EMBA Macro

Week 1
May 4, 2019

Overview
Monetary Policy

Macroeconomics is the study of income

ECONOMIC POLICIES TRY TO HELP COUNTRIES ENJOY STRONG AND STABLE GROWTH IN INCOMES

What is macro about?

- Macroeconomics is the study of income.
  - Why do incomes vary over time?
  - Why do they differ across countries?
  - Why do they differ among people?

- If we try to answer all these questions at the same time, we may not be any to answer any. So we take it one step at a time.

- First, we ignore variation among people within a country. We pretend that everyone within a country makes the average income of that country.

- Second, we make a distinction between short-run changes in income and long-run changes in income.

Income: Long Run vs. Short Run

- The long-run component of income is called the trend or potential income.

- Fluctuations around the trend or potential are the short-run component of income.

    - When income is above trend, the economy is said to be in the boom phase of the cycle or in an expansion; when income trend, the economy is experiencing a slowdown or a slump.

    - Output gap: the difference between income and its trend (or potential)
        - Negative output gap: income is below trend
        - Positive output gap: income is above trend

Main indicator of interest

Eye of the bird: Real income per person

(a.k.a. real GDP per capita, real output per capita)

Other indicators:

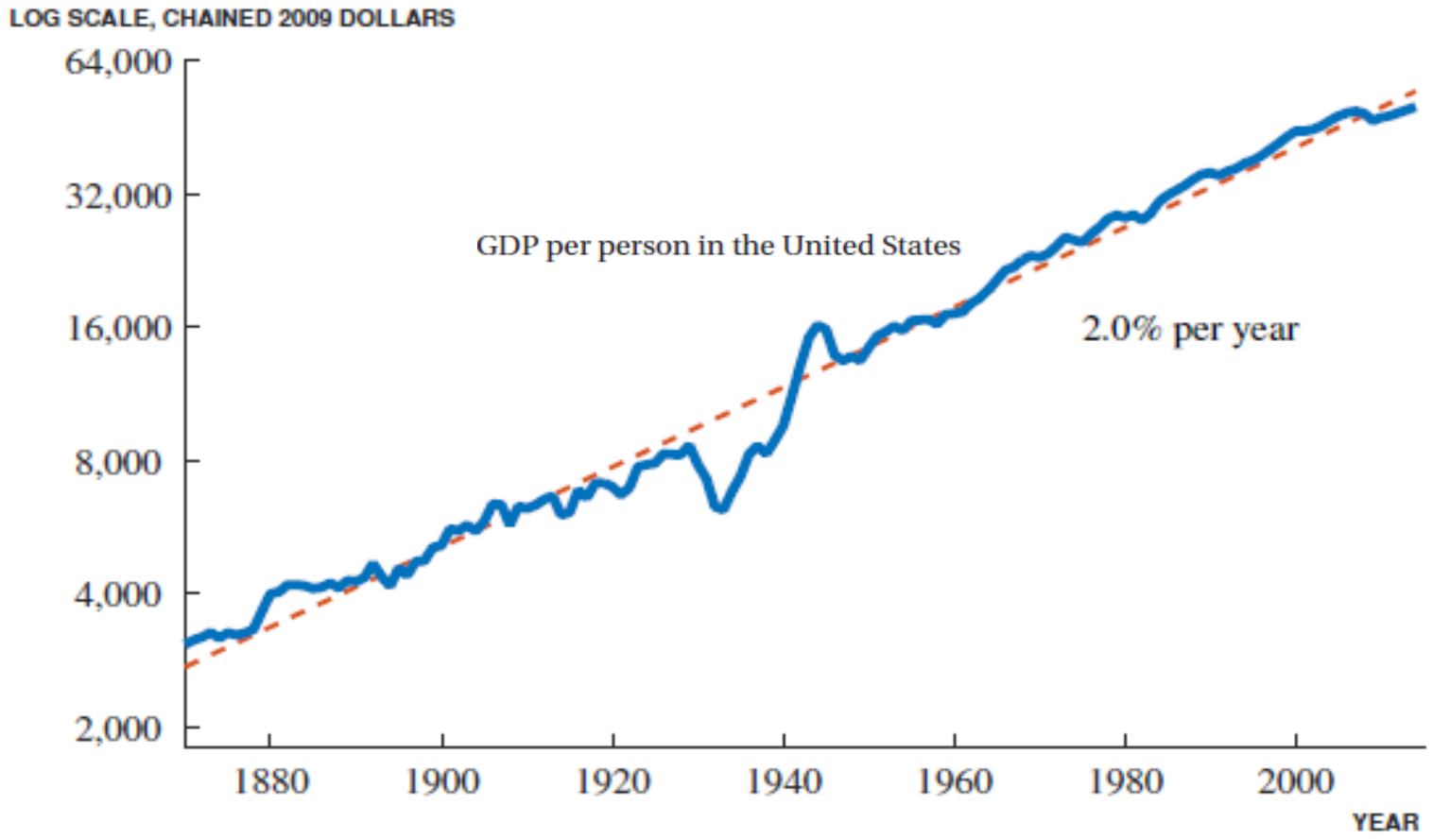
Unemployment rate

Inflation rate

Interest rate

Exchange rate

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



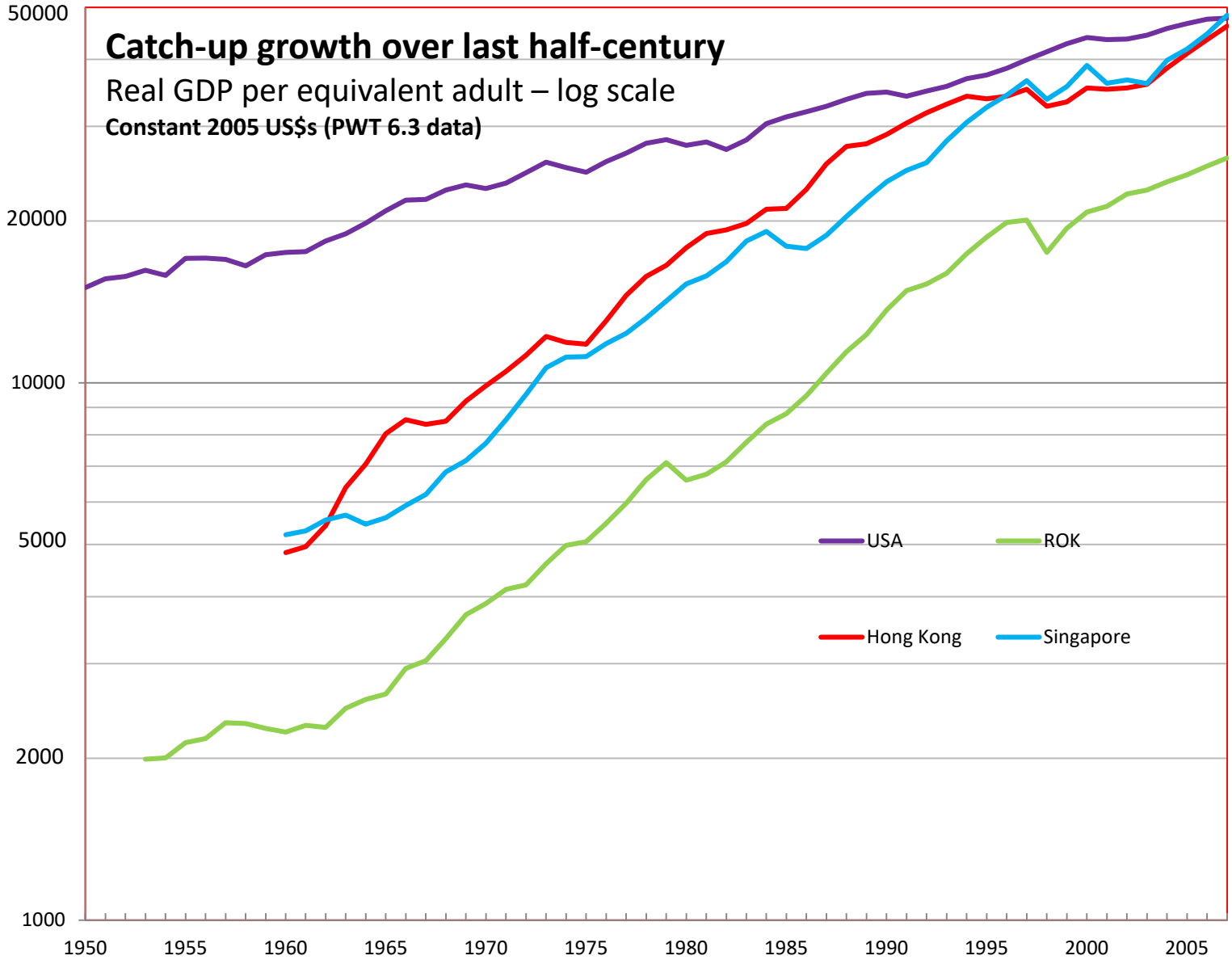
Note: Data for 1929–2014 are from the U.S. Bureau of Economic Analysis, NIPA Table 7.1. Data before 1929 are spliced from Maddison (2008).

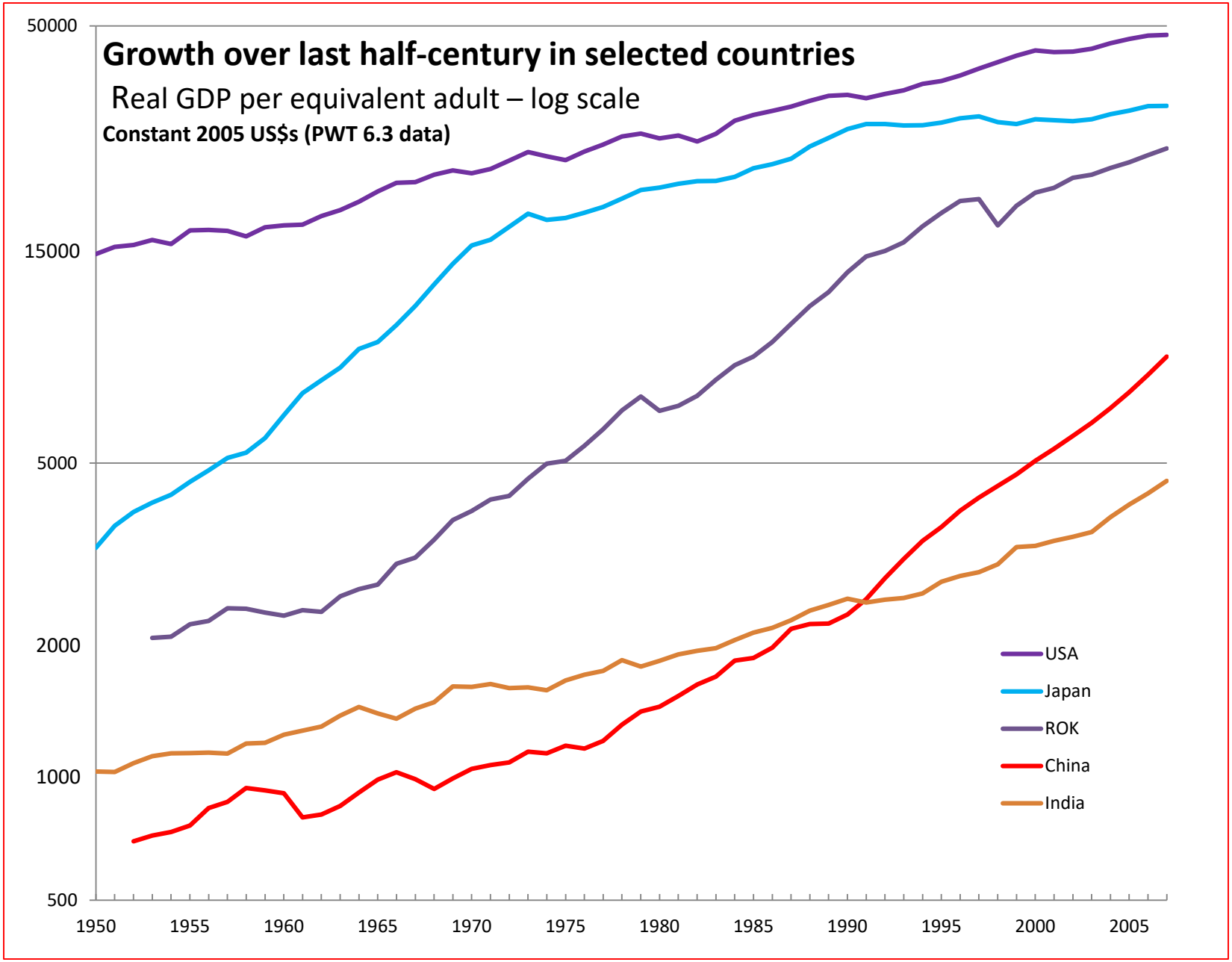
Trend vs. cycles in real GDP

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 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

UNDERSTANDING TREND INCOMES


Catch-up growth over last half-century
Real GDP per equivalent adult – log scale
Constant 2005 US$s (PWT 6.3 data)
50000
20000
10000
5000
2000
1000
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
USA
ROK
Hong Kong
Singapore


Growth over last half-century in selected countries
Real GDP per equivalent adult – log scale
Constant 2005 US$s (PWT 6.3 data)
50000
15000
5000
2000
1000
500
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
USA
Japan
ROK
China
India

Two short-cuts to understanding macro

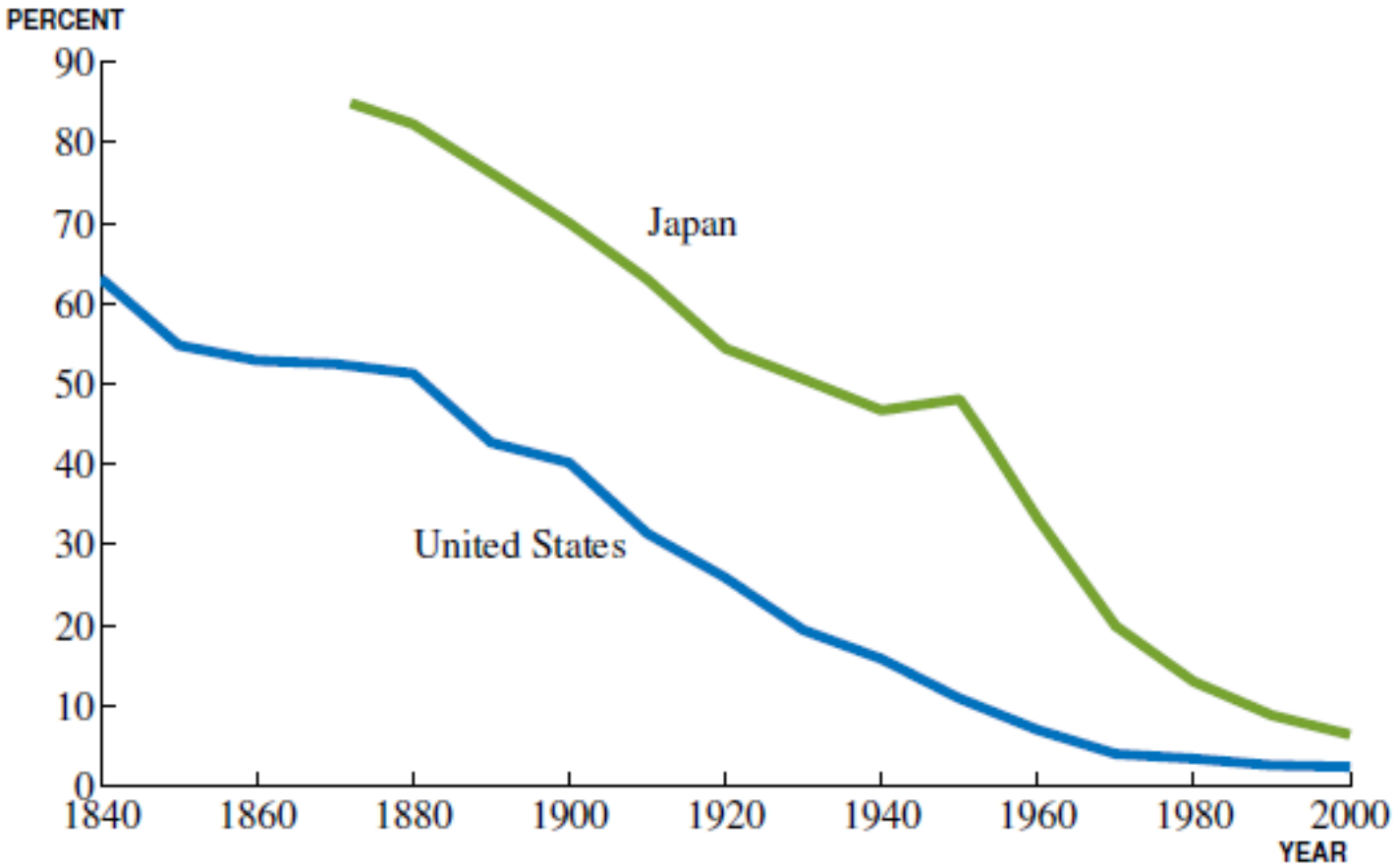
- Comparing micro and macro
  - Fish demand and supply
  - Aggregate demand and aggregate supply

