

# CHAPTER 1

# Introduction to Macroeconomics

## CHAPTER OVERVIEW

This is a conventional first textbook chapter: it defines macroeconomics, it mentions a few interesting topics, it says what a model is, and it lays out the book's separation into Long Run, Short Run, and Applications and Microfoundations. It is quite a short chapter with few surprises, so rather than summarizing it, I will instead talk a little about what makes this book different, and lay out a few different ways you can use it in your course.

## WHAT MAKES THIS BOOK DIFFERENT

It offers solid long-run growth coverage—including endogenous growth—while simplifying the New Keynesian business cycle dramatically, and it does all this without any calculus. Chad shows how long-run macroeconomic growth models have evolved and how tweaking the assumptions of the model can lead to new and interesting insights and policy conclusions. Moreover, Chad is able to easily deduce a short-run model from the long-run model, and therefore link short-run and long-run economic analyses. By streamlining the coverage while teaching surprisingly solid microfoundations, Chad's text gives you a solid chance to spend more time on intelligent, model-driven policy discussions about growth and business cycles.

## HOW TO USE THIS TEXTBOOK

### CONVENTIONAL ONE-SEMESTER CLASS

In this day and age of assessment, we are ever conscious of what we teach, how we teach it, who our students are, what

our students learn, and how they learn. Most students who have recently had a principles course and who are comfortable with a little algebra should be able to handle Chapters 1 through 14 in a semester. How much time you spend on these chapters, whether or not you omit coverage of any of these chapters, and the nature and skill level of your students will influence your coverage of the later chapters.

Moreover, if you want to leave room for a few supplementary articles, a nontechnical book, or a major empirical project or two, then you might have to tread lightly over some of the math in the growth- and labor-market models, which are self-contained and don't directly come up again later in the semester. Advice on how to do this is given in later chapters of this manual.

This third edition of the book provides an innovative chapter on dynamic stochastic general equilibrium (DSGE) models. This chapter provides a bridge between long-run economic growth and short-run economic fluctuations, and fits in nicely at the end of Part 3 of the textbook to remind us of the links between the long run and the short run. I'd recommend that you make time in the semester to include Chapter 15 as a capstone to a semester course.

### ONE-QUARTER COURSE OR ONE-SEMESTER COURSE WITH MANY OUTSIDE READINGS AND PROJECTS

Chapters 1–4 (Introduction through the basics of growth and productivity), 8–11, and 15 (inflation, business cycles, and DSGE models), and two of the following: Chapters 5, 6.1–6.3, and 7, or 12–14, and 18–20.

### TWO-QUARTER COURSE OR TWO-SEMESTER COURSE

The entire book—one quarter on long-run growth, labor markets, inflation, consumption, and investment (Chapters

1–8, 16, and 17); one quarter on short-run business cycles, the Great Recession, monetary policy, the Phillips curve, fiscal policy, the aggregate demand/aggregate supply model, DSGE models, international trade, exchange rates, and international finance (Chapters 9–15, 18–21)—with enough time for a supplementary book each quarter and a few articles and data projects. This would be a great way to teach this course.

### CHAPTERS THAT MAY BE OMITTED

I include this list because instructors often want to know if they can leave out a chapter without omitting facts or theories that come back in later chapters. These chapters each build on previous chapters, but none are directly used in later chapters:

- 6 Growth and Ideas, the last growth chapter
- 7 The Labor Market, Wages, and Unemployment
- 15 Dynamic Stochastic General Equilibrium (DSGE) Models
- 16 Consumption
- 17 Investment
- 18 The Government and the Macroeconomy
- 19 International Trade
- 20 Exchange Rates and International Finance
- 21 Parting Thoughts

In particular, the International Trade chapter (19) is independent of the Foreign Exchange chapter (20), so you can choose just one or the other depending upon your needs.

For math-averse students, Chapter 5 (Solow) may be omitted if necessary, while key parts of Chapter 6 (Growth and Ideas) may be covered without difficulty (Sections 6.1 through 6.3). That means that instructors can still teach the economics of ideas (a largely math-free topic), yet avoid the math of the Solow model.

