

# Ch. 8: Business Cycles

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# Chapter Outline

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

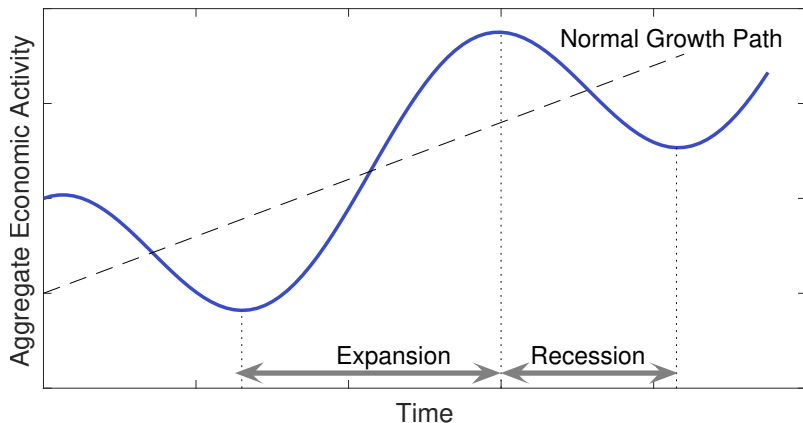
# What is a Business Cycle?

Burnes and Mitchell (*Measuring Business Cycles*, 1946) makes five points about business cycles:

- (i) Business cycles are fluctuations of aggregate economic activity, not a specific variable
- (ii) There are expansions and contractions
- (iii) Economic variables show **comovement** – they have regular and predictable patterns of behavior over the course of the business cycle
- (iv) The business cycle is **recurrent, but not periodic**
- (v) The business cycle is **persistent**

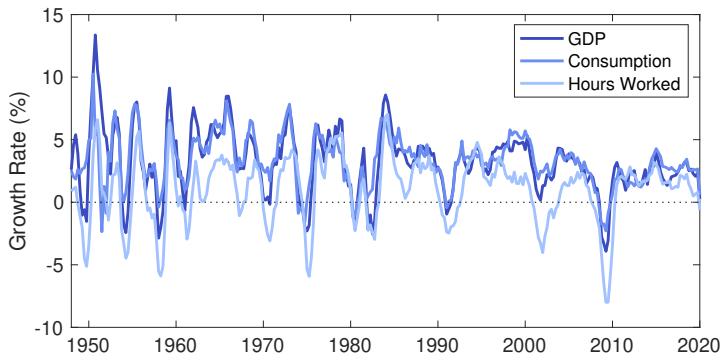
# Expansions and Contractions

- Aggregate economic activity declines in a contraction or recession until it reaches a trough



**Figure:** A Business Cycle

# Comovement



**Figure:** Growth Rates of Output, Consumption, and Hours Worked in the US

$$\text{Corr}(Y, C) = 0.78, \text{Corr}(Y, H) = 0.78, \text{Corr}(C, H) = 0.61$$

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/GDPC1>,  
<https://fred.stlouisfed.org/series/PCECC96>, <https://fred.stlouisfed.org/series/HOABS>.

# 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

# Persistent

- Declines are followed by further declines
- Growth is followed by more growth
- Because of persistence, forecasting turning point is quite important

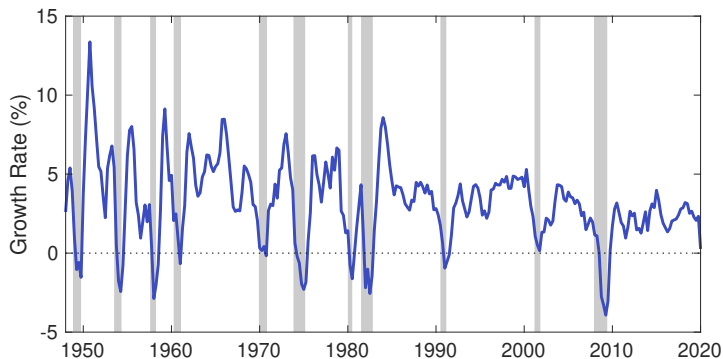
# NBER Business Cycle Turning Points and Durations

