respectability, and give a barter system the superficial façade of an exchange economy. The ideological importance of the assumptions and mathematics is to demonstrate that the full employment solution is unique and "optimal".

The term "*in*voluntary unemployment" refers to a situation in which some members of the labor force seek jobs at prevailing wages or even lower than prevailing wages, but are unsuccessful in finding them. If workers are in this situation, willing and able but unsuccessful in finding jobs, then their failure must be because employers are unwilling to offer sufficient work, at prevailing or less than prevailing wage rates. Employers will be unwilling if they believe that the output which additional workers would produce could not be sold profitably.

In this situation workers and employers face a "demand failure". When a seller perceives a demand failure, the notional demand for labor curve, the basis of neoclassical labor market analysis, is no longer relevant. The necessary condition for a demand failure is that the producer must sell his or her commodity. This condition is excluded from the neoclassical model by the nature of its assumptions; demand failures are not logically possible. They are ruled out because the model involves no sale of the commodity in the accepted sense. One portion of the output of the single commodity is bartered directly with workers for their labor services. This is not a sale, but a barter exchange for services rendered. It is inseparable from the decision that sets the producer's optimal level of employment. The producer can harbor no uncertainty about how much will be sold to workers, for the employment decision guarantees the "sale". If, for some reason, workers were to refuse a barter-wage offer, this would simultaneously mean that the level of output implied by that offer would not be produced.

Since there are only workers and profit receivers in the model, that proportion of output/income that does not go to workers is retained by the producer – it is not even bartered. Because there is no lag between the circulation of the single commodity as an item of consumption or investment and its distribution, there is no theoretical difference among income, demand and output. In this model, output is not bought and sold. It is divided into two forms of income, wages and profits.

In actual capitalist economies, there are three distinct stages, or "moments" as Marx called them: production, when commodities are created; circulation, when these commodities are exchanged and reach their users; and distribution, when the money received in exchange corresponding to the value added in the commodities accrues to various categories of income recipients. In the neoclassical "real" system, these three stages are one. They are considered in timeless equilibrium, with no theoretical distinction among them. The production function is simultaneously a value added function such that (production = distribution). The exchange between capital and labor is simultaneously the sale of the product, so (distribution = circulation). There is no theoretical space in which an insufficiency of aggregate demand can appear.

The first necessary condition for demand failures is that the sale of the producer's product not be a direct act of distribution. The second necessary condition is that the producer's output not only be a vendible article,[8] but also that it *must* be sold. If the producer can keep the product for her/his own use, then no demand failures are possible. Except in the case of self-employed producers who assemble their inputs without significant monetary exchange, the first condition implies the second.

If employers of labor sell their product to anyone other than their own workers, the workers must be compensated for their work with something that will allow them to obtain the products of employers other than their own. This "something", a general medium of exchange for the products of sellers, is by definition money. Once the employer of labor has paid out money to workers as a condition for obtaining their working time, the employer must exchange her/his product for money, or the production cycle cannot be repeated.

To repeat, the necessary conditions for demand failures, and, therefore, involuntary unemployment, are absent in the neoclassical model. The commodity is never sold; it never has to face the test of the market, lonely and uncertain without a guaranteed recipient. At this point, I can note that my terminology has been inaccurate. I used the term "commodity" to refer to the single output of the synthesis model. In order that the words "product" and "commodity" not be synonymous, I shall make explicit definitions. A product is the result of a process of production. A commodity is a product that is produced for the purpose of selling it, and must be sold if the producer is to continue in her/his role as a producer.[9]

This was the definition of a commodity used by the Classical economists (particularly Marx and Ricardo), and the usefulness of the definition should be clear. At the most fundamental level, the synthesis model precludes involuntary unemployment because it is a theoretical formulation without commodities. In the theory there is no difference between those products produced for self-consumption and those produced for the purpose of selling them, and the basic difference between private consumption and private production in a capitalist economy is obscured. The neoclassical macroeconomic model fails to include the essential character of a market economy, commodities.

3 Comparative statics and equilibrium

3.1 Statics, dynamics and general equilibrium

In the previous two chapters a simple definition of "equilibrium" was used: markets are in equilibrium if there is neither unsatisfied demand nor unsold supply. In anticipation of the introduction of money into the analysis, a more precise definition is required. For the rest of this book, the following, strictly neoclassical definition will be used:

> A market or set of markets is in equilibrium if the agents participating in that (or those) market(s) have no cause to alter their plans of how much they desire to buy and sell.

This chapter and the next require brief discussion of two related matters that implicitly rise in the real solution to the synthesis model. The first is the distinction between models in which the variables reach steady-state values and models in which the variables are changing. Following convention, I call the former static and the latter dynamic models.[1] The discussion of the preceding chapter involved static analysis, in which variables seek steady, unchanging values implied by a set of parameters such as the production function and consumer utility functions.

Assuming a change in one of the arbitrary parameters and pursuing the implications is comparative static analysis. The usual result of this analysis is a new equilibrium solution with the variables again at rest. Equilibria have three aspects, existence, uniqueness, and stability. I shall rarely refer to the second two, assuming that if an equilibrium solution exists, it is unique; i.e., there are no others for the given set of parameters. The stability of equilibria is also assumed. These simplifying assumptions imply that given the parameters of the model, if a variable is "disturbed" from its equilibrium value, it will return to it, not diverge further.

Discussions of equilibrium adjustment fall into two categories, partial and general. Veterans of introductory courses in economics would be familiar almost exclusively with the former. The usual supply and demand analysis involves consideration of a partial equilibrium solution. The demand curve for a particular commodity, for example, is constructed on the assumption that the income of all consumers in the market and prices of other commodities are fixed. These, along with other assumptions, allow one to draw a curve in two dimensions, in which quantity is a function of price. Maintaining these assumptions, one can deduce the new equilibrium price when the demand changes.

The analysis is partial because the change in the price of the commodity under consideration will affect the demand curves for other commodities, which are constructed on the assumption that the price of the first commodity is fixed. When these demand curves shift, their change will feed back on the demand for the first commodity, shifting the price away from the partial equilibrium solution in which such feedbacks were ignored. Strictly speaking, partial equilibrium solutions are inconclusive even for the direction of movement of price and quantity.

An analysis that incorporates feedback effects as they ramify through all markets results in a general equilibrium solution. It has its basis and inspiration in microeconomics, and plays an important role in synthesis macroeconomics. The synthesis model is one of general equilibrium, in which there are feedbacks among several markets, and analysis of any market taken alone is partial.

With the distinction between partial and general equilibrium analysis explicit, we can look back and see that the treatment of the real solution was partial. First, the labor market was considered, and equilibrium established there with no reference to any other market. This was possible because no variable could feed back upon the labor market. Because the model had no money, there was no price level and, therefore, no money wage that could be influenced by events in the market for commodities.

This is the essence of the *Classical dichotomy*. The labor market stands alone, achieving solitary equilibrium. The absence of feedbacks from other markets is the result of the complete dichotomization of real and nominal variables. Once money is introduced, it is no longer possible to treat the labor market in isolation. The labor market is the keystone of the model. With the introduction of money, the price level becomes a variable, and the real wage is not the simple w, but W/p, where W is the money wage and p the price level. To be precise, the so-called price level is nothing more than the price of the single commodity.

It is necessary to write "so-called" price level for reasons explained below. In the context of the synthesis model, even apparently unproblematic concepts are converted from commonsense to nonsense, and the "price level" is perhaps the best example. However, revealing the problems with this term first require treatment of the closely related concept, money, which is done in the next chapter.

Once money intrudes, disequilibrium in the labor market is not eliminated by a movement in the real wage as such, but by adjustment of W or p, or both. The real wage does not exist independently of the two nominal variables W and p. As shall be clear later, the "price level" is determined by relationships that do not directly operate on the labor market. As a consequence, the synthesis model with money, even in this simple form, requires an explicit general equilibrium solution. The values of all variables are determined simultaneously, not sequentially as was the case without money. While the labor market remains the basic determinant of the general equilibrium solution, it is not valid to consider it in isolation once one includes nominal variables. It is for this reason that general equilibrium analysis is treated in some detail in Section 3.3. Prior to this, it is first necessary to deal with potential confusions arising from the relationship between equilibrium adjustment and the conceptual treatment of time in the neoclassical model.

3.2 Confusions of logical and chronological time

The distinction between the "short run" and the "long run" is commonly encountered in neoclassical economics. It can be a source of endless confusion unless clarified. The precise meaning of these terms, and the only meaning that is free from serious ambiguities, comes from microeconomics. The short run is a period of time during which the capital stock is treated as unchanging; it is "given". This is the precise sense in which the macroeconomic model of the previous chapter was "short run", because it assumed $k=k^*$.

In microeconomics the long run is not a time period. It is a "planning perspective". In the long-run perspective, the owner of each firm is presented with a range of alternative production facilities, all using the same technology, each of which differs by the size of the capital stock. To anyone unfamiliar with neoclassical economics it may seem absurd that the "long run" could be associated with no technical change. It is absurd, but an absurdity with a purpose, to demonstrate the existence of a stable competitive equilibrium (Weeks 2010, Chapter 8).

The long-run analysis requires the theorist to specify the determinants of the decision of the optimal plant size. For this reason, the locus that traces out the minimum unit cost levels for each output is often and most correctly called a "planning curve". In textbooks on microeconomic theory it is common to encounter the statement that in the short run labor is variable and capital fixed, and in the long run both (or all) factors are variable. Strictly speaking, such a statement is incorrect or at best misleading, for it suggests that the two concepts, short run and long run, are both logical abstractions from chronological time, differing only in duration.

The term "long run" does not refer to time in any sense, but to alternative choices. The short run is a concept of time explicitly chronological in nature. Theoretical or hypothetical processes occur in the short run: the output decision is made by the firm, prices change, demand and supply curves shift, for example. In other words, the short run is a logical time period in which the actions of economic agents are realized. In the long run nothing can occur, for it not a time period, it is the perception of alternative short-run situations into which the firm can place itself to act.

Strictly speaking there is no such thing as a static long-run model. If the capital stock is given, the analysis is short run. If the capital stock is changing, one is dealing with growth theory, in which the terms short run and long run have no clear meaning. The short run/long run distinction refers to static analysis, and all static equilibrium models are short run. What, then, is one to make of a statement such as the following?

> The neoclassical full [employment] equilibrium is a useful reference point for the study of more realistic descriptions of macroeconomics. We should expect it to converge to the neoclassical equilibrium in the long run.
>
> (Dornbusch and Fischer 1983, 367)

This is an example of loose use of precise terms that results in considerable confusion. A similarly incorrect statement is the judgment that “the Quantity Theory of Money is a long-run relationship”. Such statements have no theoretical status and fall into the category of what Leijonhufvud calls a “fudge-phrase” – vague use of precise terms is employed to gloss over points at which the analysis becomes problematical. On the basis of the generally agreed, precise meaning of short run and long run, nothing can converge in the long run, because events occur only in the short run by definition.

If a statement such as the one above refers to real time, i.e., it is an empirical assertion, then it is unacceptably simplistic. The neoclassical full employment equilibrium, to take the example in the quotation, is based upon an analysis without technical changes, no uncertainty, no change in consumer tastes, and no random shocks. It is simplistic to the point of absurd to suggest that a model excluding these influences yields a definitive prediction, full employment, about the actual course of events in the real world over a given period of chronological time.

There is another interpretation of the terms short run and long run. Neither an empirical prediction nor a rigorous theoretical statement, they could refer to what happens in a successive series of short-run situations after a parameter change, such as an increase in the money supply, causes a deviation from equilibrium. In other words, after the “shock”, the model seeks equilibrium again when everything has “shaken down” and sorted itself out. This would seem to be the implication intended by authors of such statements. Such an implication is an invalid, spurious attempt at realism.[2] Short-run static models exhibit their equilibrating tendency in a single instantaneous moment or not at all. To hold the capital stock and other parameters constant, then to refer to “long-run” tendencies is to mix an abstract theoretical process with real world processes. It contradicts the assumptions of the model. The result is an inconsistent statement that has no theoretical content.

For this reason, there will be no reference to the “long run” in the subsequent discussion of the synthesis model, except in the precise sense in which it is used in microeconomic theory. The concern is not whether the neoclassical model tends to full employment in some vaguely specified “long run”, but whether given its assumptions it tends towards such equilibrium in the short run. This approach allows for a strict separation of theoretical generalizations and empirical predictions. In the previous section the nature of equilibrium solutions and adjustments were clarified, and in this section it was shown that static equilibrium solutions are by their nature short run. The process of equilibrium adjustment itself can now be treated.

3.3 Equilibration of markets

Prior to introducing money into the synthesis model, it is necessary to pursue further the process of general equilibrium adjustment. I demonstrated an equilibrium solution for the real system in Chapter 2. It appeared to be a theoretically simple process to transform the real values into nominal ones. The stage seemed set for the entry of the quantity theory of money or some variant thereof to provide a façade of a monetary economy. Most textbooks would introduce the quantity theory at this point and quickly make the transformation of real into money values. However, the introduction of money implies that a new method of solution is necessary, that treats all markets simultaneously, *general equilibrium*.

Money requires abandoning the simple sequential treatment of market clearing. The solution to the model in the previous chapter came directly from the labor market. If the labor market is considered in isolation, no concept of money is necessary. In a one-commodity world, employers barter the output of their enterprises directly to the workers who with the fixed endowment of capital produce that output. In this formulation money plays no role.

While actual commodity-exchanging economies invariably involve money, this is not a theoretical justification for introducing the concept. Actual economies possess many characteristics that the neoclassical macro model never incorporates; an obvious example is intermediate inputs. These are excluded on the grounds that they are not relevant to the problem at hand. Why, then, is it relevant to introduce money? What theoretical problem is raised that leads one to consider the role of money?[3]

To answer that question, recall that the real system has two markets. First, there is the labor market with its demand for labor derived from an aggregate production function. Second, there is the market for the single commodity, in which the commodity is distributed between current and future consumption by the interest rate. In disequilibrium states, it is apparently possible for one or both of the markets not to clear.[4] In such hypothetical circumstances, some agents (buyers and sellers) are disappointed. If a seller is disappointed, this can take no observable form without money. Disappointed buyers have money that they wish to spend but cannot; disappointed sellers have a commodity they seek to convert into money but cannot.[5]

Money functions to accommodate the possibility of disappointed buyers, and, therefore, disequilibrium in general. This role of money reveals the simplistic analysis of labor market equilibrium in the real system. Because that market was analyzed as a barter exchange, it is not possible in a meaningful way to consider disequilibrium adjustments when more than one market is not cleared. Once disequilibrium conditions are allowed and the model confronts the need to introduce some concept of money, the analysis is led logically to Walrasian general equilibrium adjustment and Walras' Law.

Walrasian market analysis seeks to solve the following problem. Consider a situation in which workers have a notional supply of their services (what they wish to sell), and they face employers who have a notional demand for those services (what they wish to buy consistent with minimizing costs). Assume that a portion of the potential workforce enters into a bargain with the employers at a money wage that is above what would be the full employment equilibrium wage. When the contract is implemented, workers must formulate their expenditure decisions on the basis of their negotiated incomes, which are now decision parameters. The resulting expenditure will generate an aggregate demand that is less than employers' notional offer of sales. This in turn will induce employers to cut back hiring. This is the Keynesian multiplier process described in Chapter 1. The multiplier process can be interpreted as the quantity adjustments resulting from trades negotiated at disequilibrium prices, sometimes called "false" prices (Leijonhufvud 1968, 211). If some trades occur at disequilibrium prices, there is no guarantee that full employment equilibrium will be achieved.

When "false" trading occurs, prices of some commodities become parameters in markets of other commodities. These "false prices" prevent simultaneous clearing of markets. "Simultaneous" is the key and precise word, and euphemistic terms such as "continuous market clearing" are misleading attempts at realism.[6] It is not sufficient that disequilibrium trades converge toward equilibrium prices in some or most markets. Achieving the general equilibrium solution requires that without exception *no disequilibrium trades occur*. All markets must clear instantaneously and simultaneously, or permanent divergence from equilibrium results.

To ensure simultaneous clearing, markets must be constructed in accordance with the principles of Walras. In Walrasian general equilibrium models the analysis is confined to an instantaneous moment sometimes called a market "day", that begins after the production of all commodities. All agents arrive on the market day in possession of a bundle of commodities, which is their "endowment". Their purpose in the market is to maximize their utility through trading. The market operates under rules that forbid any disequilibrium trading, to ensure that all agents leave satisfied. All markets clear, with no excess supplies or excess demands for commodities.

Two assumptions create the appearance that Walrasian models are an analytical advance compared to the simpler assumption that markets are always in general equilibrium. These are the Walrasian auctioneer and Walras' Law. The "auctioneer" plays a role that was implicitly invoked in the previous chapter. Metaphorically standing at the centre of all traders, the auctioneer hears alternative offers and is vested with the power to seek accommodation of all notional demands and supplies, and to prohibit any trades at non-equilibrium prices.

With the omniscience to know when each and every trader is content or disappointed, the auctioneer aids the market participants in groping for the set of prices that will clear all markets simultaneously. The French word *tatonnement* is sometimes used to summarize this process. The auctioneer calls out lower prices when he perceives a market with excess supply and higher prices for excess demand. The auctioneer cannot directly observe these excess supplies and demands, though this is not a serious drawback since the auctioneer is imaginary. With a prohibition against disequilibrium trading, excess supplies and demands cannot manifest themselves in exchanges.

Actual markets do not have auctioneers except in very specific circumstances, and real auctioneers do not behave in the Walrasian manner. Where auctioneers exist, they serve to facilitate whatever trades agents momentarily decide, not only equilibrium trades. Further, markets are not in practice cleared simultaneously, but sequentially, with or without an auctioneer. The Walrasian rules of market clearing are another example of what I identified in the previous chapter as "abstract-ideal" theorizing. Nothing remotely resembling a Walrasian market exists in any exchange economy, yet such markets are taken as the basis of neoclassical general equilibrium models.

The functional role of Walrasian markets in neoclassical theory is obvious. These ideal assumptions serve as a superficial justification for the ideology that economic agents operate with perfect knowledge and foresight of market conditions. In effect, Walrasian markets eliminate the possibility of any disruptions due to unforeseen circumstances. Because disequilibrium trades are excluded by assumption, general equilibrium is established by assumption. An implausible idea, equilibrium in all markets for all trades, is justified by an even more implausible and more complicated mechanism, the Walrasian auctioneer. Walrasian general equilibrium theory, associated with quite intricate mathematics, has no analytical content.

It is an interesting sociological phenomenon that such a patently absurd view of market adjustment should be incorporated into mainstream economics and generally accepted. This absurdity is formulated as the norm, and what actually occurs as a deviation from the norm. Since 1935 exchanges at prices other than the general equilibrium set have been called "false trading" (Hicks 1939, 119ff.). This terminology is quite extraordinary. What real buyers and sellers actually do is "false", and by implication what imaginary buyers and sellers do under stylized circumstances that could never be approached in practice is "true".

One has entered into a quasi-religious realm, in which the observed world is judged in reference to an ideal construction of the mind. The coming chapters will show how powerful the ideal is. The implication of Walrasian markets is that prices adjust with "perfect flexibility" to excess demand and excess supply. The post-Keynesians have attacked this treatment of market adjustment with considerable vigor (Dymski 2006). It might seem that reference to the actual workings of markets lends strength to their arguments. But one discovers that the entire burden of proof is placed upon the post-Keynesian critics to demonstrate that prices do not adjust instantaneously, with the Walrasian position taken as established.

Leijonhulvud has called such an inversion of reality an example of a "tribal myth" of the economics profession (Leijonhufvud 1981, Chapter 7). Placing the burden of proof upon the critics of neoclassical market theory is reminiscent of the position of the Catholic Church during the Copernican revolution. While direct observation made it obvious that heavenly bodies did not move around the earth in perfectly circular orbits, all burden of proof fell upon the critics to show why a geocentric theory was not valid.[7] Ultimately the weight of evidence forced the defenders of a geocentric solar system to abandon their position. Neoclassical economics has proved itself considerably stronger in the ability to deny reality.

In a Walrasian market excess demands and excess supplies are subject to Walras Law. The Law states that the sum of all excess demands and excess supplies over all commodities including money must be zero. The Law does not require each commodity to have an excess demand of zero. This would hold only in general equilibrium. Rather, the Law states that the sum of all positive excess demands will be exactly matched by the sum of all negative excess demands. The Law provides a simple relationship between commodities and money. If the sum of all excess demands is zero, then the excess demand for all commodities taken together must be exactly equal to an excess supply of money. By Walras' Law, where *XD* stands for excess demand in money units (price multiplied by quantity),

$$(XD \text{ for commodities}) = -(XD \text{ for money})$$

The Law can be understood as expressing the nature of the general equilibrium that neoclassical economics seeks. Consider a static situation in which there is excess supply in the market for a particular commodity, which implies excess demand elsewhere. For this market to clear, the price of the commodity in question must change. When the price of that commodity changes, the trading situation in other markets will be upset. The price will rise for some commodities and fall for others. If the market for the first commodity is cleared, this is achieved by creating repercussions in other markets. Whatever repercussions occur, Walras' Law ensures that overall, the money amount of what sellers cannot sell will be matched exactly by the money amount that buyers cannot buy.

The importance of Walras' Law in neoclassical economic theory cannot be exaggerated. Even if the theorist never allows disequilibrium to manifest itself by considering only notional disequilibrium,[8] Walras' Law is a necessary element. While disequilibrium models are constructed in which Walras' Law does not hold, general equilibrium models are never without the Law or some variant of it.

The equality between the excess demand for commodities and the excess demand for money seems reasonable enough. Under certain circumstances, this equality could be interpreted as a tautology. Commodities are produced to be sold. If commodities go unsold, then someone did not buy them. The money value of the unsold commodities for the seller must be equal to the money value of those commodities for the non-buyer, because the two amounts refer to the same thing.

However, considerably more than this is involved, for the Law is defined for *notional* demands and supplies and over all markets. The equality represents an assertion that for every disappointed seller there is simultaneously a disappointed buyer, and the two are anxiously awaiting the call of the auctioneer to reconcile their differences. This implies that an excess supply of commodities is not balanced by a mere sum of unused money, but by a sum of money in the hands of a potential buyer actively seeking to trade. This in turn implies that a general "glut" of commodities over all markets cannot persist if prices are Walrasian flexible. The potential to eliminate such a glut is always present, awaiting only the smooth functioning of the auctioneer's pricing mechanism.[9]

The reader familiar with microeconomics will have realized that Walrasian general equilibrium is the precise formulation of what is usually called "perfectly competitive equilibrium". When that concept is introduced to the student of economics, he or she is told that this equilibrium occurs when there are a large number of buyers and sellers of homogenous products, and producer cost curves are appropriately shaped. Alternatively, it is said that perfect competition results when buyers and sellers are "price takers"; i.e., they presume that they can buy or sell any amount they desire at the prevailing price.

The discussion of Walras' Law shows that "perfect competition" is a considerably more problematical concept than as usually presented. Buyers and sellers will only be price takers if there is an auctioneer. In the absence of an auctioneer, agents would on their own initiative adjust prices if they cannot buy or sell the amount they desire. But once agents act in this way, they become "price setters", and by definition it is no longer perfect competition. Despite what one might read in standard textbooks, a large number of buyers and sellers is not a sufficient condition for perfect competition, even given the appropriate cost curves. Suggestions that actual markets, such as those for agricultural products, approximate perfect competition are fallacious.

Perfect competition is an imaginary, ideal construction, involving a mythological auctioneer, with no real world counterpart past or present. Actual markets should not be considered as differing from perfect competition by some quantitative measure, such as an index of market shares. The difference is similar to the relationship that dragons have to alligators. The alligator is not a small dragon that does not breathe fire. The difference is that alligators exist and dragons do not and never have. Though seldom made explicit, the requirement that all perfectly competitive parables have what does not exist in any market, a Walrasian auctioneer, is well recognized in the literature in general equilibrium theory.

Walras' Law is a necessary element in a money economy in order that disequilibrium in hypothetical markets yields a general equilibrium across those markets. My purpose in considering general equilibrium adjustment in such detail has been to demonstrate the fragile theoretical basis upon which it is constructed. However consistent may be the mathematics of the solution, the desired result, simultaneous clearing of all markets at prices that leave all traders content, occurs only under extremely restrictive assumptions, namely the *ex machina* presence of the auctioneer. It is not by choice that a market clearing mechanism as bizarre as that suggested by Walras has persisted in models for over a century. It persists because in over 100 years no one has proposed a better explanation of how general equilibrium might be achieved. No explanation exists of how actual markets would clear in a manner to produce general equilibrium with satisfied traders, or even approach this result.

Walras' Law and general equilibrium analysis will play a central role in subsequent chapters. The critique of general equilibrium theory would not be complete without at least brief reference to one of its distinguished practitioners and most eloquent defenders, Frank Hahn. In a series of carefully argued papers written when the mainstream was less ideological and more open to self-inspection, Hahn has provided a sophisticated and, for some, compelling defense of general equilibrium theory (Hahn 1984).

Three aspects of his argument are relevant to the present discussion. First, that constructing hypothetical models in which markets clear and agents have their notional demands and supplies realized does not imply that any real world situation corresponds to such a model. Second, that general equilibrium models serve as an organizing structure to identify systematic behavioral relationships, which then might be investigated for their real world analogues. And third, by specifying the extremely restrictive conditions necessary to achieve general equilibrium, one can better understand why the real world is so different from the ideal model and beset with maladies such as unemployment and inflation. He concluded that the concept of equilibrium should be treated elastically, though rigorously, and all equilibria need not be defined as Walrasian.[10]

If all neoclassical economists had Hahn's careful attention to detail and theoretical rigor, objections to general equilibrium theory would be reduced to broad issues of methodology. In specific, many of the objections in this and the following chapters would be moot points, because Hahn makes no claim that general equilibrium theory describes real world processes, nor does he suggest that it provides a guide to policy (Hahn 1984, 123). The unfortunate reality is that not even an economist as prestigious as Hahn was successful in inspiring in his profession a careful and rigorous application of general equilibrium theory in macroeconomics, as Hahn himself complained in his writings.

In the high theory of Arrow, Debreu and Hahn one does not find sanguine conclusions about how a free market economy tends to automatically achieve full employment equilibrium with optimum use of resources.[11] But, such judgments are common in textbooks and journal articles, and even more frequently encountered in journalistic writings of economists, that have great impact upon the consciousness of the public and the policies of governments. In the chapters that follow, the critique of general equilibrium theory is based on how it is used by the vast majority of economists, not with general equilibrium analysis as it was employed in the realm of high theory by those who knew its limitations and were scrupulously honest in pointing them out.

Box 3.1 Markets and efficiency

That unregulated markets produce efficient allocation of resources and buyers and sellers content with the outcome is so generally accepted by economists and the public that few would consider it a hypothesis requiring verification. On close inspection it comes very difficult to establish either theoretically or empirically.

The faith in market outcomes is justified by invalid exercises in logic. One of the most important of these involves the concept of "clearing", a market outcome leaving no excess supply or excess demand. This absence can be interpreted as "market clearing", and the clearing cited as evidence of an efficient outcome. On this basis one could say, for example, planned economies are inefficient compared to market economies, because markets produce what people want and the price mechanism prevents inefficient surpluses.

While there are some valid aspects of this statement, efficiency is not among them. In a market society participation in most exchanges is voluntary in the formal sense that the buying and selling of specific commodities are not forced through a private or public police function. It does not follow from this formal voluntarism that markets are free of coercion. A poor person who does not have the income to purchase medical care should not be described as choosing bad health. Rather, low income, which may result from many factors beyond individual control, leaves the poor to "choose" between seeing a doctor and paying rent.

If the pretense of voluntary exchange is accepted, the concept of "clearing" remains problematical. The absence of excess supply of a commodity can be observed, though changes in business inventories create an ambiguity (whether they are desired by the seller or unanticipated and unwanted). In contrast, the presence or absence of excess demand has no form in which it can manifest itself. It cannot be seen, so it must be inferred. To take the next step and attribute efficiency to the inference is ideological, not analytical.

3.4 The homogeneity postulate

Before leaving Walras' Law it is important to point out an apparently narrow technical implication of it, the homogeneity postulate. In most general form, the postulate states that *an economic agent's demand for commodities and services, including "leisure", is independent of the absolute price level*. The postulate will seem of limited interest, but it returns to haunt the analysis when considering the quantity theory of money. The postulate is commonly invoked in economic theory, independent of any explicit consideration of Walras' Law.[12] Most of the microeconomic analysis of consumer and business behavior is based on it.

The postulate is frequently illustrated by a hypothetical example of the following type: were all prices and incomes to double, the decision by economic agents of how much of each commodity to buy and to sell would be unaffected. Because in the synthesis model price is composed only of income payments, wages plus profits or interest in the present context, a general rise in prices implies an equal proportionate rise in income. Therefore, at the aggregate level, it is redundant to include incomes in stating the postulate, and one can simply say that trading incomes are independent of the general price level, and determined by relative commodity prices.

The homogeneity postulate has an important implication for the excess demand identity derived from Walras' Law. The excess demand for commodities is identically equal to the excess supply of money. According to the postulate, if commodity prices were to double, the quantities of commodities demanded and supplied would not change, because these are independent of the absolute price level. With quantities unchanged and all prices twice as high, the excess demand for commodities doubles, and so must the excess supply of money, and vice versa. Walras' Law with the homogeneity postulate implies that the excess demand for money changes proportionately with the price level. This will be the source of considerable complications in the next chapter

Walras' Law of markets provides for market clearing in the neoclassical macroeconomic model at the cost of considerable "willing suspension of disbelief",[13] to use Coleridge's famous phrase about how the contented reader treats fictional literature. The Law does so by providing a mathematically consistent solution to the set of relative prices in the model. It does not provide a theory of the price level. A solution for the general price level requires a theory of money.

Box 3.2 The magic of competition

Central to neoclassical economists is its concept of competition. Its analytical manifestation is as perfect competition. The standard definition is given by the quotation below.

Basic assumptions required for conditions of pure competition to exist:

1 Many small firms, each of whom produces an insignificant percentage of total market output and thus exercises no control over the ruling market price.
2 Many individual buyers, none of whom has any control over the market price – i.e., there is no monopsony power.
3 Perfect freedom of entry into and exit from the industry. Firms face no sunk costs – entry into and exit from the market is feasible in the long run. This assumption ensures all firms make normal profits in the long run.
4 Homogeneous products are supplied to the markets that are perfect substitutes. This leads to each firms being passive "price takers" and facing a perfectly elastic demand curve for their product.
5 Perfect knowledge – consumers have readily available information about prices and products from competing suppliers and can access this at zero cost – in other words, there are few transactions costs involved in searching for the required information about prices.
6 No externalities arising from production and/or consumption that lie outside the market (http://tutor2u.net/economics/revision-notes/a2-micro-perfect-competition.html).

It is difficult to image a more unlikely set of characteristics for any market, yet the efficiency of a market economy requires that these characteristics prevail for an entire economy without exception. Should any market not conform to the strict discipline of perfection, the general equilibrium outcome across all markets is not optimal (socially efficient). This state of general equilibrium bliss is Pareto Optimality, named after an Italian engineer, and among its surprising implications is that all market competitors are equal and, therefore, the process of competition maintains a harmonious equilibrium of rivals.

Of prominent economists of the twentieth century, perhaps only one explicitly rejected the neoclassical romanticism of competition, John Kenneth Galbraith. Along with his skepticism about the benefits of competition, Galbraith identified it as inextricably linked to the use of mathematics in economics. Referring to the takeover of economics by mathematics, Galbraith wrote, "In the real world perfection competition was by now leading an increasingly esoteric existences, if indeed, any existence at all, and mathematical theory was, in no slight measure, the highly sophisticated cover under which it managed to survive" (Galbraith 1989, 260). His book *The New Industrial State* (1967) can be read as devastating critique of the myth of benign competition.

To describe John Kenneth Galbraith's views on competition as rare overstates their frequency among economists, left, right or centre. Joseph Schumpeter, perhaps the greatest right-wing economist of the twentieth century (1883–1950), vigorously rejected the neoclassical view that competition was a mechanism for harmonious equilibrium. Unlike Galbraith he remained enamored with it, extolling the virtues of the "entrepreneur" to the verge of Nietzchean hero-worship.

4 Money in the neoclassical model

4.1 Introduction

Chapter 2 presented the basic neoclassical macroeconomic model as a "real" system, measuring all variables in units of the single product. It might be thought that this presentation was a "straw man," because the analysis of monetary relationships is apparently a central characteristic of the neoclassical school. Indeed, in the 1980s, the term "monetarist" referred to an orthodox sect of the neoclassicists. However, this partitioning of economic analysis between the real system and the system in its monetary or nominal form is a fundamental trademark of the synthesis school, as inspection of any standard textbook will show.

This trademark approach manifests itself in a particular characteristic that the neoclassical school claims for its theory of aggregate economic behavior, the neutrality of money. The precise definition of the term is:

> Money is neutral if, following a disturbance to an initial full employment equilibrium caused by a change in the nominal money supply, a new equilibrium is reached in which all real variables have the same values as before the change in the money supply.[1]

In other words, the standard presentation the equilibrium full employment solution to the synthesis model is independent of the amount of money available for circulating commodities. This implies the crude deduction that a change in the money supply results in a proportional change in the price level. I qualify the statement with the phrase "in the standard presentation", because money is not neutral in not all versions of the neoclassical macro model. However, the exceptions to neutrality are usually presented as the preserve of specialized and esoteric theory. The typical student of economics would have to pursue his or her studies with exceptional zealousness to encounter models in which money plays a non-neutral role.[2]

The definition of neutrality refers to positions of full employment general equilibrium. Were one to introduce assumptions to create a hypothetical situation in which the model produced stable values for variables at less than full employment, then changes in the money supply could result in changes in real variables. I consider such situations in the treatment of "rigid" money wages.

However, at the moment the focus is on the workings of the pure, unadulterated neoclassical system. Why and under what conditions money might be neutral is analyzed below in some detail. Before that the implications of a money-neutral model should be made explicit.

In general equilibrium the neutrality of money implies that there is no fundamental difference between the barter-exchange model of Chapter 2 and a model with money exchanges. Given the parameters of the barter-exchange model, all real variables are determined. The neutrality of money implies that none of these real variables changes as a result of monetary exchange. The money economy of the models is no more than a transformation of the real system into nominal values, a "tidying-up" exercise in which minor loose ends such as the price level are sorted out. It could be argued that except for the analysis of the labor market, all theorizing involved in the synthesis macro models is a "tidying-up" exercise, for it is in that market that the general equilibrium solution is born, fully mature, lacking only consumption, investment, and finally, money.

In this and subsequent chapters money is introduced into the synthesis model. The discussion of a neoclassical money economy will become quite complex, with numerous qualifications and complications besetting the analysis. Therefore, it is useful to anticipate the discussion by stating clearly the general conclusion to be reached. I shall show that the static model in its full form can *either retain neutrality as a logical property or have an unqualified tendency to full employment equilibrium, but cannot in general have both of these characteristics*.

In other words, if the model claims an unambiguous full employment solution, the values of the real variables in that solution are not unique with respect to the nominal money supply. Alternatively, if the real variables are unique at full employment equilibrium with respect to changes in the money supply, then there are logically unavoidable circumstances in which that full employment equilibrium cannot be reached. To use a metaphor discussed below, money is a mere "veil" over the real system only when the logic of the model does not assure full employment equilibrium. If the full employment solution is logically guaranteed, then nominal variables such as the money supply and the price level assume causality status with their real analogues. The implication of the model losing its automatic full employment guarantee should be obvious: the unregulated working of a capitalist economy is consistent with extensive unemployment and human misery even in theory. The implication of non-neutrality is that full employment values are not unique, and, therefore, appropriate subjects for public intervention.

4.2 Neoclassical money

The first task in developing a theory of money is to define the concept. Definition involves stating what it is and specifying the form it takes. Following the tradition of the American monetary economist Irving Fisher, neoclassical theory defines money in terms of exchanges: money is anything generally accepted as medium of exchange.[3] Using this definition, Johnson wrote that money is anything acceptable "as such", where "as such" refers to the property of general exchangeability (Johnson 1972, Chapter 7). The "acceptability" criterion has serious ambiguities, because what may be acceptable for one purpose may be unacceptable for another. To take an obvious example, one can purchase a meal with a credit card, but cannot use that credit card to pay the bill received from the credit card company. However, at this stage of the presentation I accept the neoclassical argument that money can be anything accepted as payment.

If money can be anything, it has no intrinsic value of its own; i.e., it need not be a produced commodity and need have no significant resource cost. In the case of exchanges between produced commodities, the process is barter by the definition of the term. While one can define money to be anything, a theory of money cannot be constructed on this basis. If money can be anything, then it is undefined and cannot be isolated for analysis. A necessary initial step in the neoclassical theory of money is to restrict analytically the *forms* that valueless money can take. As discussed below, the neoclassical theory of money presumes the existence of a "money supply", which as a first approximation is treated as exogenous with respect to all real variables. This view of the money supply implies money is not "anything" even in theory, but something very specific.

Neoclassical writers resolve this problem, in principle money can be anything but for rigorous theory it must be something quite specific, by reference to practice. In practice, anything does not serve as money. By some process commodity producing societies restrict money to a limited number of things. Neoclassical textbook writers are content to leave the issue as settled: anything can be money, but in practice only a few things are; custom and history have resolved the indeterminacy. Monetary theory then proceeds on the assumption of a determinate definition and a supply of money that is exogenous with respect to the level of economic activity.

This is not a satisfactory approach either theoretically or for empirical application. First, there is a definition: "anything can serve as money". This theoretical generalization proves essential for the analysis. It is the necessary and unavoidable defense of the argument that money has no value. However, the "anything" generalization creates an analytical problem of major importance: how are limits set on the definition of money so that the supply of money can be treated as exogenous? Second, one discovers that the theoretical prediction, "anything can be money", is refuted in practice because very few things serve as money. Then, third, the empirical rejection of the definition is taken as the vehicle to solve the major analytical problem created by the definition of money as potentially "anything". In brief, empirical rejection of the definition is used to reconcile its own contradictory nature.

Even at this early stage the neoclassical theory of money requires an explanation of why money takes limited forms, even though money was defined to suggest otherwise. Doing so is not merely a question of tidying up logic. Later in this chapter I show that the failure of neoclassical theory to resolve explicitly the contradiction between money as anything in principle and money as something very specific in theoretical models, leaves the entire concept of "the money supply" open to attack from within the synthesis school itself as well as its Keynesian critics.[4]

Rather than seeking to resolve the contradiction between definition of money and the use of the concept in practice, I ignore the intractable problems of definition and go straight to the theoretical treatment of money.[5] I define M as valueless money. It has no cost of production, its unit value is one (unity), and its supply is determined by the "monetary authorities". The monetary authorities leave the money supply unchanged until they are summoned to act by the theorist. In other words, the money supply is given until the model builder decides to change it.

In reality even within neoclassical rules there is nothing as simple as "the money supply". The assertion common to neoclassical monetary theory that there exists a determinate money supply over which the monetary authorities have monopoly and control is a fiction. Not even the neoclassical writers themselves would argue that this is anything but a convenient assumption. The only part of the money supply over which a hypothetical monetary authority might have direct control is coin and paper notes, which account for a tiny portion of the total means of circulation and payment in a modern economy. Further, coins and notes are usually ignored in modern theoretical modeling, with the money supply defined as credit money. Credit money can at this point be defined as ledger entries of certain institutions that individuals and businesses can draw upon to make purchases. The institutions that are the repositories of these ledger entries will be called banks. Banks can act to expand and contract the total value of these ledger entries by making new loans or calling in old loans. Thus, banks are the immediate creators of neoclassical money.

The monetary authorities influence, not control, the supply of money to the extent that they can influence the behavior of banks. Therefore, essential to neoclassical monetary analysis is an explanation of bank behavior in which credit creation or contraction by banks systematically responds to decisions by the monetary authorities. The assumption of a given money supply cannot otherwise be justified. On this point there has never been controversy (Chick 1979, 13–14; and Harry G. Johnson 1974, 41ftnt). Not withstanding the central role an analysis of bank behavior plays in the assumption of a given money supply, such a theory is rarely treated in detail in neoclassical macroeconomic textbooks. The student is left to take an autonomous money supply as proved, with elaboration relegated to specialized courses in monetary economics.[6]

The student of macroeconomics can easily emerge from his or her studies unaware that the assumption of a money supply fixed with respect to the other variables in the neoclassical model is a subject of great controversy, and that quite prominent and respectable economists rejected the assumption altogether.[7] I pursue this issue after investigating the theoretical role of a fixed supply of valueless money. The purpose of this section has been to clarify the concept of money that will be employed in the presentation of the neoclassical model. The result of the discussion is somewhat inconclusive, for it has been demonstrated that there is an apparent inconsistency between the abstract definition of money and its manifestation in the model.

Box 4.1 What is money?

The theoretical problems in specifying money have their counterpart in practice. In their introductory textbook Stiglitz and Walsh sum up the confusion:

> One of the problems in defining money is the wide variety of assets that are not directly used as medium of exchange but can be readily converted into something that *could* be so used. Should they be included in the money supply? There is no right or wrong answer.
>
> (Stiglitz and Walsh 2006, 227)

This agnostic conclusion does not prevent the authors from pursuing an analysis that requires a clear and unambiguous definition of money just ten pages earlier when they write, "The supply of money is set by the government" (217). This approach in which there is a complete disjuncture between the empirical and theoretical treatments of money is the almost invariant practice in textbooks. A rare example of neoclassical writers even noting that there are alternatives to the standard is a reference to Lance Taylor and "structuralist" macroeconomics and the endogeneity of money in Agenor and Monteil (1996, 14).

Rarer still are textbooks with a critical view of neoclassical money. Notable among these few is Galbraith and Darity (2005, Chapter 7) where a Keynesian alternative in clearly presented.

4.3 Money and the price level

As explained in the previous section, governments ("the monetary authorities") do not determined the money supply. Rather, they seek to influence the extent to which the private sector institutions ("banks") can create credit. The assets that banks hold that serve for credit expansion are called "high-powered money", the "monetary base", or (my favorite) "base money". Following the practice of neoclassicals of treating the link between the monetary base and total credit as stable, automatic and unproblematical, I use the term "money supply" throughout this book.

In Chapter 2, I defined y to be the output/income in the model, measured in the single commodity. Let p be the price of the single commodity in units of money, or the "absolute price level". The value of output/income in money units is py. In keeping with the operation of Walrasian markets, all exchanges occur simultaneously. Money is used only once in the Walrasian market day, so py is the amount of money necessary to trade y amount of the single commodity at price p.

The neoclassical analysis of the price level abandons this timeless context. Breaking with the treatment of exchanges occurring in some instantaneous market moment, I now assume that trading takes place over a period of time, and during this time period the same representation of money serves to realize a number of trades. If the supply of money, as defined in the previous section, is

M^*, then $1/v=py/M^*$ is called *the velocity of money*. It measures the average number of times a representative unit of money is involved in a trade over a specified time period. Because output/income (y) is a flow per unit of time in the model, v is defined for some hypothetical chronological period. By rearranging the definition, one gets, $M^*=vpy$. The inverse of the velocity of money, v, can be interpreted as the average proportion of the money supply held idle at any moment by traders in anticipation of impending exchanges.

This relationship is true by definition. The inverse of the velocity of money is calculated by dividing the money value of output/income by the potential money supply. It is also an empirically measurable definition, and the specific value of v obtained depends upon one's operational definition of M^*. Were it the case that the velocity of money and the level of output/income were fixed, the presumption of M^* as exogenous yields a determinate price for the single commodity (the "price level"). Further, because $M^*=vpy$ is a homogenous function, a change in the money supply as a result of action by the monetary authorities would result in a proportionate change in the price of the single commodity. This one-to-one proportional relationship between the money supply and price(s) has long been interpreted as a central message of the quantity theory of money (e.g., Shapiro 1974, 268–271),

Some economists have gone back to the writings of the pre-Keynesian monetary theorists to demonstrate that attributing to them a crude proportional relationship between M^* and p is a misrepresentation of their work (see discussion in Weeks 2011). True though this defense of the pre-Keynesians may be, it remains that the thrust of modern monetary theory is to demonstrate that under conditions of full employment general equilibrium the elasticity of the price level with respect to the money supply is unity (Galbraith and Darity 2005, 215ff.). That is, under such conditions a doubling of the money supply results in a doubling of the price level with all other variables left unchanged.[8] The crude quantity of money equation, $M^*=vpy$ (with v and y fixed), is the simplest expression of the neutrality of money. The essence of the interaction of real and nominal values in the neoclassical model (e.g., y and py) is captured by using the quantity theory, for all of its simplicity.

At this point interest focuses on the explanation of the price level in full employment equilibrium, because no analytical circumstances have arisen in which the labor market does not clear, which is the necessary condition for a less than full employment equilibrium. If the Walrasian markets behave as they are designed to do, then output/income is determined at its maximum value on the basis of the wage measured in units of the single commodity. It remains only to establish that v, the inverse of the velocity of money, is constant with respect to the other variables in the model.

As mentioned above, v can be interpreted as reflecting the proportion of money or nominal income that economic agents wish to hold as money balances at any time. Since this holding of money is in anticipation of making transactions, it is called the transactions demand for money, which I write as $M_{td}=vpy$. Because there is only a transactions demand for money at this point, the transactions demand equals the total demand, $M_{td}=M_d$. The quantity equation now becomes an explicit equilibrium theory. In Chapter 2, the neoclassical "real" system was set out in behavioral and definitional equations covering the markets for labor and the single commodity, the latter implying the equilibrium of saving and investment. Three more equations can be added to cover the money market. At a later point the money demand function will be expanded.

$$M_s=M^* \text{ (autonomous money supply)} \tag{11}$$

$$M_d=vpy \text{ (demand for money)} \tag{12}$$

$$M_d=M^* \text{ (money market equilibrium)} \tag{13}$$

The essential characteristic of this treatment of the money market is the presumption that the demand for and supply of money are independent of each other. Independence is achieved in a very crude way. The supply of money is treated as autonomous, and the demand for money comes from the need to purchase output. As the money market is treated with more sophistication, this independence must be retained at all costs, for it is the necessary condition for a consistent theory of valueless money.[9]

At this point it is worth stressing that the history of economic thought offers only two mutually incompatible ways by which to resolve the indeterminacy of the absolute price level. If money is valueless, then the price level is determinate if and only if the availability of money is independent of the demand for money, with the major determinant of the demand being the level of economic activity. Alternatively, money can be a produced commodity, in which case the absolute price level is strictly related to the inverse of the cost of producing the money commodity.[10] It is unlikely that a third alternative exists that does not beg the basic questions of monetary theory.

Pre-Keynesian writers devoted considerable attention to the determination of the parameter v, especially to its stability over various theoretical time periods. After Keynes the debate over the stability of the velocity of money involved different issues, perhaps the most important being the impact of the interest rate. It is most convenient at this point to assume the velocity of money to be constant without providing a justification.

Armed with a given money supply and a constant velocity, the determination of the price level would seem to be an easy task. Let us invoke the Walrasian labor market, cleared by movement in the wage measured in the single commodity. This yields full employment of labor, which implies a determinate level of output/income. The price level then "falls out" of relationship (13) as $p=M^*/vy_e$, where y_e is full employment income, fixed by labor market equilibrium, so $y_e=y^*$.

This is the "classical dichotomy", in which the equilibrium solution of the real variables is established through a Walrasian general equilibrium model in which only relative prices are relevant variables, and the price level set by the quantity equation. As tempting as this procedure may be, it is invalid. The dichotomy is false. The real variables cannot be determined in general equilibrium without some explicit reference to the money supply. The model cannot be partitioned between real and nominal variables.

4.4 Walras' Law and the quantity theory

The simple application of the quantity theory to the real system is invalid because of a contradiction between Walras' Law and the quantity equation. In an earlier section I demonstrated that Walras' Law requires that the excess demand for all commodities equal the excess supply of money,

$$(XD \text{ for commodities}) = -(XD \text{ for money}).$$

In the present case of the single commodity, one can write (where y^* is the fixed, full employment supply of output/income, y_d the notional demand, and M_{xd} is the excess demand for money),

$$p[y_d - y^*] = M_{xd}$$

or,

$$py_d - py^* = M_{xd}$$

The quantity equation can also be manipulated to produce an equation for the excess demand for commodities and money,

$$vpy^* - M^* = M_d - M^* = M_{xd}$$

Close inspection shows that the two expressions for the excess demand for money cannot hold simultaneously.

$$py_d - py^* \neq vpy^* - M^*$$

In the case of Walras' Law, the excess demand for money, $(py_d - py^*)$, implies that a change in the price level yields an equal proportionate change in the excess demand for money, because both terms are multiplied by p. In the second relationship, the excess demand for money is $(vpy^* - M^*)$, in which price enters against only the first term. In this formulation the excess demand for money increases more than proportionately with increases in the price level.

Not even in theory are variables allowed to simultaneously increase by two different rates. One of the excess demand equations must be abandoned.[11] The inconsistency arises because Walras' Law is formulated on the basis of the homogeneity postulate, implying that the excess demand for commodities measured in physical units is unaffected by changes in the price level; i.e., the excess demand for money is directly proportional to the price level. In the Quantity

Equation, on the other hand, homogeneity of any degree is ruled out by the assumption of given money supply.

This contradiction does not invalidate the neoclassical analysis of monetary exchange; nor does it undermine the principle of neutrality of money. However, to render the model consistent, it is necessary to re-specify the demand for commodities. Patinkin's solution to the inconsistency, which has been generally accepted as valid after some resistance,[12] was to introduce the *Real Balance Effect*. Patinkin inserted another "real" variable into the commodity demand equations, the nominal quantity of money divided by the price level, "real balances", M^*/p. With this variable in the investment and consumption functions, the previous specifications must be re-written. The impact of M^*/p on consumption and investment is presumed to be positive: a rise in the purchasing power of money increases the demand for the single commodity.

$$c=c(y, r, M^*/p),\ s=s(y, r, M^*/p) \tag{3a}$$

$$i=i(y, r, M^*/p) \tag{3b}$$

The demand for money may also be a function of real balances:

$$M_d=M_d(p, y, M^*/p) \tag{12}$$

The excess demand for money now has a different form,

$$M(xd)=M_d(p, y, M^*/p)-M^*$$

The homogeneity postulate no longer holds. A rise in the price level results in a fall in real balances, which provokes a decline in the demand for the single commodity both as an article of consumption and as an item of investment. Further, a change in the price level enters directly into the consumption and investment functions. The market for the single commodity and the money market are now integrated in a consistent way.

Assume that all markets are initially in equilibrium and the price level doubles. The logical result is to create an excess demand for money, because existing money balances have fallen in purchasing power. Simultaneously, the excess demand for money is balanced by an excess supply of the only commodity. This is the result of the real balance effect depressing demand. Depreciated money makes existing money holdings inadequate and existing commodity demand excessive. Walras' Law holds. Following the rules of Walrasian markets, excess commodity supply will cause a fall in the commodity's price, restoring equilibrium there. At the same time, the falling price will reduce the excess demand for money to zero. Everything returns to its original state of equilibrium. The doubling of the price level cancels itself out.

Money is neutral in the re-specified, consistent model. Should the initial equilibrium be disturbed by the monetary authorities increasing the nominal supply of money (from M^* to $2M^*$, for example), an excess demand for the commodity will result via M^*/p, exactly balanced by an excess supply of money, again via M^*/p. The excess demand for the commodity will force price up in a Walrasian world, which eliminates both the excess demand for commodities and excess supply of money. The original "real" equilibrium is regained at a doubled price of the commodity. The neutrality of money and the equilibrium mechanics in a model incorporating the real balance effect are explained in more detail in Chapter 6. As shall be shown, the neutrality of money breaks down when the real balance effect is generalized to include forms of wealth other than money, such as bonds.

In a textbook widely-used in the past there was an interesting analogy presented to illustrate the demand for real balances. The author asked the question, what would happen to the behavior of economic agents if everyone awoke one morning to discover that the national currency had been re-denominated (for example, one new dollar replaced ten old dollars)?

> Is there any reason for you to change your demand for money? No. All prices, incomes, and wealth values would have changed proportionately, reduced to 1/10 their former values. Nothing real has changed.
>
> But this is the same as if the price level just changed overnight by the same amount![13]

The message, common in current textbooks, is that changes in the price level are inconsequential events, arbitrary occurrences that are treated by economic agents as water off a duck's back. While a rather surprising analogy for a profession obsessed with inflation, it is worth pursuing for what it reveals about method. To the extent that the analogy holds, it is a direct result of the model in which the analogy is posed, and the relationship to any actual economic process is not obvious. The model presumes an autonomous money supply over which the monetary authorities have strict and absolute control. On the basis of this assumption, changing the denomination of the currency and changing the money supply are more than formally equivalent, they are the same thing.

It must be remembered that the "thought experiments" in neoclassical analysis that involve changes in the money supply are usually in the context of a one-commodity model. As a consequence, the only "real" decision that an economic agent has to make is whether to buy the commodity or not to buy it. Any lags between expenditure and production, production and payment of receipts, and receipts and expenditure, have been eliminated through the general equilibrium method. When the price level is the price of a single commodity and price changes translate directly and instantaneously ("overnight") into money income changes, it is small wonder that nothing else changes. What is surprising is that neoclassical theory has found it so difficult and complicated to establish this, requiring Walras' Law, the real balance effect and an autonomous money supply. This and other apparently simple propositions in the neoclassical analysis of money prove esoterically complicated as a result of the theoretical inadequacy of valueless money.

To summarize this section, I demonstrated that transposing the real solution to the neoclassical model into nominal variables via the quantity equation is not possible, as tempting as its apparent simplicity makes it. An additional variable, M^*/p, real balances, must be introduced. This leaves open to question what relevance the solution to the barter model has to the model that includes money. The issue of relevance is pursued in the next section. Notwithstanding the substantial theoretical role of the real balance effect to the consistency of one version of the neoclassical model, its empirical importance is not obvious when inflation is low.

In general, my purpose in this book is to explore the logic of the neoclassical model, rather than to seek its inadequacies by reference to the actual phenomena it wishes to explain. However, when a theory must be rescued by a mechanism that may be of no practical importance, the question arises whether the theory has been rendered more robust by the inclusion of a heretofore overlooked element of strategic importance, or has been salvaged by a fortuitous discovery of an ad hoc method of exit from a blind corner.

Neoclassical logic suggests on *theoretical* grounds that the real balance effect may be miniscule, even zero. This logic involves the controversy over "inside" and "outside" money. For the real balance effect to operate, M^* must represent a *net* asset in the model. Money should not be an asset for one group of economic agents and a liability for another set. If this were the case, the net effect of a rise in the price level would be to reduce the real value of assets and off-setting this by an equal change in the real value of liabilities. Therefore, demand deposits or bank-created money cannot affect the operation of the real balance effect, for these are both an asset for the depositor and a liability for the bank. Similarly, the loan banks make are not a net asset. Money that is not net wealth is called "inside" money (Lagos 2006).

What, then is outside money? Over this issue there is controversy. Suffice to say, the extent to which the controversy is unresolved is indicated in the early neoclassical literature by two extreme positions: there is no such thing as outside money, and all money is "outside" (Gurley and Shaw 1960, and Pesek and Saving 1967). It is quite extraordinary that neoclassical theory, for which the analysis of monetary phenomena is so central, could not find consensus on its definitions of money and wealth. As with so many neoclassical conundrums, subsequent generations of economists, in lieu of resolving the problem, would ignore it.

Pursuing the debate over outside and inside money is beyond the scope of this book. The debate indicates that one inconsistency, between Walras' Law and the Quantity Equation, has been bypassed by creating another that is equally serious, to establish the existence of outside money.[14] The reproduction of essentially the same inconsistency in altered form is characteristic of neoclassical theory, and the consequence of the theoretical inadequacy of the initial concepts, in this case valueless money.

4.5 The money supply further considered

Before treating the general equilibrium solution to the neoclassical model with a money market, further consideration of the concept of an autonomous money supply is required. The entire theory of valueless money collapses if the supply of money is not independent of the demand for it. This independence is the necessary, though not sufficient, condition for the existence of monetary authorities who somehow determine changes in the money supply. Were there no other theoretical difficulties, failure to establish the theoretical existence of a determinate, autonomous money supply would render the neoclassical model invalid in its analysis of a money economy, invalid to the point of an analytical void.

The theoretical role of a fixed money supply is not merely a question of sorting out the price level in the model. While one can obtain a general equilibrium solution to the "real" system (see Chapter 2), because of the inconsistency between Walras' Law and the Quantity Theory this solution cannot be transposed to the system of nominal values. The general equilibrium solution of a system with money is not and cannot be the real system with all relevant variables multiplied by p. With the necessary presence of the real balance effect in the consumption function and demand for money functions, the price level must be determined *simultaneously* with the values of the real variables.

In other words, the system with money has its own specific equilibrium adjustment process, determined in part by M^* and p. While the real variables may be invariant with respect to changes in p and M^* in full employment equilibrium, this is a property of the solution to the monetary system itself, not a relationship between a dichotomized real solution and its monetary analogue. The neutrality of money, which holds in the model I have been discussing, does not imply the relevance of a real solution to its monetary analogue. By "monetary analogue" I mean a system characterized by all the same behavioral relationships (parameters), differing from the real system only by the presence of the money market.

The solution to the system of monetary variables requires that a value for M^* imply a unique p. If a valid argument cannot be made for a money supply independent of the demand for money, then M^* does not imply a unique price level. If the price level is not unique, then the real variables are not unique. In effect, an autonomous money supply (M^*) "closes" the neoclassical system and makes it determinate. The general equilibrium solution for a barter economy as presented in Chapter 2 is irrelevant to the solution of a model with money, though the two models may be identical in every other respect.

The stakes riding on the autonomous money supply are high, indeed. As mentioned above, there is considerable controversy over whether or not it can be established theoretically that the supply of money is independent of the demand. One of the most perceptive Keynesian critics of the neoclassical treatment of money played down this theoretical controversy, arguing that the definition of money need not be resolved at the level of abstract theory, but is rather a "practical matter".[15] For an empirical investigation referring to a specific context, the judgment is valid.

However, at the level of abstract theory, the mechanisms and elements of a model must conform to the rules the model sets for itself. The synthesis model has quite clear rules that govern the analysis. In order that the model be valid, it must be determinate with no "loose ends" that require ad hoc resolution at the last moment, when one discovers that all has not emerged from the logic as hoped. At the level of abstract logic, the rules of analysis require that the concepts employed be unambiguous and possess the properties sufficient for their theoretical role. This is the case of the real balance effect, which is analytically key to one version of the synthesis model, though theoretically suspect and empirically trivial (if it has existence in reality).

The definition of money must be equal to its theoretical task. Its autonomy is central to the "thought experiments" of neoclassical theory. The adjustment dynamics of the neoclassical model are investigated by presuming a change in some parameter or autonomous variable. Perhaps the most common of these to select for arbitrary manipulation is the money supply, to presume it changes in response to action by the monetary authorities, then pursue the logical consequences. This thought experiment cannot legitimately be initiated unless it has been established theoretically that the money supply is independent of the demand for money.

4.6 Neoclassical monetary and the realism of models

Those readers who were distressed in the first two chapters by the divergence of the "real" system from any semblance to an actual economy may have looked forward hopefully to the inclusion of money as a vehicle to draw the synthesis model closer to reality. If one had such hopes disappointment must now reign. If anything, the introduction of money renders the model more abstract and ideal. One can imagine the economics professor saying to his student, "let us be more realistic by considering money". But money is introduced in a manner no less ideal than the "real" system itself.

Money appears on the analytical stage in an arbitrary and counterfactual manner unique to itself. Instead of approaching, reality recedes further into the mist of assumptions. A new layer of counter-intuitive masonry is constructed upon the previous, with the theorist isolated inside. These layers of ideal isolation render the theorist increasingly immune to any infection from the concrete world (to mix a metaphor).

The theorist, like the medieval priest, is safely sequestered in a world of his or her making, a world of ideas that is treated as a world of existence. Like the world of the medieval priest, the neoclassical model has its purpose. It stands as an ideological construction to guide the thoughts and actions of those who move in the reality outside of it. In the next chapter I begin to consider in detail the mechanics of this ideal neoclassical world.

Part II

Paradigm lost

The basic neoclassical model

Main points

Chapter 5: The classical false dichotomy model

1 This chapter begins the demonstration that the neoclassical model cannot have an unqualified tendency to full employment equilibrium if money is neutral and vice versa.
2 A model in which the real variables are determined independently of the money market is logically invalid, a *false dichotomy*. However, it offers a clear indication of the basic result that neoclassical analysis wishes to achieve in more complex models.
3 The model reaches full employment equilibrium through the clearing of the labor market, from which all other variables derive. Unemployment is voluntary, the result of workers or their representatives enforcing a money wage above the equilibrium level.
4 The only functions of money in the false dichotomy are to determine the price of output and the money wage.
5 The possibility that the equality of investment and saving might occur at a negative interest rate (the "inconsistency" between saving and investment) makes full employment a special case.

Chapter 6: Logically consistent money-neutral models

1 The real balance effect provides the simplest mechanism to escape the false dichotomy and reach unqualified full employment. However, it is of no practical importance.
2 The more general models with an interest-elastic demand for money resolve the dichotomy but do not result in unqualified full employment.
3 The neoclassical approach excludes what Keynes considered the inherent nature of the money market, uncertainty.
4 The possibility of an inconsistency between saving and investment, and that the demand for money might be highly interest-elastic ("liquidity trap"), make full employment a special case in this version of the neoclassical model.

Chapter 7: The "complete" model with a wealth effect

1 Central to neoclassical monetary theory is the distinction between inside wealth (wealth that is not a net asset) and outside wealth (wealth that is a net asset). The wealth effect requires the latter.
2 The inside/outside distinction is purely a phenomenon of capitalist societies that obscures the actual basis of productive wealth.
3 The wealth effect is the impact of accumulations of outside wealth on the values of real variables.
4 A model with a wealth effect eliminates the possibility of an inconsistency between saving and investment and the liquidity trap, but also renders money non-neutral.
5 The wealth effect exposes a contradiction at the core of the neoclassical model, ignoring the stocks of assets that result from flows.

