

Lecture 13

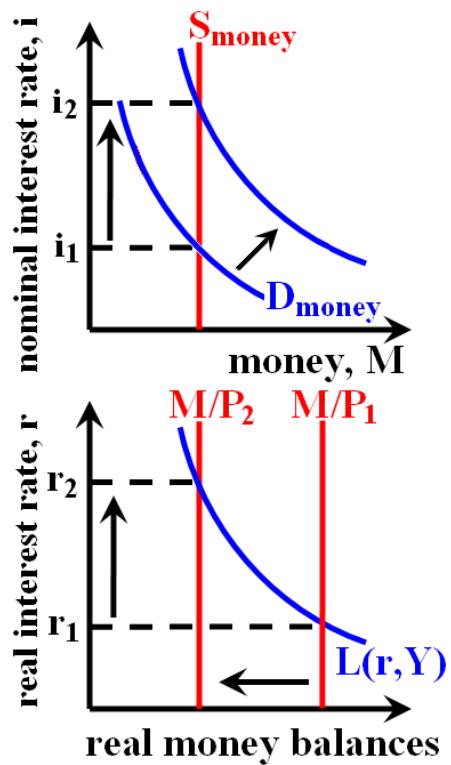
Output and Inflation in the Short Run

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Economic Growth and
Economic Fluctuations

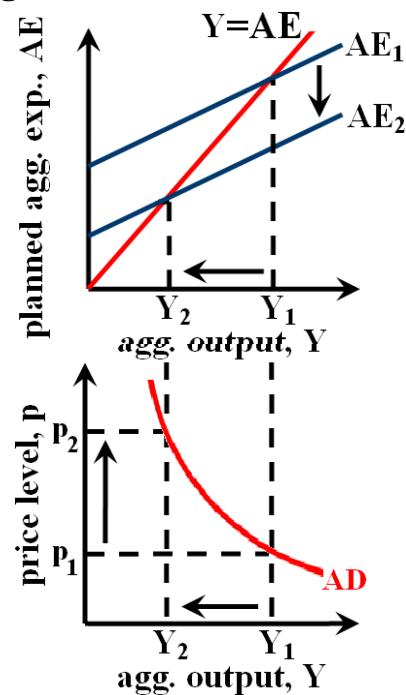
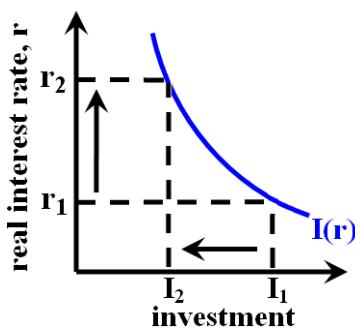
Deriving Aggregate Demand

- Consider an unanticipated increase in the price level, p
- As we saw in Lecture 10, when the price level rises, the demand curve for money shifts outward:
 - raising the nominal interest rate, i
 - and raising the short-run real interest rate, r (since we assumed that it takes time for expectations of future inflation to change)
- The increase in the short-run real interest rate can also be seen through an analysis of supply and demand for real money balances.
- For a given money supply, M , an increase in the price level, p
 - reduces M/P , the supply of real money balances and
 - raises the short-run real interest rate



Deriving Aggregate Demand

- Since an unanticipated increase in the price level raises the short-run real interest rate, r , planned investment spending, I , falls, which:
 - reduces planned aggregate expenditure
 - and lowers equilibrium aggregate output.

