MACROECONOMICS I

Class 11. Inflation

May 16th, 2014

Announcements

- **Final Exam:** May 30th, 10:30 – 12:30, S6

- **HW Assignment #4** is due: May 23rd

- **Project deadline**: May 30th, before exam

N!B! Project is an **individual**, not a group assignment

Recent Financial Crisis

Financial crisis (panic): depositors lose faith in the quality of bank's

assents and withdraw their deposits

• Self-fulfilling

• Recent crisis was a classical financial panic in broader institutional setting
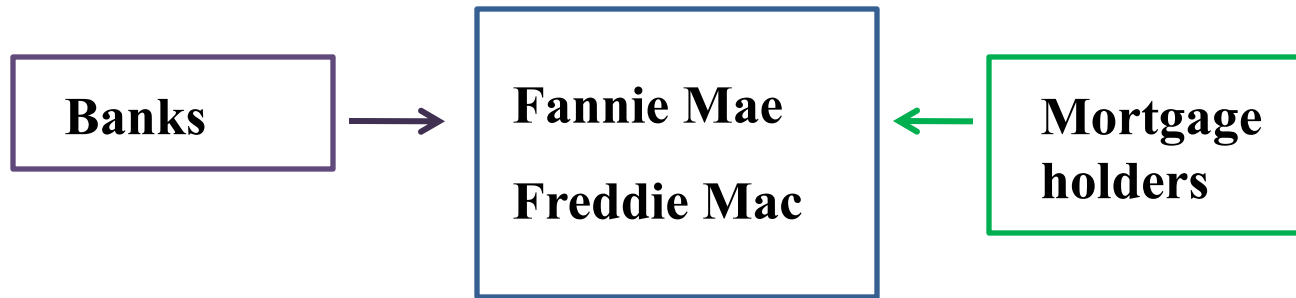
Trigger: Housing bubble burst

• Drop in housing prices by 30 %

• Deterioration of lending standards => sub-prime mortgages

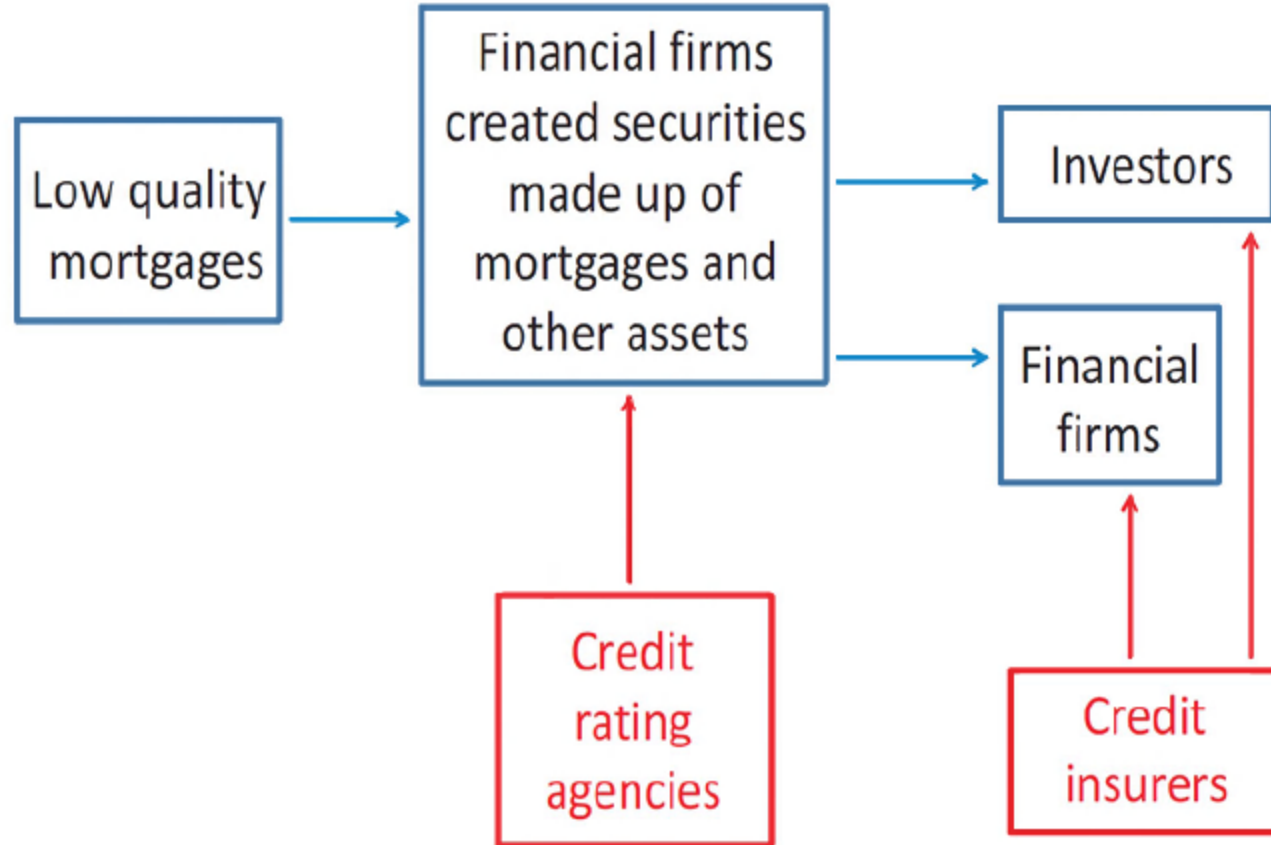• Complex nature of mortgage-backed securities (MBS)

Securitization

Government-sponsored enterprises (GSE)

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┌──────────┐         ┌──────────────┐         ┌──────────────┐
│  Banks   │ ──────> │  Fannie Mae  │ <────── │   Mortgage   │
│          │         │              │         │   holders    │
│          │         │ Freddie Mac  │         │              │
└──────────┘         └──────────────┘         └──────────────┘
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- Established by the Congress

- Largest packagers of MBS

- Guarantees against the loss

- Inadequate capital

Securitization (Cont.)

Recent Financial Crisis

Default of mortgages + mortgages under water => losses for the holders of MBS

• Subprime mortgages were distributed throughout the financial system
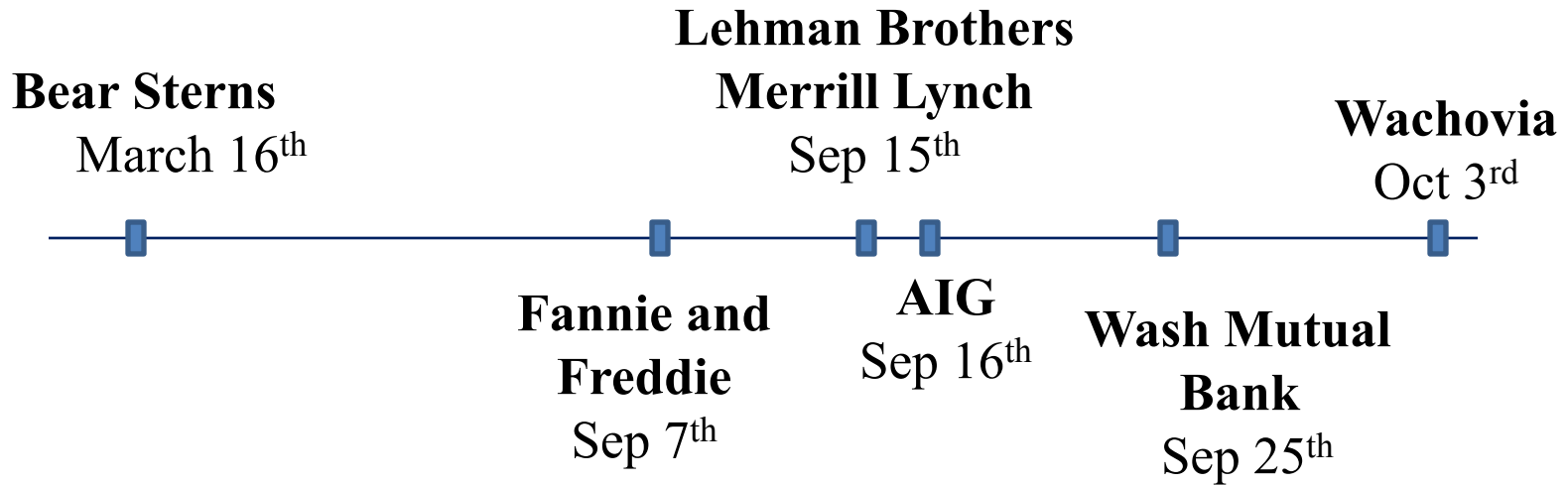
=> Uncertainty in the financial markets

• Runs on financial companies => investors pulled funding from any firm thought

to be vulnerable to losses

• Two possibilities: acquire funding or file for bankruptcy

Large Financial Firms Under Pressure

Peak of the crisis (2008)

Lehman Brothers
Merrill Lynch
Sep 15th

Bear Sterns
March 16th

Wachovia
Oct 3rd

Fannie and Freddie
Sep 7th

AIG
Sep 16th

Wash Mutual Bank
Sep 25th

Bear Sterns: Forced sale

Fannie and Freddie: Liabilities guaranteed by the US Treasury

Lehman Brothers: Files for bankruptcy

Merrill Lynch: Acquisition by the Bank of America

The Role of the FED

Central bank as a lender-of-last-resort

• Providing commercial banks with overnight liquidity (a **discount window**)

