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 assets 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)

- Established by the Congress
- Largest packagers of MBS
- Guarantees against the loss
- Inadequate capital
Securitization (Cont.)

- Low quality mortgages
- Financial firms created securities made up of mortgages and other assets
- Investors
- Financial firms
- Credit rating agencies
- Credit insurers
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)

- **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
- **AIG**:
- **Wachovia**: Oct 3rd
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

⇒ 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

Source: www.federalreserve.gov
Real Economic Consequences

In the US:

Reduced credit flows, high borrowing costs, falling assets values

⇒ Contraction of spending and output

• GDP fell by more than 5 %
• 8.5 million people lost jobs
• Unemployment increases to 10 %

Comparison to the Great Depression

Stock market
Comparison to the Great Depression

Industrial production

[Graph showing industrial production with two lines: one for July 1929 = 100 and another for September 2007 = 100. The graph plots months since peak on the x-axis and a value scale on the y-axis from 40 to 120. The graph shows a decline followed by a slower recovery compared to the 1929 recession.]
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

⇒ Increase in budget deficit, higher taxes

Government investments into infrastructure (Long-term)

- Monetary policy

Expansion: Interest rates are pushed to 0 %

⇒ 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

The Great Moderation

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 enters with a weight

\[
\text{Cost of basket}_{2000} = \text{Food} + \text{House} + \text{Education}
\]

• CPI is only a rough approximation

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

Composition of US CPI by Expenditure Category

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

Source: BLS
Consumer Price Index (Cont.)

• CPI with respect to the base year

\[ CPI_{2000} = \frac{Cost\ of\ basket\ in\ 2000}{Cost\ of\ basket\ in\ base\ year} \cdot 100 \]

• Inflation rate using CPI

\[ \pi^+ = \frac{CPI_{t+1} - CPI_t}{CPI_t} \cdot 100 \]

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

Source: BEA
## Classification

<table>
<thead>
<tr>
<th>Inflation Thresholds</th>
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<tbody>
<tr>
<td>&lt;0%</td>
</tr>
<tr>
<td>0% - 2.5%</td>
</tr>
<tr>
<td>2.5% - 5.0%</td>
</tr>
<tr>
<td>5% - 8%</td>
</tr>
<tr>
<td>8% - 12%</td>
</tr>
<tr>
<td>12% - 20%</td>
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<tr>
<td>20% +</td>
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</tbody>
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**NB** 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
   
   \[ \text{AE} \downarrow \rightarrow \text{Prices} \downarrow \rightarrow \text{AE} \downarrow \rightarrow \text{Y} \downarrow \]

2. **Increases real value of debt (real interest rate): burden on borrowers**
   
   \[ \text{AE} \downarrow \rightarrow \text{Y} \downarrow \]
   
   • 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 =>
   
   \[ \text{unemployment} \uparrow \rightarrow \text{AE} \downarrow \]

**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 WW 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 $Y^*$

![Graph showing the AD curve with price levels and output levels.]
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:

\[ M \times V = P \times Y \]

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

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?*
The Quantity Theory of Money (Cont.)

\[ M V = P Y \]

- Increase in money supply should be balanced by changes in other components

  Velocity is relatively constant

  Increase in money supply \(\Rightarrow\) 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