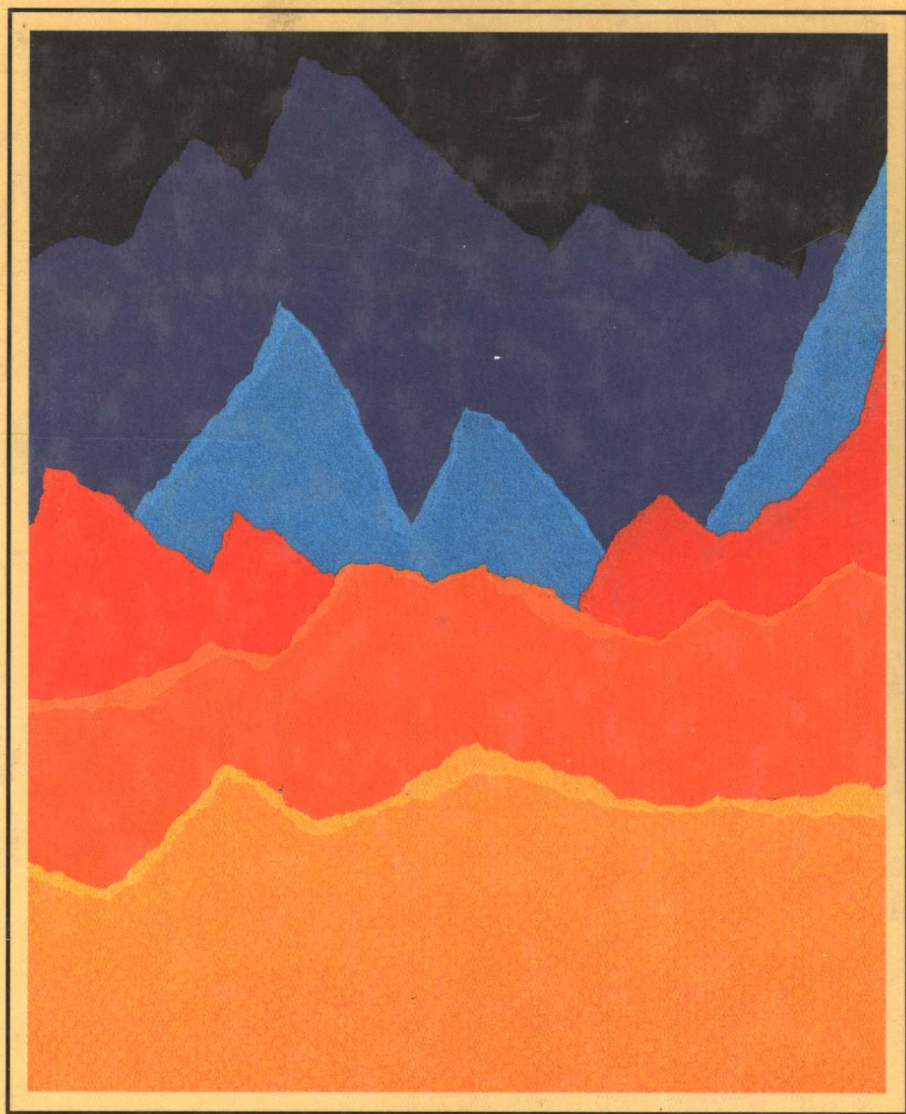


MACROECONOMIC THEORY



George T. McCandless Jr.

Macroeconomic Theory

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Preface

This text is intended as an introduction to modern macroeconomic theory. It is not intended to be a giant, all-encompassing macroeconomic text, but rather to present both a fairly concise, coherent development of macroeconomic thought as a historical process and a serious discussion of the current issues in macroeconomics.

The book grew out of my own uneasiness with existing texts. It seemed that too many of these texts presented the classical model as an intellectually empty construct and the Keynesian model as if it were brought down from the mountain by Keynes. They failed to present the development of economic thought as a process in which the Keynesian model has an important, but not final, place. This approach began as I attempted to incorporate the models in Tom Sargent's *Macroeconomic Theory* into my macroeconomics classes. The dynamic analysis grew out of efforts to present the issues of expectations formation and the Phillips curve failure of the 1970s to my students.

