Macro for SCS
Nov. 28, 2017 (Part A)

A. Overview
B. National Income Accounts; Aggregate Demand & Supply
C. Business Cycles
D. Understanding Central Bank Actions

A. OVERVIEW

Four indicators of interest

(i) Real income per person (a.k.a. real GDP per capita or real output per capita)

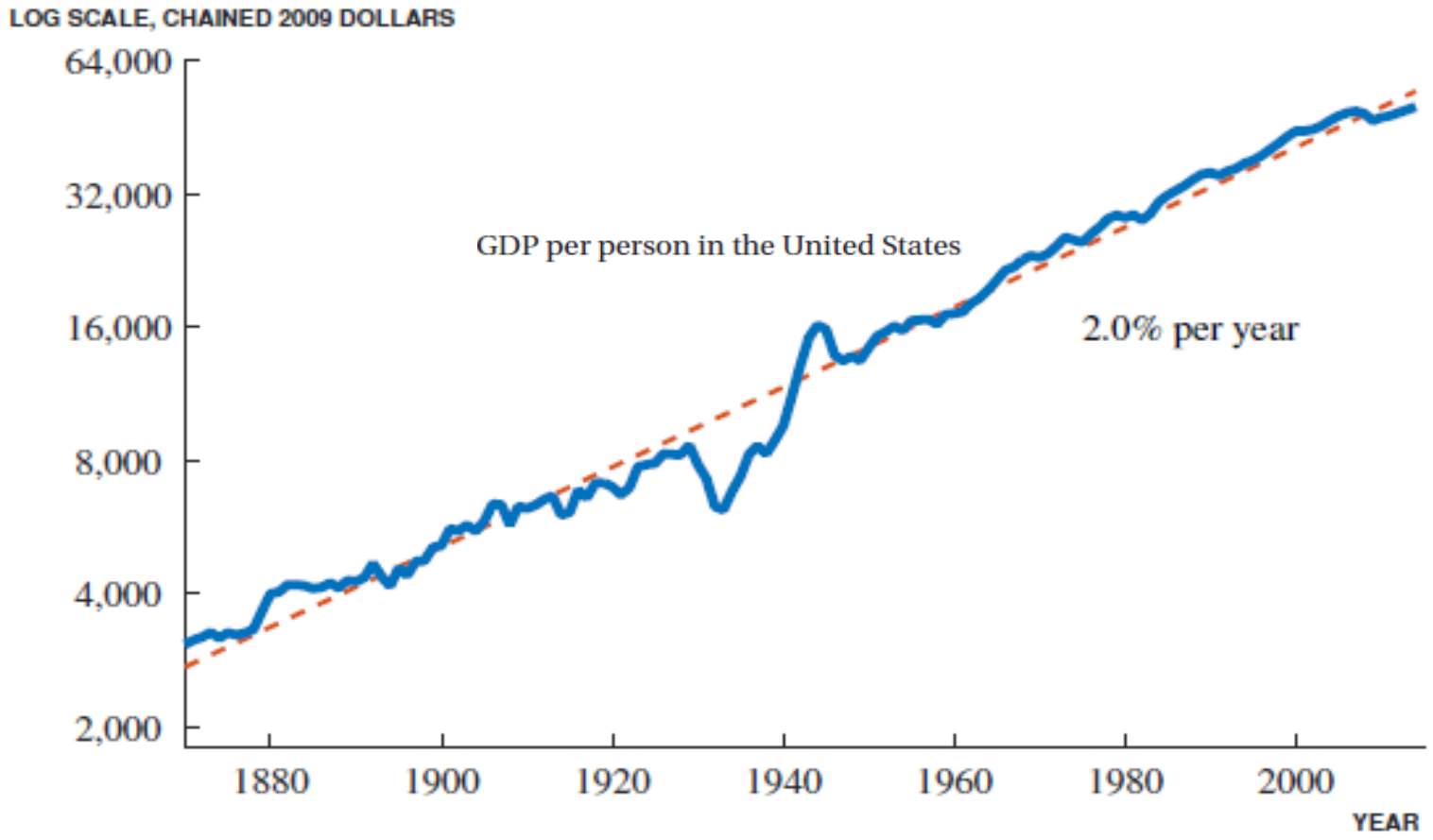
-- per capita Y

(i) Unemployment rate -- u

(iii) Inflation rate -- p

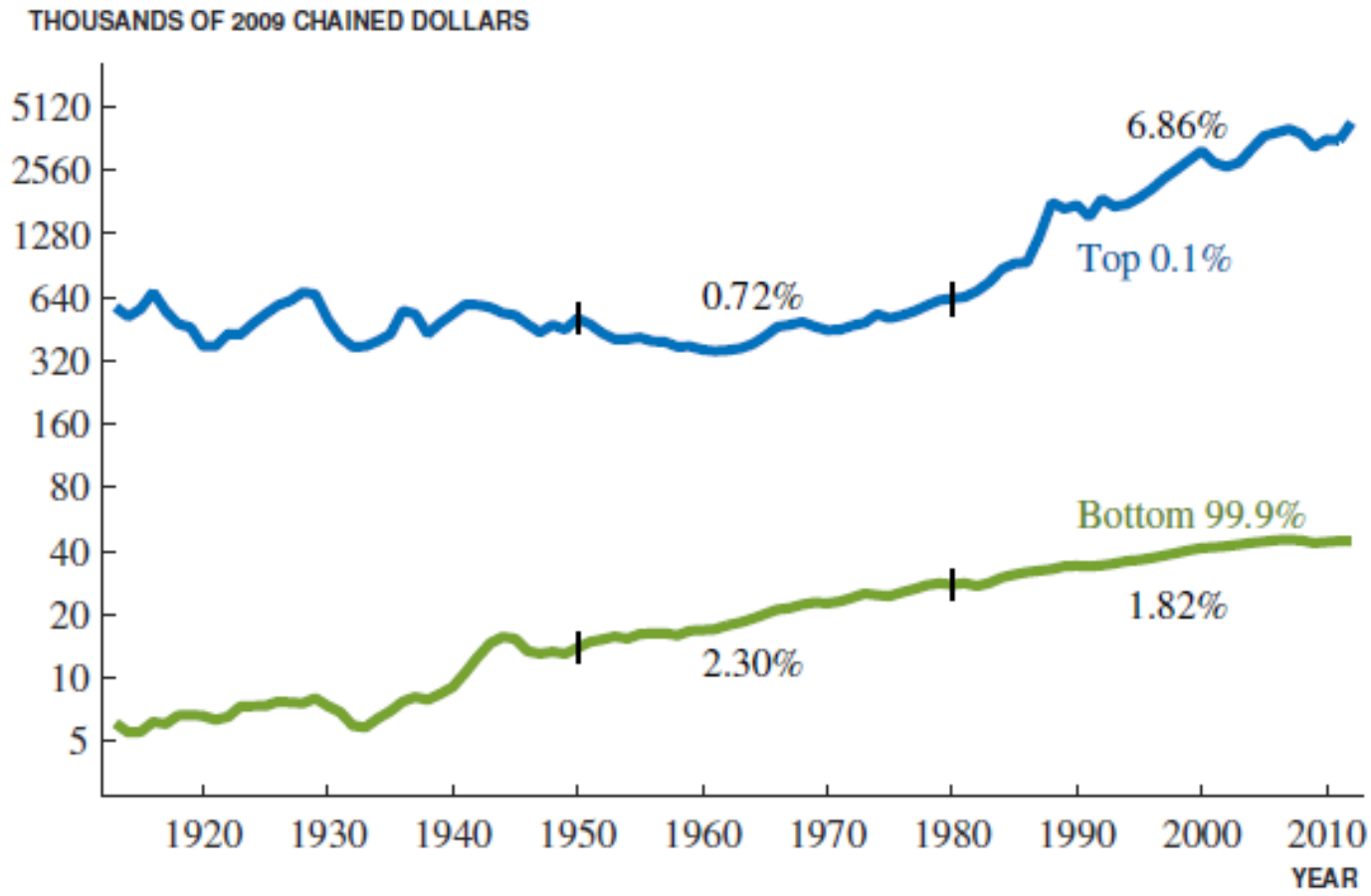
(iv) Interest rate -- n

U.S. real income per person (a.k.a. US real GDP per capita)



Note: Data for 1929–2014 are from the U.S. Bureau of Economic Analysis, NIPA Table 7.1. Data before 1929 are spliced from Maddison (2008).

