



Soochow University International Programs

2021 SCUIP Winter Session I
ECON202



Lecture 13: Aggregate Demand and Aggregate Supply: Part 1

ECON202: Macroeconomics
Soochow University



Aggregate Demand and Aggregate Supply

- This topic focuses on short-run fluctuations in macroeconomic activities.
- Economic activity fluctuates from year to year.
 - ▷ Real GDP increases in most years.
 - ▷ On average over the past 50 years, real GDP in the U.S. economy has grown by about 3 percent per year.
 - > Real GDP per person has grown at the rate of about 2 percent per year over the past century.
 - ▷ In some years normal growth does not occur, causing a **recession**.

Short-Run Economic Fluctuations

- A **recession** is a period of declining real incomes, and rising unemployment.
 - ▷ A **depression** is a severe recession.
- An **expansion** is a period of increasing real incomes, and falling unemployment.
 - ▷ A **boom** is a strong expansion.

Three Key Facts About Economic Fluctuations

- Economic fluctuations are irregular and unpredictable.
 - ▷ Fluctuations in the economy are often called the **business cycle**.
- Most macroeconomic variables fluctuate together.
- As output falls, unemployment rises.

Economic Fluctuations are Irregular and Unpredictable

- Recessions start at the **peak** of a business cycle and end at the **trough**.
- The **length** of a business cycle may be measured by the time between one peak and the next or the time between one trough and the next.
 - ▷ The peaks and troughs of the US business cycle are officially registered by the NBER.
 - ▷ During 1945-2009, there have been 11 cycles in the US.
 - ▷ The average recession lasted 11 months and the average expansion lasted 59 months, thereby making the average cycle roughly 70 months long.

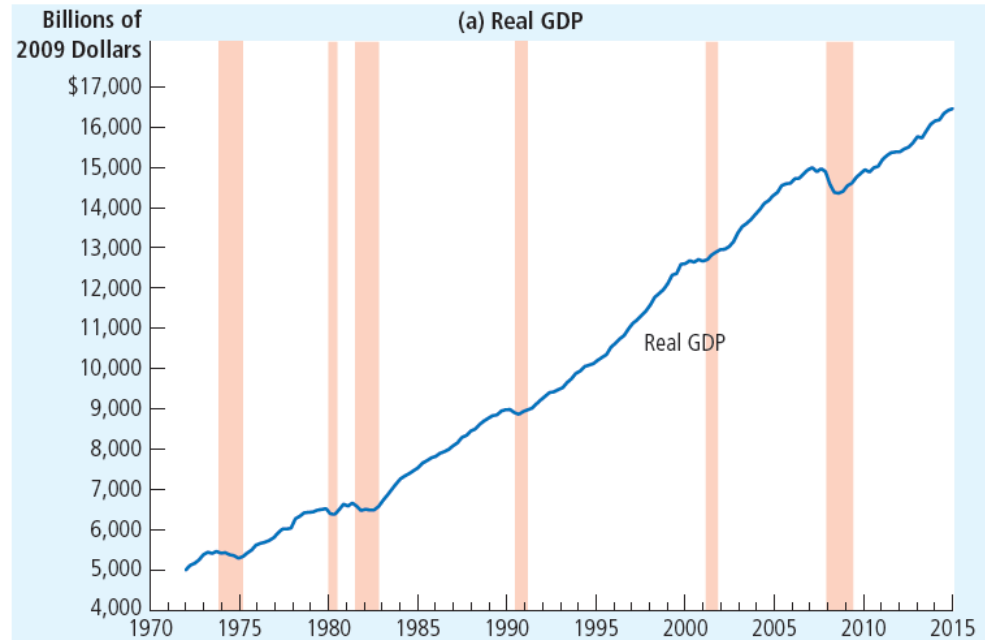
The First Fact About Economic Fluctuations

- See the figure on the next slide.
- In the US, there were recession in 1980 and 1982, just two years apart.
- On the other hand, there were no recession between 1991 and 2001.



The First Fact About Economic Fluctuations (Cont'd)

This figure shows real GDP in panel (a), for the U.S. economy. Recessions are shown as the shaded areas.
Notice that real GDP decline during recessions.



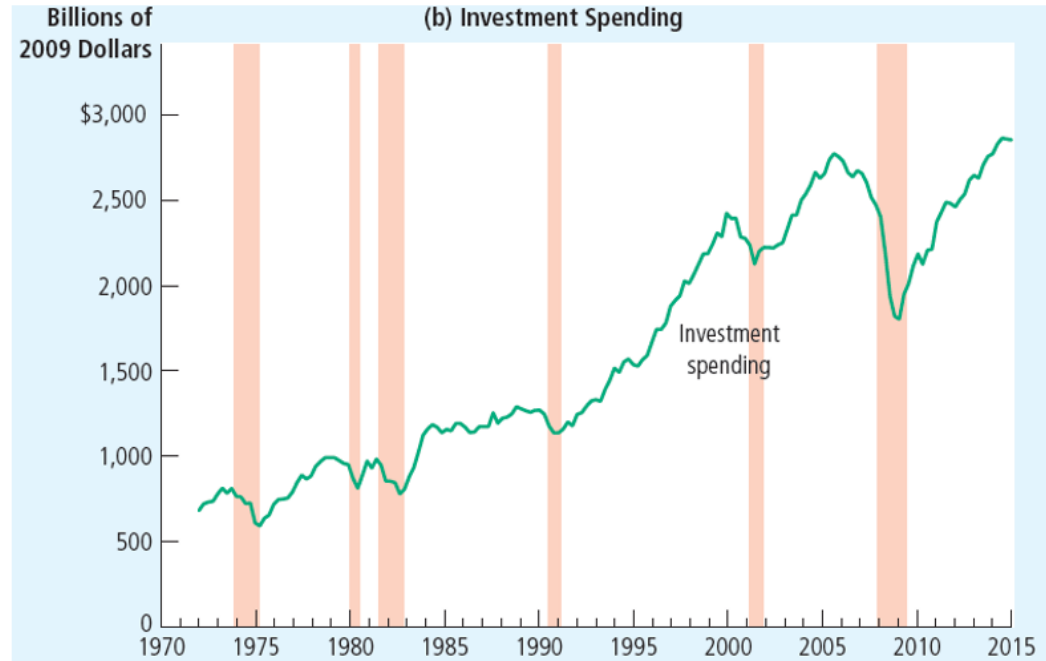
Most Macroeconomic Variables Fluctuate Together

- When real GDP falls in a recession, so do many other variables.
 - ▷ personal income, corporate profits, consumption spending, investment spending, industrial production, retail sales, home sales, auto sales, etc.
- However, investment fluctuates a lot more than other variables.
 - ▷ Even though investment is about one-seventh of GDP, much of the fall in GDP during recessions is due to the fall in investment spending.
 - ▷ See the figure on the next slide.

