

ECNS 313
Money and Banking
Fall 2016 Course Packet
Dr. Gilpin

Course Schedule

Week	Date	Topic	Due		
			Readings	HW	Term Paper
1	Aug 30	Review Syllabus / Lecture 1	Ball ch. 2		
1	Sep 1	Lecture 2 & Lecture 3	Ball ch. 1, 3		
2	6	Lecture 3			
2	8	Lecture 3	Ball ch. 4		
3	13	Lecture 3		2	
3	15	Lecture 4		2	
4	20	Lecture 4			
4	22	In-class exercise & review		3	
5	27	Exam I: Lectures 1-4			
5	29	Lecture 5	Ball ch. 9, 10		
6	Oct 4	Lecture 5 & form groups	Article IV	4	Form Group
6	6	Lecture 6	Ball ch. 7		
7	11	Lecture 7	Ball ch. 5	5	
7	13	Lecture 7			
8	18	Lecture 8	Ball ch. 11	6	Topic due
8	20	Lecture 8 & review	Article III	7	
9	25	Exam II: Lectures 5 – 8			
9	27	Lecture 9	Article I		
10	Nov 1	Lecture 9 con. / Lecture 10	Ball ch. 14, Mishkin ch. 19;		
10	3	Lecture 10 con.	Article II	8	
11	8	Election Day – No class			
11	10	Lecture 10 con. / Lecture 11	Ball ch. 11, 15, 16 / Mishkin ch.	9	
12	15	Lecture 11 con. / Lecture 12	Ball ch. 6 and 17		
12	17	Lecture 12 con.	Mishkin ch. 22	10	
13	22	Lecture 13	Mishkin ch. 23, 24, 25I	11	
13	24	Thanksgiving Break (no class)		12	
14	29	Student Presentations		13	
14	1	Student Presentations			
15	Dec 6	Student Presentations			
15	8	Review for final exam			
16	14	Final Exam (Lectures 1 – 13 and Student Presentations): 4 – 5:50 pm			

Montana State University – Depart. of Ag. Econ. & Econ.

ECNS 313: Money and Banking
Dr. Gilpin

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ECNS 313 Money and Banking (3 credits)
Number 23067 Fall 2016
Montana State University – Depart. of Ag. Econ. & Econ.

Instructor: Dr. Gilpin Email: gregory.gilpin@montana.edu Office Hours: M/W: 9–10 am, T/R: 1:30 – 2:30 pm, & by appt. Class Website: d2l	Office: 307A Linfield Hall Phone: 994-5628
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Course Description

This course explores how money, the banking system, and financial markets interact and affect the macroeconomy. This course focuses on both classical and contemporary issues. Topics covered include: theories of money demand and money supply, the relationship between money supply and overall economic activity, the determination of asset prices, the theoretical and practical aspects of monetary policies and money creation, the efficacy of fiscal policies versus monetary policies, exchange rate stabilization, and the role the Federal Reserve.

Student Learning Objectives

Upon completion of this course, students should be able to:

- Compute assets' prices and appropriate measures of key risks.
- Identify the implications, risks, and opportunities of global financial markets.
- Assess responses of the economy to both monetary and fiscal policies.
- Explain the nature and functions of money and the financial markets.

Prerequisite: ECNS 202 or ECNS 251 (or equivalent).

Course Material

Text: Laurence Ball, *Money, Banking, and Financial Markets*, 2 ed., 2012 (Recommended)
Frederic Mishkin, *Money, Banking, and Financial Markets*, 10 ed., 2013 (Recommended)
Calculator / colored pencils or pens / straight edge / stapler / loose-leaf paper

Grades

Grades are based on exams, homework assignments, and a group research project. The course is based on 600 points. Two midterms are 100 points each, and the final exam is 200 points. The research project is worth 100 points, and the remaining 100 points are for homework. Grades are posted on the course website, and I encourage you to verify all scores. In addition, I reserve the right to occasionally conduct unannounced quizzes with discretion of how to apply these points. There is no extra credit.

Grading Scale

A (93-100), A- (90-92), B+ (87-89), B (83-86), B- (80-82), C+ (77-79), C (73-76), C- (70-72), D+ (67-69), D (63-66), D- (60-62), F (<60). All grades rounded up from .49, e.g., 89.49 = 90.

Exams

There are two midterm exams and a comprehensive final exam. As specified by Student Code 310.D of the [MSU Student Conduct Code](#), students must take exams when scheduled. If an unavoidable scheduling conflict arises, students should inform me two weeks prior to the exam to take it early. Midterm make-up exams will not be given. If a midterm exam is missed for any reason, the percent score you earn on the final will replace the missing exam score.

Homework

Homework will be assigned throughout the semester. There are two types of homework assignments: problem solving assignments and economic analysis assignments. Problem solving assignments consist of workout problems similar to those found in the end of each chapter of the textbooks and prepare students for exams. An analysis assignment consists of a one-page typed economic analysis of any money, banking, or financial institution topic of your choice.

An economic analysis includes at least one paragraph to summarize the topic and two paragraphs for an economic analysis. What I do not want is a summary of a topic from an article that summarizes the topic. Do not simply cut and paste an article from *The Economist*. The point of these assignments is for you to get familiar with a topic or editorial and apply economic thought to analyze it. Use proper quotations for anything that is not written in your own words and cite your sources. It will be grading based on your economic analysis. Sample analysis papers can be found on the course website.

Group Research Project

The group research project consists of a research paper and presentations. Students will be assigned to a group. For more information and guidelines on the group research project, see the group research project section.

Help for this course

Undergraduate Study Rooms: There are two undergraduate economics study rooms: individual/group study rooms in Linfield Hall 404 and a computer/study room in Linfield Hall Room 409A. They are open Monday - Friday from 8 am to 5 pm.

Smartycat tutoring: The office of student success provides lowest cost and free tutoring sessions by former ECNS 313 students. Visit SUB 177 or go online at msusmartycats.com.

Additional Information

1. If you desire classroom/testing accommodations for a disability, please contact me outside of class to present the written supporting memorandum of accommodation from the office of [Disability Student Services](#). Requests for accommodations for disability must be received and authorized by me in written form no less than two weeks in advance of need in order to allow adequate time to review and make appropriate arrangements. No accommodation should be assumed until authorized.

2. I follow the policies in the [MUS Policy and Procedure Manual](#) with regard to cheating, plagiarism, and academic dishonesty. A grade of zero will be given for any assignment or examination on which the student is in violation of a policy, and the incident will be reported to the Office of the Dean of Students. I reserve the right to refuse to sign a drop form if cheating has been committed on an examination.

All written assignments will be verified by Turnitin for the originality of student work. Your work is retained by Turnitin to aid in verifying subsequent submissions to Turnitin. You may request your identifiable information to be removed prior to submitting.

3. I expect you to follow the [MSU Student Conduct Code](#). No form of harassment is tolerated. I do not tolerate disruptions in class. This includes, but is not limited to, cell phones, reading of newspapers, doing other classes' assignments, or private conversations with classmates.

4. I adhere to the policies in the [MSU Catalog](#) on assigning grades of incomplete. I only award a grade of incomplete upon the student proving there was such a hardship that would render it unjust to hold the student to the time limits previously fixed for the completion of his/her work.

5. Any student desiring to observe a religious holiday must contact me before the absence. Regarding assignments due on a religious holiday, it is preferable that they be submitted before observance; however, the due date will be extended to the next school day following the holiday if the student chooses.

6. I adhere to the policies in the [MSU Catalog](#) on change of grades. Final grades will not be changed except in the case of clerical error on my part or if was fraudulently obtained. A change of final grade does not mean allowing additional time to complete the work of a course or allowing the student to submit work or to take or to retake examinations after the conclusion of the semester.

7. I encourage students to come to my office hours and get assistances on understanding various concepts. Please keep me informed of any extraordinary circumstances that may hinder your academic success in this course.

8. The information in this syllabus, including the schedule and grading information is not concrete. Any changes to the syllabus will be discussed in class.

9. You are required to attend the writing center to obtain feedback on all written assignments.

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Lecture 1: Introduction to Money

This lecture discusses:

1. Definition of money
2. Purposes of money
3. The U.S. dollar
4. Evolution of money

1. Introduction to money

❖ What is money?

a) Layman's terms:

b) Economic terms:

- For economists, money is a narrow class of assets with special properties. Money serves an economy with 3 fundamental functions:

1.

2.

3.

2. Properties of money

2.1. Medium of exchange

The use of money, as a medium of exchange, promotes economic efficiency by minimizing the time spent in exchanging goods and services.

Exercise 1: The barter economy (no money)

- All individuals excel at doing certain activities.
- To obtain goods/services from other individuals, one must barter directly using their own goods/services.
- Individuals must have a double coincidence of wants. What does that mean?

The double coincidence problem is more severe in highly developed economies. These economies have large numbers of goods and services, many of which are consumed by small parts of the population. Economic specialization makes barter more difficult.

- The time spent trying to exchange goods and services is a transaction cost. Transaction costs are quite high in a barter economy.

Exercise 2: An economy with money

- Money is used as a medium of exchange instead of bartering goods for goods. This eliminates the double coincidence of wants as individuals trade pieces of paper for goods.
- Money promotes economic efficiency by reducing transaction costs.
- Money promotes specialization. How?

Money is a necessary condition to have economic efficiency and growth of an economy, not a sufficient condition.

2.1.1. Type of money

In the past, money has taken many forms. Common characteristics of money are as follows:

Examples:

- Precious metals
- Painted beads
- Agricultural products

When anything becomes a medium of exchange, people accept it not because they desire it but because others are willing to accept it as a form of payment.

2.2. Unit of account

Money is used to measure the value of goods, services, and assets in an economy.

Exercise 3: Suppose a barter economy has 3 goods. How many and what are the prices in this economy?

Exercise 4: Suppose a barter economy has 4 goods. How many and what are the prices in this economy?

- ❖ In a barter economy, if there are N goods, how many prices are required?
- ❖ How many prices are required in an economy with money?

2.3. Store of value

Money is a repository of purchasing power over time. It disconnects the time income is received to when it must be spent. Money is not unique in this role; any asset can be used to store value or wealth. Examples include:

Many assets are superior to money in storing value given they can have multiple purposes and may appreciate in value over time.

- ❖ Why do individuals hold money?
- ❖ How well does money store value?

Money is also the standard of deferred payment. Money can facilitate exchange over time by providing a store of value and unit of account.

3. What is money and what isn't money?

While money is the medium of exchange, there are many ways to facilitate the transaction for a good. For example, many Ebay purchases are conducted using Paypal. Does this mean that Paypal is money? What about checks, BillMeLater, debit and credit cards, and gift certificates?

Money can be loosely defined as anything that can be used for transaction purchases that isn't a short-term loan. The two biggest types of money used during transactions are currency and checking accounts. When debit cards, Paypal, and checks are used, most often these are linked to checking accounts.

Credit cards and BillMeLater are not money. They are deferred payments or short-term loans.

4. Evolution of currency

Money evolves according to trust. The evolution of money in an economy usually follows three distinct stages:

1. Commodity currency
2. Commodity certificates
3. Fiat currency

Currencies may also permit:

1. Checks
2. Electronic payments
3. E-money

4. The U.S. dollar

- 65% of all U.S. currency is used as reserves by foreign central banks.
- Some countries have used it as their primary currency at some point.
 - Panama, Ecuador, El Salvador, and East Timor, Palau, the Federated States of Micronesia, and the Marshall Islands, the British Virgin Islands, and Turks and Caicos Islands.
- Some countries have fixed the exchange rate between their countries' currency to U.S. dollars.
 - Bermuda, the Bahamas, Argentina, Barbados, Belize, Lebanon, the Hong Kong, Macau, Saudi Arabia, the People's Republic of China, Malaysia, Kuwait, Syria.
- Some countries have accepted it as a second currency.
 - Peru, Uruguay, Afghanistan, Cambodia, Mexico, and Canada.
- The overseas demand for dollars allows the U.S. to maintain persistent trade deficits without causing the value of the currency to depreciate.
- New theories suggest this may not be possible forever. However, when things go bad, everyone seems to run back to the Greenback!

4.1. Commodity money

The first stage in the introduction of money in an economy is to gain society trust to accept money as a form of payment. Precious metals hold intrinsic value so individuals are willing to trust commodity money as a form of payment.

Advantages

Disadvantages

4.1.1. The gold standard

The gold standard was a typical monetary system across many OECD countries 60–80 years ago.

Advantages

Disadvantages

The first settlers in English North America found vast and valuable forests, but not enough precious metal to make their own coins.

- For people accustomed to an economy based on coins, this was a serious predicament.
- Between 1776 and 1861, the first U.S. Mint, private banks, states, and other entities all created paper money to help create a dependable, expandable monetary system for a growing nation.
- Through various gold rushes starting in 1799 through 1905, gold coins were minted.
- Much of the gold was put in safes and gold certificates were issued.

4.2. Commodity certificates

After individuals trust the commodity money, they usually desire a more convenient form of money. This is easily accomplished through paper currency that carries a guarantee that it is convertible into a fixed quantity of precious metals.



Advantages

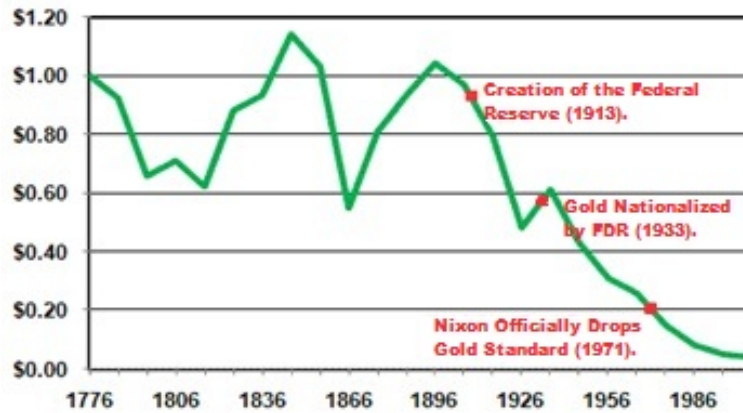
Disadvantages

4.3. Fiat currency

If there is sufficient trust in the government with paper currency backed by convertibility, the convertibility is removed and fiat (no intrinsic value) currency is introduced.



- ❖ What is the main difference between commodity certificates and fiat currency?



- ❖ What makes one country's currency strong than another?

In extreme cases, individuals lose confidence in their country's currency. Government policy cannot restore confidence in the currency. It requires currency replacement. To restore Brazil's currency, the *Plano Real* (Real Plan) first converted prices into real prices and mandated store to display both *nominal prices* (index in the currency) and *real prices*. Once the public realized that the real prices remained stationary, they introduced a complementary currency, the real.

4.7. Limits of currency

Even though it may seem that government issued currency is accepted everywhere, this is not always the case. The U.S. Treasury has indicated that *there is no Federal statute mandating that a private business, a person, or an organization must accept currency or coin as payment for goods and/or services*. However, because Federal Reserve Notes (currency) are legal tender, creditors must accept them in payments of debts, and the government will accept them in payment of taxes.

Given that there are a variety of currencies available, individuals may find that holding other countries' currency is in their best interest instead of the residing currency. Governments can do little to force individuals to hold its currency.

5. Alternative currencies

Almost all currency is backed by some government or a body that represents various countries' governments (such as the European Union). There are also a few non-government sponsored currencies. To not get into trouble with counterfeiting laws in the U.S., these currencies cannot be mistaken for U.S. currency.

Everyday examples are:

- 1) Local currency: Bozeman bucks and other local currency that can be used at local business establishments.



- 2) Bitcoins: digital currency that is used mostly to facilitate illegal transactions such as the purchase of illegal drugs and Hitmen.
- 3) Casino chips: These chips are currency in the casino walls to purchase anything. They also have an exchange rate with other currencies.

In all three examples, notice that the supply of currency is dictated by a non-government entity. They can control their own currency and, hence, their own exchange rate with other currencies.

6. Most circulated currencies

The eight most circulated currencies:

U.S. dollar
The Euro
Japanese Yen
Chinese Yuan
Indian Rupee
Russian Ruble
British pound
Swiss Franc

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Lecture 2: Introduction to the Financial System

This lecture discusses:

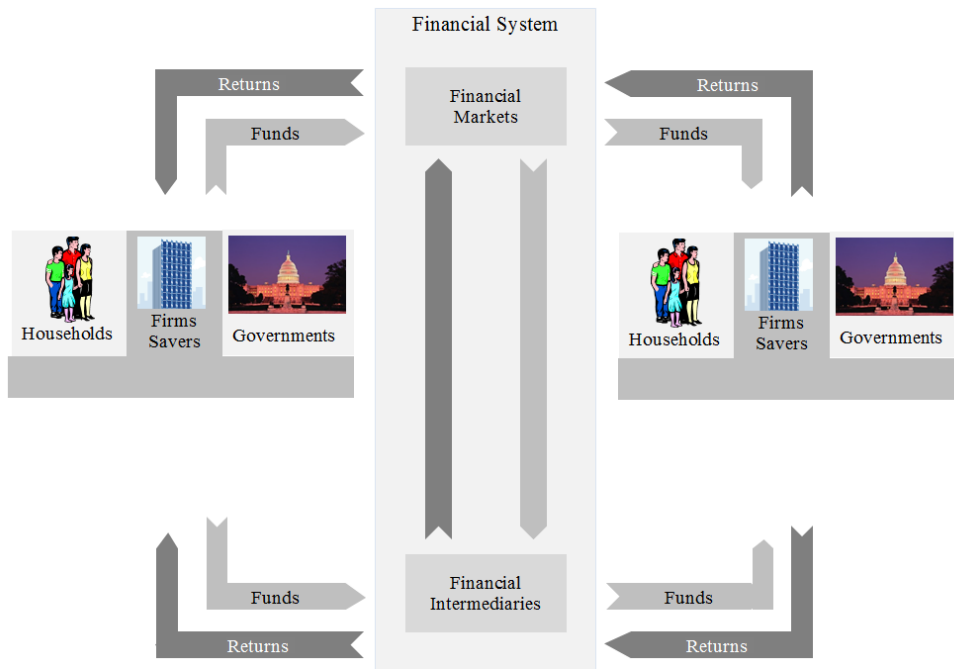
1. Overview of the financial system
2. Overview of financial products
3. Overview of financial institutions
4. Overview on other types of securities
 - a. Derivatives and Derivative Markets
 - i. Calls
 - ii. Puts
 - b. Swaps
 - c. Speculation

1. The financial system

Over time, individuals have relied less on currency and more on their checking accounts to conduct transactions. Banks assist in making these payments. They accept deposits from savers and send off payments in your behalf. They also use some of these deposits (savings) to make loans.

- ❖ What are the roles of the financial system?

The financial system is a complex dynamic system that evolves rapidly to meet the diverse needs of households, firms, and the government. The figure below provides a simplified model of the various economic players in the financial system and the flow of payments.



- ❖ Who demands financial products and services?

In recent years:

- 28% of the stock market was directly owned by individuals.
- Another 25% was held by mutual funds which are also owned by individuals
- The wealthiest 1% of U.S. households owned 37% of stock held by individuals.
- The top 10% owned 79%.

Over time:

- In 1983, only 19% of households owned stock
- In 2005, 50% of households owned stock (mostly due to 401(k)s).

❖ How do demanders of financial products obtain various financial services?

❖ What is the difference between financial markets and financial intermediaries? How does it relate to securities and assets?

❖ Who supplies financial products and services?

❖ Why are finance channels so important?

❖ What are the five main categories of financial assets?

1.1. Size of markets

Value of debt instruments in the U.S. was \$35 trillion at the end of 2008.

Value of equities was \$19.5 trillion in the U.S. at the end of 2008.

1.2 Distinguishing one financial market from another

There are a few ways that various financial markets are distinguished. The first is whether it is a part of an exchange or over-the-counter market.

- Exchanges: Meet at one central location to conduct trades. e.g., NYSE, Chicago Board of Trade
- Over-the-Counter (OTC) Markets: dealers at different locations stand ready to buy and sell securities to anyone. e.g., foreign exchange, Federal funds.

Another way to distinguish the market is based on the maturity of instruments. Money markets deal with short-term debt instruments while capital markets deal in longer-term debt and equity instruments.

Snapshot of various short-term instruments

Type of Instrument	Amount Outstanding (\$ billions, end of year)				
	1980	1990	2000	2008	2010
U.S. Treasury bills	216	527	647	1,060	1,773
Negotiable bank certificates of deposit (large denominations)	317	543	1,053	2,385	1,883
Commercial paper	122	557	1,619	1732	1,057
Federal funds and Security repurchase agreements	64	387.9	768.2	2,118.1	1,234

Sources: Federal Reserve Flow of Funds Accounts; Federal Reserve Bulletin; Economic Report of the President.

- U.S. Treasury bills: U.S. gov't debt that matures in less than one year.
- Negotiable CDs: sold in the secondary market to others.
- Commercial paper: Issue by large banks and well-known corporations.
- Repos are corporate short-term loans with treasury bills serving as collateral.

Snapshot of various long-term instruments

Type of Instrument	Amount Outstanding (\$ billions, end of year)				
	1980	1990	2000	2008	2010
Corporate stocks (market value)	1,601	4,146	17,627	19,648	17,189
Residential mortgages	1,106	2,886	5,463	12,033	9,436
Corporate bonds	366	1,008	2,230	3,703	2,983
U.S. government securities (marketable long-term)	407	1,653	2,184	3,621	2,803
U.S. government agency securities	193	435	1,616	8,073	6,158
State and local government bonds	310	870	1,192	2,225	1,807
Bank commercial loans	459	818	1,091	1,605	1,031
Consumer loans	355	813	536	871	710
Commercial and farm mortgages	352	829	1,214	2,526	1,919

Sources: Federal Reserve Flow of Funds Accounts: Federal Reserve *Bulletin*. 2008. 3rd Quarter.

- Corporate bonds can be convertible. That is, they can be converted into stock.
- Mortgages is the largest debt market in the United States.
- Government securities are long-term debt, also known as U.S. Treasury bonds.
- State and local bonds are *municipal bonds* to build roads and schools.

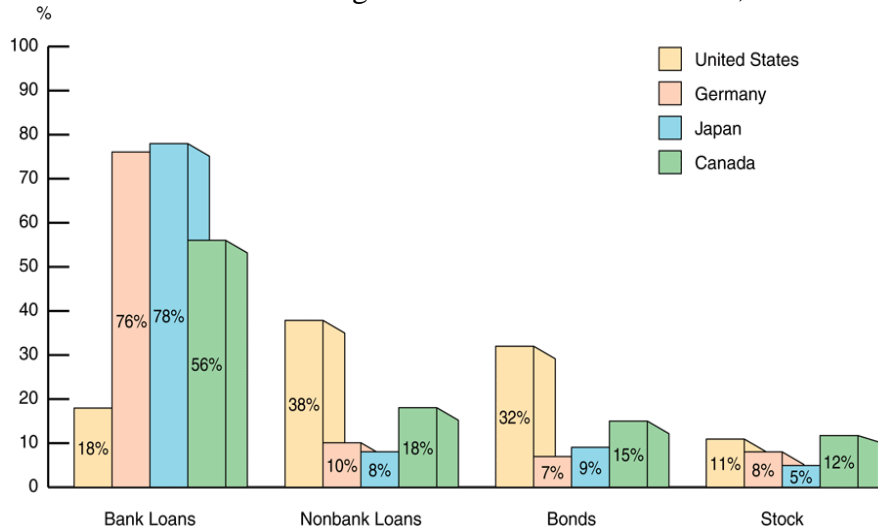
Another way to distinguish the market is through the size of financial intermediaries.

Snapshot of financial institutions

Type of Intermediary	Value of Assets (\$ billions, end of year)				
	1980	1990	2000	2008	2010
Depository institutions (banks)					
Commercial banks	1,481	3,334	6,469	12,272	14,336
Savings and loan associations and mutual savings banks	792	1,365	1,218	1518	1,244
Credit unions	67	215	441	801	912
Contractual savings institutions					
Life insurance companies	464	1,367	3,136	4,798	5,176
Fire and casualty insurance companies	182	533	862	1,337	1,242
Pension funds (private)	504	1,629	4,355	5,193	4,527
State and local government retirement funds	197	737	2,293	2,730	2,661
Investment Intermediaries					
Finance companies	205	610	1,140	1,910	1,439
Mutual funds	70	654	4,435	6,588	7,935
Money market mutual funds	76	498	1,812	3,376	2,755

Source: Federal Reserve Flow of Funds Accounts.

Sources of External Funding for Nonfinancial Businesses, 1970-2000



Combining both stocks and bonds, they make up about 43% of the total share of marketable securities. This type of direct financing may seem like a lot, but about 95% of all newly issued corporate bonds and commercial paper and over 66% of all stocks are sold to financial intermediaries. Insurance companies, pension funds, and mutual funds make up the bulk of the financial intermediaries.

According to the graph, loans from financial intermediaries make up 56% of all financing. Non-banks include insurance companies, pension funds, and finance companies. Investment banks underwrite securities which guarantee a price and then sell them publicly. This is done in the primary market.

Secondary markets, where securities that have been previously issued can be resold, are extremely important and affect the primary market in many ways. Examples of secondary markets are New York Stock Exchange and NASDAQ.

❖ Observing the above graph, how do businesses typically raise funds?

❖ Observing the above graph, how don't businesses typically raise funds?

2. Other types of securities

One type of important security is a derivative. Derivatives are securities with payoffs tied to the prices of other assets. The main use of derivatives is to reduce risk for savers and financial institutions (or for some to make risky bets on asset prices).

The most common derivatives are futures contracts, options contracts, and swaps. All of these securities derive their value based on some underlying asset.

2.1. Forward contracts

A forward contract is an agreement to trade an asset (or a commodity) for a certain price at a future point in time. One party agrees to sell the asset and another agrees to buy the asset on the *settlement date*. The *spot price* is the price which the asset can be sold at the current date.

Application: Suppose a farmer grows wheat and a miller is willing to buy the wheat when it is harvested in 6 months. Both parties face risk from fluctuations in the price of wheat. Futures contract eliminates this risk. The farmer can sell a contract for wheat in 6 months and the miller can buy this contract.

The risk of such a contract is the *counterparty risk* that occurs if the other side of the transaction defaults on the contract.

2.2. Futures contracts

Futures contracts keep the risk-sharing benefits of forward contracts while increasing liquidity and lowering risk and information costs. Futures contracts differ from forward contracts in several key ways:

1. A futures contract specifies the quantity of the assets (or commodity) to be delivered, but does not fix the settlement date price.
2. Futures contracts are tradable on exchanges.

When a trade occurs, both buyer and seller must deposit a fraction of the value of the trade with the future exchange. These deposits are called *margins*.

2.2.1. Hedging with futures

The futures market can be used to hedge against volatile prices. There are two positions in the futures market:

1. Short position: the right and obligation to sell or deliver the underlying asset on settlement date.
2. Long position: the right to receive or buy the underlying asset on the settlement date.

Hedging involves taking a short position in the futures market to offset a long position in the spot market, or taking a long position in the futures market to offset a short position in the spot market. Note that the spot price and the settlement date price are always equal.

The profits and losses from the buyer and seller in the futures market is a zero-sum game – if the seller makes a profit, the buyer must suffer a loss of exactly the same amount.

Profits of buyer = Spot price at settlement – Futures price at purchase

Profits of seller = Futures price at purchase – Spot price at settlement

Given that someone always loses, it may seem that businesses are always worse off. Reducing the variance of returns reduces risk. Investors and firms are willing to pay for a reduction in risk,

2.3. Options

An option allows the right to trade a security at a certain price at, any time, before the expiration date.

- A call option allows its owner to buy the underlying security at a certain price, called a *strike price*. Exercising an option is when an individual decides to buy the security.
- A put option allows its owner to sell the underlying security at a strike price.

This allows individuals to reduce risk by being able to sell an asset if the price falls below the strike price (for a put) and able to make a profit if the price goes above the strike price (for a call).

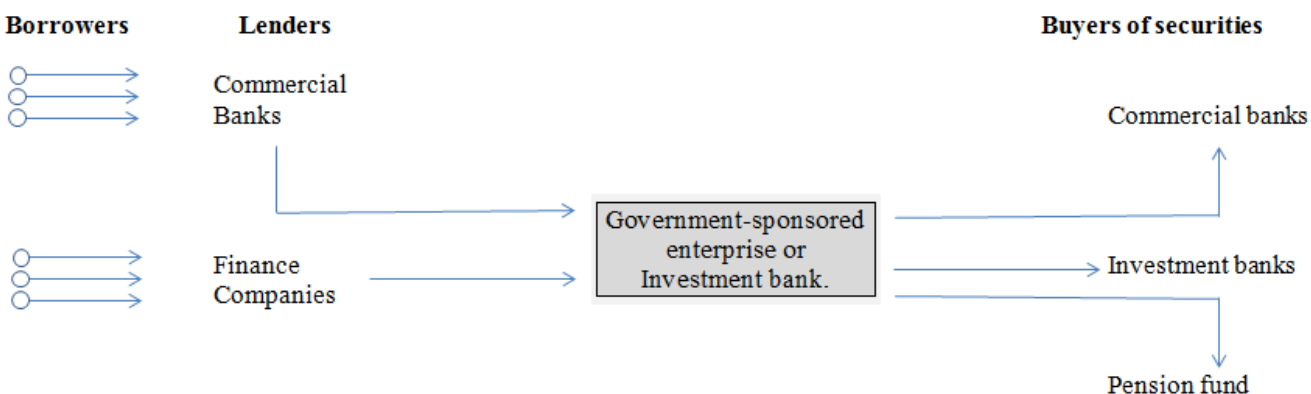
The price of an option is called an *option premium*. This premium is divided into two parts: the options intrinsic value and its time value. The intrinsic value equals the payoff to the buyer of the option from exercising it immediately (the difference between the strike price and market price). The time value equals the premium due to how far the expiration date is and by how volatile the stock price has been in the past. Fischer Black and Myron Scholes have derived the formula for the optimal pricing of options, called the *Black-Scholes formula*.

2.4. Swap contracts

A swap contract is an agreement between two or more counterparties to exchange (or swap) sets of cash flows over some future period. One example is an *interest-rate swap*: a contract where the counterparties agree to swap interest payments over a specified period of time on a fixed dollar amount, call the *notional principal*. Typically, one interest rate will be fixed while the other is variable (a few points above LIBOR - London Interbank Offered Rate). Firms and financial institutions participate in interest rates swaps as firms transfer interest-rate risk to parties that are more willing to bear it.

2.5. Mortgage-backed securities and government-sponsored enterprises

Traditionally, when a bank makes loans, the loans become assets of the bank. The flow of interest on the loans is the bank's primary source of revenue. Today, banks sell many of the loans they make rather than holding them as assets. Banks make money off of originating and servicing the loan. The loans are transformed into securities that are traded in financial markets.



Home mortgages are the most typical loan to be securitized, called mortgage-backed securities (MBS).

1. Mortgage loans are purchased from banks, mortgage companies, and other originators by a government-sponsored enterprise.
2. These loans are assembled into pools. These mortgage-backed securities represent claims on the principal and payments on the loans in the pool.
3. These securities are usually sold as MBSs.

Most MBSs are issued by the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac). Both are U.S. government-sponsored enterprises that have been mandated by Congress to increase home ownership through decreasing the cost of borrowing.

There are many reasons for mortgage originators to finance their activities by issuing mortgage-backed securities. Mortgage-backed securities

1. Transform relatively illiquid, individual financial assets into liquid and tradable capital market instruments.
2. Allow mortgage originators to replenish their funds, which can then be used for additional origination activities.
3. Can be used by Wall Street banks to monetize the credit spread between the origination of an underlying mortgage (private market transaction) and the yield demanded by bond investors through bond issuance (typically, a public market transaction).
4. Are frequently a more efficient and lower cost source of financing in comparison with other bank and capital markets financing alternatives.
5. Allow issuers to diversify their financing sources, by offering alternatives to more traditional forms of debt and equity financing.
6. Allow issuers to remove assets from their balance sheet, which can help to improve various financial ratios, utilize capital more efficiently, and achieve compliance with risk-based capital standards.

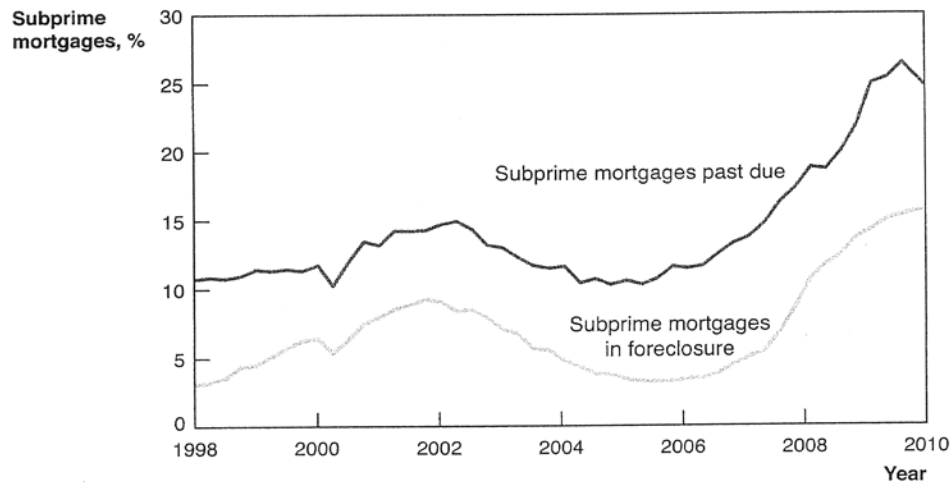
From the 1970s to the early 2000s, Fannie and Freddie purchased only prime mortgages, those that appear to have low default risk based on borrowers' incomes and credit scores. Starting in the early 2000s, they also purchased subprime mortgages. However, they only sold securities backed by prime mortgages and held onto the subprime mortgages. Some subprime loans made in the mid-2000s were later dubbed NINJA loans: loans issued to borrowers that had demonstrated No Income, No Job, or Assets. When the housing bubble burst, this led to substantial losses. Furthermore, given that they weren't selling subprime mortgages, one question was whether market signals were being sent to loan issuers on the true costs of subprime lending.

Fannie and Freddie Mae are able to obtain funds to purchase mortgages by borrowing from the Treasury Department. In the 2000s, they grew rapidly and guaranteed more than half of all mortgages in the nation. As a result, their asset-to-capital ratio, called the leverage ratio, was about 22 to 1. With such small levels of capital, neither could survive a significant number of defaults.

2.6. Credit default swap

Another type of swap is called a credit default swap (CDS). A CDS is similar to a traditional insurance policy where the buyer makes regular payments to the seller to insure against a credit event (e.g., default). The buyer receives a payment if a credit event is experienced. This is particularly useful to investors who own debt and want to hedge against risk of default.

American International Group (AIG) sold \$440 billion worth of credit default swaps to insure against subprime mortgage-backed securities. When the housing bubble burst, AIG's huge potential payouts threatened to bankrupt the company. The problem with letting AIG fail was that other parties had bought and sold their own credit default swaps that would pay off if AIG failed. This made AIG too big to fail and led the government to bail AIG out in September 2008.



2.7. Debt security pricing

Pricing a corporate bond is based on two sources of uncertainty: default risk (credit risk) and interest rate risk (maturity). The MBS adds a third risk: early redemption (prepayment). The number of homeowners in residential MBS securitizations who prepay goes up when interest rates go down. One reason for this phenomenon is that homeowners can refinance at a lower fixed interest rate. Commercial MBS often mitigate this risk using call protection.

2.8. Speculation

As one can expect, speculation in the derivatives markets happens quite frequently. Many individuals think they can beat the market and buy calls and puts where they think they can strike it rich. Many firms pay individuals to make money on the futures market. Three examples of the ill-fate awaiting those that speculate in the derivatives market are Nick Lesson, Jerome Kerviel, and, mostly recently, Kweku Abodoli.

Lesson was a futures trader in Singapore for Barings, LLC. This bank financed the Napoleonic wars. Lesson had some losses and hoping to extricate himself from the mess, he requested extra funds to continue trading. Over the next three months, he bought more than 20,000 futures contracts worth about \$180,000, each in a vain attempt to move the market. Some three quarters of the \$1.3 billion he lost Barings, LLC resulted from these trades. When Barings executives discovered what had happened, they informed the Bank of England that Barings was effectively bust. In his wake, Nick Lesson had wiped out the 233 year old investment bank, who proudly counted HM The Queen as a client. The \$1.3 billion dollars of liabilities Lesson ran up was more than the entire capital and reserves of Barings, LLC.

While Société Générale did not go bankrupt, it had a net loss in the fourth quarter of 2007 after the French bank took a \$7.18 billion hit closing the unauthorized trading positions of Jérôme Kerviel. Similarly, UBS closed \$2.3 billion unauthorized trading positions of Kweku Adobli in third quarter of 2011.

Warren Buffet, a critic of derivatives, called them financial weapons of mass destruction.