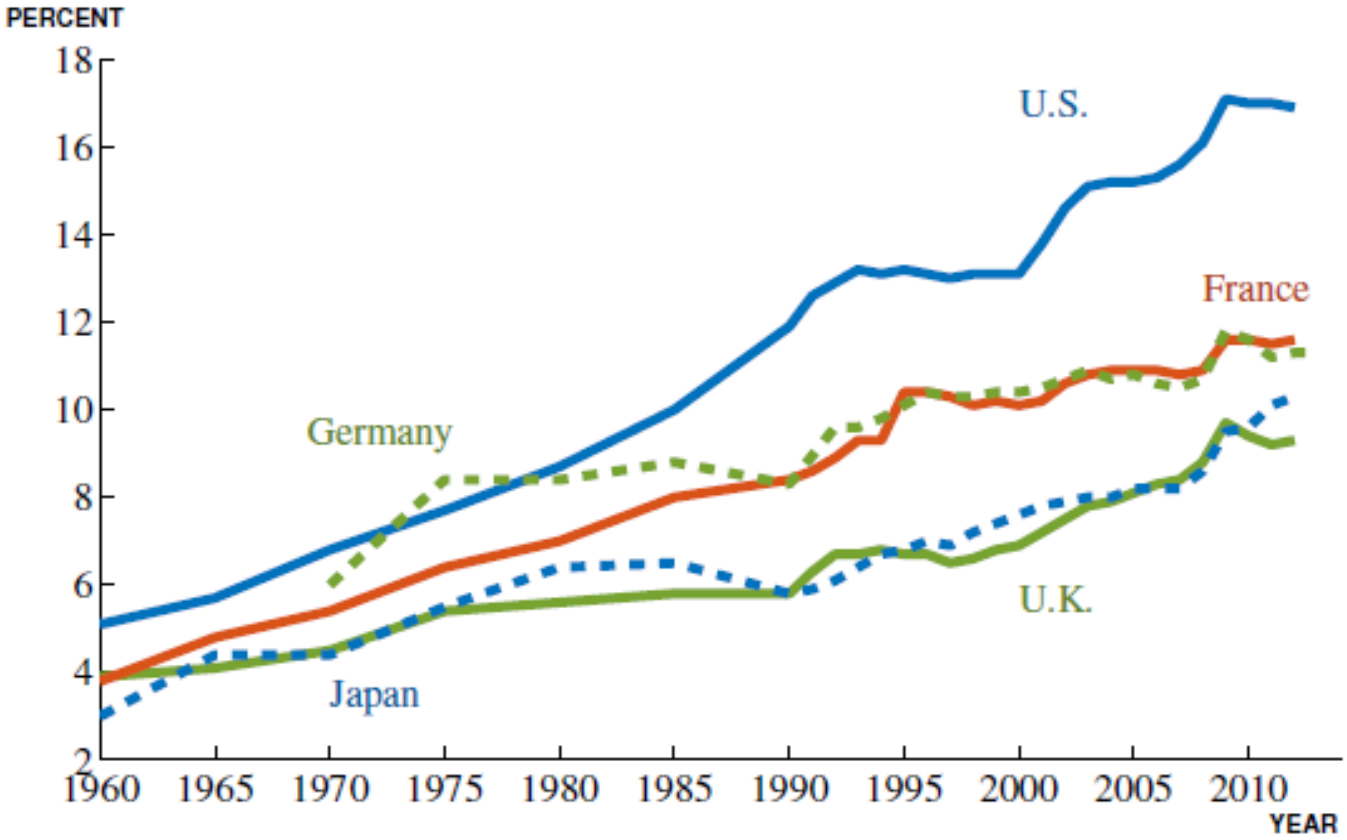
- Parable of Robinson Crusoe
  - Circular flow of income
  - Aggregate demand and aggregate supply

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


PERCENT
90
80
70
60
50
40
30
20
10
0
1840
1860
1880
1900
1920
1940
1960
1980
2000
YEAR
Japan
United States


PERCENT
18
16
14
12
10
8
6
4
2
1960
1965
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1975
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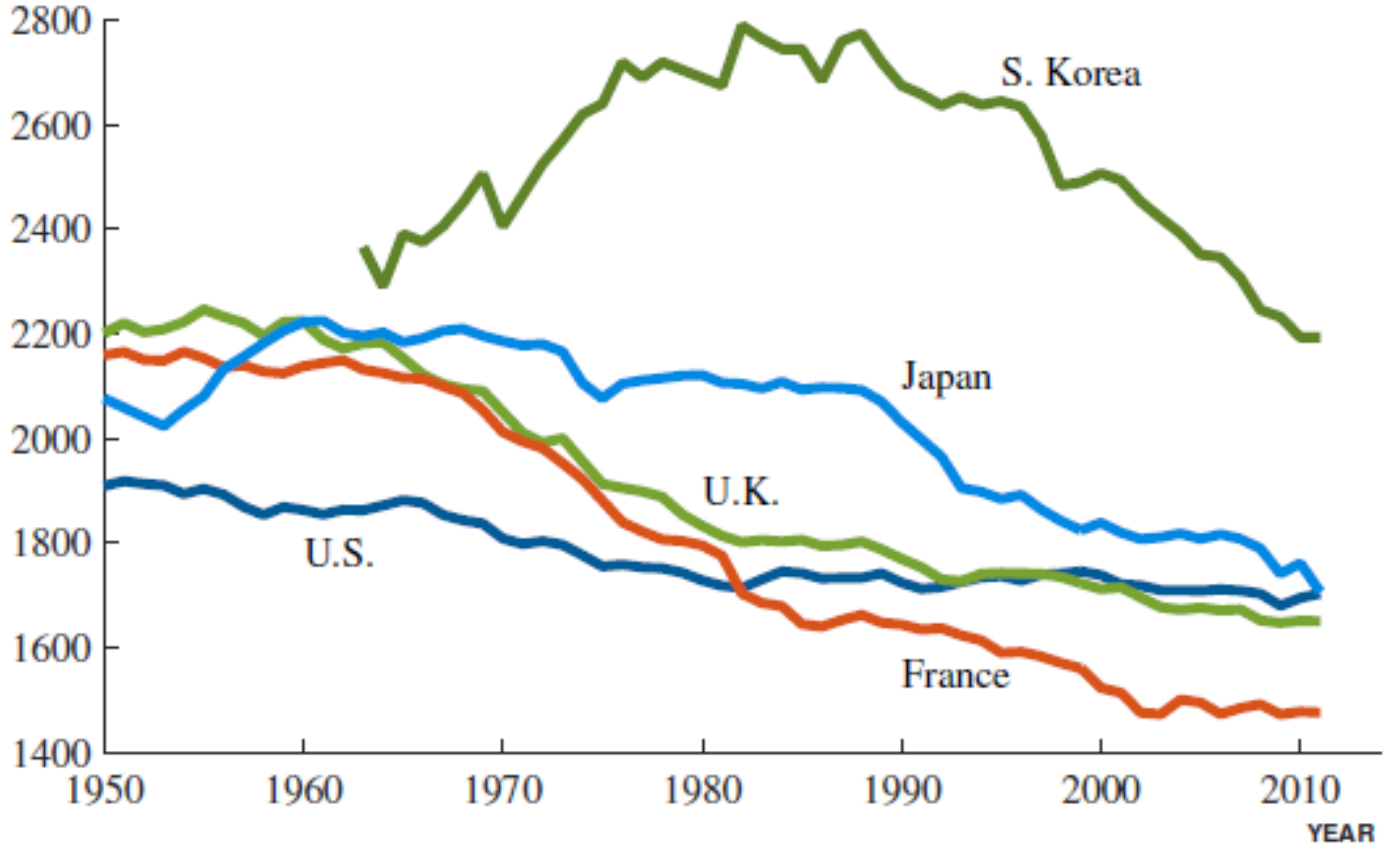
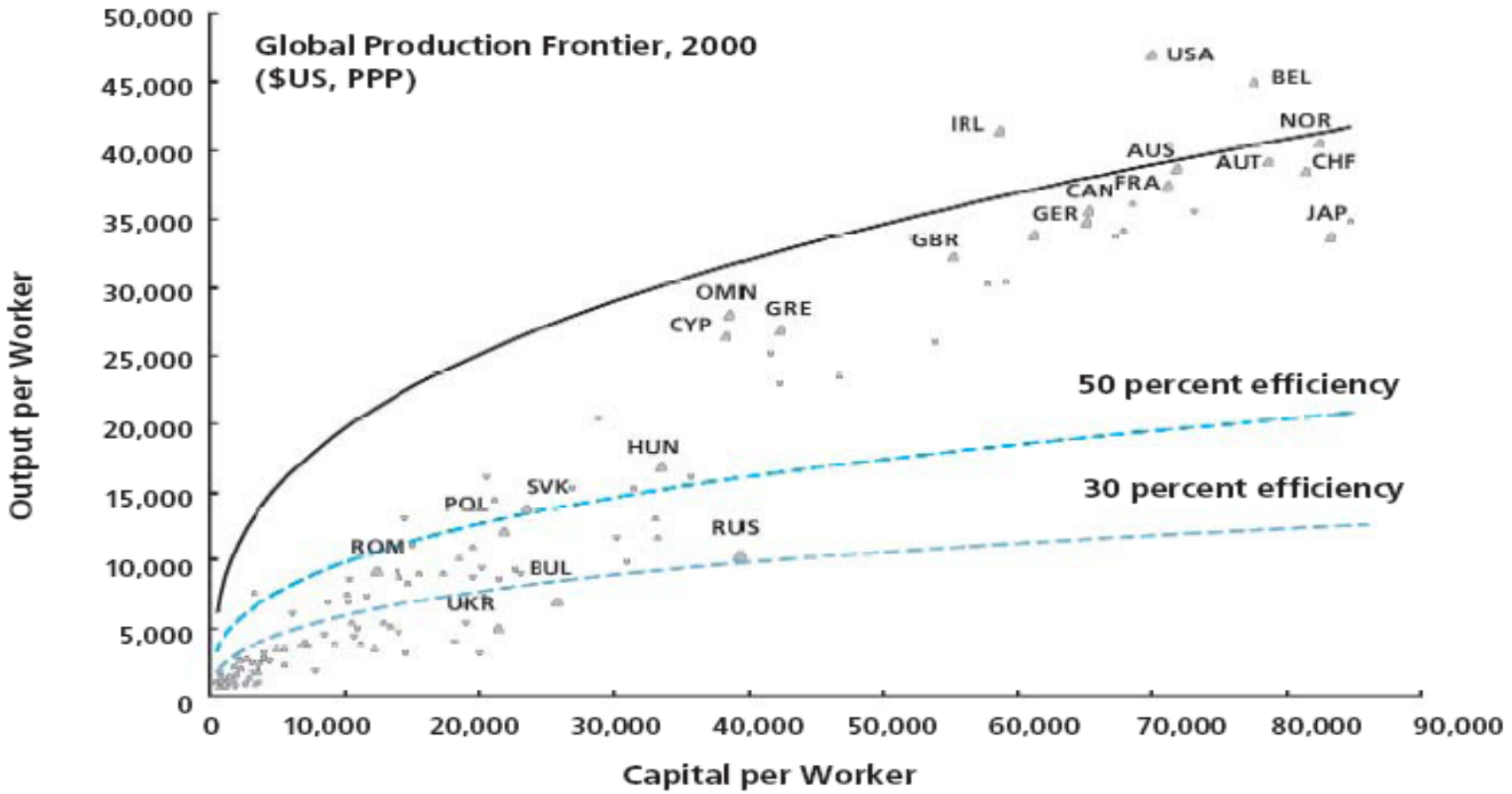
2005
2010
YEAR
U.S.
France
Germany
U.K.
Japan


2800
2600
2400
2200
2000
1800
1600
1400
1950
1960
1970
1980
1990
2000
2010
YEAR
S. Korea
Japan
U.K.
U.S.
France

Inputs, Output and Efficiency



A General View of Growth

- Y = F (Policies, Institutions, Geography, Shocks or Something Else)
- Policies
  - Macroeconomic Policies
  - Openness to trade
- Institutions
  - Extent of Rule of Law; Protection of Property Rights; Quality of Bureaucracy
- Geography;
  - Sachs: the “bad latitude” problem; Jared Diamond’s “guns, germs and steel”
- Shocks
  - Terms of trade shocks
  - Political conflict
  - Financial crises
- Something Else
  - Foreign Aid?
  - Resource Curse?
  - Expectations/Motivation?

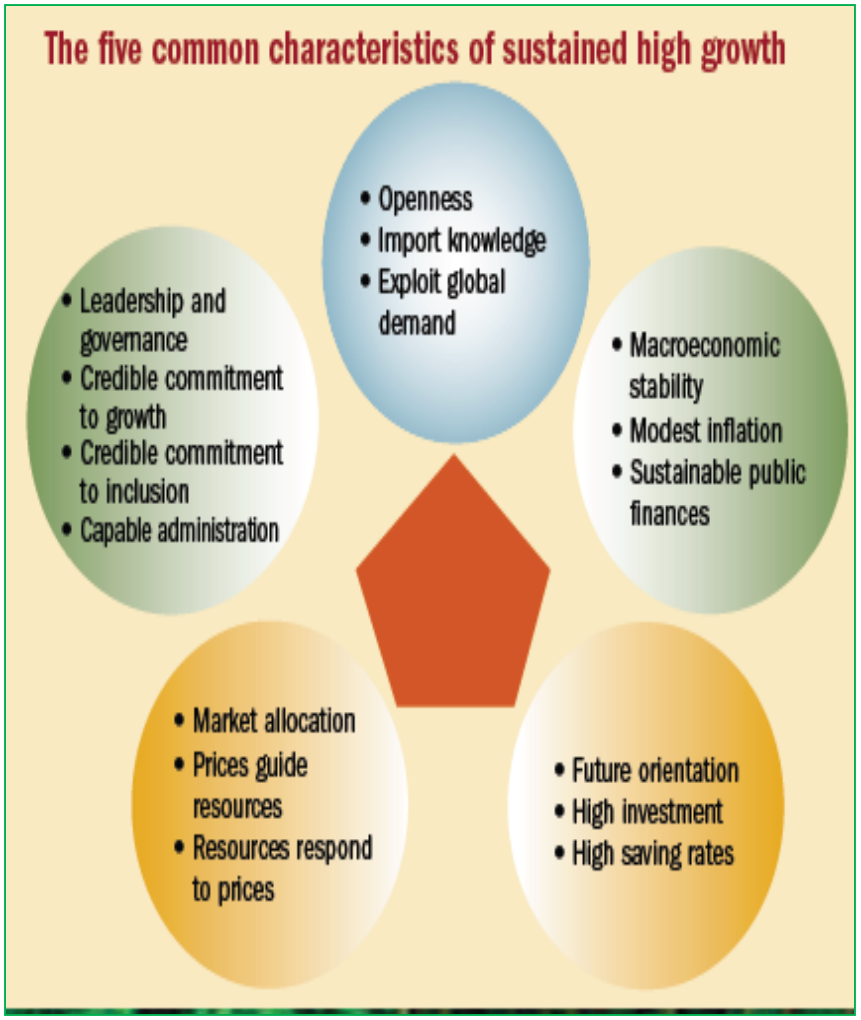
Sustained high growth in developing economies is a post-World War II phenomenon.

Economy	Period of high growth	Per capita income	
		At start of growth period	2005[1]
Botswana	1960–2005	210	3,800
Brazil	1950–1980	960	4,000
China	1961–2005	105	1,400
Hong Kong SAR	1960–1997	3,100	29,900
Indonesia	1966–1997	200	900
Japan	1950–1983	3,500	39,600
Korea	1960–2001	1,100	13,200
Malaysia	1967–1997	790	4,400
Malta	1963–1994	1,100	9,600
Oman	1960–1999	950	9,000
Singapore	1967–2002	2,200	25,400
Taiwan Province of China	1965–2002	1,500	16,400
Thailand	1960–1997	330	2,400

Source: World Bank, *World Development Indicators 2007*.

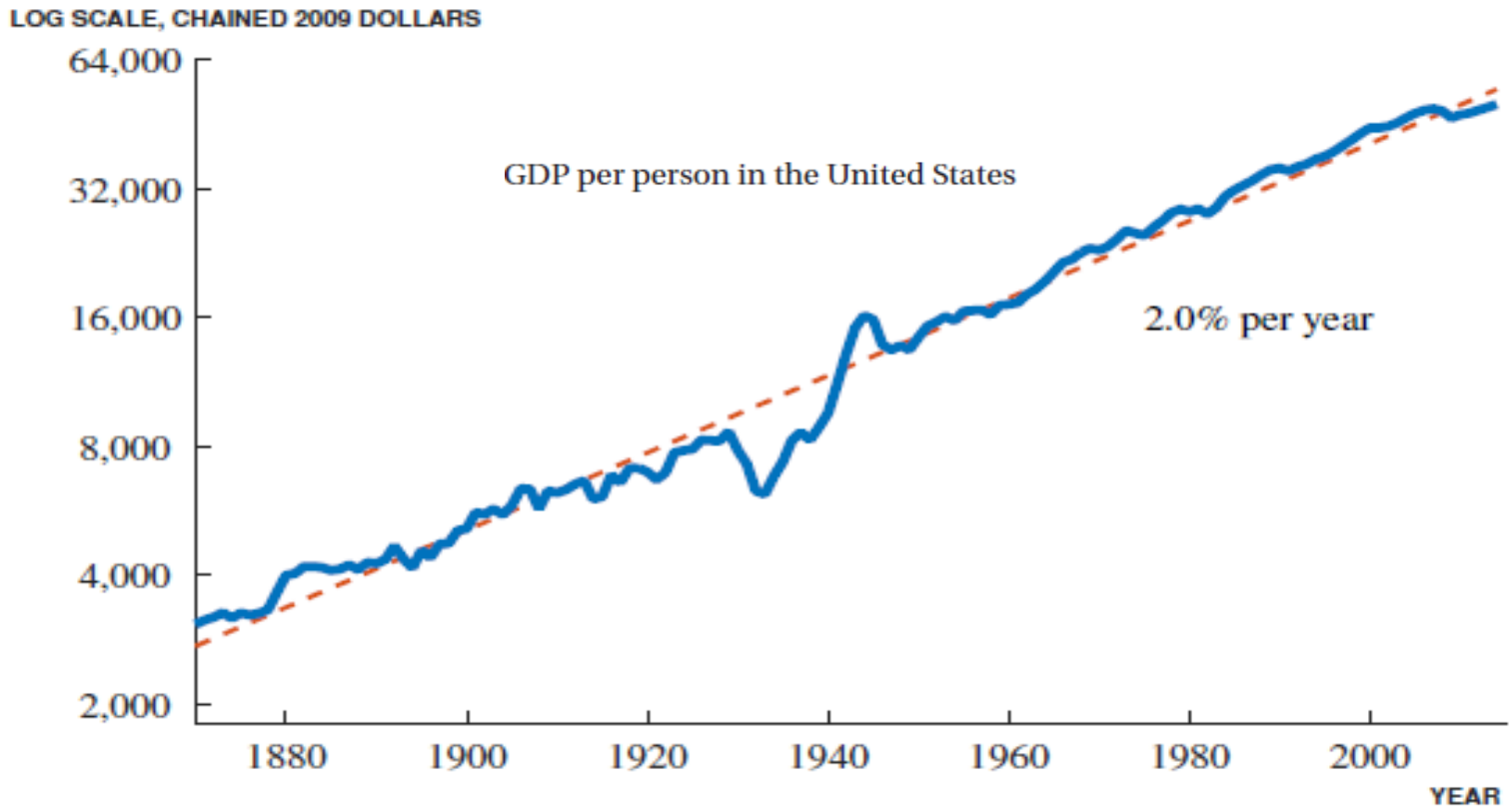
Note: A 7 percent cutoff was chosen because growth at these rates produces very substantial changes in incomes and wealth: income doubles every decade at 7 percent.

