Central Banks and Alternative Monetary Systems

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The opinions expressed are my own and not necessarily those of the Federal Reserve Bank of Saint Louis or the Federal Reserve System.
Today’s Topics

- Central Banks and Alternative Money Systems
  - What is Money?
  - Methods of Monetary Policy
  - Central Banks
  - Central Banks vs. Commodity Standard
What is Money?
Money

• Money: That which can be exchanged for goods and services.
  – Functions:
    • Medium of exchange
    • Store of value
    • Unit of measure
Why Do We Need Money?

• Money solves the mutual coincidence of wants problem.

• Greatly reduces transactions costs/shopping time.
  – My grocer does not want a lecture on economics in exchange for Cheerios.
Historical Forms of Money

- Commodities: cigarettes, furs, gold, Rai stones (Yap island)
- Fiat money: Money whose value is not intrinsic.
  - Introduced during wartime in the United States
- Characteristics of useful money
  - Durable, transportable, divisible, homogenous, easily produced (?)
Historical Forms of Money

Rai stone
Historical Forms of Money

- What are the advantages and disadvantages of having a currency that is easily produced?
Money Supply

- Monetary base: Currency and reserves with the central bank.
- Narrow to broad definitions of money
  - Currency
  - Demand deposits
  - Time deposits, CDs
  - Short-term bonds
- Money and bonds are close to a continuum now
  - M0, M1, MZM, M2
Money Supply

Monetary Base

Billions of US Dollars


Monetary Base (BASE)
Money supply levels go up and up.

M1 and M2
Money supply growth rates fluctuate.

M1 and M2

Annualized Percentage change over 3 years


MZM  M2
How Do We Decide
What Is Money?

• At least two options
  – Use economic theory.
  – Use a definition that works well in predictions
    • What to predict?
Monetary Systems
Monetary Systems

• Commodity standards: Gold, silver
  – No current examples of major countries with commodity standards.

• Central banks
  – The most common choice, by far.

• Currency boards
  – Fixed exchange rate with 1:1 reserves.
  – Outsourcing monetary policy.
How Does the Money Supply Change?

• Commodity standard
  – People dig holes in the ground, haul out ore and turn it in to the central bank for money.

• Central bank
  – Central bank buys (sells) bonds, injecting (extracting) money from the economy.
  – Central banks change the relative supplies of government debt.
How Does the Money Supply Change?

- Question(s): Suppose that the supply of gold exogenously increases under a gold standard. (Perhaps we just conquered a good portion of the New World.)

  - What happens to the domestic price level?
  - What happens to our imports and exports?
  - What happens to foreign price levels?
  - What happens to production at existing gold mines?
  - What might be true of the price level in the very long run under a gold standard?
Central Banks
Functions of a Central Bank

- Banking services for the government
- Lender of last resort
- Control of money supply and interest rates
- Bank regulation?
- Payment systems?
Why Do We Need a Lender of Last Resort?

• Bank runs can be self-fulfilling
  – “It’s a Wonderful Life”
• Banking crises can severely reduce output and employment
• A lender of last resort can reduce the frequency and severity of banking crises
• The U.S. had repeated banking crises in the 19th century
Why Do We Need a Lender of Last Resort?

Inflation and GDP data from www.measuringworth.com
U.S. Central Banks

• First Bank of the United States (1791–1811)
• Second Bank of the United States (1816–1836)
  – No lender of last resort. Repeated banking crises in 19th century.
  – 1907: JP Morgan organized a coalition of rich men to shore up the banking system.
U.S. Central Banks

• The Federal Reserve (1914–2011)
  – Structure reflects fear of centralized power and moneyed interests.
  – 12 district banks. NY, Chicago, and SF are the 3 largest district banks in terms of assets. (50%)
  – FOMC voting structure
    • Permanent votes: 7 Governors and the President of the NY Fed
    • Rotating votes: 11 other FRB Presidents rotate annually through 4 voting slots.
  – FRBs are technically owned by member banks but subject to BOG supervision. FRBs exist to serve the public interest, not their shareholders.
    • 9 directors (6 elected by Banks, 3 by BOG); 3 A directors are professional bankers; 3 B directors are leaders from industry, labor agriculture; 3 C directors are appointed by BOG as public reps.
  • http://research.stlouisfed.org/publications/es/10/ES1010.pdf
Central Banks Versus a Commodity Standard
Goals of a Monetary Standard

• Price stability
  – Inflation is a monetary phenomenon when measured over a sustained (years) period.
  – Congress mandates the Fed to pursue price stability.