• Fed extended its liquidity provisions on **other financial institution**

• Providing liquidity backed by a collateral

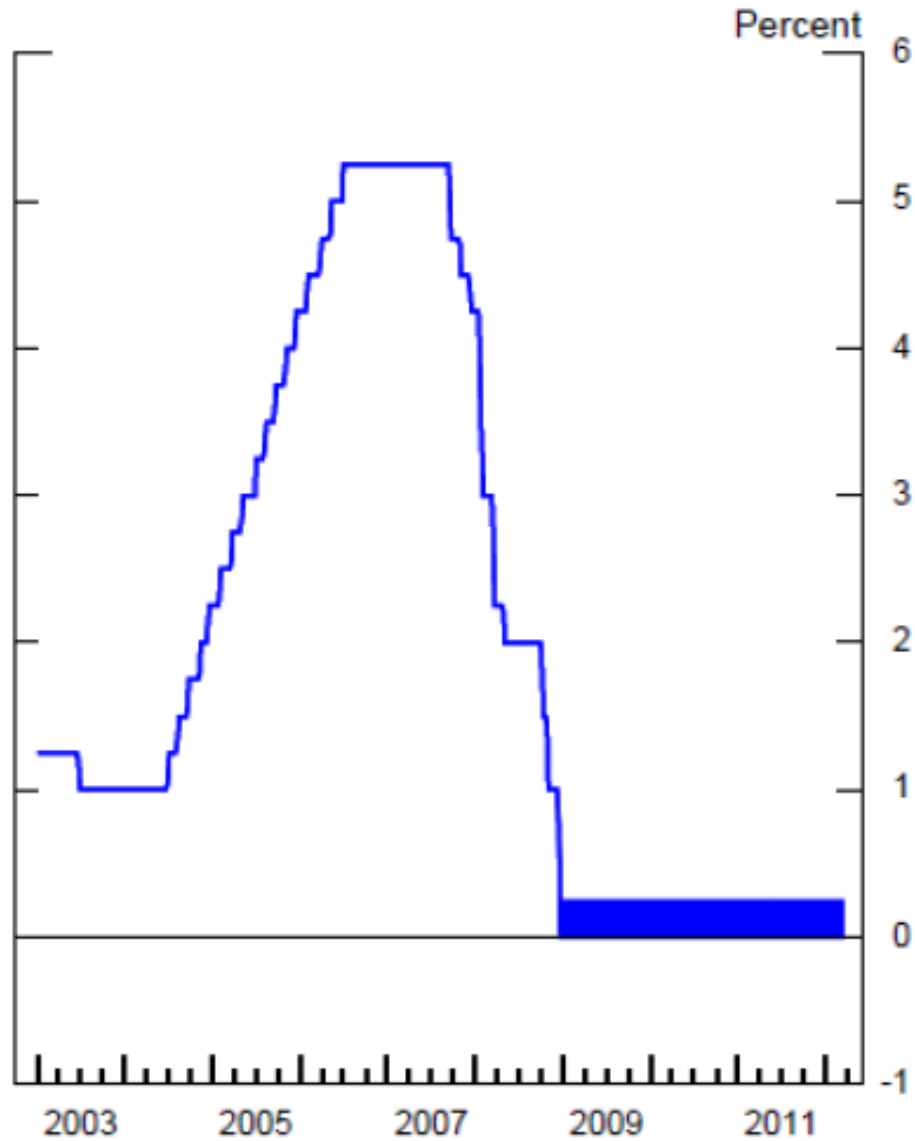$\Rightarrow$ Financial institutions will have access to liquid assets => panic will be calmed

Macroeconomic stability

• Quantitative easing – purchase of large-scale assets (government guaranteed)

• Affecting the long-run interest rate

Liquidity Trap

Federal Funds Rate*
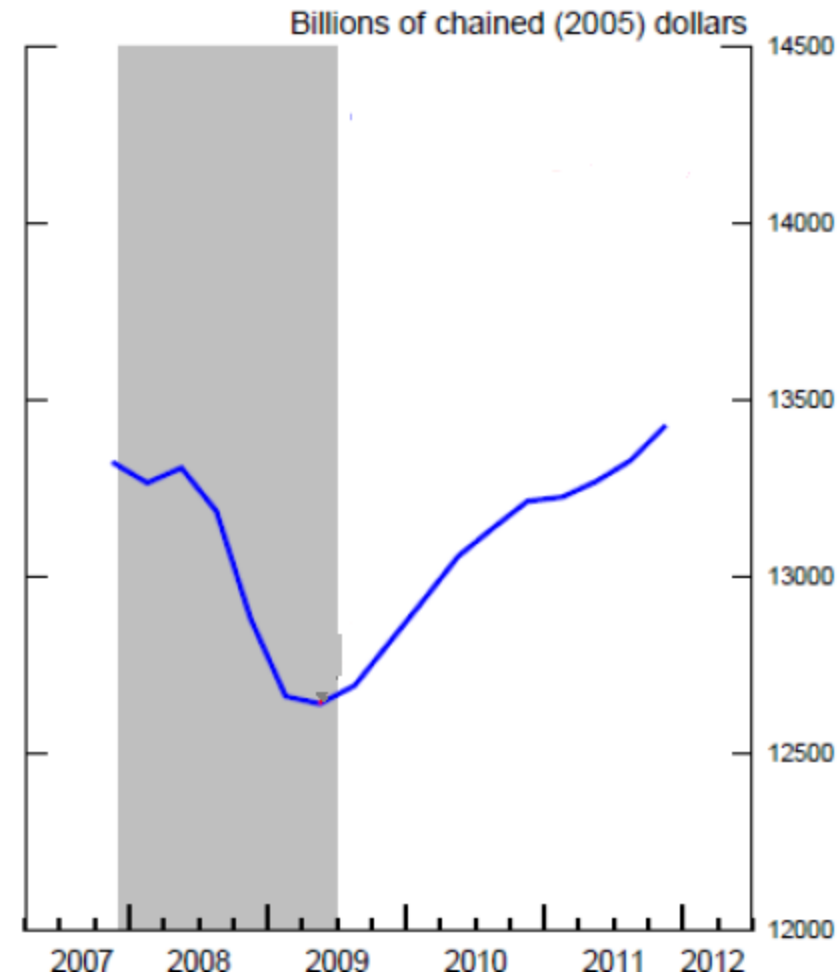
Real Economic Consequences

In the US:

Reduced credit flows, high borrowing costs, falling assets values

$\Rightarrow$ Contraction of spending and output
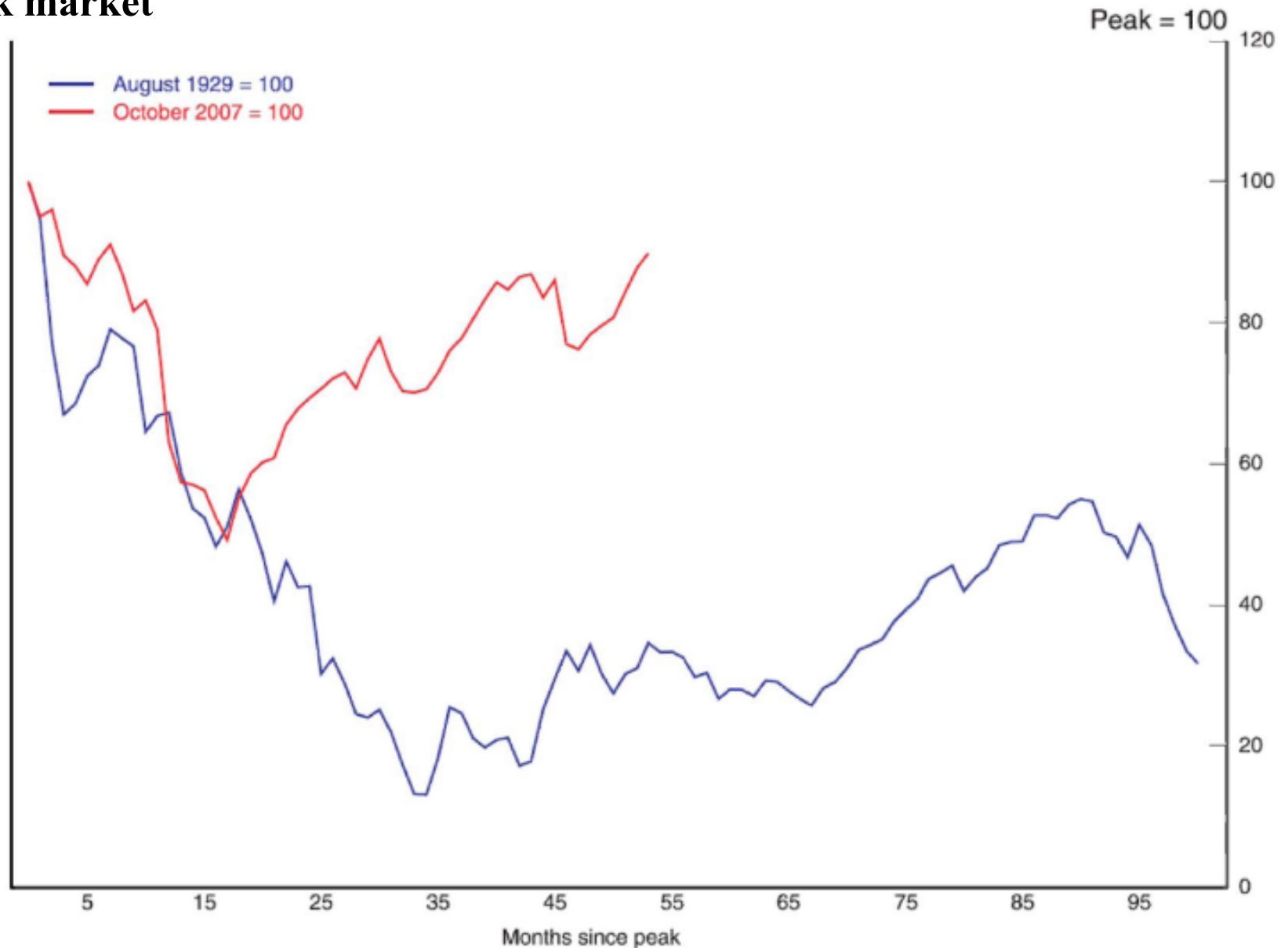
- GDP fell by more than 5 %