The book is innovative in several ways. It presents a static model that captures much of the intellectual aspects of classical economics, a static Keynesian model, and dynamic Keynesian models with naive, adaptive, and rational expectations, all developed with essentially the same intellectual framework. The failure of each model to match or predict the data at some point in time is explored, and the next model is seen as a development to solve this failure in prediction. Dynamic models are almost never presented in undergraduate texts, but issues such as inflation (which is a rate of change) demand them. Their development here is consistent with the earlier, static, models and is fairly simple. Some very modern economic models are used but they are presented in a way compatible with undergraduate technical skills. The computer package follows the text very closely and allows the student to perform additional experiments quite easily. It is particularly useful in working out the dynamic models.

Chapters 2 and 3 develop some basic microeconomic tools. Chapter 4 begins the study of macroeconomics with a discussion of the problems of aggregation, national income accounts, and price indices. Chapter 5, following fairly closely on the material in the early part of Thomas Sargent's *Macroeconomic Theory*, develops the aggregate demand side of all of the models to follow. In this chapter is a discussion of the consumption function and the theories of permanent income and the life cycle hypothesis. Investment is discussed briefly but fairly deeply. Chapter 6 presents some exercises in the use of the aggregated demand curve for analyzing government policies.

Chapter 7 begins the historical development with a classical model (where classical signifies that all markets clear). In this chapter the basic version of the four-quadrant diagram that underlies all the models that follow is first constructed. Although this diagram initially appears to be quite complicated, it is constructed from a set of quite simple ideas and is a very compact and elegant way of combining these ideas. A section on supply side economics (of the Reagan variety) is included in this chapter. Chapter 8 begins with the failure of the classical models to provide policy suggestions during the Great Depression and develops a Keynesian model that permits unemployment and provides the standard Keynesian solutions to this unemployment.

Chapters 9 through 12 present dynamic versions of the Keynesian model in which the agents are given ever more information for predicting relevant variables. The standard Phillips curve is shown to be consistent with a dynamic Keynesian model in which individuals have naive expectations (where "naive" means the least amount of information). A shifting Phillips curve is generated with adaptive expectations à la Cagan and the Phillips curve disappears as a policy tool under rational expectations. Two general models (one Keynesian and the other a general equilibrium model) that give rise to business cycles are explored in Chapter 12.

Chapters 13 through 15 deal with issues of money and monetary policy. Chapter 13 contains some definitions of money and a short history of money and banking in the United States from colonial times to the present. This history is included because most students believe that what is has always been, and an illustration of the rich United States monetary history helps break this belief. Chapter 14 discusses the Federal Reserve System, monetary policy, bonds and interest rates, and the money-creating aspect of the banking system. This chapter ends with a reprise of the earlier models but with the effects of monetary policy on interest rates and investment included. Chapter 15 discusses policy options in a world with perfect foresight through an overlapping generations model of money. This is included for several reasons. First, a model is developed that generates a social security system. Then, the model generates a private demand for money; lastly, it is possible to explore what policy options are available to a government even when the citizens have perfect foresight with respect to government policy.

Chapter 16 uses game theory to explore the kinds of policies that are available to a government in a world with rational expectations. These explorations balance the policy ineffectiveness that was predicted by the extreme rational expectations

model in Chapter 11. This is done by considering strategic policy options for the government in a simple game-theory environment. Chapter 17 deals with the effects of the issues presented in public choice theory on government policies.

Chapter 18 deals with international economics. It is a standard pure-trade theory model, in which issues of gains from trade, causes of trade, and some commercial policy can be developed. The basic issues of international (open economy) macroeconomics have been integrated with the earlier chapters, including some issues of balance of payments and exchange rates. The material developed allows some simple extensions of the models into a world with other countries.