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Lecture 3: Asset Pricing and the Efficient Market Hypothesis

This lecture presents the methodology to price assets and the inherent difficulties of asset pricing. The overview of this lecture is as follows:

1. Understanding present value
2. How to price various assets
3. Adaptive vs. rational expectations
4. Efficient Market Hypothesis
 - a) How information is processed by financial markets
 - b) The efficient market hypothesis
 - c) Efficiency as observed in the markets
 - d) Costs of inefficiency

1. Present value

Financial assets often have very different cash flows (streams of cash payments to the holder). To find the value of an asset, the value of the income stream that the asset provides must be determined.

The key principle to measure the value of an asset's income stream is that the value of a payment depends on when it is received. This is because a dollar today is worth more than a dollar in the future.

If i is the interest rate paid on deposits for a given year, then a dollar deposited today is worth $(1+i)^n$ in n years. This formula can easily be generalized for any amount.

(1)

where

FV is the future value

PV is the present value

i is the interest rate

n is the number of periods

Note: i and n are in the same unit of time. That is, if n is years, then the interest rate is the return on investment for a given year.

Exercise 1: How much is \$100 worth in 4 years given a 3% interest rate?

Exercise 2: How much is \$100 in 4 years worth today given a 3% interest rate?

1) Solve (1) for PV .

(2)

2) Plug in values to calculate PV

Note: A higher interest rate reduces the present value of future money.

Exercise 3: What return is needed to double one's \$100 in five years?

1) Solve (1) for i

2) Plug values into formula to calculate the return.

Exercise 4: How long does it take for an asset to double in value at an interest rate i ?

❖ Suppose a savings account pays 3% interest. How long would it take to double the value in the account?

❖ Suppose a CD pays an annual return of 7% a year. How long would it take to double the value of the CD?

Equation (1) can be used if there is one fixed payment in the future. Many times an asset has a stream of payments at regular intervals. The formula for one payment in the future can be extended to multiple payments in the future. Examples of multiple payments are monthly interest on bank accounts, coupon payments from bonds, or dividend payments.

- ❖ How do we extend equation (2) to measure how much an asset's future stream of income is worth today?

(3)

(4)

(5)

Exercise 5: Suppose the annual interest rate is 10%. Which is more valuable?

A: \$10 million today

B: \$1 million per year over 20 years

To solve this problem, we need to compare the present value of both options. A is already in present value while B will need to be put into present value.

Some assets provide income indefinitely – there is no year n when the last payment is made. For example, one notable bond is a *consol bond* used to finance the Napoleonic wars. These bonds have no maturity date which implies that the debtor never repays the principal but pays fixed coupon payments forever.

One can derive the present value of such an income stream if the payment is the same every year. We simply extend equation (3) out to infinity. Assuming a fixed payment indefinitely, the present value formula (4) is

(6)

Using the same algebraic manipulation to eliminate the infinite sum:

(7)

❖ Why is this formula useful to investors?

- ❖ What happens to the formula if the interest rate, time length, and the period length are not identical?

(8)

Exercise 6: What is the future value of \$1500 deposited in a bank paying an annual interest rate of 4.3%, compounded quarterly after 6 years.

- ❖ How does the answer differ if it is compounded annually?

Exercise 7: The present value formula can also be used to calculate fixed payment fixed interest mortgage payments. Suppose that:

- Loan Amount= \$100,000
- Term= 20 years
- Interest Rate = 7%
- Amortization is monthly

Steps to calculate loan payment

1. Calculate the monthly payments using the Present Value Formula (5)

a. PV : _____

b. n : _____

c. i : _____

d. t : _____

2. **Interest Calculations:** To calculate the amount of interest in your first payment, divide your interest rate by the number of payments you make each year and then multiply that by the amount of principal you owe.

3. **Principal reduction:** To calculate the principal reduction, subtract the interest calculation from the loan payment

4. **Loan Balance:** To calculate current loan balance, subtract the principal reduction from the existing loan balance.

Some Points to remember

- There is substantial disparity in the allocation of the monthly payments toward the interest, especially during the first 18 years of the mortgage. In the example above, payment 1 allocates 75% of the total payment towards interest and only \$192 toward the principal balance. Not until payment 122 or 10 years into the loan does the payment allocation towards principal and interest even out and subsequently tip the majority of the monthly payment toward principal balance pay down.
- Repetitive refinancing of an amortized mortgage loan, even with decreasing interest rates and decreasing principal balance, can cause the borrower to pay over 500% of the value of the original loan amount. 'Re-amortization' or restarting the amortization schedule via a refinance causes the entire schedule to restart: the new loan will be 30 years from the refinance date, and initial payments on this loan will again be largely interest, not principal. This economically unfavorable situation is often mitigated by the apparent decrease in monthly payment and interest rate of a refinance, when in fact the borrower is increasing the total cost of the property. This fact is often (understandably) overlooked by borrowers.
- Payment on an amortized mortgage loan remains the same for the entire loan term, regardless of principal balance owed. For example, the payment on the above scenario will remain \$775.3 regardless if the principal balance is \$100,000 or \$50,000. Paying down large chunks of the principal balance in no way affects the monthly payment, it simply reduces the term of the loan and reduces the amount of interest that can be charged by the lender resulting in a quicker payoff. To avoid these caveats of an amortizing mortgage, many borrowers are choosing an interest-only loan to satisfy their mortgage financing needs. Interest-only loans have their caveats as well which must be understood.

Exercise 8: Fill in the following table using:

Loan amount = \$267,500
Interest rate = 4.125% annual

Term = 10 years
Amortization is yearly (t = 1)

Year	Payment	Interest	Principal	Loan Balance
0				267,500
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Total				

2. Asset pricing

We now have the tools necessary to answer what determines the price of stock and bonds. An asset produces a flow of income. This flow might be a series of fixed payments or a share of a company's profits.

The classical theory of asset pricing states that an asset's price is based on the present value of the expected future flow of income that the asset produces.

$$\text{Price} = E \left[\frac{X_1}{(1+i)} + \frac{X_2}{(1+i)^2} + \dots + \frac{X_2}{(1+i)^n} \right]$$

There are some issues with this approach. The word *expected* means that nobody knows for sure what the value is. The classical theory is quite simple in the sense that the price of the asset is equal to the value that the asset produces over its lifetime.

- ❖ What if the asset's price is not equal to the present value of expected asset income?

A stock price can be found using the classical theory of asset pricing. To solve for the stock price, we discount any dividend payments. If the expected dividends per share are D_1 in the next year, D_2 in the year after that, and so on, then,

(9)

Alternatively, one might simply look at the expected future earnings of a company. Both approaches yield the same present value calculation since at some point all companies must distribute its earnings to its stockholders.

2.1. Pricing bonds and stocks

We can apply our knowledge of asset pricing to financial products. There are four basic types of credit market instruments that we will price: simple loan, fixed payment loan, coupon bond, and discount bond.

2.1.1. Coupon bonds

A coupon bond pays fixed interest payment until a maturity date at which time the principal is paid back. Three pieces of information are provided on a bond:

- 1) Name of the debtor
- 2) Maturity date
- 3) Coupon rate.



- ❖ Who is the debtor?
- ❖ What is the maturity date?
- ❖ How much is the coupon payment? Level and percent.
- ❖ How often are coupon payments?

Using the classical theory of asset pricing, the price of a coupon bond is

(10)

where

P = Price of bond

C = yearly coupon payment

F = face value of bond

n = year to maturity

From equation (10), many other kinds of assets can be priced. For instance:

A) Setting $C = 0$ and $n = 1$ in (10) yields the price of a zero-coupon bond.

B) Setting $F = 0$ in (10) yields the price of a fixed payment loan (e.g., a mortgage).

Exercise 9: Suppose that a coupon bond has a face value of \$1,000, a 12.25% annual interest rate, a \$100 annual coupon payment, and an 8 year maturity. Calculate the price of this bond?

The *Yield to maturity (YTM)* is the discount rate at which the sum of all future cash flows from the bond (coupons and face value) are equal to the price of the bond. This is the bond's internal rate of return

2.3 How does inflation affect borrowing?

Even though the real interest rate reflects the real cost of borrowing, inflation has a perverse effect on borrowing. The following example illustrates the effect.

Suppose John desires to buy a house and then rent it out. He calculates that he can charge \$1,000 a year (in real terms) into the foreseeable future. His next best alternative to buying a house is to buy a bond with a 9% nominal interest rate. The inflation rate is 4% causing the real opportunity cost to be 5% according to approximate Fisher equation (4.8% using the exact Fisher equation).

The rental price is expected to increase with inflation:

$$R_t = \$1000(1 + \pi)^t$$

The house's value is assumed to equal the discounted present value of its expected revenue stream:

$$\begin{aligned} PV_H &= \sum_{k=0}^{\infty} \frac{R_t}{(1+i)^k} = \sum_{k=0}^{\infty} \frac{\$1000(1+\pi)^k}{(1+i)^k} = \$1000 \sum_{k=0}^{\infty} \left(\frac{1+\pi}{1+i} \right)^k = \\ &= \$1000 \sum_{k=0}^{\infty} \frac{1}{(1+r)^k} = \frac{\$1000}{r} = \frac{\$1000}{.048} = \$20,833.33 \end{aligned}$$

Suppose that interest on a mortgage is 8% with an implied real interest cost of 4%. John is able to put down \$3,000 and attempts to finance \$17,833.33. If the loan was financed with a 30 year fixed-payment mortgage, the annual payment would be:

$$P = \$17,833.33 / \left(\frac{1 - (1 + .08)^{-30}}{.08} \right) \approx \$1,584$$

This loan would not be originated because in the first year, the property only yields \$1000 for the year and costs \$1584. Thus, the contemporaneous costs are greater than the contemporaneous revenue generated.

- ❖ Why isn't the mortgage accepted even though in real terms the mortgage should be accepted (since there is a 5% return on investment and a 4% cost)?

- ❖ How many years will it take for this rental unit to breakeven with 4% inflation?

Lessons from this exercise

Many times textbooks state that lenders lose from inflation while borrowers gain.

- This statement is much too broad.

The distributional effects of inflation need to be segmented between current and new borrowers as well.

- Current borrowers are better off with an increase in the price level if their interest rate was locked in at a low level while lenders on these loans are worse off.

2.4. Rate of return on real estate when competing investments exist

The following example illustrates how real estate investments are valued given competing investments at the time of the analysis.

Suppose Greg buys a house for \$100,000. Three years later, he expects to be able to sell this house for \$150,000. Simple subtraction suggests that the value of his profit on such a transaction would be \$50,000 in three years or a 50% rate of return over the three years.

$$\frac{P_{t+1} - P_t}{P_t} = \frac{150K - 100K}{100K} = 50\%$$

Using equation (1), the annual rate of return would be about 14.5%.

$$\begin{aligned}FV &= PV(1+i)^n \\150K &= 100K(1+i)^3 \\i &= 1.5^{1/3} - 1 \\&= 14.5\%\end{aligned}$$

However, this rate of return cannot be used solely to make the decision to buy the house. An alternative asset must be used to compare if the investment is worthwhile. At the time Greg buys the house, the 3-year U.S. Treasury note rate is 5% per annum. Treasury notes are generally considered to be inherently less risky than real estate, since the value of the note is guaranteed by the U.S. Government and there is a liquid market for the purchase and sale of T-notes. If he had not put his money into buying the house, he could have invested it in the relatively safe T-notes instead. This 5% per annum can, therefore, be regarded as the risk-free interest rate for the relevant period (3 years).

Using the *PV* formula above, the value of \$150,000 received in three years actually has a present value of \$129,576.

$$\begin{aligned}FV &= PV(1+i)^n \\\$150K &= PV(1+.05)^3 \\PV &= \frac{\$150K}{(1+.05)^3} \\&= \$129,576\end{aligned}$$

Thus the real return on the investment is \$29,576 or a little more than 29% of the purchase price.

$$\frac{P_{t+1} - P_t}{P_t} = \frac{129K - 100K}{100K} = 29\%$$

Another way of looking at the deal is the excess rate of return achieved over the alternative asset is 9.5%

$$14.5\% - 5\% = 9.5\%$$

We assume that the \$150,000 is Greg's best estimate of the sale price that he will be able to achieve in 3 years' time. There is a lot of uncertainty about house prices, and the actual sale price may end up higher or lower than estimated.

Under normal circumstances, people entering into such transactions are risk-averse, that is to say that they are prepared to accept a lower expected return for the sake of avoiding risk. Let's assume that the values this particular risk at 7% per annum. Therefore, allowing for this risk, his rate of return is now 7.5%

$$\begin{aligned}FV &= PV(1+i+\phi)^n \\150K &= 100K(1+i+.07)^3 \\i &= 1.5^{1/3} - 1.07 \\&= 7.5\%\end{aligned}$$

The excess return over the risk-free rate is now 2.5% per annum.

$$7.5\% - 5\% = 2.5\%$$

Since there is a positive excess return even after taking into consideration risk, Greg should purchase the property.

The present value calculations are very sensitive. Suppose instead of \$150K, the sale price is assumed to be \$145K or even \$130K:

$$\begin{aligned}145K &= 100K(1+i)^3 & 130K &= 100K(1+i)^3 \\i &= 1.45^{1/3} - 1 & i &= 1.3^{1/3} - 1 \\&= 8.2\% & &= 4.1\%\end{aligned}$$

This is quite the precipitous drop. At \$145K, the investment is still worthwhile, while at \$130K the investment is not.

3. Interest rates

All of the calculations so far have relied on an exogenously provided interest rate. The classical theory states that differences in interest rates exist due to differences in assets' characteristics (e.g., the riskier the asset, the higher the interest rate).

Suppose an asset is riskier than the expected interest rate to be paid on the asset. This reduces the present value of expected income (see equation (9)). Therefore, a higher risk premium reduces an asset's price.

The appropriate discount rate, i , is the return that the market or the consensus of investors requires on the asset. This can be stated as:

$$i = r + E[\pi] + d + \tau_n + l + e \quad (12)$$

where

- r = real interest rate
- $E[\pi]$ = expected inflation (inflation premium).
- d = default risk premium
- τ_n = maturity premium
- l = liquidity premium
- e = exchange-rate risk premium

3.1. Nominal versus real interest rates

Many times assets being compared are similar with respect to their default risk, maturity, liquidity, and exchange-rate risk, leaving only the real interest rate and expected inflation. If all other variables (other than r and $E[\pi]$) are held constant, then:

- Subtracting expected inflation from the nominal interest rate yields the *ex ante* real interest rate.
- Subtracting actual inflation from the nominal interest rate yields the *ex post* real interest rate.

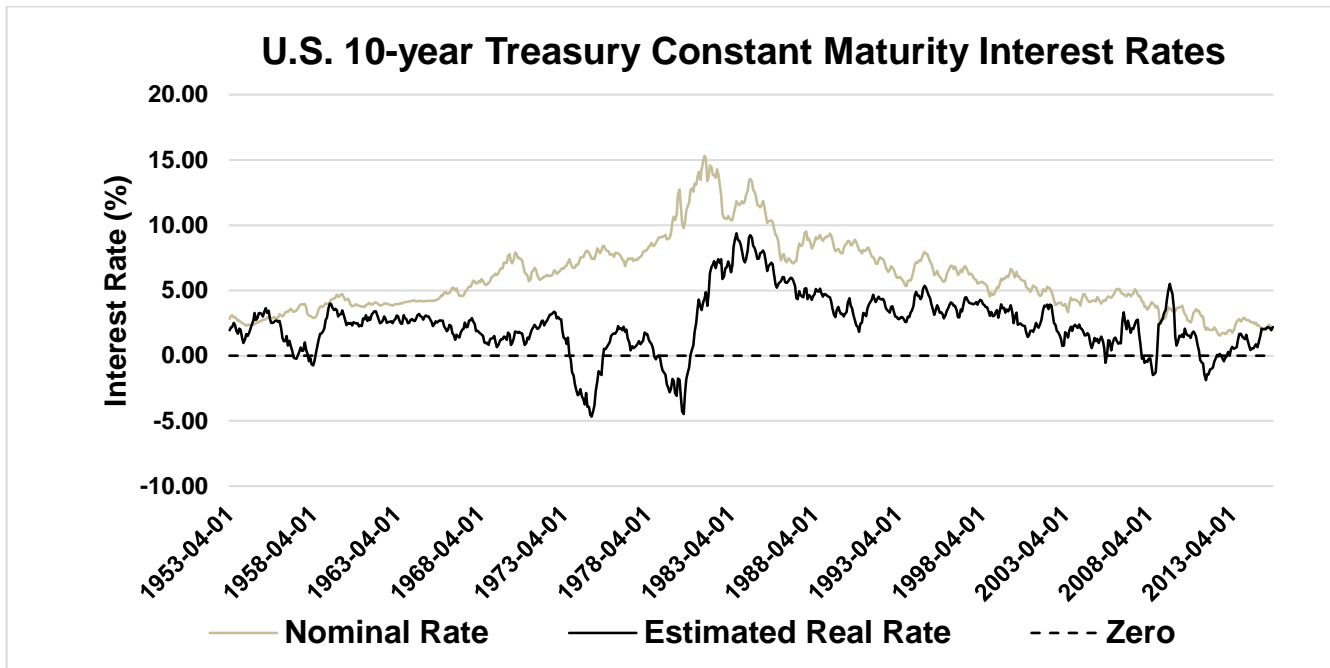
The Fisher equation states

$$\begin{array}{ll} i = r + E[\pi] & \text{Approximate} \\ i = (1+r)(1+E[\pi]) - 1 & \text{Exact} \end{array}$$

- If r is assumed to be a constant, and if expected inflation increases, then the nominal interest rate must rise.
- When the real interest rate is low, there is greater incentive to borrow and fewer incentives to lend.
- The real interest rate is a better indicator of the incentives to borrow and lend.
- The discrete time version does well when $E[\pi]$ is large.

The approximate Fisher equation is very close to equal to the exact Fisher equation when $E[\pi]$ is small. To see this, notice that expanding the RHS of the exact Fisher equation yields:

$$i = (1+r)(1+E[\pi]) - 1 = 1+r + E[\pi] + \underbrace{rE[\pi]}_{\approx 0} - 1 \approx r + E[\pi]$$



- ❖ Using the real interest rate, what was the true cost of borrowing during the 1970s?
- ❖ Since the 1980s, real and nominal interest rates track each other more closely. Why?

4. Expectations

The classical theory of asset prices assumes rational expectations. **Rational expectation is the theory that people's expectations are the best possible forecast based on all public information.**

Prior to the theory of rational expectations, adaptive expectations theory was the prevailing thought. This theory states that expectations are formed from past experience only. That is, changes in expectations will occur slowly over time as past data change. For example, if inflation has been steady at 5% rate, expectations of future inflation would be 5% as well. If inflation increased to a steady rate of 10%, expectations of future inflation rises slowly, say, 1% per year.

- ❖ What is wrong with this type of expectation?
- ❖ Can expectations fail to be rational?

Note: If an additional factor is important, but information about it does not exist, an expectation that does not take this into account is rational (e.g., unpredictable events).

Exercise 11: Suppose Joe commutes to work. What would be an adaptive expectation and rational expectation given the following information?

- It takes an average of 30 minutes to drive during non-rush hour traffic.
- It takes an additional 10 minutes on average to drive during rush hour traffic.
- Joe listens to the radio in the morning and hears there is road construction starting today that is delaying traffic by an average of 5 minutes.
- There is an accident which will delay everyone by an average of 15 minutes.

❖ What is Joe's adaptive expectations on commute time during rush hour traffic today?

❖ What is Joe's rational expectations on commute time during rush hour traffic today?

❖ Is it always the case that the average is the best tool to use in rational expectations?

❖ Why do people try to make their expectations match their best possible guess of the future using all available information?

❖ How do individuals weigh current information from past information?

❖ Why do asset prices change?

5. Information and financial market efficiency

One of the biggest questions faced by investors is whether prices in the financial markets reflect the right information. This is the essence of the efficient markets hypothesis.

- ❖ What if the asset's price is not equal to the present value of expected asset income?

Expectations of asset values by participants in financial markets determine market prices and changes in market prices.

5.1. The efficient markets hypothesis

Individuals acting rationally will estimate a value for any asset. How does this behavior translate into the prices we observe in markets? How can we be sure that a market price equals an asset's fundamental value?

Rational expectations provide the incentive to profit when market prices are higher or lower than the forecasted value. In this way, the self-interested actions of major, informed traders cause available information to be incorporated into market prices. The efficient market hypothesis is based on the assumption that prices of securities in financial markets fully reflect all available information.

The efficient market hypothesis views expectations of future prices as equal to optimal forecasts using all currently available information. In other words, the market's expectations of future securities' prices are rational. This in turn implies that expected return on the security will equal the optimal forecast of the return. Thus, the forecast of fundamental value in market prices offers individuals guidance in financial and economic decisions.

Recall that the expected rate of return from holding a security equals the expected sum of the capital gain on the security, plus any cash payments, divided by the initial purchase price of the security:

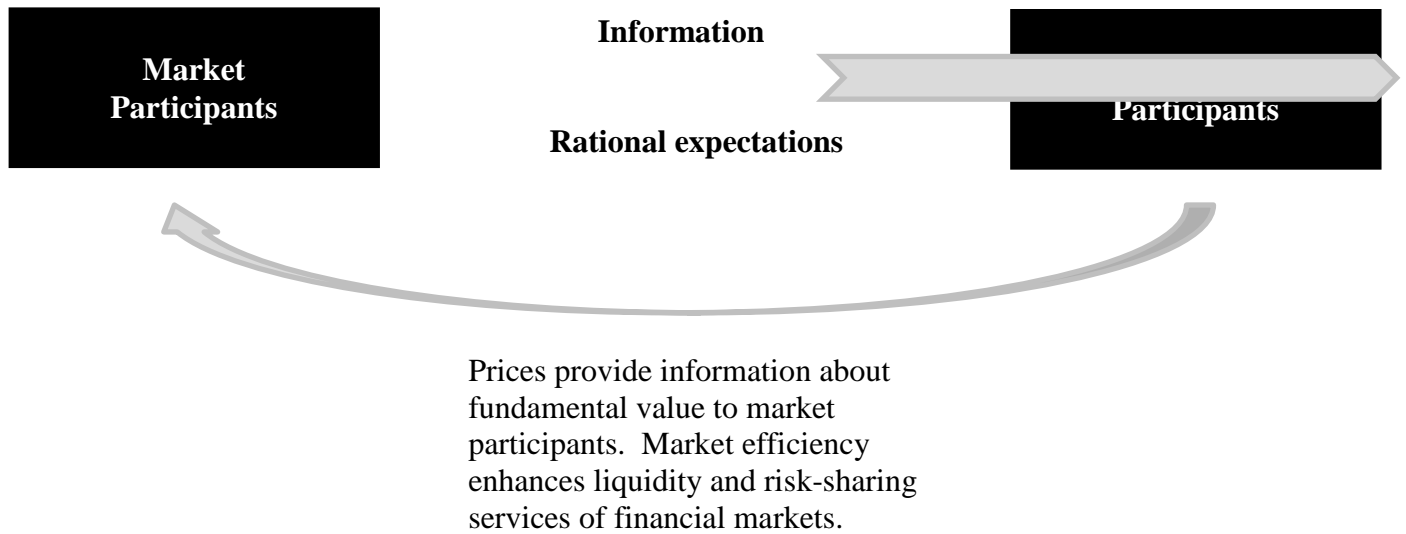
$$E[R] = \frac{E[P_{t+1}] - P_t + C}{P_t}$$

where

- $E[R]$ = rate of return on the security held from time t to $t+1$.
- $E[P_{t+1}]$ = price of the security at time $t+1$
- P_t = price of the security at time t
- C = cash payment

Unfortunately, we cannot observe either $E[P_{t+1}]$. Thus, the rational expectations equation cannot tell us much about how the financial market behaves.

- ❖ Given that expected future price of the security is unavailable, how might the rate of return be found?



- ❖ What happens if the price is not equal to equilibrium price?

❖ What conclusions are drawn from the efficient market hypothesis?

❖ What stocks should one hold based on the efficient market hypothesis?

There is good evidence of the EMH by comparing the returns of active vs. index mutual funds. Active funds have an average return of 8.2% while the S&P 500 average 10.0% (the S&P 500 is a free-float capitalization-weighted index of the prices of 500 large-cap common stocks actively traded in the United States). However, 15% of the managed funds had higher than 10% returns while 85% had lower.

5.2. Actual efficiency in financial markets

Highly liquid markets in which information costs are low are relatively efficient. Prices and returns determined in these markets appear to reflect available information. Some empirical work corroborate findings that changes in stock prices are not predictable.

There are three differences between the theoretical behavior of financial markets and the actual behavior of financial markets. This causes many to question the validity of the efficient market hypothesis:

❖ How flexible is the efficient market hypothesis to non-fundamental stock price changes?

❖ Can anyone beat the market? If so, how?

❖ How are bubbles possible if the efficient market hypothesis is true?

Booms and Busts

	% Rise bull phase	Length of up phase (months)	%Decline peak to trough	Length of down phase (months)
Tulips Holland (1634-37)	+5900%	36	-93%	10
Mississippi shares France(1719-21)	+6200%	13	-99%	13
South Sea shares Great Britain (1719-20)	+1000%	18	-84%	6
U.S. stocks United States (1921-32)	+497%	95	-87%	33
Mexican Stocks Mexico (1978-81)	+785%	30	-73%	18
Silver United States (1979-82)	+710%	12	-88%	24
Hong Kong stocks Hong Kong (1970-74)	+1200%	28	-92%	20
Taiwan stocks Taiwan (186-90)	+1168%	40	-80%	12
Japanese stocks Japan (1955-2003)	3720%	288	-80%	156

6. Shortcomings in asset pricing

Commercial banks have widely used present value calculations as a method of valuing commercial real estate construction projects. This practice has two substantial shortcomings:

1. The present value calculation relies on the market for competing investments at the time of the analysis, which would likely change, perhaps dramatically, over time. This is referred to as ketchup economics – valuation of one asset using another asset that does not make the valuation of an asset rational. If the market is overpriced, then all assets will be overpriced.

The expected return on one asset is used to value the expected return on another asset. In the above exercises, a risk-free asset is used as the anchoring return. Often, the interest rate on one asset is identified by the equating of returns. That is,

$$\text{Expected (return}_1\text{)}=\text{Expected(return}_2\text{)}$$

2. The cyclical nature of the real estate markets is problematic for valuation. Most loans are made during boom real estate markets and these markets usually last less than ten years. Using PV to analyze commercial real estate during any but the early years of a boom market will lead to overvaluation of the asset.

Discounted cash flow (DCF) models are powerful, but they do have shortcomings. DCF is merely a mechanical valuation tool which is subject to the axiom *garbage in, garbage out*. Small changes in inputs can result in large changes in the value of a company. Instead of trying to project the cash flows to infinity, terminal value techniques are often used. For example, a simple annuity is used to estimate the terminal value past 10 years. This is done because it is harder to come to a realistic estimate of the cash flow as time passes.

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Lecture 4: Determination of Interest Rates

This lecture discusses:

1. The market for loanable funds
2. The determinants of interest rates
3. The weaknesses of the loanable funds model
4. The term structure of the interest rates
The relationship among interest rates on bonds with different terms to maturity - the term structure of the interest rates
5. Risk Structure of Interest Rates
Why bonds with the same term to maturity have different interest rates – the risk structure of interest rates
5. The expectation hypothesis
6. The segmented market theory
7. The liquidity premium theory

1. Loanable Funds Theory

The loanable funds theory models the credit (or lending) market. Developed by Swedish economist Knut Wicksell (1851-1926), the loanable funds theory states that the interest rate is determined by the supply and demand for loans. This theory is based on the central idea that the financial system channels funds from savers to investors (borrowers) through a market for loans. In this market, the interest rate is the price, i.e., what investors pay savers for using their funds. The interest rate is determined by the supply and demand for loans.

The loanable funds theory is obviously a simplification of reality

- There is one type of loan and one price.
- Savers lend directly to investors.

1.1. The model setup

1.1.1. Demand for loans

The demand for loans is the level of investment in the economy. If investors decide to undertake more projects, they must borrow more. The demand for loanable funds can be segmented into three components:

1. Business Demand

This can be long-term borrowing for capital projects or short-term financing of inventories and other short-term assets. Business demand for funds is usually procyclical.

2. Household Demand

Although households are usually the net providers of loanable funds, they are also in the market as borrowers (the life cycle makes it possible to have dual personalities). They demand funds in many ways: mortgages, credit card debt, auto loans, etc.

3. International demand

If the economy is open, then the demand for loanable funds also depends on the flow of funds coming or going abroad. We model all flows to and from abroad on the demand side.

Buying of assets

Domestic resident buys foreign asset: Capital Outflow increases ($\uparrow CO$)

Foreign resident buys domestic asset: Capital Inflow increases ($\uparrow CI$)

Selling of assets

Domestic resident sells foreign asset: Capital Outflow decreases ($\downarrow CO$)

Foreign resident sells domestic asset: Capital Inflow decreases ($\downarrow CI$)

Net capital outflow (NCO) is determined by the difference in the buying and selling of assets between countries.

$$NCO = CO - CI$$

Some researchers model inflows and outflows under the term *net investment*. Others model foreigners no different than domestic residences and group all outflows under demand and group all inflows under supply.

The sum of the components of demands sum together:

$$D = I + NCO$$

1.1.2. Interpreting net capital outflow

Net capital outflow can be positive or negative.

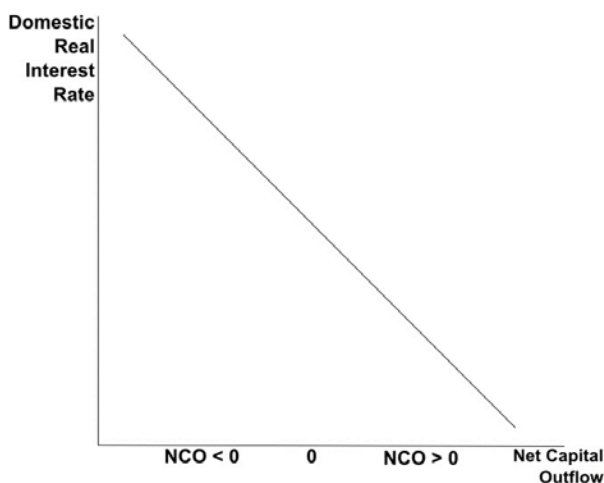
- When net capital outflow is positive, domestic residents are buying more foreign assets than foreigners are buying domestic assets. Capital is flowing out of the country.
- When net capital outflow is negative, domestic residents are buying fewer foreign assets than foreigners are buying domestic assets. The country is experiencing a capital inflow.

1.1.3. Influences on net capital outflow

There are several factors that influence a country's net capital outflow. These include

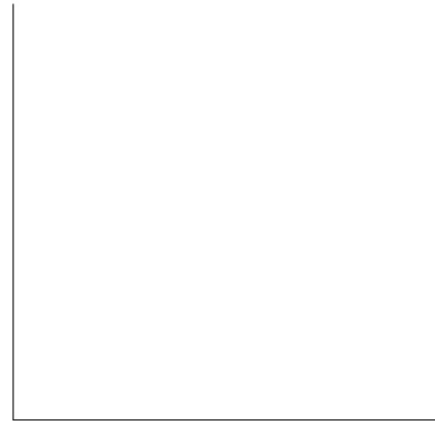
- The real interest rates being paid on foreign assets.
- The real interest rates being paid on domestic assets.
- The expected rate of currency appreciation between countries.
- The perceived economic and political risks of holding assets abroad.
 - Government policies that affect foreign ownership of domestic assets.

Holding currency appreciation and economic and political risks constant, when the domestic real interest rate is increases relative to foreign interest rates, owning domestic assets is more attractive, and NCO decreases – a negative relationship forms.



- The downward slope of the NCO curve demonstrates the negative relationship between net capital outflow and the real interest rate.

❖ Is the demand for funds downward sloping?



1.2. Supply of loans

The supply of loans is the level of savings (private and public) in the economy. Government spending/borrowing is largely interest-inelastic (i.e., not largely a function of prevailing interest rates). The supply of loans is given by the following equation:

$$\underbrace{S}_{\text{National savings}} = \underbrace{Y - C - T}_{\text{Private savings}} + \underbrace{T - G}_{\text{Public savings}}$$

$T - G > 0$: Government surplus
 $T - G < 0$: Government deficit

where C is consumption, G is government spending, and T is net taxes.

- Net taxes: Tax revenue minus transfers from the government.

Households are the largest suppliers of loanable funds, but by no means the only source. Businesses and government also can be temporary suppliers.

❖ Is the supply for funds upward sloping?

Yes. This is easily understood by viewing the future value of \$1,000 in 3 years at alternative interest rates:

Interest rate	Future value
4%	\$1,127.27
5%	\$1,161.47
6%	\$1,196.68
7%	\$1,232.93
8%	\$1,270.24
9%	\$1,308.65
10%	\$1,348.18
11%	\$1,388.88
12%	\$1,430.77

As the interest rate increases, the quantity supplied will also increase. This is due to more investors being enticed into the market at higher interest rates.



1.3. Equilibrium

Savings and investment can be derived using the formula for GDP using the expenditure approach. For a closed economy, investment (I) is equal to savings (S):

$$Y = C + I + G + NX$$

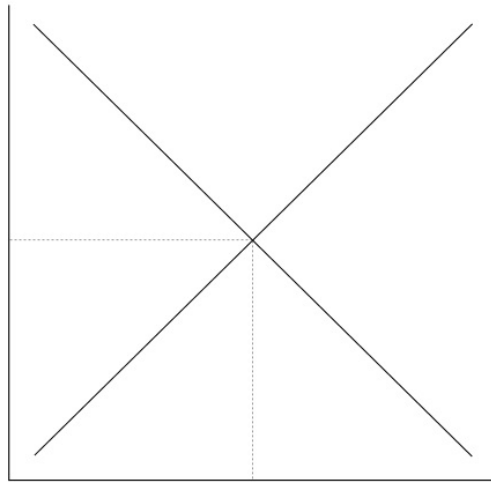
$$Y - C - G = I + NX + T - T$$

$$\underbrace{Y - C - T}_{\text{Private Savings}} + \underbrace{T - G}_{\text{Public Savings}} = I + \underbrace{NX}_{=NCO}$$

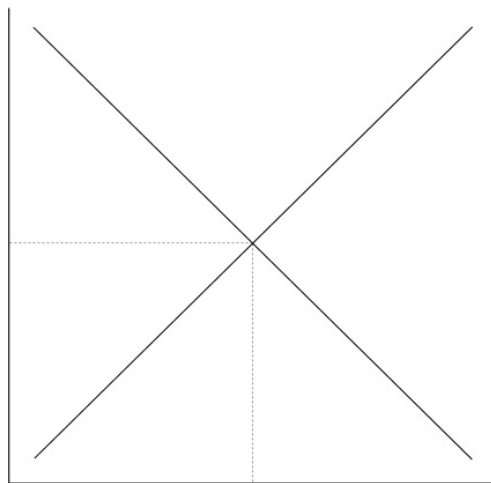
$$\text{Private Savings} + \text{Public Savings} = I + NCO$$

$$S = I + NCO$$

Graphically, the equilibrium interest rate in the loanable funds market is found at the crossing of the supply and demand curve for loanable funds.



❖ What happens if the interest rate is below the equilibrium interest rate?



1.4. Changes in demand and supply in the loanable funds market

Economists distinguish between shifts in supply and demand and movements along both curves. At this point, with a few economic courses under your belt, this should be second nature.

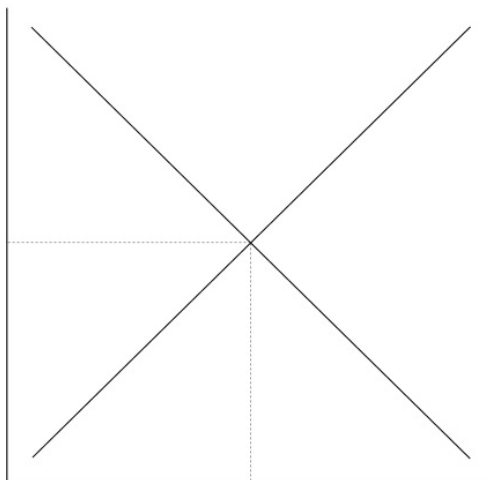
- A movement along the curves is caused by a change in the interest rate.
- A shift is caused by a reason besides changes in the interest rate.

