

# Introduction to Economic Fluctuations

August 26, 2019

*The modern world regards business cycles much as the ancient Egyptians regarded the overflowing of the Nile. The phenomenon occurs at intervals, it is of great importance to everyone, and natural causes of it are not in sight.*

—John Bates Clark, 1898

- On average real U.S. GDP grows at 3 percent
- Growth is higher in some years than others; recessions v. expansions
- Recessions (as opposed to expansions) are periods of rising unemployment and falling output
- Short run fluctuations in output and employment are called the *business cycle*

## Questions We'll Answer

- What causes short-run fluctuations?
- Can policymakers avoid recessions?
- If yes, what policy levers should they use?

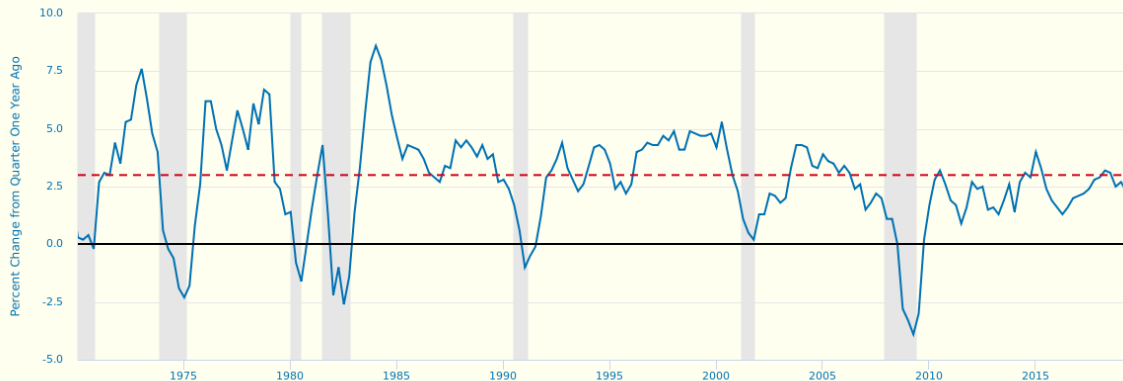
# How We'll Go About Answering Those Questions

- Examine the data that describes short-run fluctuations
- Discuss key differences between how the economy behaves in the long run and how it behaves in the short run
- Introduce the model of aggregate supply and aggregate demand

# The Facts About the Business Cycle



— Real Gross Domestic Product



Shaded areas indicate U.S. recessions

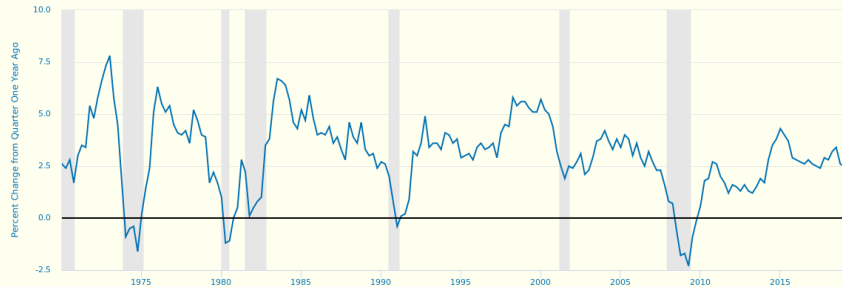
Source: U.S. Bureau of Economic Analysis

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# GDP and Its Components

- The National Bureau of Economic Research (NBER) is the official arbiter of when recessions begin and end
- The beginning of a recession is the business cycle *peak*, and the end a business cycle *trough*
- There isn't an official rule determining recessions, but the rule of thumb is two consecutive quarters of declining real GDP