### HOW TO USE THIS INSTRUCTION MANUAL

Chad provides excellent summaries at the end of each chapter, and the student study guide performs much the same function. This instruction manual does something different: it is written to help you do a better job teaching with this innovative textbook.

In this manual, I walk through each chapter from beginning to end, discussing how you might approach topics that students often find troublesome—for instance, the Solow steady state, making sense of the three ways to measure GDP, or what the Fisher equation really means.

Also, I sometimes recommend that you organize your lecture differently than the text does—some topics just flow together particularly well when you're up there at the chalkboard. I always try to point out which topics you can safely gloss over or omit, and I often mention an illustration or two that might make your lectures a bit more relevant.

Every chapter in this manual also has a sample lecture that you can use, written on a topic that students typically have a tough time with. Finally, each chapter of this manual also contains a few case studies, often building on Chad's own case studies. In the case studies I provide some additional facts or theories that might help to flesh out a lecture or provoke classroom discussion. I hope you find this manual useful in getting the most out of Charles Jones's *Macroeconomics*.

### SAMPLE LECTURE: GIVING YOU ALL THE ANSWERS UP FRONT

Of great concern to the economics profession is the economic literacy of our students. In particular, do our students really own an understanding of the subject matter or do they simply borrow an understanding for the course? One of my teaching objectives is to ensure, as much as possible, that students own an understanding of economics. To that end, I begin the introductory class with a set of unfolding questions. I start with the most basic question, What is economics? The better students respond with the textbook definition given in principles, which is fine. But then I ask the question, Would your brother or sister, friend or parent understand that answer? Most students respond by saying no. Loosely following the late great Robert Heilbroner, I'll say that economics is the study of the economy (and I'll get a laugh) and students will relax. But then that compels the question, What's the economy? And we go around on different definitions, and we work up to the point, again following Heilbroner, that the economy is a set of social institutions/relationships devised to produce and distribute goods and bads. Then we pull that definition apart (to produce—to transform nature into something useful; to distribute—to decide who gets what; the goods and the bads—things that are literally good and/or bad.) So the next question is, Why study economics? Because of the economic problem. What economic problem? Scarcity. What's scarcity? Not having enough resources or goods to meet needs and desires. What causes scarcity? Resource constraints inherent in nature and the process of social interaction that create wants and desires for goods. Again, via modified Heilbroner, How does a society, regardless of space and time, confront scarcity? People must be induced to work more when they want to work less; people must be induced to consume less when they want to consume more; and technology (the art of production) must be modified/improved. What economic system does most of the world use today to confront scarcity? Students will say capitalism or markets. What are markets? Markets are the process whereby buyers and sellers interact to determine prices and quantities. What two approaches do we have for studying markets? Microeconomics, the study of the individual parts of the economy, and macroeconomics, the study of the economy as a whole

with emphasis on factors like economic growth, economic fluctuations, unemployment, inflation, and international economic relations. Microeconomics is rooted in the writings of Adam Smith in *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776) (I like to say the full title—it sums up what most of economics is about). Smith showed that markets promote order and stability by allowing individuals to freely express self-interest through markets, and that the expression of self-interest promotes the social good. (Most students will be familiar with the “invisible hand” but not familiar with its strong political implications.) Of course, if Smith is correct then markets, as a set of institutions, become a set of goods that promote social welfare. Well, what about macroeconomics? Where did it come from? Macroeconomics’ origins can be traced to the Great Depression, the writings of John Maynard Keynes, World War II, and the Employment Act of 1946. If anything, macroeconomics was the consequence of market failures as evidenced by the Great Depression. To illustrate the market failures, Keynes invoked fallacies of composition in reasoning, like the paradox of thrift (that wage deflation in isolation can stabilize a labor market, but wage deflation in the economy as a whole will do little to reduce unemployment and may actually destabilize the economy). Keynes’s ideas were too revolutionary to gain acceptance, but World War II taught my parents’ generation that government coordination of the economy to ensure high levels of spending and the national defense of the United States ended the Great Depression. The World War II generation, wanting to eliminate future unemployment, had the Employment Act of 1946 passed. According to this legislation, government should pursue policies to promote maximum employment, production, and purchasing power. In addition, this legislation created the Council of Economic Advisors and the Joint Economic Committee to advise the president and Congress on the economy. Subsequently, macroeconomics, along with microeconomics, became part of every core economics curriculum. Although there is little disagreement as to how to teach microeconomics, tension remains as to how to teach macroeconomics. In particular, conflict occurs over whether to emphasize the long run or the short run. Chad’s textbook gives you the flexibility of emphasizing either concept or both.

