

Before you read anything, two stories to keep in the back of your mind

Story #1

Suppose we have \$100 in monopoly money in class, and this monopoly money has only one use - it can be used to purchase 20 lollipops in class today only. If I asked to you take a crack at the price of a lollipop, you might guess \$2.50, \$5, \$6.75, who knows?

But now, suppose I give class the same 20 lollipops, and hand out \$1000 in monopoly money. Again, I ask you to guess the new price of lollipops, and I suspect that most of you would guess a higher price.

The point is - if we have the same number of goods, but we have more dollars chasing those goods, the price of goods will rise. Does this sound sensible?

Story #2

You go to sleep tonight, and this is the state of the world.

In your pocket you have	5	\$1 bills
	10	\$20 bills
a wage of		\$5.75 / hour
price of a Coke		\$1.00 / bottle
tuition at CU		\$5,000 a semester

You wake up tomorrow, and every price has another 0 on the end.

In your wallet are	5	\$10 bills
	10	\$200 bills (I think Richard Nixon is on the \$200 bill)
a wage of		\$57.50 / hour
price of a Coke		\$10.00 / bottle
tuition at CU		\$50,000 a semester

Has your life changed any? Will you change your behavior? Will you buy more Coke? Will Coke get all excited and bottle more Coke? Will you drop out of school? We'll see.

Aggregate Demand / Aggregate Supply - a look back, and a look ahead.

So far, we've come up with our classical (long-run) model with a production function and the market for labor. It tells us a nice story about the economy in the long run. However, it doesn't do a good job explaining business cycles (booms and recessions).

We are now coming up with the AD / AS model that will do a good job explaining business cycles. Before we can do that, we'll need to figure out what determines the overall level of spending in the economy (this will be aggregate demand). And then will need to know how many goods suppliers are willing to produce at each price level (this will be aggregate supply). But I am getting ahead of myself...

Aggregate Demand

Aggregate Demand curve— shows us the relationship between the price level (**P**) and real GDP (**y**), for a given level of total spending. It shows us all the combinations of **P** and **y** that are possible given the total level of spending in the economy.

So if total spending in the economy is \$100, we could either have....

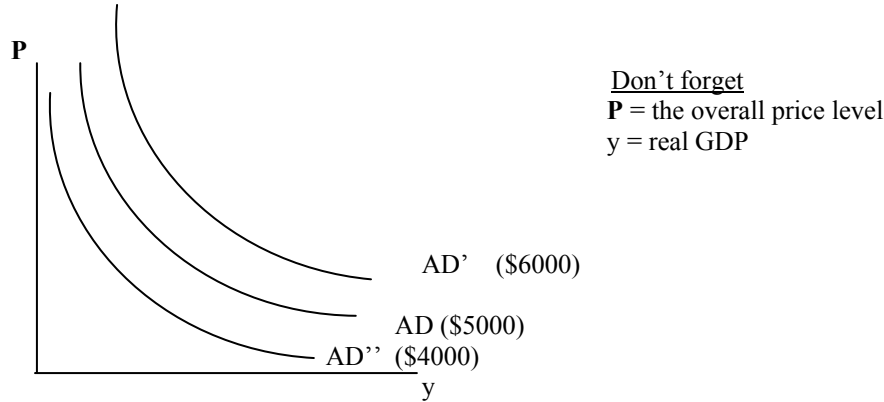
P = 1, **y** = 100

P = 2, **y** = 50

$P = 20, y = 5$

or any number of other combinations that result in \$100 of spending.

Given the level of total spending, we can graph all the combinations of the price level (P) and real GDP (y) that are possible with that level of spending. The result is called an Aggregate Demand curve.



Increases in AD will shift the entire curve to the right, while decrease in AD will shift the entire curve to the left. (Math people: this is a rectangular hyperbola).

What determines the level of AD? How do I know what the level of total spending in the economy will be? Which level of spending? Where do I draw the curve?

Go back to our story about money. Recall from before we had:

- (1) $M^d = k * Y$ money demand
- (2) $M^s = M$ money supply
- (3) $M^s = M^d$ equilibrium condition

We did some algebra and found out that $Y = M / k$. We said before that Y (GDP) was determined by the money supply and money demand. But what is GDP? It is the total dollar value of spending in the economy. **GDP is aggregate demand**. Thus, the level of aggregate demand is determined by M and k. If we know M, and we know k, we'll know GDP and thus the level of Aggregate Demand.

$Y = M / k$ This is Aggregate Demand (AD).

So, as we said before, an increase in M the money supply will lead to an increase in AD (GDP) and shift the AD curve to the right. A decrease in the money supply will lead to a decrease in AD (GDP) and shift the AD curve to the left.

An increase in k (money demand) will lead to a reduction in AD (GDP) and shift the curve to the left. A decrease in k (money demand) will lead to an increase in AD (GDP) and shift the curve to the right.

Long run aggregate supply (LRAS)

Now we know the level of overall spending in the economy, and all of the various possibilities of price level and real GDP this level of spending can support. Which one will it be?