Peak	Trough	Duration of Recession
February 1945	October 1945	8
November 1948	October 1949	11
July 1953	May 1954	10
August 1957	April 1958	8
April 1960	February 1961	10
December 1969	November 1970	11
November 1973	March 1975	16
January 1980	July 1980	6
July 1981	November 1982	16
July 1990	March 1991	8
March 2001	November 2001	8
December 2007	June 2009	18
February 2020	?	?

**Table:** After WW2 Business Cycle Dates in US



# US Output Growth and Business Cycles

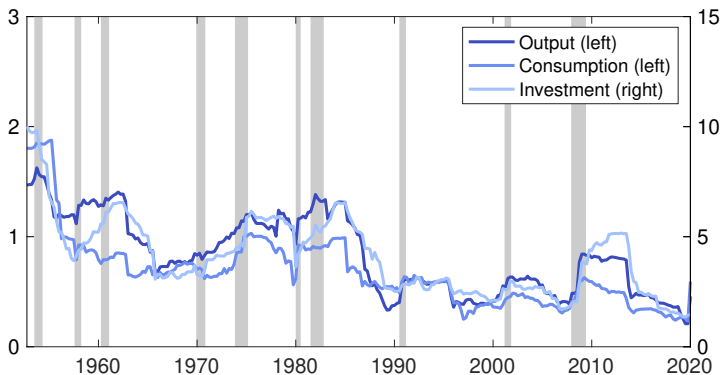


**Figure:** US GDP Growth and Business Cycles

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/GDPC1>.

# The Great Moderation

- Have the US business cycles become less severe?



**Figure:** 5-Year Moving-Window Standard Deviation of Quarterly Growth Rates

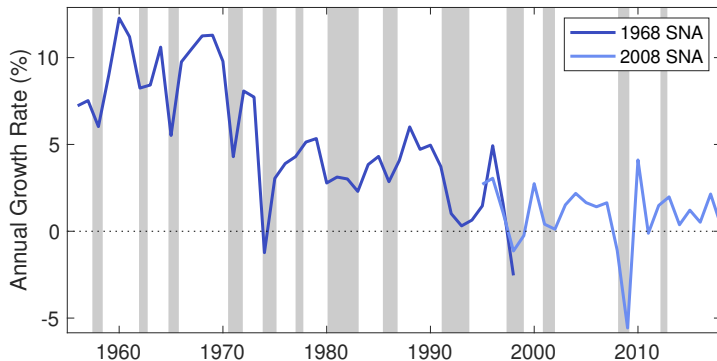
Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/GDPC1>,  
<https://fred.stlouisfed.org/series/PCECC96> <https://fred.stlouisfed.org/series/GPDIC1>.

# Business Cycles in Japan

Peak	Trough	Duration of Recession
June 1951	October 1951	4
January 1954	November 1954	10
June 1957	June 1958	12
December 1961	October 1962	10
October 1964	October 1965	12
July 1970	December 1971	17
November 1973	March 1975	16
January 1977	October 1977	9
February 1980	February 1983	36
June 1985	November 1986	17
February 1991	October 1993	32
May 1997	January 1999	20
November 2000	January 2002	14
February 2008	March 2009	13
March 2012	November 2012	8

