The Global Economy

Monetary Policy – Nuts and Bolts
Main questions

1. What is money?

2. How do central banks (try to) control the quantity of money in circulation?
What is money?
Why Money?

• Once upon a time, there was barter

• A big problem with barter is that it requires double coincidence of wants

• Money is any object that can be used to overcome the absence of double coincidence of wants

• In ancient times, shells or blocks of salt were used

• Ideal attributes of money
  ○ Easy to carry
  ○ Easy to divide
  ○ Durable
  ○ Purchasing power does not fluctuate much
Commodity Money

- The government produces coins with a given content of precious metal (gold, silver)
- People bring precious metal to the king’s mint and obtain coins in return
- Example: in XIII, XIV, XV century, the Republic of Florence’s florin contained 3.5 grams of gold
- The king charges a minting fee
- The king also charges a minting tax, called seigniorage
Paper Money

- The government may decide to replace coins with certificates redeemable for gold – banknotes
- Example: most countries adhered to the Gold Standard from 1860s to WWI and then again in the 1920s
- Government stands ready to exchange intrinsically worthless banknotes for given quantities of gold
- The system works as with commodity money as long as gold reserves equal 100% of currency in circulation
- Novel issue: the temptation to finance expenditures by printing banknotes in excess of gold reserves
Paper Money – Continued

- Say that the government needs to finance a war
- Now it is possible to simply print banknotes to pay for it
- Exchanging (intrinsically worthless) banknotes for goods and services is a novel form of seigniorage
- Increasing the currency in circulation for given gold reserves leads to inflation
Fiat Money

- Fiat money is not backed by anything with intrinsic value.
- People accept banknotes in exchange for goods simply on the expectation that other people will take those same notes in exchange for other goods.
- In turn, this faith depends on the money-issuing authority’s commitment to preserve the currency’s purchasing power.
- Usually, it is the central bank which is charged with the duty of introducing money in circulation, trading it for other financial assets.
Money Creation
Money Creation – Example

- Banks can hold accounts at the central bank – reserve accounts
- Assumption: banks must hold 30% of deposits as reserves (vault cash or reserve accounts)

<table>
<thead>
<tr>
<th>Central Bank of Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkish Treasury Bonds 90.0</td>
</tr>
<tr>
<td>Foreign Exchange 10.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asik Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault Cash           4.0</td>
</tr>
<tr>
<td>Reserve Account      0.5</td>
</tr>
<tr>
<td>Loans                16.5</td>
</tr>
<tr>
<td>Turkish Treasury Bonds 4.0</td>
</tr>
</tbody>
</table>
Money Creation – Example – Continued

- The Central Bank of Turkey purchases TL 2.0B worth of Turkish Treasuries from Asik Bank
- The Central Bank’s credits Asik’s reserve account for TL 2.0B

<table>
<thead>
<tr>
<th>Central Bank of Turkey</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkish Treasury Bonds</td>
<td>92.0</td>
<td>Currency</td>
</tr>
<tr>
<td>Foreign Exchange</td>
<td>10.0</td>
<td>Reserves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asik Bank</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault Cash</td>
<td>4.0</td>
<td>Deposits</td>
</tr>
<tr>
<td>Reserve Account</td>
<td>2.5</td>
<td>Net Worth</td>
</tr>
<tr>
<td>Loans</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>Turkish Treasury Bonds</td>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>
Money Creation – Example – Continued

- Asik’s excess reserves are TL 2.0B
- Asik lends TL 2.0B to Mr. Hedo Turkoglu
- Mr Turkoglu holds TL 1.0B in cash and deposits TL 1.0 at Ilyasova Bank

Ilyasova Bank

<table>
<thead>
<tr>
<th></th>
<th>Deposits</th>
<th>Net Worth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault Cash</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Reserve Account</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Loans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkish Treasury Bonds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Asik Bank

<table>
<thead>
<tr>
<th></th>
<th>Deposits</th>
<th>Net Worth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault Cash</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Reserve Account</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Loans</td>
<td>18.5B</td>
<td></td>
</tr>
<tr>
<td>Turkish Treasury Bonds</td>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>
Money Creation – Example – Continued

- Because of the bond purchase (open market operation) by the Central Bank of Turkey
  - Monetary Base increased by TL 2.0B
  - Money Supply (means of payments available to the public) did not change

- Because of Asik’s loan to Mr Turkoglu
  - Monetary Base did not change
  - Money Supply increased by TL 2.0B