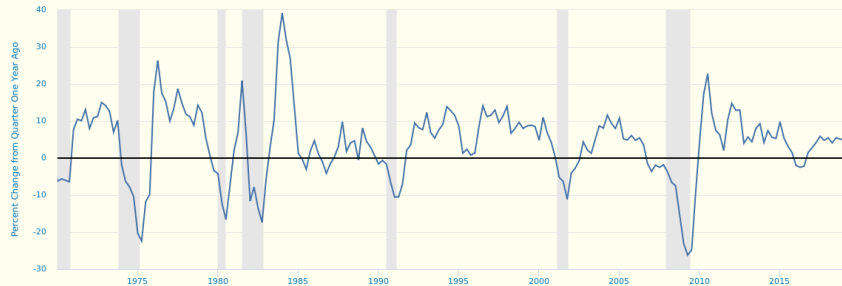




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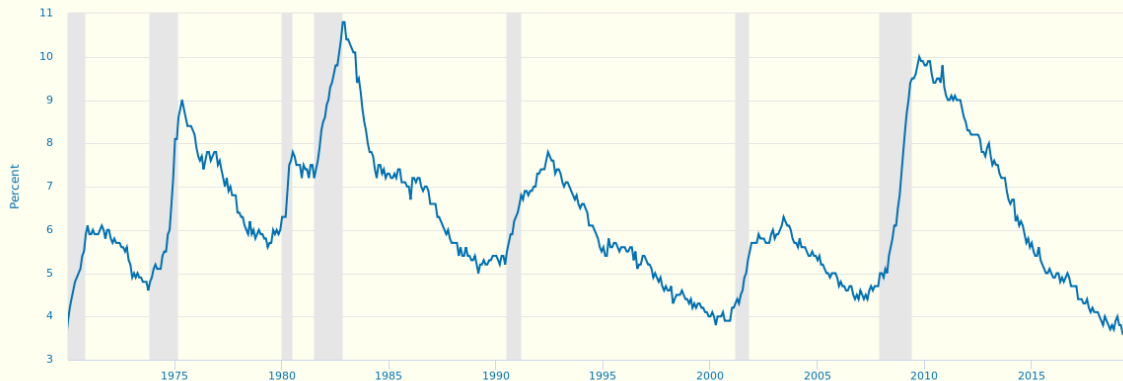


# Unemployment and Okun's Law

What relationship should we expect to find between unemployment and GDP?

Because employed workers help produce goods and services and unemployed workers do not, increases in unemployment should be reflected in decreases in production.

We call this relationship **Okun's law**, after Arthur Okun who first studied it.



Shaded areas indicate U.S. recessions

Source: U.S. Bureau of Labor Statistics

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# Okun's Law

We can actually be more precise about the magnitude of the Okun's Law relationship. On a yearly basis,

$$\text{Percentage Change in Real GDP} = 3\% - 2 \times \text{Change in Unemployment Rate}$$

- If unemployment remains the same, real GDP grows at 3%
- Real GDP will grow more quickly or slowly depending on the change otherwise

## Short Run vs. Long Run

- In "Economic Growth", we learned the economy grows because of changes in saving, population growth, or technological progress with the latter being responsible for changes in the standard of living
- The long run trend leading to higher standards of living is not associated with long-run trends in unemployment
- By contrast, short-run movements in GDP are highly correlated with utilization of the economy's labor force

# Leading Economic Indicators

Scores of economists are tasked with predicting fluctuations in the economy

Business economists

- Help companies plan for changing economic conditions

Government economists

- forecast to predict changes in revenues from taxes
- can affect future output through monetary and fiscal policy

Economists arrive at these predictions by observing **leading indicators**, variables that tend to fluctuate in advance of the overall economy.

# Leading Indicators

Every month the *Conference Board*, a private economics research group, announces the *index of leading economic indicators*. It includes ten data series that are often used to forecast changes in economic activity about six to nine months into the future.

## Average Weekly Hours in Manufacturing

Before making new hires or laying off workers, businesses will adjust the hours of existing employees.

- Longer work week implies strong demand and increasing production
- Shorter work week implies weak demand and cutting back on production



## Average Weekly Initial Claims for Unemployment Insurance

An increase in those filing UI claims indicates firms are laying off workers and cutting back production.

# Manufacturers' New Orders for Consumer Goods and Materials

Increase in new orders is a direct indicator of increased demand.

## Building Permits for New Private Housing Units

An increase in building permits means that planned construction is increasing which indicates a rise in overall economic activity.

# Index of Stock Prices

The stock markets reflects expectations of future economic conditions. If stock prices go down, investors expect companies' profitability to go down or the economy to grow more slowly.

## Interest Rate Spread: 10-yr - F.F.R.

A “spread” is a difference in interest rates. A large spread means interest rates are expected to rise, which typically occurs when economic activity increases.

Caveat: Short-run economic fluctuations are largely unpredictable

# Time Horizons in Macroeconomics

## How the Short Run and the Long Run Differ

**In the long run, prices are flexible and can respond to changes in supply or demand. In the short run, many prices are "sticky" at some predetermined level.**

Because prices behave differently in the short run than in the long run, various economic policies have different effects over different time horizons.



## Short Run vs. Long Run: An Example

What happens to prices when the Fed contracts the money supply by 5%?

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## Short Run vs. Long Run: An Example

What happens to prices when the Fed contracts the money supply by 5%?

- Long run (Classical Theory): Prices go down 5%
- Short run: Prices are sticky so output and employment adjust instead

## “On Sticky Prices” Blinder (1994)

Frequency	Percentage of Firms
Less than once	10.2
Once	39.3
1.01 to 2	15.6
2.01 to 4	12.9
4.01 to 12	7.5
12.01 to 52	4.3
52.01 to 365	8.6
More than 365	1.6

### Why?

Numerous microeconomic phenomena: coordination failure, cost-based pricing with lags, delivery lags, nominal contracts, etc

# The Model of Aggregate Supply and Aggregate Demand

We've *implicitly* assumed that prices adjust to ensure the quantity supplied equals the quantity demanded. The economy works differently when prices are sticky.

- Output will additionally depend on the economy's *demand* for goods and services
- Demand depends on a variety of factors: consumers' confidence about their economic prospects, firms' perceptions about the profitability of new investments, and monetary and fiscal policy

The model of aggregate supply and aggregate demand resembles demand within a single market, but it includes interactions among many markets.

