ECON 310 - MACROECONOMIC THEORY

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1 Chapter 1: Introduction

Part I: Introduction and Measurement Issues

- Chapter 1: Introduction
- Chapter 2: Measurement
- Chapter 3: Business Cycle Measurement

Chapter 1: Introduction

- Introduction to intermediate macroeconomics
- Look at some stylized facts

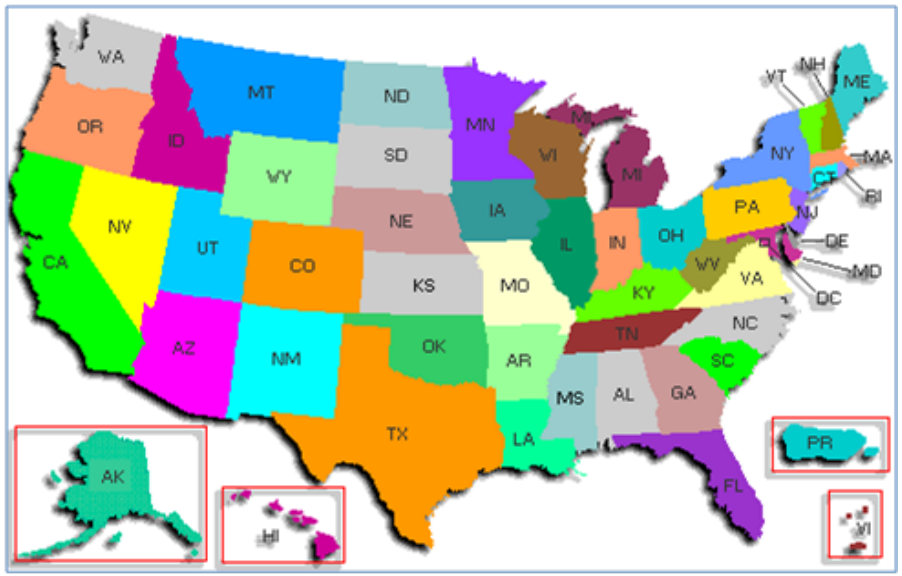
"The theory of economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions"
John Maynard Keynes

Topics

1. Key macroeconomic phenomena: GDP, economic growth, business cycles.
2. What is macroeconomics?
3. Macroeconomic models.
4. Understanding recent and current macroeconomic events.

Considering the biggest economy in the world

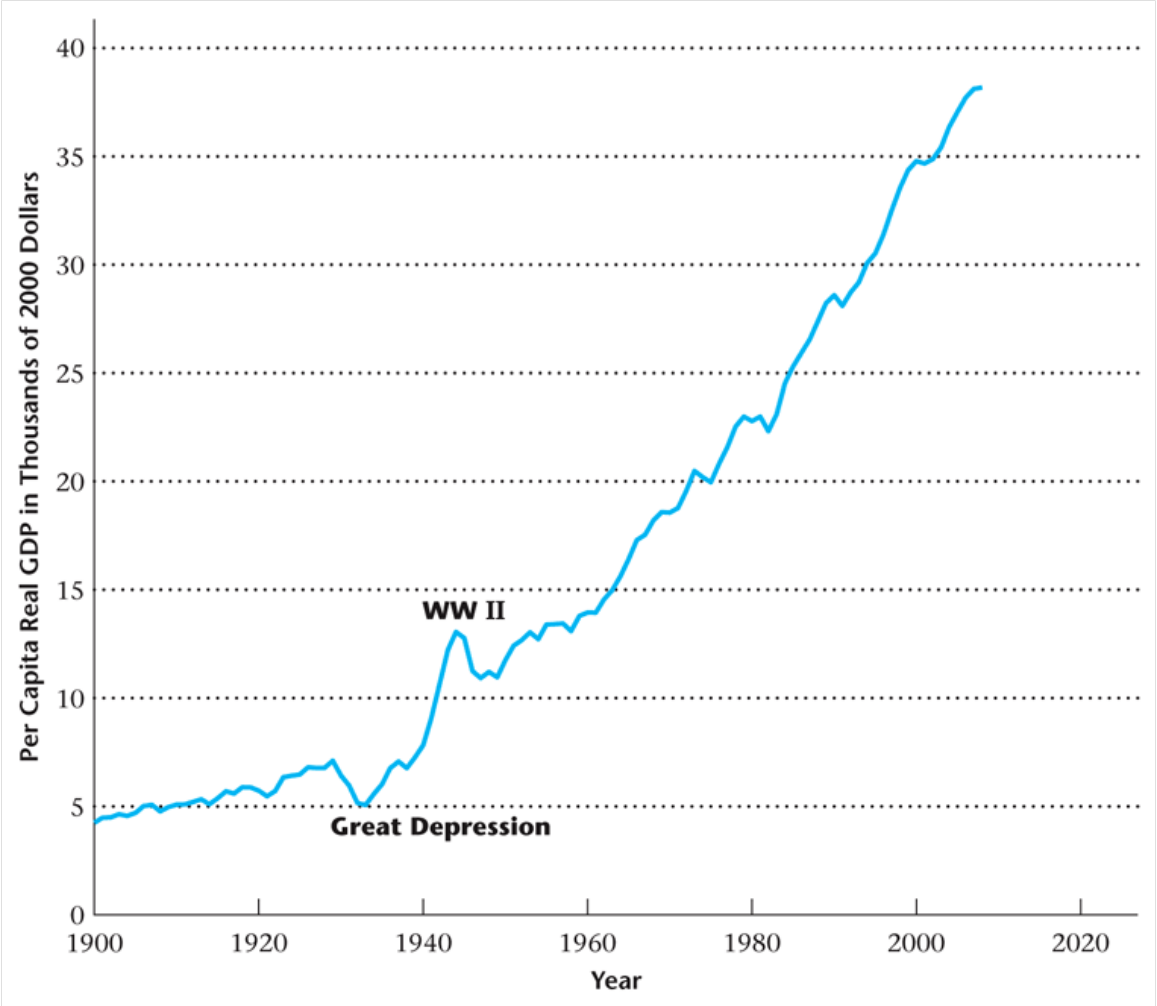
Figure 1.1: The United States of America



Quick Facts

- Land area: 3,500 mil square miles
- Population: 310 mil people
  - 113 mil households
  - 27 mil firms
- GDP: $16.2 trillion (in 2012 USD)
- GDP per capita: $50,000 (in 2012 USD)
- Gross Domestic Product (GDP): the quantity of goods and services produced within a country's borders over a particular period of time.

Figure 1.2: Per Capita Real GDP (2000 USD)



Key Macroeconomic Facts

- Fact 1: Upward exponential trend
  - Between 1900 and 2002, average income increased eigh-fold
  - Long-run growth
- Fact 2: Fluctuations around long term growth trend
  - Short-run cyclical components
  - Business cycle

How to Measure Growth

- Consider a time series $y_0, y_1, ..., y_{t-1}, y_t, ..., y_T$
- Let y_t denote GDP in time period t i.e. US GDP 10 trillion in year t.
- Growth rate is the rate of change (Discrete vs. Continuous). The discrete rate of change is:

$$g_t = \frac{y_t - y_{t-1}}{y_{t-1}} = \frac{y_t}{y_{t-1}} - 1$$

so that

$$1 + g_t = \frac{y_t}{y_{t-1}}$$

How to Measure Growth (cont.)

- Note: If x is small then $\log(1+x) \approx x$

$$\begin{aligned} \log(1+g_t) &\approx g_t \\ \log\left(\frac{y_t}{y_{t-1}}\right) &\approx g_t \\ \textit{or} & \\ \log y_t - \log y_{t-1} &\approx g_t \\ \Delta \log y_t &\approx g_t \end{aligned}$$

- g_t is the slope of the $\log y_t$ line.
- Can think of growth rates in log as continuous time analogue of discrete approximation

How to Measure Growth (cont.)