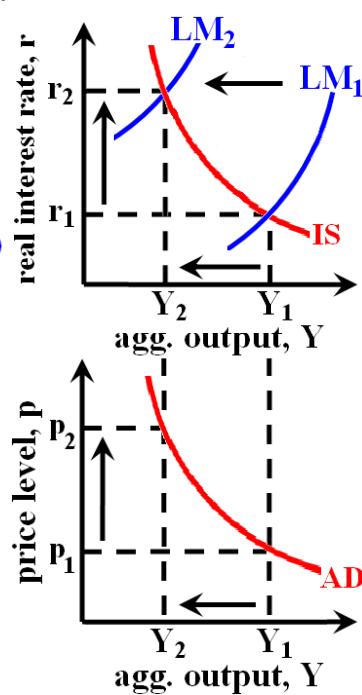
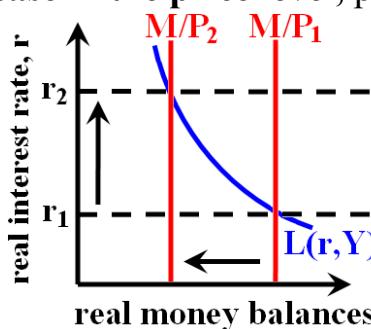


- The Aggregate Demand curve summarizes these changes. It shows an inverse relationship between the price level, p , and aggregate output, Y .
- It's drawn for a given money supply, M , and for given levels of government spending, G , and taxes T .

Deriving Aggregate Demand

- The same sequence can be depicted using the IS-LM diagram.
- When the price level rises, the LM curve shifts in because – for a given money supply, M – an increase in the price level, p :

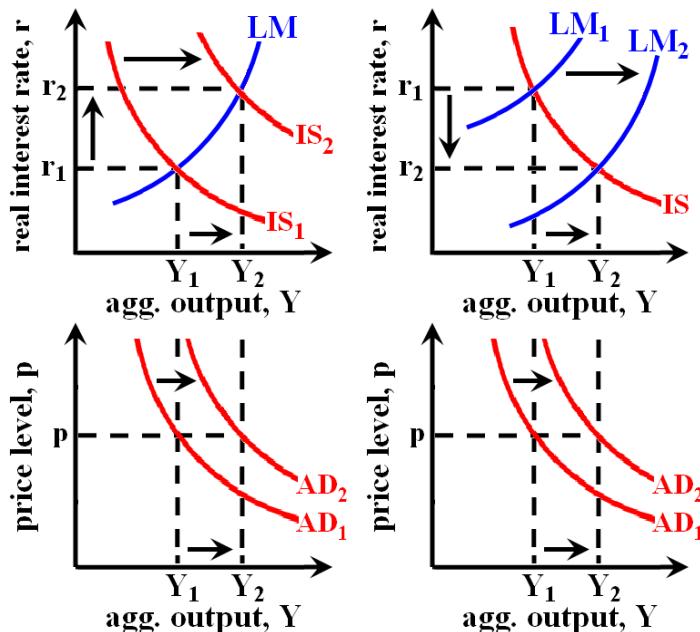
- reduces M/P , the supply of real money balances and
- raises the short-run real interest rate



- Equilibrium aggregate output falls because the higher short-run real interest rate reduces planned investment.
- Each point along the aggregate demand curve corresponds to a price level, p , and a level of aggregate output, Y , for which both the goods market and the money market are in equilibrium.

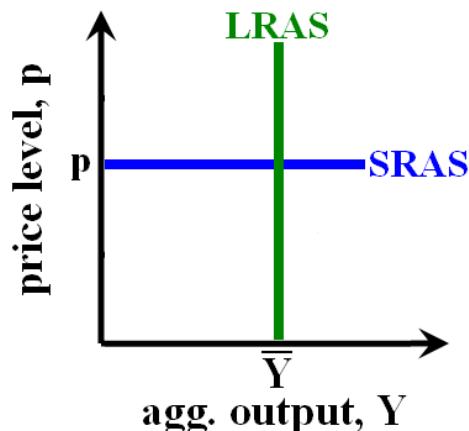
Shifts of Aggregate Demand

- Expansionary fiscal policy and expansionary monetary policy both shift the aggregate demand curve outward.
- **Expansionary fiscal policy** – an increase in government purchases or a decrease in taxes raise equilibrium aggregate output at each price level.
- **Expansionary monetary policy** – for a given price level, an increase in the supply of money increases the supply of real money balances and raises equilibrium aggregate output.