[1]In constant 2000 U.S. dollars.



INCOME INEQUALITY

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



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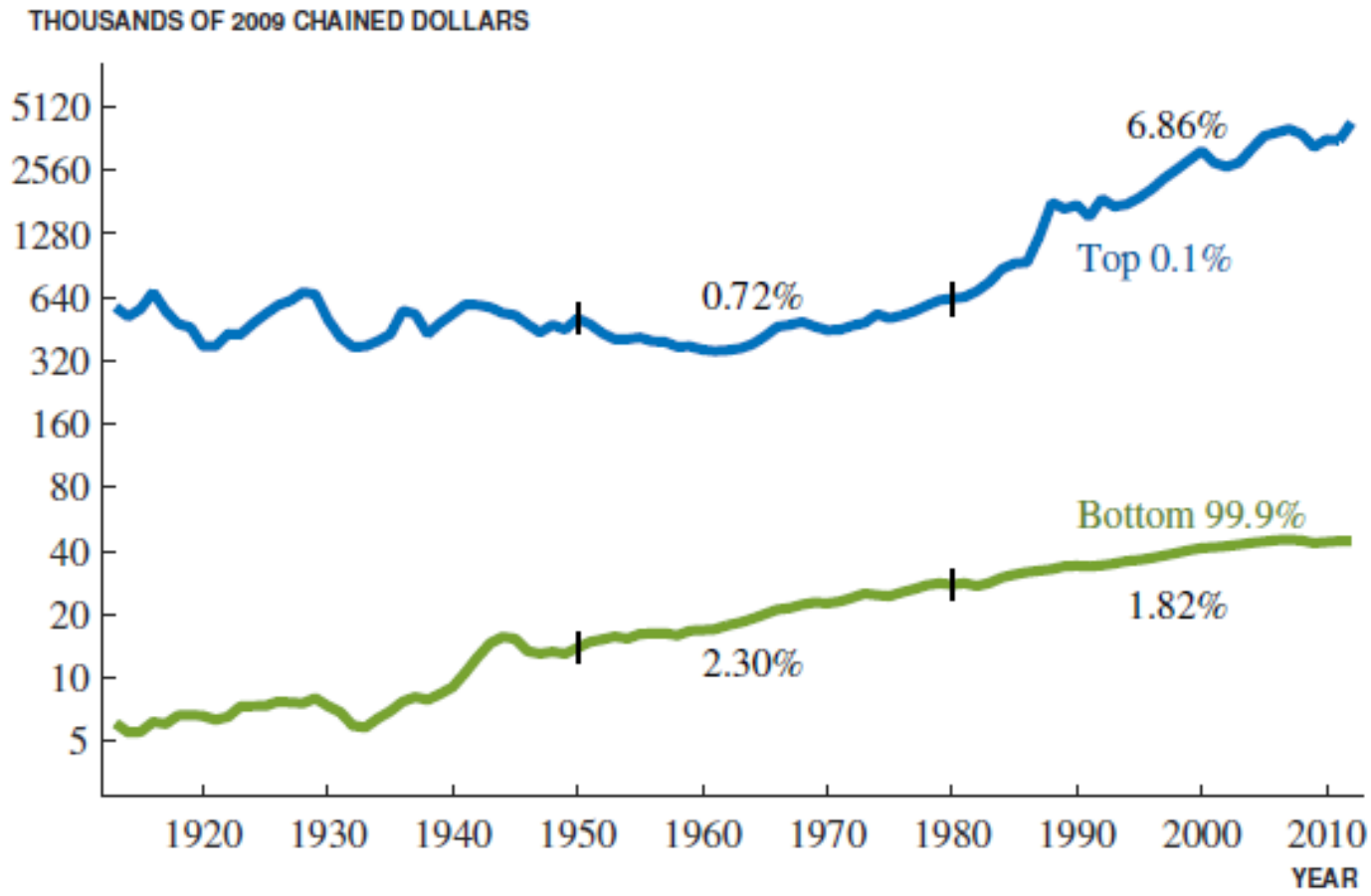
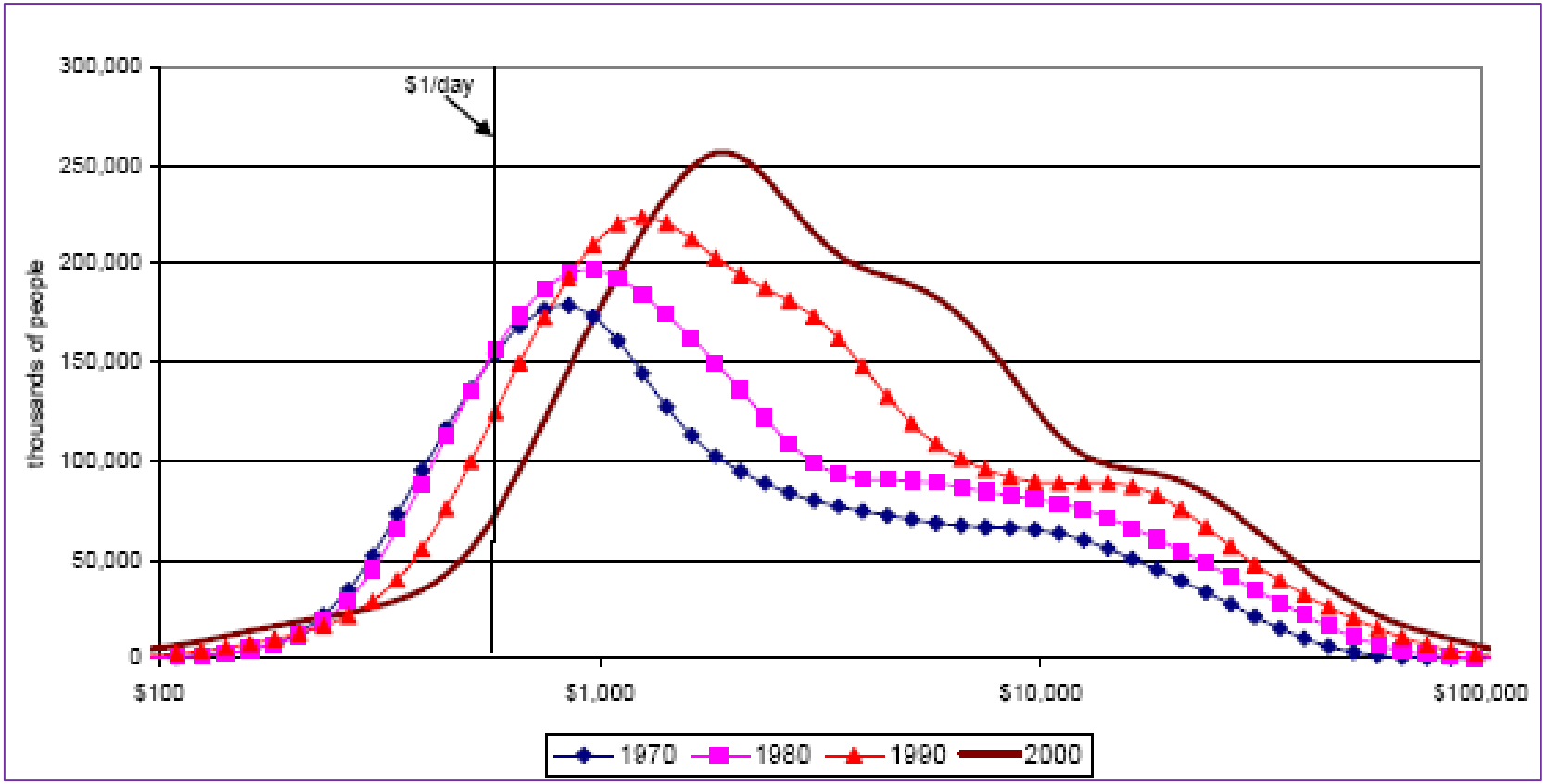
GDP per person, Top 0.1% and Bottom 99.9%



Basic Facts About Income Inequality

Concept of income inequality	Cross-country inequality	Within-country inequality	Global inequality
What it measures	Inequality of *average* incomes across countries	Differences between incomes of the rich and the poor within a country	Differences between incomes of the rich and the poor, ignoring the country to which they belong
What the evidence shows	Divergence	Increasing inequality in many countries (for example, Brazil, China, United States), but low and stable levels in many others (for example, Canada, France, Japan)	Convergence

‘Global Inequality’ (“Imagine there’s no countries”: Evolution of the World Distribution of Income



Inclusive Growth

"A unifying framework for all this [new] work can be summarized in two words: Inclusive growth. We want growth, but we also want to make sure:

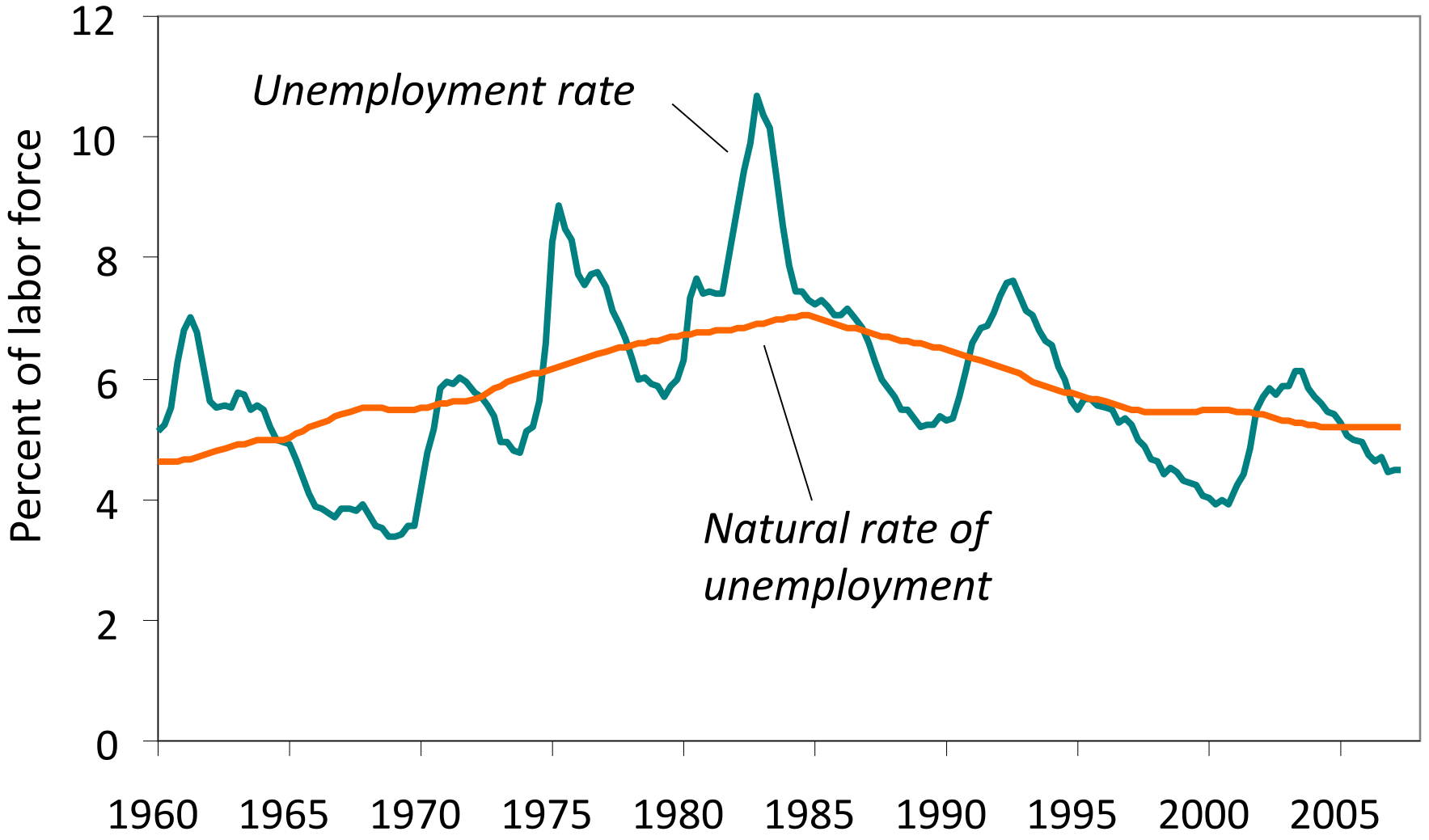
- that people have jobs—this is the basis for people to feel included in society and to have a sense of dignity;
- that women and men have equal opportunities to participate in the economy—hence our focus on gender;
- that the poor and the middle class share in the prosperity of a country—hence the work on inequality and shared prosperity;
- that, as happens, for instance when countries discover natural resources, wealth is not captured by a few—this is why we worry about corruption and governance;
- that there is financial inclusion—which makes a difference in investment, food security and health outcomes; and
- that growth is shared just not among this generation but with future generations—hence our work on building resilience to climate change and natural disasters."

Prakash Loungani, IMF Blog, January 24, 2017.

