

APPLIED INTERMEDIATE MACROECONOMICS

This textbook offers a complete course in applied macroeconomics at the intermediate level that emphasizes the application of economic theory to real-world data and policy. Topics covered include national and international income and financial accounts, business cycles, financial markets, economic growth, labor markets, aggregate supply and demand, inflation, and monetary and fiscal policy. The text is unique in developing a detailed toolkit of elementary statistics and graphical techniques for economic data. One strength is its detailed treatment of national and international financial markets and the institutions of monetary and fiscal policy, which makes it especially helpful in understanding recent economic crises. The website for the text is found at www.appliedmacroeconomics.com.

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To
Joseph Bisignano
and
Andrew Graham,
my teachers and mentors in the quest to understand the economy,
not as we want it to be, but as it is.

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This book was first conceived in the mid-1990s when I engaged in a radical reformulation of my bread-and-butter Intermediate Macroeconomics course at the University of California, Davis – making it much more empirically oriented. None of the extant textbooks really suited my course. My first debt is to John Greenman, then a commissioning editor at Addison-Wesley. When he first proposed that I write a textbook, I expressed the reservation that the book that I wanted to write would be too unlike the market leaders, too much of a niche book to be commercially successful. Even so, he urged me to write a prospectus and offered me a contract. For various reasons, the work on the book was slow, and after a number of personnel changes, Addison-Wesley and I parted ways.

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To the Student

The goal of economics is to make sense of the economy. *Applied Intermediate Macroeconomics* keeps that goal constantly in mind. It teaches macroeconomics as a tool of factual and interpretive understanding of the economy. It differs from most intermediate macroeconomics textbooks in its focus on applications to real-world data. The object is to prepare students to use economic theory and data to illuminate the information and policy debates that constantly bombard us in newspapers, on television and radio, and online. The strategy of the book is always to illustrate economic theory with data and detailed worked examples and to present the student with problems that involve the analysis and interpretation of actual data.

This strategy presupposes some facility with data manipulation and some familiarity with rudimentary statistics, such as constructing graphs, calculating growth rates, and taking means. The necessary level of statistical prowess is roughly things one can easily do with data using Microsoft's Excel or a similar spreadsheet *without* any special statistical add-ons. The text assumes a basic competence with Excel or another spreadsheet, and it gives frequent hints about particular applications. Most students will already have the necessary skills. But those who do not need to get quickly up to speed. The website www.appliedmacroeconomics.com, which is a resource for this book, contains some guidance on getting started with Excel.

The book does not assume that the student already knows any statistics. It teaches all the statistics required. The key resource is the chapter entitled *A Guide to Working with Economic Data* – usually referred to simply as the *Guide*. The *Guide* aims to be a self-contained reference – with clear, detailed explanations and numerous examples. It can be read profitably front to back or dipped into on an as-needed basis. Precise details often matter, so that even a student who is fairly familiar with basic statistics would be well advised to read the relevant sections of the *Guide* as a review. The main text contains numerous pointers to the sections of the *Guide* relevant to particular issues. And the instructions for the problems at the end

of each chapter also note the relevant sections of the *Guide* that explain the techniques essential to doing the problems.

To master applied macroeconomics it is not enough just to read the text. The student must actively engage the material: pay close attention to the details of the worked examples, read the relevant sections of the *Guide*, and do the problems at the end of each chapter thoughtfully and carefully, always thinking about the way in which the theory in the text illuminates the data and the way in which the data illustrate, test, or challenge the theory. Remember that in the end, it is not about crunching numbers, but about analyzing, interpreting, and understanding the economy.

In addition to the *Guide*, the book contains other resources to aid the student:

- key concepts in each chapter are indicated in the text by bold-faced small capitals at the point of first use or best definition or discussion (e.g., **ECONOMIC MODELS**); other important terminology is indicated by bold-faced regular type (e.g., **production boundary**);
- all emboldened terms are defined in the Glossary;
- a list of Symbols used in the text is provided;
- a Summary of each chapter is broken down into succinct numbered points;
- Suggested Readings for each chapter provide sources for pursuing the subject of the chapter further;
- a Guide to Online Resources – mostly to sources of data – is provided.

