

Chapter 8: Business Cycles

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- What is a business cycle?
- The American business cycle: The historical record.
- Describe the behavior of various variables over business cycles.
- Use aggregate demand and aggregate supply to describe the impact on business cycles of various shocks.

What Is a Business Cycle?

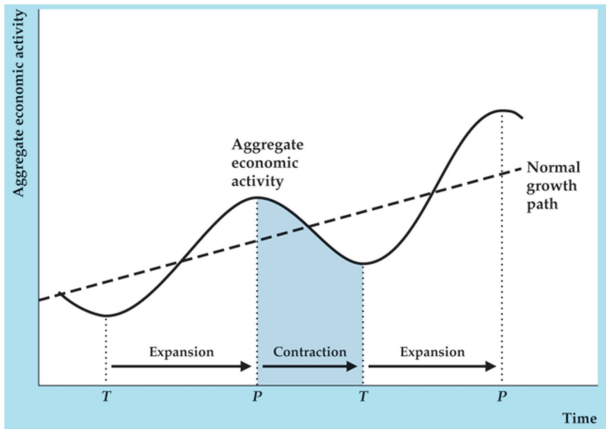
- U.S. research on cycles began in 1920 at the National Bureau of Economic Research (NBER):
 - NBER maintains the business cycle chronology—a detailed history of business cycles: <http://www.nber.org/cycles.html>
 - NBER sponsors business cycle studies.
- Burns and Mitchell (Measuring Business Cycles, 1946) makes five main points about BCs:
 - BCs are fluctuations of aggregate economic activity, not a specific variable.
 - There are expansions and contractions.
 - Economic variables show comovement — they have regular and predictable patterns of behavior over the course of the BC.
 - The BC is recurrent, but not periodic.
 - The BC is persistent.

Expansions and contractions

- Aggregate economic activity declines in a contraction or recession until it reaches a trough (Fig. 8.1).
- After a trough, activity increases in an expansion or boom until it reaches a peak.
- A particularly severe recession is called a depression.
- The sequence from one peak to the next, or from one trough to the next, is a BC.
- Peaks and troughs are turning points.
- Turning points are officially designated by the NBER BC Dating Committee.



Figure 8.1 A business cycle



- (Conti.) The BC is recurrent, but not periodic:
 - “Recurrent” means the pattern of contraction–trough–expansion–peak occurs again and again.
 - Not being periodic means that it doesn’t occur at regular, predictable intervals.
- The BC is persistent:
 - Declines are followed by further declines; growth is followed by more growth.
 - Because of persistence, forecasting turning points is quite important.



Table 8.1 NBER Business Cycle Turning Points and Durations of Post-1854 Business Cycles

Trough	Expansion (months from trough to peak)	Peak	Contraction (months from peak to next trough)
Dec. 1854	30	June 1857	18
Dec. 1858	22	Oct. 1860	8
June 1861	46 (Civil War)	Apr. 1865	32
Dec. 1867	18	June 1869	18
Dec. 1870	34	Oct. 1873	65
Mar. 1879	36	Mar. 1882	38
May 1885	22	Mar. 1887	13
Apr. 1888	27	July 1890	10
May 1891	20	Jan. 1893	17
June 1894	18	Dec. 1895	18
June 1897	24	June 1899	18
Dec. 1900	21	Sept. 1902	23
Aug. 1904	33	May 1907	13
June 1908	19	Jan. 1910	24
Jan. 1912	12	Jan. 1913	23
Dec. 1914	44 (WWI)	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	50	May 1937	13 (Depression)
June 1938	80 (WWII)	Feb. 1945	8
Oct. 1945	37	Nov. 1948	11
Oct. 1949	45 (Korean War)	July 1953	10
May 1954	39	Aug. 1957	8
Apr. 1958	24	Apr. 1960	10
Feb. 1961	106 (Vietnam War)	Dec. 1969	11
Nov. 1970	36	Nov. 1973	16
Mar. 1975	58	Jan. 1980	6
July 1980	12	July 1981	16
Nov. 1982	92	July 1990	8
Mar. 1991	120	Mar. 2001	8
Nov. 2001	73	Dec. 2007	18
June 2009			

Source: NBER Web site, www.nber.org/cycles.html.

