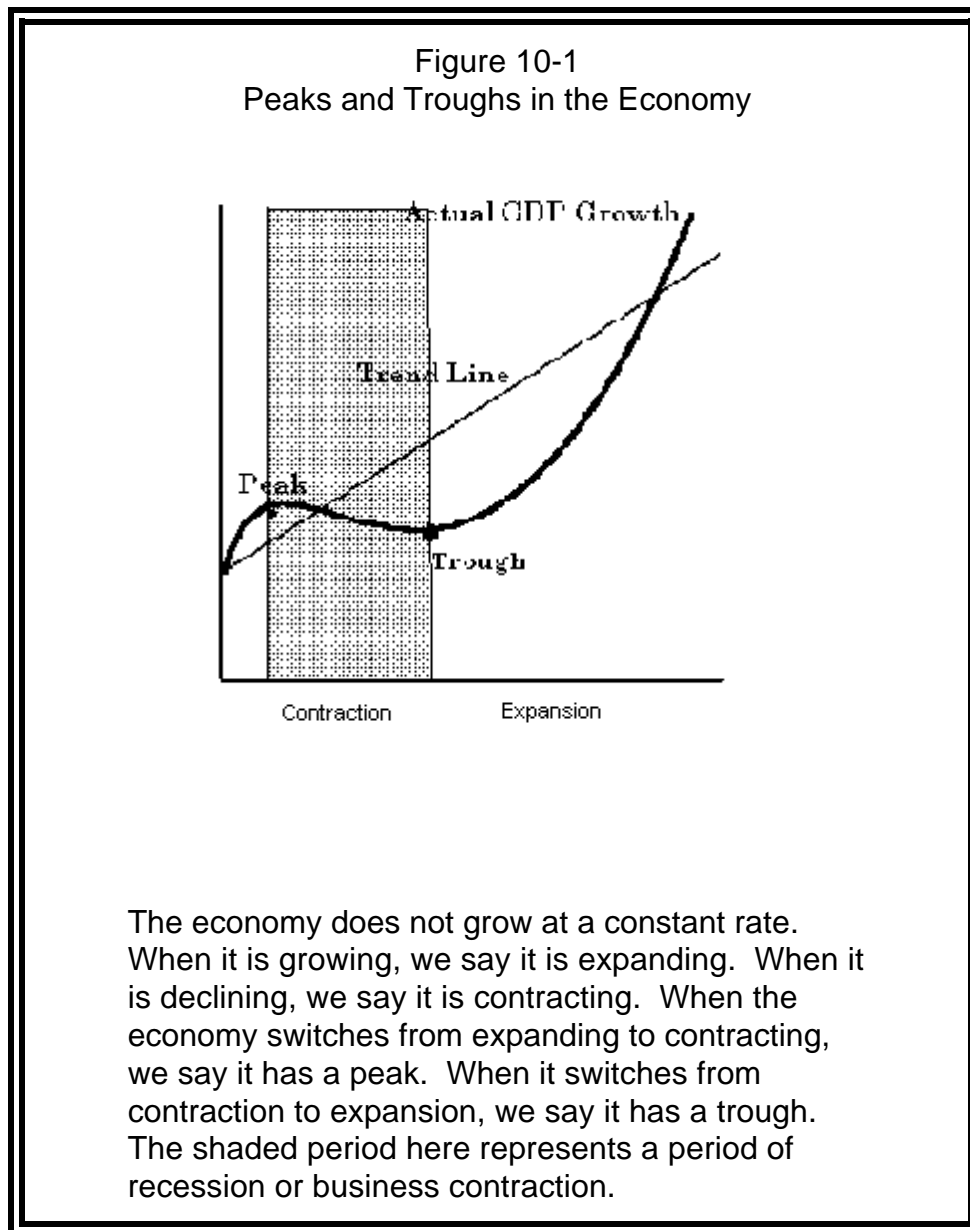## Lecture 10: Economic Fluctuations

As we know, the long-term growth in the United States and other advanced economies is quite impressive over the past couple of centuries. We also know that this growth gets interrupted from time to time. As Figure 10-1, repeated here from Figure 2-2 reminds us, the growth process has both periods of growth and periods of recession, when the economy moves from a peak to a trough.

Figure 10-1
Peaks and Troughs in the Economy

The economy does not grow at a constant rate. When it is growing, we say it is expanding. When it is declining, we say it is contracting. When the economy switches from expanding to contracting, we say it has a peak. When it switches from contraction to expansion, we say it has a trough. The shaded period here represents a period of recession or business contraction.

Periods of business contraction are not isolated events. Table 10-1 shows the peaks and troughs in American economic activity from 1854. These cycles are both mild and severe. From 1929 to 1933, real GDP in the United States fell by 30 percent, prices fell almost as much, and nominal GDP fell from $103 to $55 billion. The unemployment rate rose to 25 percent. Most economists and historians refer to this period as the *Great Depression*. In recent years, we have had only relatively mild recessions, one in 1981-82 and a particularly mild one in 1990-91.

For example, consider the contraction of 1981-82. The late 1970's had been a period of rapid inflation, and the Federal Reserve System decided to bring inflation under control. They did so. In 1979, the inflation rate was 13.3 percent; by 1982, it was only 3.8 percent. While prices did not decline as they did in 1929-33, the 1982 price level was some 20 percent lower than it would have been without the drop in the inflation rate. As in the case of the Great Depression, the economy suffered. Real GDP fell by 3.0 percent from the fall of 1981 to the fall of 1982. That may not seem like much, but it was enough to cause the unemployment rate to rise from 5.8 to 10.0 percent.

In the case of the 1991-92 recession, the changes were much milder. The unemployment rate rose only about 2 percentage points.
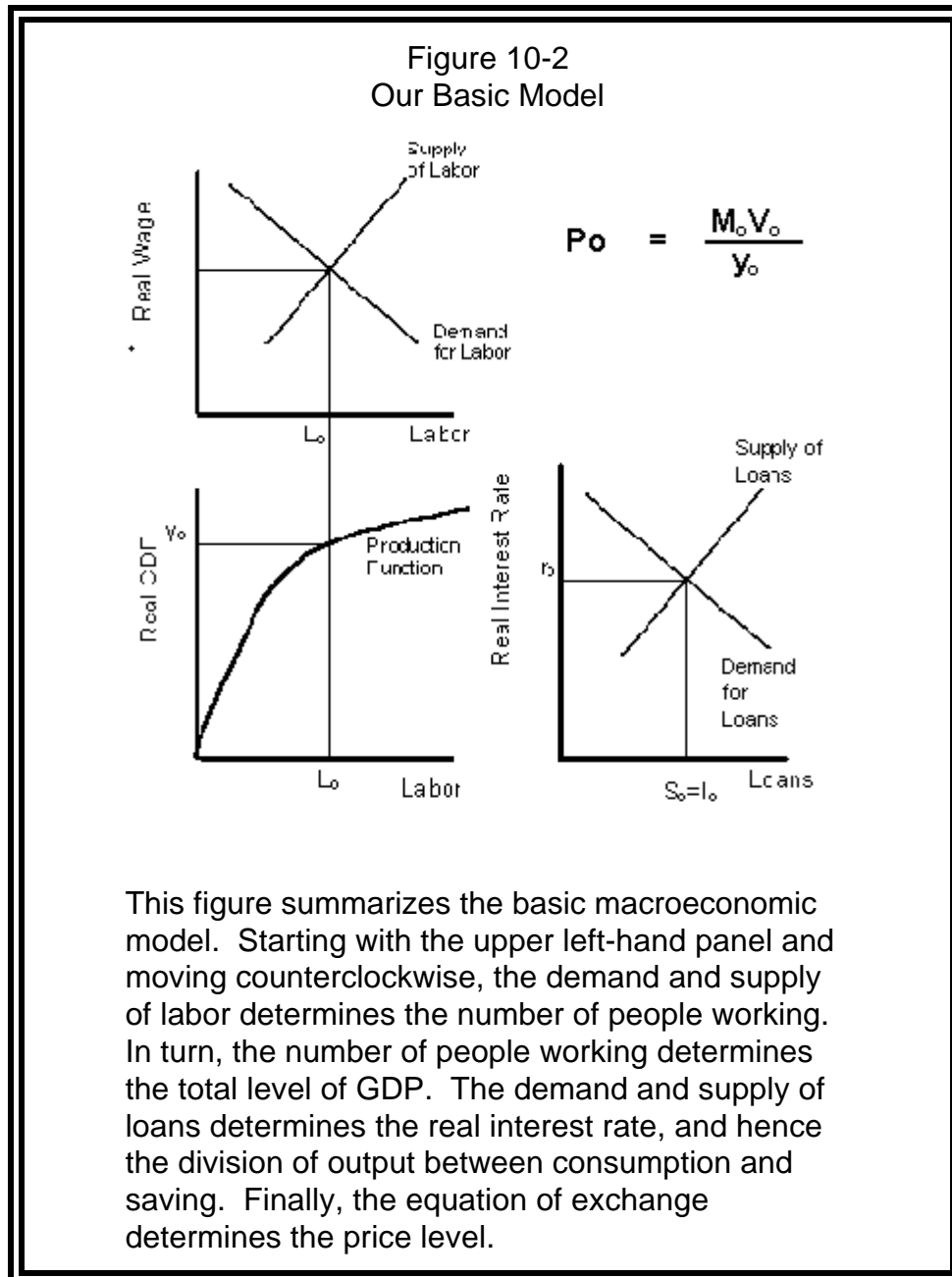
<table>
<tr><th colspan="3">Table 10-1
Dates of Peaks and Troughs of Business Cycles
in the United States, 1854-1997</th></tr>
</table>

