Macroeconomic Policy Fundamentals

Chapter 13 +

Discussion Topics

- Characteristics of money
- Federal Reserve System
- Changing the money supply
- Money market equilibrium
- Effects of monetary policy on economy
- The federal budget deficit
- The national debt
- Fiscal policy options

Irving Fisher
1867 - 1947

- Yale economist - eccentric and colorful
- Founder of monetary macroeconomic theory
- Life
  - Son of a minister
  - Graduate of Yale - dissertation
  - Married, two daughters and a son
  - TB
  - Became an activist for health issues
  - Advisor to Benito Mussolini?
- Inventor – visible card index system – similar to rolodex, founder of company eventually becoming Sperry Rand - now part of Unisys and Honeywell
- $10 million to rags
Functions of Money

- **Medium of exchange** – facilitates payment to others for goods and services

- **Unit of accounting** – assessing profitability of businesses, household budgets and aggregate variables like GDP

- **Store of value** – money is a liquid asset which has value in investment portfolios and cash flow decisions of businesses and households

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Gold Standard Certificate

- The **gold standard** is a monetary system in the medium of exchange are paper notes that are normally freely convertible into pre-set, fixed quantities of gold.
- The gold standard is not currently used by any governments, having been replaced completely by **fiat currency**.
- **Fiat money** is money declared by a government to be legal tender.

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Silver Certificate

Silver Certificates were printed from 1878 to 1964 in response to citizens who were angered by the Fourth Coinage Act, which had effectively placed the United States on a gold standard. The certificates were initially redeemable in the same face value of silver dollar coins. Since 1968 they have been redeemable only in Federal Reserve Notes and are thus obsolete, but are still valid legal tender.
Fiat Money

Paper currency are called Federal Reserve Notes

Bank of Origin

Legal Tender

Fiduciary Monetary System

- **Value of money** – rests on the public’s belief that a piece of paper can be exchanged for goods and services

- **Three reasons why a fiduciary system has value**
  - Money is acceptable by others when purchasing goods and services
  - Money has been designated legal tender by the federal government
  - Predictable value – a dollar is a dollar

- **Definition of money**
  - M1, M2, and M3

Federal Reserve System - Fed

- Country’s central bank - created in December 1914 – 12 Districts

- [Map of Federal Reserve Districts]
**Federal Reserve System - Fed**

- Major goals
  - Encourage economic growth
  - Combat both inflationary and recessionary tendencies in the domestic economy
  - Lower transaction costs / banking
- Accomplishes goals
  - Regulating quantity and cost of credit
  - Regulating banks and acts as a clearing house

**Functions of the Fed**

- Supply the economy with paper currency
- Supervise member banks
- Provide check collection and clearing services
- Maintain the reserve balances of depository institutions
- Lend to depository institutions
- Act at the federal government’s banker and fiscal agent
- Regulate the money supply

**Determinants of the Money Supply**
Money Supply – How Determined

- Scenario
  - $200,000 in the economy
  - Banks can loan out deposits
  - Banks must keep 40% of the deposit on hand
    • Why?
- How much money is in the economy, if all $200,000 is deposited initially in a bank and all loaned out.

Money Supply – Continued

<table>
<thead>
<tr>
<th>Bank</th>
<th>Change in Deposits</th>
<th>Change in Reserves = deposit *0.4</th>
<th>Change in Loans = deposit - reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>200,000</td>
<td>80,000</td>
<td>120,000</td>
</tr>
<tr>
<td>B</td>
<td>120,000</td>
<td>48,000</td>
<td>72,000</td>
</tr>
<tr>
<td>C</td>
<td>72,000</td>
<td>28,800</td>
<td>43,200</td>
</tr>
<tr>
<td>D</td>
<td>43,200</td>
<td>17,280</td>
<td>25,920</td>
</tr>
<tr>
<td>subtotal</td>
<td>435,200</td>
<td>174,080</td>
<td>261,120</td>
</tr>
<tr>
<td>Etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other banks</td>
<td>64,800</td>
<td>25,920</td>
<td>38,880</td>
</tr>
<tr>
<td>Total</td>
<td>500,000</td>
<td>200,000</td>
<td>300,000</td>
</tr>
</tbody>
</table>

Change in the Money Supply

We can skip tracing deposits through the economy by using the following money supply ($M_s$) equation:

$$M_s = (1.0 \div RR) \times TR = MM \times TR$$

where TR represents total reserves and RR is the reserve requirement ratio. The expression with the brackets is known as the *money multiplier*.