1.4.1. Shifts in demand

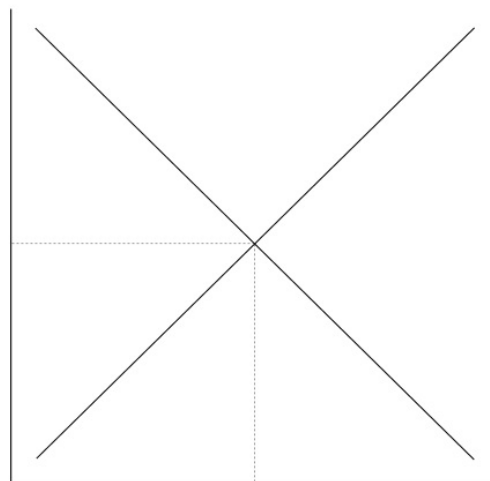
The demand for loans shifts if a change occurs in the level of investment at a given interest rate. There are a number of reasons that cause demand to shift:

1. Profit expectations
 - a. New technology typically requires capitalization and increases demand.
 - b. Higher domestic investors' confidence increases demand.
2. Government policy towards investing: tax incentives to invest increases demand.
3. Net capital inflow: if net capital outflows increase, then demand increases.
4. Inflation expectations: If inflation is expected to rise, demand increases.
5. Business cycle: During economic expansions, demand increases.

Exercise 1: What is the effect on existing loans if the demand for loanable funds shifts outward?



Exercise 2: What is the effect on domestic interest rates if foreign investors' confidence increases?



1.4.2. Shifts in supply (Savings)

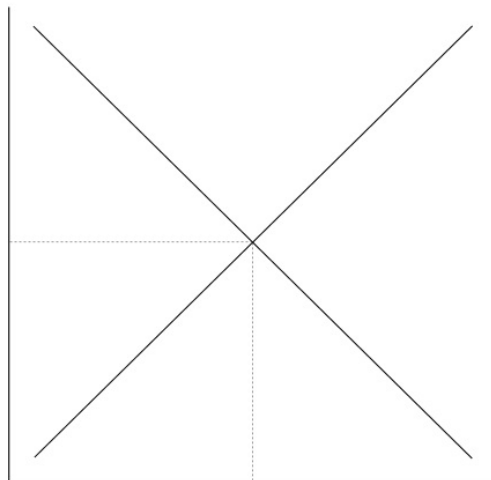
The supply of loans shifts when a change occurs in the behavior of savings.

Recall that savings is an aggregate of private and public savings. There are several reasons why supply shifts:

- 1) Behavior of savers: increase in percentage of income saved increases supply.
- 2) Government budget deficit: increase in government deficits decreases supply
- 3) Business cycle: during economic expansions, supply increases.
- 4) Inflation expectations: If inflation is expected to rise, supply decreases.
- 5) Government policy towards savings and consuming
 - a. Tax incentives to save increases supply of loanable funds.
 - b. Consumption tax increases supply of loanable funds.

U.S. private savings has fallen considerably over the years. The exact reasons why this has happened have still not been established. There are correlations in the data which lend some support to why the private savings has fallen but it remains a puzzle. These are:

Shifts in public saving is identical to private saving except that it is dictated by government spending and revenue, i.e., the budget surplus or deficit. While most individuals recognize that higher taxes or reduced spending in the future will be welfare (i.e., utility) declining, it affects households and businesses today through increasing the interest rate at which they borrow as well.



One study by Thomas Lauback estimates that a rise in the forecasted deficit of 1 percent of GDP raises the interest rate of .25%.

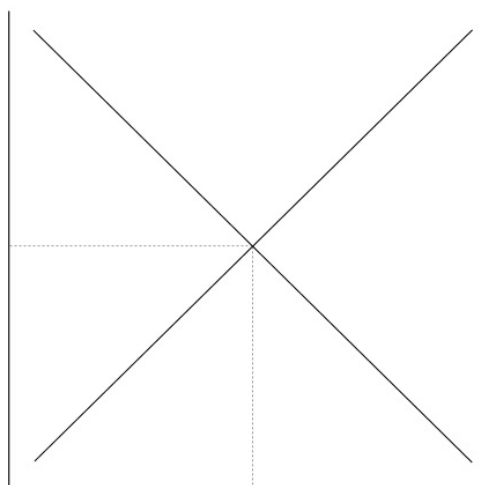
- ❖ Why does the U.S. seem to enjoy low interest rates when the deficit has ballooned under the Obama Administration?

1.5. Inflation

Nothing impacts the behavior of interest rates more strongly than the formation of inflationary expectations. Moreover, the effect of inflation will typically dominate all others, including offsetting variables such as expansionary open market operations. The impact of inflationary expectations is strong because it affects both the supply curve and the demand curve.

The supply curve shifts inward as lenders are less willing to make loans at lower real interest rates. The demand curve shifts to expedite purchases of certain credit-financed goods and services – when interest rates are expected to rise, demand increases now.

- ❖ Graph the change in equilibrium quantity and interest rate due to an increase in expected inflation in the loanable funds market.



The final spread between interest rates is referred to as the *inflation premium* on interest rates, and reflects the extent to which inflation drives interest rates higher.

1.6. Effects of business-cycle expansions (and recessions) on interest rates

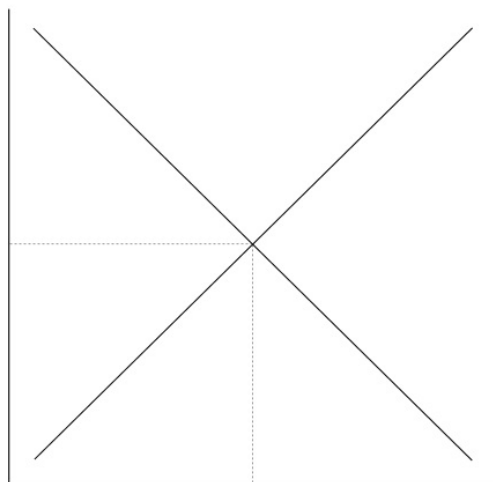
1.6.1 Expansions

New investments and savings tend to change depending on where the economy is in the business cycle. Generally speaking, demand picks up as the economy picks up. Businesses are more willing to invest in new products as the demand for goods and services tends to be higher during expansions and households are more willing to purchase more credit financed purchases such as cars and houses.

In an expansion:

1. Expected profits rise -> companies invest more -> demand for loanable funds increases
2. Real GDP increases, so wealth increases -> private savings increases -> supply of loanable funds increases.

❖ What is the effect on the interest rate from an expansion?



Empirical studies find that the demand shift is larger than the shift in supply.

1.6.2. Contractions

In a recession, all effects are exactly opposite. What is the effect on the interest rate from a recession?

1.7. Some remarks on interest rates

1.7.1 Historical comparison of the 30-year interest rate



1.7.2. Forecasting interest rates

Forecasting interest rates is extremely difficult. Most research suggests that the market is efficient in the sense that it is hard to predict interest rates in an effort to beat the market. Is it possible to beat the market?

1.7.3. Criticism of the loanable funds model

One of the biggest weaknesses of this model is that it is too simple - the market for loanable funds should be affected by other investment opportunities. This model fails to answer why demand increases when investors' confidence increases; it just does. We need another asset or assets to investigate how the demand for loanable funds increases when there is a change in:

- 1) liquidity of the alternative asset
- 2) risk of the alternative asset
- 3) expected return of the alternative asset
- 4) maturity of an alternative asset
- 5) taxation of an alternative asset
- 6) wealth

To amend this deficiency, we apply the theory of asset demand to study portfolio theory. This allows us to gain an understanding on the choices individuals make in allocating their resources between assets. To understand how interest rates are determined with money and assets, we study Keynes's Liquidity Preference Theory of Money. This model is then extended to multiple competing assets using Friedman's Quantity Theory of Money Demand.

1.7.4. Which interest rate does the loanable fund theory predict?

The loanable funds theory models investment and savings in the long-run. Thus, long-run interest rates are determined. The short-run interest rates are determined by current financial and monetary conditions in the economy. There are four interest rates discussed frequently in the media:

- 1) *Prime rate*: The base interest rate on corporate bank loans, an indicator of the cost of business borrowing from banks.
- 2) *Federal funds rate*: The interest rate charged on overnight loans in the federal funds market, a sensitive indicator of the cost to banks of borrowing funds from other banks and the stance of monetary policy.
- 3) *Treasury bill rate*: The interest rate on U.S. Treasury bills, an indicator of general short-term interest-rate movements (1 to 6 months).
- 4) *London Interbank Offered Rate (LIBOR)*: The British Banker's Association average of interbank rates for dollar deposits in the London market.

1.7.5. Bretton Woods System

The Bretton Woods system of monetary management established the rules for commercial and financial relations among the world's major industrial states in the mid-20th century. The chief features of the Bretton Woods system maintained pegged exchange rates by tying its currency to the U.S. dollar. On August 15, 1971, the United States unilaterally terminated convertibility of the dollar to gold. This brought the Bretton Woods system to an end and saw the dollar become fiat currency.

1.8. Enhancing one's future living standard through savings (not just in retirement!)

Many know that saving for retirement is important. However, well before retirement, saving more now can make a huge difference. Suppose that everyone has a 35 year work career (age 30 to 65) and that there are two types of people: Spendees who save 5% of their income and Thriftees who save 20% of their income. Everyone has the same income of \$40,000 a year in real terms and both get an 8% return on any savings. How long does it take for the Thriftees to have higher consumption than the Spendees? Assume that interest income from the last year is counted towards the next year's income.

Year	Spendees				Thriftees			
	Income	Save	Wealth	Consume	Income	Save	Wealth	Consume
1	\$ 40,000	\$ 2,000	\$ 2,000	\$ 38,000	\$ 40,000	\$ 8,000	\$ 8,000	\$ 32,000
2	\$ 40,160	\$ 2,008	\$ 4,008	\$ 38,152	\$ 40,640	\$ 8,128	\$ 16,128	\$ 32,512
3	\$ 40,321	\$ 2,016	\$ 6,024	\$ 38,305	\$ 41,290	\$ 8,258	\$ 24,386	\$ 33,032
...
16	\$ 42,468	\$ 2,123	\$ 32,978	\$ 40,345	\$ 50,753	\$ 10,151	\$ 144,569	\$ 40,603
...
35	\$ 45,815	\$ 2,291	\$ 74,976	\$ 43,524	\$ 68,619	\$ 13,724	\$ 371,465	\$ 54,895

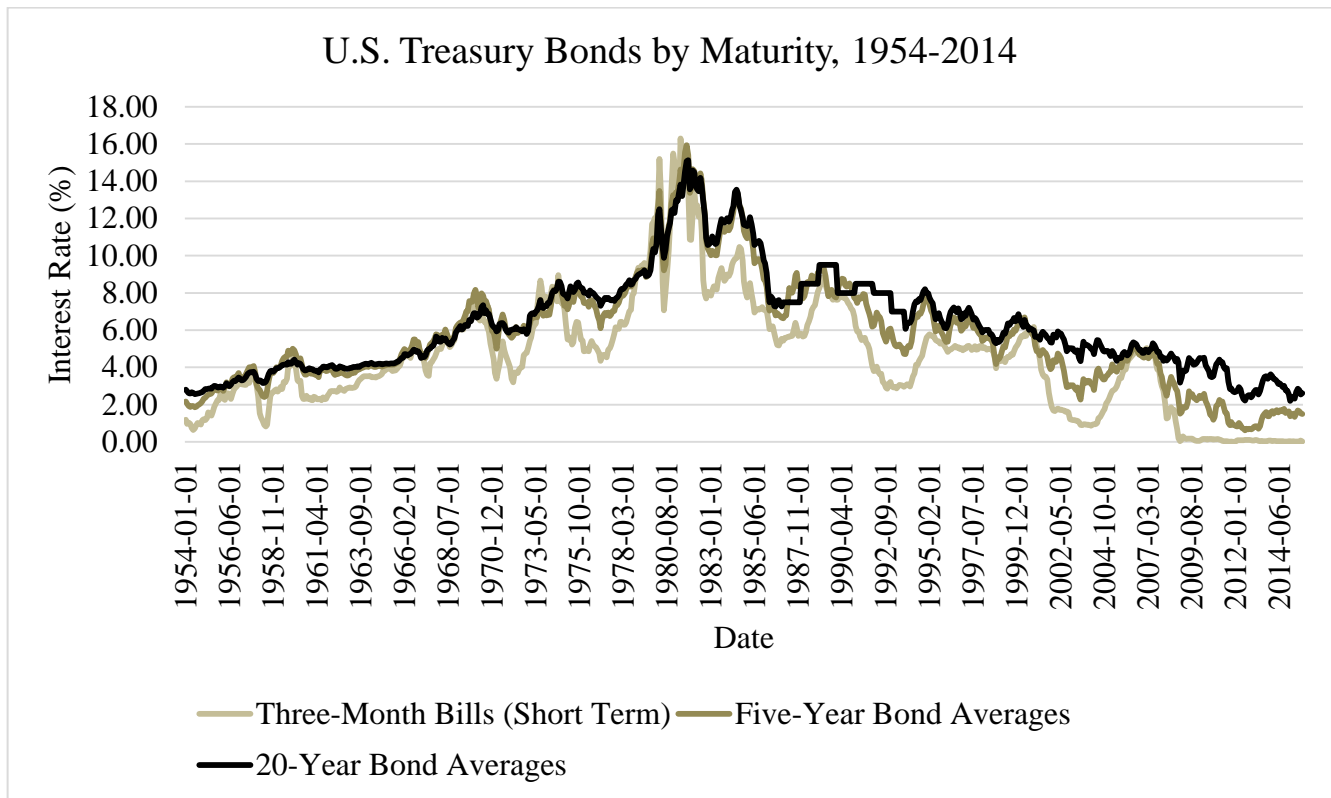
At year:

- 16-35: Thriftees consuming more than the Spendees.
- 35: total wealth of Thriftees is 5 times that of the Spendees. Consumption is 26% higher.

2. The term structure of interest rates

The main criticism of the loanable funds model is that it is too simple. A single interest rate fails to capture the reality of different interest rates observed in the markets. One extension is to simply explain why bonds with identical risk, liquidity, and tax characteristics, but with different maturity dates, have a different interest rates.

The term structure of interest rates refers to the relation between the interest rates on short-term bonds versus those on medium- and long-term bonds.



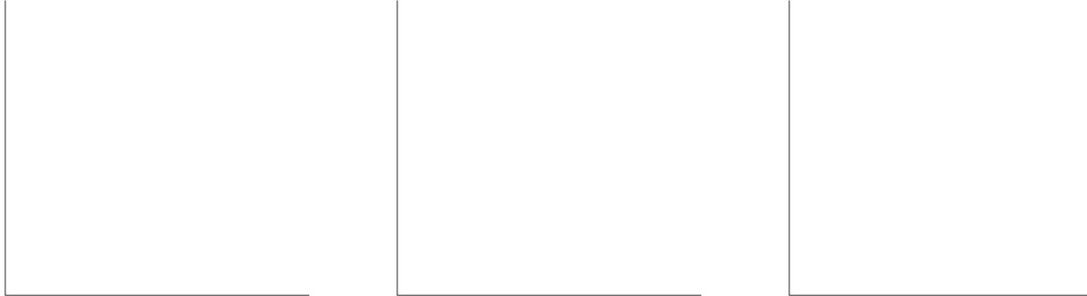
- ❖ Using the above graph, what empirical relationships can be established?

The term structure of interest rates is important to individuals who desire to buy bonds. The interest rates on the bonds are likely to be different, and a prospective bondholder should have some understanding of why. One way to understand the term structure of interest rates is using a yield curve.

A *yield curve* plots the yields on bonds with differing terms to maturity, but with the same risk, liquidity, and tax consideration.

The classification of yield curves is as follows:

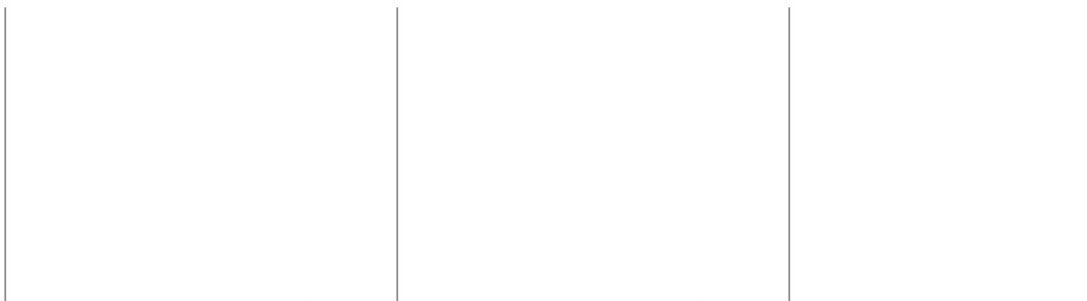
1. Upward-sloping: long-term interest rates are above short-term rates.
2. Flat: short- and long-term interest rates are the same.
3. Downward-sloping (inverted): long-term rates are below short-term rates.



The typical yield curve slopes upward, reflecting the usual pattern of longer-term bonds paying higher interest rates, but is not super-steep.

The Wall St. Journal, on its *Markets Lineup* page, prints a yield curve every day for Treasury bonds. In January, 2010 the yield curve was upward-sloping and steeper than the previous year. Also, the three-month T-bills paid very low rate of interest whereas 10- and 30-year T-bonds paid much higher rates of interest, in the range of 4-5%, which was also low but closer to the norm.

The three empirical facts of the term structure of interest rates can be defined using yield curves.



2.1 Theories to explain the term structure of interest rates

There are three theories to the term structure of interest rates. The first two, Expectations Theory and Segmented Market Theory, cannot separately prove all three facts. However, both are required to understand the Term Premium Theory which does prove all three facts.

2.1.1 Expectations hypothesis (or theory)

The Expectations Theory of the term structure is quite simple: the interest rate on a long-term bond is equal to an average of the short-term interest rates that people expect to occur over the life of the long-term bond.

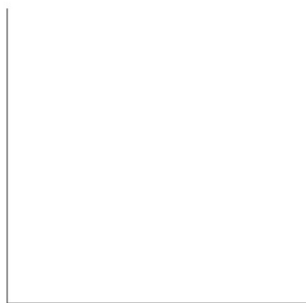
- ❖ What is the key assumption of this theory?

The equation is simply an average of current and future expected interest rates. That is, the interest rate on an n -year bond at time t ($t = \text{today}$; $t+1 = \text{a year from today}$) is

Notice that this is the geometric mean to assure that the compounded interest is also taken into account.

Exercise 4: If the interest rate on a brand-new one-year bond is 5% and people expect the one-year bond rate to rise to 6% next year, 7% the year after, 8% the year after that, and 9% the year after that, then:

- ❖ The interest rate on a 1-year bond sold today is
 - ❖ The interest rate on a 2-year bond sold today is
 - ❖ The interest rate on a 3-year bond sold today is
 - ❖ The interest rate on a 4-year bond sold today is
 - ❖ The interest rate on a 5-year bond sold today is
-
- ❖ What is the yield curve corresponding to this set of bonds?



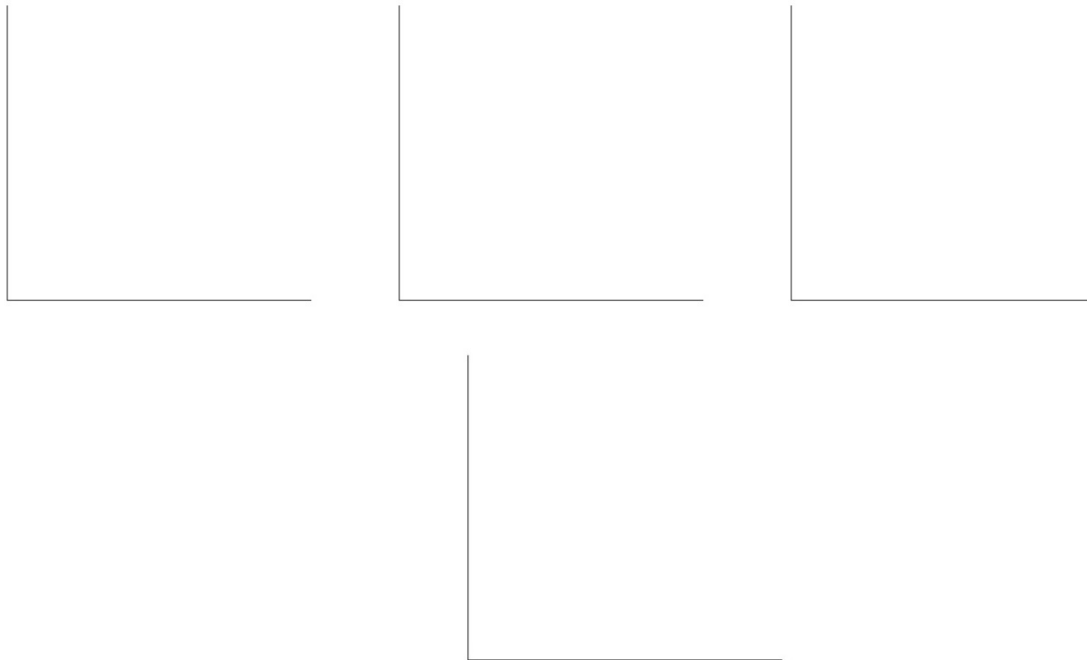
2.1.2 Segmented market theory

The segmented market theory of the term structure sees markets for different-maturity bonds as completely separate and segmented. Supply and demand of each market determines the equilibrium interest rate for that market with no effect from expected returns on other bonds with other maturities.

❖ What is the key assumption of this theory?

❖ Is this a realistic assumption?

❖ How is the yield curve drawn?



2.1.3 Preferred habitat and the liquidity premium theories

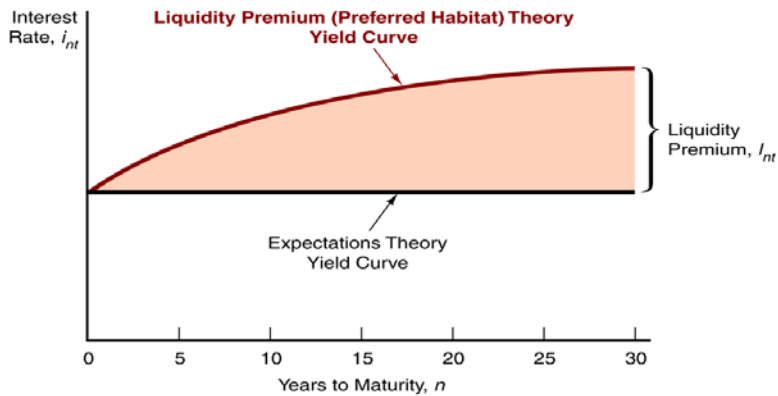
Since both extreme assumptions (perfectly substitutable and non-substitutable) cannot predict all empirical facts, it may be that a combination of the two yields a predictable theory.

Suppose the market is segmented based on individuals' bond maturity preference.

- The Liquidity Premium Theory states that given that long-term bonds have an interest rate risk, a term premium is required that increases with maturity to compensate for this risk.
- The Preferred Habitat Theory states that bondholders require an additional premium to hold a bond with a different maturity than the ones they prefer.

Exercise 5: How would the n -period bond equation under the expectation theory be modified?

This equation is graphically demonstrated below.



Exercise 6: Suppose that the current i on 1-year bonds is 4% and the expected interest rate on all one-year bonds to be issued in the next four years is also 4%. Suppose that the illiquidity premium (in %) is

$$\tau_n = n - 1$$

- ❖ What will the interest rates on 2, 3, and 4 year bonds be based on the illiquidity-premium theory?

$$i_{1,t} =$$

$$i_{2,t} =$$

$$i_{3,t} =$$

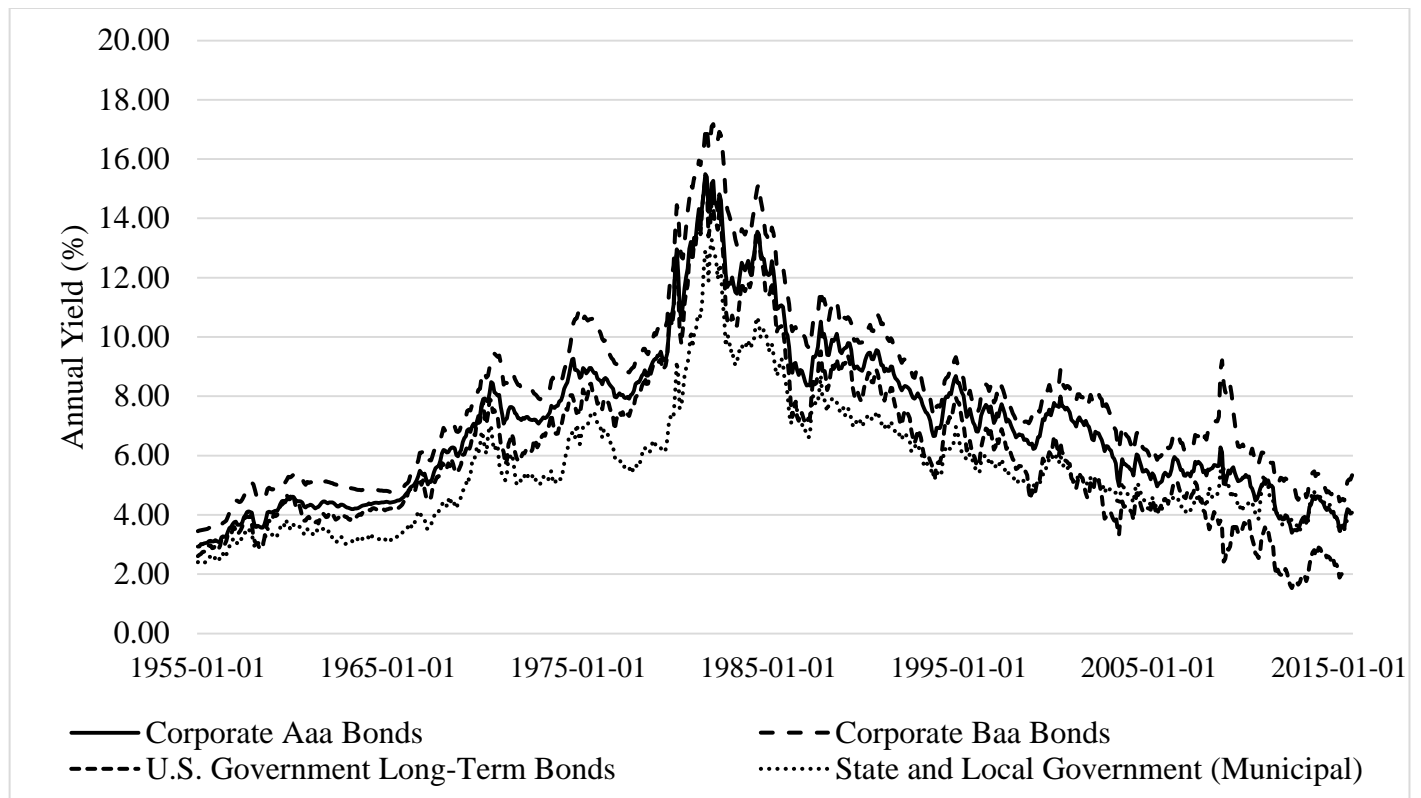
$$i_{4,t} =$$

Conclusion:

3. The risk structure of interest rates

Another extension to the standard loanable funds model is to explain why same maturity bonds differ in interest rates.

The risk structure of interest rates explains differences in interest rates due to differences in default risk, liquidity, and tax considerations.



❖ Above is a plot of the interest rates on identical maturity bonds. What relationships exist using the above graph?

❖ What factors are responsible for the above relationships?

Exercise 7: Show how the theory of asset demand can explain the effect on interest rates in the bond market if a default risk, liquidity, or tax considerations change

3.1. Default risk

Definition: *Default risk* is the probability that the issuer of the bond is unable or unwilling to make interest payments or pay off the face value.

U.S. Treasury bonds are considered default-free, this acts as a baseline to compare all other bonds.

- ❖ How do default-free bonds affect bondholders' attitudes towards government debt?

Definition: *Risk premium* is the spread between the interest rates on bonds with default risk and the interest rates on Treasury bonds for bonds of the same maturity.

Because default risk is so important to the size of the risk premium, the likelihood of default is established by credit-rating agencies. The table below provides the classifications of risk as established by Moody's, Standard and Poor's, and Fitch rating agencies.

Rating			Definitions
Moody's	S&P	Fitch	
Aaa	AAA	AAA	Prime Maximum Safety
Aa1	AA-	AA-	High Grade High Quality
Aa1	AA	AA	
Aa2	AA-	AA-	Upper Medium Grade
A1	A+	A+	
A2	A	A	
A3	A-	A-	
Baa1	BBB+	BBB+	Lower Medium Grade
Baa2	BBB	BBB	
Baa3	BBB-	BBB-	
Ba1	BB+	BB+	Non-Investment Grade
Ba2	BB	BB	
Ba3	BB-	BB-	Speculative
B1	B-	B-	
B2	B	B	Highly Speculative
B3	B-	B-	
Caa1	CCC+	CCC		Substantial Risk
Caa2	CCC	—	
Caa3	CCC-	—	In Poor Standing
Ca	—	—	
C	—	—	Extremely Speculative
—	—	DDD	
—	—	DDD	May be in Default
—	D	DDD	
—	—	DDD	Default
—	—	—	

❖ What are the key features of this rating system?

❖ What makes high yield bonds more likely to default?

❖ How does default risk explain the relationship between interest rates on corporate and treasury bonds?

Application: The subprime mortgage market collapsed in August 2007. Many questioned the rating system's ability to rate default. The perceived increase in default risk for Baa bonds made them less desirable at any given interest rate. This causes investors to switch to investment grade bonds and is an outcome described by a flight to quality.

The result is that interest rates on investment grade bonds fall, while raising the interest rate on junk bonds. The spread on Baa to Treasury bonds increased from 1.85% to 5.45%.

3.2. Liquidity

Definition: *Liquidity* is the relative ease with which an asset can be converted to cash.

We already know that U.S. treasury bonds are the most liquid securities.

❖ How liquid are non-Treasury bonds?

❖ How does the reduced liquidity affect their interest rates relative to that of Treasury bonds?

3.3. Income tax considerations

Municipal bonds are unusual in the sense that they have a lower return than U.S. Treasury bonds. Why is this unusual?

The key to this puzzle is that interest payments on municipal bonds are exempt from federal income taxes.

- ❖ Why did the interest rate spread switch after 1941?

3.3.1. After-tax interest rates

Most investment income is taxable, so taxes lower returns on assets. However, investment tax rules are unique..

In assessing the economic return on any interest-bearing asset, the amount of interest being taxed must be considered. The demand for an asset is partly determined by how the income from the asset is taxed. This is because the tax treatment of income generated effect the expected returns on those assets.

The interest rate that matters is the *real after-tax interest rate*:

$$r_{AT} = i(1 - \tau) - E[\pi]$$

where

i = nominal interest rate

$E[\pi]$ = expected inflation rate

τ = marginal tax rate

The nominal after-tax interest rate $i(1 - \tau)$ is useful when comparing returns on alternative assets, especially since the expected inflation rate is the same regardless of what kind of assets one holds.

Exercise 8: The middle-class tax brackets (covering every dollar of income between \$25,000 \$85,000 per year) are 25% for federal and 7% for New York (32% together). What are the tax rates, τ , on Corporate bonds, U.S. Treasury bonds, and New York muni bonds for New Yorkers?

Exercise 9: Suppose a middle-class individual is choosing between a corporate bond ($i = 6.3\%$), a U.S. Treasury bond ($i = 5.0\%$), and a New York bond ($i = 4.2\%$) with the tax rates calculated in Exercise 8. What are the after-tax interest rates if inflation is 0%?

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Lecture 5: Banks and Bank Regulation

1. Overview of Bank Balance Sheet
2. How Banks Manage Risk
3. Bank Regulation

1.1 Bank's balance sheet

The objective of banks is to maximize shareholders return on their investment in the bank. This is done in part by maximizing assets and minimizing liabilities:

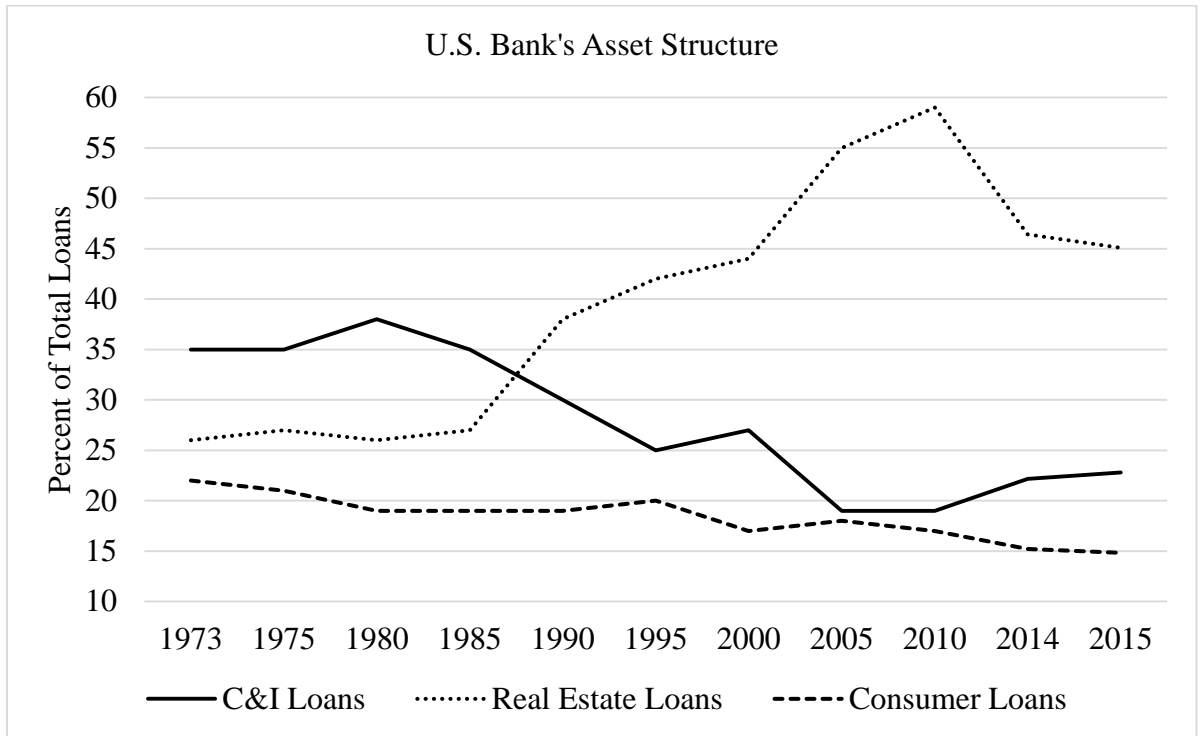
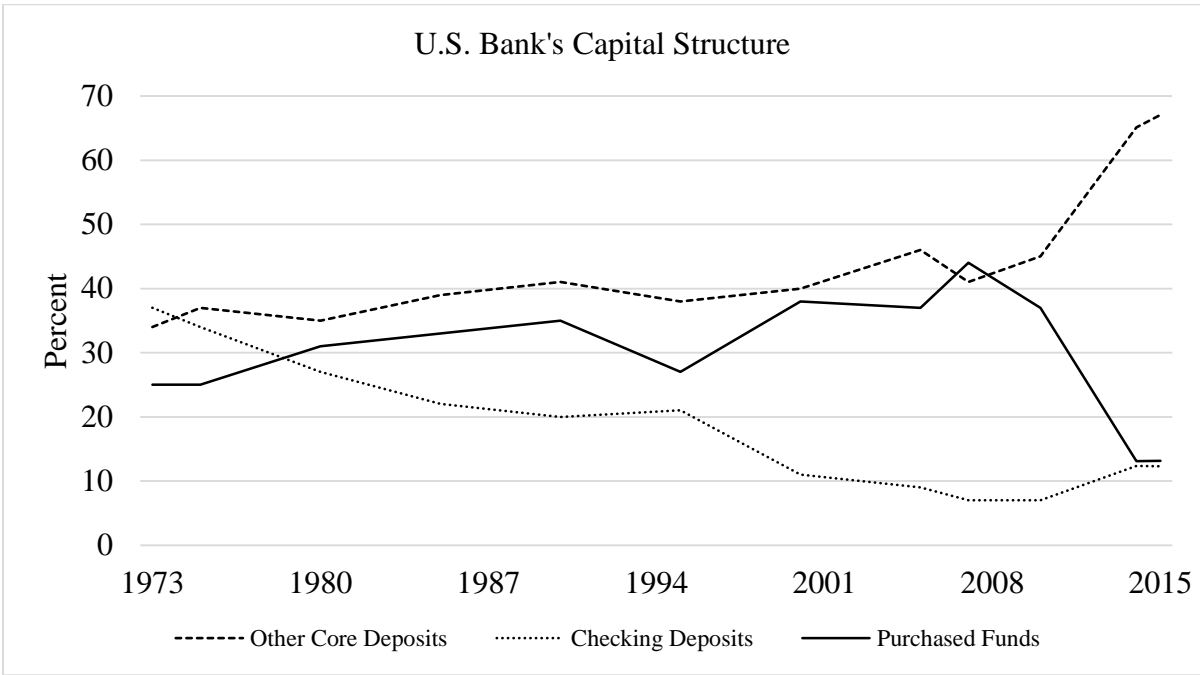
$$\text{bank capital} = \text{total assets} - \text{total liabilities}$$

Bank capital, also known as net worth or equity capital, is income generated by the bank and at some point distributed to shareholders. Banks generate this capital by borrowing and by other liabilities, such as bank deposits, and use these funds to create or purchase assets that generate income. Rearranging the above equation, total liabilities + bank capital = total assets.