GDP per person, Top 0.1% and Bottom 99.9%



Trend vs. cycles in real GDP

There are two main components of real GDP (or of real GDP per capita)

- The first is the **trend**. The trend is generally upward and reflects technological progress and 'factor accumulation' (the trend is the topic of Week 2).

- The second component is the **business cycle (or cyclical fluctuations)**. This refers to the movements around the trend.

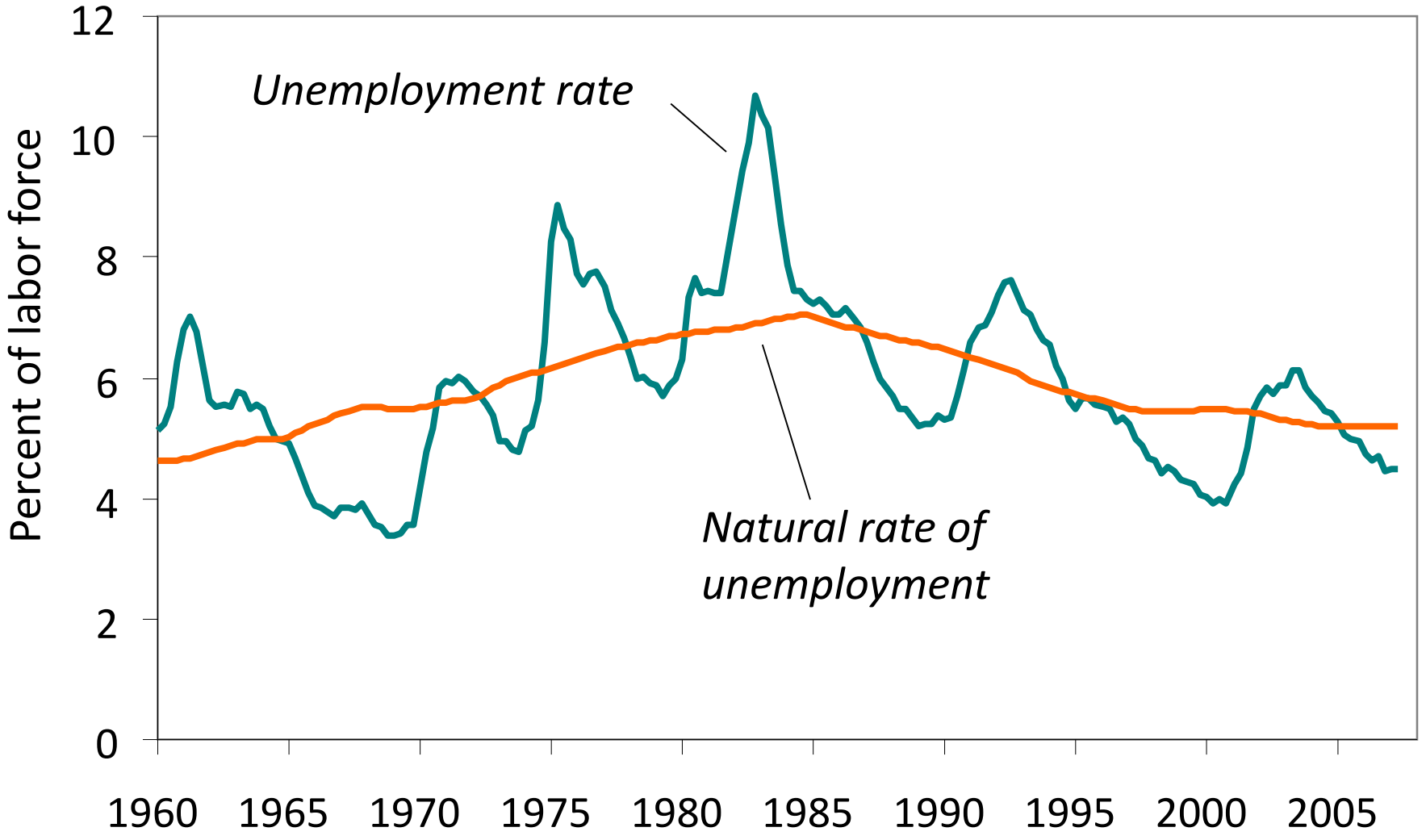
  - When real GDP is above its long-run trend, the economy is said to be in the boom phase of the cycle or in an expansion; when real GDP is below its long-run trend, the economy is experiencing a slowdown or a slump.

  - Output gap (or GDP Gap): the difference between real GDP and its long-run trend
    - When output is about its long-run trend, the GDP gap is positive
    - When output is below its long-run trend, the GDP gap in negative