- Remember also the definition of log

$$ln(x) = y \rightarrow e^y = x$$

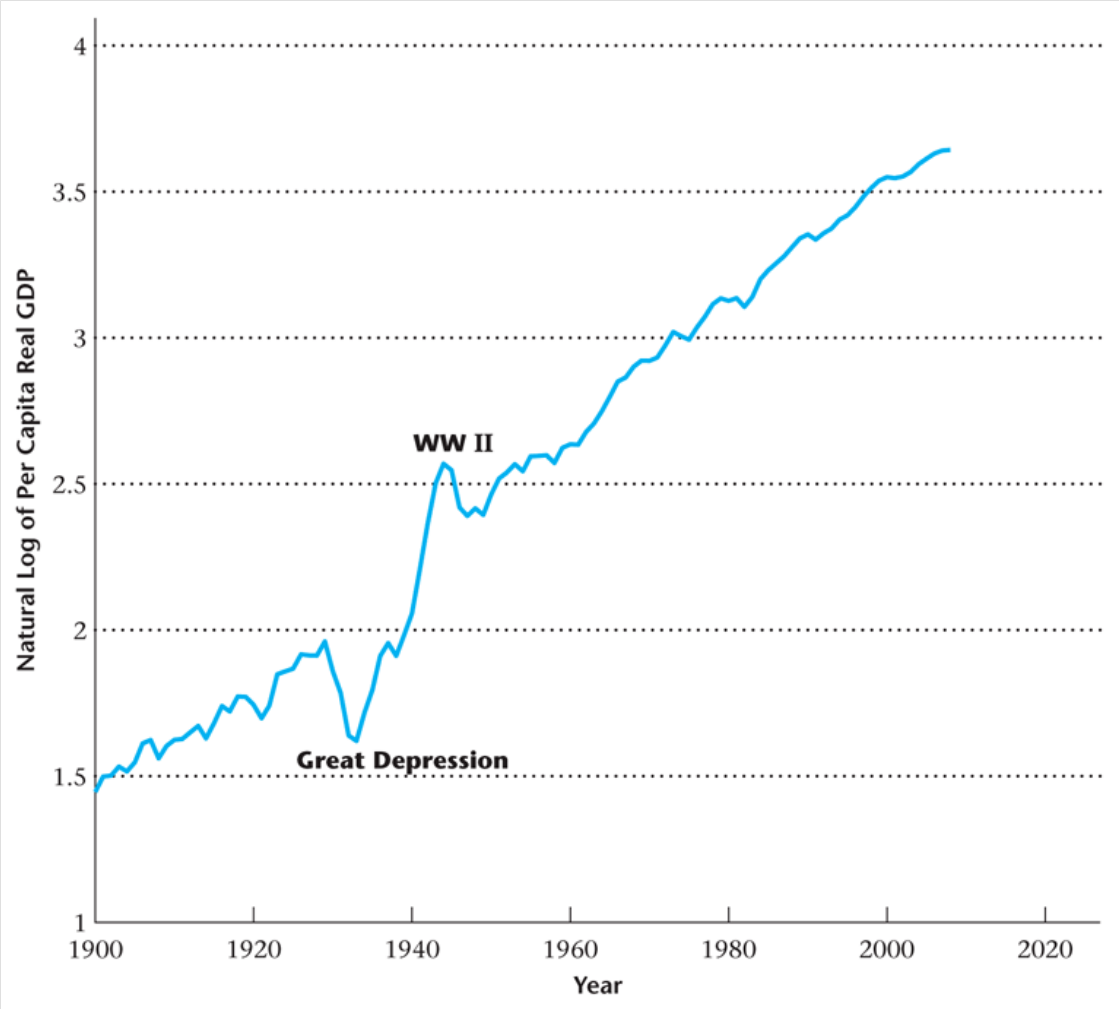
so that

$$ln(1) = 0 \rightarrow e^0 = 1,$$
$$ln(e) = 1 \rightarrow e^1 = e,$$

where e is Euler's constant

$$e = \lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = 2.71828$$

Figure 1.3: Natural Log of Per Capita Real GDP



Trend vs. Cycle

- Most economic series (y_t) contain a trend (τ_t) (long-run component) and a cycle (c_t):

$$y_t = \tau_t + c_t$$

- Standard inferential methods cannot be performed on such variable
- Popular (but controversial) method of extracting the trend is the Hodrick-Prescott (HP) Filter:

$$\min_{\tau_t} \sum_{t=1}^{T} \left((y_t - \tau_t)^2 + \lambda [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})] \right)$$

- The residual $y_t - \tau_t$ is considered the business cycle component
- **Percentage Deviations from Trend** for the rest of course
- You too can HP-filter: http://dge.repec.org/cgi-bin/hpfilter.cgi
- Smoothing parameter λ - see Uhlig and Ravn (REStat, 2002)

Figure 1.4: Natural Log of Per Capita Real GDP and Trend

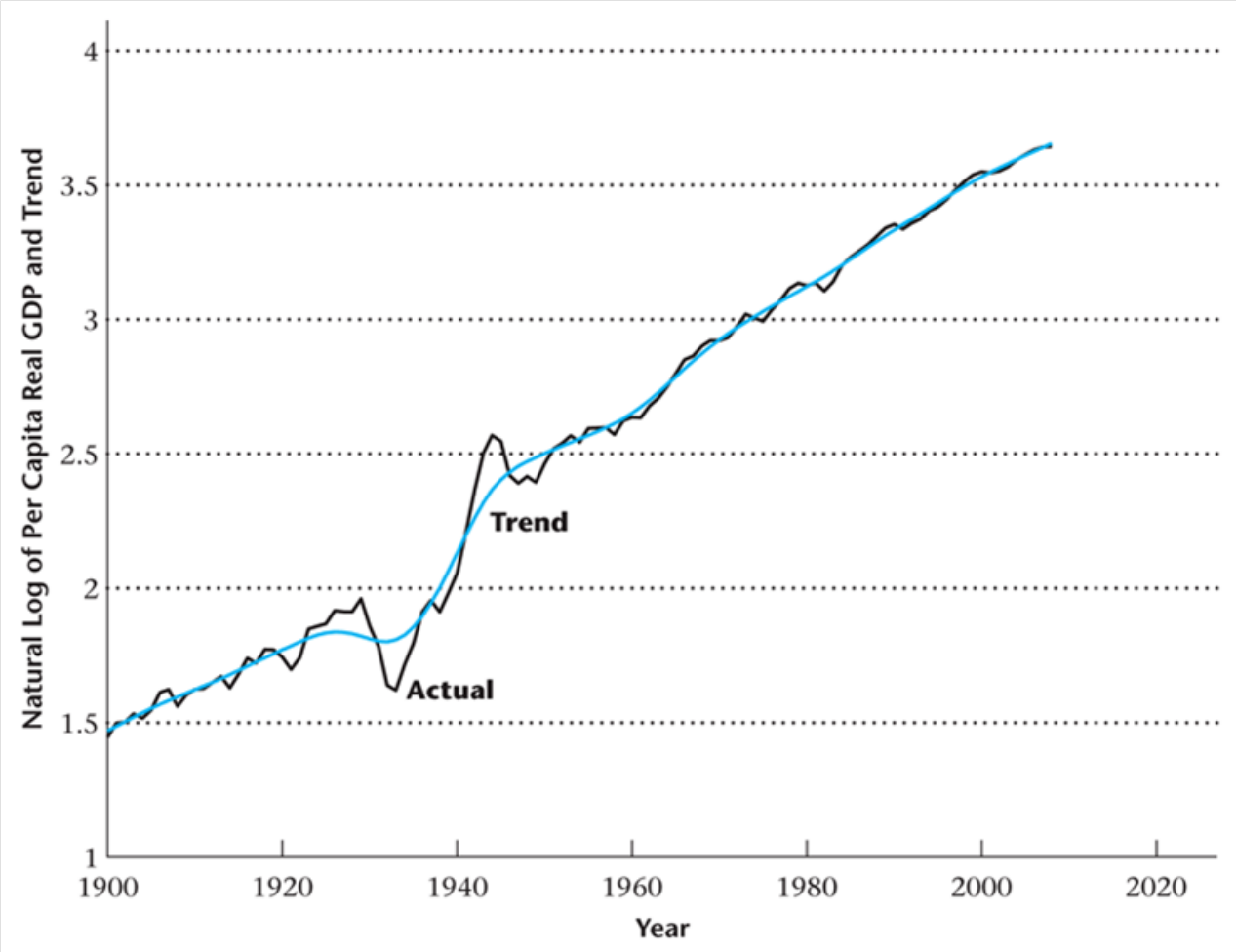
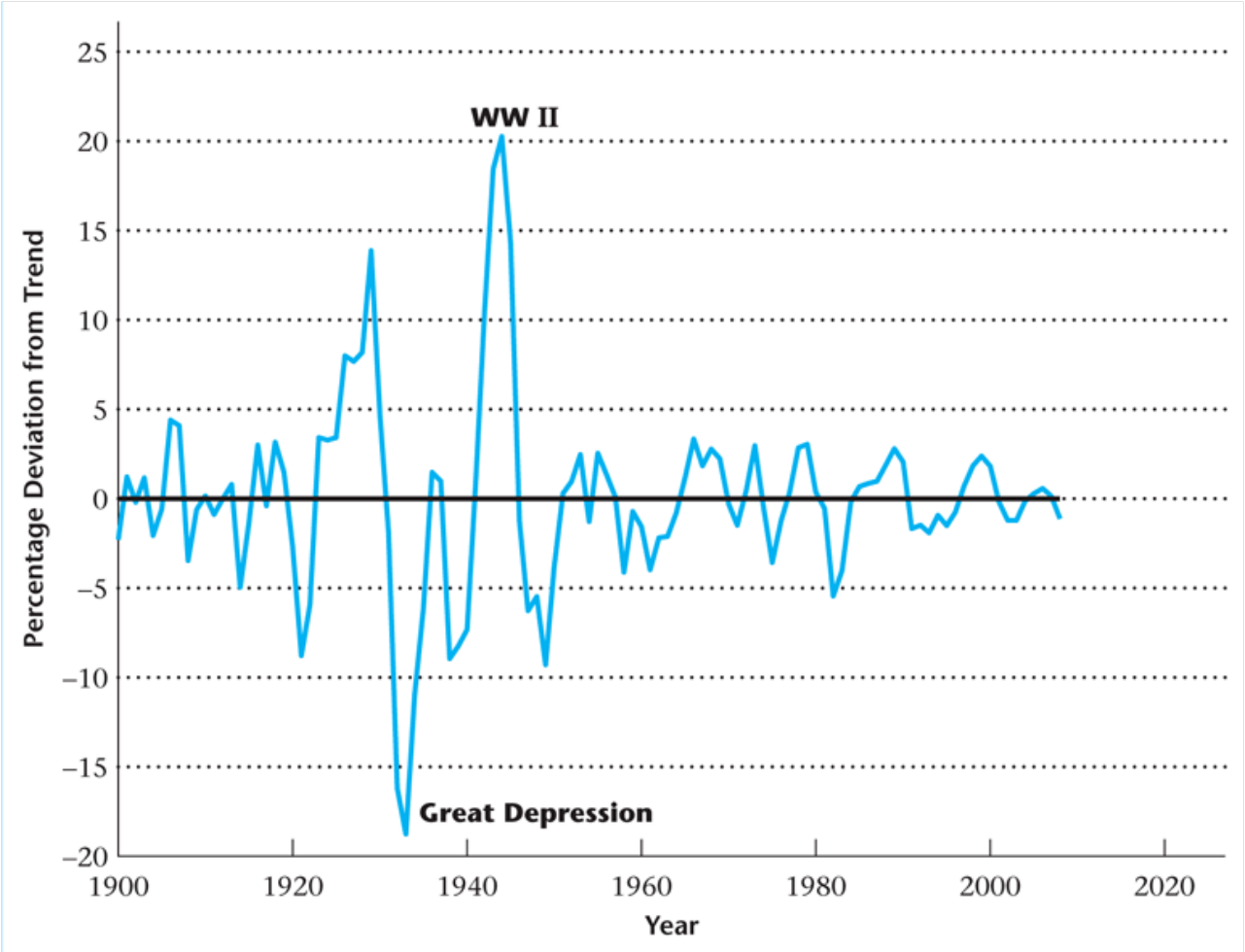