We can restate this equation in terms of the change in the money supply as follows:

$$\Delta M_s = (1.0 \div RR) \times \Delta TR = MM \times \Delta TR$$
Using the $200,000 deposit and 40% reserve requirements ratio, the change in the money supply is

$$\Delta M_S = (1.0 \div RR) \times \Delta TR = MM \times \Delta TR$$

$$= (1.0 \div 0.40) \times 200,000$$

$$= 2.5 \times 200,000 = 500,000$$

This results in a change in loans of

$$\Delta \text{loans} = \Delta M_S - \Delta TR$$

$$= 500,000 - 200,000$$

$$= 300,000$$

Money Multiplier of 2.5

Interpretation?

If RR = 0.1 what is MM, ΔMS, and Δloans?

Money Supply

Existing money supply curve. Note it is perpendicular to the quantity axis, implying it is unaffected by the interest rate.

Expansionary monetary policy actions will shift the $M_S$ curve to the right.

Contractionary monetary policy actions will shift $M_S$ curve to the left.

The Fed’s Policy Tools

- **Reserve requirements** – depository institutions are required to maintain a specific fraction of their customers’ deposits as reserves – MM
- **Discount rate** – rate depository institutions pay when they borrow from the Fed - TR
- **Open market operations** – Fed can buy or sell government securities to alter the money supply - TR
Impacts of Policy Tools

Expansionary actions
- Fed buys securities
- Fed lowers the discount rate
- Fed lowers required reserve ratio

Effects of action
- Total reserves increase
- Money multiplier increases

Contractionary actions
- Fed sells securities
- Fed raises the discount rate
- Fed raises required reserve ratio

Effects of action
- Total reserves decrease
- Money multiplier decreases

ΔMS = MM × ΔTR

Reserve Requirement

April 2018

Transaction Accounts Amounts
- 0 – 16 million – 0%
- 16 – 122.3 million – 3%
- > 122.3 million – 10%

Open Market Operations
1/1/2003-11/6/2019
Determinants of the Money Demand

• Transactions demand for money – carry cash to pay for normal expenditures
• Precautionary demand for money – carry cash to cover unexpected expenditures
• Speculative demand for money – hold cash as an asset in investment portfolios since the value of cash does not decline during periods of falling asset prices.

Demand for Money

- The money demand curve is given by $MD = c - d \times R$ where $R$ is the rate of interest
- Downward sloping – why?
  - Interest rate cost of holding money
- Movement along the demand curve vs. shift in the demand curve
Demand for Money

- Increase in national income leads to an increase in demand for money. Why?
- Decrease in national income leads to a decrease in demand for money. Why?

Equilibrium – Money Market

- Money market interest rate given by intersection of money demand and money supply

Monetary Policy

- Contractionary Policy leads to an increase in the interest rate
- Expansionary policy leads to a decrease in the interest rate
How Monetary Policy Works

Change in monetary policy
Change in excess reserves
Multiple changes in money supply
Change in the interest rate
Change in planned investment
Change in national income

The full effects of this change could take 12 months or more to register in bank deposits.

A change in the money supply alters the equilibrium interest rate in the money market.

A change in interest rates leads to movement along the planned investment function…increasing or decreasing new investment.

Changes in investment expenditures, a component of GDP, changes the demand for labor, changes unemployment and affects growth in national income.

Money Supply and GDP - Quarterly

1/1/1980 – 7/1/2019

Fed increases money supply during recessions to increase GDP – notice lag
GDP decreased before money supply increase

Eliminating Recessionary and Inflationary Gaps
What is the magnitude of the recessionary gap?

It is $Y_{FE} - Y_0$

The use of expansionary monetary policy actions to push aggregate demand from $AD_0$ to $AD_1$ increases real GDP from $Y_0$ to $Y_1$ while only increasing the general price level to $P_1$.

Recessionary gap of $Y_{FE} - Y_0$ is partially closed to $Y_{FE} - Y_1$

The further use of expansionary monetary policy to push aggregate demand from $AD_1$ to $AD_2$ increases real GDP from $Y_1$ to $Y_{FE}$ (full employment GDP), but increases the general price level to $P_2$.

Recessionary gap Closed $Y_0 = Y_{FE}$

Inflation rate $(P_1 - P_0)/P_0$

Inflation rate $(P_2 - P_1)/P_1$
The use of expansionary monetary policy to attain $Y_{POT}$ by shifting aggregate demand to $AD_1$ will increase the general price level to $P_2$.

Inflationary gap
Created $Y_e = Y_{POT} > Y_{FE}$

What is Fiscal Policy?