The American BC: The Historical Record. Pre-World War I period

- Recessions were common from 1865 to 1917.
- 338 months of contraction and 382 months of expansion [compared with 642 months of expansion and 104 months of contraction from 1945 to 2007].
- Longest contraction on record was 65 months, from October 1873 to March 1879.

The Great Depression and World War II

- The worst economic contraction was the Great Depression of the 1930s.
- Real GDP fell nearly 30% from the peak in August 1929 to the trough in March 1933.
- The unemployment rate rose from 3% to nearly 25%.
- Thousands of banks failed, the stock market collapsed, many farmers went bankrupt, and international trade was halted.
- There were really two BCs in the Great Depression
 - A contraction from August 1929 to March 1933, followed by an expansion that peaked in May 1937.
 - A contraction from May 1937 to June 1938.
- By May 1937, output had nearly returned to its 1929 peak, but the unemployment rate was high (14%)
- In 1939 the unemployment rate was over 17%.
- The Great Depression ended with the start of WWII
 - Wartime production brought the unemployment rate below 2%.
 - Real GDP almost doubled between 1939 and 1944.

Desire for Free Food



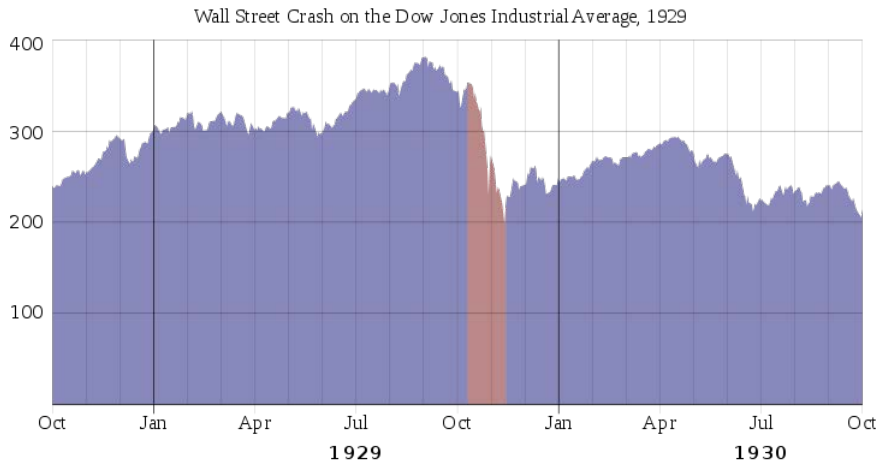
Bank Run: AUB



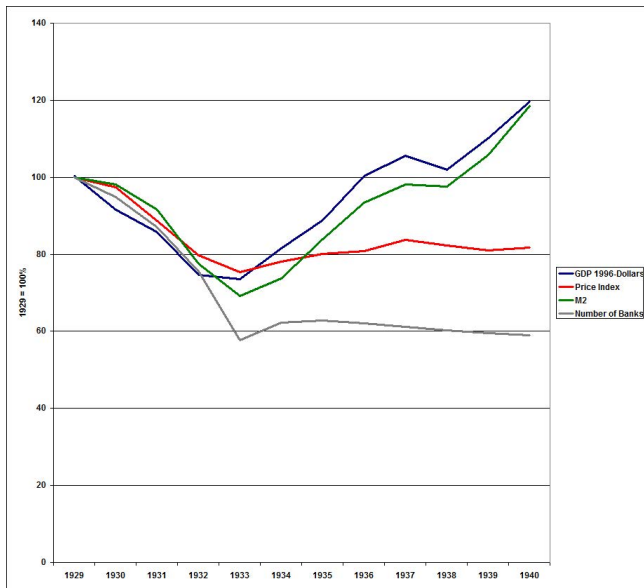
Bank Run: BUS



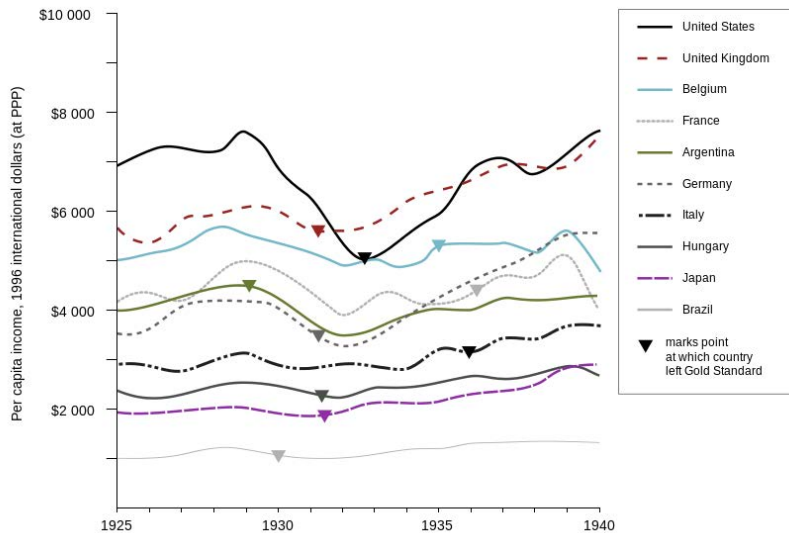
Collapse in Stock Market



Major Indices

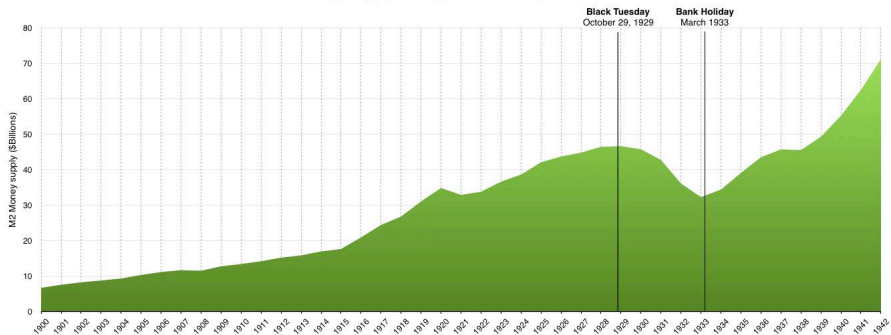


Great Depression around World

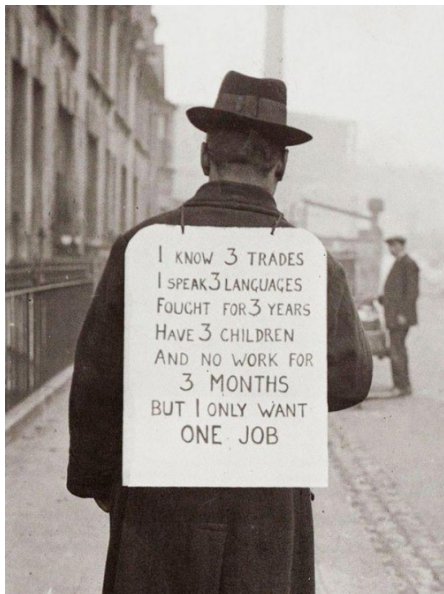


Explanation One: Money Supply

Money supply during the Great Depression era



Explanation Two: Confidence and Demand-driven Crisis



- From 1945 to 1970 there were five mild contractions.
- A very long expansion (106 months, from February 1961 to December 1969) made some economists think the business cycle was dead.
- But the OPEC oil shock of 1973 caused a sharp recession, with real GDP declining 3%, the unemployment rate rising to 9%, and inflation rising to over 10%.
- The 1981 – 1982 recession was also severe, with the unemployment rate over 11%, but inflation declining from 11% to less than 4%.
- The 1990 – 1991 and 2001 recessions were mild and short, but the recoveries were slow and erratic.

- From 1982 to 2001, only one brief recession, July 1990 to March 1991, not very severe.
- Volatility of many macroeconomic variables declined sharply.
- So long boom was the first part of the period known as the Great Moderation.