The above equation provides the totals of a bank's balance sheet that lists the values of assets, liabilities and bank capital. The consolidated balance sheet of all U.S. commercial banks on June 30, 2010 is provided below. The majority of banks' assets are real estate loans, roughly 28% of all assets, while the majority of banks' liabilities are non-transaction deposits, roughly 57%.

Assets		Liabilities	
Category	Total	Category	Total
Total Assets		Total Liabilities	

- Banks earn income from the loans and securities on their balance sheet.
- Notice that securities and reserves are assets for the bank.



1.1.1. Off-balance sheet activities

Banks also receive income from off-balance sheet (OBS) activities that are not revealed on the bank's balance sheet because they do not affect assets or liabilities.

Examples include

1.2. Bank profits

Banks earn profits from holding assets that provide a stream of income that is larger than its stream of expenses. The profitability of a bank, income minus expenses, is easily understood using an income statement. An income statement is a financial statement summarizing income, expenses, and profits over some time period.

Exercise 1: Fill in the table to identify the bank's profits.

Income Statement For Year Ended December 31, 2021						
Interest Income						
Securities		2%	\$ 30			
Residential Loans		4%	\$ 40			
C&I Loans		8%	\$ 40			
Total						
Noninterest Income						
Letters of credit				\$ 5		
Total						
Total Income						
<hr/>						
Interest Expense						
Savings		1%	\$ 150			
Total						
Noninterest Expense						
Salaries				\$ 6		
Total						
Total Expense						
<hr/>						
Profit						
<hr/>						

Banks evaluate their profitability with three ratios.

The first measure is the *return on assets* (ROA):

$$\text{ROA} = \frac{\text{profits}}{\text{assets}}$$

The second measure is the *ratio of profits to equity capital* (ROE):

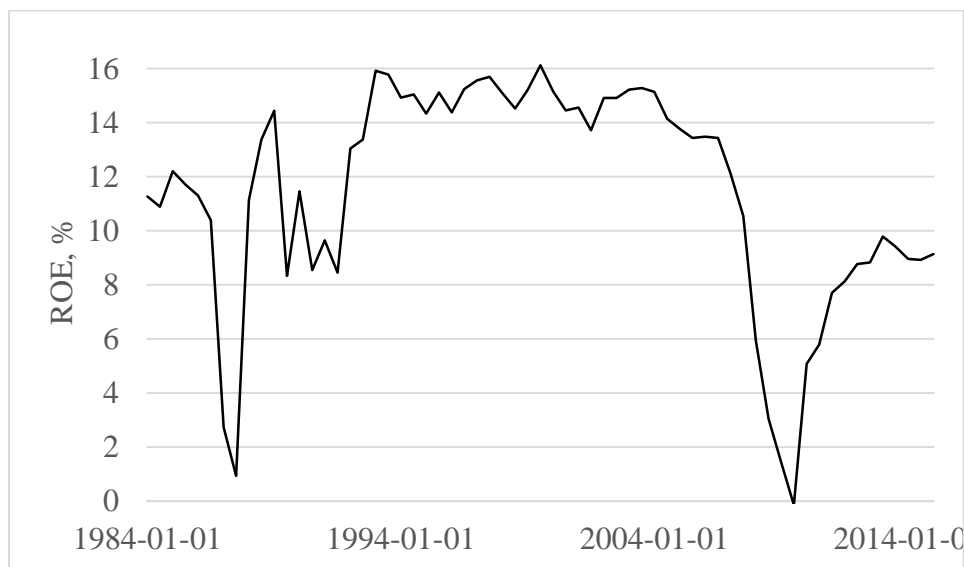
$$\text{ROE} = \frac{\text{profits}}{\text{equity capital}}$$

The third measure is the *equity ratio* (EM):

$$\text{EM} = \frac{\text{equity capital}}{\text{assets}}$$

The inverse of the equity ratio is called the bank's *leverage ratio*. It indicates the buffer when asset prices fall. A small loss of assets (such as a loan default) will magnify into a large drop in equity capital, which can easily cause illiquidity and insolvency.

From the above equations, it is clear that banks desire to increase profits relative to both assets and capital.



Exercise 2: Calculate the bank's ROA, ROE, and EM using the income statement from Exercise 1. The bank's balance sheet notes that its assets are \$120 and its bank (equity) capital is \$20.

ROA: _____

ROE: _____

EM: _____

LR: _____

1.3. Managing risk

Banking can be risky. Large losses can occur if banks' assets or OBS activities go awry. Thus, risk management is an important aspect of banking.

1.3.1. Liquidity risk

The first risk is the liquidity risk. This occurs when withdrawals from a bank exceed its liquid assets. When this occurs, the bank must quickly sell illiquid assets, such as loans, to become liquid, or obtain additional funds from other banks (through the Federal Funds Market) or through a discount loan from the government (Federal Reserve).

1.3.2. Credit risk

The second risk is the credit (or default) risk that occurs when borrowers won't repay their loans.

Banks reduce this risk by:

1.3.3. Interest rate risk

Interest rate risk occurs when short-term interest rate increases causes instability in bank profits. This occurs due to the fact that higher short-term interest rates raise the rates that banks pay on liabilities (such as checking deposits) and have less effect on rates received on assets. Banks perform *gap analyses*, in which the amount of rate-sensitive liabilities is subtracted from the amount of rate-sensitive assets.

Banks reduce interest rate risk by:

1. Selling long-term loans such as 30-year fixed interest mortgages (that carry the greatest interest rate risk)
2. Using floating interest rates for long-term loans.
3. Hedging interest rate risk with derivatives. A bank can sell futures contracts for Treasury bonds, a transaction that yields profits if bond prices fall. Recall that bond prices are inversely related to interest rates.

Exercise 3: Conduct a gap analysis using the income statement from Exercise 1. Assume residential and C&I loans have fixed interest rates.

1.3.4. Market and economic risk

Banks also face market and economic risk. Market risk occurs from fluctuations in asset prices while economic risk occurs from fluctuations in the economy's aggregate output (i.e., recessions). A subset of economic risk is exchange rate risk. This risk occurs when assets and liabilities are not held in the same country's currency and a change in the currency's value occurs.

1.3.5. Equity capital

In all of the above risks, bank capital is the buffer between solvency and insolvency. That is, bank managers must make a trade-off between safety and returns to equity holders.

- If equity capital is too low, large losses or withdrawals can potentially push the bank towards insolvency where liabilities (minus equity) are greater than assets.
- To make up for any shortfalls, banks reduce their assets and therefore a contraction in lending occurs.

Exercise 4: Suppose an investment bank has \$310M in assets, \$300M in liabilities, and \$10M in equity capital.

Calculate the leverage ratio. _____

Suppose the value of the assets declines by about 2.5%. Calculate the updated values of:

Assets: _____

Bank capital: _____

Leverage ratio. _____

Recall that $ROE = \text{profits} / \text{bank equity}$. If ROE goes up, the outlook may not be very good.

1.4. Troubled Asset Relief Program

During the 2008 financial crisis, the Troubled Asset Relief Program (TARP) was signed into law permitting various measures to confront the subprime mortgage crisis. TARP expenditures top \$431 billion and allowed the U.S. Treasury to purchase both *troubled assets* and any other asset the purchase of which the Treasury determines necessary to further economic stability. One of the biggest difficulties in the program was asset pricing as many of the assets did not have a market. On February 9, 2009, the Congressional Oversight Panel concluded that the Treasury paid \$254 billion, for which it received assets worth approximately \$176 billion.

2. Bank Regulation

The government continues to intervene in the financial system to bring stability to it and the general macroeconomy. Regulators implement various policies to reduce the two biggest problems: misuse of depositors' funds and bank runs.

Bank runs occurred frequently prior to the establishment of the FDIC in 1933. Since depositors have been guaranteed 100% of their deposits below \$250,000, no bank runs in the United States have occurred.

Unfortunately, stopping moral hazard of bankers has proven to be more difficult. Regulators decide who can open a bank, limit the types of assets that banks can hold, and set minimum levels of capital the banks must maintain. It is also easily seen that FDIC exacerbates the problem of moral hazard.

2.1. Capital requirements

As discussed above in section 1.3.1., when banks are choosing its level of capital, it faces a trade-off: lower bank capital raises profits, but it also raises its insolvency risk. This has caused bank regulators to impose capital requirements.

The Basel Accord is an agreement signed by bank regulators from around the world (in 1988) in the Swiss city of Basel to a set of recommendations on capital requirements. The United States follows the Basel Accord as well as a predated rule that a bank's capital must equal at least 5 percent of its assets. The Basel Accord additionally sets the riskiness of different kinds of assets a bank can hold. Specifically, the Basel Accord requires banks to hold capital of at least 8 percent of *risk-adjusted assets*. Risk adjusted asset values are constructed based on weights for each type of assets. For example, U.S. Treasury bonds hold a weight of 0 since they are risk-free. Municipal bonds and home mortgages have a weight of .5, while most other loans have a weight of 1. Federal fund loans (interbanking lending) has a weight of .2.

Exercise 5: Construct the capital requirements for the following bank's assets.

Capital Requirements			
	Assets	Weights	Weighted Assets
Reserves	10		
Securities			
Treasury Bonds	10		
Municipal Bonds	10		
Loans			
Interbank	10		
Home mortgages	20		
C&I	90		
Total	150		

The minimum levels of capital can now be constructed:

- 1) Based on minimum equity ratio of 5%.

- 2) Based on Basel requirement of 8% of weighted assets.

Banks have long suggested that the Basel Accord requirements are too restrictive. A committee was formed in 2004 to update the requirements, *Basel 2*. Since the financial crisis hit in 2007, it became apparent that many banks held insufficient capital to survive a major shock. In summer of 2013, *Basel 3* was approved by the Federal Reserve with even stricter rules. One new criteria is that banks must hold sufficient high-quality liquid assets to cover its total net cash outflows for 30 days.

2.1.1. Limitations of Basel Accord requirements

The Basel Accord requirements have several shortcomings. First, the accord failed to differentiate between bonds issued by industrialized versus emerging economies. Second, corporate bonds received a weight of 100% regardless of whether it was investment or high-yield. Third, banks received no credit for diversification of their portfolio. For example, one loan of \$50 million received the same risk weight as making 50 \$1 million loans. These shortcomings encouraged bankers to shift their assets towards riskier assets in a way that did not increase their required bank capital.

Exercise 6: Suppose that instead of holding Treasury bonds from the United States in Exercise 1, a bank holds 10% of its Treasury bonds from the United States and 90% from Turkey. How does this affect the weighted assets if Turkey should have a weight of .25?

2.1.2. Circumventing capital requirements

In the last 25 years, financial institutions have attempted to reduce their assets on their balance sheets by using structured investment vehicles (SIVs). The SIV raises funds by issuing commercial paper and using the funds to purchase securities backed by the bank loans. Even though SIV are independent businesses from the financial institution, they are almost wholly owned by the financial institution. Since they were associated with banks, their commercial paper received a ‘safe’ rating so they pay a lower interest rate while receiving a higher interest rate on the securities purchased by the financial institution. These profits went back to the financial institution.

In the most recent financial crisis, SIVs lost substantial amounts of money on the securities (in particular MBSs). This caused substantial losses for financial institutions and many wonder if the losses wouldn’t have been greater if they had had the capital requirements to sustain the losses.

Structured Investment Vehicle’s and Bank’s Balance Sheets

SIV	
Assets	Liabilities

Bank	
Assets	Liabilities

Exercise 7: Suppose that a bank constructs a SIV and takes its C&I loans and sells them as a security to the SIV with the agreement that the bank will buy back the securities if the SIV becomes insolvent.

Capital Requirements			
	Assets	Weights	Weighted Assets
Reserves	10		
Securities			
Treasury Bonds	10		
Municipal Bonds	10		
SIV Equity			
Loans			
Interbank	10		
Home mortgages	20		
C&I	90		
Total	150		

If SIVs have a weight of .5, what is the minimum level of capital under:

a) Equity requirement of 5% of assets.

b) Basel requirement of 8% of weighted assets.

2.2. Bank supervision

Financial institutions are regularly visited and audited. Each bank receives a *CAMELS rating*, an evaluation on bank's insolvency risk based on its capital, asset quality, management, earnings, liquidity, and sensitivity to interest rates and asset prices. If a bank's overall CAMELS rating is 3 or above, regulators require the bank to take action to reduce risk and improve its score. Regulators can additionally impose fines or turn the case over to the FBI if illegal activity has occurred.

3. Bankruptcy (or insolvency)

Any of the above risk can cause a bank to go bankrupt. A bank becomes bankrupt when it is insolvent. Insolvency occurs when liabilities exceed assets and bank capital is negative. Thus, the bank does not have sufficient liquidity to meet its liabilities. The two most common methods employed by FDIC in cases of insolvency or illiquidity are:

1. **Purchase and Assumption Method (P&A):** most deposits and liabilities are sold to another healthier bank with some being auctioned off. Typically the FDIC accepts a negative price as many times liabilities exceed assets. Depositors keep their deposits and bank branches stay open under new ownership.
2. **Payoff Method:** the bank ceases to exist and deposits are paid by the FDIC, which attempts to recover its payments by selling the bank's assets.

From 1995 through 2007, there were 58 bank failures. From 2008 through 2012, there were 448.

Exercise 8: Using the definitions below to categorize each of the following events.

Insolvency: Bank's assets are less than bank liabilities.

Illiquid: Insufficient reserves and immediate marketable assets to meet depositors' demand for withdrawals.

- a. The government announces it is abolishing its deposit insurance program.
 - b. The economy falls into recession and job losses are rampant.
 - c. The central bank triples the reserve requirements, effective immediately.
- ❖ Using your answers from a-c, which is more likely to occur first, insolvency or illiquidity? Does one always lead to the other?

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Lecture 6: Asymmetric Information

This lecture discusses asymmetric information and the effect on markets. The overview is as follows:

1. An overview of asymmetric information
2. Adverse selection
 - a. *The Market for Lemons*
 - b. Lemons in the securities market
 - i. Lemons in the stock market
 - ii. Lemons in the bond market
 - c. Tools to reduce adverse selection problem
3. Moral hazard
 - a. Moral hazard in the stock market
 - b. Moral hazard in the bond market
 - c. Tools to reduce moral hazard
4. The Sarbanes-Oxley (SOX) Act
5. Insider trading and conflicts of interest

1. Overview on asymmetric information

Asymmetric Information occurs when one party has insufficient knowledge about the other party involved in a transaction to make accurate decisions of whether they should engage in the transaction. Asymmetric information is inherent to financial markets.

There are two types of asymmetric information that occur in financial markets:

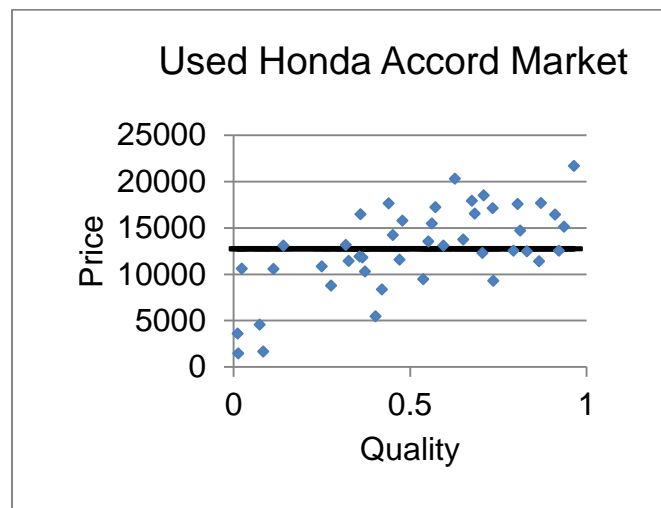
1. Adverse selection: Those most risky seek out financial products. Occurs before the transaction (e.g., bad credit risk individuals are most actively seeking out loans).
2. Moral hazard: Behavior that breaches their side of the financial contract. Occurs after the transaction (e.g., borrowers engage in activities that are undesirable from the lender's point of view).

2. Adverse selection

Agency theory analyzes how asymmetric information problems affect economic behavior. The pioneering work on adverse selection is due to Akerlof which he titled *The Market for Lemons*.

2.1. The Market for Lemons

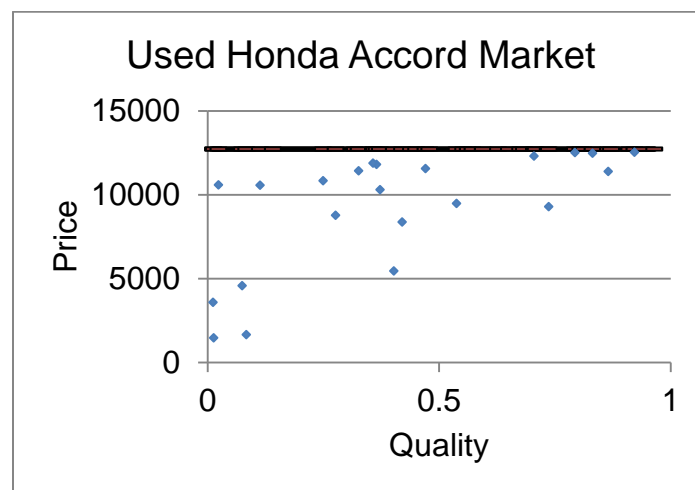
Consider the market for a used Honda Accord that has an assortment of good cars and bad cars (lemons) for sale.



Each car on the graph above represents a dot indicating a used car's quality and price. The line is the average market price for all Honda Accords in the market.

1. If the quality is perfectly observable, then each car would be priced according to its quality and the owner's ability to sell a car.
2. If the quality is unobservable to everyone, then all cars would be priced according to the average market price. Thus, some cars sell for above average price (lemons) and other cars sell for below average price (good cars). This is indicated on the graph by the line at \$12,728.

- ❖ How can asymmetric information be introduced into this example?
- ❖ How many prices will be observed in the market?
- ❖ How will sellers react knowing that there is a single price? What is the result in the market?



- ❖ If buyers recognize that all the used cars tend to break down (partially observing aggregate quality but not individual quality), what happens to the market?
- ❖ What other markets have a problem with asymmetric information?

2.2. Adverse selection in the securities market

Asymmetric information is a big problem in the securities markets. When a firm sells a security, it knows more than buyers do about the security's likely return because it knows its business. If purchasers of securities can distinguish good firms from bad firms, they will pay the full value of securities issued by good firms. Good firms will sell their securities in the market. This permits funds to move to the most productive investment opportunities.

2.2.1 Adverse selection in the stock markets

Suppose a firm wants to raise funds by issuing stock. Savers can forecast these earnings based on the firm's past performance and its announcements on future plans. However, firms know much more information than savers.

This asymmetry causes the same problem as in the used-car market. Suppose the price of each firm's stock is based on the public's forecast of its earnings.

- ❖ What is the behavior of management of a firm that knows their stock is undervalued vs. overvalued?

2.2.2. Adverse selection in the bond market

- ❖ Can there be an adverse selection problem in the bond market?

- ❖ Why does adverse selection tend to persist in the bond's market?

Exercise 1: Suppose there are two firms.

- Safe firm's revenue is \$125 for sure
- Risky firm revenue is
 - \$150 with $\frac{2}{3}$ probability.
 - \$0 with $\frac{1}{3}$ probability.
 - If the project fails, the firm defaults.

The saver buys the bond if the expected payment is \$110.

- ❖ Given symmetric information, does the saver buy the bond?

- ❖ Given asymmetric information, does the saver buy the bond?

2.3. Tools to help minimize adverse selection

2.3.1 Private production and sale of information

Standard and Poor's, Moody's, and Value Line gather information on firms' balance sheet positions and investment activities, publish the data, and sell them to subscribers. This system does not completely solve the adverse selection problem in securities markets because of the free-rider problem.

The free-rider problem exists because some individuals follow the investment footsteps of those individuals who pay for this information. This bids up the price of good investments so that they all sell for face value. Individuals who purchase this information may question why they purchased it. If free riding is sufficiently large, then the market for information may collapse. The Madoff scandal of 2008 presents a spectacular failure of monitoring.

2.3.2. Government regulation

There are a few regulations which increase information:

- a: Require firms to disclose certain information on their finances.
- b: Require independent audits of firms to verify information.

Given the amount of firms collapsing, regulation is not a complete solution. Either firms can hide some of their debt through complex financial schemes or they may use auditing firms which give preferential treatment.

2.3.3. Financial intermediation

Private production of information and government regulation do not solve the problem of asymmetric information. Indirect financing through financial intermediaries may aid in solving the issue. Since the information acquired by a bank on a firm's performance is private and does not require disclosure, they reap the benefits.

2.3.4. Collateral and net worth (debt)

Adverse selection is only a problem if the lender suffers a loss when a borrower is unable to make loan payments and thereby defaults. Collateral reduces the consequences of adverse selection. The defaulter recognizes that they will lose their property if they default on the loan.

3.0 Moral hazard

The word *moral* refers to the principles of right and wrong in behavior; *hazard* refers to harmful behavior that individuals engage in since their actions cannot be observed.

The classic example is auto insurance. The insurance company would like everyone to drive safely, never talk or text on cell phones, and park only in safe neighborhoods. Prior to purchasing insurance, these ideals seem reasonable. However, once insured, individuals' mentality switch and these ideals seem unreasonable. Individuals do not worry as much about accidents or thefts because the insurance company will pay most of the costs. This causes costs to increase for everyone.

- ❖ Can moral hazard be minimized or eliminated?

3.1. Moral hazard in the financial markets

Moral hazard exists in both the equities and debt markets.

3.1.1. Moral hazard in equity contracts (principal-agent problem)

Moral hazard can be severe when firms issue stocks. The owners of the corporation (the stockholders) are the principals, and the managers who run the firm are the agents. If shareholders cannot observe the actions of managers, then the principal-agent problem exists.

Moral hazard exists in the form of managers maximizing their paycheck or other perks and not maximizing profits. One of the biggest misconceptions of moral hazard is that the individual is doing something illegal if they engage in moral hazard behavior. This is incorrect. Many times the individual is within their legal right, they simply are derelict of their duty.

The biggest face of moral hazard with shareholders is Dennis Kozlowski, the former CEO of Tyco. He was convicted of larceny and fraud for using Tyco funds for his own use and sentenced to 8 to 25 years in prison. Kozlowski supposedly used funds to decorate his apartment (\$5.7 million) and have a birthday party for his wife in Sardinia (\$2.1 million). He and another executive supposedly took over \$600 million in improper payments.

However, there was no shredded or hidden paperwork. The prosecutors used all of the expense records to prosecute Dennis. This made some to question if it was in actuality the firm's mismanagement and not that of the CEO. He was simply utility maximizing using funds that he thought were entitled to him.

Exercise 2: Suppose that Cody asks Wyatt to become a silent partner in his horseshoeing business. The store requires an investment of \$10,000 to set up and Cody has only \$1,000. Wyatt purchases an equity stake for \$9,000, which entitles him to 90% of the ownership of the firm, while Cody owns 10%. If Cody works hard, excluding his salary, the store will have \$50,000 in annual profits.

How much is Wyatt's and Cody's returns?

What incentives does Cody have to work hard?

3.1.2. Moral hazard in debt markets

Moral hazard is less severe in the bond market than in the stock market. Bondholders do not care if a firm's manager is wasting money as long as the firm makes its promised payments. However, if there is already a significant default risk, managers may increase this risk by misusing funds.

3.2. Tools to minimize moral hazard

3.2.1. Monitoring the firm's production

There are a few ways to monitor managers. The first is using a board of directors. The board hires and sets the salary of the CEO. These board members are elected to their position by shareholders. The second way is through frequent and intensive audits to check what management is doing. The free-rider problem exists in both cases.

3.2.2. Government regulation

There are a few regulations which increase information on the firm's behavior

- a. Require firms to disclose certain information on their finances.
- b. Require independent audits of firms to verify.

3.2.3. Financial intermediation

Since private production of information and government regulation do not solve the problem of asymmetric information. Indirect financing through financial intermediaries may aid in solving this issue. Since the information is acquired by the bank on the firm's performance is private, they reap the benefits. Thus, the free-rider is eliminated.

One financial intermediary that helps reduce moral hazard arising from the principal-agent problem is venture capital firms. These firms provide funds to entrepreneurs to start new businesses in exchange for equity share in the business. Venture capital firms also have members in management and the contract stipulates that equity in the firm is not marketable to others. This eliminates the free-rider problem of shareholders.

3.2.4. Collateral and net worth

Collateral reduces the consequences of moral hazard. The defaulter recognizes that they will lose their property if they default on the loan. No such contract exists for equity holders.

3.2.5. Include equity in management's pay

Moral hazard can be reduced by making a large portion of management's pay in equity (shares of stock) or based on profit. One of the largest problems with this approach is that managers may mislead analysts and investors to inflate the company's stock price prior to selling large stakes in the firm.

4. The Sarbanes-Oxley (SOX) Act

The SOX Act of 2002 increased supervisory oversight to monitor and prevent conflicts of interest. There are two main parts to this act:

- a. Internal auditing standards – firms must establish an auditing committee to collect financial data and check its accuracy. The CEO must certify these accounts.
- b. External auditing standards – external auditors must review the work. Auditors are rotated around so that auditor-firm relationships do not become blurred.

5. Insider trading and conflicts of interest

Firms that issue securities know more than savers who buy securities. The act of insider trader is buying or selling securities based on information that is not public. There are many sources of information that create these scenarios. Some of this information may be due to the information gathering process done by investment banks through the auditing process and from the management of the firm who have first-hand knowledge. This information is misused for their own purposes or to family and close friends. Insider trading can be between firms. That is, one firm provides information in expectation of receiving more business from the other firm at a future date. Unlike the acts engaged in moral hazard, all insider trading is illegal and subject to stiff penalties.

6. Screening, monitoring, and the Financial Crisis of 2008

All tools to combat adverse selection and moral hazard either screen credit risk to limit adverse selection or monitor the recipients of funds to limit moral hazard. However, none of these tools eliminate either problem. Typically during financial crisis, it becomes apparent which companies have engaged in moral hazard -- as Warren Buffett famously put it: “[w]hen the water is drained out of the pool, you see who is not wearing trunks.”

- ❖ What were the screening and monitoring failures of the most recent financial crisis?

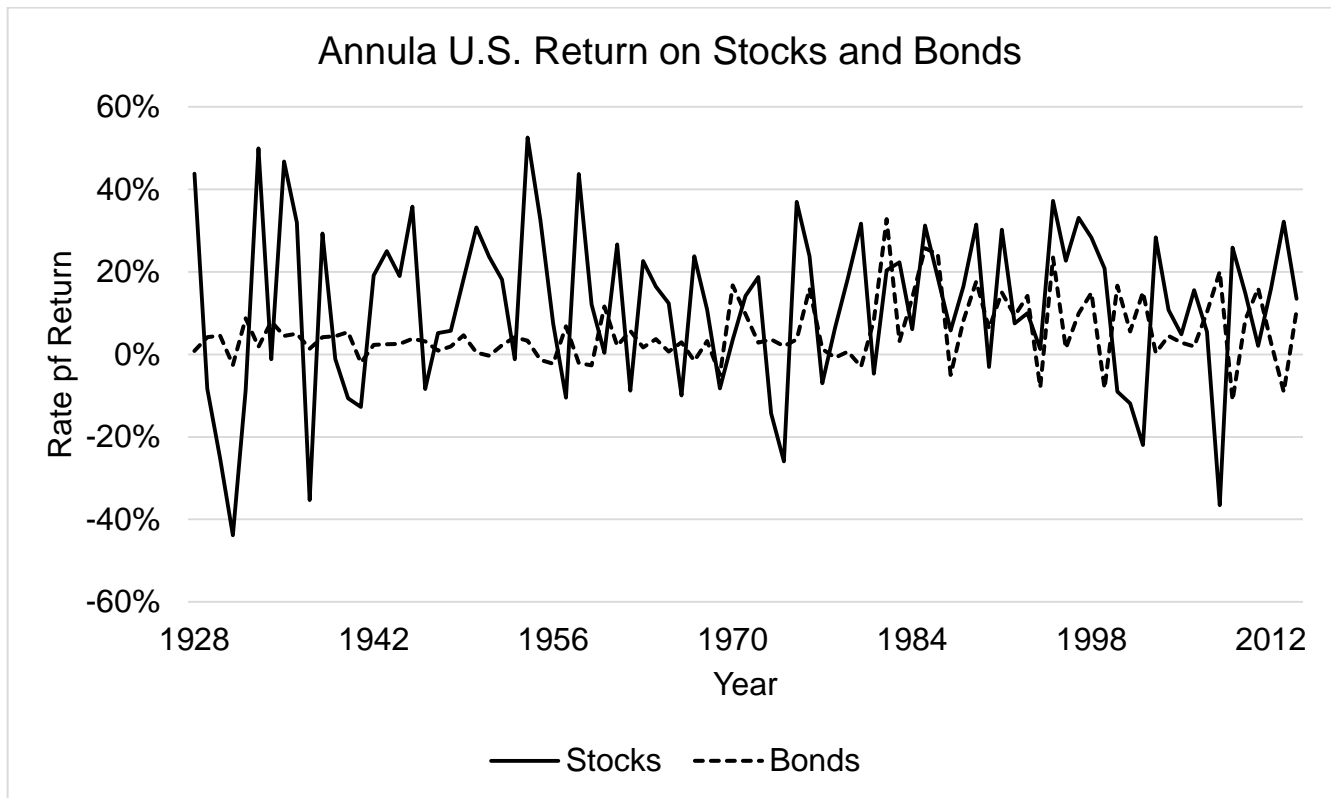
Lecture 7: Portfolio Theory

This lecture series discusses:

1. Understanding risk and return
 1. Portfolio Theory
 2. Value at Risk (VaR)
2. Firm's capital structure

1. Understanding risk and return

The average real rate of return on stocks from 1900 to 2007 is 8% and 2% for bonds. However, the return on stocks is more volatile than bond returns.



When a saver chooses between stocks and bonds, the choice is between return and risk. However, the choice is not all-or-nothing. The saver can split wealth between the two assets, seeking a high return on part of it and keeping the rest safe. The key decision is the fraction of wealth to put into stocks, i.e., the mixture of assets (a so-called *portfolio*) that is optimal.

Optimal is interpreted as earning the highest possible return at the lowest possible risk. In other words, given a certain return, the corresponding risk is minimized.

1.1. Event probability

Suppose that there are two assets: stocks and bonds. To introduce volatility, assume that there are two states: good and bad. A good state happens with probability π while a bad state happens with probability $1-\pi$. A portfolio consists of a return parameter and risk parameter. The return parameter is a weighted average of the individual returns, while the risk parameter is a weighted average of individual risk parameters adjusted for the correlation between the assets.

Probability is a measure of the likelihood that an event will occur. It is always expressed as a number between 0 and 1. The closer π is to 0, the less likely that state good will occur. Notice that probability is also relative to some benchmark.

1.2.1. Expected Return

The expected returns of asset j is:

$$\mu^j = \pi R_{good}^j + (1 - \pi) R_{bad}^j$$

Exercise 1: Suppose that there is a probability of .6 of entering into a good state where the return on a stock is 20% and a probability of .4 of entering into a bad state where the return on stocks is -3%. Calculate the expected return on the stock.

Notice that the event probabilities, π , determine the expected returns. Event probabilities (or the risk of entering one state over another) can be classified into one of two groups: (1) idiosyncratic or unique risks and (2) systematic or economy-wide risks. Idiosyncratic risk comes in two types. In the first, one set of firms is affected in one way and others are affected in another way. Not all idiosyncratic risks are balanced by opposing risks to other firms or industries. Some risks are unique to a company or an industry and no one else.

1.2.2. Risk

Risk measures the volatility of an asset's return. This volatility can be thought of as the fluctuation around an expected return. The measure the riskiness used is the variance and the covariance of the returns.

The risk of asset j is

$$\sigma^j = \pi(R_{good}^j - \mu^j)^2 + (1 - \pi)(R_{bad}^j - \mu^j)^2$$

❖ Can the variances be negative?

Exercise 2: What is the associated risk of the stock given the probability and expected return from Exercise 1?

We also need the covariance between the two assets. This measures the diversification of the assets. If the covariance is positive and large, then the two assets' returns are positively correlated, while if the covariance is negative and large, then the two assets' returns are negatively correlated. When the covariance is close to 0, the assets' returns are not correlated.

The covariance between the two assets is:

$$\sigma^{sb} = \pi(R_{good}^s - \mu^s)(R_{good}^b - \mu^b) + (1 - \pi)(R_{bad}^s - \mu^s)(R_{bad}^b - \mu^b)$$

- ❖ Why is it important to have diverse assets?

Exercise 3: For bonds, suppose that the return is 5% in the good states while 10% in the bad state. Calculate the covariance between the two assets.

1.3. Constructing the portfolio's return and risk

We are now able to construct the portfolio of the two assets. This is done by using fixing weights of how much stocks and/or bonds are to be in the portfolio. Define the weight w^s as the fraction of the portfolio's assets in stocks, and a weight $1-w^s$ as the fraction of the portfolio's assets in bonds.

- When w^s increases, more stocks are held in the portfolio.
- When w^s decreases, more bonds are held in the portfolio.

We can now define the expected return on the portfolio as

$$\mu^P = w^s \mu^s + (1 - w^s) \mu^b$$

and the risk of the portfolio as

$$\sigma^P = \left[(w^s)^2 \sigma^s + (1 - w^s)^2 \sigma^b + 2w^s (1 - w^s) \sigma^{sb} \right]^{1/2}$$

1.4. Comparing portfolios

A portfolio is constructed for a certain amount of stocks and bonds consisting of a return and risk. A new portfolio can be constructed by varying the amount of stocks and bonds. This is done by varying the weight w^s and, subsequently, $1 - w^s$.

Exercise 4: Construct portfolios for $w^s = .3$ and $w^s = .7$

- ❖ Plot the risk and return parameters for each portfolio with risk on the horizontal axis and return on the vertical axis.

Notice that the upper half of the hyperbola is superior to the lower half. The hyperbola is sometimes referred to as the *Markowitz Bullet*, and is the efficient frontier if no risk-free asset is available.

- ❖ What is the minimum risk portfolio? What is the maximum return portfolio?
- ❖ What happens to the Markowitz Bullet if the return on bonds in the bad state is 4% instead of 10%?
- ❖ How is the most preferred bundle found?

1.5. Managing risk

There are several ways to manage risk when investing. The above example shows that diversification of investments may reduce idiosyncratic risk. There are two ways to diversify: (1) hedge risk, and (2) spread risk. Hedging is a strategy of reducing idiosyncratic risk by making two investments with opposing risks. When one does poorly, the other does well, and vice versa. Spreading risk is a strategy of holding investments with unrelated returns.

1.6 The risk-free asset and the capital allocation line

The efficient frontier will be moved when a third asset, the risk-free asset, is available and used in conjunction with the risky portfolio. The new efficient frontier is called the *capital allocation line* (CAL) and is the highest possible return at the lowest possible risk. It is found using

$$\mu^C = R^F + \underbrace{\sigma^C \left(\frac{\mu^P - R^F}{\sigma^P - \sigma^F} \right)}_{\text{Sharpe Ratio}}$$

where R^F is the risk-free rate of return. Note that σ^F is 0 since it is risk-free and has no variation in return. The *Sharpe Ratio* is also known as the reward-to-variability ratio because the expected return increases continually with the increase of risk. The new ‘complete’ portfolio’s risk is

$$\sigma^C = w^C \sigma^P$$

where w^C is the weight of the ‘risky’ portfolio. Combining these two equations and assumptions yields:

$$\mu^C = R^F + w^C (\mu^P - R^F) = w^C \mu^P + (1 - w^C) R^F$$

where $1 - w^C$ is the weight of the risk-free asset in the new ‘complete’ portfolio

Exercise 5: Suppose that the risk-free rate is 7% and the return on a portfolio is 15% with a risk of 22%. The weight on the risky portfolio is .75. Compute the expected return and risk on the new ‘complete’ portfolio and the Sharpe Ratio.

Exercise 6: Add in the capital allocation line on a Markowitz bullet.

The risk-free asset as a possible component of the portfolio improves the range of possible risk-return combinations. Furthermore, by shorting the risk-free asset (sell now with a promise to buy later), the range can be extended beyond 100% of assets held by the portfolio.

Notice now there is an optimal portfolio, the *tangency portfolio*. Once the tangency portfolio is identified, the *one mutual fund theorem* states that only the portfolio is needed, the tangency portfolio, and the risk-free asset does not have to be purchased.