The website www.appliedmacroeconomics.com provides essential supporting materials for the textbook and courses that use it. The website contains regularly updated data keyed to the end-of-chapter problem sets. It also includes hints for getting started with Excel, answers to selected end-of-chapter problems, and various other supplemental materials and links.

To the Teacher

The Problem and the Pedagogical Approach

This textbook has had a long gestation. It began in the mid-1990s when I taught intermediate macroeconomics at the University of California, Davis. I became increasingly dissatisfied that even very good students, students who had easily mastered the textbook materials, left our program with little factual knowledge of the economy and with little ability to make the theory that they had learned helpful in interpreting real-world macroeconomic issues. Even students who received A grades in Intermediate Macroeconomics often found it difficult to understand economic news and to use sound economic analysis to criticize the economic proposals of pundits, politicians, or central bankers.

I began to rethink my course – what its objects should be and how I should teach it. Most economics majors do not go on to further graduate study in economics. The greatest value-added for the typical student would be a macroeconomic education adapted to understanding the real world as filtered through the media and politics. Even those who go on to graduate study would be better prepared to appreciate the ultimate motivation of macroeconomic theory if they had first developed a good practical understanding of applied macroeconomics. This textbook is the fullest expression of that rethinking and is grounded in about fifteen years of teaching macroeconomics at UC Davis and at Duke University along these new lines.¹

Current intermediate macroeconomics texts suffer from three common problems:

- *Theory is detached from the facts of the economy.* Textbooks often include boxed case studies to illustrate theoretical principles and illustrative graphs and tables

¹ A fuller account of the pedagogical philosophy behind my earlier courses and the book appears in Kevin D. Hoover, “Teaching Economics While Taking Complexity Seriously,” in David Colander, editor, *The Complexity Vision and the Teaching of Economics*. Cambridge: Cambridge University Press, 2000, which can be downloaded from www.appliedmacroeconomics.com.

of current data. The numbers in the chapters on national income accounting are updated with each edition. Yet the facts of the economy are usually peripheral – not woven tightly into the main exposition. And it is common for students to emerge nearly as ignorant at the end of the course of the basic features of the economy as at the beginning.

- *Exposition of theory is not well adapted to the real world.* Macroeconomic news generally reports rates of change (e.g., growth rates, inflation rates), whereas typical textbooks focus on levels (e.g., the aggregate supply and demand curves determine the level of prices and GDP). The teacher knows how to translate from one context to the other, but the average student finds it difficult. Much of real-world macroeconomics is closely tied to the complexities of financial markets. Textbooks typically focus on “the” rate of interest as determined by the supply of and demand for money, leaving a richer analysis of financial markets to later money and banking courses.
- *There is too much stress on theoretical closure and advanced topics at the expense of first principles.* Many intermediate macroeconomics textbooks read like graduate textbooks without the mathematics.

In contrast, this book aims to avoid these common pitfalls through a complete integration of macroeconomic theory and statistical analysis and interpretation.

The goal of economics is to make sense of the economy. *Applied Intermediate Macroeconomics* keeps that goal constantly in mind. It teaches macroeconomics as a tool of factual and interpretive understanding of the economy. The key is that the textbook introduces elementary data analysis simultaneously with macroeconomic theory. Students apply these skills to the interpretation of actual U.S. economic data. Students develop competence to use economic theory and sophisticated back-of-the-envelope statistics as tools of analysis. They leave the course with both a well-grounded knowledge of the main features of the U.S. economy and the skills necessary to analyze any macroeconomy.

The textbook is structured around three parallel and interrelated streams:

- A clear presentation of the fundamentals of macroeconomic theory
- A practical introduction to elementary statistics
- A set of structured empirical exercises using actual macroeconomic data and the elementary statistical and graphical tools commonly available in modern spreadsheet software

The focus is on macroeconomics, not statistics. The only purpose in introducing the statistics is to give the student a foundation for applying the theory to actual data. Statistical topics are limited to those suitable for the task at hand, and are introduced only as needed to support the developing account of the macroeconomy. Consider each of the three streams in turn.