The Second Fact About Economic Fluctuations

This figure shows investment spending in panel (b) for the U.S. economy. Recessions are shown as the shaded areas.

Notice that investment spending decline during recessions.



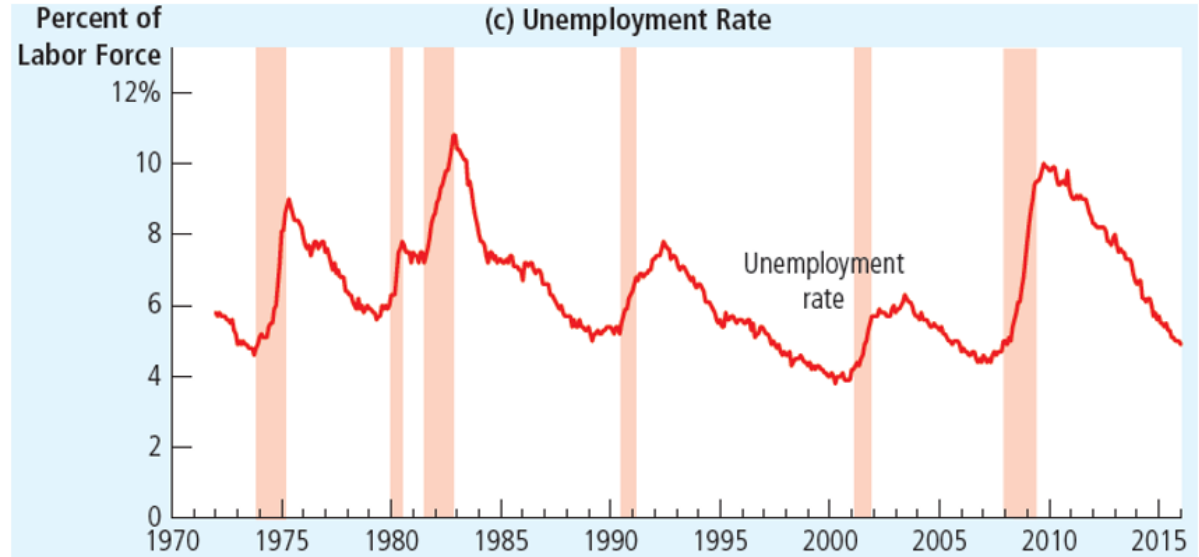
As Output Falls, Unemployment Rises

- The unemployment rate never approaches zero; instead it fluctuates around its natural rate, which itself fluctuates between 5 and 6 percent.
- See the figure on the next slide.

As Output Falls, Unemployment Rises (Cont'd)

This figure shows unemployment in panel (c) for the U.S. economy. Recessions are shown as the shaded areas.

Notice that unemployment rises during recessions.



Review of long-run macroeconomics

- **GDP** depends on
 - ▷ number of workers
 - ▷ physical capital per worker
 - ▷ human capital per worker
 - ▷ natural resources per worker
 - ▷ technological knowledge
 - ▷ laws, government policies, and their enforcement
- **Saving, investment**, and the **real interest rate** depend on the supply and demand for loanable funds

Review of long-run macroeconomics (Cont'd)

- **Unemployment** depends on
 - ▷ how well the labor market matches unemployed workers to job vacancies, and
 - ▷ how close the wage is to the equilibrium wage
- The **price level** depends on the quantity theory of money, and the rate of **inflation** depends on the growth rate of the quantity of money.
- The factors that affect the real interest rate and the inflation rate together determine the **nominal interest rate**.



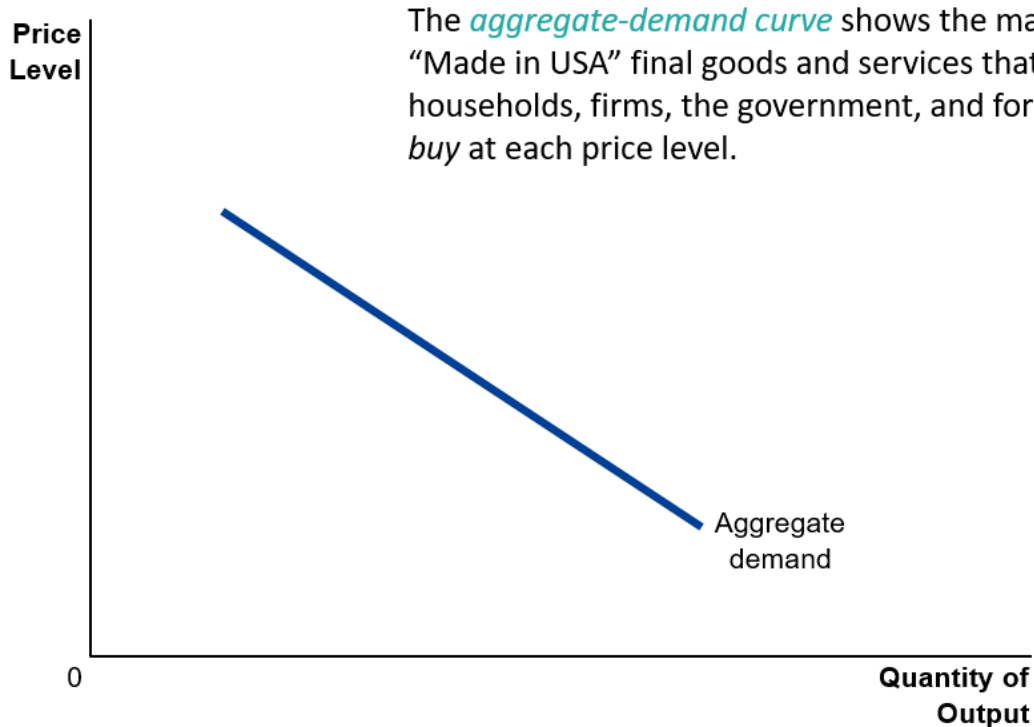
The Reality of Short-Run Fluctuations

- Most economists believe that the long run theory we've studied in previous topics does not explain short run fluctuations.
 - ▷ In the long run, changes in the money supply affect nominal variables but not real variables.
 - > This is **monetary neutrality**.
 - ▷ But most economists believe that monetary neutrality is not true in the short run.
 - ▷ Most economists believe that the central bank's monetary policy
 - > Has no effect on real variables (especially real GDP and unemployment) in the long run, but
 - > Has significant effects on real variables in the short run