Peak	Trough	
???	December 1854	
June 1857	December 1858	
October 1860	June 1861	These data come from a long-standing research project of the National Bureau of Economic Research (NBER). While an NBER committee dates when recessions begin and end, the following rule will almost always predict what they are going to do: if Real (Inflation Adjusted) GDP declines for two consecutive quarters, a recession has begun; when Real GDP begins to rise, the recession is declared over.
April 1865	December 1867	
June 1869	December 1870	
October 1873	March 1879	
March 1882	May 1885	
March 1887	April 1888	
July 1890	May 1891	
January 1893	June 1894	
December 1895	June 1897	
June 1899	December 1900	
September 1902	August 1904	
May 1907	June 1908	
January 1910	January 1912	
January 1913	December 1914	
August 1918	March 1919	
January 1920	July 1921	
May 1923	July 1924	
October 1926	November 1927	
August 1929	March 1933	
May 1937	June 1938	
February 1945	October 1945	
November 1948	October 1949	
July 1953	May 1954	
August 1957	April 1958	
April 1960	February 1961	
December 1969	November 1970	
November 1973	March 1975	
January 1980	July 1980	
July 1981	November 1982	
July 1990	March 1991	

Aggregate Demand and Aggregate Supply

When talking about business cycles we once again go back to our basic model of the economy. As we can tell from the lower right hand part of Figure 10-2, our basic graph, we require that the demand and supply of loans be equal. Specifically, we require that

$$S + M\text{-}X = I + G\text{-}T$$

Figure 10-2
Our Basic Model

$$Po = \frac{M_o V_o}{y_o}$$

This figure summarizes the basic macroeconomic model. Starting with the upper left-hand panel and moving counterclockwise, the demand and supply of labor determines the number of people working. In turn, the number of people working determines the total level of GDP. The demand and supply of loans determines the real interest rate, and hence the division of output between consumption and saving. Finally, the equation of exchange determines the price level.

That is saving plus the value of the trade deficit must equal domestic investment plus the government budget deficit. There is another way of stating this requirement that is more useful to us here, namely that the supply and demand of aggregate output be equal. In fact, this was our basic starting point when we derived the requirement that the supply and demand of loans be equal. To refresh our memory, our starting equation was

$$Y = C + I + G + (X\text{-}M)$$

- **Aggregate Supply** is the entire productive capacity of the economy. The left-hand side represents Aggregate Supply.

- **Aggregate Demand** is the total demand for goods and services in an economy by all individuals, firms, and governments. The right hand side represents aggregate demand.

A minor change we want to introduce is to work with the requirement that aggregate demand (AD) must equal aggregate supply (AS), which we do by rewriting our equation as.

$$Y = AS = AD \equiv C + I + G + (X\text{-}M)$$

Note the use of the "≡" symbol. This is mathematical shorthand for "is defined as". In short, there is nothing new when we restate our requirement that the demand and supply of loans be equal as
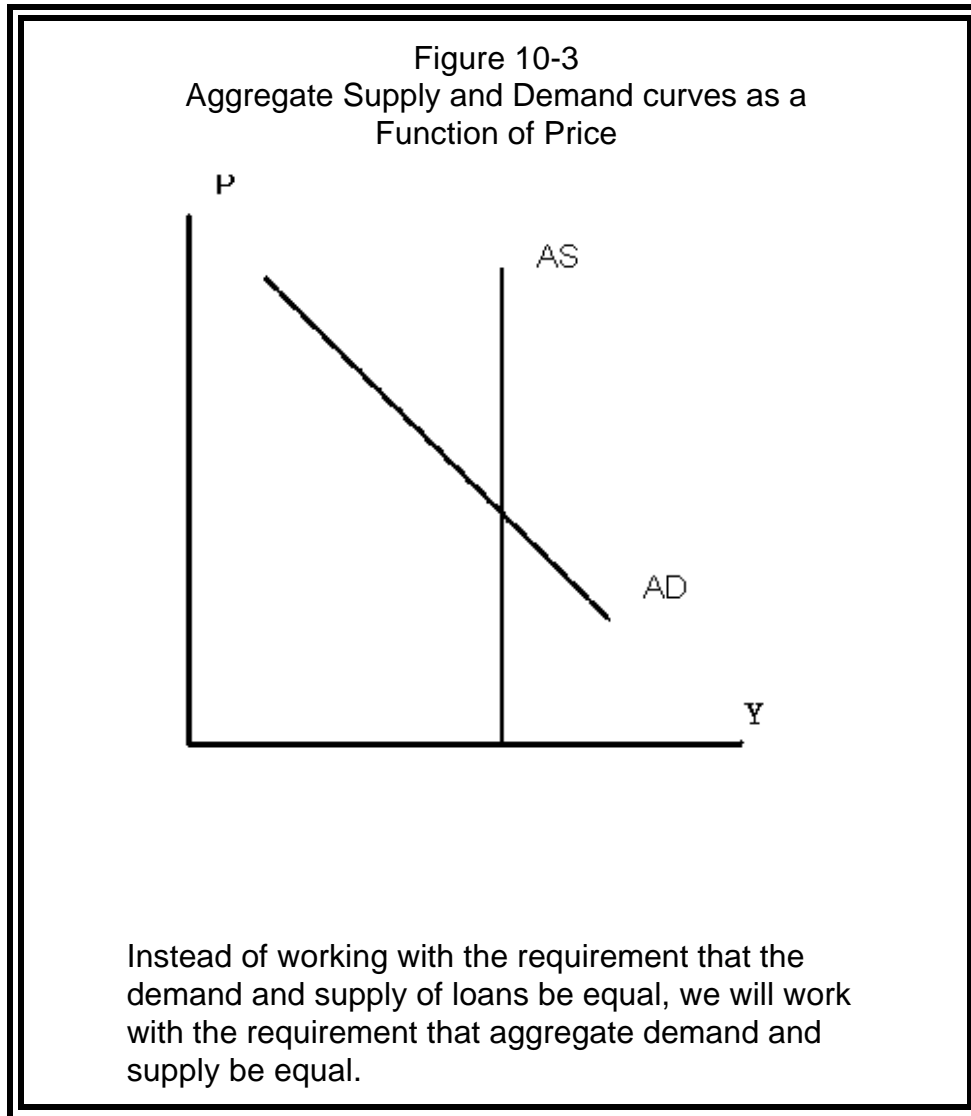
$$AS = AD$$

The aggregate demand and aggregate supply curves

Figure 10-3 shows our aggregate demand and supply curves. Obviously whenever an economist draws supply and demand curves, the curves will be function of some price. Here the "price " is the price level. This requires explanation.

Why is the aggregate demand curve a downward sloping function of the price level?

As you know, aggregate demand comes from summing up the sources of aggregate demand: Thus we know that

Real Aggregate Demand = Y = C + I + G + (X-M)

Figure 10-3
Aggregate Supply and Demand curves as a
Function of Price

Instead of working with the requirement that the demand and supply of loans be equal, we will work with the requirement that aggregate demand and supply be equal.

However, there is actually a second equation for describing the relation between aggregate demand and price. Recall from the equation of exchange that

Nominal Aggregate Demand = PY = MV

And, adjusting for the price level,

Real Aggregate Demand = Y = MV/P

These two equations are two ways to describe purchases at a store. The first equation describes the amount an economy spends on each type of

good, here consumption, investment, etc., instead of spending on marshmallows, graham crackers, and chocolate chips. The second equation describes the total amount of money that people spend each year, but in terms of the total dollars spent, here MV/P or the money supply times the number of times each dollar is spent, divided by the price level.

Some people might object to this way of stating aggregate demand. But sometimes it is useful to recognize that there may be two ways of explaining something. For example, why am I teaching this class right now? One explanation is that I am paid to teach this class. Another explanation is that I got up this morning, showered, got dressed, came to my office, then walked into this classroom. Both explanations are true, but offer different insights into my behavior. If you want to explain my behavior, some times you will find one explanation more convenient and other times you will find the other explanation more convenient. They will always give the same answer.

If we want to see the slope of the aggregate demand curve, the second equation is more convenient. Holding both the money supply and velocity constant, aggregate demand curve is a downward sloping function of price. Since Aggregate Demand equals MV/P. it is obvious that the higher the level of P, the lower the level of aggregate demand and vice versa.

Warning Required by the Economist-General

- To some, the use of the equation of exchange to show the aggregate demand curve is a downward sloping function of the price level may look like pulling a rabbit out of a hat. Rest assured that this argument could be made in more detail. More advanced versions of the theory of aggregate demand do not hold velocity constant, but instead hold constant various factors that affect velocity, and thus spell out in more detail the process by which lower price levels lead to a downward sloping aggregate demand curve. The crucial point is that the aggregate demand curve does slope downward.