- 8.5 million people lost jobs

- Unemployment increases to 10 %

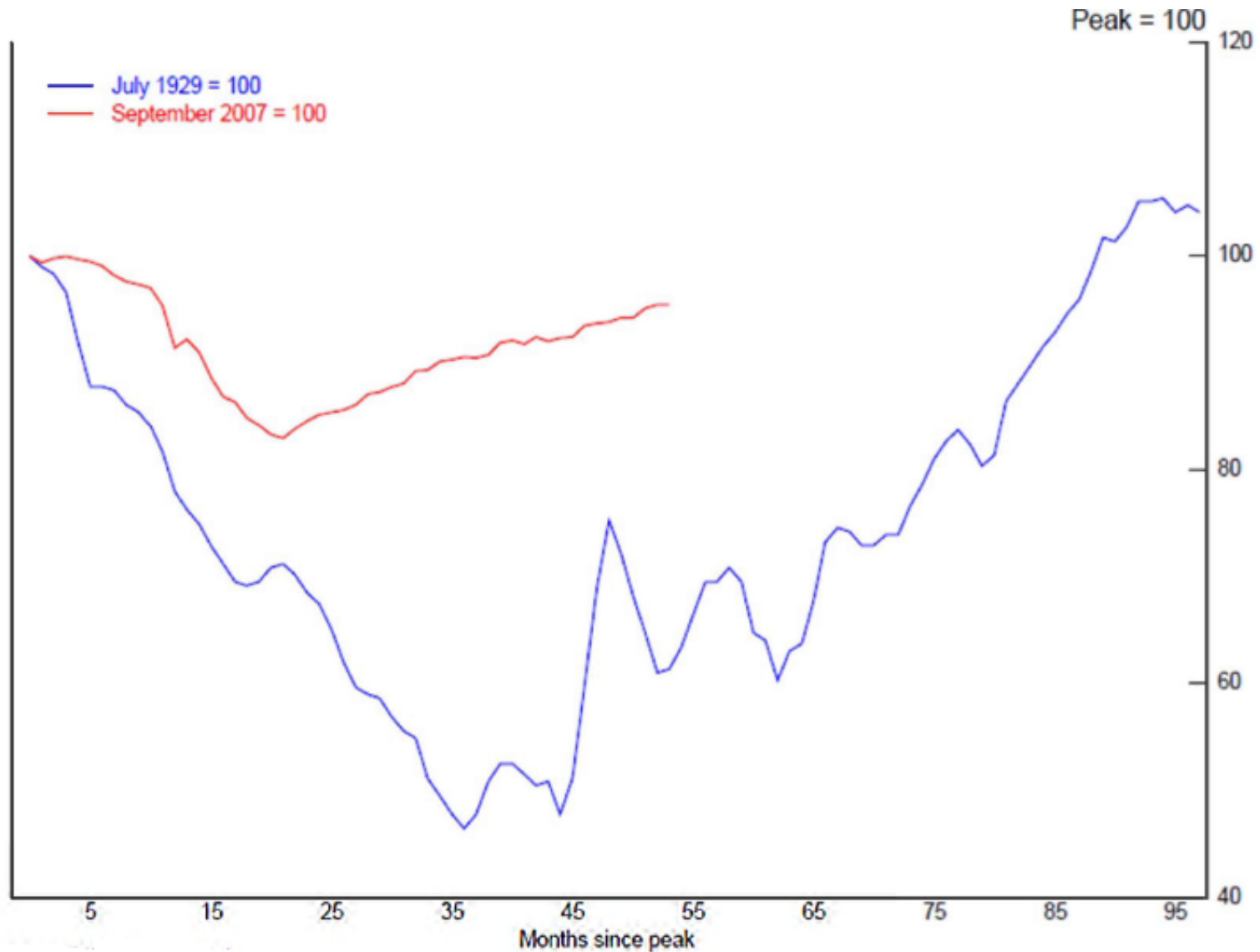**Official recession**: December 2007 – June 2009

Billions of chained (2005) dollars

Comparison to the Great Depression

Stock market

Comparison to the Great Depression

Industrial production

International Contagion

- The key transmission channel: **international trade**

- Drop in C, I and Y => Drop in demand for imports

- The US economy accounts for 13 % of total world imports

- US major trading partners

EU (17 %), China (16 %), Canada (16 %), Mexico (10 %)

- The effect was amplified in countries (the UK and Ireland) where domestic

  banks suffered similar problems as the US banks.

The Role of Policy

- **Fiscal policy**

Expansion: Governments increase spending to compensate the drop in C and I

$\Rightarrow$ Increase in budget deficit, higher taxes

Government investments into infrastructure (Long-term)

- **Monetary policy**

Expansion: Interest rates are pushed to 0 %

$\Rightarrow$ Liquidity trap

- Monetary policy is inefficient => waiting for the results of fiscal expansion

- The key role of a central bank as a **lender-of-last resort**

- Providing liquidity (short-term collateralized loans) to financial institutions

- Central banks buy the assets commercial banks want to sell (**quantitative easing or LSAP**), government-guaranteed securities only

=> Cost of borrowing will not change (increase)

Introducing Inflation

• An ongoing rise in the *general level* of prices over a period of time

• Price shock – one-time increase in prices

• Inflation implies the fall in the overall *purchasing power* of the currency

Deflation - a fall in the general price level over a period of time

• Danger: psychology of falling prices

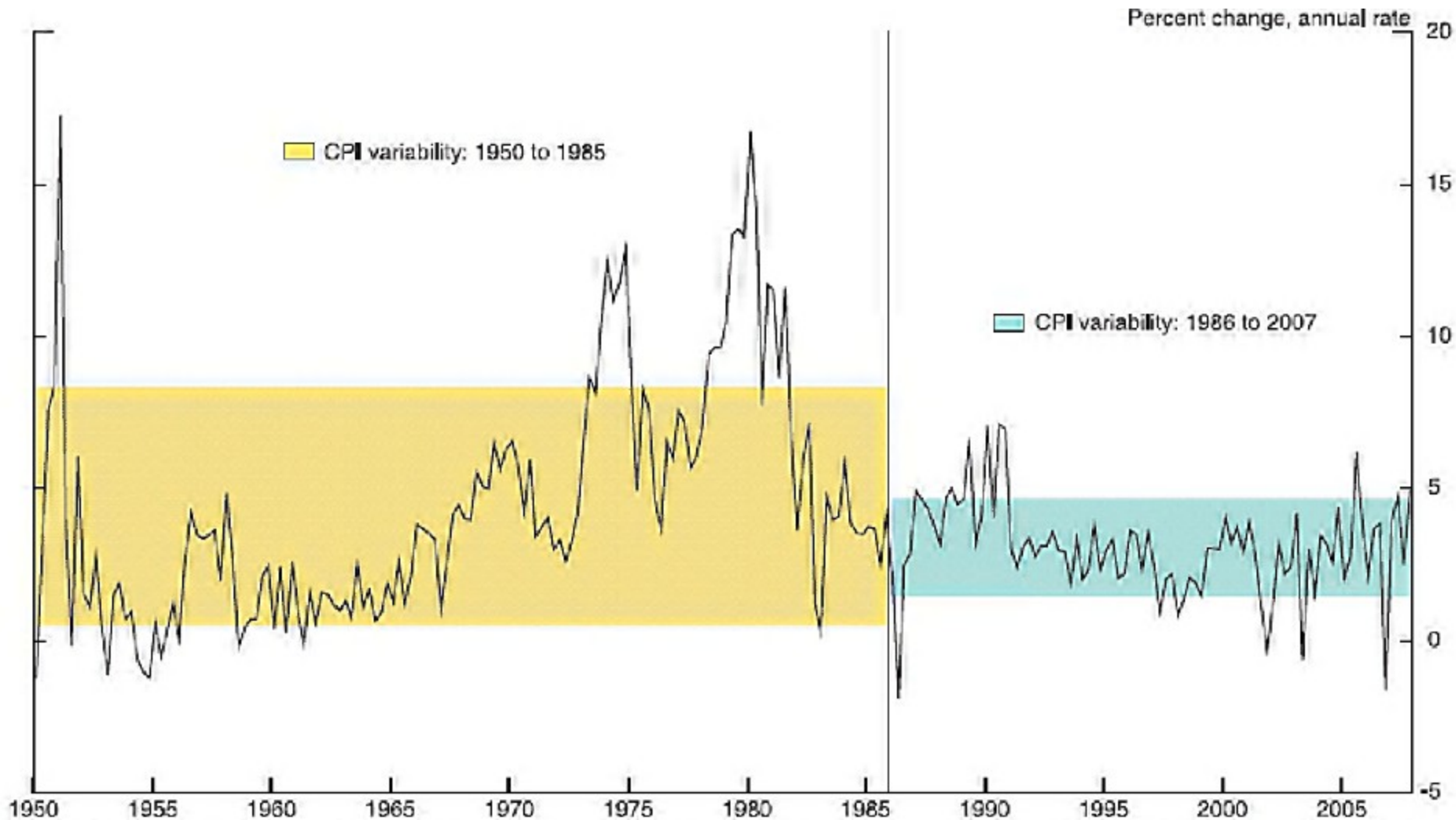**Stagflation** - a combination of inflation and recession