The Model of Aggregate Demand and Aggregate Supply

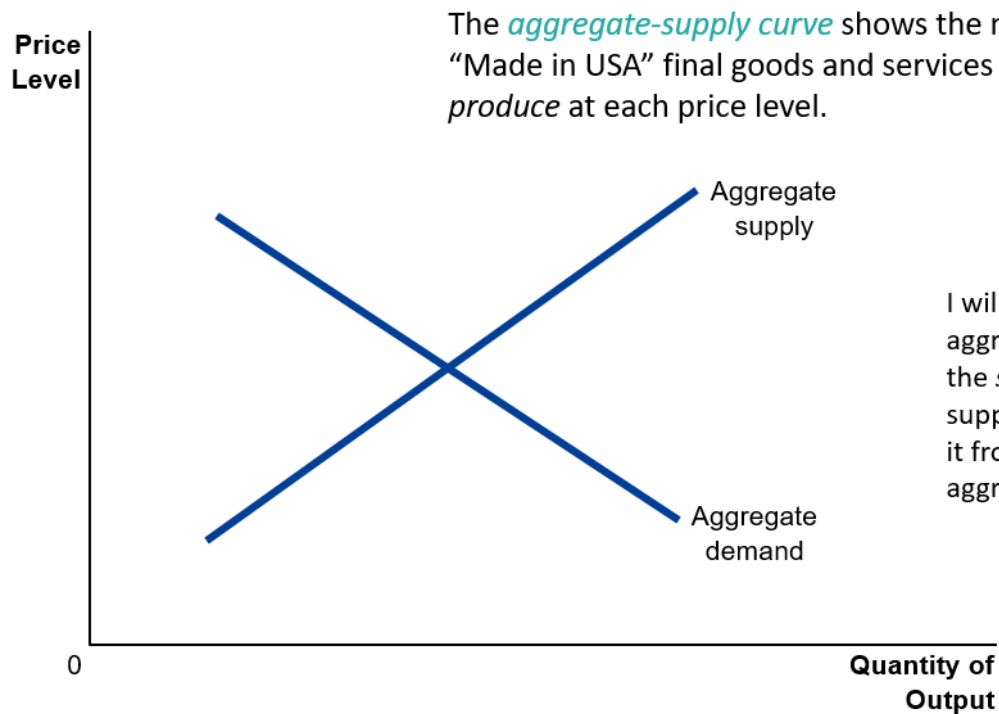
- Economists use the [model of aggregate demand and aggregate supply](#) to explain short-run fluctuations in economic activity around its long-run trend.
- Aggregate demand and aggregate supply are two ways in which real GDP and the overall price level are linked in the short run.
 - ▷ Real GDP (Y)
 - ▷ Overall Price Level (P)
 - > GDP Deflator
 - > Consumer Price Index

Aggregate Demand and Aggregate Supply



The *aggregate-demand curve* shows the market value of “Made in USA” final goods and services that buyers—households, firms, the government, and foreigners—*want to buy* at each price level.

Aggregate Demand and Aggregate Supply (Cont'd)



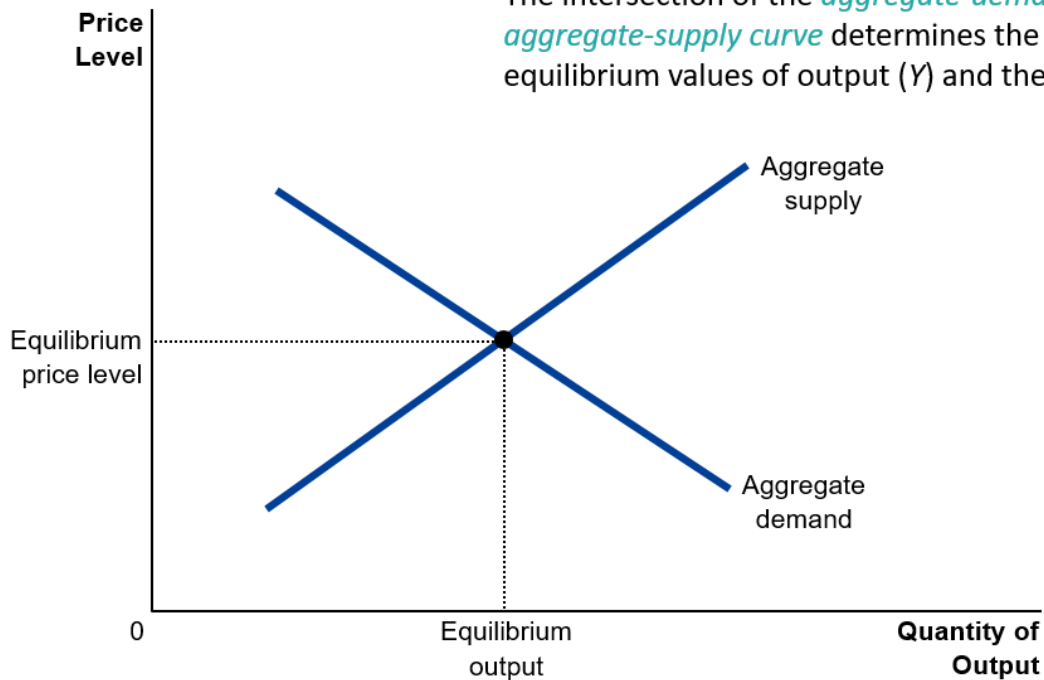
The *aggregate-supply curve* shows the market value of “Made in USA” final goods and services that sellers *want to produce* at each price level.

I will later refer to the aggregate supply curve as the *short-run* aggregate supply curve, to distinguish it from the *long-run* aggregate supply curve.



Aggregate Demand and Aggregate Supply (Cont'd)

The intersection of the *aggregate-demand curve* and the *aggregate-supply curve* determines the short-run equilibrium values of output (Y) and the price level (P).



Recap: GDP = Total Expenditure

- We saw earlier that GDP is the actual total expenditure on final goods and services made within a country in a given period of time.
- Therefore, GDP =
actual consumption spending +
actual investment spending +
actual government spending +
actual exports - actual imports