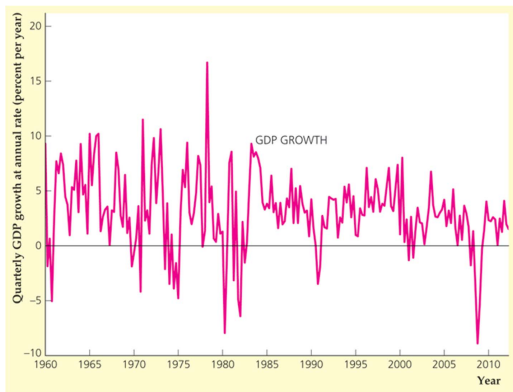
- The longest and deepest recession since the Great Depression began in December 2007.
 - Began with a housing crisis.
 - Followed by a financial crisis that rivaled that of the Great Depression
- Unemployment rose above 10% for the first time since 1982.
- Fed reduced interest rates to near zero.
- Sluggish economic growth even after the recession ended in 2009.
- Recent trend in GDP growth:
<http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=US> https://www.bea.gov/newsreleases/national/gdp/gdp_glance.htm

Have American BCs become less severe?

- Economists believed that BCs weren't as bad after WWII as they were before
 - The average contraction before 1929 lasted 21 months compared to 11 months after 1945.
 - The average expansion before 1929 lasted 25 months compared to 50 months after 1945.
- Romer's 1986 article sparked a strong debate, as it argued that pre-1929 data was not measured well, and that BCs weren't that bad before 1929.
- New research has focused on the reasons for the decline in the volatility of U.S. output:
 - Stock and Watson's research showed that the decline came from a sharp drop in volatility around 1984 for many economic variables; dubbed the Great Moderation.
 - A plot of real GDP growth (Fig. 8.2) shows that the quarterly growth rate of GDP was more stable after 1984.
- A plot of the std (Fig. 8.3) confirms the decline in volatility.



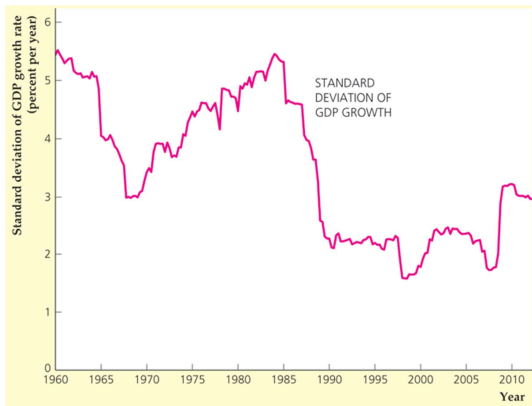
Figure 8.2 GDP growth, 1960-2012



Source: Authors' calculations from data on real GDP from the Federal Reserve Bank of St. Louis FRED database, research.stlouisfed.org/fred2/GDPC1.



Figure 8.3 Standard deviation of GDP growth, 1960-2012



Source: Authors' calculations from data on real GDP from the Federal Reserve Bank of St. Louis FRED database, research.stlouisfed.org/fred2/GDPC1.

- (Conti.) Stock and Watson found that the change from manufacturing to services was not a major cause of the reduction in volatility.
- They showed that evidence that changes in how firms managed their inventories, which some researchers thought was the main source of the drop in volatility, was sensitive to the empirical method used, and thus not a convincing explanation.
- Improvements in housing markets may have contributed to the decline in volatility, but cannot explain the sudden drop in volatility, as those changes occurred gradually over time.
- Reduced volatility in oil prices was also not an important factor in reducing the volatility of output.
- After showing that many theories for the reduced volatility in output were not convincing, Stock and Watson found no factors that were convincing.
 - The reduction in output's volatility remains unexplained—some unknown form of good luck in terms of smaller shocks to the economy.

All business cycles have features in common

- The cyclical behavior of economic variables—direction and timing.
- What direction does a variable move relative to aggregate economic activity?
 - Procyclical: in the same direction.
 - Countercyclical: in the opposite direction.
 - Acyclical: with no clear pattern.
- What is the timing of a variable's movements relative to aggregate economic activity?
 - Leading: in advance.
 - Coincident: at the same time.
 - Lagging: after.

