ECON 201 - Macroeconomics
Lecture Notes 2
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BB Chapter 4

Macroeconomics deals with aggregate measures of what happens in an economy rather than worrying about particulars of any one person, firm or market.

More specifically, macroeconomics is concerned about the total value of stuff produced in an economy rather than the composition of all that stuff. Macroeconomics is concerned about the total number of people employed rather than exactly what they are doing. Macroeconomics is interested in the total price for a large set of goods rather than the price of any particular good.

We’re first going to do some definitional stuff and then get to the basic model of macroeconomics.

Definitions

Gross Domestic Product (GDP)
GDP is the total value of all the goods and services produced and in a country in a year. It includes only final goods and services (not intermediated goods that contribute to the production of other goods) and only includes things that pass through standard markets.

Gross National Product (GNP)
GNP is the value of all the goods and services produced by domestic firms, regardless of where that production takes place. It also includes only final goods and services.

So, the production of a Japanese-owned factory in Ohio would be counted in U.S. GDP and in Japanese GNP, but not in U.S. GNP or in Japanese GDP. GDP has become more prominent over the years as people seem to care more about how much is being produced in their country instead of how much their country’s firms are producing.

Per capita GDP is a country’s GDP divided by its population, or the average value of production per person.

Per capita (or per person) GDP is not a perfect measure of well-being in a country as it excludes such things as:
- leisure
- household production
- goods and services traded in gray markets
-illegal goods and services
-environmental quality and services
-natural resource depletion
-the mix of goods produced and how much people enjoy them or not
-the distribution of income and/or wealth

Despite this, most population flows are from places with lower per capita GDP to places with higher per capita GDP.

Real versus Nominal GDP
Nominal GDP is the market value of all the goods and services produced at the prevailing prices.
Real GDP is the market value of all the goods and services produced adjusted for changes in the price level.

For example, if from one year to the next, a country produced exactly the same quantity of goods and services but the prices of all things doubled, the nominal GDP would double (because the value of all goods and services at prevailing prices doubled) but real GDP, the value adjusted for inflation, would remain unchanged.

The distinction of real versus nominal is critical in digesting macroeconomic information. For example, an increase in nominal wages means that you are getting paid more dollars per year, but may or may not mean that you can purchase more goods and services with those dollars. An increase in real wages means that you can buy more goods and services with your wages.

Economic Growth
Economic growth is the rate of increase of GDP (generally real GDP and hopefully real per capita GDP). It is a measure of how much more an economy (or in the case of per capita GDP, a person in the economy) produced this year relative to last year.

Recession
A recession is a period of two or more quarters (six months or more) of negative economic growth. That is, the economy is technically in a recession if there have been two or more consecutive quarters during which real GDP has fallen.

Inflation
Inflation is a general and sustained increase in the prices in an economy.

Unemployment
Unemployment exists when people who want to work and are actively seeking work are unable to find jobs that they consider acceptable. This happens for a variety of reasons, so there may be several different types of unemployment in an economy. It should be noted that some unemployment is healthy in an economy because it generally takes people time to find jobs that are good matches for their skills and, from the other side, it also takes employers time to find good employees that can do what employers need them to do.

The Basic Macroeconomic Model – Aggregate Supply and Aggregate Demand

The standard model in macroeconomics is similar to that of microeconomics:

Aggregate demand is the total quantity of goods and services that will be demanded at each price level.

Aggregate demand is downward sloping for several reasons:

1. The Real Balances Effect
   The amount of stuff people will want to buy depends on how wealthy they are. If people are holding cash (and most everyone does) when the price level rises, the purchasing power of that cash falls. People become less wealthy (that is, they have less purchasing power) and they choose to purchase less.

2. The Intertemporal Substitution Effect
   Given some amount of cash in an economy, an increase in the price level will reduce its real value. This will result in an increase in interest rates. Higher interest rates make it more difficult to borrow to purchase things, so people will purchase less.
3. The International Substitution Effect
When prices rise in a country, holding other things constant, that country’s goods become more expensive relative to other countries’ goods, so people will demand fewer of them.