Lastly, the *Sharpe Ratio* aids in understanding how leveraged a portfolio is to obtain a certain return. Notice that to get a return beyond the tangency portfolio, leveraging is required. The rule of thumb to decide whether to invest in a fund is if its' *Sharpe Ratio* is bigger than your preferred stock's Sharpe Ratio, then the portfolio is desirable.

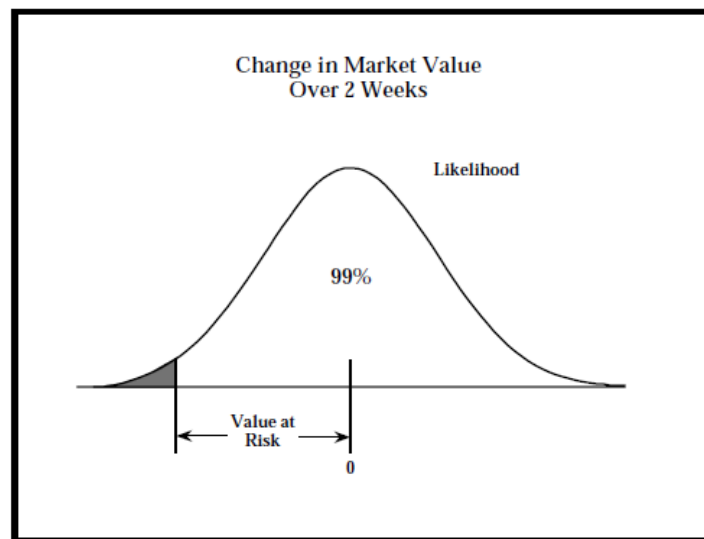
1.7 Criticism of portfolio theory

- Portfolio theory assumes asset returns are (jointly) normally distributed random variables. In fact, it is frequently observed that returns on equity and other markets are not normally distributed. Large swings of 3 to 6 standard deviations from the mean (*black swan* or rate events) occur in the market far more frequently than the normal distribution assumption would predict.
- Correlations between assets are fixed and constant forever. During times of financial crisis all assets tend to become positively correlated, because they all move (down) together. In other words, MPT breaks down precisely when investors are most in need of protection from risk.
- All investors are rational and risk-averse. It does not allow for herd behavior or investors who will accept lower returns for higher risk. Casino gamblers clearly pay for risk, and it is possible that some stock traders will pay for risk as well.
- Investors have an accurate conception of possible returns, i.e., the probability beliefs of investors match the true distribution of returns. Another possibility is that investors' expectations are biased, causing market prices to be informationally inefficient.
- There are no transaction costs.
- All investors are price takers, i.e., their actions do not influence prices. In reality, sufficiently large sales or purchases of individual assets can shift market prices for that asset and others (via cross-elasticity of demand.)
- All securities can be divided into parcels of any size. In reality, fractional shares usually cannot be bought or sold, and some assets have minimum orders.

1.8 Value at Risk (VaR)

In 1987, Value at Risk (VaR) measure was instituted across U.S. financial institutions as a tool to measure risk of loss on a specific portfolio. VaRs attempt to calculate the predictive probability distribution for the size of a future financial loss. For example, if a portfolio of stocks has a one day 5% VaR of \$1 million, then a loss of \$1 million or more is expected on 1 day in 20. The probability is calculated during normal markets and excludes abnormal market events such as Sept 12, 2001 (stock market was closed) and the severe illiquidity in 2008. Such events are excluded due to mathematical impossibility of measuring the tails of the return distributions (lack of data in the tails).

The figure below visualizes the Value at Risk measure of probability for a two-week change in market value for a one-day 1% loss in asset value in the amount of the *Value at Risk*.



To calculate a VaR, the variance of the asset's (or portfolio's) return over the time horizon is calculated along with the corresponding probability of loss associated with that return.

$$VaR_p = -z_p * \sigma^{1/2} * v$$

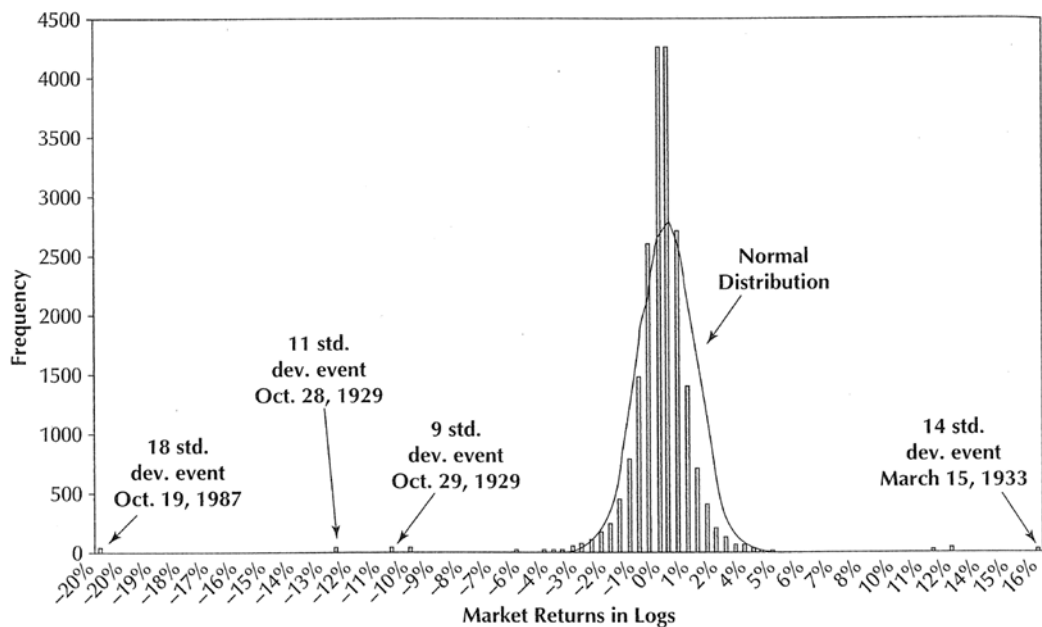
where z_p is the probability of a loss measured as the inverse cumulative distribution function (commonly known in statistics as the z value or distance from mean as measured in standard deviations) for a particular probability p and v is the total value of the assets. Calculating σ is straightforward, while calculating z_p is quite complex and requires positing a distribution.

Exercise 7: Calculate the maximum daily loss under normal markets with 99% confidence ($VaR_{1\%}$) on the S&P 500 index of \$1,000,000 if the daily return is 0, the standard deviation over the interval is 1, and the $z_{.01}$ is -2.326.

1.8.1 Calculating the probability of loss

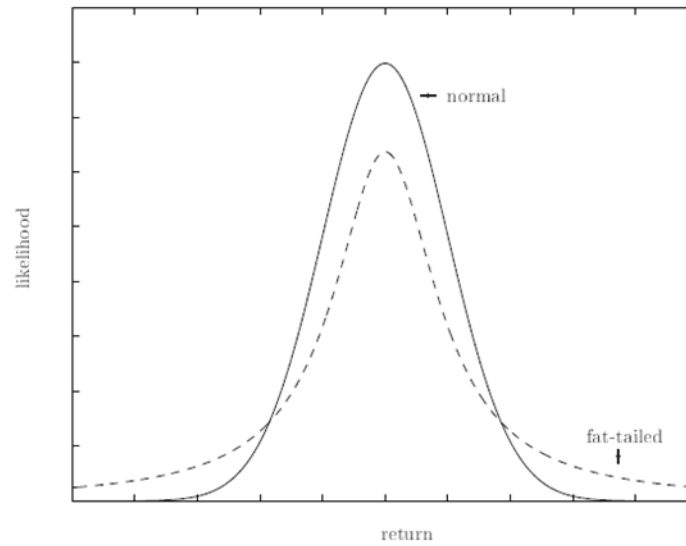
VaRs have come under heavy criticism as the measure seems to only account for idiosyncratic risk of the portfolio and the not systematic risk of financial markets. Furthermore, given that the large deviations in returns is not properly accounted for due to the inability to measure the tails correctly, most suggest that the VaR measure understates financial risk. The consequence is that financial institute decision makers take on more risk than they assumed. David Einhorn compared VaRs to "...an airbag that works all the time, except when you have a car accident."

To understand why a VaR model understates risk, consider the Normal (Bell shaped) distribution and a fat-tailed distributions (such as the Cauchy) displayed below, with the return on the portfolio on the horizontal axis (measured in standard deviations) and the probability of such return on the vertical axis. Many financial models assume the Normal distribution (such as Black-Scholes option pricing model) that posits events that deviate from the mean by 5- or more standard deviations (5-sigma events) as extremely rare, and 10- or more being practically impossible. Recall that with a normal distribution, 99.7% of observations falls within three standard deviations of the mean. Black-Monday (the market crash of October, 1987) had a return approximately 20-25 std. dev. from the mean return. Below is the daily S&P 500 returns from 1928 through April 2006.



Source: Exhibit 4 in Jeremy Grantham, "Risk Management in Investing (Part Two): Risk and the Passage of Time," Letters to the Investment Committee VII (April 2006). © 2006 GMO LLC.

The Cauchy distribution accommodates real-world events, but the variance does not exist (infinite sigma).



More recently, a measure of systemic financial risk has been constructed, the CoVaR systemic risk measure. This measure focuses on each institution's contribution to overall system risk.

2.0. Firm's capital structure

The capital structure is the ratio of stocks to bonds that a company holds. The main question firms ask is whether their capital structure should include more stocks or more bonds. When answering this question, firms must weigh the benefits and costs of issuing stocks relative to issuing bonds (and vice versa).

- ❖ Why does the capital structure matter?

2.1. Need for investment banks

- ❖ Why do we need investment banks?

- ❖ What are the biggest criticisms of investment banks?

Lecture 8: The Money Supply Process

This lecture discusses:

4. Multiple Deposit Creation
5. Determinants of the Money Supply

1. Money supply process

We will now turn our attention to how a central bank adjusts the supply of money or what determines the money supply.

The three players in the money supply process are:

To understand how the Fed changes the monetary base when the Fed uses one of its tools, we will look at the balance sheets of the three players. We have already reviewed bank's balance sheet.

1.1. The Fed's balance sheet

Federal Reserve System	
Assets	Liabilities

Liabilities

- ❖ Why are these liabilities costless?

Reserves are assets for the banks, but liabilities for the Fed. This is because the bank can demand payment on them at any time, and the Fed is required to satisfy its obligations by paying notes.

Reserves can be divided into two categories:

1. Required Reserves (RR):
2. Excess Reserves (ER):

1.1.1. Non-banking public's balance sheet

Non-banking Public	
Assets	Liabilities

- Notice that securities are under the asset column for the non-banking public. Technically, securities could be a liability.

1.2. The monetary base and the money supply

Prior to defining the money supply, we first define the monetary base. For many non-economists, the monetary base is the money supply. In reality, the monetary base is equal to the currency in circulation and total reserves in the banking system. Equivalently,

where MB is the monetary base (or high-powered money), C is currency in circulation, and R is total reserves.

The money supply is the cash in circulation plus total deposits:

where M is the money supply and D is total deposits.

- Bank deposits, not cash, account for the vast majority of the money supply.
- This is the case even though cash deposits and cash reserves are the foundation of the banking system.
- The reason why the volume of bank deposits is so much larger than the total amount of cash is that banks practice fractional reserve banking: when cash is deposited into a bank, the bank keeps only a small fraction of that cash as reserves and loans the rest of it out, with interest.

The difference between the monetary base and the money supply is equivalently stated as the difference between bank deposits and bank reserves.

1.2.1. Controlling the monetary base and the money supply

The central bank exercises control through its purchase or sale of government securities in the open market, called open market operations, and through its extension of discount loans to banks.

We explore how the central bank controls the money supply through a series of simple exercises.

Exercise 1: Open market purchase from a bank

Suppose the Federal Reserve performs an open market purchase of a security from a bank.

- The Fed purchases \$100 of bonds from a bank and pays for them with a \$100 check.
- The bank either deposits the check into its Fed account or cashes it into currency, counted as vault cash.

❖ What is the effect on the balance sheets for the Fed and the bank?

Banking System	
Assets	Liabilities
Securities	
Reserves	

Federal Reserve System	
Assets	Liabilities
Securities	Reserves

❖ **Conclusion**

Exercise 2: Open market purchase from an individual

Suppose the Federal Reserve performs an open market purchase of a security from an individual.

- The Fed purchases \$100 of bonds from an individual and pays for them with a \$100 check.
- The individual can do two things: deposit the check into a bank or cash it.

❖ What is the effect on the balance sheet for the Fed, the individual, and the bank for the two options, respectively?

If the individual decides to deposit the check:

Banking System	
Assets	Liabilities
Reserves	Deposits

Federal Reserve System	
Assets	Liabilities
Securities	Reserves

❖ **Conclusion**

If the individual decides to cash the check:

Nonbank Public	
Assets	Liabilities
Securities	
Currency	

Federal Reserve System	
Assets	Liabilities
Securities	Currency in circulation

❖ **Conclusion**

❖ What happens to the monetary base in both instances?

1.2.2. Conclusions from exercises 1 and 2

Exercise 3: Discount loan

The Fed makes discount loans, which also can affect reserves. Suppose the Fed make a \$100 discount loan to a bank.

❖ What is the effect on the balance sheets for the Fed and the bank?

Banking System	
Assets	Liabilities
Reserves	Discount loan

Federal Reserve System	
Assets	Liabilities
Discount Loan	Reserves

❖ What is the effect on the monetary base?

Exercise 4: Shift from deposits into currency

Reserves can change due to forces outside of the Fed's control. Suppose an individual withdraws \$100 from their bank account. While this does not change the MB, reserves do change.

- ❖ What is the effect on the balance sheets for the Fed, the individual, and the bank when an individual withdraws money from the bank?

Nonbank Public	
Assets	Liabilities
Checking Deposits	
Currency	

Banking System	
Assets	Liabilities
Reserves	Checking Deposits

Federal Reserve System	
Assets	Liabilities
	Currency in circulation
	Reserves

- ❖ What is the effect on the monetary base?

1.3. Fractional reserve banking

The effect of monetary policy is magnified by the fractional reserve banking system - a fraction of each deposit is held by the bank to cover withdrawal liabilities while the remaining is loaned out. The two key assumptions in this money creation process is:

1. Banks loan out some fraction of the deposit received.
2. Some of the money loaned out gets redeposited into the banking system.

Fractional reserve banking causes a multiplier effect on the money supply.

Exercise 5: Suppose the Fed buys \$100 in securities from First National Bank. The Fed pays for the securities by crediting First National's with \$100 in cash. The Fed has a required reserve ratio of 10%. This bank holds no excess reserves. Firms that receive funds from selling assets to those who obtained funds through loans deposit all proceeds into banks that are identical to First National Bank.

- ❖ What is the ultimate change in the money supply after the entire chain of deposit creation has run its course?

Let's first start with the initial change in the Fed's and First National's balance sheet is

First National Bank		Federal Reserve System	
Assets	Liabilities	Assets	Liabilities
Securities		Securities	Reserves
Reserves			

The bank can now loan out of \$100 since there is no required reserve and no liability from the transaction.

First National Bank loans money to an individual and this individual puts the money into his checking account. This money is available for purchase of goods. The individual purchases goods.

Suppose the proceeds from the individual's purchase are deposited into another bank, say Bank A.

- ❖ What is the cumulative change in the banking system's balance sheet from both transactions?

Banking System	
Assets	Liabilities
Securities	Checking Deposits
Required Reserves	
Currency	
Loans	

This process continues with the bank receiving the funds from deposits, holding the required reserve, and loaning out the remaining deposit balance.

- ❖ How much are the next two cycles of loans and required reserves?

- ❖ What happens to the banking system’s balance sheet after these three cycles?

Banking System	
Assets	Liabilities
Securities	Checking Deposits
Required Reserves	
Cash	
Loans	

- ❖ Construct an equation that will sum up the total amount of loans and checking deposits.

Following this cycle, the money continues to circulate and grow deposits. This process unfolds as follows:

Process	Securities	Loans	Deposits	Reserves		Currency Balance
Asset transformation	-\$100	\$0	\$0	\$0		\$100
First cycle	\$0.00	\$100.00	\$100.00	\$10.00		\$90.00
Second cycle	\$0.00	\$90.00	\$90.00	\$9.00		\$81.00
Third cycle	\$0.00	\$81.00	\$81.00	\$8.10		\$72.90
Fourth cycle	\$0.00	\$72.90	\$72.90	\$7.29		\$65.61
Fifth cycle	\$0.00	\$65.61	\$65.61	\$6.56		\$59.10
Sixth cycle	\$0.00	\$59.05	\$59.10	\$5.91		\$53.91
.		.	.	.		
.		.	.	.		
.		.	.	.		
After many cycles	-\$100	\$1,000	\$1,000	\$100		\$0

The \$1,000 increase in checking deposits all came about as the result of an initial increase in bank reserves of \$100 from selling a security. Thus, the total amount of deposits has expanded by a multiple of ten of the original change in reserves.

Exercise 6: Construct the balance sheet for the banking system after all loans have been originated.

Banking System	
Assets	Liabilities
Securities	Checking Deposits
Required Reserves	
Currency	
Loans	

1. The change in the monetary base ($MB = C + R$) is _____
2. The change in the money supply ($M = C + D$) is _____

1.3.1. Multiple deposit destruction

Multiple deposit destruction is when the Fed pulls money out of the economy. Suppose instead of buying a security, the government sells a security. This pulls money out of the economy or equivalently, it destroys some bank reserves. This reduces total bank deposits, and, consequently, the money supply by a multiple of the amount.

- When the Fed decreases the level of bank reserves by selling a bond to a bank and collecting payment by debiting the bank's reserve account, the banking system will have negative excess reserves, or a reserve deficiency. Any bank with a reserve deficiency will call in loans for repayment.
- Their creditors will repay the loans by drawing down their checking accounts.
- The volume of loans and the volume of checking deposits will shrink at the same time.

1.4. The real world money multiplier

The increase in deposits generated from an increase in the MB is called the money multiplier. In the previous section, we derived that the money multiplier was simply $1/rrr$ so that we could easily understand the effect of the money multiplier on the money supply. This simplistic view of the multiplier solely being a function of the required reserve ratio is not sufficient as the above section alludes.

- To the extent that banks hold onto some of their excess reserves, those reserves do not get loaned out and do not get redeposited into the banking system; thus excess reserves do not increase the money supply at all. The ratio of excess reserves to checking deposits or ER/D above zero will cause the money multiplier to be less than $1/rrr$.
- When currency loaned out is held as cash instead of being redeposited into bank accounts, those holdings of currency are still counted as part of the money supply. However, they do not generate multiple expansions of deposits.

With information on banks' actual holdings of excess reserves and the fraction of loan amounts that people hold as currency, we can get a much more realistic estimate of the money multiplier. This realistic estimate is called the real-world money multiplier.

1.4.1. Deriving the real-world money multiplier

Deriving the real-world money multiplier, m , requires combining the monetary base and money supply equations with a little mathematical manipulation. Rearranging the above equation,

(1)

which we can calculate if we know M and MB .

For M , we use

(2)

For MB , we use

Reserves can be broken into

where RR is the required reserves and ER is excess reserves.

Note that required reserves are $RR = D*rrr$.

Thus, we get that the monetary base is:

(3)

Using (2) and (3) in (1) yields

(4)

Divide the top and the bottom of (4) by I/D yields:

(5)

To find m , all that is required are the values of the C/D and ER/D ratios as r is already known and set by the central bank (typically .1, or 10%). Alternatively, we could compute m with values for C , D , and ER . (The ratios are somewhat more stable than the absolute numbers of C , D , and ER , however.). Using the above money multiplier, we can link the money supply to the monetary base using:

$$\Delta M = \Delta C + \Delta D$$

$$\Delta D = m * \Delta R$$

Exercise 7: Compute the money multiplier using the following information:

- C : currency held by the public = \$400 billion
- D : checking deposits = \$800 billion
- ER : excess reserves = \$0.8 billion
- MI : narrowest measure of money supply = $C + D = \$1200$ billion
- rrr : 10% of total deposits.

1.4.2. Effects on m

The money multiplier is important because the Fed needs to keep the money supply in balance with money demand -- which fluctuates a lot -- in order to keep interest rates stable. The Fed cannot control the money supply effectively unless it knows what the money multiplier (m) is.

- The Fed's control of the money supply (MI) is indirect, because the Fed directly controls only the monetary base, whereas the money supply is equal to the monetary base times the money multiplier:
- If and when m changes, the Fed needs to make offsetting changes in the monetary base in order to keep the money supply stable.

Let's look at all the players who jointly determine the size of the money supply.

Recall that $MS = MB * m$.

Player	Variable	Causes	Response to M
The Fed	$\uparrow rrr$	$\downarrow m$	$\downarrow M$
	$\uparrow R$	$\uparrow MB$	$\uparrow M$
	$\uparrow i_D$	$\downarrow MB$	$\downarrow M$
Banks	$\uparrow ER/D$	$\downarrow m$	$\downarrow M$
Depositors	$\uparrow C/D$	$\downarrow m$	$\downarrow M$

Exercise 8. Suppose $rrr = .10$, $c = 0$, and $e = 0$, and bank reserves increase by \$100.

1. What is the simple deposit multiplier?
2. What is the total change in deposits and the money supply?

Exercise 9. Assume $rrr = .1$, and $c = 0$, and $e = 0$. What is the effect on the money supply if:

1. A bank sells an asset (such as a government security) and loans the money out?
2. An individual takes \$100 in currency and deposits it into the bank.

1.4.3. The business cycle effect on m

- m is procyclical (rises in expansions and falls in recessions).
- ❖ Why is m procyclical?

m is also affected by changes in interest rates. There are two reasons why m is affected by interest rates:

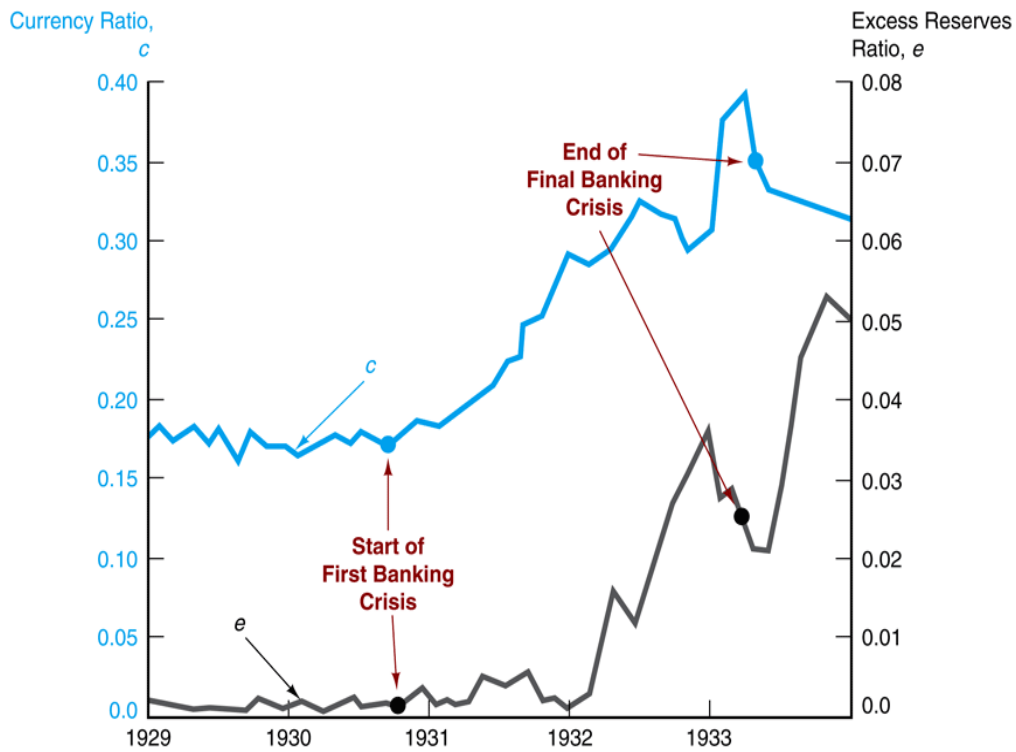
- Higher interest rates will induce banks to loan out more of their excess reserves, causing ER/D to decrease, which causes m to become larger.
- higher interest rates will induce people to carry less cash (C) and keep more in interest-earning checking account deposits (D), so C/D will decrease, too, causing m to become larger.

Since both of those changes make m larger, then they'll also cause the money supply to become larger. So, when we draw the money market as a supply and demand diagram (where Q_m is the quantity of money and the nominal interest rate, i , is the price of money), the supply-of-money curve should be upward-sloping, not vertical.

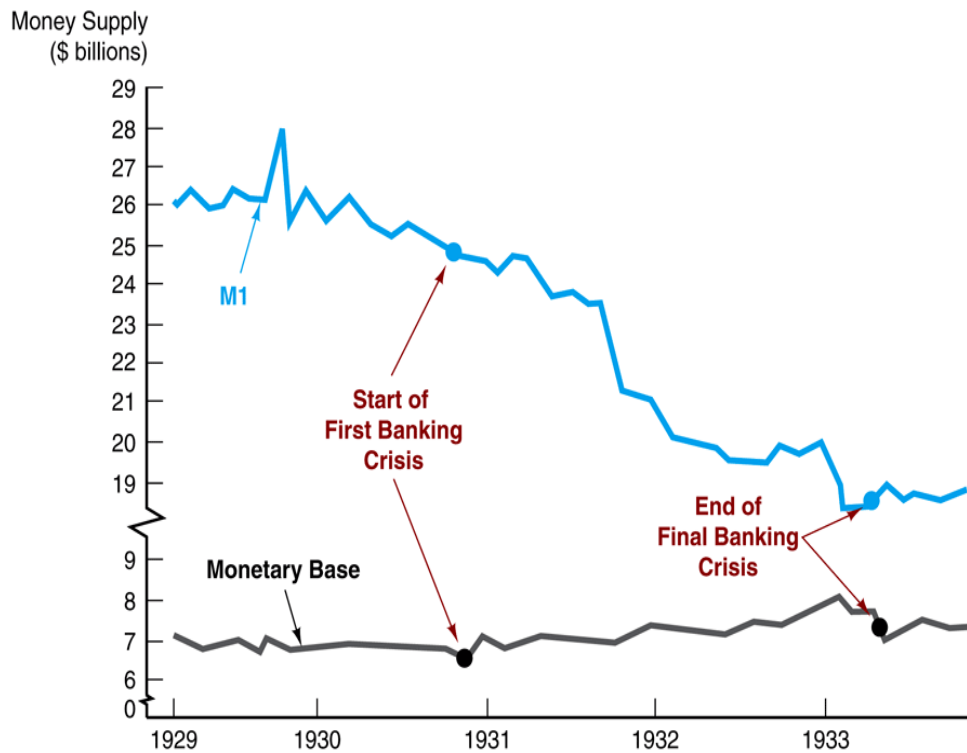
2.0. The great depression and the great recession

C/D and ER/D tend to increase during major recessions and depressions, because the public may view banks as unsafe and banks are more likely to be pessimistic about borrowers' creditworthiness. During the Great Contraction of 1929-33, both of those ratios skyrocketed, and the money supply fell by about 25%, the most it has ever fallen.

The drop was due to increases in those ratios causing the money multiplier to slow down. A related reason was the huge number of bank failures caused in large part by the many runs on the bank by depositors who were trying to convert their deposits into cash. Those bank failures, directly and severely, reduced the level of bank deposits, a key component of $M1$.

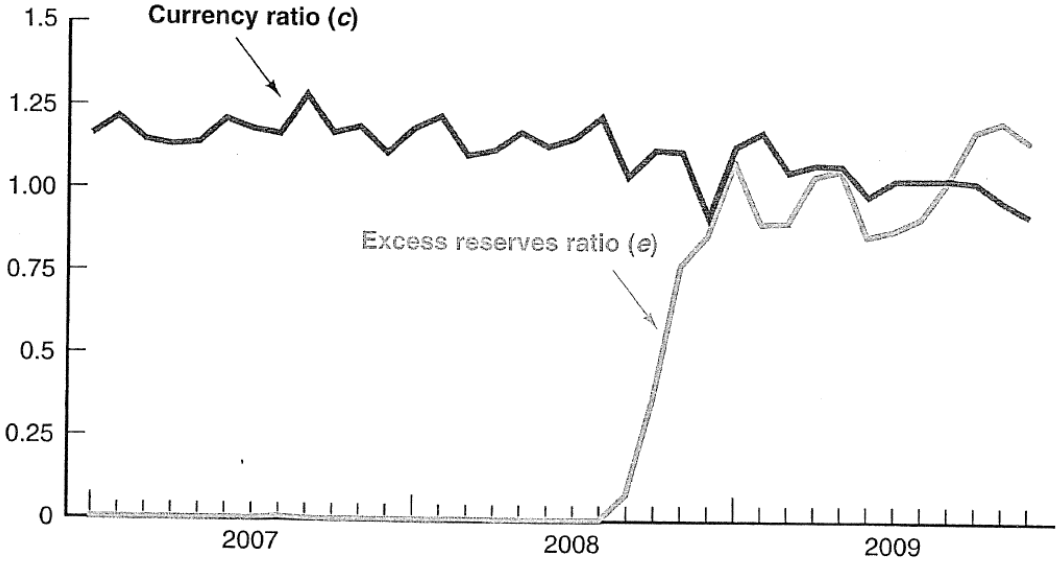


Sources: Federal Reserve Bulletin; Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton, NJ: Princeton University Press, 1963), p. 333.

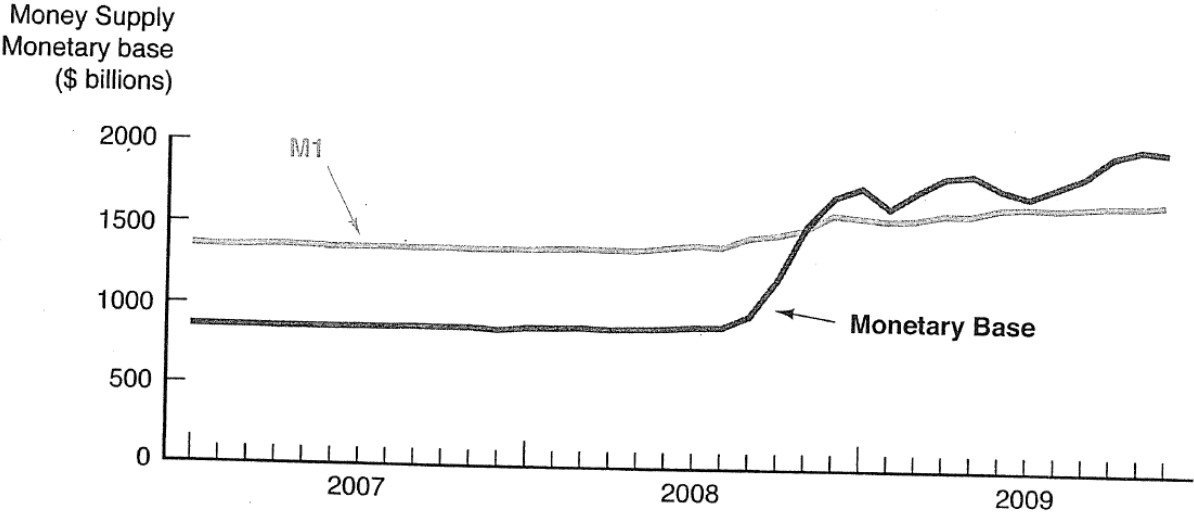


Source: Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton, NJ: Princeton University Press, 1963), p. 333.

In contrast, the Great Recession wasn't nearly as bad as the Great Depression. There was some contraction in c leading to a slight rise in the money multiplier. However, this contraction was offset by a 500 folder increase in e . This causes the money multiplier to fall rapidly and would have led to a substantial decline in the money supply had the Fed not intervened through a doubling of the monetary base.



Source: Federal Reserve



Source: Federal Reserve

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Lecture 9: The Quantity Theories of Money

This lecture discusses:

1. Fisher's Quantity Theory of Money
2. Keynes' Liquidity Preference Theory
3. Friedman's Quantity Theory of Money
4. Differences in Keynes and Friedman
5. The Economics of a POW camp

1. The demand for money

We have talked a little about why individuals hold money:

- Medium of Exchange – money being the most liquid
- Store of value
- Unit of Account

However, we have yet to discuss a formal theory of why people hold money. The theories of money demand have evolved over the years. Most theories are dependent upon the time frame and condition of the economy when written. All theories build on Irving Fisher's classic book *The Purchasing Power of Money*.

1.1. Fisher's quantity theory of money

Fisher desired to understand how money is linked to prices and output. That is, he desired to answer:

1. How much money do people need?
 2. What affects how much money they want?
- ❖ How do higher prices affect the demand for money?

- ❖ If output increases, how does this affect the demand for money?

Fisher linked the quantity of money in circulation (M) to the total amount of spending on final goods and services produced in the economy (PY), where P is the price level and Y is aggregate output. He defined the link between M and PY that balances out the identity: the velocity of money, V .

- Velocity is the average number of times per year that a dollar is spent buying the total amount of goods in the economy.

The equation of exchange he wrote is

- The quantity of money multiplied by the number of times that this money is spent in a given year is equal to nominal income.
- This is an identity – a relationship that is true by definition and not a theory.
- ❖ What happens when M increases?

To come up with a theory, assumptions are made regarding certain aspects of the identity. Fisher reasoned that velocity, V , is determined by institutions in an economy that affect the way individuals conduct transactions.

Exercise 1: Charge accounts reduce the flow of money to monthly payments. How does this affect velocity? Think $MV = PY$.

Exercise 2: Everyone pays with cash. More money is used. How does this affect velocity?

Fisher assumed institutions and technology were constant in the short-run; thereby, velocity was constant as well. Fisher also reasoned that in the short-run, aggregate output was fairly constant as well. Based on his assumptions:

- Only changes in the quantity of money cause movements in price.
- Demand for money is determined by:
 - Level of nominal income, PY .
 - Institutions in the economy that affect the way people conduct transactions.

This can also be expressed in growth rates:

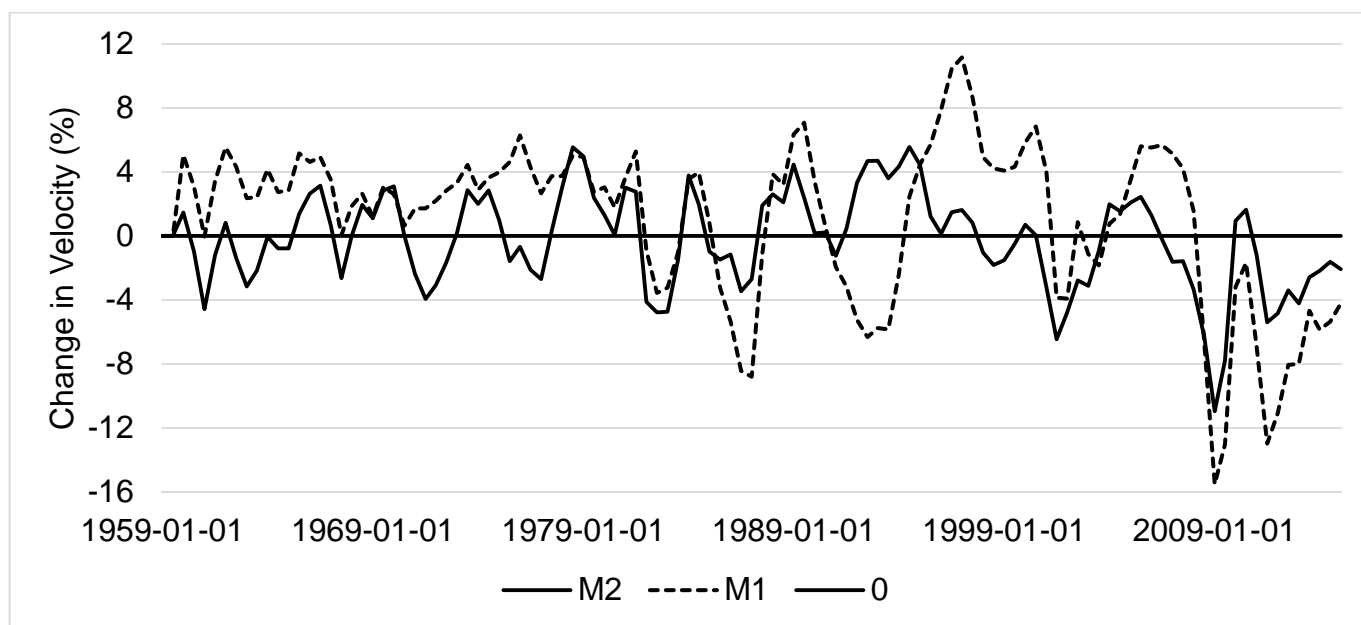
$$\% \Delta M + \underbrace{\% \Delta V}_{=0} = \underbrace{\% \Delta P}_{=\pi} + \% \Delta Y$$

or

$$\% \Delta M = \pi + \% \Delta Y$$

If the change in aggregate output is small, any change in the quantity of money only causes high prices (inflation). This is sometimes referred to as *monetary neutrality*.