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



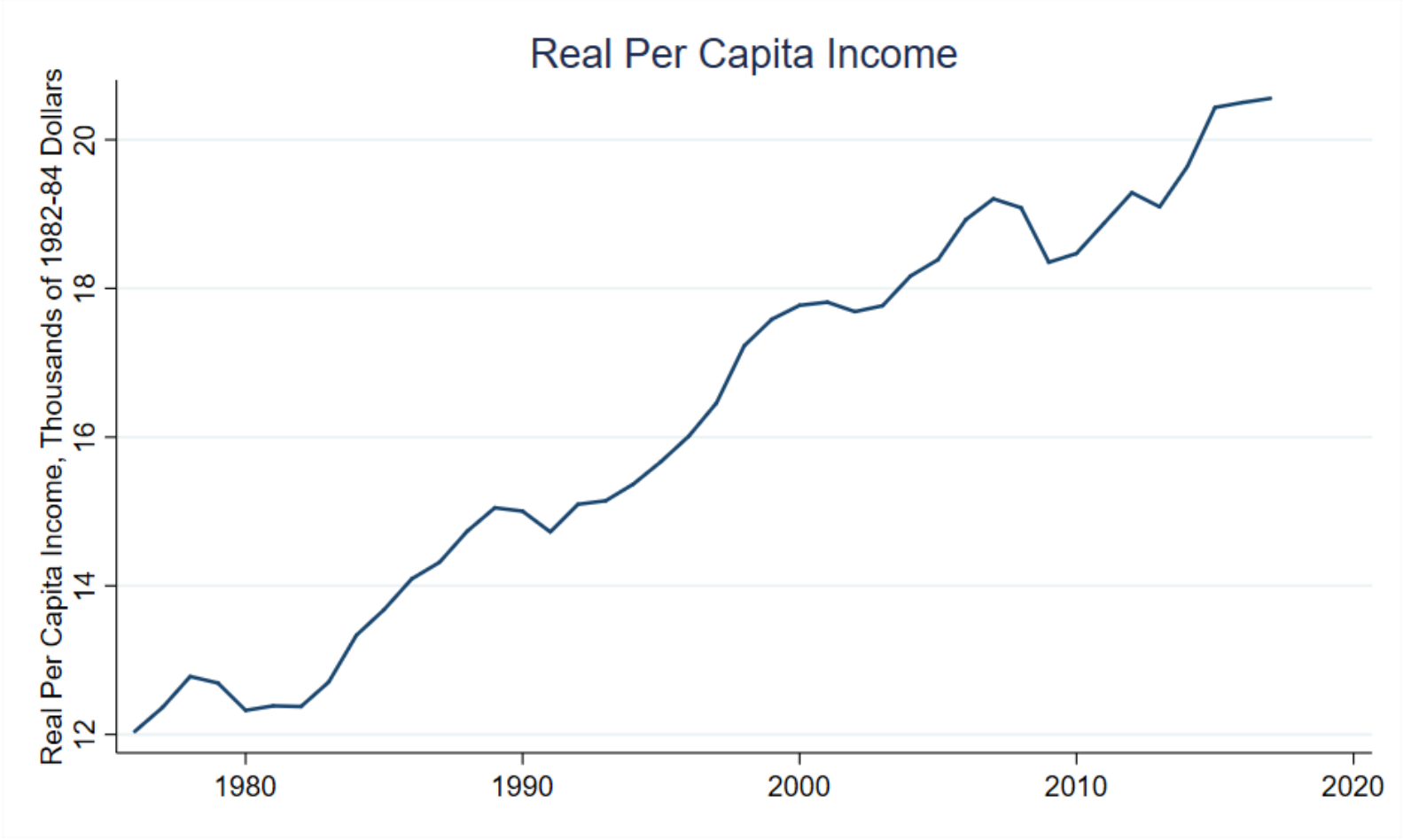
UNDERSTANDING CYCLICAL RELATIONSHIPS

List of Figures

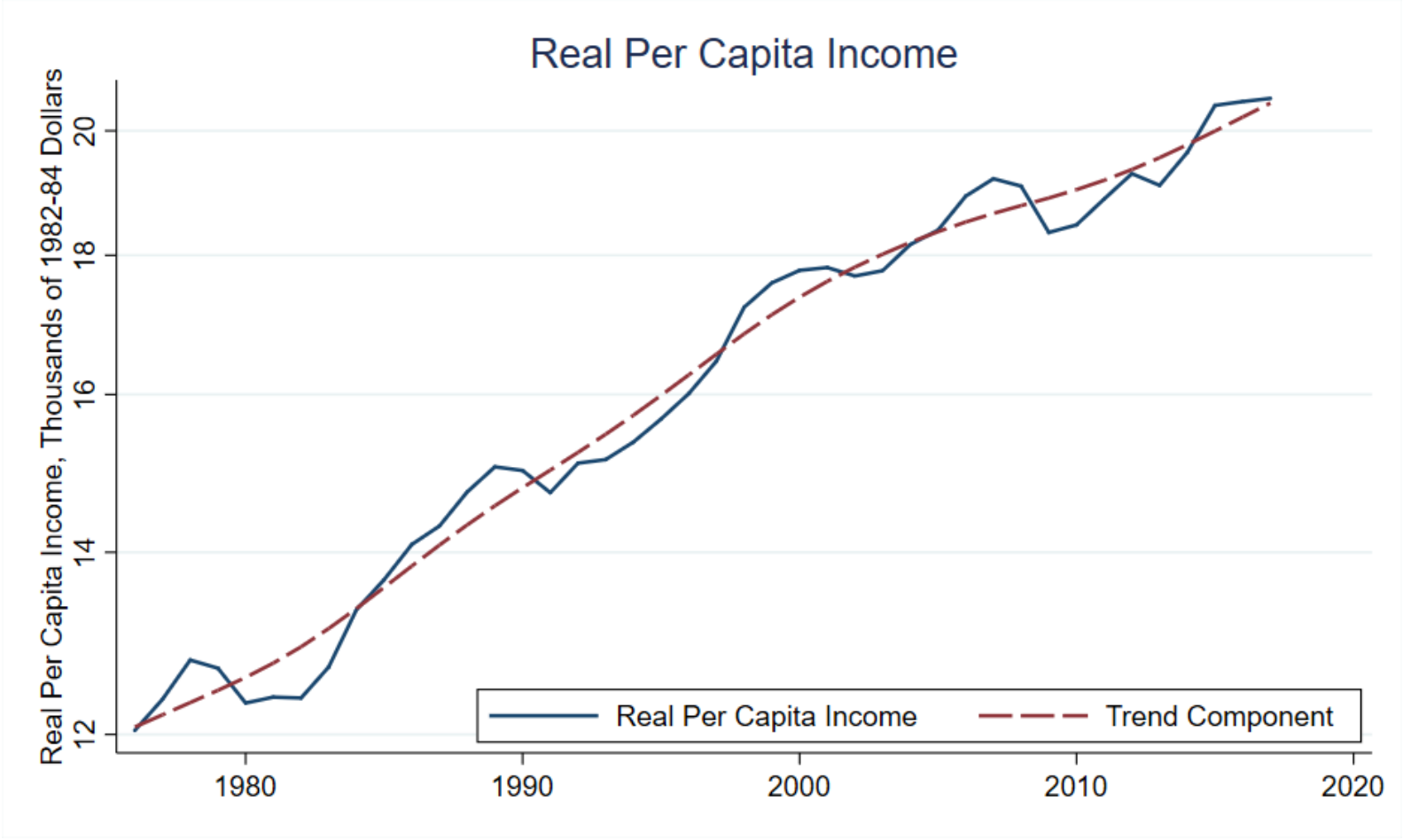
(see Data_National Sheet in 'Okun' Database)

- Real Income
  - Plot of raw data
  - Plot of logged data and trend (HP)
  - Plot of cycle component (HP)
  - Plot of logged data, trend and cycle (HP)
- Unemployment Rate
  - Plot of raw data
  - of data and trend (HP)
  - Plot of cycle component (HP)
  - Plot of data, trend and cycle (HP)
  - Cycle components between U and Y
- Unemployment Rate
  - Plot of data and trend (average)
  - Plot of cycle component (average)
  - Plot of data, trend and cycle (average)
  - Cycle components between U (average) and Y (HP)

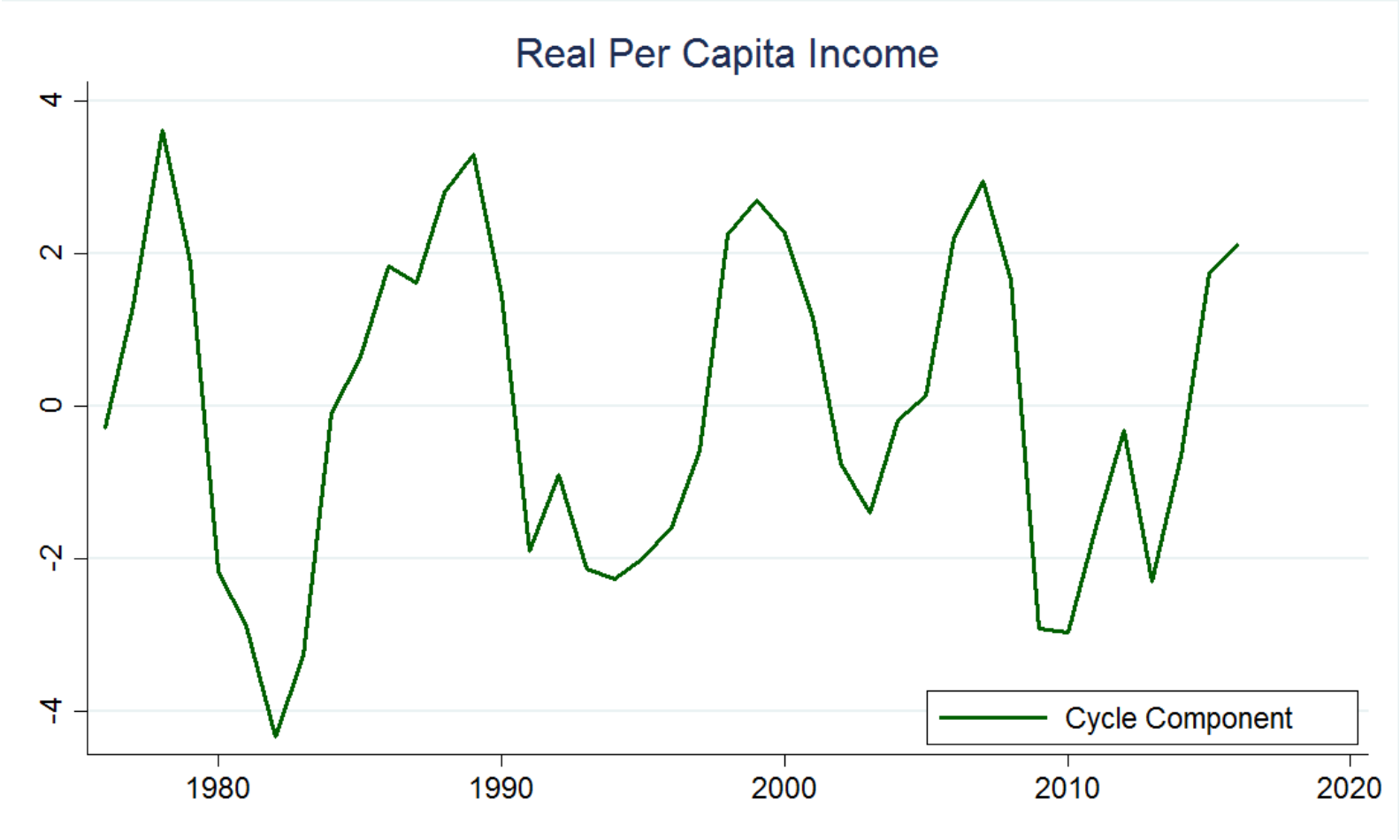
Real Per Capita Income



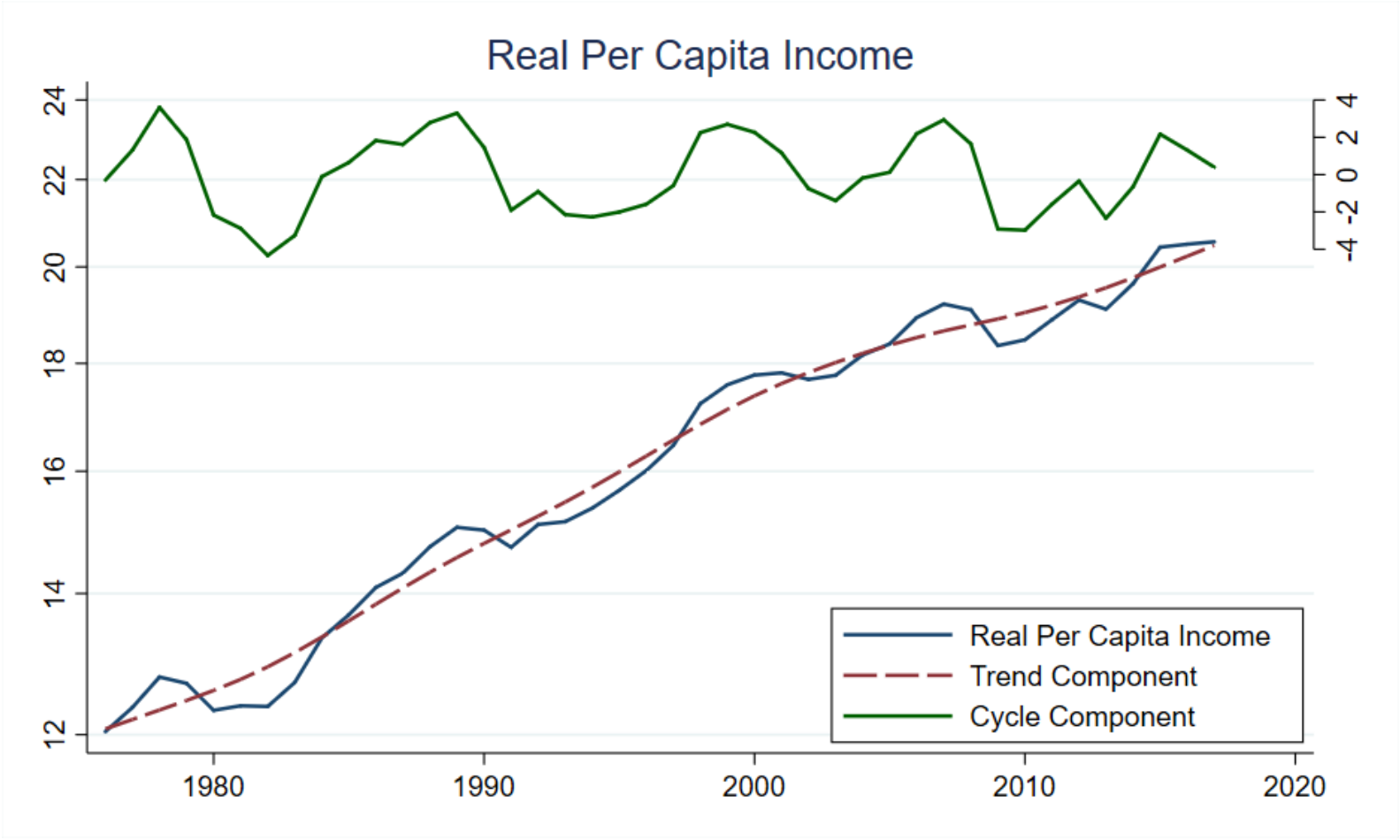
Real Income – HP Trend



Real Income – Cycle (after removing HP trend)