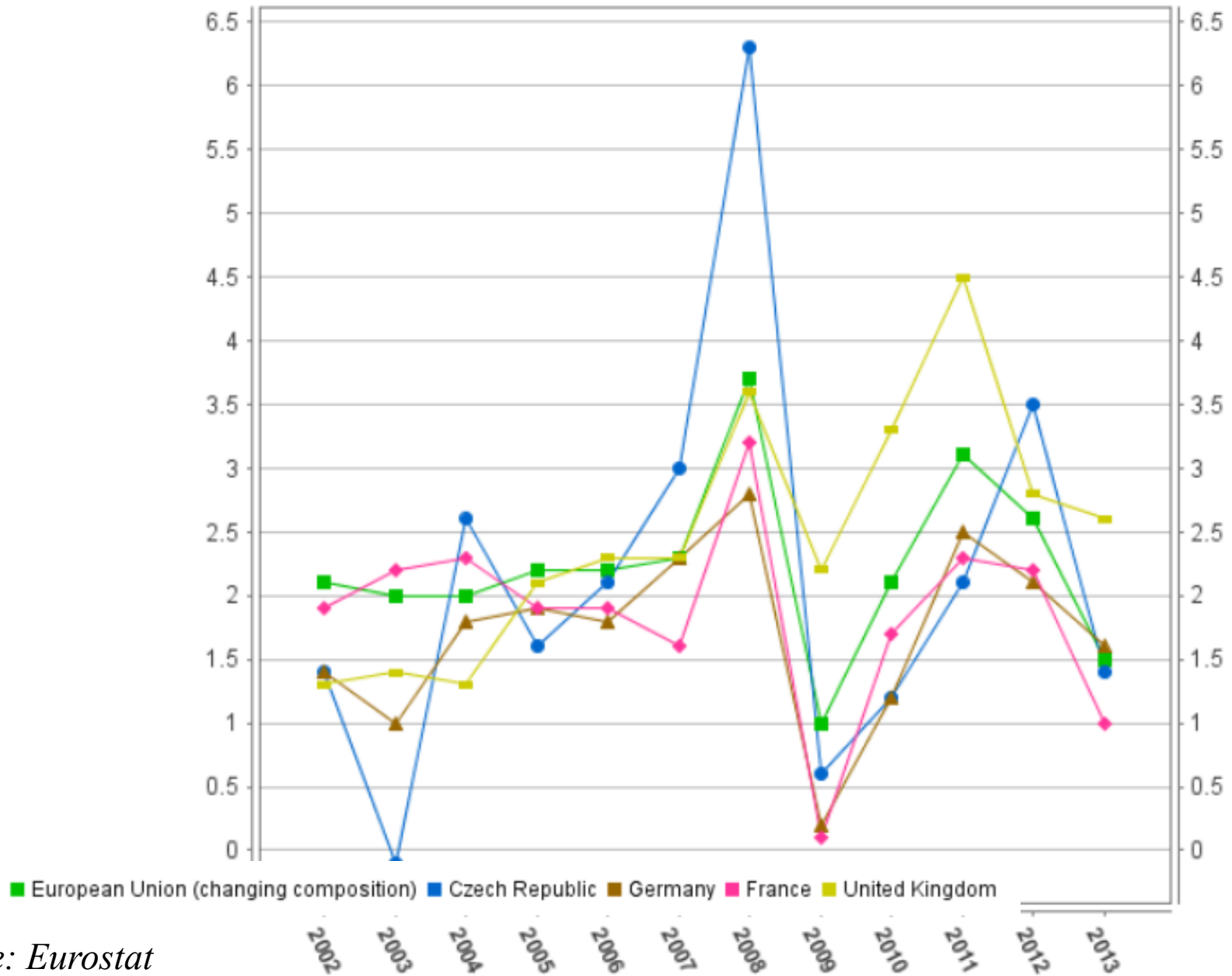# Inflation in the United States
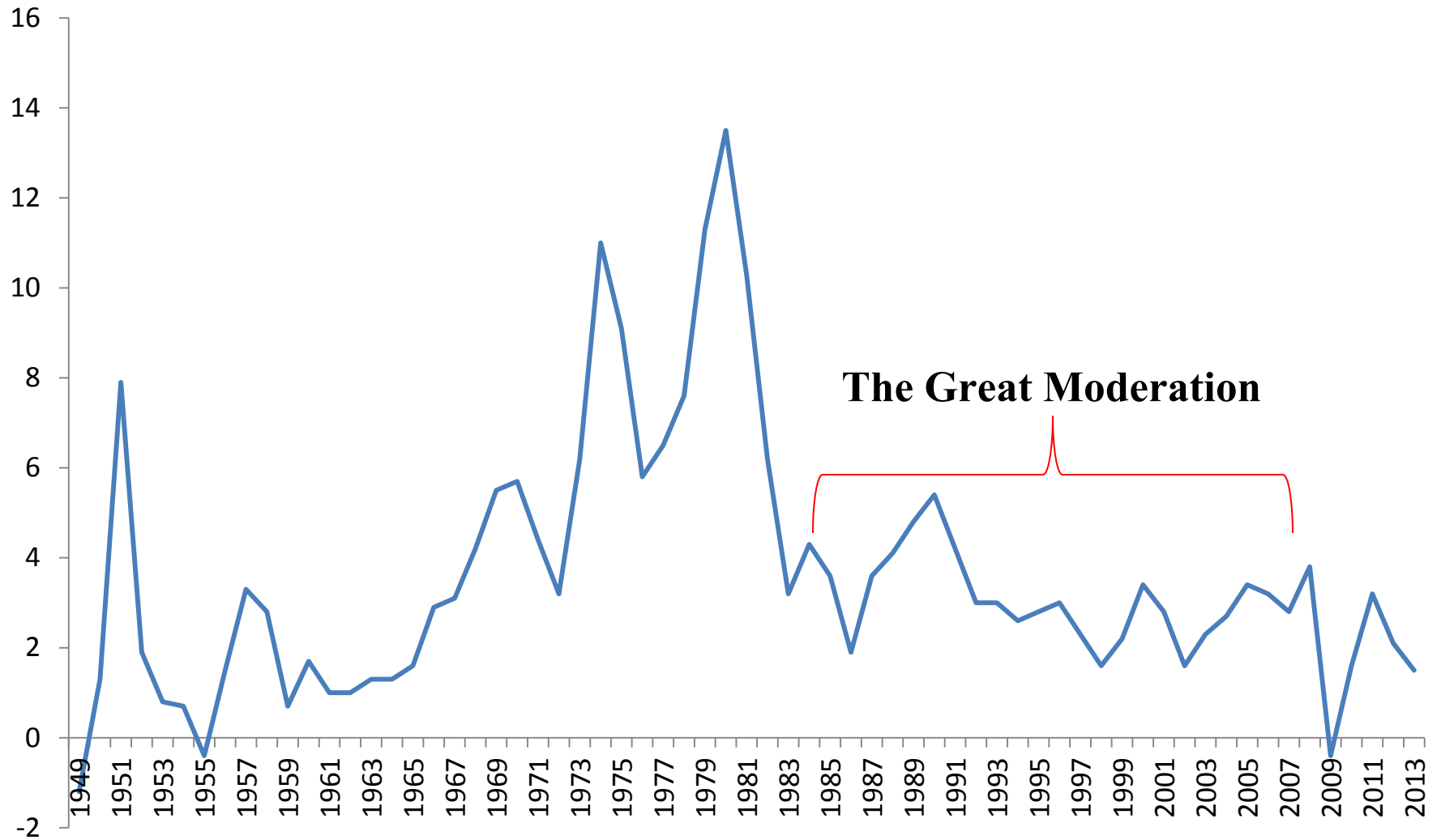
Source: BEA

Inflation in the United States

Source:BEA

Inflation in Europe

Source: Eurostat

Measuring Inflation

Price indexes

- Consumer Price Index (CPI)

- Personal Consumption Expenditures (PCE)

- Producer Price Index

- GDP Deflator

- Employment Cost Index

Which measure of inflation to use?

Consumer Price Index (CPI)

• The average price of a fixed basket of goods and services

A representative household: housing, food, clothing, transportation, medical care,

entertainment, education

• A single number which indicates a change in the

 households' standards of living relative to base year

•   Each category of goods in the CPI <u>enters with *a weight*</u>

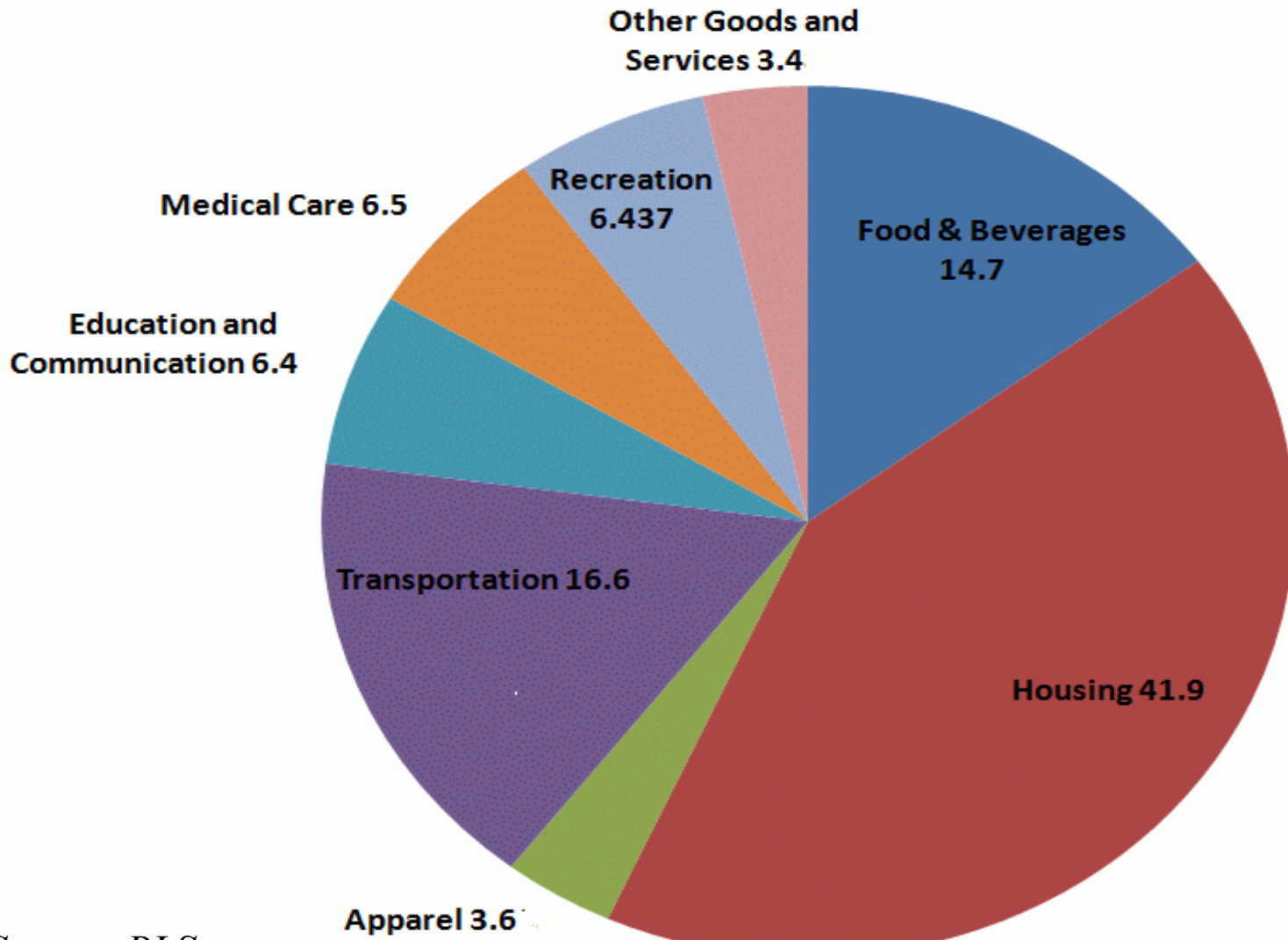$$\textit{Cost of basket}_{2000} = \qquad + \qquad + \qquad +$$