**Table:** Business Cycle Dates in Japan

# Output Growth and Business Cycles in Japan



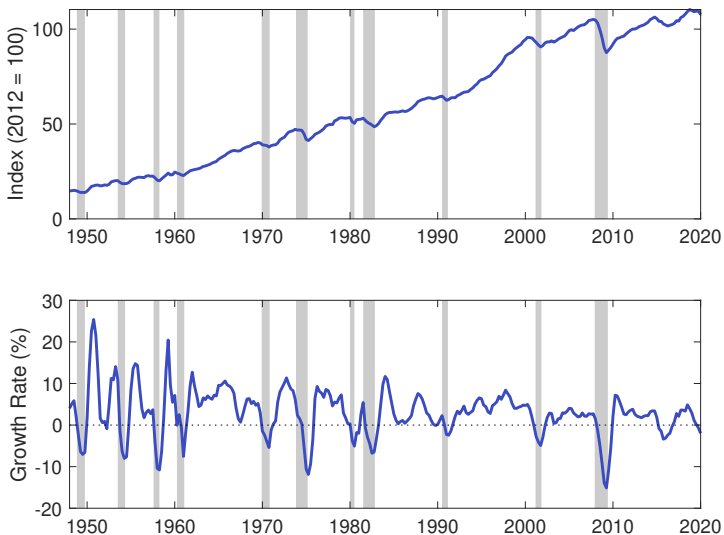
**Figure:** Annual GDP Growth and Business Cycles in Japan

Source: Source: Cabinet Office, Economic and Social Research Institute, [The determination of Business-Cycle Peak and Trough, 1968 SNA; 2008 SNA.](#)

# Cyclical Behavior of Macroeconomic Variables

- Direction (relative to aggregate economic activity)
  - ▶ Procyclical – in the same direction
  - ▶ Countercyclical – in the opposite direction
  - ▶ Acyclical – with no clear pattern
- Timing
  - ▶ Leading indicators move in advance  
(e.g., residential investment, inventory investment, average labor productivity, money growth, stock prices)
  - ▶ Coincident indicators move at the same time  
(e.g., industrial production, consumption, business fixed investment, employment)
  - ▶ Lagging indicators move after the aggregate economic activity  
(e.g., inflation, nominal interest rates)

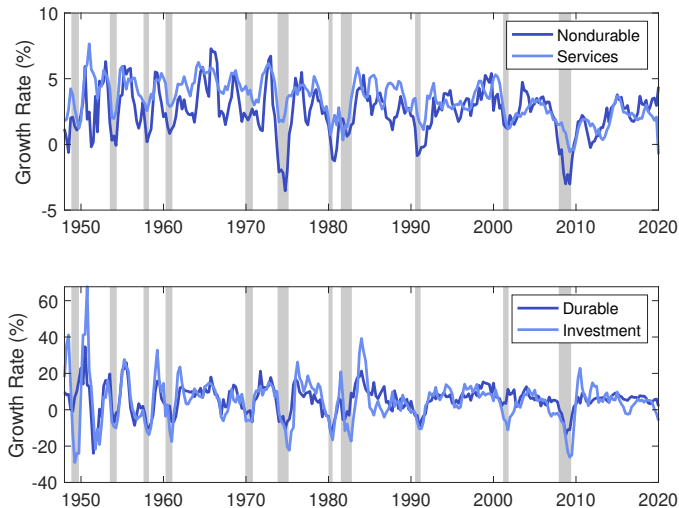
# Cyclical Behavior of Production



**Figure:** Level and Growth Rate of US Industrial Production

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/INDPRO>.

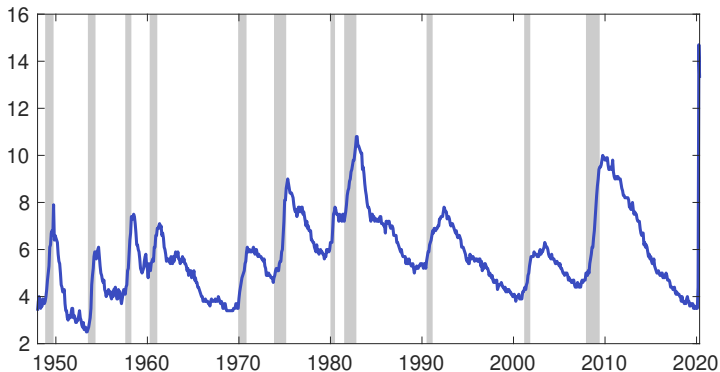
# Cyclical Behavior of Expenditures



**Figure:** Growth Rates of US Consumption and Investment

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/DNDGRA3Q086SBEA>, <https://fred.stlouisfed.org/series/DDURRA3Q086SBEA>, <https://fred.stlouisfed.org/series/DSERRA3Q086SBEA>, <https://fred.stlouisfed.org/series/GPDIC1>.

