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## Business Cycles

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## Agenda

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- What is a Business Cycle?
  - Business Cycle Facts.
  - Business Cycle Analysis: A Preview.
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## What Is a Business Cycle?

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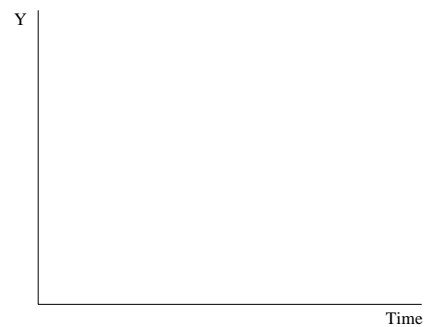
- Business cycles are the short-run fluctuations in aggregate economic activity around its long-run growth path.
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## What Is a Business Cycle?

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## What Is a Business Cycle?

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- Components of a Business Cycle:
  - Peak,
  - Contraction or Recession,
  - Trough, and
  - Recovery and Expansion.

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## What Is a Business Cycle?

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- Peak:
  - The maximum level that aggregate economic activity reaches.
    - Can only be determined after the fact.
    - Generally,  $Y > Y_n$ .

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## What Is a Business Cycle?

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- Contractions, Recessions, or Hard Landing:
  - Popular definition:
    - 2 or more consecutive quarters of declining real GDP.
  - Official definition:
    - A period of significant decline in total output, income, employment, and trade,
    - usually lasting from 6 months to a year, and
    - marked by widespread contractions in many sectors of the economy.

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## What Is a Business Cycle?

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- Growth Recession or Soft Landing:
  - Official definition:
    - A recurring period of slow growth in total output, income, employment, and trade,
    - usually lasting a year or more.
  - Actual growth rate is less than natural growth rate, resulting in a rising unemployment rate.

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## What Is a Business Cycle?

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- Depression:
  - A recession that is major in both scale and duration.

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## What Is a Business Cycle?

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- Trough:
  - The minimum level that aggregate economic activity reaches.
    - Can only be determined after the fact.
    - Generally  $Y < Y_n$ .

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## What Is a Business Cycle?

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- Expansion:
  - Official definition:
    - A period of significant increase in total output, income, employment, and trade,
    - usually lasting 6 months or more, and
    - marked by widespread expansion in many sectors of the economy.

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## What Is a Business Cycle?

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- Boom:
  - An extended economic expansion where aggregate economic activity is high and rising.
    - $Y$  is well above  $Y_n$ .

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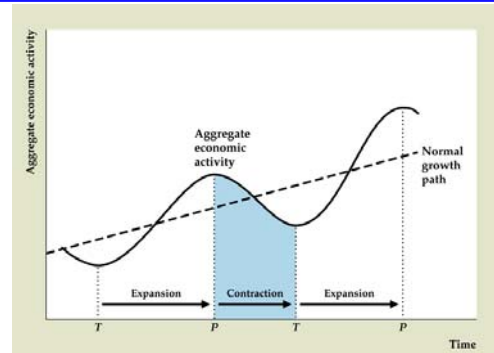
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## What Is a Business Cycle?

- Expansions and contractions:
  - The sequence from one peak to the next, or from one trough to the next, is a **business cycle**.
  - Peaks and troughs are called **turning points**.
    - Turning points are officially designated by the NBER Business Cycle Dating (BCD) Committee.
    - Typically wait 9 – 24 months after the fact before deciding on turning points.

11-13

## What is a Business Cycle?



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## What Is a Business Cycle?

- Main features of a business cycle:
  - Pervasive in nature,
  - Recurrent but not periodic,
  - Persistent, and
  - Each cycle differs in length and severity.
    - Expansions are longer than recessions.

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## What Is a Business Cycle?

- Business cycle are **pervasive in nature**.
  - Business cycles are fluctuations in **aggregate economic activity**, not fluctuations in a specific economic variable.
    - Significant changes in total output, income, employment, and trade.