Aggregate Demand = Desired Total Expenditure

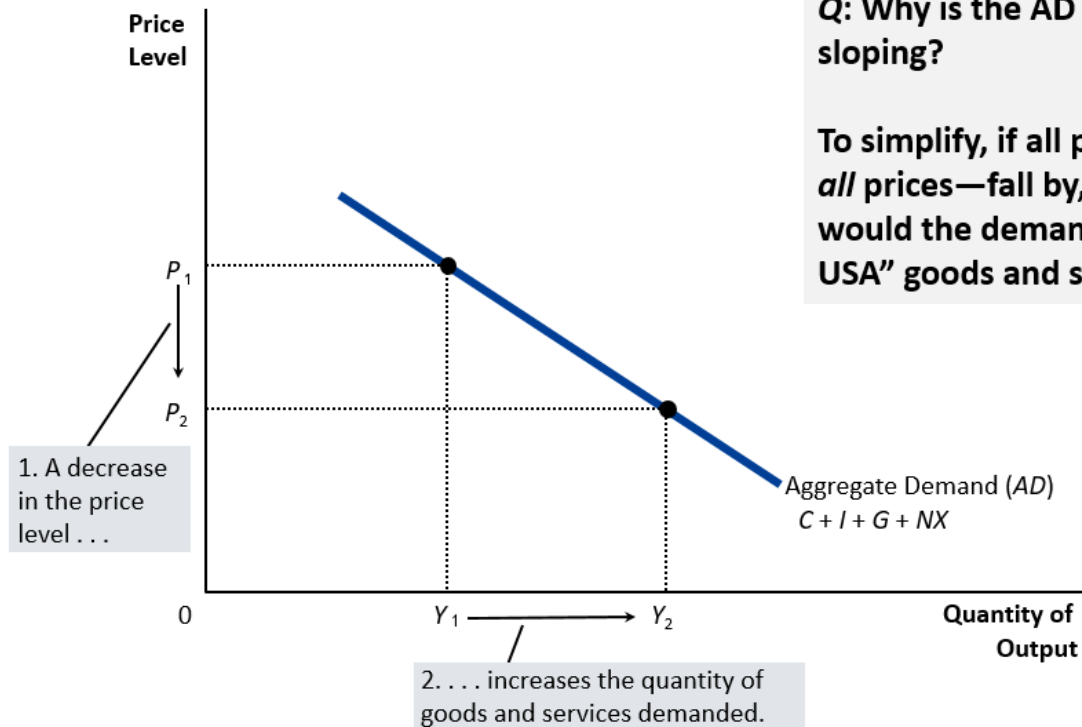
- Now, aggregate demand is the **desired** total expenditure on final goods and services made within a country in a given period of time.
- So, aggregate demand =
desired total expenditure =
desired consumption spending (C) +
desired investment spending (I) +
desired government spending (G) +
desired exports - desired imports (NX)

Why the Aggregate Demand Curve Slopes Downward?

$$\text{Aggregate Demand} = C + I + G + NX$$

- In lecture 2, we interpreted C , I , G , and NX as the actual amounts of consumption, investment, government purchases, and net exports.
- Now, we interpret C , I , G , and NX as the **desired** amounts of consumption, investment, government purchases, and net exports.

The Aggregate Demand Curve is downward sloping



Q: Why is the AD curve downward sloping?

To simplify, if all prices—and I do mean *all* prices—fall by, say, ten percent, why would the demands for *all* “Made in USA” goods and services increase?

Why Micro Demand Curve Can't Explain Macro AD Curve

- The demand curve for an individual commodity is downward sloping because of two effects:
 - ▷ Substitution effect: when the price of ice cream decreases and all other prices are unchanged, people buy more ice cream because they switch from eating frozen yogurt (a substitute)
 - ▷ Income effect: when price of ice cream falls and income is unchanged, people feel richer and, so buy more ice cream
- But if all prices decrease, there can be no substitution effect.
- Also if all price decrease, one can't assume incomes are unchanged.



Why the AD Curve Slopes Downward?

- The **Wealth Effect**: a lower price level boosts consumption spending by households (C)
- The **Interest Rate Effect**: a lower price level boosts investment spending by businesses (I)
- The **Exchange Rate Effect**: a lower price level boosts net exports (NX)
- As a result, a lower price level boosts aggregate demand ($C + I + G + NX$)

The Price Level and Consumption: Wealth Effect

- If all prices fall ($P \downarrow$), the purchasing power of consumers' monetary wealth increases.
- This causes consumption spending to rise ($C \uparrow$)
 - ▷ Besides, if the price decline is perceived to be temporary it makes sense to buy now (while prices are still low)
- The rise in consumption spending ($C \uparrow$) raises aggregate demand ($C + I + G + NX \uparrow$)

Price Level and Investment: Interest Rate Effect

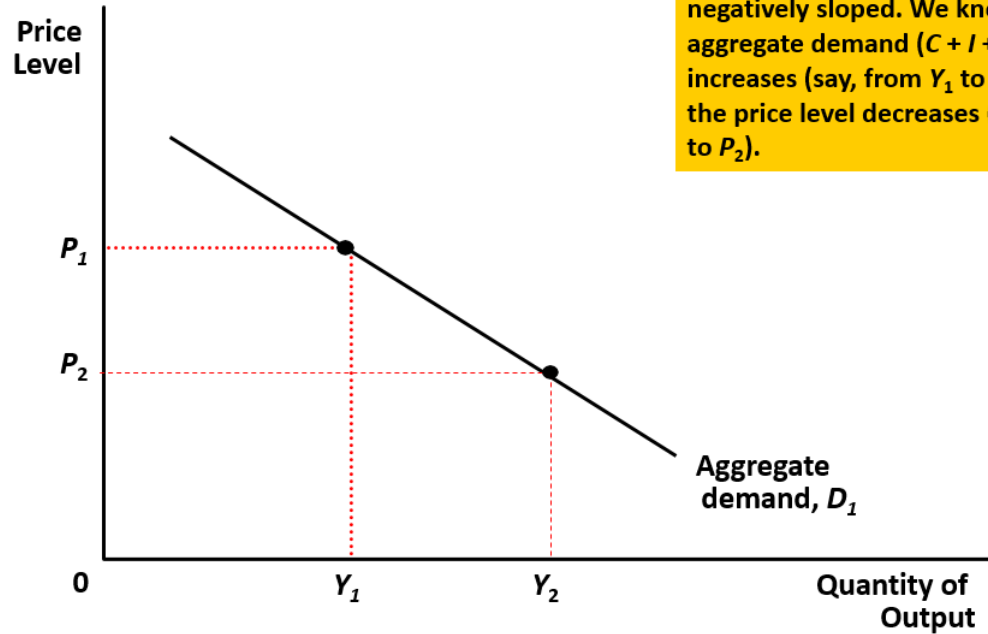
- When all prices fall, people need less cash for shopping needs.
- They lend the unneeded cash.
- The increased availability of loans reduces the interest rate.
- A lower interest rate encourages greater investment spending by businesses ($I \uparrow$)
- The rise in investment spending ($I \uparrow$) raises aggregate demand ($C + I + G + NX \uparrow$)

Price Level and Net Exports: Exchange Rate Effect

- We saw in the previous slide that lower prices lead to a lower interest rate.
- Disappointed by the lower interest rate, people with money in US banks look for ways to move their money to foreign banks.
- These people sell their dollars and buy foreign currencies.
- The value of the dollar falls (say, from €2 per \$ to €1 per \$)
- As a result, US goods become cheaper relative to foreign goods.
- This makes US net exports increase ($NX \uparrow$)
- $NX \uparrow$ means aggregate demand increases ($C + I + G + NX \uparrow$)