1. Macroeconomic Theory

The textbook has a clear theoretical point of view. It is Keynesian in the sense that recessions and cyclically high unemployment are regarded as (possibly remediable) deviations of the economy from optimal economic arrangements. Classical (and new classical) analysis in which all markets are regarded as clearing is seen as a limiting case, practically important for fully employed economies. Doctrinal disputes are largely ignored in the text, as they are more likely to confuse than to inform the neophyte.

Although the textbook concentrates on the practical core of macroeconomic theory, which is familiar to economists and is covered in other macroeconomics texts, it is distinguished from these texts by its emphasis on empirical applications of the theory. Some features that enhance the empirical relevance of the theory include:

- *Emphasis on fundamental economic ideas and their application.* Some examples: the distinction between real and nominal magnitudes, the distinction between *ex ante* and *ex post* points of view, the importance of expectations, opportunity cost and present value, supply and demand, arbitrage, and risk.
- *Richer than usual discussion of the structure and importance of financial markets for the macroeconomy.*
- *Orientation toward monetary and fiscal policy (including both aggregate effects and incentive effects) from the beginning of the book.* Relevant facts about policy can be gleaned from the earliest chapters on national accounting, through later chapters on factor markets and financial markets, and to the last chapters in which policy takes center stage.
- *Stress on a changing economy.* The analysis of economic growth and business cycles is integrated. The exposition is formulated so that the student can readily map the theory of the book onto the growth rates, inflation rates, and unemployment and utilization rates that dominate economic policy goals and popular economic commentary.

A symposium in the *American Economic Review* (May 1997) posed the question, “Is there a core of practical macroeconomics that we should all believe?” The approach in this book comes closest to the separate answers offered in that symposium by Robert Solow and Alan Blinder. Between them, Solow and Blinder identified the practical core as including: neoclassical growth theory, the IS curve, the Phillips curve, and Okun’s law. Blinder observed the necessity for a more realistic treatment of financial markets that would downplay the analytical role of the LM curve (the instability of money supply and demand having rendered it virtually irrelevant analytically and as a guide to policy) and would provide an adequate account of the term structure of interest rates. A similar case for eliminating the LM curve from the macroeconomic model has been made by David Romer (“Keynesian Macroeconomics without the LM Curve,” *Journal of Economic*

Perspectives, Spring 2000) and by Benjamin Friedman (“The LM Curve: A Not-So-Fond Farewell,” National Bureau of Economic Research, Working Paper No. 10123, 2003).

The theory in *Applied Intermediate Macroeconomics* departs from some of the common elements of many macroeconomics textbooks to implement this vision of the core of macroeconomics. Although it relies on an aggregate demand–aggregate supply conception of the economy, one departure is that it makes no use of the apparatus of an aggregate demand and supply curve in price-output space. This apparatus is not easy to relate to data on the economy at the level at which undergraduates are equipped, nor do the aggregate demand and supply curves integrate well with discussions of long-term economic growth, Okun’s law, or the Phillips curve.

Instead, the analysis of aggregate supply is developed using the aggregate production function, which is easily quantified, and which ties in directly to the neoclassical growth model and lends itself to discussions of productivity. Later the notions of the balanced growth path and productivity measures are easily related to Okun’s law (which is given much stronger theoretical grounding in this text than is usually the case) and to the Phillips curve. The aggregate production function is also used to define a workable and data-relevant notion of potential output that is used throughout the book.

Another departure is that the core short-run macro model takes the form of three main elements: the IS curve, the Phillips curve, and the financial sector reflecting Federal Reserve interest-rate policy and the term structure of interest rates. These three elements are supplemented by Okun’s law. The three-element approach is fundamentally the one advocated in the symposium on core macroeconomics cited earlier. It also closely reflects the approach to macro-modeling that now dominates thinking in the Federal Reserve and central banks around the world. This makes it especially easy to relate to current popular discussions of monetary policy.

