

## Macroeconomics, Module 1: Macroeconomic Modeling

### *Readings and Overview*

(The attached PDF file has better formatting.)

Module 1 begins with the key *stylized facts* that macroeconomics seeks to explain, starting with historical data about how real GDP, unemployment, and the price level have changed in the United States and how they relate to fluctuations in GDP.

*Question:* What is macroeconomics about? Does it explain how the economy works: why some countries do well and others don't?

*Answer:* This is part of macroeconomics, but only a part. We have a good idea of what helps an economy: free markets, property rights, contract enforcement, low taxes, open borders, rule of law, universal education, cultural openness to innovation, and so forth. The United States performs well on most of these criteria, and the US economy does well. Many Asian countries (Japan, Hong Kong, Taiwan, South Korea, Singapore, and mainland China) also do well, and their economies are strong.

But these items are not the primary subjects of most macroeconomics textbooks. Instead, macroeconomics examines why a nation's economy doesn't just hum along at its long-run expected growth rate. Why do interest rates, inflation, unemployment rates, investment growth, and capital growth fluctuate so widely from period to period – sometimes even from year to year? What causes business cycles?

Macroeconomics has many competing schools of thought; unlike microeconomics, there is no consensus among economists. Barro reflects mainstream macroeconomics; his views are similar to those of the *Wall Street Journal*. Barro is an honest author, as well as one of the leading U.S. economists; he states when his model is appropriate and when not.

*Question:* What are the competing schools of thought? Are these Marxism and socialism?

*Answer:* This textbook covers Western economics. Economists agree that free markets work well; socialism does not. Competing schools of thought are Keynesian, monetarist, and classical (market-clearing).

### *STYLIZED FACTS*

*Question:* What are *stylized facts*? How do they differ from regular facts? Why does Barro begin his chapters with facts instead of starting with the theory?

*Answer:* Many economists begin with the theory. This works well for microeconomics, where the facts are not in dispute and economists agree on much theory. In contrast, the facts are disputed for macroeconomics, and economists disagree on many items.

A macroeconomic model abstracts from the millions of facts to extract the basic relations that drive the economy; these are the stylized facts.

- Some of these facts are intuitive; for example, investment expenditures vary positively (pro-cyclically) with the business cycle.
- Other items – such as whether inflation and unemployment are positively or negatively correlated – are not intuitive. Economists once believed in a Phillips curve, and many authors still explain expectational Phillips curves, long-run vs short run Phillips curves, and so forth. Barro checks the data and finds no empirical evidence of a Phillips curve. His macroeconomic model does not predict a Phillips curve.
- Some facts are hard to derive from the macroeconomic model alone, and we must carefully examine the evidence. Whether unemployment is pro-cyclical or counter-cyclical is not self-evident, and Barro carefully examines the empirical evidence.

Barro describes first the empirical evidence in the United States, Great Britain, and sometimes other countries, and then explains how the macroeconomic model interprets the evidence. The final exam does *not* test these details. You must know the stylized facts, such as whether a relation is pro-cyclical or counter-cyclical, not the specific numbers in each economic era in the U.S. or Great Britain.

For module 1, pages 1 and 2 are a general introduction to the macroeconomic reasoning in the text. Pages 2–21 are the stylized facts that Barro's model must explain. Focus on the relations, not the details, in Figures 1-1 through 1-17. The final exam tests the relations discussed in the postings, not relations that might be inferred from the textbook diagrams.

*Market clearing model:* Barro uses a market clearing model, based on microeconomic fundamentals about supply and demand curves and market equilibrium. Barro and Landsburg use the same theory: Landsburg applies it to the pricing behavior of firms and Barro applies it to business cycles of nations. The two on-line VEE economics courses are complementary; what you learn in one course applies to the other as well.

*Neutrality of Money:* Barro's model predicts that changes in monetary variables, such as the price level or the money supply, have little or no effect on real variables, such as GDP, unemployment, real interest rates, consumption, and investment. Most U.S. economists share this belief (following Milton Friedman); European economists are more likely to follow Keynes's views, not Friedman's.

*Temporary vs permanent shift and intertemporal substitution:* Barro emphasizes permanent vs temporary shifts in the marginal products of capital and labor and how workers and consumers save for the future or borrow from expected future earnings. Landsburg is like Barro.