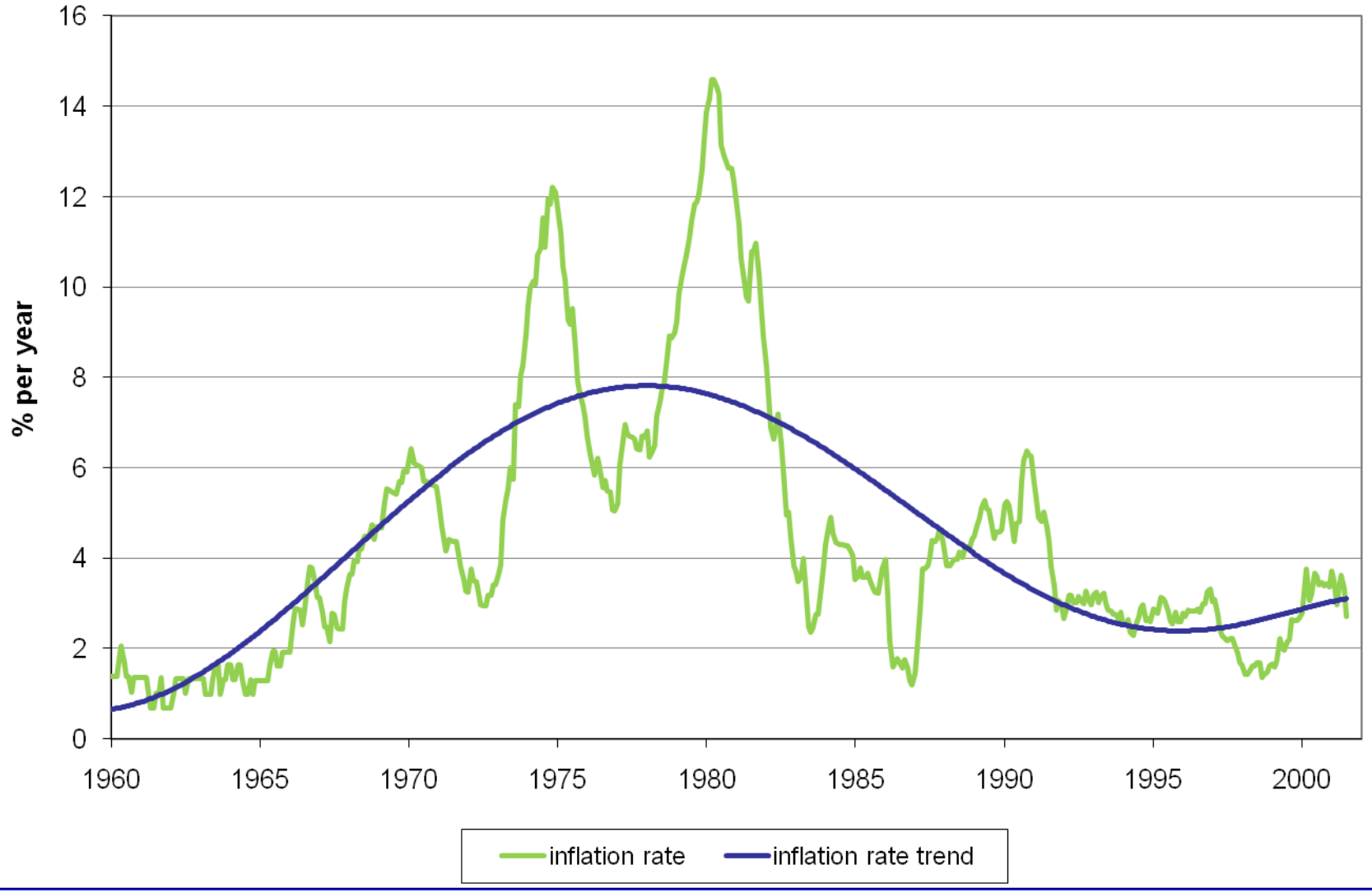
Unemployment

- Two components of unemployment rate
  - Cyclical unemployment – related to the business cycle
  - Natural rate of unemployment – the unemployment that would prevail even in the absence of business cycles (even at “full-employment’)
- In a slump, the actual unemployment rate rises above the natural rate; cyclical unemployment is high
- In a boom, the actual unemployment rate falls below the natural rate; cyclical unemployment is low.

Actual and natural rates of unemployment in the U.S., 1960-2007



U.S. Inflation & its Trend



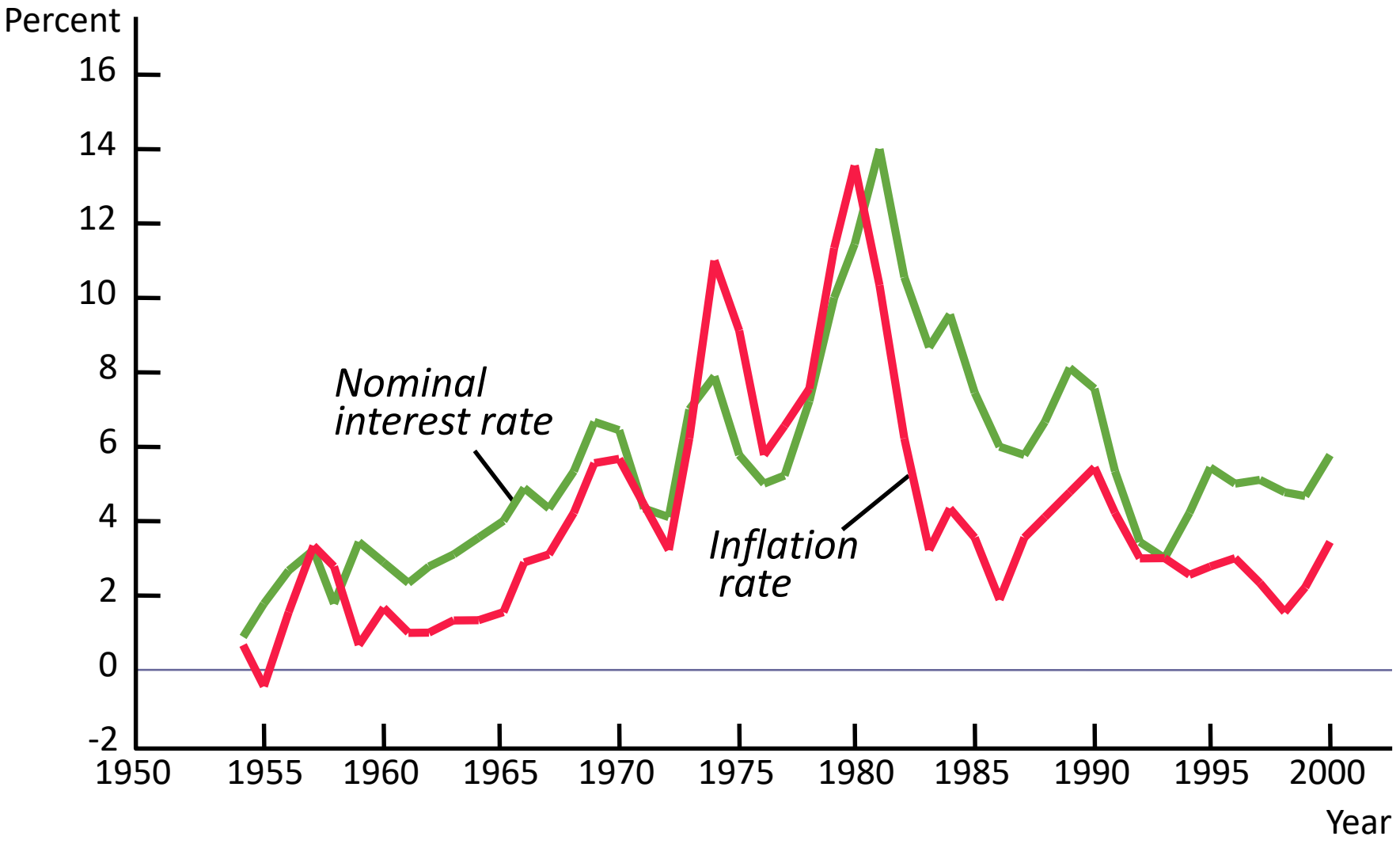
Interest Rates

- Two components of the nominal interest rate (n):

  $n = r + p^e$

  where p^e represents expected inflation and r represents real interest rates.

U.S. inflation and nominal interest rates



Cyclical components

- Output gap: Deviation of output from potential
- Unemployment gap or cyclical unemployment: Deviation of unemployment from natural rate ("cyclical" unemployment)
- Short-run inflation: Deviation of inflation from trend or target
- Short-run interest rate movements: Deviation of interest rate from 'natural', 'neutral' or 'long-run' rate

Two important relationships between *cyclical* components

- Okun's Law: the relationship between output gap and cyclical unemployment (the deviation of unemployment from natural rate)
  - when output gap is positive, cyclical unemployment is high
  - when output gap is negative, cyclical unemployment is low

- Phillips Curve: the relationship between the output gap and deviation of inflation from trend or target
  - when output gap is positive, inflation tends to go above target
  - when output gap is negative, inflation tends to go below target

    - note: we can also think of the Phillips Curve as a relationship between cyclical *unemployment* and the deviation of inflation. Why?

Trend components

- Trend output
- Natural rate of unemployment
- Long-run inflation
- Long-run interest rates

Inter-relationships between ***trend*** components?