Today, the U.S. economy continues to recover from the Great Recession—the greatest recession since the Great Depression. Clearly the emphasis in policy has shifted to the short run, but long-run concerns remain. The unemployment rate rose from 4.6 percent in 2007 to 5.8 percent in 2008, then to over 10 percent in 2009, and was 7.3 percent as of October 2013 (almost two percentage points above the natural unemployment rate). While the financial markets have largely recovered, still fresh in the public’s mind is that the Dow Jones Industrial stock index, along with many other stock indexes, lost 40 percent of its value in a matter of weeks; housing prices in many markets collapsed; record numbers of bankruptcies and foreclosures have been recorded; banks,

insurance companies, and brokerage houses became insolvent as their assets proved insufficient to cover their liabilities; and a chain of bankruptcies threatened the strength and stability of the United States and global economies. Prior to the financial crisis, the price of crude oil rose from under \$70 in August 2007 to over \$140 by July 2008. Two of the big three U.S. auto makers were on the brink of bankruptcy. Unprecedented steps were taken by the Federal Reserve and the U.S. Treasury to bail out the financial sector and to save the automakers. An economic stimulus bill was passed that included tax credits for first-time homebuyers, cash for clunkers, tax cuts, and funding for so-called shovel-ready projects (to name a few). The economic stimulus bill, combined with the War on Terrorism and the downturn in the economy, subsequently increased the federal government budget deficit from around \$160 billion in 2007, to about \$460 billion in 2008, over \$1.4 trillion in 2009, and almost \$1.3 trillion in 2011. Moreover, despite bailouts and the stimulus, we have seen the money supply (M2) grow by 8 percent in 2009, 2.5 in 2010, 7.3 in 2011, and 8.5 in 2012. The threat of worldwide recession remains. Even as of this writing, the recovery is slow and fragile, and the debate over austerity versus stimulus continues to rage (see John Cassidy, “The Reinhart and Rogoff Controversy: A Summing Up,” *The New Yorker*, available at <http://www.newyorker.com/online/blogs/johncassidy/2013/04/the-rogooff-and-reinhart-controversy-a-summing-up.html>). This experience has taken the economics profession by surprise, and is currently causing us to reevaluate what we think about how the economy works.

In this course, we’ll spend the first half of the semester talking about why some countries are richer than others, and why the average person today lives so much better than someone one or two hundred years ago. A generation ago, such topics would barely have been mentioned, but with the rise of globalization, the spread of markets around the world, and a new concern about global growth prospects, a new emphasis in economics has emerged.

In the second half of the semester, we’ll talk about economic busts and booms, which economists often call the “business cycle” or “economic fluctuations.” The book’s goal is to provide a framework for understanding the nature, causes, and solutions to both short-run and long-run fluctuations.

A generation ago, the business cycle section would’ve been almost the whole course. Back then, many macroeconomists thought they could control the overall level of GDP on a year-to-year basis. That’s certainly what the textbooks taught back then. In those days, we spent the semester talking about how to control the demand for goods and services in the economy. Back then, we thought we actually *could* control things.

Today’s macroeconomics is largely about teaching macroeconomists—myself and my colleagues—to be humble. We’ll learn that the Federal Reserve can have an impact on the average rate of inflation. There are increases in the

overall price level, but at the same time we'll see that the Federal Reserve has a limited impact on reducing the average rate of unemployment—the fraction of workers who can't find jobs. (The Federal Reserve might be able to temporarily reduce the unemployment rate below some “natural” rate, but subsequently risk high inflation without any long-run reduction in the unemployment rate.)