Figure 1.5: Percentage Deviations from Trend in Per Capita Real GNP



What Is Macroeconomics ?

- Models built to explain macroeconomic phenomena.
- The important phenomena are *long-run growth* and *business cycles*.
- Approach in this course is to build up macroeconomic analysis from microeconomic principles.

Some fundamental macro questions

1. What causes sustained economic growth?
2. Is economic growth indefinite *i.e.* limit to growth?
3. Can governments (policymakers) alter the rate of growth?
4. What causes business cycles?
5. Can the booms (expansions) and busts (recessions) be repeated?
6. Should governments (policymakers) smooth business cycles?

Macroeconomic Models

- A macroeconomic model
  1. captures the essential features of the world needed
  2. to analyze a particular macroeconomic problem.

- A macroeconomic model
  1. should be simple,
  2. but they need not be realistic (think about the car map example).

Basic Structrure of a Macroeconomic Model

1. Agents: consumers and firms that interact in the economy.
2. Set of goods that consumers wish to consume.
3. Preferences: consumers' preferences over goods.
4. Technology: production methods available to firms for producing goods.
5. Endowment: resources available.

A Deductive Methodology in Macroeconomics

- Step 1: Understand facts, empirical features or regularities about observable macro phenomena
- Step 2: Use economic theory to construct a model that endogenously generates these facts
- Step 3: Measure empirical fit of theoretical model
- Step 4: Check! Bad? Back to step 2. Good? Use model for experiments

Agreement

- **Microfoundations**: focus on **Optimizing** behavior that results in a **competitive equilibrium**.
- **Agree**: Growth models (a lá Solow) and endogenous growth. *For the most part*.

Disagreement

Causes of business cycles

1. Money surpise theory (late 60's and 70's) - Friedman and Lucas.
2. Real Business Cycle theory (RBC) (early 1980's) - Kydland and Prescott.
3. Keynesian coordination failure - inspired by Keynes.
4. Sticky price models (early 1980's) - Blanchard, Fischer, and Taylor.
   - A crude implication of these theories - role of policymakers!
   - Schools of thought: saltwater versus freshwater schools.
   - Vast Generalization!

Major Developments in Macroeconomics

- Macroeconomics became discpline during the Great Depression (post 1929 and pre WWII).
- John Maynard Keynes is generally credited for this distinction.
- Motivation: understand aggregate economies (*i.e.* countries).
- Microeconomics focus on the individual firm or household.
- Macroeconomics focus on behavior of large collection of economic agents.
- **Rational Expectations** revolution (1970's) blurred this distinction.
- Macroeconomics models are built from **Microfoundations**.
- Major distinction is the study of Long-Run (LR) growth versus business cycles.

What we learn from macro analysis

1. Production and consumption is jointly determined by economy's productive capacity and preferences of consumers.
2. In free market economies, there are strong forces that tend produce social efficient outcomes.
3. $\Uparrow$ standard of living are a result of LR technological progress.
4. A tax cut is not a free lunch.
5. Consumer and firm expectations are important for current macroeconomic events.
6. Money takes many forms, it is better to have it. Changing its quantity ultimately does not matter.
7. Business cycles may seem similar but they have different causes.
8. Gains from trade between countries but trade is source of shocks for the economy.
9. In the LR, inflation is caused by growth in the money supply.
10. Unemployment is painful for the individual but it is necessary evil.
11. Significant short-run tradeoffs between output (Y) and inflation (π). In LR no tradeff other than inefficiencies caused by LR inflation.

Recent and Current Macroeconomic Events

- **Average labor productivity**: productivity slowdown (cause?)
- **Taxes, Government Spending, and Deficits**: crowding out, Ricardian Equivalence
- **Interest Rates**: nominal vs. real interest rates
- **Current Account and Goverment Surplus**: twin deficits
- **Inflation**: correlation with money growth rate
- **Unemployment**: 1) 1970 spike 2) volatile 3) tend increase until 80's drop then increase again

Figure 1.6: log(Average Labor Productivity)