•   *CPI is only a rough approximation*

European analog: a Harmonized Index of Consumer Prices (HICP)

CPI Components

Composition of US CPI by Expenditure Category

- Other Goods and Services 3.4
- Medical Care 6.5
- Education and Communication 6.4
- Recreation 6.437
- Food & Beverages 14.7
- Transportation 16.6
- Housing 41.9
- Apparel 3.6

Consumer Price Index (Cont.)

• CPI with respect to the base year

$$CPI_{2000} = \frac{Cost\ of\ basket_{2000}}{\ } \cdot$$

•**Inflation rate** using CPI

$$\pi + = \frac{CPI}{\ } \cdot$$

TE CPI$_{2000}$=120 implies that in year 2000 it takes \$120 to purchase a representative basket of goods that \$100 purchased in the base year

Current comparison for the US: 1982-1984

Alternative Inflation Measures

• Measurement issues with CPI: changes in consumption habits + substitution bias

•**Producer Price Index** - average changes in the prices domestic producers receive

for their output

• **Personal Consumption Expenditure** – all domestic consumption of durable and

non-durable goods and services targeted toward individuals and households

• **GDP deflator** : measure the overall inflation

• **Core inflation**: Price indexes excluding food and energy products

Assessing the overall (long-term) trends in price changes due to the *monetary policy*

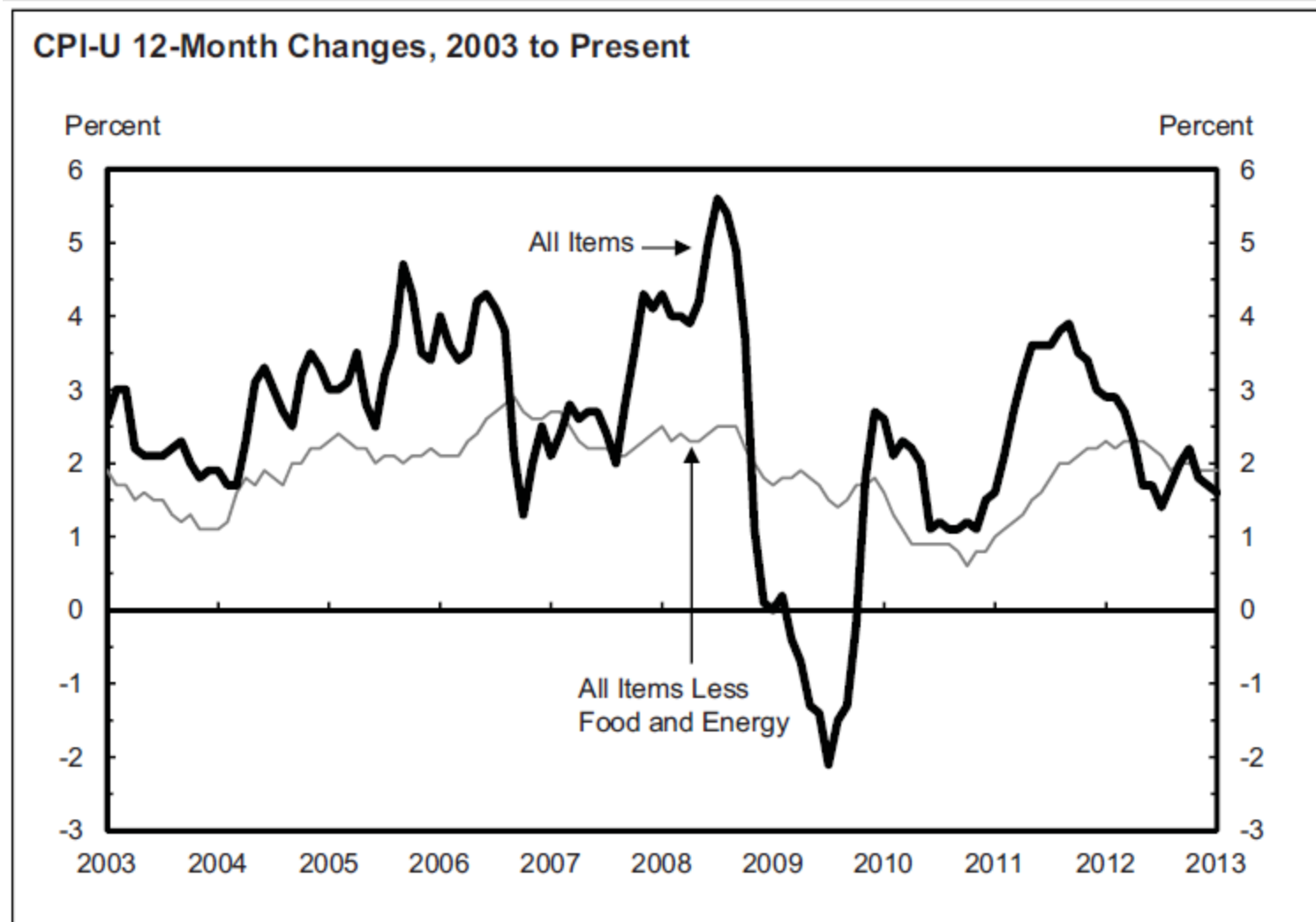# CPI vs. GDP Deflator
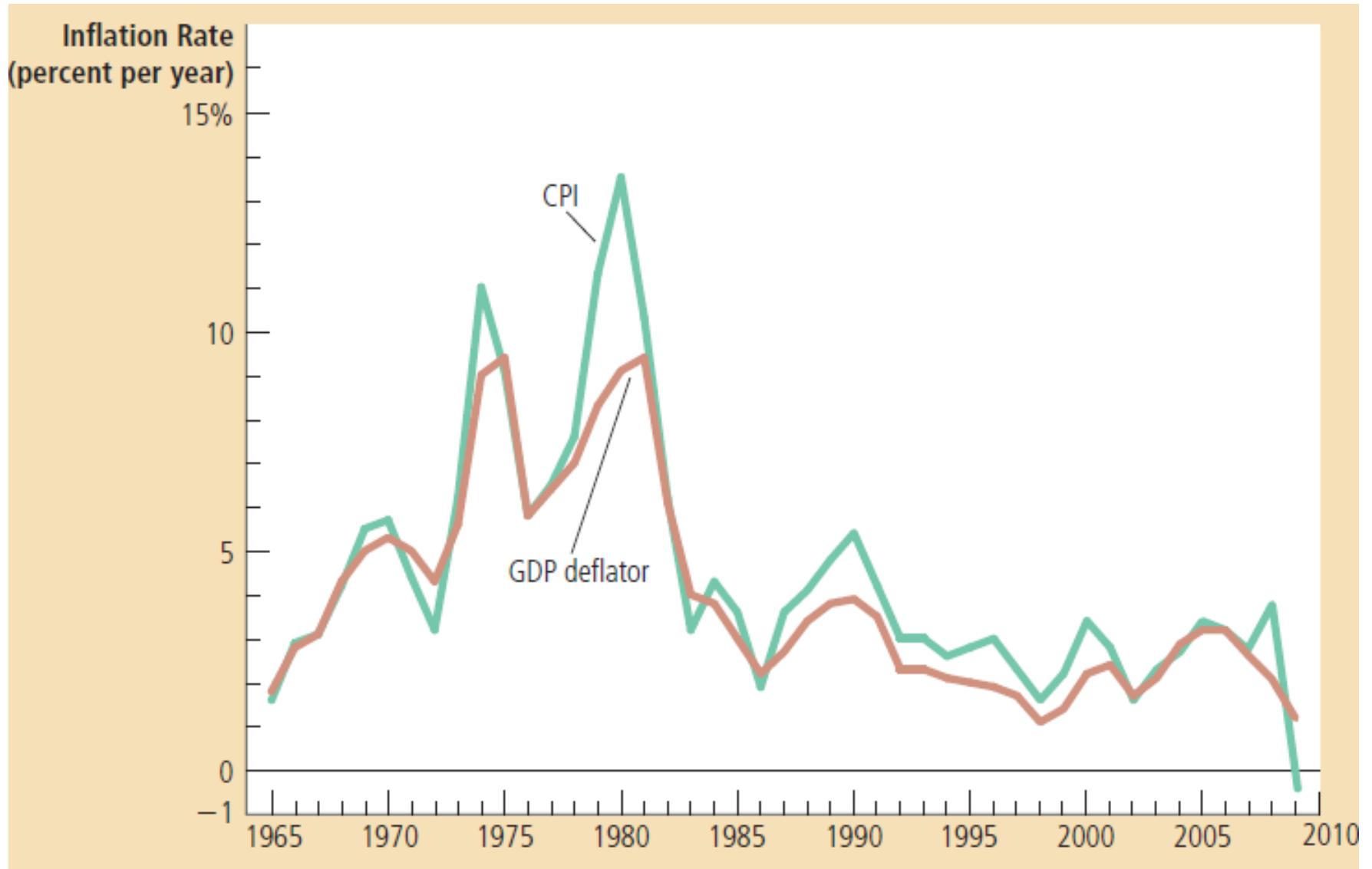
Source: Mankiw, 2012