- No obvious relationship between trend output and natural rate of unemployment
- No relationship between trend output and long-run inflation ("long run Phillips curve is vertical")
- Positive association between long-run inflation and long-run ***nominal*** interest rates (called the "Fisher effect")

B. NATIONAL INCOME ACCOUNTS AGGREGATE DEMAND AND SUPPLY

Two short-cuts to understanding macro

- Comparing micro and macro
  - Fish demand and supply
  - Aggregate demand and aggregate supply

- Parable of Robinson Crusoe
  - Circular flow of income
  - Aggregate demand and aggregate supply

National income identity

The expenditure approach to measuring GDP

- Measures total spending on final goods and services produced within a nation during a specified period of time

- Four main categories of spending: consumption (*C*), investment (*I*), government purchases of goods and services (*G*), and net exports (*NX*)

- $Y = C + I + G + NX$

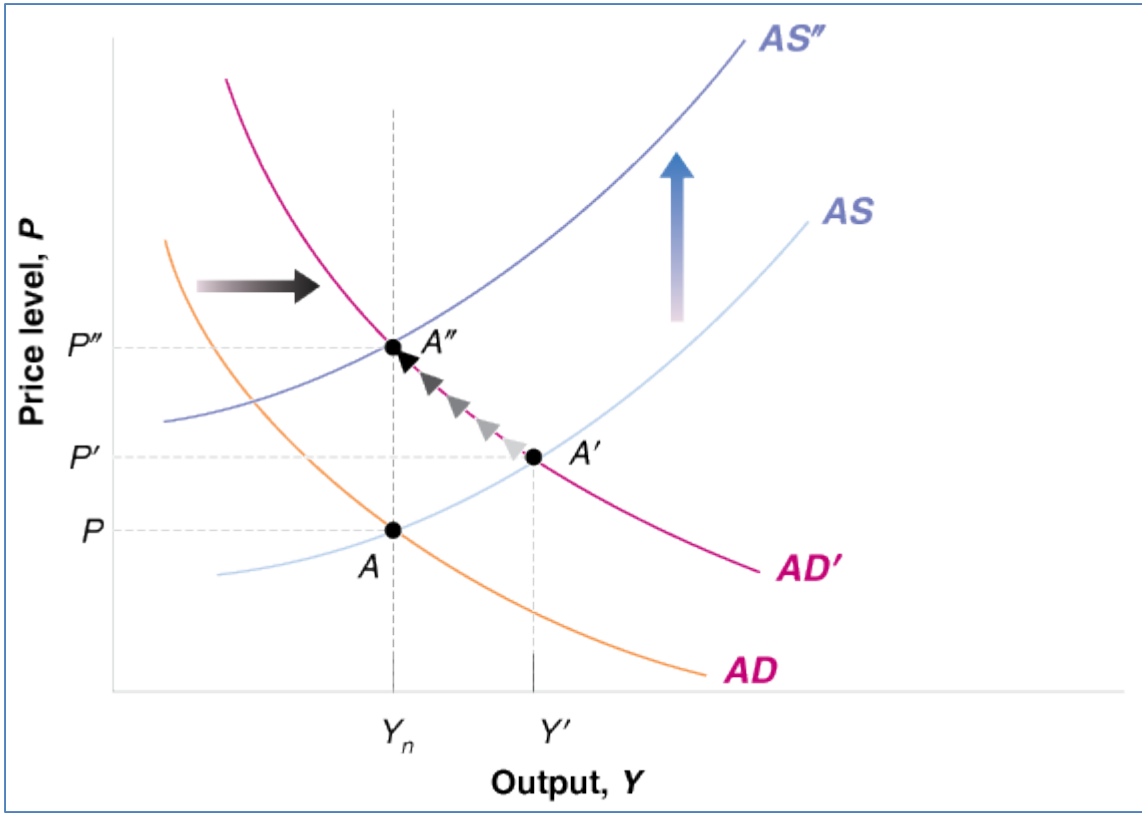
Aggregate Demand and Aggregate Supply: Effects of a Permanent Monetary Expansion

A monetary expansion leads to an increase in output in the short run but has no effect on output in the medium run.

The difference between Y and Y_n sets in motion the adjustment of price expectations.

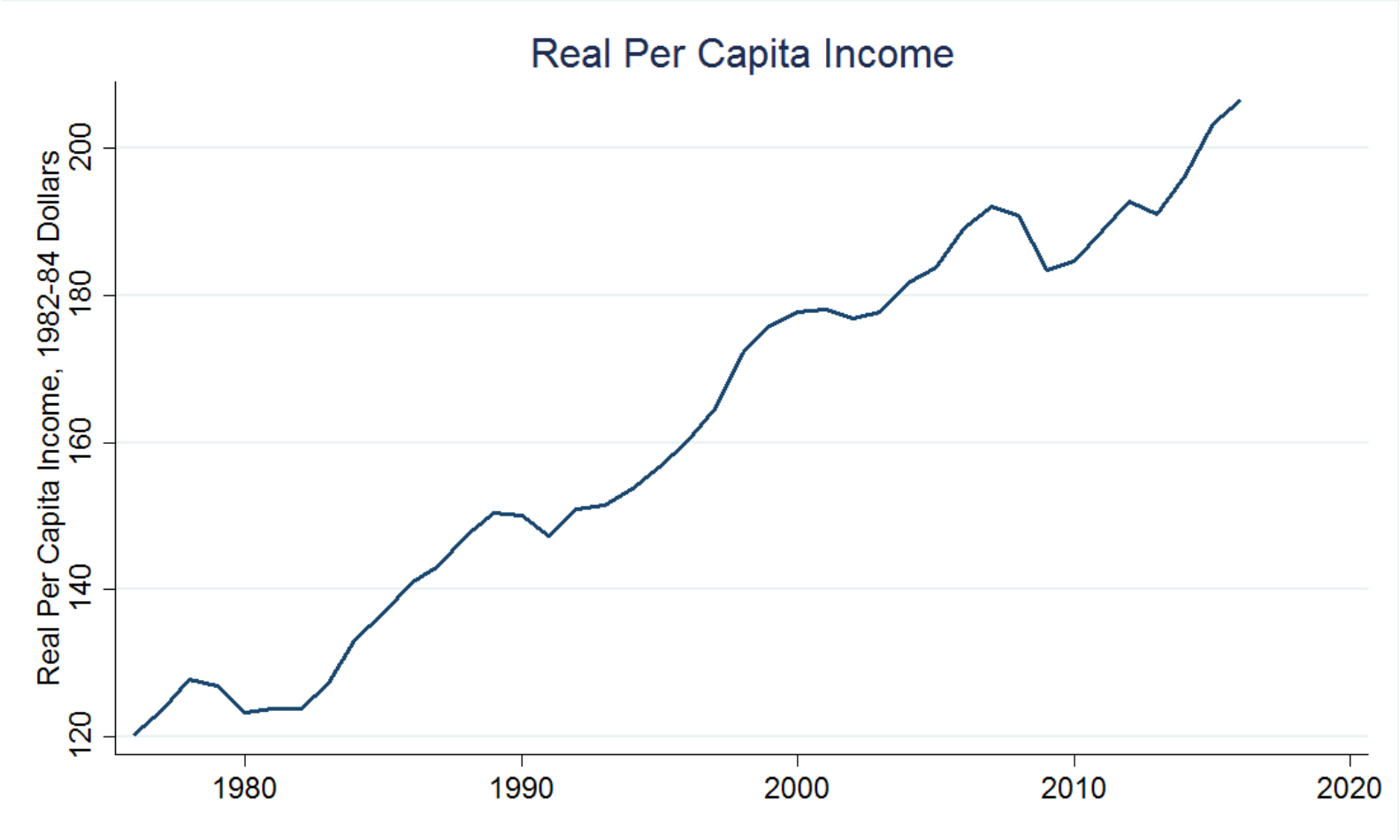
In the medium run, the *AS* curve shifts to *AS"* and the economy returns to equilibrium at Y_n.

The increase in prices is proportional to the increase in the nominal money stock.