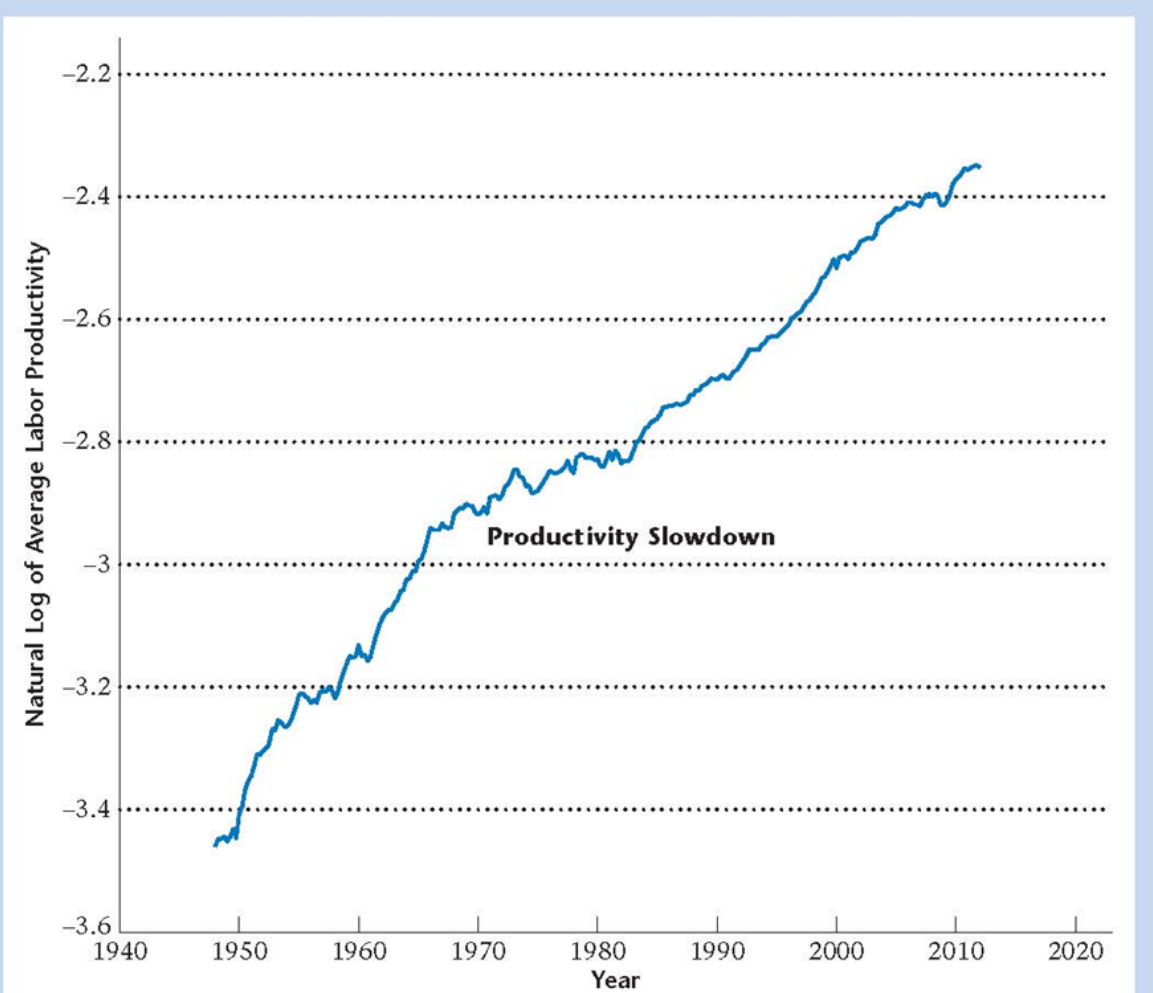
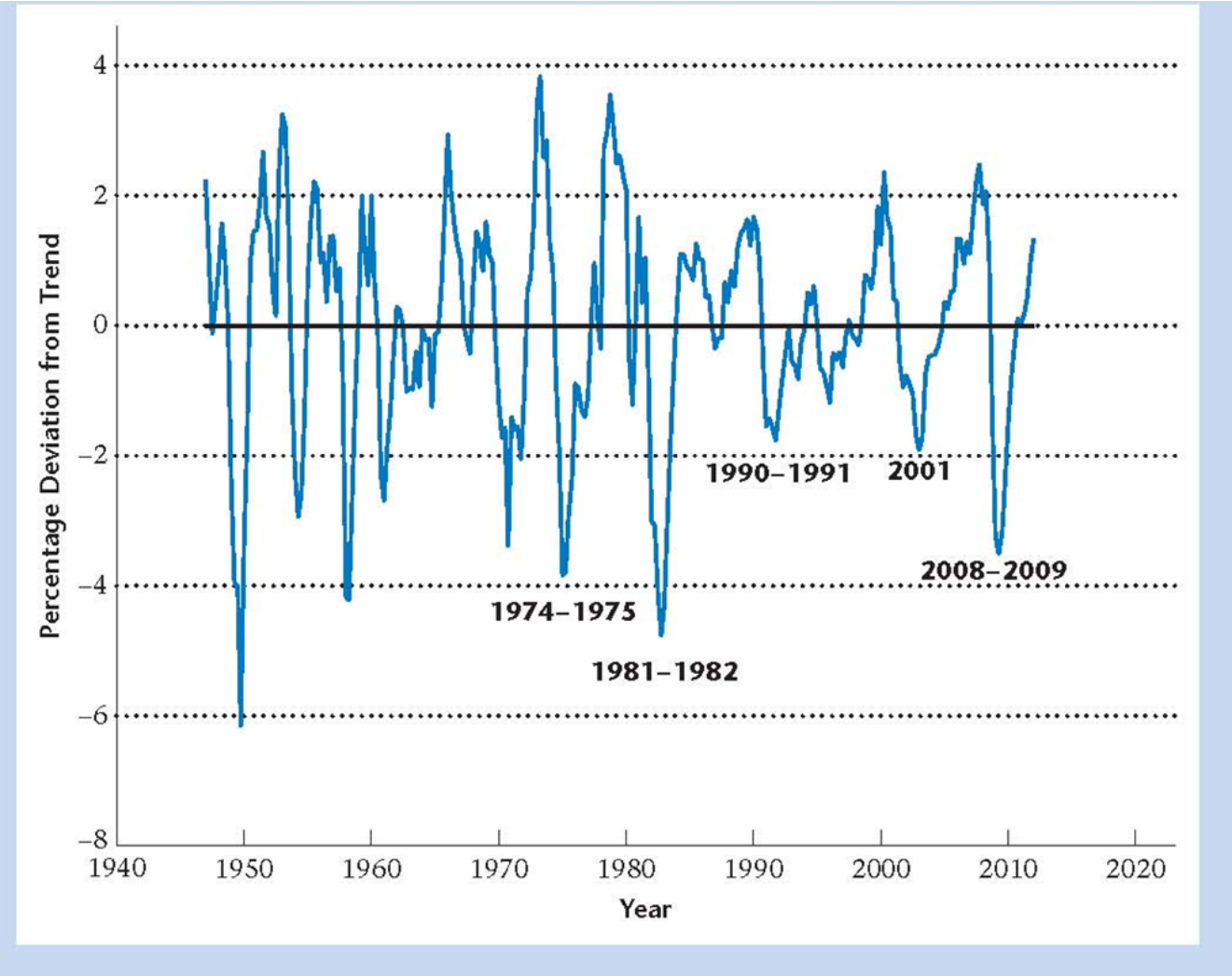


Figure 1.7: Percentage Deviation from Trend in Real GDP, 1947-2009



Recessions

1. 1974 – 1975: Oil price shock caused by OPEC restrictions
2. 1981 – 1982: Fight inflation using monetary policy i.e. high interest rates (Volcker rule)
3. 1990 – 1991: Gulf War, oil price high again
4. 2001: Burst of Dot.com bubble and loss of optimism $\rightarrow$ start of housing bubble (Greenspan rule)
5. 2008 – 2009: Burst of Housing bubble and financial crisis

- 1982 – 2008: The Great Moderation $\rightarrow$ macro aggregates become less volatile