• Countercyclical policy
  – Subject to some debate.
  – Congress mandates the Fed to pursue maximum sustainable employment.
Price Stability

• Low and stable inflation.
• Should inflation be zero on average?
• Target prices or inflation?
  – What is the difference? Targeting prices implies that you make up for past errors. If inflation has been high, you attempt to reduce it below the long-run average.
Price Stability

Gold standard: Deflation from 1870 to 1895 and inflation after.

Data from www.measuringworth.com
Price Stability

Post-WWII: Rising inflation from 1960 to 1980, then the great Volcker disinflation.
Price Stability

The long-run value of the dollar?

• The U.S. price level is about 20 times the price level in 1913. The dollar is only worth 4-6% of what it was worth.

• [http://www.measuringworth.com/uscompare/result.php?use%5B%5D=DOLLAR&use%5B%5D=GDPDEFLATION&use%5B%5D=VCB&use%5B%5D=UNSKILLED&use%5B%5D=MANCOMP&use%5B%5D=NOMGDPCP&use%5B%5D=NOMINALGDP&year_source=2010&amount=100&year_result=1913](http://www.measuringworth.com/uscompare/result.php?use%5B%5D=DOLLAR&use%5B%5D=GDPDEFLATION&use%5B%5D=VCB&use%5B%5D=UNSKILLED&use%5B%5D=MANCOMP&use%5B%5D=NOMGDPCP&use%5B%5D=NOMINALGDP&year_source=2010&amount=100&year_result=1913)
The long-run value of the dollar?

• Has the Fed *debased* the currency? Is this a monstrous failure?
  
  – No. The great majority of economists would argue that low and stable inflation has very low costs.
  
  – Most economists would probably argue that low and stable inflation is better than inflation that averages zero.

  • This is disputed. Most would agree that the cost difference is very small.
The long-run value of the dollar?

• Price comparisons across long periods of time are not very useful as baskets of goods have changed.
  – Woodrow Wilson did not have an iPhone; neither did Wilson get an MRI after his stroke.
  – I do not buy many railroad tickets or much horse feed.
The long-run value of the dollar?

- Much of the inflation has been due to wars. The U.S. – and other countries – would regularly leave the gold standard during wars to raise revenue through inflation.
The long-run value of the dollar?

• What is the relative harm of low and stable inflation versus 0 inflation?

• Two types of inflation:
  – Anticipated inflation can potentially distort price signals and causes people to economize on currency holdings.
  – Unanticipated inflation creates much greater distortions and arbitrary reallocations between creditors/debtors and workers/employers.
The long-run value of the dollar?

• Question: If you are happy working for $50,000 and you expect 2% inflation next year, how much salary do you want to make you just as happy?

• Suppose that you expect 2% inflation and you want to buy a bond to fund your retirement. If the bond pays a 5% yield, how much will your real return be?
The long-run value of the dollar?

- Low and stable inflation creates very small distortions.
  - Stable inflation can be anticipated accurately. Wages and interest rates can adjust for it.
  - Low inflation creates only small incentives to economize on money holdings.
The long-run value of the dollar?

• So why not shoot for zero inflation?
  – A reasonable question. Two usual answers…
  – Quality of goods
    • If a good improves in quality, it should cost more. Measured inflation doesn’t always accurately reflect quality improvement so it overstates true inflation.
  – Zero bound
    • Nominal interest rates can’t go below zero. If inflation is zero on average it will be negative half the time and real interest rates cannot decline sufficiently in recessions.
The long-run value of the dollar?

• So why not shoot for zero inflation?
  – One more (unusual) reason…
  – Inflation is a tax on currency (mostly).
  – Much of the U.S. monetary base is held as currency by non-US residents. Inflation effectively taxes these non-US residents.
  – There is about $1.05 trillion in U.S. currency outstanding in 2011. That is about $3500 for every man, woman and child in the U.S..
  