Inflation rate vs. Core Inflation rate in the US

CPI-U 12-Month Changes, 2003 to Present

Source:BEA

Classification

Inflation Thresholds	
<0%	Deflation
0% - 2.5%	Price stability
2.5% - 5.0%	Moderate inflation
5% - 8%	Serious inflation
8% - 12 %	Self-compounding inflation
12% - 20%	Hyperinflation
20% +	Explosive inflation

N!B! Inflation thresholds are *arbitrary*

Types of Inflation: Deflation

Deflation - a fall in the general price level over a period of time

Deflation leads to recession

1. Psychology of falling prices => shifting consumption from present to future

$$\textbf{AE} \downarrow \textbf{=> Prices} \downarrow \textbf{=>} \quad \textbf{AE} \downarrow \textbf{=> Y} \downarrow$$

2. Increases real value of debt (real interest rate): burden on borrowers

$$\textbf{AE} \downarrow \textbf{=> Y} \downarrow$$

•   Discourage new borrowings and makes existing borrowers worse off

•   Redistribution of wealth from borrower to lender

3. Reduced employment: Sticky wages => increase in costs of labor =>

   unemployment $\uparrow$ => AE$\downarrow$

TE The US during the Great Depression and Japan in 1990s

Types of Inflation: Hyperinflation

Hyperinflation – monthly inflation rate greater than 50 %

Germany after the W W I: 322 % per month

Hungary after the WW II: 19 000 % per month

Zimbabwe (2008): 79,600,000,000 % per month

Causes: extremely rapid growth of the money supply

• Monetarization of the government debt

Self-perpetuating: The public is trying to spend the money quickly in order to avoid the inflation tax; the government responds to higher inflation with even higher rates of money issue

• Transfer of wealth from public to the government

• Moving away from money transactions to barter

• Dollarization as a remedy

Aggregate Demand-Aggregate Supply Model

• Relationship between prices and output (AD-AS Model)

Two-way causation:

1. **Prices determine output** level
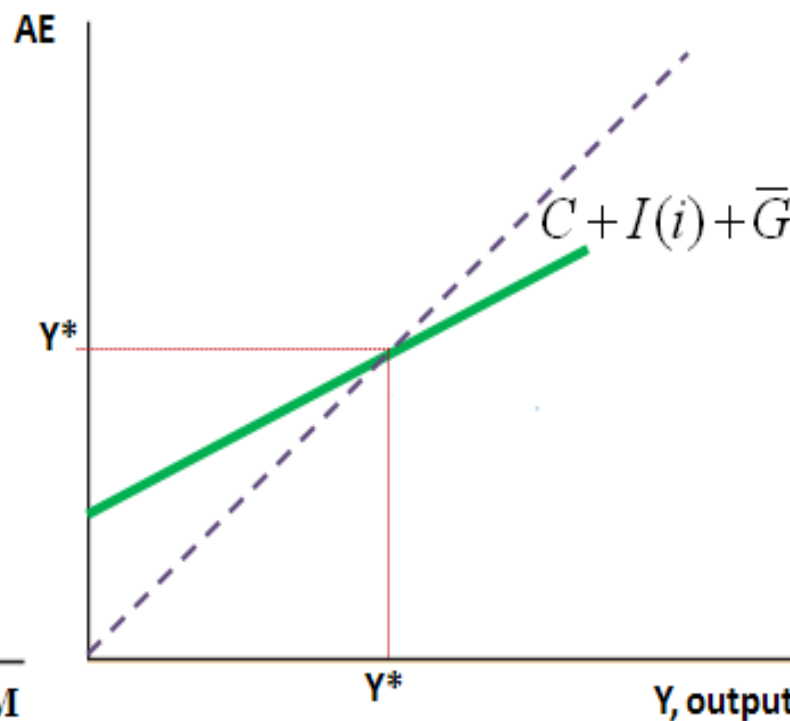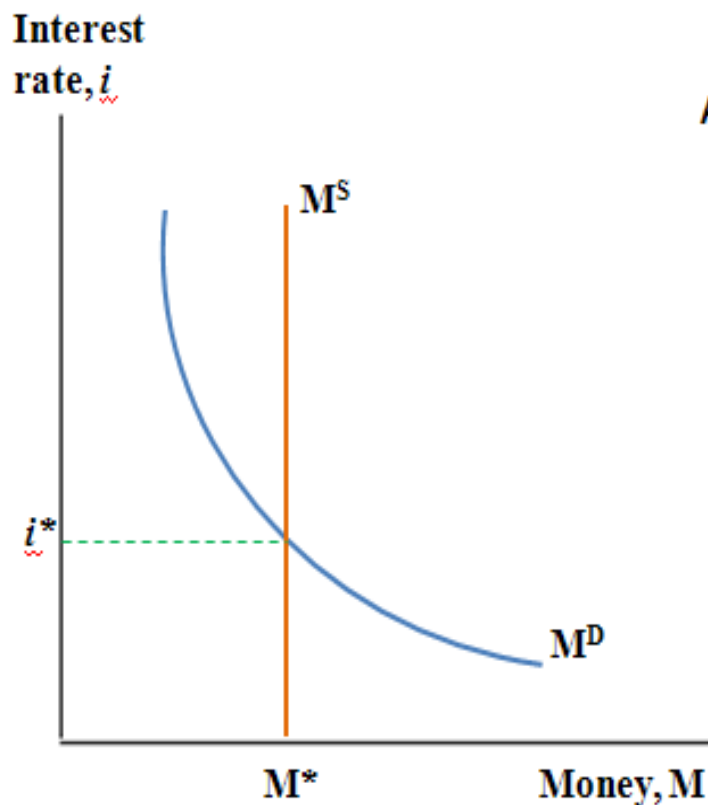
   Increase in prices => Contractionary effect on the economy

2. **Output** level **determines prices**

   Output moves toward full capacity => Increase in prices

Determining the *equilibrium* price level

Equilibrium in Goods and Money Markets

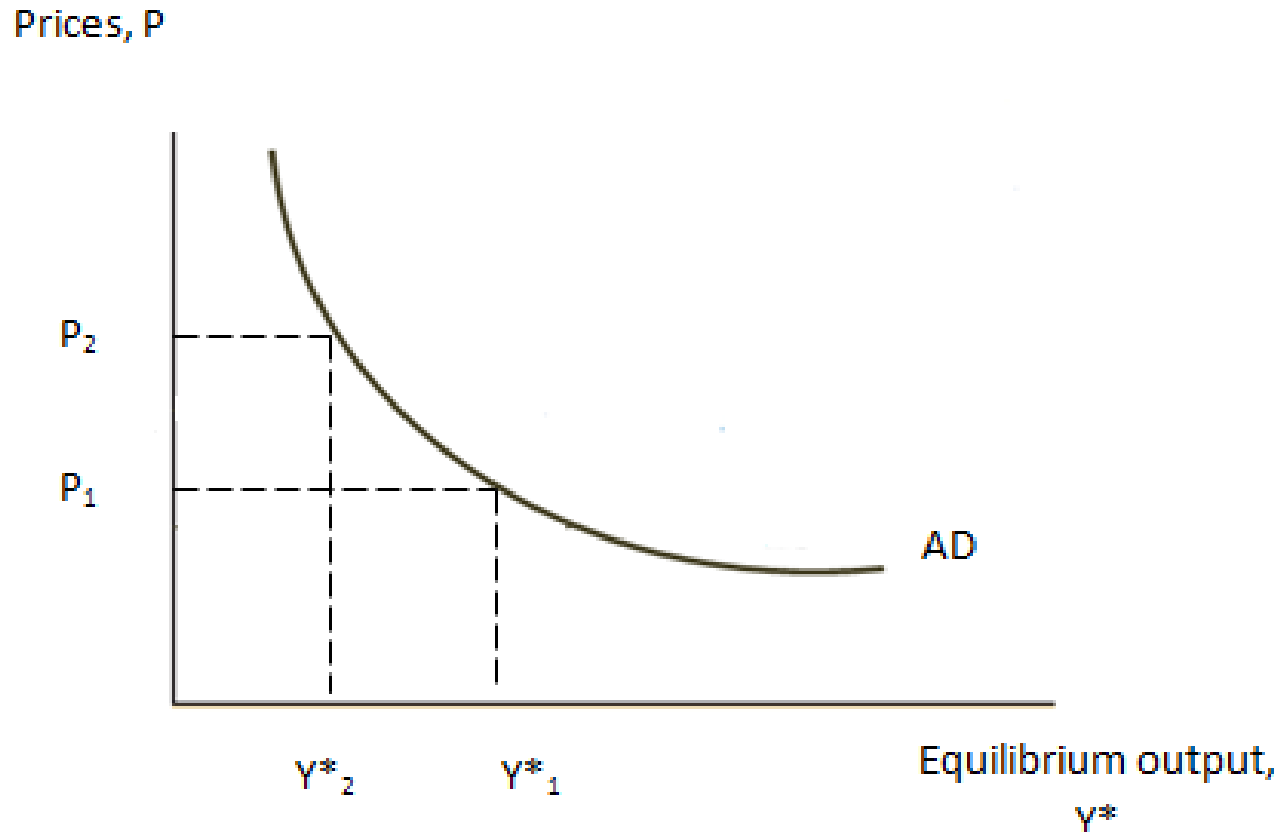- For **a particular price level** (P)