Figure 1.8: Total Taxes and Total Government Spending

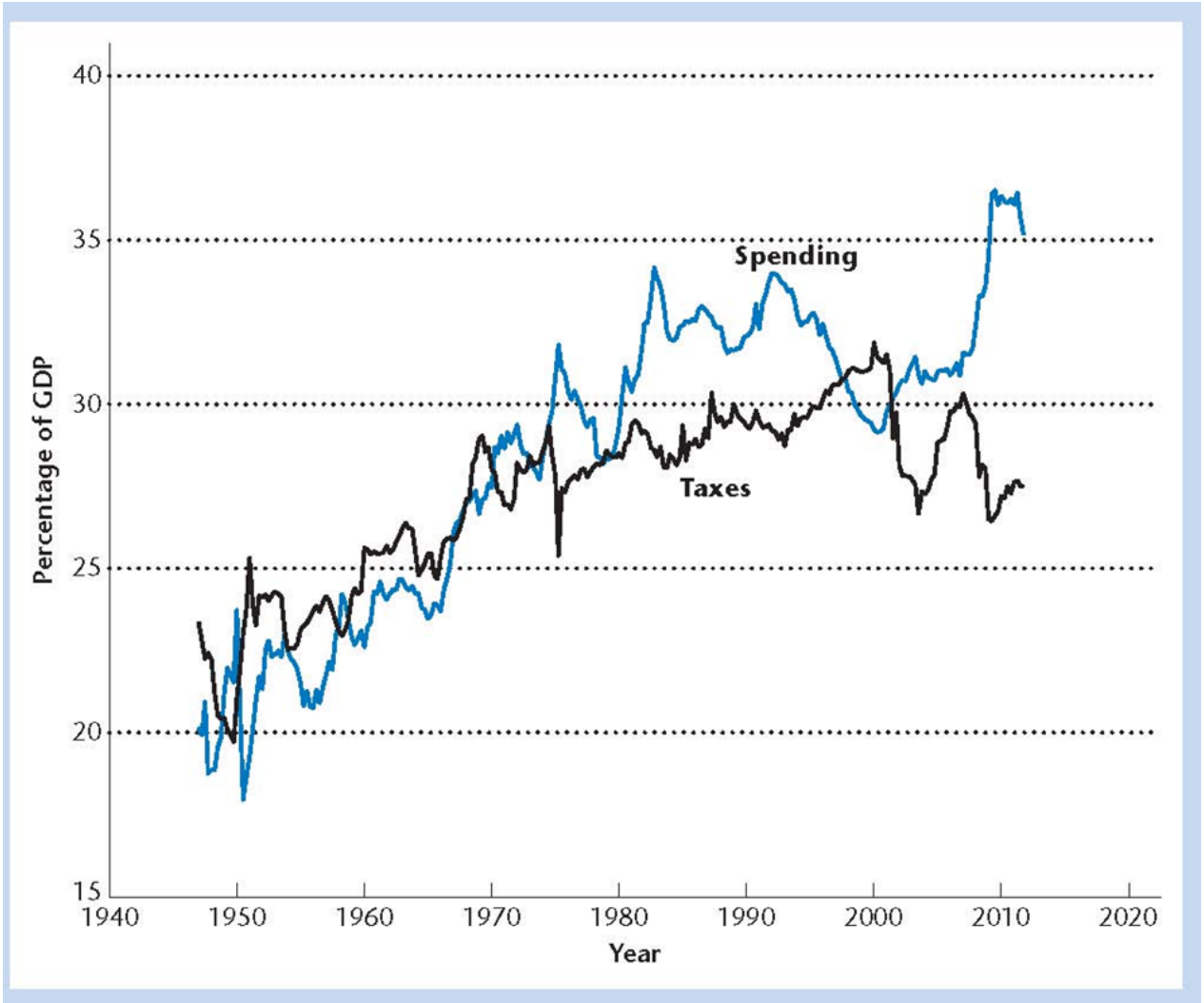


Figure 1.9: Government Surplus (Deficit) as fraction of GDP

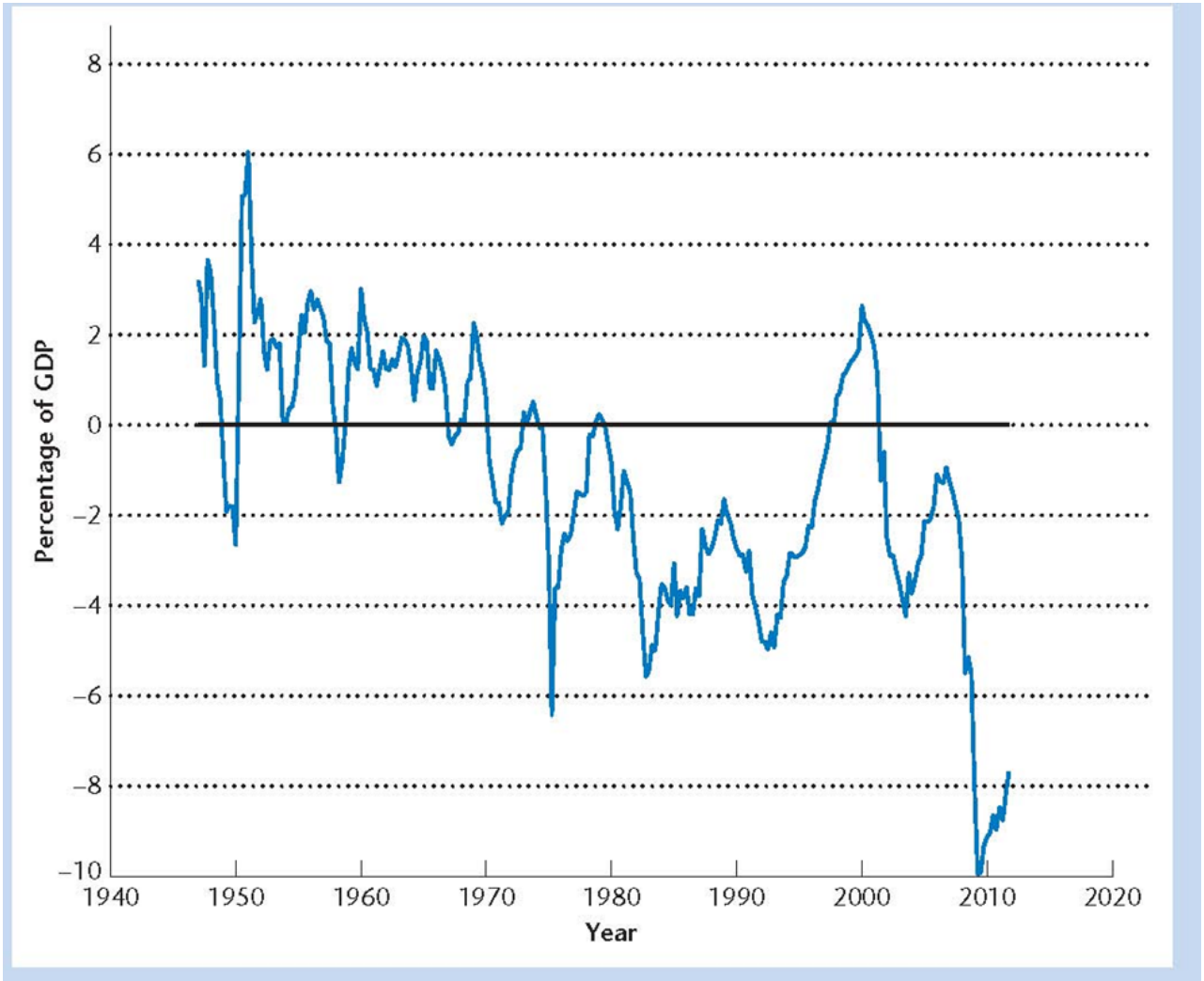


Figure 1.10: Nominal Interest Rate and Inflation Rates

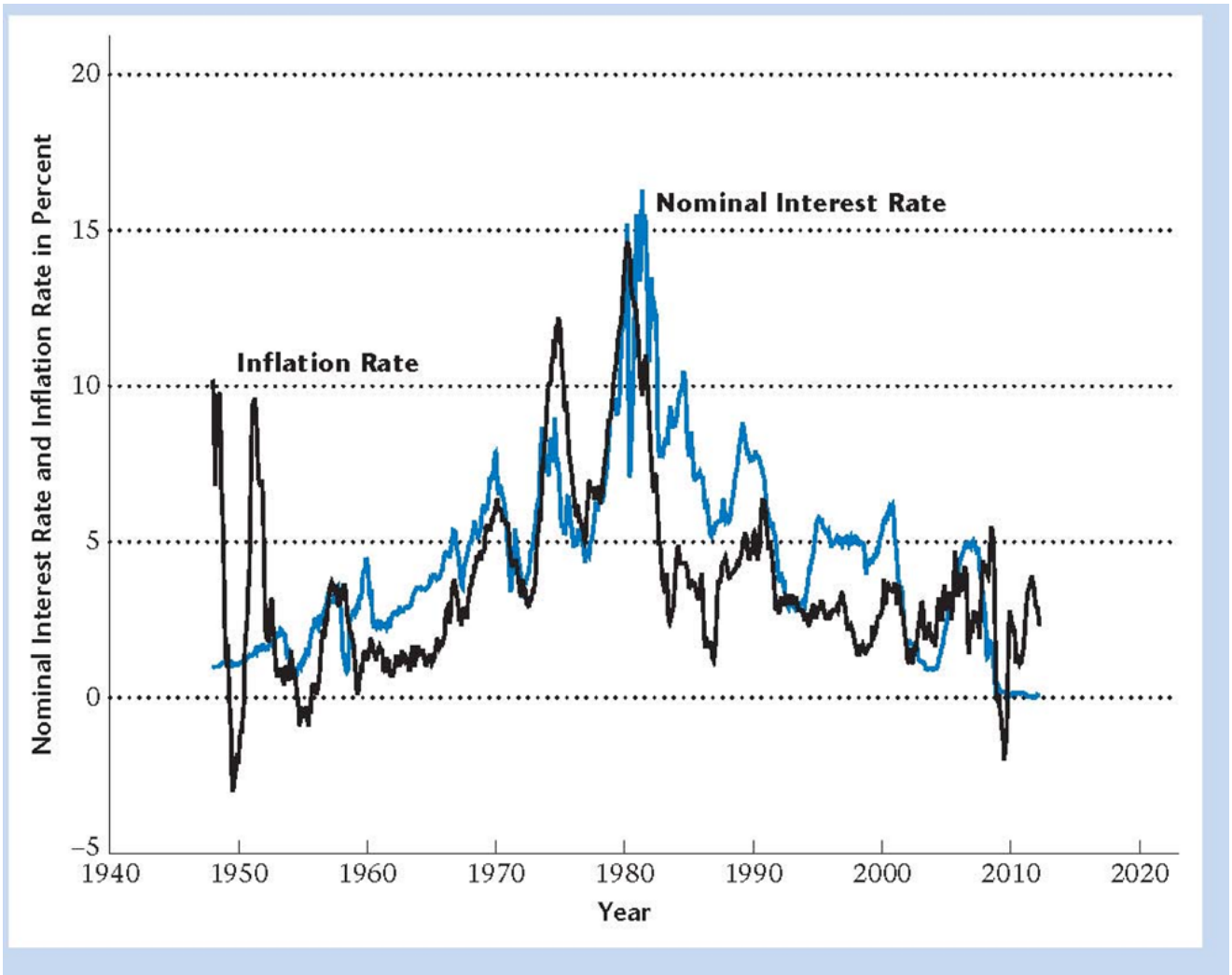