The LRAS curve will show us how many goods and services will be produced at each price level. Does the amount of goods and services produced depend on the price level at all? Go back to Story #2. Here, we increased all prices ten times. Do you think Coke will produce more bottles of Coke? I don't.

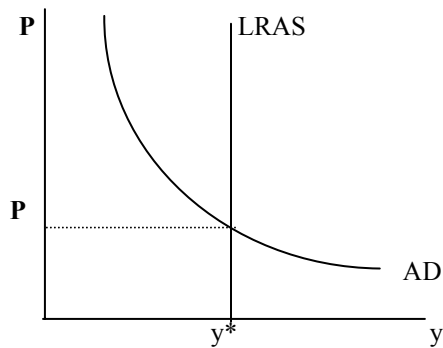
If the overall amount of goods and services being produced in the economy doesn't depend on the price level, what does it depend on?

LRAS depends on the production possibilities of the economy. According to your book, its location will be determined by three factors.

1. population
2. capital
3. technology

If you like, think back to the model we had with production function and the supply and demand for labor. Population is embedded in the supply of labor curve. The amount of capital and technology determine where the production function and the demand curve for labor are.

Thus, we will draw the LRAS curve as a vertical line at y^* , the quantity of real GDP determined by the above factors. We call y^* the steady state level of real GDP. This is the same y^* we were talking about when we calculating cyclical unemployment. The idea is that is the level of real GDP are economy can sustain in the long run, given our resource limitations. It does not depend on the price level. It does not depend on M or k .



We can now combine the AD curve with the LRAS, find equilibrium P and y^* , and do comparative statics.

AD / LRAS Comparative Statics

Suppose there is an increase in M

$$Y = M / k \quad M \uparrow \Rightarrow Y \uparrow, \text{ i.e. } AD \uparrow \text{ (shifts right to } AD') \quad P \uparrow \text{ to } P'. \text{ No change in } y.$$

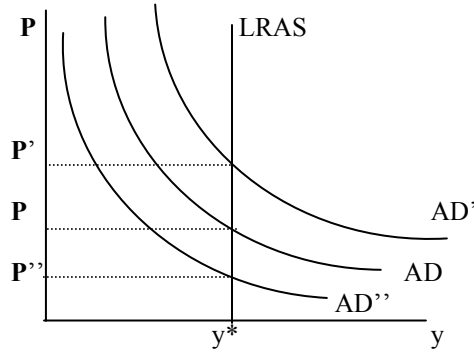
The story goes that people will have too much money relative to their income level. They will go out and spend more money, as will everyone else in the economy. But, since the total number of goods being produced in the long run doesn't change, there is just extra money chasing around the same number of goods. As a result, all that will end up happening is an increase in the price level. Since y doesn't change (it's stuck by the LRAS curve), and P is rising, Y (GDP) increases.

Thus, the long run effect of an increase in the money supply is a higher price level, but no change in real GDP.

Suppose there is an increase in demand for money, i.e. $k^* \uparrow$

$$Y = M / k \quad k \uparrow \Rightarrow Y \downarrow, \text{ i.e. } AD \downarrow \text{ (shifts left to } AD'') \quad P \downarrow \text{ to } P''. \text{ No change in } y.$$

Now, you suddenly want to hold a larger fraction of your income as money. You aren't holding enough money. When you've got too much money, you go out and spend a bunch. In this case, you have too little money, so you cut back you're spending. But again, the level of real GDP is stuck by the LRAS curve, so we have less money chasing around the same quantity of goods, and the price level will fall. In the end, Y decreases.



You should also decrease the money supply, decrease the demand for money, and increase LRAS and see what happens in each of these cases.

The long-run neutrality of money

Above, we noticed that an increase in M increases AD , and thus increases the price level, but didn't change real GDP. This is important. It is called the long run neutrality of money.

A disturbance to the money supply (either an increase or decrease) has no long run effect on real GDP. It only affects prices. We thus say that monetary changes are neutral in the long run. It will not affect any real variables.

Go back up to Story #2 at the beginning of these notes. In the long run, the only effect changes in the money supply have is to adjust the price level. If all prices change by the same amount, relative prices (opportunity costs haven't changed). Your nominal wage has gone up ten times, but so have the cost of coke and the price of tuition. None of this will change your behavior.

Why do you keep saying long run?

I keep saying in the long run. If there were a 10-fold increase in the money supply, there might be some chaos in the short run. We will explore this now. Thus far, we have said nothing about the short run.

Helicopters

Suppose the government decides to increase the money supply. I claim they drop the cash from helicopters, and people pick it up the next morning?!?!?!? It might be a tad more subtle, eh?

Some fun exercise for you?

Suppose there is an increase in the productive resources of the economy. For instance, suppose a bunch of immigrants show up in the US (of course with no money). What will happen to the LRAS supply curve?

And, if at the same time they show up (and end up producing more goods), and there is no change in the amount of money, we'll have the same amount of money chasing around a larger number of goods. What will happen to the price level? Is this the answer you get when you shift the LRAS curve? It should

Suppose there is an increase in R . What happens to k ? Y ? The price level? Real y ?

What should I read?

Chapter 20. You may also take a look at Chapter 16 if you haven't already.