I am grateful for the comments of the members of the classes at the University of Minnesota, Dartmouth College, and the University of Chicago where this text was developed. Additional helpful comments were given by Evangelos Falaris, Dennis Hall, Mustafa Koluman, Nicholas Noble, Charles Whiteman, Sharon Erenburg, and Ernst Stromsdorfer. Patricia Pitzele read and critiqued the entire manuscript, Barbara Belisle provided invaluable administrative support, and Susan Everly helped me prepare the index. At Prentice Hall, my editors, William Webber and Whitney Blake, my production editor, Joanne Palmer, and the rest of the staff were extremely supportive and friendly.

Contents

Preface xiii

1 Introduction 1

2 Production 8

Factors of Production 9

Agents 12

The Production Process 14

The Production Possibility Frontier 19

Trade with Other Economies 22

Reprise 23

Exercises 24

3 Supply and Demand 25

Introduction 26

A Demand Curve 27

A Supply Curve 32

The Market and Market Dynamics 34

Reprise 38

Exercises 39

Appendix 40

4 Aggregation 43

Some Sample Data 50

Reprise 55

Exercises 55

5	Aggregate Demand	56
	Introduction	57
	Aggregate Demand	58
	The Consumption Function	59
	The Investment Function	69
	Government Expenditures	72
	The Aggregate Demand Curve	74
	Reprise	75
	Exercises	76
6	Shifts in the Aggregate Demand Curve	77
	Introduction	78
	An Example of a Change in Investment	79
	Examples of Government Policies	81
	Exercises	84
7	"Classical" Aggregate Supply Curve	85
	Introduction	86
	The Production Function	86
	The Labor Market	88
	The Price—Real Wage Curve	93
	The Aggregate Supply Curve. Finally!	94
	Equilibrium in the Classical Model	96
	A Policy Example	97
	Supply Side Economics—the Classical Version	98
	A (Slightly) Open Economy	100
	Reprise	104
	Exercises	104
	Appendix	105
8	The Keynesian Model	107
	Introduction	108
	The Keynesian Aggregate Supply Curve	110
	Keynesian Equilibrium	114
	The Keynesian Version of Supply Side Economics	116
	The Keynesian Multiplier	118

Reprise	120
Exercises	121

9 The Phillips Curve 122

Introduction	123
The Phillips Curve and the Keynesian Model	126
Government Policy Under Naive Expectations	129
Reprise	133
Exercises	133

10 Adaptive Expectations 134

Introduction	135
Putting Adaptive Expectations in the Keynesian Model	138
Comparing Naive and Adaptive Expectations on a Long Term Policy	141
Reprise	146
Exercises	146

11 Rational Expectations 148

Introduction	149
The Phillips Curve—the Data	150
Modeling Rational Expectations	151
An Extreme Version	153
The Phillips Curve—the Theory	156
An Income Tax Cut	159
Not Exactly a Reprise	162
Exercises	163

12 Business Cycles 165

Introduction	166
Some Early Business Cycle Theories	171
Hicks-Samuelson Model	173
Lucas's Equilibrium Business Cycles	178
Countercyclical Policy: A Comment	182
Reprise	184
Exercises	184

13	Money	186
	Introduction	187
	A Short History of Money and Banking in the United States	191
 14	 Banks and Financial Institutions	 204
	Introduction	205
	The Federal Reserve	206
	How Banks "Create" Money	207
	Returning to the Federal Reserve System	209
	Bonds	210
	Open Market Operations	214
	Money in Our Macro Models	215
	The Return of the Supply Side	216
	Reprise	219
	Exercises	220
 15	 Money and Policy under Perfect Foresight	 221
	Introduction	222
	The Economy	223
	Laissez Faire Equilibrium	226
	Equilibrium With a Long-Lived Government—a Transfer Scheme	226
	Monetary Equilibrium	227
	Inflation and Money	229
	Other Assets	234
	Reprise	237
	Appendix	238
 16	 Strategic Government Policies	 240
	Introduction	241
	Single Game Models	242
	Nash Equilibrium	245
	Mixed Strategies	246
	Repeated Games (Supergames)	249
	Reputations	252
	Reprise	256

17	Choosing Government Policies	258
	Introduction	259
	Public Goods	261
	The Unanimity Rule	264
	Majority Rules	265
	The Median Voters	267
	Cycling	270
	Arrow's Impossibility Theorem	273
	Reprise	279
18	Open Economy Macroeconomics	280
	Introduction	281
	Exchange Rates	282
	An Open Economy Aggregate Demand Curve	292
	An Open Economy With a Classical and New-Classical AS Curve	295
	Foreign Assets	298
	Reprise	305
	Index	307

1

Introduction

In which we are introduced to the heroine of our story, discover a little of her history, meet some of the men most important in her life, and become aware of some of her current trials.