Figure 1.11: Real Interest Rates

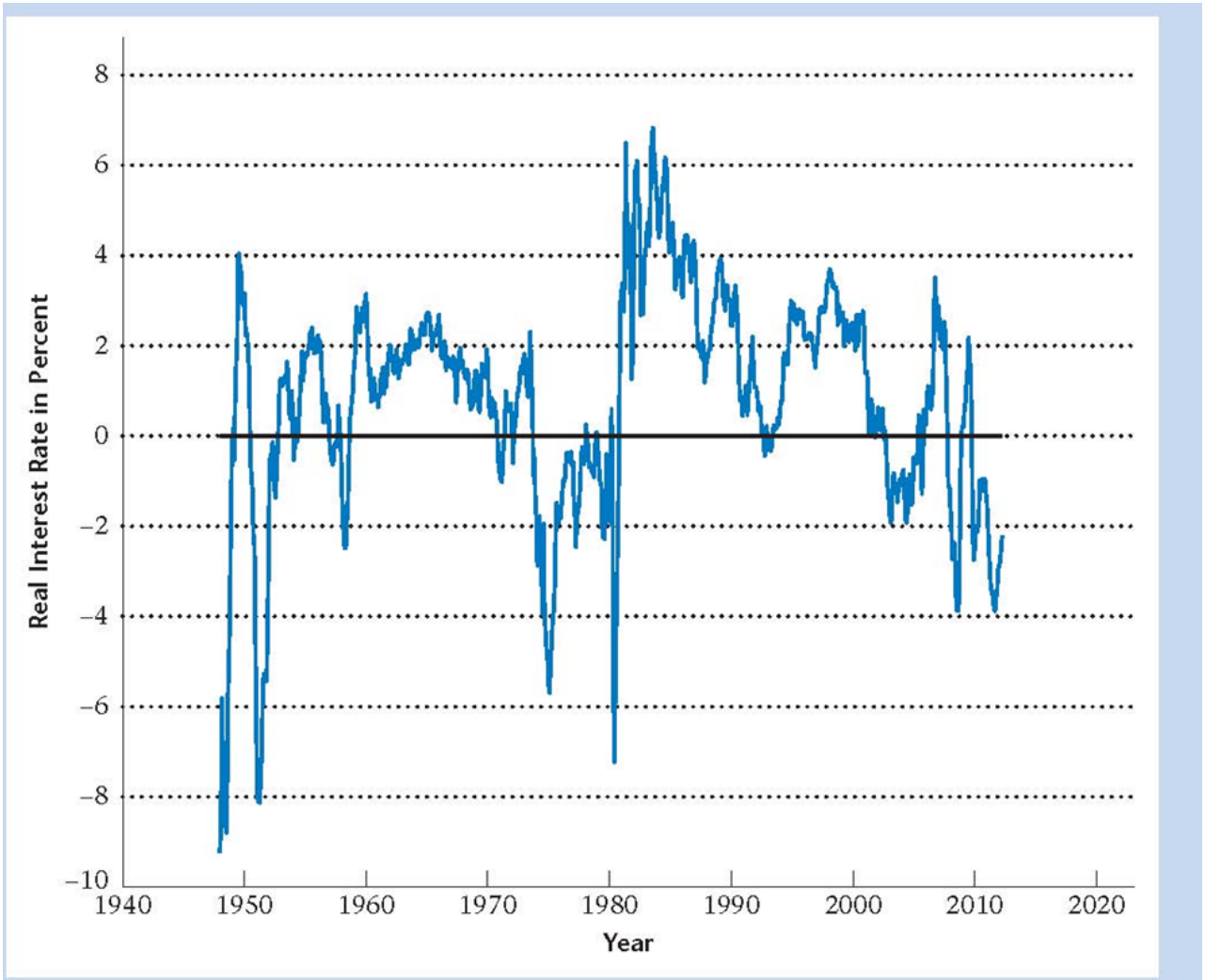


Figure 1.12: Interest Rate Spread

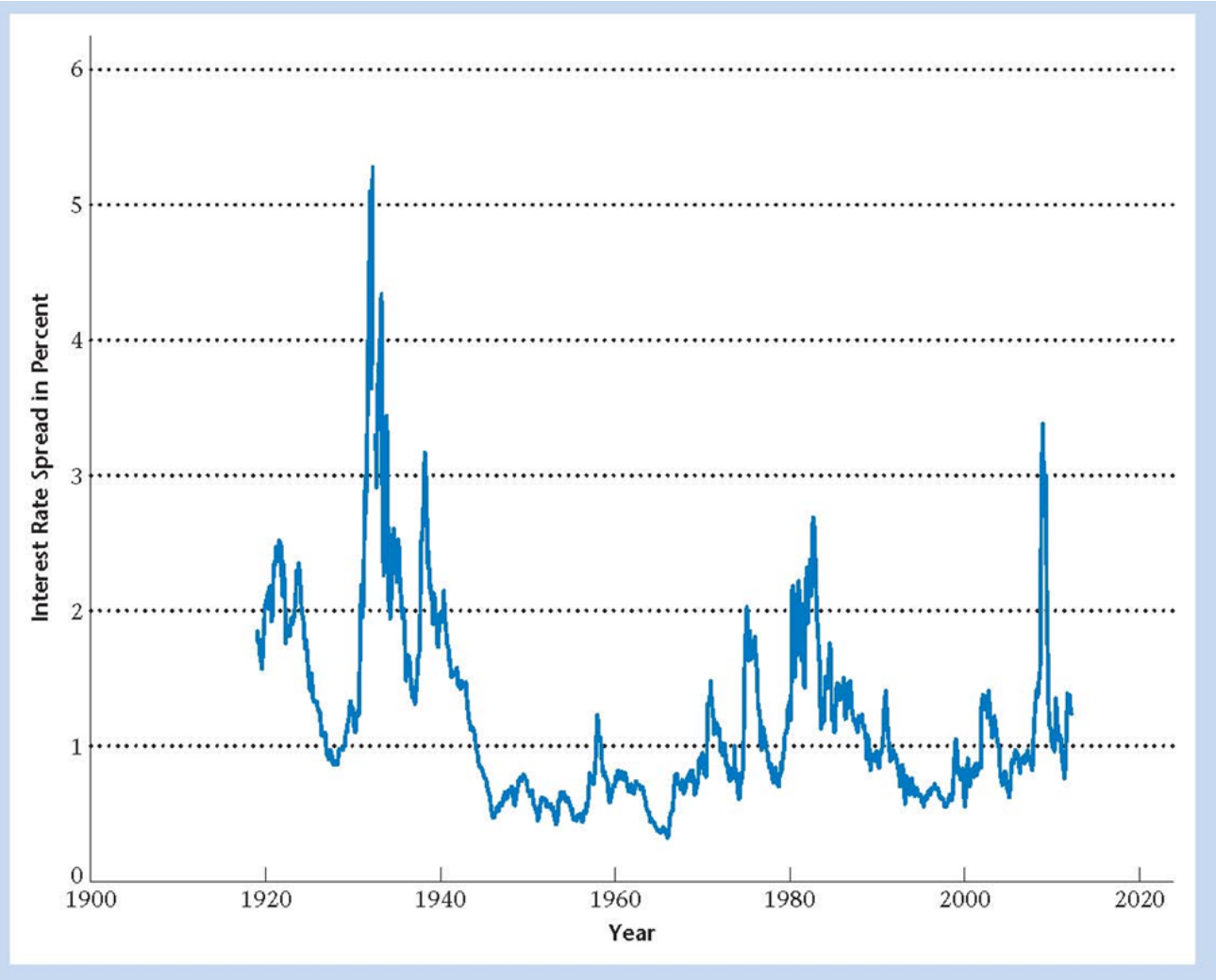


Figure 1.13: The Inflation Rate and the Money Growth Rate

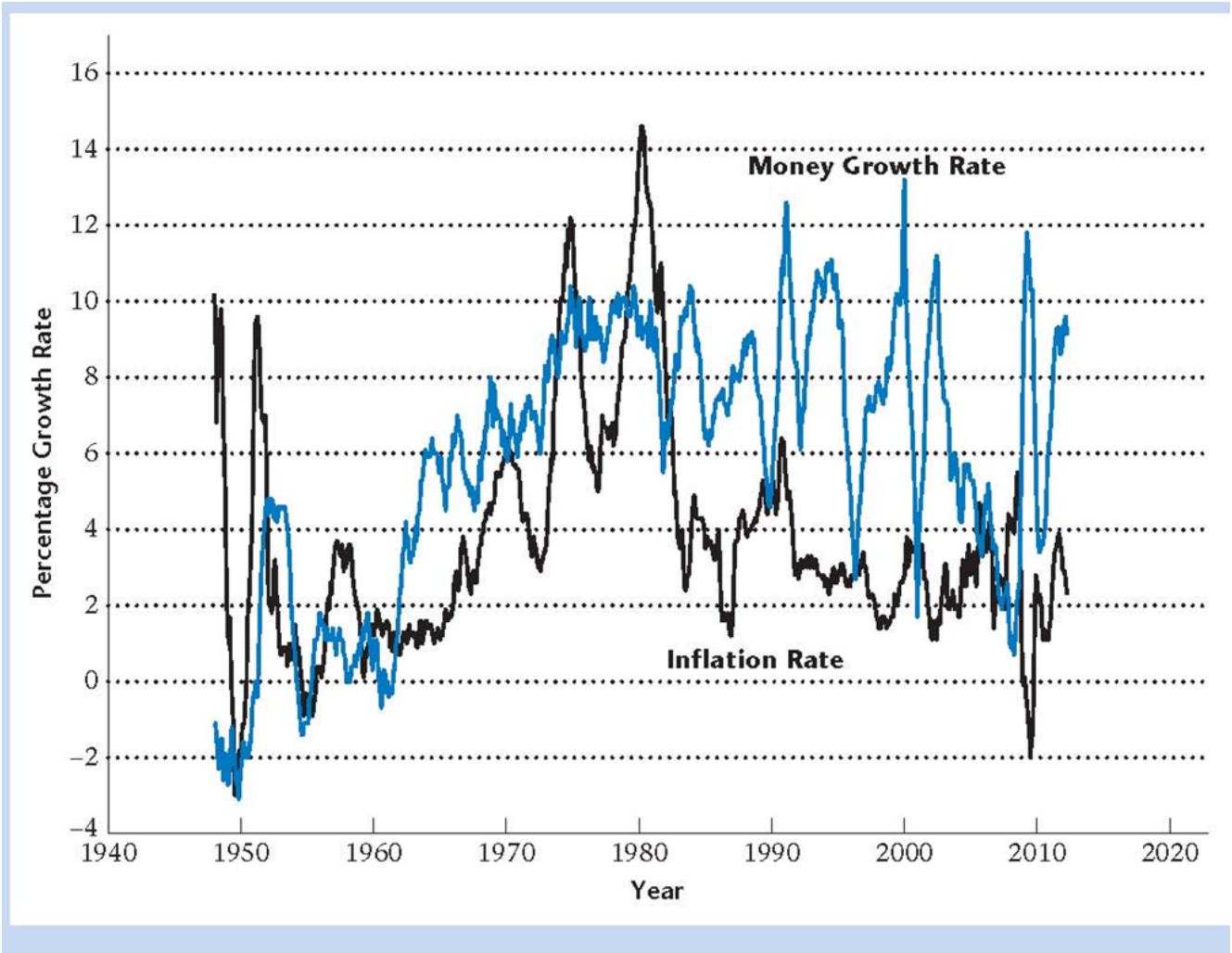