# Cyclical Behavior of Employment

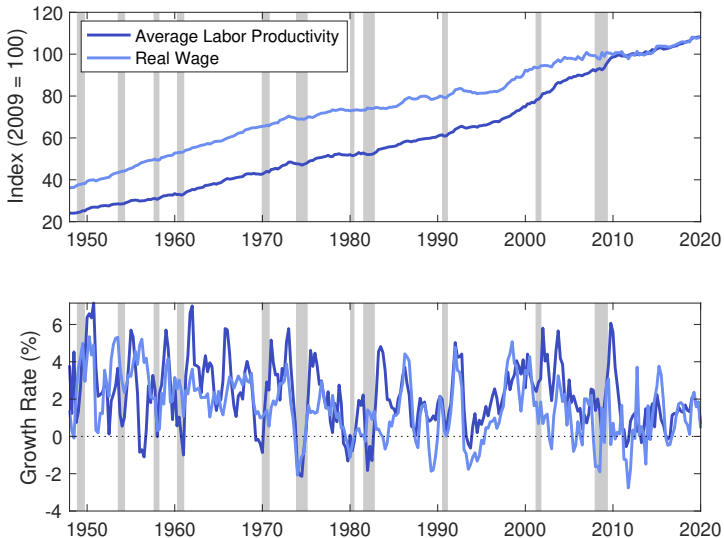


**Figure:** Monthly Unemployment Rate in the US (%)

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/UNRATE>.



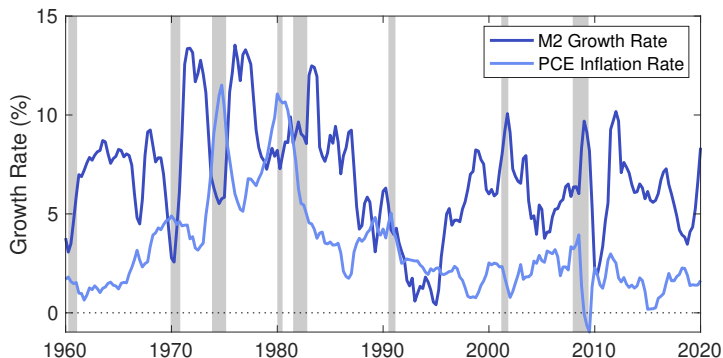
# Average Labor Productivity and the Real Wage



**Figure:** Average Labor Productivity and Real Wage

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/OPHNFB>,  
<https://fred.stlouisfed.org/series/COMPRNFB>.

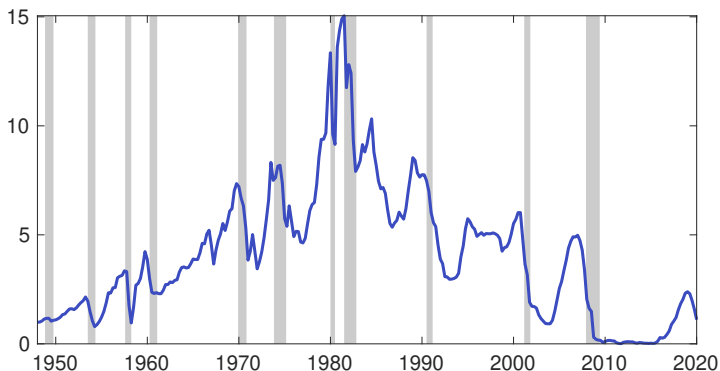
# Nominal Money Growth and Inflation Rate



**Figure:** M2 Growth Rate and PCE Inflation Rate (%)

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/M2SL>,  
<https://fred.stlouisfed.org/series/PCEPI>.