Why the aggregate supply curve is not a function of price

Long proofs that supply curves slopes upward are generally a sure-fire cure for insomnia. The idea that more of a commodity will be supplied as its price rises is simple, obvious, and compelling. But this supply curve is special. It talks about the supply of aggregate output as a function of the overall price level. And, as we would expect, there is no relation between this

aggregate supply curve and the price level. As the graphs on the left hand side of Figure 10-2 make clear, a country's aggregate supply is determined by the total amount of capital, the number of people who want to work, and the hours they work. A rise in the price level simply means that things that used to cost five pictures of George Washington now cost (say) seven, and why that should make people willing to work harder is surprising. To be sure, one of the things that now costs seven pictures of George Washington is (say) an hour's worth of your time or my time. Normally we would have no trouble explaining why we would be willing to work more for seven pictures of George than for five. But in this case, remember that the things that we used to be able to buy with those five pictures now cost seven. Unless you have a psychological disorder or a case of extreme patriotism, you don't work for pictures of George; you work for what they can buy. And the plain truth is that an increase in the price level means that what you get paid, in inflation adjusted terms, does not rise. Thus we would expect no increase in the amount of labor you or I would be willing to supply.
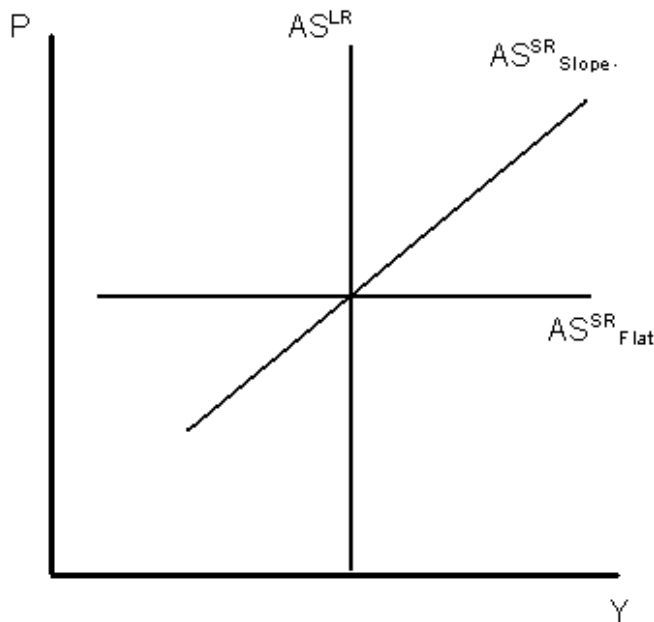
The Short Run Aggregate Supply Curve

But there is another part of the puzzle, which we must now introduce: the short run aggregate supply curve. As you will recall, lecture one discussed the difference between short run and long run supply curves. In this case economists distinguish between a

- Long Run Aggregate Supply Curve and a

- Short Run Aggregate Supply Curve

Economists disagree about the shape of the short run aggregate supply curve AS^{SR}. Figure 10-4 illustrates two possibilities. Some believe it runs roughly horizontally, such as AS^{SR}_{Flat} while others believe it is upward sloping such as AS^{SR}_{Slope}. Of course, in the last case, there is also the second question of just how sloped the curve is. We will draw it as an upward sloping curve.

You might want to ask just how much slope the short run aggregate supply curve has. We will defer that question and turn to the more basic question: why does the short run aggregate supply curve differ from the long run supply curve at all?

Figure 10-4
Two possible short run aggregate supply curves

This figure illustrates two possible slopes for the short run aggregate supply curve. In one case it is upward sloping, though not vertical, as is the long run aggregate supply curve. In the other case, it is horizontal.

Why can there be a short run aggregate supply curve?

For there to be a short run aggregate supply curve there must be sticky prices, meaning prices are slow to change. Economists have given a number of explanations of why there can be a sticky prices and a short run aggregate supply curve. Rather than give an exhaustive treatment of these explanations, let's concentrate on just one: the imperfect information explanation.

The idea is quite simple. Suppose a worker who normally earns $10 an hour is offered a chance to work for $11 an hour. While some workers may choose not to work harder, others will conclude that this wage premium will not last forever and will jump at the chance to work harder while they

can earn a premium. In our terms, there is a movement along the short run labor supply curve. With more people working more hours, it should come as no surprise that there is a boost in total output.

Of course, if it were simply a nominal wage increase, then it would make no sense to respond by working harder. The worker will still be earning the same amount of real goods and services as before.

So too with firms. We know that the higher the real price a firm receives, the more it will supply. Suppose the price of a bicycle rises from $100 to $106. Is this a real increase or simply an increase in the nominal price? In practice, it is hard to tell. If it is a real increase, the firm can increase its profits by increasing output. If it is only a nominal increase, the firm will lose money by expanding output.

How Imperfect Information Affects Behavior

Both firms and workers thus face a problem that economists call the problem of imperfect information. How does the worker determine that the increase from $10 to $11 an hour is a real increase? And how does the firm decide that the increase in the price it can get for a bicycle is a real price increase?

It turns out to be a complicated problem. It would be foolish to act as if it were certain that the real price had risen from $100 to $106, though would be equally foolish to assume that it was certain that the real price had not risen at all. It turns out after a *great* deal of mathematics that the solution is to assume that part of the price increase is real. For example, the firm *might* respond as if the real price of a bicycle had risen from $100 to $102.

So too with workers. Workers, just like firms, have trouble distinguishing between real and nominal increases, and thus adopt the same behavior as firms. They may assume that part of an unexpected increase in their money wage is an increase in the real wage.

Thus a correct equation might be something like the following:

$$AS^{SR} = AS^{LR} + a(P\text{-}P^e)$$

In words, we are saying that the short run aggregate supply equals long run aggregate supply plus an adjustment for the difference between actual and expected inflation. The value of α will depend on just how sure workers and firms are of just what the inflation rate will be.

This, of course, brings us back to our earlier point. If workers work harder then output will go up. Moreover, they will work harder if their real wage has gone up -- *or at least if they think their real wage has gone up.* Unexpected inflation makes people think their real wage has gone up and thus makes them willing to work harder.

We should note some important restrictions.

- First this works only for unanticipated increases in the price level, or, as some people put it, unexpected inflation. If you expect prices to rise by, say, six percent, you would take the increase in the price of bicycles from $100 to $106 as simply confirmation of your expectations.

- Second if only the nominal price that has gone up, people will eventually realize that and eliminate any increase in output.

Other Explanations

There are other explanations given for a upward sloping aggregate supply curve, include:

- An explanation that prices are sticky because it costs too much to change them. For instance, a restaurant must reprint menus each time it raises prices and may be loath to change them that often.

- An explanation that wages are sticky because it costs too much to change them. It is hard for a professor to expect a wage increase in the middle of the year, for instance.
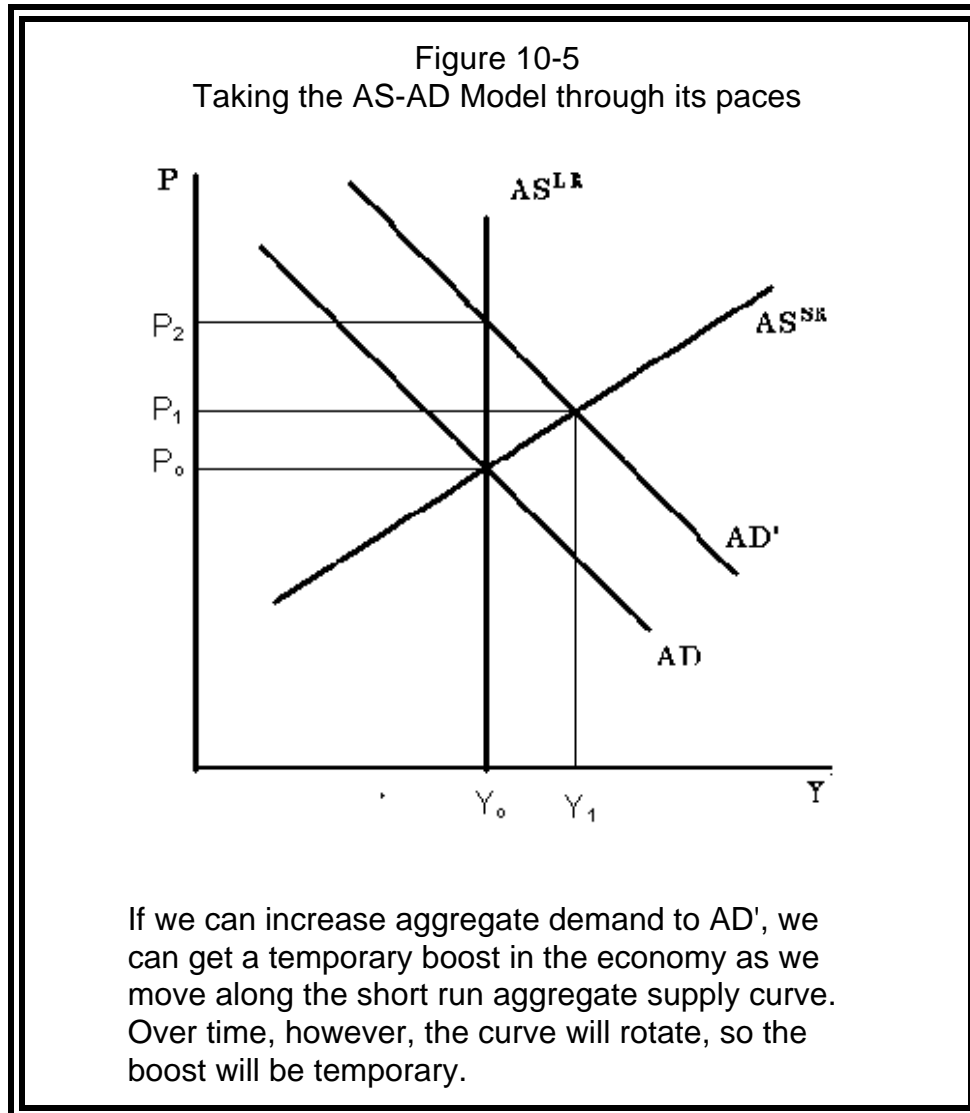
We need not settle which of these or other explanations to believe, but just note that these may be reasons why there could be an upward sloping supply curve. The important point to remember is that for there to be an upward sloping short run aggregate supply curve prices must be sticky.