5 The classical false dichotomy model

5.1 Introduction

The previous chapters explained the basic elements of the neoclassical macroeconomic model. This chapter presents the equilibrium solutions to the simplest version of the model that includes money. The purpose is to take the analysis beyond what is found in standard textbooks on macroeconomics. The intention of this and the next two chapters is to substantiate my assertion that the logic of the model cannot produce a solution in which there is an unqualified tendency to full employment equilibrium with money neutral.

To sustain this assertion, the presentation begins with a simple formulation of the model that is flawed by the “false dichotomy”. This flaw is rectified in the next chapter by the introduction of Patinkin’s real balance effect. The Patinkin model ensures full employment equilibrium and the neutrality of money, but for several reasons it is not satisfactory. Chapter 6 also considers an alternative solution to the false dichotomy inspired by Keynes, in which the demand for money is interest-elastic. The role of money satisfies neutrality, but full employment is not logically guaranteed. In Chapter 7 the logical extension of the real balance effect, the wealth or Pigou effect, is introduced. Invoking the Pigou effect provides for full employment equilibrium, but money is non-neutral. In all models the solution is presented graphically and by use of simple algebra.

5.2 A false dichotomy model

The equilibrium mechanics of the neoclassical system with money begin with a model in which the real variables are directly converted to nominal values by the application of the simplistic version of the quantity theory of money. There is a strict dichotomy between the real and monetary sectors of the model and money is neutral. As explained in the previous chapter the model is internally inconsistent. It incorporates two contradictory relationships for the excess demand for money. In older textbooks models very similar to that developed below were presented as a summary of the pre-Keynesian or “classical” treatment of macroeconomic relationships, without noting its internal inconsistency.[1] Beginning with an invalid model is purely pedagogical. The simplicity of the model provides a useful introduction to graphical and algebraic manipulation, both of which will become complicated as the analysis proceeds. In addition, false though the model may be, it offers a clear indication of the basic result that neoclassical analysis wishes to achieve, but can do so only in more complicated versions, if at all.

The analysis begins with the labor market. For mathematical simplicity, I assume that the supply of labor is fixed, $n_s = n^*$. To obtain the demand for labor, an explicit form of the single commodity output/value added function is required. The simplest algebraic form is the Cobb–Douglas function, $y = k^{\alpha} n^{(1-\alpha)}$. This function displays diminishing returns to the variable factor, as well as being extremely easy to manipulate mathematically.[2] With the appropriate assumptions, this output/value added function can yield an expression for the demand for labor. By definition, the net revenue of a firm is sales minus cost. If it were the case that all of the firm's output could be sold at the prevailing market price (the firm is a "price taker", see Chapter 4), and if there were no inputs other than labor and capital, then one could write,

$$y = k^{\alpha} n^{(1-\alpha)} \text{ (output/value added function)} \tag{1}$$

$$NR = py - [rpk + pwn] \text{ (net revenue)} \tag{2}$$

If firms are price takers, sales revenue is py. The two terms within parentheses remind one that this is a one-commodity world, in which the real wage (w) and the capital stock (k) are the same product, both measured in units of, and consisting of, the only commodity. As a consequence, pw is the money value of what is paid to workers, the nominal or money wage, W. Similarly, pk is the money value of the capital stock, K. The only discretionary variable for the price taking firm is the level of output.

Price, the interest rate and the money wage are given in perfectly competitive markets, and the capital stock is fixed in the short-run model. Neoclassical microeconomic analysis assumes that the level of output is selected to minimize losses or maximize net revenue (profits) in the short run. This is called "optimizing behavior". Because the level of output is determined by the level of employment, the employment decision is the optimizing decision. Optimization is achieved mathematically by taking the first derivative of net revenue with respect to the labor input and setting it equal to zero. When expression (1) is substituted into (2), it yields the following.

$$p[(1-\alpha)k^{\alpha} n^{(-\alpha)}] - W = 0 \tag{3}$$

Substitute $y/n = k^{\alpha} n^{(-\alpha)}$,

$$W = p[1-\alpha]y/n \tag{4}$$

$$n_d = [p(1-\alpha)y]/W \text{ (demand for labor)}$$

In (3) the first term is called the value of the marginal product of labor (or the marginal value product). It is marginal product of labor times the price of output. Under perfectly competitive conditions the value of the marginal product measures the sales revenue that results from hiring an additional infinitesimally small unit of labor. Optimization is achieved by equating this to the money wage. In the case of the Cobb–Douglas function, the marginal product of any factor is proportional to its average product, making the algebra simple. When the symbol for the labor input is moved to the left of the equality, the demand for labor schedule is the result, equation (4). Combined with the labor supply assumption, $n_s = n^*$, the equilibrium condition for the labor market results. Assuming a fixed demand for labor has avoided the problem of a quadratic expression for labor market equilibrium.

$$n^* = [1-\alpha]py/W \text{ (labor market equilibrium)} \tag{5}$$

Under the assumptions of perfect competition and optimization this mathematical relationship stands alone, with both y and p/W direct functions of n. Elsewhere in the model the nominal values p and W must be determined, consistent with the optimization condition that $W/p = [1-\alpha]y/n^*$. First I inspect the other real variables in the system, consumption and investment. Again, simple relationships are assumed. The model has no public sector and no external trade. Terms with stars represent constants. The symbol a is the marginal propensity to consume, and b is the rate of change of investment with respect to the interest rate, both constants.

$$c = c^* + ay \text{ (consumption function)} \tag{6}$$

$$i = i^* - br \text{ (investment function)} \tag{7}$$

By definition,

$$s \equiv y - [c^* + ay].$$

With these equations, I can simplify the graphical analysis by using a relationship called the IS schedule. It is defined as a locus of points for which savings and investment are equal. Along the IS schedule, the market for the single commodity is in equilibrium. The IS curve is derived in Figure 5.1, according to the following conditions.

$$y = c + i \text{ (aggregate expenditure)}$$

$$y = c + s \text{ (aggregate income)}$$

$$c + i = c + s \text{ (commodity market equilibrium)}$$

$$i^* - br = y - [c^* + ay]$$

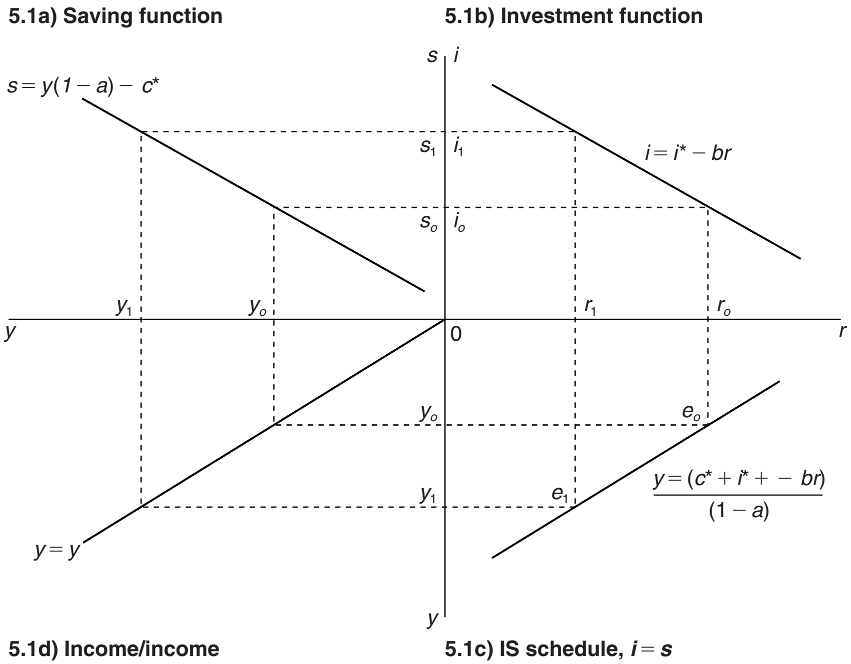


Figure 5.1 Graphical construction of the IS schedule.

As in Chapter 1, let μ be the multiplier, in this case $1/(1-a)$.

$$y=\mu[i^*+c^*-br] \text{ (IS curve)} \tag{8}$$

In quadrant 5.1a saving is shown as a function of income, and in 5.1b investment is drawn as a function of the interest rate. Assume that the interest rate is fixed at r_o. If income were above y_o, saving would exceed investment, implying that all of the single commodity would not be sold. As a result, income would fall, reducing saving until $s_o=i_o$ at y_o. The point e_o in quadrant 5.1c marks such an equality. The point e_1 is associated with interest rate r_1 and so on. Quadrant 5.1d transfers income from one axis to another. In terms of mechanics, the IS curve allows one to reduce two quadrants into one, 5.1a and 5.1b into 5.1c.

Many Keynesians see in the IS curve a procedure considerably more pernicious than analytical simplification (Chick 1983, 4). As mentioned in the second chapter, the neoclassical model makes no distinction between consumption and investment on the supply side. With the introduction of the IS curve, any difference between the two on the demand side is also eliminated. Now aggregate demand appears as an undifferentiated function of income and the interest rate. If one believes that investment is substantially more volatile than consumption, for which there is considerable empirical evidence, then combining the two into a single expression is rather like adding lambs and lions. Further, the two are put together in an equilibrium condition, so that disequilibrium in the commodity market is not part of the analysis.

Submerging consumption and investment into one behavioral relationship is the natural extension of the single commodity model. It indicates that commodities as such play no role in the analysis. Analytically the IS curve does not connect points of commodity market equilibrium. It is the equilibrium between non-spending in the current period and spending out of current income in future periods. In Section 2.2 I pointed out that the neoclassical macro model ignores the capacity-expanding role of investment, and that consumption and investment are the same commodity. As a result investment is treated implicitly as deferred consumption. If we trace back the definition of terms, the so-called "goods market" equilibrium condition (commodity market) states that deferred consumption (saving) as part of income must be equal to deferred consumption as part of the only commodity (investment). There is a strong hint of tautology in such a condition. Finally, and of immediate import, the IS curve shifts all attention to the labor market for adjustment mechanics, especially since the money market will also be formulated in terms of an equilibrium condition.

For the money market in this false dichotomy model, demand is implied by the simple quantity theory of money, along with a fixed supply set by the monetary authorities. Equilibrium of demand and supply is the false dichotomy LM curve.

$M_d = vpy$ (demand for money)

$M_s = M^*$ (supply of money)

$M^* = vpy$ (money market equilibrium, the LM curve)

These equations complete the specification of the false dichotomy model, and the analysis can move to the equilibrium solution.

5.3 False dichotomy general equilibrium

Figure 5.2 demonstrates false dichotomy general equilibrium. It is useful for pedagogical purposes to solve this general equilibrium algebraically before considering the diagrams. In the labor market, full employment equilibrium requires that $n_d = n^*$. With a fixed capital stock the full employment level of output/income is:

$$y_e = (k^*)^\alpha (n_e)^{1-\alpha}$$

Saving and investment are:

$$s_e = i_e = y_e - [c^* + ay_e] = [1 - a]y_e - c^*$$

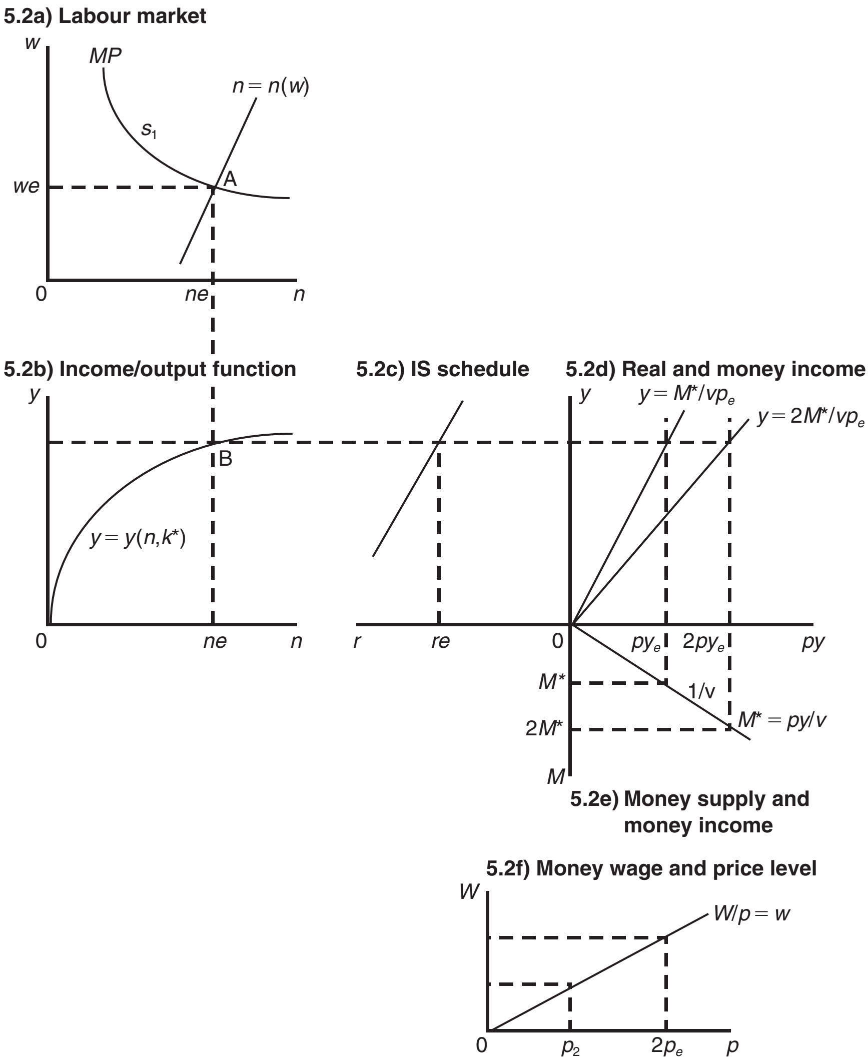


Figure 5.2 General equilibrium in a False Dichotomy model.

The other real variable to determine is the interest rate, which is done by substituting the last expression, which is equal to full employment investment, into the equation for the IS curve.

$$r_e = [(i^* + c^*) - (1 - a)y_e]/b$$

It only remains to determine the nominal wage and the price of the single commodity. From the LM curve one obtains the value of p,

$$p_e = M^*/vy_e$$

Because the money wage is price times the commodity ("real") wage, this variable's full employment value is given by the following expression.

$$W = [M^*/vy_e][(1-\alpha)y_e/n^*] = (1-\alpha)M^*/vn_e$$

The nominal values of consumption, investment, and income are similarly obtained by multiplying each by the full employment price. This is the essence of the classical dichotomy. All real variables are independent of the price level and the money supply. In this false dichotomy model money is strictly neutral. If we ignore the problem of the inconsistency between Walras' Law and the quantity theory, a doubling of the money supply leaves all real variables unchanged, while p and W double. This is the result that the more sophisticated versions of the synthesis model seek unsuccessfully to maintain.

The graphical solution in Figure 5.2 appears in six parts. First, as in Chapter 2, the labor market determines the level of output and the IS curve. The saving and investment schedules are not shown, subsumed in the IS curve equilibrium. The money market is introduced in Figure 5.2d, with the equation, $y = M^*/vp$. Values marked "*e*" indicate the general equilibrium for which both the money market and the commodity market are simultaneously cleared. Figures 5.2c, 5.2d and 5.2e explicitly show the relationship between commodity ("real") output and nominal output, and between nominal output and the price level. Finally, separate with no link to the other diagrams, Figure 5.2f gives the real wage as a ratio of W and p.

The result of an increase in the exogenous money supply is simply demonstrated. Should M^* rise to $2M^*$, the quantity equation yields $y = 2M^*/vp$. With y determined by equilibrium in the labor market and v constant, only p can change. This is shown in Figure 5.2d by a rotation clockwise of the price line, implying an increase in nominal income and movement along the line $1/v$ in Figure 5.2e. The rise in the price level is associated with an equal proportionate rise in the nominal wage, consistent with labor market equilibrium.

I can use this simple model to demonstrate the synthesis view of unemployment. In Figure 5.3 the previous set of diagrams is reproduced, with the additional assumption that the money wage is fixed at W_o (see Figure 5.3f). When called upon to relate the assumption of fixed money wages to the observed world, neoclassical economists frequently justify it by the alleged power of trade unions and legislated minimum wage regulation, though the former is hardly credible for the United States or the United Kingdom in the twenty-first century. With a fixed money wage the level of employment cannot be deduced from the labor market alone (Figure 5.3a), because that market is defined in terms of the real wage. However, one knows,

$$n_d = [p(1-\alpha)y]/W$$

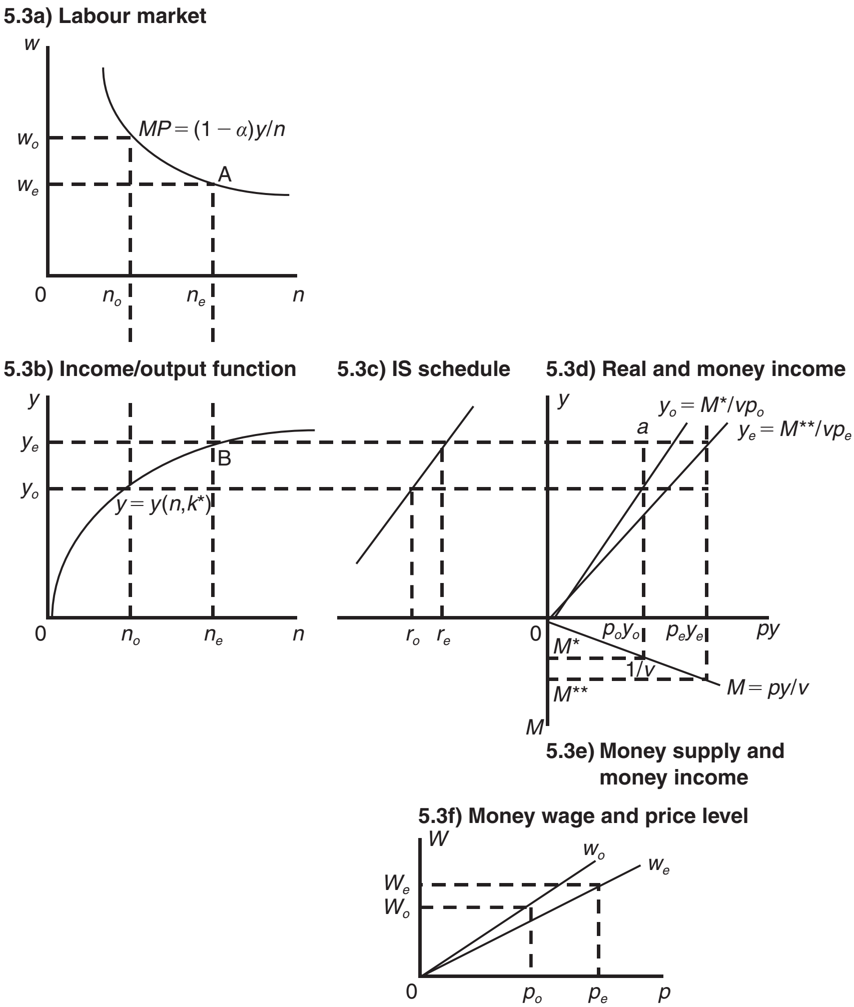


Figure 5.3 False Dichotomy model with a rigid money wage.

Because the money wage is above the full employment level, the labor input in the output/income function will be determined by n_d, the demand for labor. This level of employment is indicated in Figures 5.3a and 5.3b as n_o. Using the output/income function the demand for labor can be solved immediately. Substituting $y = M^*/vp$, one obtains,

$$n_d = [1-\alpha][M^*/vp][p/W_o]$$

$$n_d = [(1-\alpha)M^*]/vW_o$$

With a fixed nominal wage, the demand for labor is determined by the money supply, the velocity of money and the parameter $[1-\alpha]$.[3] With the level of employment determined, the output of the single commodity follows.

$$y_o = k^{\alpha}[(1-\alpha)M^*/vW_o]^{(1-\alpha)}$$

The other real variables in the solution derive directly from y_o.

$$c_o = c^* + by_o$$

$$s_o = y_o - c_o$$

$$i_o = s_o \text{ (commodity market equilibrium)}$$

$$r_o = [i^* - i_o]/b$$

It only remains to solve for the price of the single commodity,

$$p_o = M^*/vy_o$$

The real or commodity wage, at which the demand for labor is less than the supply, completes the solution. It can be expressed in two ways.

$$w = [vy_oW_o]/M^* = [(1-\alpha)y_o]/n_o$$

The first expression is the commodity wage in terms of nominal influences (M and W), and the second is the marginal product of labor. The set of values associated with the nominal wage W_o is shown in Figure 5.3. When the rigid-wage equilibrium indicated by "o" is compared with the full employment equilibrium "e", employment falls by more than the output of the commodity falls. This follows from the principle of diminishing returns, in which marginal productivity of labor rises when employment declines (w).

Second, were the money wage "flexible" and full employment achieved, the money value of the output of the single commodity would not change (noted by point a in 5.3d). This follows from the quantity equation. Because equilibrium in the money market requires $M^* = vpy$, if M^* and v are constant, py must be constant. Therefore, price must change by the same proportion as output, $p_o/p_e = y_e/y_o$. However, this proportionate increase in price is less than the proportion by which the fixed money wage exceeds the full employment equilibrium money wage, W_o/W_e. The real wage has risen because the marginal product of labor is greater for n_o than n_e.

Two results of this analysis that will be found in subsequent versions stand out as counter to commonsense. First, the model implies that a fall in production and sales is associated with a higher price level; and, second, that a fall in employment is accompanied by (caused by) a rise in real earnings for employed workers. One commonly observes the opposite in both cases: real earnings rise when labor is in short supply, and prices rise when output and sales are expanding. Most people would not associate higher money wages with an excess supply of labor, as this model does. It could be argued that these conclusions are the result of static analysis; that we do not observe these basic relationships because in the real world there are many simultaneous changes that hide the true relationships between wages and employment, and prices and output. By this argument, one concludes that the simple model and its more sophisticated versions reveal what the complexities of reality conceal. If it is the case that an increase in employment must be bought at lower wages, then the model is powerful indeed.

Paul Samuelson offered an analogy from physics to justify such counterintuitive conclusions. An object dropped from any height within the earth's gravitation pull accelerates at 32 feet per second. This general property of the earth's gravity refers to conditions in a perfect vacuum. Any actual falling body will accelerate slower, due to air resistance. The analysis of real earnings and employment is allegedly similar. The argument goes that were economists able to isolate social phenomena as physicists do natural phenomena, the conclusions of the synthesis model would be verified.

The analogy is inappropriate. It is not the case that the two counter-intuitive conclusions reached above are the result of a static analysis that abstracts from extraneous complexities. The first conclusion, that price and output are negatively related, is the result of the assumption of an exogenous money supply and a constant velocity. If the money supply is endogenous, or has a substantial endogenous component, then price and output are not necessarily inversely related even in a static model. Similarly, the second conclusion, that a drop in employment is associated with a rise in real earnings,[4] is not inherent in static analysis. This conclusion results from specifying production in terms of a single commodity output/income function. The inverse relationship between employment and real earnings (the commodity wage) is a logically consistent argument if and only if the model involves one and only one commodity.[5] Near-perfect vacuums can be approximated in laboratory conditions and in interplanetary space. One commodity economies cannot be approximated in any experiment outside the mind of the theorist.

In this model, as in all neoclassical models, unemployment is the fault of workers themselves, either because they demand a money wage that is "too high" or because they support political intervention in the labor market to establish legal minimum wages. It is common to read that organized labor benefits at the expense of unorganized labor. Higher wages for the employed are achieved at the expense of unemployment for workers who are so unfortunate as not to be in strong unions or protected by minimum wage legislation. This seems a powerful critique of the alleged monopoly power of organized labor and has passed into the folklore of conventional wisdom. There is nothing immutable or even very interesting about this conclusion, except its flagrant ideology. It follows from the arbitrary treatment of the economy as a one commodity system.

As constructed, the model suggests a simple solution to the problem of unemployment. Given the quantity equation's specification of the money market, an increase in the autonomous money supply will call forth an immediate increase in the price of the single commodity. Given W_o, a rise in price will result in a fall in the commodity/real wage, W/p. A fall in the commodity wage will induce a higher level of employment and output/income. A sufficient increase in the money supply eliminates unemployment in this model.[6] This is shown in Figure 5.3 by a shift in M^* to M^{**}. Given this new level of the money supply, the money value of output rises to be consistent with all of the full employment levels of the real variables, noted by "*e*".

Neoclassical economists have traditionally taken a negative view of this remedy for unemployment. The judgment is commonly encountered that monetary expansion involves "endorsing inflation", and what increasing the money supply achieves would also result from a fall in the money wage. The theory of individual maximizing tells one that workers should be indifferent between the two paths to full employment, because both result in the same real wage and level of employment. The ideological instinct of almost all neoclassical economists is to prefer the real wage adjustment because it allegedly involves the automatic working of the market, while monetary expansion requires government action.

5.4 The arbitrariness of the full employment solution

Even ignoring the false dichotomy inconsistency, the full employment solution to this model is unsatisfactory. A look back at Figure 5.2 shows that the investment and saving schedules were drawn such that they yielded $i=s$ at a positive interest rate for the full employment level of output/income. As one of his three famous exceptions to automatic full employment, Keynes suggested that the saving and investment schedules might be of the form in Figure 5.4.[7] In this case; there is no point on the IS curve that corresponds to full employment.

This is sometimes referred to as an "inconsistency" between saving and investment.[8] For all positive interest rates, the clearing of the commodity market implies excess supply for labor. No wage adjustment can eliminate disequilibrium in the labor market. If money wages are flexible, their fall will not induce more employment, for any output in excess of y_o cannot be sold, because r cannot fall below zero. If falling money wages result in falling prices, then the model experiences continuous deflation with no tendency to full employment. In the next chapter the inclusion of the real balance effect eliminates this problem.

Not withstanding the possible formal solutions to the "inconsistency", it conceptually epitomizes the unemployment suffered by the major capitalist countries at the end of the 2000s and into the next decade. In the United Kingdom, United States and Japan central banks reduced their rates almost to zero, yet bank lending for productive investment made no substantial recovery. It appeared that in lieu of this US banks used their excess liquidity for short-term speculation (Auerbach 2011; Galbraith 2009).

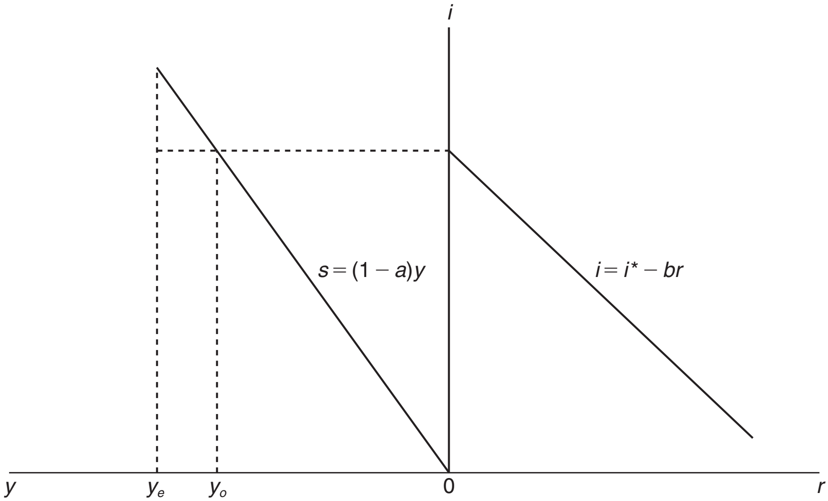


Figure 5.4 An “inconsistency” between saving and investment.

Before proceeding to more complex models, it is useful to summarize the results obtained so far. In the case in which none of the variables of the model is constrained (e.g., flexible money wages) and the functional relationships in each market are constructed to be consistent with full employment ($i = s$ at $r > 0$ for y_e), all real variables are independent of the exogenous money supply when they have achieved their full employment values. Money is strictly neutral, determining only the price of the single commodity and the money wage. If the money wage is fixed above the equilibrium level, then all variables, real and nominal, move with changes in the money supply. Any change that might be brought about by an increase in the exogenous money supply would also be achieved by a fall in money wages. The outcome of the model results from two arbitrary assumptions: that the money supply is exogenous and that there is only one commodity.

6 Logically consistent money-neutral models

6.1 A real balance effect model

The contradiction between Walras' Law and the quantity equation invalidates the false dichotomy model. That problem can be solved by the introduction of the real balance effect. Let the purchasing power of money be defined as M^*/p, *real balances*. In this section I assume that money is the only form in which people can accumulate and hold wealth. A more general treatment of wealth-holding will be presented in Chapter 7.

I assume that the consumption expenditure of households is a function of the real balances they hold. A rise in the price level reduces the wealth of holders of money, while a fall in the price level increases their real wealth. On the presumption that people have in mind some desired level of real balances or real wealth, it follows that a rise in the price level, by reducing real wealth, will stimulate a lower level of expenditure in order to replenish real balances, and the opposite for a fall in the price level.

While this behavior may appear reasonable for people taken individually, it is not necessarily true for the aggregate behavior of households. This contradiction is called the fallacy of composition, which appears in the treatment of saving. In the case of real balances, if all money is *inside money* (see Section 4.3), then in the aggregate the real balance effect is zero. The gains (losses) of asset holders are exactly offset by the losses (gains) of holders of liabilities. I shall arbitrarily assume that all money is a net asset, it is "outside".

To keep matters simple, I assume that the real balance effect influences consumption but not investment. The purchasing power of money must logically affect the demand for real balances themselves. If a person is holding an initial amount of money and is content with this amount, a rise in the price level will reduce the real value of that amount of money and leave the person with an excess demand for real and nominal balances, because one must acquire nominal wealth in order to increase real wealth. Except for the consumption function and demand for money functions, all schedules remain as in Chapter 5. The new explicit consumption function takes the following form.

$$c = c^* + ay + g[M^*/p]$$

The demand for money now has two parts, the transactions demand and the demand for real balances.

$$M_{td} = vpy$$

$$M_{bd}/p = f\,[M/p]$$

$$M_d = vpy + fM^*$$

The new functional relationships result from the distinction between real and nominal variables. Consumption demand in measured in units of the single commodity is a function of real income and real balances. Were one to multiply the consumption function by p, the result would be a function in which the money expenditure on consumption was determined by money income and nominal balances. If the price level and the money supply were both to double, money expenditure on consumption would double, but consumption measured in units of the single commodity would be unchanged.

Moving to the new consumption function, the IS curve is (μ is the multiplier),

$$y = \mu[c^* + i^* - br + g(M^*/p)]$$

Clearing of the money market requires that $M^* = M_{td} + M_{bd}$. Behavior has been re-specified to include real balances. The demand for money function shows that agents in the aggregate hold a proportion of the money supply as idle balances, and this is independent of the price level. This simple assumption indicates that the desire is to maintain a certain level of real wealth, rather than seeking to maintain some level of nominal balances. Were agents to set their goal in nominal terms, the result in neoclassical language would be called "money illusion".[1]

The money market equilibrium condition is,

$$M^* = vpy + fM^*$$

$$M^* = vpy/(1 - f\,)$$

Before considering the equilibrium of this model, it should be verified for internal consistency. The excess demand equations for money implied by the simple quantity equation and Walras' Law contradict each other. The real balance effect eliminates the inconsistency.[2] From a position of full employment equilibrium, should the price level double, the real balance effect in the demand for money equation creates an excess demand for cash balances. Operating in the consumption function, it simultaneously generates excess supply of the single commodity. A rise in the price induces people to hold more money and to buy fewer commodities. Excess supply in the commodity market results in a fall in price, which eliminates the disequilibrium in both markets.

As before, I first find the general equilibrium solution algebraically. The labor market functions are the same in this model as in the previous. As before, the commodity wage at full employment is,

$$w_e = (1-\alpha)y_e/n_e$$

and

$$y_e = (k^*)^{\alpha}(n_e)^{(1-\alpha)}$$

In the previous model it was possible at this point to move to the IS curve and determine investment, saving and the interest rate. Now, the IS relationship includes the real balance effect. I must first derive p_e in order to find the equilibrium value of M^*/p. From the condition for money market equilibrium I can write $p = (1-f)M^*/vy$. Therefore,

$$p_e = (1-f)M^*/vy_e$$

The money wage is $pw = W$, and when the substitutions are made,

$$W_e = [(1-\alpha)(1-f)M^*]/vn^*$$

t return to the IS curve.

$$y_e = \mu[\mathrm{c}^* + i^* - bdr_e + g(M^*/p_e)]$$

If I substitute for p, the nominal money supply is eliminated and the IS schedule is again a function of only one variable, the interest rate.

With y_e determined, the equilibrium interest rate, r_e, can be found, as well as c_e, i_e, and s_e). Money is neutral in this model. A review of the solution to the full employment equilibrium shows that neither the money supply nor the price level enters the behavioral equation for any real variable. By introducing the real balance effect Patinkin pulled off an extremely clever conjuring trick. Superficially, money appears to play a more central role in this model than in the Classical false dichotomy case. The effect of making the demand for money more complex is to achieve the Classical goal of neutrality while resolving the excess demand for money dilemma on which the Classical model floundered. The trick was achieved by introducing another "real" variable M^*/p, which algebraically is nothing but a fractional part of real output/income itself.

The introduction of y in disguised form has a profound consequence: it eliminates the possibility of a full employment solution being blocked by the inconsistency between saving and investment (see below). Three-quarters of a century later, no one has improved upon the simplicity of Patinkin's rescue of the Classical system from its internal inconsistencies of equilibrium adjustment.

The full employment solution to the model with the real balance effect can be presented graphically. In the rather complicated Figure 6.1 the analysis begins

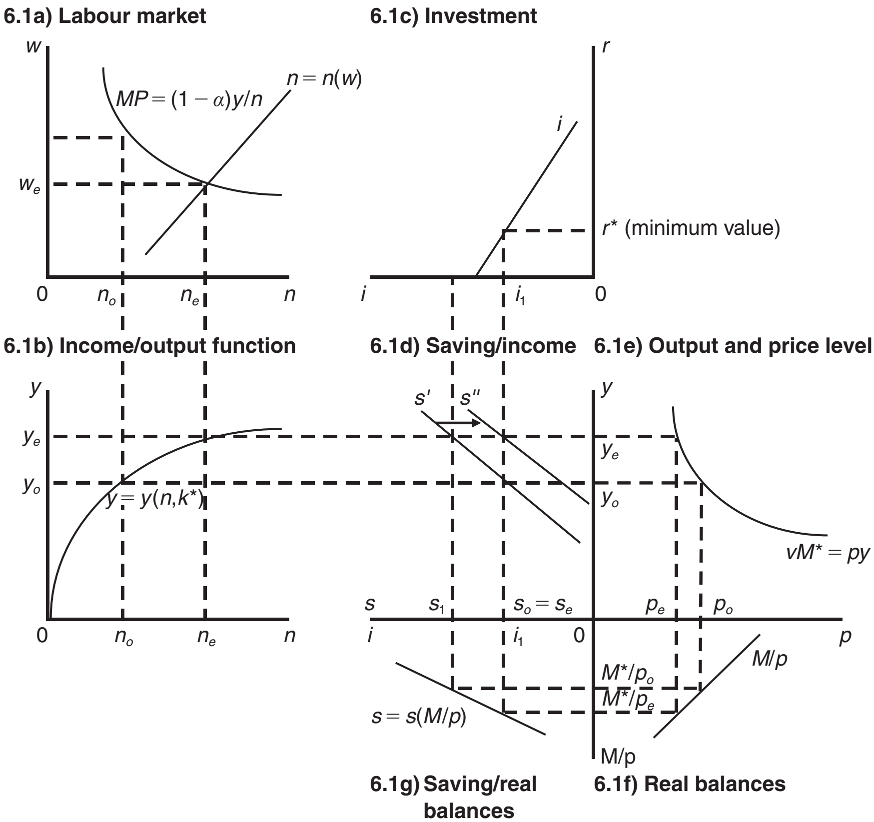


Figure 6.1 General equilibrium in a classical model with a real balance effect.

with the labor market (part 6.1a). The full employment equilibrium solution in itself is of relatively little interest. I consider it to establish its existence and ensure that there are no conditions that would render it a special case. In the false dichotomy model full employment was a special case even if wages and prices were flexible. This was because there was no mechanism to ensure that saving and investment could be equated at the full employment level of output/income. That problem is formally eliminated in the real balances model.

Consider the possibility that the saving schedule is s' (Figure 6.1d), the investment schedule is i (Figure 6.1c), and r^* is the minimum to which the rate of interest can fall. For these parameters, at the full employment level of income/output the level of saving must be of s_1. To achieve full employment it is necessary for households to save less (spend more) at every level of income, so that $i{=}i_1{=}s_o{=}s_e$. The real balance effect provides the mechanism to shift the saving function to eliminate the excess supply of commodities and achieve the full employment outcome.

The real balance effect is activated by changes in the price level, shown in Figure 6.1e. Because the transactions demand for money equation is the same as for the false dichotomy model, the relationship between the price level and real output is a rectangular hyperbola (the price level times the level of output is a constant). Let the initial price level be p_o. The excess supply of commodities ($s_1 > i^*$ for y_e) induces a fall in price according to Walrasian rules of markets. The fall in price cannot directly eliminate the excess supply, because lower prices generate lower incomes. The fall in the price level results in a rise in M^*/p (Figure 6.1f), which activates the real balance effect.

With real wealth increasing, there is movement to the right along the savings schedule in Figure 6.1g, where s is a function of M^*/p. This movement implies a shift to the right of the saving schedule in Figure 6.1d, where s is a function of y. A falling price shifts the saving-income function such that less is saved at each level of income. When the saving-income function has shifted such that schedule s'' prevails, the full employment level of output/income is achieved, such that $i = s$ for y_e (Figure 6.1b).

This logical sequence demonstrates the extent to which the solution to full employment comes from the labor market. At first inspection it appears that the consumption and the saving schedules were independent of other functions in the system, though sharing some of the same variables. However, the position of the saving function in Figure 6.1d is dictated by the labor market. Given equilibrium in the labor market, M^*/p is determined. The money supply is exogenous and only one price level is consistent with full employment. Two components of the solution, y_e and M^*/p_e determine everything. This can be seen in Figure 6.1 by again referring to the investment and saving functions. With the initial saving/income function s', investment schedule i implies a level of saving of s_o in Figure 6.1d. Moving left to Figure 6.1b, this level of saving implies income level y_o and level of employment n_o. Figure 6.1a reveals that the labor market is in excess supply and that the real wage is above its equilibrium level. This level of income cannot be an equilibrium if wage and price are flexible.

Unemployment in disequilibrium in this case is *not* the result of the real wage being too high. This is an extremely important point and will loom large in the next chapter. The excess supply of labor in this model is the result of the position of the investment function. That the real wage is above its equilibrium level is the *symptom* or manifestation of a problem arising in the commodity market, where s and i cannot be equated at full employment. Keynes sought to establish precisely such a conclusion: if the real wage is above its equilibrium level this is the consequence not the cause of unemployment.[3] But the real balance effect brings the blame for unemployment back to roost in the labor market, because if the price level does not fall, the guilt lies with "sticky" money wages. Were there no mechanism to shift the saving schedule to eliminate the inconsistency between i and s, unemployment would unambiguously be involuntary in the model. Idleness would be thrust upon workers by circumstances over which they had no control. The real balance effect plays an extremely important ideological role by removing the prefix "in" from "involuntary unemployment".

Now, we return to the saving/income function in Figure 6.1d. If one moves to the right, it is discovered that a less-than-full-employment level of income, y_o, implies a level of money income the same as at full employment, as in the false dichotomy model. The money value of income does not change because nominal balances are a constant portion of the money supply. The money available for transactions balances is a constant if the money supply is constant (M^*).

Consider an *ex machina* increase in the price level above the full employment price level. If money income does not change, real income must be lower, $y_o < y_e$. This occurs because a higher price results in a fall in M^*/p, which increases saving for any level of income, creating excess supply in the commodity market. In the labor market this inconsistency is resolved, because $n_o < n_e$ results in falling money wages. All workers re-contract under the gavel of the auctioneer (see Section 2.3). In a perfectly competitive world, falling money wages prompts a falling price. While this cannot directly equilibrate the labor market, it reverses the fall in M^*/p. As M^*/p rises, there is a moment along the saving schedule in Figure 6.1g, which dictates a shift downwards in the saving-as-a-function-of-income schedule in Figure 6.1d. This continues until the saving/income schedule finds its full employment intercept in Figure 6.1c. No other intercept for the saving function is consistent with the parameters of the model.[4] Full employment is achieved, and y_e is unique.

The docile movement of the saving function to serve the needs of equilibration in the labor market indicates how far the neoclassical model moved from Keynes's analysis in *The General Theory*. Keynes's general conclusion was that the level of employment in a capitalist economy was dictated by conditions in the commodity market, "effective demand". The real balance effect returns one to a classical world in which the clearing of all markets is derivative from the instantaneous, Walrasian adjustment of wages and prices. In the next section I consider a "Keynesian neoclassical" model in which the commodity market can under limited circumstances achieve the importance Keynes assigned to it. Its moment in the spotlight is brief, however, for in Chapter 7 the real balance effect is re-introduced in general form and the commodity market again plays only a supporting role.

6.2 Interest-elasticity money market model

In this section I present what was once called "the Keynesian model" or the "complete Keynesian system".[5] It omits the wealth effect, though writers frequently made ad hoc reference to it when discussing exceptions to full employment equilibrium. What allegedly made the model "Keynesian" is the introduction of the interest rate into the function for the demand for money.

Unsynthesized Keynesians as well as pure neoclassicals agree that the demand for money should be modeled as interest-elastic. Controversy has waxed and waned as to the theoretical justification. In *The General Theory* the interest elasticity of the demand for money is closely related to Keynes's treatment of uncertainty and the expectations of capitalists. Keynes stressed the obvious fact that a capitalist economy creates an environment that is inherently uncertain. He argued that to a great extent economic fluctuations are a result of uncertainty and the behavior of capitalists in response to uncertainty. Central to his treatment of uncertainty and expectations was the presumption that the future is both unknown and unknowable. No amount of information about the past and present can do more than indicate what will occur in the future. Further, predictions based upon full knowledge of the past and present are frequently contradicted by what occurs in the future.

Keynes argued that capitalists hold cash for speculative purposes. Speculation occurs because the future cannot be accurately predicted, which creates the potential for making money by guessing outcomes. The role of speculation in the demand for money can be shown by assuming the simple case in which wealth can be held in only two forms, money itself and interest-yielding bonds. For the moment I ignore the transactions demand for money. In this simple example of money and bonds, assume that a capitalist knows without doubt that the prevailing interest rate would persist for the foreseeable future. On the basis of such knowledge there would be no reason to hold money. With each passing moment the holder of money forgoes interest income.

If the capitalist has suspicions that the interest rate might rise or fall, but is not certain, the situation is different. A fall in the interest rate would increase the market value of bonds, while a rise would decrease bond value.[6] It follows that optimizing holders of wealth will keep a large portion of their wealth in money form if they anticipate a rise in the interest rate, and in bonds if they anticipate a fall in the interest rate. If all wealth holders have the same anticipation (guess) of what the interest rate would do at any moment, they all would either want to hold only money (anticipating a rise in the interest rate) or hold only bonds (anticipating a fall).

Because it seemed to him self-evident that the future could not be accurately predicted, Keynes presumed that everyone would not have the same guess about what coming events would bring. At any prevailing interest rate some wealth holders anticipate a rise in the interest rate, while others anticipate a fall (and some think it will not change). As a result of these mixed anticipations, some hold money and others hold bonds. If one assumes that the higher is the interest rate the fewer are those who think it will go still higher, and vice versa, then the demand for speculative balances is inversely related to the interest rate.

The bond and money markets are analogous to a horse race. Every race may have a predicted winner, the “favorite”, that has the lowest payoff. All gamblers (“punters” to use the British term) do not bet on the favorite, because the favorite does not always win. People bet on different horses because the outcome of a horse race is inherently uncertain. A gambler can have possession of all possible knowledge and still select a losing horse.

This view of the markets, that they are dynamic and subject to changes that at best people can only vaguely anticipate, was rejected by the neoclassical synthesis. This was most explicit and unabashed in the rational expectations, New Classical Economics school, treated in a later chapter. Not only do these latter-day pre-Keynesians model a world of predictable outcomes, they also assert that the actual world is no different. This is a clear case of "nature imitating art" (Oscar Wilde). The synthesis, even in its pre-rational expectations days, was never at home with Keynes's treatment of uncertainty. His explanation for an interest-elastic demand for money was rejected in the literature in favor of explanations that yield similar functional forms, but are consistent with predictable and certain outcomes.[7]

Neoclassical monetary theory has reformulated the interest-elastic demand for money in terms of opportunity cost, which is interest income lost as a result of holding money (an asset with a return of zero). To the extent that Keynes's speculative motive was retained, it has little resemblance to the original concept in which the non-predictability of the future and the volatility of expectations played such a central role. An interest-elastic demand for money can be inferred from the transactions demand alone. The idea is quite simple. A person has a certain chronological sequence of income receipts and a certain sequence of payments to make.

In general these two sequences will not coincide. Assume there is a cost to shift funds from bonds and other forms of wealth. An optimizing agent will hold some cash idle even if the income sequence and the payment sequence are known with certainty. In other words, a wealth holder will not send a sell order to his bond broker every time he buys an ounce of caviar. Other things equal, such as the brokerage cost of a transaction on bonds, the higher the rate of interest the less attractive it will be to hold idle a given amount of cash. This line of argument implies that the transactions demand for money is a function of the anticipated value of exchanges and the commercial interest rate.

As in the previous model, the demand for money is specified in terms of real balances. In general form, this can be written as $M_d/p = L(y, r)$, with the letter L indicating that this is the liquidity preference function. As before, the exchange-motivated demand for money is vpy. To this I add an interest rate element, and obtain the following.

$$M_d/p = vy + [h - jr]$$

The notation for the demand for money is indicated by the letter "*d*", indicating that the reader can attribute its interest elasticity to a number of motivations (transactional, precautionary and speculative) and obtain the same function. Equilibrium in the money market requires that supply equal demand, or $M^*/p = M_d/p$. This yields the LM curve, which shows all possible points of equilibrium for the supply and demand for money. As with the IS curve above, it can be solved for y in terms of r.

$$y = ([(M^*/p) - h] + jr)/v$$

In money market equilibrium, income is a positive function of the interest rate. The reader can note that it is a quite satisfactory neoclassical result. Because in the commodity market equilibrium income is a negative function of the interest rate, we now have two functions in y and r, which if they intersect at all in the positive quadrant must yield a stable equilibrium.[8] The LM curve has a positive slope because a higher interest rate results in a fall in holdings of cash. This represents a shift of cash from idle to active balances as the commercial interest rate rises, making more money available for and seeking commodity transactions. If the commodity price is assumed constant, equilibrium can be maintained only by an increase in output/income. A rise in the interest rate creates an excess supply of idle balances and an excess demand for commodities. With a fixed price, the excess demand for commodities calls forth a greater supply to satisfy it.

If the Keynesians were discontent with the neoclassical treatment of consumption and investment (combining them in the IS curve), they would be no happier with the LM curve. In both cases all distinction between more and less volatile economic behavior is obliterated. Treating investment and consumption as equally stable functions of two variables, income and the interest rate, eliminates what Keynes and other economists considered to be the main source of fluctuations on the demand side. The IS treatment implies an abandonment of what in the thirty years after *The General Theory* was called "business cycle theory", an attempt to explain why developed capitalist economies exhibit systematic fluctuations in the level of aggregate economic activity. If one presumes the investment function to be stable and analytically indistinguishable from the consumption function, then stability and equilibrium are the subjects of theory, not fluctuations.

As with investment and consumption, Keynes distinguished between the income related demand for money and the interest rate related demand in order to focus in both cases on the relative stability of the former and the relative instability of the latter. On theoretical grounds and from his experience in financial markets, he concluded that the interest-elastic demand for money was an inherently unstable function, and, therefore, a central cause of the cyclical volatility of capitalist economies. This, in turn, was part of his argument that money economies are inherently unstable if left unregulated.[9] If the demand for money is volatile in the sense that agents quickly and unexpectedly change their targets for idle balances, then markets are rendered unstable. The commodity market is upset by sudden shifts in effective demand, which are passed on to the labor market. The money market is affected directly, undermining the role of the rate of interest in equilibrating saving and investment.

With the introduction of the LM curve, the demand for money is discarded as a possible source of instability. The simple neoclassical model is complete. First, the labor market was specified in terms of the commodity wage and a notional demand for labor, that assumed that firms have no sales (demand) constraint. This was followed by formulating the commodity market to eliminate the distinction between consumption and investment, and, therefore, any distinction between saving and investment. Now the money market has been modeled to ensure stability. It only remains to solve the complete model for equilibrium.

Before solving the model, it should be investigated whether it is consistent with Walras' Law. The situation is now complicated by the introduction of another market with an additional vendible article, "bonds". With the introduction of bonds, the excess demand for money becomes equal to the sum of the excess demands for the commodity and bonds. Looking at the excess demand for money implied by the liquidity preference function, we see that it is determined by the interest rate, the commodity price, and the level of income. The same is the case for the excess demand for the commodity and bonds. A rise in the price level increases the excess demand for money and decreases the excess demand for the single commodity, both in a linear relationship. A rise in the interest rate increases the excess demand for bonds and decreases the excess demand for money. The two excess demand equations for money are consistent.

We can move to the full employment general equilibrium solution. The steps follow as before, beginning with the labor market, where the same functions are employed as in the first two models.

$$y_e = y_e = (k^*)^{\alpha}(n_e)^{(1-\alpha)}$$

$$w_e = [1-\alpha]y_e/n_e$$

$$c_e = \mathrm{c}^* + ay_e$$

$$s_e = [1-a]y_e - c^*$$

$$i_e = s_e$$

$$i_e = i^* - br_e$$

At this point we encounter a difference compared to previous models. Unlike previously, the interest rate must work to clear the money and bond market as well as to equate investment to saving. The same equilibrium interest rate must satisfy the commodity market. Following convention, I solve for the r which satisfies the IS curve, then use that r elsewhere as needed. Such a procedure is valid only if one knows in advance that all functional relationships will be consistent with full employment, because the solution is a simultaneous one in which r must satisfy more than one equation.

As in the false dichotomy model, solving for r_e yields the following:

$$r_e = \mu[(c^* + i^*) - (1-a)y_e]$$

With the interest rate determined, we move on to the demand for money; M_d:

$$M_d = p_e v y_e + h - jr_e$$

This expression contains a variable yet to be determined, the equilibrium price, p_e. The value of this nominal variable can be found from the equilibrium condition for the money market, the LM curve.

$$M^* = p_e v y_e + [h - jr_e]$$

This equation implies,

$$p_e = (M^* - [h - jr_e])/vy_e$$

It only remains to determine the money wage, W_e.

$$W_e = [(1-\alpha)\,y_e p_e]/n_e$$

Money is neutral in this model. Looking at the equation for p_e, we see that both y and r have been determined elsewhere by the equilibrium condition $i=s$. As a result, they can be taken as given. Should the money supply, M, double, the price level will double with no change in any real variable. Because a doubling of M^* implies a doubling of p, the implicit real variables M^*/p (and M_d/p) are unchanged.

The full employment general equilibrium solution is easily demonstrated diagrammatically. In Figure 6.2 the analysis begins, as always, with the labor market. In order to make the equilibrium conditions explicit, IS and LM curves have not been used, but rather the functional relationships which underline them.

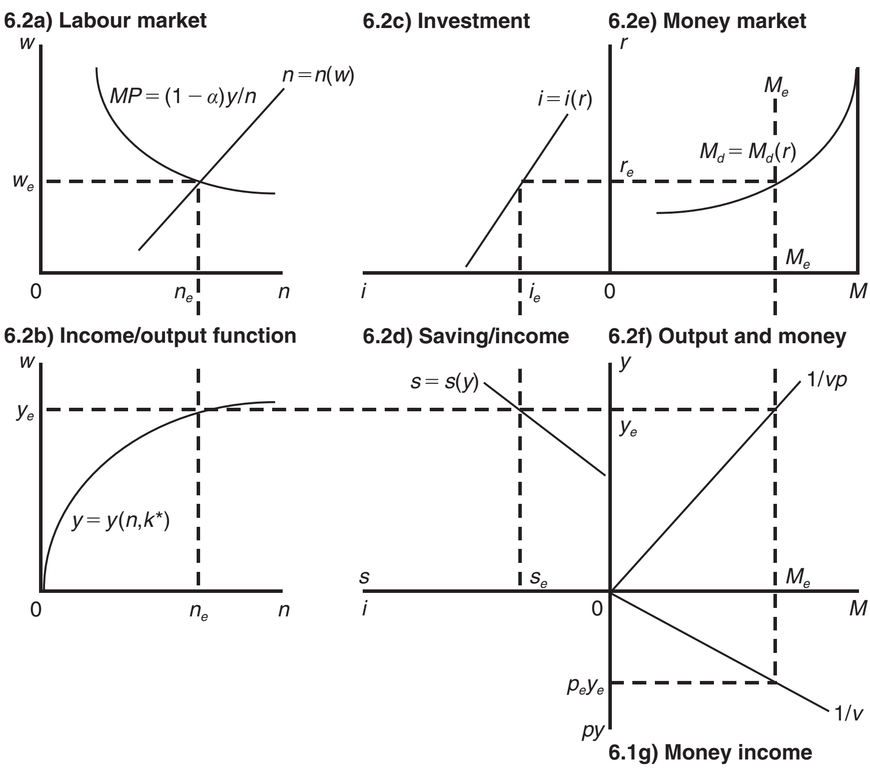


Figure 6.2 General equilibrium in the "complete Keynesian system".

By now the sequence of logical events should be familiar. In Figure 6.2a we have the notional demand curve for labor and the notional supply. The demand for labor schedule assumes that firms act as if they have no sales constraint; i.e., it assumes a Walrasian process in which there is no False Trading. In the labor market output/income is determined, unless somewhere else in the model one encounters conditions that contradict full employment. In Figure 6.2b, full employment output/income is shown explicitly as y_e. To the right is the saving function (Figure 6.2c), and above it in Figure 6.2d is the investment function, in which the interest rate adjusts to equate investment and saving. All of this differs in no way from the false dichotomy model, and establishes the values of the "real" system, with the exception of M^*/p.

In this model the interest rate, coming from the equality of saving and investment, divides the money supply between idle and active balances (Figure 6.2e). The distance M_e to the vertical line M^* are cash balances. As defined, M_e indicates is the portion of the money supply that is available to facilitate transactions (in 6.2e it is $[M^*-M_e]=vp_ey_e$). At full employment equilibrium, money is a "veil" over the real system in this model in the sense that money is strictly neutral.

The interest-elastic component of the demand for money, introduced by Keynes to explain the observed instability of a money economy, in this interpretation merely determines the transactions supply of money as a residual. Whether this residual is large or small, and the interest rate low or high, is no consequence in the model. If the schedule in Figure 6.2e were more elastic with respect to the interest rate, M_e would move to the left, also in Figure 6.2f and 6.2g. This would require a lower price. The line $1/vp$ would rotate clockwise in Figure 6.2f, but full employment is consistent with any price level. To paraphrase a sarcastic remark by Karl Marx, the entire national income could be circulated by a single penny, if that penny could be divided into enough parts (Marx 1970, 63).

The addition of a fixed money wage to this "complete" version of the so-called Keynesian model results in unemployment, as in previous models. The result is hardly different from invoking the same assumption in the false dichotomy model. This is shown in Figure 6.3, which should be compared with Figure 5.3. Let $W=W^*$, with W^* above the full employment equilibrium level. Now it is considerably more complicated to solve the system for the values of the variables than was the case in the same model with unconstrained full employment. The complication arises because the level of employment is determined by the commodity wage, but the commodity wage cannot clear the labor market because the money wage is above its only possible full employment value. In this variation of the model the commodity wage, w_o is derivative from the level of employment, not vice versa. Employment is set by the level of aggregate demand, which reflects the two arbitrary parameters M^* and W^*.

Understanding is facilitated by dispensing with the algebra and going directly to Figure 6.3. As we know, only one money wage is consistent with the commodity wage w_e. By assumption ($W^*=W_o>W_e$), meaning that the model cannot be at full employment. To reduce the complexity of the diagrams, the money wage function is not shown in Figure 6.3. If some labor is unemployed, this

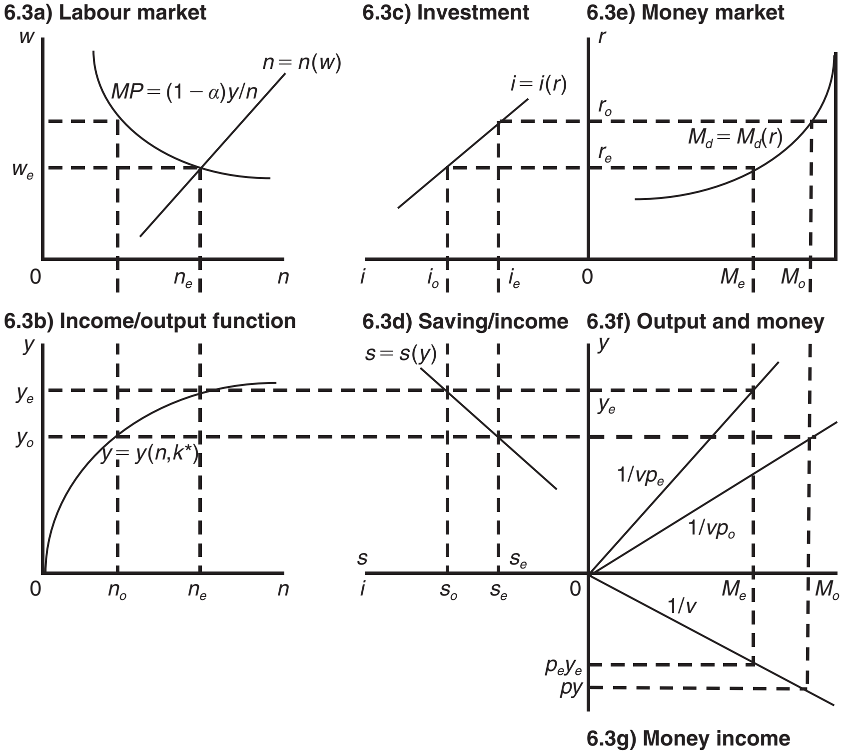


Figure 6.3 Fixed money wage in the "complete Keynesian system".

requires that the commodity wage associated with ($W^* = W_o$) be above the full employment commodity wage ($w_o > w_e$). When employment falls below n_e to n_o, output/income falls to y_o. Because saving is a function of income, saving falls to s_o. This lower level of saving must equate to a lower level of investment in order that the commodity market clears. With investment greater than saving, the interest rate must rise to clear the commodity market. The mechanism for the interest rate is that the combination an excess demand for bonds and an excess supply of money prompts a sale of bonds that lowers their bonds. By definition this increases the money available for transactions. The price level rises, because the level of output/income is lower and the quantity of money chasing commodities has risen.

This last sequence, the release of more money for transactions, results in yet another strikingly counter-intuitive conclusion of neoclassical theory. The previous, simpler models predicted that falls in employment and output/income would be accompanied by a rising commodity wage, money wage, and price level. Now, a fourth unexpected outcome appears. With the inclusion of an interest-elastic demand for money, less than full employment equilibrium results in a money value of output/income that is *higher* than at full employment. A higher interest rate implies a greater transactions supply of money. In the aggregate people are better off in nominal terms but worse off in real terms. Money, the model tells us, is not only a veil but is actively misleading of real relationships. It is fortunate that neoclassical rational agents, unlike mere mortals, are not victims of money illusion.

As in previous models, the labor force is to blame for unemployment. Given the functional relationships represented in Figures 6.2 and 6.3, the model fails to achieve full employment equilibrium if the money wage is inflexible downwards. The present model and the false dichotomy version arrive at the same conclusions, and the similar outcomes indicate an interesting aspect of neoclassical macroeconomics. Its analysis can be and is made progressively more complicated, adding an interest-elastic element to the demand for money in the current case. Yet, its message remains the same: workers are to blame for unemployment. More generally, any failings of capitalism result from the actions of workers (and government, discussed in Part V).

This analytical invariance is both a strength and a cause for disquiet. It is a strength in that apparently the simplistic version of the model tells the same story as the more sophisticated and esoteric versions. It appears all levels of complexity yield the same conclusions. This could be viewed as evidence of analytical generality. However, the value of analytical invariance is open to question. When all avenues of inquiry lead back to the same conclusion, doubt is sown as to whether the more complicated and sophisticated journeys are necessary. One normally thinks of science as progressing by uncovering new and sometimes startling discoveries that disprove accepted doctrine and create new paradigms. The neoclassical school seems content to define progress as finding new ways to verify what it has known for over two hundred years.

6.3 The "liquidity trap"

The full employment solution in this last version of the synthesis model is in serious need of the Wealth Effect. The inconsistency between saving and investment, discussed in Section 6.1, returns here. Its impact in this model is the same as before, so there is no need to labor it. However, the introduction of the interest-elastic demand for money creates the possibility of another logical barrier to full employment, the "liquidity trap". This term refers to the possibility that at some low rate of interest the demand for idle balances may become infinitely elastic. The Liquidity Trap concept is commonly attributed to Keynes. Leijonhufvud argues that it is not to be found in *The General Theory*. Be that as it may, its inspiration comes from Keynes's stress upon the volatility of the demand for money.

One explanation for the existence of the liquidity trap is that the interest rate might at some moments be so low that all wealth holders would anticipate it to rise in the near future. An anticipated rise would imply a fall in the price of bonds and induce wealth holders to have a strong preference for money to avoid a capital loss. Alternatively, wealth holders might wish to hold only money because the rate of interest is so low that it does not justify the default risk involved in holding bonds. Whichever the case, liquidity trap behavior need not necessarily present a problem for the logic of full employment equilibrium. Difficulty would arise if the interest rate required to equate saving to investment at full employment were below the interest rate at which the demand for idle balances becomes infinitely elastic.

The logical consequence of the liquidity trap is demonstrated in Figure 6.4. Only the commodity and money markets are shown. The mechanism by which the interest rate changes in this model needs explicit explanation. Changes in the interest rate are the result of disequilibrium in the portfolios of wealth holders. If there is an excess demand for money, wealth holders sell bonds, which drives down the bond prices and pushes up the rate of interest. If there is an excess supply of money, the resultant purchase of bonds drives the interest rate down. If at any moment the interest rate is above the full employment level, an excess supply of money is required that will induce bond purchases by wealth holders.