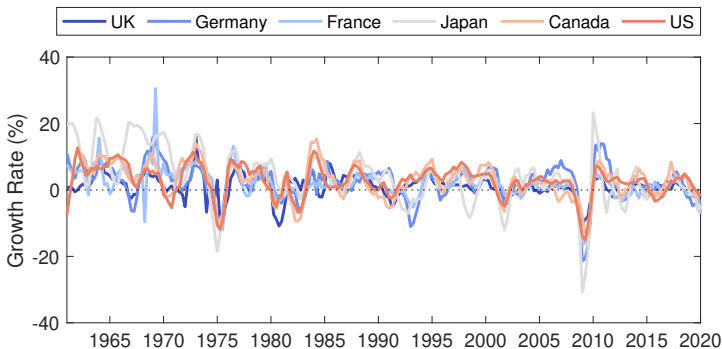
# Nominal Interest Rate



**Figure:** Nominal 3-Month Treasury Rate (%)

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/TB3MS>.

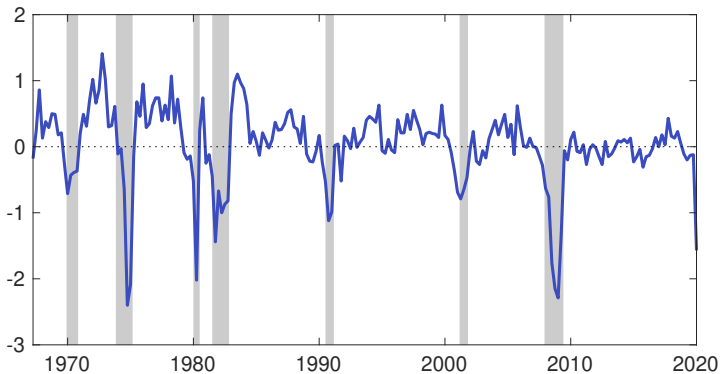
# Industrial Production in Different Countries



**Figure:** Growth Rates of Industrial Production in Different Countries (%)

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/GBPROINDMISMEI>, <https://fred.stlouisfed.org/series/DEUPROINDMISMEI>, <https://fred.stlouisfed.org/series/FRAPROINDMISMEI>, <https://fred.stlouisfed.org/series/JPNPROINDMISMEI>, <https://fred.stlouisfed.org/series/CANPROINDMISMEI>, <https://fred.stlouisfed.org/series/USAPROINDMISMEI>.

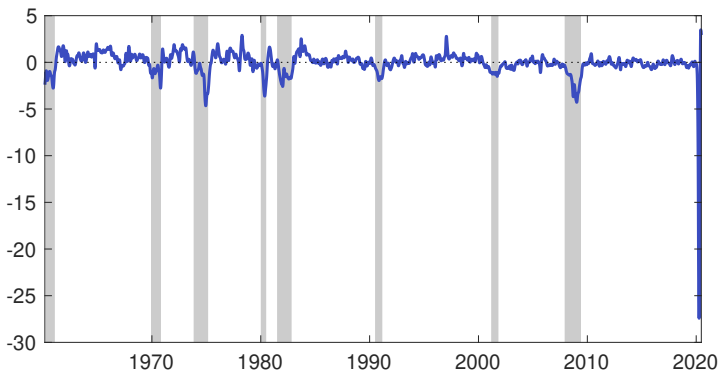
# Chicago Fed National Activity Index



**Figure:** Chicago Fed National Activity Index

Source: FRED database, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/CFNAI>.

