Cooleconmics.com

Macroeconomics Notes, set #1

Introduction

Macroeconomics studies the performance of the economy as a whole, including:

--forces that make the economy grow/shrink over long periods of time
--forces that make the economy grow/shrink over short periods of time (the business cycle)
--forces that cause unemployment to rise/fall
--forces that cause inflation to rise/fall
--effect of government on performance of the economy
--international transactions and their effects on the economy

Our goal is to build models that describe how the economy works, and to use these models to forecast how events can change the course of the economy. The models that we will build are simplified versions of models used by practicing macroeconomists.

Defining terms

Before we delve into macroeconomics we must understand the terminology.

Production:

The Gross Domestic Product (GDP) is the most common measure of a country's production. It measures the total value of all final goods and services produced within the borders of a country (over some period of time, commonly 1 year).

Aggregate Supply (AS) is the economic modeler's term for the total amount of production (GDP) in an economy.

Income:

The National Income (NI) is the aggregate value of all income earned by a country's citizens. (It is commonly divided into four parts: wages, interest, rent, and profits).

Disposable Income (DI) is the aggregate value of all income available for spending and saving by households. In simplified terms:

DI = NI – household taxes + government transfer payments
DI = personal consumption expenditures + personal savings

Expenditures:

Spending on final goods/services is commonly divided into 5 parts:

Personal Consumption Expenditures (C) is the aggregate value of all spending by households on final goods/services, not including new housing purchases.

Gross Private Domestic Investment (I) includes:

--purchases of new physical capital by firms (machinery, equipment, buildings, and the like).
--purchases of new houses by households
--any increase in inventories

(IMPORTANT NOTE! When a macroeconomist refers to "**investment**," she is referring to the above—Gross Private Domestic Investment. She is NOT referring to purchases of stocks and bonds.)

Expenditures continued:

Government Purchases of Goods and Services (G) is self-explanatory—it includes all purchases of goods and services by governments in the economy. (Note that G does not include government *transfer payments*—when government spends money without buying anything, such as Social Security or AFDC spending).

Exports of Goods and Services (X) is self-explanatory.

Imports of Goods and Services (M) is self explanatory.

Aggregate demand (AD) is the economic modeler's term for the sum of all expenditures on final goods and services produced in the economy:

$$AD = C + I + G + X - M$$

Relationship between GDP and Expenditures:

Since everything produced in the economy is either purchased or goes into inventories:

$$GDP = C + I + G + X - M$$

(note that M is subtracted, because imports are not produced in the country)

Relationship between GDP and National Income:

Since all revenue taken in by producers eventually returns to the citizens in the form of earned income (wages, interest, rent, or profits):

$$GDP = NI$$

(In the real world, a few things separate GDP from NI, and if we had more time I'd explain)

Since GDP = NI, they are often represented in models with the same symbol, Y

$$Y = GDP = NI$$

Unemployment:

A person is officially unemployed in the U.S. if all of these are true:
--aged 16 or over
--not working at all for pay
--seeking work

Causes of unemployment are sometimes categorized:
Structural: due to poor job skills (e.g. illiteracy)
Frictional: Due to skilled people taking time to find a job
Induced: Caused by government regulations (e.g. minimum wage)
Seasonal: Santa in July
Cyclical: Insufficient GDP for all skilled workers to find work any time soon.
(Cyclical is the one that concerns macroeconomists the most).

When the economy is humming along nicely (plenty of GDP), total unemployment is not zero—only the cyclical category is zero.

Full employment exists when there's enough GDP for all skilled people to find work, given reasonable job search efforts. (In other words, cyclical unemployment is zero when there is full employment, but other categories of unemployment still exist.)

Unemployment continued:

The Natural Unemployment rate is the unemployment rate at the minimum level of GDP at which cyclical unemployment is eliminated. The natural unemployment rate is not 0%--it is some positive percentage since many categories of unemployment (such as frictional and structural) still exist at full employment; only cyclical unemployment is zero.

Relationship between GDP and unemployment:

Potential GDP (a.k.a. Full Employment GDP) is the theoretical minimum level of GDP at which cyclical unemployment is zero.

A recessionary gap exists if actual GDP is below potential GDP.

An inflationary gap exists if actual GDP is above potential GDP.

Inflation:

Inflation is an increase in the average price level of a basket (group) of goods and services. (There isn't one inflation rate in the economy; there are many inflation rates, depending on which goods and services are included in the basket.)

A price index measures the average price level of a basket of goods. Examples of price indices in the U.S.:

Consumer Price Index (CPI): Measures the average price level of about 10,000 goods and services consumed by the typical urban consumer.

Producer Price Index (PPI): Measures the average price level of about 1,000 things bought by the typical firm.

Implicit GDP deflator: Measures the average price level of all goods and services included in the GDP.

An increase in any of these price indices is inflation; an inflation rate is the percentage increase in a price index.

"Nominal" vs. "Real" Variables:

The values of Nominal variables are unadjusted for inflation; they take on values observed every day by everyday people. (Note that one meaning of "nominal" is "normal.")

Real variables are adjusted over time by statisticians and economists so that they are unaffected by inflation. That is, real variables do not rise or fall over time due to inflation.

Example #1: Nominal GDP rises over time in part because production is rising but also in part because there is inflation. Real GDP, on the other hand, is adjusted so that it does not rise due to inflation; it only rises due to increases in production. (Hence real GDP has risen more slowly than nominal GDP over time in the U.S.)

Example #2: A nominal interest rate is the interest rate that one observes—say, the 30-year mortgage interest rate advertised at Bank of America. A real interest rate equals the nominal

interest rate minus the inflation rate. (Hence nominal interest rates are higher than real interest rates in the U.S.)