An increase in the demand for bonds increases the price of bonds, which by definition implies a fall in the interest rate. In the case of Figures 6.2 and 6.3, an excess supply of money could be brought about by the commodity price falling according to Walrasian rules. Were price to fall, the transactions needs for cash would decline, creating an excess supply of money and an excess demand for bonds. The situation is different in Figure 6.4. As before, disequilibrium in the commodity market logically causes price to fall, and a decline in p releases money from transactions needs. But in Figure 6.4 a decline in price cannot

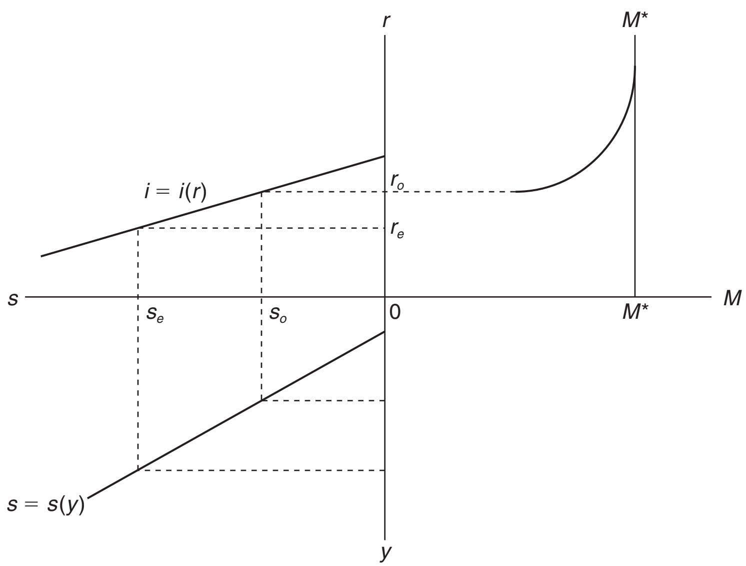


Figure 6.4 Full employment blocked by the liquidity trap.

rectify the situation, because wealth holders will absorb any amount of money into their portfolios as idle balances. The situation depicted is indeterminate. With an instantaneously adjusting money wage and price the model implies continuous deflation with no remedy in logic.

If one wished to relate the diagram to some real world process where presumably wages and prices do not fall without limit, it would be sufficient to presume that the demand for money were extremely elastic with respect to the interest rate, rather than infinitely so. While in theory a full employment equilibrium exists, the price decline necessary to achieve it would be catastrophic for the economy. This was the judgment made by Keynesians. Their remedy for a liquidity trap would be to increase aggregate demand through public expenditure or lower taxes. Graphically, fiscal intervention could be represented by a parallel shift to the left of the investment schedule, so it becomes $(i+A)$, with A standing for real public expenditure.

There has been considerable debate over the empirical importance of the liquidity trap. However, empirical arguments are irrelevant in the context of the synthesis model. Were one to start requiring empirical credentials for concepts, the liquidity trap would fare quite respectably alongside the wealth effect, the interest elasticity of the investment schedule, and the aggregate production function, not to mention the assumption of a single commodity world and the instantaneous equilibrating of markets. The model is a logical one, and defending it by singling out awkward aspects for the acid test of empirical evidence, while exempting others from the same test, is inconsistent, to say the least. The issue is a logical one: can the synthesis model be formulated to preclude theoretically the possibility of the liquidity trap blocking the full employment solution? The answer is "yes". The rescue is achieved by introducing the wealth effect, not as an aside to be placed in a footnote, but as an integral part of the model. This approach is pursued in the next chapter.

The liquidity trap concept fell out of favour in the 1970s (or earlier), rarely included in courses and viewed as a Keynesian curiosity. However, it would return to haunt the world economy in the 1990s when interest rates in Japan fell to zero, and at the end of the 2000s when interest rates in the United States also approached zero. The relevance of the liquidity trap to the global financial crisis at the end of the 2000s was pointed out by Liejohufvud (Liejonhufvud 2008, 2).

7 The "complete" model with a wealth effect

7.1 Inside and outside money

The final version of the synthesis model includes the wealth effect. It differs from the real balance effect model in Section 6.1 in an important respect. In that model money was the only asset. Once the demand for money is interest elastic, the model includes bonds. The inclusion of bonds as part of wealth is logically necessary, not arbitrary. If by whatever theoretical argument the demand for money is interest elastic, then there are bonds in the system, and these bonds are part of wealth. If the demand for money is not interest elastic, then we return to the naive "classical" model of Chapter 5 or the real balance effect model of Chapter 6.

Before considering the wealth effect, it is necessary to return to the discussion in Chapter 4 of "inside" and "outside" money. "Inside" money is not a net asset. For each unit of money there is a debtor and a creditor. "Outside" money refers to money for which there is no canceling liability. Debate once raged over whether the money supply in abstract models and actual economies should be treated as primarily inside or outside (Lagos 2006). A similar debate raged over bonds. It is obvious that bonds issued by corporations are not net wealth by the neoclassical test. The debt of the issuing institution cancels the credit of the bond-holder. Controversy arises over bonds issued by governments. This controversy need not distract us, though it is of great importance to neoclassical monetary theory.[1] I assume that the bonds in the model are outside and represent net wealth. If there are no outside bonds, then we return to the complete Keynesian model of the previous chapter, in which money is neutral but there may be no full employment solution.

The argument over inside and outside wealth indicates the extent to which capitalist societies are controlled by illusions arising from property relations. Private bonds and other private securities represent productive assets, buildings, machines, vehicles, etc. These productive assets are by any commonsense judgment society's true wealth, the source of its material well-being. For example, in a non-exchange society, no one would argue that land and the means of producing on land were not net wealth. The debate over inside and outside money and bonds involves what Marx called "commodity fetishism", in which the fundamental character of wealth is obscured because of its role as a commodity.

By passing through a moment in which they are exchanged, productive assets assume a money form, though their essential character is material wealth. Neoclassical economics focuses on the exchange of assets and ignores their role as real wealth. Emphasis on *individual exchange* enhances the process by which the material nature of assets is obscured. In every exchange there is a buyer and a seller. In the case of bonds, the buyer purchases the credit aspect of the bond and the seller receives the debit aspect. Though this is true by definition, it does not alter that the exchange of assets may have involved a net accumulation of wealth for society as a whole.

7.2 Specifying the wealth effect

In the model in this section bonds are "outside". The symbol B^* will stand for the aggregate interest yield on bonds. I assume that bonds are issued with a fixed contractual interest yield in pounds, dollars, etc. The total interest yield is given at any moment, because the number of bonds in circulation is given. If the market rate of interest is r, then the aggregate market value of bonds is B^*/r. For example, if the interest yield on bonds is ten billion dollars and the market rate of interest is 10 percent, then the aggregate value of bonds is one hundred billion dollars. If all bonds and all money were outside, then aggregate wealth, Q, is $[M^*+B^*/r]$. Real wealth is $q=Q/p$.

The impact of q on the various variables in the model is the *wealth effect*, or Pigou effect. This new variable, q, is introduced into all relevant functional relationships, saving, investment, the demand for money and the demand for bonds. Further, the interest rate is included as a determinant of saving. To keep notation simple, the functional relationships are written in implicit form, breaking with the practice of the previous two chapters.

$$s=s(y, r, q[r, p])$$

$$i=i(y, r, q[r, p])$$

$$M_d/p=m(p, y, r\ q[r, p])$$

$$B_d/p=b(p, y, r\ q[r, p])$$

The discussion of adjustment to general equilibrium will prove quite complex, so a clear understanding of each behavioral relationship is necessary. The *saving function* is now more complex. As before, increases in income induce more saving. The interest rate has a direct effect and an indirect effect on saving through its impact on wealth. An increase in the interest rate directly generates more saving by raising the opportunity cost of current consumption. The increase in the interest rate also stimulates further saving because it reduces the real value of bonds. The decline in the value of bonds reduces total wealth, provoking people to save more to restore their desired real wealth position. Finally, a rise in the price level stimulates saving by reducing real wealth.

The interest rate also plays a dual role in the *investment function*. The direct result of an increase in *r* is to reduce investment expenditure. Working through real wealth, *q*, the increased interest rate also depresses investment by reducing the real value of bonds and total real wealth. This mechanism, decreases in real wealth reduce investment and *vice versa*, is based upon a portfolio-adjustment argument. If a firm initially holds its desired portfolio, a decrease in the value of financial assets, for example, due to the interest rate increasing, would provoke a switch from investment in productive assets to bonds to restore the original portfolio balance. Similarly, a *ceteris paribus* rise in price depresses investment by reducing real wealth, both for money and bonds.

Interactions become more complicated for the *nominal demand for money function*. The impact of output/income is straightforward and positive as before, but both price and the interest rate have dual effects. For the interest rate the direct and indirect effects are in the same direction: an increase in the interest rate directly raises the opportunity cost of idle balances. Working through *q* it reduces the value of bonds, and with less total real wealth optimizing agents desire to hold less money in real terms. The impact of price is ambiguous, however. An increase in price raises the nominal value of exchanges, inducing larger nominal holdings of money for transactions; but by reducing real wealth in both bonds and money, it reduces desired real money holdings.

The impact of variables on the *real demand for bonds* is analogous to the impact on the commodity. Increases in income raise the demand for bonds, and an increase in price decreases it by reducing real wealth. In this case the interest rate plays an ambiguous role. By reducing the real value (price) of bonds, a rise in the interest rate stimulates demand, but by simultaneously reducing real wealth *via* those same bond prices, an increased interest rate also depresses the demand for bonds. However, the net effect of the interest rate on the demand for bonds is positive.

7.3 Mechanics of the wealth effect

For analytical simplification I assume that the model is at full employment, so the level of output/income is given and unique.[2] This assumption has already been justified. In the classical real balance effect model, we saw that the limited version of the wealth effect, the Real Balance Effect, eliminated any problem of an inconsistency between saving and investment, and a more inclusive definition of wealth strengthens the logic of that argument.

The wealth effect also eliminates the liquidity trap. The liquidity trap involved an across-the-board decision by wealth holders to absorb money into cash balances. In the new model the demand for money is determined in part by the real wealth of agents. If a liquidity trap occurs, the logical result is deflation, as argued in the previous section. Deflation, a falling *p*, increases the real value of wealth, which shifts the consumption function and the investment function upwards, raising aggregate demand. At some point price will fall sufficiently so the downward shift of the saving function and the upward shift of the investment function equate full employment saving and investment at the "trapped" interest rate.[3] We can proceed confident that under Walrasian rules nothing but rigid money wages will prevent an instantaneous move to full employment.

The analysis limits itself to the markets for the commodity, money and bonds. The mechanics of these markets under present assumptions are presented in two diagrams, Figures 7.1 and 7.2. These diagrams show two stages in the equilibrium adjustment process, separated in order to minimize confusion, though this division is purely heuristic. In logic all the adjustments occur instantaneously and there are no steps or stages. With income given, each market can be drawn as a function of the interest rate, and shifts in the schedules are the result of changes in the wealth variable. In each market the relationship between r and the other variable refers only to the direct impact. The indirect impact of r, embodied in B^*/rp, is part of the shift parameter, $q=[M^*/p+B^*/rp]$.

The two diagrams investigate the impact of a change in the money supply on the real variables in the system. The analysis demonstrates that money is not neutral in this version of the neoclassical model, which is the most complete so far. Because this is not a detective story with suspense until the end, the source of non-neutrality can be revealed at the outset. As shown above, wealth is the sum of money and bonds, both of which are exogenously given. When the money supply doubles, for example, and the supply of bonds remains unchanged. This implies that neither nominal nor real wealth can double. Therefore, a change in the money supply necessarily results in a change in at least one real variable, q.

In Figures 7.1 and 7.2 all variables are price-deflated, not only the familiar investment (i) and saving (s), but also $b=B/p$ and $m=M/p$. The diagrams are constructed on the assumption of a fixed initial supply of money (M^*) and bonds (B^*). The analysis begins with the schedules marked 0, and the reader is reminded that the labor market remains in full employment equilibrium throughout the analysis. Looking at the two diagrams, one might be initially confused to see that in Figures 7.1b and 7.2b the price-deflated money supply is drawn as a vertical line in 7.1b, while the price deflated bond supply has a negative slope (7.1c), though the nominal supplies of both are fixed. This is because, given the price level, the value of the money supply is invariant with respect to the interest rate, while the value of bonds decreases as the interest rate increases. Other things equal, a fall in the interest rate is equivalent to issuing more bonds at the same interest rate. This is a rare case in neoclassical theory in which a demand curve is upward sloping and a supply curve downward sloping with respect to a price variable.

With these preliminaries, consideration of the diagrams may begin. In Figure 7.1, from the equilibrium marked with 0, let the nominal money supply double, from M^* to $2M^*$. Prior to any other change, the impact effect of this is to shift the vertical line in Figure 7.1b (representing the real money supply initially at m_o) to point m_1. Measuring along the horizontal axis, the shift is $m_1=2m_o$. The increase in the nominal supply of money sets off shifts for all of the schedules.

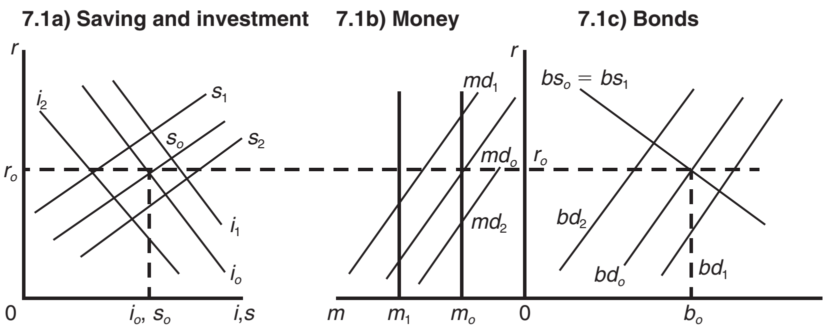


Figure 7.1 Impact of a change in the money supply on a model with bonds.

In Figure 7.1a the saving schedule shifts to the left to s_1 (declines) as a result of the increase in the money component of real wealth, and the investment schedule shifts to the right to i_1 for the same reason.

The result of the shifts in saving and investment is an excess demand for the commodity, because at interest rate r_o, $i > s$ (referring to schedules i_1 and s_1). The wealth effect also does its work in Figure 7.1b, shifting the demand for money outwards, to m_{d1}. The supply of money doubled, but demand for money does not for a given interest rate. The nominal and real money supplies doubled ($M*$ and $M*/p = m$), but nominal wealth and real wealth (Q and q) do not double, because the nominal supply of bonds is unchanged. It is the change in wealth that determines the shift in the demand for money. In the next part, Figure 7.1c, the demand for bonds increases, but does not double, and the nominal supply of bonds remains the same. Summing up the situation for the shifts, we are left with an excess demand for the commodity ($i > s$), an excess supply of money, and an excess demand for bonds at interest rate r_o.

If the rules of Walrasian markets hold, the excess demand for the commodity results in a rise in its price, and the excess demand for bonds provokes a fall in the interest rate so that bond prices rise. All schedules shift in response to the price change. The real money supply and the real supply of bonds decline toward their respective vertical axes, saving increases for any interest rate, and the investment schedule falls. All of these shifts represent the work of the wealth effect, generated in this second phase by a rise in p, as opposed to the increase in $M*$ in the previous phase. The second wave of shifts is noted with the number 2.

If money were neutral, then the increase, $M*$ to $2M*$, would imply an increase of price, from p_o to $2p_o$, with no change in any real variable. Let the schedules marked with 2 be associated with $2p_o$. They cannot logically be associated with the same equilibrium interest rate that began the exercise, r_o. Consider saving and investment. The schedule $s0$ was implied by y_o, p_o, and q_o. Real wealth was,

$$q_o = [M*/p_o] + [B*/r_o p_o]$$

However, the position of schedule $s2$ is determined by an altered wealth effect. We know by assumption that the schedules noted by 2 are associated with price level $2p_o$. Because neutrality cannot be assumed, the interest rate associated with price level $2p_o$ is unknown at this point. Let this unknown interest rate be designated as $r_?$.

$$q_o = [2M^*/2p_o] + [B^*/r_? p_o]$$

In order that no real variables be changed, it is necessary that $r_? = r_o$ and that $q_o = q_2$. If we set $q_o = q_2$ and attempt to solve for r, we discover that real wealth is unchanged only if the interest rate falls. If the interest rate falls, other real variables must also change. Money is not neutral and the reason is clear. The nominal supply of money has doubled, but nominal wealth has not (B^* is unchanged). No shifting of the schedules can bring back the equilibrium to the initial interest rate after a change in the money supply.

Pursuing further the position associated with a doubled price level, we should note that it would involve a shift in the real money supply back to its original position,

$$m_o = M^*/p_o = 2M^*/2p_o$$

However, the doubling of the money supply and the price level do not leave q unchanged. It is clear that, $B^*/2rp_o < B^*/rp_o$. With real wealth lower than before, the demand for money falls compared to the initial situation. In the bond market real supply has fallen, by half if the price level doubles. If the price level were to double, the result would be an excess supply of the commodity and money, and an excess demand for bonds.

If the reader finds this sequence confusing, the situation can be summarized simply. From an initial position of general equilibrium, the nominal money supply and the price level double. By definition the real supply of bonds must be cut in half, but the real demand for bonds declines by less than this due to the wealth effect. The impact of a change in the money supply on the bond market alone requires a fall in the interest rate, for supply has decreased relatively to demand because the demand for bonds is negatively related to the interest rate.

The final equilibrium position is shown in Figure 7.2, with the relevant schedules noted by the number 3. An increase in the nominal supply of money has provoked a wave of once-and-for-all changes. While retaining full employment, the new equilibrium bears little similarity to the initial position. The rate of interest is lower, as are the market clearing quantities of m and b. In this model the wealth effect ensures that money cannot be neutral. Each equilibrium is set by the nominal values of money and bonds, and even the equilibrium level of employment can change. The next chapter explores the implications of non-neutrality. It is no longer true that a change in the nominal money supply results in an equal proportionate change in the price level. The simple parables of the quantity theory do not hold, in the short run, long run or any run.

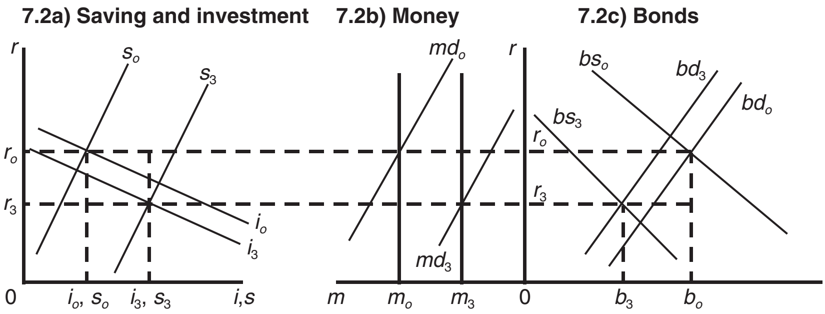


Figure 7.2 Impact of a change in the money supply on a model with bonds (equilibria compared).

The mechanism invoked to save the model from Keynes's inconsistency between saving and investment and the liquidity trap, the wealth effect, eliminates the neutrality of money. Neoclassical economists have sought solutions to salvage neutrality. One possible solution is that bonds be "indexed". This implies that bonds are issued such that their real value is independent of the price level (price of the single commodity, to be precise). This is not a solution to the theoretical problem, because it invokes an arbitrary institutional assumption to extract the model from the undesired results of the theoretical logic.

Even if we allowed this convenient assumption, it must be accompanied by additional assumptions even more arbitrary. In order that indexed bonds serve their purpose of rendering real wealth impervious to changes in price, the nominal stock of bonds must be independent of the nominal stock of money. This assumption would contradict both the theory and practice of monetary policy. In advanced capitalist countries an instrument used by central banks to affect the money supply is the buying and selling of public sector bonds. A sale of bonds by the monetary authorities has the effect of reducing the money supply by taking money out of the hands of people and banks,[4] while the purchase of bonds has the opposite effect.

The false dichotomy model produced a simple parable about prices that seems obvious, an increase the money supply results in a proportional increase in the price level. Close inspection reveals that this parable is not simple. It has proved impossible to sustain it in a model in which Walrasian market-clearing full employment equilibrium is guaranteed. The source of the difficulty is basic: an internally inconsistent concept of money.

7.4 Non-neutrality and the wealth effect

The neoclassical literature has frequent statements suggesting that neutrality is an inherent property of money, directly derived from first principles or commonsense. For example, Harry G. Johnson, one of the most distinguished monetary theorists of his generation, summarized the neutrality issue as follows:

> Money's property of being desired for its ability to purchase other things results in the property of homogeneity whereby an equal proportionate change in the nominal quantity of money and prices results in no change in behavior.
>
> (Johnson 1972, 55)

Despite its distinguished source and broad acceptance, this generalization is false. It suggests that the assumption of valueless money is sufficient unto itself to make money neutral. Or put more explicitly, it asserts that if a model is constructed faithful to the property that money is "desired for its ability to purchase other things", money will be neutral in that model. The model of the previous section was constructed faithful to that property and money is not neutral in it.

Neutrality is not an inherent property of valueless money, no matter what presumptions are made about the motivation for desiring it. Neutrality cannot be deduced from first principles. Neutrality or non-neutrality emerges from the interaction of the variables in a model. If it holds, neutrality is the end-product of a general equilibrium solution, and the theorist proceeds invalidly if he or she assumes neutrality at the outset. Neutrality cannot be assumed. This last point will loom large in the discussion below of the New Classical Economics.

As a final point, a warning should be issued about the wealth effect. The wealth effect ensures that there can be a formal full employment solution to the neoclassical macro model. It cannot he taken as a definitive refutation of the liquidity trap and the inconsistency between saving and investment. The models presented in this chapter have an extremely important characteristic, namely that no creditor ever loses the value of a loan; i.e., debtors do not go bankrupt.

If bankruptcy is allowed, private assets are no longer "inside" wealth. To be more precise, they are at some moments, when no bankruptcies occur, and not at others. Bankruptcies represent a potentially powerful effect that renders inappropriate the assumption that changes in the price level result in no distributional shifts between debtors and creditors.[5] One would expect that the distributional effects of bankruptcies would be to reduce the real wealth of agents. If this is accepted as a reasonable working hypothesis, then the wealth effect is seriously undermined. The process that activates the wealth effect, falling prices, is closely associated with waves of bankruptcies in the real world. The wealth effect, like the real balance effect, is a convenient logical solution to nagging problems in an abstract model rather than a mechanism of practical significance.

7.5 Stocks and flows and the wealth effect

Quite separate from its impact on the neutrality of money, the wealth effect exposes a fundamental contradiction at the core of the neoclassical macro model. This contradiction arises from the interaction of stocks and flows and the requirements of achieving full equilibrium. A short-run macro equilibrium requires that all markets be cleared and that all agents be content with the outcome of the market clearing; i.e., that they have no desire to re-contract the exchanges they have made.

Using this standard definition of a static general equilibrium, let us inspect the complete model with the wealth effect. The equilibrium requires that all agents have adjusted to their desired level of wealth. However, it is impossible for this to be the case, because the agents in the standard model are engaging in saving and investment, both of which increase private wealth. Portfolio balance models, which seek to analyze the wealth holdings of agents, resolved this obvious contradiction by assuming zero saving and investment. Logically sound macro models constructed by neoclassical rules should restrict equilibrium, even short-run equilibrium, to a steady state in which nominal and real wealth are constant, saving is zero, and no accumulation of the capital stock occurs.

These outcomes are absurd, eliminating all practical relevance the model might otherwise claim.[6] The problem lies not in the wealth effect itself. We encountered the same problem in the first two chapters, when trying to reconcile short-term equilibrium with the growth in the capital stock arising from investment. Neoclassical analysis can and does eliminate the difference between consumption and investment on the expenditure side. However, it cannot eliminate their function in an economy, because the former is completely consumed through use in the short run, and the latter continues through successive periods as a means to produce other commodities.

Therefore, the problem of maintaining the level of desired wealth in short-term equilibrium requires establishing an "optimal capital stock". There can be no doubt that such a concept is both implied and required by short-run macro models. To put the matter in simple partial equilibrium terms, the interest rate cannot equate saving and investment unless the desired wealth of savers and desired capital stock of capitalists are realized. If they are realized, there is no reason for savers to save or capitalists to invest. Once one considers even these two simple stocks, wealth and productive capital, saving and investment become manifestations of *disequilibrium*.

As with other internal contradictions of the neoclassical macro model, the stock-flow inconsistency cannot be resolved within the rules of the model. In order to do so, one requires an entirely different type of model, such as those constructed by Ricardo and Marx, which use the gross output of production, not value added categories.[7]

Annex to Part II

Keynes and aggregation

1 Insights from the past

Part I provided a critique of the main aspects of the standard neoclassical model. This annex seeks to encourage the reading of the work of Keynes, above all *The General Theory of Employment, Interest, and Money*. In the first half of the twentieth century Keynes made many of the critiques of neoclassical macroeconomics presented in this book. In the 1950s almost all students of macroeconomics were required to read Keynes. In the 1960s most were. By the 1980s few if any were; and subsequently an economist trained in the neoclassical paradigm would be as likely to read Marx as they would Keynes (i.e., never).[8] Much is lost by not reading Keynes, even for those who disagree with him. As well as finding important insights in Keynes, the reader is charmed by his wit and humor.

The tendency in the social sciences to assign students interpretations of great figures in place of the writings of the great figures themselves is insidious. In economics this practice partly reflects a fervent belief that knowledge accumulates and discovery proceeds in a strictly linear fashion. By this view each succeeding generation of economists culls the wisdom and discards the errors from the work of the previous, so at each successive moment we reach a new peak of knowledge and understanding. Every day in every way theory becomes better and more complete (without ever changing any substantial conclusion).

Few sophisticated economists would explicitly voice such a naive and self-serving view of the profession's progress. However, the vast majority would judge that decades of sifting through *The General Theory* must have resulted in the discovery of all that is valuable in it. Indeed, those few who continue to seek insights from the work of Keynes risk the danger of being accused of ancestor worship.[9] Why read *The General Theory* after over half a century of progress in theoretical macroeconomics?

Keynes himself provided an answer to this question: economics is a science that can accumulate knowledge without gaining wisdom or even understanding. Because of its ideological element, economics is not a science that proceeds primarily on the basis of formulating hypotheses and testing the validity of these against observed phenomena.[10] The different social groups in society find it in their interest to portray capitalist economies in different ways. Perhaps the most difficult task in understanding economic phenomena is trying to separate the scientific content of each theory from its ideology.

Because of the strong ideological component in economics, theories that contain valuable insights may be discarded for a considerable length of time, because the general orientation of those theories is at variance with the prevailing political climate. The economics of Marx is an obvious victim of political prejudice. Whatever the failings of Marx's analysis, it contains a number of important contributions to cycle and growth theory. Few mainstream economists would admit to being influenced by the nineteenth-century revolutionary writer. Many of Keynes's basic insights have also been discarded for political reasons. Prominent among these is his conviction that capitalist economies do not automatically tend towards full employment and that it is wishful thinking to treat

John Maynard Keynes

John Maynard Keynes (familiarly addressed as Maynard, not John) was the greatest economist of the twentieth century. This distinction derived from his policy work even more than his theoretical contributions, though the latter far exceeded those of his contemporaries. A larger-than-life figure, Keynes dominated economic theory and policy making from the end of World War I until his death in 1946 at the age of 62. His brilliance, withering wit and progressive tendencies made him the *bête noir* of the conservative economists of his time.

Among his many policy interventions perhaps the most famous was his attack upon the Treaty of Versailles that ended World War I and his proposals for international economic governance at the end of World War II. In his monograph on the former, *The Economic Consequences of the Peace* (1921, first published 1919), he produced the most famous correct prediction in the history of economics. With particular pressure from the French government, the victors imposed impossibility burdensome reparation payments on the post-war German government. Keynes wrote,

> If we aim deliberately at the impoverishment of Central Europe, vengeance, I dare predict, will not limp. Nothing can then delay for very long that final war between the forces of Reaction and the despairing convulsions of Revolution, before which the horrors of the late German war will fade into nothing, and which will destroy, whoever is victorious, the civilization and progress of our generation.
>
> (Keynes 1921, 124)

Having in effect predicted German inflation and depression in the 1920s, the rise of the National Socialist (Nazi) Party, and World War II, Keynes, in the years before his death, designed a program for post-war economic stability. The International Monetary Fund that emerged from the victors' negotiations in Bretton Woods, New Hampshire in 1945 was far from the vision of Keynes; indeed, it was a neoclassical parody of it (see Skidelsky 2003).

them as doing so. Such views made and make Keynes theoretically suspect in the profession.[11]

In this annex no attempt is made to present the reader with an interpretation of the "real Keynes". The purpose is to bring together some of his more unorthodox arguments that directly relate to the theoretical critique of neoclassical macroeconomics treated in previous chapters. In part the following reinvestigation of Keynes is an unabashed attempt to lend authority to the arguments of this book. The more important motivation is to indicate the exciting possibilities opened up for aggregate economic analysis when one breaks from the confines of the single commodity, general equilibrium macro model.

2 The central theoretical problem of macroeconomics

In the preceding chapters I critiqued the neoclassical approach to macroeconomics, with the purpose of logically refuting two basic parables: 1) that increased employment is achieved through a lower real wage; and 2) that increases in the price level are the consequence of increases in something called the money supply. The critique treated in detail a number of issues and concepts judged as crucial to the neoclassical argument: general equilibrium adjustment, the aggregate single commodity, the autonomous money supply, and the neutrality of money. While the critique has at times been complex and involved, all of the arguments come from a very fundamental theoretical problem that neoclassical method fails to resolve in a satisfactory manner.

The fundamental problem of all aggregate economic theory is to relate the money value of production to the material quantity of that production. In an economy with monetary exchange, products have a monetary value attached to their material form. These two aspects of commodities I call their exchange value form and their material form.[12] The essence of macroeconomics is to specify the relationship between the two. This specification involves discovering a way in which the total collection of commodities in their material form can be consistently related to the monetary value of those same commodities.

The problem can be illustrated with an apparently trivial example. Assume that an economy produces only two commodities, wheat and beer. Let the production of wheat and beer in the first period be four units and three units, respectively, and three units and four units, respectively, in the second period. In which period is output greater? This difficulty in comparing different collections of commodities I call the valuation problem.[13]

In microeconomics this question does not arise, because each theoretical market and price refers to one commodity. For a single homogeneous commodity output can be measured in physical units of the product. Many markets can be treated simultaneously by use of partial or general equilibrium analysis. The need to express production or value as an aggregate need not concern the theorist. Macroeconomics is the analysis of aggregates. Its basic foundation is the manner in which many things of great diversity, the material form of commodities, are combined as an aggregate.

The process of aggregation implies there to be three different aggregates, two of which are strictly empirical. First, there is the collection of commodities in their material form. This collection exists as a real world phenomenon. It is an aggregate in the sense that one can conceive of it, all the economy's commodities brought together in a great pile. An aggregate number cannot be assigned to it, because we cannot add tons of wheat and bottles of beer.[14] Second, there is the monetary form of these commodities, which also exists as an observable phenomenon and can be measured in a single number. We can add the money value of wheat and price of beer.

The *sine qua non* of macroeconomics is the third aggregate that is the measure of the collection of diverse commodities in homogeneous units. These homogeneous units must be independent of the prices used to compute the total monetary value of commodities in order to avoid the index number problem. This third aggregate exists for the purpose of allowing for quantitative comparisons of different combinations of commodities. One aspect of such comparisons is assigning a unique value to a given collection, so its quantitative assessment remains unchanged whatever set of market prices may prevail for it. To avoid the ambiguous modifier "real", I shall refer to this third aggregate as the "price-independent" measure of output. The need for such an aggregate in order to create a field called "macroeconomics" is so obvious that elaboration of the concept may seem trivial. However, modern economics hardly deals with this issue at all, or does so only at the most superficial level.

This third aggregate allows one to construct short-run macro models and models of economic growth. On its basis we can make statements about the rate of flow of production and changes in society's productive assets. However, unlike the first two types of aggregates *the third is not directly observable.* A beer can be drunk and its price paid, but beer measured in homogeneous units that allow it to be added to other commodities can only be inferred. This third aggregate is an analogue of the material form of commodities, but cannot itself be measured in the physical units one uses to measure each commodity taken alone.

Several great economists sought to specify the nature of this third aggregate with varying degrees of success. Ricardo was the first to treat the problem systematically, with the purpose of deriving a theory of the distribution of income and long-term accumulation. Through his attempt to solve the problem of "an invariable measure of value", Ricardo can be assigned the distinction of being the first macroeconomist (Sinha 2010). His solution involved measuring the output of a diverse collection of commodities in terms of their labor content. Theoretical difficulties that he found insurmountable drove him to use a one-commodity model at critical points in his analysis.

The neoclassical treatment of the valuation problem is not without its sophistication and complexity, but is either trivial or irrelevant to short-run models. It is trivialized by the assumption of a single commodity, as was explained in some detail in Chapter 2. The construction of a one-commodity supply side ignores the valuation problem rather than confronting it, creating a system with no relative prices or relative costs.

Neoclassical theory offers another approach to the valuation problem that is not trivial, but has no relevance to aggregate analysis. Assume a two-commodity system with fixed resource endowments. Following neoclassical logic, one can say that output is less than its maximum if all resources are not fully used or fully in a manner that does not involve cost minimization. In this case, more of both commodities could be produced with the given resources. However, maximum output is not unique. Output is at its maximum if all resources are devoted to wheat, all to beer, or all combinations of wheat and beer.

The analysis need not stop at this point. On extremely restrictive assumptions, neoclassicals construct a "community utility map" or "community indifference curves", which show all combinations of wheat and beer that all economic agents taken together find equally desirable. For each curve the level of community welfare is constant. At the point where the wheat/beer production transformation curve (production possibilities frontier) is tangent to the highest community indifference curve, community welfare is maximized.

Even if one accepts the extremely dubious and ad hoc idea of aggregating individual preferences,[15] the result is of little relevance to macroeconomics. With regard to comparisons of less than full employment to full employment, all that can be said is that more complete use of resources results in increased output, though one cannot quantify the increase unless production remains in the same proportions. In full employment positions all output combinations look alike, because even in principle there is no operational way to know if the community is in equilibrium in its consumption choices.

During the 1950s and 1960s when Keynesians dominated the profession, there was a tendency to create a compartmentalization between macroeconomics and microeconomics. Anti-Keynesians such as Friedman quite correctly found this unsatisfactory on grounds of theoretical consistency.[16] Along with this compartmentalization frequently went a judgment that macroeconomics was more realistic and more relevant to the real world than microeconomics. The latter appeared bogged down in a number of dubious and non-empirical concepts such as utility, perfect competition, and subjective optimization.

It would seem that despite the failings of neoclassical microeconomics, it has been on stronger theoretical ground than macroeconomics. Even in its early origins as part of monetary theory, neoclassical macroeconomics never resolved the central issue of aggregate analysis, the valuation problem. This failing did not go unnoticed by Keynes. In the section that follows, Keynes's incomplete and sometimes confusing approach to the problem of aggregate valuation is analyzed. The purpose is not to offer a general interpretation of the work of Keynes, of which there are many. Rather, I demonstrate the profound doubts held by the twentieth century's greatest economist about the basic building blocks of neoclassical macroeconomics, doubts quite similar to those raised in this book.

3 Keynes on "real" variables[17]

In a comment that has gone relatively unnoticed, Keynes tells the reader of *The General Theory* that it is his goal to provide an integration of the theory of money and the theory of value, a task he felt that his "classical" opponents had failed to achieve or had not seriously attempted. At one level his objection was that Classical economics because of the dichotomy between real and monetary variables failed to integrate the theory of relative prices with the theory of money.[18] A close reading of *The General Theory*, particularly those parts ignored by mainstream economics, suggests that he had ambitions to do something quite fundamental, to provide a general theory of a money economy based upon a radically different solution to the valuation problem.

Among the least read parts of *The General Theory* are the passages that grapple with the problem of valuing aggregate output in monetary and in price-independent terms. The lack of attention to Keynes's discussion of the aggregation and valuation problem is in contrast to his own statements. Early in *The General Theory* he writes that proper choice of units to measure his aggregate concepts was one of the "three perplexities which most impeded my process" (Keynes 1936, 37). Throughout this book we have dealt with models specified in terms of "real" variables, real income, consumption, investment, etc. Keynes explicitly rejected such concepts as inappropriate for the construction of economic models.[19]

Real concepts play two quite different roles in macroeconomics that should be distinguished in order to grasp the significance of Keynes's objections. First, there is their role as empirical measures. At a moment in time one measures the level of money GNP, for example, and at a subsequent moment another level. Which involves the greater level of production? Answering this question involves the construction of index numbers about which there is a large and quite technical statistical literature. While no method of construction is ideal, some can be judged as providing more accurate answers, depending on the question. Keynes considered this use of "real" variables, more precisely, price-deflated variables, as valid. However, he warned, and many economic statisticians agree, these were "vague concepts", "avowedly imprecise and approximate", and their use should be limited to cases "when we are attempting historical comparison" (Keynes 1936, 43).[20]

Second, there is the use of "real" categories as elements in an abstract economic model, and to this Keynes objected vehemently, especially to "real income" whose "precise definition is an impossible task".[21] In the construction of his model, Keynes abandoned "real" variables, choosing instead to employ the following measures, "quantities of money-value and quantities of employment". He summarized his discussion by writing,

> It is my belief that much unnecessary perplexity can be avoided if we limit ourselves strictly to the two units, money and labor, when we are dealing with the behavior of the system as a whole.
>
> (Keynes 1936, 43)

Proposing to formulate models in units of money and labor had the potential to be a radical break with the prevailing economic wisdom of Keynes's time and subsequent neoclassical macroeconomics. Keynes's principle objection was to the use of spurious aggregates measured in physical units. If his objection is sustained, then the aggregate production function must be abandoned. With the aggregate production function gone, capital–labor substitution must also be dropped from the analysis.[22] Keynes did not draw these conclusions from his "choice of units".[23]

Before proceeding with the implications of labor and money as sole units of measure, comment is required on Keynes's method of abstraction. The reader might wish to refer back to Section 2.1 and the discussion there of two theoretical methods, "abstract ideal" and "abstract simplified". In the first, the theorist begins with mental constructions that need have no direct analogue in the phenomena to be explained. In effect, the theorist reduces complexity or "abstracts" by creating a simple fictitious world of his or her own construction. Neoclassical economics refers to this method as *a priori* reasoning. Output measured in physical units is a purely ideal concept, for it has no analogue in a functioning economy. In all economies there are physical inputs and physical outputs, and a structure of established technology that links the one to the other. However, in no economy except in the imagination is there an aggregate homogeneous commodity that is both the input and output.

Keynes recognized this indisputable fact, and quite sensibly concluded that it would be ridiculous to assume the existence of that which cannot exist. His theoretical choice of money and labor indicates use of the abstract-simplified method. These are not concepts created in the mind of the theorist. They are categories of actual economies. Neither is a simple category, because many things can serve as money and labor comes in many varieties. For all their complexities they are "real", in the same way that "alligator" is a real abstraction for all varieties of this species, but "dragon" is an imaginary abstraction. Keynes did not create his two abstractions, money and labor, but drew them out of the confusing complexity of reality and assigned them simplified definitions.

4 Keynes's money aggregate

There is considerable textual evidence in *The General Theory* to suggest that Keynes had a strong intuition that reality should inspire theory. One of the clearest examples is his treatment of aggregate income, which is in sharp contrast to the neoclassical approach. The models treated in this book all begin with homogeneous value added or income, then reach money income as a variable derivative from the price level. In Keynes's view, money income could not be decomposed into the product of "physical output" and "the general price level". In order to understand Keynes's treatment of national income, we must consider the institutional context of his abstract model.

Recall from the first chapter that the neoclassical macroeconomic model is formulated in terms of households or individuals, with all national income representing personal income. This is one of the most fundamental characteristics of the neoclassical macro model, a not very subtle ideological obfuscation of the economic power of business enterprise. Keynes rejected the view that economic models should be formulated in terms of socially undifferentiated economic actors, be they called "agents" or "households". At the outset of his analysis a money economy is treated as a capitalist economy, whose most important actors are business enterprises, not households.

There is a quite clear reason for this difference between neoclassical models and the model of Keynes. In neoclassical theory economies are treated in terms of notional demand and supply curves, so the system is not demand-constrained. In the absence of demand constraints, the relevant constraints refer to individual choices between income and leisure. In Keynes's demand-constrained system, the crucial actors become business enterprises, and their expectations of the future are crucial. Having conceptualized a money economy with business enterprise at the centre, Keynes proceeded to define the components of national income in terms of the cash-flow or net worth position of these enterprises (Keynes 1936, 53–54).[24] By this procedure Keynes sought to extract from the complexity of business transactions that part of cash-flow that represents the net addition to society's production during any time period; i.e., the value added created by the process of transforming intermediate products.

This might seem an unnecessarily tedious method. Why not begin with a concept of value added in production ("payments to factors") and ignore intermediate costs altogether, since we know that these cancel out in the aggregate? The answer is that the workplaces of business enterprises do not produce value added. They produce commodities in which value added is embodied. Only part of the sales revenue from these commodities becomes factor incomes. By treating income in the context of the cash-flow of enterprises, Keynes's analysis incorporates the characteristic that money economies are composed of commodities. In contrast, neoclassical theory treats economies as systems that produce value added.

It is necessary to elaborate this point, because habits of neoclassical thought are so ingrained that its significance could easily be lost. In neoclassical macroeconomics, costs of production other than those that correspond to factor payments are not netted out, they are assumed not to exist. In Keynes's approach, there is an explicit analysis of the netting-out process that allows one to isolate, not begin with, factor payments. Keynes's route to the concept of income results in quite subtle insights. Some of these could make a neoclassical economist feel like a Euclidian lost in a non-Euclidian world.

To demonstrate the theoretical implications of Keynes's procedure, the steps he takes to obtain factor incomes will be briefly explained. Beginning with gross receipts of the enterprise, Keynes subtracts out purchases from other firms. This subtraction eliminates the money value of intermediate inputs. Next Keynes adjusts for changes in the valuation of the enterprise's capital stock, which accounts for that part of the sales revenue covering depreciation. The result of these theoretical calculations, which could be carried out in practice, is to obtain the net sales revenue which accrues to factors of production.

By proceeding in this way, Keynes broke the definitional equality found in neoclassical macroeconomics between value added and the aggregate production of final commodities (consumption commodities plus investment commodities). In neoclassical theory these two must be equal because there are no intermediate commodities and no changes in the valuation of the capital stock. In practice they are never equal except by chance. In Keynes's analysis the principal reason the two can differ arises from changes in the valuation of the capital stock. Prior to explaining this, I identify three money aggregates:

1 total factor income, total sales minus intermediate cost, with adjustment for equipment and stocks due to price changes;
2 aggregate supply of final commodities, the market value of consumption and investment commodities; and
3 aggregate final demand, the expenditure by workers and capitalists on consumption commodities, plus the expenditure of capitalists on investment commodities.

Keynes argued that the aggregate supply and aggregate demand for commodities (numbers 2 and 3) could differ because of insufficient aggregate demand (some final commodities go unsold). Implicit in his analysis is the possibility that factor income and the aggregate supply of final commodities could differ. The implications of this second inequality are considerably more interesting for theory than the first.

Assume that a major technical change, such as computerized automation, renders part of the economy's capital stock obsolete. Part or all of the anticipated depreciation of the obsolete capital stock that is embodied in commodities will not be recaptured in the selling price of commodities. Nonetheless, money must be set aside by enterprises in order that at some future date the productive stock can be replaced with new plant and machinery. The money to do so must be deducted from factor incomes.

In the short term the money would be from profits, and perhaps in the longer term by forcing wages down. The effect of shifting money from factor payments to the depreciation account is to make disbursed factor payments less than the money value of final commodities. With disbursed factor incomes less than the value of final commodities, some final commodities will go unsold even if all income is spent.[25] This provides an explanation of demand failures. Further, the possible incongruity between final commodity supply and factor income provides a convenient vehicle for treating economic relationships dynamically, particularly the dynamic effects of technical change. While he lays out the possibility of an inequality between aggregate supply and factor incomes in some detail, Keynes does not employ it as an analytical device in his discussion of the determinants of effective demand.[26]

This discussion demonstrates how Keynes sought to define his national income aggregates with reference to the commodity-producing nature of money economies. This attention to commodities also manifests itself in his treatment of the apparently simple category "price". As explained above, Keynes derived factor incomes by taking gross receipts of the enterprise and subtracting out intermediate costs including depreciation. The part of gross receipts that does not accrue to factors of production Keynes called "user cost".

As any student of first year economics knows, in neoclassical microeconomics, like at the macro level, output is treated as produced without intermediate products, with capital and labor alone. As a consequence, "marginal cost" is "marginal labor cost". At the micro level firms are treated as producing value added, not commodities. Referring to his concept of user cost, Keynes proceeds to take issue with the orthodox treatment of price theory:

> The concept of user cost enables us, moreover, to give a clearer definition than usually adopted of the short period supply price of a unit of a firm's saleable output. For the short period supply price is the sum of the marginal factor cost and the marginal user cost…
>
> Whereas it may be occasionally convenient in dealing with *output as a whole to deduct user cost, this procedure deprives our analysis of all reality.* It is habitually (and tacitly) applied to the output of a single industry or firm, since it divorces the "supply price" of an article from any ordinary sense of its price.
>
> (Keynes 1936, 67)

Keynes's point would be quite obvious were it not for habits of thought induced in economists for generations: the price of a commodity includes all of the elements which go to produce it, be they factor services or inputs of materials. Consider any commodity, for example, beer. The price of beer includes labor cost, other factor payments, depreciation on equipment, and commodity inputs such as the bottle, hops, and electricity. Keynes's recommendation is that the production of the beer industry be treated as what it is, the amount of beer produced in a time period, embodying non-factor costs as well as factor costs. This is in sharp contrast to neoclassical microeconomics, where for purposes of analyzing price behavior the production function for beer is written, $q_b = q(k, n)$, and q_b refers to the amount of beer corresponding to the embodied value added, not the actual production and sale of beer.[27]

The implication of treating prices as what they are, inclusive of all costs, rather than as what they are not, factor costs only, is quite radical. Pursuing this sensible approach leads one to abandon marginal productivity analysis in favor of some version of the labor theory of value or commodity-production models set within an input–output framework. Once there is explicit consideration of intermediate costs, a part of the money value of every commodity is not created in the production of that commodity. Intermediate commodities arrive at the production process with their money value already determined, and this money value is passed on to the final item ("final" with respect to the production process in question).

To put the matter simply, the electricity used to heat the vats in a brewery does not create value added. It represents a cost of production. The inclusion of a category of inputs that transmit their money value in production without expanding value undermines the *raison d'être* of a value-expanding capital input. Machinery can also be treated as passing its money value on to the final product through use, what Keynes called the "sacrifice" of equipment. It is not obvious why a vat that lasts several production periods should not be treated similarly to electricity and hops in its role in the determination of the price of beer. This was the argument of Ricardo and Marx, that only the labor input generates value added (expands value).[28] Keynes endorsed this view:

> I sympathize … with the pre-classical doctrine that everything is *produced by labor, aided by what used to be called art and is now called* technique, by natural resources which are free or cost a rent according to their scarcity or abundance, and by the results of past labor, embodied in assets, which also command a price according to their scarcity or abundance. It is preferable to regard labor … as the sole factor of production, operating in a given environment of technique, natural resources, capital equipment and effective demand.
>
> (Keynes 1936, 213–214)

Because Keynes did not formulate a theory of price on the basis of the labor content of commodities, it is more precise to say that he is endorsing a labor theory of production and aggregation rather than a labor theory of value.[29] It is by use of labor as a unit of measure that he sought to relate the money aggregates to material production.

5 Keynes's price-independent aggregate

The production of commodities results in the output of a heterogeneous collection of useful products, and an aggregate based on their market value. Keynes discarded a concept of "real" variables, implicitly measured in physical units, as a valid tool for constructing economic models. His proposed solution to the aggregation problem was the "labor unit".

Keynes defined a labor unit to be homogeneous labor performed for a standardized amount of time, one person-day, for example. With this unit he proposed to construct his theory of effective demand. Applying empirically the hypothesis of homogeneous labor is a problem that has plagued practitioners of the labor theory of value for over one hundred years. The first difficulty is that labor is not homogeneous. In order to render labor homogeneous, Keynes proposed that different types of labor be evaluated on the basis of their remuneration.[30]

This is an appealing and simple solution adopted by some Marxists and Ricardians. There is very little theoretical justification for it. At the outset it would seem to fail the test which Keynes himself has used to flunk "real income" out of economic theory. This latter concept was rejected by Keynes because of the "grave objection … that the community's output of goods and service is a non-homogeneous complex", and the same is true of the community's labor force. If this labor force can be aggregated on the basis of relative wages for some base period, why not aggregate commodities using relative prices? Keynes's main defense of the labor unit, that wage differentials are more or less fixed by comparison with commodity prices, is not empirically obvious and is suspiciously ad hoc.

Keynes's labor unit was from its inception a non-starter, rarely employed even by those most in sympathy with the innovative aspects of his work.[31] The basic problem with the labor unit is that it offers an alternative aggregate measure to that of the neoclassicals, but keeps the same method. Like the neoclassicals, Keynes in effect creates by assumption the element central to his aggregate analysis, homogeneous labor. As a consequence, use of the labor unit appears quite arbitrary. If one is willing to assume labor to be homogeneous, assume output is homogeneous and avoid the intermediate measure.

The attempt by Keynes to provide a fresh solution to the valuation problem immediately ran into trouble when he tried to relate employment in labor units to money output. In specifying the output side of his model, Keynes defined an industry supply curve as follows:

$$Z = Z(N)$$

where N is employment in labor units, Z is the sales revenue, and Q is the output in physical units, so $Z = pQ$.[32]

The aggregate supply function is defined for levels of sales revenue. By definition sales revenue equals price times the quantity of output, $Z = pQ$. But output can only be assigned a number if an industry produces a homogeneous output. Keynes's case for the adoption of his version of the industry supply curve in place of the familiar neoclassical supply curve is that it can be aggregated across industries to obtain an aggregate supply curve.[33] The usual supply curves cannot be added because they are measured in physical units. The aggregation is achieved, Keynes argued, by summing labor units across industries.

With some regret I conclude that Keynes's aggregate supply curve was no improvement upon the neoclassical assumption of a single commodity. In order that Z, sales revenue, be unique with respect to the level of employment, at least two assumptions are necessary. First, the price of each commodity produced by the industry must be constant. Keynes achieved this by assuming constant returns to scale and a constant money wage. More important in terms of the "Classical" (neoclassical) aggregates Keynes sought to discard, his supply function requires that commodities always be produced in the same proportion.

If an industry produces more than one commodity, the sales revenue generated by a certain level of employment will depend upon how much of each commodity is produced. The same restriction carries over to the aggregate supply curve. Given the set of commodity prices, the aggregate supply curve is unique with respect to the number of labor units if and only if the composition of output remains unchanged. If the composition of output remains unchanged, there is no difficulty in measuring "real" output, because this is equivalent to a one-commodity system.

In the construction of the aggregate supply function the labor unit becomes superfluous. After an exciting start in his formulation of money aggregates, Keynes provided limited insight into solving the aggregate relationship between the material production of commodities and their market value. His great contribution on aggregation was to point out that the neoclassical approach was theoretically unacceptable.

Part III

A critique of self-adjusting full employment

Main points

Chapter 8: Neutrality and full employment

1. The various versions of the neoclassical macro model reach almost identical conclusions, many of which are counter to common perception.
2. To justify a non-interventionist public policy, the neoclassical macro models must sustain two conclusions: an automatic tendency to full employment and the neutrality of money. If these conclusions are valid, economies gravitate to a unique full employment outcome that public intervention would block or distort.
3. If money is not neutral, then the full employment solution is not unique, and some may be more socially desirable than others. Public intervention is the mechanism to select among them.
4. Walras' Law creates a contradiction at the heart of the macro model: it seeks to explain the level of output and employment, but is valid only for full employment.
5. The essentially ideological nature of the model is demonstrated by considering whether capital, like labor, can be idle ("unemployed").

Chapter 9: Expectations and full employment

1. Walrasian adjustment assumes that economic actors have full knowledge of the general equilibrium, full employment outcome, the "perfect foresight hypothesis" (PFH). The PFH assumes the impossible, that the future could be known.
2. New Classical Economics offered an allegedly more credible alternative, the rational expectations hypothesis (REH), which suffers from the same theoretical objections as the PFH.
3. The anti-interventionist policy ideology of the neoclassical model is based on non-scientific treatments of expectations.

Chapter 10: Full employment and multi-commodity production

1 The demand for labor in neoclassical labor market derives from an aggregate production function that has only one product/commodity, produced by labor and capital. This labor market model yields the apparently powerful conclusion that increases in employment require a lower real wage.
2 The inverse relationship between employment and real wages cannot be generalized beyond the one product case. In general, an increase in employment would be consistent with a lower and a higher real wage, as a result of the phenomenon known as “re-switching among techniques”.

Chapter 11: Full employment and disequilibrium

1 A group of critics emphasizing disequilibrium demonstrated that unemployment is possible if all wage bargains are struck at the general equilibrium money wage rate.
2 In this vein, Liejonhufvud showed that unemployment need not arise from the labor market, but is derivative from the money market.
3 Valid though these critiques may be, they tend to abandon macroeconomics for multi-market analysis.

8 Neutrality and full employment

8.1 Logic of the models summarized

In the previous chapters four versions of the neoclassical macro model were presented with a running critique. In this chapter I provide a synthesis of those critiques by focusing upon the neutrality of money and full employment. The discussion is more easily followed by referring to Table 8.1, which has a summary of the central features of the models.

The differences among the four models can be briefly stated. Only in the first is there a strict dichotomy between real and monetary variables. The dichotomy is logically false because of the clash of Walras' Law and the quantity theory of money over the excess demand for money if the model is not in general equilibrium. In the second model this inconsistency is eliminated, and the introduction of the real balance effect results in a real solution that is part of a general equilibrium system; i.e., it is determined simultaneously with nominal variables. Money is strictly neutral, so the values of real variables are not altered in full employment equilibrium by a change in the nominal money supply. Unlike in the false dichotomy variant the nominal money supply enters directly to determine the values of real variables. Real and nominal variables cannot be partitioned. The model is of heuristic interest only. Central to its operation is the wealth-holding of agents, but no interest-bearing assets are included.

The third model solves the problem of the inconsistency between Walras' Law and the Quantity theory in a different way. Here interest-yielding bonds are introduced, so the demand for money is interest-elastic. Again, real and monetary variables are not separate, and money is strictly neutral for full employment equilibria. Full employment is a special case because of the logical possibility of an inconsistency between saving and investment and the liquidity trap. In the last model the logical barriers to full employment are eliminated, but the introduction of the wealth effect renders money non-neutral. There is no autonomous real solution.

In Table 8.2 the summary of the neoclassical models continues, with selected predictions listed down the left-hand side, followed in subsequent columns by analytical commentary. The predictions assume that "other things are equal"; i.e., the parameters of all functions remain the same and exogenous variables, supply

Table 8.1 Summary of the characteristics of the neoclassical model

Category/model	*1 False dichotomy*	*2 "Classical" with RBE*	*3 "Complete Keynesian"*	*4 Keynesian with WE*
Commodity market	$c = c(y)$ $i = i(r)$	$c = c(y, M^*/p)$ $i = i(r)$	$c = c(y)$ $i = i(r)$	$c = c(y, q)$ $i = i(\mathrm{r}, q)$
Money market	$M_s = M^*$ $M_d = vpy$	$M_s = M^*$ $M_d = vpy$ $+ f[M^*/p]$	$M_s = M^*$ $M_d = vpy$ $+ [h - jr]$	$M_s = M^*$ $M_d = vpy$ $+ M(r, q)$
Automatic full employment?	**No** Inconsistency i & s	**Yes** RBE acts on c	**No** Inconsistency i & s, liquidity trap	**Yes** q acts on c, i and M_d
Neutrality of money?	**Yes**	**Yes**	**Yes**	**No**
Comments	Logically invalid, WL & QT clash	Heuristic value only, no bonds, requires "outside" M^*	Not to be confused with the model of the GTEIM	Requires M^* and bonds to be "outside"

Notation
RBE – real balance effect.
WE – wealth effect.
WL – Walras' Law.
GTEIM – General Theory of Employment, Interest and Money.

Table 8.2 Theoretical predictions of the neoclassical model (from an initial position of less than full employment)

The model predicts	*Necessary conditions*	*Casual empiricism*
1 Real wages fall when employment rises	Diminishing returns with a one product production function (see note below)	Real wages rise when employment falls
2 Employment rises	As above, and exogenously given money supply	Money wages rise or remain constant when employment rises
3 Price level falls when output rises (nominal value of output can fall in models 3 and 4, Table 8.1)	Diminishing returns, one product, exogenous M	Price level rises or constant when employment rises
4 Interest rate falls when output rises	Interest-elastic investment, exogenous M (r-elastic M_d in models 3 and 4)	Interest rate rises or is constant when output rises

Note
The law of diminishing returns requires a single product aggregate production function for reasons given in Section 2.1, and also implied by the Capital Controversy (Chapter 10).

of money and bonds, do not change. As pointed out above, the neoclassical model predicts that an increase in employment is associated with lower real wages, lower money wages, a lower price level, and a lower interest rate. These predictions are contingent upon the assumptions of single commodity production to ensure a negatively sloped demand for labor, and an exogenous money supply.

Casual empiricism suggests that these predictions are rarely realized in practice (see final column of the table). Experience and an inspection of short-run economic statistics published by governments suggest that when employment rises, real wages, money wages, the price level, and the interest rate all tend to rise, not to fall. Keynes stressed these empirical relationships when counseling against money wage cuts as a solution to unemployment in the 1930s (Keynes 1936, Chapter 19). That casual or even systematic observations do not correspond to the predictions of a theory does not in itself represent a refutation of that theory. As Marx wrote, were it possible to deduce correction explanations from observation alone, economic and social theory would be unnecessary.

However, the divergence of economic outcomes from theoretical predictions is troublesome for neoclassical analysis for two reasons. First, when considering competing economic paradigms neoclassical writers are quick to apply the test of empiricism. For example, in mainstream histories of economic thought one finds the assertion that Marx's theory of accumulation is false because: 1) it predicts a falling standard of living for the working class as capitalism develops and this has not occurred; 2) it predicts the profit rate to decline secularly and this also has not occurred; 3) labor cannot be the sole source of value because this would imply that labor-intensive industries would be more profitable than capital-intensive ones, which is not systematically the case; and so on.[1] It would be equally valid for a critic of neoclassical theory to assert that IS–LM analysis is wrong, because in general expansions of employment are associated with upward pressure on prices and wages, while the theory predicts the opposite.

Second, the test of empiricism has a particular sting for neoclassical theory because the concepts that the theory employs are counter-empirical, bearing little relation to observed economic categories. I discussed at length two of these, homogeneous output and the money supply. Neoclassical practitioners would perhaps argue that as abstract and ideal as their concepts may be, they are constantly subjected to empirical test. The mainstream journals are full of empirical studies, not to mention hundreds of books and monographs published every year.

However, the method of these empirical studies is to first formulate a model incorporating neoclassical concepts, then to see if the subsequent statistical results sustain the predictions of the model. This procedure is not a test of the validity of the model, but an exercise to see if there exists a formulation of the model that empirical evidence will not contradict. To take an analogy, the Ptolemaic model of a geocentric planetary system was repeatedly altered by its adherents to be consistent with the observed movement of the planets, moon, and sun in the sky. The Ptolemaic system enhanced with epicycles is a mathematical analogue of a heliocentric system. Not withstanding its "empirical validity", the geocentric model of the solar system is wrong (the earth is not the center of the solar system).

While all theories must have an empirical analogue, this analogue does not establish their validity. Key to establishing validity is the nature and adequacy of the concepts the theory employs, and the logical consistency of the conclusions reached from those concepts. The preceding chapters challenged the basic neoclassical concepts on grounds of internal consistency. In this chapter I take the process further and consider the two key conclusions based upon those concepts.

8.2 The significance of neutrality

After extended treatment of standard neoclassical models, it was established that the clearing of markets with instantaneously flexible price, wage, and interest rate results in a full employment equilibrium if the model includes a wealth effect. However, inclusion of a wealth effect renders money non-neutral. Only in a model with no financial assets other than money can neutrality be consistent with full employment. One might legitimately say, "so what?" The central issue is whether a capitalist economy tends automatically to full employment. If this can be demonstrated, surely the neutrality question is icing-on-the-cake; a bit more than a curiosity, but not much more.

While the major issue of political economy is whether a capitalist economy has a natural tendency to full employment, this is inseparably linked with the neutrality of money. Within the debate over neutrality, arcane and esoteric as it may seem, lurks a powerful ideological message. The neutrality of money is central to the fundamental question of whether public intervention in a capitalist economy is justified.

The neutrality of money with respect to real variables is the keystone of what might be called the "naturalistic" view of capitalist society. Always implicit and frequently explicit in neoclassical theory is the assertion that economic life is governed by laws with the same status of those of physics and chemistry. These laws are timeless and objective; i.e., they exist independently of whether one perceives and understands them. Central to this naturalistic view of economic phenomena is the dichotomy between real and monetary variables, and, therefore, the relationship between a barter economy and a money economy.

Assume that the real world of economic relations is characterized by (1) an automatic tendency towards full employment through market clearing, with no exceptions; and (2) that money is neutral. If this is the case, there exists a combination of real variables at full employment that is unique.[2] Being unique, it is the only set of real variables for which output/income and employment will be at a maximum. All other sets of real variables will result in lower output/income and employment.

Ignoring distributional effects and assuming more output/income is desired compared with less, the full employment solution is not only unique, it is also desirable (optimal) above all others. If there is a tendency for unregulated markets[3] to bring about this unique and most desirable set of real variables automatically, then there is no place for state intervention. At best, the state can attempt to do what the process of market clearing would bring about automatically. At worst, and considerably more likely by this line of argument, intervention by the state will prevent market clearing from generating the optimal result.