11-16

## What Is a Business Cycle?

- Business cycle are **recurrent**:
  - The pattern of *contraction–trough–expansion–peak* occurs over and over again.
- Business cycles are **not periodic**:
  - Business cycles do not occur at regular, predictable intervals.

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## What Is a Business Cycle?

- Business cycles are **persistent**:
  - Declines in aggregate economic activity are followed by further declines; growth in aggregate economic activity is followed by more growth.
    - Because of persistence, forecasting turning points is quite important.

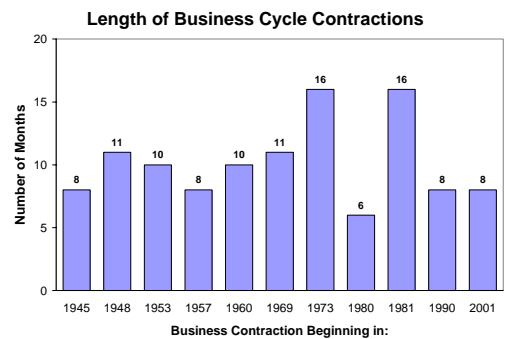
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## What Is a Business Cycle?

- Business cycles differ in **length** and **severity**:
  - Recessions are fairly short; expansions are fairly long.

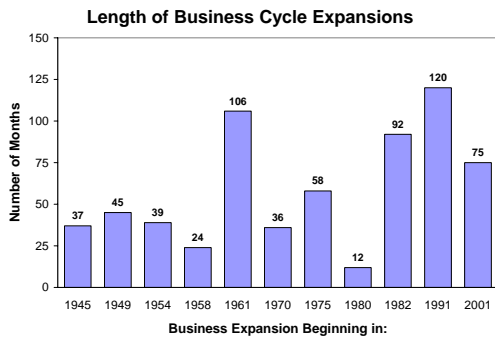
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## What is a Business Cycle?



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## What is a Business Cycle?



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## What Is a Business Cycle?

- Main points about business cycles:
  - Business cycles are *pervasive in nature*, i.e., they are fluctuations in *aggregate economic activity*, not a specific economic variable.
  - Business cycle are *recurrent*, but not *periodic*.
  - Business cycles are *persistent*.
  - Business cycles differ in *length* and *severity*.

11-22

## Business Cycle Turning Points

Trough	Expansion (months from trough to peak)	Peak	Contraction (months from peak to next trough)
Dec. 1954	30	June 1957	18
Dec. 1958	23	Oct. 1960	8
June 1961	46 (2nd War)	Apr. 1969	32
Dec. 1967	18	June 1969	18
Dec. 1970	34	Oct. 1973	63
Mar. 1975	36	Mar. 1982	38
May 1980	22	Mar. 1982	13
Apr. 1982	27	July 1990	10
May 1981	20	Jan. 1993	17
June 1984	18	Dec. 1995	18
June 1987	24	June 1999	18
Dec. 1990	21	Sept. 2000	23
Aug. 1994	13	May 2007	13
June 1996	16	Jan. 2010	24
Jan. 1997	12	Jan. 2010	23
Dec. 1974	44 (WW)	Aug. 1918	7
Mar. 1919	10	Jan. 1920	18
July 1921	22	May 1923	14
July 1924	27	Oct. 1926	13
Nov. 1927	21	Aug. 1929	43 (Depression)
Mar. 1933	30	May 1937	13 (Depression)
June 1936	62 (WW)	Feb. 1945	8
Oct. 1945	17	Nov. 1948	11
Oct. 1949	43 (Korean War)	July 1953	30
May 1954	39	Aug. 1957	8
Apr. 1958	24	Apr. 1960	10
Feb. 1961	106 (Vietnam War)	Dec. 1969	11
Mar. 1969	18	Mar. 1973	16
Mar. 1975	26	Jan. 1980	6
July 1980	12	July 1981	16
Nov. 1982	32	July 1990	8
Mar. 1991	120	Mar. 2001	8
Nov. 2001			