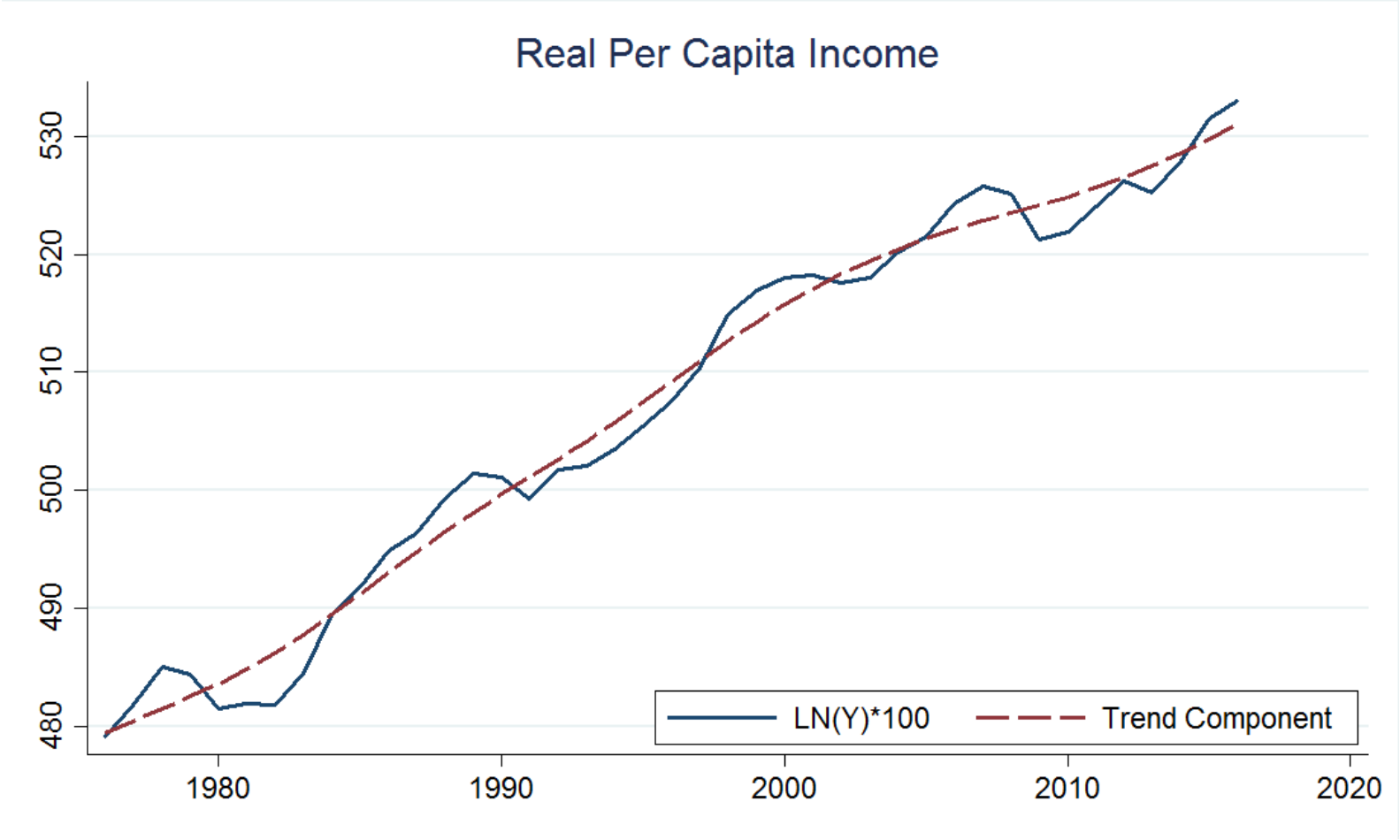


C. BUSINESS CYCLES

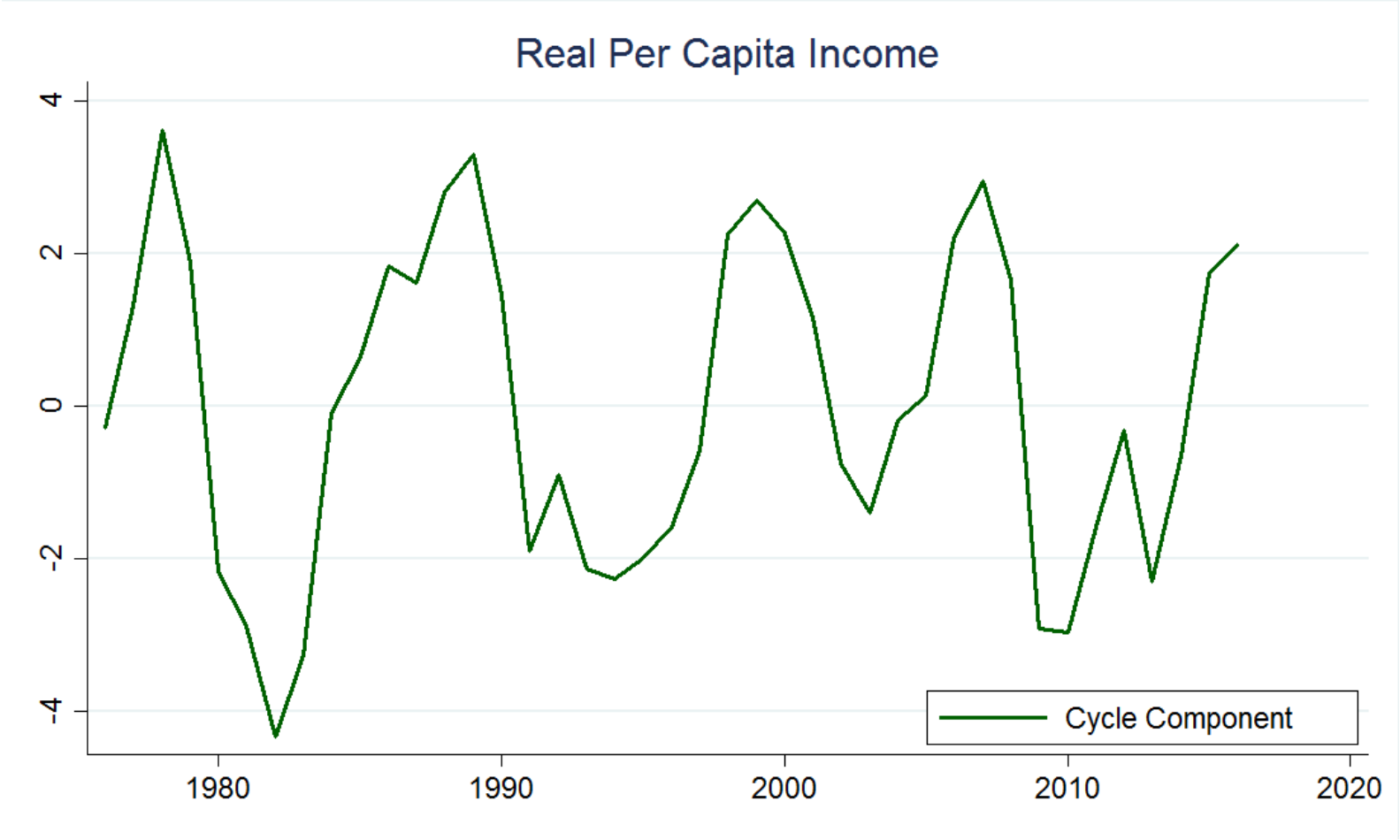
Real Per Capita Income



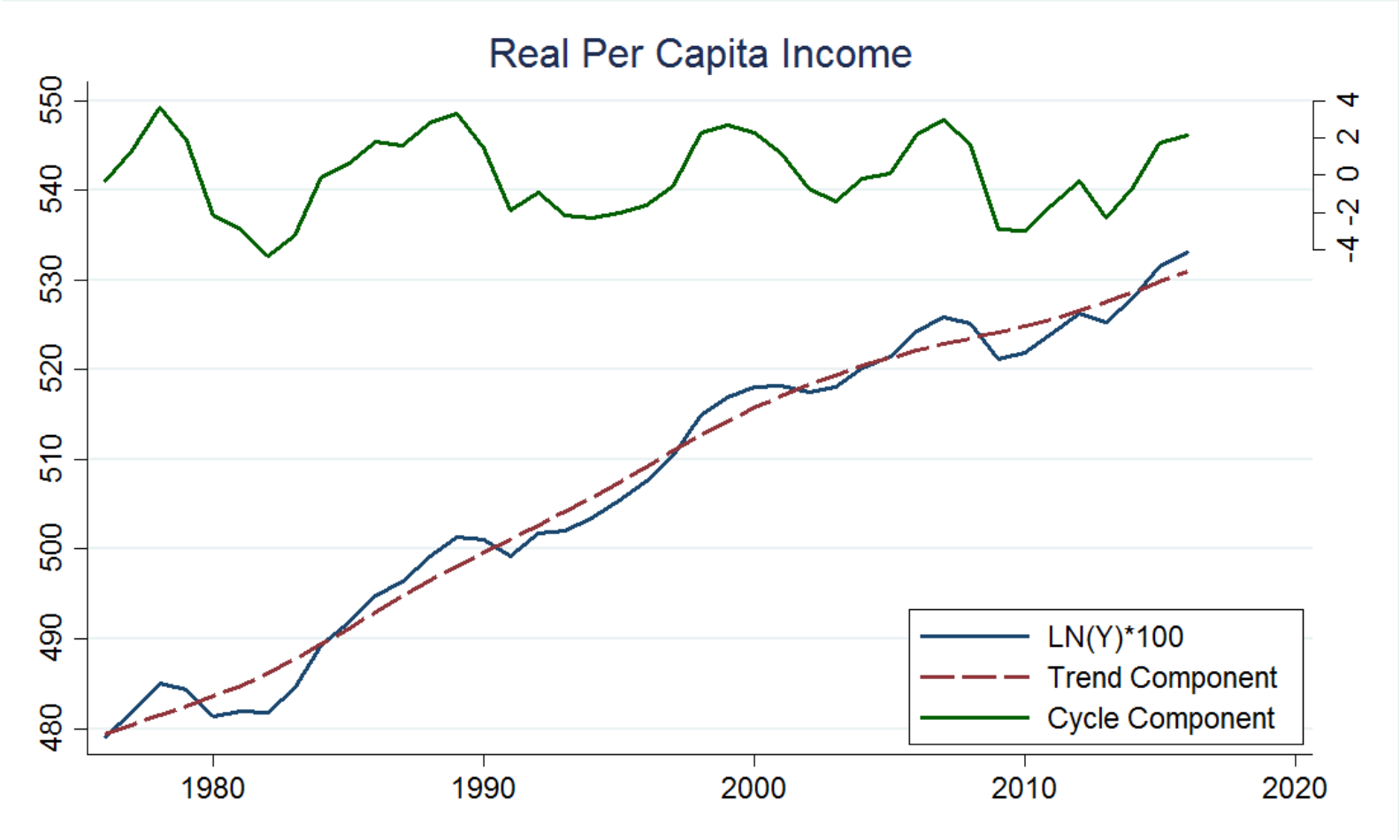
Real Income – HP Trend



Real Income – Cycle (after removing HP trend)