In this unique and optimal full employment solution, public intervention creates "distortions", defined as arbitrary conditions that "distort" the economy from its natural, optimal equilibrium. These distortions take many forms. Excessive public borrowing will create "crowding" in money markets, transferring credit from the private to the public sector. In addition, public expenditures will redistribute resources from private hands to the public sector. If the government limits its actions to the minimum, and at the same time have a purely neutral impact on private decision making, its behavior will not reduce the general welfare.

A necessary but not sufficient condition for this anti-interventionist argument is that money be neutral. If money is not neutral, then the full employment solution is not unique. In the real wealth effect model of the previous chapter full employment output/income and employment itself may be unique; i.e., there may be no other level of employment and output for which the labor market is cleared.[4] But these values are consistent with an infinitive variation in the other real variables. Put another way, there is no real solution as such. By changing the money supply, "the monetary authorities" can produce an infinite variation on the full employment theme. None of the alternatives can be singled out as preferable to others without explicit value judgments. The free market does not produce the most desired result; indeed, without government action it produces no result, because the government determines the money supply.

For example, a government might wish to achieve a higher rate of economic growth. It could do this by increasing the money supply, which would drive down the rate of interest and increase investment absolutely and relatively to consumption.[5] Or, a government might seek to change the functional distribution of income between wages and profits. This could be done by acting upon the interest rate and the money wage via the money supply.[6]

When money is not neutral, all full employment equilibria are arbitrary. Each is unique only with respect to a given money supply and a given supply of bonds. Public intervention via the money supply or supply of bonds is one of the defining characteristics of an equilibrium. Non-neutrality of money renders the debate over the desirability of public intervention moot. The relevant issue becomes, what form of intervention and to what extent?

The argument that the natural forces of markets generate an optimal solution which governments distort at the cost of the general welfare rests upon the presumption of the neutrality of money. Neutrality is a thin thread by which to hang such an ideologically powerful message. Granting all assumptions, neutrality could not be justified in the simple classical model because of the inconsistency between Walras' Law and the quantity theory (see Chapter 4). Once the money market includes the interest rate, the theorist is forced to choose between an employment solution and neutrality, the one excluding the other.

In this context one might recall that Patinkin claimed that the real balance effect was the *sine qua non* of all monetary theory. There is a sense in which Patinkin was correct, for the narrowly defined real balance effect that includes only money produces the only model in which neutrality and full employment can be unambiguously combined. This is an excellent example of the cliché, "the exception that proves the rule". A model with no bonds is too restrictive to be taken as more than a heuristic exercise, even among neoclassical theorists.

8.3 Full employment further investigated

The standard properties of the textbook version of the neoclassical model are the neutrality of money and an automatic tendency to full employment in the absence of "arbitrary" constraints, usually inflexible money wages. Previous chapters demonstrated that the two are not theoretically compatible. In Chapter 7 most attention focused on full employment equilibria. At this point a critical eye is turned to the concept of full employment itself; or rather, that concept as it manifests itself in neoclassical analysis.

With the wealth effect it is possible within the synthesis paradigm to reach the conclusion that unemployment of a portion of the labor force must always be "voluntary". Unemployment occurs if money wages do not fall to clear the labor market. Because employers would not oppose lower wages, the cause for wages being too high must come from the implicit or explicit actions of workers, individually or collectively. Workers must accept the "blame" for their unemployment.

While the neoclassical model seems to grind inexorably to this conclusion, it is not as logically strong as it appears. First, it is open to question whether the neoclassical model can reach any logical conclusions about unemployment, because of "the case of the missing excess demand". If we look back to the "complete Keynesian model" with rigid money wages (Chapter 6), we see that the less than full employment solution is associated with equilibrium in the commodity market and the money market. Saving equaled investment and the demand for money equaled the supply, with the bond market in equilibrium by implication. Therefore, rigid money wages yielded a solution in which the labor market had excess supply, but the excess supplies and demands in all other markets were zero, in sum and individually.

One uncleared market is inconsistent with Walras' Law, which requires that the sum of excess demands and excess supplies be zero for the system as a whole. It would appear that even "voluntary" unemployment, employment resulting from rigid money wages, is logically inconsistent with the neoclassical market clearing mechanism, Walras' Law, which is so central to the entire theory. This logical difficulty has preoccupied the more insightful neoclassical economists, provoking a search for the missing excess demand to match the excess supply of labor.[7] While ad hoc solutions to this difficulty are produced, the result has the appearance of being forced upon the theory by necessity rather than arising from its logic.

The basic difficulty is that the model *presupposes* full employment. This presupposition arises from the nature of Walras' Law, which should now be briefly reviewed. At one level Walras' Law is the salvation of the neoclassical model by ensuring that the clearing of individual markets is consistent with aggregate market clearing. The elimination of excess demand and excess supply in one market does not in itself move the neoclassical model toward general equilibrium. On the contrary, the clearing of one market can make full employment impossible to achieve, as explained in the discussion of false trading in Section 3.4. Walras' Law avoids this difficulty. As counterfactual as the mythical auctioneer may be, no systematic tendency to full employment is logically possible without the Law, no matter what other assumptions are made.

On another level, Walras' Law is a curse upon the neoclassical model, for it cannot be applied to any stable equilibrium except one of full employment. If the labor market is not cleared due to rigid money wages, then the Law requires that some other market is also not cleared. *But only in the labor market is non-clearing consistent with a stable solution.* Should the commodity market be nominated to balance the excess supply in the labor market with an excess demand, then the situation is logically inconsistent. An excess demand for the single commodity, provoking a rise in price and output/income, implies that the money wage is too low, a labor shortage, contradicting the initial situation of excess supply of labor, and rendering the downward inflexibility of the money wage irrelevant.

The only other candidate is the money market, and disequilibrium there would be inconsistent with equilibrium in the commodity market. If the commodity market is in equilibrium, then both output/income and the interest rate are in equilibrium unless disturbed elsewhere. Because the nominal supplies of money and bonds are exogenous, and the demands for money and bonds are set by the variables rendered stable in the commodity market (the interest rate and level of income/output), the compensating excess demand cannot be found in the financial markets.

The fundamental sources of the difficulties reflected in the logical problem of Walras' Law at less than full employment are two. First, in the neoclassical model the labor market is only formally linked to the other markets. As long as the demand for and supply of labor are specified in terms of the commodity ("real") wage, the positions of these schedules must be independent of what happens in all other markets. This first source of difficulty arises from carrying forward a labor market analysis appropriate to a barter economy into models in which "real" solutions either are no longer relevant or do not exist at all.

The second source of difficulty arises from the treatment of the commodity that workers sell. Formally, what workers sell is no different from the other commodities in the model. However, only in the labor market can an arbitrary limitation upon the value of the price variable prevent market clearing. Consider the consequences of rigidity of the other two price variables in the model, the price of the single commodity and the interest rate. If price is inflexible downward, the commodity market will clear (saving will be equated to investment) by a change in the level of output/income, which will also imply a change in the interest rate (movement along the IS curve). The money market will clear in the same manner. If the interest rate is inflexible, income will again equilibrate the commodity and money markets. While an inflexible price or inflexible interest rate will produce excess supply or excess demand in the labor market, neither can result in a stable situation in which there is excess supply or demand in the commodity or financial markets.

The discussion has been somewhat complex, but the fundamental difficulty can be stated clearly. In a system governed by Walras' Law, equilibrium is achieved by the adjustment of price variables to notional full employment supplies and demands. No points on demand and supply schedules except those of full employment exist even in theory, because false trading is prohibited. In contrast to this, a less than full employment equilibrium, even reached according to strict neoclassical rules, is a non-Walrasian position. By definition it is a position of false trading. It is invalid to conclude from the neoclassical model that unemployment is "voluntary", or to assign blame to workers for demanding excessive money wages. These judgments are invalid because the neoclassical model, firmly grounded in Walras' Law, has no analysis of unemployment at all, be it voluntary or involuntary.[8]

The basic problem can be traced back to the nature of Walras' Law itself. It is singularly inappropriate for the purpose assigned to it in the neoclassical model, *and* absolutely necessary. Walras formulated his Law for a market "period" during which no production occurred; i.e., commodity supplies are given throughout the trading-period. By contrast, the neoclassical macro model purports to analyze a situation in which the output of the commodity is a decision variable. In the original Walrasian system agents were precluded from deciding to vary the quantity of commodities they brought to the market. In the neoclassical macro model firms come to the market with nothing produced, because laborers must be hired and set to work before there is anything to sell.

Walras did not intend his model to include the labor market. He sought a solution to the relative prices of commodities in a system of many commodities, in which the supplies of these commodities were given. By the criterion of logic, Walras can be judged to have provided a determinate answer to the question he posed, though it is difficult to conjure up an actual situation that corresponds to his solution. Neoclassical theorists assign a quite different task to the hypothetical Walrasian market day and to Walras' Law. Ignoring the central issue posed by Walras, relative commodity prices, by presuming a one-commodity world, they attempt to apply Walrasian analysis to a situation in which the quantity of the single commodity is variable. It is hardly surprising that Walras' principles prove inconsistent in all cases except when the supply of the commodity is in effect fixed; i.e., at a unique point of full employment equilibrium.

Practically speaking, is it not the case, with or without Walras' Law, that an excessive level of money wages will result in unemployment? A commonsense argument would seem to serve as well as the esoteric of Walrasian general equilibrium: if money wages are high, labor costs to firms are high, and this induces firms to hire less labor than they would were money wages lower. But once one abandons a Walrasian world, it is not at all obvious that lower wages would increase employment. Causality as it appears to the individual capitalist may not be valid for all capitalists taken together. Lower wages reduce the demand for commodities, and if all markets do not clear simultaneously the level of employment could fall. In the absence of the strict discipline of the Walrasian auctioneer, the impact of lower wages on employment is an empirical question, about which no general theoretical conclusion can be drawn.

Neoclassical analysis produces a formally elegant model of full employment, but it has no theory of employment or unemployment. This conclusion seems startling for an analysis that offers such definitive prescriptions for economic policy. None the less, it is valid. The absence of a theory of unemployment is why neoclassical theory, like its "classical" forerunner, is a special case, and why Keynes, by dealing with situations of less than full employment, contended that his was the general theory of employment, interest and money.

8.4 The "unemployment of capital"?

Even ignoring the logical difficulties associated with Walras' Law, the synthesis treatment of unemployment presents a troubling anomaly. As shown in Chapter 2, neoclassical theory treats output/income as generated by the combination of capital and labor. These two inputs into the production/value added function are treated strictly equivalent, with their only difference in the units in which they are measured. The analytical similarity is emphasized by use of the terms “capital services” and “labor services”, each of which is defined to flow from assets, physical and human capital.

In the neoclassical macroeconomic model the strict similarity between capital and labor as inputs breaks down in a dramatic way. Every presentation of the model considers the case of unemployment of labor, but never is the possibility of “unemployment of capital” suggested. Investigation of this apparent anomaly provides insights into the synthesis model, as well as anticipating the post-Keynesian critique of the neoclassical model, which follows in Chapters 10 and 11.

Under-utilization of capacity in the sense in which it is measured empirically is not equivalent to unemployment of labor in the neoclassical model. Indeed, it is not a neoclassical concept. Capacity utilization refers to the degree that a given collection of buildings, machinery and equipment is utilized. Under-utilization of capital occurs if part of plant and machinery lie idle. For example, a factory that normally operates five days a week for eight hours a day is under-utilized if its management reduces operations to three days. The definition of “normal” utilization varies by production process, usually determined by the technical characteristics of the machinery in use.

In real economies the typical cause of under-utilization is insufficient demand for the product of the enterprise. Because of the neoclassical assumption of substitution between capital and labor, under-utilization of capacity is excluded by definition. It is not possible for demand conditions to induce an optimizing capitalist to use less than all of the available capital stock in a neoclassical world. In the short run, capital costs are fixed. Any level of anticipated unit costs of output will be minimized by minimizing variable (labor) costs, and with a given wage rate implies minimizing the labor input. Competition among identical firms, requiring each to sell at the lowest achievable unit cost, ensures that the entire capital stock will be utilized by the labor hired.

On the basis of this optimization process, I shall attempt to treat labor and capital in a strictly analogous manner. A real wage above the full employment equilibrium rate results in the unemployment of labor. By analogy a rate of return on capital above the equilibrium level would result in unemployment of capital. This possibility is illustrated in Figure 8.1. Part 8.1a shows the production isoquants, and contour lines each representing a constant level of output in the two-dimensional capital–labor space. The capital stock is fixed at k^* and the labor supply at n^*. If the labor market clears, equilibrium full employment output is y_e. The top left-hand quadrant shows the “demand curve for capital”, with the marginal product of capital equated to the rate of return, r. Optimizing behavior implies $MP_k = r$, just as it implies $MP_n = w$.

Figure 8.1d represents the labor market, familiar from previous chapters. Figure 8.1c measures the ratio of the commodity wage to the rate of return, the “factor price ratio”. Equilibrium with full employment of labor and of capital is associated with r_e and w_e. First, note the sense in which capital is fixed and labor

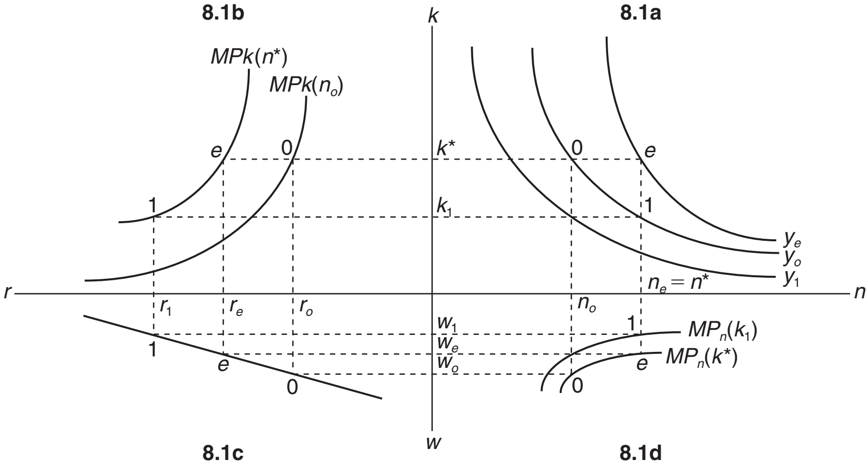


Figure 8.1 "Unemployment" of capital in the short run.

is variable. Because I make the standard assumption that the labor supply is invariant with respect to its only determining influence, the commodity wage, both factors are fixed in the sense that their potentially available quantities are given. If both have invariant supplies, in what sense is capital fixed and labor variable?[9]

This question can be answered by attempting to treat capital and labor in a strictly parallel manner. Assume that the equilibrium money wage is W_e and workers as a group refuse to sell their services for less than W_o, which is greater than W_e. As shown in the previous chapter, with a fixed money supply, W_o will imply a commodity wage, $w_o = W_o/p_o$, which is higher than the full employment equilibrium commodity wage, w_e. These two-commodity wage levels are shown in Figure 8.1d. With employment lower at n_o, the marginal product of capital schedule shifts inwards, and the rate of return falls. All of the values noted by "0" indicate the situation when rigid money wages result in the unemployment of labor while capital remains fully used.

Let the situation be reversed, indicated by values with the number 1. In this case, capitalists demand a certain rate of return, r_1, the consequence of which is to leave part of the capital stock "unemployed", $k*$ to k_1. With the employment of capital at level k_1, the marginal product of labor shifts towards the origin, and full employment of labor is achieved at a lower commodity wage than before, w_1. This particular "thought experiment" in which capital is not completely used is not treated in neoclassical theory. Neoclassical theorists are quite correct to ignore it, because the "experiment" is nonsensical. In attempting to treat labor and capital as strictly analogous and parallel factors of production, we reach a nonsensical result because the two factors are not analogous and parallel. It is worth repeating that the logic of unemployed labor in the short run, on the one hand, and the illogic of capital being unemployed in the short run, on the other, have nothing to do with one factor being fixed and the other being variable.

In the model being analyzed, the supplies of both factors are exogenously given, because it refers to the neoclassical short run. This is the same treatment as in the previous chapter, where there was no difficulty producing conditions under which part of the fixed labor supply was unemployed, if we ignore the nagging problem of Walras' Law being violated out of full employment. Analyzing labor as partially unemployed makes sense, but doing the same for capital does not because the nature of competition among workers is different from the competition among capitalists. If capitalists combine to administer a fixed market price, for example, individual capitalists who are initially a party to this agreement can gain by violating it. By underselling the fixed price, the maverick can expand his or her market share and gain a larger profit than operating within the agreement. Competition among capitalists tends to make coalitions unstable. However, a worker who is employed and a member of a trade union that has negotiated a fixed wage can only lose by underselling the capacity to work.

The fundamental difference is that capitalists own the means by which production is carried out and workers do not. As a result, the commodity that is produced belongs to the owners of the means of production. Capitalists sell commodities. Workers sell their ability to work. Therefore, capitalists can gain from cutting price, but workers cannot. This difference between competition among capitalists and among workers is the relation of ownership that creates and defines a market system (Weeks 2010, Chapter II).

Neoclassical theory reaches a profound truth when it ignores the possibility of unemployed capital, though for the wrong reason. The neoclassical reason for treating capital as fully employed is that in the short run rational capitalist behavior will dictate utilizing the existing capital stock with whatever labor is available. The basic truth of this assertion arises because capitalists need sell nothing to be employed (they own the means of employment), while employment of labor requires successfully selling the ability to work to capitalists.

Full understanding of the capital–labor relation requires abandoning imaginary models and moving to the actual economic and social relations. The machinery and equipment available for use at any moment is the property of capitalists. It has been exchanged and is in place. For this reason it is called the capital *stock*. Part of it may lie unused, but all of it is always owned. The output resulting from the capital stock must be sold profitably to justify continued use of machinery and equipment. However, the "services" of capital associated with a given output are not for the most part exchanged, except implicitly as cost entries on a ledger.[10]

By contrast, labor services are not a "stock". They must be repeatedly exchanged, sold to capitalists. Unemployment results because workers do not own the means by which production is carried out. Therefore, workers must sell their ability to work ("labor services") in order to participate in the production process. Their motivation for the sale is that they lack the means to produce. They cannot directly provide themselves and their families with food, clothing, and other necessities. Stating it succinctly, workers can be unemployed because they must work for others (non-workers), and they must work for others because they lack the means that would enable them to work for themselves.

The relevance of ownership relations to the neoclassical macro model is that they indicate the fundamental cause of unemployment. Workers do not have direct access to the means by which production is carried out. Workers must first sell before they can work. The property relations of a capitalist society are the fundamental cause of the idleness of part of society's resources. The use of the term "capital services" tends to obscure this basic cause of unemployment by suggesting that labor and capital are strictly analogous in production and exchange, which they are not.

The property relations of a capitalist economy make the labor market fundamentally different from other markets. In every developed country the history of the labor movement has been the struggle to reduce competition among workers. By contrast, commodity and money markets are inherently competitive. Neoclassical economists, particularly the more conservative, take a skeptical view of arguments alleging systematic price fixing through collusion by capitalists. They argue that such arrangements tend to break down under the pressure of competition from disgruntled sellers in the market or potential competitors who are eager to enter when profits are high. This argument has considerable empirical support as well as a sound basis in Ricardian and Marxian theory (see Weeks 2010, Chapter VIII).

The asymmetry between capital and labor that implicitly manifests itself in the synthesis macro model has not gone unnoticed by critics who accept the general neoclassical paradigm. Leijonhufvud, whose critique is treated in Chapter 11, refers to the asymmetry as the "transactions structure" of a money economy (Leijonhufvud 1981, 90). He argues that in a money economy characterized by self-employed craftsmen and farmers, unemployment would be impossible. Without employers there are no employed people, thus no unemployed. The point is a profound one, rarely made explicit in mainstream economics. Unemployment exists because labor is a commodity. Labor is a commodity because workers do not have ownership of the means by which they can produce.

9 Expectations and full employment

9.1 Perfect, static and adaptive expectations

In the 1970s a new and, in the view of some, revolutionary element was added to the neoclassical macroeconomic model. This was the rational expectations hypothesis (REH), based on the work of John Muth a decade earlier. Closely associated with the REH was the "New Classical Economics", which is treated in this chapter. While it was the members of the new classical school who were instrumental in introducing the REH into economics, its influence was not limited to them. In order to appreciate the implications of the REH, it is necessary to consider neoclassical treatments of expectations that pre-dated the REH.

Except in the presentation of Keynes's treatment of the demand for money, I made little explicit reference to expectations in the previous chapters. However, present throughout was the assumption of "perfect foresight". The simultaneous clearing of all markets required a ban on false trading, because all exchanges have to be at general equilibrium prices. The creation of an imaginary auctioneer to oversee trades served to enforce the prohibition against false trading.

If the auctioneer were taken away, then market clearing requires that each trader is required to self-enforce not buying or selling at disequilibrium prices. A trader can avoid "false" prices by knowing the general equilibrium prices that will prevail when all trades are complete. This means that traders must know without error what will happen in the future. Assuming an omniscient auctioneer is formally equivalent to traders knowing the future, perfect foresight. Implicitly or explicitly, pre-Keynesian general equilibrium analysis and much neoclassical analysis subsequent to Keynes assumed prefect foresight.

There are many objections to the perfect foresight hypothesis (PFH). In the neoclassical literature one frequently finds the argument that the PFH is unsatisfactory because it is inconsistent with utility maximization. Perfect foresight requires more information than a rational agent would ever choose to acquire. Gathering information has a cost, and like any other commodity it will be purchased (by money, time or both) up to the point at which its marginal benefit equals its marginal cost.

More important, the PFH cannot be considered an intellectually serious argument. Even if information were costless, the hypothesis presupposes the impossible, that one could know the future. The fundamental difference between the past and the future is that the past has occurred and the future has not. The only way to be sure of what will happen tomorrow is to wait for it to occur. Was this not the case, languages would have no need for the word "accident". Perfect foresight is not a hypothesis in the strict sense, but an invocation of the impossible.

As an alternative, one could adopt the static expectations hypothesis (SEH), which assumes agents act as if the future will be like the present. This hypothesis at least meets the minimum test of credibility. An example is the Cobweb solution to market clearing in comparative static partial equilibrium analysis. From an initial disequilibrium in a market sellers have static expectations, so their offers for each time period are based on the price that prevailed in the previous period. Because it allows for false trading, the SEH would not serve for general equilibrium models.

A variation on the SEH is the adaptive expectations hypothesis (AEH), according to which agents determine their expectations of the future on the basis of experience of the past. Expectations are "adaptive" because as each period passes predictions of the future are adjusted in light of most recent experience. Previous experience is discounted on the basis of its distance from the present. As should be obvious, the AEH results in less volatile models than the SEH. If a dramatic change occurs in the economy, an agent governed by the SEH will respond with an equally dramatic adjustment, on the belief that the change will persist. Someone acting on the AEH will move more cautiously, with behavior governed by past trends and fluctuations. The AEH "smoothes things out". A well-known example of use of the AEH was Milton Friedman's argument that monetary policy is ineffective in the long run.[1]

9.2 The rational expectations hypothesis

In contrast to the other hypotheses, which postulated stylized behavior of economic agents within the context of formal models, the REH purported to specify the actual behavior of agents in real market circumstances. Specifically, it sought to establish a relationship between agents' expectations and empirical outcomes of the economic system. As a result of the pretension that it arises from actual behavior, the REH should be assessed against criteria different from those used for the other hypotheses. In the case of the first two (PFH and SEH), it is not appropriate to demand that they satisfy the test of realism because they are logical exercises. By its own assumptions the REH stands or falls on the test of realism.

The REH can be simply stated: 1) if economic and social relations are deterministic;[2] 2) if all aspects of these deterministic relations are known by economic agents; 3) if economic agents form their predictions of the future on this complete knowledge;[3] then 4) the predictions (expectations) formed in this manner will be correct on average and any divergence between anticipated and actual outcomes will be the result of random influences. The full and complete knowledge assumption was sometimes called the "formal model" of the economy.

There are several serious difficulties with the REH. First, it presupposes a strict dichotomy between systematic and random influences that is a naive and simplistic approach to causality. It asserts that all systematic influences affecting the economy are completely known, and any unknown influences are random events. This places an unbearable burden of identification upon the theoretical analysis. Only if the theory has completely and correctly specified all relevant behavioral relationships, and estimated them with accurate data in an unbiased specification can the unexplained residual be considered purely random.

The REH assertion that there exists full and complete knowledge of the operation of economies is quite astonishing.[4] The specific assertion is that there exists "the economic agent who fully understands how the economy actually operates" (Shaw 1984, 52), and obtained this knowledge through the discoveries of economic science. This claim, that economics has revealed the true and complete operation of the capitalist economy, is a manifestation of hubris that appears in no other intellectual discipline, be it a social or a physical science. The physical sciences, where new discoveries continuously challenge the existing body of accepted truth, are considerably more humble in their claims.[5]

The literal omniscience of neoclassical economic theory is asserted. At any moment it has discovered all that need be known about the economy. A cynic might say that the enthusiasm with which the profession has embraced the REH might in part be explained by the pleasing effect of the hypothesis upon the professional egos of economists. The perfect foresight hypothesis postulated the impossible, knowing events prior to their occurring. The REH postulates the incredible, complete knowledge. If it were the case that economic science at the end of the twentieth century reached the sublime state in which it correctly and completely modeled the capitalist economy, economists did not agree on what that correct and complete model might be.[6] Relevant is the cliché that if all the economists in the world were laid end-to-end, they would fail to reach a conclusion. For many reasons, scientific method,[7] state of knowledge, and the intense controversies within the economics profession, it is not credible to presume that a correct and complete model of the capitalist economy exists as a reference for economic agents.

When suggesting behavior on the part of people that is *prima facie* incredible, neoclassical theory frequently seeks to establish credibility through an "as if" statement. For example, in consumer theory it is argued that the analysis does not require that people know their utility functions and to maximize them subject to their budget constraint, only to behave "as if they did". A similar argument is advanced in the case of cost-minimizing firms. The "as if they did" treatment has been applied to the REH.[8] In the case of consumer theory the "as if" can be justified on grounds that the assumption of utility maximization is tautological. All behavior is consistent with utility maximization. The person in question would not have selected a particular action in the market had it not brought him or her closer to optimality. In the case of the theory of the firm, one might argue that cost minimization is forced upon capitalists by competition, and those who do not behave in this manner are driven out of operation.

Neither of these justifications can apply to the REH. Assuming that people have complete knowledge of the economy is not tautological. The REH advocates concede that even under the best of conditions some people will not behave as the REH predicts. Further, it is not correct to assume that mistakes in forecasting will lead people to close in on the correct model by trial and error, though some authors argue this.[9] Trial and error is the last line of defense of the REH, and it is invalid because it assumes what it seeks to prove.

Consider the proposition that a rational agent could "close in on" the correct model by noting discrepancies between his or her predictions and actual outcomes. To do this, first assume the world to be strictly deterministic and that the hypothetical agent *does* know the correct model. Each chronological event is unique. That circumstances never repeat in precisely the same way would not necessarily create a problem of prediction. For example, the consequence of a change in a personal tax rate would be correctly anticipated whether prices were rising or falling. If, however, an agent has the wrong model in mind, a very serious problem of evaluation results. The agent with the wrong model might sometimes generate the right prediction by accident or for the wrong reason.

With the wrong model an agent would be unable to distinguish between forecasting errors that were the result of wrong specification of the model, and those resulting from random influences on the correct model. This problem with the "trial and error" argument can be put another way. The REH itself implies that people's predictions will be inaccurate more often than they will be correct. The hypothesis states that predictions will be correct on *average*, with a normal distribution around the average. In order that a person reformulate his or her model on the basis of inaccurate predictions, it must be known which deviations of the predicted from the actual outcomes are systematic modeling errors and which are random errors.

If the errors are systematic, then the model must be changed to correct them. If the inaccurate outcomes are random deviations from the true mean, no change should be made to the model. Without the ability to distinguish between the two error sources, the REH agent could spend time reformulating a correct model or resting complacently in the mistaken belief that systematic errors were only random "noise".[10] In summary, an agent can successfully use trial and error as a method of establishing the correct model only if the agent knew the correct model prior to attempting to learn it.

Closely related to the above, *even in theory* each prediction made by the REH agents is a unique, "one-off" exercise. The REH agent is in effect operating with an econometric model estimated from historical data,[11] plus incorporating key information about the future such as government policy changes. An elementary principle of econometrics is that the unbiased probability distributions of the estimated parameters of a model refer to *hypothetical* outcomes. There is only one actual outcome, except in science fiction stories involving parallel worlds. No competent econometrician would argue that a quantitative model could be constructed through trial and error. On the contrary, the whole body of econometric theory denies such an ad hoc approach. There are no alternative outcomes for the rational agent to observe. Yet it is such a theoretically invalid presumption that the REH advocates defend.

Using the REH in economic models involves what Coleridge called "willing suspension of disbelief" that enhances reading fiction (found in his 1817 work, *Biographia Literaria*), but such credulity is of questionable appropriateness when constructing economic models. To give some spurious verisimilitude to the REH, its practitioners tend to employ extremely simplistic models and equally simplistic "thought experiments"; this despite the assertion that agents are supposed to have complete and full knowledge of how the economy operates, and not merely some simple analogue. The policy implications of the REH, particularly those reached by the new classical economists, almost invariably follow from extremely simple and sometimes logically flawed false dichotomy models.

9.3 The New Classical Economics and the REH

Pre-Keynesian "classical" economics was characterized by its faith that capitalist economies tended automatically to adjust to full employment equilibrium in some chronological "long-run" period with money strictly neutral. The New Classical Economics took the same full employment, money neutral position, but argued that it applied to the *short run*. Quite explicitly the New Classical Economics argued that deviations from full employment equilibrium *in practice* will tend to be minor.

A favorite "thought experiment" generated with the REH hypothesis involved an assumption of aggregate money wage bargaining between capital and labor in which the only change is in an autonomous money supply.[12] The typical model had only three equations, an IS curve, an LM curve, and an aggregate supply of output curve (see Akerlof 1979). The last of these was specified in terms of a single commodity.[13] That most workers might not know the "true" model was brushed aside by the contention that their trade union representatives would do the homework to arrive at full and complete knowledge.[14] On the other side of the hypothetical negotiating table, capital was presumed to have the same model linking nominal variables in the economy to real ones. Let us suspend disbelief, ignoring, for example, that economists cannot agree on precisely how the economy operates, and inspect how this simplistic model might be used by the new classical economists.

Assume an aggregate wage bargain in which both sides possess the same unique and complete formal model of the economy. Further assume that all prices are flexible, so that at the time of the wage bargain the commodity market and labor market are in equilibrium. This assumption of equilibrium involves the introduction of a concept central to the New Classical Economics, "the natural rate of unemployment" and its close companion "the natural rate of output".

These two concepts represent the naturalistic tendency of neoclassical economics in its most blatant manifestation. By whatever definition, unemployment is not "natural" and use of the term is purely ideological. As explained in Chapter 8, the necessary condition for unemployment is that workers do not own the means by which production is carried out. If they did, they would have no need to offer their services for sale. One may think that capitalism provides the best of all worlds, but the existence of workers without property is no more natural and ordained by nature than slavery was.

Second, by the definition used in the New Classical Economics unemployment cannot be natural. The "natural" rate is defined as the rate of unemployment that prevails when the labor market is in equilibrium.[15] Because equilibrium is an ideal state that the actual economy only approximates, equilibrium unemployment is also an ideal concept. Third, the empirical manifestation of unemployment cannot be natural if "natural" means generated by forces of nature without human agency.

As an empirical category, the "natural rate of unemployment" is supposed to refer to those people who voluntarily chose to be without employment. The "natural rate" hypothesis explains such a choice by people on the basis of optimizing behavior. For example, a person may chose not to work at the prevailing wage because the cost of relocating to take an available job may be too great, or the prevailing wage may lie below the worker's customary wage, either making it rational to wait in hope of a better offer. These decisions are influenced by the institutions of society, for example the level and duration of unemployment compensation, access to retraining programs, and discrimination on the basis of sex, age and ethnicity. The new classical economists themselves pointed to unemployment compensation as being in part the cause of "voluntary" unemployment. These factors can be changed by legislation and government decree. It makes no sense to call a rate of unemployment "natural" when it can be altered by passing a law or winning a class action in a court.

It might be thought that much is being made out of a purely semantic matter. However, there is a fundamental theoretical issue here. The term "natural rate of unemployment" as used by the new classical economists is nothing other than full employment equilibrium. To call it what it is, full employment equilibrium, identifies it as an ideal concept. It is a product of an abstract economic model that incorporates a number of extremely problematical concepts, such as the aggregate production function and an exogenous money supply.

Full employment in the sense of there being no one who wishes to work at the going wage but cannot find employment, may not exist outside of the arcane models of neoclassical economists. It is a hypothesis.[16] Invoking the word "natural" reflects an attempt to repackage an extremely dubious concept to make it more acceptable. The repackaging has been a success. The term quickly gained wide respectability within the economics profession despite the objections of a number of prominent neoclassical theorists.[17]

Despite its theoretical problems, I accept the "natural rate of unemployment" to investigate the New Classical Economics wage bargaining story. To avoid misrepresentation, I follow closely a standard presentation from the early days of the REH and the New Classical Economics. Recall that the correct and complete model of the economy is known by both capital and labor. The story goes as follows,

> [T]he equilibrium expected real wage at the date of the nominal wage bargain is made is assumed to be set in the expectation of clearing the labor market.… Thus I assume that nominal wages are set each period to produce an expected real wage which (*sic*!) is expected to generate unemployment at the Natural Rate.
>
> (Begg 1982, 37)

The story that pretends to establish full employment (the "natural rate") begins by assuming it ("in each period"). The story bears no resemblance to what occurs in any actual economy. Very few capitalist economies have aggregate wage bargaining. In most Western capitalist countries the majority of wage and salary earners are not organized into trade unions. In the United States, for example, approximately a twentieth of the workforce is unionized.

Second, the assumption that the parties to the wage bargain seek a nominal wage that will clear the labor market is arbitrary. It is a strange assumption for a new classical economist. For decades neoclassical economists argued that trade union leaders tended to be most influenced by their direct constituency, the dues paying members. As a result they allegedly showed little concern for the non-union employed, much less the unemployed. It is unclear what prompts the New Classical Economics to attribute such selfless motives to trade union leaders throughout the capitalist world. The assumption that a wage is set to clear the labor market is nothing other than the Walrasian auctioneer disguised in a blue collar and cloth cap.

Third, the assumption is implicitly made that there is no conflict of any significance between capital and labor, because both parties to the bargain seek the wage that will clear the labor market. More basic, the story involves no bargaining at all. Because both capital and labor know with certainty the true model of the economy and both seek to establish the full employment real wage, it would be a waste of time for them to meet. The trade union leaders could leave wage setting to the capitalists (and *vice versa*), because both parties have the same information and seek the same result. Completely ignored is the possibility that the wage bargain might involve a struggle over the distribution between wages and profits.

The story may impress some one that it has more superficial realism than the general equilibrium parables in previous chapters, but it is no closer to reality. It is that same general equilibrium thought experiment disguised as a real world process. The REH is incidental to the story. It must be stressed that this story is not merely an exercise in abstract model building, because it has pretensions to explain actual events. In its attempt to do so, it begins by assuming that the labor market is in equilibrium. This assumption means that all markets clear according to Walrasian rules. Walrasian market clearing requires the assumption of perfect foresight to avoid false trading, either in the form of the PFH or a mythical auctioneer. Rather than replacing the PFH, the REH is introduced *in addition* to the presumption of perfect foresight. The assumption of perfect foresight is required to ensure the market clearing that establishes full employment each market period.[18] The REH does no more than provide a spurious link between one market period and the next.

The implicit necessity for the PFH can be demonstrated with another "thought experiment". Assume that at the outset of a market period agents establish their predictions on the basis of a complete and correct economic model. If able to do so a large number of times, they will on average predict the general equilibrium outcome. However, in any specific case, random influences will result in the actual outcome differing from general equilibrium, and false trading will occur. Further, each prediction exercise is a unique event that can never be repeated in practice. Hypothetically there exists an average of the many outcomes that is equal to the general equilibrium outcome. Because each market period is unique, the theoretical existence of a zero mean for deviations from general equilibrium is of no help to avoid false trading once the story refers to the real world.[19]

Even if the REH yielded general equilibrium for theoretical, one-off events, the approach is unsatisfactory. As shown in previous chapters, full employment general equilibrium is a theoretically fragile concept requiring a number of problematical assumptions and concepts. Pre-REH neoclassical theorists for the most part felt it necessary to demonstrate the existence, uniqueness, and stability of general equilibrium. The New Classical Economics takes full employment equilibrium as its starting point and then marvels that it has a model to generate it.

9.4 The New Classical Economics and policy

With these critical comments in mind, we can turn to what were considered the policy conclusions of the New Classical Economics story. Perhaps the most remarkable aspect of these policy conclusions was that they were taken seriously. Recall that the wage bargain has been struck in the context of full employment with both parties seeking a money wage which will preserve that full employment in the next time period. To continue the story,

> Under Rational Expectations, the remarkable implication … is that, no matter how we define the rest of the model and no matter which systematic parts of the [government economic] policy rule are altered, the effect on the path of real output will be nil.[20]

The story apparently has the following moral: if agents act according to the REH rules, no matter what the characteristics of the formal model of the economy, no systematic government economic policy will have any effect upon real output and, therefore, employment during the life of the wage contract. This statement is false. To understand why it is false, first we investigate the conditions under which it would be true. Assume that the government plans to increase the money supply during the period when the wage agreement applies. If the increase is based upon some reasonable and systematic policy guidelines, then it will be anticipated by the parties to the aggregate wage bargain. In anticipation of the implementation of the policy rule, the bargainers will agree on a nominal wage that clears the labor market with the specific policy in mind.

For example, if the government plans to increase the money supply by ten percent, the bargainers will set a market clearing nominal wage consistent with this change in the money supply. On the assumption that the wage bargainers do this, under what circumstances will there be no effect upon real output? *This will result if and only if money is strictly neutral*.[21] In other words, application of the REH tells one nothing that economists have not known for at least two generations: if the economy is at full employment equilibrium and money is neutral, a change in the money supply will leave all real variables unchanged.

The "remarkable" REH conclusion is the neutrality condition and nothing more. It differs from the same story told in traditional Walrasian market theory by the replacement of the all-knowing auctioneer with all-knowing wage bargainers. The economic policy nihilism of the New Classical Economics was a repackaging of the economics of Pigou, Keynes's famous theoretical adversary.

The quotation is wrong in the first instance because there are many specifications of how the economy operates in which money is not neutral. If we allowed non-neoclassical specifications, there are the models of the neo-Ricardians, post-Keynesians and Marxists. Even if respectability is granted only to neoclassical models, it was shown in Chapter 7 that the wealth effect renders money non-neutral.[22] If money is non-neutral, then the hypothetical 10 per cent increase in the money supply will alter the rate of interest, directly affecting real investment and consumption. If the supply of labor is sensitive to the interest rate, then the market clearing level of employment will change.

Second, if money were neutral, it is not true that changing systematic policy rules will have no effect upon real output. There exist fiscal policy rules that even if unchanged would affect real output. If the tax structure is progressive, then a rise in nominal wages and prices will increase tax revenue more than proportionately to the rise in money income. In a neoclassical world a higher average tax rate for the economy would affect the work–leisure trade-off and shift the supply of labor schedule (Hahn 1980, 2).

Pre-Keynesian Classical Economics was forced to retreat before the attack of Keynes. It remained largely an academic pursuit during the decades when Keynesians dominated the policy debate. Its two central messages, the neutrality of money and automatic full employment equilibrium, were treated with considerable skepticism by policy-oriented economists. The New Classical Economics changed this, and the believers in full employment and neutrality again seized the high ground of economic theory, in part by using the REH.

Under close inspection the REH resolves none of the theoretical problems that plagued both the old classicals and the neoclassicals; rather, it added additional logical problems of its own. Its popularity in the profession was largely a political phenomenon. With the election of right-wing governments in the United States and the United Kingdom in the 1980s, the New Classical Economics was a doctrine whose time had come, its theoretical failings ignored in the enthusiasm of having an analytical basis for right-wing policy.

9.5 Evaluating the New Classical Economics

Having been quite critical of the New Classical Economics and its rational expectations medicine, I must give it its due. While many liberal and progressively minded neoclassical economists were appalled at the right-wing policy nihilism of the New Classical Economics, the latter can with some justification claim to have been the true standard bearer of the neoclassical synthesis tradition.

For at least 30 years after the end of World War II there existed a strong consensus among mainstream economists about macroeconomics. In the realm of high theory, a successful counter-attack was launched against *The General Theory*. It was accepted in the profession, more in the United States than elsewhere, that Keynes had done little more than demonstrate that rigid money wages would prevent achievement of full employment.[23] This theoretical victory of the pre-Keynesian paradigm appeared of little importance, because the other part of the consensus was that money wages were rigid in practice.

Those who refused to abandon the pre-Keynesian paradigm were left to pursue their interest in the analysis of full employment equilibria if they wished. Practitioners of economic policy and macroeconomic empirical studies devoted themselves to situations of less than full employment, and to developing rules for interventionist policies of governments. With the exception of a few graduate schools, young economists-in-training were required to learn the intricacies of full employment solutions as something to master before moving to the serious work of analyzing what could be done to correct situations of unemployment. Walrasian general equilibrium theory was frequently restricted to a topic within advanced courses in microeconomics (which, one can note, is where Walras himself had located it). Studying general equilibrium theory was akin to a language requirement for an advanced degree.

The decline of what Keynes had called classical economic theory reflected the political environment of the post-war period. It was an environment conditioned by two traumatic events in the developed countries, the Great Depression of the 1930s and World War II. The most developed capitalist country, the United States, suffered a catastrophic economic decline during 1929–1933. Another highly developed capitalist country, Germany, unleashed organized barbarism on a historically unprecedented scale on its own population and its neighbors. One did not have to be a communist or even a social democrat to believe that modern capitalism required government intervention to control its more flagrant economic and political abuses (see Rothschild 1946).

However, the most of the pragmatists of less-than-full employment had few theoretical differences with the general equilibrium idealists, especially in the United States. Even in the Keynesian heyday, the so-called frontier of macroeconomic theory was dominated by Walrasian methodology. For thirty years a split personality characterized mainstream macroeconomics. It swore theoretical allegiance to Walras, but unceremoniously abandoned him when treating policy issues. Economists such as Joan Robinson on the left and Milton Friedman on the right pointed out the contradictions between the discipline's theory and practice, but made little headway in obtaining a consensus for rendering the two consistent. Like the Catholic Church during brief historical periods, the profession flourished on the basis of rigid doctrine in the Vatican and heterodoxy among the clergy.[24] Those who pointed out the absurdities of the neoclassical paradigm, most notably John Kenneth Galbraith, were ignored no matter how prominent they were (and he was perhaps the best known economist of the twentieth century after Keynes).

While the importance of the mainstream by the New Classical Economics during the last decades of the twentieth century was brief, its nihilism left a profound impact on the mainstream.[25] By the mid-1980s, the theoretical core of economics was again general equilibrium. The New Classical Economics united theory and practice. If theory tells one that the natural working of the market mechanism will produce full employment, and that the government is a burden upon the economy, and if that theory is accepted as the collective wisdom of the profession, an economist should treat the world accordingly.[26] Neoclassical theory found its purest expression in the New Classical Economics, where it could run its course to its logical and practical conclusion.

10 Full employment and multi-commodity production

10.1 Introduction

At points in previous chapters I have criticized the neoclassical aggregate supply of output function. In this chapter I expand that critique. Of special importance are those objections by writers who feel that the neoclassical synthesis is a serious distortion, even a perversion, of Keynes's contribution to economic theory. The purpose is not to cover all critiques from writers influenced by Keynes. As noted in the introduction, there are many excellent presentations of post-Keynesian economics. This chapter restricts itself to those who address the implications of the neoclassical macro modeling of the supply side.

Keynes explicitly accepted marginal productivity theory,[1] but at a number of points in *The General Theory* he made arguments and comments that contradicted the concept of a neoclassical production function (see Annex on Keynes at the end of Part II),[2] either aggregate or at the firm level. One group of economists in the tradition of Keynes judged his acceptance of marginal productivity theory to be a fatal compromise. Central to their critique of the neoclassical synthesis was an attack upon the aggregate production function. This group of writers, among whom Joan Robinson was the most distinguished, are generally identified as "neo-Keynesians".[3] There is a second group critical of the neoclassical model, some of whose members share the skepticism about the aggregate production function. This second group, including Robert Clower and Axel Leijonhufvud, centers its critique of the synthesis model on the general equilibrium analysis of Walras' Law. For this approach I use the term "disequilibrium neoclassicals" and treat them in the next chapter.[4]

The neo-Keynesians sought to reconstruct the analysis of *The General Theory* in terms of a macro analysis that discarded the concept of an aggregate production function. In their approach, the neoclassical treatment of capital–labor relations as a harmonious one determined by purely technical influences (the production function and factors supplies) is rejected in favor of placing the distributional struggle between capital and labor at the centre of the theory.[5]

10.2 Switching techniques and the factor price frontier

A basic conclusion of neoclassical theory is that holding other things equal, more employment can only be achieved at a lower real wage. If neoclassical economics can be said to have behavioral "laws", this is one of them. It carries a powerful ideological message. Attempts by workers to improve their conditions of pay, if successful, will be self-defeating by generating unemployment.[6] If the labor market is left to operate freely without interference, full employment will result. Intervention results in the employed gaining at the expense of an increased number of the unemployed. Further, society as a whole loses, because unemployment implies that total output is below its maximum level. This argument, that there is a trade-off between the level of the real wage and the level of employment, derives directly from the aggregate production function. It frequently appears in journalistic economic arguments as a justification for a range of antisocial practices, such as miserable wages and working conditions, "sweat shops", in low-income countries.

To clarify the importance of the debate over the aggregate production function, a detailed investigation of how the real wage–employment trade-off is supposed to occur is necessary. On the supply side of the macro model, neoclassical theory begins by assuming that the total production of the economy can be treated as a single product. It then postulates that at any moment there exists a known range of techniques that can be used to produce this single commodity. This range or set of techniques can be called "the state of technology".

Together these techniques are a single production function, and differ from each other only by the ratio in which capital is combined with labor. There will be some capital–labor ratio at which each technique will produce the single commodity at the lowest cost, given the wage rate. The aggregate production function represents a locus of many techniques, all the possible capital–labor combinations that are economically efficient. Capital–labor substitution results in the full use of the capital stock, because it is always rational for capitalists to do so whatever might be the labor input (see Chapter 8).

Movement along a production function, as in the stories told in Chapters 5 to 7, involves firms substituting labor for capital (or vice versa) by *switching* techniques. No competent neoclassical economist thinks that a given production process (technique) allows a wide range of capital–labor ratios.[7] It may be that some processes do, but this is an empirical issue and cannot be the theoretical basis of capital–labor substitution. The theory of capital–labor substitution asserts that there exists a book of blueprints of many possible alternatives techniques. When the ratio of wages to the profit rate changes, optimizing capitalists switch to a different technique.

Technique switching in response to changes in factor prices is illustrated in Figure 10.1, where there are three manifestations of the aggregate production function. A map with four techniques available for the production of the aggregate commodity is represented in Figure 10.1a, each for a fixed capital stock of k*. A small k is used because the capital stock is measured in units of

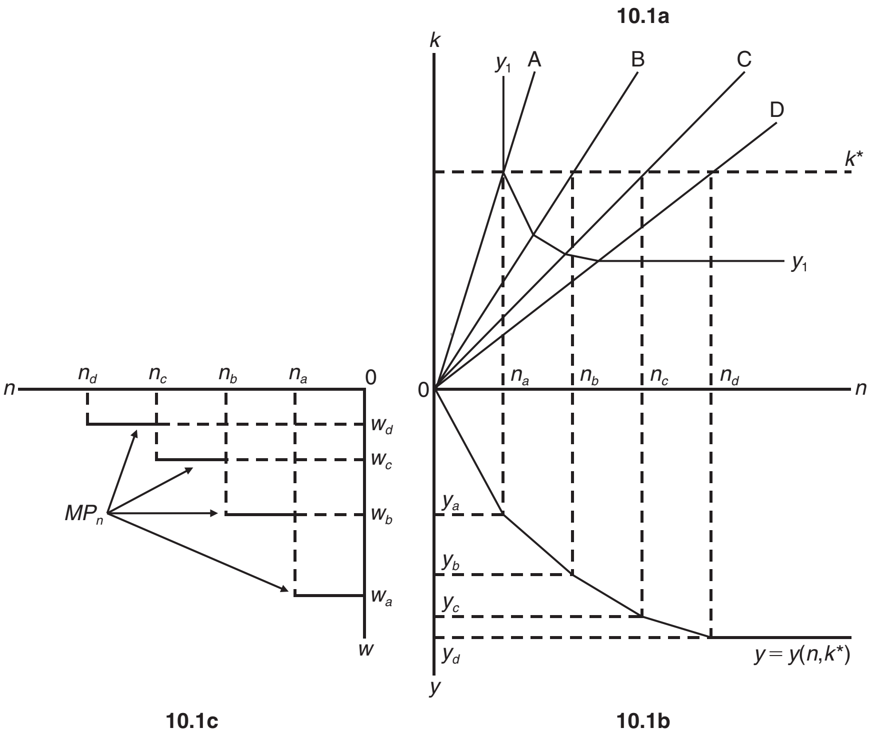


Figure 10.1 The aggregate production function as a range of techniques.

the single commodity. Each of these techniques, A, B, C, and D, is characterized by fixed coefficients. When using technique A, capital and labor can be combined only in the ratio k^*/n_a. Additional input of labor, adding amount $[n_a - n_b]$ for example, has no impact on the level of output when technique A is used. The straight lines from the origin for which the k/n ratio is constant are called activity vectors.

As drawn, moving equal increments outward from the origin along any activity vector produce equal increases in output (constant returns to scale). When points of equal output on different vectors are joined, the result is an isoquant (only one is shown, for y_1). The isoquants in this diagram differ from those in Figure 8.1 because here they are made up of straight-line segments. Were we to include more activity vectors (techniques) between the existing ones, the isoquants would progressively begin to approximate smooth curves. Even were we to do this, the curves would be constructed on the basis of discrete techniques, each characterized by fixed coefficients of production.

Figure 10.1b shows the production function in the output-labor space, again with a series of straight lines whose slopes diminish with respect to the level of employment. Finally, Figure 10.1c presents the implied marginal product of labor schedule, measured in units of the single commodity, though on a different vertical scale. Note that the production function and marginal product schedules consist of line segments, not merely four points. At levels of employment between points n_a and n_b, for example, a combination of techniques A and B can be used. The marginal product schedule takes the form of a step-function, with the operative portions of each technique shown as solid lines. This diagram demonstrates that changing the capital–labor ratio involves a switch from a fixed coefficient technique with a higher capital–labor ratio to one with a lower capital–labor ratio.

The next diagram, Figure 10.2, is a variation on the one before, in which the *factor price frontier* is derived using all four quadrants. In Figure 10.2a the isoquants are presented as before, with four fixed coefficient techniques. In the quadrant below (Figure 10.2b), the marginal product of labor schedule is derived. This part of the diagram reveals the real wage associated with each technique, measured on the vertical axis in units of the single commodity. In Figure 10.2c, the relationship between the capital stock and the rate of return is shown, with r rising as techniques are chosen for which the capital–labor ratio falls. Figure 10.2c has a series of shifting vertical marginal product of capital schedules, as labor varies with capital constant.

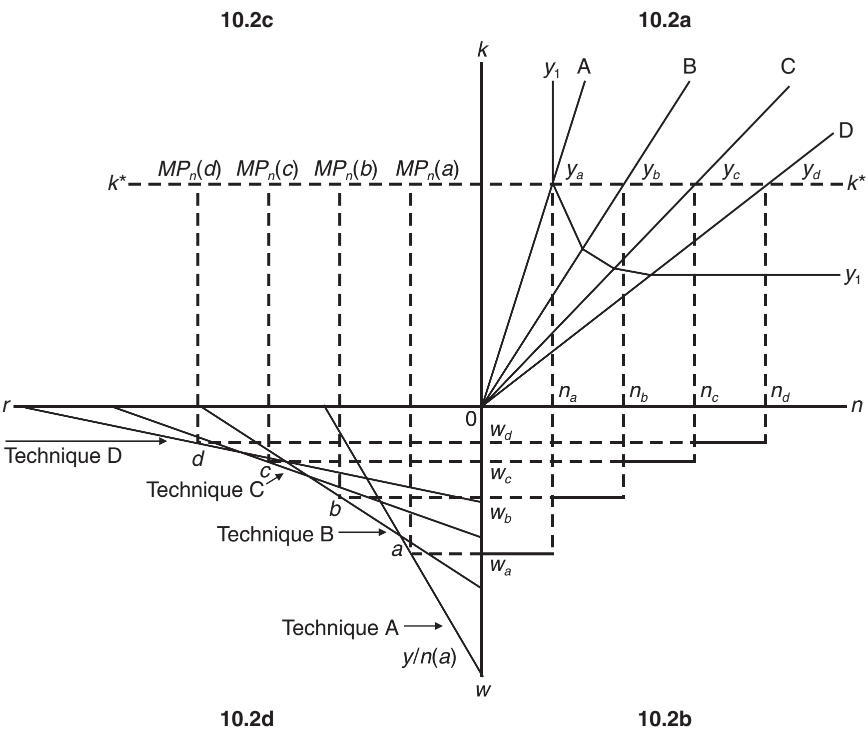


Figure 10.2 Derivation of the factor price frontier.

The shape of the curve in Figure 10.2d is explained by use of algebra. Because output is equal to wages plus profits, one can write for any of the four techniques, (using technique A as an example),

$$y_a = wn_a + rk^*$$

and

$$r = [y_a - wn_a]/k^*$$

In this equation, only w and r vary because there is only one ratio in which capital and labor can be productively used, namely k^*/n_a. Further, the average product of labor, y_a/n_a, is unique when the entire capital stock is employed. This equation is the factor price frontier for technique A, and it is linear. It shows the unique rate of return that is associated with any commodity wage (and vice versa). A factor price frontier can be derived for each technique, and these are shown in Figure 10.2d. As the capitalist producer switches to techniques with more labor relatively to capital, the vertical intercept, y/n, crawls toward the origin, so each successive factor price frontier intersects the previous one at a lower commodity wage and a higher rate of return.[8]

The result of constructing several factor price frontiers is easily interpreted. If the commodity wage is w_a, then technique A will be chosen by capitalists because it yields the highest rate of return. At some point below w_a technique B begins to offer the highest rate of return. When the commodity wage declines toward w_b capitalists will switch from technique A to technique B. Where techniques A and B cross is a "switch point". As the commodity wage continues to decline capitalists will switch to technique C, and to technique D. We now have the explicit theoretical foundation of the less-than-full-employment stories of Chapters 5 to 7.

Assume that the supply of labor is n_c in Figure 10.2a. If the money wage is flexible and markets clear according to Walrasian rules, then nominal variables will adjust so that the commodity wage moves into the region in which technique *C* is most profitable and labor is fully employed. If, however, workers combine to hold the money wage above the market clearing level, the commodity wage would increase, to a level where technique B is most profitable. The total capital stock is converted to technique B, and the maximum level of employment would be n_b, resulting in unemployment.

The moral of the story told in Figures 10.1 and 10.2 is neat, compact, and politically powerful. However, it is a moral based upon a world created by the story-teller. It is not a tale of any actual economy, nor is it a story relevant to any actual economy. The logical argument in its entirety requires a one-commodity system, in which the output of the production process is identical to the input that serves as the capital stock. This story of aggregate capital–labor substitution in response to a change in the economy-wide ratio of the commodity wage to the rate of return is, strictly speaking, a parable, "[a] narrative setting forth something in terms of something else, fictitious story told to point a moral … [an] allegory" (Fowler and Fowler 1964, 572). The narrative told in Figures 10.1 and 10.2 is fictitious: economies are not one-product systems, no matter how convenient it may be to treat them as such. It certainly sets forth something in terms of something else, for the actual capital stock of any economy is not homogeneous, nor is it identical to the output it generates.

That economies have more than one product, and that capital inputs and consumption outputs are not the same thing, do not in and of themselves invalidate the parable. However, the allegorical nature of the aggregate production function requires that its users demonstrate that its conclusions are not contradicted in a system with more than one commodity. If it can be demonstrated that the capital–labor substitution story survives the minimal theoretical test of a multi-commodity model, then its judgment on wages and employment can be taken seriously. To be explicit, the theoretical hurtle is not that the aggregate production function should stand the test of realism or even casual empiricism. It must survive in a model no different from the general synthesis model with the exception that there are two products rather than one. The Neo-Keynesian critique demonstrates that the aggregate production function cannot survive this simple test.

10.3 The neo-Keynesian critique

Before presenting the Neo-Keynesian critique of the aggregate production function, a brief digression is required. Readers familiar with what has been called the "Cambridge Controversy"[9] might be surprised to find it in a treatment of macroeconomics, especially a treatment of macroeconomics which is restricted to short-run models. As it developed, the debate over the logical consistency and generality of the neoclassical aggregate production function focused almost entirely upon issues of distribution, the determination of wages and profits and choice of technique in response to changes in factor price ratios.

The critics used their attack upon the aggregate production function primarily as a vehicle to discredit the neoclassical theory of distribution and marginal productivity analysis. The ability of the critique to achieve these formidable tasks is open to question. What is not open to question is the relevance of the critique to short-run adjustment mechanics in the neoclassical macro model. As Hahn pointed out,[10] it is surprising that the critics did not pursue more vigorously the powerful short-run implications of their attack upon the aggregate production function.

The analysis begins with a very simple two-commodity system in which there is one output, one input, and the input is completely used up each period; i.e., capital has a life of one period. I also assume that the system keeps to the same level of production each period, implying that an amount of the input is produced that is just sufficient to produce the output. Keeping with the approach used in the one-commodity parable, I assume that there exists a range of fixed coefficient techniques for capitalists to chose among. Unlike before, each technique now involves two products, the input and the output. First, a typical technique A will be defined for one unit of output. The output is designated by the number 1, and the input by the number 2. The price of each product can be defined as follows:

$$p_2k_{a1}+p_{a1}wn_{a1}+(\text{profit})_{a1}=p_{a1}$$

$$p_2k_{a2}+p_{a1}wn_{a2}+(\text{profit})_{a2}=p_{a2}$$

where p_j is the price of each commodity, n_{ai} is the labor input required to produce one unit of each commodity, k_{ai} is the amount of input (capital) required to produce one unit of each commodity, and w is the wage measured in physical units of the output.

I assume that competition results in the same wage and rate of return for each commodity. The rate of return is defined as $r=rk/k$. In this simple case in which capital has a life of only one production period, the rate of return can be written as price minus cost divided by the input cost. For the output the rate of return is

$$r=[\text{price}-\text{total cost}]/[\text{capital cost}]$$

and, capital cost = input cost,

$$r_{a1}=[p_{a1}-(p_{a1}wn_{a1}+p_{a2}k_{a1})]/[p_{a2}k_{a1}]$$

As a further step in simplification, the technique will be defined for relative ("normalized") prices, so $p_a=p_{a2}/p_{a1}$ is the price of the input, and the price of the output is unity. Because I assume a constant level of production, it is convenient to define one unit of the input to be that produced and used up in a time period, or $[k_{a1}+k_{a2}]=1$. Finally, because I shall deal with only one technique, the notation "a" is unnecessary. With these assumptions, the summary of the technique can be rewritten in the usual form that the reader would encounter in the literature.

$$pk_1+wn_l+rpk_1=1$$

$$pk_2+wn_2+rpk_2=p$$

or

$$[1+r]pk_1+wn_1=1$$

$$[1+r]pk_2+wn_2=p$$

The "factor intensity" of the input or the output is defined as k/n. If $[k_2/n_2]>[k_1/n_1]$, then the input is more "capital-intensive" than the output. As will be shown below, comparing the factor intensities of different techniques is less straightforward than comparing the factor intensities of the two products within one technique.

These equations are easily converted into the familiar income and value added aggregates. If production of the output is constant, corresponding to IS–LM equilibrium in the neoclassical model, then the production of the input is completely exhausted in the current period by its combined use as an input to produce the input itself and in the output. The equations are defined for one unit of output, and the price of the input is equal to the value of its production in the current period.

$$p=pk_1+pk_2$$

The price equation for the input is, $pk_2+wn_2+rpk_2=p$. I can eliminate the price by setting the two equations equal to each other.

$$[pk_2+wn_2+rpk_2]-[pk_1+pk_2]=0$$

Simplification yields the following:

$$pk_1=wn_2+rpk_2$$

In other words, the input cost of the output equals the value added generated in the production of the input. Now, I can substitute for pk_1 in the equation for the output.

$$wn_1+wn_2+rpk_1+rpk_2=1$$

$$w[n_1+n_2]+rp[k_1+k_2]=1$$

Total wages and profits equal the production of the output, and value added equals the value of "final" products. On the assumption that this technique is characterized by constant returns to scale, the equations can expand to the level of aggregate output/income (y), and are equivalent to the neoclassical circular flow relationship that wages plus profits equal final output (Section 1.2). Note that $[n_1+n_2]$ is total labor utilized, $[k_1+k_2]$ is the capital stock, and multiplying by p results in measuring the capital stock in units of the output. What I have called a "technique" is in effect one point on the one isoquant of the aggregate production function. If I designate the capital stock in units of the output as k, and y as the level of output, then the equations can be written simply as:

$$y=wn+rk$$

and

$$r=[y-wn]/k$$

The discussion below treats techniques at a unit level of output, and is strictly equivalent to considering aggregate production on the assumption of constant returns to scale for each technique. This is appropriate, because the purpose of the exercise is to investigate whether techniques involving an input that is different from the output will produce a parable about wages and employment that is the same as in the one-commodity macro model.[11] To investigate this, I derive the factor price frontier for the two-commodity case, as was done previously for the one-commodity case. I seek the factor price frontier for the technique as a whole, because the two parts of it, the input and the output, form a single indivisible system of production. To obtain this combined relationship, each element of the technique is solved for p, the price of the input. Then, the price of the input is eliminated by setting the two equations equal to each other.

$$p=[1-wn_1]/[(1+r)k_1]$$

$$p=wn_1/[1-(1+r)k_2]$$

The price term is eliminated by substitution.

$$\frac{1-wn_1}{[1+r]k_1}=\frac{wn_2}{1-[1+r]k_2}$$

This expression has two variables, r and w. After some manipulation, one obtains the factor price frontier in the following form.

$$r=\frac{1-wn_1}{k_2+w[k_2n_1-k_1n_2]} \tag{10.6}$$

This equation for the factor price frontier is considerably more complicated than the analogous expressions (10.1) and (10.5). In general it is not linear. The factor price expression (10.6) can be rendered equivalent to the case in which there is only one commodity. If the expression in brackets in the denominator of (10.6) were zero, then $r=[1-wn_1]/k_2$. The bracketed term will be zero if

$$k_2n_1=k_1n_2$$

or,

$$k_{2/}n_2=k_{1/}n_1 \tag{10.7}$$

The two-commodity case reduces to the one-commodity case if both products of the technique are characterized by the same capital–labor ratio. This is not surprising, because two products with the same factor intensity are one product with respect to production. We can conclude that the two-product technique will have a straight-line factor price frontier if and only if the two products are one. In the general case in which the capital–labor ratios of the input and the output are not the same, the factor price frontier will be non-linear. If the input is less capital-intensive than the output, then the factor price frontier will be bowed in towards the origin, and bulge outwards in the opposite case. These two general forms are shown in Figure 10.3, along with the one product factor price frontier. Some writers refer incorrectly to a linear frontier as a special case of the two-product economy. Linearity is the case of a one-product system and of no other.