The Dynamics of Aggregate Demand and Supply Model

Let's see if we really understand the basic aggregate demand and supply model by considering a few applications. Figure 10-5 illustrates the aggregate demand curve along with both a short run and long run aggregate supply curve. Initially, the economy is in equilibrium with the price level equal to P_0, and output equal to Y_0.
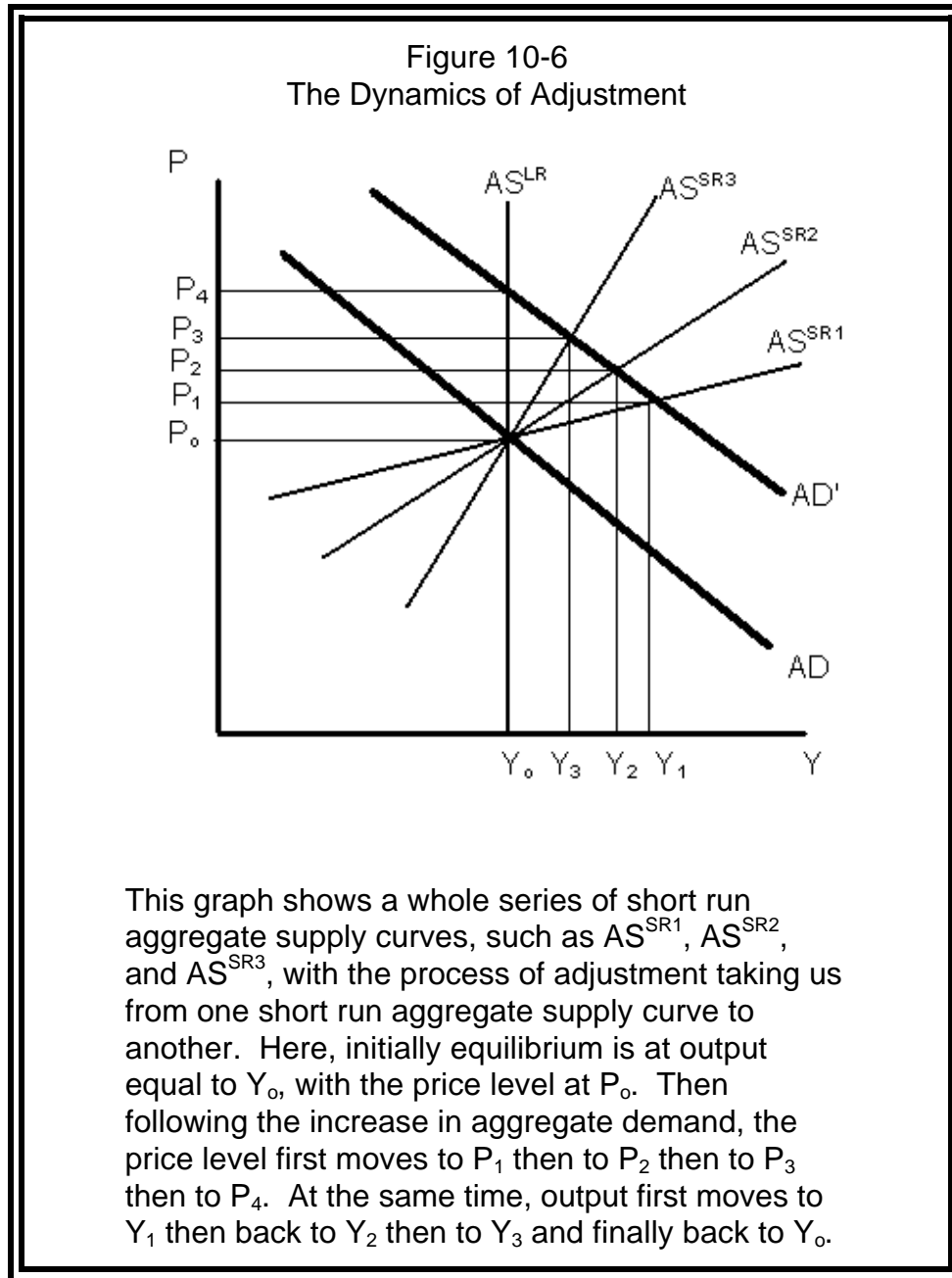
Suppose now that for some reason, the aggregate demand curve shifts to the right to AD'. We need not worry for the moment about why this shift takes place.

- The initial impact is to boost the price level to P_1, and GDP to Y_1.

- The boost in GDP is a temporary effect. The short run supply curve will eventually rotate. In time, GDP will go back to Y_o, while the price level rises all the way to P_2.

Figure 10-5
Taking the AS-AD Model through its paces

If we can increase aggregate demand to AD', we can get a temporary boost in the economy as we move along the short run aggregate supply curve. Over time, however, the curve will rotate, so the boost will be temporary.

Putting the graph this way illustrates why we do not worry about the exact slope of the short run aggregate supply curve. The process of adjustment is a continuous one. In fact, a more accurate picture might be to draw as in Figure 10-6 a whole series of short run aggregate supply curves,

such as AS^{SR1}, AS^{SR2}, and AS^{SR3}, with the process of adjustment taking us from one short run aggregate supply curve to another.

Figure 10-6
The Dynamics of Adjustment

This graph shows a whole series of short run aggregate supply curves, such as AS^{SR1}, AS^{SR2}, and AS^{SR3}, with the process of adjustment taking us from one short run aggregate supply curve to another. Here, initially equilibrium is at output equal to Y_o, with the price level at P_o. Then following the increase in aggregate demand, the price level first moves to P_1 then to P_2 then to P_3 then to P_4. At the same time, output first moves to Y_1 then back to Y_2 then to Y_3 and finally back to Y_o.

Here, initially equilibrium is at output equal to Y_o, with the price level at P_o. Then following the increase in aggregate demand, the price level first moves to P_1 then to P_2 then to P_3 then to P_4. At the same time, output first moves to Y_1 then back to Y_2 then to Y_3 and finally back to Y_o. If we were to display this process each time, it would make the graph much too messy.
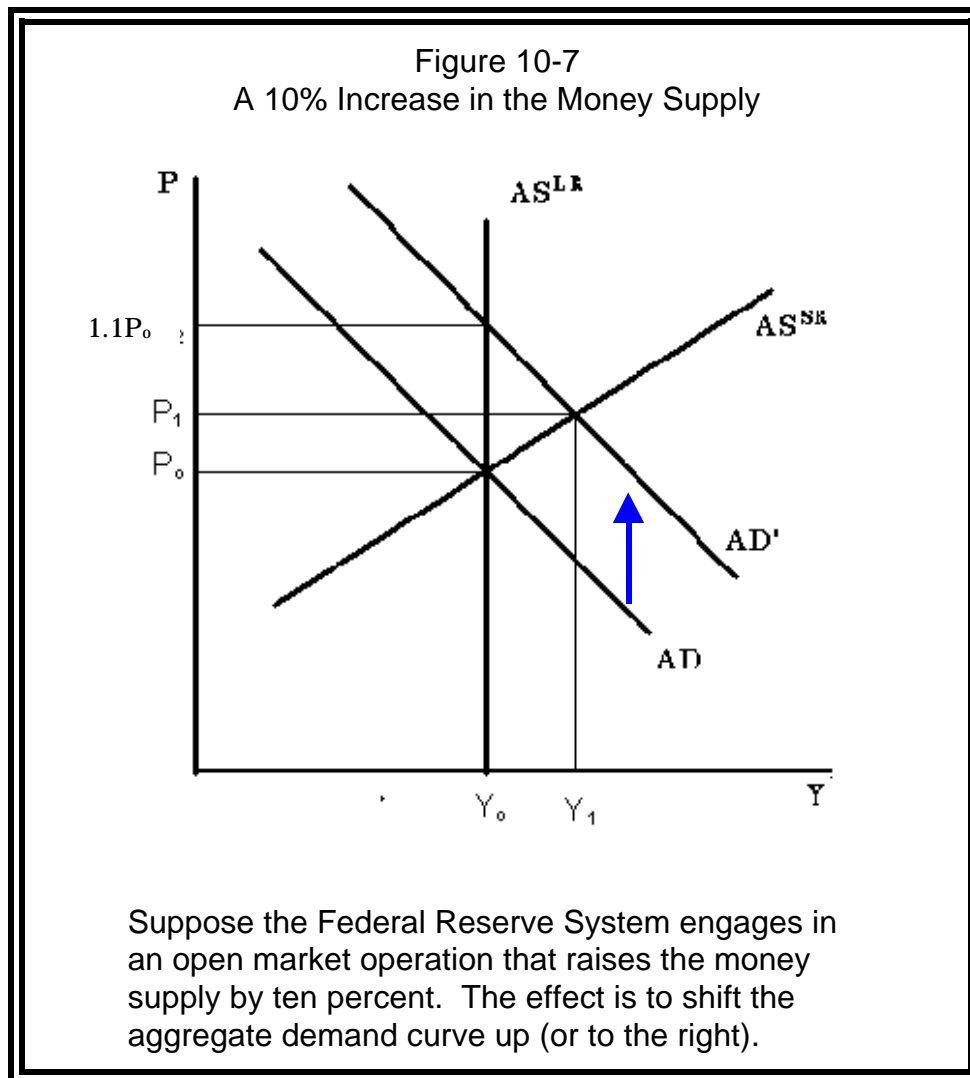
Think of the short run aggregate supply curve as merely a "snapshot" of a continual process.