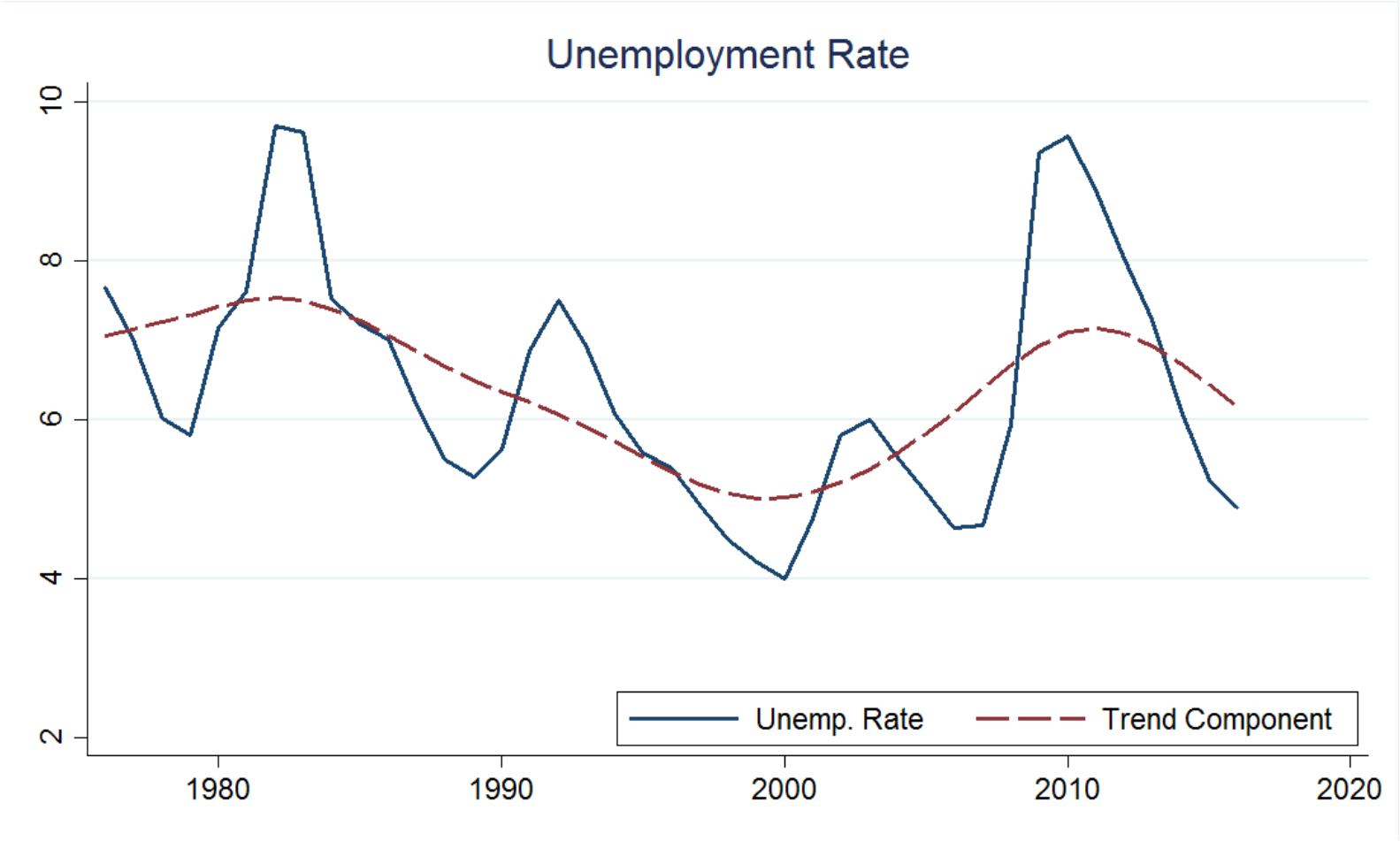


Real Income – Trend and Cycle



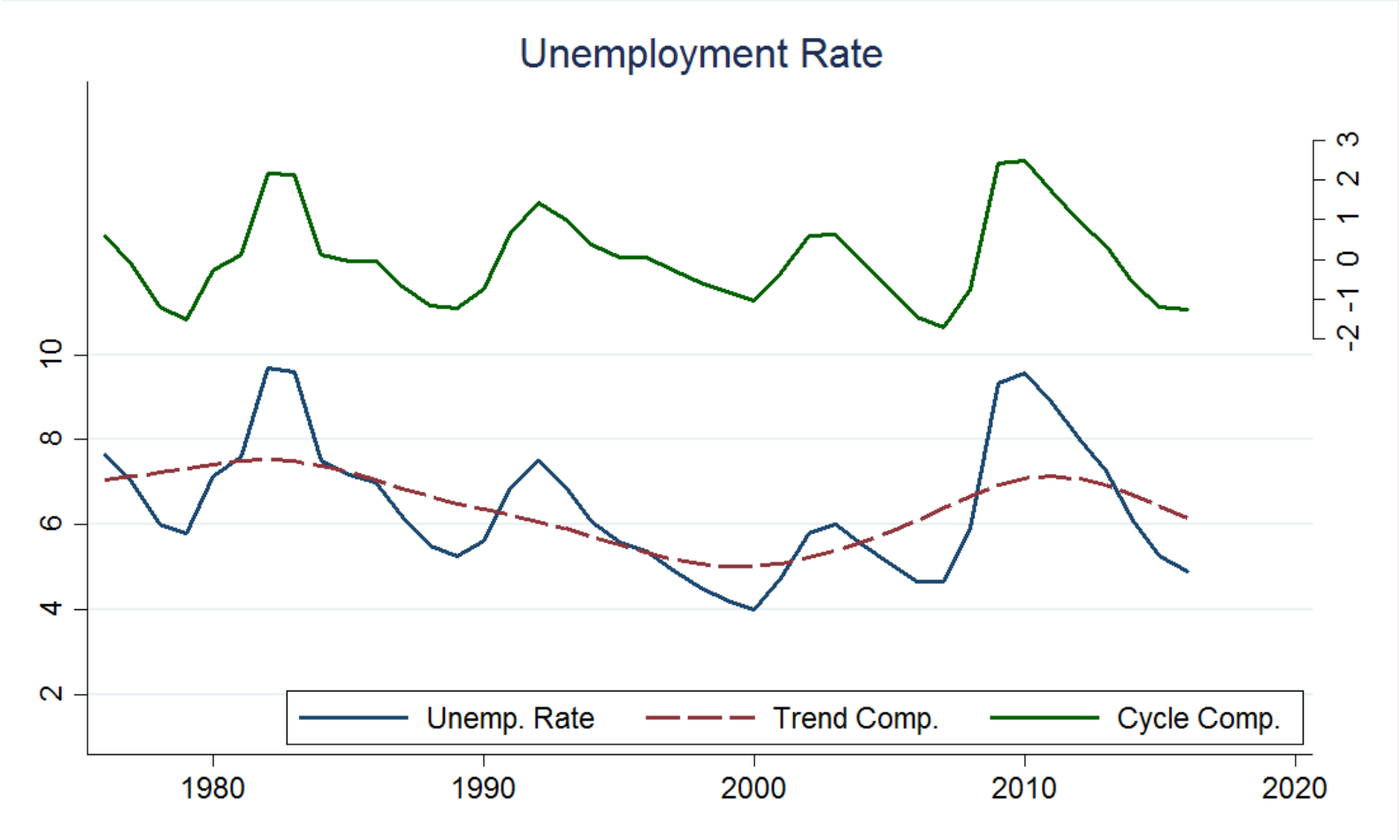
Unemployment Rate

Unemployment Rate – HP Trend

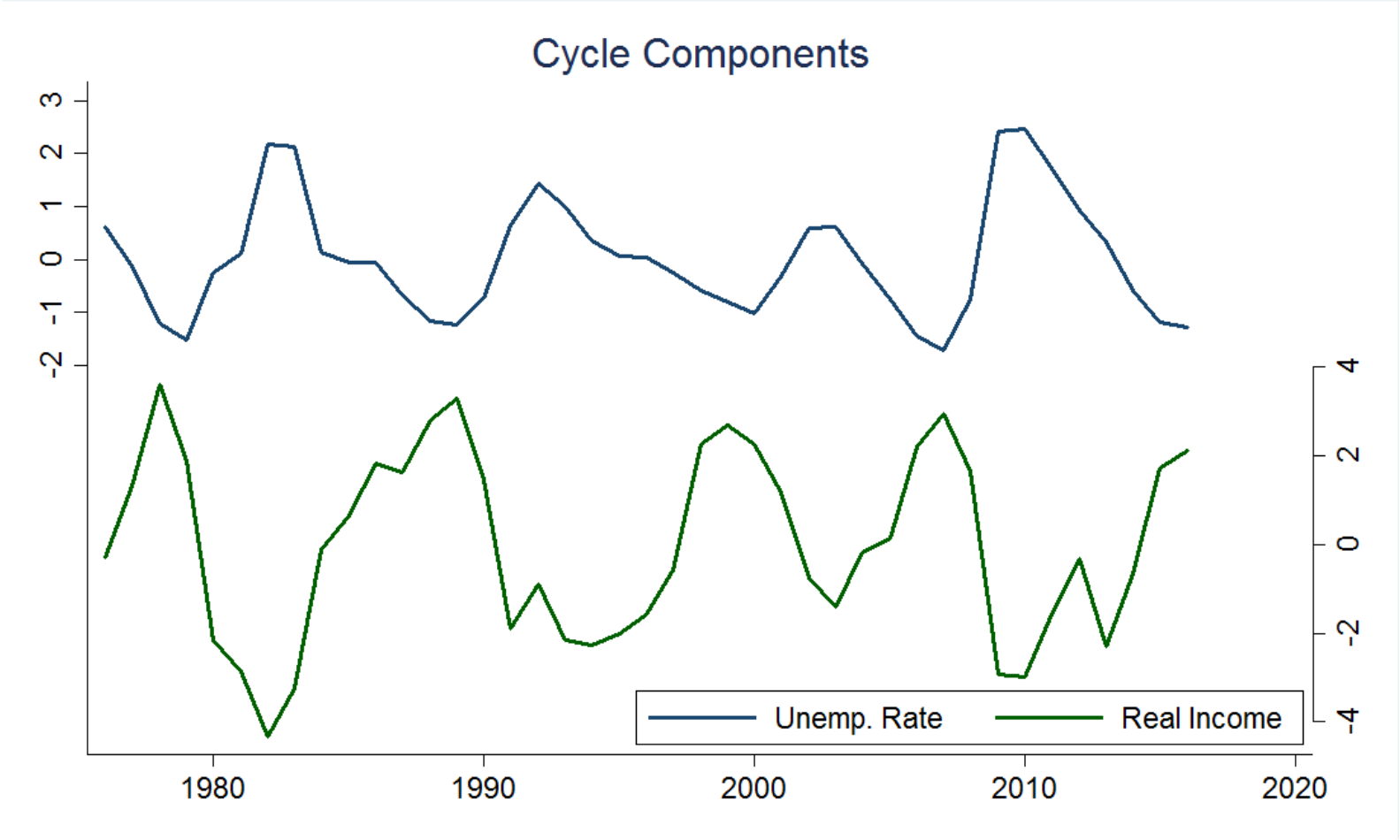


Unemployment Rate – Cycle (after removing HP trend)

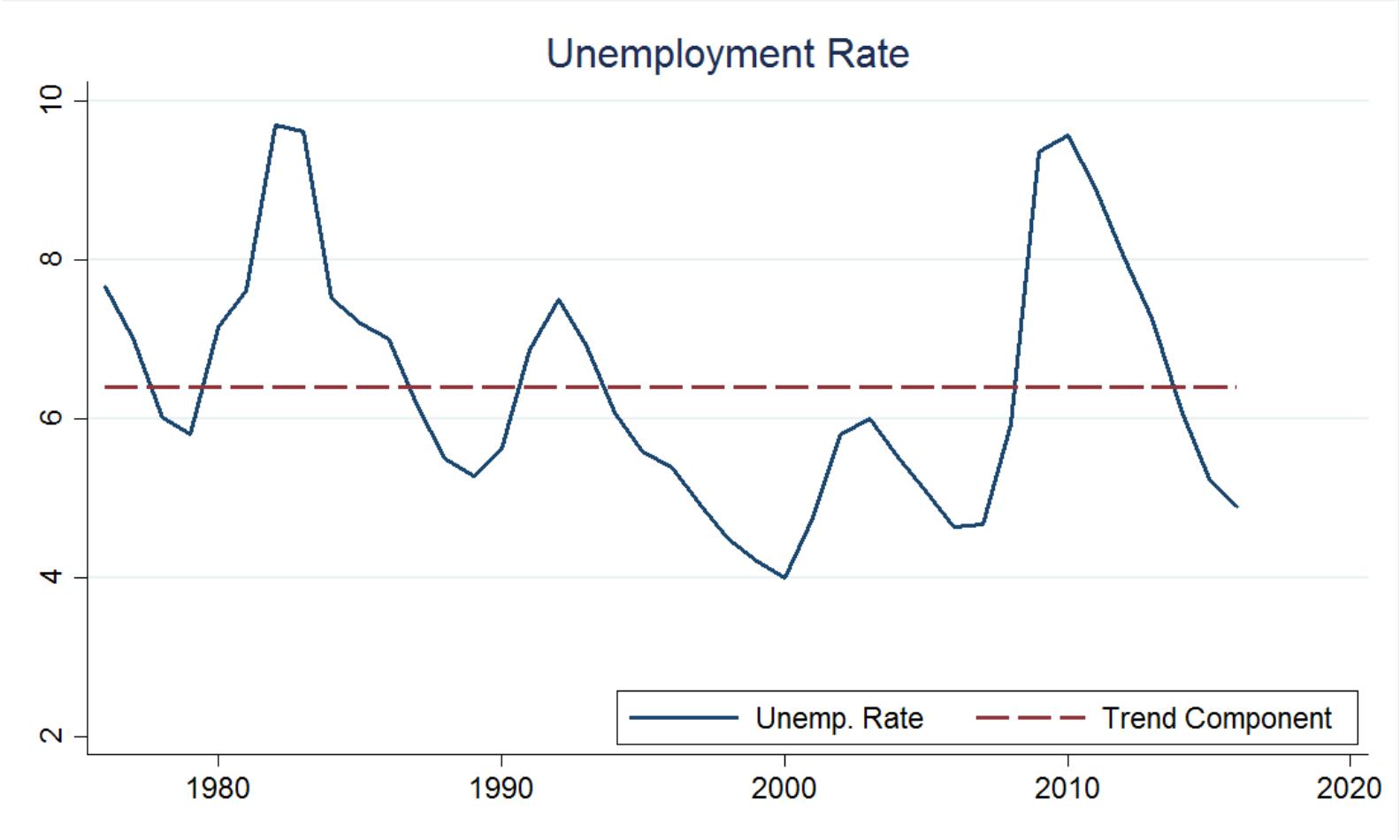
Unemployment Rate – Trend and Cycle



Cyclical Components of Output (Income) and Unemployment

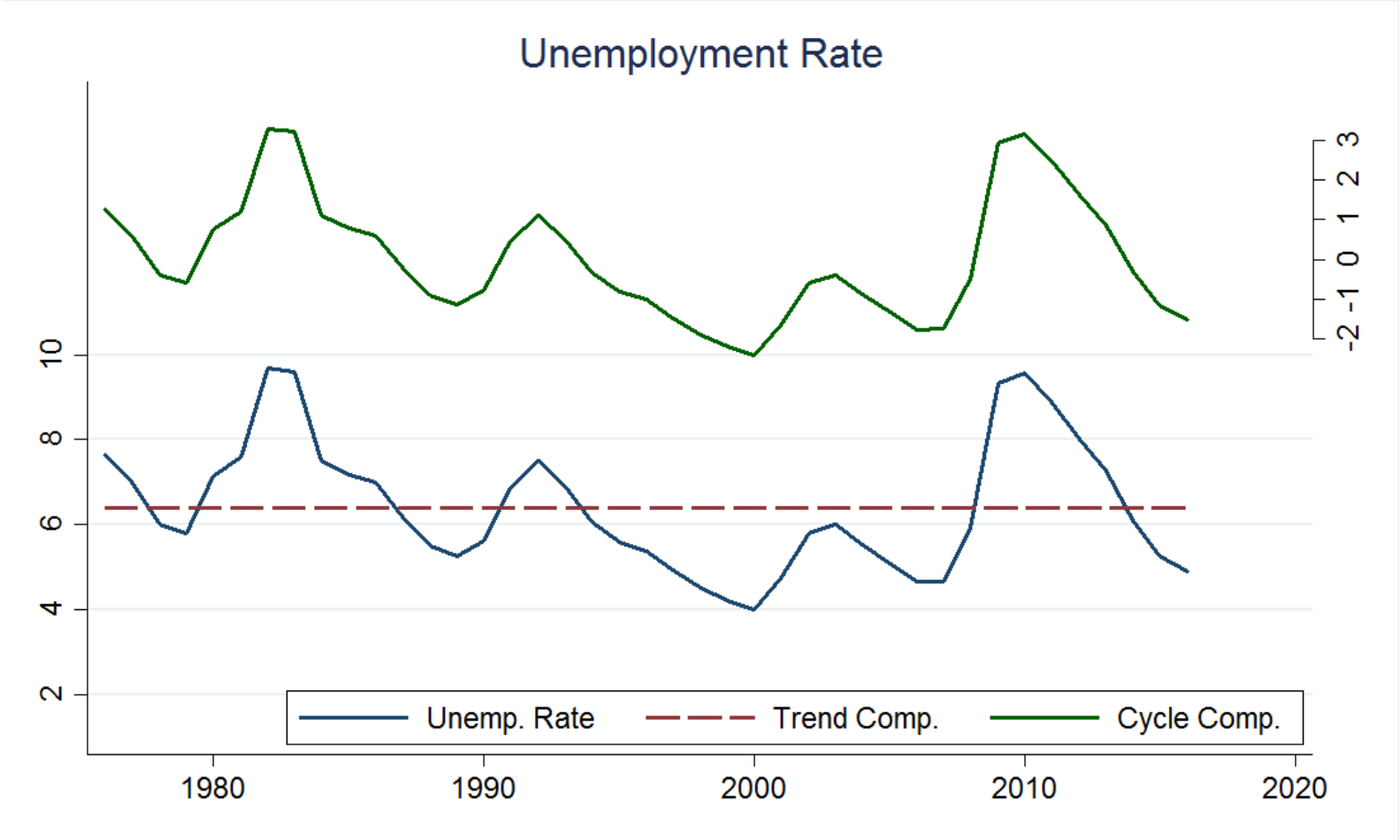


Unemployment Rate
Trend = Sample Average

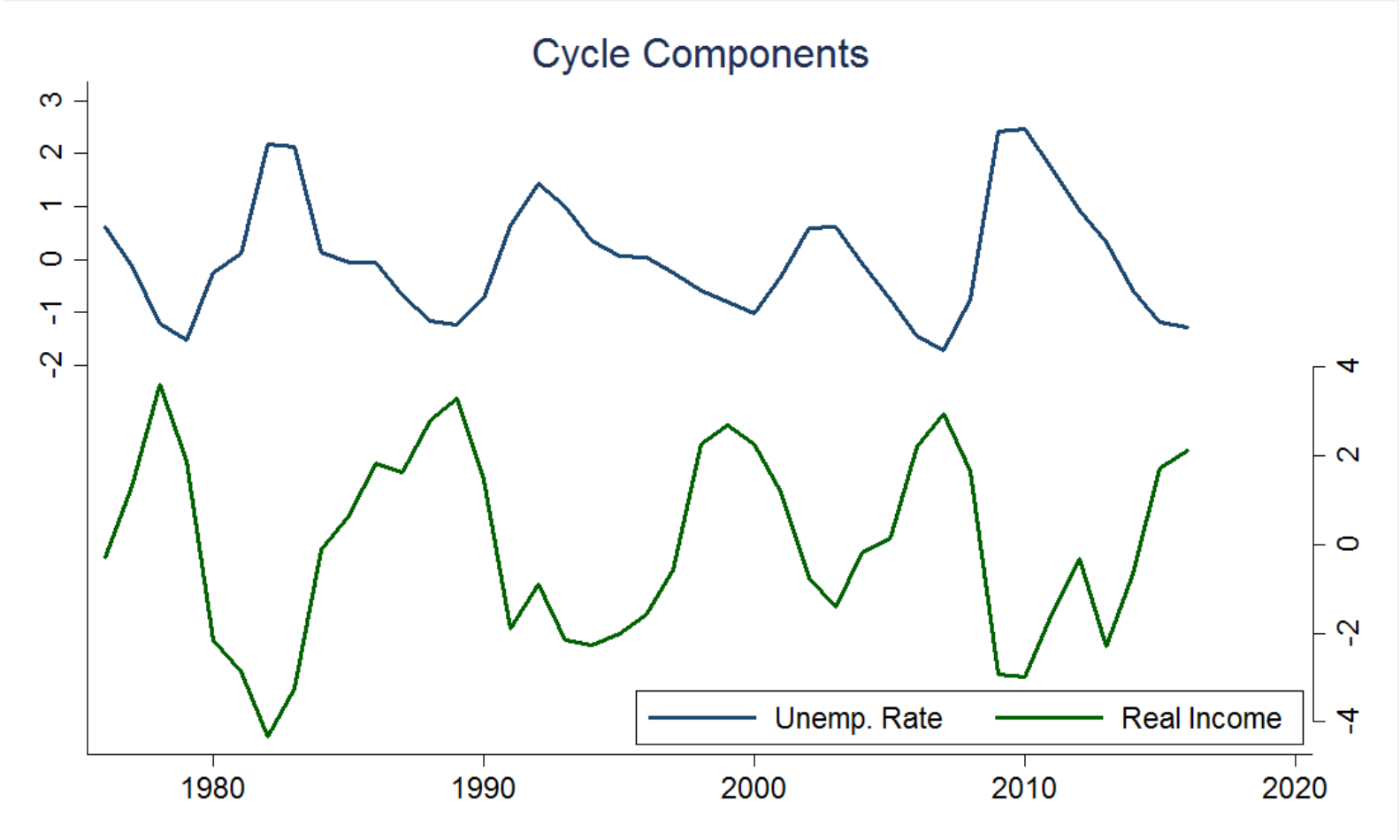


Unemployment Rate – Cycle (Deviations around Sample Average)

Unemployment Rate – Trend and Cycle



Cyclical Components – Real Income (HP), UR (Average)



Okun's Law
("Levels" or "Gap" version)

$u_t - u_t^* = \beta (\ln y_t - \ln y_t^*) + \varepsilon_t \qquad \beta < 0$

u = unemployment rate

u* = natural rate of unemployment

ln y = natural log of output (or output per capita)

ln y* = natural log of potential output (or output per capita)

We measure u_t^* and y_t^* with HP filter ("lambda" = 100).

Okun's Law ("Changes version")

$\Delta u_t = \alpha + \beta\, y_t + \omega_t$

Δu = change in unemployment rate

(i.e. $\Delta u_t = u_t - u_{t-1}$)

y = growth rate of real GDP

- The "changes" version follows from the "levels" or "gap" version under certain assumptions

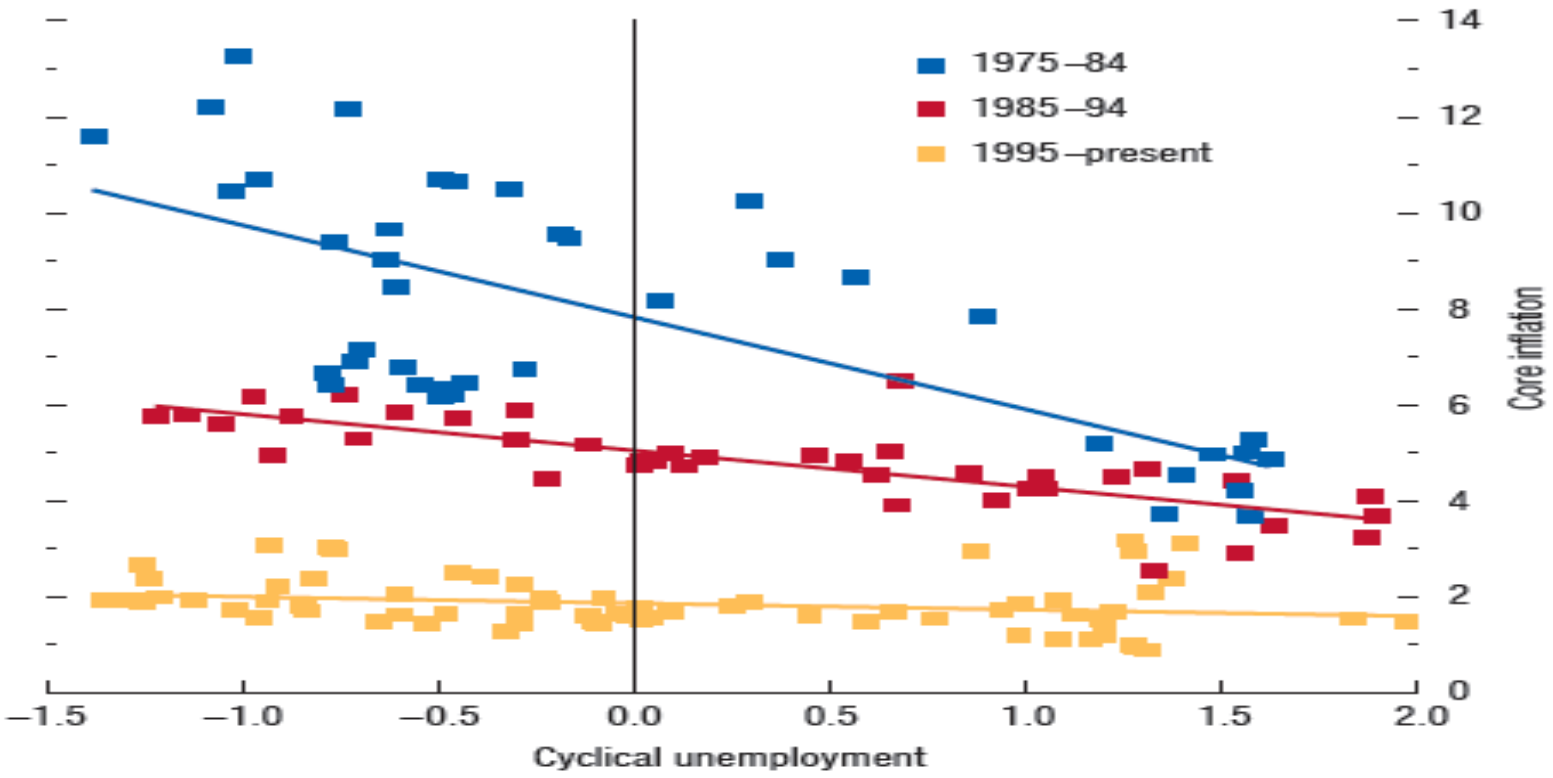
  (for example, if u^* and Δy^* are constant)

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.