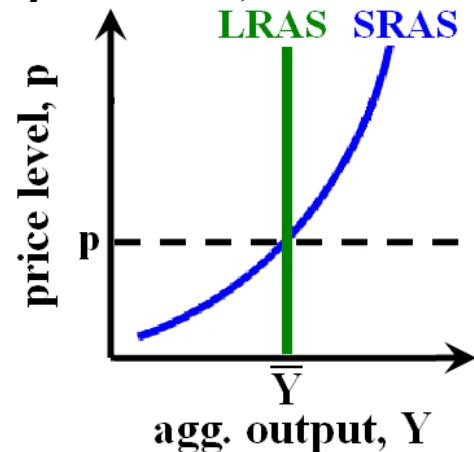
Aggregate Supply

- When we discussed the **goods and money markets in the long run**
 - we assumed that the available stocks of physical and human capital, the size of the labor force and the level of technology determine the level of aggregate output
 - we assumed that the quantity of money available determines the price level, but does not affect the level of output, i.e. money is neutral
 - such assumptions are represented by the vertical long-run aggregate supply curve (LRAS)
- So far, our discussion of the **goods market in the short run** has assumed that **prices are sticky**.
 - in the extreme case that we have been discussing, firms do not adjust their prices at all in response to fluctuations in aggregate output.
 - such an assumption is represented by a horizontal short-run aggregate supply curve (SRAS)



Aggregate Supply

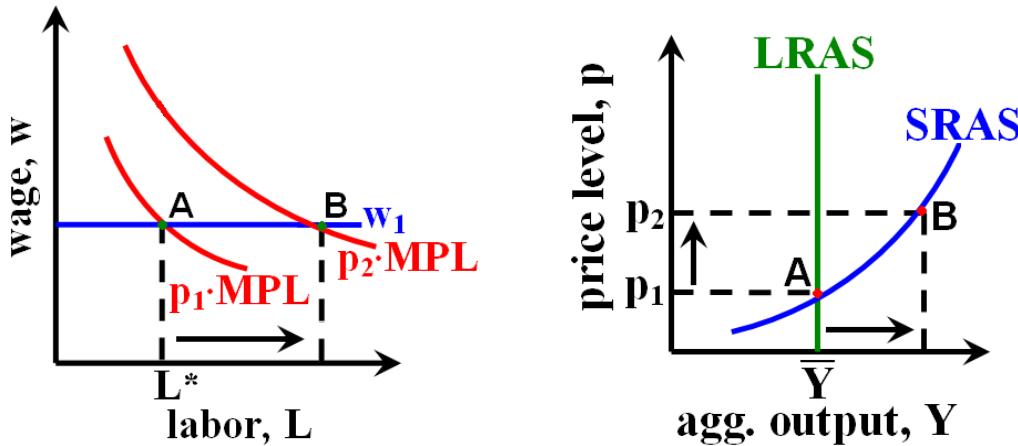
- The assumption of extremely sticky prices (i.e. the assumption that we have been making so far) may hold in the **very short run**,
 - but it is highly unlikely that all prices would be extremely sticky for a period of time and then suddenly adjust all at once
 - it's more likely that some prices change faster than others, so that in the short run firms respond to an increase in the price level by supplying more output
 - implying an upward-sloping short run aggregate supply curve
- In fact, we can draw a short-run aggregate supply curve that traces out the output decisions of all the markets and firms in the economy that correspond to each price level.
- Many explanations have been offered to explain why the short run aggregate supply curve may slope upward, but – for simplicity – we'll focus on one.



The Sticky Wage Model

- In many industries, particularly those that are unionized, nominal wages are set by long-term contracts, so wages cannot adjust quickly in response to changes in economic conditions.
- Consider an economy which is producing at the **natural rate of output** – i.e. the level of output predicted by the economy's stocks of physical and human capital, the size of the labor force and the level of technology – this level of output is denoted: \bar{Y} . At the natural rate:
 - the economy employs L^* units of labor
 - if units of labor are measured in hours worked, then workers are paid wage rate w_1 for each hour that they work
- as discussed in Lecture 3, firms hire labor until the wage rate is equal to price times the marginal product of labor, i.e. $w_1 = p_1 \cdot MPL$
- When the price level increases:
 - the demand for labor shifts outward
 - and firms are willing to hire more units of labor at each wage level
- So if the price level increases, but the wage rate remains constant, then firms will hire more labor.
- Since more labor is employed, more output will be produced.