Cyclical behavior of key macroeconomic variables

- Procyclical
 - Coincident: industrial production, consumption, business fixed investment, employment.
 - Leading: residential investment, inventory investment, average labor productivity, money growth, stock prices.
 - Lagging: inflation, nominal interest rates.
 - Timing not designated: government purchases, real wage.
- Countercyclical: unemployment (timing is unclassified).
- Acyclical: real interest rates (timing is not designated).
- Volatility: durable goods is more volatile than nondurable G&Ss.
 - Durable goods production is more volatile than nondurable G&Ss.
 - Investment spending is more volatile than consumption.
- Inventory and bullwhip effect:
https://en.wikipedia.org/wiki/Bullwhip_effect



Summary 10

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

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

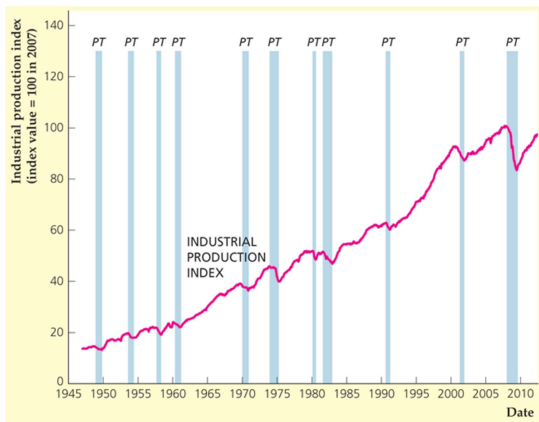
^a Timing is not designated by The Conference Board.

^b Designated as "unclassified" by The Conference Board; leading at peaks and lagging at troughs.

Source: *Business Cycle Indicators*, September 2008. Industrial production: series 47 (industrial production); consumption: series 57 (manufacturing and trade sales, constant dollars); business fixed investment: series 86 (gross private nonresidential fixed investment); residential investment: series 28 (new private housing units started); inventory investment: series 30 (change in business inventories, constant dollars); employment: series 41 (employees on nonagricultural payrolls); unemployment: series 43 (civilian unemployment rate); money supply: series 106 (money supply M2, constant dollars); inflation: series 120 (CPI for services, change over six-month span); stock prices: series 19 (index of stock prices, 500 common stocks); nominal interest rates: series 119 (Federal funds rate), series 114 (discount rate on new 91-day Treasury bills), series 109 (average prime rate charged by banks).



Figure 8.4 Cyclical behavior of the index of industrial production, 1947-2012



Source: Federal Reserve Bank of St. Louis FRED database at research.stlouisfed.org/fred2/series/INDPRO.

Application: The Job Finding Rate and the Job Loss Rate

- The probability that someone finds or loses a job in a given month changes over time.
- The job finding rate is the probability that someone who is unemployed will find a job during the month, but that probability declines in recessions and increases in expansions (Figure 8.8).
- The job loss rate is the probability that someone who is employed one month will become unemployed the next month (Figure 8.9).
- It declines in expansions and rises in recessions.
- An example (Table 8.2) shows that small changes in the job loss rate may lead to larger changes in the unemployment rate than larger changes in the job finding rate.
- Since the job loss rate applies to many more people, job loss is the main force in increased unemployment rates during recessions.



Figure 8.8 The job finding rate, 1976–2012

Source: Shigeru Fujita and Garey Ramey, "The Cyclicity of Separation and Job Finding Rates," *International Economic Review*, May 2009, pp. 415–430; data for January 1976 to February 1990 from Shigeru Fujita and data for March 1990 to June 2012 from Bureau of Labor Statistics Web site, www.bls.gov/cps/cps_flows.htm.

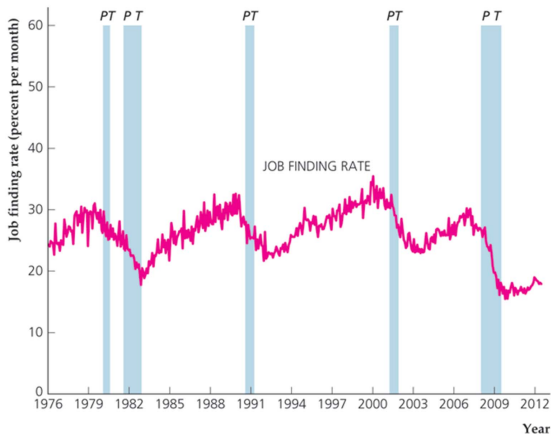
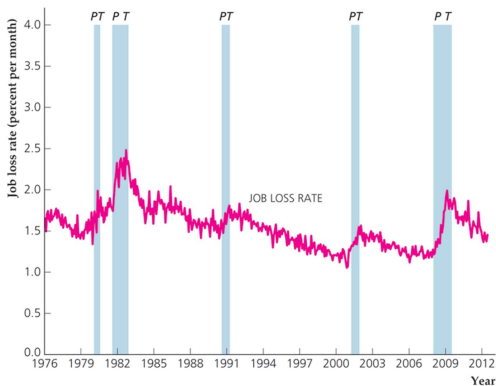