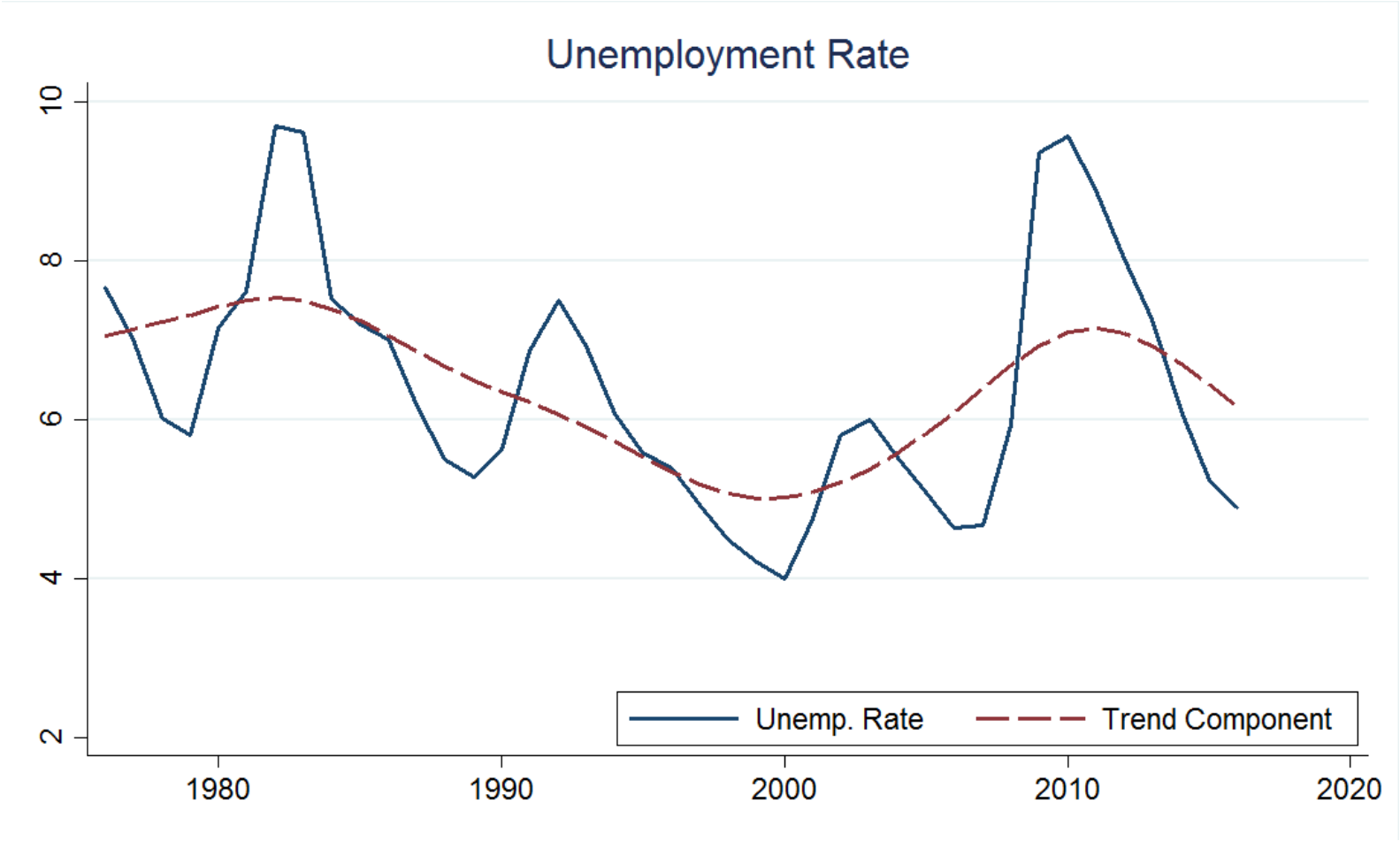


Real Income – Trend and Cycle



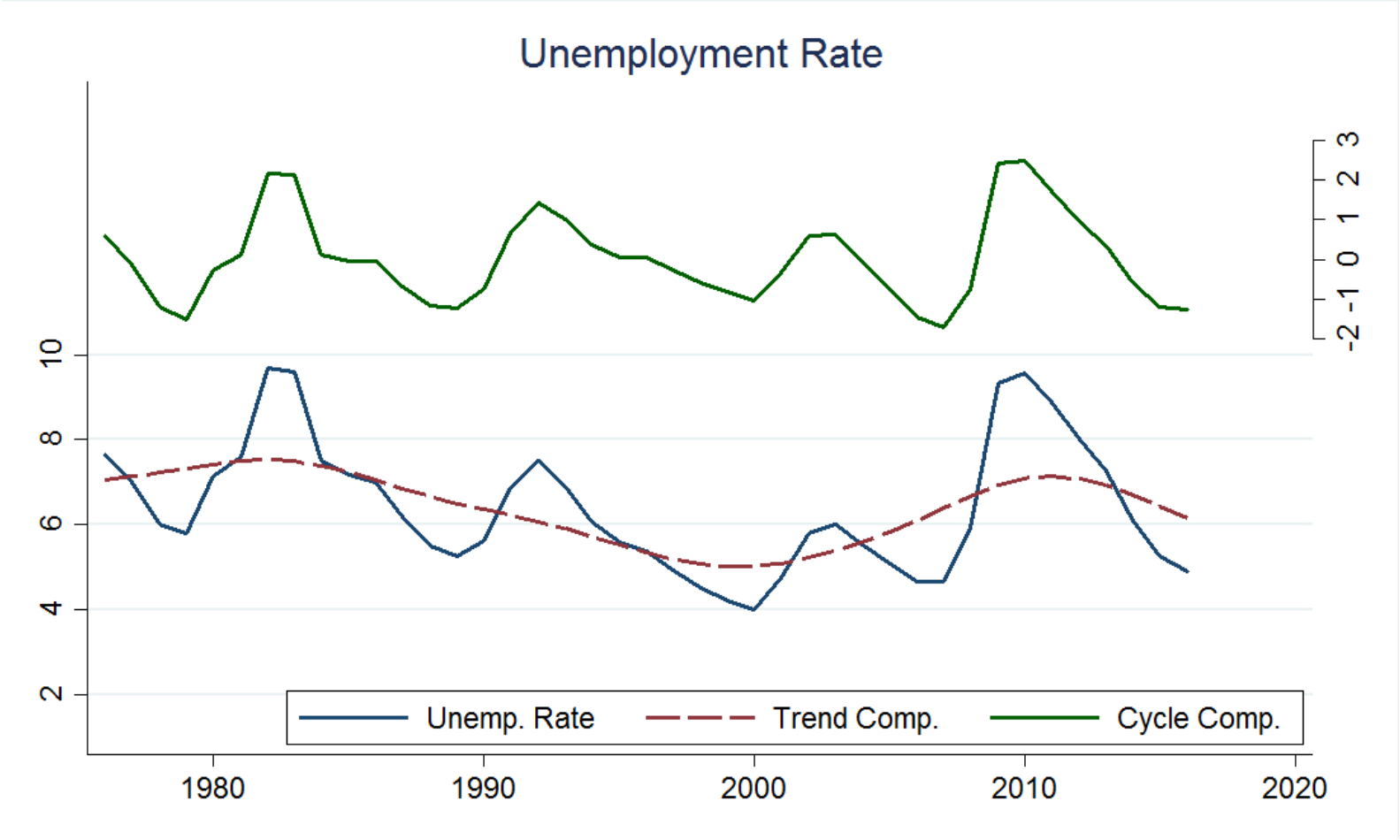
Unemployment Rate