# Aggregate Demand

# The Quantity Equation as Aggregate Demand

Recall that the quantity theory states,

$$MV = PY$$

- $M$  - money supply
- $V$  - velocity of money
- $P$  - price level
- $Y$  - amount of output

The quantity equation can be rewritten in terms of the supply and demand for real money balances

$$M/P = (M/P)^d = kY$$

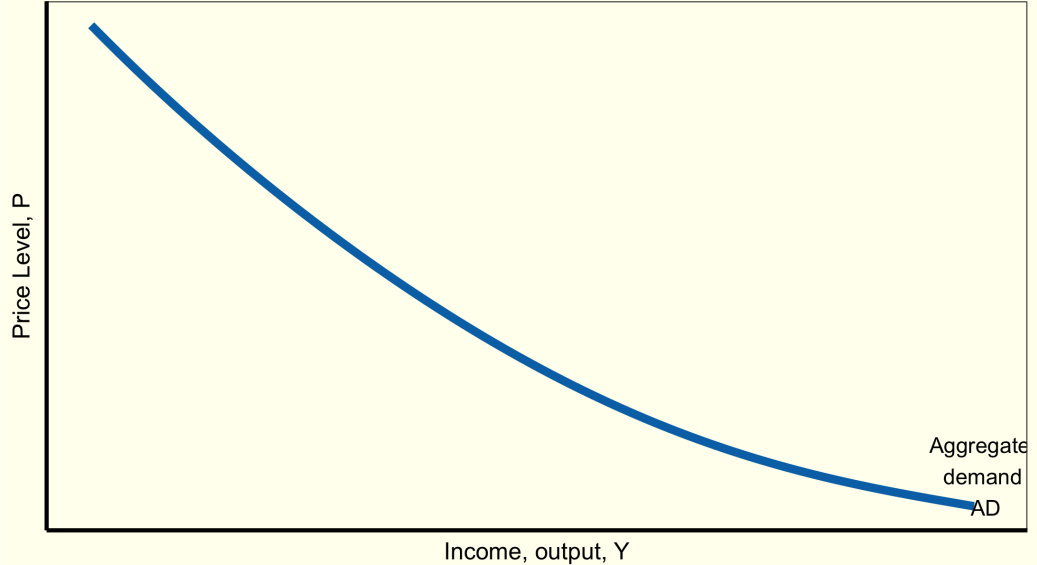
If we assume constant velocity  $V$  and the money supply  $M$  is fixed by the central bank, then the quantity equation yields a negative relationship between output  $Y$  and the price level  $P$ . Abusing some notation,