Figure 1.14: The Unemployment Rate in the United States, 1948-2012

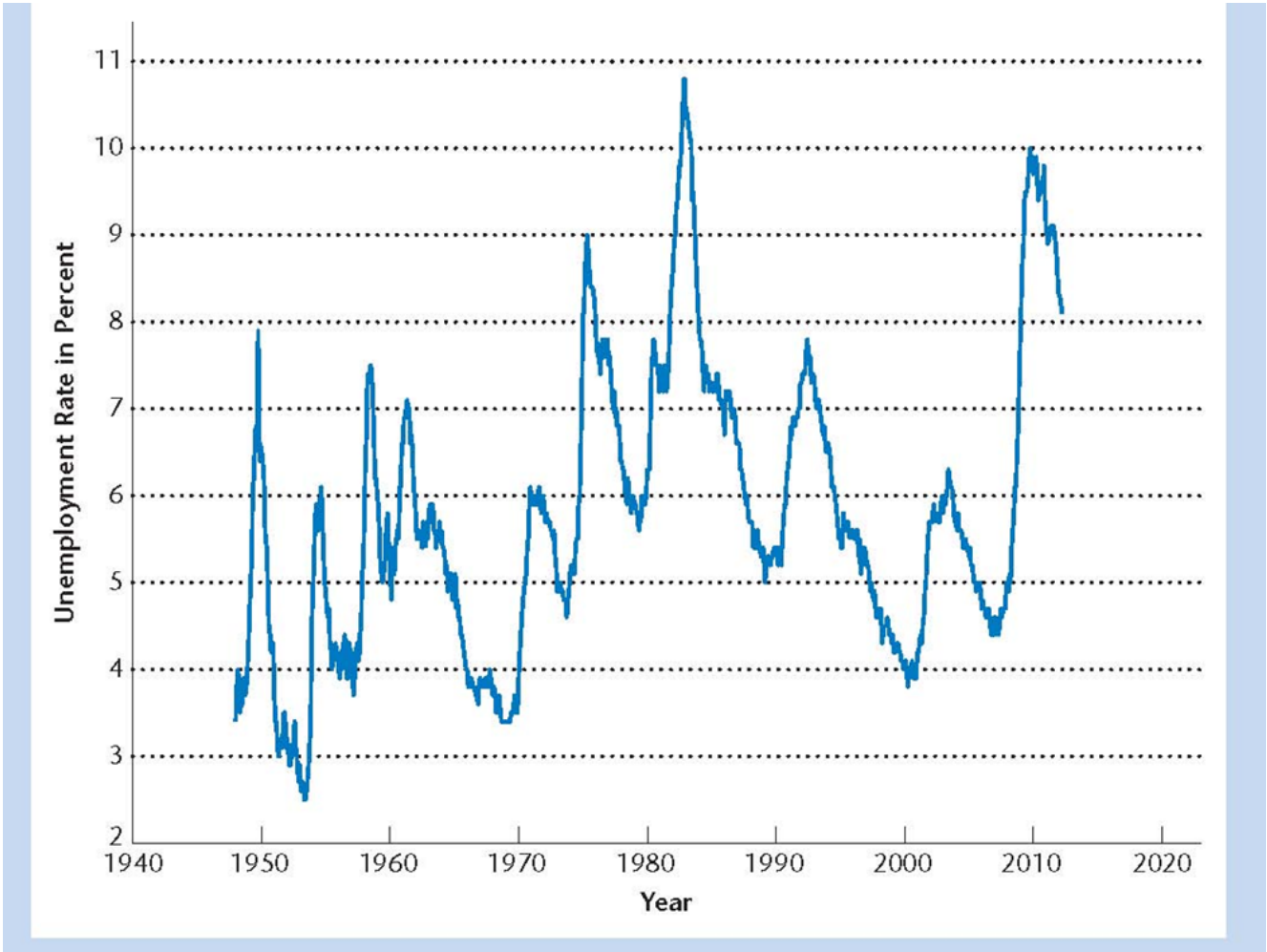


Figure 1.15: The Beveridge Curve, 1948-2012

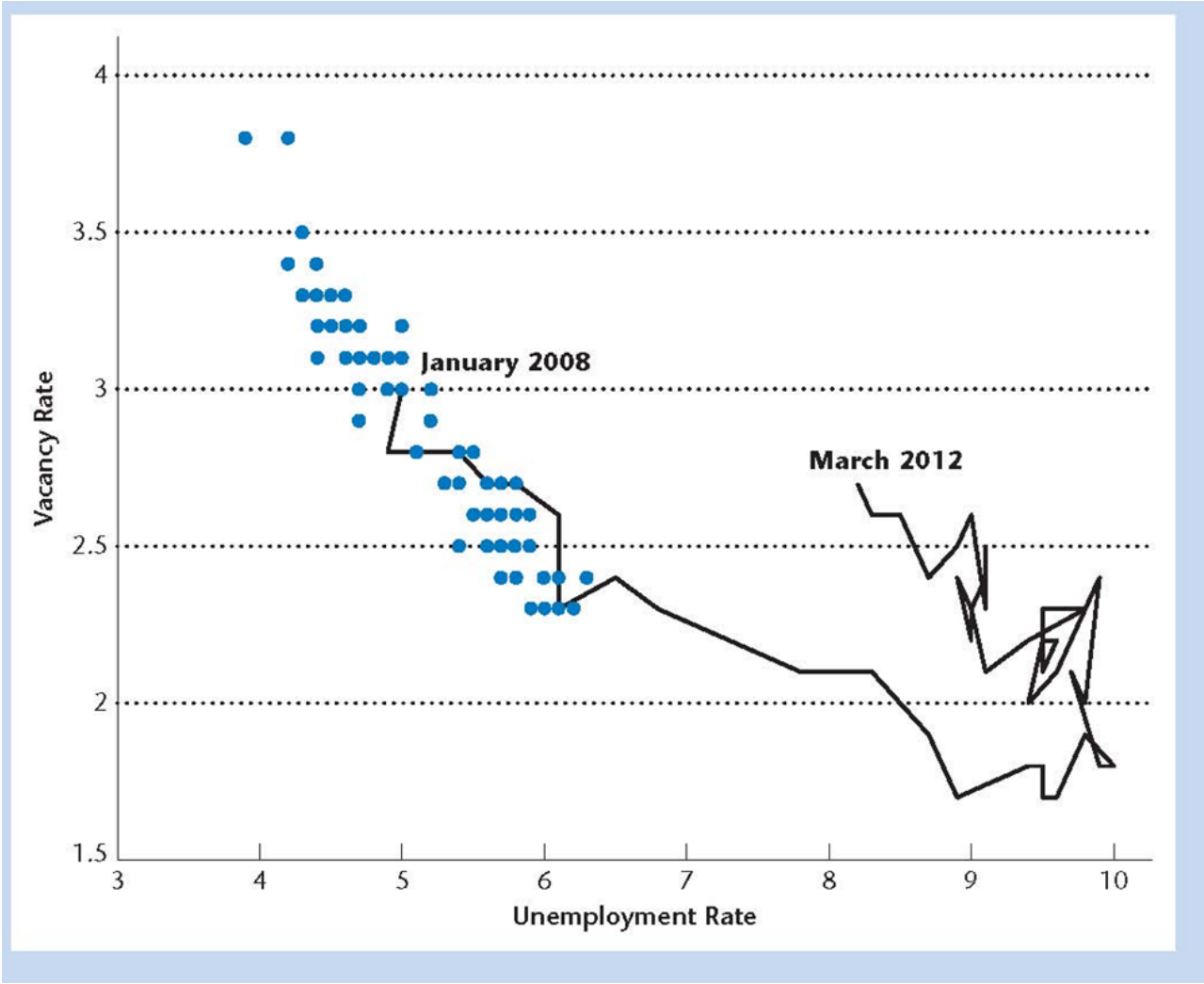


Figure 1.16: Deviations from Trend in the Unemployment Rate and Percentage Deviations from Trend in Real GDP