Figure 8.9 The job loss rate, 1976-2012



Source: Shigeru Fujita and Garey Ramey, "The Cyclicalities of Separation and Job Finding Rates," *International Economic Review*, May 2009, pp. 415–430; data for January 1976 to February 1990 from Shigeru Fujita and data for March 1990 to June 2012 from Bureau of Labor Statistics Web site, www.bls.gov/cps/cps_flows.htm.

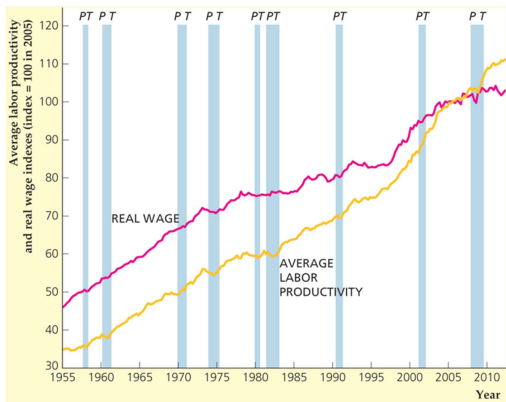


Table 8.2 Jobs Lost and Gained In an Expansion and a Recession

	June 2012 (expansion)	October 2008 (recession)
Number of employed people	142.3 million	145.1 million
Job loss rate	1.5%	1.6%
Number of newly unemployed people	2.1 million	2.3 million
Number of unemployed people	12.7 million	9.5 million
Job finding rate	17.9%	22.6%
Number of newly employed people	2.3 million	2.1 million
Net change in number of unemployed	-0.2 million	0.2 million



Figure 8.10 Cyclical behavior of average labor productivity and the real wage, 1955-2012



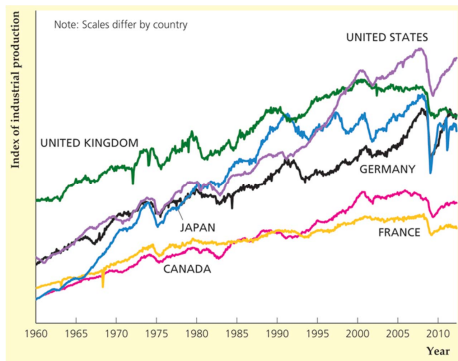
Source: Federal Reserve Bank of St. Louis FRED database at research.stlouisfed.org/fred2 series OPHNFB (productivity) and COMPRNFB (real wage).

International aspects of the business cycle

- The cyclical behavior of key economic variables in other countries is similar to that in the U.S.
- Major industrial countries frequently have recessions and expansions at about the same time
- Fig. 8.13 illustrates common cycles for Japan, Canada, the U.S., France, Germany, and the U.K.
- In addition, each economy faces small fluctuations that aren't shared with other countries.
- Japan and Germany were hit severely by financial crisis, as they are big exporting countries.



Figure 8.13 Industrial production indexes in six major countries, 1960–2012



Source: OECD Main Economic Indicators, August 2012, www.oecd.org/std/oecdmaineconomicindicatorsmei.htm (with scales adjusted for clarity).

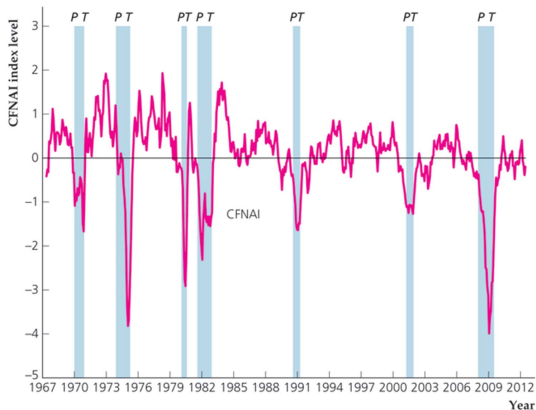
Note: The scales for the industrial production indexes differ by country; for example, the figure does not imply that the United Kingdom's total industrial production is higher than that of Japan.