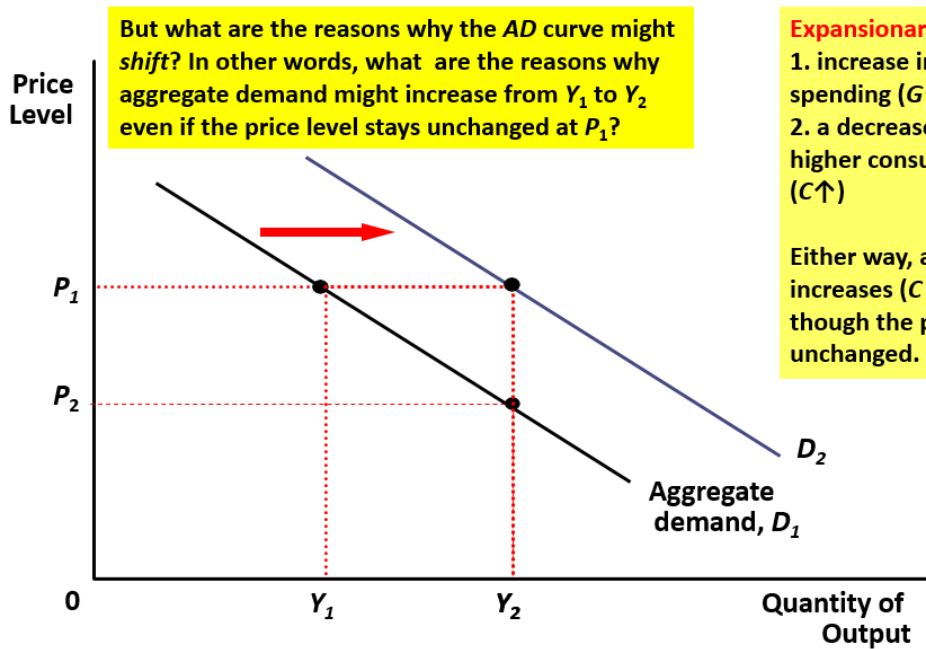


Shifts in the Aggregate Demand Curve



We have seen why the *AD* curve is negatively sloped. We know that aggregate demand ($C + I + G + NX$) increases (say, from Y_1 to Y_2) when the price level decreases (say, from P_1 to P_2).

Shifts in the Aggregate Demand Curve (Cont'd)

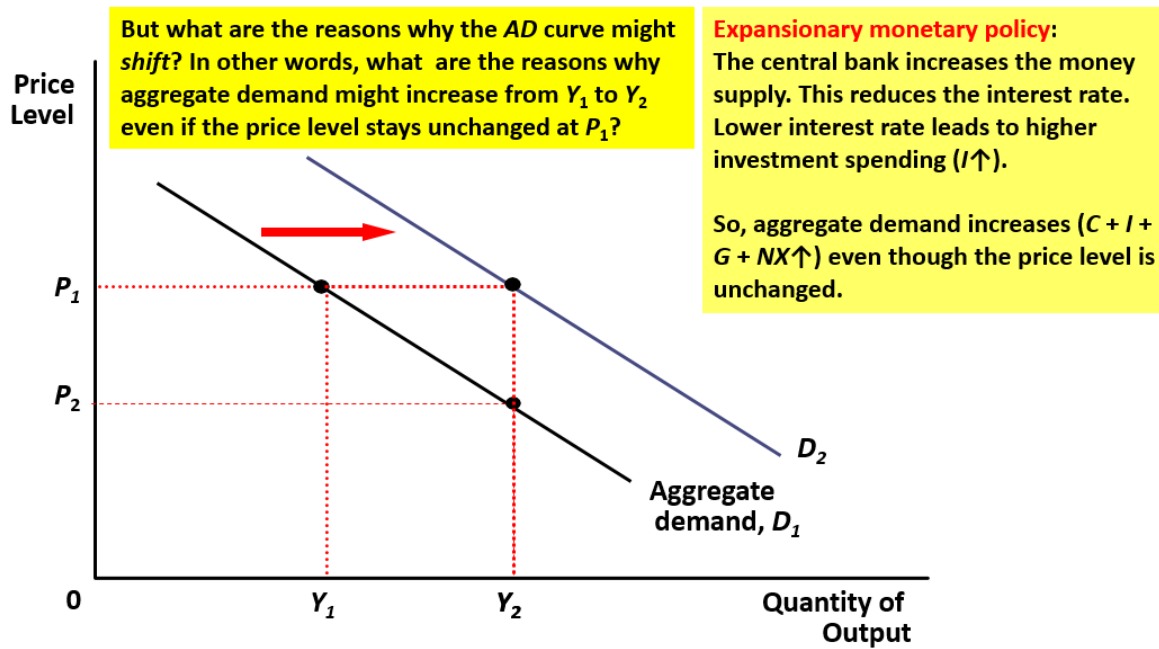


Expansionary fiscal policy:

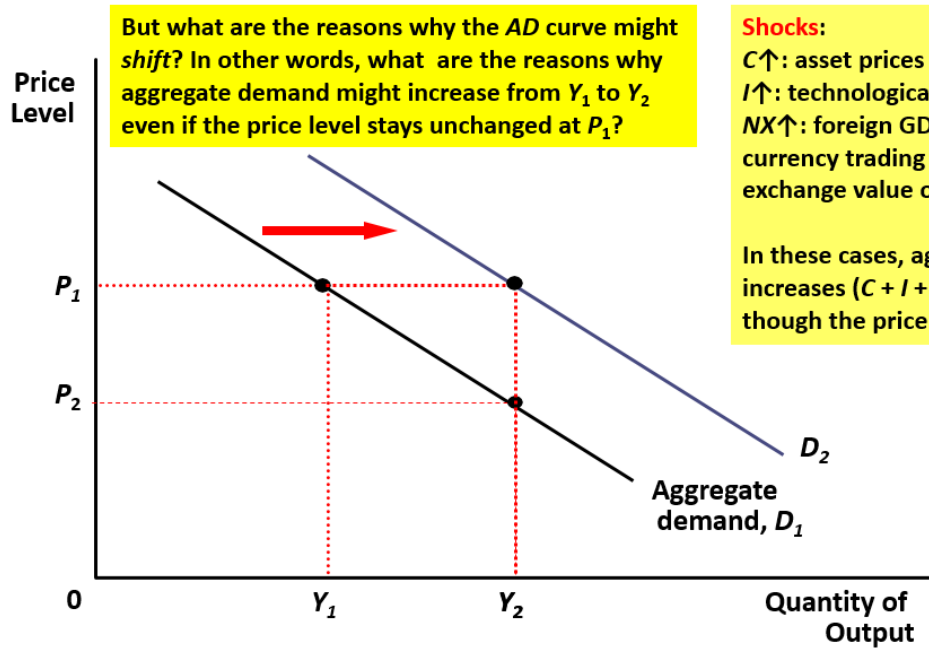
1. increase in government spending ($G \uparrow$)
2. a decrease in taxes leads to higher consumption spending ($C \uparrow$)

Either way, aggregate demand increases ($C + I + G + NX \uparrow$) even though the price level is unchanged.