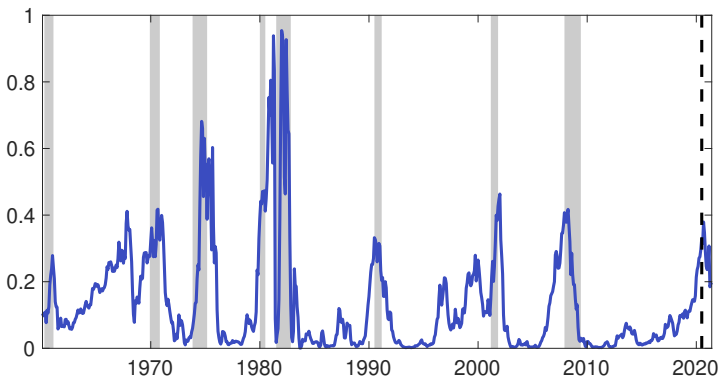
# Aruoba-Diebold-Scotti Business Conditions Index



**Figure:** Aruoba-Diebold-Scotti Business Conditions Index

Source: FRB Philadelphia, <https://www.philadelphiafed.org/research-and-data/real-time-center/business-conditions-index>.

# 12-Month Recession Probability Forecasts



**Figure:** Probability of US Recession

- Prediction based on the spread between Treasury 10-year and 3-month rates
- Estimates based on the data from January 1959 to December 2009
- $P_{t+12} = \Phi(\hat{\alpha} + \hat{\beta}s_t)$ , where  $\hat{\alpha} = -0.5333$  and  $\hat{\beta} = -0.6330$

Source: FRB New York, [https://www.newyorkfed.org/research/capital\\_markets/ycfaq.html](https://www.newyorkfed.org/research/capital_markets/ycfaq.html).

# Business Condition Indices in Japan

- Economic and Social Research Institute (ESRI) of Cabinet Office announces leading, coincident, and lagging indices (available at <http://www.esri.cao.go.jp/en/stat/di/di-e.html>)
- The leading index is a composite of 11 leading indicators (e.g., inventory ratios, new job offers, new machine orders, new hous
- The coincident index is a composite of 9 series (e.g., industrial production, durable consumption, overtime hours, retail sales
- The lagging index is a composite of 9 series (e.g., regular worker employment, unemployment, corporate tax revenue, CPI, etc...)



# Business Cycle Analysis: A Preview

## What explains business cycle fluctuations?

- Two major components of business cycle theories
  - ▶ A description of the shocks
  - ▶ A model of how the economy responds to shocks
- Two major business cycle theories
  - ▶ Classical theory
  - ▶ Keynesian theory
- Study both theories in aggregate demand-aggregate supply (AD-AS) framework

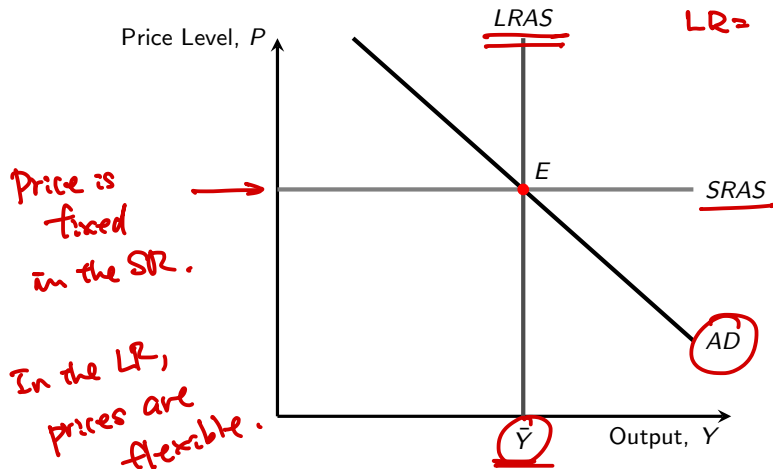
# Aggregate Demand and Aggregate Supply

## 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)
  - (1) aggregate demand curve
  - (2) short-run aggregate supply curve
  - (3) long-run aggregate supply curve