Source: NBER Web Site: www.nber.org/publine.html

11-23

## What Is a Business Cycle?

- Should we care about business cycles?
  - Robert Lucas (University of Chicago): NO
    - The cost of business cycle instability is very low.
      - About one-fifth the cost of having a 10% inflation rate.
    - Suppose the choice is either:
      - Eliminating recessions but having 10% inflation, or
      - Having recessions but no inflation.
    - Lucas argues we should choose the latter.

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## Business Cycle Facts

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- The cyclical behavior of economic variables:
  - Economic variables show *co-movement*.
    - They have regular and predictable patterns of behavior over the course of the business cycle.
    - Macroeconomic variables can be classified by *direction*, *timing*, and *volatility* of their movement with aggregate economic activity.

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## Business Cycle Facts

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- The cyclical behavior of economic variables:
  - *Direction*:
    - What is the *direction* of a variable's movement relative to aggregate economic activity?
      - *Procyclical*: moves in the same direction.
      - *Countercyclical*: moves in the opposite direction.
      - *Acyclical*: moves with no clear pattern.

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## Business Cycle Facts

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- The cyclical behavior of economic variables:
  - *Timing*:
    - What is the *timing* of a variable's movements relative to aggregate economic activity?
      - *Leading*: moves in advance.
      - *Coincident*: moves at the same time.
      - *Lagging*: moves afterwards.

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## Business Cycle Facts

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- The cyclical behavior of economic variables:
  - *Leading indicators* have been used to **predict** peaks and troughs of the business cycle.
    - Generally, several leading variables are combined into an index of leading economic indicators.
    - A decline in the index for 3 to 6 months warns of a recession.

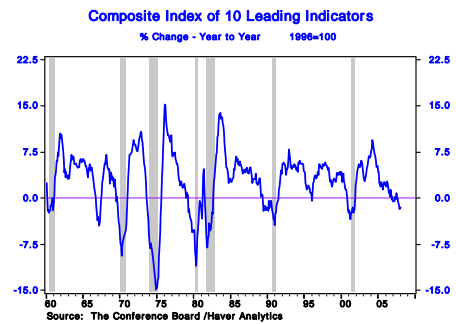
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## Business Cycle Facts

- The cyclical behavior of economic variables:
  - Leading indicators have not been that useful in predicting recessions.
    - Although the data are available promptly, they are often revised.
      - Sometimes signals change without warning.
    - A number of false warnings have been given.
    - Provides little information about the timing or severity of a recession.

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## Business Cycle Facts



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## Business Cycle Facts

- The cyclical behavior of economic variables:
  - Leading indicators suffer from 2 other issues:
    - Structural changes in the economy necessitate periodic revision of the index.
    - Recessions are often caused by sudden shocks to the economy that leading indicators will not pick up.

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## Business Cycle Facts

- The cyclical behavior of key macro variables:
  - **Procyclical:** moves in the same direction as Y.
    - **Leading:** residential investment, inventory investment, average labor productivity, money growth, stock prices.
    - **Coincident:** industrial production, consumption, business fixed investment, employment.
    - **Lagging:** inflation, nominal interest rates.
    - **Timing not designated:** government purchases, real wages.

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## Business Cycle Facts

- The cyclical behavior of key macro variables:
  - **Countercyclical:** moves in the opposite direction as Y.
    - **Timing is unclassified:** unemployment, the unemployment rate.
  - **Acyclical:** moves in no clear pattern with Y.
    - **Timing is not designated:** real interest rates.