$$\overline{M}(1/k) = PY$$

$$\overline{M}\overline{V} = PY$$



# The Aggregate Demand Curve

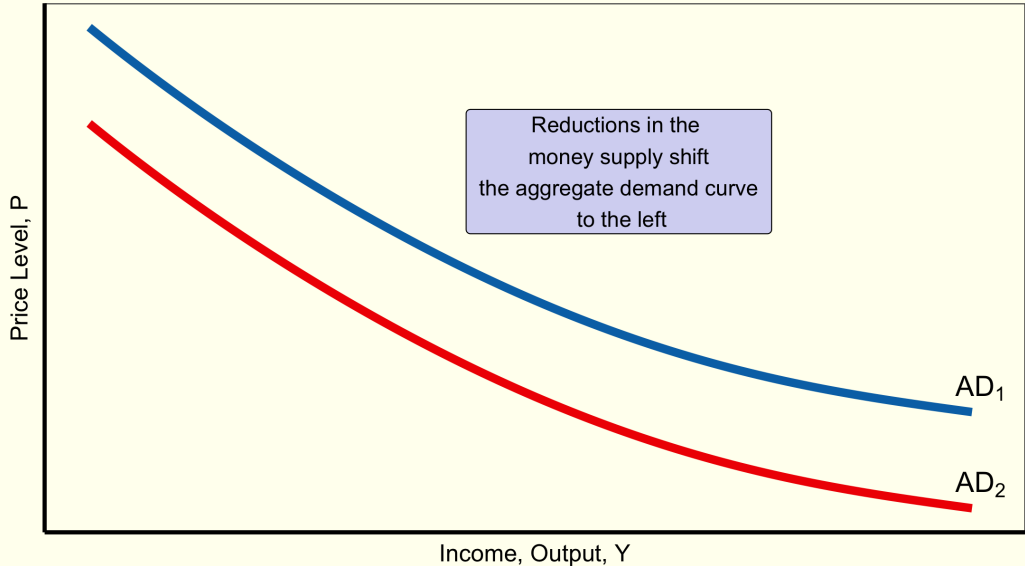


## Shifts in the Aggregate Demand Curve

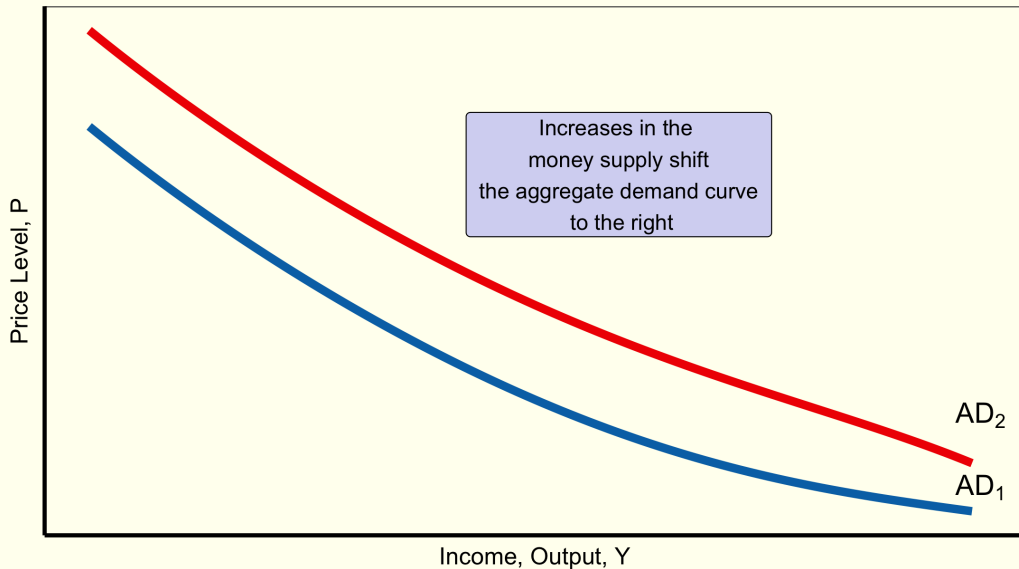
The aggregate demand curve is drawn for a fixed value of the money supply. i.e. it tells us the possible combinations of  $P$  and  $Y$  for a given value of  $M$

- Suppose the Fed changes the money supply to  $M_2 < M_1$ , then the nominal level of output is reduced. i.e. for any given price level the amount of output is lower.
- Suppose the Fed changes the money supply to  $M_3 > M_1$ , then the nominal level of output is greater. i.e. for any given level of output the prices are now greater.

# Inward Shifts in the Aggregate Demand Curve



# Outward Shifts in the Aggregate Demand Curve



# Aggregate Supply

# The Long Run: The Vertical Aggregate Supply Curve

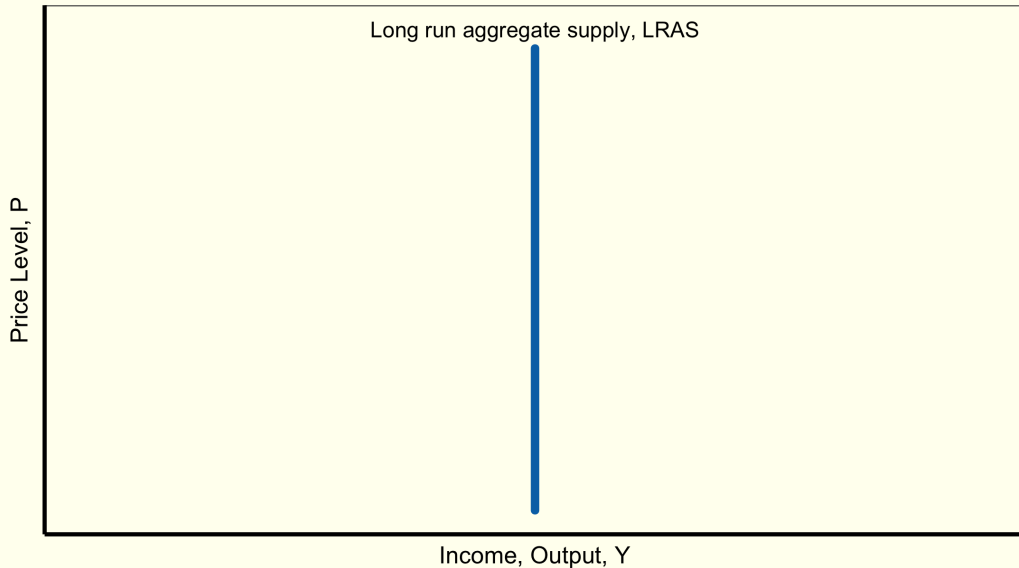
**Aggregate Supply** is the relationship between the quantity of goods and services supplied and the price level. We'll borrow the long-run aggregate supply (LRAS) curve from classical theory.