In touch with data and research—coincident and leading indexes

- Coincident indexes are designed to help figure out the current state of the economy.
- Leading indicators are designed to help predict peaks and troughs.
- The first index was developed by Mitchell and Burns of the NBER in the 1930s.
- The CFNAI is a coincident index produced by the Federal Reserve Bank of Chicago based on 85 macroeconomic variables.
- It is a coincident index that turns significantly negative in recessions (Figure 8.14).



Figure 8.14 Chicago Fed National Activity Index, 1967-2012

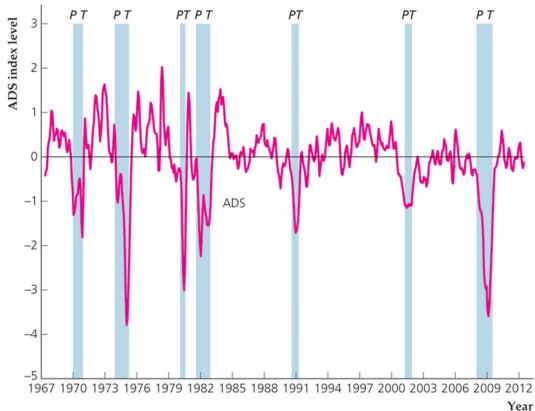


Source: Federal Reserve Bank of Chicago Web site, www.chicagofed.org/economic_research_and_data/cfnai.cfm.

- (Conti.) The ADS Business Conditions Index is a coincident index based on variables of different frequencies (Figure 8.15).
- The CFNAI and ADS index perform similarly; the ADS is available more frequently but doesn't have a long track record.
- The Conference Board produces an index of leading economic indicators.
- A decline in the index for two or three months in a row warns of recession danger.



Figure 8.15 ADS Business Conditions Index, 1967-2012



Source: Authors' calculations from data on Federal Reserve Bank of Philadelphia Web site, www.philadelphiafed.org/research-and-data/real-time-center/business-conditions-index.

Problems with the leading indicators

- Data are available promptly, but often revised later, so the index may give misleading signals.
- The index has given a number of false warnings.
- The index provides little information on the timing of the recession or its severity.
- Structural changes in the economy necessitate periodic revision of the index.
- Research by Diebold and Rudebusch showed that the index does not help forecast industrial production in real time.
- In real time, the index sometimes gave no warning of recessions.

- (Conti.) Stock and Watson attempted to improve the index by creating some new indexes based on newer statistical methods:
 - But the results were disappointing as the new index failed to predict the recessions that began in 1990 and 2001.
 - They gave up the indexes after that.
- Because recessions may be caused by sudden shocks, the search for a good index of leading indicators may be fruitless.

In touch with data and research: the seasonal cycle and the business cycle

- Output varies over the seasons: highest in the fourth quarter, lowest in the first quarter.
- Most economic data are seasonally adjusted to remove regular seasonal movements.
- Barsky and Miron's 1989 study shows that the movements of variables across the seasons are similar to the movements of variables over the BC.
- A surprising discovery by Barsky and Miron: there is little production smoothing.

- (Conti.) Economic theory suggests that even if demand changes over the seasons, production needn't.
- Firms could instead produce steadily through the year, building up inventories of goods in the first three quarters of the year and selling them off in the fourth quarter.
- *But Barsky and Miron find that this doesn't happen; production and sales tend to move together.*
- If the seasonal cycle is like the business cycle, and the seasonal cycle represents desirable responses to various factors (Christmas, the weather) for which government intervention is inappropriate, should government intervention be used to smooth out the BC?

The seasonal cycle and the business cycle

- Some economists challenge the need for the Fed to change the money supply over the seasons.
- If the Fed did not increase the money supply in the fall, for example, the seasonal demand for currency due to holiday shopping would cause interest rates to rise.
- Some economists see the rise in interest rates as a natural phenomenon that the Fed should not prevent.
- But the case for seasonal monetary policy is based on preventing bank panics (as occurred frequently from 1890 to 1910) and reducing transactions costs (which arise because people expend effort to reduce money balances when interest rates rise).