❖ What are the biggest problems with this theory?



Sources: *Economic Report of the President; Banking and Monetary Statistics*
www.federalreserve.gov/releases/h6/hist/h6hist1.txt.

1.2. Keynes' liquidity preference theory

Keynes provided a theory of the demand for money based on the importance of interest rates.

- He gave 3 reasons why people hold money.

(1) and (2) were already known while (3) was new.

Real money demand is negatively related to the level of interest rates according to:

- Since M_D and i are inversely related, M_D is downward sloping.
- If interest rates increase, individuals desire to hold less money and more bonds (assets which pay interest!).
- If output rises, individuals desire more money.

❖ Solve for velocity.

❖ How does velocity change?

❖ Why does velocity change before recessions?

1.2.1. Comparison of Fisher vs. Keynes

Fisher

- Changes in the quantity of money only affect prices, not output.
- Velocity is constant.

Keynes

- Velocity is not constant.
- Nominal income is not determined by movements in the quantity of money.
- Interest rates can affect how much money individuals hold.

1.2.2. The serious implications of Keynesian economics

- ❖ If interest rates can be lowered by increasing M , then why not simply increase the money supply when interest rates creep up?

- There are three effects that potentially could make interest rates rise with an increase in the money supply.

- ❖ Are 2 and 3 the same?

❖ How quickly do these effects take to change interest rates?

❖ Which one of the effects will dominate?

• There are three possible scenarios:

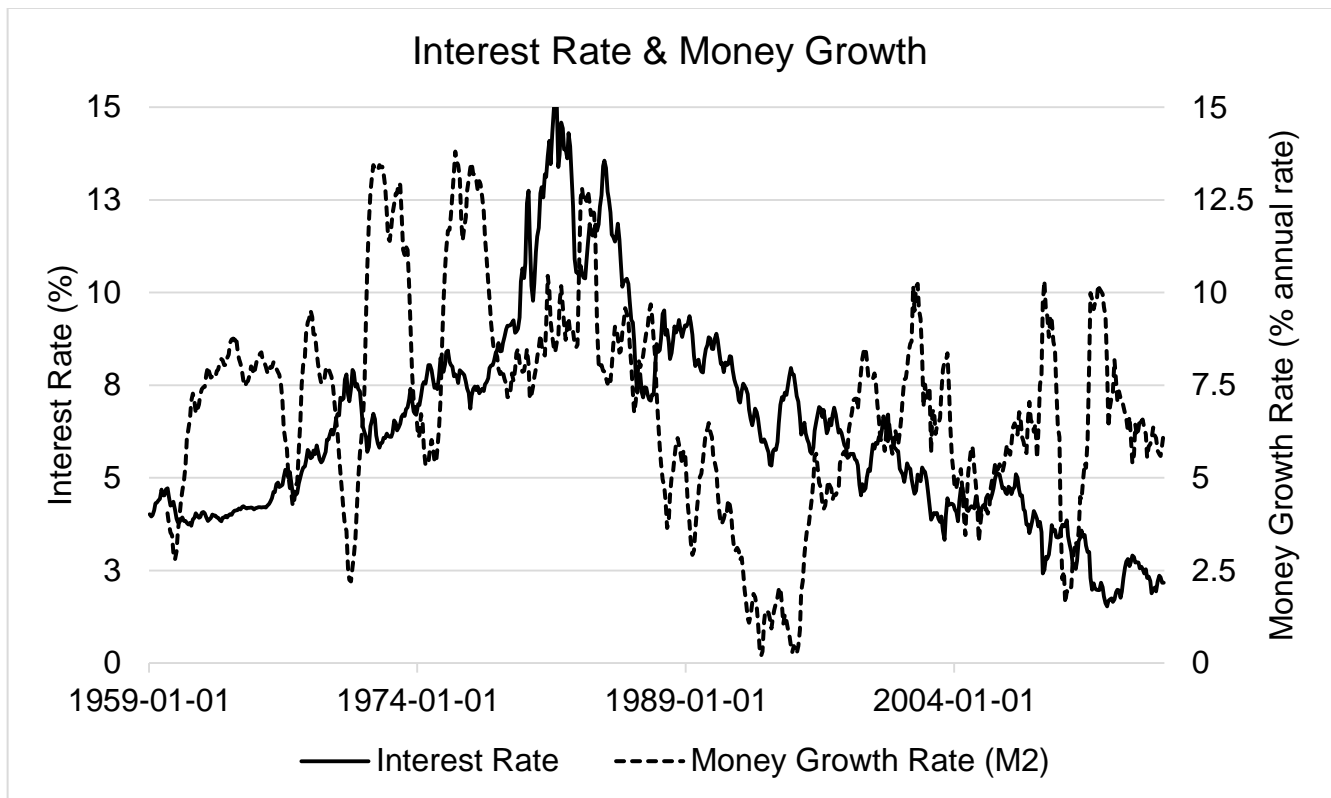
1.

2.

3.

1.2.3. The evidence

- ❖ Does a higher rate of growth in the money supply lower interest rates?



Sources: Federal Reserve: www.federalreserve.gov/releases/h6/hist/h6hist1.txt.

- ❖ What does the evidence tell us?

1.3. Friedman's quantity theory of money

Friedman dismissed Keynes' theory and went back to Fisher's classical theory. Friedman reasoned that the demand for money must be influenced by the same factors that influence the demand for any asset.

❖ He stated his theory as follows:

where

Y^p = permanent income

r^m = long-run return on money (also known as inflation, π)

r^b = long-run return on bonds

r^s = long-run return on stocks

$E[\pi]$ = expected inflation

The main results of Friedman's theory are

1.3.1. Keynes vs. Friedman

Keynes viewed the stock market like a casino: guess right and win, guess wrong and lose.

- This caused him to lump all assets into one pot. Thus, individuals decide how much wealth to hold in money and how much to hold in non-money assets.

Keynes: Quantity of money is linked to aggregate output through interest rates. If the economy slows down, government intervention is required.

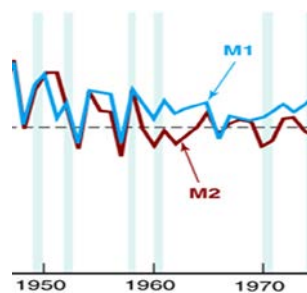
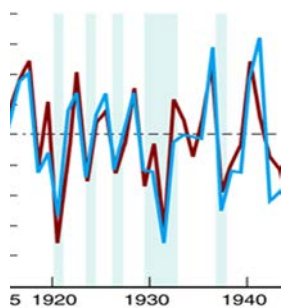
Friedman: Mentioned many assets affect the demand for money but said they are all unimportant.

- This helped him lead to stable velocity where Keynes said it was not stable at all.

Stable velocity was extremely important to Friedman for his Monetary Doctrine:

- If the quantity of money is only linked to output, then a steady increase in money supply of 2-3% (similar to output growth) is all that is needed. Government intervention (government spending) is unnecessary and harmful.
 - Money is the primary determinant of aggregate spending.
- This led to the 1979-1982 monetarist experiment.

Both Keynes and Friedman had data on velocity.

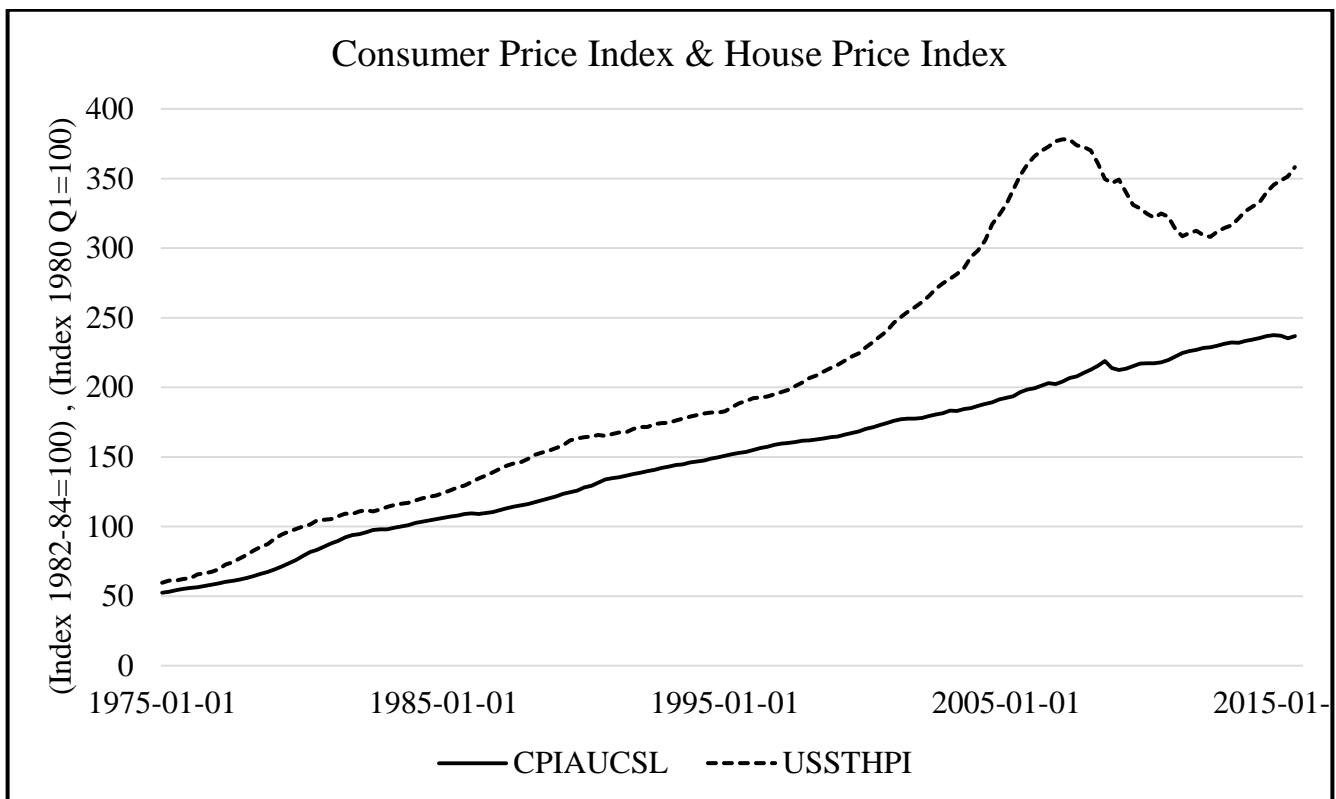


- Keynes' data indicated that velocity was not constant
 - Friedman's data indicated that velocity was constant.
- ❖ How does data affect theory?

1.4. Asset valuation

Friedman's theory rests on the premise that money is simply one of many assets, and money is subject to valuation just like any other asset. Asset theory rests on rational individuals (no herd mentality, no bubbles, and no irrational exuberance). The asset price is equal to discounted future dividends, and portfolio choices are all made rationally. Individuals that believe this are called freshwater economists (think Midwest: Chicago and Minnesota have lots of freshwater).

- This has come under attack since we have had a housing bubble, which under rational agents, should not have happened. As the monetarist put it: individuals study this decision and make an informed, rational decision.
- Saltwater economists on the other side (think coastal schools) exclaim this is ketchup economics: 1 quart of ketchup selling for half the price of 2 quarts of ketchup does not indicate that ketchup is valued correctly. If the market for ketchup is irrational, then both ketchups are incorrectly priced.



- ❖ How does this relate to the quantity of money? It goes back to Keynes vs. Friedman!
- Economist got a big ego by believing that they could control the economy with the money supply. Since economists are in charge of the money supply, this was a grand theory to make economists extremely important.
- The macroeconomic profession took a big hit when the Fed reached the lower bound on interest rates (Federal funds rate of 0) and the economy did not recover. In fact, we have had the largest injection of government spending since WWII, and we still are not done spending. Keynesians believe that since individuals won't spend, the government must do it for them.
- Greenspan continues to express that he does not understand how the housing market had a bubble and how hitting the lower bound still did not make a difference in this economic downturn.
- ❖ Which demand for money theory allows the velocity of money to fluctuate more, the theory of Keynes or Friedman?

- ❖ Which theory is more correct?

1.5. Economics of a P.O.W. camp

- ❖ What conditions allowed the effects of individuals' behavior to be identified?

- ❖ Why were cigarettes introduced?

Lecture 10: Monetary Tools and Policies

This lecture discusses:

1. Tools of the central bank
 - i. Open market operations
 - ii. Discount policy
 - iii. Reserve (and capital) requirements
2. Monetary targets and goals
 - i. Monetary aggregate targets
 - ii. Interest rate targets
3. Taylor rule
4. Asset bubbles and monetary policy



2. Tools of the Fed

Recall that there are three primary monetary policies that central banks use to adjust the monetary base:

1. Open Market Operations
 - Affect the quantity of reserves and the monetary base
2. Changes in Borrowed Reserves (Discount loans)
 - Affect the monetary base
3. Changes in Reserve Requirements (*rrr*)
 - Affect the money multiplier
 - More recently, capital requirements have superseded the reserve requirement ratio.

In the last lecture we saw how open market operations and discount lending (changes in borrowed reserves) affect the balance sheet of the Fed and the amount of reserves. Given that the market for reserves is where the Federal Funds rate is determined, we turn to a supply and demand model of this market to analyze how all three Fed tools of monetary policy affect the federal funds rate.

1.1. Federal funds rate

The Federal Reserve focuses on the federal funds rate as the primary instrument.

Federal funds rate is the interest rate on overnight loans of reserves from one bank to another.

We begin with a supply and demand analysis of the market for reserves to explain how the Fed's setting of the three tools of monetary policy determine the federal funds rate.

1.1.1. The demand curve for reserves

To understand how the demand curve works, one must answer:

- What happens to the quantity of reserves demanded by banks as the federal funds rate changes, holding everything else constant?

As discussed earlier, there are two components of reserves:

Required reserves = rrr *total deposits.

Excess reserves = desired quantity by banks.

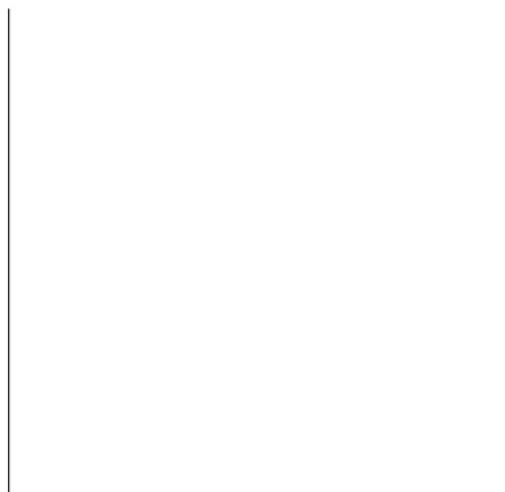
Therefore, the quantity of reserves demanded by banks equals the required reserves plus the quantity of excess reserves demanded.

- Excess reserves act as insurance against deposit outflows (withdrawals), and the cost of holding these excess reserves is their opportunity cost.
- The cost of holding these is the interest rate that could have been earned by lending these reserves out minus the interest rate that is paid on these reserves, i_{er} .

The Fed pays interest on reserves at a level that is set at a fixed amount below the federal funds rate target.

- When the federal funds rate is above the rate paid on excess reserves, i_{er} , as the federal funds rate decreases, the opportunity cost of holding excess reserves falls and the quantity of reserves demanded rises.

The downward sloping demand curve becomes flat (infinitely elastic) at i_{er} .



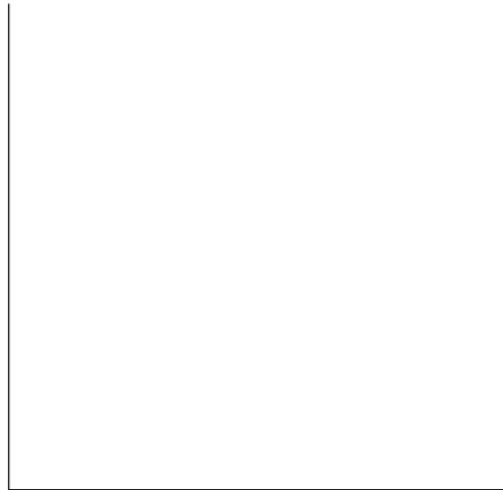
1.1.2. The supply curve for reserves

The supply can be broken up into two components:

1. Non-borrowed reserves (NBR): the amount of reserves that are supplied by the Fed's open market operations.
2. Borrowed reserves (BR): the amount of reserves borrowed from the Fed (discount loans).

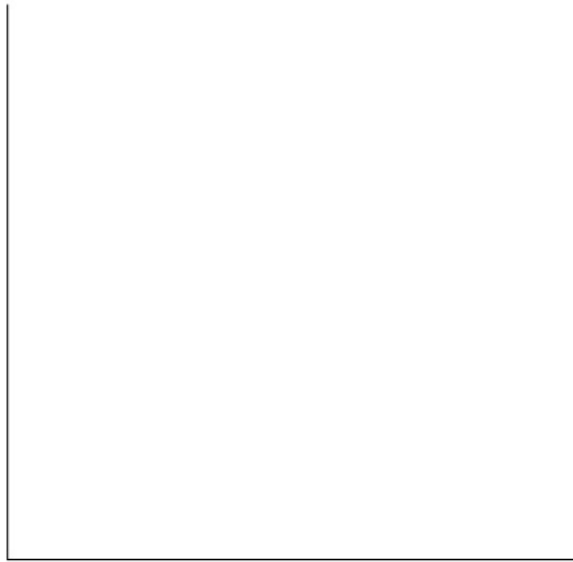
The cost of borrowing from the Fed is the discount rate (i_d). Borrowing from the Fed is a substitute for borrowing from other banks.

- If $i^{ff} < i^d$, then banks will not borrow from the Fed and borrowed reserves are zero.
 - The supply curve is vertical and equal to NBR .
- If $i^{ff} > i^d$, then banks will borrow from the Fed at i_d , and re-lend at i^{ff} in the Federal funds market.
 - The supply curve is horizontal (perfectly elastic) at i_d .



1.1.3. Equilibrium in the market for reserves

Market equilibrium occurs where the quantity of reserves demanded equals the quantity supplied. Where should i_d be in relation to i_{ff}^* ?



We can now explore how changes in the three tools of monetary policy affect the market for reserves and the equilibrium federal funds rate.

1.2. Open market operations

The effect of open market operation depends on whether the supply curve initially intersects the demand curve in its:

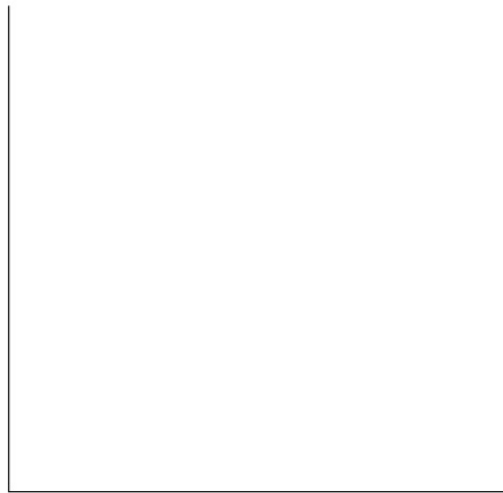
- downward sloped section. or
- flat section.

Recall that an open market purchase causes banks' reserves to increase (since they sell a bond).

- Thus, non-borrowed reserves increase and the supply shifts right.

1.2.1 Supply curve intersects the demand curve in its downward sloping section

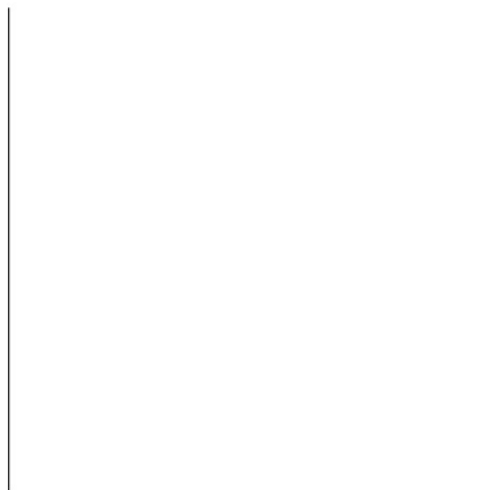
Suppose that the supply curve initially intersects the demand curve in its downward sloped section.



Conclusion:

1.2.2. Supply curve initially intersects the demand curve at the flat section (zero lower bound)

Suppose that the supply curve initially intersects the demand curve at the flat section



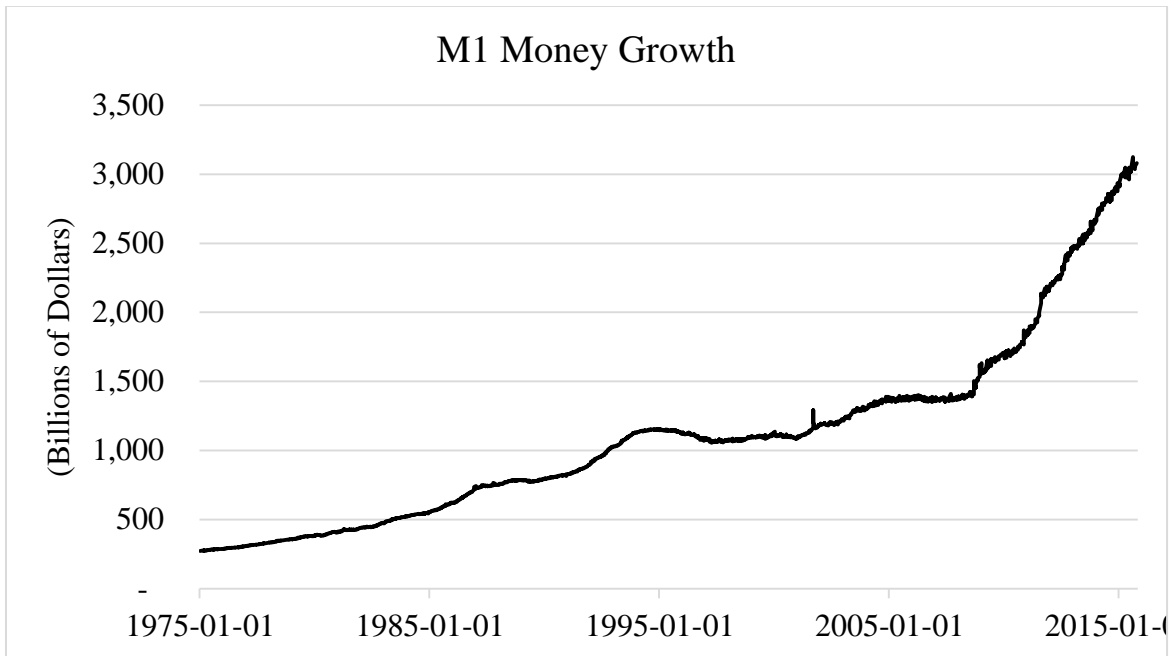
Conclusion:

1.2.3. Advantages of open market operations

There are four main advantages of using open market operations as a monetary policy tool:

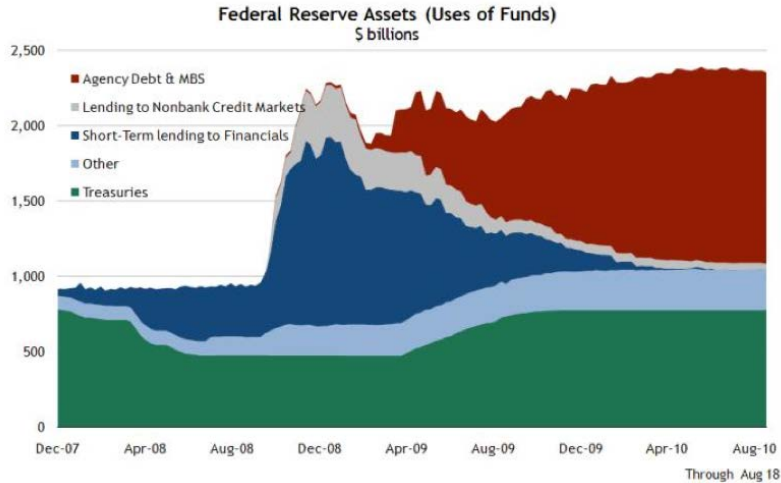
1.2.4. Unconventional monetary policy 1

What happens when the federal funds rates hits zero and the economy is still not recovering? This is called the *Zero lower bound (ZLB)* problem since increasing reserves into the financial system will not cause the federal funds rate to decrease further. However, the amount of money in the economy can still be increased by increasing reserves, even though the federal funds rate is unaffected. This type of monetary intervention is called *quantitative easing*.



1.2.5. Unconventional monetary policy 2

If the central bank finds that buying securities does not provide financial stability, they may buy private assets. This is called *credit easing*. Similar to quantitative easing, the central bank takes on risky or troubled assets that no one else in the market will buy to improve the financial position of financial intermediaries in an attempt to unfreeze the credit market.



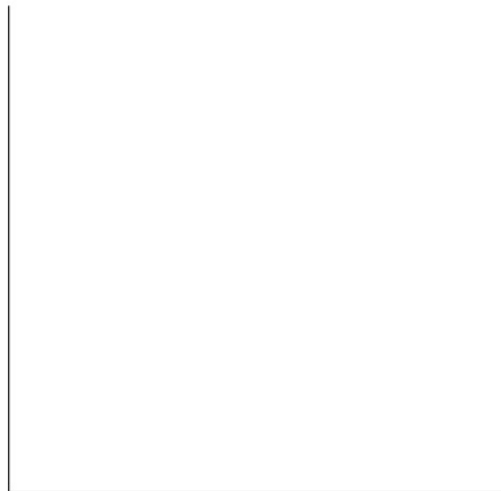
1.3. Discount Lending

The effect of a change in the discount rate depends on whether the demand curve initially intersects the supply curve in either the:

- Vertical section or flat section

1.3.1. Intersection of supply and demand occurs on the vertical section of the supply curve

Suppose the intersection of supply and demand occurs on the vertical section of the supply curve and that a decrease in the discount rate occurs.



Conclusion:

1.3.2. Intersection of supply and demand occurs on the horizontal section of the supply curve

Suppose the intersection of supply and demand occurs on the horizontal section of the supply curve, i.e., $BR > 0$ or discount lending occurs. The discount rate decreases.



Conclusion:

1.3.3. Discount policy

Healthy banks can borrow all they want at very short maturities (usually overnight). The interest rate is the discount rate and is usually 1% higher than the i_{ff} .

- ❖ Why not just use the FDIC?

1.3.4. Advantages and disadvantages of discount policy

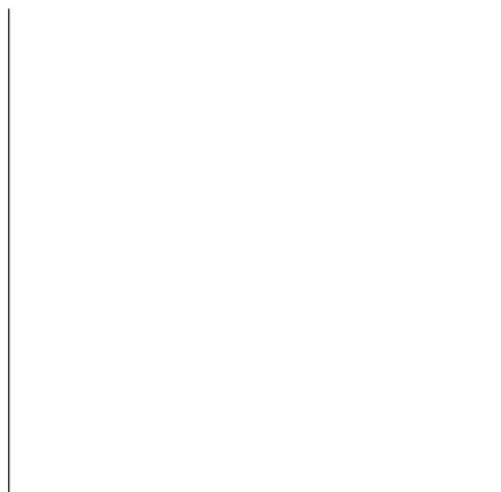
The advantages of using the discount policy:

The disadvantages of using the discount policy:

1.4. Reserve requirement

When the Fed raises the reserve requirement, required reserves increase; hence, the quantity of reserves demanded increases for any given interest rate.

- Shifts the demand curve to the right.



- ❖ What is the effect on the equilibrium?

1.4.1. Changing the reserve requirement

Depository Institutions Deregulation and Monetary Control Act of 1980 set the reserve requirement the same for all depository institutions.

- 3% of the first \$48.3 million of checkable deposits
- 10% of checkable deposits over \$48.3 million

The Fed can vary the reserve requirement anywhere from 8% to 14% but have increased it to 18% in the past.

The reserve requirement is no longer binding for most banks as many banks keep excess reserves. If they did not keep excess reserves, then rapid changes in the reserve requirement could cause liquidity problems for banks.

Since Ben Bernanke has taken office, the Fed has attempted to be clear and provide increased notice of the state and future of monetary policy.

1.5. Historical perspective of U.S. monetary policy

1.5.1. Open-market Operations

Open market operations were discovered on accident. The Fed would purchase income-earning securities from banks. They noticed that there was a multiplier effect and started to use this as a tool to control reserves.

1.5.2 The discount window

The discount policy was the primary tool in the beginning of monetary policy during the 1920s. This allowed cheap money for banks to lend out. The purpose behind lending the money to banks was that loans were made for productive purposes. This theory was called the 'real bills' doctrine. This theory is useless, and the implementation of this doctrine led to substantial inflationary pressure.

During the Great Depression, the Fed wanted to temper the boom by raising the discount rate but feared it would hurt the good and the bad of the economy. The Fed stood idly by and watched over 1/3 of all banks fail. The bank panic was tremendous and it was not until FDR was elected that the economy exhibited growth.

- ❖ What happened to the lender of last resort idea? What didn't the Fed know then that we know now?

1.5.3. Reserve requirements as a policy tool

The reserve requirement was not permitted to fluctuate until the Thomas Amendment to the Agricultural Adjustment Act of 1933. This amendment permitted the reserve requirement to be adjusted by the central bank. Since banks were holding so much in excess reserves, the required reserve tool was useless. To fix this, the act allowed them to adjust the required reserve ratio. Policymakers were concerned that banks would lend excess reserves out causing an uncontrollable expansion of credit in the future. Talk about worrying about the wrong thing at the wrong time. This caused a recession and a disaster of the recovery. Since then, reserve requirement ratios are touched delicately.

1.5.4. War finance and the pegging of interest rates

Upon entering WWII, government spending skyrocketed. The treasury issued huge amounts of bonds and, recognizing that this would push interest rates upward, the Fed's helped by pegging interest rates to pre-war rates. If interest rates rose above the peg, the Fed would make an open market purchase, bidding up bond prices and driving interest rates down again. This caused the Fed to give up control of monetary policy. Everything was fine until inflation rose in 1950. The Fed asserted its independence even though the Treasury was upset.

2. Monetary targets

Monetary targets are a way that the central bank can indicate to the public what monetary policy is attempting to affect. There are a few types of targets, monetary aggregate and interest rate targets being the most prevalent.

- A monetary aggregate target is a *monetary policy strategy* in which the central bank announces that it will achieve a certain value (the target) of the annual growth rate of a monetary aggregate. An example is :

$$\% \Delta MI = \% \Delta RGDP \text{ for the next 6 months.}$$

- ❖ What is the purpose of monetary targets?

- ❖ What can they do for a central bank?

2.1.1. Monetary aggregate targets around the world

The Bank of Canada and the Bank of England also made commitments to monetary targets around the same time as the U.S., and abandoned them as well. They just were not as sneaky as the United States.

Japan was hit by oil price shocks in late 1973 increasing inflation to over 20%. This caused Japan to pay attention to the money supply.

In 1978 the Bank of Japan began to announce forecasts for $M2 + CDs$. However, they did not commit to a monetary target.

The Bank of Japan's monetary performance was much better than the Fed's during 1978-1987. During 1979, a second oil shock hit in which the Bank reacted by reducing $M2+CDs$ quickly.

In 1989, the Bank of Japan switched to a tighter monetary policy in response to land and stock price increases and was partially blamed for the consequences of the bubble bursting. Many critics continue to say that Japan's monetary policy is too tight, i.e., they won't allow any inflation. There was so much wealth lost that many call the 90s in Japan *the lost decade*.

Germany and Switzerland both used monetary targets. The Bundesbank (Germany) focused on central bank money in the early 1970s. Germany's target was not the primary focus of monetary policy – that is, they did not attempt to control any aggregate's growth to a constant.

Instead, they used the target as a method of communicating the strategy of monetary policy focus on the long-run considerations and the control of inflation.

2.1.2. Monetary aggregate targets in the United States

The Fed's monetary target has changed over time.

1950-60s: Targeted money market conditions

- Procyclical monetary policy: during expansions, money supply would be increased, during declines, money supply slowed

1970s: Targeted monetary aggregates

- Very confusing time since operational procedures, Fed policies, and FOMC notes are contradictory

Under Volker: Targeted non-borrowed reserves

- De-emphasis of federal funds rate – smoke screen

1982-1993: Targeted borrowed reserves

- De-emphasis of monetary aggregates
- Discount loan borrowing

1990- present: Targets the federal funds rate (a non-monetary aggregate target)

- Greater transparency
- Preemptive strikes against inflation

The Fed began to publicly announce its targets for the growth in money supply in 1975. Paul Volker (Fed Chairman from 1979-1982) focused more on non-borrowed reserves and less on the federal funds rate.

Despite the change in focus, the performance in hitting monetary targets was worse. In all three years, quarter after quarter, the Fed missed its M1 growth target range.

- ❖ Why couldn't they hit it?

Suppose Volker was not committed.

Volker was mandated to fight inflation. To do so, he needed to raise interest rates above any realistic target. Since he was 'targeting' the money supply, the public did not make him accountable for high interest rates. Besides, what does anyone know of controlling M1? In 1982, with inflation under control, the discussion of the M1 target decreased.

- Greenspan announced in July 1993 that the Fed would not use any monetary aggregates as a guide for conducting monetary policy in the United States.

2.1.3. Lessons learned from monetary aggregate targeting

The monetary aggregate targets allowed monetary policy to be transparent (clear, simple, and understandable) and informative to the public. In practice, those countries which succeeded with monetary aggregate targeting had a few similar characteristics which are a lesson for using targets in general:

The advantages of monetary aggregate targets

The disadvantages of monetary aggregate targets

2.2. U.S. monetary policy

The United States has achieved excellent macroeconomic performance (low and stable inflation) for many years. The Fed has not articulated goals of monetary policy, yet an underlying concern for inflation and employment levels exist. The Fed also attempts to maintain financial and macroeconomic stability.

The Fed's policy regime might best be described as Just Do It.

2.2.1. Advantages of Just Do It approach

2.2.2. Disadvantages of Just Do It approach

2.2.3. Current U.S. monetary policy

Ben Bernanke has discussed transparency and openness of the Fed's policies to help reduce the volatility in the market it creates due to not following a fixed rule. He continues to say that long-term low inflation is a priority. Janet Yellen has repeated that Fed policy will be clear to the public.

2.3. Measuring the perform of U.S. monetary policy using the Taylor Rule

The U.S. currently targets the federal funds rate. The Taylor Rule was created by John Taylor to explain how the federal funds rate target is set. It stipulates how much the Fed should change the nominal interest rate in response to divergences from target inflation rates and potential GDP. The rule defines an equation for how the Fed's response would change the Federal funds rate. Given the Federal Funds rate target, the government uses one of its tools to accomplish this target. The equation stated by Taylor is:

$$i_{ff}^* = \pi_t + r_t^* + a_\pi (\pi_t - \pi_t^*) + a_y (y_t - \bar{y}_t)$$

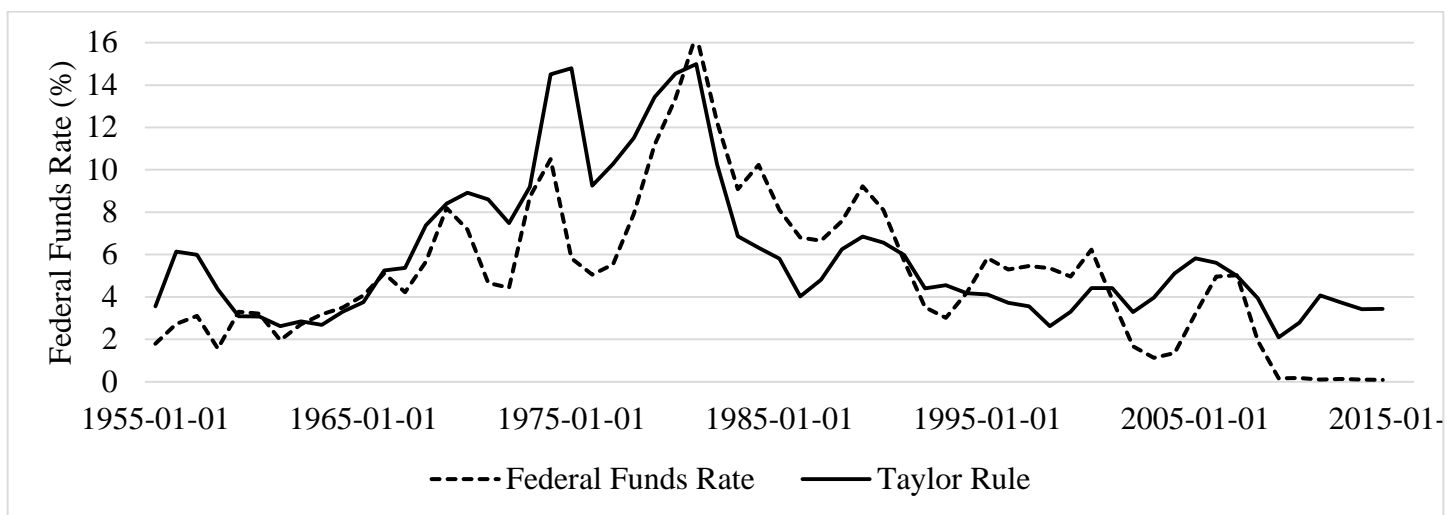
where

1. The first term is the estimated current rate of inflation as measured by the GDP deflator.
2. The second term is the equilibrium real fed funds rate consistent with full employment.
3. The third term is the inflation gap which measures the differences between the estimated current inflation and target rate of inflation.
4. The fourth term is the output gap which measures the percentage deviation of real GDP from an estimate of its potential full employment level.