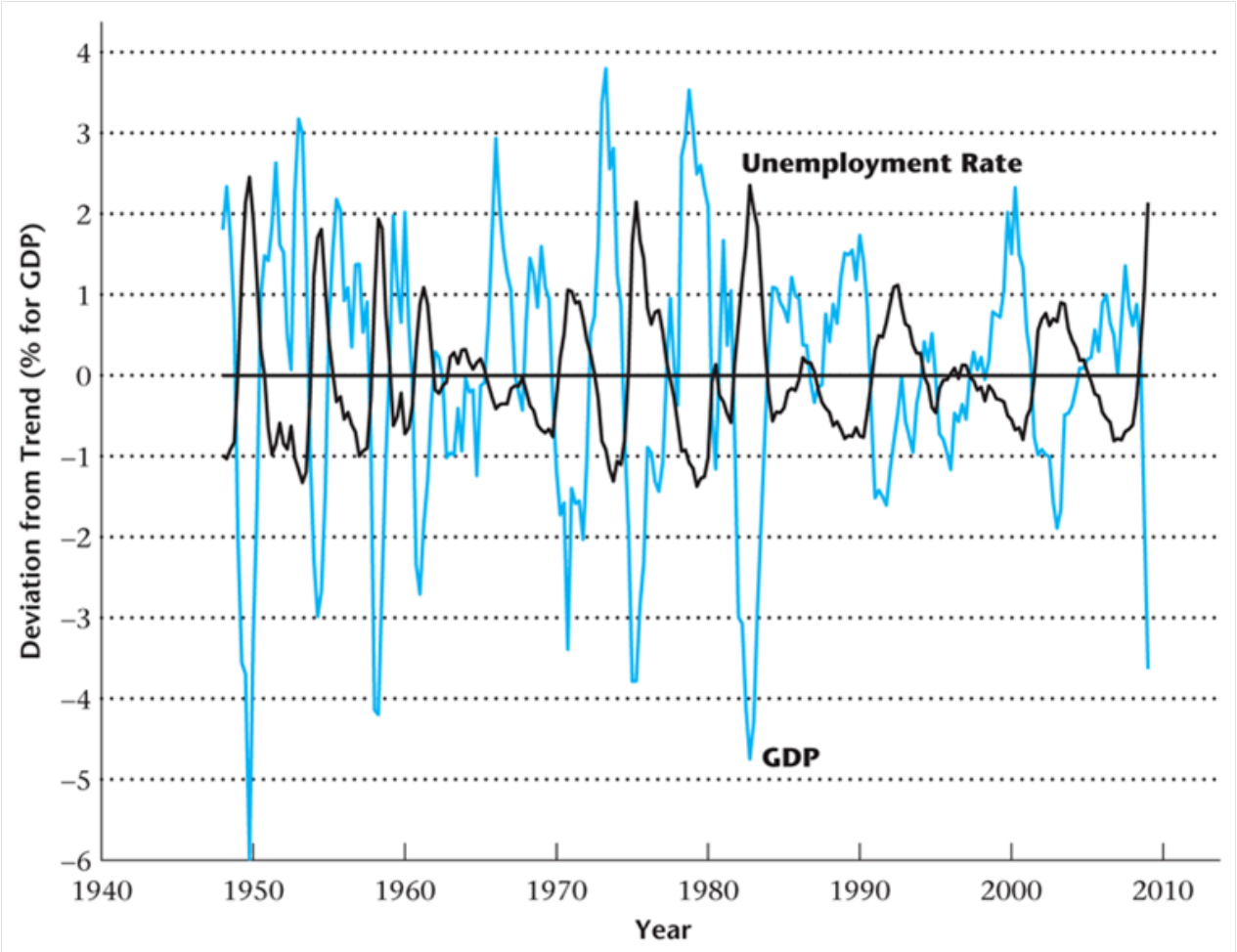


Figure 1.17: Relative Price of Housing

Figure 1.18: Exports and Imports of Goods and Services as Percentages of GDP

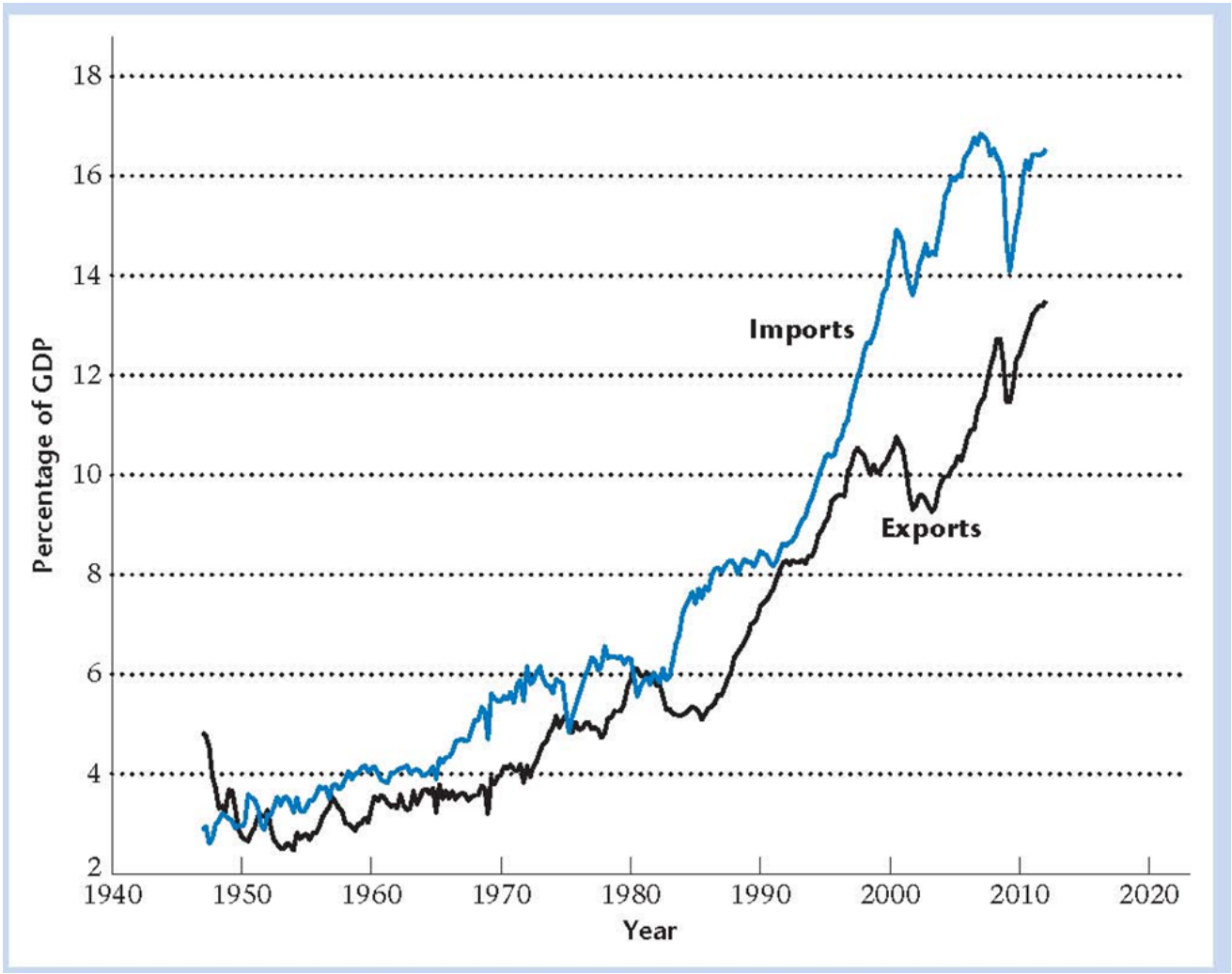


Figure 1.19: The Current Account Surplus