We get the word economics from the Greek words *οικοζ* (house) and *νομζ* (rule), or the rules of management of the household. "Household" was a very general term and could mean either the household of a single family or the household of a state or city-state. The early Greeks (Plato, Aristotle, and Epicurus, for example) wrote about economics. Aristotle, who was the most influential of these writers in Western thought, attempted to determine the **just price** for goods. His work in this area dominated economic thought in the Middle Ages and is still of interest to the more philosophically inclined economists of today.

From the mid-seventeenth century until fairly recently, economics was devoted almost entirely to the study of commercial arrangements; the interchange and production of goods. More recently, economics has developed into what Nobel Prize winner George Stigler calls the "Imperial Science" and has encroached on the realms of political science with an economic analysis of the behavior of politicians, returned to the household with an analysis of the formation and dissolution of families, and added education with an analysis of the formation of human capital or knowledge.

Economics has traditionally¹ been divided into two subcategories, microeconomics and macroeconomics. Microeconomics studies the behavior of individual **agents**, households or firms, as they attempt to maximize some kind of objective function²—their welfare or profit—in the face of such constraints as their incomes, time, likes and dislikes, prices, and taxes. It can be used rather successfully to explain or predict the changes in an individual's behavior in response to changes in these constraints. For example, economists can fairly accurately predict how individuals will change their purchasing patterns in response to some price changes. Microeconomic methods have been used to analyze such areas of human concern as the structure of industry, the introduction or removal of specific types of taxes, the optimal use of nonrenewable and renewable resources, schooling, occupation choice, marriage, toothbrushing, and (my personal favorite) household allocation of time and church attendance.

Macroeconomics is the study of economies in the large ("macro" is from the Greek word *makros*, which means "long") or, more accurately in its modern use, in the aggregate. It is the attempt to analyze the interrelated behavior of all the agents in an economy. Usually the macroeconomist tries to describe the behavior of each type of agent and the types of institutions through which these different types of agents interact. This is normally done with a mathematical model which, once constructed, is solved in order to determine how the macroeconomy will behave.

¹ This is a very recent tradition. According to the Oxford English Dictionary (supplement), the first use in print of the word "macroeconomic" was in 1948, when David Hawkins used it in the title of an article published in the November edition of the journal *Econometrica*. Interestingly enough, the word was not used in the text of the article, only in the title.

² Some psychologists claim that individuals who appear to act irrationally (the insane) can be viewed as having rational **processing** behavior, but have somehow collected information on life that is wildly at variance with sane norms.

Difficulties arise in macroeconomics for at least two reasons. In order to make the models tractable, massive simplifications occur. The nature of these simplifications determines the nature of the shortcomings in a particular model's ability to describe the real world. Second, data is insufficient to allow us reliably to distinguish innocuous assumptions from those that generate serious errors. Many—possibly infinitely many—models cannot be rejected by the data. The inability of macroeconomists to conduct careful experiments is a major obstacle in the search to generate an accurate model of the economy. It is a continual frustration to many economists that because of their inability to perform experiments they are unable to use the scientific method.

One of the major controversies in macroeconomics is the role of government, or more precisely of a central or federal government. There are two polar positions in this debate, with a bunch of folks falling in between. One position, currently called “liberal” even though this usage is at variance with the term's older definition, claims that the government must provide many services and a controlling or guiding role in the economy. Those who take this position believe that the government can and should make policy changes that change, in some beneficial way, current aggregate economic variables. The variables most often considered are aggregate output (called Gross National Product, GNP), inflation, and unemployment. The view taken is that the government itself has an understanding of the kind of trade-offs (represented by a mathematical function, called a trade-off function, that describes the preferences of the government) that it is willing to make between various values of these variables. It then wants to follow policies that will yield an optimal value to its trade-off function. (This is what a government will do, even though one may be unlikely to find many government officials who are able to describe either their own or their government's trade-off function.) Note that this position contains two possibly separate views: That a wide range of social services *should* be provided by government and that the government *can* control the aggregate economy.