Economists prefer using real variables rather than nominal variables, because the confusing effects of inflation are removed from the analysis.

Government:

Government affects the economy through its spending, its taxes, and its control of the money supply.

The government budget deficit is the excess of government spending above its tax and fee revenue (over some amount of time, usually a year):

budget deficit = G + transfer payments - tax and fee revenue
(if taxes and fees exceed government spending, then that's a budget surplus)

The national debt is the total amount government owes to the rest of humanity.

national debt = sum of all past budget deficits - sum of all past budget surpluses

Fiscal policy is when politicians pass laws changing tax rates or government spending; this affects the economy.

The Central Bank is the government entity that oversees the banking system, acting in part as the bank for banks. For our purposes, the major role of the Central bank is *controlling the nation's money supply*. (The Federal Reserve System, nicknamed "the Fed," is the U.S. Central Bank. Chair: Alan Greenspan)

Monetary policy is when the Central Bank alters the supply of money; this affects short term interest rates, affecting the economy.

International Transactions:

The trade deficit is the excess of imports of goods/services above exports of goods/services

trade deficit = M – X

Model of Short Term Economic Fluctuations (A business cycle model):

Now that the terms are straight, let's build a simple model that explains short term economic fluctuations (business cycles).

Model Structure: We model the economy as a huge market; the interaction of aggregate demand and aggregate supply determines conditions in the economy.

Proposition 1: Any event that causes Aggregate Demand to fall causes all of the below:
--a reduction in GDP
--a reduction in employment
--a reduction in inflation
--a reduction in pay raises for workers

"Proof" of proposition 1: When spending on products falls, producers reduce production (since they don't want to produce things that no one buys); hence Gross Domestic Product falls. Producers are also less likely to raise prices in the face of falling demand for their products; hence inflation falls. Faced with declining production, producers lay off workers; hence employment falls. Workers, seeing the layoffs, are less likely to ask for big raises; hence wage increases are not as large.

By the way, here is a list of events which can cause aggregate demand to fall:
These cause consumption to fall:
--lower consumer confidence
--lower wealth (e.g. decline in stock market)
--higher income tax rates
--lower transfer payments
--higher interest rates
These cause investment to fall
--lower expectations of future profits by CEOs
--higher interest rates
These cause government purchases to fall
--change in law
These cause exports to fall
--lower incomes in countries that buy our exports
--an appreciated dollar (which can result from higher interest rates)
These cause imports to rise
--higher national income in the U.S.
--an appreciated dollar (which can result from higher interest rates)

Using the same logic as in proposition 1, let's develop a corollary:

Corollary to Proposition 1: Any event that causes Aggregate Demand to rise causes all of the below:
-- an increase in GDP
-- an increase in employment
-- an increase in inflation
-- an increase in pay raises for workers

"Proof" of corollary to proposition 1: When spending on products rises, producers increase production (since they want to produce more things to satisfy the higher demand); hence Gross Domestic Product rises. Producers are also more likely to raise prices in the face of rising demand for their products; hence inflation rises. Faced with rising production, producers hire more workers; hence employment rises. Workers, seeing the new hiring, are more likely to ask for big raises; hence wage increases are larger.

By the way, here is a list of events which can cause aggregate demand to rise:

These cause consumption to rise:
--higher consumer confidence
--higher wealth (e.g. increase in stock market)
--lower income tax rates
--higher transfer payments
--lower interest rates

These cause investment to rise
--greater expectations of future profits by CEOs
--lower interest rates

These cause government purchases to rise
--change in law

These cause exports to rise
--lower incomes in countries that buy our exports
--a depreciated dollar (which can result from lower interest rates)

These cause imports to fall
--lower national income in the U.S.
--a depreciated dollar (which can result from lower interest rates)

Proposition 1, and the role of government:

Note that government, by affecting aggregate demand, can affect economic conditions.

Countercyclical policy:

Proposition 2: If government officials are worried about an impending recession (and the unemployment that goes with it), they can counteract declining aggregate demand :
--Use fiscal policy: cut taxes, increase government purchases, or increase transfer payments.
--Use monetary policy: increase the money supply to reduce short term interest rates.

Corollary to Proposition 2: If government officials are worried about an impending overheated economy (and the inflation that goes with it), they can counteract rising aggregate demand :
--Use fiscal policy: raise taxes, cut government purchases, or cut transfer payments.
--Use monetary policy: reduce the money supply to increase short term interest rates.

Forecast error: In the real world, countercyclical policy combined with forecast errors can have really bad results.

Example: Government forecasts an overheated economy, so it raises taxes. But the forecast is wrong—the economy is actually going into recession! The higher taxes make the recession worse.

Stagflation: The worst of all possible worlds

Proposition 3: An economic event which causes a rapid economy-wide increase in production costs causes
--higher inflation
--higher unemployment
--lower GDP

"proof" of proposition 3: If producers face rapidly-rising costs, they must raise prices to maintain profitability; hence inflation increases. But the higher prices reduce aggregate demand. As a result, firms reduce production; hence the GDP falls. Lower production means that firms require fewer workers; hence unemployment rises.

The only event that would really cause this in the U.S. is a rapid increase in the price of oil.

Growth Without Inflation: The new high tech economy?

Corollary to Proposition 3: An economic event which causes a rapid economy-wide decline in production costs causes

--lower inflation
--lower unemployment
--higher GDP

"proof" of corollary to proposition 3: If producers face rapidly falling costs, they can reduce prices and still maintain profitability; hence inflation decreases. But the lower prices increase aggregate demand. As a result, firms increase production; hence the GDP rises. Higher production means that firms require more workers; hence unemployment falls.

Some economists claim that the use of computers and the Internet allows our new high tech economy to grow quickly without inflation.