Shifts in the Aggregate Demand Curve (Cont'd)



Shifts in the Aggregate Demand Curve (Cont'd)



Shocks:

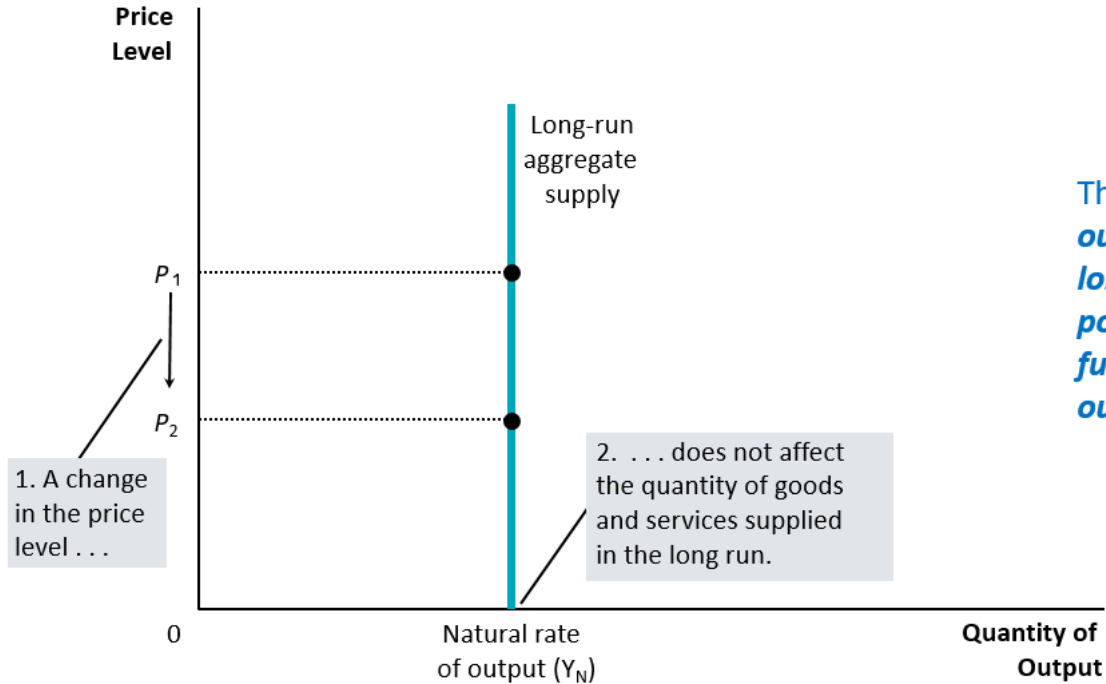
$C \uparrow$: asset prices rise, optimism
 $I \uparrow$: technological progress, optimism
 $NX \uparrow$: foreign GDP rises, speculative currency trading reduces the exchange value of domestic currency

In these cases, aggregate demand increases ($C + I + G + NX \uparrow$) even though the price level is unchanged.

The Aggregate Supply Curve

- The upward-sloping aggregate supply curve that we saw earlier is more precisely called the **short-run aggregate supply** (SRAS) curve.
- The **long-run aggregate supply** (LRAS) curve, on the other hand, is vertical.

The Long-Run Aggregate Supply Curve



The *natural rate of output* is also called *long-run output* or *potential output* or *full-employment output*.

Long-Run Aggregate Supply

- In the long run, the price level increases when the quantity of money increases.
- When the price level increases, it helps to assume, for simplicity, that all prices rise by the same proportion.
- Assumption: a producer's incentives are not affected one way or the other when all price rise by the same proportion.
- Consequently, in the long run, aggregate supply should not change when the price level increases.

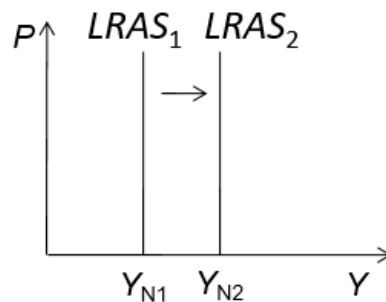
Why the AS Curve is Vertical in the Long Run

- An economy's long-run output of goods and services
 - ▷ is also called the **natural rate of output** or **potential output** or **full-employment output**
- Long-run output depends on:
 - ▷ labor
 - ▷ physical capital
 - ▷ human capital
 - ▷ natural resources
 - ▷ technology
 - ▷ laws, government policies, and their enforcement
- The price level does not affect these variables in the long run.



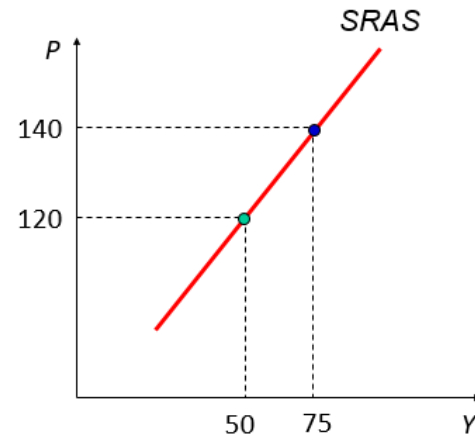
Why the Long-Run AS Curve Might Shift

- Any change in the economy that increases the natural rate of output will shift the long-run aggregate supply curve to the right.
 - ▷ Labor: population growth, immigration, lower natural rate of unemployment
 - ▷ Capital, physical or human
 - ▷ Natural resources: cheaper imported oil
 - ▷ Technology
 - ▷ Laws, government policies



Why the AS Curve Slopes Upward in the Short Run?

- Assumption: In the short run, an increase in the overall level of prices (P) increases the market value of all final goods and services that sellers want to sell (Y).
 - ▷ Conversely, a decrease in the overall level of prices decreases the market value of all final goods and services that sellers want to sell.
 - ▷ Consequently, SRAS is a rising curve.
- Why? What could justify this assumption?