# The Aggregate Demand-Aggregate Supply Model

*SR = short run.  
LR = long run.*



**Figure:** The AD-AS Model

# Aggregate Demand Curve

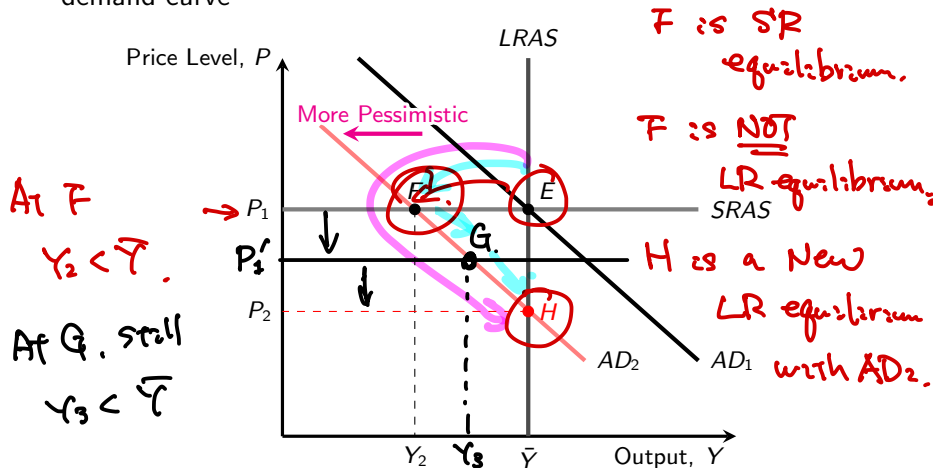
- AD curve shows quantity of goods and services demanded ( $Y$ ) for any price level ( $P$ )
- An increase in aggregate demand shifts the AD curve to the right (e.g., stock market boom)
- A decline in aggregate demand shifts the AD curve to the left (e.g., drops in government purchases)

# Aggregate Supply Curve

- The AS curve shows how much output producers are willing to supply at any given price level
- The short-run AS curve is **horizontal** due to fixed prices
- The long-run AS curve is **vertical** at the full-employment level of output (i.e., flexible price)

# Aggregate Demand Shocks

- An aggregate demand shock is a change that shifts the aggregate demand curve



**Figure:** An Adverse Aggregate Demand Shock

# Transition from the SR to LR Equilibrium

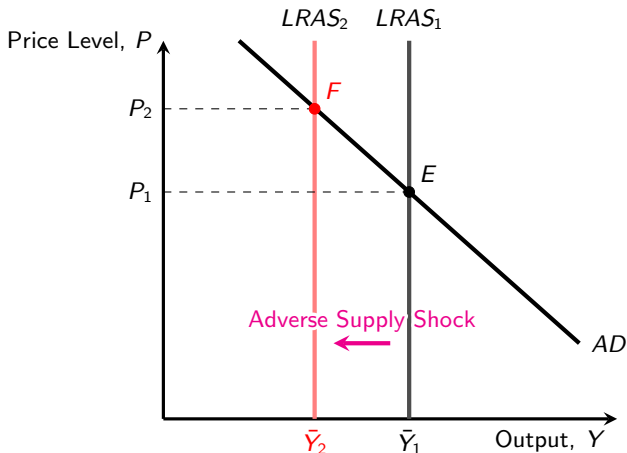
- How long does it take to get to the long run?
- Classical theory: prices adjust rapidly
  - ▶ Recessions are short-lived
  - ▶ No need for government intervention
- Keynesian theory: prices and wages adjust slowly
  - ▶ Adjustment may take several years
  - ▶ The government can fight recessions by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

# Aggregate Supply Shocks

- Classicals view aggregate supply shocks as the main cause of fluctuations in output
- An aggregate supply shock is a shift of the LRAS curve
- Factors that cause aggregate supply shocks are things like changes in productivity or labor supply
- Keynesians also recognize the importance of supply shocks, which is further discussed in Chapter 11.



# An Adverse Aggregate Supply Shock



**Figure:** An Adverse Aggregate Supply Shock