Figure 10.4 presents a two-product economy with two available techniques, A and B. For technique A, the output has a higher capital–labor ratio than the input, and for B the input has a higher capital–labor ratio than the output. First, I investigate which technique is the more capital-intensive, using the capital–labor ratio. To do this it is necessary to derive a measure of the capital–labor ratio for a technique as a whole, considering both the output and the input used to produce the output. I can solve for the capital–labor ratio for the two techniques A and B.

$$[k_a/n_a]=[(y_a/n_a)-w]/r$$

$$[k_b/n_b]=[(y_b/n_b)-w]/r$$

In other words, the ratio of the capital stock to the labor employed can be measured as the average product of labor minus the wage. When divided by the rate of return, this numerator is equal to capitalists' average profit per worker employed. Using this method of calculation, it is easily seen in Figure 10.4

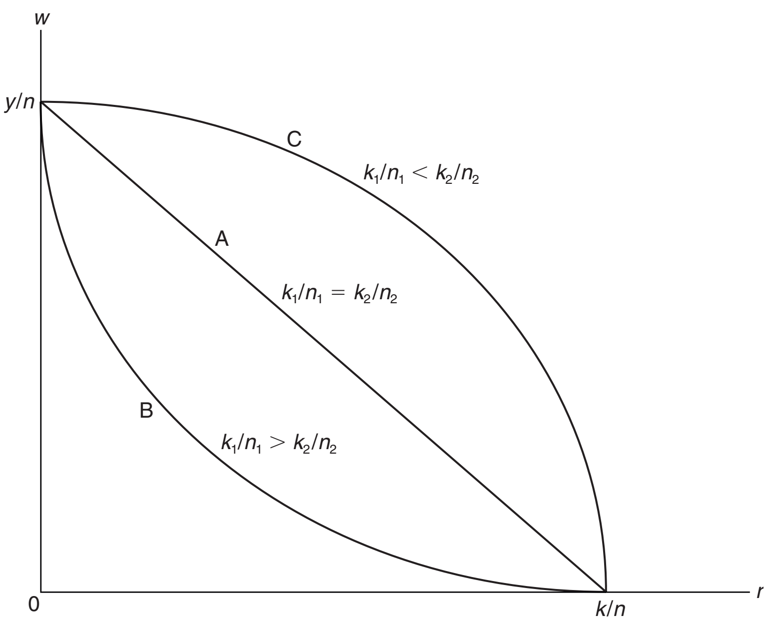


Figure 10.3 Factor price frontiers for a two-commodity economy.

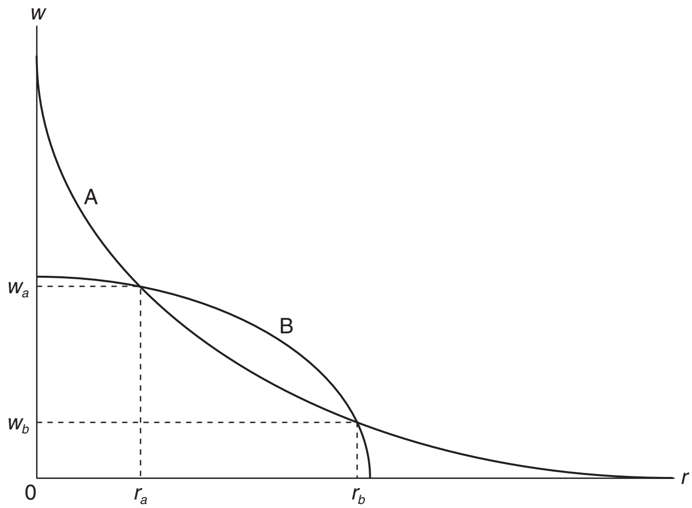


Figure 10.4 A two-commodity economy with two available techniques.

which technique is the more capital-intensive. At two points the two techniques enjoy the same wage and rate of return, differing by the value of the average product of labor (y/n). In the diagram the vertical intercept of each technique marks the value of y/n. The diagram and the algebra imply that technique A is the more capital-intensive, because $0a' > 0b'$. This is the expected result: the technique for which labor is more productive is the more capital-intensive one.

I have used what most economists would consider the basic definition of factor intensity, the capital–labor ratio. Neoclassical rules require that the capital-intensive technique will be selected by capitalists when wages are high and the labor-intensive alternative when wages are low. Inspection of Figure 10.4 reveals that this is not the case. For a commodity wage above level w_a, technique A offers the higher profit rate, as expected because A is more capital-intensive. When the commodity wage drops below w_a, technique B is the more profitable and capitalists will switch techniques. All is well until the commodity wage edges below level w_b. Below w_b technique A, which is capital-intensive, reappears as the more profitable. This reappearance is called the "reswitching" of techniques. Reswitching implies an unexpected conclusion. Theory tells us that in general capitalists *will not* select more labor-intensive techniques when wages fall. Whether they do is an empirical question.

This result is a potential disaster for the neoclassical macro model and its parable about real wages and employment. The generally accepted definition of factor intensity breaks down when a one-commodity world is abandoned. First, it is not the case that more capital-intensive techniques will always be chosen as the real wage rises. Second, and equally distressing for neoclassical analysis, the measured factor intensity of a technique is not determined by technology alone.

Close inspection of Figure 10.4 demonstrates this. Consider technique A. When the commodity wage is w_a, the measured capital intensity of technique A is larger than its value at commodity wage w_b.[12]

This is a strange result. With no unchanged technical coefficients of production, changes in the wage and the profit rate alter the factor intensity of a technique. This variability of the capital–labor ratio with respect to the distributional variables r and w throws into question a convention that I have employed throughout the first four chapters of this book. All discussion of the short-run macro model was based on the presumption of a fixed capital stock. A fixed capital stock is the defining characteristic of the short run. Now we discover that the capital stock is not unique with respect to the distribution between wages and profits except in the case of a one-commodity world.

This variation in capital value has nothing to do with whether the capital stock is homogeneous (for example, composed of many identical machines). In the two-commodity model represented in Figure 10.4, the capital stock is completely homogeneous. The conclusion in the two-commodity model is bizarre in the extreme. There is only one form of capital equipment and the thought experiment assumes that the total input of this homogeneous capital equipment is given, for example, at level $[k_{a1}+k_{a1}]$. None-the-less, the measured capital stock varies with the wage and the profit rate!

How is it possible for a capital stock fixed in physical units to vary with the wage and the profit rate? The paradox arises from the need to render the production of the output equal to total value added for the technique as a whole. Looking back at the original equations, we see that the materials cost of the final output is replaced in the distributional (value added) expression by wages and profits generated in the production of the input. However, these wages and profits have their origin in a certain amount of the input. The measurement of value added includes an amount of a commodity that is not the final output itself. In order to add the wages and profits arising from the input to the wages and profits of the final output, both sets of wages and profits must be measured in units of the final output. The denominating of the input in terms of the output was achieved by defining the two-commodity system in terms of relative prices, $p=p_2/p_1$.

Now it is clear that "dividing through" by p_1 was not merely a step to simplify the mathematics of the solution to the factor price frontier. It was necessary to aggregate value added for the technique as a whole. A side-effect of obtaining total value added was to measure the capital stock not as $[k_{a1}+k_{b1}]$ but as $p[k_{a1}+k_{b1}]=k$. While $[k_{a1}+k_{b1}]$ is invariant with respect to the wage and the profit rate, k is not. Because the factor intensities of the input and the output are different, p, relative prices, varies with the ratio w/r.[13] Knowing that the technical coefficients are invariant with respect to distribution is of no help to resolve the paradox of variable factor intensity in a two-product system. There is no way to avoid measuring the capital stock as $k=p[k_{a1}+k_{b1}]$. When there is more than one commodity, there is no purely physical measure of capital.

10.4 Full employment and reswitching

The implications of the reswitching analysis for short-run employment is profound. When the capital stock is measured in terms of the relative price of the output, in general factor price frontiers will cross more than once (as in Figure 10.4). The parable about real wages and the level of employment breaks down. To pursue the implications of reswitching, I return to the neoclassical analysis of the labor market.

The Walrasian process of labor market clearing has a clear logical sequence. If there is excess supply in the labor market, the result is a fall in the money wage. This fall in the money wage results in a fall in the commodity wage, which induces capitalists to switch techniques. The production techniques, like everything else, are undetermined at the beginning of the market day, chosen as a result of the final equilibrium prices. The labor market clears if the lower commodity wage stimulates the choice of a technique that requires more labor for the given capital stock. It is no longer sufficient to say, "a more labor-intensive technique". The analysis of the previous section demonstrated that the concept of "factor intensity" is ambiguous except in a one-commodity model. Figure 10.4 demonstrates that a fall in the commodity wage may induce capitalists to choose a technique that employs *less* labor with the fixed physical capital stock.

The hypothetical adjustment process is clarified by Figure 10.5. Assume three techniques, A, B, and C. With the given capital stock fully utilized, technique A generates a demand for labor or level of employment of n_a, technique B employment of n_b, and technique C employment of n_c. These are the notional demands for labor associated with each fixed-coefficient process, shown in Figure 10.5a. The factor price frontiers are found in Figure 10.5b, with one drawn as a straight line to keep the diagram as simple as possible. The supply of labor is assumed to be invariant at $n_c = n^*$, coinciding with the notional demand for labor implied by technique C. In the Walrasian general equilibrium parable, excess supply in the

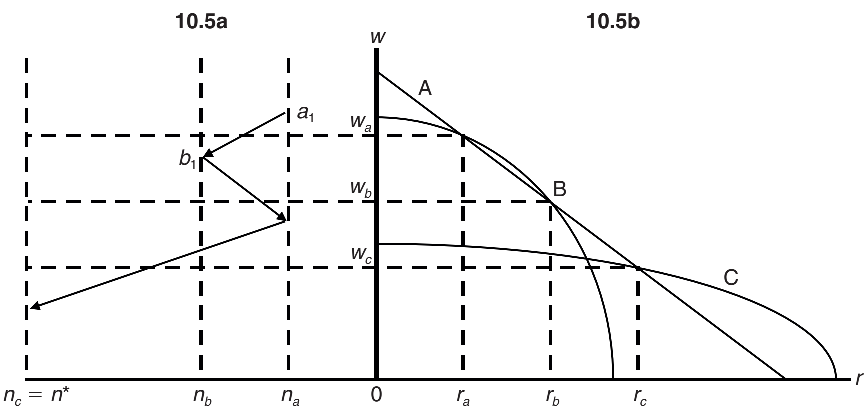


Figure 10.5 Labor market adjustment in a two-commodity economy.

labor market results in a fall in the real wage, which provokes a slide down a smoothly-sloping, monotonic demand for labor schedule.

Now the story is quite different. Assume that the commodity wage is initially above w_a. The most profitable technique will be A, generating employment of n_a and leaving part of the labor force unemployed, n_c to n_a. Unemployment will cause the commodity wage to fall, and when it drops below w_a capitalists will switch to technique B and employment level n_b, following a path such as a_1 to b_1. There is still unemployment, of $n_c - n_b$, so the commodity wage will fall further. When it drops below w_b, "reswitching" occurs, as technique A reappears as the most profitable. As a result, employment will *fall*, back to level n_a, following a path shown by b_1 to a_2. Finally, a drop in the commodity wage to below w_c will bring about full employment with technique C. With many techniques, the theoretical path by which full employment is reached involves a dizzy Yo-Yo-ing from levels of higher to lower employment. The auctioneer would have to be on his or her toes to ensure that the capitalists and workers do not become confused in such an erratic process.

The adjustment to full employment equilibrium in a multi-commodity world involves complications considerably more serious than merely erratic jerks between higher and lower levels of employment, as Figure 10.6 demonstrates. Here only the relevant portions of the factor price frontiers of two techniques are shown; i.e., only those portions for which any particular technique is the most profitable. This curve, of the most profitable segments for each technique, I name the economy-wide factor price frontier. As in Figure 10.5, the factor prices frontier is to the right and the employment and wage space to the left (where arrows show possible adjustment paths form an initial wage of w_a).

In an multi-commodity world, the economy-wide factor price frontier is always downward sloping, but "wiggly" rather than smooth.[14] Assume that the

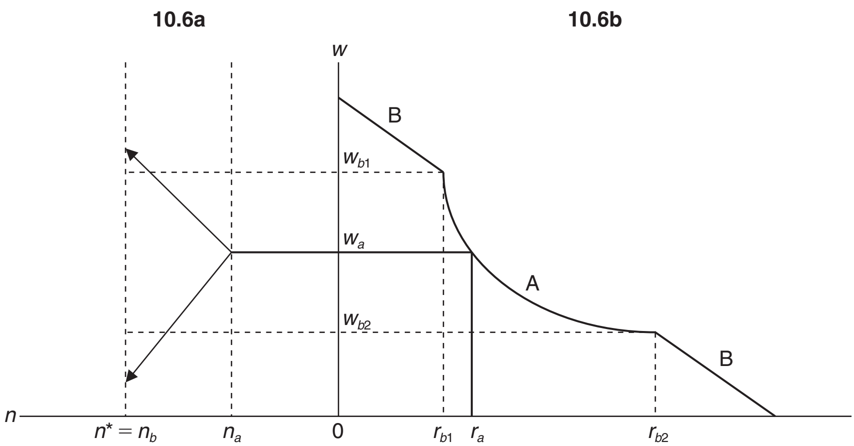


Figure 10.6 Labor market adjustment in a multi-commodity model, economy-wide factor price frontier.

commodity wage, now a composite of a number of final products, is initially at w_a, generating a level of employment of n_a when the fixed capital stock is fully utilized. At this wage and using technique A, there is an excess supply for labor of amount n_a to n_b. Because one knows that factor price frontiers cross in this multi-commodity world, assume that some technique B, the full employment technique, is most profitable at both w_{b1} and w_{b2}. This last assumption is not arbitrary, for with reswitching there will always be techniques that appear as the most profitable at wage levels both above and below the prevailing wage.

Figure 10.6 demonstrates that an adjustment of the commodity wage will indeed bring about full employment, either via a fall or a rise in the wage! A fall in the commodity wage results in full employment via the path w_a to w_{b2}, and a rise in the commodity wage has the same result from w_a to w_{b1}. Figure 10.6 produces the general theoretical conclusion that in a multi-commodity world both real wage increases and decreases eliminate unemployment.

There are two reasons why even in theory lower real wages are not the necessary condition to increase employment. First, and as argued in the previous chapter, if money is not neutral then the full employment equilibrium is not unique. Monetary policy alone can change the real wage at which full employment is secured, perhaps raising it (see Section 8.2). Now, there is a second qualification. In a multi-commodity world, the demand for labor is not necessarily downward-sloping for all ranges of the real wage. On the contrary, theory predicts that in general the demand for labor schedule will not be unique and monotonic.

In the introduction to this book a quotation from *The Times* of London was cited, that made the assertion, "few economists would argue with the general proposition that lower real wages will mean higher employment." If it refers to theoretically competent neo-classical economists, this statement is false. The correct statement would be, "no economist would argue with the general proposition that lower real wages will mean higher employment *for a one-commodity world in which money is strictly neutral*". However, there is a considerable doubt as to whether money is neutral in any actual economy and no debate that all economies are multi-commodity systems. Therefore, startling as it may seem to those inculcated in the neoclassical parable, no general conclusion can be drawn about what might happen to the level of aggregate employment in response to a fall in the real wage.

Faced with this unpalatable theoretical result, some neoclassical economists shrugged it off with the reply that reswitching of techniques is an "empirical" question. The implication is that until someone demonstrates empirically that the demand for labor is not uniquely monotonic, the real wage–employment parable stands (Ferguson 1969). This line of defense gives the game away. That the relationship between the level of real wages and the level of employment is an empirical question, about which no theoretical generalization can be made, is all that the critics of the neoclassical macro model need to establish. By conceding that the issue is an empirical one, the neoclassicals have posthumously accepted Keynes's argument that a falling money wage level is in general an unsound way of achieving full employment in a capitalist economy. In any case, the appeal to empiricism is a defense as empty as it is a surrender, for the wage–employment parable cannot be tested in a meaningful way.[15]

An economist no less distinguished than Paul Samuelson fervently defended the concept of the aggregate production function, invoking the laws of thermodynamics in its defense (Samuelson 1972, 174). There can be no doubt considerations of the conservation of energy are relevant to the relationship between inputs and outputs. They do not imply that in the aggregate the demand for labor is single-valued and downward-sloping with respect to the real wage in a multi-commodity model, much less in the real world. We can conclude that when referring to actual economic outcomes, there is no theoretical basis for the generalization that lower real wages will stimulate more employment. The opposite conclusion has equal theoretical merit. The neoclassical parable, upon which so many policy prescriptions are based, is a false guide to real economies.

Neoclassical theorists frequently allege that the study of economics is subject to the same rigor and discipline as the natural sciences, citing the use of mathematics as evidence. Were that allegation true, economists would have abandoned the aggregate production function and its associated labor demand schedule in the 1950s when Robinson and others demonstrated its irreconcilable contradictions. It was not abandoned, because neoclassical economics is an exercise pursued according to its own rules of arcane mathematics that hide the underlying lack of rigor and intellectual discipline. Were the profession's rigor and discipline real rather than merely formal, it would be necessary to abandon the ideological commitment to the virtues of "free markets" along with the aggregate production function.

11 Full employment and disequilibrium

11.1 Effective demand and the multiplier

As explained in previous chapters, the effect of the synthesis of pre-Keynesian and Keynesian economics was to exclude the possibility of involuntary unemployment. This was achieved by (1) the introduction of a pre-Keynesian labor market, an aggregate single commodity production function; (2) rejecting Keynes' view that expectations were inherently volatile; (3) the inclusion of a wealth effect; and (4) presupposing general equilibrium with Walrasian market clearing. From its beginning, the synthesis version of macroeconomics left many neoclassical theorists discontent.

Prominent among these theorists was Clower, who in the 1960s took issue with the use of Walrasian general equilibrium theory. Clower objected to the neoclassical formulation of general equilibrium that limited its application to full employment outcomes.[1] As explained in Chapter 8, when the labor market does not clear due to rigid money wages, Walras' Law appears to breakdown. All other markets can clear, leaving an excess supply of labor without a compensating excess demand. Clower's critique involved an attempt to reformulate adjustment dynamics along non-Walrasian lines. The key to this argument was the distinction between *notional* and *effective* demand and supply, a distinction encountered previously in this book.

Notional demands are those for which the prices of commodities and services are the only variables considered by economic agents. In forming notional demands, agents take prices as given and consider how much they desire to buy or sell at those given prices. They do not consider that they might not be able to buy or sell the desired amounts. Notional demands are not constrained by demand or income, only by price. The most important aspect of notional demand is the implication that income and, therefore, the amount of labor time offered for sale, is a decision variable.

Effective demand is the expenditure by agents based upon their *actual* incomes.[2] Effective demand represents what has been called "the extra constraint". In addition to prevailing prices, expenditure must conform to available or current income in the case of a household or to anticipated sales in the case of a firm. The question then arises, under what circumstances will the additional constraint be binding? The answer is quite straightforward: in general, an agent's decisions will be income or sales constrained if false trading occurs.

As briefly discussed in Chapter 3, trades at disequilibrium prices can be interpreted as the operation of the Keynesian multiplier process. Consider the case in which a firm sells its entire planned supply, but at a price below the Walrasian general equilibrium price. In this hypothetical example the market is cleared, in that all output has been sold, but the revenue from the sale is inconsistent with full employment equilibrium. The firm in question will discover that the net revenue it gains does not justify maintaining the same level of output, so employment will be adjusted downwards in the next period. As a result, the income paid out by the firm will prove insufficient to make its required contribution to the general equilibrium demands in other markets. In principle, one incidence of "false trading" can result in a cumulative movement away from full employment general equilibrium.

11.2 General disequilibrium

Clower's most important theoretical conclusion is that unemployment can result even if all wage bargains are struck at the general equilibrium money wage rate. Leijonhufvud demonstrated this striking conclusion with an instructive example, which he interprets as Keynes's diagnosis of the fundamental maladjustment that perpetuated the Great Depression. Leijonhufvud reads Keynes as saying that the Great Depression, and depressions in general, resulted from the long-term rate of interest standing at too high a level, implying that asset prices are too low. With the rate of interest on long-term assets too high, the rate of investment is too low to generate the aggregate demand necessary for full employment equilibrium (Leijonhufvud 1968, Chapter V; and Leijonhufvud 1981, 56–58).

By this interpretation, false trading occurs in the capital market. The false trading at an interest rate above the general equilibrium rate is explained by Keynes-as-interpreted-by-Leijonhufvud to reflect a depressed state of long-run entrepreneurial expectations.[3] This emphasis on a downwardly "sticky" interest rate produces Leijonhufvud's striking conclusion (Leijonhufvud 1968, 335–337):

> The essence of Keynes' diagnosis [of depressions] is this: the actual disequilibrium price vector initiating the contraction differs from the appropriate, hypothetical equilibrium vector in one major respect – the general level of long-term asset prices is lower than warranted … Observing unemployment, the "Classical" economist [e.g., Pigou] draws the conclusion that wages are too high and "ought" to be reduced. In Keynes' theory, the maintenance of full employment depends upon the maintenance of a "right" relation between … asset prices and the wage … Keynes' point is that when the appropriate price relation does not obtain, it is in general not wages but asset demand prices that are out of line.

By this argument, unemployment results from disequilibrium in the capital market, which manifests itself as excess supply in the labor market. This results even though the money wage and perhaps the real wage are at their full employment general equilibrium level. Assigning the blame for unemployment to labor and prescribing a fall in wages to rectify the situation involves a false application of partial equilibrium analysis to a general equilibrium system.[4] In an insightful comment Leijonhufvud (1968, 337) writes,

> [Keynes's] diagnosis [of unemployment] is not based on the naive presumption that the causes of disequilibrium are to be found in the markets which at any time exhibit the most drastic symptoms of maladjustment. He approached the problem from a general equilibrium perspective.

Leijonhufvud makes a point well recognized in scientific enquiry, that things are not always what they appear. Excess demand in the labor market is either a manifestation of general disequilibrium, or the result of some influence that prevents the money wage from adjusting to general equilibrium while all other markets are behaving properly along Walrasian rules. Assuming that the wage level is the problem is arbitrary. In order that all other markets adjust in a Walrasian fashion, false trading must not occur in any commodity or money market except when forced upon agents by a failure of the money wage to "properly" adjust. The cause of unemployment can be attributed to an inappropriate money wage only if all other markets function with Walrasian perfection.

There are persuasive theoretical reasons for predicting that false trading would be characteristic of all markets. In order to clarify this point, the analysis will proceed by considering the neoclassical macro model in its most logically-defensible form (if least credible). Let it first be assumed that money is strictly neutral, so that the general equilibrium solution is not altered by changes in nominal variables. Second, assume only one commodity, so that the simplistic wage–employment parable holds. Third, recall that false trading is banished in general equilibrium theory by the intervention of the Walrasian auctioneer. This specification ensures simultaneous market clearing by eliminating time from the analysis. All exchanges occur at the same instant. Walrasian general equilibrium theory is the analysis of an economy without a time dimension, as one of the most distinguished neoclassical economists of the theory made clear (Hahn 1984, Chapter 4).

False trading is nothing more than trading in chronological time. Once a model incorporates some concept of chronological time, that all actions are not simultaneous, false trading is implied in all markets. If exchanges are not simultaneous, then by definition some precede others. Unless one assumes perfect foresight, in which case simultaneity of exchanges has slipped in under a different name, it is arbitrary and not credible to proceed on the faith that a chronological sequence of transactions will produce the general equilibrium vector of prices. This is implicitly conceded in Walrasian general equilibrium theory, by use of the French word *tatonnemont* to describe how equilibrium is reached, a word invariably translated into English as "groping". "Groping" in markets in chronological time is false trading. The disequilibrium theorists required no other defense of the superiority of their analysis over the traditional general equilibrium approach than to point out that chronological time is an inherent characteristic of all economic activity. General equilibrium solutions that exclude false trading are of no practical or policy significance, nor is there any theoretical justification for such an approach.[5]

One would have thought that the obvious limitations of Walrasian general equilibrium theory would have resulted in the disequilibrium theorists sweeping the field before them and winning a consensus around the view that disequilibrium is the general case and Walrasian market clearing the exceptional one. A disequilibrium analysis that incorporates false trading has the potential to rescue the neoclassical macro model from its Walrasian vacuousness.[6] What occurred in the profession was quite the contrary. Notwithstanding that trading at non-equilibrium prices is implied by the placement of commodity exchange within chronological time, the burden of proof fell upon the disequilibrium theorists to explain why prices should not adjust instantaneously, and, therefore, why false trading should occur. This was a strange demand, for it amounts to accepting an imaginary world, full employment general equilibrium, as the norm, and requiring the critics of that imaginary world to verify the existence of the real world.

Stranger still, the disequilibrium theorists for the most part accepted this definition of the debate, though Leijonhufvud was an exception (see next section).[7] Rather than incorporating some concept of time into their analysis, which would automatically imply "sticky" prices, the disequilibrium theorists sought to establish their critique within a Walrasian world only slightly modified from the traditional neoclassical one. Specifically, they considered Walrasian markets, "without the auctioneer". This led them to place heavy emphasis on the cost of gathering information. The argument is that in the absence of the auctioneer, the general equilibrium solution can be known only at a cost of information gathering which no rational agent would incur.

While a reasonable enough argument, proceeding on this basis concedes the basic argument to the general equilibrium theorists. As Hahn pointed out, placing stress upon information costs implicitly accepts the principle that if information were readily and cheaply available, prices and wages would be perfectly flexible and there would be no problem of involuntary unemployment.[8] Further, invoking lack of information as the cause of unemployment disequilibrium resuscitates the argument that unemployment is "voluntary". It could and has been argued that excess supply disequilibrium in the labor market is the result of workers choosing to wait for a more attractive offer that on the basis of information they suspect might come to them.

Precisely to eliminate such an explanation, "justification" is the more accurate word, for why some workers do not have jobs, Keynes excluded "search unemployment" from his definition of "involuntary unemployment" (Keynes 1936, 15). In any case, placing emphasis upon information costs as the cause of unemployment renders the disequilibrium theorists particularly vulnerable to attacks from neoclassical economists armed with the rational expectations hypothesis. While the neoclassical mechanism by which agents acquire knowledge does not stand close scrutiny, it does offer a superficially compelling rejoinder to the information-cost disequilibrium analysis.

While one cannot offer a definitive explanation as to why the disequilibrium theorists were willing to construct their critique upon such disadvantageous grounds, the proximate cause is clear. Like the general equilibrium theorists, the disequilibrium theorists wished to retain the mathematical and analytical simplicity of market models without time. They abandoned a fundamental justification for their approach when they did so. Once one enters a timeless world of the imagination, the general equilibrium theorists are quite within their rights to demand an abstract explanation for behavior which is an inherent characteristic of the real world.

Finally, there is a quite disturbing aspect of the disequilibrium approach. Particularly in the work of Leijonhufvud, one finds a powerful critique of the single commodity supply side of the neoclassical model. However, multi-commodity analysis with a disequilibrium Walrasian analysis of markets is a de facto abandonment of macroeconomics.[9] The disequilibrium approach becomes one of considering "demand failures" with reference to specific markets, based upon the behavior of individuals.[10] This approach has more in common with the economics of the neoclassical microeconomics than with the macroeconomics of Keynes. By approaching their analysis along strict neoclassical rules of market clearing (albeit without the auctioneer) in a multi-commodity context, the disequilibrium approach perhaps earns the title "neo-Walrasian". What appeared to be so promising and innovative in the early work of Clower and Leijonhufvud was swept aside by the rational expectations counter-revolution in macroeconomic theory. This is in no small part because the methodology of the disequilibrium approach discarded Keynes' most important innovation, macroeconomics itself.

11.3 Leijonhufvud on disequilibrium adjustment

In terms of its scholarship and the analytical depth of its critique of the neoclassical macro model, Leijonhufvud's 1968 book, *Keynesian Economics and the Economics of Keynes*, was perhaps the most important work on aggregate economic analysis of the second half of the twentieth century. Partly due to Leijonhufvud's own emphasis in subsequent work on the lack of full information as the cause of disequilibrium and unemployment, the best insights of the book were lost. For a time after its publication the book was extremely influential, representing one of the key elements in what was called the "Reappraisal of Keynesian Economics". But it quickly came under heavy fire from both orthodox neoclassicals and the demand-side Keynesians.

As explained in the previous section, Leijonhufvud's attempt to reconstruct aggregate analysis can be faulted on the grounds that it tended to abandon macroeconomics all together. However, the opponents of Leijonhufvud, by focusing on his reformulation of aggregate analysis, missed the scientific content of his critique of the neoclassical macro model. The purpose of this section is to resurrect some of his arguments and to indicate their significance.

In previous chapters (2 and 8), I pointed out that unemployment is possible because of the institutional organization of production in a market economy. On the one side, there are those who own the means by which production is carried out and whose decision to use those means of production is motivated by considerations of profitability. On the other side, there are those who in practice have no commodity to sell except their ability to work.[11] Unemployment is possible because the majority of "agents" must sell their ability to work to the minority of "agents". Without a social division between employers and employees, a division based upon property relations, there is no labor market. With no labor market, there can be no unemployment. Leijonhufvud is one of the few theorists in the neoclassical tradition to recognize this, the social basis of unemployment.

> [T]he dynamic properties of an economic system depend upon what I will call its "transaction structure". That labor services are sold for money and that households obtain their consumption goods in exchange for money is one aspect of the transaction structure in Keynes' system. In an economy of self-employed artisans [the problem of] unemployment cannot appear.
>
> (Leijonhufvud 1968, 90)

Leijonhufvud identified the class nature of production relations in capitalist society, an insight in the tradition of the nineteenth-century classical economists. Leijonhufvud used the concept of the "transaction structure" in a more narrow way than Marx or Ricardo used the "social relations of production" in their analysis. None-the-less, it serves him as a powerful tool for considering the essentially monetary character of a capitalist economy. The transaction structure of a capitalist economy implies that all exchanges must be treated as monetary exchanges. The "real" solutions and "real" calculations are not relevant to the theoretical analysis or actual operation of such an economy. Some writers have taken issue with Leijonhufvud at this point, interpreting him as arguing that it is the monetary character of capitalist economies that makes unemployment possible, and countering with the contention that unemployment is just as much a logical possibility in a multi-product barter model as in a model with money.[12] The argument for unemployment in a barter economy is not difficult to make. In a multi-commodity world without money, individual workers will not in general barter their labor services against the commodity they produce. Rather, the capitalist must pay his workers in units of that commodity, which the workers would then have to barter for food, clothing, etc. In such a model there is a labor market, so unemployment is possible (Chick 1983, 141).

However, it is incorrect to interpret Leijonhufvud to argue that it is the monetary character of exchanges which makes unemployment possible. His orthodox neoclassical critics interpret him in this way because social relations and classes are alien to them. Leijonhufvud's point is considerably more profound than the arid money-exchange/barter dichotomy. He argues that it is the "transactions structure" (property relations) of an economy which makes unemployment possible. A secondary consequence of the transaction structure is that the exchange between capital and labor is necessarily a monetary exchange.

One can conjure up imaginary examples of barter exchange between capital and labor. The relevance of such models to the problems of a money economy is not obvious (see Section 8.2). It reflects the scientific character of Leijonhufvud's method that he wasted no time treating the metaphysics of barter models. Following this line of argument, that capitalist economies must be treated as money economies, Leijonhufvud is particularly scathing in his critique of the neoclassical practice of "dividing through by the price level" to obtain a set of "real" variables. Like Keynes, he considers "the general price level" to be a vague and imprecise concept (Keynes 1936, 40–43), and that its use as a deflator in theoretical models is a transparent attempt to avoid analyzing money exchange. The intrinsic role of money in capitalist economies and the complexities created by money calculations led Leijonhufvud to conclude that the symptom of imbalance in an economy may not directly indicate the cause of that imbalance.

As explained in the previous section, the discordance between symptom and cause that Leijonhufvud stresses is the lack of labor market clearing. This is explained superficially by the orthodox neoclassical, as a result of an inappropriate real wage. Leijonhufvud finds the source of labor disequilibrium elsewhere: the long-run interest rate is too high. This argument fulfils Leijonhufvud's promise in the introduction to his book to interpret Keynes as integrating the theory of value (relative prices) with the theory of money. As shown in Chapters 1 to 7, no such integration is seriously attempted in the neoclassical macro model, for two reasons. First, the neoclassical approach raises the non-integration of value and monetary theory to the level of principle by constructing money-neutral models. Second, consistent use of one-commodity models makes a theory of relative prices an unnecessary "fifth wheel" in the system.

In Leijonhufvud's analytical model there are at least two commodities, one for investment and one for consumption. The interest rate then becomes a true price variable, not merely the rate of transformation of present into future consumption. This approach has a strong kinship with the method of the nineteenth-century classical economists. Central to the theories of distribution and growth (accumulation) of Ricardo and Marx was the analysis of the relative values of consumer and producer commodities. However, Leijonhufvud encounters a serious difficulty. While he is interested in treating this problem that the nineteenth-century political economists stressed, he operates with neoclassical tools ill-designed to investigate it. As long as one holds to an analysis based upon the behavior of individual agents, the analytical power gained from the division of output between consumer and producer commodities cannot be realized.

The important characteristic of Leijonhufvud's book was and will remain his critique of full employment adjustment. One of the general conclusions of neoclassical economies, both micro and macro, is that capitalist economies tend to full employment equilibrium automatically under conditions of perfect competition. Therefore, the only possible causes of unemployment, fluctuations, and instability are exogenous influences, monopoly power, or state intervention in markets. Heaping ridicule upon such a sanguine view of *laissez-faire* ideology,[13] Leijonhufvud placed himself in the camp of the handful of twentieth-century economists, such as Veblen, Schumpeter and Keynes, who were bold enough to argue that capitalist economies are inherently dynamic and unstable, not equilibrium systems. It is a shame that Leijonhufvud's insights were lost in a largely trivial debate over information costs and the disequilibrium versus equilibrium analysis, and a further shame that he did not move into the post-Keynesian camp (see the Introduction). None-the-less, his 1968 book remains a classic of economic analysis.

Part IV

So-called open economy analysis

Main points

Chapter 12*: *Introduction to "open economies"

1 The so-called open economy macro model has only one product, and cannot be reconciled with multi-product trade models.
2 The analytical dichotomy between fixed and flexible exchange rates is simplistic and misleading.
3 In a closed economy the impact of a fiscal expansion on private investment depends on behavioral parameters and how the expansion is financed. If the expansion is financed through monetization, there is no impact on interest rates or private expenditure.

Chapter 13*: *The neoclassical open economy

1 The standard open economy analysis, derived from the Mundell–Fleming (MF) model, assumes that output is demand constrained.
2 Unlike for a closed economy, the IS, LM and balance of payments (BP) schedules are not independent of each other. Capital flows cover a trade deficit or surplus, and increase or decrease the money base.
3 The conventional theoretical wisdom for a fixed exchange rate is that fiscal expansion is effective because it induces capital inflow that covers a trade deficit. Monetary expansion is 100 percent self-defeating by inducing capital outflow that causes an equivalent monetary contraction.
4 The conventional theoretical wisdom for a flexible exchange rate is that fiscal expansion is totally ineffective with perfectly elastic capital flows, and ineffectiveness is partial if flows are less than perfectly elastic. Monetary policy is effective, with the degree of effectiveness positively related to the elasticity of capital flows.
5 The allegation is simplistic that a flexible exchange rate simplifies policy making.
6 Open economy adjustment in the Mundell–Fleming model is general equilibrium falsely claiming to explain conditions of less than full employment.

***Chapter 14*: Reassessing monetary and fiscal policy**

1 The conventional wisdom on open economy monetary and fiscal policy is invalid because it ignores the effect of the exchange rate on domestic prices, and has a superficial treatment of export and import elasticities.
2 A monetary expansion provokes a depreciation that increases the domestic price level, thereby reducing the real money supply and rendering the real depreciation less than the nominal.
3 Empirical evidence on short-term trade elasticities and foreign exchange reserves indicate that a floating exchange rate would be destabilizing.
4 The same parameters that weaken the effectiveness of monetary expansion strengthen fiscal policy.
5 The relative effectiveness of fiscal and monetary policy with a flexible exchange rate is an empirical question about which no theoretical generalization is possible.

12 Introduction to "open economies"

12.1 Theoretical problems with "open economies"

The previous chapters analyzed what neoclassicals call a "closed economy". Rigorously defined, a closed economy model is an analytical system in which all variables arise within the system. It is a completely endogenous system in which the variables are governed by a set of behavioral parameters. Every variable is explained within the system, and there are none "outside" of the system. It is necessary to labor this point because it is not rigorous to define a closed economy as an economy without trade and capital flows, as is frequently done in textbooks.

A closed economy model is not an open economy model without trade and capital flows, nor is the reverse true. The closed economy in neoclassical analysis is a one-product system. To "open" the "closed" economy to trade between two economies or more would imply that what the economy exports and what it imports are the same commodity. This is absurd. Not even in theory do rational agents sell a commodity in order to buy the same commodity. This absurdity is the basis of so-called open economy macroeconomics, that people would produce and export a commodity for the purpose of importing and buying the identical item. This absurdity is carried to the next stage of analytical farce by the introduction of different currencies for the two economies. The ratio of these two currencies, the "exchange rate", is formally defined as "the current market price for which one currency can be exchanged for another", or "the price of one currency in terms of another".[1] One can accept such sensible definitions, but what possible role could the exchange rate play between two economies that that produce the same homogeneous output?

This problem results from the inability of neoclassical analysis to resolve the aggregation problem (see Chapters 1 and 2). To take the minimum step towards "opening" the "closed" economy, one could assume that each economy produced only one product, but a different one. If that were the case, trade would occur between the two economies with each importing what the other produced. However, taking even this minimal step would introduce the intractable aggregation problem for both economies.

The implications of the aggregation problem are demonstrated by brief reference to neoclassical trade theory. The formalization of trade theory began with David Ricardo at the beginning of the nineteenth century. His model, in which the values of commodities were measured in units of the labor required to produce them, assumed that land and capital were fully employed, with the utilization status of labor ambiguous. In the twentieth century economists reformulated trade theory in terms of marginal productivity analysis, which culminated in a synthesis by two Swedish economists, Betil Gotthard Ohlin and Eli Filip Heckscher, the Heckscher–Ohlin model. This model assumed full employment, had two tradable products, two inputs (capital and labor) and two countries. The assumption of full employment eliminated the aggregation problem.

Subsequently, it was recognized that the model was one commodity "short", because without a "non-tradable" it could not consider the impact of the exchange rate on the allocation of resources within a country (Greenway 1994). The trade model generally accepted in the economics profession assumes full employment and has a minimum of three commodities. A neophyte economist might ask, how does one reconcile a single-commodity macro model with a three-commodity trade model that is always at full employment? Reconciliation is impossible, implying that the strong conclusions of the trade model, such as the alleged benefits from free trade, do not apply to the macro model, even when it is at full employment.

12.2 From theory to policy

The neoclassical closed economy model can be developed analytically with no reference to public policy as done in Part I, and frequently is. The "government sector" is added subsequently. This cannot be done for an "open" economy model. In theoretical analysis an economy is "open" in the specific sense that it includes more than one "country". In this context the concept of a "country" is quite specific. It is an entity that at the minimum has its own currency and, therefore, an exchange rate with other currencies. The existence of a separate currency implies an authority to manage that currency, which is the "government".

The closed economy requires a money-management authority, but that authority need do nothing beyond open market operations. Once more than one currency exists, each monetary authority has a further task, to manage the exchange rate or choose not to manage it. At the outset of the analysis of the open economy the issue of how the national authorities, the "government", will manage the exchange rate requires analysis, placing policy choices at the heart of the discussion.

Textbooks usually begin this discussion by proposing a dichotomy between "fixed" and "flexible" exchange rates. The exchange rate is fixed if the government specifies a rate of exchange to other currencies and takes the actions necessary to maintain that rate. The "necessary" actions are an instruction to the central bank to use foreign currency reserves ("foreign exchange") to purchase the domestic currency when depreciation is anticipated, or to sell domestic currency for foreign currencies to avoid an appreciation. If a government decides to move from one fixed rate to another, a rate at a higher amount of foreign currency is called a "revaluation", and a rate of exchange for less foreign currency is a "devaluation".

Defining a fixed rate is straightforward. Considerably more problematical is to define a "flexible" rate. It is sometimes defined as an exchange rate system or regime in which the central bank does not intervene, "in which the values of participating currencies are free to change in relation to one another according to market demand and supply for each currency".[2] This definition is non-rigorous as well as unclear. It could be interpreted as explaining currency movements in terms of flows that reflect the supplies and demands in a market at any moment in time. This is not the case even in the abstract, as demonstrated by the more elaborate definition of a flexible exchange rate that uses the synonymous term, "floating exchange rate":

> [The] movement of a foreign currency exchange rate in response to changes in the market forces of supply and demand [is] also known as *flexible exchange rate*. Currencies strengthen or weaken based on a nation's reserves of hard currency and gold, its international trade balance, its rate of inflation and interest rates, and the general strength of its economy.
>
> (www.allbusiness.com/glossaries/flexible-exchange-rate/4958219–1.html)

If there are no interventions to limit convertibility, the price of a currency in terms of other currencies is determined by its stock as well as its flow, its domestic "price" in terms of commodities, and the conditions prevailing in the national economy. By the end of the twentieth century it became part of conventional wisdom that a flexible exchange rate was not determined by flows alone ("supply and demand"). It results from portfolio adjustments to desired stocks of different assets that determine those flows.[3] While the specifics of the various theories of exchange rate determination need not be considered at this point, those theories imply that defining a flexible exchange rate as "market determined" has no clear meaning.

In textbook presentations of open economy macroeconomics, fixed and flexible rates have a specific and behaviorally vacuous definition. A fixed exchange rate is one that changes by administrative action, and a flexible exchange rate is one that adjusts instantaneously to equilibrate the trade deficit (or current account). How a flexible rate achieves this equilibration is typically left to the reader's imagination. These two exchange rate concepts are polar opposites. Actual economies can have fixed exchange rates, and during 1946–1970 all countries in the world with few exceptions pegged their currencies to the US dollar directly or indirectly.[4] No real world equivalent exists for an exchange rate that instantaneously equilibrates a country's trade balance.

Such exchange rate behavior can be established only as a special theoretical case. The absence of a real world analogue can be verified in the annual reports of the International Monetary Fund, where country exchange rate policies are categorized. The table of exchange rate regimes reports that of 166 country currencies, 23, or 14 percent, were of the type that approximated the theoretical category of "floating".[5] While these 23 currencies accounted for the vast majority of international trade,[6] there is no evidence that "floating" resulted in a tendency, instantaneous or otherwise, to equilibrate either the trade account or the balance of payments.

12.3 Fiscal and monetary policy in a closed economy

Central to open economy models in neoclassical textbooks is the concept of "effectiveness" of fiscal and monetary policies. Explicitly or implicitly, open economy policy "effectiveness" is defined in comparison to the closed economy model. Prior to presentation of open economy fiscal and monetary policy, it is necessary to analyze briefly the simpler closed economy case.

I begin by assuming a constant velocity of money and a closed economy at less than full employment, typically due to a fixed money wage in the neoclassical model. From a position of equilibrium, an increase in the nominal money supply creates an excess supply of money that is eliminated either by an increase in the price of output, by an increased quantity of output, or a combination of the two. Because there is unemployment, output can increase.

In the models presented in Chapters 5–7, the increase in employment necessary for more output required a lower real wage. This lower real wage was generated by a rise in the price of output that exceeded the rise in the money wage. Open economy macro models almost invariably have no explicit labor market. The absence of an explicit labor demand function means that an implicit assumption is made that the real wage is constant. A constant real wage implies a constant price of output. Therefore, the excess demand for money that results from the monetary expansion is eliminated through an increase in output at a constant price.

The process for fiscal policy is more complicated, because its impact on output depends on how it is financed. For this reason I begin the diagrammatic presentation with fiscal policy in Figure 12.1. The LM schedule is the same as that derived in Chapter 6 (see Section 6.2). The IS schedule now includes government expenditure and taxation. The algebra can be found in the annex to this chapter. The closed economy IS schedule is the same as equation 11 in the annex with the real exchange rate, exogenous exports and the propensity to import all zero.

In Figure 12.1 the initial position is at the interaction of IS_1 and LM_1, with output equal to y_1 an interest rate of r_1. Investment is shown by level i_1 and the money supply is M_1. I assume that the government initiates a fiscal expansion that shifts the IS schedule to IS_2. For analytical purposes it is simpler to consider the case of an increase in expenditure rather than a reduction in taxes, and to assume that in the initial position public expenditure equaled revenue. The increased expenditure would be financed through borrowing, either by sales of government bonds to the central bank or to the private sector.

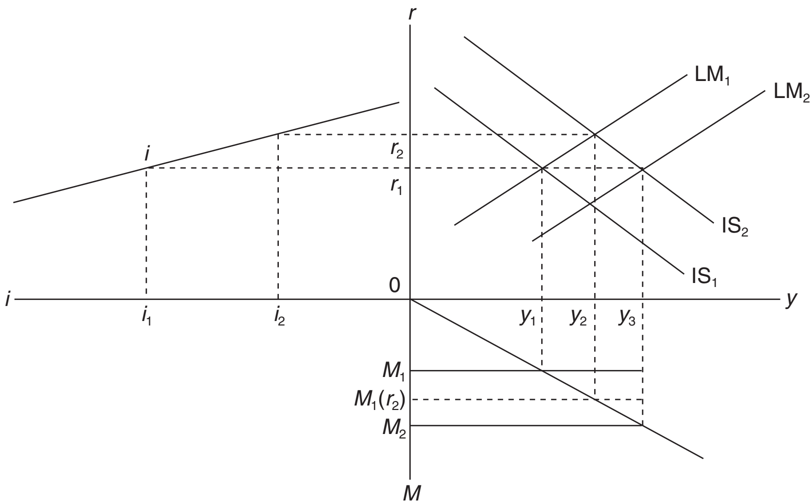


Figure 12.1 Fiscal expansion in a closed economy.

If the bonds are sold to the central bank, there is an expansion of the monetary base equal to the increase in expenditure. The LM schedule shifts to LM_2, output rises to y_3, the interest rate and private investment do not change, and the money supply increases to M_2. By selling the bonds to the central bank, the government simultaneously executes fiscal and monetary expansion. Output increases until its expansion generates saving and taxation to exactly compensate for the increase in expenditure. The financing of the expenditure "accommodates" itself, a process called "monetization". More recently the preferred term is "quantitative easing", which I shall avoid because it acquired ideological undertones after the financial crisis of 2008.

If the increase in expenditure is financed by bond sales to the private sector no increase in the money supply occurs. The increase of expenditure creates an excess demand for money. This excess demand for money causes the interest rate to rise. As the expenditure stimulates more output, asset holders seek to switch to money for transaction purposes. In order to sell the bonds that finance the fiscal expansion, the government must raise the yield. The increase in the interest rate releases idle money into active circulation (see Chapter 6), and also reduces private investment. The fall in private investment partially cancels the fiscal expansion, so that output increases less than would be the case with monetization. In Figure 12.1, with no shift in the LM schedule, the interest rate rises to r_2, investment falls to i_2, which allows for an increase in output to y_2, not y_3. The higher interest rate liberates money from idleness to activity, shifting the active money supply to $M_1(r_2)$.

The relationship between fiscal expansion and how it is financed can be shown algebraically. In the annex to this chapter the IS schedule for an open economy is derived. For the simpler case of a closed economy there is no exchange rate term and the propensity to import is zero. The closed economy IS schedule with government expenditure is:

$$y=\alpha(\delta+g-a_7 r)$$

The term α is the closed economy multiplier, δ is the autonomous element of investment, g is government expenditure, r is the domestic interest rate, and a_7 is a parameter. The closed economy money market equilibrium is:

$$y=(M^*+a_5 r)/vp$$

IS–LM equilibrium in a closed economy with a public sector is:

$$r_o=\frac{\alpha vp(\delta+g)-M^*}{(\alpha vpa_7+a_5)}$$

Monetary expansion alone results in a rise in output and a fall in the interest rate:

$$r_1=\frac{\alpha vp(\delta+g)-(M^*+\Delta M)}{(\alpha vpa_7+a_5)}$$

$$r_1<r_o$$

For any increase in the money supply, the increase in output depends on the size of the multiplier and the responsiveness of investment to the interest rate.

$$\Delta y=\alpha a_7 M^*$$

This can be compared to a fiscal expansion. If the expansion, Δg, is financed by bond sales to the private sector,

$$y=\alpha(\delta+g+\Delta g-a_7 r)\ \text{(IS)}$$

$$y=(M^*+a_5 r)/vp\ \text{(LM)}$$

$$r_1=\frac{\alpha vp(\delta+g+\Delta g)-M^*}{(\alpha vpa_7+a_5)}$$

$$r_1>r_o$$

Bond sales result in a rise in the interest rate and a fall in private investment. The fall in investment will be greater the larger the absolute value of the investment sensitivity to the interest rate (a_7) and the lower the sensitivity of money demand to the interest rate (a_5). If money demand is vertical with respect to the interest rate (the false dichotomy case), private investment falls by an amount equal to the fiscal expansion. If money demand is highly interest rate responsive (Liquidity Trap case) and the investment coefficient low, the fall in investment will be small, a combination viewed as likely by Keynesians. The investment response is an empirical issue about which no theoretical generalization is justified, except the obvious inference that the likelihood of a fall in investment would cancel the fiscal expansion requires extreme and improbable values for the relevant coefficients.

If the fiscal expansion is monetized, the increase in government spending is financed by borrowing from the central bank. The monetary base increases by an amount equal to the increase in government expenditure ($\Delta g = \Delta m$), and ($\alpha \Delta g = vp\Delta m$.

$$r_1 = \frac{\alpha vp(\delta + g + \Delta g) - (M^* + \Delta m)}{(\alpha vpa_7 + a_5)}$$

$$r_1 = \frac{\alpha vp(\delta + g) - (M^*)}{(\alpha vpa_7 + a_5)}$$

$$r_1 = r_o$$

With monetization, the interest rate and private investment are unchanged, and the full effect of the fiscal expansion is realized.

Neoclassicals have assigned the term "crowding out" to the decline in investment that is associated with fiscal expansion when there is no monetization. As might be inferred from the inherently pejorative character of the phrase, crowding out is judged by the neoclassicals to be bad, *ipso facto*. It is not clear how this judgment might be defended other than on ideological grounds. The real world analogue of Figure 12.1 is an economy suffering from unemployment. Setting aside the ideological view that unemployment always results from the wage setting misbehavior of labor and governments, the economy is below full capacity due to insufficient demand, part of which is insufficient investment demand. If the policy intent is to increase demand without affecting the private components, then monetization is the appropriate policy. If for some reason monetization is judged as inappropriate, then some reduction in private investment may result from the fiscal expansion. This is the technical consequence of a decision not to sell government bonds to the central bank. "Crowding out" is neither good nor bad; it is the by-product of the financing decision.

It should be noted that the more elastic the LM schedule, the less private investment will be "crowded". In general and for practical reasons, governments would and should use fiscal expansion when private demand is weak. When private demand is weak, the demand for loans will also be weak, which implies that private banks hold excess reserves, and the LM schedule is extremely elastic. Therefore, when governments are likely to initiate fiscal expansion the likelihood of crowding out is low.

Concern about crowding out in the short run is ideologically motivated, a theoretical possibility that is highly improbable in practice. When it is likely that a fiscal expansion would result in crowding out, a government is unlikely to do it. In any case, even the theoretical possibility of crowding out can always be avoided by monetization. It is in part for that reason that neoclassicals have a very negative opinion of monetization, as discussed in a later chapter.

The case of a monetary expansion alone is treated in Figure 12.2. An increase in the monetary base shifts the LM schedule from LM_1 to LM_2. This could be implemented by the central bank purchasing assets from the private sector, including the purchase of government bonds. The money supply increases from M_1 to M_2, the interest rate falls from r_1 to r_2, and private investment rises from i_1 to i_2. If the LM schedules are not vertical, a fiscal expansion with monetization is more expansionary than monetary expansion alone.

Before proceeding to open economy models, clarification of the direct use of interest rates in monetary policy is necessary. In the late 1970s and early 1980s a form of economic policy called "monetarism" gained influence among right wing politicians in the United States and the United Kingdom. The principal policy recommendation of this short-lived policy ideology was for central banks to "target" a measure of the money supply and regulate its growth. In the application of this approach policy makers came to the conclusion that regulation of so-called monetary aggregates was not possible in practice. In place of this, governments would directly manipulate central bank interest rates with the intent of affecting private sector behavior, especially credit growth.

While different in appearance, acting on the monetary base through open market operations and manipulating interest rates are functionally equivalent in the neoclassical macro model. When a central bank lowers the rate at which it

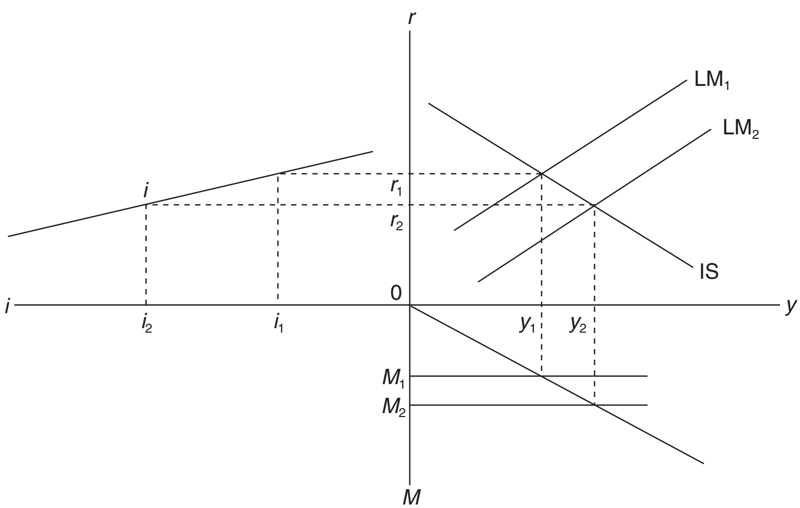


Figure 12.2 Monetary expansion in a closed economy.

lends to commercial banks it seeks to induce those banks to expand credit to the non-bank private sector. The purpose of open market operations is to increase directly the bank reserves that allow for credit to expand. In the simple financial markets that characterized most macro models, open market operations and interest rate manipulation are strictly equivalent, though this may not be the case in practice.

At the analytical level, the most important difference between the two is that direct interest rate manipulation is an overt admission that markets are not self-adjusting, and government intervention is required not just occasionally, but as a regular, consistent feature of the economic landscape. It would be a quite interesting study in logical inconsistency to understand how neoclassicals might justify and advocate government price fixing in financial markets and condemn it in all other markets.

The next chapter begins the analysis of monetary and fiscal policy in a model with trade and capital flows. The central characteristics of open economy analysis are the exchange rate regime and the ease of movement of money flows between countries.

Annex to Chapter 12

The open economy in algebra

This annex provides the algebraic presentation of the open economy model that is used in this chapter and the next. As in previous chapters, upper case letters refer to nominal values and lower case letters to variables measured in units of the single commodity. The open economy algebra includes the public sector and international transactions. It is necessary to change notation to incorporate these complications.

X, x = exports
Z, z = imports
F, f = net external capital flows
Y, y = national income
C, c = household consumption
I, i = business investment
S, s = household saving
G, g = government expenditure
T, t = public revenue, "taxes"
M_s, M_d, M^* = supply of money, demand for money, and the supply fixed by the monetary authorities
r = domestic interest rate
r^* = "world" or international interest rate, assumed constant
p = price level
v = inverse of the velocity of money
E, e = nominal and real exchange rates

The behavioral relationships are as follows:

$x = x^* + a_1 e$ export function, $a_1 > 0$ (1a)

$z = a_2 e + a_3(y - t)$ import function, $a_2 < 0$ and $a_3 > 0$ (2a)

$f = a_4(r - r^*)$ international capital flow function, $a_4 > 0$ (3a)

$M_d = vpy - a_5 r$ demand for money, $a_5 > 0$ (4a)

$M_s = M^*$ supply of money (5a)

$c = a_6(y - t)$ consumption function, $a_6 > 0$ (6a)

$i = i^* - a_7 r$ business investment function, $a_7 > 0$ (7a)

$t = a_8 y$ public revenue function, $a_8 > 0$, and (8a)

$g = g^*$ government expenditure. (9a)

From the above, the IS, LM and BP schedules are derived. First, the IS curve:

$$y = c + i + g + (x - z)$$

$$y = a_6(y - a_8 y) + i^* - a_7 r + g + [(x^* + a_1 e) - (a_2 e + a_3 y)]$$

$$y = [i^* - a_7 r + g + x^* + (a_1 - a_2)e]/[1 - a_6(1 - a_8) + a_3]$$

Define $1/\alpha = [1 - a_6(1 - a_8) + a_3]$, and α is the open economy multiplier.

$\delta = (i^* + x^*)$, autonomous expenditures of the private sector, and

$(a_1 - a_2) = a_T$, ($a_2 < 0$, *so* $a_T > 0$)

Substitution yields the IS schedule:

$$y = \alpha(\delta + g - a_7 r + a_T e) \tag{11}$$

Second, I derive the LM curve by setting money demand equal to the supply (monetary base).

$$M^* = vpy - a_5 r$$

Solving for y directly yields the LM schedule:

$$y = (M^* + a_5 r)/vp \tag{12}$$

Finally, I deal with the BP schedule. As explained in the next two chapters, the following specification, usually presented as the general case, contains a mistake, the omission of the domestic price level. Following the practice of almost all textbooks, it is used in the next chapter, then corrected in Chapter 14.

$$(x - z) + f = 0$$

$$[(x^* + a_1 e) - (a_2 e + a_3 y)] + a_4 (r - r^*) = 0$$

As above, $(a_1 - a_2 = a_T)$.

Solving for y gives the BP schedule:

$$y = [x^* + a_T e + a_4 (r - r^*)]/a_3 \tag{13}$$

When the international rate of interest and the price level are assumed constant, the three equations (schedules) have three variables ("unknowns"), the level of output (y), the domestic interest rate (r), and the exchange rate (e and E are the same because the price level is assumed constant). In the next chapter a fourth equation is added to render the price level endogenous.

13 The neoclassical open economy

13.1 Introduction

With the exception of Chapter 7, it has been the practice in this book to derive all diagrams rigorously from an algebraic specification of behavioral relationships. That practice cannot be followed for the neoclassical open economy model because to do so would immediately divert the discussion from presentation to critique. In order to have a model to critique, I follow the usual diagrammatical presentation found in intermediate macro textbooks.[1]

The typical presentation excludes the labor market. This allows for less than full employment outcomes, implying that the model is quantity constrained. Because the economy is quantity constrained below full employment, an equilibrium solution does not imply allocative efficiency, and the "gains from trade" that characterize the Heckscher–Ohlin trade model are not relevant.

The standard model for analyzing open economy adjustment comes from the work of Marcus Fleming and Robert Mundell.[2] It has an equilibrium schedule associated with each of three markets, two of which were encountered in the presentation of a closed economy: the "IS curve" for the commodity market; the "LM curve" for the money market; and a balance of payments equilibrium schedule for the external sector usually designated "BP".

Although it is a half-century old, the Mundell–Fleming model remains the keystone of open economy macroeconomics.[3] The model aspires to provide a simple and consistent method of integrating trade into the IS–LM model. The model emerged in the late 1950s and early 1960s, a time when Keynesian analysis was dominant in the economics profession. The Mundell and Fleming analysis seemed to transform the Keynesian neoclassical synthesis framework from a closed to an open economy that could generate powerful policy rules. These rules or generalizations can be found in twenty-first century textbooks.

13.2 Standard open economy model: the algebra

The open economy analysis can begin with the commodity market, whose condition for equilibrium is that expenditures autonomous with respect to the level of income must equal induced non-expenditure. The standard policy analysis involves a comparison of the effects of monetary and fiscal policy. It becomes necessary at this point to include public expenditure and taxation as well as imports, exports and capital flows. This more complicated commodity market equilibrium condition becomes,

$$I+G+X=S+T+Z$$

The letters G and T are government expenditure and taxation, and X and Z are exports and imports. Because there is only one commodity, we can shift from nominal to "real" variables, with the latter measured in units of the single commodity, as in Part I of this book. After specifying the relationships with new notation to accommodate the increased complexity (see annex to Chapter 12), the expanded constant price IS curve becomes:

$$y=\alpha(\delta+g-a_7r+a_Te) \qquad (IS)$$

The Greek letter δ is the sum of the autonomous elements of the investment and export functions, g is government expenditure; a_T is the sum of the absolute values of the coefficients of exports and imports with respect to the real exchange rate; e is the real exchange rate; and a_7 is the coefficient of investment with respect to the domestic interest rate (r). In a multi-commodity model, there would be a difference between the import and export exchange rates, but for a one-commodity model the real exchange rate is simple, the nominal rate divided by the price level, or $E/p=e$. In all presentations of the standard model prices are assumed fixed, an assumption critiqued in some detail in the next chapter.