$$\begin{aligned} Y &= F(\bar{K}, \bar{L}) \\ &= \bar{Y} \end{aligned}$$

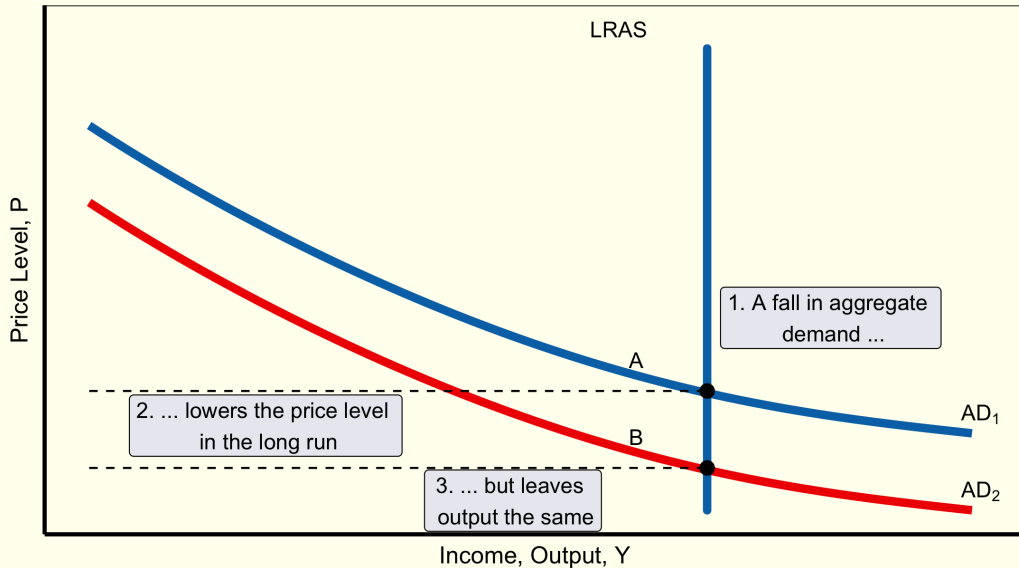
If LRAS is vertical then changes in aggregate demand affect prices but have no effect on output. The LRAS curve satisfies the *classical dichotomy* in that output is not related to prices

$\bar{Y}$  is called the *full-employment* level of output

# The Long-Run Aggregate Supply Curve



# Shifts in Aggregate Demand in the Long Run





## The Short Run: The Horizontal Aggregate Supply Curve

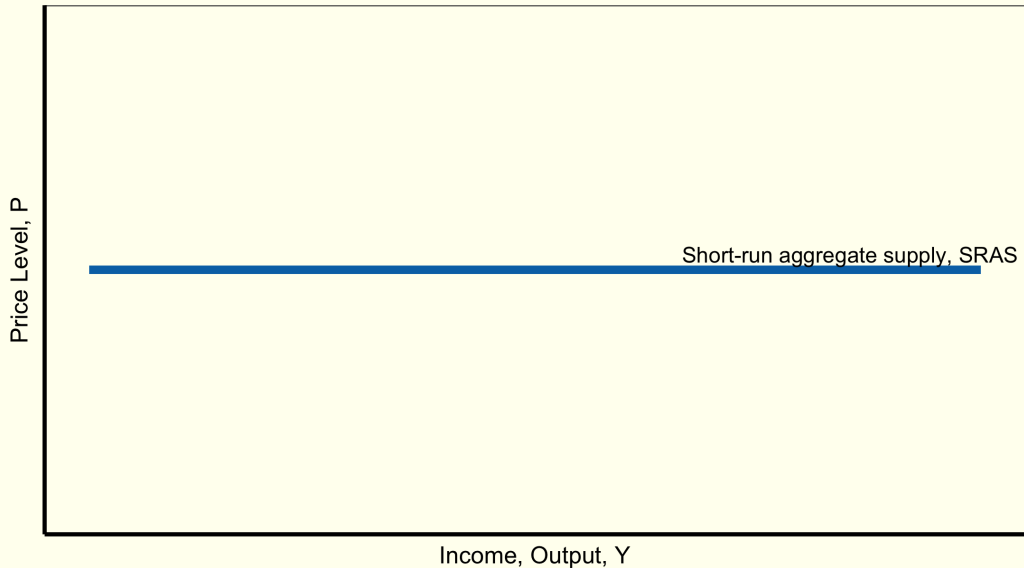
We'll use the most extreme case as an example: all firms have price catalogs and it is too costly for them to issue new ones; therefore, all prices are sticky.

At these prices firms are willing to sell as much as consumers are willing to buy

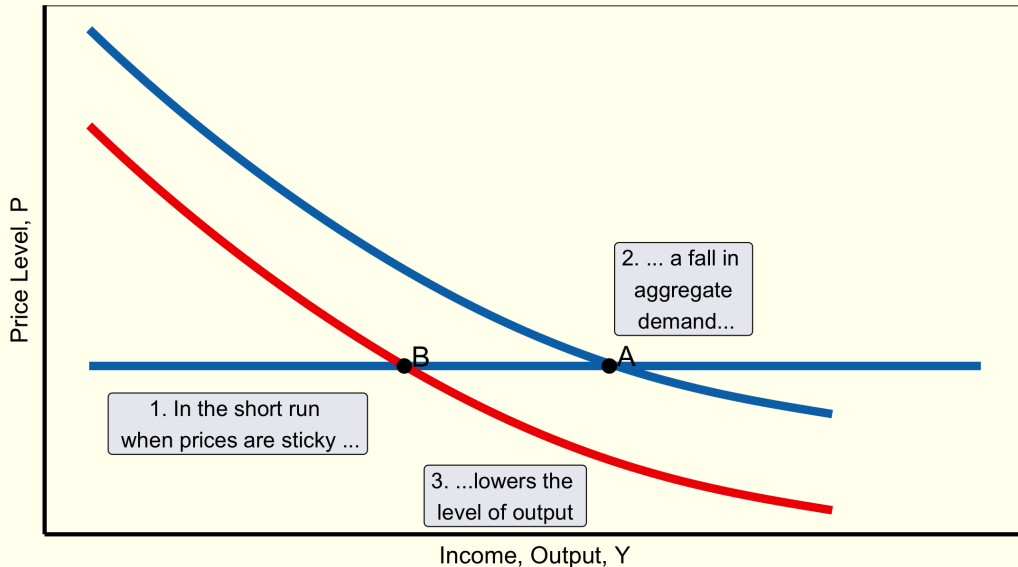
They hire just enough labor to produce the amount demanded