Shifts in Aggregate Demand
If government spending (G) increases, AD shifts out. If G decreases, AD shifts in.
If taxes (T) increase, AD shifts in. If T decreases, AD shifts out.
If the money supply (MS) increases, AD shifts out. If MS decreases, AD shifts in.
If real interest rates (RIR) rise, AD shifts in. If RIR fall, AD shifts out.
If the value of the dollar relative to foreign currencies rises, AD shifts in.
If foreign income rises, AD shifts out. If foreign income falls, AD shifts in.
If expected future inflation rises, AD shifts out. If EFI falls, AD shifts in. (Note the cool self-fulfilling inflation prophecy here!)
If expected future income rises, AD shifts out. If EFY falls, AD shifts in. (Note the cool self-fulfilling GDP prophecy here!)
If expected future profits rise, AD shifts out. If EFP fall, AD shifts in.

Aggregate supply is the total quantity of goods and services that will be supplied at each price level.

Aggregate supply is upward sloping because, holding the cost of inputs constant, as the price for which a firm’s outputs may be sold rises, the firm will choose to supply a greater quantity of goods.

Changes that make it more expensive to produce goods and services will reduce aggregate supply (shift it to the left). Changes that make it less expensive to produce goods and services will increase aggregate supply (shift it to the right).

In particular, if the costs of productive inputs rise, the AS curve will shift up.

Whereas the micro model is concerned with the quantity and price of a particular good, the macro model is concerned with the total quantity of stuff (goods and services produced in an economy) and an overall measure of prices.

Inflation, recessions and unemployment, and economic growth
The three most important issues in macroeconomics are:
1. Inflation – a general increase in prices
2. Recessions and unemployment – a decrease in economic activity
3. Economic growth – steady increase in the amount of stuff produced

Here are what each of these might look like in the standard macroeconomic model:
Inflation – can be caused either by an increase in aggregate demand, by a decrease in aggregate supply or both.

Recessions, and the accompanying unemployment, can similarly be characterized as being supply side, demand side, or a result of both effects.

Economic growth occurs as a result of expansions in both aggregate supply and aggregate demand. It may or may not result in increases in the price level.
A problem with rapid economic growth
By golly folks seem to like rapid economic growth. One sign of this is that presidents tend to be re-elected with greater probability when the economy is growing rapidly and unemployment is low than when it is growing slowly and unemployment is relatively high. There is, however, a problem with very rapid economic growth in that it really can’t be sustained and will lead to inflation.

Here’s how the story goes.

Imagine that an economy is operating well, with some unemployment but a decent match between the jobs that are available and the people who are seeking jobs. For some reason, however, the government wants to raise GDP and lower unemployment.

The government’s main tools for creating economic growth are spending increases, tax cuts or increases in the money supply (we’ll talk more about these later). Each of these has the effect of shifting the AD curve to the right.

If the government takes one of these actions, AD will shift to the right. The impact of this is higher GDP and lower unemployment, as shown below.
Now, low unemployment is great, but it does have the effect of making employers compete for workers. The effect of employers competing for workers is to raise wages. When wages increase, the AS curve shifts up, as shown in the following diagram:

Now, the adjustment doesn’t happen immediately, but the eventual impact of trying to push unemployment too low is that wages rise and GDP falls back to its original level (or perhaps its original growth rate) and unemployment winds up back where it was. All there is to show for the effort in the end is a higher price level or possibly a higher inflation rate.

**Long Run Aggregate Supply – Equilibrium GDP and the Natural Rate of Unemployment**

The AS/AD model can be augmented somewhat to consider the idea of a long run equilibrium.
For our purposes here, equilibrium can either mean that inflation is zero (that is, prices don’t rise) or that inflation is constant (prices rise at a constant and predictable rate) instead of being unexpectedly high, as in the above example.

This idea is represented in the graph by a vertical line at the level of GDP that is associated with price stability or inflation predictability.

Put another way, this vertical line is at a level of GDP that is consistent with a level of unemployment called the natural level of unemployment. This is a level of unemployment that is associated with a healthy, well-functioning economy.

If GDP is pushed too high or unemployment is pushed too low, the economy will naturally return to the equilibrium levels of GDP and unemployment, given enough time.