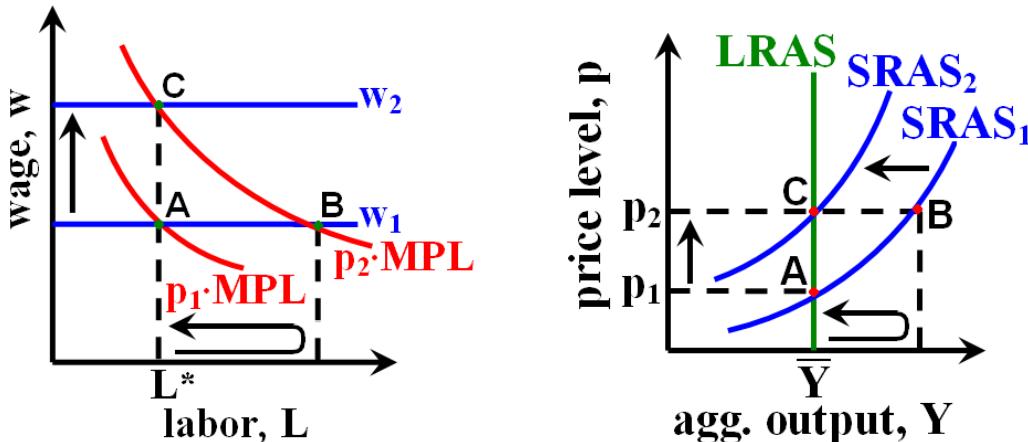
The Sticky Wage Model



- At wage rate w_1 , firms hire labor up to the point where $w_1 = p_1 \cdot MPL$
 - where p_1 is the initial price level
 - at the initial price level, L^* units of labor are employed
- This initial equilibrium is represented by point A in the figures above
- If the price level were to unexpectedly rise from p_1 to p_2 and the wage rate remained at w_1 , then firms would increase employment to a level above L^* and produce output at a level above \bar{Y}
- This new equilibrium is represented by point B in the figures above

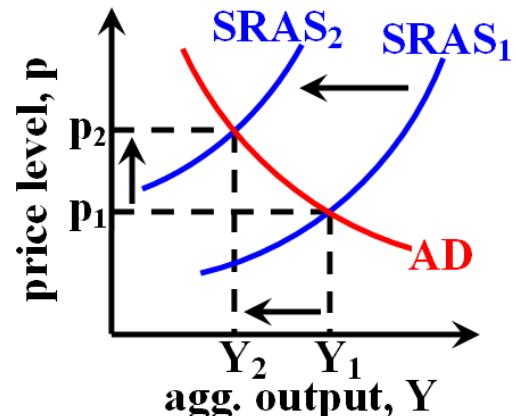
The Sticky Wage Model

- With the passage of time, workers would realize that the higher price level has diminished their purchasing power, so they would insist upon a higher nominal wage.
- If the nominal wage increased from w_1 to w_2 (and if $w_2 = p_2 \cdot MPL$),
 - firms would cut the amount of labor that they hire back to L^* units
 - the economy would return to production at the natural rate of \bar{Y}
- This new equilibrium is represented by point C in the figures below.