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## Cyclical Behavior of Key Macro Variables

The Cyclical Behavior of Key Macroeconomic Variables (The Business Cycle Facts)

Variable	Direction	Timing
<b>Production</b>		
Industrial production	Proyclical	Coincident
Durable goods industries are more volatile than nondurable goods and services		
<b>Expenditures</b>		
Consumption	Proyclical	Coincident
Business fixed investment	Proyclical	Coincident
Residential investment	Proyclical	Leading
Inventory investment	Proyclical	Leading
Government purchases	Proyclical	---
Investment is more volatile than consumption		
<b>Labor Market Variables</b>		
Employment	Proyclical	Coincident
Unemployment	Countercyclical	Unclassified*
Average labor productivity	Proyclical	Leading*
Real wage	Proyclical	---
<b>Money Supply and Inflation</b>		
Money supply	Proyclical	Leading
Inflation	Proyclical	Lagging
<b>Financial Variables</b>		
Stock prices	Proyclical	Leading
Nominal interest rates	Proyclical	Lagging
Real interest rates	Acyclical	---

\*Timing is not designated by the Conference Board.  
Source: Business Cycle Indicators, April 2003. Industrial production series 87 (Industrial production), consumption series 87 (Manufacturing and trade sales), constant dollar business fixed investment series 88 (Gross private residential fixed investment), residential investment series 23 (New private housing units started), inventory investment series 81 (Change in business inventories, constant dollar), employment series 41 (Employees on nonagricultural payroll), unemployment series 42 (Unemployment rate), money supply series 10 (Money supply M1, constant dollar), inflation series 130 (CPI for services, change over six-month span), stock prices series 18 (Index of stock prices, 1927-2002 constant dollar), nominal interest rates series 110 (Federal funds rate), series 114 (Discount rate on new 91-day Treasury bills), series 100 (Average prime rate charged by banks).

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## Business Cycle Facts

- The cyclical behavior of key macro variables:
  - **Volatility:**
    - How **volatile** is a variable relative to the volatility of aggregate economic activity?
      - **High volatility:** Durable goods production and spending, investment, inventory investment, net exports.
      - **Low volatility:** Nondurable goods and services production and spending, consumption.

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## Business Cycle Facts

- International aspects of the business cycle:
  - The cyclical behavior of key economic variables in other countries is similar to that in the US.
  - Major industrial countries frequently have recessions and expansions at about the same time.
    - In addition, each economy faces small fluctuations that aren't shared with other countries.

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## Business Cycle Analysis: A Preview

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- What explains business cycle fluctuations?
  - 2 major components of business cycle theories:
    - A description of the shocks.
    - A model of how the economy responds to shocks.
  - 2 major business cycle theories:
    - Classical theory.
    - Keynesian theory.

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## Business Cycle Analysis: A Preview

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- What explains business cycle fluctuations?
  - Both theories can be studied in an aggregate demand-aggregate supply (*AD-AS*) framework.
  - The *AD-AS* model has 3 main components:
    - An aggregate demand (*AD*) curve,
    - A short-run aggregate supply (*SRAS*) curve, and
    - A long-run aggregate supply (*LRAS*) curve.

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## Business Cycle Analysis: A Preview

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- *AD* and *AS*—A brief introduction:
  - The aggregate demand (*AD*) curve:
    - Shows quantity of goods and services demanded (*Y*) for any price level (*P*).
    - A higher *P* means less aggregate demand (lower *Y*),
      - The aggregate demand curve slopes downward.
    - An increase in aggregate demand for a given *P* shifts the aggregate demand curve to the right.

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## The Aggregate Demand Curve

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## Business Cycle Analysis: A Preview

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- AD and AS—A brief introduction:
  - The short-run aggregate supply (SRAS) curve:
    - The short-run aggregate supply curve shows how much output ( $Y$ ) producers are willing to supply in the short-run at any given price level ( $P$ ).
    - The short-run aggregate supply curve is horizontal.
      - We assume the prices are fixed in the short run.