Changes in aggregate demand do affect the level of output

# The Short-Run Aggregate Supply Curve



# Shifts in Aggregate Demand in the Short Run

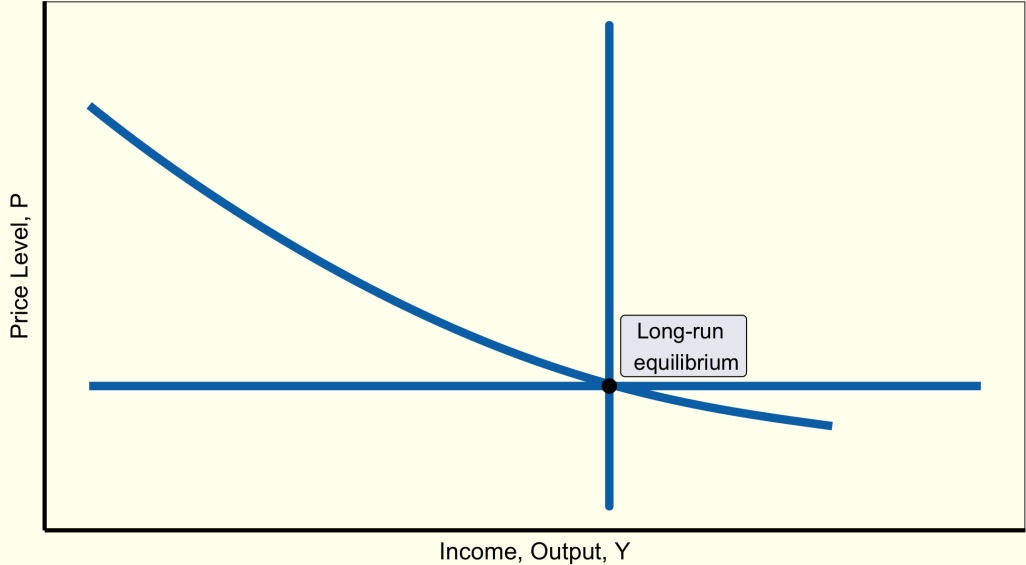


# From the Short Run to the Long Run

We can summarize everything thus far,

- Over long periods of time prices are flexible
  - The aggregate supply curve is vertical
  - Changes in aggregate demand affect price but not output
- Over short periods of time prices are sticky
  - The aggregate supply curve is flat
  - Changes in aggregate demand do affect the economy's output

# Long-Run Equilibrium



## From the Short Run to the Long Run

Suppose the economy is initially in long-run equilibrium

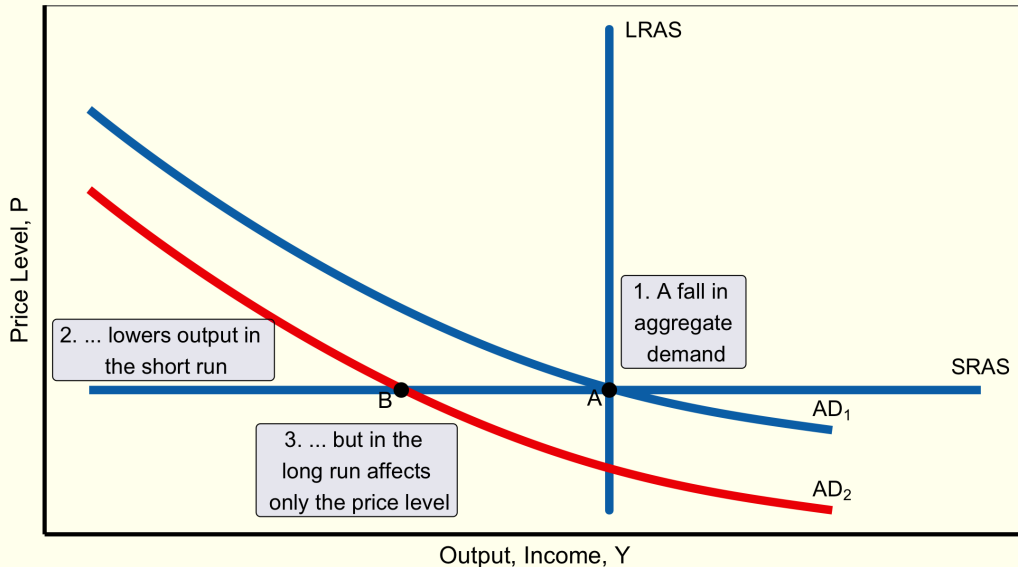
- The long-run equilibrium is the point at which aggregate demand crosses the long-run aggregate supply curve
- Prices have adjusted to reach this equilibrium
- The SRAS must cross at this point as well

## From the Short Run to the Long Run

Now suppose the Fed reduces the money supply and the aggregate demand curve shifts to the left

- In the short run, output and employment fall below their natural levels  
—recession
- The gradual reduction in the price level moves the economy to the long-run output level
- Long-run output is obtained at a lower price level
- So, a shift in AD affects output in the short run, but this effect dissipates over time as firms adjust their prices

# A Reduction in Aggregate Demand





# A Monetary Lesson From French History

The money stock of eighteenth century France took the form of gold and silver coins that did not indicate a specific value; the values were set by decree.