Applications of the Aggregate Supply Aggregate Demand Model

Let us see if we can apply the aggregate supply and aggregate demand model to a couple of cases.

A 10% Increase in the Money Supply

If a ten-percent rise in the money supply were to lead to an immediate ten-percent rise in prices, then the economy would move to the new long-run equilibrium immediately. Real GDP would not change. The price level would rise by 10%.

Figure 10-7
A 10% Increase in the Money Supply

Suppose the Federal Reserve System engages in an open market operation that raises the money supply by ten percent. The effect is to shift the aggregate demand curve up (or to the right).

To see why, recall that MV = PY. If M is going up by 10%, and Y and V are not changing, then P must go up by 10%
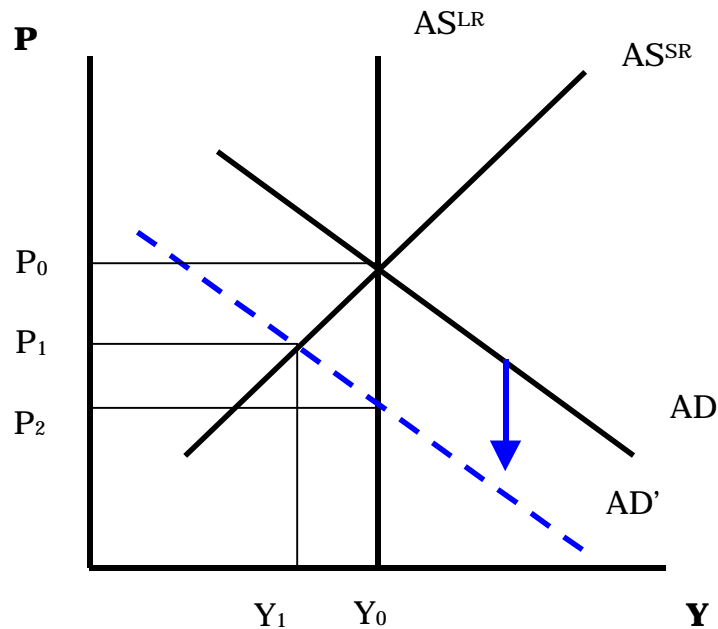
With a short run aggregate supply curve, the story is different. As Figure 10-7 shows, both the price level and output initially rise. These effects are temporary. As the short run aggregate supply curve rotates, the price level will move up by ten percent.

Economists have another name for these effects: they talk about whether *money is neutral*. Money is neutral if a change in the money supply does not affect real GDP or any other real variables.

- In the long run, after the short run aggregate supply curve has rotated to the long run aggregate supply curve, money is neutral.

- In the short run, when the short run aggregate supply curve may be different from the long run aggregate supply curve, money may not be neutral.

To see another illustration of our basic model, suppose that, for whatever reason, there is a fall in velocity, as there would be if people decided to hold on longer to their dollars. For example, people might become more uncertain about the banking system. Here, as Figure 10-8 shows, the fall in velocity would shift the aggregate demand curve to the left. The initial effect would be to first depress both prices and output. Over time, as the short run aggregate supply curve rotated back to the long run aggregate supply curve, output would return to its initial level, while prices fell even further.

Figure 10-8
An Exogenous Fall in Velocity

P

AS^{LR}

AS^{SR}

P_0

P_1

P_2

AD

AD'

Y_1 Y_0

Y

With a fall in velocity, the aggregate demand curve shifts to the left. The initial effect would be to first depress both prices and output. Over time, as the short run aggregate supply curve rotated back to the long run aggregate supply curve, output would return to its initial level, while prices fell even further

Government Spending Increases

Suppose government spending goes up. This increase in aggregate demand will cause the aggregate demand curve to shift to the right. Absent any effect of higher taxes on consumption demand, the net effect is as illustrated in Figure 10-9. There will be an initial – albeit temporary – increase in output, and an increase in the price level.

Figure 10-9
Government Spending Increases
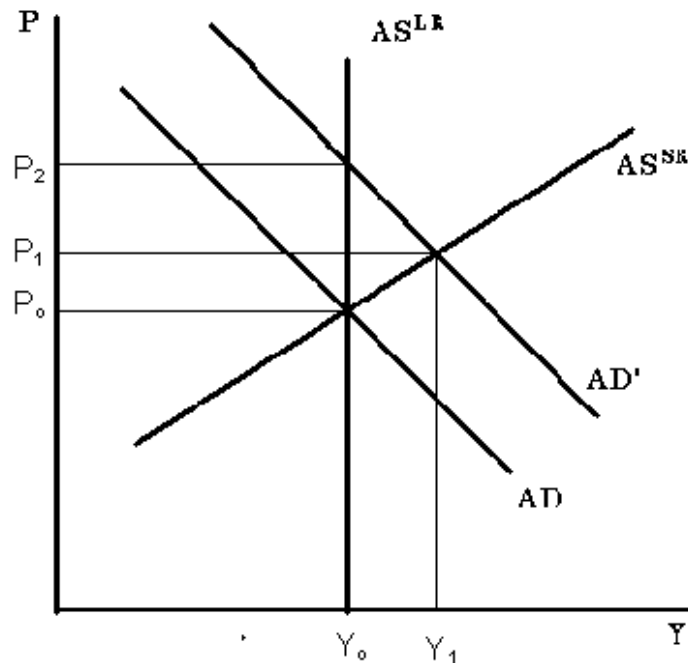
An increase in government spending will cause the aggregate demand curve to shift to the right, absent any effect of higher taxes on consumption demand. There will be an initial – albeit temporary – increase in output, and an increase in the price level.

Tax Increase

On the other hand, if the government increases taxes, consumption will decline since people will have less income. The effect will be to shift aggregate demand to the left. As Figure 10-10 shows, the impact will be a temporary reduction in output, and a reduction in the price level

Figure 10-10
An Increase in Taxes
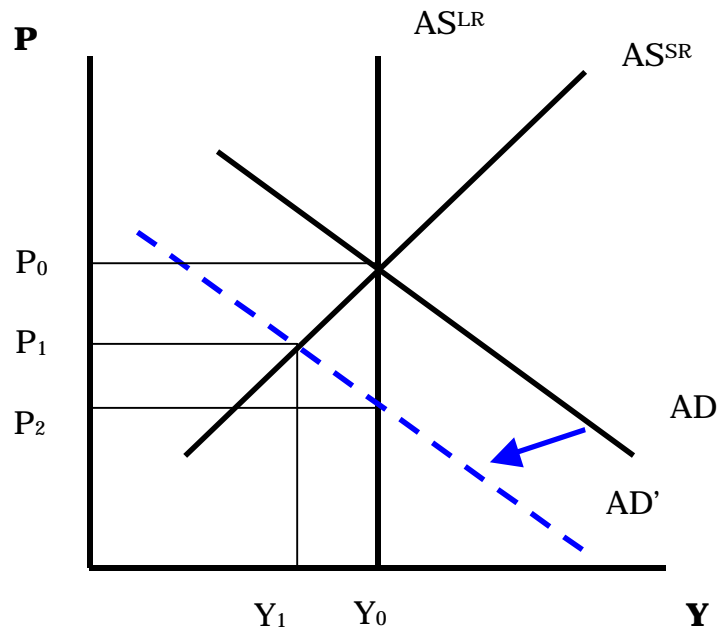
If the government increases taxes, consumption will decline since people will have less income. The effect will be to shift aggregate demand to the left. The impact will be a temporary reduction in output, and a reduction in the price level.