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## The Short-run Aggregate Supply Curve

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## Business Cycle Analysis: A Preview

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- AD and AS—A brief introduction:
  - The long-run aggregate supply (LRAS) curve:
    - The long-run aggregate supply curve shows how much output ( $Y$ ) producers are willing to supply in the long-run at any given price level ( $P$ ).
    - The long-run aggregate supply curve is vertical at the full-employment level of output.

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## The Long-run Aggregate Supply Curve

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## Business Cycle Analysis: A Preview

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- AD and AS—A brief introduction:
  - Equilibrium in the AD—AS model:
    - **Short-run equilibrium:** At the Y and P where the aggregate demand (AD) curve intersects the short-run aggregate supply (SRAS) curve.
    - **Long-run equilibrium:** At the Y and P level where the aggregate demand (AD) curve intersects the long-run aggregate supply (LRAS) curve.

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## The AD-AS Model

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## Business Cycle Analysis: A Preview

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- Business cycles occur because of:
  - Aggregate demand shocks:
    - A **positive AD shock** shifts the AD curve to the right.
    - A **negative AD shock** shifts the AD curve to the left.
  - (Permanent) Aggregate supply shocks:
    - A **positive (permanent) AS shock** shifts the LRAS curve to the right.
    - A **negative (permanent) AS shock** shifts the LRAS curve to the left.

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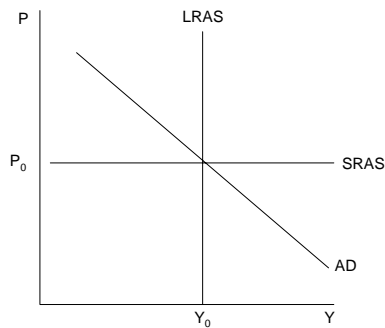
## Business Cycle Analysis: A Preview

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- Example: A negative AD shock:
  - The aggregate demand curve shifts to the left:
    - **Short-run equilibrium** occurs where the AD curve intersects the SRAS curve; Y falls, P is unchanged.
    - **Long-run equilibrium** occurs where the AD curve intersects the LRAS curve; Y is unchanged, P falls.

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## A Negative AD Shock



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## Business Cycle Analysis: A Preview

- Example: A negative AD shock:
  - How long does it take to get to the long run?
    - Classical theory: prices adjust rapidly.
      - So recessions are short-lived and
      - There is no need for government intervention.
    - Keynesian theory: prices and wages adjust slowly.
      - Adjustment may take several years and
      - The government can fight recessions by taking action to shift the AD curve .

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## Business Cycle Analysis: A Preview

- Example: A negative (permanent) AS shock :
  - Permanent aggregate supply shocks shift the LRAS curve.
    - Permanent changes in productivity or labor supply can cause supply shocks.
  - Classical view LRAS shocks as the main cause of fluctuations in output.
    - Keynesians also recognize the importance of supply shocks.

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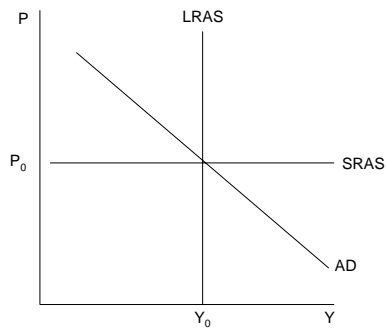
## Business Cycle Analysis: A Preview

- Example: A negative (permanent) AS shock :
  - A permanent, negative aggregate supply shock reduces full-employment output and shifts the LRAS curve to the left.
    - The new long-term equilibrium is lower output and a higher price level.
      - A recession is accompanied by higher price level.

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## A Negative Permanent AS Shock

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## Business Cycle Analysis: A Preview

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- Business cycles are caused by both aggregate demand and aggregate supply shocks hitting the economy.
  - Depending on the type(s) of shock(s), there are a variety of possible outcomes for Y and P.
    - Higher Y, higher P.
    - Higher Y, lower P.
    - Lower Y, lower P.
    - Lower Y, higher P.

11-54