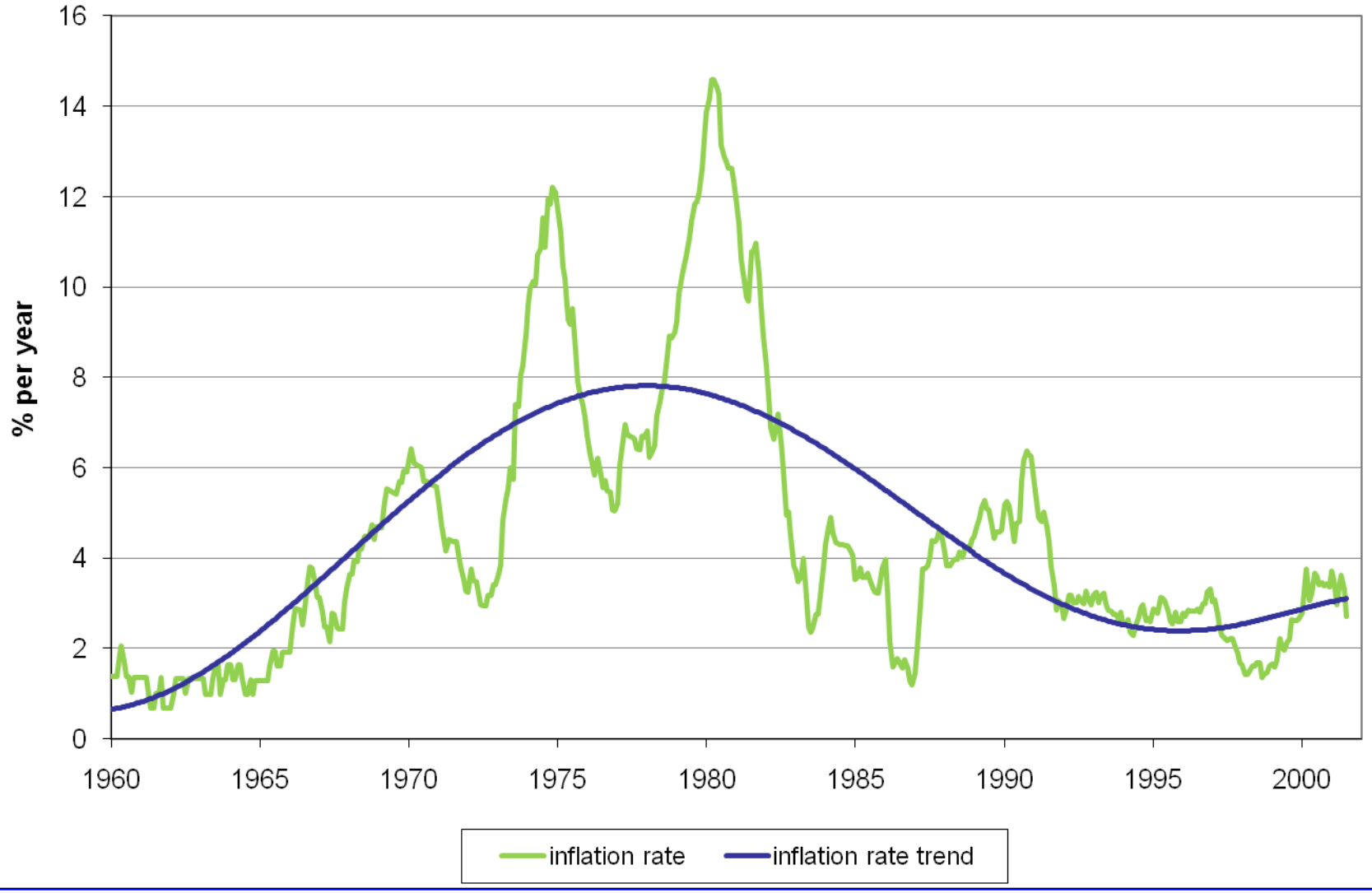


THE ROLE OF MONETARY POLICY:

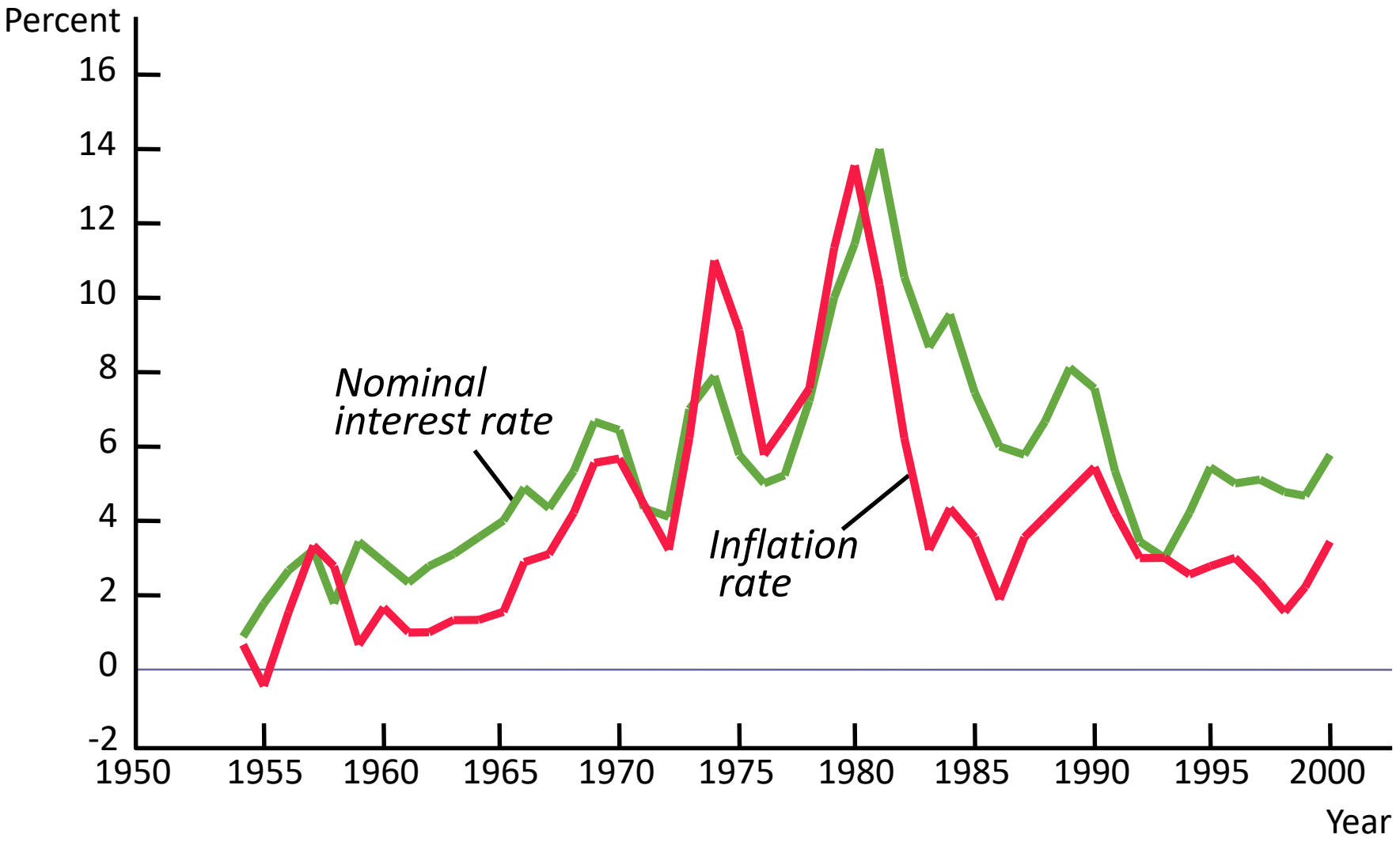
1) KEEP AVERAGE INFLATION LOW

2) STABILIZE CYCLICAL FLUCTUATIONS

U.S. Inflation & its Trend



U.S. inflation and nominal interest rates



Many different interest rates

- For this lecture:
  - 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’


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

How Should Central Banks Set the Policy Rate? The Taylor Rule

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

n_{cb} = nominal federal funds rate

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

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

- The first '2' in the equation is the neutral (long-run) real interest rate (assumed to be 2 percent)
- The second '2' in the equation is the inflation target (assumed to be 2 percent)
- The two '0.5' numbers are values that held for the U.S. in the 1980s and 1990s. They can be different over other periods, and can differ by country.

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 policy rate at 2% (and therefore the nominal policy rate is 4%).
- For each percentage point increase in p, monetary policy should be 'tightened' by raising the real policy rate by 0.5 percentage points.
- For each percentage point that GDP falls below potential, monetary policy should be 'eased' by reducing the real policy rate by 0.5 percentage points.

CENTRAL BANK ACTIONS:
FROM THE SHORT RUN TO THE LONG RUN

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**"

Transition from Short Run to Long Run (1)

- Interest rates and money supply
  - Raising policy interest rates is similar to curbing growth of money supply.
  - Lowering policy interest rates is similar to raising the growth rate of the money supply.
- In the short run, the central bank lowers policy interest rates (i.e. raises the growth rate of the money supply) to stimulate the economy (bring output back to trend; close the output gap)
- But it lowering policy interest rates stimulates the economy, shouldn't the central bank always keep interest rates low?

Transition from Short Run to Long Run (2)

- 'Good' scenario:
  - Central bank has lowered rates because the economy is in a slump (output gap is large). In this case, inflation may not go up much; plus, some stimulus can be justified even if inflation does go up a bit
  - The central bank has credibility, that is, people expect it to keep its (medium- to long-run) inflation target. This means that people expect that interest rates will be raised back to neutral once the output gap has closed. Hence, inflation expectations remain anchored.

Transition from Short Run to Long Run (3)

- ‘Bad’ scenario(s):
  - Wrong reasons: Central bank has lowered rates even though the economy is not in a slump (output gap is zero). Or, the central bank may have made a mistake about the size of the output gap. In these cases, inflation may go up (and the stimulus cannot be justified on the grounds that it is helping the economy recover from a slump)
  - Right reasons, poor credibility: Central bank may have lowered reasons for the right reasons (economy is indeed in a slump) but it has poor credibility. That is, people expect it will not keep to (or have difficulty keeping to) its medium- to long-run inflation target. This means that people expect that interest rates will not be raised back to neutral once the output gap has closed. Hence, inflation expectations can get unanchored.
  - Wrong reasons, poor credibility: Worse case scenario – inflation may kick up because central bank has intervened at the wrong time; and problem is compounded as inflation expectations get unanchored.

CENTRAL BANK ACTIONS: THE LONG RUN

The Quantity Theory of Money

$$\pi = \frac{\Delta M}{M} - \frac{\Delta Y}{Y}$$

Key	
π	inflation rate
$\Delta M/M$	growth rate of money supply
$\Delta Y/Y$	growth rate of output (real GDP)

Normal economic growth requires a certain amount of money supply growth to facilitate growth in transactions. Money growth in excess of this amount leads to **inflation**. *Inflation is* ***"too much money chasing too few goods"***

[Note: we're simplifying by assuming that the 'velocity of money' is constant.]

As we have learnt, in the **long-run**, $\Delta Y/Y$ (growth rate of real GDP) depends on growth in inputs and on technological progress.

Hence, the Quantity Theory of Money predicts a long-run **one-for-one relation** between **changes in the money growth rate** and **changes in the inflation rate.**

Note: During hyperinflations, the quantity theory of money can hold even in the short run

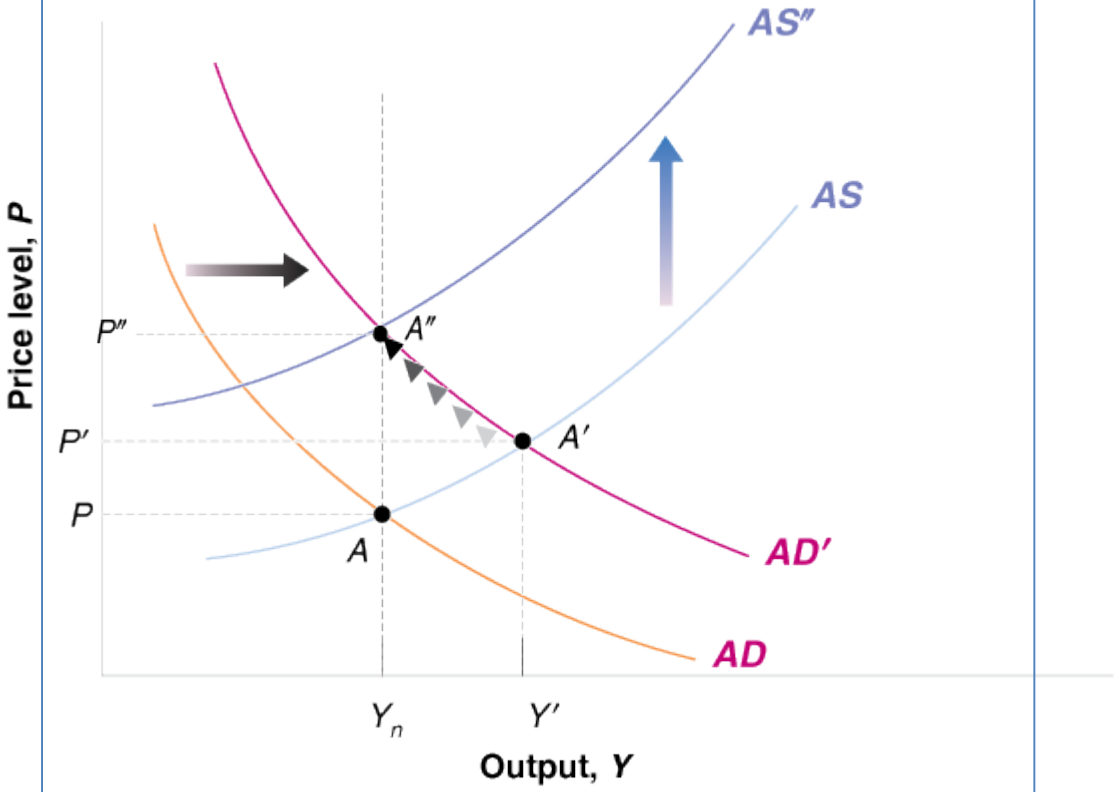
Aggregate Demand and Aggregate Supply: Effects of a Permanent Monetary Expansion

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

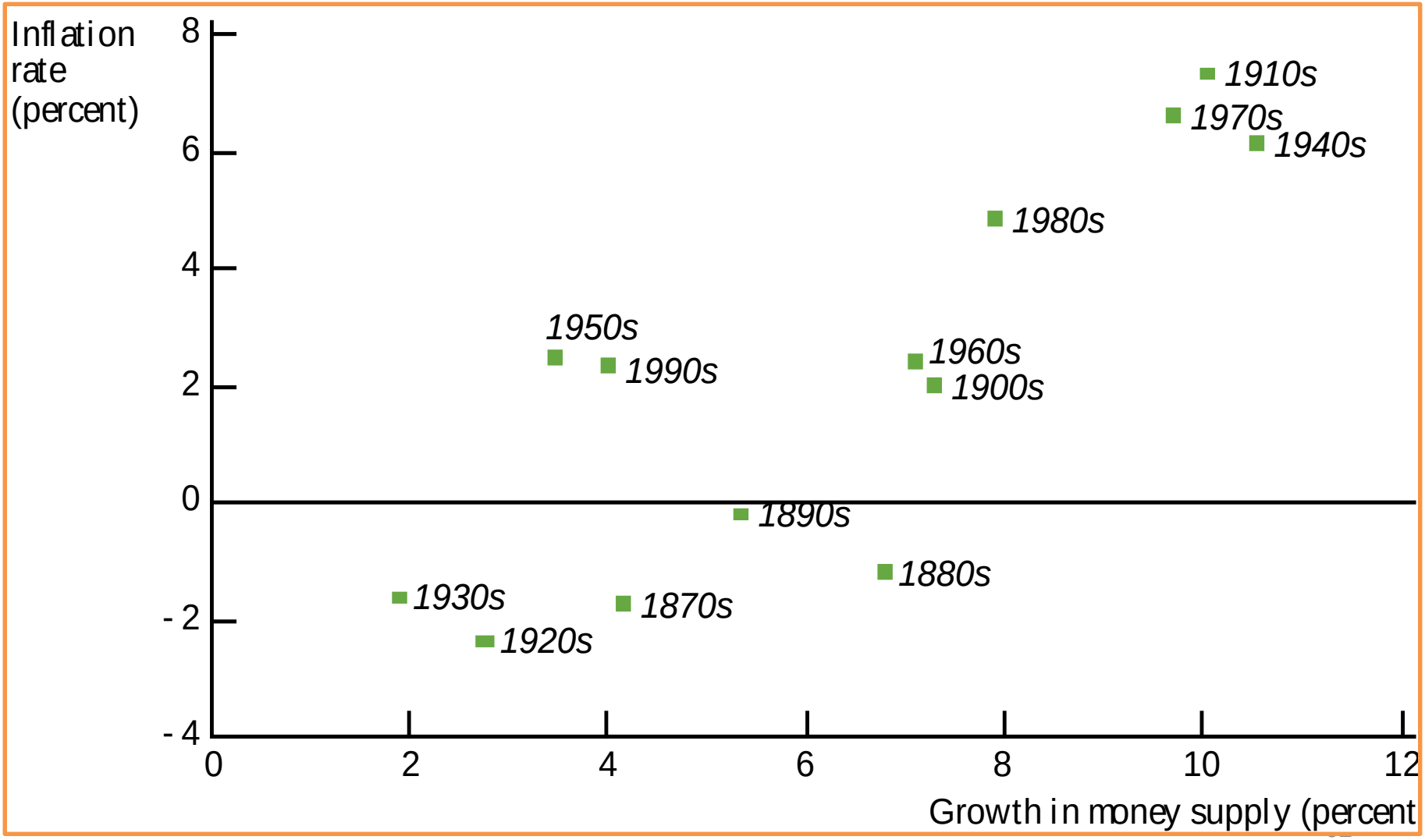
The difference between Y and Y_n sets in motion the adjustment of price expectations.