Dollar Falls in the International Market

If the dollar falls in international financial markets, so that it goes from (say) ¥140 to ¥120, Japanese goods become more expensive in this country and American goods become less expensive in Japan. Thus there would be an increase in the demand for exports and a decrease in the demand for imports, both of which would push up the X-M component of aggregate demand. As Figure 10-11 shows the impact would be inflationary and there would be a temporary boost in aggregate output

Figure 10-11
Dollar Falls on the International Markets

P | AS^{LR}

P$_2$

P$_1$

P$_o$

AS^{SR}

AD'

AD

Y$_o$ Y$_1$ Y
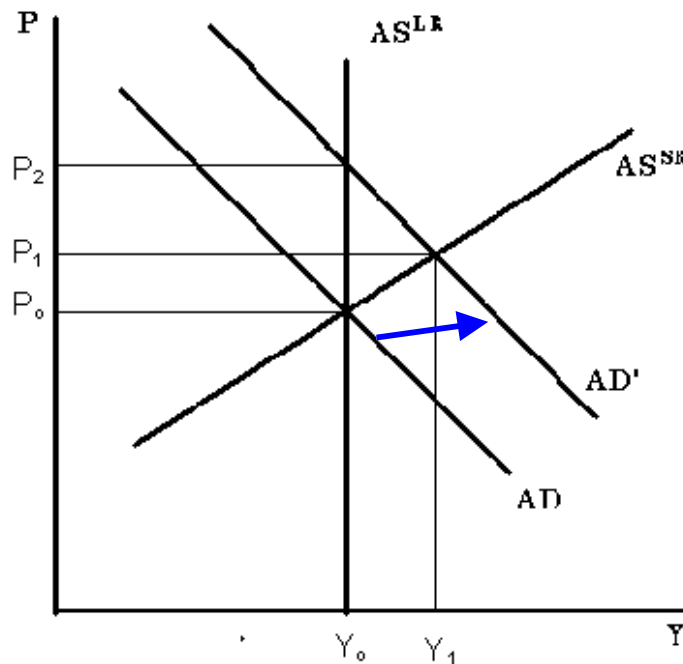
If the dollar falls on international markets there
would be an increase in the demand for exports
and a decrease in the demand for imports, both of
which would push up the X-M component of
aggregate demand. The impact would be
inflationary. There would also be a temporary
boost in aggregate output

Summing It All Up

We have looked at several things that can cause the aggregate demand
curve to shift. Here is a list of the major factors we are concerned with which
can cause AD to shift and the effect that each has on AD. These factors are
the variables in the expenditure equation, the quantity equation, and a few
others. The effects are shown for an increase in each of the factors, the effect
on AD is opposite when there is a decrease in any of these factors.

Table 10-2 Increase in Factors and Their Effect on Aggregate Demand	
Factor	Effect on Aggregate Demand
$Y = C + I + G + (X - M)$	
Consumption Increases	AD Increases
Investment Increases	AD Increases
Government Purchases Increase	AD Increases
eXports Increase	AD Increases
iMports Increase	AD Decreases
$M^s V = P y$	
Money Supply Increases	AD Increases
Velocity Increases	AD Increases
Price Level Increases	Movement Along AD Curve
Selected Other Factors	
Value of Dollar Increases	AD Decreases
Taxes Increase	AD Decreases

Warning required by the Economist-General:

- This table lists "Selected Other Factors". Anything that changes any of the variables above will cause a change in aggregate demand. It is certainly a fair exam question to ask, "Suppose some particular event happens. Trace the effects through using Aggregate Demand and Aggregate Supply" and expect you to answer "In this case, Consumption (say) would decline and thus …"
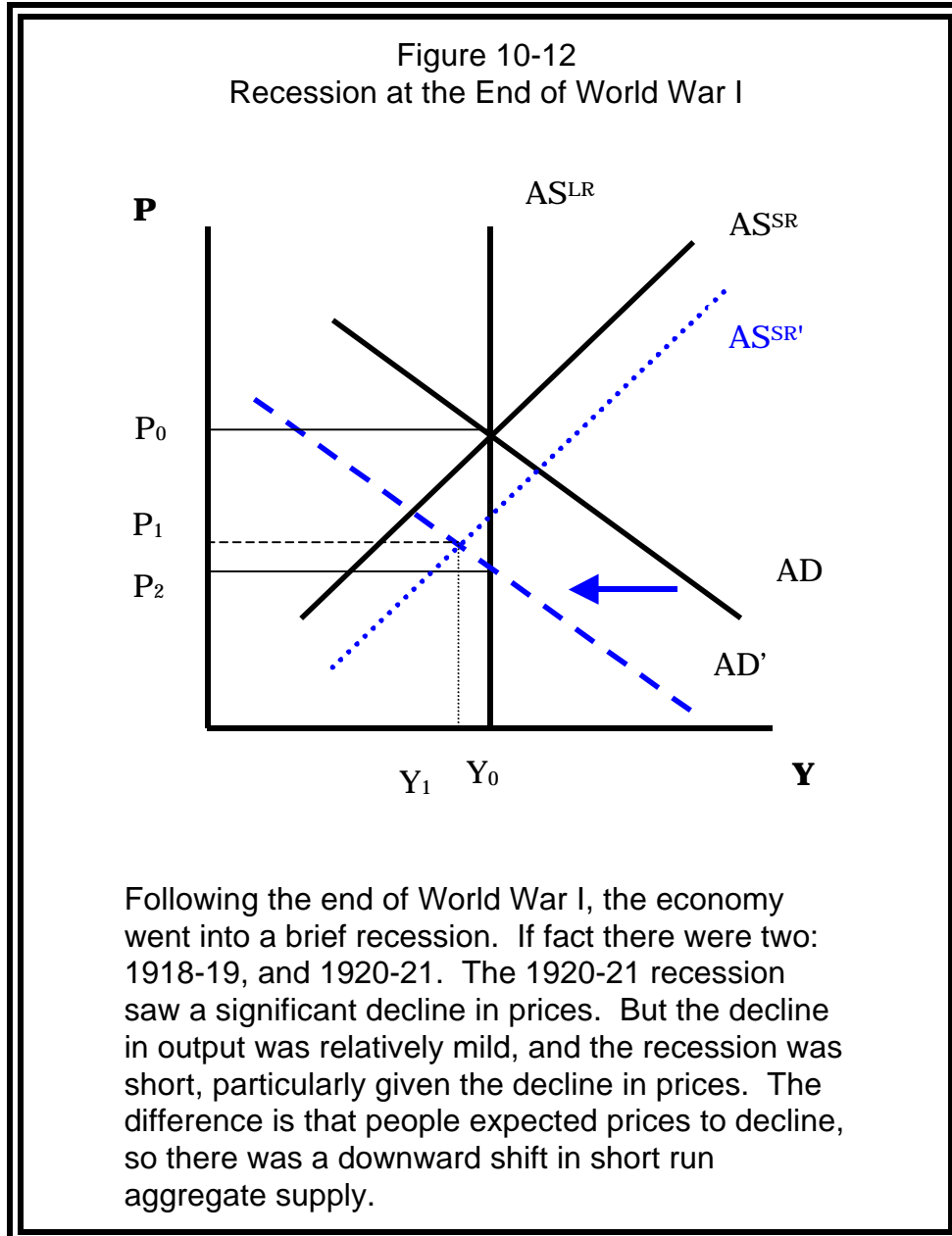
Application to Recessions

Now let us apply this model to some specific business cycles. We will not cover the 1929-33 depression in this lecture. It is sufficiently important that we give it special attention in a later lecture. We cover three

- The Recession at the End of World War I

- The 1981-82 Recession

- The 1990-91 Recession

The Recession at the End of World War I

Following the end of World War I, the economy went into a brief recession. If fact there were two: 1918-19, and 1920-21. The 1920-21 recession saw a significant decline in prices. But the decline in output was relatively mild, and the recession was short, particularly given the decline in prices.

Figure 10-12
Recession at the End of World War I

Following the end of World War I, the economy went into a brief recession. If fact there were two: 1918-19, and 1920-21. The 1920-21 recession saw a significant decline in prices. But the decline in output was relatively mild, and the recession was short, particularly given the decline in prices. The difference is that people expected prices to decline, so there was a downward shift in short run aggregate supply.
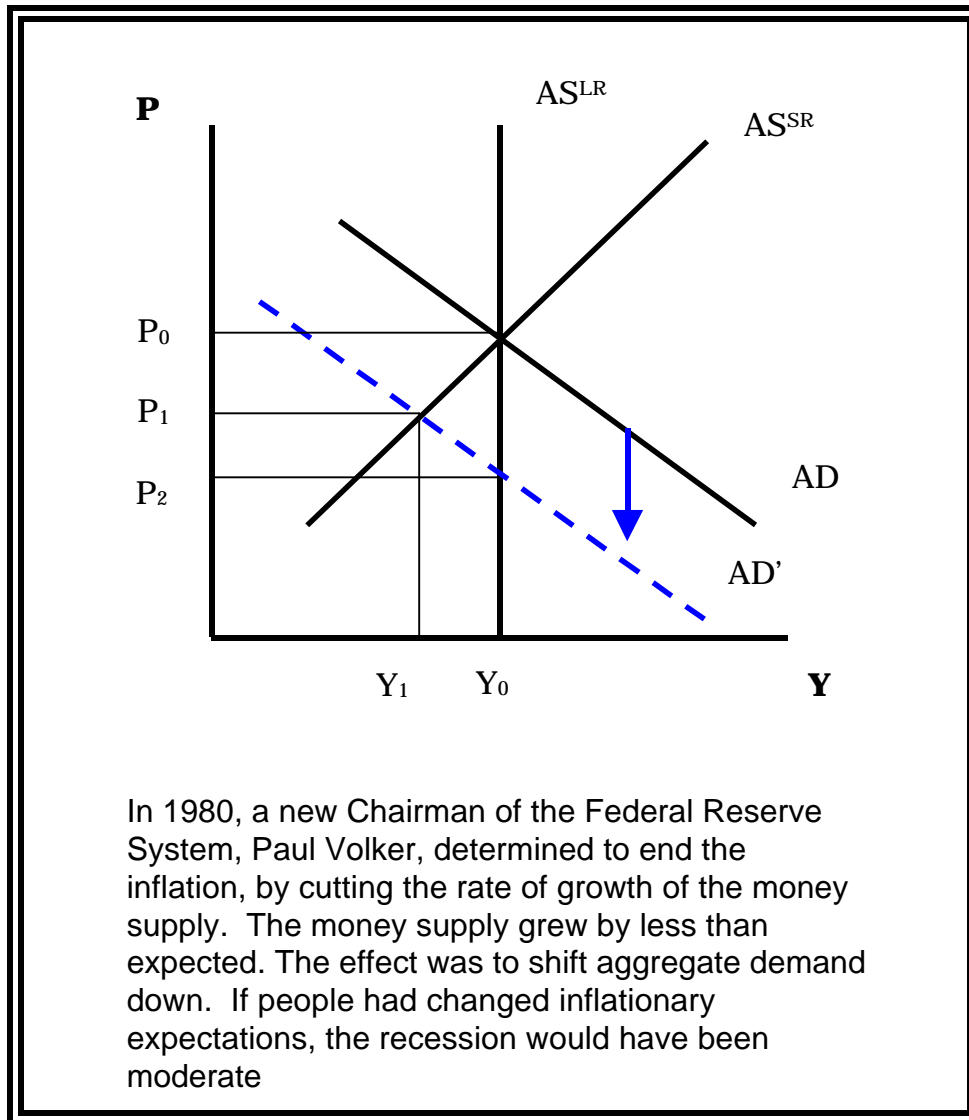
The reason for this impact is reasonably clear. The end of World War I brought an end to dramatic spending throughout the United States and Europe. We reduced military spending, and the Europeans reduced their spending here. The effect was to shift the aggregate demand curve to the left, as illustrated in Figure 10-12.