If the price of the single commodity is constant and set to unity, then the nominal and real exchange rates are identical ($E=e$). I notionally calculate the exchange rate as the ratio of domestic to "foreign" currency, so that an increase implies devaluation or depreciation. The parameter a_T is positive because a devaluation or depreciation increases export demand and reduces import demand, with the latter resulting in an increase in the demand for domestic substitute commodities. In a one-commodity model the availability of a perfect substitute is assured.

The standard specification of the open economy LM curve appears in a diagram to be the same as its closed economy counterpart, though a major change has been introduced. Where previously the money supply consisted of domestic credit, in the open economy the money base also includes "foreign currency" holdings in the banking system. I leave the implications of this change to the next section, and write the LM curve as before:

$$y=(M^*+a_5r)/vp \text{ (LM)}$$

The parameter a_5 is the derivative of the demand for money with respect to the interest rate. It remains to specify the balance of payments equilibrium schedule.

The change in international reserves will be zero if the trade balance ($X - Z$) and capital flows (F) sum to zero. Letting R stand for the stock of reserves,

$$\Delta R = 0 = (Z - X) + F$$

With no price changes, these variables can be measured in units of the single commodity. Capital flow is narrowly defined to be portfolio capital and is a positive function of the difference between the domestic and "world" rates of interest (r and r^*). Since this relationship will play a major role in adjustment to external equilibrium it is shown in Figure 13.1. Two capital flow functions are represented in the upper right quadrant, with F2 more elastic than F1. The trade balance is shown immediately below, traced from the import and export functions in the lower left quadrant. As in the algebra, imports are a function of income and exports are exogenous.

Using constant price units, the BP schedule is (see annex to Chapter 12):

$$y = [x^* + a_T e + a_4(r - r^*)]/a_{3(BP)}$$

The a_T term is the same as in the IS curve and a_4 is the coefficient of capital flows with respect to the difference between r and r^*. In what follows I assume a constant international interest rate. In textbooks the three market equilibrium relationships are presented in one diagram, as shown in the two parts of Figure 13.2,

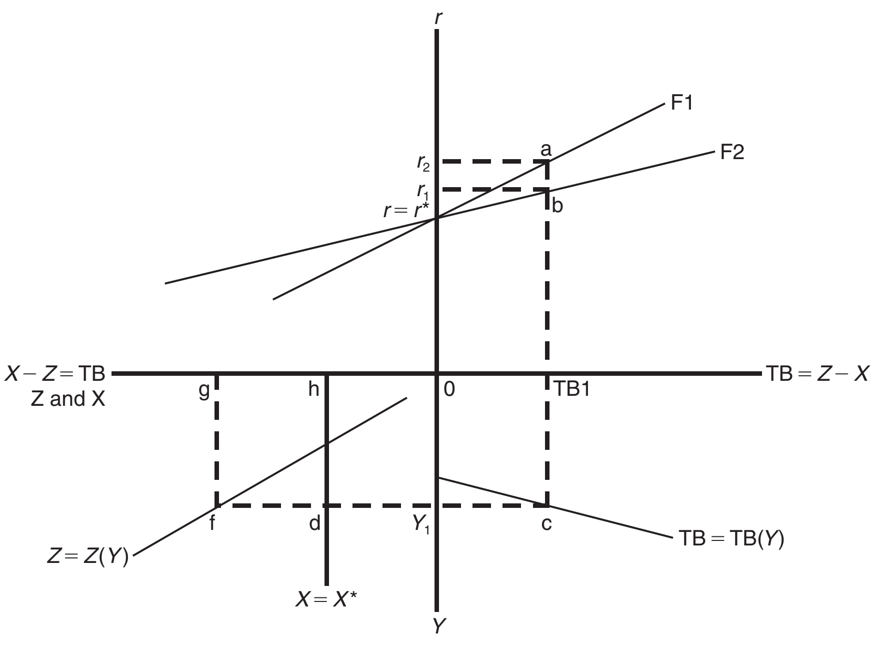


Figure 13.1 Domestic and "world" interest rates and capital flows.

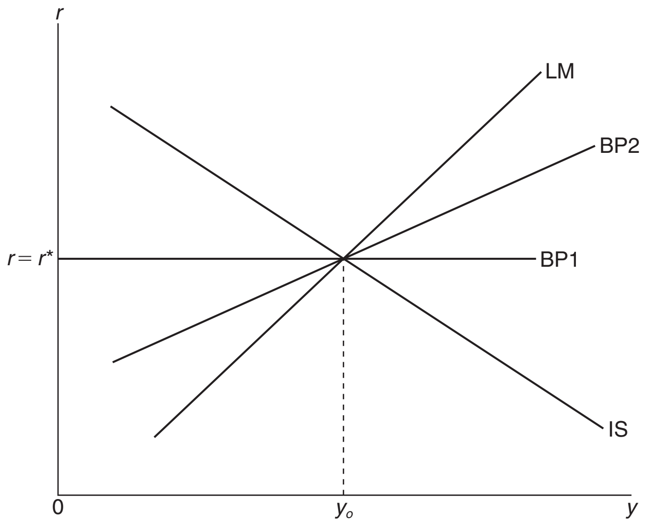


Figure 13.2a Standard open economy diagram.

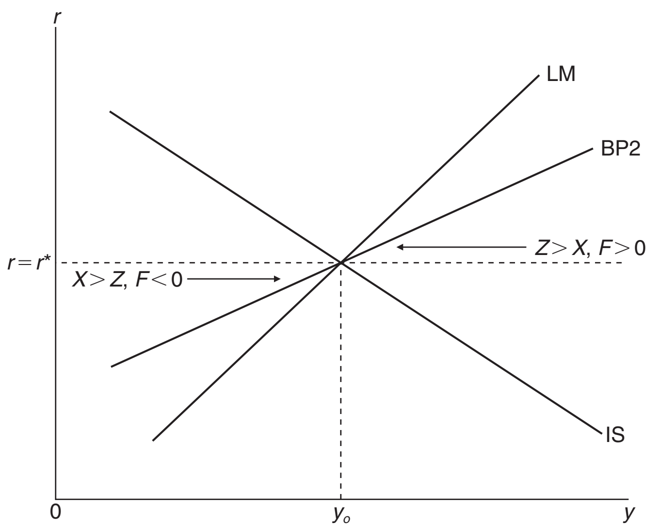


Figure 13.2b Standard open economy diagram, the BP schedule in detail.

with the purpose of analyzing the effect of fiscal and monetary policies. Figure 13.2a shows two specifications of the BP curve, one less than perfectly elastic (BP2) and one that is perfectly elastic (BP1). In the case of the latter, a small difference between the domestic interest rate and the world rate results in a large instantaneous capital flow to cover any difference between exports and imports. If the line were horizontal, "perfect capital flows", and the interest rate were flexible, not set administratively by the central bank, *r* could not differ from the world rate no matter what fiscal or monetary policies are implemented.[4]

The three equilibrium schedules can be placed in the same diagram, as in Figure 13.2a. This is frequently used in textbooks, and it conceals considerably more than it reveals. If the exchange rate is fixed and capital flows are perfectly elastic, the simplest analytical case, a shift in any one of the equilibrium schedules results in a change in all the induced variables, output/income, imports, tax revenue and saving. In the more complicated case of less than perfectly elastic capital flows and a flexible exchange rate, to these variables must be added investment, exports, the domestic interest rate and the exchange rate. None of these except the domestic interest rate and output/income can be read from the diagram. It is a severe test of a student's imagination to deduce all the changes concealed by this diagram. It might be described as a "just believe" diagram.

Analyzing open economy adjustment in this model is facilitated by inspecting the BP curve, which dictates the equilibrium outcome. Figure 13.2b emphasizes the two general equilibrium outcomes. Either the equilibrium is above the world rate of interest, in which case a trade deficit is balanced by a capital inflow; or the equilibrium is below the world rate of interest, in which case there is a trade surplus balanced by a capital outflow (noted in diagram by inequalities).[5] The latter outcome is usually not treated in textbooks because it implies a fall in national income, contrary to the expected goal of policy intervention.

13.3 Standard open economy model: the diagrams

In place of Figure 13.2a and 13.2b, I use a four quadrant diagram in Figures 13.3 through 13.10, that explicitly represents the adjustments of the important variables. Part 1 of each diagram reproduces Figures 13.2a and 13.2b. Part 2 represents imports and exports in relation to output/income. Imports and exports as a function of the exchange rate with income constant, are presented in Part 3. Finally, Part 4 shows the interaction of the exchange rate and the domestic interest rate, where a decline in the former is an appreciation. Though complicated, this method of presentation allows more detailed analysis of the adjustment process. Eight diagrams are necessary in order to consider the theoretical possibilities implied by two exchange rate regimes (fixed and flexible), two capital flow possibilities (perfectly elastic and less than perfectly elastic), and two policy instruments (fiscal and monetary).

Prior to initiating a series of complex equilibrium stories, clarification of terms is important. The analysis of open economy adjustment is without exception conducted in comparative statics. In some textbooks the words "temporary" and "final" equilibrium are used in the presentation of open economy adjustment.[6] As explained in Chapter 3, in comparative static analysis this terminology is misleading, because there is no time dimension. Comparative static equilibria are stable or unstable, unique or multiple, but cannot be "temporary". Authors use these terms to provide a step-by-step guide for students through a complex adjustment process. The purpose may be benign, but the terminology is unsound and misleading. Comparative static adjustment to equilibrium is instantaneous, with no intermediate stations.

Figure 13.3 shows the consequence of a fiscal expansion achieved by an increase in government expenditure with a fixed exchange rate.[7] From an initial equilibrium shown by points marked with "a", the expenditure increase that shifts the commodity market schedule from IS1 to IS2 is financed by bond sales to the public, which leaves the money supply unchanged and puts upward pressure on the interest rate.[8] With less than perfectly elastic capital flows (an upward sloping BP schedule), the rise in the interest rate induces capital inflow that compensates for the trade deficit generated by the increase in income to level y_2 (shown in Part 2 of Figure 13.3). Because there is no change in the exchange rate (Parts 3 and 4), exports remain the same and there is an upward shift of the import function in the exchange rate and trade quadrant (due an increase in income).

In summary, the domestic interest increases, output/income rises, and the trade deficit thus generated is covered by capital inflow, which also increases the money base to shift the LM curve to the right. The more inelastic the BP schedule, the less output/income increases. The final equilibrium at points "b" is stable on the assumption that the gap between the world and domestic rate of interest causes a continuous capital inflow. The stability of this equilibrium has been questioned because it gives no consideration to portfolio equilibrium. This

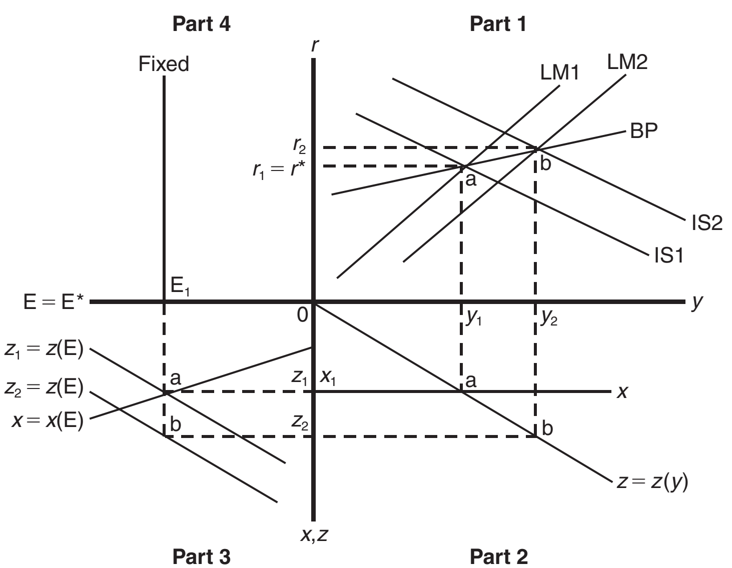


Figure 13.3 Fiscal policy, fixed exchange rate, imperfectly elastic capital flows.

problem in the Mundell-Fleming model, the flows required for equilibrium may cause disequilibrium in desired stocks, is analogous to the relationship between investment flows and the capital stock in the closed economy model.

If capital flows are perfectly elastic, shown in Figure 13.4, the tendency for the domestic interest rate to rise is instantaneously prevented by capital inflow in Part 1, with the consequences in the other quadrants similar to Figure 13.3. In this case the fiscal expansion achieves its maximum increase in output/income, to level y_3. If Figures 13.3 and 13.4 are compared, one can identify an index of the effectiveness of fiscal policy, the ratio $[y_1y_2]/[y_1y_3]$, which is determined by the slope of the BP schedule, with effectiveness approaching zero as BP becomes vertical and unity as it becomes horizontal.

The analysis of monetary policy with a fixed exchange rate is simpler, shown in Figures 13.5 and 13.6. Only Part 1 is necessary to follow the adjustment process in both diagrams. The central bank purchases bonds from the public, and this increases the domestic money base, shifting the money market equilibrium schedule from LM1 to LM2. The purchase raises bond prices and lowers the domestic interest rate (arrow pointing to the right in Part 1 in both diagrams). This downward pressure on the interest rate results in a capital outflow that cancels the monetary expansion of the central bank (arrow pointing to the left in Part 1 of both diagrams). With a fixed exchange rate, monetary policy cannot increase output/income. This conclusion is not affected by the degree of capital mobility.

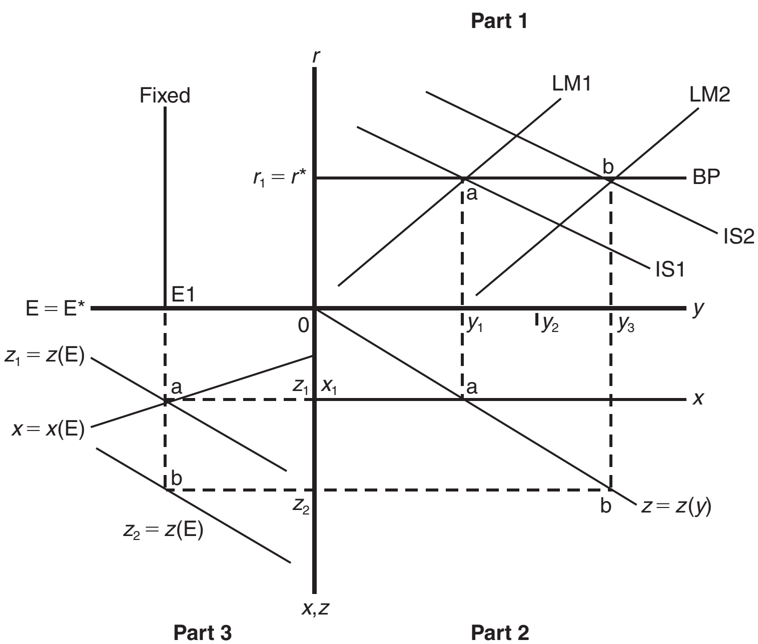


Figure 13.4 Fiscal policy, fixed exchange rate, perfectly elastic capital flows.

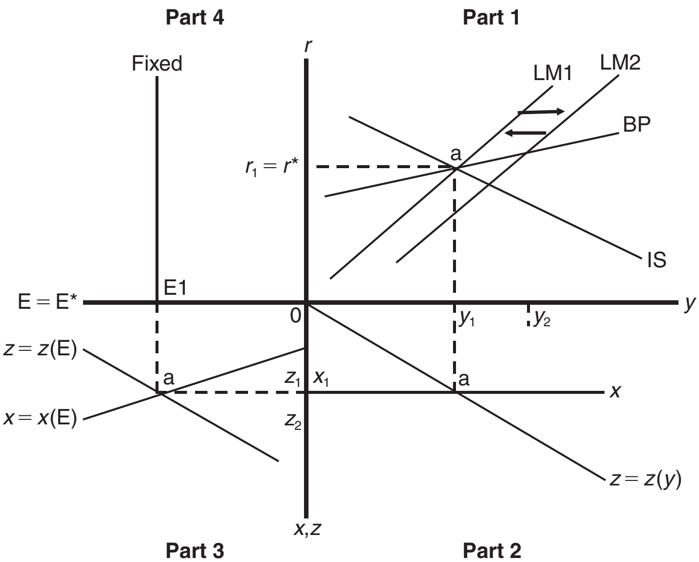


Figure 13.5 Monetary policy, fixed exchange rate, imperfectly elastic capital flows.

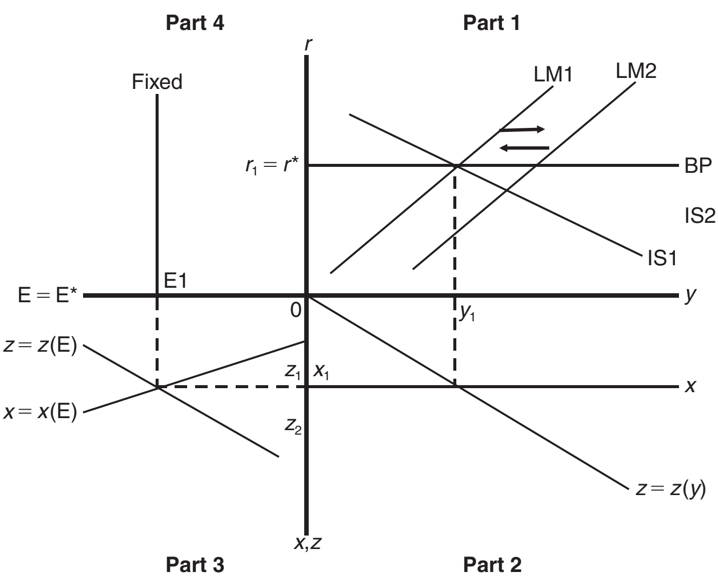


Figure 13.6 Monetary policy, fixed exchange rate, perfectly elastic capital flows.

The fixed exchange rate stories can be simply stated:

1 fiscal expansion is self-supporting by inducing capital inflow that covers the trade deficit and causes monetary expansion to accommodate the additional expenditure; and
2 monetary expansion is one hundred percent self-defeating by inducing capital outflow that causes an equivalent monetary contraction.

As one would expect, the "flexible" exchange rate cases are more complicated. Complication is reduced by beginning with two analytical guidelines: i) with perfect capital flow, a "flexible" exchange rate instantaneously equates imports and exports ensuring balance of payments equilibrium with no net capital flow; and ii) if the BP schedule is not perfectly elastic, both fiscal and money expansion cause a rightward movement along the BP schedule, implying a trade deficit and capital inflow.

Figure 13.7 presents a fiscal expansion with a flexible exchange rate and less than perfectly elastic capital flows. As before, at the initial equilibrium there is no interest rate differential and trade is balanced ($r=r^*$, $X=Z$ in Part 2). The fiscal expansion (IS1 to IS2) provokes a movement to the right along the BP schedule (Part 1). This movement simultaneously causes an *appreciation* of the exchange rate due to the capital inflow associated with the interest rate differential. The appreciation shifts the BP schedule to the left. On the new BP schedule, any level of income requires a higher interest rate than before, and any interest rate is associated with a lower level of income.

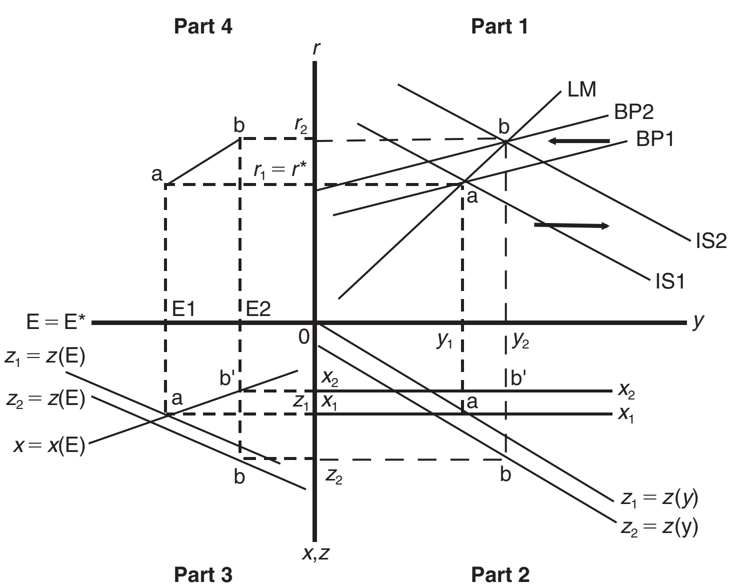


Figure 13.7 Fiscal policy, flexible exchange rate, imperfectly elastic capital flows.

Part 4 shows the exchange rate, that moves from E1 to E2 when the interest rate rises to r_2. The appreciation causes a movement back along the export function and outwards along the import function (Part 3). Simultaneously the increase in output/income induces higher imports (Part 2), corresponding to an upward shift in imports as a function of the exchange rate (again, Part 3). The increase in output/income is determined by the elasticity of capital flows. The more *inelastic* are capital flows, the greater will be the increase in output, the opposite of the fixed exchange rate case.

The adjustment may be easier to understand by inspecting more closely the interaction between income and the interest rate. The increase in the interest rate causes a capital inflow, while movement to a higher level of output/income causes a trade deficit. If the two effects were equal, equilibrium could not move from point "a". Point "a" would be the outcome for perfectly elastic capital flows. With less than perfectly elastic flows, the interest rate effect is the stronger, which causes a balance of payments surplus (despite the currency appreciation) that allows for an expansion of output.

The fiscal expansion increases the level of output/income (y_1 to y_2), though exports are lower (falling from x_1 to x_2, see Parts 2 and 3) and imports higher (z_1 to z_2). A rise in the domestic interest rate provoked the appreciation, but there is a capital inflow to cover the trade deficit ($z_2 - x_2$). The more inelastic are capital flows, the more effective is fiscal policy. Inelasticity implies less capital inflow for a given interest rate differential, which implies a weaker pressure for currency appreciation. The problem for fiscal policy in the flexible exchange rate case is that the capital inflow that would allow for output expansion also depresses demand via a currency appreciation.

The limiting case is shown in Figure 13.8, fiscal expansion with a flexible exchange rate when capital flows are perfectly elastic. The shift in the IS schedule is indicated by a dashed line because it cannot be realized due to the exchange rate effect. Fiscal expansion (the arrow pointing to the right in Part 1) causes an instantaneous capital inflow that appreciates the exchange rate (Part 4), and completely cancels the expansion by depressing exports and stimulating imports (the arrow pointing left in Part 1, with the trade effects shown in Parts 2 and 3). In the next chapter algebra is used to show that this, the standard textbook conclusion, is logically invalid.

The cases of fiscal policy with a flexible exchange rate and less than perfectly elastic capital flows reveal the limitation of a diagrammatic presentation of open economy equilibrium. The first problem is that when one looks at Figure 13.7 it might be thought that greater elasticity would result in a higher level of output/income, while the opposite is the case. This misunderstanding can arise because the graphic gives no guide to the interaction of the BP and IS schedules. The more elastic the BP schedule, the greater the capital flow associated with any interest rate differential, and, as a consequence, the larger the induced currency appreciation, which depresses aggregate demand by its impact on exports and imports. In the graphic this means that the more elastic the BP schedule, the less the IS schedule shifts to the right.

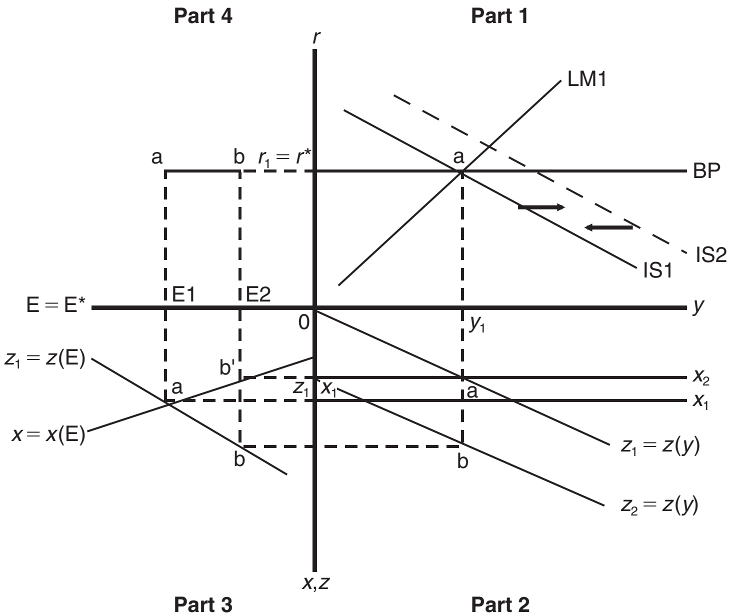


Figure 13.8 Fiscal policy, flexible exchange rate, perfectly elastic capital flows.

Figures 13.9 and 13.10 present the standard analysis of monetary policy with a flexible exchange rate. The perfectly elastic case in Figure 13.9 is simply told: monetary expansion causes an income-induced trade deficit and capital outflow, and the exchange rate depreciates until trade is again balanced. The outcome is characterized by higher output/income (Part 1), an upward shift in exports due to exchange rate depreciation (Parts 2 and 3), and an equal increase in imports. Imports increase because the output/income effect overwhelms the downward shift of the import function due to exchange rate depreciation. Monetary policy finds its full effectiveness with a flexible exchange rate and perfectly elastic capital flows.

As for the discussion above of fiscal policy, a diagram is not fully adequate to understand monetary expansion with a flexible exchange rate and less than perfect capital flows. Specifying some characteristics of the outcome helps to understand the adjustment: i) if the elasticity of capital flows is greater than zero, the outcome must lie to the right of the initial equilibrium and on the BP schedule, ii) the exchange rate must depreciate, iii) there must be a trade surplus, and iv) there must be capital outflow to balance the trade surplus.[9]

These points provide a guide to following the analytical sequence in Figure 13.10. An increase in the domestic component of the money supply shifts the money market equilibrium from LM1 to LM2. This lowers the domestic interest rate and simultaneously generates a trade deficit. The lower interest rate immediately increases investment and shifts the IS schedule. The capital outflow

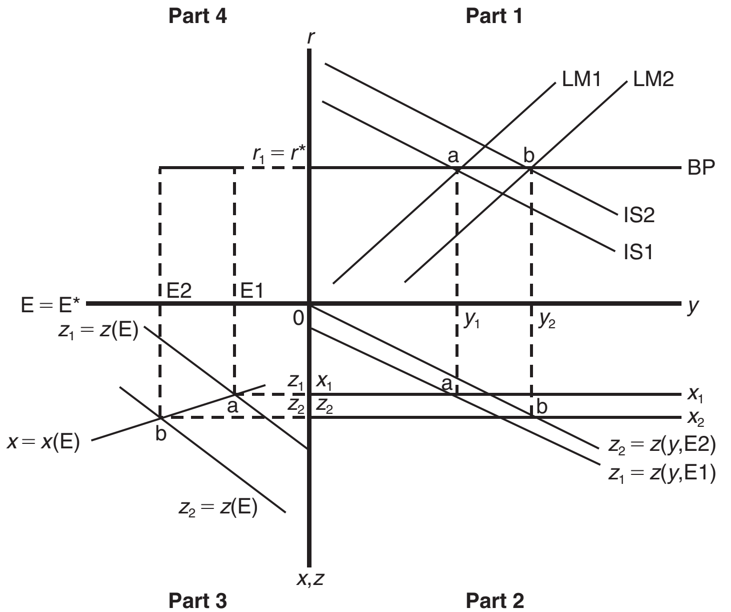


Figure 13.9 Monetary policy, flexible exchange rate, perfectly elastic capital flows.

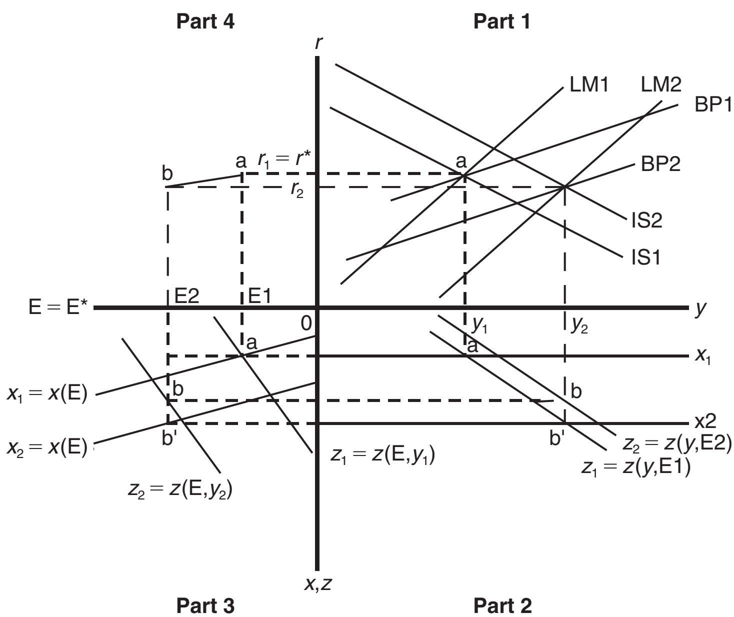


Figure 13.10 Monetary policy, flexible exchange rate, imperfectly elastic capital flows.

depreciates the currency, and shifts the export and import functions (Parts 2 and 3). Both shifts reinforce the outward movement of the IS schedule in Part 1. The equilibrium trade surplus (distance b to b′) is exactly equal to the capital outflow. The more inelastic are capital flows, the less effective is monetary expansion, because inelastic capital flows imply a smaller depreciation.

This long and tedious diagrammatic analysis yields the standard neoclassical policy conclusions and prescriptions.

With a fixed exchange rate regime:

1.a Fiscal policy is effective, with the degree of effectiveness positively related to the degree of capital mobility.
1.b Monetary policy is totally ineffective and the elasticity of capital flows makes no analytical difference.

With a flexible exchange rate regime:

2.a Fiscal policy is ineffective, with the ineffectiveness reduced as capital flows become more inelastic.
2.b Monetary policy is effective, with the degree of effectiveness positively related to the elasticity of capital flows.

These conclusions are sometimes synthesized into one sentence: fiscal policy is effective with fixed exchange rates and monetary policy is effective with flexible exchange rates. As common as this oft-repeated statement may be, it is wrong, as we see in the next chapter. The next section considers the political and ideological implications of the advocacy of flexible exchange rates derived from these invalid conclusions.

13.4 "Advantages" of flexible exchange rates

With the collapse in the early 1970s of the IMF-monitored system of fixed rates among currencies, the Mundell-Fleming conclusion that under flexible exchange rates monetary policy was effective and fiscal policy ineffective passed from theoretical curiosity to practical importance. It counseled that active fiscal policy, like fixed exchange rates, was an anachronism.[10]

This policy advice has great appeal to the neoclassicals, because it complements their faith in the operation of markets, in this case the market for foreign exchange. The ideological nature of the preference is demonstrated in standard textbook presentations that typically make little reference to the practical difficulties associated with flexible rates.

Salvatore, whose book has one of the most balanced presentations of fixed and flexible rates, summarizes as follows:

> In general, advocates of flexible exchange rates argue that such a system is more efficient than a system of fixed exchange rates to correct balance-of-

> payments disequilibria … [T]hey stress that by allowing a nation to achieve an external balance easily and automatically, flexible rates facilitate the achievement of internal balance and other economic objectives.… [A]dvocates of fixed exchange rates argue that by introducing a degree of uncertainty not present under fixed rates, flexible rates reduce the volume of international trade and investment, are more likely to lead to destabilizing speculation, and are inflationary…
>
> A careful review of theoretical arguments … does not lead to any clear-cut conclusions that one system is overwhelmingly superior to the other.
>
> (Salvatore 2004, 596–598)

After reaching this agnostic and pragmatic conclusion, a page later Salvatore repeats without qualification the claim of the neoclassicals that a flexible exchange rate regime is effective in automatically resolving balance of payments problems:

> Under a flexible exchange rate system, only the exchange rate needs to change to correct a disequilibrium in the nation's balance of payments…
>
> A flexible exchange rate system also means that the nation need not concern itself with its external balance and is free to utilize all policies … to achieve its purely domestic goals of full employment with price stability, growth, an equitable distribution of income, and so on.
>
> (Salvatore 2004, 599)

The statements that with flexible rates "only the exchange rate needs to change" for balance of payments bliss, and that "the nation need not concern itself with its external balance" read like a parody of neoclassical theology. Even a fervent advocate of flexible rates, the International Monetary Fund, would not take such a sanguine view.[11] The potential difficulties arising under a flexible exchange rate can be highlighted by tracing the steps from a balance of payments deficit to its elimination through automatic exchange rate adjustment. For simplicity, assume that a country's external account consists only of commodity imports and exports. Let an external "shock", such as a change in world prices, result in a trade deficit:

1 the trade deficit provokes a nominal depreciation of the domestic currency with respect to the currencies of its major trading partners;
2 the depreciation must cause a shift in relative prices within the country, with the prices of tradables rising relatively to non-tradables; and
3 the elasticity of supply of exports (positive) and elasticity of demand of imports (negative) must be sufficiently large to eliminate the trade deficit within a short time period so that the depreciation is not so large as to provoke inflationary instability.

In the absence of capital flows, the first step can be accepted as automatic. The second is contingent upon the degree of price competitiveness in domestic markets. The third would depend on the nature of a country's imports and exports. If domestic relative prices are slow to adjust and short-term import and export elasticities were low, the result could be a continuously depreciating exchange rate with no improvement in the trade balance. Even if one ignores the inflationary effect of the depreciation, which is considered in the next chapter, the failure to close the trade gap would lead to the central bank exhausting its foreign reserves. Once imports could not longer be financed, the trade balance would adjust through a contraction of real output that would reduce import demand.

Specifying the steps from a trade deficit to trade equilibrium reveals the underlying premises of the flexible exchange rate mechanism. It assumes that 1) the domestic and world economies are price constrained, which logically implies global general equilibrium full employment including the country under analysis; and 2) that changes in production and consumption are instantaneous. In other words, a flexible exchange rate regime brings automatic balance of payments adjustment if and only if markets behave according to the rules of Walrasian General Equilibrium.

Looking back at the Mundell–Fleming analysis reveals that it suffers from a fundamental theoretical flaw. It claims to be an analysis of how policy tools can be used to achieve both "internal balance" (full employment) and "external balance" (balance of payments stability). If it limits itself to the case of a fixed exchange rate, the Mundell–Fleming model can claim to provide such an analysis. However, when it considers the case of flexible exchange rates, the analysis becomes trivial, because the exchange rate adjustment mechanism presupposes Walrasian General Equilibrium.

Therefore, the allegations that "monetary/fiscal policy is effective/ineffective under a flexible change rate regime" are false in the sense of being irrelevant. "Effectiveness" in the Mundell–Fleming context always refers to effectiveness in managing the level of output and employment. Because the exchange rate adjustment mechanism, Walras' Law, holds only for a full employment level of output, the "effectiveness" of fiscal or monetary policy to change the level of output is a question that cannot even be asked, much less answered.

Open economy adjustment based on the Mundell–Fleming model is general equilibrium falsely claiming to explain conditions of less than full employment. As a result its entire analysis is invalid. Despite this fundamental problem, the model continues to be used on an ad hoc basis for the analysis of policy effectiveness when output is below full employment. The next chapter demonstrates that the ad hoc less than full employment version harbors an internal contradiction that fatally undermines its usefulness in formulating policy for an open economy.

14 Reassessing monetary and fiscal policy

14.1 Introduction

The neoclassical closed economy macro model claims to demonstrate two great parables with powerful political and ideological messages. The better known is the assertion that unemployment is the result of trade union or government intervention, and in the absence of these a market economy will automatically generate full employment. The second, complementary assertion is that the full employment outcome is unique because money is neutral.

If these two parables were valid capitalist economies would have no need for either an active fiscal policy or an active monetary policy. Government expenditure need do nothing beyond fund whatever functions society defined as appropriate to the public sector. Monetary policy could be reduced to an automatic, technocratic rule such as specifying an annual money growth consistent with continuous full employment. The first two parts of this book demonstrated that neither parable is logically valid.

To these closed economy parables can be added a third for the open economy: a flexible exchange rate will ensure that the external sector of the economy is always in equilibrium. These three parables represent the free market dream team: deregulate internal markets and the economy will adjust to full employment; set an automatic, prudent monetary rule and there will be no inflation; and "free" the exchange rate from government manipulation to end balance of payments problems. The third parable is no more valid that the first two, because the Mundell–Fleming model has a fatal flaw.

In both its simple and complex forms, the Mundell–Fleming analysis of a flexible exchange rate regime ignores an obvious, simple and fundamental economic relationship, the impact of exchange rate changes on the price level. For example, one of the more advanced macro textbooks used in the 1990s explicitly states that exchange rate adjustment has no domestic price impact.[1] In another textbook, the domestic price effect of changes in the exchange rate is noted, but its unavoidable impact on the money market explicitly excluded.[2]

It cannot be correct either in theory or in practice that adjustment of the exchange rate would reduce a trade gap and have no domestic price effect. The one implies the other. The standard stories of monetary policy with a flexible exchange rate in the previous chapter were wrong. A logically complete story would be:

1 an increase in the money supply results in a trade deficit; with perfect capital flows this deficit is instantaneously eliminated by depreciation of the currency;
2 the depreciation of the currency raises the price level *via* its impact on imported goods;[3]
3 this price increase feeds back to make the real depreciation is less than the nominal; and
4 the price increase simultaneously renders the increase in the real money supply less than the increase in the nominal money supply.

Even in the analytically most favorable case, perfect capital flows, monetary policy would not be completely effective because of the price effect on the real money supply and the real exchange rate. This is obvious if one considers the limiting case of an economy at less than full employment that exports its entire production in return for imports of the same value. In such an economy, monetary expansion would have zero impact on output because the domestic price effect would equal any nominal devaluation, implying no change in the real exchange rate.

A typical justification for excluding domestic price effects is the assertion the Mundell–Fleming analysis is a "fixed price" model, and including the exchange rate effect on prices is not obeying the rules of the story. This argument cannot be correct. By its design the model is not "fixed price", because the comparative statics of adjustment require a change in a price, the exchange rate. The adjustment of export and import volumes to reach equilibrium requires a change in relative prices, to make tradables more profitable. The initial level of income would be the only possible equilibrium if the model were fixed-price, because no relative price change would occur to provoke expenditure switching from imports to domestic substitutes, and there would be no change in the incentive for producers to sell in the external market.

An empirical argument might be made that domestic prices in practice adjust slowly. Therefore, the domestic price level effect of changes in the exchange rate can be ignored in the short run. This argument refutes the main conclusions of the model. In the absence of an immediate relative price change, the necessary adjustment in export and import volumes would not occur. Whether from a theoretical or an empirical perspective, external adjustment requires changes in domestic prices. The effect of these cannot be ignored. If they are ignored, the analytical result is formally equivalent to the case of a fixed exchange rate.

Finally, it might be asserted that Mundell–Fleming refers to a non-chronological "long run" (see Chapter 3, Section 2), not to short-run adjustment. This argument cannot eliminate the need to consider domestic price effects. The first implication of a "long-run" argument would be that flexible exchange rates have little importance for short-term policy. A balance of payments disequilibrium must be resolved in the short run if the alleged advantages of a flexible exchange rate would be realized.

To state the problem in a sentence, the MF model requires domestic price changes in order to bring about balance of payments adjustment, and it does not incorporate those price changes into its analysis. This chapter pursues the implications of correcting that oversight.

14.2 Effectiveness of monetary policy

Part of the reason that the mistakes in standard open economy macro analysis are repeated in textbooks is the consistent absence of an explicit algebraic development of the central equilibrium relationships. The typical presentation using mathematics gives the IS, LM and BP schedules in implicit form and with key variables missing, as done in the previous chapter.

That absence is now corrected. For an algebraic presentation of the interaction of the exchange rate and monetary policy, I consider the "small country" case. A small country is defined as one whose demand for imports and supply of exports do not affect world prices.[4] A change in the nominal exchange rate affects only internal prices, potentially altering the profitability of traded goods relatively to domestic goods.

The balance of payments equilibrium schedule (BP) is defined by the following equation (see annex to Chapter 12), in which the sum of trade and net capital flows is zero:

$$(x-z)+f=0, \text{ and}$$

$$(x-z)=-f$$

Because of the small country assumption, I measure exports (x), imports (z), and capital flows (f) in constant price units; i.e., in units of the single commodity. The following explicit functions are assumed (see annex to Chapter 12):

$$[(x^*+a_1e)-(a_2e+a_3y)]+a_4(r-r^*)=0$$

Real output is y, and e is the real exchange rate (nominal rate divided by the price level, E/P) measured in units of the domestic currency to some composite world currency. The domestic interest rate is r and the "world" rate r^*. I assume the latter, r^*, constant. The parameter x^* is the intercept of the export-exchange rate function. When r^* is constant, the total derivative is:

$$0=(a_1+a_2)de-a_3dy+a_4dr$$

If capital flows are perfectly elastic, $r=r^*$, and dr is zero. Because the exchange rate is defined as units of the national currency to the "world currency", an increase in e raises exports and reduces imports. If the total derivative is solved for the rate of growth of output, I obtain the following, where y' and e' are the rates of change of output and the real exchange rate, respectively.[5]

$$y' = (\varepsilon_1 + \varepsilon_2)e'$$

Define $(\varepsilon_1 + \varepsilon_2) = \varepsilon^T$, so

$$y' = \varepsilon^T e'$$

Because $r = r^*$, $x = z$.

The elasticity of exports with respect to the real exchange rate is ε_1, and ε_2 is the elasticity for imports. Because $\varepsilon_1 > 0$ and $\varepsilon_2 < 0$, ε_T is positive. These elasticities refer to the real exchange rate and quantities of exports and imports, implying that $(\varepsilon_1 + \varepsilon_2) = \varepsilon^T > 0$, that insures a devaluation or depreciation improves the trade balance and appreciation or revaluation worsens it.[6] When output is below full employment and there are no bottlenecks limiting output, its growth rate is determined by the proportional change in the exchange rate and the sum of the trade elasticities.

In a one-commodity model conversion from the real to the nominal exchange rate is a simple calculation, the rate of change of the nominal rate (E') minus the rate of inflation (p'). The model's pretense that the single commodity is both produced domestically and imported implies that the rate of inflation is determined by import prices. If the market for imports is competitive in the neoclassical sense, inflation (p') is determined by the rate of nominal devaluation (E') and the marginal propensity to import, which is equal to the average propensity (a_3E').[7] Designing the real exchange rate as e',

$$e' = (E' - p') = (E' - a_3E') = (1 - a_3)E'$$

$$y' = \varepsilon^T e' = \varepsilon_T(E' - p') = \varepsilon^T(1 - a_3)E'$$

$$= \varepsilon^T(1 - a_3)E'$$

To investigate the Mundell–Fleming analysis of monetary policy the growth of output must be linked to the money market. Using previous specifications, let the nominal demand and supply for money be:

$$M_d = vpy + a_5r \text{ (nominal money demand)}$$

$$M_s = M^* \text{ (nominal money supply)}$$

$$M_d = M_s = M^* = vpy + a_5r \text{ (equilibrium)}$$

Where p is the price level, M^* is the nominal money supply set by the "monetary authorities", v is the velocity of money, and a_5 is the derivative of money demand with respect to the domestic interest rate. From equation 2 it follows that if the velocity of money and the interest rate are constant, the inflation rate is:

$$p'=M'-y'$$

From above, we also know that $a_3E'=p'$. Therefore,

$$a_3E'=M'-y'$$

$$E'=(M'-y')/a_3$$

Substitute for e' in equation in the equation for the growth of income:

$$y'=\varepsilon^T(1-a_3)(M'-y'')/a_3$$

$$y'=[(1-a_3)\varepsilon^T/a_3][M'-y']$$

Again, solve for y',

$$y=\frac{(1-a_3)\varepsilon^T M'}{a_3+\varepsilon^T(1-a_3)}$$

Dividing through by M' completes the algebra to obtain an index for the index of effectiveness of monetary policy with perfect capital flows, determined by the marginal propensity to import and the trade elasticities:

$$y=\frac{(1-a_3)\varepsilon^T M'}{a_3+\varepsilon^T(1-a_3)}$$

This fraction is the corrected Mundell–Fleming case of perfect capital flows. It is immediately obvious that the effectiveness of monetary policy declines as the import share rises (a_3) and the trade elasticities decline (ε^T). The larger is the import share, the greater will be the price impact of a nominal devaluation. The lower is the sum of the trade elasticities, the larger must be the devaluation in order to maintain the balance between imports and exports. In a closed economy, the effectiveness of monetary policy is one (100 percent), because a_3 is zero. In a closed economy at below full employment an increase in the money supply increases output by the same proportion as the increase in the money base.

In an open economy, effectiveness is reduced by two mechanisms. First, the depreciation of the nominal exchange rate causes a rise in the domestic price level that makes the increase in the real money supply less than the nominal increase, and simultaneously renders the real depreciation less than the nominal. This effect is determined by the marginal propensity to import. Second, for any real devaluation, the increase in output will be less the lower is the sum of the trade elasticities. I consider how important these effects might be in practice after deriving the analogous measure for fiscal policy.

14.3 Effectiveness of fiscal policy

Beginning from the equation for national income equilibrium,

$$y = c + i + g + (x - z)$$

Substituting the behavioral relationships produces the following:

$$y = a_6(y - a_8 y) + i^* - a_7 r + g + (x^* + a_1 e) - a_2 e + a_3 y$$

$$y = \alpha[i^* - a_7 r + g + x^* + (a_1 - a_2)e]$$

The symbol α is the open economy multiplier (see Chapter 12, annex, and Chapter 1 Section 3 for the closed economy case). As before, with the interest rate constant because of perfect capital flows, from an initial position with balanced trade, the total derivative is:

$$dy/y = y' = \alpha[dg/y + (a_1 - a_2)de/y]$$

As before, I convert the trade coefficients to elasticities and substitute to obtain the nominal exchange rate. As before, the trade term can be presented as elasticities and the nominal exchange rate.

$$y' = \alpha[(g/y)g' + a_3\varepsilon^T(1 - a_3)E']$$

Where g' is the rate of change of government expenditure. For cleanness of algebraic presentation, let the share of government expenditure in national income be β.

$$y' = \alpha[\beta g' + a_3\varepsilon^T(1 - a_3)E']$$

As before, inflation is, $a_3E' = M' - y'$. To investigate fiscal effects, I assume no change in the nominal money supply, $M' = 0$. I can substitute $E' = -[y/a_3]$, and solve for y' as a function of g':

$$y' = \frac{\varepsilon\beta g'}{1 + \alpha\varepsilon^T(1 - a_3)}$$

In a closed economy, ε^T is zero and $y' = \alpha\beta g'$. For example, if government expenditure were initially thirty percent of national income, a 5 percent real increase would raise the growth rate by 1.5 percent times the multiplier. As for monetary policy, I divide both sides by the rate of change of public expenditure.

Showing the complete algebra, fiscal expansion in a closed economy equals the following (a_6 is the marginal propensity to consume and a_8 the marginal propensity to tax, see annex to Chapter 12):

$$y'(CE) = \frac{\beta g'}{1 - a_6(1 - a_8)}$$

In the open economy the expansion is:

$$y'(OE) = \frac{\beta g' / (1 - a_6(1 - a_8) + a_3)}{1 + [\varepsilon^T (1 - a_3) / (1 - a_6(1 - a_8) + a_3)]}$$

I can multiply by unity in the form of the open economy multiplier:

$$y'(OE) = \frac{\beta g'}{[1 - a_6(1 - a_8) + a_3] + \varepsilon^T (1 - a_3)}$$

The measure of policy effectiveness is fiscal expansion in the open economy divided by expansion in the closed economy. This is strictly equivalent to the measure for monetary policy, because if there is no trade, the propensity to import and the trade elasticities are zero, effectiveness assumes its maximum value of one (assuming that the maximum for a_3 is also one).

$$EFP = \frac{1 - a_6(1 - a_8)}{1 - a_6(1 - a_8) + [a_3 + \varepsilon^T (1 - a_3)]}$$

In the simple case of perfect capital flows, the algebra of the effectiveness of fiscal policy (EFP) appears a bit more complex than for monetary policy. Close inspection of the two shows that the major difference is that the trade elasticities appear in both the numerator and denominator for monetary effectiveness, only in the denominator for fiscal effectiveness. For both, maximum effectiveness occurs in a closed economy, and as the trade share increases, effectiveness declines.

For monetary policy this decline is the result of the import price raising the overall price, which reduces the real money supply and the real depreciation, other parameters fixed. In the case of fiscal policy, holding other parameters constant, initially balanced trade implies that a higher import share means a higher export share. The larger is the export share, the greater the effect of the appreciation on aggregate demand. The negative effect is moderated, but not reversed, by the fall in price that results from the appreciation. The most important other parameter is the sum of the trade elasticities. As this sum rises, the effectiveness of monetary policy increases, approaching unity as ε^T approaches infinity. Large trade elasticities reduce fiscal policy effectiveness, whose index approaches zero as the trade elasticities approach infinity.

To summarize, both fiscal policy and monetary policy are always less effective in the open economy model. Which is the more effective is determined by choice of parameters, as shown in Table 14.1. For very low values of ε^T and the import share, the likelihood that fiscal policy is the more effective is high. When trade elasticities are high, monetary policy will tend to be the more effective. It is possible to be a bit more specific for import shares and trade elasticities. The international average import share, excluding the tiniest countries and city states, is about 40 percent, and generally below 30 percent for large countries.[8] No data base for the exchange rate elasticities of import and export exists, though many case studies are available. The overall conclusion is that elasticities for both imports and exports are lower the shorter the time period of adjustment.[9] If this is the case, there is a strong likelihood that in a correctly specified flexible exchange rate model fiscal policy would be more effective in stimulating output than monetary policy.

This conclusion, the opposite of the standard Mundell–Fleming analysis, refers to models, not to actual economies. The most obvious reason is that the MF analysis applies to the category "small countries". In these countries movements in the nominal exchange rate and in domestic interest rates have no impact on other countries. It applies to the country equivalent of perfect competition (price takers). Immediately eliminated from the analysis even in the abstract are the United States, the Euro Zone (17 countries), Japan, China and perhaps Brazil. These countries account for the overwhelming majority of global trade. Second, it is irrelevant for all petroleum-exporting countries, because the price of their major product is not set in the domestic currency (almost all of these countries have fixed exchange rates). Logically flawed and empirically suspect, the Mundell–Fleming analysis should be abandoned along with the aggregate production function.

In addition to the trade elasticities and the import share, there is another important variable affecting exchange rate policy, a government's foreign exchange holdings. The purpose of a flexible exchange rate is automatically to equilibrate the external account, or bring it to a sustainable balance, without the need for active exchange rate management. As argued above, to achieve this purpose the exchange rate adjustment must be realized in a finite time period. This is in contrast to analyzing relative price adjustments in a closed economy, when there is no endogenous variable or process to force consideration of the chronological dimension of the abstract equilibration process.

In the case of an open economy the limiting variable is foreign exchange holdings. For the United States, the European Union and Japan this may not be an immediately binding constraint because the US dollar, Euro and Yen are held

Table 14.1 Policy effectiveness in an open model

Trade share	*Low*	*High*
Trade elasticities		
Low	EFP > EMP	EFP > EMP
High	EFP< EMP	EFP < EMP

as currency reserves by other countries. For the other countries the exchange rate adjustment to a sustainable balance of payments position must occur before foreign reserves fall to a level that threatens macroeconomic stability.

One of those frequently occurring clashes between neoclassical theory and reality appeared with the policy shift from fixed to flexible exchange rates, and the associated issue of capital flows. While in theory this shift brings stability to the balance of payments through automatic adjustment, in reality it is far from an automatic process. If nothing else, it requires institutional protection against exchange instability by substantial foreign currency holdings. This requirement was stressed in 2001 by the First Deputy Managing Director of the IMF:

> Reserves [of hard currencies] matter because they are a key determinant of a country's ability to avoid economic and financial crisis … Following the turmoil of the last few years, crisis prevention has emerged as a central priority…
>
> For much of the post-war period, the rule of thumb was that reserves should be sufficient to pay for three or four months of imports…
>
> But the growth of capital flows … has prompted a revolution in the way we think about the adequacy of reserves. The availability of capital flows to offset current account shocks should … reduce the amount of reserves a country needs. But access to private capital is often uncertain, and inflows are subject to rapid reversals.
>
> (Fischer 2001, 3)

This statement tells us that flexible exchange rates and deregulation of capital flows created the exchange rate instability that theory predicted that they would eliminate. As a consequence, the need for reserves increased in practice:

> This change in thinking about reserve adequacy has been matched by what countries are actually doing.… In terms of the traditional measure, import coverage has increased from 6 months in 1997 to 7 months in 2000 for emerging market economies.
>
> (Fischer 2001, 4)[10]

Table 14.2 shows the level of reserve holdings of selected regions and countries during 2006–2008. Inspection of the table reveals that by the six to seven month criterion, many if not most "emerging market economies" needed to accumulate larger reserves: the sub-Saharan countries, the countries of Central and Eastern Europe, the CIS countries other than Russia, and most of the Latin American countries including Mexico. In addition to its obviously depressing effect on domestic aggregate demand, the need to accumulate reserves implies that the period over which the exchange rate must adjust the balance of payments to a sustainable position would in practice be less than a year.

For such a short time period, one would expect the exchange rate elasticities for imports and exports to be quite low, as noted in the previous section. In

Table 14.2 Foreign reserve holdings in months of imports, selected regions and countries, 2006–2008

Region or country	*2006*	*2007*	*2008*
Africa	8.3	8.6	8.3
Sub-Sahara	5.5	5.6	5.2
Excluding Nigeria and South Africa	4.7	4.7	4.5
Central and Eastern Europe	4.4	4.4	3.8
Commonwealth of Independent States (CIS)			
Russia	17.0	19.8	13.7
Excluding Russia	5.0	5.1	4.5
Asia			
China	15.0	17.8	19.6
India	9.1	11.4	9.5
Others	5.1	6.0	5.1
Western Hemisphere	5.4	6.5	6.0
Brazil	8.5	13.7	10.5
Mexico	3.3	4.6	3.4

Source: International Monetary Fund 2009.

practice an expansion of manufacturing exports should be achieved faster than for agricultural exports, and even for manufactures it would depend on the period of production in the absence of substantial inventories. Assuming the existence of large inventories would be arbitrary, as well as inconsistent with maximizing behavior.

On the import side the elasticity would be determined by the availability of domestic substitutes and the supply conditions governing the production of those substitutes. Empirical evidence indicates that the smaller and less developed a country, the less potential for import substitution, so the lower the exchange rate elasticity of import demand. As for exports, substitution for manufactures should be more elastic in the short term than for agricultural commodities.

These practical considerations suggest that if the exchange rate adjustment must be achieved within a few months the combined export and import elasticities, if positive, are likely to be less than unity. Therefore, with some confidence one can conclude, without or without the Mundell–Fleming model, it is obvious that:

1 a floating exchange rate is unlikely to equilibrate the balance of payments of most countries within the time period required to make this a practical policy alternative; and
2 the tendency for short-term trade elasticities to be low implies that for many if not most countries, the combination of a floating exchange rate and perfect capital mobility is a recipe for economic instability.

14.4 Summing up open economy models

Neoclassical economics embraces with enthusiasm the economic equivalent of the famous quotation of Thoreau, "that government is best which governs least".[11] It justifies this anti-interventionist dogma by the argument that unregulated markets generate economically and socially efficient outcomes. The first two parts of this book demonstrated that only under extremely restrictive assumptions could this argument be logically sustained in the simplest case of a closed economy with one commodity.

Notwithstanding this analytical failure, the neoclassicals attempt an extension of the closed economy non-interventionism into the open economy, built on two policy assertions: 1) flexible exchange rates are technically superior to fixed exchange rates; and, as a consequence, 2) monetary policy is technically superior to fiscal policy for macroeconomic management. These assertions have no relevance for the economic efficiency that unregulated markets are alleged to achieve, because open economy analysis refers to conditions of less than full employment. If the open economy analysis were strictly equivalent to that of the closed economy, and maintained that unregulated markets resulted in full employment general equilibrium (including balance of payments equilibrium), the result would be no more than the closed economy with one more price (the exchange rate) and a few more *faux* variables (exports, imports and capital flows). Because the model remains theoretically limited by the assumption of a single product and unable to distinguish between domestic and foreign commodities except in name, the extension would be to no purpose.

Thus, the two policy assertions refer to what a government should do or not do in circumstances of less than full employment. First, a government should not fix the exchange rate, because this limits its ability to pursue other policy goals. Second, having chosen not to fix the exchange rate, a government cannot effectively use fiscal policy as an instrument of economic management. This chapter demonstrated that both policy assertions are false. In order to be effective in maintaining a sustainable balance of payments, a flexible exchange rate must adjust to an external shock within a short period of chronological time. Its ability to do this is determined by two specific parameters, the marginal propensity to import and the elasticity of trade flows with respect to the real exchange rate. The actual values of the former and likely values of the latter make such an adjustment improbable for most countries.

The same parameters that make an automatically equilibrating exchange rate adjustment unlikely imply that were it achieved, the relative effectiveness of monetary and fiscal policy cannot be determined by theory alone. Once the analysis passes from the abstract to the practical, it produces generalizations that contradict the standard textbook conclusions, or fails to produce any general rules. The explicit implication of the Mundell–Fleming model is that flexible exchange rates and the greater effectiveness of monetary policy are associated with greater openness to trade; i.e., a higher import share in GDP. However, the algebra of the model shows the reverse to be the case.

Part V

Paradigm regained

Reclaiming policy

Main points

Chapter 15*: *Neoclassical inflation: keystone of reactionary policies

1 Neoclassical analysis interprets all changes in the general level of prices to be the result of changes in the supply of money. The simplest and most representative form of this analysis is the Quantity Theory of Money, in which money is valueless, its supply determined exogenously, velocity of circulation is constant, and there is only one commodity.
2 In the neoclassical one-commodity inflation process there can be no distribution effects of inflation or measurement complications associated with technical change.
3 For logical consistency, the neoclassical theory of inflation requires that the economy be in full employment general equilibrium.
4 Inflation should occur only at full employment, which implies there can be no conflict or "trade-off" between controlling the price level and increasing employment.
5 The neoclassical inflation analysis produces a narrow policy nihilism in which inflation control is the only macroeconomic goal.

Chapter 16*: *De-commissioning policy tools

1 The ideological message of the neoclassical macro model is that policy intervention is not necessary in a market economy. Fiscal policy should focus on balanced budgets, monetary policy should be governed by a non-discretionary rule, and exchange rates should float.
2 The purpose of this policy neutrality is to remove economic policy from public control and oversight, justified by pseudo-technical arguments and dismissal of democratic participation as "populism".
3 A capitalist economy fit for humanity requires rejection of the automatically adjusting neoclassical dogma and introduction of basic reforms to regulate markets in the public interest: countercyclical fiscal policy, public control of the financial sector, a basic income, and protection of the right for workers to organize.

Chapter 17: The critique summarized

The purpose of this book was to refute the fundamental macroeconomic "parables" of neoclassical theory:

1 an increase in employment requires a lower "real wage";
2 increases in the price level are proportional to increases in the money supply; and
3 in an open economy with a flexible exchange rate monetary policy is effective and fiscal policy is not.

15 Neoclassical inflation

Keystone of reactionary policies

15.1 Introduction

As for all areas of intellectual inquiry, economics responds to contemporary events. Rising price levels in most developed countries characterized the 1970s, something not experienced since immediately after World War II. This inflationary period was associated with the end of the international system of fixed exchange rates and dramatic increases in petroleum prices. As a result, macroeconomic textbooks published in the late 1970s and 1980s for the first time included lengthy presentations on inflation.

As a result of that emphasis, the previous version of this book devoted four chapters to variations on the neoclassical inflation theme, focusing on expectations as a key explanatory element (Weeks 1989, Chapters 12–15). By the late 1980s it was clear that inflation at rates experienced in the 1970s were a transitory phenomenon in the developed countries (see Box 15.1). One might think that the worldwide decline in inflation would shift the emphasis of mainstream theory back to employment and growth where it was in the 1950s and 1960s. Quite the contrary occurred. If anything, the neoclassical analysis of inflation shifted from emphasis to obsession.

As inflation rates across the globe declined, the neoclassical treatment of it altered. In the wake of the 1970s, it could be credibly argued that achieving employment and growth goals required reducing inflation, though the neoclassical analysis might not provide the appropriate policy response. By the mid-1990s the US inflation rate had fallen below 3 percent. Still to argue that inflation reduction was essential would be (and was) a case of the aphorism, “madness is carrying an argument to its logical conclusion”.

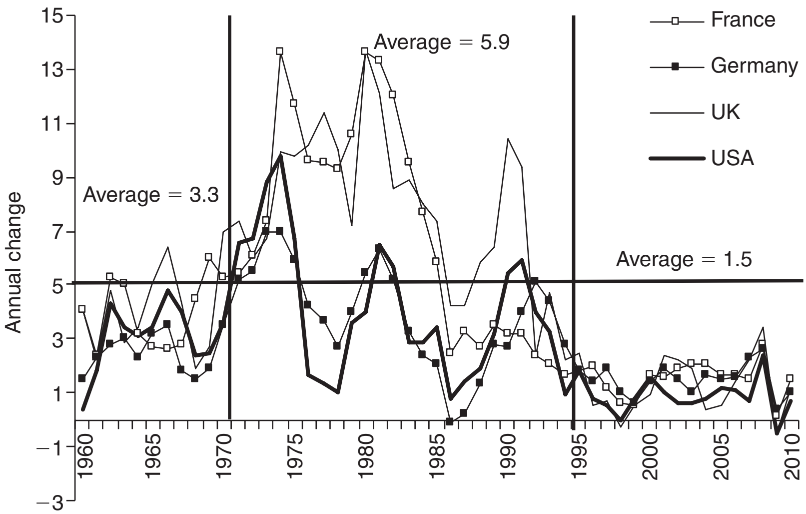
However, inherent in the neoclassical macroeconomic model was a general, all-purpose argument against any and all inflation. If market economies tend automatically to a full employment general equilibrium in which all agents are content, the only legitimate policy goal is to fight inflation, which is created by government mismanagement. It is this spirit of policy nihilism that drives the neoclassical analysis of inflation.