One point to take away from the semester is this: the Federal Reserve might be able to smooth out the bumps on the road—emphasis on “might”—but it can't make the trip go any faster. For the average American to have a better standard of living in the long run, we'll have to focus on something other than interest-rate policy.

That's why we'll spend quite a bit of time in the first half of the semester on the “supply side” of the economy: the supply of people willing to work, the supply of machines, equipment, and natural resources, and the supply of useful, practical ideas. Economists tend to think that if you have a good supply of those four things—people, machines, natural resources, and ideas—then in a market economy, those “inputs” will usually get combined to create “outputs” that we really want, like cars and movies and doctor's appointments and books and vacations and food. By spending time in the first half of the semester talking about the supply side, the hope is that when you're voting or when you're serving in government, you'll remember that how well people live doesn't depend on whether there's a *demand* for goods—as you learned in principle or by talking with your friends, people's demands are basically unlimited. The key problem of economics is scarcity—and the miracle of long-term economic growth is that most of the things people want are a little bit less scarce each year.

### CASE STUDY: HOW MUCH WOULD YOU PAY TO GET RID OF RECESSIONS?

Given that the U.S. economy has just emerged from the so-called Great Recession and is perhaps teetering on the brink of another recession, Nobel Prize winner Robert Lucas's question, How much would you pay to get rid of recessions? remains apropos. Lucas's answer to this question was: not much.

As is well described in “After the Blowup” by John Cassidy (*The New Yorker*, January 11, 2010), Lucas won the Nobel Prize, in part, for reinventing the notion that markets are self-regulating. So Lucas's answer is not surprising. Lucas noticed that consumer spending—the part of our income we use to buy happiness—doesn't really change that much for the average person from year to year. It only fluctuates from year to year by about 1.5 percent (aside: that's the standard deviation of real consumption) for the average person. There's a strong annual upward trend of about 2 percent, but around that trend there's a small wiggle, averaging about 1.5 percent per year.

So how much would you, personally, be willing to pay for an insurance policy that promised that you'd never have

to risk those 1.5 percent up-and-down shocks to your consumer spending?

Lucas ran some estimates and found that the average person would be willing to pay about 0.06 percent per year for an insurance policy like that. For a person earning \$50,000 per year, it would cost \$30 per year to guarantee a steady growth in your standard of living. Even when taking into account that it's hard to buy goods when you lose your job—you just might not be able to borrow the money to put food on the table—he found that in the United States, unemployment insurance benefits are usually good enough that the average person still wouldn't want to pay a lot for insurance to get rid of their consumption risk. This suggests that modern unemployment insurance is pretty good insurance already.

Quite possibly, the average poor person in the United States would pay more than \$30 per year for that kind of insurance policy. For poorer people, every dollar counts more. But Lucas was trying to come up with an *average* estimate of how much the *typical* American would pay to get rid of business cycles. And he just couldn't find a way to make that number look big.

Economists David Romer and Lawrence Ball<sup>1</sup> think that Lucas is missing the point entirely. They think that the big cost of economic fluctuations isn't the fact that you can't go to restaurants as often during a recession; it's that you might not have a job. They've run some estimates based on what they think the average person is like and they find that economic fluctuations have a much higher cost than Lucas believes. They agree that the average person doesn't get hit hard on the consuming side during a recession, but they think that people really don't like going in and out of the workforce. They find that people would rather work a steady 40-hour week than work 45 hours most of the time with some random layoffs thrown in. And of course, surveys and common sense do show that people hate being out of work.

Over the course of 50 years the economics profession has gone from the notion that business cycles could be tamed (Samuelson and the Keynesians) to the ideas of Lucas and others that markets are self-regulating and that government intervention has ill or nil effects. In light of current events, you will be challenged throughout this course with questions regarding what should be done to end recessions and reduce unemployment.

For a nice review of the current debate, see the aforementioned *New Yorker* article.

### REVIEW QUESTIONS

1–3. Based on personal preference.