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

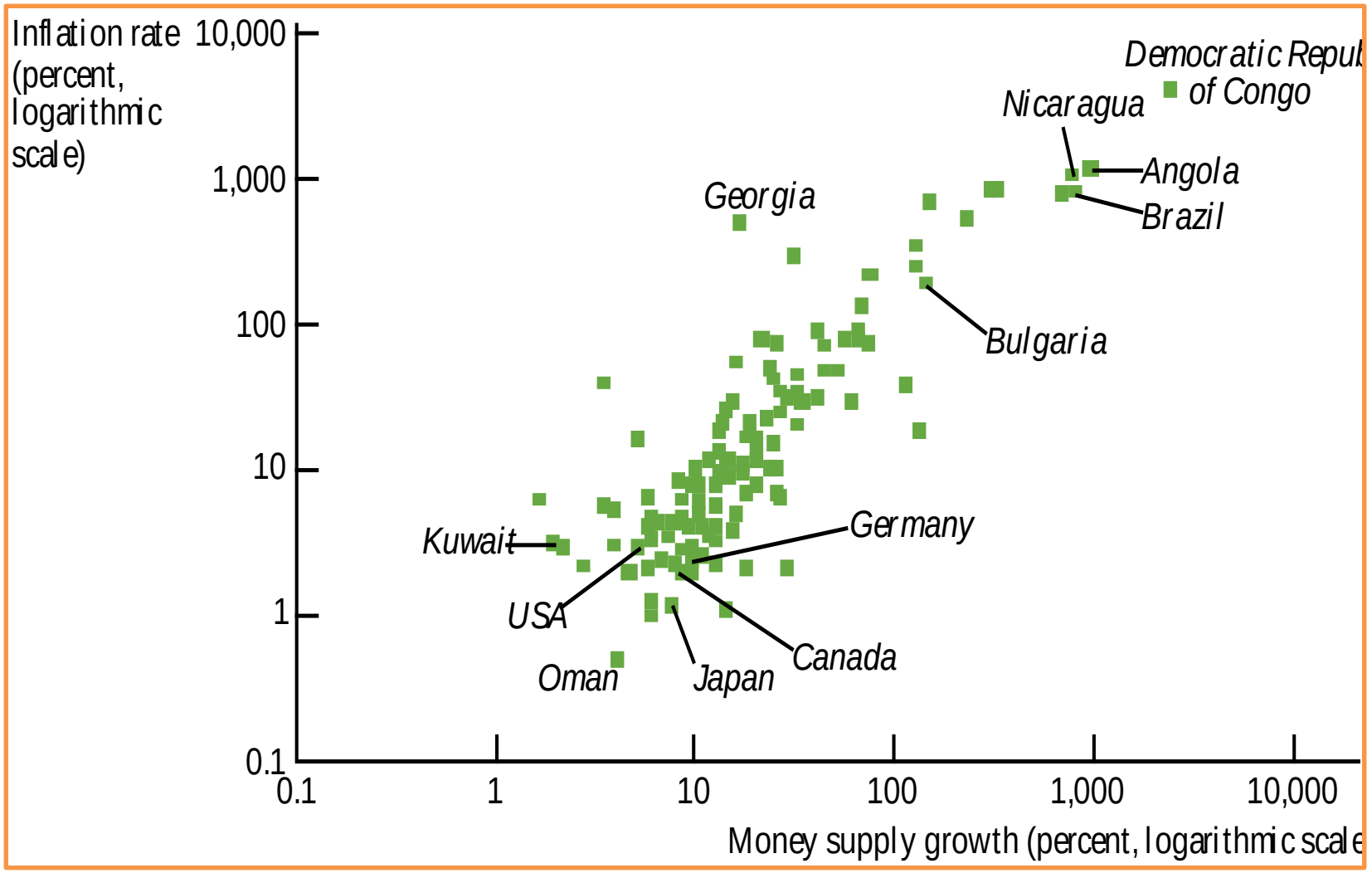
The increase in prices is proportional to the increase in the nominal money stock.



U.S. data on inflation and money growth, decade averages



International Data on Inflation & Money Growth



Understanding Hyperinflations

Three ways to finance G

- Taxation
- Borrowing
- Inflation

Hyperinflation

What is it?

- $\pi \geq 50\%$ per month

What causes it?

- Excessive money supply growth.

Does that work?

- Only for a short time.
- Because money ceases to function as a store of value, and may not serve its other functions (unit of account, medium of exchange), people start conducting transactions with barter or a stable foreign currency.
- Because people are no longer willing to subject themselves to the "inflation tax," it ceases to be a source of revenue for the government.

How is it stopped?

- Proximate step: **stop printing money**.
- At a more fundamental level: it requires a credible announcement of government fiscal reform (i.e. cuts in government spending, increases in tax revenue, new sources of borrowing or some combination of all three) and follow-through.

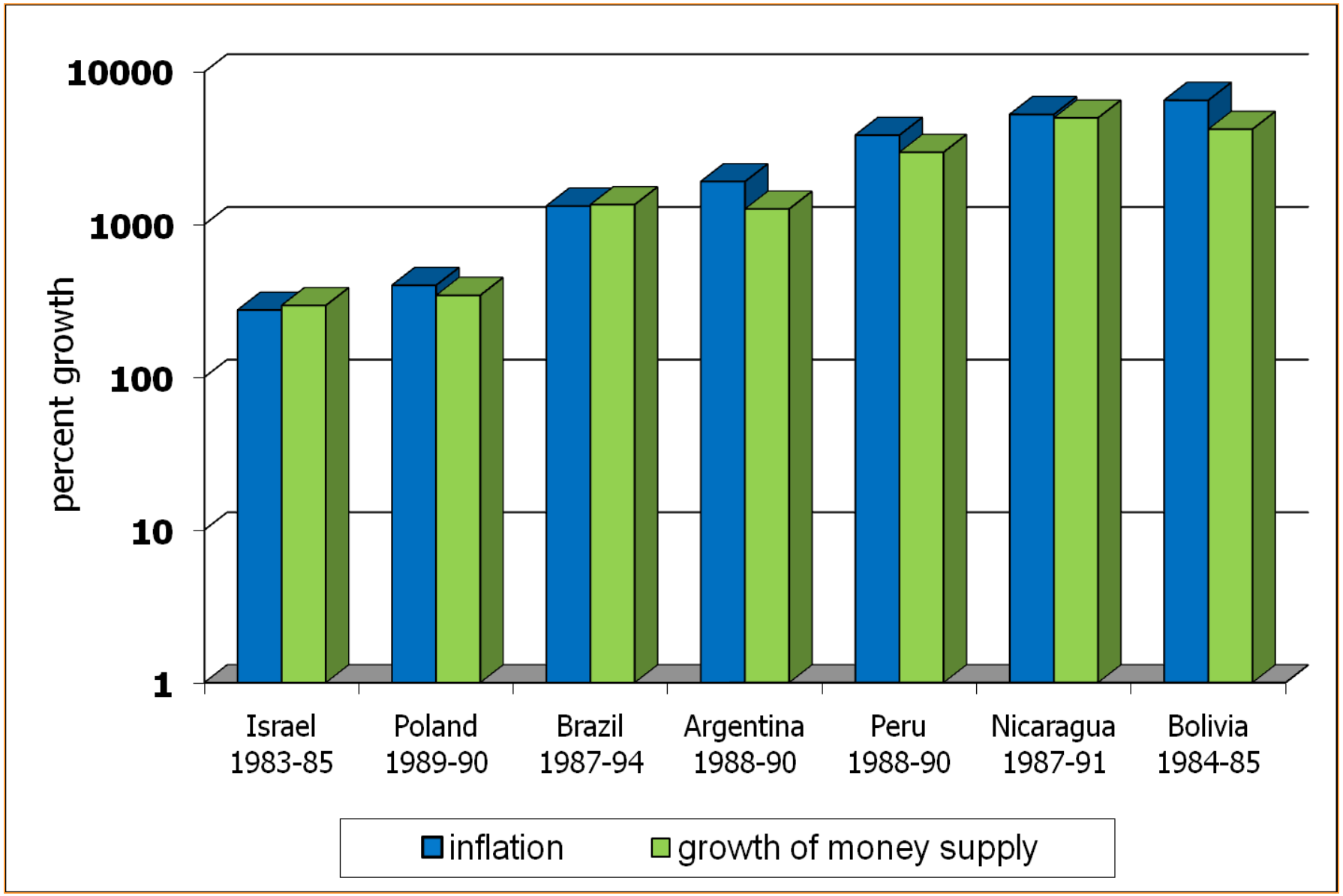
‘Classic’ hyperinflations

Seven Hyperinflations of the 1920s and 1940s

Country	Beginning	End	P_T/P_0	Average Monthly Inflation Rate (%)	Average Monthly Money Growth (%)
Austria	Oct. 1921	Aug. 1922	70	47	31
Germany	Aug. 1922	Nov. 1923	1.0×10^{10}	322	314
Greece	Nov. 1943	Nov. 1944	4.7×10^{6}	365	220
Hungary 1	Mar. 1923	Feb. 1924	44	46	33
Hungary 2	Aug. 1945	Jul. 1946	3.8×10^{27}	19,800	12,200
Poland	Jan. 1923	Jan. 1924	699	82	72
Russia	Dec. 1921	Jan. 1924	1.2×10^{5}	57	49

P_T/P_0 is the price level in the last month of hyperinflation divided by the price level in the first month.

Episodes of Hyperinflation in the 1980s



MONETARY POLICY IN OPEN ECONOMIES: THE IMPOSSIBLE TRINITY

Interest Rate Parity

- If domestic and foreign assets are considered perfect substitutes, then we expect interest parity to hold on average:

  $r_t - r^w_t = (X^e_{t+1} - X_t)/X_t$

- That is, the interest rate differential between the domestic (R_t) and foreign interest rate (r^w_t) should be zero, unless the market expects changes in the exchange rate.
  - In practice, interest rate differentials fail to predict large swings in actual exchange rates and even fail to predict which direction actual exchange rates change. Why?

- It could be because domestic and foreign assets are imperfect substitutes. Changes in risk premiums (ρ_t) may drive deviations from interest rate parity

  $r_t - r^w_t = (X^e_{t+1} - X_t)/X_t + \rho_t$

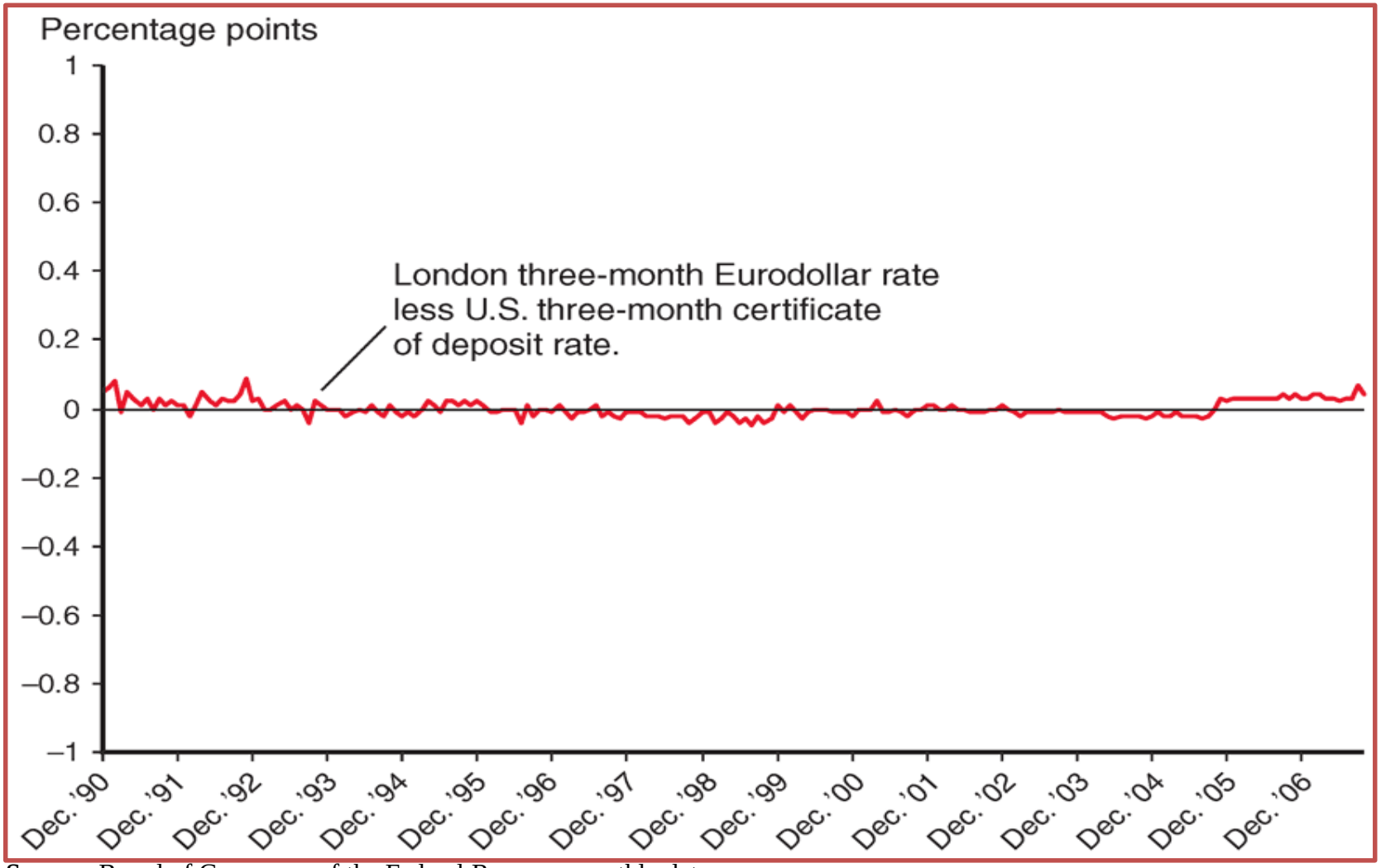
Example of Interest Rate Parity

We should expect that interest rates on offshore currency deposits and those on domestic currency deposits within a country should be the same if

- the two types of deposits are treated as perfect substitutes,
- assets can flow freely across borders and
- international capital markets are able to quickly and easily transmit information about any differences in rates.

Example of interest rate parity:

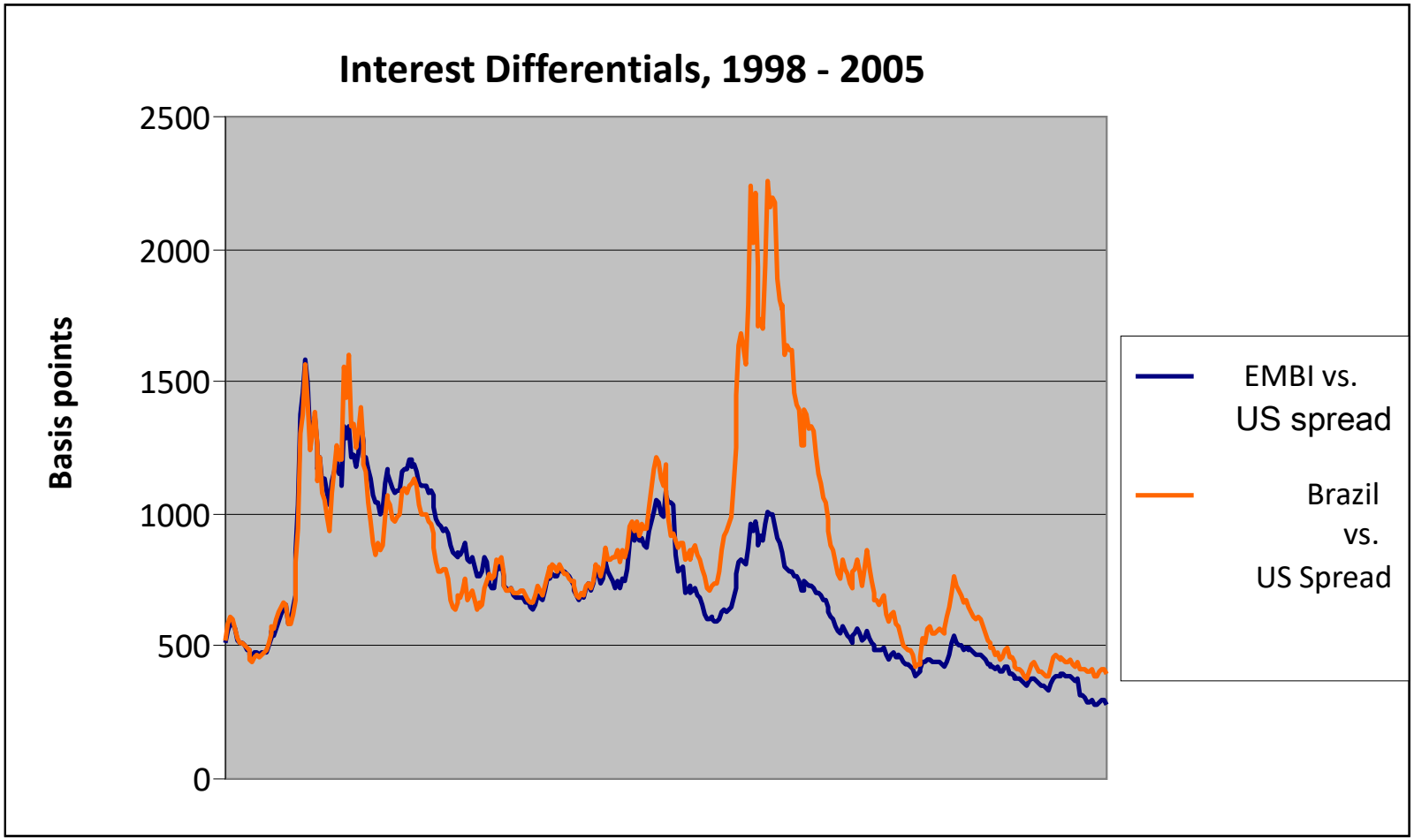
Comparing Onshore and Offshore Interest Rates for the Dollar



Source: Board of Governors of the Federal Reserve, monthly data.