❖ Why the inflation and output gap?

❖ What about the signs and sizes of the coefficients on inflation and output gap terms?

2.2.1. Taylor rule in practice



2.2.2. Critiques of the rule

There are some critiques of the Taylor rule:

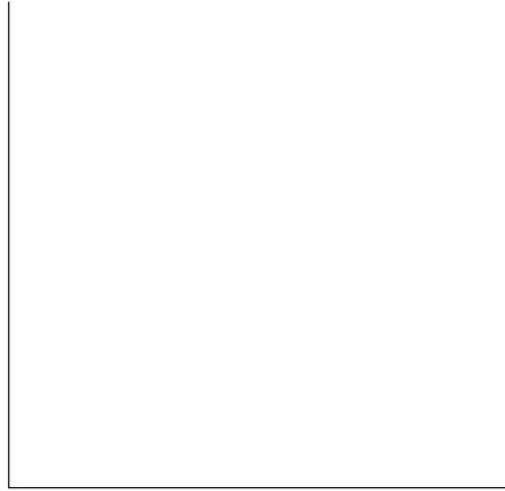
2.4. Choosing a monetary target

The market for reserves can provide illustration to study the effects of pursuing either a monetary aggregate target or an interest rate target.

2.4.1. Targeting non-borrowed reserves

Suppose the U.S. central bank targets the monetary aggregate non-borrowed reserves.

- ❖ What happens if demand for reserves increases?
 - Will the central bank respond?
 - What happens to the federal funds rate?
 - Can the central bank control both an aggregate and the federal funds rate?

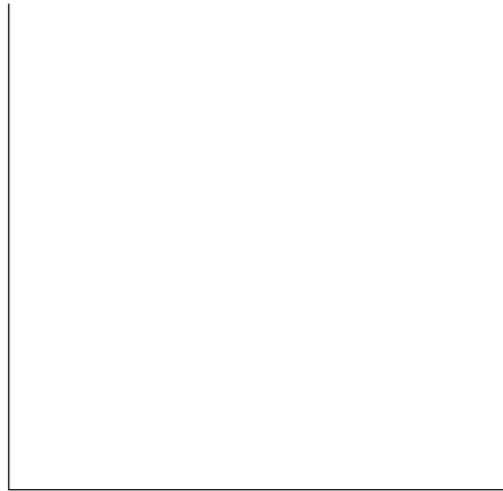


Conclusion:

2.4.2. Targeting the federal-funds rate

Suppose the central bank targets the federal funds rate.

- ❖ What happens if demand for reserves increases?
 - Will the central bank respond?
 - What happens to the federal funds rate?
 - Can the central bank control both an aggregate and the federal funds rate?



Conclusion:

2.4.3. Criteria for choosing the monetary targets

When comparing monetary aggregate targets to interest rate monetary targets, there are a few criteria that must be considered:

2.3. Inflation targeting

Since monetary targets do not have a sufficiently strong relationship to the goal variables, many central banks have since abandoned targets and publicly announced inflation goals as their monetary policy strategy, but do not explicitly tell the conduct of monetary policy to achieve the goal.

- Announcements are usually medium-term numerical target for inflation.
 - Institutional commitment to price stability as the primary, long-run goal of monetary policy and a commitment to achieve the inflation goal.
 - Information-inclusive approach in which many variables are used in making decisions.
 - Increased transparency of the strategy.
 - Increased accountability of the central bank.
- ❖ Why would central bankers want to commit to a rule?
- ❖ What happens to their independence?

2.3.1. Inflation targeting around the world

New Zealand was the first to target inflation.

- The governor of the Reserve Bank is fired if the target is not hit.
- Inflation was brought down and remained within the target most of the time.
- Inflation volatility decreased significantly.
- Growth has generally been high and long-term unemployment has been smaller.



Canada

Inflation decreased since the implementation of the target with some costs in term of unemployment (above 10% from 1991-1994). This may have to do with other issues: labor unions and the implementation of socialized medical coverage.



United Kingdom

Inflation has been close to its target. Growth has been strong and long-term unemployment has decreased.



2.3.2. Advantages of inflation targeting

2.3.3. Disadvantages of inflation targeting

4.1. How should the central bank respond to asset-price bubbles?

Asset-price bubbles are pronounced increases in asset prices that depart from fundamental values. These bubbles may shrink gradually to fundamental or below fundamental values or burst.

There are a few types of notable asset-price bubbles:

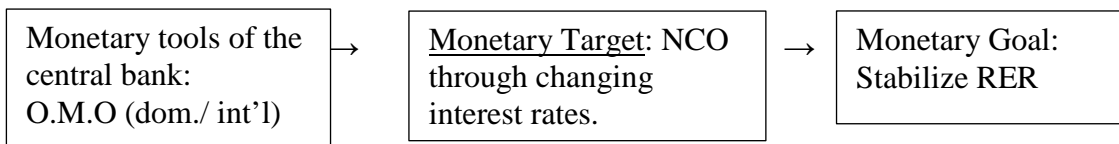
- ❖ Should central banks respond to bubbles?

Conclusion:

Lecture 11: Exchange Rates and Stabilization Policies

This lecture discusses:

1. Exchange rate determination
 - a. Capital flight
2. Exchange rate interventions
 - a. Interest rate adjustment intervention
 - b. International reserves intervention
 - i. Sterilized intervention
 - ii. Unsterilized intervention
 - c. Capital controls
3. Fixed exchange rate regimes



1. Introduction

This lecture highlights the forces that determine the economy's trade balance and exchange rates. It will also discuss central bank intervention in this market.

1.1. The market for foreign-currency exchange

The demand for dollars comes from foreign residents who desire to buy domestic goods, services, and assets. The supply of dollars comes from domestic resident who trade dollars for foreign currencies to purchase foreign goods, services, and assets.

Buying of assets

Domestic resident buys foreign asset: Capital Outflow increases ($\uparrow CO$)

Foreign resident buys domestic asset: Capital Inflow increases ($\uparrow CI$)

Selling of assets

Domestic resident sells foreign asset: Capital Outflow decreases ($\downarrow CO$)

Foreign resident sells domestic asset: Capital Inflow decreases ($\downarrow CI$)

Note that:

$$\begin{aligned}\text{Supply of dollars} &= IM + CO \\ \text{Demand for dollars} &= EX + CI\end{aligned}$$

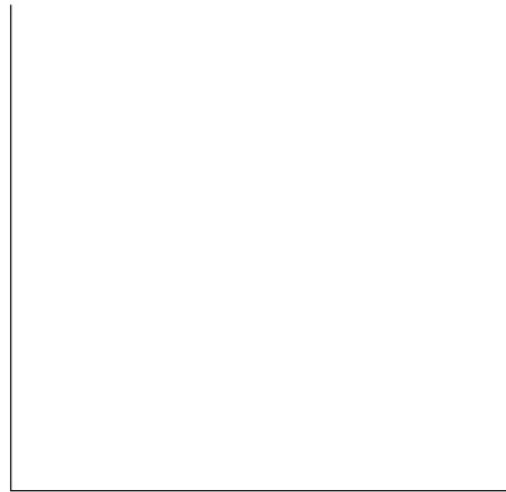
In equilibrium, these are equal:

$$\begin{aligned}IM + CO &= EX + CI \\ CO - CI &= EX - IM \\ \underbrace{NCO}_{S_{FCE}} &= \underbrace{NX}_{D_{FCE}}\end{aligned}$$

Thus, we model the supply of dollars as NCO and the demand for dollars as NX .

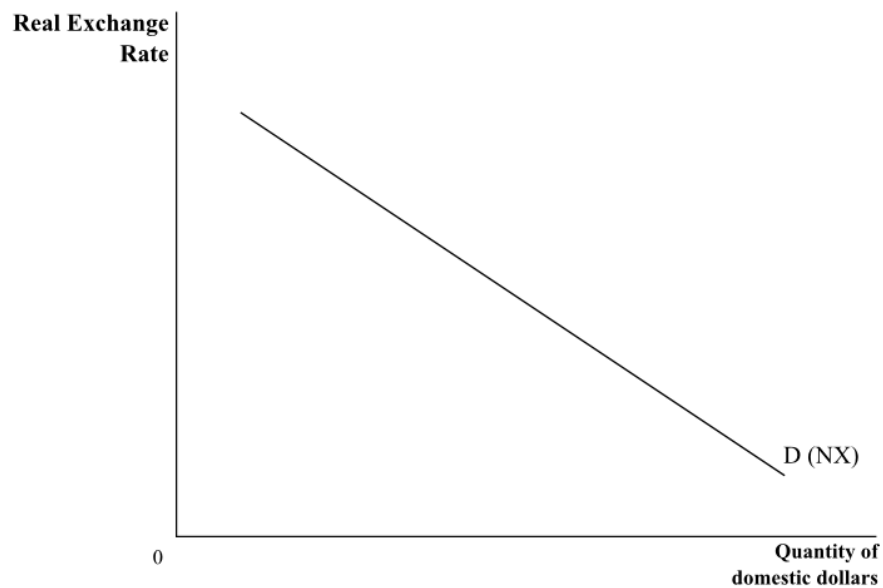
The supply of foreign currency is determined by NCO . Since NCO is determined by the domestic interest rate, foreign interest rates, and the expected rate of currency appreciation, it is perfectly inelastic with respect to the real exchange rate.

- ❖ Draw the supply of foreign currency using the real exchange rate as the price on the vertical axis and the quantity of domestic dollars on the horizontal axis.

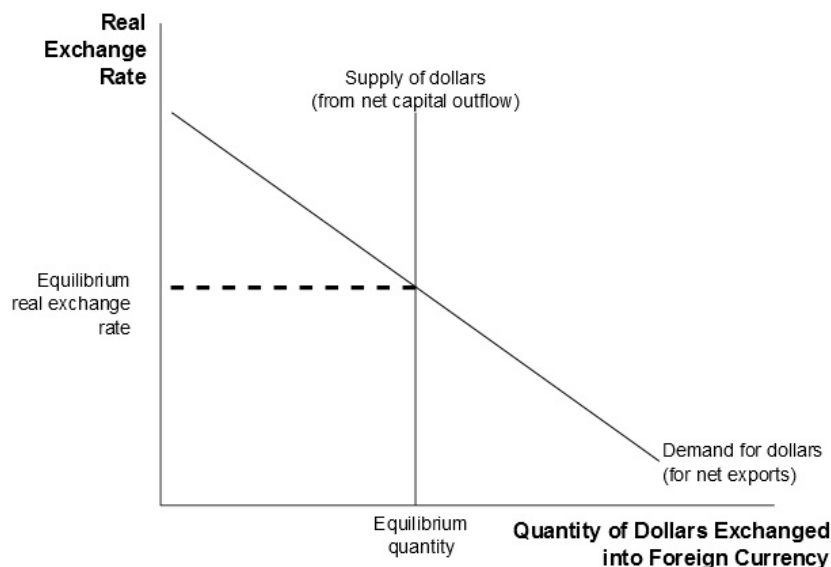


The demand for foreign currency is determined by NX – foreign residents buy domestic dollars to purchase export goods.

- As the real exchange rate appreciates, domestic goods become more expensive relative to foreign goods, lowering exports and raising imports.



The equilibrium real exchange rate is the price that balances the supply and demand in the market for foreign-currency exchange.



In equilibrium:

$$NCO = NX$$

- The imbalance between the purchase and sale of capital assets abroad must be equal to the imbalance between exports and imports of goods and services.

1.2. Exchange rate destabilization from a shock

Investors may become optimistic (or pessimistic) about a certain country when they receive positive (or negative) information regarding the country's economic, political, and financial stability. Investors react by buying (or selling) assets from that country.

Exercise 1: Demonstrate how higher investor confidence affects the value of the dollar?



1.2.1 Capital flight

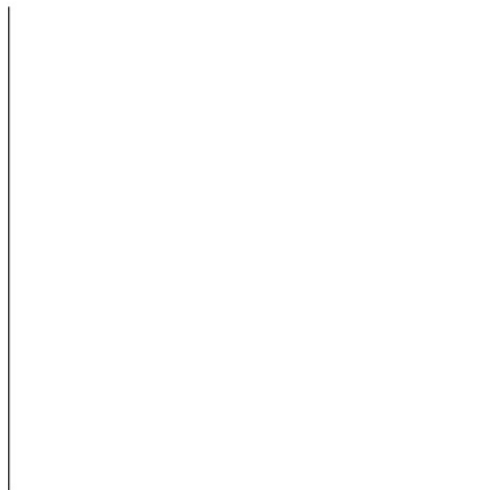
Capital flight occurs when assets flow rapidly out of a country due to an event of economic consequence. This can lead to destabilization of the economy and is especially detrimental if the country is small and has liberal policies regarding trade and asset ownership.

Examples of capital flight include:

- Greece (May 2012) - undecided legislative election caused €4 billion a week.
- Spain (first quarter of 2012) – bad economy caused €7 billion.
- United Kingdom (2009) – tax increases.
- Developing countries (2008 Financial Crisis) - \$850B to \$1T for the year.
- Argentine (2001) - fears that Argentina would default on its external debt
- France (2000s) – high taxes have caused more than \$125B since 1998.

Given the strong future market for foreign currency, this can lead to substantial speculative attacks by investors. While investment in traditional financial instruments like bonds or stocks often is considered to contribute positively to economic growth by providing capital, currency speculation does not. Another view is that speculators help enforce international agreements and anticipate the effects of basic economic laws.

Exercise 2: Demonstrate capital flight.



Conclusion

1.3. Exchange rate stabilization intervention

Central banks may intervene in the foreign-currency exchange market to stabilize their exchange rate, especially if their country has a large export sector. Central banks (and fiscal policy makers) use several methods to stabilize their exchange rates.

Exercise 3: Modify the Taylor rule to include exchange rate stabilization. What is the sign of the coefficient a_e ?

1.3.1. Domestic interest rate adjustments

A government can change NCO by adjusting the real interest rate. If capital flight occurs, the government can raise the real interest rate by:

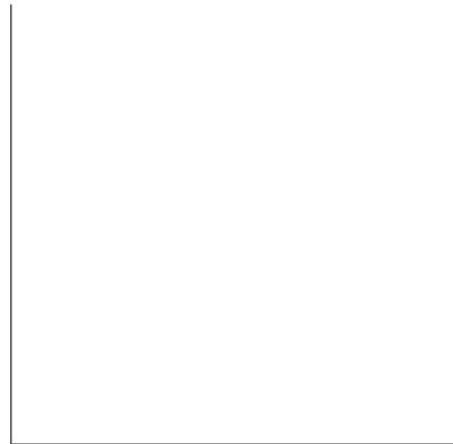
1. Central bank decreases real interest rate through monetary policy.
2. Fiscal policymakers affect real interest rate through government budget.

Exercise 4: Demonstrate interest rate adjustments if capital flight occurred.

Output stabilization



Exchange rate stabilization



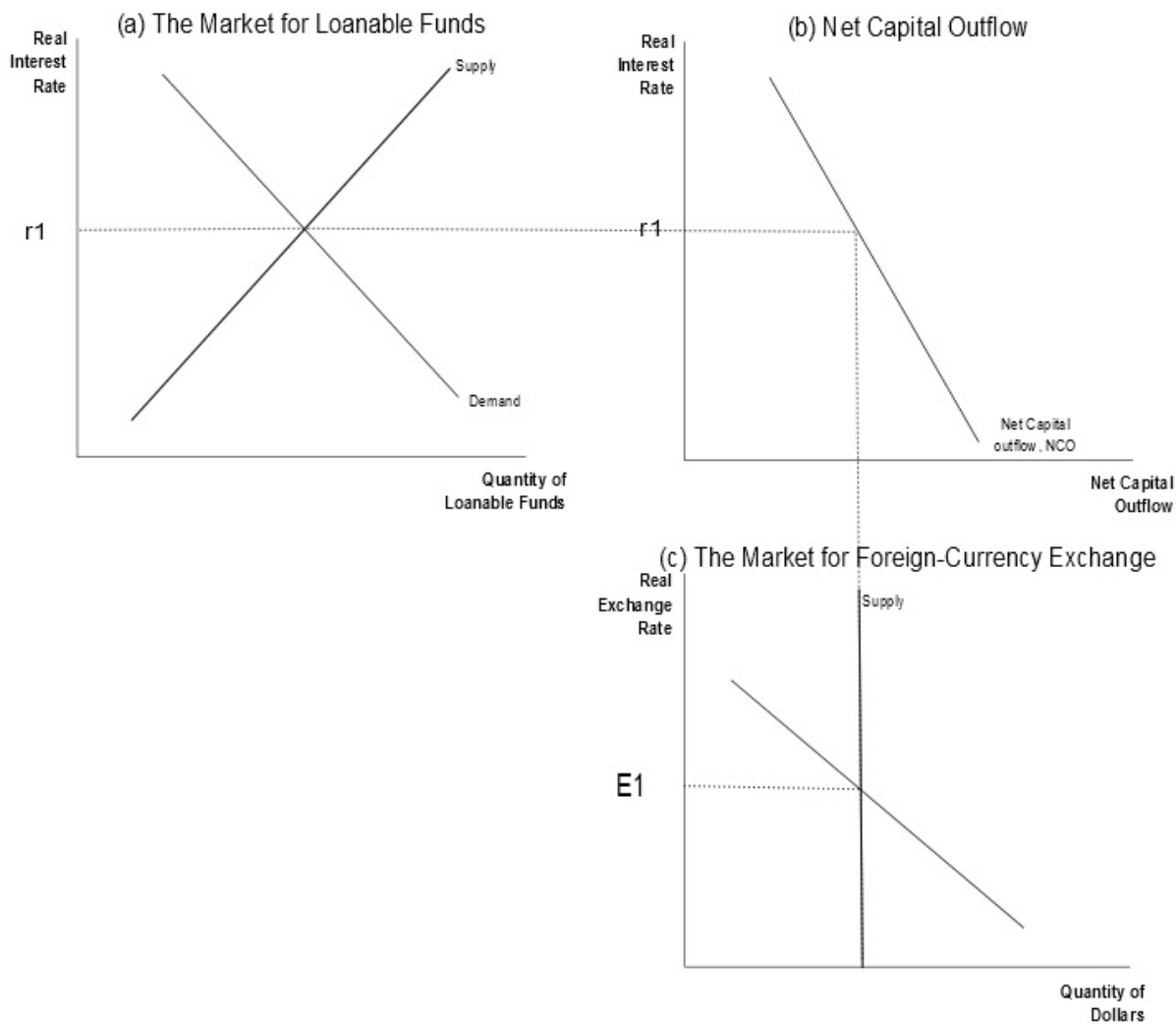
Conclusions:

$\uparrow r$ causes C and I to fall
 $\downarrow r.e.r$ causes EX to rise
Output remains constant
Exchange rate is lower

$\uparrow r$ causes C and I to fall
No change in $r.e.r$
Output falls
Exchange rate is constant

- Stabilizing the exchange rate back to its original equilibrium requires raising the domestic real interest rate by more than it would to stabilize output.
- Trade-off between exchange rate stability and output stability.
- When the central bank adjusts reserves, it affects the monetary base.

Exercise 5: Suppose the government increases its government budget deficit. What is the effect on the real exchange rate?



Recently China has claimed that the United States manipulates its exchange rate through the buying and selling of its own government debt (quantitative easing).

1.3.2. Foreign exchange intervention

A government can change *NCO* by buying/selling of domestic and foreign assets (typically foreign currency). Central banks intervene by conducting international open-market operations.

- Central bank holding foreign assets is called *international reserves*.
 - Must hold foreign assets if desiring to sell.
- Adjusts international reserves by buying/selling foreign assets.
- Used to offset changes in *NCO* without affecting domestic real interest rate.

When the central bank adjusts international reserves, it affects the monetary base.

Unsterilized foreign exchange intervention: adjusts international reserves by buying/selling foreign assets using domestic currency or reserves. This affects the monetary base.

Sterilized foreign exchange intervention: adjusts international reserves by buying/selling foreign assets using domestic currency or reserves and then offsetting the change in the monetary base using an open market operation. The combined transactions have no effect on the monetary base.

Exercise 6: Show an unsterilized foreign exchange intervention to capital flight of \$1T.

Central Bank's Balance Sheet			
Assets		Liabilities	

❖ How is the monetary base affected?

Exercise 7: Show a sterilized foreign exchange intervention to capital flight of \$1T.

Central Bank's Balance Sheet			
Assets		Liabilities	

❖ How is the monetary base affected?

There are some benefits and also drawbacks from adjusting international reserves.

1. No adverse effect on output from intervention.
2. Lower bound on how much foreign currency a CB can sell.
3. Intervening during a speculative attack can deplete all international reserves.
 - High money growth causes domestic interest rates to be lower than foreign interest rates.
 - This causes a *carry trade* involving market participants borrowing domestically and lending internationally
 - This depreciates domestic currency.
 - Central bank intervention is typically futile as all international reserves are depleted to offset the shock.
 - Root cause needs to be address: high money growth.

1.3.3. Capital controls

Central banks and policymakers can intervene through capital controls that regulate the flow of savings across countries.

- Restrict foreign ownership of domestic assets.
- Restrict domestic resident from buying foreign assets.

Restrictions include:

- Taxes
- Ban
- Government approval

The reasons why governments impose the controls may also differ:

- Force savers to purchase domestic assets.
- National security (or symbolization of dominance)

Unlike interest rate adjustments and foreign exchange intervention, capital controls attempt to stabilize the NCO so that shocks are mitigated prior to occurring.

1.3.4. Summarizing exchange rate interventions

The exchange rate stabilization policies can be summarized as follows:

Policy Tool	Drawback
Interest rate adjustments	May destabilize output
Foreign exchange intervention	Questionable effectiveness
Fiscal policy	Government budget deficit
Capital controls	Impede efficient flow of savings

1.4. Exchange rate manipulation

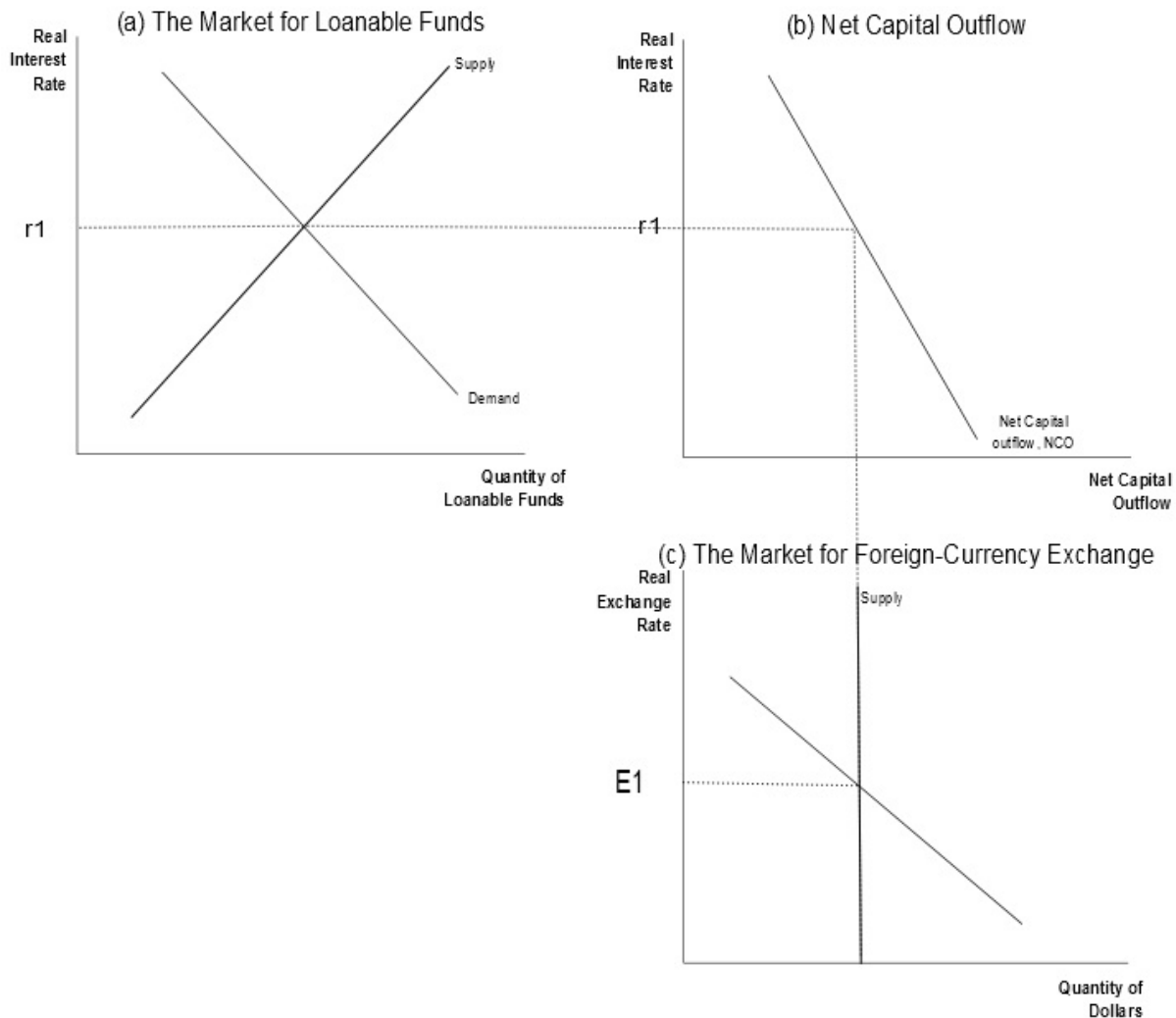
Central banks have several intervention options to control the exchange rate, each having its own drawbacks. As such, many countries choose to allow their exchange rate to float.

Countries that maintain strict controls on the exchange rate choose to peg their exchange rate to another country, typically the United States dollar, the Euro, or the Japanese Yen.

Central banks attempt to devalue their currency when manipulating exchange rates. One of the benefits of depreciating a country's currency is that exports become cheaper for foreigners. This typically occurs if a recession is likely.

1.4.1. The Yuan

Exercise 8: The Chinese government has maintained a fixed nominal exchange rate against the U.S. of 0.121 dollars per yuan from 1994 to 2005 and then allowed it to appreciate to 0.146 in 2008.



As of 2010, Chinese international reserves were \$2.4 trillion USD dollars and some economists have estimated that the yuan would be 30 to 40 percent higher if they had no capital controls or central bank intervention.

1.4.2. Fixed Exchange rate

Under the Bretton Woods system, forty-four countries established a fixed exchange rate board in 1944. The board pegged all other countries' currencies against the U.S. dollar. By the early 1970s, speculative attacks forced almost all countries into a floating exchange rate.

The euro area can be thought of a fixed exchange rate regime with all of the benefits and costs of such action. One drawback is that it may be advantageous for one country to desire to devalue its currency to increase exports, while another country may seek to have it appreciate (such as Greece).

Dollarization is another form of monetary policy to fix the exchange rate. This entails committing to use another country's currency as the domestic currency.

- Adopted by Ecuador in March 2000.
- Federal Reserve prints approximately \$30 billion a year due to dollarization of emerging countries use of the U.S. dollar.

1.5. The International Monetary Funds (IMF)

Upon initial formation, the IMF had two primary functions:

- Oversee the fixed exchange rate arrangements between countries.
- Aid governments managing their exchange rates by providing short-term capital (lender of last resort to central banks).

IMF sets conditions for countries that borrow from them in exchange for financial resources. The IMF does not require collateral from countries for loans but rather requires the government seeking assistance to correct its macroeconomic imbalances in the form of policy reform. If the conditions are not met, the funds are withheld.

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Lecture 12: The AD-AS Model and Inflation

This lecture discusses:

1. The Aggregate Supply – Aggregate Demand Model
2. Persistent Inflation

1. The Aggregate Supply – Aggregate Demand Model

During past lectures, we have addressed how money affects prices and output primarily using the Fisher's equation. This included the extension on money demand theory by Friedman and Keynes. However, these were demand analyses. In this lecture we study a tool to understand how changes in the total amount of money affects output and prices in a supply and demand framework. The framework to do this is the Aggregate Demand – Aggregate Supply (AD-AS) model.

The model of short-run economic fluctuations focuses on the behavior of two variables. The first is the economy's output of goods and services, as measured by real GDP. The second is the aggregate price level, as measured by the CPI.

- Aggregate output is a real variable, Y .
- Output price is a nominal variable, P .

1.1. Aggregate Demand

Aggregate demand is made up of four components:

1. **Consumer expenditures (C):**
2. **Planned Investment spending (I):**
3. **Government spending (G):**
4. **Net exports (NX):**

The following expression summarizes aggregate demand:

1.1.1. Deriving Aggregate Demand

Since aggregate demand describes the relationship between the quantity of aggregate output demanded and prices, we need to demonstrate this. The simplest way to examine how prices affect aggregate output is to analyze each individual component.

- If all components respond in the same direction, then the aggregate demand responds in the same way.

Exercise 1 (wealth effect): Let us first begin with consumption. The experiment is as follows:

1. Hold the nominal amount of money constant.
2. Lower price. What is the effect on consumption?

Exercise 2 (interest rate effect): We can do this same experiment for investment:

1. Hold the nominal amount of money constant.
2. Lower price. What is the effect on investment?

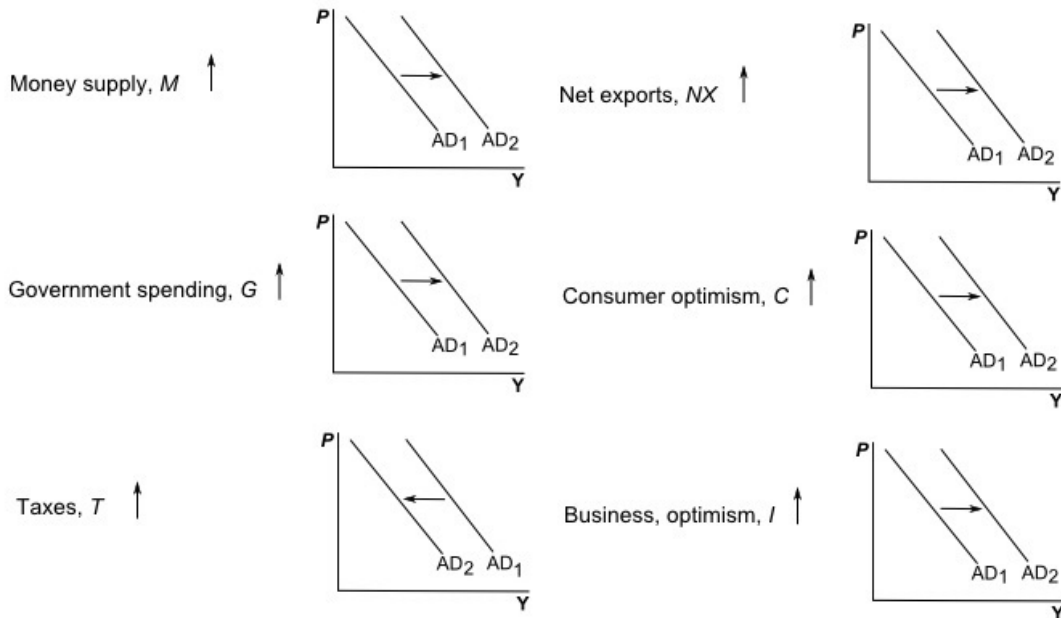
Exercise 3 (exchange rate effect): We can do this same experiment for net exports:

1. Hold the nominal amount of money constant.
2. Lower price. What is the effect on net export?

- Is there a faster way to derive AD?

1.1.2. Shifts in Aggregate Demand

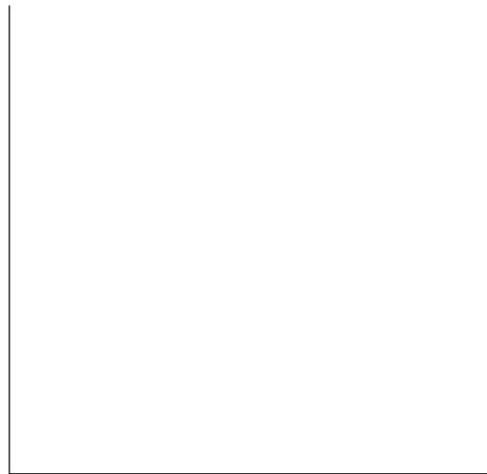
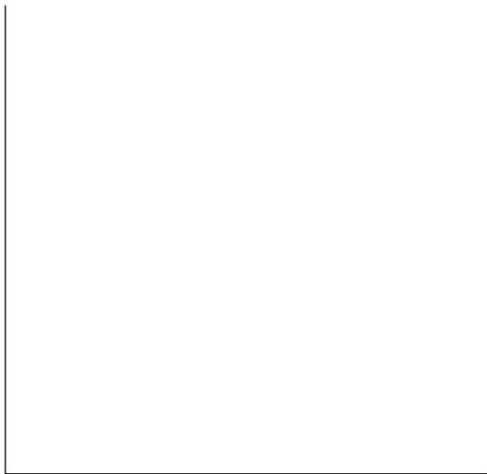
There are several factors that shift AD . At a given output price level, a rise in any component of GDP raises AD .



Exercise 4: The experiment is as follows. Increase the total amount of money in the economy and then ask:

At every price level, what happens to output?

At every output level, what happens to prices?

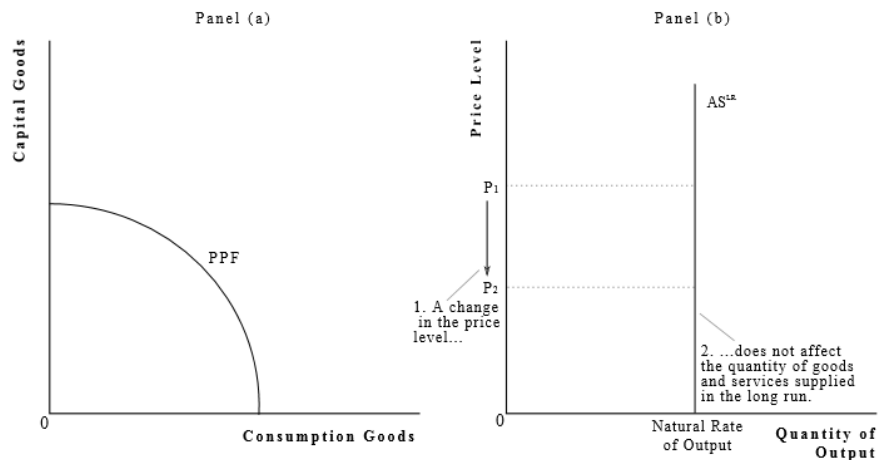


1.2 Aggregate Supply (AS)

Aggregate supply describes the relationship between the quantity of output supplied and the price level. Because input prices take time to adjust, the AS curve differs in the short and long run. The long run refers to the amount of time required for all input prices to adjust.

Long-run aggregate supply curve (AS^{LR}): Indicates production capabilities and is not influenced by output prices.

- Factors of production are fixed at any one point in time similarly to the PPF model.
 - Allocative efficient point on the PPF corresponds to the AS^{LR} .
 - Similar to the assumption that the PPF's frontier use full employment, so does AS^{LR} .
- Increases in price cannot shift the PPF or the AS^{LR} outward.



Short-run aggregate supply curve (AS^{SR}): As the price level rises, suppliers to produce more.

- Assume input prices are fixed in the short-run (\overline{ATC}).
- As P increases, per unit profits to rise.

$$Profit = (P - \overline{ATC}) \times Q$$

- Firms increase profits by producing more.
- Generates upward sloping AS^{SR} .