Unemployment Rate – HP Trend

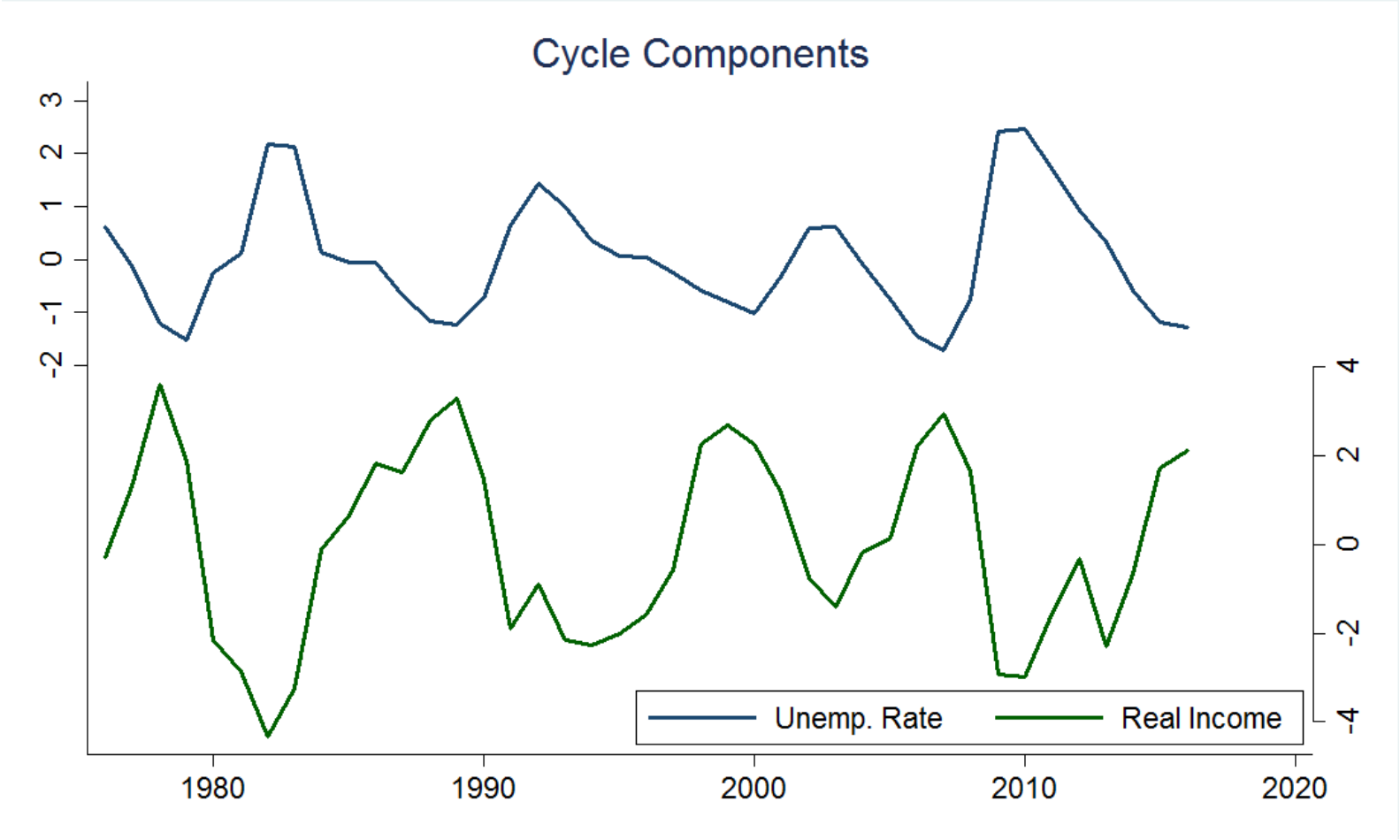


Unemployment Rate – Cycle (after removing HP trend)