Sometimes the decrees occurred overnight.

- On September 22, 1724 everyone's money was worth 20 percent less than the previous day.
- Over the course of seven months, the nominal value of the money stock was reduced forty-five percent
- Wages and interest rates sometimes took years to adjust—as our sticky price theory would tell us
- The industrial sector, however, contracted twenty percent



# Stabilization Policy

- Economists call exogenous events that shift AS or AD **shocks**
  - A shock that shifts the AD curve is called a **demand shock**
  - A shock that shifts the AS curve is called a **supply shock**
- **Stabilization policy** is the set of actions policymakers use to reduce the severity of economic fluctuations

# Shocks to Aggregate Demand

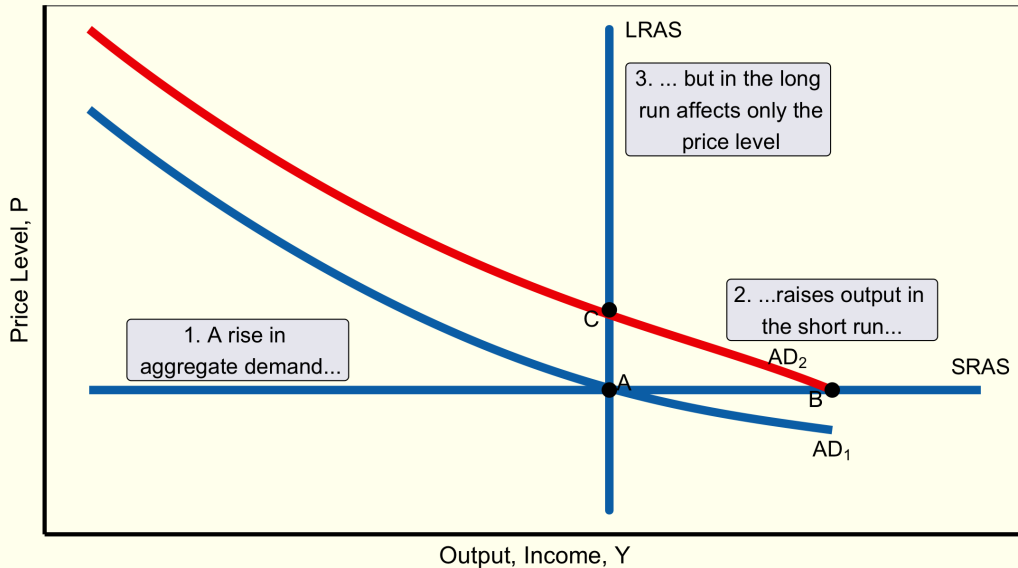
As an example let's consider the expanded availability of the credit card.

- CCs reduce the amount of money people are willing to hold.
- The reduction in money demand is equivalent to an increase in velocity

If the money supply is held constant, then the increase in velocity increases nominal spending and the AD curve shifts outward.

- In the short run, there is an economic boom
- Over time, the high level of AD raises pulls up wages and prices, and the quantity demanded declines
- The central bank—an effective or skillful one—might reduce the money supply to dampen the increase in velocity

# An Increase in Aggregate Demand



# Shocks to Aggregate Supply

A supply shock is a shock to the economy that alters the cost of producing goods and services. Supply shocks directly affect the price level and are alternatively called *price shocks*. *Adverse* examples include

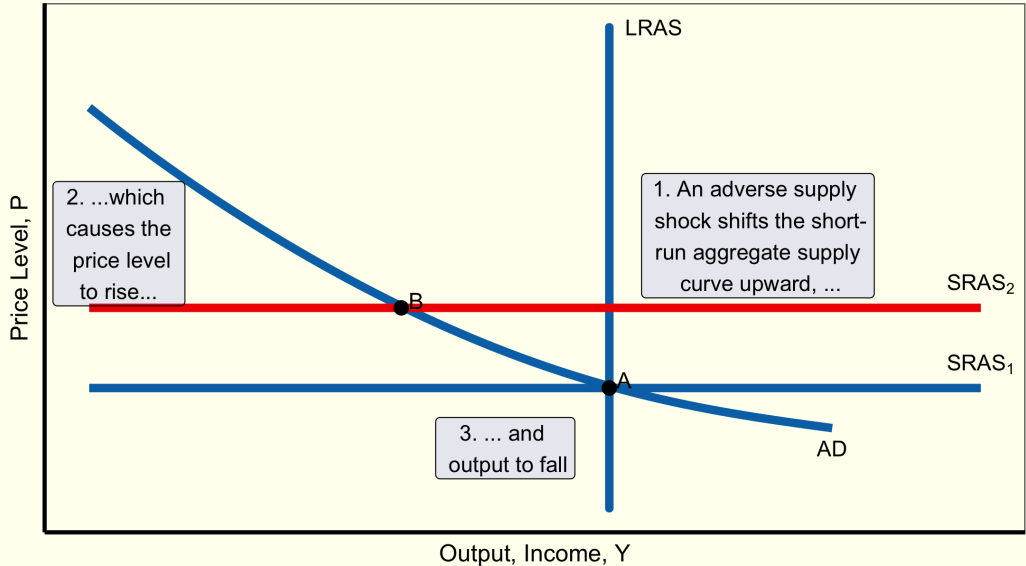
- A drought that destroys crops
- A new environmental protection law that requires firms to reduce their emissions
- An increase in union aggressiveness
- The organization of an international oil cartel (or cartels in general)