The other position, currently called “conservative,” usually claims that government *cannot* control the current aggregate economy and *should not* provide social services since the provision of those services by government only hinders the proper private operation of the economy. What a government *can* and *cannot* control are the crucial questions of macroeconomics. What it *should* and *should not* do are moral or political questions.

Modern economics is thought by many to have begun with Adam Smith³ and his book *The Wealth of Nations*, published in 1776. In this book, Smith argued that the free interactions of individuals, each selfishly pursuing individual goals and attempting to become as well off as possible, generated the greatest welfare for

³ Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (London: W. Strahan and T. Cadell, 1776). As with almost everyone else, Smith did not generate his ideas in a vacuum. Important influences on Smith include Hutcheson, Locke, and Smith's friend Hume. The general notion of the fine order of the natural universe that belonged to the system of Newton heavily influenced the 18th century.

society as a whole. Government, in this view, was small and had the role mainly of enforcing private contracts. The individuals who followed these ideals of a *free* interaction of individuals originally called themselves “liberals,” and were against such policies as the government’s granting of monopolies and other restrictions on free trade. This is the point of view of those currently called “conservative,” while current “liberals” are those who favor government intervention. How this change in meaning came about is one of the mysteries of etymology.

Economic research in an environment with this contemporary conservative philosophical background is aimed mainly at understanding the *structure* of the economy and the nature of the interactions of its various agents. It has been long known that economies exhibit **business cycles**, alternating periods of boom and bust; periods of great business activity, high employment, and raising wages and profits, followed by periods of reduced business activity, increasing unemployment, and declining wages and profits. Macroeconomic research in the early part of this century attempted to explain these business cycles and to consider the effects of such economic institutions as banking laws, the nature of transfer schemes, and investment incentives on these fluctuations. This was the era we will consider in our **Classical Model**. (We are doing a little disservice to the historical economic usage of the term classical economics. Classical economics is often used to signify pre-marginalistic economic thought. This would include the works of Smith, Ricardo, and Marx. The economic theories of the early part of this century would be more accurately classified as neoclassical. For us, in this book, the terminological distinction is not important.)

The 1920s and 1930s saw the onset of the “Great Contraction,” as Milton Friedman likes to call it, or the Great Depression, as almost everyone else calls it. During this time the old economic ideas seemed not to be working. The great unemployment and misery seemed far removed from the society described by Adam Smith and the many neoclassical economists who followed him. With something like one third of the labor force unable to find work, the classical model and its promise of full employment seemed of little relevance to the world in which people lived. More germane, a model that does not permit unemployment tells one nothing about how to get rid of it.

In 1936 in England, John M. Keynes published his book entitled *The General Theory of Employment, Interest, and Money*.⁴ The economic model developed in that book—and since relatively few people actually read *The General Theory*, it’s main ideas were spread by Keynes through his students at Cambridge University—described a world that *could* contain unemployment. Here was a model in which markets did not work perfectly. In his model, asymmetries existed in the labor market (a market that would determine full employment wages) and in the investment market (a market that would determine the interest rate so that savings and investment would equal each other). These asymmetries made it

⁴ John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt Brace, 1935).

possible for the labor market not to clear—for unemployment to exist—and for the interest rate to fail to clear the investment market.⁵

The most important aspect of this model from a historical point of view, however, was that it provided a theoretical rationale for the economic intervention that the governments at that time so wanted to pursue. This does not mean that the **Keynesian Model** was being scientifically applied to regulate the economy; that was for much later. The mildly activist governments of the time finally had an economic theory that justified what they were doing and what they wanted to do. This, in part, was the reason for the phenomenal success of *The General Theory*. A second important result of this “Keynesian revolution” was a serious change in the direction of economic research. Instead of trying to understand how business cycles were generated in an economy, economists became concerned with trying to determine how to use short-term countercyclical policy to mitigate the effects of these cycles. The belief in this new approach, called **Keynesian Countercyclical Policy**, was reinforced by a statistical *correlation* noticed in the 1950s in both England and the United States by A. W. Phillips. Phillips noticed that periods of high unemployment tended to be correlated with periods of low inflation. Few doubt the ability of the government to generate inflation—this has a long and gory history—and if Phillips’s discovery was interpreted as proving a *causal* relationship between inflation and employment, it could be viewed as strong statistical evidence in support of the Keynesian model and activist government policy.