Box 15.1 Long-run movements in inflation rates

In the 1990s and 2000s great emphasis was placed on the role of governments and central banks in controlling inflation. One might think, therefore, that inflationary pressures represented a clear and pressing threat during these decades. The evidence is to the contrary.

During the 1960s the inflation rate averaged just over 3 percent across four major developed countries, France, Germany, the United Kingdom and the United States. In 1970 the US government made the bilateral decision to end its practice of guaranteeing the dollar price of gold, and during 1972–1973 the Organization of Petroleum Exporting Countries raised oil prices dramatically. Together these events ushered in an inflationary period that would last for two decades, 1970–1992, highest in the United Kingdom and France.

From 1994 through 2010, not one of these countries would have an annual rate of increase of consumer prices of 3 percent or higher. Enthusiasts for the "fight against inflation" might look at the last two decades and feel vindicated for winning a war. More convincing is that after the early 1990s the anti-inflationists were fighting a war in which the other side did not show up.



Annual changes in the consumer price index, four major developed countries, 1960–2010 (source: OECD, http://stats.oecd.org/index.aspx).

Note
Prior to 1990 "Germany" is the Federal Republic only.

15.2 The simple neoclassical inflation model

The basic elements for treating the neoclassical model of inflation were presented in Chapter 5. To keep matters simple, I use the false dichotomy model. So the reader does not have to turn back to that chapter, Figure 5.3 from Chapter 5 is reproduced with minor changes (Figure 15.3). To refresh memories, this model has a fixed supply of labor whose demand is derivative from an aggregate value added function (Parts 15.1a and 15.1b); a commodity market in which consumption and saving are a function of income and investment a function of the interest rate (yielding the IS curve in Part 15.1c); and a money market in which the demand for money is a function of the quantity of the commodity to be exchanged (Parts 15.1d and 15.1e). The final part of Figure 15.1 shows the money wage and the price of the commodity, which are implicit as a ratio in Part 15.1a.

The analysis begins at full employment equilibrium with a given money supply M^*. All markets clear at equilibrium levels, and the money supply dictates a nominal wage of W_1 and a price of the commodity of p_1. With only one commodity, it would be misleading to use the term "price level", which by convention is a term implying a composite measure of many prices. "Price" is the correct term to use in a one-commodity model.

Assume that the money wage rises from W_1 to W_o and cannot fall because of labor market "rigidities". With a money supply M^*, the implied price level will be p_o, employment n_o, and unemployment $(n_e - n_o)$. In this false dichotomy model aggregate money income is unchanged by the fall in employment and output. This is shown in Parts 15.1d and 15.1e, where M^* and the constant velocity of money alone determine money demand and supply, so $py^* = p_1 y_e = p_o y_o$. A rise in the money wage resulted in a rise in price. Before I interpret this rise in price two other cases are considered.

Assume that $W_o = 2W_1$, implying that full employment (n_e) can be restored if the money supply is doubled, $M^{**} = 2M^*$. If the money supply were increased to M^{**}, price would rise to p_2 and $p_2 = 2p_1$, bringing the model to full employment equilibrium. The diagrams can be used for a third hypothetical exercise in price increases. Once more let the initial situation be a full employment general equilibrium with the money supply equal to M^*, and the money supply doubles, to M^{**}. In this case the price would double, though no real variable would change because money is strictly neutral in the false dichotomy model.

In the three hypothetical exercises price rose. None of these involved inflation by the neoclassical definition. In neoclassical analysis a strict distinction is drawn between a "once-and-for-all" or "one-shot" increase in price and a "continuous" or "sustained" increase. The latter constitutes inflation; the former does not.[1] This distinction is purely idealistic. It applies only to an abstract, timeless general equilibrium model under "other things unchanged" assumptions. It has no relevance to actual economics; nor has it empirical content. In actual economies there are periods when a composite index of prices rises; that is inflation. There are also periods when the composite index of prices falls (much rarer); that is deflation. Finally, there are periods when the price level is more or less constant.

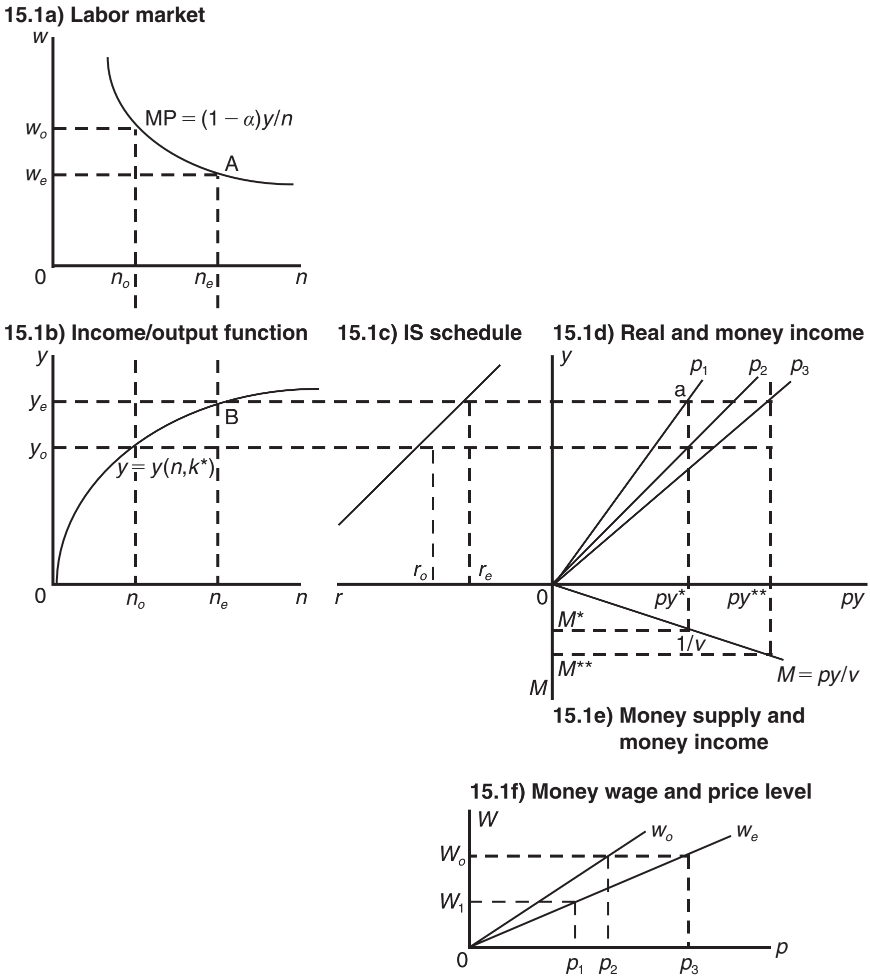


Figure 15.1 False Dichotomy model with a rigid money wage.

My objection is not trivial semantics. The distinction between "one-shot" price increases and "continuous" ones is essential to the neoclassical model. It is the key to treating inflation as a general equilibrium adjustment process, provoked and necessarily facilitated by a change in a government regulated money supply. This is a distinction without a difference. In a money-neutral model with a constant velocity, at full employment, an increase in the money supply will provoke an increase in price. Price will stop rising when all of the increased money is absorbed into circulation. In such a model, further increases in price require further increases in the money supply. Stating the proposition this way makes it clear that a "continuous" rise in price is nothing but a series of "one-shot" increases. The distinction between the two is arbitrary as well as ideal.

Neoclassical analysis has a purpose in this arbitrary distinction between the "once-and-for-all" and the "continuous". First, it implies that inflation is always a full employment phenomenon. Increases in the money supply that bring the model to full employment are "shots", not "continuous". Second, it lays the basis for a particular theory of inflation, that it is the result of expectations of the future, in particular the expectation of inflation itself. In the neoclassical view inflation is the result of agents acting in a manner which generates inflation as a result of them expecting there to be inflation (Weeks 1989, Chapter 14). Third, the distinction between "one-shot" and continuous price rises is essential to sustain the argument that money is a neutral "veil" over the system of real variables.

15.3 Defining inflation

In his Preface to *The General Theory*, Keynes refers to the "outstanding fault" of the theory in his previous book, *Treatise on Money*, "that I failed to deal thoroughly with the effects of *changes* in the level of output" (Keynes 1936, vi–vii, emphasis in original). This statement explains why his book was "general" and the theorizing done by those he called the "classicals" was not. When he treats inflation he delivers on his promise to analyze changes in the level of output:

> When a further increase in the quantity of effective demand produces no further increase in output and entirely spends itself on an increase in [prices] fully proportional to the increase in effective demand, we have reached a condition which might be appropriately designated as one of true inflation. Up to this point the effect of monetary expansion is entirely a question of degree, and there is no previous point at which we can draw a definite line and declare that conditions of inflation have set in. Every previous increase in the quantity of money is likely … to spend itself partly in increasing [prices] and partly in increasing output.
>
> (Keynes 1936, 303)[2]

The nuances in this passage and the clear reference to concrete outcomes can be contrasted with the neoclassical view of inflation, encapsulated in a much-quoted phrase of Milton Friedman, that "inflation is always and everywhere a monetary phenomenon".[3] For its banality the statement is perhaps exceeded by "there is no such thing as a free lunch", a quotation much used by Friedman though he was not the first to coin the phrase. This view of inflation is so dear to the hearts of neoclassicals that the "always and everywhere" quotation appears with alarming regularity despite is vacuousness. The enthusiasm it excites arises from its ideological message that price instability is caused by governments. This is made explicit by Fischer and Easterly, long-time bureaucrats at the IMF and World Bank, respectively:

> Milton Friedman's famous statement that inflation is always and everywhere a monetary phenomenon is correct … Rapid money growth is conceivable

> without an underlying fiscal imbalance, but it is unlikely. Thus, rapid inflation is almost always a fiscal phenomenon.
>
> (Fischer and Easterly 1990, 138–139)

The Fischer and Easterly endorsement touches another neoclassical ideological base, fiscal deficits. They thereby neatly combine two alleged policy sins, fiscal deficits and "printing money", into one.

Not withstanding this endorsement, considerable elaboration is required to convert Friedman's ideological cliché into a substantive analytical statement, and even more to link it to fiscal policy. If Friedman's statement means, "in a one-commodity system in which money itself has no value and its supply is determined by the monetary authorities, at full employment increases in the price of the commodity result from increases in the supply of money so defined and controlled", then it is correct but trivial. If it is intended to mean, "the price increases we observe are the result of the authorities increasing the reserves of the banking system (monetary base)", it is may be true or false, depending on economic conditions and the framework of interpretation. If it is intended to mean, as it certainly was, that "inflation results from governments printing money", it is wrong.

To understand why it is wrong and more generally the limitations of the neoclassical theory of inflation, it is first necessary to clarity the phenomenon that it seeks to explain. The following discussion refers to what I shall vaguely identify as "moderate" inflation. What is often called "hyper-inflation" is a separate phenomenon with its own causes and dynamics (see Box 15.2).

Frequent changes in the prices of commodities and services are a characteristic of a market economy. Price fluctuations are the mechanism by which capitalists allocate and re-allocate resources across sectors of an economy. The term "deflation" describes a fall in prices, and "inflation" a rise, though giving clear and rigorous meaning to these terms is not simple. In all economies people buy and sell many different commodities and services, and it is unlikely that all of these would simultaneously experience price increases or price declines.

Therefore, in practice the terms inflation and deflation always refer to a composite measurement of prices, a price index. A statement of the type, "inflation is an increase in the general level of prices," must always refer to specific aggregate measures of the prices of commodities and services. Even when referring to a specific measure, such as a consumer price index, this definition of inflation has ambiguities.

All price indices employ a weighting mechanism, and the consumer price index in most countries uses the quantities of the household with average (mean) income. Consumption patterns change substantially over the income distribution, with housing and food carrying heavier weights towards the lower end. The more unequal the distribution of income, the greater will be the number of households below the average. For example, in 2005 in the United States average income for people fifteen years and older was $25,500. The income level exactly halfway up the rank ordering of people was $24,300, more than $1,000 less. The

Box 15.2 Fears of hyperinflation

The specter of hyperinflation is frequently invoked to impress upon people the need to make price stability the macroeconomic priority rather than full employment. Those who urge extremely low inflation targets as policy goals frequently argue that any inflation is dangerous, rather like an unattended campfire in a forest: a little inflation leads to more, and soon inflation is out of control, ravaging the land like a wildfire.

This is quite an old argument and its proponents seek to give it verisimilitude by citing historical moments when inflation reached extreme levels. Favorite among these examples are Germany in 1923, the breakaway Confederate States of America during 1863–1865, and, more recently, Zimbabwe in the second half of the 2000s. All of these cases and other less known examples are alleged to have been the result of "printing money", with the printing presses rolling in response to so-called populist fiscal policies of feckless governments generating unsustainable public deficits.

The allusions to moments of hyperinflation are rarely accompanied by any rigorous analysis and almost never placed in their historical and social context. The hyperinflation in Germany after World War I was the direct result of the victors' demands for onerous reparation payments and occupation of part of the German industrial heartland. Runaway inflation in the American Confederacy, like the collapse in value of the Japanese-issued occupation dollar in Southeast Asia in 1944–1945, was the result of the expectation of military defeat.

Hyperinflation has been and will continue to be the result of extreme social and political stress, defeat in war, post-war political instability and civil war. It is not caused by "printing money". The printing of money is merely a symptom, such as the fever run by a flu victim. Issuing dire warnings about the consequences of inflation by reference to periods of hyperinflation is rather like seeking lessons for conventional warfare from nuclear holocaust.

Reference

www.wintersonnenwende.com/scriptorium/english/archives/articles/hyperinflation-e.htlm, Germany; Kratoska (1998), Southeast Asia; Doyle (2000), US Confederacy.

obvious implication is that a price index based on the behavior of the average household would be considerably more representative of the expenditure patterns of the rich than the poor. This means that inherent in price indices is considerable imprecision of measurement. Substantial inflation for one class of income earners may be trivial for another (see Muellbauer 1974a and 1974b).

A second ambiguity arises because different types of commodities and services have their prices determined in substantially different ways. The clearest example is for commodities and services that enter global markets ("tradables") and those that do not ("non-tradables"). Perhaps the most important of the former is petroleum, which is relatively homogeneous in quality and whose price is strongly influenced by the market power of producers. When the price of petroleum rises, this contributes to a rise in aggregate price indices, at the retail level (the price of gasoline) and indirectly (the prices of all commodities using it as a production input). Governments and central banks can do very little to prevent this component of inflationary pressure, which is also the case to varying degrees for all globally traded commodities and services.

Third, both traded and non-traded commodities and services include ones with prices constrained in the short run by contracts. These include housing and accommodation, as well as wage and salary levels. The importance and duration of these contractual constraints varies by country. They are a further limitation on the ability of governments and central banks to influence price levels over a short time period.

This discussion produces the obvious conclusion that governments and central banks do not in practice have the power to influence "the price level". To varying degrees they can influence components of the aggregate price indices. It should be obvious that these components are those with prices overwhelmingly determined in domestic markets that are relatively competitive. To take an example, in a country with a small and open economy, success in constraining the rise of aggregate price indices will be through non-traded commodities. Because the most important non-traded item is labor, the probable effect of successfully constraining inflation in an open economy is the compression of real wages. For this reason if no other, capital tends to be more enthusiastic about anti-inflation measures than labor.

In addition to distributional effects and the differences in the behavior of prices there is a third practical consideration affecting the theory, measurement and interpretation of changes in composite measures of prices, the qualitative changes in commodities. The term inflation refers to the behavior of prices in chronological time. In every economy as time passes qualitative improvement occurs for commodities and services. Price indices can be updated to include new products, but accommodating quality change is much more difficult. In 1996 an expert commission established by the US Congress, the Boskin Commission, estimated that the commonly used aggregate indices that *overestimated* actual price changes in the United States by from one-half to slightly over one percentage point per annum (see summary in Oulton 1998; and noted in Stiglitz and Walsh 2006, 124–125). This estimate indicates that when a composite price index shows a rate of change of zero, it should be interpreted as indicating deflation. To be specific, it means that the average rate of inflation in the United States during the 1990s and 2000s was not significantly different from zero (see Box 15.2).

The income distribution effects of price changes, the sensitivity of different prices to policy measures, and qualitative changes in commodities and services are not minor nuances. They are the essence of the inflation process and highly relevant for policy. Inflation is a process in which uneven increases in prices across commodities and services undergoing qualitative change have different consequences on households and businesses depending on their expenditure patterns.

Inflation is *not* "a general rise in the price level" that "reduces the purchasing power of money", as it is frequently defined. It is this analytically simplistic and empirically inappropriate definition of inflation that neoclassical economics enthusiastically adopts. This definition ignores all the important aspects of price changes that should be the focus of policy. Milton Friedman could write that inflation is a purely monetary phenomenon because the statement referred to a one-commodity economy with no technical change, eliminating the possibility of differential price movements, as well as excluding income distribution effects and quality change. When it has thus trivialized inflation, neoclassical theory still is unable to generate a coherent theory, as the rest of this chapter shows.

15.4 The neoclassical inflation hypothesis decoded

The formal theoretical statement of the neoclassical inflation hypothesis takes its simplest form in the famous "quantity equation", treated in previous chapters. The equation appears to state algebraically an obvious relationship between prices and money in circulation. On closer inspection the equation degenerates into an identity or triviality.

The definitional nature of the equation can be demonstrated by beginning with an obvious tautology, that the sum of all commodity transactions equals the sum of all means by which those transaction were realized. It is necessary to use the words "were realized" because a person can engage in an exchange by contracting a debt and promising to pay later. If I identify commodities by the subscript i and each transaction by the subscript j, by definition we obtain what I call the "transactions equation".

$$\Sigma[(P_i Q_i)_j] \equiv \Sigma \mu_j$$

P_i = price of commodity i

Q_i = quantity of commodity i

$P_i Q_i$ = transaction j

μ_j = the means of realizing transaction j

The equation merely states the obvious, that the sum of all transactions equals the sum of all means by which the transactions were carried out. Empirical measures of inflation use the left-hand side of the equation, defined over various categories of commodities and services at various stages of production and distribution, to obtain consumer, wholesale, producer and other composite price measures. The right side of the equation contains a great variety of means of purchase, cash, personal checks, credit card debits, and many others.

To convert this definition into a behavior relationship, neoclassical economics simplifies the transaction equation beyond recognition. Moving from left to right (as shown in Part I, especially Chapter 4), the neoclassical macro model assumes one commodity, noted as y. This reduces many prices times their quantities, $\Sigma[(P_i Q_i)_j]$, to one price times one quantity, py. The right side of the equation is similarly transformed. All the means of purchase are reduced into one, "money". If all the transactions take place simultaneously as in a Walrasian market day, the equation collapses into $py = M$. However, there is no need to assume that all transaction are simultaneous, because with only one commodity this is automatically the case. To give the simplistic simplification the appearance of real world relevance, I allow the fiction that there is more than one time period. Multi-periods result in the famous "velocity of money" (v), and the Equation becomes $py = vM$.

The neoclassical inflation hypothesis can now be rigorously stated. In a model with one commodity and a homogenous means of purchase, changes in price result from changes in the amount of money. Even if one accepts a homogeneous means of purchase ("money"), the hypothesis remains unconfirmed in logic. A change in price could result from a change in quantity or velocity as well as the amount of money. The converse also holds, that a change in money could result in a change in velocity or the quantity of output.

As explained in Chapter 4, the simple one commodity, one means of payment model is rendered even simpler by a constant velocity of money. Making this assumption leaves only two algebraic possibilities. Changes in money result in changes in quantity, or changes in price (or a combination). The neoclassicals could leave the analysis with this limited degree of flexibility. To do so would allow the inference that what happens to price when money changes is theoretically indeterminate. This would imply that the principle purpose of monetary policy need not be to fight inflation, and by the last decades of the twentieth century this was the keystone of neoclassical macroeconomic policy. Assigning overwhelming priority to fighting inflation would be inconsistent with empirically indeterminate outcome.

The analytical outcomes can be reduced to one, inflation, by the now-familiar assumption/belief that market economies adjust automatically to their maximum potential output (full employment). If it were the case that 1) an economy had only one commodity, 2) all purchases of that product were in one instrument ("money"), 3) the rate of turnover of that instrument were constant, and 4) the product was at its maximum quantity, then increases in the purchasing instrument would logically result in increases in the price of the commodity (though not necessarily equally proportionate increases).

The inflation-money conclusion is trivial. To be non-trivial, the theory must explain the meaning of full potential or full employment; show why many forms of purchase can be represented by one; and justify a constant velocity of the means of purchase. Clarifying these points makes the money-inflation hypothesis valid for one commodity. The task of generalization to a multi-commodity system would remain. This task need not be confronted, because the hypothesis flounders on defining full employment.

15.5 Neoclassical full employment

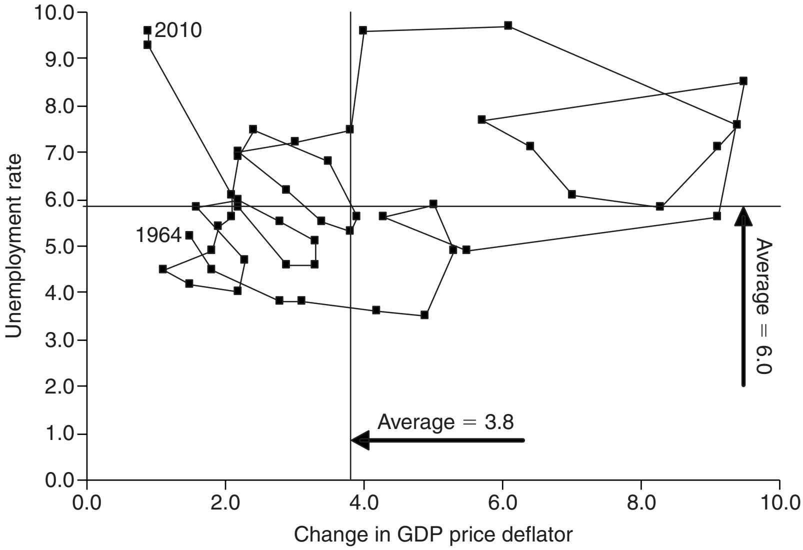
In the neoclassical framework inflation is by analytical necessity a full employment phenomenon because at less than full employment increases in the quantity of

Box 15.3 Is inflation a full employment phenomenon?

The hypothesis that inflation is the result of increases in the money supply, "too much money chasing too few goods", requires that an economy be at full employment (full capacity). If there were unemployment, price increases should be dampened by increases in output. Only once full capacity is reached would increases in the money supply be fully transmitted to increases in prices, approaching a proportional relationship. To state the process more technically, increases in the supply of money create an excess supply that will be eliminated by an excess demand for commodities. At full employment this excess demand cannot be met by an increase in quantity, so prices must rise. If money is neutral, the relationship is strictly proportional (see Chapter 4).

The scatter diagram offers a crude test of the Quantity hypothesis for the United States, 1964–2010, using the GDP price deflator as a measure of inflation and the civilian unemployment rate as a proxy for full capacity. If the average for both indicators is calculated (shown in the diagram), the hypothesis predicts that most of the forty-seven observations should lie in the quadrant of high unemployment and low inflation (upper left) and that for low unemployment and high inflation (lower right). The statistics show the opposite. Not even a majority of the observations lie in those two quadrants. The overwhelming majority, 38 of 48, lie in an approximately circular cluster, whose center would be slightly below the average values.

The scatter diagram suggests that inflationary pressures are not restricted to moments when unemployment is low, which casts doubt on the money-inflation hypothesis. It suggests that while measures of the money supply may be closely correlated with changes in the price level, causality may involve other variables.



US civilian unemployment rate and percentages changes in the GDP price deflator, 1964–2010 (source: United States Government Printing Office, *Economic Report of the President 2011*, tables B3 and B42).

money need not generate inflation. Experience shows that inflation occurs at different levels of unemployment even within the same country over a relatively short period of time, which would seem to contradict the neoclassical money-inflation story. This experience indicates a fundamental characteristic of market economies, that full capacity has various meanings and empirical manifestations. Neoclassical analysis has resolved this real world ambiguity by defining full employment with reference to inflation itself: inflation is a full employment phenomenon; therefore, when inflation occurs an economy must be at full employment.

This unenlightening syllogism gains a semblance of substance through introduction of the "natural rate of unemployment". The relationship between unemployment and money wage changes, and by extension unemployment and prices, can be investigated empirically in a straight forward manner. This was probably done first by Irving Fisher in the 1920s (Fisher 1926), though the empirical relationship is known as the Phillips Curve, after an article published by A. W. H. Phillips in 1958 (Phillips 1958). Phillips' hypothesis was a simple one: a low rate of unemployment is associated with excess demand for labor; an excess demand for labor will generate upward pressure on money wages; and rising money wages will provoke businesses to raise prices.

The Phillips hypothesis is shown in Figure 15.2, with the rate of change of the price level measured on the vertical axis (p) and unemployment on the horizontal axis (u). With regard to causality, Phillips hypothesized that tight

Table 15.1 The trivialization of inflation

1 $I_{pt} \equiv \Sigma[(P_{it}Q_{io})]/\Sigma[(P_{io}Q_{io})]$	Price index, a definition: the composite price level (I_p) in period t measured by using quantities in period zero (Laspeyres method)
2 $\Sigma[(P_iQ_i)_j] \equiv \Sigma\mu_j$	Convert numerator and/or denominator into a definition, the "transactions equation"
3 $\Sigma[(P_iQ_i)_j] = vM$	Assume only means of purchase, M, whose amount is set by the "monetary authorities", and is used v number of times each period which is a constant, a behavioral equation
4 $py = vM$	Assume the economy has only one product, y, whose price is p; both p and y can change, but py is a constant because vM is constant
5 $p = vM/y$	Assume the output of y is at its maximum value, which implies than only p and M can change. It follows that inflation ($\Delta p/p$) is the result of the "authorities" increasing the money supply. Therefore, "inflation is always and everywhere a monetary phenomenon" (Friedman 1970).

Notes

P is the price of a commodity or service, Q is the quantity, i specifies the item ($i = 1, 2, \ldots n$), j is the transaction P_iQ_i (amount spend on item i), μ_j is the means by which P_iQ_i was purchased (cash, check, credit card, etc), M is a homogenous means of purchase ("money"); and v is the "velocity of money" (constant).

labor markets were the cause of inflation by generating higher money wages that would lead to higher prices. In the neoclassical rendition causality is reversed. The hypothesis of Phillips was strictly *empirical*, and he came under sharp criticism for allegedly not supplying an adequate theoretical explanation of the relationship. By treating Figure 15.2 as an empirical relationship, one can say that there is by definition an excess demand for commodities to the left of unemployment rate u^* (prices rise), and an excess supply to the right of that rate (prices fall).

The problem with this apparently obvious approach is that positive or negative excess demand for commodities does not in itself imply what conditions prevail in the labor market. Wage increases may not be the cause of price increases. Both may result from the operation of some third variable not represented on the two-dimensional diagram, such as a temporary shortage of a non-labor input. The presumption that wage increases are the only possible cause of price increases requires specific assumptions.

The argument is sometimes made that price inflation can be reduced to wage inflation because "labor costs represent a fairly stable proportion of total costs" (Parkin 1984, 300). This is an ad hoc argument with no obvious theoretical basis. Strictly speaking, the link from wage increases to price increases is valid only in a one-commodity model with no non-labor inputs. This conclusion cannot be generalized to a multi-commodity system without additional assumptions or analytical linkages. As one frequently finds, Keynes was not so naive or analytically narrow as to take this labor cost approach to inflation.

> [I]n general, the demand for some services and commodities will reach a level beyond which their supply is, for the time being, perfectly inelastic, whilst in other directions there is still a substantial surplus of resources without employment. Thus as output increases, a series of "bottle-necks" will be successively reached, where the supply of particular commodities ceases to be elastic and their prices have to rise.
>
> (Keynes 1936, 300)

Neoclassicals swept aside arguments over causality and the commonsense of "bottle-necks" by the practice of treating wages and prices are the only relevant variables, rendering the complex multi-product world into the neoclassical special one-commodity case. Figure 15.3 represents the Phillips hypothesis reinterpreted by Friedman. The unemployment rate is measured on the horizontal axis (u), and the inflation rate on the vertical ($p = \Delta P/P$). The analysis begins by postulating a unique and stable rate of unemployment for which the rate of change of inflation is zero. For this unemployment rate any given inflation rate has no tendency to increase or decrease. Friedman named this "the natural rate", and was treated in Chapter 9, Section 3. Let this "natural" rate be u^* or point A in Figure 15.3. Through u^* passes line SFC1, a short-run Friedman curve. This curve, SCF1 has the characteristic that economic agents anticipate a zero rate of inflation.

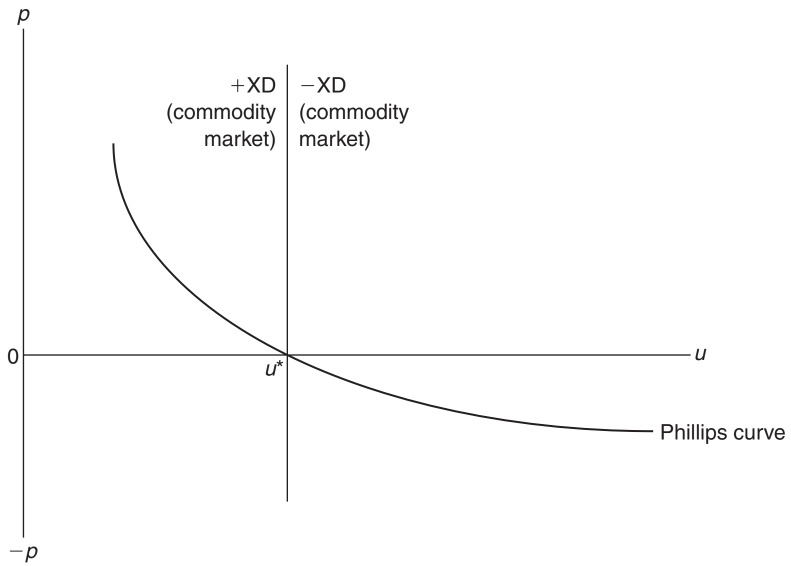


Figure 15.2 Inflation as a function of unemployment (the Phillips hypothesis).

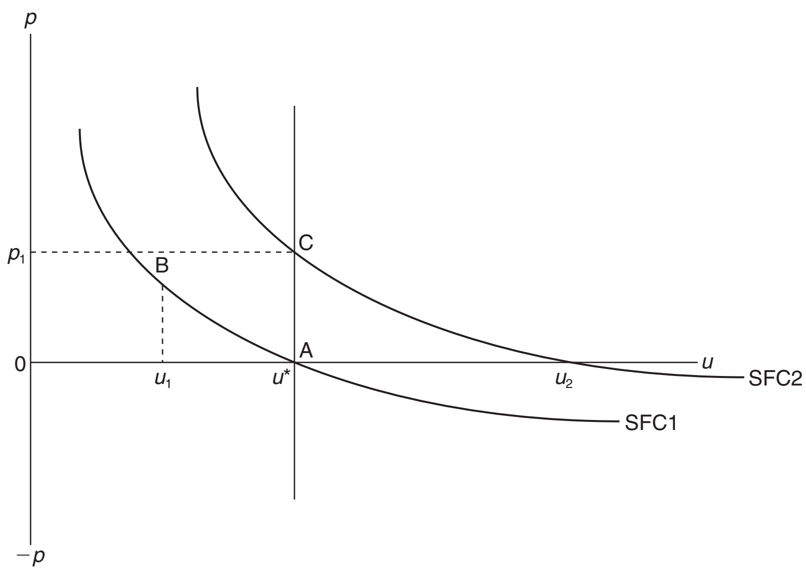


Figure 15.3 Unemployment as a function of inflation (the Friedman hypothesis).

Next, assume that workers individually or through their trade unions bargain for a money wage that clears the labor market. Finally, define the unemployment rate associated with a zero rate of change of inflation to be the unemployment rate consistent with clearing of the labor market. In other words, u^* is the full employment rate of unemployment, though there is no analytical evidence to support this; it is an assertion.

The analysis begins at point A, with the labor market in equilibrium, and a zero rate of inflation is anticipated by all agents. Let there be an *ex machina* unanticipated increase in the price level. If money wages are constant, the real wage falls. The fall in the real wage induces firms to increase employment. This reduces the unemployment rate to u1, shifting left along SPC1. Dissatisfied with a lower real wage, workers demand a higher money wage to compensate themselves. The bargain for the new money wage will be such as to regain the "natural rate of unemployment", u^*. A new short-run Friedman curve is established, SFC2, based on the expectation of a rate of inflation of p1. The adjustment process is from equilibrium at zero inflation (point A) to a disequilibrium with inflation (point B), to equilibrium with inflation (point C). The implication of the story is that any unemployment rate less than the "natural rate" will quickly result in a return to the "natural rate".

The purpose of the Friedman Curve is to undermine arguments for public policy intervention. It alleges that inflation results from the government expanding demand in a misguided attempt to reduce the rate of unemployment. By stimulating inflation and lowering the real wage, expansion of aggregate demand will lower the unemployment rate, but the result is unsustainable, and by implication "unnatural". Further, lower temporary unemployment is purchased by inflation. To keep unemployment below its "natural" level an accelerating rate of inflation is required. Each rate of inflation calls forth an increase in the money wage to match it, so the SFC shifts continuously upwards.[4]

The Friedman hypothesis might appear a strong critique of expansionary fiscal and monetary policy. It asserts that at best these interventions only reduce unemployment momentarily at the cost of inflation. This reduction is "unnatural" because it is in conflict with the maximizing behavior of workers and employers, and contradicts efficient market outcomes.

Closer inspection reveals that the result is a trivial conclusion derived from an obfuscating re-statement of a special case. It is trivial because the analysis assumes what it claims to prove. If an economy is continuously and automatically regaining full employment equilibrium, it is obvious that expansionary public policies are not needed. There is absurdity in the triviality: policy intervention seeks to achieve full employment, and the Friedman hypothesis assumes that the economy is always there and with great self-importance concludes that intervention is useless.

The faux-analytical result is a special case because the "long-run Phillips Curve" is vertical if and only if money is neutral. If money is not neutral, increasing the money supply at full employment causes a monetary expansion that will change the equilibrium rate of interest. This change can affect the supply curve of labor, shifting point u^* even if the “natural rate” hypothesis were accepted as valid (see Chapter 8) as well as changing the distribution of demand between investment and consumption.

The Friedman-augmented Phillips Curve appeals to neoclassicals because it seems to resolve the problem that in theory inflation should only appear at full capacity, and in practice occurs at various levels of unemployment. By assuming economies are always in full employment general equilibrium, the resolution abandons any pretense to analyze the levels of output and employment. It tells us nothing more than when output cannot rise, increases in the money supply provoke price rises. Even this trivial conclusion applies only in the Walrasian special case of continuous general equilibrium, because of the contradiction between Walras’ Law and the Quantity Theory. Further, the assumption of a unique “natural rate of unemployment” is wrong, because in general money is not neutral.

Finally, the concept of full employment and its familiar the “natural rate of employment” betray a systemic refusal to consider economies as they are. If meant as an actual number, “maximum output” and “full capacity” are purely ideal concepts. In reality many factors determine how much can be produced at any time. The labor force can vary because of changes in the level of employment itself, as well as changes in participation rates.[5] How much output can be obtained from the installed capacity at any moment is an empirical outcome that can only be estimated *ax ante*.

Further, this empirically determined full capacity can be greater than, less than or equal to full employment of the labor force in the narrow numerical sense. For example, when labor is in short supply, private employers can introduce overtime and multiple shifts to increase production without hiring more employees. Analogously, local or economy-wide shortages of key non-labor inputs such as electricity generation may set a short-term limit to output though labor of most skill categories is in excess supply.

There is nothing “natural” about unemployment or its level. Nor is there a “natural” level of output, not even a level which is determined by economic parameters. In a market economy the levels of output and employment are in part policy variables, determined by choices made by governments. The empirical estimation of the relationship between labor market pressure and inflation is important for an informed macroeconomic policy. Equally important is the estimation of the aggregate productive capacity of the economy. Both are key components in macroeconomic models to guide policy in central banks and the government agencies than manage fiscal policy. Defining these as natural phenomena produced by the automatic adjustment of an economy that is continuously at full employment is little more than ideology.

15.6 The theory that isn’t there

In Chapter 4 the reader might have been startled by the discovery that neoclassical economics has no coherent explanation for the existence of money. This failing leads to another that may be equally surprising: it has no theory of inflation. Neoclassical economics has no theory of inflation because it denies its existence, and a theory cannot be produced for a phenomenon whose existence the theory denies.

The non-existence of inflation in neoclassical economics results because its macro-economy is a self-regulating system that continuously seeks full employment through barter exchange. In this system commodities have nominal prices that are a veil over barter exchange (money is neutral). It would be difficult to design a framework less appropriate for explaining the behavior of prices in a modern economy. When to this general equilibrium system is added the inability to specify money in a manner that can be generalized to real exchange, the task of explaining inflation is impossible.

In place of analyzing the real phenomenon, neoclassical theory offers an idealized surrogate consistent with the limitations of its framework, one commodity general equilibrium inflation. Analogously to degenerate solutions in linear programming, one commodity general equilibrium inflation might be defined as a degenerate solution. Even this degenerate case proves impossible to formulate without ad hoc interventions. The most important of these is defining the money supply as being under the control of a monetary authority. Accepting this definition is not sufficient to produce a logical analysis, because of the contradiction between the Quantity Theory and Walras' Law (see Chapter 4).

The apparently simple statement, increases in the money supply generate equal proportional increases in prices, is the essence, the *sine qua non*, of neoclassical inflation theory. The conditions under which this statement is logically true are so restrictive that by any rational judgment the statement is false. These are listed below along with the reason for each.

1 The economy produces one commodity so there are no differential price changes.
2 There is no technical change, thus excluding quality change and new products.
3 All means of exchange can be reduced to one homogenous and valueless money.
4 The velocity of the homogenous means of exchange is constant, which excludes hoarding of money or the commodity.
5 The production of the commodity is at its maximum, thus preventing any output change in reaction to changes in the quantity of money.
6 The economy is in continuous general equilibrium eliminating the conflict between the Quantity Equation and Walras' Law and making money neutral.

Perhaps the most striking characteristic of the neoclassical inflation parable is that it proves so difficult to formulate with logical consistency. Even more than the real wage and employment parable, the money and inflation one seems so simple as to be obvious: more money in circulation makes prices go up. In both logic and practice this putatively simple parable is false, because neither of the principle concepts, money and inflation, can be consistently specified by the theory.

The first and most fundamental difficulty with the inflation parable is that it is based upon an unsubstantiated hypothesis: that the amount of money available for commodity transactions is independent of the level of output. Simply put, the inflation parable requires that there be an exogenous money supply under the control of the monetary authorities. To begin by assuming this to be the case is to assume what must be proved.

15.7 Why is inflation a problem?

The obvious and not-so-obvious failings of the neoclassical theory of inflation do not imply that movements in prices are an unimportant macroeconomic policy issue. By treating inflation as a phenomenon in a system that automatically adjusts to achieve full employment, the neoclassical analysis dictates a clear and dysfunctional policy rule, that fighting inflation should take priority over all other goals. It is this practical policy conclusion that makes the money-inflation hypothesis so pernicious.

A rational public policy would first focus on management of the price level, not inflation. This means it would be concerned with the consequences of deflation as well as inflation. This management would follow several practical guidelines. First, at the aggregate level, price level policy should be consistent with other macroeconomic policy goals, namely employment and growth. If the over-riding goal of policy is employment, then the rate of change of the price level could be treated as a flexible constraint to achieving that outcome. Second, underlying the aggregate impact of price changes are distribution effects of several types, among households, across enterprises by size, and among sectors of the economy.

These considerations would indicate the appropriate policy instruments for implementing management of the price level. Among the available and effective instruments in an advanced economy are the various tools of the central bank, administrative price controls, rationing and in some countries use of commodity stocks. An example of the last is the Strategic Petroleum Reserve in the United States, which in May 2011 held about one month's supply. The choice of one or more of these would be determined by the forces generating inflation (or deflation) at a specific moment.

In neoclassical analysis all changes in an aggregate price index have the same cause, too much money in circulation. This approach, in which the central bank interest rate is a hammer and every inflation a nail, severely misrepresents the policy choices facing governments. Breaking out of the money-inflation parable is essential to rational policy-making, which I elaborate in the next chapter.

16 De-commissioning policy tools

16.1 Introduction

This book showed that macroeconomic analysis divides into two broad theoretical approaches, the demand-constrained and price-constrained frameworks. *A price-determined economy* is either in a unique full employment general equilibrium, or prevented from achieving that general equilibrium by private or public price "distortions". *An economy is demand-determined* when its level of output is limited by one or all of the components of aggregate demand: consumption, private investment, government expenditure, or exports.

What appears as an intellectual division is the ideological manifestation of the fundamental political struggle in almost all advanced capitalist societies, between the tiny minority that controls production and finance, and the vast majority that work for the minority. The price determined framework is non-credible to the point of absurdity and beyond. In no other intellectual discipline would such a chaotic collection of logical inconsistencies and arbitrary assumptions be taken seriously. The price-constrained framework is based on an unambiguously false premise: that the normal condition of capitalist economies is full employment. Yet, the price-constrained framework dominates mainstream economics, the media and political debate. The demand-constrained framework, as obviously sensible as its opposite is absurd, has been relegated to the margins of the discipline.

This inversion, in which the absurd is embraced as science and science is dismissed as absurd, reflects the great victory of the minority over the majority during the final decades of the twentieth century after a brief interruption during the middle of the century (Foley 2006). For almost 60 years, 1870–1930, a relatively primitive form of the price-constrained framework dominated the emerging economics profession. During the early stages of development of this framework, the undisguised purpose of leading economists was to refute Karl Marx and justify capitalism.[1]

Two great human disasters prompted a rebellion against the free market doctrine, the Great Depression and World War II. It was obvious to all that the first resulted from the excesses of a capitalism unconstrained by public regulation. The second was the consequence of the first. Denying this chain of causality requires considerable intellectual invention. By the end of the war a broad consensus emerged in Europe and North America that the excesses of capitalism demanded strict regulation of markets, and especially of the financial sector. This consensus could be found in the most prestigious journal of the profession, the *Economic Journal*, where K. W. Rothschild asserted that fascism was the fruit of unregulated markets:

> [W]hen we enter the field of rivalry between [corporate] giants, the traditional separation of the political from the economic can no longer be maintained. Once we have recognised that the desire for a strong position ranks equally with the desire for immediate maximum profits we must follow this new dual approach to its logical end.
>
> Fascism … has been largely brought into power by this very struggle in an attempt of the most powerful oligopolists to strengthen, through political action, their position in the labour market and vis-à-vis their smaller competitors, and finally to strike out in order to change the world market situation in their favour.
>
> (Rothschild 1946, 317)

It is now clear that the minority that controlled production and finance considered this consensus a temporary arrangement to be destroyed as soon as possible, because its main economic consequence was to limit the freedom of capital. Those who judged the post-war regulated capitalism as a new norm would be quickly proved wrong. The system of international regulation of exchange rates ended in 1970, deregulation of the financial sector in the United States and parts of Europe began in the 1980s, and the political base for a managed capitalism, the trade unions, fell into secular decline in most advanced countries. The collapse of the Soviet Union complemented these trends, eliminating the global rival to unmanaged capitalism.

The purpose of destroying the post war regulatory consensus was to liberate capital from civilizing constraints. The macroeconomics of Keynes and those he influenced provided both the theoretical explanation for why these constraints were needed and the practical policy tools to manage an economy within those constraints. The "Keynesian revolution" briefly institutionalized the singularly sensible principle that governments have policy tools that they can use to pursue the welfare of the populations they were elected to serve. The most important of the tools are fiscal policy, monetary policy and management of the exchange rate. The active use of all these tools was implied by another sensible proposition, the Tinbergen Rule, that achieving several policy goals requires an equal number of policy instruments.[2] For example, a government seeking internal and external stability would use fiscal policy to reach a desired unemployment rate, monetary policy to make that unemployment rate consistent with a target inflation rate, and adjust the exchange rate to maintain a sustainable balance of payments.

The obviously sensible proposition that governments should use the tools available to them to pursue the public welfare, while enforcing constraints on the excesses of capitalism, would be discredited by repeated ideological attacks beginning in the 1970s. The constraints would be dismantled and tools de-commissioned by increasingly reactionary governments. Against weak internal opposition the economics profession would provide the ideology for the de-commissioning of the policy tools to support those constraints.

16.2 De-commissioning fiscal policy

Until the Great Depression of the 1930s macroeconomic policy in the advanced countries meant monetary policy, with exchange rates tied to an international gold mechanism and fiscal policy constrained by the goal to balance public budgets. Fiscal policy was used by a few governments during the depression, notably in the United States, but in an ad hoc manner. Perhaps the first clear legal commitment to an active fiscal policy was the US Full Employment Act of 1946, the preamble of which states,

> The [US] Congress hereby declares that it is the continuing policy and responsibility of the Federal Government to use all practicable means ... with the assistance and cooperation of industry, agriculture, labor, and State and local governments ... to promote maximum employment, production, and purchasing power.

In the early 1970s, elements in the economics profession would initiate an assault on this legal commitment, with an analytical de-commissioning of fiscal policy. The de-commissioning story was developed in detail in Parts I and II. In the simple case of a closed, price constrained, one-commodity economy with no public sector, all markets clear in an instantaneous process. No exchanges occur at prices other than those in the price set that would prevail at full employment general equilibrium (no "false trading"). Consumers and producers take prices as "signals" to determine the quantities they buy and sell. In this system governments have no role except the enforcement of contracts and keeping public order.

Thus, the first argument to de-commission fiscal policy is that it is unnecessary. It cannot contribute to employment, which would achieve its maximum possible value automatically. However, this is a rather weak argument against fiscal policy, if the economy is plagued by unemployment. The argument that an active fiscal policy is unnecessary is reinforced by two mutually complementary arguments, that the unemployment one observes is almost entirely voluntary, and an active fiscal policy would make unemployment, voluntary or involuntary, worse.

Pre-Keynesian economists argued that the unemployment one observes is voluntary, the result of minimum wages and trade union pressure in labor negotiations. The membership and economic strength of trade unions declined in most advanced countries, and problems of enforcement and erosion through inflation made minimum wages a weak reed for a general theory of voluntary unemployment. Unemployment compensation itself, a major reform arising from the Great Depression, offered an alternative explanation: unemployment persists because payments to the unemployed reduce the incentive to seek work, an argument that would garner the Nobel Prize in Economics in 2010. The argument carries great political power, because it converts involuntary misery into willing avoidance of work, and cautions that well-meaning reforms make matters worse.

The combination of Walrasian general equilibrium and benefit-induced unemployment are necessary elements to de-commission fiscal policy. The sufficient argument is that active fiscal measures, even if they were to temporarily reduce unemployment, are intrinsically undesirable. An active fiscal policy is rendered undesirable through three complementary and equally fallacious arguments, all focusing on public sector deficits: direct crowding out of private expenditure, inflationary impact and reduction of private confidence.

The possibility that a fiscal expansion might directly reduce private expenditure (crowding out) would be realized through a rise in interest rates. As explained in Chapter 12, if the economy is below full employment, the extent of crowding out depends on how a fiscal expansion is financed and the elasticity of investment with respect to interest rates. In a recession the latter will be low, and crowding out is completely avoided by monetizing the fiscal expansion. The fiscal-expansion-causes-inflation argument is in part designed to rescue the crowding out argument. Financing through bond sales is rejected because of its putative impact on interest rates and private investment. The alternative method of finance, monetization, is slandered as "printing money" and alleged to invariably cause inflation.[3] The neoclassical macro model unambiguously concludes that an increase in the money supply when an economy is below full employment increases output, and the accompanying increase in the price of output is not by any definition inflationary, but a necessary adjustment to a lower real wage (see Chapters 5 and 6).

One is left with the private sector confidence argument, whose great strength lies in its vagueness, making it almost impossible to refute. In 2010 the right-wing British government presented this argument under the imaginatively oxymoronic title of an "expansionary fiscal contraction". The essence of this and similar arguments against fiscal policy is that the public sector deficit and the debt it creates themselves are a direct cause of the reduction of private sector "confidence", which results in a fall in private sector investment. At the end of the 2000s and into the following decade, the marginally more plausible crowding out argument could not be made because nominal interest rates were close to zero and could not fall further.

The more respectable version of this anti-deficit argument suggests that private agents consider that a fiscal deficit is equivalent to a future tax increase, and reduce their expenditures accordingly (so-called Ricardian Equivalence).[4] Even were this the case, the increase in the individual tax burden would be very low, as well as discounted into the future. Irvin demonstrated the absurdity of this argument, pointing out that it opportunistically stresses the cost of public borrowing while ignoring the cost of the output foregone in the absence of a fiscal stimulus.[5] All such arguments against public deficits and debt fail to accept that the public bonds held by the private sector are income generating assets. If they represent outside wealth (see Chapter 7), then they should stimulate private expenditure. If the Ricardian Equivalence holds, then they are inside wealth and cancel themselves out.

These ideological arguments against an active fiscal policy have supported political moves in the US Congress to restrict the federal government from deficit finance, such as the Budget Enforcement Act of 1990. The essential purpose of this and other legislation to restrict public sector deficits is to remove fiscal policy from the democratic process, however flawed that process may be. The de-commissioning of fiscal policy becomes presented as a technical measure, designed to prevent irresponsible politicians from embarking on "populist" vote-buying expenditure programs that undermine the general welfare (Dornbusch and Edwards 1991). The minority that controls production and finance had made considerable progress in de-commissioning fiscal policy by the second decade of the twenty-first century. In the case of monetary policy its de-commissioning was almost complete.

16.3 De-commissioning monetary policy

One of the few progressive aspects of US economic policy institutions is the legislatively mandated political oversight of the central bank, the Federal Reserve System (FRS). This oversight is through required reports to Congress, which typically take the form of testimony by the FRS chairman. In addition there is a requirement that the board of governors of the Federal Reserve System have "fair representation of the financial, agricultural, industrial, and commercial interests and geographical divisions of the country". Perhaps more important, the Federal Reserve System has a mandate that requires it to consider employment as well as inflation: "to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates" (Mishkin 2007). In practice the effectiveness of the political oversight has waxed and waned, depending on the chairman and the politics of the time.

Conventional wisdom holds that in the final decades of the twentieth century the power of central banks increased dramatically in almost all countries, including the United States. The truth is quite the opposite. The role of central banks in most countries, advanced and underdeveloped, narrowed substantially towards the end of the twentieth century. The vehicle for this narrowing was their so-called operational independence.

The inherently reactionary nature of neoclassical economics is manifested in a broadly held preference in the profession for the complete separation of central banking from political oversight. This predilection is justified by the argument that without independence, governments will force central banks to pursue reckless monetary expansion to fuel populist fiscal policy. Vindication of this argument is found in evidence allegedly showing that the more independent a central bank, the lower the inflation rate in a country (Grilli *et al.* 1991; Crowe and Meade 2008).

The so-called independence of central banks, a dogma zealously pursued by the International Monetary Fund, is profoundly anti-democratic. The essence of the argument is that monetary policy is a technical matter, and any degree of democratic oversight results in reckless and irresponsible policies. As for fiscal policy, monetary decisions are not a matter for public involvement. They should be under the dictatorship of a technical elite.

16.4 Who decides policy?

As shown Chapter 14, the neoclassical version of an open economy reaches the conclusion that flexible exchange rates automatically bring external balance, leaving governments free to concentrate fiscal and monetary policy on domestic goals. However, an active fiscal policy is rejected as unnecessary (the domestic economy will correct itself automatically) and counter-productive (deficits crowd out private expenditure). While monetary policy is necessary, its focus should be control of inflation. Taken together, these allegedly technical arguments produce a profoundly reactionary program of public sector inaction.

The reactionary program is especially pernicious because it need not be defended on its intrinsic merits. Its ultimate justification is the infamous TINA principle: there is no alternative. The theoretical conclusion that flexible exchange rates stabilize economies may prove wrong, but would be of no practical consequence because there is no alternative. A balanced public budget may have a pro-cyclical effect on the economy, depending recessions and exaggerating booms, but deficits would produce worse outcomes. Using monetary policy in the single-minded pursuit of lower inflation may result in persistent unemployment and slow growth, but failing to do so courts disaster. Balanced budgets, low inflation and flexible exchange rates are all necessary to prevent adverse reaction in “financial markets”, discussed in the next section.

This book has demonstrated that the power of these arguments comes from their repetition, not from their theoretical or empirical validity. They are all based on a theory that is internally contradictory and ideologically driven. Prior to summarizing the critique in the final chapter, the fog of neoclassical ideology can be cleared in a simple manner. The fundamental issue in a democratic society is not whether inflation, deficits or unemployment are too high or too low. The fundamental issue is, who decides? The general rule in democratic societies is that experts advise and democratically elected representatives decide. Mainstream economics provides the ideological foundation for canceling that rule for social policy: elected representatives enact laws that make the advice of neoclassical experts legally binding. Thus, the danger that the many will pressure for policy that limits the privileges of the few is minimized.

16.5 Capitalism fit for human life

There is an alternative to the Hobbesian neoclassical world in which the capitalist minority defines and limits social and economic policy.[6] As happened in the

1930s in the United States, the crisis of the 2000s demonstrated that a range of government actions could be effective to rescue national economies from collapse. The experience of the United States and Western Europe after World War II, during the so-called golden age of capitalism, suggests what the component parts of the alternative must be. The reconstruction of that managed capitalism will require the reassertion of the strength of the trade unions in the advanced countries.

Controlling capitalism would require four fundamental reforms, whose purpose would be to severely restrict the economic and political power of capital.[7] First, because capitalist economies do not automatically adjust to full employment, governments must institutionalize an active countercyclical macroeconomic program. The active element in the countercyclical program would be fiscal policy, supported by an accommodating monetary policy, and, if necessary, with exchange rate management and capital controls to stabilize the balance of payments.

Countercyclical policies, and many other sensible and humane economic measures, are dismissed as impractical because of the alleged effect they might have on "financial markets". This personification of markets, universal in the media and appallingly common in the economics profession, is an essential part of the justification of a capitalist economy free from the constraints of democratic oversight. This personification is applied across all types of markets, as if the market itself were an independent actor in society. In the twenty-first century it became integral to the justification of a socially dysfunctional financial system, national and global.

This personification, an ideological abstraction from the real world of speculators and financial fraud, is an essential part of the mystification of financial behavior. It facilitates the mythology that the dysfunctional financial system is not the work of men and women (mostly the former) within institutions that have socially irrational rules and norms. It promotes the disempowering argument that financial dysfunction is a manifestation of the inexorable operation of the laws of nature that no government can change. It seeks to hide that specific financial speculators wish to coerce governments to take actions in their narrow economic interests.

While it is in the interests of capital to exaggerate the power of finance, the dire warnings about the behavior of financial markets carry some truth. The solution to this threat to humane macroeconomic policies is to tame those markets, not to yield to them. The manner to tame them is public control of the financial sector. In part this could be through direct nationalization, and in part by conversion of financial activities into non-profit or limited profit associations such as mutual societies and savings and loan institutions (building societies). Even in the United States, the heartland of minimalist public regulation, non-profit and limited profit financial institutions have been common in the past.

Third, government regulation of internal markets would be based on the principle of the International Labour Organization that "labor is not a commodity".[8] The purpose would be to eliminate unemployment as a form of labor discipline.

The most effective method to achieve this would be a universal basic income program.[9] A properly designed universal income program would facilitate labor mobility, by reducing the extent to which people were tied to their specific employer. Also, by reducing the volatility of household income, it would provide an automatic stabilizer at the base of the economy, the labor market. It would be similar to the automatic stabilizing effect of unemployment compensation, and more effective.

Fourth, and the basis for all of the others, would be the protection of workers' right to organize. The program of fundamental reform of capitalism would be based on the political power of the working class, in alliance with elements of the middle classes. This is the political alliance that brought about major reforms throughout Europe after World War II. An effective reform of capitalism that eliminates its economic and social outrages requires a democracy of labor and its allies in which the political power of capital is marginalized.

For three hundred years a struggle has waxed and waned to restrict, control or eliminate the ills generated by capitalist accumulation: exploitation of labor, class and ethic repression, international armed conflict, and despoiling of the environment. When a progressive majority has allied, this struggle has taken great strides. When capitalists, the tiny minority, have been successful in creating their own anti-reform and counter-revolutionary majority, much is lost. The last thirty years of the twentieth century and into the twenty-first was such an anti-reform period during which capital achieved a degree of liberation it had not enjoyed since before the Great Depression. With the rise of capital many of the more absurd elements of neoclassical economics, such as the alleged stabilizing effect of financial speculation, manifested themselves in reality, as nature imitated bad art.

At the beginning of this chapter I pointed out that the sufferings caused by the Great Depression of the 1930s, quickly followed by the horrors of World War II, generated a broad consensus in the developed countries. This consensus agreed on the need for public intervention to protect people against the instability and criminality that results from the accumulation of economic and political power by great corporations. Franklin D. Roosevelt, four times elected president of the United States, had this dangerous power in mind when he addressed the US Congress in 1938:

> Unhappy events abroad have retaught us two simple truths about the liberty of a democratic people. The first truth is that the liberty of a democracy is not safe if the people tolerate the growth of private power to a point where it becomes stronger than their democratic State itself. That, in its essence, is fascism – ownership of government by an individual, by a group or by any other controlling private power. The second truth is that the liberty of a democracy is not safe if its business system does not provide employment and produce and distribute goods in such a way as to sustain an acceptable standard of living. Both lessons hit home. Among us today a concentration of private power without equal in history is growing.

The advanced industrial countries, especially the United States and the United Kingdom, reached the point early in the twenty-first century in which private power was stronger than “their democratic state”. This private power manifested itself in unconstrained corporate power that over-rides democratic decisions, justified by an ideology of self-adjusting markets. Rejection of that ideology and fundamental reform of those markets is required to prevent unconstrained corporate power from a latter-day fulfillment of Roosevelt’s warning against fascism.

17 The critique summarized

17.1 Purpose of this book restated

The purpose of this book has been to analyze critically neoclassical macroeconomics *as it is taught.* The presentation went into considerable detail, and the reader might lave lost track of the basic message, especially in the political argument of the last chapter. The basic purpose was to refute the fundamental macroeconomic "parables" of neoclassical theory: (1) more employment requires a lower "real wage" (commodity wage); (2) increases in the price level are proportional to increases in the money supply; and (3) in an open economy with a flexible exchange rate monetary policy is effective and fiscal policy is ineffective.

Each parable can be restated in the more journalistic and ideological form in which one frequently encounters them: (1) cutting wages will bring full employment; (2) inflation is the result of increases in the money supply; and (3) monetary policy is effective and fiscal policy is not.

Before summarizing the critique, I should be clear exactly what I mean by "refute". No attempt was made at an empirical refutation. Whether in practice increased employment can be found to be associated with a reduced value of price-deflated wages (for example) is largely irrelevant to the issue considered here: can it be demonstrated in theory (logic) that the former follows from the latter? If a theory is logically flawed, empirical evidence for its predictions is no support. Such evidence would imply that the theory may occasionally yield the appropriate prediction, but has the wrong explanation. The pre-Copernicus geocentric celestial theory yielded roughly accurate predictions of major astronomical events, but it was wrong; the sun does not circle the earth.

More important, it was the wrong framework in which to consider those events. In a sentence, the purpose of this book has been to provide *prima facie* logical evidence that the basic neoclassical model is the wrong way to think about economies in the aggregate. The theory is not totally wrong, and it can produce useful insights. But notwithstanding advanced and esoteric qualifications, the heart of standard macroeconomics is quite simple. As evidenced by the way its wisdom is distilled and passed on to each new generation, it is the single commodity supply side, neutrality of money, and Walrasian market clearing. These were the basic principles of pre-Keynesian ("classical") economics, and remain the core of synthesized macroeconomic wisdom to this day. Any textbook, undergraduate or graduate, which does not base itself on these principles is considered an eccentric curiosity unworthy of serious notice.

17.2 Self-adjusting full employment

In Chapter 1 the critique began with the manner in which neoclassical economics conceives of the circulation of commodities and money in a capitalist society, "the circular now of income". Treatment of the supply side as consisting of only one commodity has its basis in this stylized interpretation of the economy. It ignores intermediate production, a necessary step towards justifying an aggregate production function.

More important for its ideological purpose, the circular flow model initiates the analysis of a parallel and symmetric treatment of the two major classes in capitalist society, those who own productive property (capitalists and rentiers) and those that do not (blue and white collar workers). This counter-factual treatment of social and economic relations is a fundamental characteristic of all neoclassical theory, in microeconomics as well as macroeconomics. The interpretation is that households supply a variety of services. These services correspond to factors of production, allegedly flowing from laboring activity, the ownership of capital, the ownership of land, and the abstinence from consumption. The symmetry is fallacious. In order to obtain a claim on income, wage and salary workers must sell their ability to work and do so repeatedly. "Capital services", by contrast, are not for the most part bought and sold. What is bought and sold is a claim on income from the ownership of capital. The service sellers in the case of capital are stockholders or their agents. While a business firm must continuously enter into transactions with its workers in order to obtain a workforce, no exchange in the usual sense is required to set its machinery in motion.

This strongly ideological treatment of capital and labor plays a subsidiary role in the neoclassical model if the analysis is restricted to the demand side. The stress on demand as the determinant of national income allows for considerable flexibility of analysis and ideological orientation. Integral to this emphasis is the non-dogmatic view that the economy is at less than full employment. An obvious line of inquiry is to place heavy emphasis on the social and economic cost of unemployment, as Keynes did. A somewhat more radical approach has stressed the fundamental distinction between consumption and investment, the former being what workers do and the latter what capitalists do. In a demand-determined system the level of national income is determined by the level of capitalist spending (investment). This results in Nicholas Kaldor's famous aphorism that "workers spend what they get and capitalists get what they spend".[1]

These left-wing tendencies had limited respectability within the neoclassical tradition, and the vehicle for writing them out of the distilled wisdom of the mainstream has been the introduction of a supply side for the model (Chapter 2). The heart of the supply side is the aggregate production function. Rare is the textbook that omits it. The only consistent way to construct this aggregate relationship is by assuming a single commodity, which has fundamental implications for the model. Most obvious, it eliminates the distinction between consumption and investment, which is formally completed by use of the IS (commodity market equilibrium) curve.