If GDP falls too low or unemployment gets too high, the economy will naturally return to the equilibrium levels of GDP and unemployment, given enough time.

The process by which an economy returns to equilibrium is called the automatic adjustment process, and it relies on wages either rising if unemployment is too low or falling if unemployment is too high.

Diagram: Pushing AD too high is ultimately inflationary

First Graph (short run)
1. AD shifts out (perhaps due to a tax cut or government spending increase): A to B
2. PL and GDP rise, unemployment falls

Second Graph (long run)
3. Wages rise due to low unemployment and SRAS shifts up as a result: B to C
4. PL rises. GDP falls back to original level. Unemployment rises to original level.
Diagram: An economy recovers from a recession with no government intervention

First Graph (short run)
1. AD shifts in (perhaps due to some sort of external shock): A to B
2. PL and GDP fall, unemployment rises

Second Graph (long run)
3. Wages fall due to high unemployment and SRAS shifts down as a result: B to C
4. PL falls. GDP rises back to original level. Unemployment falls to original level.

These fancy graphs carry two important messages:
1. Trying to push unemployment too low (perhaps because you want to get re-elected) is ultimately just inflationary.
2. If an economy enters a recession and wages are free to fall, given enough time an economy can recover on its own with no government intervention.

In general, the goal of macroeconomic policy is to create sustained economic growth with accompanying low unemployment while maintaining a low and steady rate of inflation.

Some In-Class Exercises
Show the effects of the following events on a standard AD/AS diagram. What will be the impact of each event on GDP and the price level?
1. A big increase in stock prices.
2. A big increase in oil prices.
3. Worries about a coming recession.
4. A huge influx of foreign workers.
B&B Chapter 5
Macroeconomic policy relates to three important things:
1. Economic Growth
2. Unemployment
3. Inflation

Basically, it’s good to have sustained and steady growth, low unemployment and low and steady inflation.

Growth
Basically, economic growth is a steady increase in the amount of stuff (goods and services) produced by an economy.

The measure of the amount or value of stuff produced might be:
Real GDP – the total amount of stuff
Real per capita GDP – the total amount of stuff per person
Labor productivity – GDP per hour of work

How do you get economic growth?
1. Increased population will increase real GDP, but not other measures
2. Increased labor force participation – can increase everything but productivity
3. Accumulate more physical capital – can increase all measures
4. Accumulate more human capital – can increase all measures
5. Greater productive efficiency – producing more stuff with the same inputs

Point #5 is what Eat the Rich is really about.

Unemployment
High unemployment is bad. It wastes human potential. When people are unemployed, instead of making things that are of value to other people, they do other things. These other things are often bad.

Officially, the unemployment rate is defined as:

\[
\left(1 - \frac{\text{employed}}{\text{labor force}}\right) \times 100\%
\]

The labor force is defined as everyone who is either working or actively seeking work.
The unemployment rate might alternatively be defined as the number of people seeking work divided by the sum of the number seeking work and the number actually working.

There are a number of problems with using the unemployment rate as a measure of the health of the economy:
- Discouraged workers
- Part time workers
- Underemployed workers
- Non-wage workers (housewives)
- Illegal or underground workers, non-reported for tax purposes (Bulgaria)

Three types of unemployment
- Frictional: From normal turnover and searching (good)
- Structural: Due to large changes in skills desired in the economy (good)
- Cyclical: Due to recessions (bad)

If you want to reduce unemployment, think about how you would reduce each type.

Natural rate of unemployment... just frictional (and a little of structural)
- Why natural rate is rising
- Why some unemployment is good

Unemployment insurance – it improves equity but hurts efficiency

Inflation
Defining inflation takes a few steps.

1. Price level or price index
   Idea of a basket of goods

EX: Imagine that a typical person consumes five pounds of coffee and twenty bagels in a week. In year one, the price of coffee is $2/pound and the price of bagels is $1.00 each. In year two, the price of coffee rises to $4/pound and the price of bagels rises to $1.10 each.