By 1964, the Keynesian model had gained such acceptance that W. W. Heller, then chairman of the President’s Council of Economic Advisors, persuaded President Johnson and the congress to pass a tax cut with the specific intent of pulling the economy out of the small recession it was then in. The idea was to use deficit spending during recessions and to tax more than the government spent during boom periods to help counter the business cycle. With varying degrees of faithfulness, especially with respect to the part about taxing more during good times, that policy has since been pursued in both the United States and many other countries. Through the 1960s these Keynesian types of policy were considered great successes, especially with the rising world standard of living and the long continued growth that was then being experienced in the United States and Europe. Robert Solow—who won the 1987 Nobel prize in economics, but not for this comment—declared that economists finally understood how the macro-economy worked. Moreover, in the future it would simply be necessary to get better estimates of the parameters of these models to be better able to do the fine tuning that the economy would require.

A major crisis occurred in macroeconomics in the 1970s. As that decade’s data, which showed a surprising combination of high inflation and high unem-

⁵ A market clears when the price moves to the point where the quantity of a good or service that is demanded equals the quantity that is supplied. In terms of a labor market, the market clears when all of those who want work find it. The unemployed are those who do not want to work at the prevailing wage.

ployment came in and presented patterns unexpected for and unexplained by a Keynesian world, economists began seriously to question the predictions generated by that model, and some of the younger economists began to question the basis of the model itself. This set off a round of work aimed at discovering what was required to improve the Keynesian model in order to allow it to be better able to predict economic variables.

One of the major intellectual innovations in economics that grew out of this research was the inclusion of individuals' expectations into the macroeconomic models. It had been recognized early on that individuals' expectations were important in economics, but little had been done to incorporate those expectations into macroeconomic models. In *The General Theory*, Keynes had spoken of the effects and importance of expectations, but this style of development had virtually disappeared in the Keynesian theory that was developed by his most eminent followers. In response to the crisis of the 1970s, the Keynesian model was first augmented by the inclusion of the notion of adaptive expectations⁶. In adaptive expectations, an individual's expectations of inflation were formed by a learning process based on the inflation that he had observed over the last few years. This adaptive expectations model generated a shifting Phillips curve that could explain the data reasonably well. The adaptive expectations approach to changing the Keynesian model was well liked by the older economists because it preserved much of the theory that they already knew and required only minor adjustments in their lifetimes' beliefs.

A group of young economists suggested another way of viewing the macroeconomy. Noting a number of inconsistencies in the Keynesian model, they began concentrating on the microeconomic foundations of macroeconomics. This led to what is now called **Rational Expectations Theory**. At the core of this theory is the "Rational Expectations Critique" of economic policy making. This critique is as follows: Suppose one estimates an economic model, using statistical tools to find estimates of the variables and coefficients in a macroeconomic model, and does not explicitly include in that model the way that individuals' expectations of government behavior—to use one of the most important examples—influence their behavior. If one then uses this model to make predictions about what the economy will be like if the government changes its behavior, one will almost certainly get incorrect predictions. This is because the behavior of the individual agents will depend on what they think the government will do, and these expectations are incorporated in the values of the coefficients that are estimated. If the government changes its policies, individuals change their behavior, and the equations will then have different coefficients. The *old* set of coefficients is incorrect for forecasting the effects of a *new* policy. This way of viewing the economy, known as the New Classical economics, brought to the front, again, the whole question of the feasibility of helpful government action. If individuals guess correctly,

⁶ The most important source for the idea of adaptive expectations comes from Phillip Cagan's study of the hyperinflations in Germany and other eastern European countries after World War I.