However there was another effect. Under the pressure of defense purchases during the war, there had been significant inflation, and people expected prices to fall at the end of the war. The consequence was that the short run aggregate supply curve shifted down. People's expectations of the full employment price level dropped. Without this decline in the short run aggregate supply curve, output would have declined to Y_2. As a consequence of the changed expectations, it only fell to Y_1

The 1981-82 Recession

The late 1970's were marked by high inflation. In 1980, a new Chairman of the Federal Reserve System, Paul Volker, determined to bring the inflation to an end, by cutting the rate of growth of the money supply. Figure 10-13 illustrates what happened. The money supply grew by less than expected.

Figure 10-13
The1981-1982 Recession

In 1980, a new Chairman of the Federal Reserve System, Paul Volker, determined to end the inflation, by cutting the rate of growth of the money supply. The money supply grew by less than expected. The effect was to shift aggregate demand down. If people had changed inflationary expectations, the recession would have been moderate

The effect was to shift aggregate demand down. If people had changed inflationary expectations, the recession would have been moderate. But Volker was not believed. People did not expect inflation to fall. (And who could blame them, given the history of the 1970's?) The impact was a classic recession caused by a movement along the short run aggregate supply curve.

The 1990-91 Recession

Economists disagree over the causes of the 1990-91 recession. The end of the Gulf War and the Cold War brought reduced government spending on the military, thus shifting the aggregate demand curve to the left. At the same time, banks became concerned about their liquidity, giving the S&L crisis at that time. This too caused the shift in the Aggregate Demand curve.

In any even, Figure 10-14 shows what happened. There was a recession.
This was a relatively mild recession, certainly compared to 1981-82.

Figure 10-14
The 1990-1991 Recession

AS^{LR}

AS^{SR}

P_0

P_1

P_2

AD

AD'

Y_1 Y_0

P

Y

The end of the Gulf War and the Cold War brought
reduced government spending on the military, thus
shifting the aggregate demand curve to the left. At
the same time, banks became concerned about
their liquidity, giving the S&L crisis at that time.
This too caused the shift in the Aggregate Demand
curve.
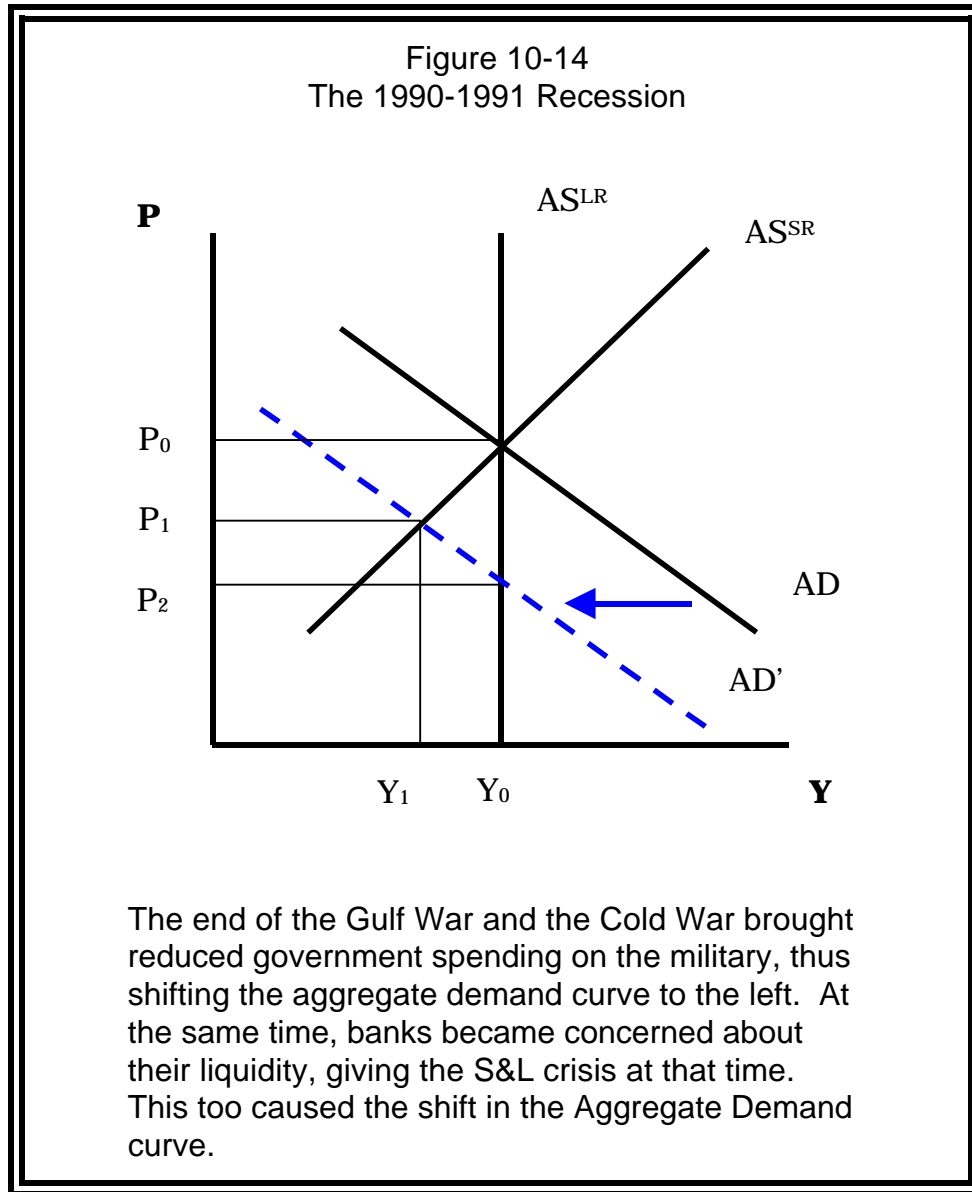
Inflation and Unemployment

Common sense suggests that there is a relation between output and
unemployment. In fact, there is a statistical relation between output and
unemployment, known as Okun's Law. There are a variety of ways to state
it, but I like the following:

*For every percentage point that GDP is above long run aggregate supply,
Unemployment will be one-half percent below the natural rate.*

For example, suppose full Employment GDP is $9,trillion, and the natural rate of unemployment is 4.5%. If GDP is actually $9.09 trillion, unemployment will be 4.0 percent.

Warning from the Economist General:

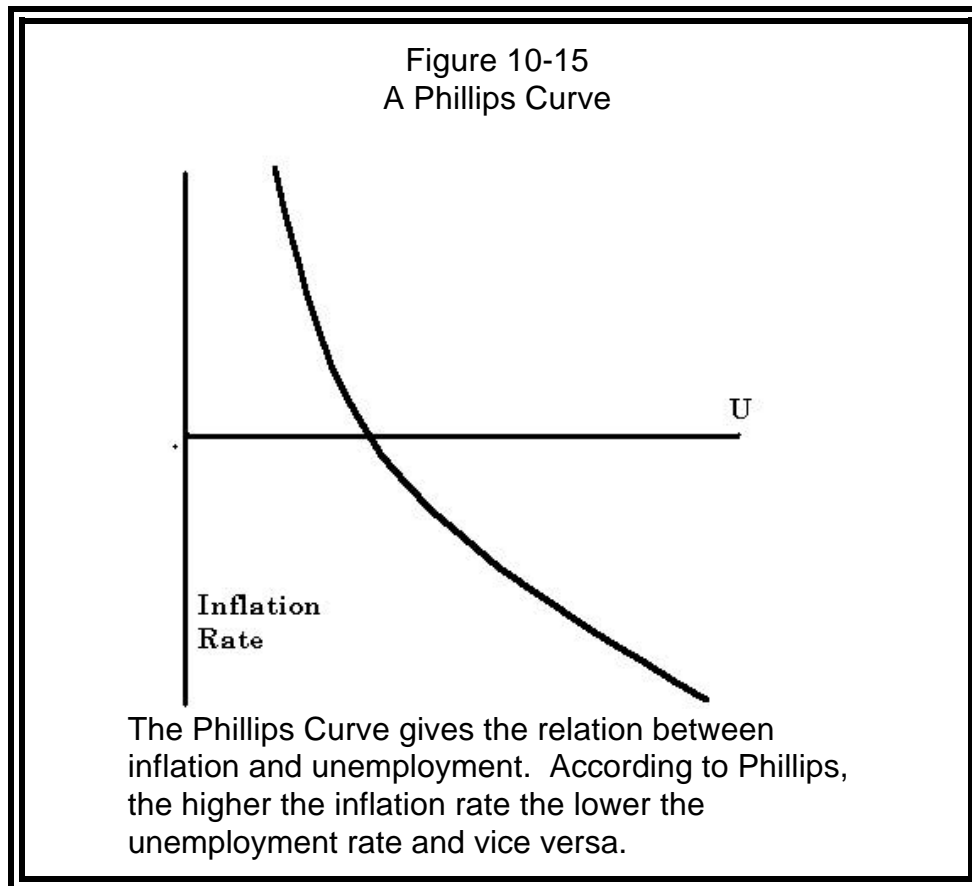- Stockman would not like this way of stating Okun's Law, and you should see the textbook to see how he states it.