Although the approach retains the IS curve as a key element in the analysis of aggregate demand, it omits the LM curve. I believe that the LM-curve analysis (1) is insufficiently rich to do justice to financial markets that play an increasingly prominent part in real-world macroeconomics; (2) overemphasizes the significance of the monetary aggregates, which are a tiny fraction of the asset base of the financial system; and (3) systematically misleads with respect to the actual conduct of monetary policy, which in most countries, including the United States (except for the 1979–1982 period), has been dominated by interest-rate targeting and, more recently in the crisis of 2008–2009, by credit-oriented monetary policy – the so-called quantitative easing. In place of the LM curve, the current text contains three chapters that provide a rich discussion of the domestic and international financial systems (tied through the flow of funds accounts to the national-income-accounting framework) and the behavior of interest rates, as well as a chapter

on monetary policy that more closely reflects actual central-bank practices than one generally finds in textbooks at this level.

Some readers of earlier drafts have insisted on the importance of the LM curve. While I disagree, the LM curve and the IS-LM model are developed in the appendices to Chapters 7 and 13. An application of the IS-LM analysis (including the money-multiplier analysis) to the “monetarist episode” of 1979–1982 is provided in the appendix to Chapter 16.

2. Practical Statistics

Students will develop statistical skills in the service of economics. I have struggled over how best to incorporate statistical tools in the textbook. (It is practically much less of a problem in the actual conduct of a course.) In the end, it seemed most practical to present a comprehensive *Guide to Working with Economic Data* as a reference tool separate from the main text. Cross-references to particular parts of the *Guide* point out where statistical tools are relevant, and the end-of-chapter problems draw heavily on the skills taught in the *Guide*. (Each problem set notes the relevant sections of the *Guide*.)

The *Guide* aims to be a self-contained reference – with clear, detailed explanations and numerous examples. It can be read profitably front to back or dipped into on an as-needed basis. It is a subsidiary tool. My own practice has never been to try to teach a statistics course alongside an economics course. The *Guide* aims at basic competency in elementary statistics rather than proto-econometrics. Although many students will have already taken an introductory statistics course, it does not presuppose statistical knowledge. It gives a clear account from first principles that provides adequate background knowledge for the complete beginner and serves as a useful review for the better prepared student. The *Guide* uses only the most basic statistics – roughly things one can easily do with data using Microsoft’s Excel spreadsheet *without* any of the statistical add-ons.

The *Guide* emphasizes three aspects of working with economic data:

- *General statistical methods.* The *Guide* begins with mundane, but too often neglected, topics, for example, units of measurement and the making of graphs and tables. It progresses to the simple but powerful statistical tools that are readily available in common spreadsheet packages, including descriptive statistics (means, variances, standard deviations, coefficients of variations, and correlation coefficients), trend fitting and single variable regression (as an option on scatterplots), and moving averages.
- *Specifically economic methods.* For the most part, the *Guide* introduces statistical techniques that are particularly relevant to economics in the order in which they arise naturally in their economic contexts. These include: conversion of nominal to real (constant dollars); index numbers; ratios and percentage shares; calculation of growth (and inflation) rates, including annualization and compounding;

calculation of doubling times; logarithms and their relationship to growth rates; and fitting linear and exponential trends.

- *Interpretive issues.* The end-of-chapter exercises stress the interpretive use of statistics. A number of formally difficult, sophisticated statistical issues are discussed in an informal manner, stressing their relevance to practical economic issues. These include the problem of spurious correlations resulting from common causes or common trends, instability over time, the direction of causation, unobserved expectations, and time aggregation.

3. Exercises

Problem sets at the end of each chapter typically include both theoretical and empirical exercises. Empirical exercises are dominant. Some can be done with a calculator, but most presume that the student will have access to a spreadsheet program. Microsoft's Excel is the model, although other spreadsheet programs may well be adequate. Although there is no systematic attempt to teach the fundamentals of Excel – my experience is that most students now have a rudimentary understanding before starting the class or can quickly come up to speed – there are numerous hints about how to apply Excel to particular problems.

The textbook is supported by a website (www.appliedmacroeconomics.com) containing, among other things, regularly updated data sets keyed to the empirical exercises for each chapter. The book and the website also contain a *Guide to Online Resources* that documents web-based sources of data. It is good for students to learn to find and use publicly available data sources. They should do so, for instance, for supplementary class projects. Nevertheless, there are many pitfalls, and experience shows that things work more smoothly if all students are using the same data for end-of-chapter exercises and do not have to struggle to find it in the right format.