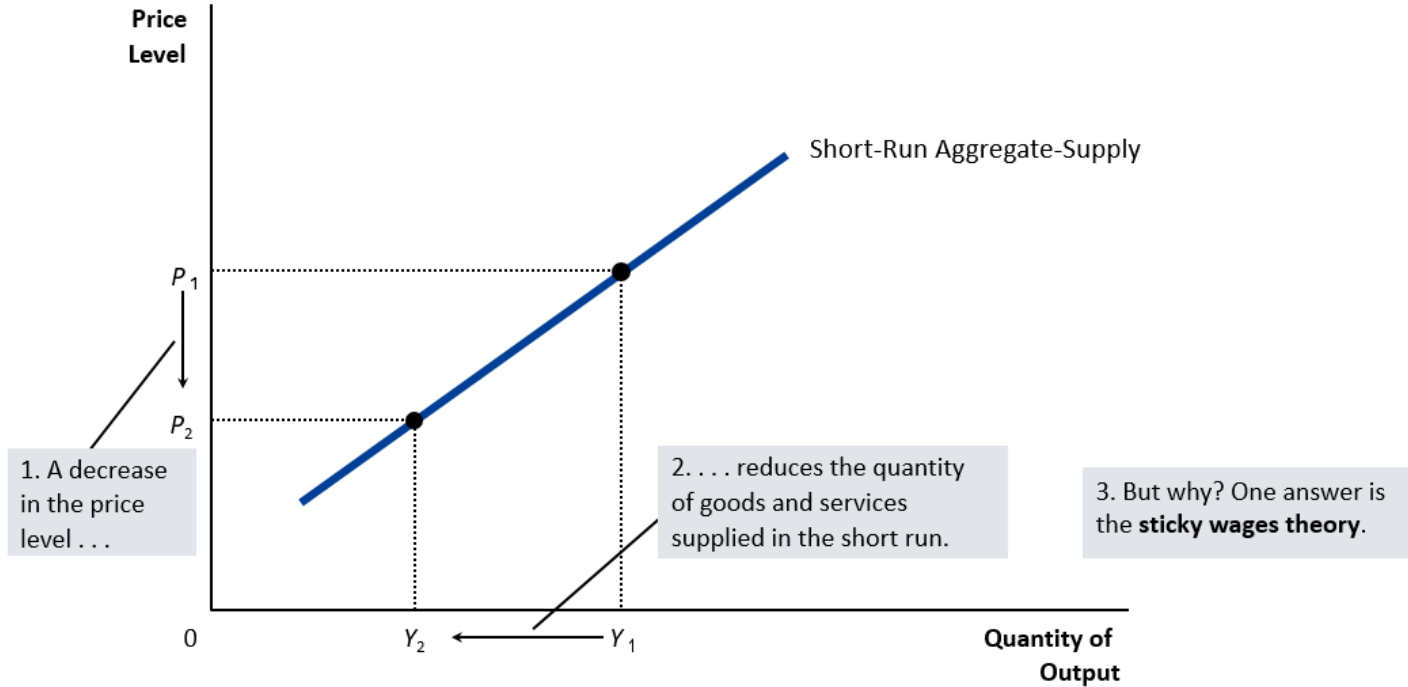
Why SRAS Curve Slopes Upward?

- In the short run, why would producers want to produce more if the prices of all final goods and services increase by 3 percent?
 - ▷ I'm simplifying by assuming that, if the overall price level increase by, say, 3 percent, then all prices increase by 3 percent.
- Conversely, why would producers want to produce less if all prices decrease by 3 percent?
- That is, **why would the SRAS curve be upward sloping?**

Aggregate Supply: Long Run vs. Short Run

- Recall that in long-run macroeconomics it is assumed that if the prices of all final goods and services change by the same proportion then businesses will not change their behaviour.
 - ▷ That's why the LRAS curve is vertical.
- Why does short-run macroeconomics assume that producers want to increase production if the prices of all final goods and services increase by 3 percent?
- Three reasons: sticky wages, sticky prices, and misperceptions.

Short-Run Aggregate Supply Curve



Sticky Wage -> Upward Sloping SRAS Curve

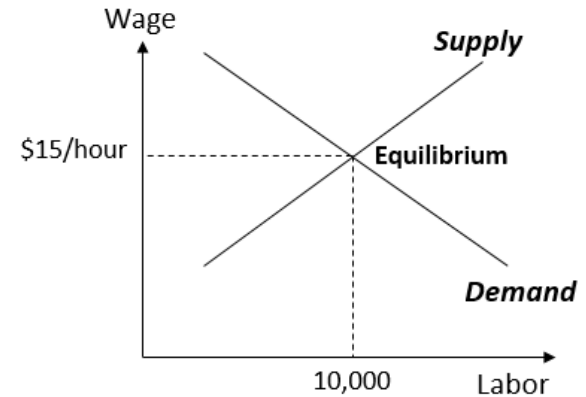
- Assume the hiring for 2021 jobs is done in 2020.
- All workers are aware of the conditions of a job

Conditions of a job (2020 job market)

1. The job is for 2021.
2. We all think that in 2021 the price level will be 135. (In symbols, $P^e = 135$.) If the actual price level in 2021 turns out to be *equal to* what we now expect ($P = P^e = 135$) then you will be employed full-time (8 hours a day, 5 days a week).
3. If the actual price level in 2021 turns out to be *more than* what we now expect ($P > P^e = 135$) then you will work extra hours: 10 hours a day, 5 days a week.
4. If the actual price level in 2021 turns out to be *less than* what we now expect ($P < P^e = 135$) then you will work fewer hours: 6 hours a day, 5 days a week.
5. The wage at which you are hired in 2020 cannot be renegotiated in 2021.

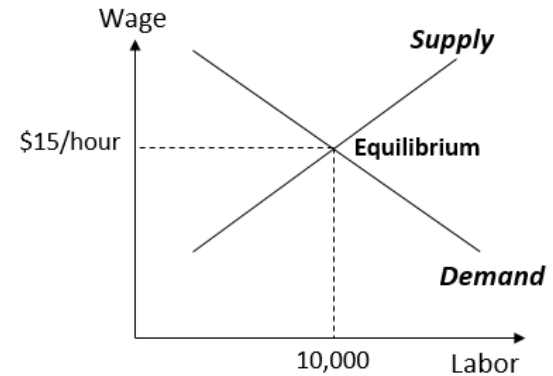
Sticky Wage -> Upward Sloping SRAS Curve (Cont'd)

- Based on this understanding of what a job entails:
 - workers form a labor supply curve, and
 - businesses form a labor demand curve
- The wage is determined by supply and demand in the usual manner.
 - That is, the wage will be the equilibrium wage that makes the quantity of labor demanded equal to the quantity of labor supplied.



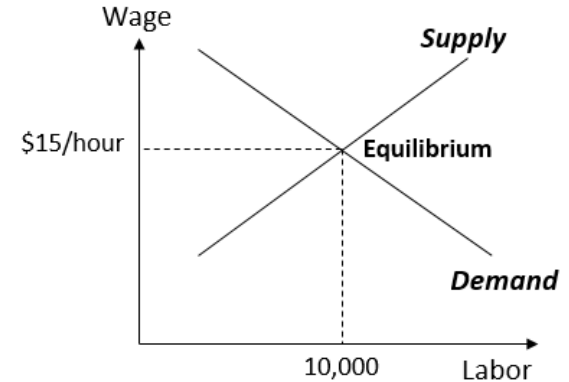
Sticky Wage -> Upward Sloping SRAS Curve (Cont'd)

- Suppose this equilibrium wage is \$15 an hour.
- Suppose further that, in this equilibrium, the quantity of labor supplied is 10,000 workers, as is the quantity of labor demanded.



Sticky Wage -> Upward Sloping SRAS Curve (Cont'd)

- When 2021 comes along, if $P = P^e = 135$, as was expected, then all 10,000 workers would have full-time jobs at \$15 per hour as was promised in 2020.
- This would be a full-employment outcome and the resulting output will be the full-employment output ($Y = Y_N$).