Lack of interest rate parity

(and illustration of risk premium)



Interest Rate Parity (IRP) and Monetary Policy Choices

IRP imposes limits on central bank's monetary independence.

Why?

- Assume capital can flow in unlimited amounts between domestic and foreign country.
- Suppose now the domestic central bank were to try to keep exchange rates steady.
- At the same time, suppose also that it tries to adjust interest rates (say upwards) in order to attain a separate inflation target.
- Under fully-integrated capital markets, higher domestic interest rates $\Rightarrow$ large capital inflow into the domestic economy.
- Capital flows in $\Rightarrow$ the value of the domestic currency will have to go up versus the foreign currency—i.e., appreciation of the domestic currency.
- So the exchange rate cannot be held steady if the interest rate objective takes primacy.

IRP and Monetary Policy Choices (continued)

- Suppose now the central bank wants to keep its currency from appreciating.
- To prevent appreciation it must either inject more domestic currency into the market directly, or buy up foreign currency with domestic currency.
- Either way, the domestic currency it issues or pays out is new money $\Rightarrow$ expansion in domestic liquidity
- Expansion in domestic liquidity $\Rightarrow$ interest rate falls
- So the interest rate target cannot be achieved if the fixed exchange rate takes primacy.

Conclusion: One of the three must go. Either

- A central bank must give up trying to maintain stability in exchange rates and allow the currency to be determined by the market forces that work through arbitrage, *or*
- A central bank must give up its independence in setting domestic interest rates; that is, it must align its domestic objectives with the objective of keeping exchange rates stable, *or*
- Something has to be done to limit capital flows and break the arbitrage that ties together exchange rates and interest rates.

Breaking the Arbitrage that Ties Interest Rates and Exchange Rates:

- The ability to conduct full arbitrage between local and global capital markets depends on the degree to which capital is allowed to flow between the two sets of markets—the **degree of capital market integration** or linkage between domestic and global markets.

- The degree of capital market integration often depends on the level of development and sophistication of local financial markets and institutions. But it can also be a policy choice

Degree of Capital Market Integration:

- "Full" or complete capital market integration: Few or no legal restrictions or natural market barriers on capital flows between domestic and global capital markets, particularly on currency-related transactions.

$\Rightarrow$No limit on volume of capital flows between markets. Convertibility of currency on capital account (not just current account).

$\Rightarrow$Feasible to conduct unlimited arbitrage whenever it makes sense to.

Degree of Capital Market Integration:

- Less than complete capital market integration: Significant capital or exchange controls limit the volume of capital that can flow between domestic and global markets.

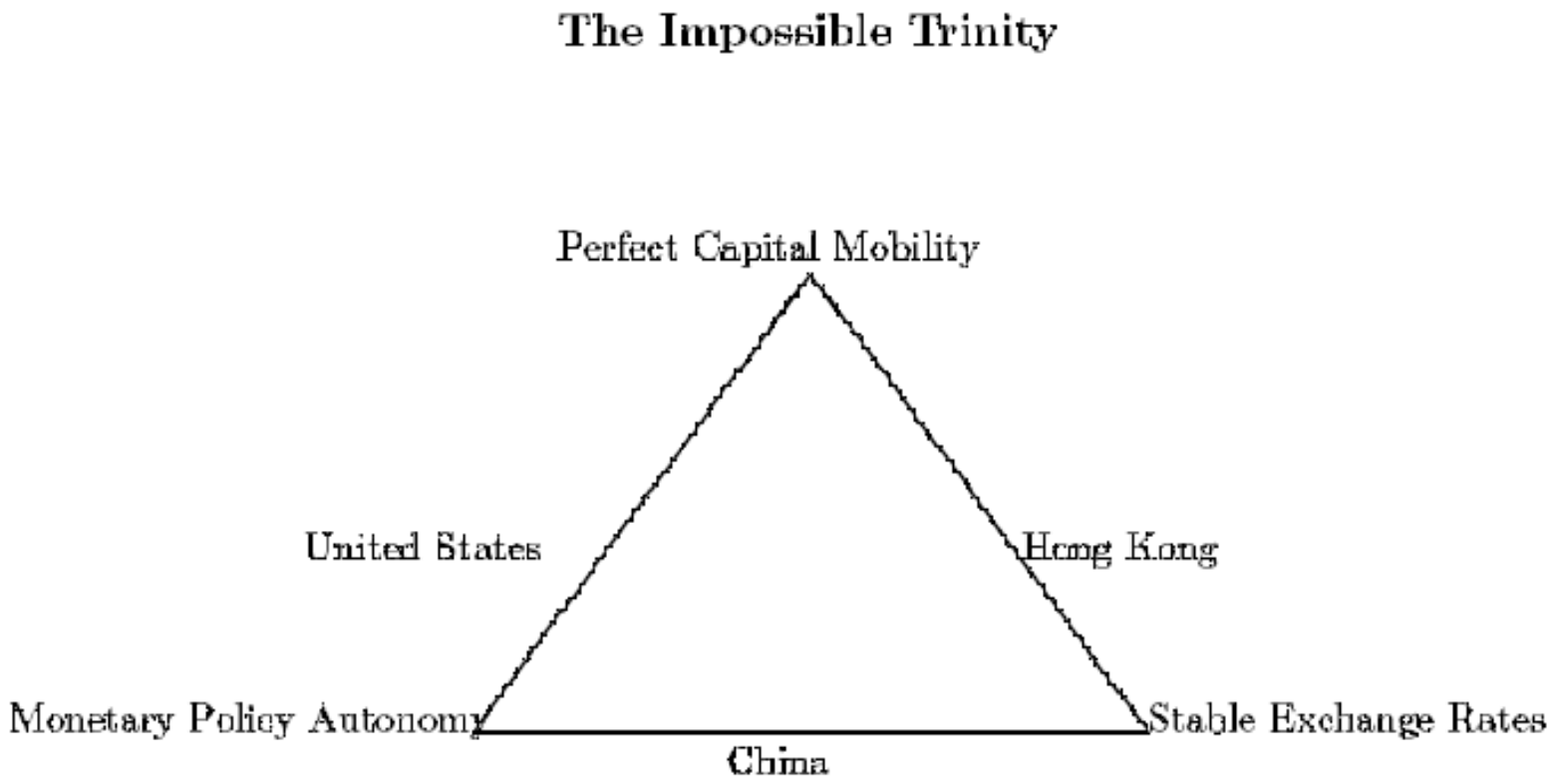
$\Rightarrow$Capital markets are segmented and arbitrage between from one market to another is expensive or impossible.

"Impossible Trinity"

"Impossible Trinity" or Policy Trilemma–The following three things are incompatible:

- Fully integrated capital markets (which would require interest rate parity)
- Independent or autonomous monetary policy (i.e., CB can target policy interest rates, as in the Taylor's Rule we discussed)
- Fixed ("stable") exchange rates (***x)***

Monetary Policy in 'Small' Open Economies



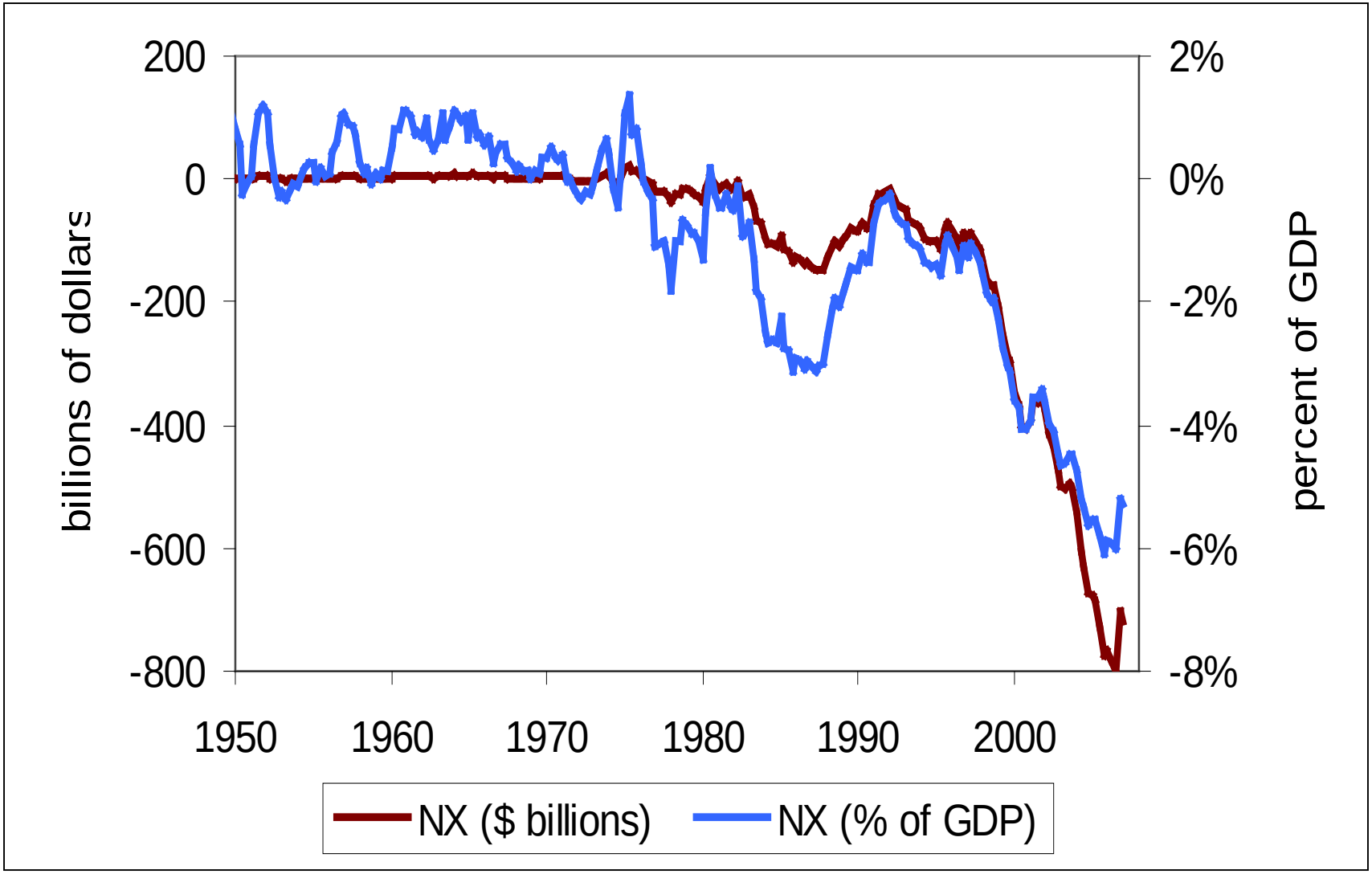
Savings, Investment and the Financial Sector

- Financial sector = Intermediary
- Accepts savings (part of income that is not consumed) from workers in the form of deposits
- Makes loans to firms who carry out the investment

Savings and Investment in a Global Economy

- trade surplus: exports greater than imports (means domestic savings are greater than domestic investment)
- trade deficit: imports > exports (means domestic savings are less than domestic investment)
- a country with a trade deficit is a net borrower from the rest of the world

U.S. net exports, 1950-2007



THE ROLE OF FISCAL POLICY: IMPORTANT FOR BOTH TREND AND CYCLE

Role of Government

Government's decisions:

- Decide how much to spend: G

- Decide how to finance the spending

Deciding how much to spend

- Is it something that the private sector does not already provide? (e.g. defense)
- Does it add to the productivity of the economy? (e.g. infrastructure)
- Does it give happiness? (e.g. public parks)
- Does it meet distributional goals? (e.g. transfers; unemployment benefits during recessions)

Decide how to finance the spending

Three ways to finance G

- Taxation
- Borrowing
- Inflation

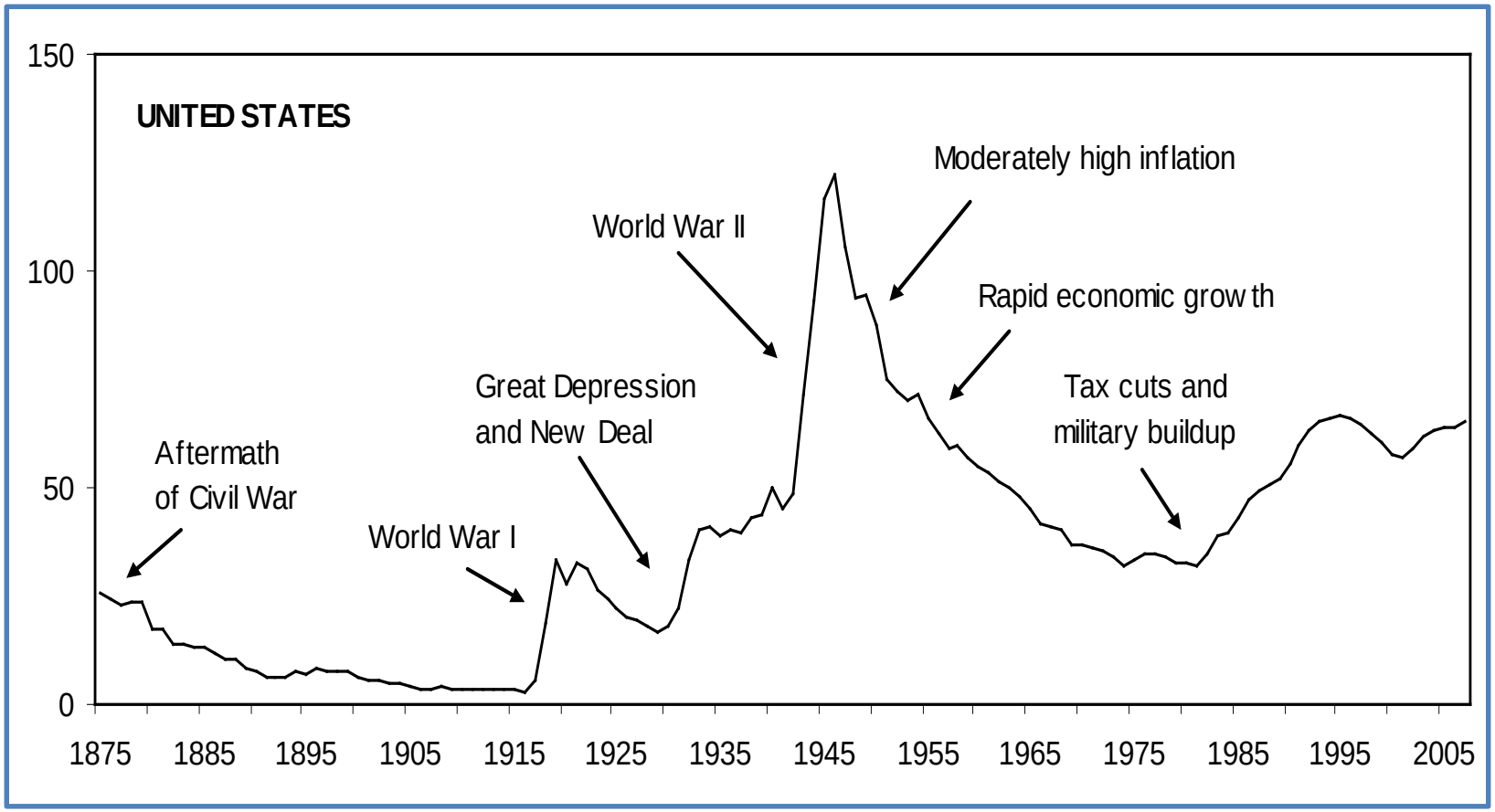
Deciding whether to tax or borrow

- One option: “balanced budget rule” (government spending should equal tax revenues each year)

- Why balanced budget rule may not be a good idea
  - Suppose government spending goes up temporarily (e.g. due to war); under balanced budget rule, would have to raise tax revenues
  - Suppose economy goes into recession (income is less than potential), and so tax revenues drop; under balanced budget rule, options would be either to cut spending or raise tax rates

- A better rule
  - Finance temporary increases in government spending or temporary shortfalls in tax revenues by borrowing
  - Finance permanent increases in government spending by a permanent increase in tax revenues

U.S. Debt-to-GDP ratio



Source: Finance and Development, March 2009; Paying the Piper, Carlo Cottarelli.

Indicator	Long Run	Short Run
Unemployment	- Called '**natural rate of unemployment**' - Depends on institutions & policies	- Generally related to the cycle in incomes - Relationship is called **Okun's Law**
Inflation	- Depends on institutions and policies - Often related to difference between growth in money supply and income (or output) growth; relationship is called the '**Quantity Theory of Money**' - Many central bank set an 'inflation target' for the medium- to long run	- Can be related to cycle in incomes - Relationship is called **Phillips Curve** - Phillips Curve has 'flattened' in recent years
Interest Rate	- Depends on balance between saving and investment - Distinction between 'nominal' and 'real' interest rates - Nominal interest rate = real interest rate + expected inflation (**Fisher equation**) - Called the neutral rate (r*)	- Can be influenced by actions of the central bank - Central banks set interest rate targets based on output gaps and inflation gaps (**Taylor Rule**) • Output gap = difference between output and trend • Inflation gap = difference between inflation and target
Exchange Rates	- Related to long-run difference in incomes (productivity) – the Balassa-Samuelson effect	- Related to movements in interest rates (**interest rate parity**)