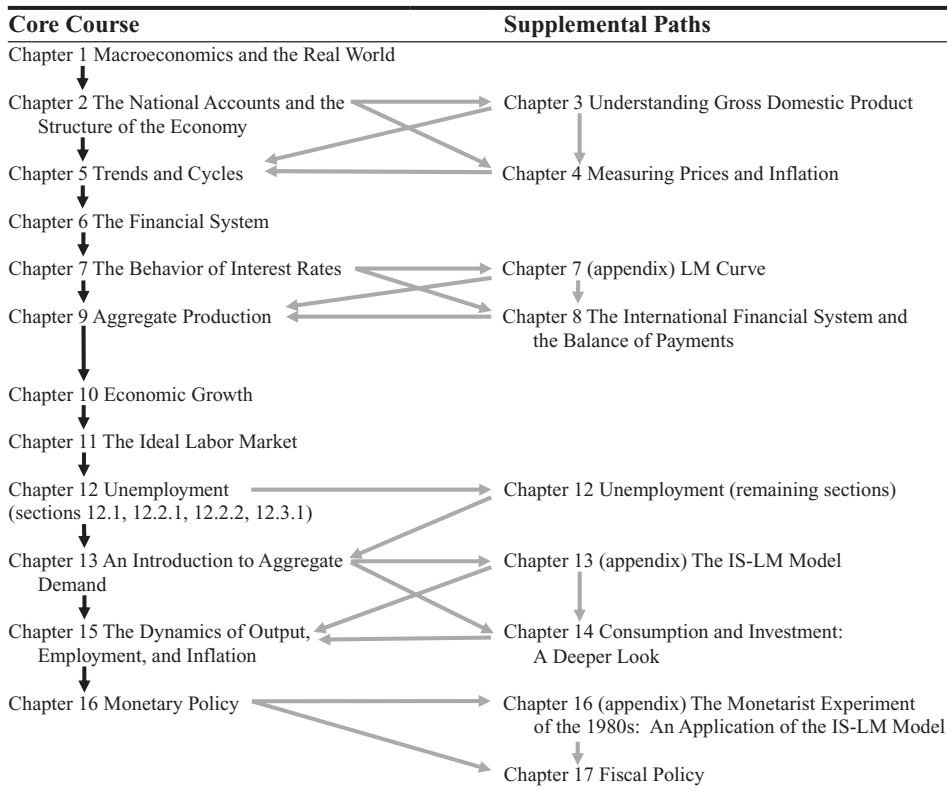
Using the Text in a Course

The chapters of the book are arranged in a logical order – a little different perhaps from in other textbooks. In keeping with the empirical orientation of the book, the basic data of the economy – the national-income and product accounts, the balance of payments, and the flow of funds, as well as the descriptive analysis of business cycles (viewing economic data as having trend and cyclical components) – are all introduced early. Because of their key role in connecting aggregate supply and demand, the real economic content of the book begins with domestic and international financial markets. Aggregate supply – both in the aspect of long-term economic growth and the cyclical behavior of labor markets – is introduced next, followed by aggregate demand. Monetary and fiscal policy are integrated into the discussion of earlier chapters, but the book closes with a more detailed treatment of each.

Although the chapters are designed to be read straight through, they have sufficient independence that instructors who prefer to consider topics in various different orders should find that the chapters can be treated somewhat flexibly. Flexibility is reinforced by a comprehensive glossary and list of symbols used in the text, allowing students to fill in missing terminology or concepts. Key concepts in each chapter are indicated in the text by bold-faced small capitals at the point of first use or best definition or discussion; other important terminology is indicated by bold-faced regular type. All emboldened terms are defined in the glossary.

I have myself taught courses using the material in the book in different orders in both quarter and semester courses. The book is comprehensive in its treatment of most topics, so that some selection and omission are inevitable. The following table suggests a basic core course in domestic macroeconomics and notes several alternative or supplementary paths through the materials.

Possible Course Structures Using Applied Intermediate Macroeconomics



Essential supporting materials for the course are accessible through the website www.appliedmacroeconomics.com. The website includes regularly updated data sets for problems, hints for getting started with Excel, answers to selected end-of-chapter problems, and various other supplemental materials and links.