- Prices enter M^D

✓ *Show graphically how Y* and i* change due to increase and decrease in prices*

AD-AS Model

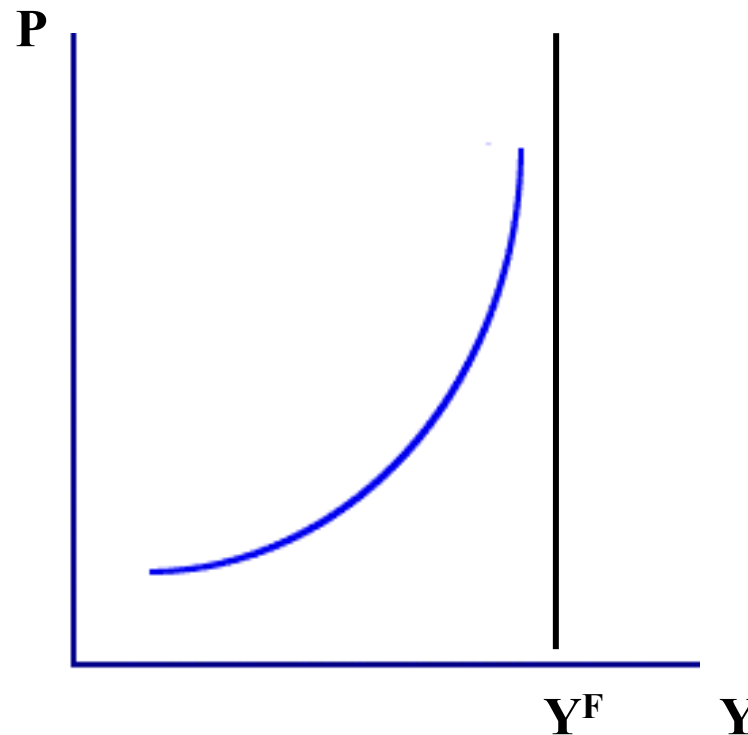**Aggregate demand (AD)** curve: For any price level, what is Y* and $i*$

• Effect of prices on Y*

AD-AS Model (Cont.)

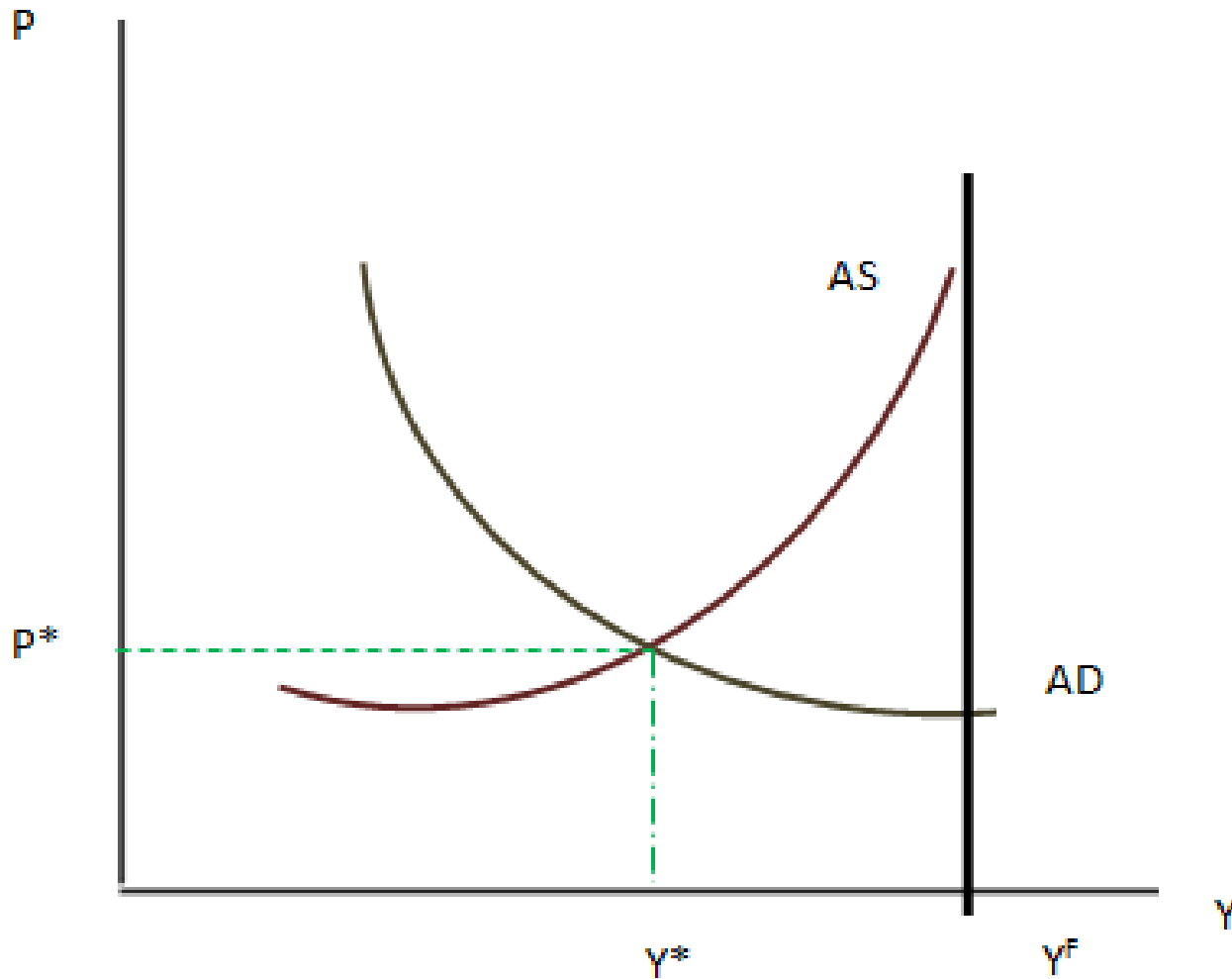**Aggregate supply (AS)** curve: For each Y*, there is only one level of prices that would be sustainable

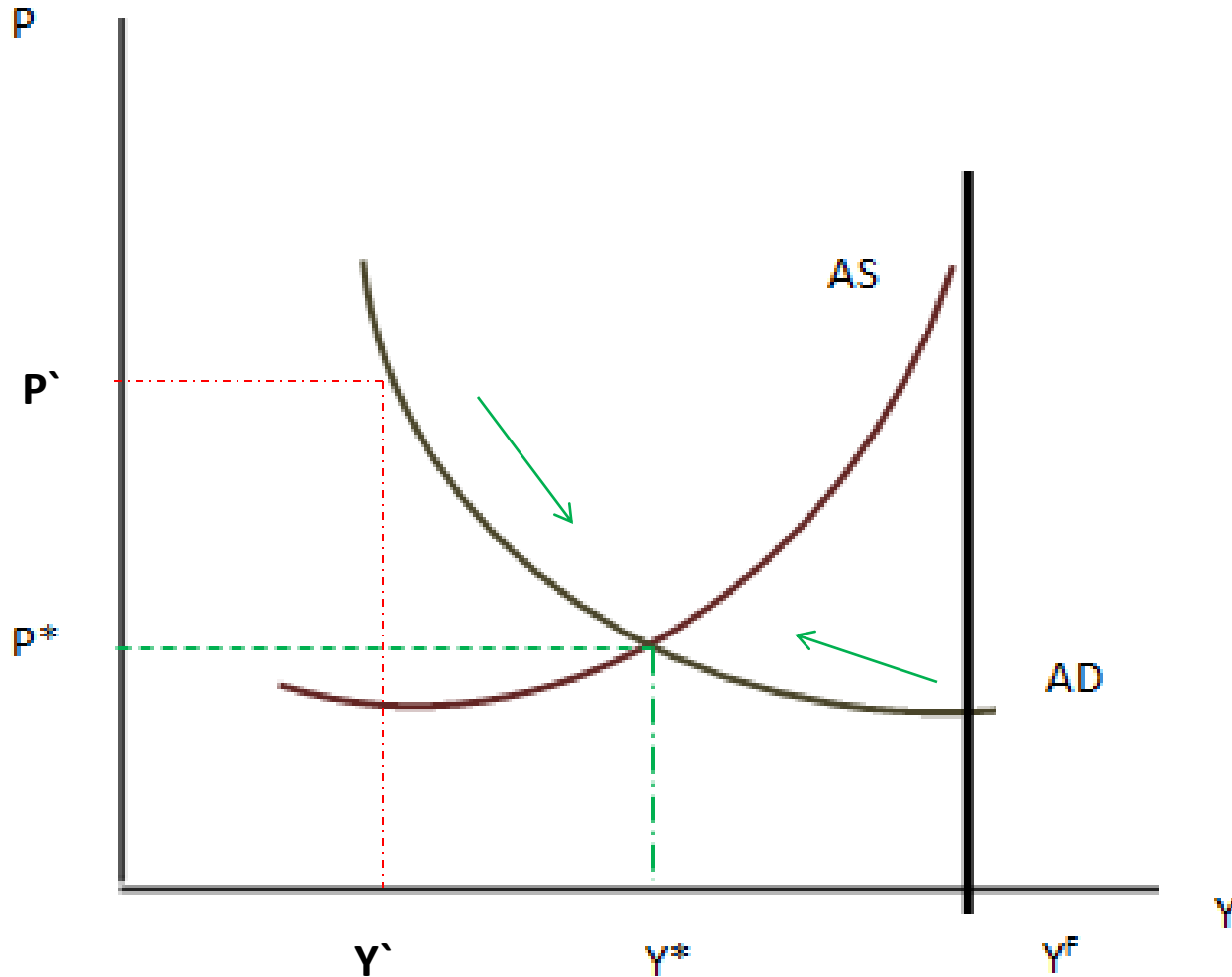• Higher Y* puts an upward pressure on prices (through inputs market)