Many people talk about something called "demand pull" inflation, as happens when aggregate demand increases and moves us along the short run aggregate supply curve. The idea is intuitive, for we all know that a "strong" demand for our product provides a basis for increased prices. If the shift in aggregate demand pushes the economy past the long run aggregate supply curve, Okun's Law suggests that unemployment will be below the natural rate.

The difficulty with this simple model is that it ignores the important distinction between a long run and a short run aggregate supply curve. As prices adjust and the short run aggregate supply curve rotates to the long run aggregate supply curve, the economy tends to return to the full employment level of output and the natural rate of unemployment. Thus we get inflation without the long run increase in output.

Long Run and Short Run Phillips Curves

After World War II, economists continued to be worried about inflation (something that was *not* a concern in the 1930's), and wondered if inflation and unemployment (or inflation and output) were related. The key argument was something called the Phillips Curve, named after A. W. Phillips. Based on British data from the Victorian Era, Phillips developed the relation between changes in the wage rate (a measure of inflation) and unemployment. Figure 10-15 illustrates the Phillips Curve. This is not, for us, a new topic. We just showed how Okun's Law can be demonstrated using the aggregate supply-aggregate demand model. The Phillips Curve demonstrates this same relationship, but more explicitly. The model of the upward sloping short run aggregate supply curve and aggregate demand is

simply another way of putting the Phillips curve, where shifts in aggregate demand "trace out" a particular short run aggregate supply curve.

Figure 10-15
A Phillips Curve

The Phillips Curve gives the relation between inflation and unemployment. According to Phillips, the higher the inflation rate the lower the unemployment rate and vice versa.

(We should apologize for switching from talking about a relation between aggregate supply and the price level to a relation between unemployment and inflation, but they are really the same. And, since people talk about the relation in both ways, perhaps it is best that we talk about the relation both ways).

The idea is quite simple. Increases in aggregate demand cause us to move along the short run aggregate supply curve, and thus increasing the price level. We sometimes put this another way by saying that the Phillips curve shifts as inflationary expectations change. Thus there would be a whole range of Phillips curves corresponding to different expectations of the inflation rate. That is, the Phillips Curve changes all the time.

Figure 9 -16
How the Phillips Curve Shifts with Changes in
Inflationary Expectations
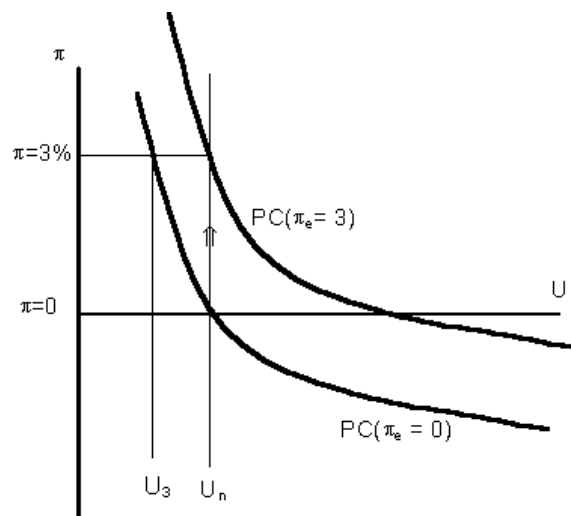
As expected inflation changes, the Phillips Curve moves. Thus, when actual inflation equals expected inflation, the unemployment rate will be at the natural rate.

Figure 10-16 illustrates the basic idea, which is, of course, the same idea as the Short Run Aggregate Supply Curve. This figure contains two Phillips Curves, corresponding to expected inflation rates of zero and three percent. When both expected and actual inflation are zero, the unemployment rate is the natural rate. If the expected inflation rate were to remain at zero, but the inflation rate rose to three percent, the unemployment rate would drop to U_3. However, once the expected inflation rate rose to three percent, an inflation rate of three percent would mean that unemployment returned to U_n, the natural rate.

How well does this model work?

Actually, quite well. Figure 10-17 shows American data on Inflation and Unemployment from 1950-1994. The first panels show data from selected time periods, and many seem to show a Phillips Curve. As the last panel shows, there appears to be no relationship between Inflation and Unemployment over the whole period. Thus, there appears to be a short run Phillips Curve but not a long run Phillips Curve.

Figure 10-17
Inflation and Unemployment in the United States
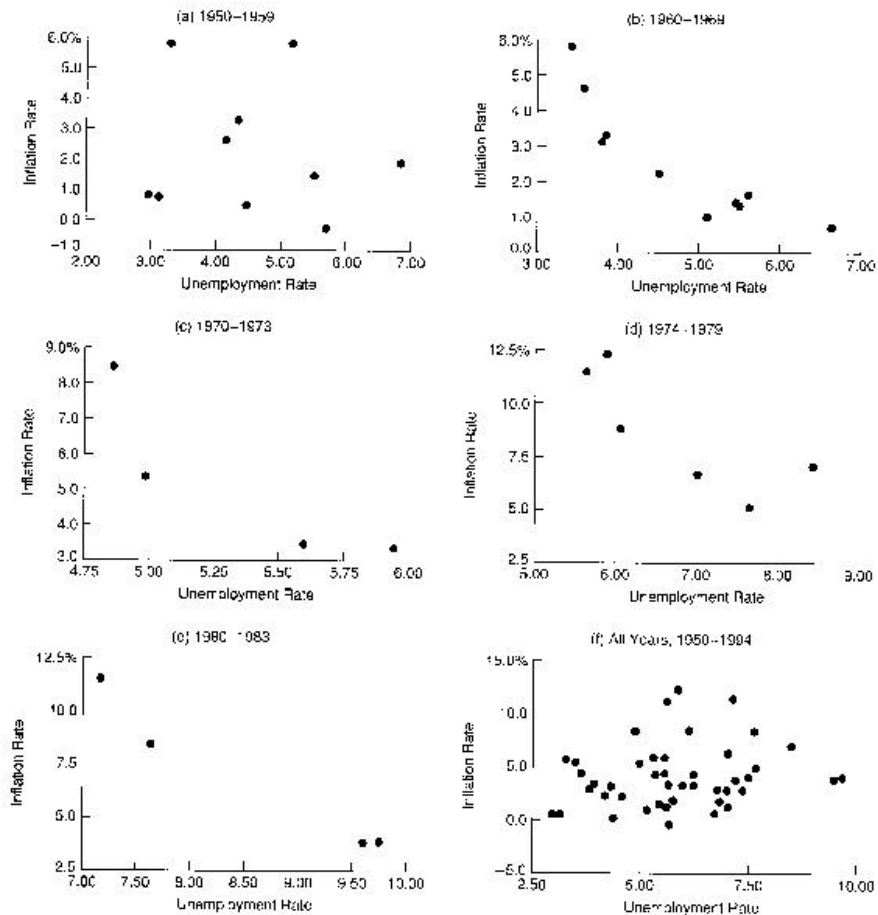
The data on inflation and unemployment shows Phillips curves
for different periods. When we look at the whole period, there is
no relation between inflation and unemployment. The
reconciliation is obvious: inflationary expectations change.

Relation to the Text

Each lecture ends with a section relating it to the text. In some cases,
material is omitted, either because the text covers it well enough or because
it is not worth learning. In other cases, material is added. Each of these
"lectures" will end with a brief note relating the lecture to the text, describing
what material is left to the student to learn alone and what material may
safely be skipped.

Which Chapters does this lecture cover?

Section from Stockman	Coverage
Ch. 11, Booms and Recessions	Covered
Ch. 11, A Simple Model of a Recession	Covered
Ch. 11, Aggregate Demand	Covered
Ch. 11, Aggregate Supply	Covered
Ch. 11, Summaries of Changes I Aggregate Supply and Demand	Covered
Ch. 12, Money and Interest Rates in the Short Run	Covered
Ch. 12, Phillips Curves	Covered
Ch. 13, Three Theories of Aggregate Supply	Covered
Ch. 12, The aggregate demand Multiplier	Not covered. Skip
Ch. 13, Case Studies	The great depression is covered later. The 1981-82 recession and the 1990-91 recession are covered here. Ignore the material on credit controls.

What material is new?

The data on historical business cycles and the recession after World War I.