• Do you have this much cash on hand?

• http://research.stlouisfed.org/fred2/series/WCURCIR
The long-run value of the dollar?

- Many economists would advocate a zero inflation target despite concerns about measuring quality of goods or the zero bound.
- Some members of the FOMC have expressed a desire for inflation in the 1 to 2% range.
Inflation Targeting

- In the 1990s, many central banks moved to inflation targeting.
- Disadvantage is a lack of attention to the real economy.
# Inflation Targeting

<table>
<thead>
<tr>
<th>Country</th>
<th>Index</th>
<th>Targeted Range</th>
<th>Country</th>
<th>Index</th>
<th>Targeted Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>CPI</td>
<td>2-3% from 1993</td>
<td>Norway</td>
<td>CPI-ATE</td>
<td>2.5% since 2001</td>
</tr>
<tr>
<td>Brazil</td>
<td>IPCA</td>
<td>4.5% for 2008</td>
<td>Peru</td>
<td>CPI</td>
<td>1-3% since 2007</td>
</tr>
<tr>
<td>Canada</td>
<td>CPI</td>
<td>1-3%, with aim for 2%</td>
<td>Philippines</td>
<td>CPI</td>
<td>3-5% for 2008, 2.5-4.5% for 2009</td>
</tr>
<tr>
<td>Chile</td>
<td>CPI</td>
<td>2-4%</td>
<td>Poland</td>
<td>CPI</td>
<td>2.50%</td>
</tr>
<tr>
<td>Colombia</td>
<td>CPI</td>
<td>3.5-4.5% for 2008</td>
<td>Romania</td>
<td>CPI</td>
<td>3.8% in 2008, 3.5% in 2009</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>HICP</td>
<td>1-3% from 2010</td>
<td>South Africa</td>
<td>CPI</td>
<td>3-6%</td>
</tr>
<tr>
<td>European Union</td>
<td>HICP</td>
<td>Maximum of 2% from 1999</td>
<td>South Korea</td>
<td>CPI</td>
<td>2.5-3.5% for 2007-2009</td>
</tr>
<tr>
<td>Guatemala</td>
<td>CPI</td>
<td>4.5-6.5% for 2009</td>
<td>Sweden</td>
<td>CPI</td>
<td>1-3% from 1995</td>
</tr>
<tr>
<td>Iceland</td>
<td>CPI</td>
<td>1-4% from 2003, goal is 2.5%</td>
<td>Switzerland</td>
<td>CPI</td>
<td>Maximum of 2% from 2000</td>
</tr>
<tr>
<td>Israel</td>
<td>CPI</td>
<td>1-3% from 2003</td>
<td>Thailand</td>
<td>Core CPI</td>
<td>0-3.5% since 2000</td>
</tr>
<tr>
<td>Mexico</td>
<td>CPI</td>
<td>3%</td>
<td>Turkey</td>
<td>CPI</td>
<td>4%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>CPI</td>
<td>1-3% from Sept. 2002</td>
<td>United Kingdom</td>
<td>CPI</td>
<td>2% from 2004</td>
</tr>
</tbody>
</table>
International Inflation Targeting

Canada Inflation Targeting

- Headline Inflation
- Underlying Inflation

Year

Percent

1991 1993 1995 1997 1999 2001 2003 2005 2007
International Inflation Targeting

New Zealand Inflation Targeting

- Headline Inflation
- Underlying Inflation

Year

Percent

1991 1993 1995 1997 1999 2001 2003 2005 2007
International Inflation Targeting

United Kingdom Inflation Targeting

- Headline Inflation
- Underlying Inflation

Year

Percent

1991 1993 1995 1997 1999 2001 2003 2005 2007
Inflation Targeting

• Advantages
  – Anchors inflation expectations and prevents arbitrary reallocations from lenders to borrowers or vice versa.

• Criticisms
  – Inflation can be difficult to manage in the short-term.
  – Inflation targeting can tie the hands of countercyclical policy.
Central Bank Independence

• Political authorities can attempt to influence monetary policy for short-term gain.

• A solution: Shield the central bank from political pressure.
  – Governor’s terms, budgets, informal strictures.