The cost of the set of goods rises from

\[(2 \times 5) + (1.00 \times 20) = 30\]

to

\[(4 \times 5) + (1.10 \times 20) = 42.\]

The percentage change, the inflation rate, is

\[\frac{42 - 30}{30} = \frac{12}{30} = 0.40 = 40\%\]
Different price levels (CPI, PPI, GNP deflator)
The price level is the price of the basket of goods, but…

Definition of a base year (numbers from back of book), the price level in the base year is 100.

2. Definition of the inflation rate is the percentage change in the price level:

\[
\frac{(PL_2 - PL_1)}{PL_1}
\]

Sample calculations
Imagine that the price level rises from 97 in Year 1 to 102 in Year 2. What is the calculated inflation rate over the year?

\[PL_1 = 97\] \[PL_2 = 102\]
Inflation rate = \(\frac{(102-97)}{97} = 0.0515 = 5.15\%\)

Lightly for now…the question of changing basket of goods used to calculate the price level. What happens if the set of goods that people consume changes over time?

An example with two goods

EX: Returning to the above example of coffee and bagels, you might realize that if the price of coffee rises a lot and the price of bagels rises only a little, people might substitute from coffee to bagels. As a result, maybe the set of goods used to calculate the price level should change.

As above the price of coffee rises from $2/pound to $4/pound and the price of bagels rises from $1.00 to $1.10.

Above, the basket of goods remained constant at 5 pounds of coffee and 20 bagels.
Imagine that typical consumption changes to 3 pounds of coffee and 24 bagels.

Price of original basket at original prices: \(\$2 \times 5 + \$1.00 \times 20 = \$30\)
Price of new basket at original prices: \(\$2 \times 3 + \$1.00 \times 24 = \$30\)
Price of original basket at new prices: \(\$4 \times 5 + \$1.10 \times 20 = \$42\)
Price of new basket at new prices: \(\$4 \times 3 + \$1.10 \times 24 = \$38.40\)
The inflation rate using the original basket in both years is 40\%
The inflation rate when the basket changes from one year to the next is:

$$\frac{38.40 - 30}{30} = \frac{8.40}{30} = 0.28 = 28\%$$

Changing the basket results in a lower calculated inflation rate.

Which gives a better indication of inflation?

If you are trying to guarantee people a certain standard of living, which is better?

This is important for Social Security because benefits are adjusted for inflation

Difference between anticipated and unanticipated inflation

Adjustments that can be made to perfectly anticipated inflation (indexing)

Winners and losers from unanticipated inflation

Winners: Borrowers (home buyers, governments in debt, students), employers with long term wage contracts

Losers: Lenders (S&Ls, banks, CD holders, bond holders), employees with long term wage contracts

Unanticipated inflation results in a random redistribution of wealth and so is bad.

Real Versus Nominal Interest Rates

A nominal interest rate is the rate either paid on a loan or received on a deposit.

The real interest rate is the rate at which the purchasing power of the money loaned or deposited increases.

The function relating the two is approximately:

$$\text{Real} = \text{Nominal} - \text{Inflation}$$

For example, if you deposit some money in an account paying a nominal interest rate of 5% for a year, and over the year inflation turns out to be 3%, the real rate of interest over the year will be

$$5\% - 3\% = 2\%$$

This means that the amount of stuff that you could buy with your money will have increased by 2% over the course of the year.
If, instead, inflation had been 6% (probably surprisingly high!) your real rate of return would have been –1%, meaning that the money would buy 1% less stuff at the end of the year as compared to the beginning of the year.

There are two related issues.

First, you pay income taxes on taxable interest based on the nominal rate of return, and not the real rate of return.

So, if your tax rate is 20%, you earn a nominal rate of 5% and inflation is 3%, your after tax, real rate of return will be approximately:

\[
\left[5\% \times (100\% - 20\%)\right] - 3\% = 4\% - 3\% = 1\%
\]

Second, the amount of time it takes money to double in value is approximately equal to 72 divided by the interest rate. This is the so-called Rule of 72.

For example, in the first case above, the real rate of return was 2%. At this rate, money would double in real value (in its purchasing power) in \( \frac{72}{2} = 36 \) years.

In the second case above, the real rate of return was 1%. At this rate, money would double in real value in \( \frac{72}{1} = 72 \) years. The extra 1% makes a huge difference, even though it might not seem like much.