Pages 23–32 are the core of this module. The *budget constraint* on the bottom of page 23 is a central tool in the model; this is Landsburg's *budget line*. Barro uses the market clearing model; he reviews the differences from the Keynesian approach in chapter 20.

Pages 33–50 deal with national income accounting. The textbook is nonmathematical, so that it can be used even by college students with no calculus and little algebra. Barro explains nominal vs real figures, which are simple for actuarial candidates.

Question: Sometimes we speak of real vs nominal; sometimes we speak of present values. Are real terms the same as present value terms?

Answer: No; real figures adjust for the price level; present values adjust for the real interest rate as well. Suppose that GDP is \$10 billion in 20X5 and \$11 billion in 20X6; the price level is 100 in 20X5 and 108 in 20X6; and the nominal interest rate (the inflation rate times the real interest rate) is 12% from 20X5 to 20X6.

- Nominal GDP has increased 10%.
- Real GDP has increased about 2%.
- The present value of GDP has decreased about 2%.

Focus on the three means of measuring GDP: expenditure, production, and income approaches, on pages 37–46. Know the definitions of each item in bold-face type. Expect an exam question based on Table 1.2 on page 34. The precise items that go into each measure of GDP will *not* be tested, but know well Table 1.7 on page 46 with the relation of these items.

*Key Concepts* for first half of Module 1; see also the stylized facts below.

- Investment expenditure is *strongly* pro-cyclical (moves up and down with the business cycle) and is *more volatile* than GDP. Consumption is *weakly* procyclical. Investment expenditure accounts for most business cycle fluctuations.
- Employment and labor productivity are pro-cyclical.
- Real variables, such as real GDP, measure the production of goods and services.
- Individuals' income is earned by the production of output.  $GDP = \text{National income} + \text{depreciation} + \text{indirect business taxes} + \text{net factor income from abroad}$ .

*Question:* What does it mean that something is strongly or weakly pro-cyclical?

*Answer:* If GDP increases from \$10 billion to \$12 billion, 90% of this change stems from investment, even though investment is smaller than consumption.

The production of goods and services (real GDP) in the US has grown by about 3% per annum, but real GDP growth and the unemployment rate have not been steady. Fluctuations in real GDP and unemployment (the business cycle) last 1 to 5 years.

Quarterly United States data from 1959 to 1996 shows several *stylized facts* (which are the key concepts in this module; see above):

- GDP is private consumption and investment plus government consumption and investment.
  - Private consumption expenditure varies proportionally less than GDP while private investment expenditure fluctuations proportionally more:
- Private consumption is pro-cyclical; investment is strongly pro-cyclical.
  - Government consumption and investment are a-cyclical, not related to the business cycle.
- The labor market has strong cyclical variations: employment is pro-cyclical, unemployment is strongly counter-cyclical, and fluctuations in productivity are pro-cyclical.
- Fluctuations in inflation are counter-cyclical.

Some of these relations are intuitive; some are not. Economists disagree whether inflation is pro-cyclical, counter-cyclical, or a-cyclical.

Barro uses a *market clearing approach*: prices and the interest rate adjust so that the supply and demand in all markets are equal. This is the same perspective that Landsburg has.

The second half of Module 1 discusses national income accounting.

GDP is the value of all the final (non-intermediate) goods and services produced in an economy in a given period. The components of GDP are

- *Consumption*: (C) purchases of goods and services by households.
- *Investment*: (I) purchases by private firms of new capital goods and additions to inventory
- *Government*: (G) (consumption and investment) purchases of goods and services by all levels of government
- *Net exports*: (X) purchases of domestically produced goods and services by foreigners minus the domestic purchases of foreign produced items.

The fundamental equation is  $GDP = C + I + G + X$ .

We use real variables, not nominal variables, for most equations.

- Nominal GDP is the market value of final goods and services measured in dollars.
- Real GDP evaluates the production of goods and services, measured in deflated dollars.

*Question:* Why does Barro emphasize real vs nominal measures so much?

*Answer:* We use real terms for the macroeconomic model, but the data are measured in nominal terms. For the monetary parts of the model, we sometimes look at nominal interest rates, not real interest rates. For instance, the cost of holding money depends on the nominal interest rate, not the real interest rate.