4. Ingredients: Inputs, the model itself, and outputs. We can call these “exogenous variables,” “equations or words,” and

1. Laurence Ball and David Romer, “Real Rigidities and the Non-neutrality of Money,” *Review of Economic Studies*, vol. 57, no. 2, (April 1990), pp. 183–203.

“endogenous variables” respectively. The best short summary of the power of models is Robert Lucas’s speech “What Economists Do.” It is available widely on the Web.

This is possibly his best line: “I’m not sure whether you will take this as a confession or a boast, but we are basically storytellers, creators of make-believe economic systems.” Lucas explains that if you want to be a matter-of-fact person who understands how the world works, you actually need to be creative and imaginative.

#### EXERCISES

1–2. Based on personal preference.

3. (a) From [www.stanford.edu/~chadj/snapshots.pdf](http://www.stanford.edu/~chadj/snapshots.pdf):

Ethiopia: 1.6 percent  
India: 8.4 percent  
Mexico: 28.9 percent  
Japan: 76 percent

(b) Botswana’s per capita growth rate between 1960 and 2010 was about 5.33 percent. China’s per capita growth rate was somewhere between 4.62 percent and 6.02 percent depending on which version of the data in the “snapshot” file provided by Chad is used.

(c) Population, biggest to smallest: USA (310.2 million), Indonesia (243 million), Brazil (201.1 million), Bangladesh (156.1 million), Nigeria (152.2 million), Russia (139.4 million).

(d) Government purchases are larger in poor countries, while investment expenditures are higher in rich countries.

(e) While there are many exceptions, it appears that money in poorer countries has less value per unit compared to rich countries. This is largely because some poor countries have a history of high inflation, so that one unit of their currency becomes worth very little compared to the dollar. High inflation is rare in rich countries, and much more common in poor countries.

4. Based on personal preference.

5. This is a worked exercise. Please see the text for the solution.

6. (a)  $\bar{a}$  tells us how the quantity of labor supplied responds to wages. Informally, it tells us how sensitive workers are to wages when deciding how much to work.

(b) This is the same as in 5: quantity of labor supplied, quantity of labor demanded, equilibrium labor supply, and the

wage. (Of course, you could just collapse this to equilibrium labor supply and equilibrium wage without losing much of interest.)

$$(c) \quad w^* = (\bar{f} - \bar{\ell}) / (1 + \bar{a}) \\ L^* = (\bar{f} - w^*)$$

Now might be a good time to review the importance of the associative rule—students often forget about the importance of parentheses when doing algebra.

(d) If  $\bar{\ell}$  increases, the wage falls, and the equilibrium quantity of labor increases. This is just what we expect: The supply of labor increased exogenously, and workers were willing to work the same hours at a lower wage. In equilibrium, firms decided to hire more workers at a new, lower wage.

(e) This is an increase in demand: the quantity and wage of labor will both rise in equilibrium. The wage rises a bit, to which workers respond by supplying more labor.

7. (a)  $Q^D =$  demand for computers  $= F(P, \bar{X})$   
 $\bar{X}$  is exogenous, and captures consumers’ understanding of how to use computers.

$Q^S =$  supply of computers  $= G(P, \bar{Y})$   
 $\bar{Y}$  is exogenous, and captures manufacturing skill of the computer industry.

In equilibrium  $Q^S = Q^D = Q^*$ , so this model is really two equations and two variables. If the demand and supply functions are straight lines, then there must be a unique solution.

(b)  $Q^D =$  demand for classical music  $= F(P, \bar{X})$   
 $\bar{X}$  is exogenous, and captures consumers’ interest in classical music.

$Q^S =$  supply of classical music  $= G(P, \bar{Y})$   
 $\bar{Y}$  is exogenous, and captures the technology for recovering and cleaning up old classical music recordings.

(c)  $Q^D =$  demand for dollars  $= F(P, \bar{X})$   
 $\bar{X}$  is exogenous, and captures the domestic and foreign beliefs about the relative safety of the dollar versus the yen, the euro, and the pound.

$Q^S =$  supply of dollars  $= G(P, \bar{Y})$   
 $\bar{Y}$  is exogenous, and captures the Federal Reserve’s supply of currency.