- Ilyasova Bank can extend loans for as much as 0.7

- Bottom line: following the increase in base by TL 2.0B, money supply can grow by more than TL 2.0B
The Money Multiplier

- $M =$ money supply
- $H =$ monetary base
- $c =$ currency (except vault cash) as a fraction of deposits
- $rr =$ reserves as a fraction of deposits

\[
\frac{M}{H} = \frac{1 + c}{c + rr}
\]
Definitions of Money

<table>
<thead>
<tr>
<th>M1</th>
<th>3,223.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currency (except vault cash)</td>
<td>1,409.7</td>
</tr>
<tr>
<td>Travelers Checks</td>
<td>2.2</td>
</tr>
<tr>
<td>Demand deposits at comm. banks</td>
<td>1,282.4</td>
</tr>
<tr>
<td>Other checkable deposits</td>
<td>529.4</td>
</tr>
</tbody>
</table>

Week of November 7, 2016. Figures are in billions of current dollars.
Definitions of Money

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2</td>
<td>13,188.9</td>
</tr>
<tr>
<td>M1</td>
<td>3,223.7</td>
</tr>
<tr>
<td>Saving Deposits</td>
<td>8,897.1</td>
</tr>
<tr>
<td>Small denomination time deposits</td>
<td>374.8</td>
</tr>
<tr>
<td>Balances in retail money market funds</td>
<td>693.3</td>
</tr>
</tbody>
</table>

Week of November 7, 2016. Figures are in billions of current dollars.
Definitions of Money

M3

M2
Balances in institutional money market funds
Repurchase agreements
Eurodollar deposits
Monetary Aggregates in the US

United States – Monetary Aggregates

Source: Federal Reserve
The Money Multiplier in the US

United States – Money Ratios

Source: Federal Reserve

Currency Ratio
Reserve Ratio

Percent

1960m1 1970m1 1980m1 1990m1 2000m1 2017m9

Source: Federal Reserve

Gian Luca Clementi
The term “monetary policy” refers to the actions undertaken by a central bank, such as the Federal Reserve, to influence the availability and cost of money and credit to help promote national economic goals. The Federal Reserve Act of 1913 gave the Federal Reserve responsibility for setting monetary policy.
Tools of Monetary Policy

- **Traditional tools**
  - Open Market Operations
  - Discount Window
  - Reserve Requirements

- **Innovative tools**
  - Interest on Reserves
  - Quantitative Easing
  - Forward Guidance
Federal Reserve System

- Board of Governors
- Federal Reserve Banks (12)
- Federal Open Market Committee
Federal Reserve Banks

- 12 San Francisco
- 9 Minneapolis
- 7 Chicago
- 4 Kansas City
- 1 New York
- 10 St. Louis
- 3 Philadelphia
- 8 Atlanta
- 5 Richmond
- 6 Dallas
- 11 Austin

Alaska and Hawaii are part of the San Francisco District.
The Federal Open Market Committee is the actual policy-making body.

It is composed of:

- 7 members of the Board of Governors
- The president of the Federal Reserve Bank of New York
- 4 presidents of the other Federal Reserve Banks on a rotating base
Domestic Trading Desk

- Open Market Operations are arranged by the Domestic Trading Desk at the Federal Reserve Bank of New York
- A secondary Trading Desk is located at the Federal Reserve Bank of Chicago
Eurosyste\textcolor{red}{m}

- National Central Banks of EU member states which adopted the Euro (19)
- European Central Bank
- Governing Council
  - ECB’s Executive Board
  - Governors/presidents of all NCBs
Takeaways

1. What do we really mean by money?
   - Money consists of all means widely accepted as payment.
   - Commodity money is a commodity that, because of its physical characteristics, is accepted as a means of payment. Examples: gold, salt.
   - Fiat money is a means of payment that has not intrinsic value. It is accepted in exchange for goods and services because of people’s faith on the central bank’s ability to control the change of its purchasing power over time.
   - Technically, we classify money as M1, M2, or M3, depending on the speed and the cost at which they are available for transfer.
2. How do central banks (try to) control the quantity of money in circulation?

- Central banks directly control the monetary base, but not the amount of money in circulation
- The amount of money implied by a given amount of monetary base is variable and depends on the choices of banks, firms, and households
- Most central banks change the level of monetary base by means of money market operations - exchange of reserves for securities