Cost-Push Inflation

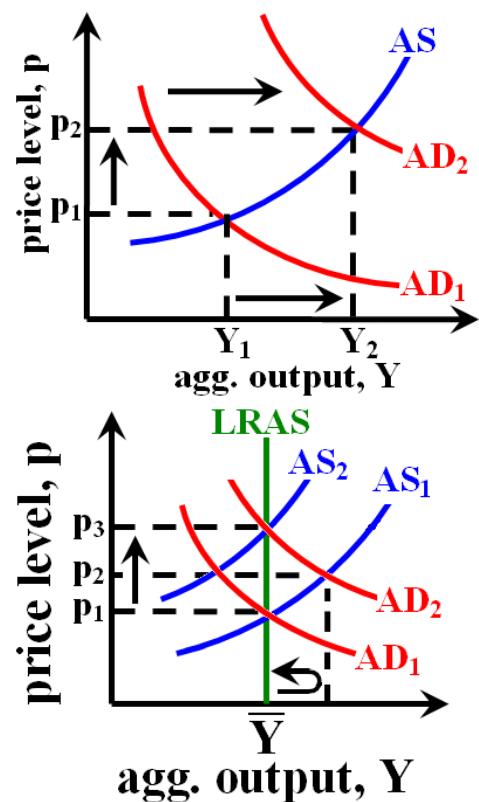
- Notice that the return to the natural rate of output, \bar{Y} , at price level p_2 is represented by an inward shift of the short-run aggregate supply curve in the figures above.
- Notice also that the increase in the wage rate causes the inward shift of the aggregate supply curve.
- In fact, whenever **factor input prices** rise, the short run aggregate supply curve shifts inward.
- For example, when OPEC imposed an oil embargo on the U.S. in 1974:
 - the price of oil jumped 68 percent (this is called a "cost shock")
 - the short run aggregate supply curve shifted inward and
 - the US experienced "**stagflation**" – that is: "**stagnation**" (recession) and "**inflation**" (higher prices)
- Conversely, the short run aggregate supply curve shifts outward when factor input prices fall.



Demand-Pull Inflation

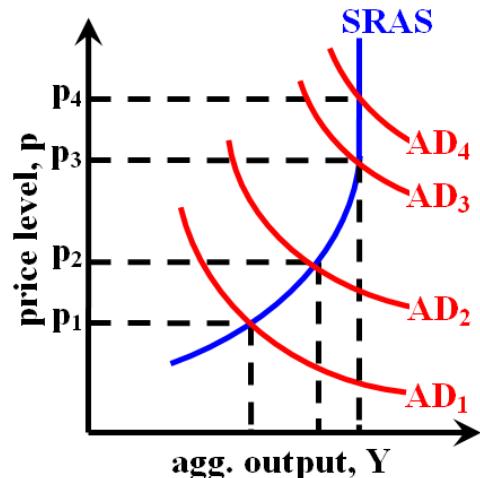
- Expansionary fiscal and monetary policy can also cause the price level to increase in the short run through outward shifts of the aggregate demand curve.
- This is an example of demand-pull inflation.
- However, aggregate supply does not depend on the price level in the long run.
- If expansionary policy causes output to exceed its natural rate:
 - factor input prices will rise
 - causing the short run aggregate supply curve to shift inward (as depicted in the graph on the bottom right)

Note: It's also possible that output could return to its natural rate through an inward shift of the aggregate demand curve, which brings the price level back down to its initial level. This rarely occurs however, since the Fed allows the money supply to grow over time.



Inflation in the Long Run

- In the long run, inflation is essentially a monetary phenomenon.
- Although expansionary fiscal policy causes some increase in the price level, sustained increases in the price level can only occur when an expanded money supply accommodates the expansionary fiscal policy.
- Hyperinflation – defined as a rate of inflation that exceeds 50 percent per month – is an extreme example that illustrates the point.
- Hyperinflation occurs when the government resorts to printing money to finance its spending.
- Hyperinflation ends when the government cuts its spending or raises revenue through traditional taxes.
- As illustrated in the graph at right, continuously expanding the money supply eventually ceases to affect aggregate output. It only increases the price level.



Output Growth and Inflation

- As we saw in the lectures on long run economic growth, the available stocks of physical and human capital, the size of the labor force and the level of technology determine the level of aggregate output.
- This level of output is represented by the vertical long run aggregate supply curve.
- If output is growing in the long run, then the long run aggregate supply curve moves rightward over time.
- Long run output growth thus decreases the price level (holding monetary and fiscal variables constant).