- Taxation by federal, state and local governments
  - Major revenue sources - sales, property, and income
- Government spending by federal state and local governments
- Budget deficits and the national debt
  - Many states / local – balanced budget

States’ Revenue Sources

Five states do not have a state sales tax (may have a local sales tax)
- Alaska
- Delaware
- Montana
- New Hampshire
- Oregon

Nine states do not have a state income tax but New Hampshire and Tennessee tax dividends and interest
- AK, FL, NV, MD, TX, WA, WI, NH, TN

All states appear to have some type of property taxes

### 2019 State and Local Tax Burden

<table>
<thead>
<tr>
<th>Least Friendly</th>
<th>Most Friendly</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Rate %</td>
</tr>
<tr>
<td>New York</td>
<td>12.97</td>
</tr>
<tr>
<td>Hawaii</td>
<td>11.71</td>
</tr>
<tr>
<td>Maine</td>
<td>10.84</td>
</tr>
<tr>
<td>Vermont</td>
<td>10.77</td>
</tr>
<tr>
<td>Minnesota</td>
<td>10.25</td>
</tr>
<tr>
<td>Texas #33</td>
<td>8.18%</td>
</tr>
</tbody>
</table>

https://files.taxfoundation.org/legacy/docs/LOST--2015.png

State-Local Tax Burdens by State
State-Local Tax Burden as a Percentage of State Income, FY 2012

https://wallethub.com/edu/states-with-highest-lowest-tax-burden/20494/
National debt\(_T\) = National debt\(_{T-1}\) + Deficit\(_T\)
Housing Values – Jan 1987- Aug 2019

Home Value Index Composite 10 Cities

https://www.standardandpoors.com/economics/indices/housing-prices/indices/en/us/?indexId=spusahomepriceindex10

U.S. Federal Receipts – Fiscal Year 2008 ($ Billions)

Total
$2,524 B

Individual Income Taxes
1,136
49%

Corporate Income Taxes
225
9%

Social Security & Social Insurance
198
8%

Excise Taxes
160
7%

Other
106
4%

Individuals and not businesses pay the bulk of federal taxes.

Source Data: Congressional Budget Office

Federal Receipts % - 2016

Individual Income Taxes
2.91%

Corporate Income Taxes
0.65%

Social Security & Social Insurance
0.17%

Excise Taxes
4.74%

Notice percentages change by year, recession and tax changes
A strong economy and controlled spending led to the first budget surplus in more than 20 years...

The effects of the sub-prime lending defaults and subsequent financial crisis and deficit spending have led to record high deficits...

The growth in federal debt has grown rapidly over the last 25+ years...

Current debt = $23.04 Trillion – November 13, 2019
Debt per citizen = $69,796
Debt per tax payer $186,579
What comes after a trillion? quadrillion $1 \times 10^{15}
Federal government spending on agriculture programs is the fourth highest on this list of total federal spending.

Department of Ag. Spending 2018

Fiscal Policy Options

- Automatic fiscal policy instruments - take effect without explicit action by policymakers (e.g., progressive tax rates)

- Discretionary fiscal policy instruments - require explicit actions by the president or Congress (e.g., passing a law)
Impacts of Policy Tools

Expansionary actions
Cut taxes
Increase government spending

Effects of action
Increase disposable income
Increase aggregate demand

Contractionary actions
Increase taxes
Cut government spending

Effects of action
Decrease disposable income
Decrease aggregate demand

“Crowding Out”

A federal budget deficit requires the U.S. Treasury to issue more government securities to balance sources and uses of funds...

Interest rates rise
Some planned investment “crowded out” by high rates

An increase in the sale of government securities reduces the pool of private capital available to finance investment expenditures, raising interest rates...

Higher interest rates depresses investment expenditures...

Fiscal Policy to Increase AD

The use of expansionary fiscal policy actions to push aggregate demand from \( AD_0 \) to \( AD_1 \) increases real GDP from \( Y_0 \) to \( Y_1 \) while only increasing the general price level to \( P_1 \).

Recessionary gap of \( Y_{FE} - Y_0 \) is partially closed to \( Y_{FE} - Y_1 \)
Fiscal Policy to Increase AD

The use of expansionary fiscal policy to push demand from $AD_1$ to $AD_2$ increases real GDP from $Y_1$ to $Y_{FE}$ (full employment GDP), but increases the general price level to $P_2$.

Recessionary gap
Closed $Y_E = Y_{FE}$

Fiscal Policy to Increase AD

The use of expansionary fiscal policy to attain $Y_{POT}$ by shifting aggregate demand to $AD_3$ will increase the general price level to $P_3$.

Inflationary gap
Created $Y_E = Y_{POT} > Y_{FE}$

Monetary Policy Summary

- Functions of money and the role of the Federal Reserve System in the economy
- The money multiplier and the growth of the money supply
- Tools of monetary policy
- Demand for money and money market equilibrium
- Policy linkages and timing of full effects
- Elimination of recessionary and inflationary gaps.
Fiscal Policy Summary

- Difference between discretionary and automatic fiscal policy tools
- Expansionary and contractionary fiscal policy actions
- Application to eliminating recessionary and inflationary gaps
- Budget deficits, national debt and concept of "crowding out"