Sticky Wage -> Upward Sloping SRAS Curve (Cont'd)

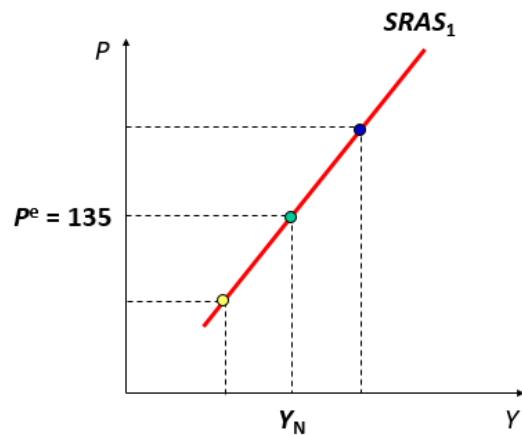
- If, in 2021, it turns out that $P > P^e = 135$, it would be a pleasant surprise for business.
- ... and an unpleasant surprise for workers because the \$15 per hour wage can no longer be re-negotiated.
- Production will be more profitable for businesses than they had expected back in 2020.
- They will require workers to work extra hours at \$15 per hour.
- The resulting output will exceed the full-employment output ($Y > Y_N$).

Sticky Wage -> Upward Sloping SRAS Curve (Cont'd)

- Conversely, if, in 2021, $P < P^e = 135$, production will be less profitable for businesses than they had expected back in 2020.
- They will reduce workers' hours and may even let some workers go.
- The resulting output will be less than the full-employment output ($Y < Y_N$).

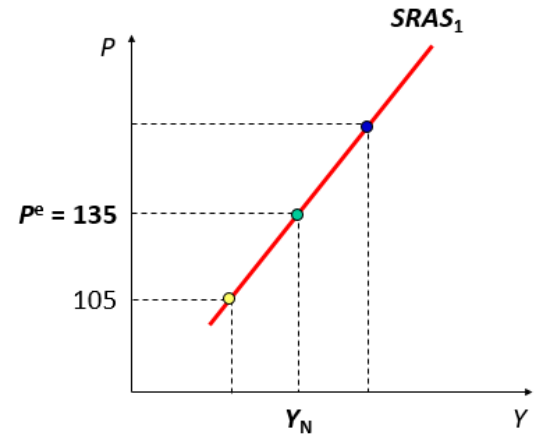
Sticky Wage -> Upward Sloping SRAS Curve (Cont'd)

- To summarize:
 - at $P = P^e = 135$ we have $Y = Y_N$,
 - at $P > 135$ we have $Y > Y_N$, and
 - at $P < 135$ we have $Y < Y_N$.
- Thus we see that **the short-run aggregate supply curve is upward-sloping ($SRAS_1$)**.



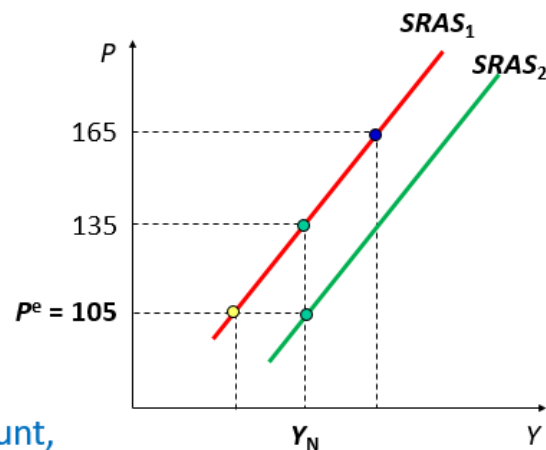
How Price Expectations Affect SRAS Curve

- Now, how would the *SRAS* curve look like if, back in 2020, all workers and all businesses had expected that the price level in 2021 would be only 105 instead of 135?
 - (That is, what if $P^e = 105$?)



How Price Expectations Affect SRAS Curve (Cont'd)

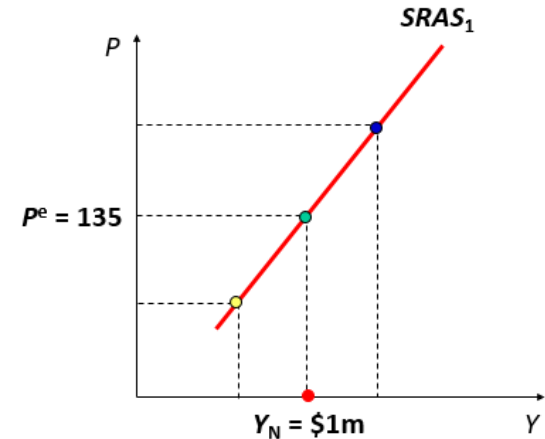
- By applying the same reasoning we used earlier, we can say that
 - at $P = P^e = 105$ we have $Y = Y_N$,
 - at $P > 105$ we have $Y > Y_N$, and
 - at $P < 105$ we have $Y < Y_N$.
- This is shown as the upward-sloping SRAS curve ($SRAS_2$).



Thus, we see that **when the expected price level decreases by some amount, the SRAS curve shifts downwards by the same amount.**

How long-run output affects the SRAS curve

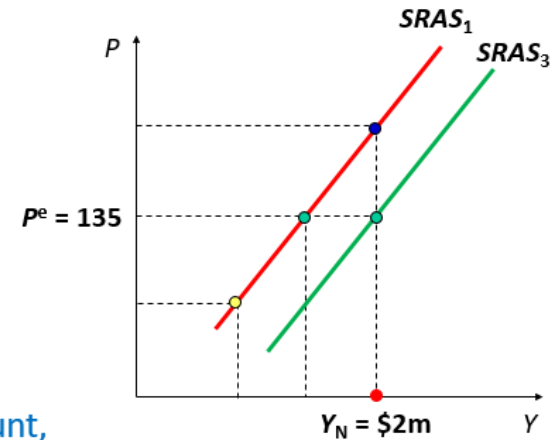
- Finally, let us return to the assumption that $P^e = 135$ and consider *two different values of the full-employment output*.
- If $Y_N = \$1$ million, we can say that
 - at $P = P^e = 135$ it must be that $Y = Y_N = \$1$ million,
 - at $P > 135$ it must be that $Y > \$1$ million, and
 - at $P < 135$ it must be that $Y < \$1$ million.
- This is the upward-sloping SRAS curve ($SRAS_1$) we saw earlier.



How long-run output affects the SRAS curve (Cont'd)

- On the other hand:
- If $Y_N = \$2$ million, we can say that
 - at $P = P^e = 135$ it must be that $Y = Y_N = \$2$ million,
 - at $P > 135$ it must be that $Y > \$2$ million, and
 - at $P < 135$ it must be that $Y < \$2$ million.
- This is shown as $SRAS_3$.

Thus, we see that if the full-employment output increases by some amount, the SRAS curve shifts rightward by the same amount.





2021 SCUIP Winter Session I