Unemployment Rate – Trend and Cycle



Cyclical Components of Output (Income) and Unemployment

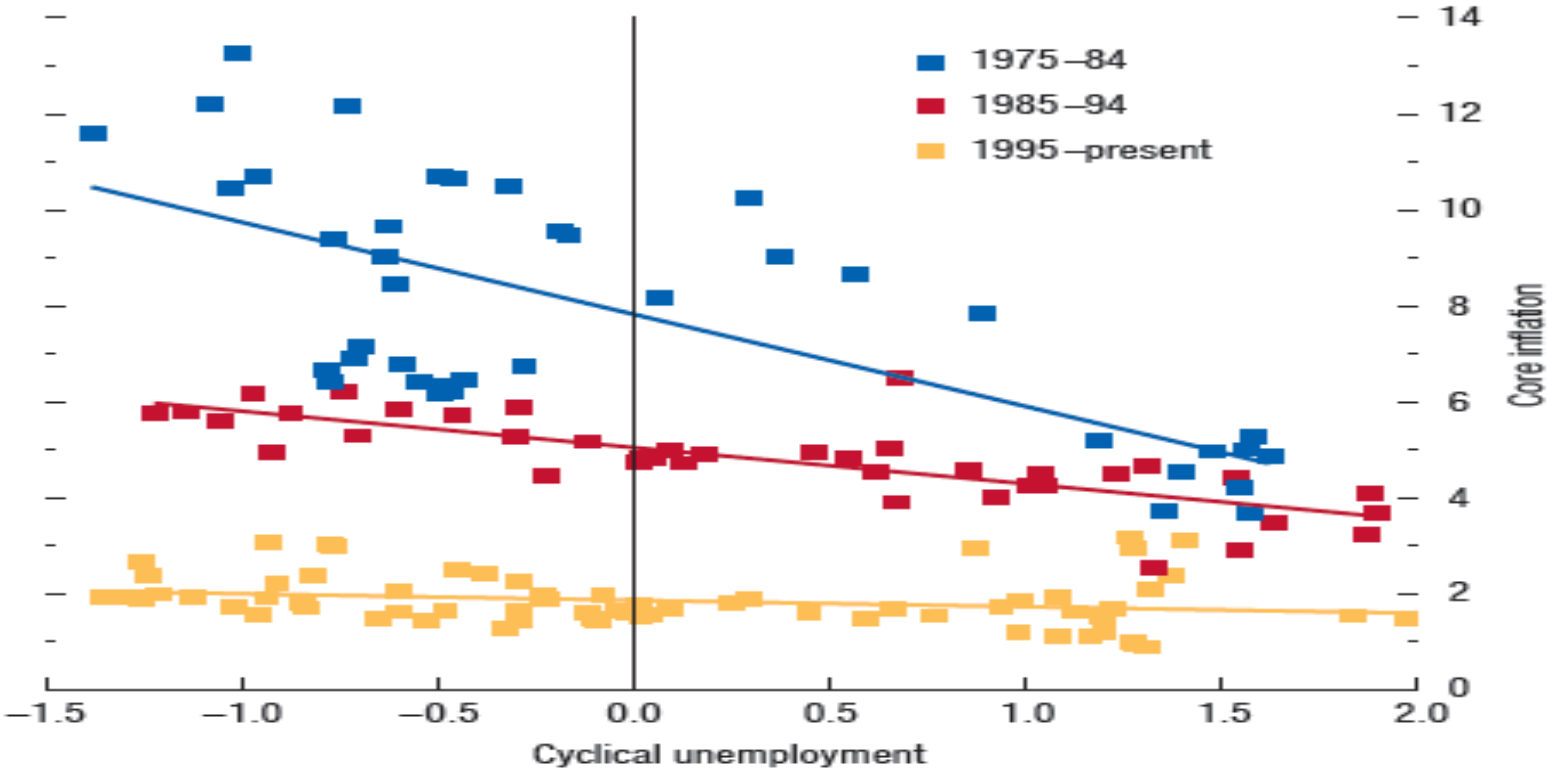


Estimates of Okun's Law

	Gaps Version		Changes Version
Unemp. Cycle	-0.44***	Change in Unemp.	-0.40***
	(0.05)		(0.05)
Constant	N/A	Constant	0.47***
	N/A		(0.12)
Obs	41	Obs	40
R-sq	0.69	R-sq	0.60

The flattening of the Phillips Curve

From its peak in the 1970s, the average level of inflation has fallen as a result of central banks' disinflationary policies. What is also noticeable is that the relationship between cyclical unemployment and inflation appears to have moderated as the level has fallen.



Recessions

- "Rule of thumb" — two consecutive quarters of decline in real GDP

- NBER definition — **A recession is a significant decline in economic activity spread across the economy, lasting more than a few months,** normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales.

  - In the United States, a private economic research organization called the National Bureau of Economic Research (NBER) has been given the task of deciding whether or not the economy is in a recession.

  - Because real GDP is available only on a quarterly basis and because the final numbers become available with a substantial lag, the NBER uses other indicators of economic activity (along with real GDP) in deciding whether or not the economy is an a recession.

Historical Facts about U.S. business cycles using NBER dating (excluding the most recent recession)

- Since 1854, the U.S. economy has experienced 31 cycles (alternating periods of expansion and contraction). The average recession has lasted 18 months; the average expansion has lasted 35 months.
- In the post-WWII period, the average recession has lasted 11 months; the average expansion has lasted 50 months.
  - The last two recessions (prior to the recent Great Recession) lasted 16 and 8 months, respectively; the last two expansions lasted 92 and 120 months, respectively.
  - The NBER dates the last recession (prior to the recent Great Recession) as having started in March 2001 and having ended in November 2001.

D. UNDERSTANDING CENTRAL BANK ACTIONS

Many different interest rates

- For this course:
  - Policy interest rate (can be “set” by central bank)
  - Short-term interest rate
  - Long-term interest rate
- Each of these interest rates can be decomposed into a part that is “real” and a part due to “expected inflation”
- An assumption we make is that by changing the policy interest rate the central bank can influence other interest rates
- The relationship among short-term and long-term interest rates is called the ‘yield curve’ or the ‘term structure of interest rates’

When the Fed Wants to "Loosen"

Fed buys **T-bills** from banks

Fed pays for the T-bills by writing a cheque:

injecting liquidity

Banks now have more cash than they want to hold

Banks that want to borrow from other banks can do so at **a lower fed funds rate**

money is cheap

Fed injects liquidity until **fed funds rate** has fallen to the Fed's set "**target**"


"I BOUGHT BILLY AN EDUCATIONAL TOY..."
ECONOMIC GROWTH
INTEREST RATES
WHAM!
POP!
HOEY
WHAM!
POP!
WHAAAA!
WHAAAA! WHAAAA!!!
POP! POP! POP!
"I'M HOPING HE GROWS UP TO BE FED CHAIRMAN."

The Taylor Rule

$$r_{cb} = 2 + 0.5(p - 2) + 0.5(\text{GDP Gap})$$

where:

n_{cb} = nominal federal funds rate

$r_{cb} = n_{cb} - p =$ real federal funds rate

$$\text{GDP Gap} = 100 \times \frac{Y - Y^*}{Y^*}$$

Taylor Rule (continued)

$$r_{cb} = 2 + 0.5(p - 2) + 0.5(\text{GDP Gap})$$

- If p = 2 and output is at potential, then monetary policy targets the real Fed Funds rate at 2% (and the nominal rate at 4%).
- For each one-point increase in p, monetary policy is automatically tightened to raise the real Fed Funds rate by 0.5
- For each percentage point that GDP falls below potential, monetary policy automatically eases to reduce the Fed Funds Rate by 0.5.

Monetary Policy in Open Economies