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.
- Study both theories in aggregate demand-aggregate supply (AD-AS) framework.

Aggregate demand and aggregate supply: a brief introduction

- The model (along with the building block IS-LM model) will be developed in chapters 9-11.
- The model has 3 main components; all plotted in (P, Y) space:
 - AD curve.
 - short-run AS curve.
 - long-run AS curve.

Aggregate demand curve

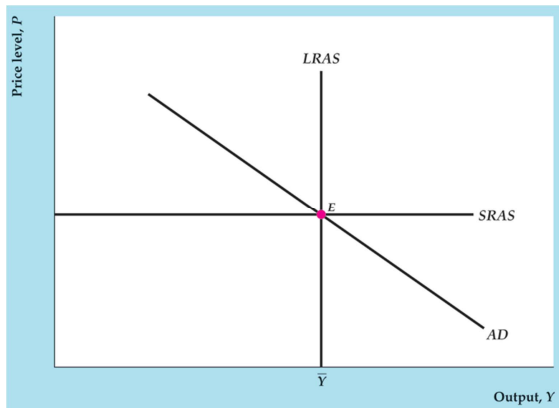
- Shows quantity of goods and services demanded (Y) for any price level (P).
- Higher P means less AD (lower Y), so the AD curve slopes downward; reasons why discussed in chapter 9 (different from individual demand curve).
- An increase in AD for a given P shifts the AD curve up and to the right; and vice-versa:
 - Example: a rise in the stock market increases consumption, shifting the AD curve up and to the right.
 - Example: a decline in government purchases shifts the AD curve down and to the left.

Aggregate supply curve

- The aggregate supply curve shows how much output producers are willing to supply at any given price level.
- The short-run AS curve is horizontal; prices are fixed in the short run.
- The long-run AS curve is vertical at the full-employment level of output.
- Equilibrium:
 - Short-run equilibrium: the AD the short-run AS curve.
 - Long-run equilibrium: the AD curve intersects the long-run AS curve.



Figure 8.16 The aggregate demand–aggregate supply model

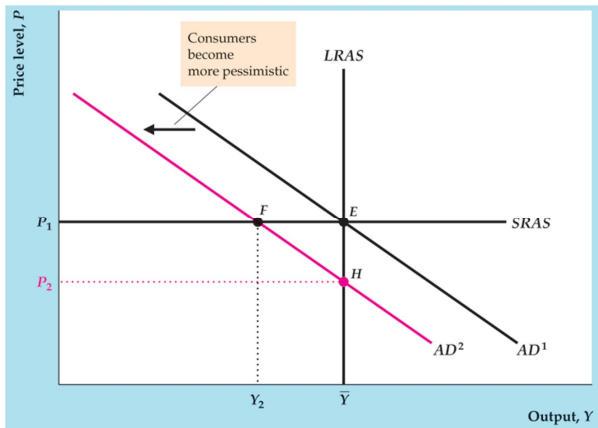


Aggregate demand shocks

- An AD shock is a change that shifts the AD curve.
- Example: a negative AD shock (Fig. 8.17):
 - The AD curve shifts down and to the left.
 - Short-run equilibrium occurs where the AD curve intersects the short-run AS curve; output falls, price level is unchanged
 - Long-run equilibrium occurs where the AD curve intersects the long-run AS curve; output returns to its original level, price level has fallen.



Figure 8.17 An adverse aggregate demand shock



- (Conti.) How long does it take to get to the long run?
 - Classical theory: prices adjust rapidly. So recessions are short-lived. No need for government intervention.
 - Keynesian theory: prices (and wages) adjust slowly. Adjustment may take several years. So the government can fight recessions by taking action to shift the AD curve.

Aggregate supply shocks

- Classicals view AS shocks as the main cause of fluctuations in output.
- An AS shock is a shift of the long-run AS curve.
- Factors that cause AS shocks are things like changes in productivity or labor supply.
- Example: a negative AS shock (Fig. 8.18):
 - Aggregate supply shock reduces full-employment output, causing long-run AS curve to shift left.
 - New equilibrium has lower output and higher price level.
 - So recession is accompanied by higher price level.
- Keynesians also recognize the importance of supply shocks; their views are discussed further in chapter 11.



Figure 8.18 An adverse aggregate supply shock