AD-AS Model: The Equilibrium

Equilibrium: Y* and P*

AD-AS Model: Movement Toward Equilibrium

Equilibrium: Y* and P*

AD-AS Model: Expansionary Policy

1. Expansionary **policy leads to inflation**

Demand-pull inflation

*   Shifts of the AD curve

*   Part of the effect is eaten by inflation

The size of two effects depends on how close the economy is to the Y^F

*   Economy is coming out of recession (expansionary policy)

*   Economy is booming (expectations)

AD-AS Model: Stagflation

Cost-Push inflation: increase in the costs of production independent of demand

- Shifts of the AS curve => Low Y* and higher prices

- Expansionary monetary policy => higher inflation and lower output

Source:BEA
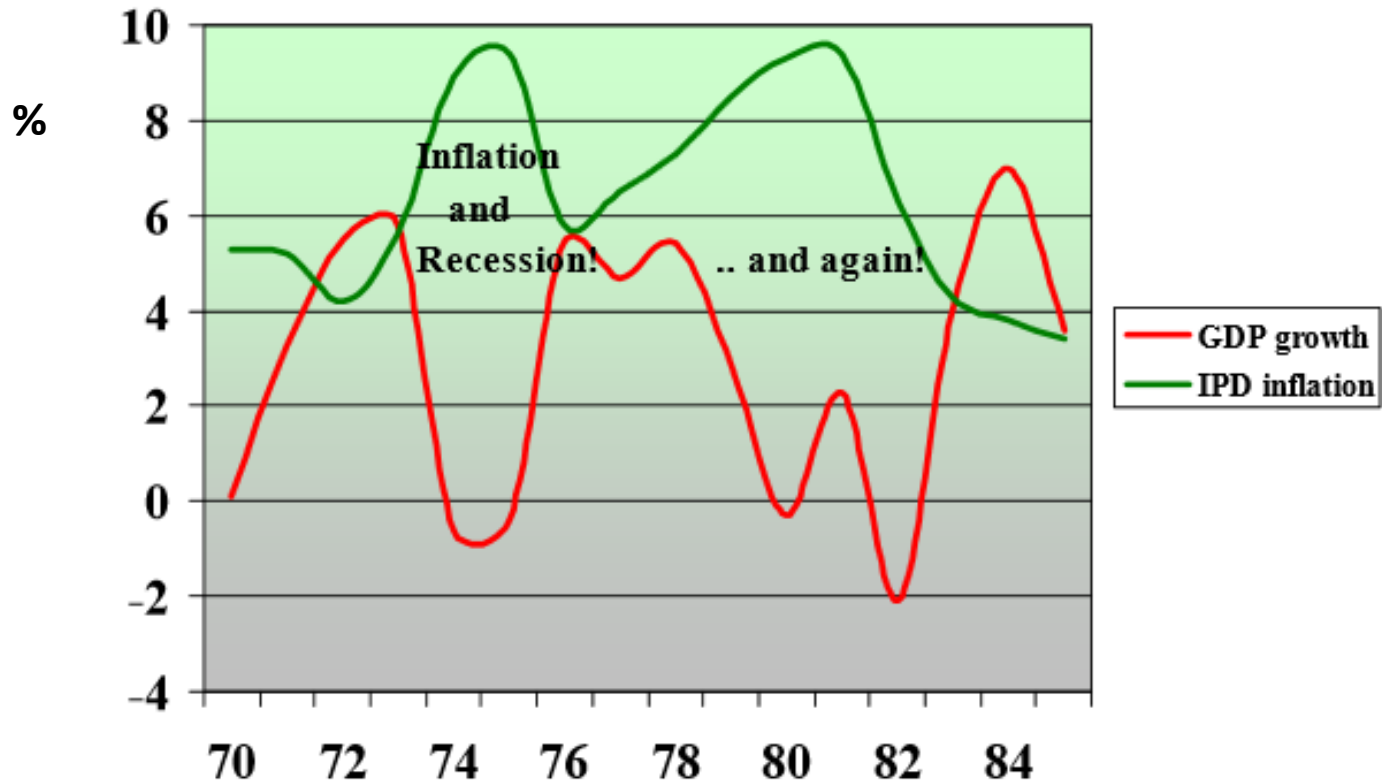
Causes of Inflation

Keynesian school

Key assumption: sticky prices

Demand-pull inflation: increase in aggregate demand

Cost-push inflation: increase in the costs of production independent of demand

Monetarists

Key assumption: flexible prices

"Inflation is always and everywhere a monetary phenomenon" (M. Freedman)

• Inflation is a consequence of a more rapid money supply than increase in output

•An increase in money supply would lead only to the increase in prices rather than output expansion

The Quantity Theory of Money

Accounting identity:

Velocity

$$MV =$$

Money in circulation   **GDP**

(cash + checks)

Velocity - the number of times per year the average currency unit turns over in transactions for final goods and services

TE. The US nominal GDP in 2012 was $14 trillion, but the amount of money in circulation in 2012 was only $1 trillion.
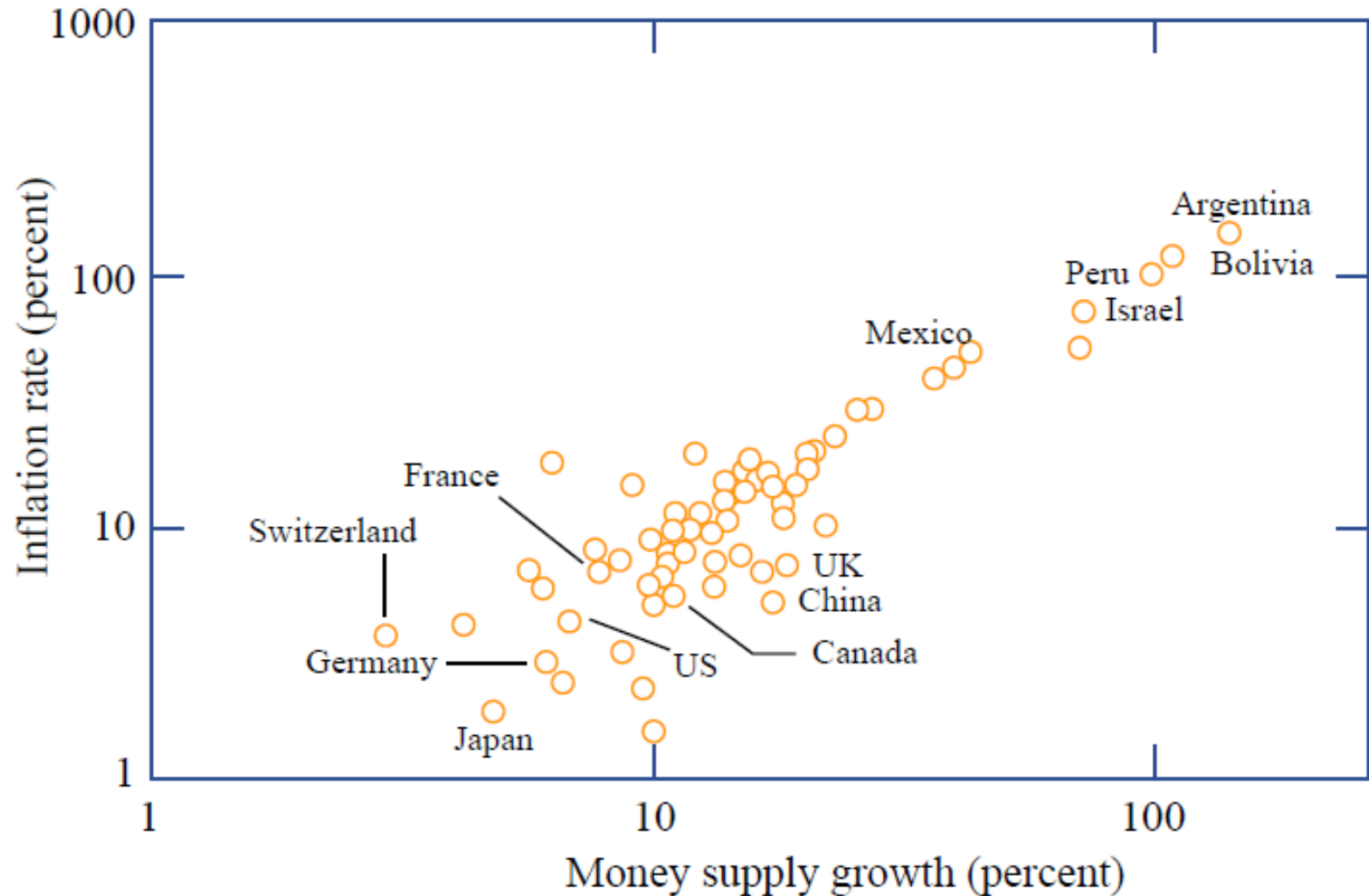
What is the velocity?

$$MV$$

• Increase in money supply should be balances by changes in other component

Velocity is relatively constant

Increase in money supply => Increase in nominal GDP

Which component of the nominal GDP changes?

Average Inflation Rates & Money Supply Growth

Source: Mankiw, 2012

Costs of Inflation

• Fall in the real value of savings

• Fall in net exports

• Fall in investment expenditures

• Fall in GDP

• Increase in unemployment

• Redistribution of real income (decreasing liabilities of debtors and assets of

creditors in real terms)

Inflation expectations

• **Anticipated** inflation – business and individuals adjust their actions based on inflation expectations

• **Unanticipated** inflation – portion of inflation businesses and households cannot predict

Random redistribution of wealth

Next class: Unemployment

Handout