The most profound effect of the aggregate output/value added function is to introduce a stylized labor market into the analysis. The familiar parable that more employment requires a lower real wage derives from the introduction of this aggregate function, giving it a central analytical and ideological role in the model. Once an aggregate labor market is included, all else in the model is derivative: the values of all variables are unique once the real (commodity) wage is determined. The real wage is determined either by the "clearing" of the labor market or by assigning an arbitrary lower limit to this key variable, with the lower limit given the ideological interpretation that it reflects trade union monopoly or state intervention. The clearing of the labor market establishes an imaginary result called the "real solution", which serves as a benchmark for all more complicated models. The allegation is that agents make their decisions on the assessment of "real" (price-deflated) variables, and to do anything else would result in irrational behavior (to suffer from "money illusion").

For this book the REH is important in two ways: (1) by carrying the logic of the neoclassical macroeconomic model to its extreme, it unwittingly provides a parody of the synthesis school considerably better than any critic could create; and (2) it indicates the extent to which full employment general equilibrium is a special case. The central conclusion of the New Classical Economics, that agents armed with rational expectations behave to nullify any policy action by governments, is a special case in the extreme. It assumes that the economy is continuously in full employment general equilibrium, and that money is neutral so that the equilibrium is unique. These assumptions avoid all the difficulties associated with adjustment to equilibrium and the theoretical problems with assuring neutrality. That such a special case based upon the pseudo-science of complete knowledge of future outcomes could be influential in the economics profession indicates the intrinsically conservative nature of the discipline.

Chapter 10 took up an issue that had been lurking in the background throughout the critique: the severe limitation placed upon the neoclassical model by virtue of assuming a one commodity supply side. A bit of simple algebra and graphics demonstrates that the hypothesis that a lower real wage calls forth a higher level of employment cannot be generalized even to the two-commodity case. In general, multi-commodity models yield multiple full employment real wage levels. It is not true even in theory that an excess supply of labor implies that the real wage should fall in order to clear the labor market. None the less, the parable that more employment requires a lower real wage is repeated as if it were a natural law of economics.

Chapter 11 indicated the periodic dissatisfaction in the economics profession with Walrasian general equilibrium analysis by reference to seminal works critical of this approach. Important as the anti-Walrasian critique was, the response in the profession has been to trivialize it. Again, the conservative nature of economic science is indicated by a comparison of the reception of the disequilibrium Keynesian critique and the rational expectations "revolution". The insights of the former contribution are rarely incorporated into textbooks, implicitly judged as insufficiently important to be passed on to students of macroeconomics.

The entire purpose of the first eleven chapters of this book has been to undermine the judgment that capitalist economies tend automatically to full employment. This judgment was undermined by several basic arguments, and all are found in the more advanced economic literature: (1) the mechanism of Walrasian market clearing is no guide to the operation of real economies; (2) if there were a satisfactory theory of disequilibrium adjustment, it would not necessarily imply that full employment involved a reduction in the real wage; and (3) were there an automatic tendency to full employment and were this associated with a lower real wage, the result would not be unique because money is not neutral.

All textbooks do not take as a serious practical conclusion the argument that capitalist economies tend automatically to full employment. But virtually without exception standard undergraduate and graduate works repeat that full employment is correct in theory. The standard textbook position is that the pure theory is correct in logic and provides an analytical benchmark against which the second-best achievements of the real world can be judged. This compromise position perpetuates an unsubstantiated dogma and its powerful ideological message. It is an ideological incantation, unsupported empirically and a special case in logic. It is grist for the mill of right-wing ideologues and a barrier to the development of theory that would address the fundamental problems of a capitalist economy.

17.3 Open economy models

The neoclassical approach to open economy analysis builds on the logical mistakes in the closed economy model and adds ones unique to itself. As a result, the standard textbook stories of monetary policy with a flexible exchange rate are wrong. The logically complete story would be:

1. an increase in the money supply results in a trade deficit; with perfect capital flows this deficit is instantaneously eliminated by depreciation of the currency;
2. the depreciation of the currency raises the price level *via* its impact on imported goods;
3. this price increase feeds back to make the real depreciation less than the nominal; and
4. the price increase simultaneously renders the increase in the real money supply less than the increase in the nominal money supply.

The logically correct models contradiction the standard policy rules. In general, monetary policy is not more effective than fiscal policy under flexible exchange rates. This implies that there is no general theoretical support for the conclusion that monetary policy should be preferred in an open economy, or that flexible exchange rates should be preferred to fixed exchange rates.

17.4 Money and inflation

For the second great scourge of market economies, deflation and inflation, neoclassical economics can produce no logically consistent theory. Perhaps the most striking characteristic of the neoclassical inflation parable is that it proves so difficult to formulate with logical consistency. Even more than the real wage and employment parable, the money and inflation one seems so simple as to be obvious: more money in circulation makes prices go up. In both logic and practice this putatively simple parable is false, because neither of the principle concepts, money and inflation, can be consistently specified by the theory.

The first and most fundamental difficulty with the inflation parable is that it is based upon an unsubstantiated hypothesis: that the amount of money available for commodity transactions is independent of the level of output. Simply put, the inflation parable requires that there be an exogenous money supply under the control of the monetary authorities. To begin by assuming this to be the case is to assume what must be proved.

In neoclassical analysis all changes in an aggregate price index have the same cause – too much money in circulation. This approach, in which the central bank interest rate is a hammer and every inflation a nail, severely misrepresents the policy choices facing governments. Breaking out of the money-inflation parable is essential to rational policy making, which I elaborate in the next section.

17.5 Theory and ideology

The many supporters of neoclassical economics present it as “value free” in the sense that it encapsulates eternal truths of economic behavior and natural law that are as independent of human perception and will as the law of gravity. The truth is that economics has always been a highly political discipline, and twenty-first century mainstream theory no less so than economics in the past. Recognizing that neoclassical theory is heavily laden with ideology does not invalidate its insights, but it does require a serious attempt to distinguish that part of the theory that is scientific and that which is essentially propaganda. One example demonstrates the distinction: the hypothesis that there exists a rate of unemployment in the aggregate for which the rate of change of the price level would be zero (and that this relationship is stable) is a scientific proposition in that can be derived theoretically and empirically verified or rejected. Calling such a rate of unemployment “natural” and associating it with full employment is propaganda, placing theory in the service of ideology.

With a few notable exceptions, as it is taught neoclassical macroeconomics conveys the following messages to the student. Capitalist economies are essentially self-regulating, with major problems resulting from mismanagement by governments. Inflation should be feared more than unemployment, because the self-regulating economy will tend to eliminate unemployment automatically, but cannot correct the errors of governments. Exchange rates should be left to market forces and capital flows should not be regulated. Along with this distrust of government intervention goes a negative assessment of the role of trade unions in capitalist societies, viewed as instruments to create monopoly power in labor markets rather than the vehicle by which workers have collectively protect themselves against the power of capital. While many mainstream economists would disagree with this crude characterization of the political message of mainstream economics, it is what the pure theory teaches.

Due to its methodology economics is the most conservative of the social sciences. For the first one hundred years of its existence (*c.*1750–1850), conservatism was not inherent in the methodology due to the importance of the hypothesis that labor was the source of expanded value. During this period the advocates of unregulated markets, such as Ricardo, could operate within the same broad framework as critics of capitalism, such as the Ricardian socialists, the French socialists (Proudhon and Sismondi), and Marx. After a few decades of theoretical turmoil, the discipline coalesced around a new paradigm based upon individual optimizing behavior, marginal productivity theory of production, and Walrasian general equilibrium. Subsequently economic inquiry dedicated itself to demonstrating the inherent stability of capitalist economies and the tendency of unregulated market economies to generate socially optimal outcomes.

The Great Depression briefly undermined that sanguine approach, with the theoretical attack led by Keynes. For only a brief period did Keynes's basic message, that capitalist economies tend to produce socially unacceptable outcomes if not controlled and regulated, find a receptive audience in the profession. The free market conservatives of the profession again seized the theory by the early 1970s. If a consensus existed in the profession in favour of intervention in markets and the necessity for public macroeconomic management, it lasted for no more than 25 years.

The conservatism that characterizes mainstream economics is based on unsound theoretical foundations. The models from which the fundamental macroeconomic parables derive suffer from serious flaws of internal logic that cannot be resolved. Accepting these models and proceeding as if they were analytically sound is an act of ideologically-motivated faith that leads to folly. That is the message which this book conveys to students of economics.

Notes

Introduction

1 For example, Hein and Stockhammer (2011) provide a good survey of contemporary Keynesian analysis and policy implications, with contributions from major writers in the field. In the highly contested field of monetary economics, a presentation of heterodoxy from Keynesian to Marxian is found in Arestis and Sawyer (2006).

2 Very few theorists, one being Kalecki, were influenced by both Marx and Keynes, the former the greatest economist of the nineteenth century, the latter the greatest of the twentieth century. On Kalecki, see Toporowski (1987) and Sawyer (in Arestis and Sawyer 2006).

3 I use Frank Hahn's definition of neoclassical economics:

> I have frequently … been classified as a neo-classical economist … There are three elements in my thinking which may justify it:
>
> 1 I am a reductionist in that I attempt to locate explanations in the actions of individual agents.
> 2 In theorizing about the agent I look for some axioms of rationality.
> 3 I hold that some notion of equilibrium is required and that the study of equilibrium is useful.
>
> (Hahn 1984, 1)

4 This analysis is found in Volume II of *Capital* by Karl Marx. With justification this has been called the "lost" volume (see Weeks 1982, 1983 and 2011).

5 At the beginning of the twenty-first century there could be some limited hope for a return of "macroeconomics after Keynes" (Chick 1983). Two men with some sympathy for Keynesian analysis, Joseph Stiglitz and Paul Krugman, won Nobel Prizes in Economics. In most years the prize went to the right wing of the profession.

6 Relevant to my plea is a comment by Hahn,

> The most strongly held of my views I have left to the last.… It is that neither is there a single best way for understanding in economics nor is it possible to hold any conclusions, other than purely logical deductions, with certainty.
>
> (Hahn 1984, 7)

1 The demand side of the neoclassical model

1 Throughout this book I shall avoid use of the term "goods". The word has an obvious normative connotation, derived from subjective utility theory in which anything one buys is by definition a source of pleasure and therefore a "good". Instead, I use the neutral and precise terms "commodity" and "product". A commodity is a product produced for the purpose of selling it.

2 At the risk of pedantry, the term is placed inside quotation marks, because the category is arbitrary. Machinery is an intermediate commodity, but is treated as "final". The significance of the intermediate/final dichotomy will become clear as the analysis progresses.

3 The sin of double-counting allegedly results from the error that would result if the exchange of steel between a steel producer and an automobile producer were summed along with the sale of the vehicle itself. This is not a problem of double-counting but of the time period chosen for the analysis. This issue is treated in Weeks (2010, annex to Chapter IV and annex to Chapter XI).

4 One of these few is Chick, who writes, "I came to realize that the circular flow and Keynes's treatment of finance and money were not really compatible" (Chick 1983, v).

5 "The aggregate procedure is … as important in determining the properties of an economic model as are the assumptions made about the relationships between the aggregates" (Leijonhufvud 1968, 111).

6 In the annex at the end of Part I on Keynes I demonstrate that these are not identities.

7 Introduction of this lag requires a redefinition of terms so that aggregate demand and aggregate supply can assume different values. For example, $Y(t)=C_t+I_t$, where consumption is $C_t=C(Y_{t-1})$, and the equilibrium condition, $I_t=S_t$ implies $Y_t=Y_{t-1}$.

8 Allen in his mathematical economics textbook suggests the possibility of a production lag, but does not pursue it or give it a name (Allen 1968, 16–18).

9 Use of mark-up pricing in models is found in Eichner and Kregel (1975). Macroeconomic treatments with constrained variables are sometimes called "fixed price models".

2 The neoclassical model with a supply side

1 After making no mention of any problem of aggregation, Parkin writes, "This completes the definition of the short-run aggregate production function" (Parkin 1984, 112). Dernburg was considerably more careful (Dernberg 1985, 145–148). Bronfenbrenner, whose text included non-neoclassical treatments of macroeconomics, made no mention of the aggregation problem when he presented the aggregate production function (Bronfenbrenner 1979, 220–221). Even Nobel Prize winners seem to find it unnecessary to point out the one commodity character of the aggregate production function (Stiglitz and Walsh 2006, 141).

2 If all income is made up of wages and profits, then it is obvious for income at market prices that $Y=Wn+rK$ (wages plus profits measured in current prices). The neoclassical adding-up condition asserts more than this definitional identity. Its assertion is that the equality will hold if one substitutes for the commodity wage, w, whose role is to equilibrate the labor market ($n_s=n_d$), and the interest rate uniquely implied by that equilibrium w. This conditional equality that requires the assumption of constant returns to scale.

3 This is in contrast to the models of Nicholas Kaldor, in which workers have a saving rate of zero (from wages) and capitalists save all their incomes (from profits). In the models the capitalists advance their entire profits for the inputs for the next production period. These models yielded Kaldor's then-famous conclusion that workers spend what they get, and capitalists get what they spend (Kaldor 1957). Keynes agreed with this fundamental insight, and neoclassical economics ignores it.

In the early 1950s, two pioneers of econometrics, Lawrence Klein and Arthur Goldberger, estimated consumption functions in which income data were divided by functional groups – employees, entrepreneurs and farmers. Such studies subsequently were subject to considerable ridicule, with it suggested that distinguishing consumption behavior by economic class was no more theoretically valid than doing so on the basis of hair color.

4 See the seminal article by Smith and a similar treatment by Ackley. In both of these the commodity market equilibrium is treated by use of "IS-LM" curves, which are discussed in Chapter 5 (Smith 1956 and Ackley 1978a).
5 The market-clearing difficulty presented here is in addition to the equally problematical restriction that any exchanges at non-equilibrium prices preclude an equilibrium solution. This difficulty, involving the intervention of the "Walrasian auctioneer", is considered in the next chapter.
6 Overtime work does not contradict the all-or-nothing character of employment contracts, because a full-time work contract is the recondition for overtime. Part-time work characterizes a minority of the labor force in developed capitalist countries, though it increased at the end of the twentieth century as a result of labor market deregulation.
7 The usual way of writing the "IS" curve is $y=c(y, r)+i(y, r)$. Chick comments, "the distinction between consumption and investment … was virtually obliterated" (Chick, 1983, 4).
8 In other words, it is an object of utility, which I have presumed throughout the discussion.
9 For an elaboration of the implications of this definition, see Weeks (2010, Chapter II).

3 Comparative statics and equilibrium

1 Referring to Harrod's definition, Baumol writes, "dynamics should be confined to the analysis of continuing changes as against once-and-for-all changes", and goes on to say, "Economic dynamics is the study of economic phenomena in relation to preceding and succeeding events" (Baumol 1959, 4).
2 "[T]here is no theoretical evidence to suggest that the invisible hand performs better 'asymptotically' than it does 'momentarily'" (Hahn 1984, 98). "Momentarily" here means instantaneous market clearing.
3 Some have concluded "none", arguing that the synthesis model is formulated in a way which makes money useless as a theoretical concept (Harris 1981, 289ff.).
4 Under the rules of Walrasian general equilibrium mechanisms, it is impossible for only one market not to clear.
5 One might argue that the disappointment of buyers takes the form of labor services that go unsold. A shortfall in the barter of the single commodity must correspond to a shortfall in the barter of labor services to produce the commodity that could not be bartered. This ignores the notional demand of employers for the single commodity, as an item of present and future consumption.
6 See Begg (1982), where "continuous market clearing" is used throughout.
7 This is explained in Toulmin and Goodfield (1961, Chapter 7).
8 Disequilibrium never refers to a situation in which trades have taken place, always to a situation in which some agents are dissatisfied and no one has committed himself or herself to any exchange.
9 Leijonhufvud argues that Walras' Law and Say's Law, Walras' Law defined over commodity markets only, do not imply anything about market clearing. If the Law is accompanied by the omniscient auctioneer, market clearing is implied.
10 "[T]he recent meaning given to equilibrium (and disequilibrium) has had quite disastrous effects. Equilibrium is defined as Walrasian competitive equilibrium or a rational expectations equilibrium. All other states are said to be in disequilibrium" (Hahn 1984, 8–9.).
11 See, for example, Arrow and Debreu (1954). Hahn wrote, "The main conclusion [about Walrasian general equilibrium] is rather pessimistic: we have no good reason to suppose that there are forces which lead the economy to equilibrium. By that I mean we have no good theory" (Hahn 1984, 13).
12 Except in rare cases, the utility functions of consumer theory invoke the homogeneity postulate, as does the theory of the firm. Aggregates based upon such micro

foundations must also incorporate the postulate. While Walras' Law need not involve the homogeneity postulate, if it does not it is inconsistent with the usual supply and demand analysis.

13 Despite the artificial and ideal character of the Walrasian solution to market clearing, the mechanism is treated with considerable respect in the economics profession. Leijonhufvud, a severe and sometimes polemical critic of Walrasian general equilibrium models, wrote, "Walras, Marshall, *et al.* had left a by-and-large satisfactory solution to the problem of the determination of prices for 'final' outputs and factor services and the allocation of resource flows under the (arbitrary) condition of 'fixed' resource endowments" (Leijonhufvud 1968, 214, quotation marks in original)

4 Money in the neoclassical model

1 The definition is taken from Harris (1981, 43). I added the words "full employment" to make more explicit the nature of the equilibrium state.

2 "It is difficult not to be struck by the high proportion of economists who assent to the doctrine of the neutrality of money" (Forder 2006, 224).

3 Neoclassical writers define money as anything generally accepted as "means of payment". I do not employ this term, because it was used quite differently by Ricardo and Marx. See Weeks (1981 and 2011).

4 Presenting the Post-Keynesian criticism of neoclassical money is beyond the scope of this book. Lavoie (2006) and Dow (2006) provide clear summaries. One of the definitive statements is in Moore (1988).

5 My views on the nature of money can be found in Weeks (2010, Chapters V and VI) and Weeks (2011).

6 Ackley (1978a) made only passing reference to any controversy over the money supply. Branson (1989) has a three-page treatment of the relationship between central bank lending and commercial bank response. A leading monetary theorist called this approach "a mechanistic analysis of the determination of the money supply, very similar to the outmoded treatment of velocity" (Johnson 1974, 41). No reference to the controversy is found in Shapiro (1974), Gordon (1981), Kenen (1994), Agenor and Montiel (1996), or Dornbusch *et al.* (2004). This reflects the confidence of the neoclassicals of their hegemony over the profession. It is left to the Post-Keynesians and other dissidents to provide students with rigorous treat of bank behavior (e.g., Dow 2006, 38ff.; Lavoie 2011).

7 See Moore (1988), and for the practical policy implications the report commissioned by the British government on the effectiveness of monetary policy, the Radcliff Committee report (Radcliff Committee 1959).

8 This will be discussed later in this chapter. The proportional relationship between prices and the money supply need not imply that the homogeneity postulate holds.

9 "[A] theory of money, if it is to be consistent, requires that supply be determined independently of the demand for money. And if the theory is to be of use, it must allow that the central bank ('monetary authorities') can control the quantity of money in the hands of the public" (Johnson 1972, 136). This independence of supply is necessary for a demand theory of *valueless* money, not a general requirement of a theory of money.

10 If capital is mobile across industries, then there will be a tendency for the rate of return to equalize for all commodities. This theoretical rule would also apply to the commodity serving as money. All other commodities would exchange against the money commodity such as to bring about this equalization. An increase in the cost of producing money would then lower all prices and vice versa (Weeks 2010, Chapter V).

11 The contradiction between Walras' Law and the quantity equation was first pointed out by Patinkin (1965, Chapter VIII).

12 See the discussion of the debate over the real balance effect in Johnson (1974, 17–21). Notwithstanding the virtually universal agreement among neoclassical monetary theorists that the real balance effect in some form (e.g., as the Pigou effect, considered in Chapter 4) is critical for logical consistency in adjustment to equilibrium, it is not unusual for textbooks in macroeconomics to ignore it and proceed on the basis of internally inconsistent models. See Branson (1989, 107ff.), where the demand for cash balances is defined in real terms (M/p), but consumption and investment are functions of the level of output/income and the interest rate only.

13 The quotation is from Branson (1977, 62). This quotation is a latter-day version of Pigou's famous reference to money as a "veil" (Pigou 1941, 20–27).

14 The inconsistency takes a third form when the Pigou effect replaces the real balance effect.

15 Referring to this, Chick wrote,

> The definition of the money supply … is neither a question of abstract principle, to be decided by theoretical controversy, nor an empirical matter, to be decided on the basis of statistical estimates of substitutability [among different empirical categories of money]. It is a practical matter, a free and always somewhat arbitrary choice, based on the judgment of the investigator, of the aggregate most relevant to the problem he is attempting to answer
>
> (Chick, 1979, 13–14)

Among books on monetary theory, Chick's still provides the clearest and most thorough treatment of the controversies surrounding the presumption of an autonomous money supply.

5 The classical false dichotomy model

1 See, for example, Ackley (1978a, Chapter 6); and Shapiro (1974, Chapter 17). The inconsistency is often ignored in more recent textbooks.

2 Since the exponents add to one, $[\alpha+(1-\alpha)]=1$, the function is characterized by "constant returns to scale". If from any initial level, the inputs are doubled, output/income also doubles. This implies $y=wn+rk$, and that $py=Wn+rpk$. Refer back to the discussion of the "adding up" equation in Chapter 2.

3 The simplicity of the solution derives from the special property of the Cobb-Douglas function that the exponents are equal to the income shares of the variables they are associated with; i.e., $wn/y=Wn/py=(1-\alpha)$, and $rk/y=rK/py=\alpha$.

4 Also implied is a negative relationship between employment and the money wage. This "trade-off" is the result of diminishing returns combined with the quantity equation.

5 This was established in the Cambridge Capital Controversy, treated in Chapter 10.

6 The New Classical Economics would appear to deny that increasing the money supply can raise the level of employment. However, their conclusion is the result of arbitrarily assuming that all markets quickly and instantaneously equilibrate. It should be obvious that if the labor market is always in full employment equilibrium, increasing the money supply will not increase employment.

7 The other two exceptions are rigid money wages, discussed above, and the "liquidity trap", considered in Section 6.3. Leijonhufvud argued that neither of these two can be found in *The General Theory* (Leijonhufvud 1981, 53–54).

8 In Figure 5.4 it is assumed that saving is interest inelastic and investment is unrelated to current income. The same point can be demonstrated if both saving and investment are interest elastic. A clear, if rather old, treatment is found in Ackley (1978a, 193–195).

6 Logically consistent money-neutral models

1 "Money illusion" is defined as behavior by an agent in which a real variable (M^*/p in this case) is affected by a change in a nominal variable (p or M^* in this case). Leijonhufvud has a low opinion of the concept of money illusion, calling it a "fudge-phrase". His objections are treated in Chapter 11.

2 The Classical (real balance effect) case is:

$$M_d = vpy - fM^* \quad y_d = c + i$$

Let M_{xd} be the excess demand for money.

$$M_{xd} = vpy + fM^* - M^* \quad M_{xd} = pyxd$$

$$M_{xd} = vpy - [1-f]M^* \quad M_{xd} = py - p[c^* + ay + gM^*/p + i]$$

$$M_{xd} = p[vy] - [1-f]M^* \quad M_{xd} = p[y(1-a) + (c^* + i)] - gM^*$$

In both cases a change in the price level affects the first term and leaves the second term involving M^* untouched.

3 Clower and other post-Keynesians argued that in disequilibrium unemployment can result even when the real wage is at the level consistent with full employment general equilibrium; i.e., when notional supply and notional demand are equal. This is explained in Chapter 11.

4 Recall that $p_e = [1-f]M^*/vy_e$. The intercept of the consumption function can have only one value given the marginal propensity to consume, which is its slope). This is shown below.

$$c(e) = C^* + by_e + gM^*/p_e$$

$$c^* = c_e - by_e - gM^*/p_e$$

The intercept of the saving function is ($-c^*$), which is not a true parameter. It changes with the variables of the model and has a unique and non-arbitrary value in equilibrium.

5 The model presented in this section is virtually identical to that in Smith (1956). Smith's diagrammatic technique subsequently became common usage until replaced by IS-LM diagrams. The model is neither complete nor Keynesian, as will be shown in this section.

6 Assume one buys a bond for \$100 that has a yield of 5 percent. If the interest rate on bonds rises to 10 percent, then one can purchase a 5 percent yield for \$50. As a consequence, the owner of the original 5 percent bond will find that while that bond has a face value of \$100, it will fetch only \$50 when sold in competition with 10 percent bonds. This assumes all other factors unchanged.

7 In "portfolio theory" there is an *a priori* determination of the optimal composition of an individual's wealth holding (money, bonds, etc.) on the assumption of utility maximization. See Harris (1981, Chapter 10) for a treatment of the transactions, precautionary, and speculative demands for money within this framework.

8 As for the familiar supply and demand curves for a single commodity, the stability of an equilibrium point for the IS and LM curves depends upon the slope of each. If one curve is downward sloping and the other upward, the equilibrium is stable without qualification. If both have a positive slope or both have a negative slope, stability depends upon the slope of one curve relatively to the other.

9 Keynes explicitly deals with the differences between a barter system and a money economy in Chapter 17 of *The General Theory* (1936). Some would argue that this is the most important chapter of the book.

7 The "complete" model with a wealth effect

1 Central to the debate is whether economic agents discount the future stream of taxation necessary to finance the interest payments on state bonds. If so, bonds are "inside". Such an analysis involves a naive presumption that there are no distributional effects across the population.

2 If the supply of labor were a function of the interest rate it would be no less valid to presume full employment, but full employment output/income would no longer be unique. This point will be clear later in the discussion of neutrality.

3 To reduce complications, I ignore the impact of price upon the demand for money and bonds.

4 This assumes that the money supply is exogenous. See discussion in Chapter 4.

5 Hahn provides a clear and concise discussion of the implications of bankruptcies. At the end he writes, "I conclude from all this that the assertion that the 'Pigou effect' ensures the existence of an equilibrium is unproven" (Hahn 1965, 135).

6 Kenen agreed, albeit in milder words:

> [T]he [portfolio] model … is still too simple to be realistic. There is no capital formation (investment). The government balances its budget.… Interest payments are ignored … The demand for money depends on interest rates and wealth but not on income.
>
> (Kenen 1994, 449)

7 It is beyond the scope of this book to discuss such models. Their essential feature is that the outputs of one period become the inputs of the next period (see Weeks 1981 and 2010, and Sraffa 1960).

8 Keynes wrote numerous journal articles in the mid-1930s that might entice readers to *The General Theory* (specifically, Keynes 1937a, 1937b, 1937c; and Keynes and Kaldor 1937).

9 Leijonhufvud provides a humorous critique of the tendency of economists to ignore their theoretical forebears in his satirical essay, "Life among the Econ" (Leijonhufvud 1981).

10 Referring to the economics profession, Keynes wrote,

> [A]lthough the [theoretical) doctrine itself has remained unquestioned by orthodox economists up to a late date, its signal failure for purposes of scientific prediction has greatly impaired, in the course of time, the prestige of its practitioners. For professional economists … were apparently unmoved by the lack of correspondence between the results of their theory and the facts of observation; a discrepancy which the ordinary man has not failed to observe, with the result of his growing unwillingness to accord to economists that measure of respect which he gives to other groups of scientists.
>
> (Keynes 1936, 33)

11 Keynes did not make himself popular among his opponents by his liberal use of ridicule. For example,

> The celebrated optimism of traditional economic theory, which has led to economists being looked upon as Candides, who, having left this world for the cultivation of their gardens, teach that all is for the best in the best of all possible worlds provided we will let well alone.… It may well be that the classical theory represents the way in which we should like our Economy to behave. But to assume that it actually does so is to assume our difficulties away.
>
> (Keynes 1936, 33–34)

12 Marx used the terms "exchange value" and "use value".

13 It could be called the *aggregation* problem. While I have no desire to contribute to the proliferation of unnecessary terms, "aggregation problem" is a phase commonly used

in mainstream economics in a quite narrow and restricted sense. My use of an alternative term avoids potential confusion.

14 The problem is not one of finding a common unit of measure. Wheat and beer could be weighed and added together, but the resultant "aggregate" measure would be nonsense except for purposes such as ensuring a vehicle was not overloaded.

15 Derivation of community indifference curves is unnecessary for the current discussion. The simplest conceptualization is to assume that all economic agents have the same utility function, so a community of people can be treated as an individual.

16 Theoretical objections to the apparent incompatibility of macro- and microeconomics resulted in the "micro foundations" literature. This literature sought to construct a macro theory consistent with microeconomics (and certainly not the reverse). This effort was a precursor to the New Classical Economics. Particularly influential was Phelps *et al.* (1970).

17 The rest of this chapter draws upon a longer treatment of Keynes's views on valuation and aggregation. See Weeks (1988), where the chapter is mis-titled, "Value and Protection in the *General Theory*", rather than the correct, "Value and Production in the *General Theory*".

18 Keynes wrote,

> So long as economists are concerned with what is called the Theory of Value, they have been accustomed to teach that prices are governed by the conditions of supply and demand.... But when they pass ... to the Theory of Money and Prices, we hear no more of these homely but intelligible concepts.
>
> (Keynes 1936, 292)

19 Referring to "real" variables and using the terminology of his time, Keynes wrote,

> The National Dividend, as defined by Marshall and Professor Pigou, measures the volume of current output or real income, and not the value of output or money income.... But it is a grave objection to this definition for such a purpose [use in economic models] that the community's output of goods and services is a non-homogeneous complex which cannot be measured, strictly speaking, except in certain special cases, as for example when all the items of one output are included in the same proportions in another output.
>
> (Keynes 1936, 37–38)

20 In a characteristic display of his rather wry sense of humor, Keynes wrote,

> To say that net output to-day is greater, but the price-level lower, than ten years ago or one year ago, is a proposition of a similar character to the statement that Queen Victoria was a better queen but not a happier woman than Queen Elizabeth – a proposition not without meaning and not without interest, but unsuitable as material for the differential calculus. Our precision will be a mock precision if we try to use such partly vague and non-quantitative concepts as the basis of a quantitative analysis.
>
> (Keynes 1936, 40)

21 He also rejected the closely-related concept of the "general price level" (Keynes 1936, 39).

22 There are no units, including units of labor, that will produce well-behaved aggregate capital–labor substitution, i.e., no re-switching, in response to changes in the real wage. A non-technical explanation is found in Fine (1980, Chapter 5).

23 The chapter in which Keynes discusses aggregation and valuation is called "The Choice of Units", but would be more accurately be entitled "Choice of Method".

24 In the discussion that follows a simplified version of Keynes's procedure will be presented in order not to raise unnecessary complications.

25 This phenomenon, which Marx called the "moral depreciation of capital", is discussed in detail in Chapters IX and X of Weeks (2010).

26 Devaluation of the capital stock due to technical change plays a major role in Marx's treatment of demand failures. See the discussion in Weeks (1982, Chapters VII and VIII).

27 When neoclassical economists carry out empirical studies at the firm or industry level they may include intermediate commodities on the supply side and treat output in the usual sense. The point is that the abstract theory of price teaches one to think of price determination in general as if each firm produced only value added.

28 Use of labor as the basic ingredient of value theory involves certain analytical difficulties, which led some non-neoclassical economists to abandon it in favor of a price theory based upon inputs (including labor) that cannot be directly aggregated. This approach, which sometimes referred to as "the production of commodities by means of commodities", involves measuring total output in terms of a concept called "the standard commodity". The standard commodity is a collection of commodities such that when it is introduced into an input-output system as an input, yields an output precisely like the input with regard to the proportions of each commodity in the collection. See Sraffa (1960).

29 Keynes concludes the quoted paragraph by saying that his sympathy for the doctrine that everything is produced by labor "partly explains why we have been able to take the unit of labor as the sole physical unit which we require in our economic system, apart from units of money and time" (Keynes 1936, 214).

30 Keynes wrote:

> [I]n so far as different grades and kinds of labor and salaried assistance enjoy a more or less fixed relative remuneration, the quantity of employment can be sufficiently defined for our purposes by taking an hour's employment of ordinary labor in proportion to its remuneration.... We shall call the unit in which the quantity of employment is measured the labor-unit.
>
> (Keynes 1936, 41)

31 For example, Robinson agreed with Keynes about neoclassical "real" aggregate, "*The* volume of output and *the* purchasing power of money are metaphysical concepts". However, in her famous book on growth theory, she does not use the labor unit. She assumes that consumption and investment commodities are produced in an unchanging proportion (Robinson 1969, 22).

32 The definition of *Z* given by Keynes is confusing: "where *Z* is the return the expectation of which will induce a level of employment *N*" (Keynes 1936, 44). The sentence structure suggests that one should write, $N=N(Z)$.

33 The supply curve for the firm under perfect competition is the marginal (labor) cost curve above the "break-even" point. The industry curve is the sum of all firm supply curves.

8 Neutrality and full employment

1 The first two are not theoretical or empirical predictions of Marx's analysis of capitalism. The third is a misinterpretation of his theory of relative prices (Weeks 2010).

2 Uniqueness requires additional assumptions. For sake of argument, uniqueness is assumed.

3 In this argument markets are "unregulated" and "free" in the absence of state intervention.

4 The full employment values ye and ne need not be unique. As noted in the previous section (and discussed in Section 2.2), it would be reasonable to assume that the supply of labor is influenced directly by the interest rate. If this were the case, ne would no longer be unique nor would ye.

5 In the examples given I make the invalid but simplifying assumption that the state acts autonomously of economic agents.

6 In the models developed in the previous chapters no action by the "monetary authorities" can change the functional distribution of income. This is because the production function used, the Cobb–Douglas, implies constant factor shares, no matter what are the values of y, w, and r. With a more general functional form, even of the Constant Elasticity of Substitution type (of which the Cobb–Douglas is a special case), a change in r would alter the distribution between wages and profits. This discussion of distribution refers to points of full employment equilibrium and ignores the impact of fiscal policy, particularly taxation.

7 The problem of a dangling excess supply is not restricted to the labor market. Recall that the demand for labor schedule is constructed on the assumption that firms plan their supply with no demand constraint. This implies that the notional supply of output is full employment output. At less than full employment equilibrium, there is a second unrequited excess supply, for the single commodity. This leaves the model with two excess supplies and no apparent compensating excess demands.

8 This was recognized by the New Classical Economics school, which argued that deviations from full employment do not occur even in the short run. While this position is perhaps the most faithful to the logic of the neoclassical model, one is reminded of Oscar Wilde's observation that madness is anything carried to its logical conclusion.

9 In this analysis it is not justified to refer to r as "the interest rate". For simplicity, up to this point all analysis has implicitly assumed no difference between the rate of return and the interest rate. This is rather sloppy analysis, though characteristic of textbook presentations. In the factor markets, maximizing behavior is based on the rate of return, and in the market for investment the lending rate is the relevant adjustment price. In general the two are not the same in the short run, even in full employment equilibrium. Rather than showing this algebraically, I can demonstrate the divergence of the two with a "thought experiment". Assume that any of the models from the previous chapter are at less than full employment equilibrium in the short run (i.e., money wages are initially assumed rigid). Let money wages fall to clear the labor market. Because employment will rise, the commodity wage must fall, and the rate of return must rise. The latter must rise because more labor combined with a given capital stock results in a rise in the average and marginal products for capital for any level of k. In the other markets, the lending rate (interest rate) must fall, because the IS curve is downwardly sloped (greater output/income requires a lower interest rate). Only by coincidence will all of the functions of the model be such that the rate of return and the interest rate are the same at full employment equilibrium. Static general equilibrium analysis is not designed to treat this inequality of the rate of return and the interest rate. They are brought into equality by adjustment of the capital stock, which lies in the domain of growth theory. With the interest rate not equal to the rate of return, interpretation of the "adding up" equation becomes problematic ($y = wn + rk$, see Chapter 2). I make no attempt to tidy up this loose end of the neoclassical model.

10 The point holds if dividend payments are interpreted as reflecting the flow of "capital services" and common stock shares as ownership of productive capital. What is "owned" in this case is a claim on income. No shareholder in IMB can identify his or her fragment of the company's plant and equipment, much less choose to hold it out of production.

9 Expectations and full employment

1 Friedman's argument is treated in many places (see Shaw 1984).

2 The REH is a deterministic theory by the definition employed in the physical sciences. Max Born, the famous physicist, wrote, "*Determinism* postulates that events at different

times are connected by laws in such a way that predictions of unknown situations (past or future) can be made". He distinguishes determinism from causality, defining the latter as follows: "there are laws by which the occurrence of an entity B of a certain class depends on the occurrence of an entity A of another class, where the word 'entity' means any physical object, phenomenon, situation, or event. A is called the cause, B the effect." He goes on to argue that causality does not imply predictability (determinism). The REH makes no reference to this fundamental distinction (Born 1949, 9).

3 By neoclassical rules it may not be rational for all economic agents to form their expectations in this manner, because of information costs. The REH explicitly recognizes this point, but incorporating it into the analysis proves of no consequence. It is assumed that virtually all agents form their expectations rationally, either from their own complete knowledge or via intermediaries. See discussion of wage bargaining below.

4 And apparently it had existed for some time, since the new classical economists have used the REH to analyze the US Great Depression of the 1930s.

5 The defenders of the REH might ponder the following statement by a mathematician:

> All science is full of statements where you put the best face on your ignorance, where you say: true enough, we know awfully little about this, but more or less irrespective of the stuff we don't know about, we can make certain useful deductions. Now, my view is that any theory which pretends to comprehend everything breaks down on this point. It will be a uselessly rigid theory because it won't have a place into which to put new things.… [W]e ought to so shape our theories that new discoveries won't upset *every* theory we have and for that purpose we must have plenty of *open* theories.
>
> (Bondi 1967, 11)

This view directly contradicts the neoclassical obsession with ensuring that all models are "closed", with no loose ends. Hahn takes the sensible and modest view that in economics understanding does not imply precognition. "It is plain that we can claim understanding of an event without claiming that we can predict it. Geophysicists, for instance, believe that they understand earthquakes but cannot predict them" (Hahn 1984, 4).

6 To take one example, Hahn wrote, "[I]t is by no means the case that [economists] are agreed that the IS–LM cross is a generally accepted theory of the economy" (Hahn 1980, 1). Shaw offers an ingenious solution to this problem:

> If professional economists can disagree as to what should constitute the appropriate definition of the money stock, how does the proverbial man in the street determine whether a money supply change has occurred or not?… Unable to understand or fathom the all important changes occurring in economic variables, [people in the street] fall back upon the consensus of opinion [*sic!*] in the news media.
>
> (Shaw 1984, 54)

So while professional economists cannot agree, financial journalists can produce the correct model out of the controversy.

7 In one important branch of science, quantum theory, the inherent indeterminacy of the material world is central to the analysis. Referring to the treatment of quantum theory by Heisenberg, Bohm wrote:

> The fact that quantum theory implies that *every* process of measurement will be subject to the same limitations on its precision led Heisenberg to regard the indeterminacy relationships … as being a manifestation of a very fundamental and all-pervasive general principle, which operates throughout the whole of natural law. Thus, rather than consider the indeterminacy relationships primarily as a deduction

> from the quantum theory in its current form, he postulates these relationships directly as a basic law of nature and assumes instead that all other laws will have to be consistent with these relationships.
>
> (Bohm 1957, 83, referring to Heisenberg 1930, 3)

The particular indeterminacy relationship referred to in the quotation is the problem of simultaneously measuring the position and momentum of sub-atomic particles.

8 "Nor is it necessary for economic agents to know the true model of the economy. All that is required is for them to form their expectations in the aggregate *as if* they did know it" (Shaw 1984, 57, emphasis in original).

9 "[The REH] does not imply that individuals should not make systematic errors. This does not imply that individuals invariably forecast accurately … [but] rather the assertion is that guesses about the future must be correct on average if individuals are to remain satisfied with their mechanism of expectations formation" (Begg 1982, 29). Hahn was unimpressed by this learning-from-experience argument.

> Rational Expectations themselves are justified by the argument that rational agents will learn what is the case. The argument is ill-founded in theory for it must be shown that agents could learn. Just as classical general equilibrium theory has never been able to provide a definitive account of how equilibrium prices come to be established, so rational expectations theory has not shown how, starting from relative ignorance, everything that can be learned comes to be learned.
>
> (Hahn 1984, 82)

10 The size of the difference between predicted and actual outcome is no guide to whether the prediction was correct but randomly displaced or a systematic error. According to the rules of the REH, random deviations from correct predictions will be normally distributed around a mean of zero, but the "tails" of the normal distribution have no upper or lower bounds.

11 Shaw is quite clear about this: "Assuming [the REH agent] uses [his] information efficiently, his prediction or expectations will be identical to the mean value of possible outcomes generated *by the relevant theory*." (Shaw 1984, 58, emphasis added.)

12 Shaw wrote (1984, 55), "much of rational expectations theory is concerned with the behavior of labor in negotiating formal wage contracts", and this can be verified by reference to the seminal REH literature (see Sargent and Wallace 1975, and the original source, Muth 1961).

13 "New classical market clearing models gain greatly in elegance and tractability by assuming a one product economy" (Shaw 1984, 74).

14 "[T]he trade union leadership will pay very close attention to crucial economic variables in the economy. They will possess a highly sophisticated model of how the economy behaves and employ highly qualified economic advisors … Through the proxy of trade unions many economic agents are acting in accordance with the rational expectations postulate" (Shaw 1984, 55). This presumes that the true model is known and agreed upon by "highly qualified economic advisors".

15 "When we say that the labor market clears, we do not mean that measured unemployment is literally zero. Rather, we mean that no individuals are voluntarily unemployed in the sense that they are prepared to work at the going wage, but cannot find employment. Friedman has termed this full employment rate of unemployment the *Natural Rate of Unemployment*" (Begg 1982, 136, emphasis added).

16 Shaw, whose book is quite balanced in its judgment on the REH, explicitly recognizes the hypothetical nature of the "natural rate".

17 Hahn called "the natural rate of unemployment" an "unproven assertion" (Hahn 1980 and 1982a). It is surprising that Stiglitz, an economist considered by many to be politically progressive, explicitly endorsed the concept: "I have become convinced that the NAIRU is a useful analytic concept" (Stiglitz 1997, 3).

18 Shaw wrote, "The rational expectations thesis departs from the classical equilibrium framework [Walrasian general equilibrium] in one very important respect. It does *not* assume that all economic agents possess perfect knowledge of all market conditions" (Shaw 1984, 67). This is incorrect, because the REH predictions are based on a "full model" of an economy.

19 Begg demonstrates that the REH produces a solution that converges to general equilibrium that is formally equivalent to the PFH. The proof has no relevance for *actual* predictions of future variables, however, since it presumes that the parameters of the "correct model" remain unchanged over many time periods. This is a perfectly legitimate procedure for an abstract model, but will not serve to justify market-clearing in the real world in which each time period heralds a new and unique event.

20 See Begg (1982, 137). The last clause in the quotation is misleading. Since the story being told is about static equilibrium states, the precise statement would be, "the effect on the level of real output will be nil".

21 It is no accident that REH–New Classical Economics stories are frequently told using the model of the simple quantity theory (see Shaw 1984, 3–7). Such examples prove nothing even in the abstract, because they incorporate the false dichotomy.

22 The inclusion of the phrase "no matter how we define the rest of the model" seems to be a slip of the pen on Begg's part. Elsewhere he argues cogently that introduction of the wealth effect cancels the "remarkable" conclusion of the new classical economists: "Provided there remains a real balance effect on consumption, systematic monetary policy will feed back through into the goods market, thereby affecting the level of investment required for market clearing," and "if monetary policy can alter the real steady state [full employment equilibrium] it will generally have real effects" (Begg 1982, 149, 147).

23 Even before the end of World War II, Modigliani, in one of his first publications, provided the summary statement that would become the keystone of the neoclassical synthesis:

> It is usually considered as one of the most important achievements of the Keynesian theory that it explains the consistency of economic equilibrium with the presence of involuntary unemployment. It is, however, not sufficiently recognized that … this result is due entirely to the assumption of "rigid wages".
>
> (Modigliani 1944, 64)

The thinly-veiled disdain here ("usually considered", "due entirely to", and "rigid wages" in quotes) indicates the low esteem in which Keynes's contribution was held by some even before he died in 1946.

24 But there was not much heterodoxy, at least in the United States. In the 1950s there were only two Marxist economists at a major American university, Paul Baran of Stanford and James Becker of New York University. After Baran's death Becker was the only one for several years.

25 For an evaluation of the impact of the New Classicals on the mainstream, go to www.econlib.org/library/Enc/NewClassicalMacroeconomics.html.

26 The difficulty of maintaining an interventionist policy position while accepting general equilibrium theory is treated in Milgate and Eatwell (1983).

10 Full employment and multi-commodity production

1 Keynes explicitly accepted what he called "the first classical postulate", which he summarized as "the wage is equal to the marginal product of labor" (Keynes 1936, 5ff.).

2 The term "output/income function" was used to refer to $y=y(k, n)$. This term was used because in neoclassical models y equals total value added. In this chapter we revert to the conventional term, "aggregate production function", because the debate

summarized in the next section is over whether $y = y(k, n)$ can be treated as summarizing production relations.

3 The terms became confused. Eichner and Kregel, for example, claim the "post-Keynesian" for an analytical model that derives its inspiration from Joan Robinson and Nicholas Kaldor (Eichner and Kregel, 1975). Before the term post-Keynesian came into general use, these two economists and like-minded theorists were referred to as neo-Keynesian. See Harcourt (1972).

4 Some economists, particularly those disposed to the Robinson-Kaldor school, objected to the use of the word "Keynesian" to identify this second group. Brothwell (1976), for example, preferred to call them "neo-Walrasians", for reasons explained in the next chapter.

5 In this respect, the neo-Keynesians had some aspects of their analysis in common with the "neo-Ricardians". The latter, however, place their analysis of distribution within a gross product framework (i.e., they consider intermediate costs as well as value added, Sraffa 1960). Those I later label disequilibrium Keynesians have little in common with the neo-Ricardians.

6 Following closely on this conclusion is the argument that the distribution between profits and wages is technically determined, a position first worked out in detail by John Bates Clark in his 1899 book, *The Distribution of Wealth* (reprinted by Harvard University Press in 1988). If one takes as given the aggregate production function, the supply schedule of labor, and the capital stock, and if money is strictly neutral, then the profit share and wage share are uniquely determined in full employment equilibrium. Aggregate distribution will not be treated here. For an excellent discussion of the implications of the Capital Controversy for the theory of distribution, see Fine (1980: 109–113).

7 Stiglitz and Walsh appear to be notable exceptions. They write,

> With a fixed amount of capital, the amount of equipment and machinery available for each worker falls as the number of workers employed goes up. For example, the first workers are hired and have their own desktop computers, but as new workers are hired and the amount of capital remains fixed, workers must share computers.
>
> (Stiglitz and Walsh 2006, 141)

If this statement is intended to be an empirical generalization, it is nothing more than an unsubstantiated opinion. If it is a theoretical generalization, it is absurd. To compound the confusion, they continue as follows:

> Diminishing returns to labor also occur because the most productive workers are likely to be hired first; as employment rises, workers with less training and fewer skills will be hired.
>
> (Ibid.)

This statement is wrong. Diminishing returns is specified for homogeneous labor, which is obvious in the two diagrams used by Stiglitz and Walsh on the same page.

8 The point of intersection corresponds to the commodity wage which is equal to the marginal product of the technique intersecting from the right in quadrant 10.2(d). Recall that for each technique the marginal contribution of labor is constant (though lower for technique B than A, C than B, etc.).

9 The debate is so called because its two sides tended to coincide with the two Cambridges – Cambridge, England, and Cambridge, Massachusetts. This particular designation indicates that the protagonists represented the elite of the elite of the economics profession at the time.

10 Hahn wrote, referring to the Sraffian version of the critique of the aggregate production function, "What is at risk is a simplified neo-classical comparative static equilibrium analysis and a simplified neo-classical dynamics. Sraffa's point was a fine technical insight into neo-classical economics but … [the critics] have not exploited it

… [O]n the manner in which an equilibrium is supposed to come about, neo-classical theory is highly unsatisfactory…. The remarkable fact is that neither [Sraffa] nor the Sraffians have made anything of this" (Hahn 1984, 383–384). This was first published as an article titled, "The Neo-Ricardians" (Hahn 1982b).

11 What follows treats only one aspect of what is called "the Capital Controversy". The definitive work on the various ramifications and implications of the debate is Harcourt (1972), where it is presented with insight and wit. The core of Harcourt's analysis is found in Harcourt (1969), and reprinted in Harcourt and Hamouda (1986).

12 For those familiar with trigonometry this is obvious. The ratio k_a/n_a is the tangent of the angle formed at the horizontal axis by a straight line beginning at point a' and passing through the relevant wage-rate of return coordinates. For example, k_a/n_a at w_a is measured by the tangent of the angle formed on the r axis by the extension of the line a' to a.

13 In the Marxian and neo-Ricardian literature, the variation of relative prices with the profit rate is referred to as the transformation process, or transformation problem. See Weeks (2010).

14 The mathematics of an economy-wide factor price frontier for a multi-commodity system are complex and tedious. See Fine (1980, 101), where the shape of the curve is briefly discussed, and for a more detailed presentation, Harcourt and Hamouda (1986, 173ff).

15 Any econometric test using time series data requires that the aggregate demand for labor schedule be estimated with a production function specified to distinguish between returns to scale and technical change. As is widely recognized, this distinction is empirically impossible without assuming what is to be tested. Were this problem somehow solved, correct identification of the demand for labor schedule requires simultaneous estimation of the demand schedule for capital, though this is hardly ever attempted. This part of the estimation encounters the problem that if factor price frontiers are not linear, then the value of the capital stock varies with the wage and profit rate and cannot be taken as an independent variable. Since the empirical test is for reswitching, it would be invalid to assume linear factor price frontiers, which exclude reswitching. Some writers have sought to test for reswitching in an indirect way, by looking at the factor intensity of commodities traded between two countries. This way of approaching the problem requires one to make a number of rather arbitrary assumptions specific to trade theory. It is interesting to note that some of these studies sustain the hypothesis that reswitching is a significant phenomenon. See Minhas (1962), Leontief (1964), and Ball (1966). The theoretical invalidity of empirical work on production functions is demonstrated elegantly in Shaikh (1974).

11 Full employment and disequilibrium

1 Clower wrote,

> Walras' Law, although valid as usual with reference to *notional* market excess demands, is in general irrelevant to any but full employment situations. Contrary to the findings of traditional theory, excess demand may fail to appear anywhere under conditions of less than full employment.
>
> (Clower 1965, 53)

2 Actual income can be defined in many ways. The generality of the discussion that follows is not affect by defining actual income as the income flow that coincides with the expenditure.

3 In the later chapters of *The General Theory* one encounters suggestions of a "secular stagnation" thesis, with Keynes placing stress upon the alleged investment-depressing effects of slow population growth and a slow pace of technical change.

4 "The traditional diagnosis of depressions which lays the 'blame' for unemployment on the obstinate behavior of labor is based on a *partial* equilibrium analysis" (Leijonhufvud 1968, 337).

5 Hahn, sometimes a polemical defender of the usefulness of general equilibrium theory in economics, was quite clear in his warnings about the theory's improper use:

> The most superficial acquaintance with game theory is enough to convince one that competitive instantaneous market clearing is not an axiom one wants to adopt.… What one must … not do is to claim that it comes from a deep "universal" of economics or that there are profound philosophical reasons for its employment.
>
> (Hahn 1984, 13)

6 Hahn (1984, 88) wrote,

> The achievements of economic theory in the last two decades are both impressive and in many ways beautiful. But it cannot be denied that there is something scandalous in the spectacle of so many people refining the analyses of economic states which they give no reason to suppose will ever, or have ever, come about.

7 Leijonhufvud (1968, 37) suggested the reform that the "strong assumption of instantaneous price adjustment" be relaxed.

8 Again, from Hahn,

> A consequence of [the use of general equilibrium theory in macro models] … has been … to designate all economic states with Keynesian features (e.g., involuntary unemployment) as disequilibria with the further implication that they will, if they exist at all, also soon disappear. Those who have been somewhat more sympathetic to Keynes … have none the less quite supinely agreed to having their endeavors called "disequilibrium economics". They have also much to their cost gone along with the vacuous proposition that there could be no Keynesian problems if prices and wages were "flexible".
>
> (Hahn 1984, 9)

Hahn's accusation that the Disequilibrium Keynesians accept in principle the existence of a general equilibrium full employment solution finds support in the following passage from Leijonhufvud,

> [R]econciling competition with unemployment appears as a "riddle" only when "competition" is implicitly equated with "perfect information". When a more realistic view is taken of the information problem … the emergence of unemployed resources is a predictable consequence of changes in demand.
>
> (Leijonhufvud 1968, 102)

9 Because of the neoclassical method of the disequilibrium Keynesians, their approach would seem to yield the same conclusion as that reached by a distinguished practitioner of general equilibrium theory, "Certainly, macroeconomics serves as a good 'simple' model which many economists feel is what we need.… But how one is to give it a theoretical foundation, I do not know" (Hahn 1984, 193).

10 Fine and Murfin argue that the disequilibrium Keynesians abandon macroeconomics and therefore should be considered as generalizing general equilibrium theory rather than as critiquing it (Fine and Murfin 1984, Chapter 2).

11 This was Marx's definition of the working class.

12 "The idea that there would be no unemployment in a barter economy is grotesque" (Hahn 1984, 192).

13 On monopoly, he writes, "We have argued that Keynes' theory constitutes an attack on, not an elaboration of, those explanations of depressions which stress monopolistic restraints on the movement of prices". Warming to his topic, he goes on to say,

> If the wealth distribution which the automatic working of the system brings about is accepted, behavior that interferes with the adjustment of relative prices is dysfunctional to the system and can be condemned on ethical grounds. Academic economists have been the high priests of this ethic.
>
> (Leijonhufvud 1968, 107–108)

12 Introduction to "open economies"

1 This standard definition can be found at http://economics.about.com/cs/economicsglossary.
2 See the online dictionary "Encarta" (http://encarta.msn.com/).
3 See Shaikh (1999), Driskall (1980) and Dooley (1979).
4 The International Monetary Fund had the task of monitoring the system of fixed exchange rates. For a historical review, see Eichengreen (1992).
5 The categories were (with number of countries in parenthesis): no independent currency (10), currency board (13), "conventional fixed" (70), pegged in a band (5), crawling peg (6), crawling band (1), managed float (48), and independent float (23). If one eliminates the first category and takes the Euro Zone as one currency, there are 166 currencies (International Monetary Fund 2007, Appendices, page 10).
6 The independent floating category included all major trading countries except China.

13 The neoclassical open economy

1 See, for example, Dornbusch and Fisher (1994, 167ff) or the more advanced Kenen (1994, 376–393). Neither derives the basic model mathematically. The best is Kenen (1994), to which frequent reference will be made.
2 A detailed critique is presented in the next chapter. The basic references are Fleming (1962) and Mundell (1963). In this chapter secondary presentations from textbooks are treated.
3 "Since the early 1960s, the dominant policy paradigm for studying open-economy monetary and fiscal policy issues has been the Keynesian framework developed by Mundell and Fleming" (Obstfeld and Rogoff 1996, 609).
4 I ignore the possibility of a country risk premium.
5 "In the Fleming–Mundell model … a permanent interest rate difference causes a permanent capital flow" (Kenen 1994, 378).
6 For example, Kenen uses "temporary" and "permanent" (Kenen 1994, 384ff).
7 An increase in expenditure is simpler diagrammatically, because it involves a parallel shift in the IS schedule, while a change in the tax rate would alter the slope of the function.
8 In the initial equilibrium the public hold their desired amount of bonds. Lower bond prices, a higher interest rate, are required to induce additional bond purchases.
9 In his textbook Kenen implies that the monetary expansion results in an equilibrium with a domestic interest rate below the world rate (see Kenen 1994, Figure 15–17, 391, where the BP schedule is not represented). His characterization of this equilibrium with less than perfect capital flows goes as follows, "Capital mobility strengthens [the shift of the IS curve], because the reduction in the interest rate induces a capital outflow, causing a greater depreciation of the currency" (Kenen 1994, 391). However, this logic implies a *downward* sloping BP schedule.
10 Dunn and Mutti wrote, "There is now relatively little serious discussion of abandoning flexible [exchange] rates" (Dunn and Mutti 2004, 431).
11 In 2005 in the IMF journal, *Economic Issues*, a review of exchange rate policy issued the following warning about governments shifting to a flexible exchange rate regime:

Country experiences indicate that four ingredients are generally needed for a successful transition to exchange rate flexibility:

- a deep and liquid foreign exchange market;
- a coherent policy governing central bank intervention in the foreign exchange market (the practice of buying or selling the local currency to influence its price, or exchange rate);
- an appropriate alternative nominal anchor to replace the fixed exchange rate; and
- effective systems for reviewing and managing the exposure of both the public and the private sectors to exchange rate risk.

(Duttagupta *et al.* 2005, 1)

14 Reassessing monetary and fiscal policy

1 In a discussion of fiscal policy, Romer wrote,

> [T]he exchange rate does not affect money demand.… The fact that the LM curve is vertical means that output for a given price level – that is, the position of the AD curve – is determined entirely in the money market.… [S]uppose that government purchases rise. This change shifts the IS curve to the right.… At a given price level this leads only to appreciation of the exchange rate and has no effect on output.
>
> (Romer 1996, 207)

2 "Since the exchange rate, rather than the balance of payments, moves constantly, domestic prices of traded goods are affected" (Dunn and Mutti 2004, 434). On the following and subsequent pages exchange rate changes are analyzed assuming all prices are fixed. For example, they write, "depreciation also increases domestic prices of tradable goods.… *The original increase in the domestic money supply remains intact*" (Dunn and Mutti 2004, 436, emphasis added).

3 That this effect is ignored in macro analysis is all the more surprising because it is dealt with in detail in trade theory (for example, see Van der Ploeg 1994, 53ff).

4 Agenor and Montiel call this the "dependent economy" model (1996, 48–52).

5 Equation 1.3 is obtained as follows:

$$dy/y = y' = [(a_1 + a_2)/a_3]de/y$$

For the first term, multiply numerator and denominator by e/x and substitute $a_3y = z = x$. This produces:

$$y' = (\varepsilon_1 + \varepsilon_2)e'$$

6 This is the Marshall-Lerner condition. I do not derive it. Those interested should see http://www-personal.umich.edu/~alandear/glossary/m.html.

7 The price level, p, is equal to the weighted average of domestic prices (p_d) and import prices.

$$p = (1 - a_3)p_d + a_3e$$

When domestic prices are constant and product markets competitive, the rate of change of the price level is the marginal propensity to import times the change in the exchange rate (see Agenor and Montiel 1996, 44–45).

8 See *World Development Indicators*, freely available online, where there are data for all countries: http://go.worldbank.org/JKKOV0UJV0.

9 For example, what Kenen calls "consensus" estimates of the sum of *long-run* trade elasticities for seven "major industrial countries" were all below one (Kenen 1994, 356). Short-run elasticities would be even lower. Hooper *et al.* (1998, 9) conclude that "the short run price elasticities are, in all cases, less than 1 and not significantly different from zero".

10 The term “emerging market economies” is a synonym for the World Bank category “middle income countries”.
11 The quotation is from *Civil Disobedience*, see www.bartleby.com/73/753.html.

15 Neoclassical inflation: keystone of reactionary policies

1 The New Classical economists made much of this distinction. See Parkin (1984, Chapter 12).
2 Where I have inserted “prices” Keynes uses the term “cost-unit”. This does not affect his meaning and is more familiar for twenty-first century readers. The words “fully proportional” could suggest that Keynes had not completely abandoned the concept of the neutrality of money at full employment. An alternative explanation is that he did not mean the words as a rigorous analytical statement.
3 The cliché is usually attributed to his Wincott Memorial Lecture in London, September 16, 1970.
4 “The long-run Phillips Curve is vertical, or, in substance, that in the long run money is neutral” (Modigliani 1979, 119).
5 The “discouraged worker” hypothesis maintains that when labor markets are in excess supply some people suspend the active search for employment because of the low probability of finding it. There is considerable empirical support for this hypothesis, which implies that the labor force participation rate and potential output vary with the level of aggregate demand (Flanagan 2008).

16 De-commissioning policy tools

1 See the discussion in Henry (1983), which focuses on the American economist John Bates Clark.
2 Jan Tinbergen shared the 1969 Nobel Prize for Economics with Ragnar Frisch. Jan Tinbergen has the unique distinction of being a Nobel prize winner in a family with another winner, his brother Nikolaas (in physiology).
3 While monetization is formally equivalent to printing currency notes, this is also the case when a commercial bank uses its excess reserves to extend a new loan. No one calls what a bank does “printing money”.
4 It is so called because of an article by David Ricardo, “Essay on the Funding System”, which might be interpreted as implying this equivalence.
5 See Irvin’s article at www.guardian.co.uk/commentisfree/2010/nov/07/myths-swallowed-by-george-osborne.
6 Thomas Hobbes, with more insight than Adam Smith, recognized that pursuit of individual self-interest would result in a “state of war” and lives that would be “solitary, poor, nasty, brutish, and short” (*Leviathan* I, 13).
7 The four measures are much the same as those in the program of the British Labor Party in 1945, which was more radical than what was implemented during 1945–1951 (www.unionhistory.info/timeline/1945_1960.php).
8 This principle can be found at www.ilo.org/ilolex/english/iloconst.htm. It is sometimes called the Declaration of Philadelphia, where it was adopted in 1944 at the twenty-sixth conference of the International Labour Organization.
9 A universal basic income would be paid to the employed as well as the unemployed. Possible specifications for such programmes are explained in detail at www.basicincome.org/bien/. See Standing (2011, 299ff.) and Pollin and Luce (1998).

17 The critique summarized

1 Along with Joan Robinson, Nicholas Kaldor was a distinguished economist not awarded the Nobel Prize. His approach to macroeconomics is shown in Kaldor (1957), which was elaborated by Pasinetti (1962).

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