## Shocks to Aggregate Supply

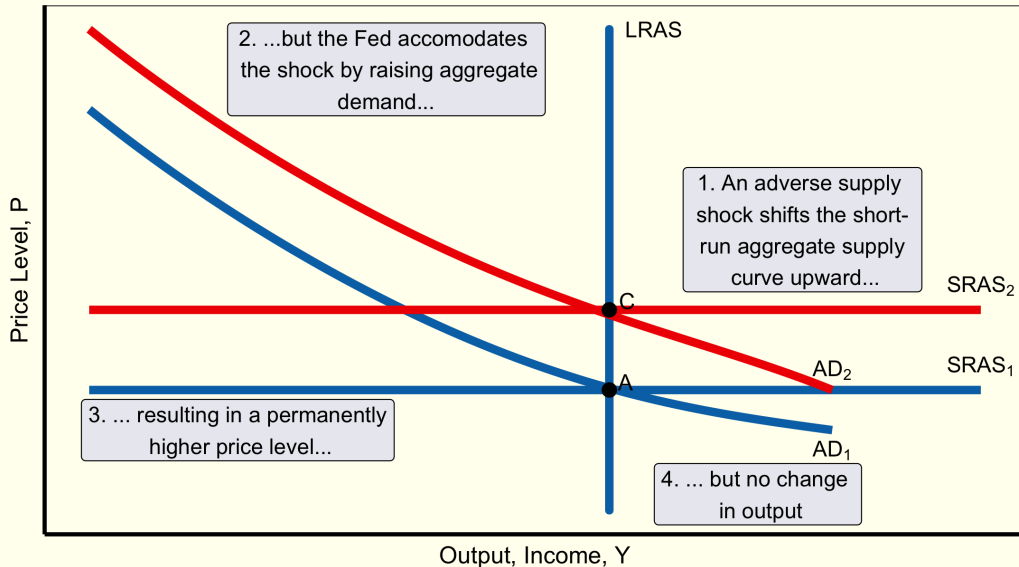
Suppose the economy experiences an adverse supply shock shifting the SRAS curve upward. Assuming no changes to AD

- The price level rises and output falls
- Rising prices and falling output (rising unemployment) is called *stagflation* (= economic stagnation + inflation)
- The first option available to the policymaker is hold AD constant
- The second option available to the policymaker is to expand (*accomodate*) AD with the drawback being higher prices

# An Adverse Supply Shock



# Accommodating an Adverse Supply Shock





## How OPEC Helped Cause Stagflation in the 1970s

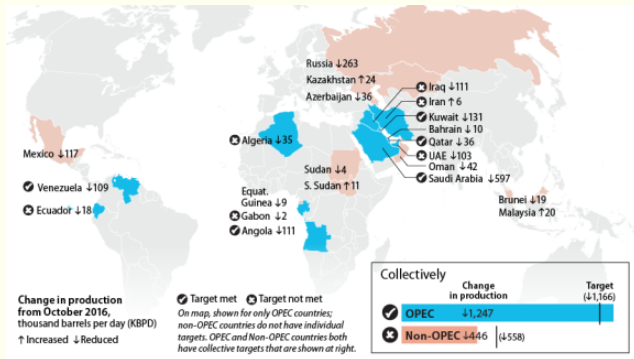
The Organization of Petroleum Exporting Countries (OPEC) is a cartel. In the 1970s OPEC's reduction of oil supply nearly doubled the world price. The increase in prices caused stagflation in most industrial countries.

<b>Year</b>	<b>Change in Oil Prices</b>	<b>Inflation Rate (CPI)</b>	<b>Unemployment Rate</b>
1973	11.0%	6.2%	4.9%
1974	68.0	11.0	5.6
1975	16.0	9.1	8.5
1976	3.3	5.8	7.7
1977	8.1	6.5	7.1

OPEC repeated their actions at the end of the decade leading to another stagflation

# How OPEC Caused the Euphoria of the 1980s

- Political turmoil in Arab countries weekend OPEC's cartel abilities
- In 1986 oil prices fell by nearly half —low inflation, low unemployment
- The present-day U.S. is less susceptible to oil shocks due to conservation efforts and technological change



# Conclusion

- Introduced a framework to study economic fluctuations
- Prices are sticky in the short run and flexible in the long run
- Effective monetary policy can stabilize the economy
- As we move forward, we'll build a richer model of the economy in the short run