• Independent central banks tend to deliver low and stable inflation.

• These central banks are accountable for their inflation performance.
Central Bank Independence

**TABLE 1**

**INDEX OF CENTRAL BANK INDEPENDENCE**

<table>
<thead>
<tr>
<th>Country</th>
<th>BP¹</th>
<th>GMT²</th>
<th>Conversion from GMT to BP¹</th>
<th>Average GMT, BP¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Belgium</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Canada</td>
<td>2</td>
<td>11</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>Denmark</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>France</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Germany</td>
<td>4</td>
<td>13</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Italy</td>
<td>1.5</td>
<td>5</td>
<td>2</td>
<td>1.75</td>
</tr>
<tr>
<td>Japan</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2</td>
<td>10</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>Norway</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Sweden</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>2</td>
</tr>
<tr>
<td>Switzerland</td>
<td>4</td>
<td>12</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>United States</td>
<td>3</td>
<td>12</td>
<td>4</td>
<td>3.5</td>
</tr>
</tbody>
</table>

1. This is the index originally proposed by Bade and Parkin (1982) and extended by Alesina (1988).
3. Conversion from the GMT scale to a (1) to (4) scale comparable with the BP scale. The conversion is as follows:

<table>
<thead>
<tr>
<th>GMT index (i)</th>
<th>conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>$i &gt; 11$</td>
<td>4</td>
</tr>
<tr>
<td>$7 &lt; i \leq 11$</td>
<td>3</td>
</tr>
<tr>
<td>$4 &lt; i \leq 7$</td>
<td>2</td>
</tr>
<tr>
<td>$i \leq 4$</td>
<td>1</td>
</tr>
</tbody>
</table>

4. Average of columns (1) and (3).

Central Bank Independence

CB independence = low inflation

Central Bank Independence

CB independence = stable inflation

Central Bank Independence

CB independence = no effect on output growth

Countercyclical Policy

• Can policy affect the economy?
  – If people fully anticipate policy actions, they might have little or no effect.

• Should it affect the economy?
  – Does it fool people into taking actions that make them worse off?
  – Consider a pizza restaurant that sees more customers coming in to buy pizza.
    • If a change in real demand, increase production.
    • If a change in nominal demand, increase prices.
Countercyclical Policy

• What can we say about countercyclical monetary policy?
  – M policy cannot raise the average level of output growth or employment over the long run.
    • Money is *neutral* in the long-run.
  – M policy can have real effects in the short-run.
    • See the 1980-1982 Volcker disinflation.
  – Can or should M policy be used systematically to smooth business cycle fluctuations?
    • Economists dispute the answer.
Taylor Rule

- Prescriptive & descriptive M policy rule.
- Several variations.
  - Original was John Taylor (1992).
  - Which price level? Forecast or current values? Coefficients?
  - Variations imply different things for the current funds rate.
Taylor Rule

\[ FF_{IMP,t} = \pi_{t-1} + 2.5 + .5 \times Y_{gap_{t-1}} + .5 \times (\pi_{t-1} - \pi^*) \]

- Relates the fed funds rate to the deviation of inflation from some target and the output gap.
  - Higher output and/or higher inflation means higher short-term interest rates.
Taylor Rule

$FF_{IMP,t} = \pi_{t-1} + 2.5 + .5 \times Ygap_{t-1} + .5 \times (\pi_{t-1} - \pi^*)$

• If last quarter’s inflation rises by 1 percentage point, how much does this Taylor rule imply the fed funds rate will rise?
  
  – Hint: Lagged inflation appears in two places on the right-hand side.
Taylor Rule

\[ FF_{IMP,t} = \pi_{t-1} + 2.5 + 0.5 \times Y_{gap_{t-1}} + 0.5 \times (\pi_{t-1} - \pi^*) \]
Summary of Methods of Monetary Policy

- Central banks can achieve price stability; commodity standards have nearly random price levels.
- No M policy System is free from disadvantages.
- No modern economy has a commodity standard; central banks are the most common, by far.
- Many countries have directed their central banks to target inflation specifically.
- More independent central banks have delivered better inflation performance at no loss in employment or output.
The End