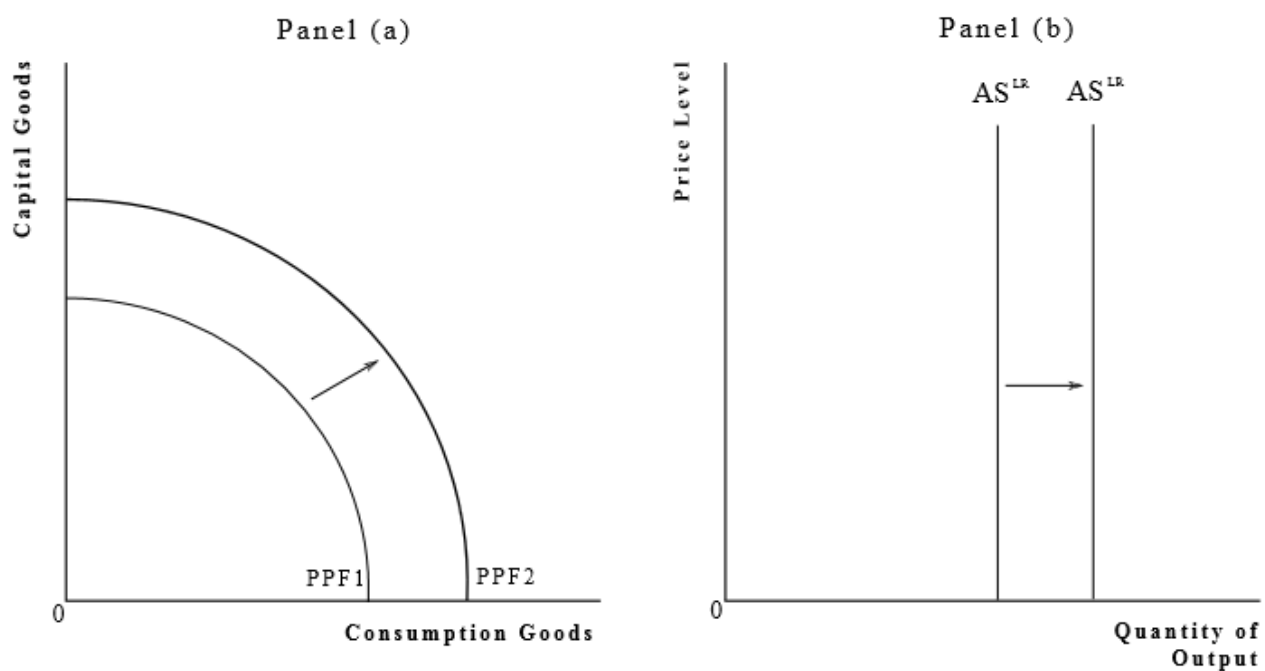
Exercise 5: Draw this relationship

1.2.2. Factors that shift AS^{LR}

The long-run aggregate supply curve shifts due to a change in a factor of production:

- | | |
|---------------------|------------------|
| 1. Land | 4. Labor |
| 2. Physical capital | 5. Human capital |
| 3. Resources | 6. Technology |

As a factor of production increases, production possibility increases, thus shifting the long-run aggregate supply curve outward.

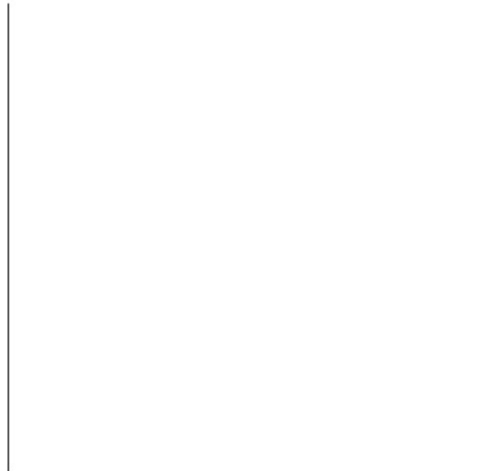


1.2.2. Factors that shift AS^{SR}

Exercise 6: To understand how AS^{SR} shifts, we fix output price (\bar{P}) and ask how suppliers will respond to a change in input prices (ATC).

$$Profit = (\bar{P} - ATC) \times Q$$

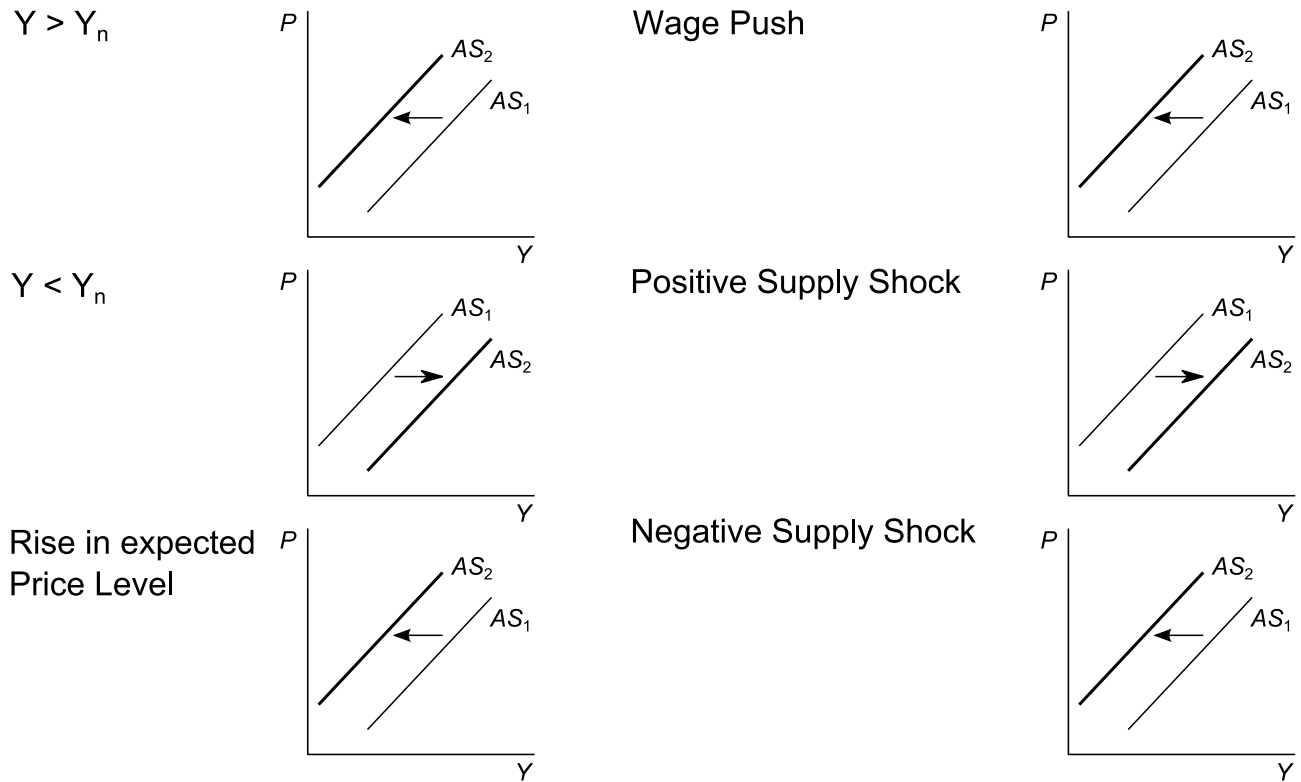
- $\downarrow ATC \Rightarrow \uparrow$ per unit profits \Rightarrow outward shift in AS^{SR} .
- $\uparrow ATC \Rightarrow \downarrow$ per unit profits \Rightarrow inward shift in AS^{SR} .



There are several reasons why input prices and other costs of production change. These are:

- Business cycle
 - Expansions cause inputs to become more scarce, increasing their prices - AS^{SR} shifts leftward.
 - For example, when employers find it difficult to find qualified workers.
 - Employers raise wages to attract needed workers.
 - Demand for labor > Supply of labor \Rightarrow wages and costs of production increase \Rightarrow profit per unit of output falls and the AS^{SR} shifts left.
 - Recessions cause inputs to become less scarce, decreasing their prices - AS^{SR} shifts rightward.
 - For example, when employers find it easy to find qualified workers.
 - Demand for labor < Supply of labor \Rightarrow wages and costs of production fall \Rightarrow profit per unit of output rises and the AS^{SR} shifts right.
- Expected output price
 - A rise in the expected output price level causes the AS^{SR} to shift leftward.
- Wage push
 - Striking and other employee demands for higher wages increases (or pushes) the cost of production upward (AS^{SR} shifts left).
- Change in production costs unrelated to wages (supply shocks)
 - Positive shock: AS^{SR} shifts rightward.
 - Negative shock: AS^{SR} shifts leftward.

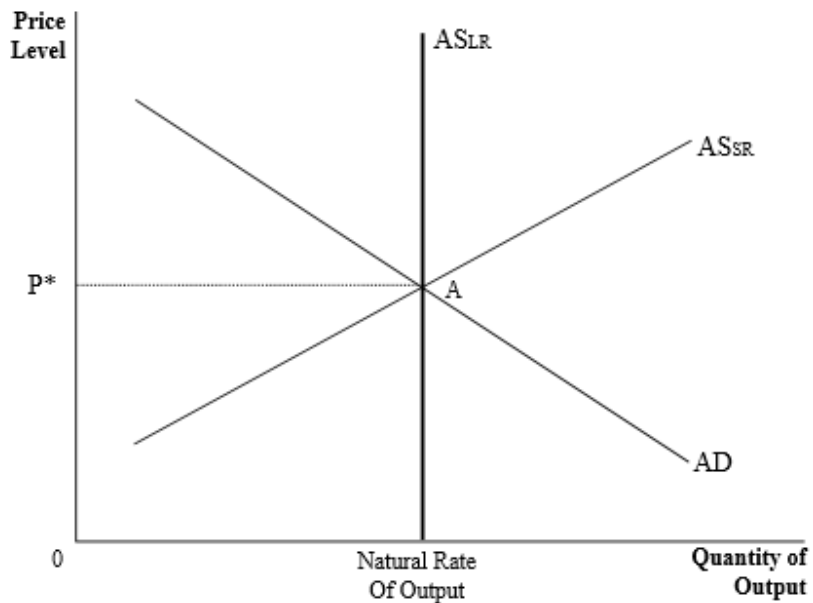
The following table provides a list of all factors that shift the short-run AS curve



1.3. Equilibrium in the Aggregate Demand – Aggregate Supply Model

Equilibrium occurs where $Y_{AD} = Y_{AS}$. However, there are two quantities of aggregate output, one for the short-run and one for the long-run.

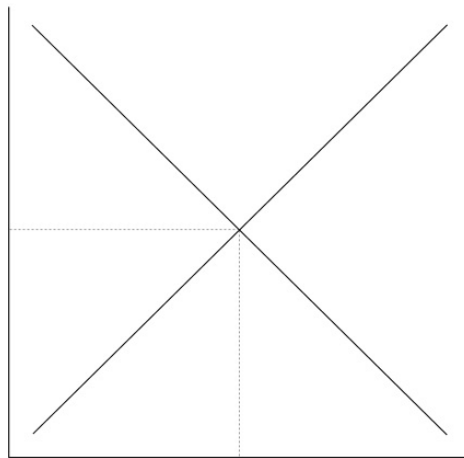
$$Y_{AS}^{SR} = Y_{AD} \text{ and } Y_{AS}^{LR} = Y_{AD}$$



Even if $Y_{AD} = Y_{AS}^{SR} = Y^*$, output may move if $Y^* \neq Y_n$. There are two possibilities:

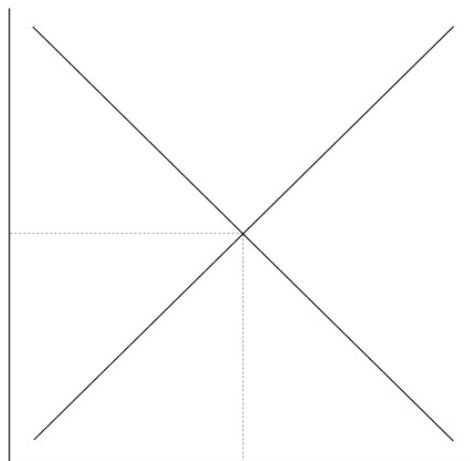
1. When $Y > Y_n$ (during an expansion), labor markets are tight (low unemployment) and output is above the natural level. This causes production costs to rise at any given price level, which in turns causes firms to cut employment to raise profits.
 - o This implies a leftward shift in AS_{SR} .

Exercise 6: Show the dynamics to the long-run equilibrium when $Y > Y_n$.



2. When $Y < Y_n$ (during a recession), labor markets are slack (high unemployment) and output is below the natural level. This causes production costs to fall at any given price level, which in turns causes firms to increase employment to raise profits.
 - o This implies a rightward shift in AS_{SR} .

Exercise 7: Show the dynamics to the long-run equilibrium when $Y < Y_n$.



1.3.1. The self-correcting mechanism

Regardless of where output is initially, it eventually returns to the Y_n . This is called *the self-correcting mechanism*. When $Y=Y_n$ (long-run equilibrium), labor markets are at their natural rate, and production costs are constant at any given price level. This implies resources are utilized at maximum efficiency. There are no adjustments in AS^{SR} .

- The *self-correcting mechanism* is the amount of time that it takes for the current level of output to return to long-run output, Y_n .

Keynesians

- Government intervention may be needed during recessions to increase AD if consumers are not spending.
- As famously said by Keynes “[i]n the long-run, we are all dead.”

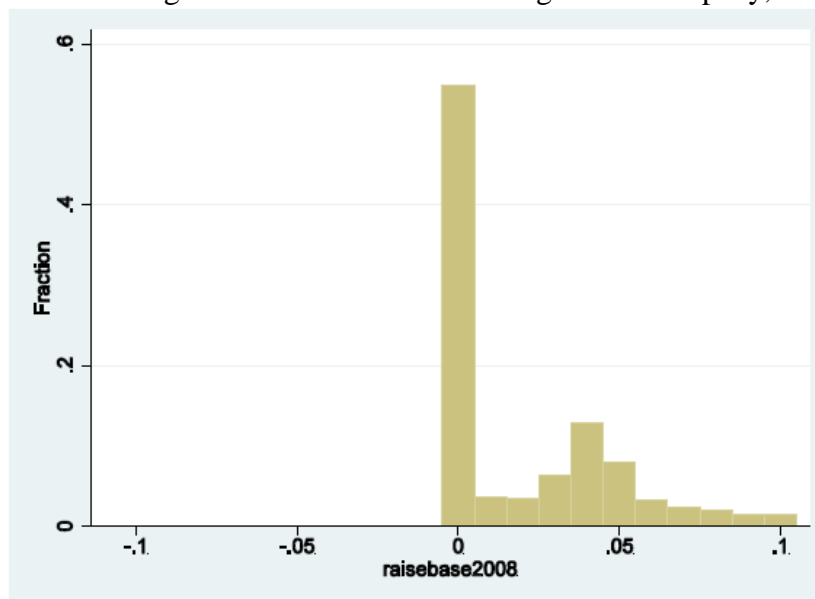
Monetarists

- Government intervention is never required. Wages are sufficiently flexible and adjust quite rapidly.
- All that is required is a stable AD . This is achieved by a stable money supply. Recall:

$$\frac{M_d}{P} = f(Y_p)$$

Exercise 8: How long does it take to self-correct?

Nominal Wage Growth of Workers at Large U.S. Company, 2008



Source: Daron Acemoglu, John Beshears, James Choi, Nathan Hipsman, David Laibson, and Brigitte Madrian.

1.4. Shocks

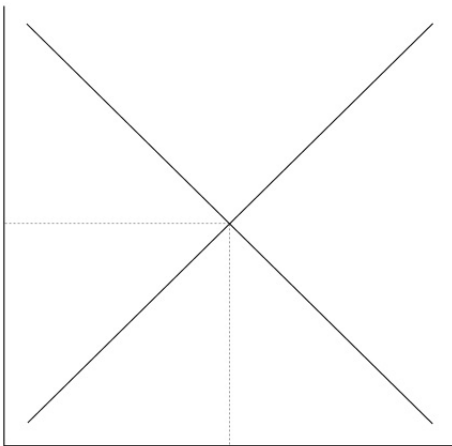
We can now investigate how shocks affect prices and output.

1.4.1. Negative demand shock (demand-side recession)

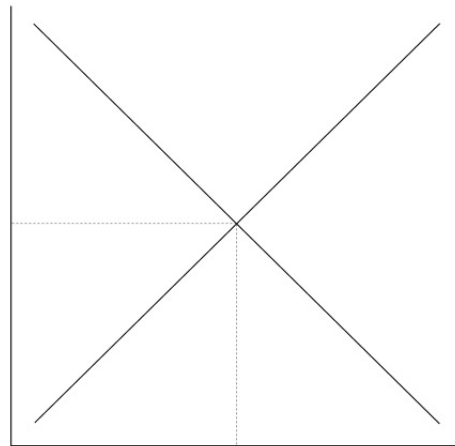
Demand-side recessions occur when there is a fall in aggregate demand. Keynes studied these types of recessions and suggested that ‘animal spirits’ or a lack of consumer and business confidence can explain such a shift.

Exercise 9: Suppose a negative demand shock occurs. What happens to AD, AS (SR and LR), prices, employment, and output?

No government intervention



Government intervention



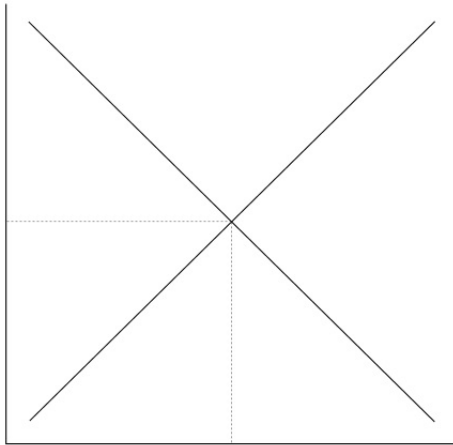
Conclusion:

1.4.2. Negative supply shock (real business cycle theory)

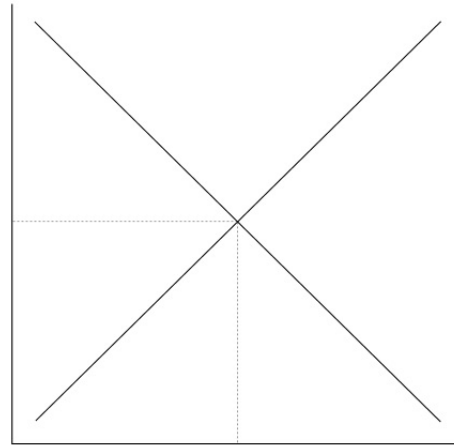
Supply-side recession occurs from increases in the cost of production. The real business cycle theory suggests that changes in productivity and technology cause aggregate supply in the short run to shift.

Exercise 10: Suppose a temporary negative supply shock occurs. What happens to AD , AS_{SR} , AS_{LR} , prices, employment, and output?

No government intervention



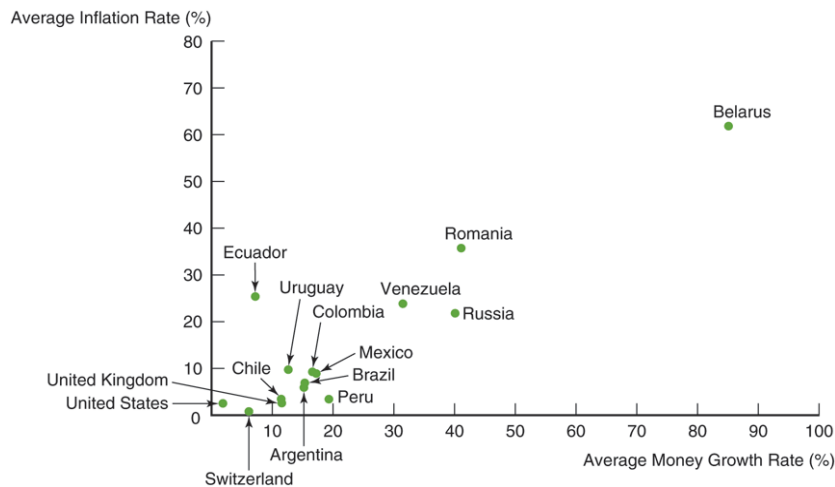
Government intervention



Conclusion:

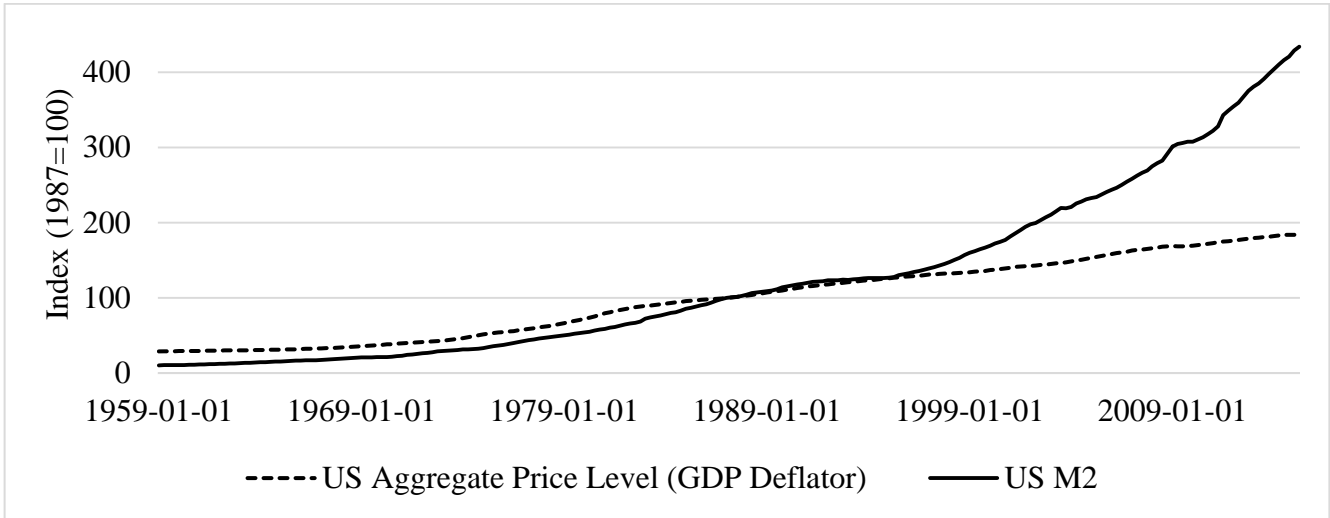
2.0 Inflation

We will now apply our AD-AS model to understand what causes inflation. We will start with the most obvious, money supply growth, and then look at other influences such as government spending, supply shocks, and government budget financing. The figure below provides a cross-section of average inflation rates and average rates of money growth for selected countries from 1997–2007.

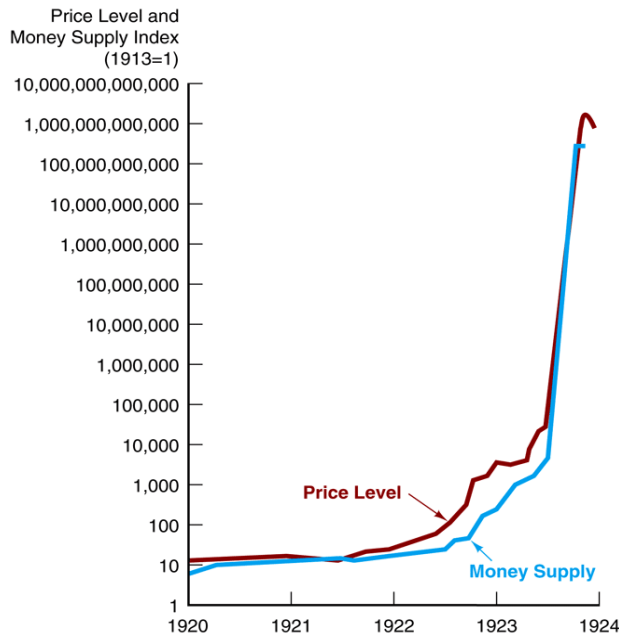


Conclusion:

Data from the United States indicates that increasing the money supply may not affect the price level 1-1: while both indicate correlation, since money supply continues to grow while the deflator does not, this does not imply causation.



❖ We know that correlation exists, how do we prove causation?



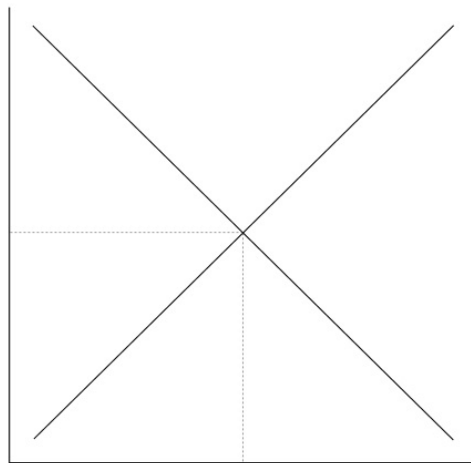
- The invasion of the Ruhr and the printing of currency to pay workers fit the characteristics of an exogenous event.

Only one country has recently topped Germany in the high inflation league. In 2008, Zimbabwe's inflation rate went to over 2 million percent officially (unofficially 10 million percent). In July, the central bank issued a new \$100 billion bank note.

2.1 Meaning of inflation

❖ What does persistent inflation mean?

❖ Suppose a government continually increased printed money. What is the effect on the price level?

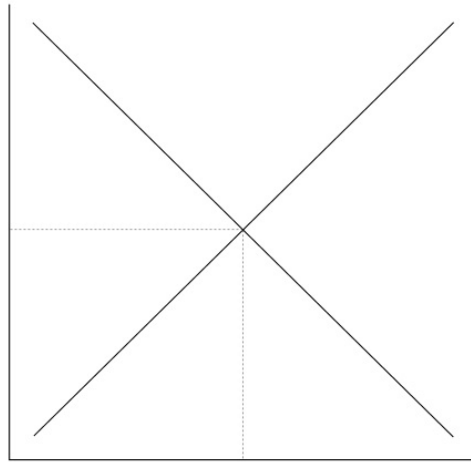


2.2. Other potential factors causing inflation

What other factors produce persistent inflation? There are two candidates: fiscal policy and supply shocks

2.2.1. Government spending

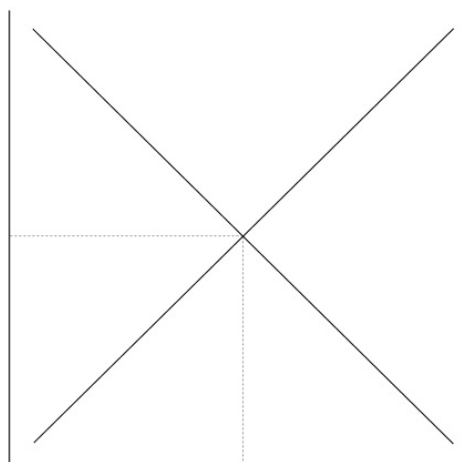
If government spending is one-shot, then this will not cause persistent inflation.



- ❖ What about continuous government spending?

2.2.2. Supply shocks

What happens if there are supply shocks, will that cause persistent inflation?



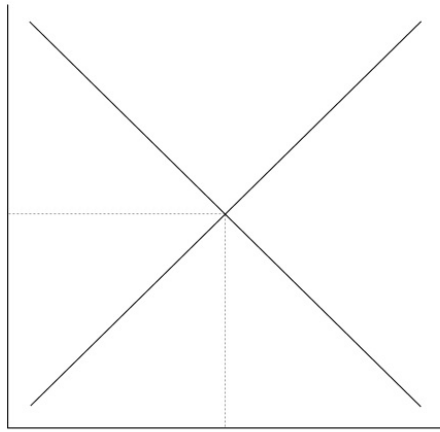
Supply shocks will not cause persistent inflation. The automatic stabilizer kicks in and brings the price back down.

2.3. Origins of inflationary monetary policy

We know what causes persistent inflation – high money supply growth. Why do governments print so much money? What goal is attempting to be achieved by increasing money growth?

- **Cost-push Inflation**
 - Workers push for higher wages.
 - Government reacts to high unemployment through an expansionary policy (increase *AD*).
 - Inflation cannot occur without monetary authorities pursuing an accommodating policy.

- ❖ What does the AD-AS graph look like?

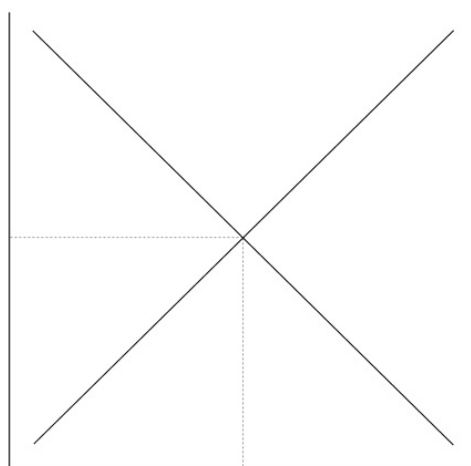


Under the scenario of cost-push, workers are happy since they get higher wages and the government has to solve unemployment. They may seek even higher wages and the government continues to accommodate. This causes persistent inflation.

- **Demand-pull inflation**

- If policymakers set an unemployment target below the natural rate of unemployment, this could cause persistent inflation.
 - Politicians enact policies to increase AD to boost employment to the target.
 - This pushes employment above the natural rate.
 - AS^{SR} contracts.
 - Politicians persist on these expansionary policies.

❖ What does the AD-AS graph look like?



- **Budget deficits**

How the government finances its deficit could cause inflation. The government's budget constraint is:

$$G = T + B + C$$

where government spending (G) can be financed three ways:

- 1) T : Taxes
- 2) B : Issue new debt
- 3) C : Print currency

When a government cannot tax individuals or sell new debt in the form of government bonds, it must finance spending by printing money.

❖ What happens if it finances through issuing new bonds and having the central bank buy them?

Lecture 13: Policy Evaluation

This lecture discusses:

1. The debate on discretionary vs. nondiscretionary policy
2. The effect of expansionary policy on aggregate output
3. The effect of unanticipated and anticipated policy
4. Monetary theory and the great capitol hill babysitting co-op crisis

1. Introduction

Last lecture we found that inflation can persist due to the government attempting to ‘help’ the economy during recessions. There are two camps when it comes to policymaking:

- **Discretionary policy:** Intervention is required whenever the AS^{SR} shifts left by immediately increasing AD (lower taxes, increase government spending, and/or increase money supply).

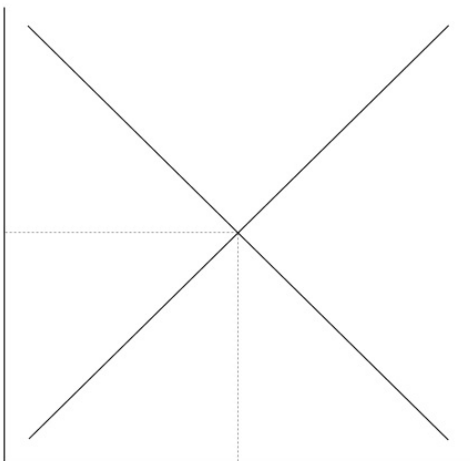
The discretionary policy camp feels that the economy would be better off if high unemployment is eliminated whenever it appears. They regard the self-correcting mechanism to be too slow.

- **Non-discretionary policy:** Discretionary policy produces volatility in both the price level and output.

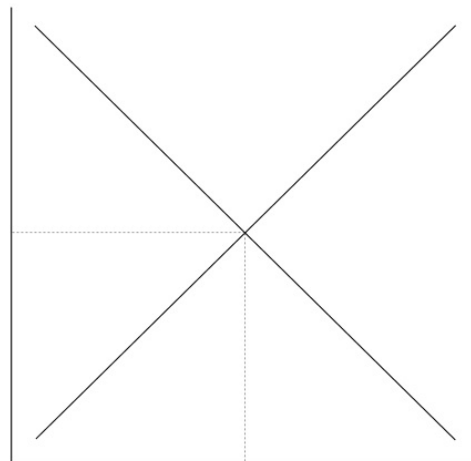
Advocates of nondiscretionary policy believe the government should not get involved.

The two views can be demonstrated graphically using an AS-AD model.

Discretionary policy advocates’
discretionary view on discretionary policy effects



Non-discretionary advocate’s view on
discretionary policy effects



1.1 Difficulties with implementing policy

After WWII, economists made models that described how government policies could be used to manipulate employment and output. During the 60s and 70s, these economists got a chance to put their policies into practice. The results were devastating:

- High unemployment
- High inflation

There were two large lessons that were learned from these experiments.

1. Expectations on how individuals respond to government policy matter.
 - a. The models assumed that individuals' behavior was static.
2. Immediate reaction may not be possible due to:
 - a. Data lag
 - b. Recognition lag
 - c. Legislative lag
 - d. Implementation lag
 - e. Effectiveness lag

1.2. The Lucas Critique

During this era, econometric models were used for two purposes:

- To forecast economic activity
- Policy evaluation

Robert Lucas argued that econometric models could not be relied on to evaluate the potential impact of particular policies on the economy. These models contain equations that describe the relationship among hundreds of variables. These relationships are assumed to remain constant and are estimated using data.

The Lucas critique, based on rational expectations, argues that policy evaluation should not be made with these models.

Why?

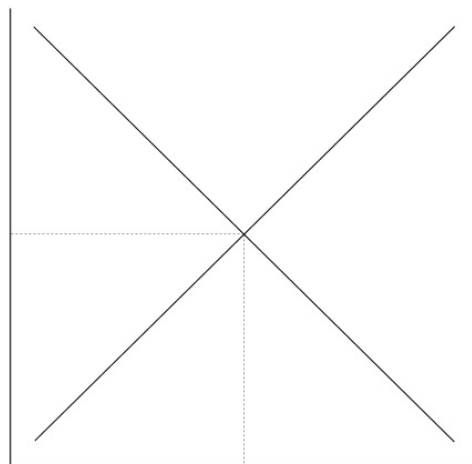
Lucas identified the problem and later provided a solution: The solution was a new class of models called the New Classical Macroeconomic Model. Since this is a classical model, all wages and prices are completely flexible with respect to expected changes in the price level. Workers try to keep their real wages from falling when they expect the price level to rise.

- ❖ What happens when the expected price level rises for some exogenous reason?

1.2.1. Anticipated and unanticipated policies

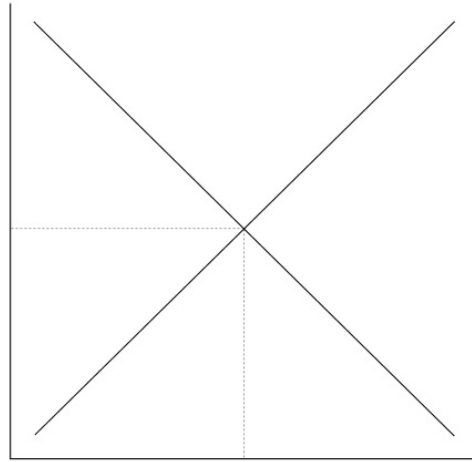
The classical model assumes that all rises in expected price for an exogenous reason do not affect real variables. Suppose that instead of an exogenous cause, the cause was from central bank policy. The effect on prices and output depend on whether the policy is anticipated or unanticipated.

- ❖ What happens if the central bank decides to unexpectedly increase the money supply? What does the AS-AD graph look like?



Conclusion:

- ❖ What happens if the central bank announces to the public that it will increase the money supply and the public believes them? What does the AS-AD graph look like?

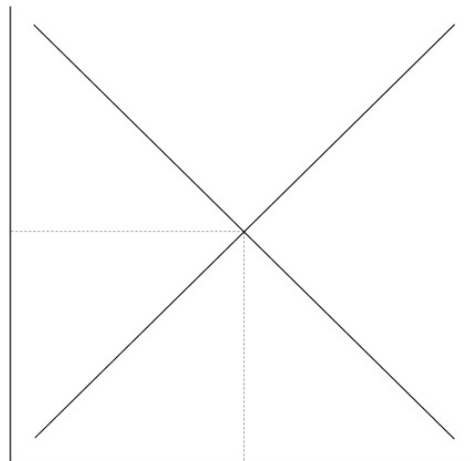


Conclusion:

- ❖ Why does the AS_{SR} curve shift left? **Everyone knows that prices will be higher and demand higher wages.**

The results from the new classical model make it clear that prices and output can be affected but it is a matter of expectations. Suppose the government announces it will increase the money supply. The private sector forms expectations of its effect on output and employment. If these expectations are not fulfilled, then this could cause trouble.

- ❖ Suppose that the public expects the aggregate demand to shift out a lot but AD only shifts to half the distance. What is the effect on prices and output if this occurs?



Conclusion

1.2.2. Implications for policymakers

Distinction between effects of anticipated and unanticipated policy actions

- Anticipated policies have no effect.
- Unanticipated policies have an effect.

Policymakers must know expectations to know outcome of the policy

- Nearly impossible to find out expectations.
- People will adjust expectations guessing what the policymaker will do.

Discretionary policies are no good unless they are unanticipated – this is not satisfactory.

- ❖ Do anticipated policies still have an effect?

1.3. New Keynesian model

Many economists are dissatisfied with the assumption of complete wage and price flexibility in the classical models. There are many examples of inflexibility:

- Labor contracts
- Reluctance by firms to lower wages
- Fixed-price contracts
- Menu costs

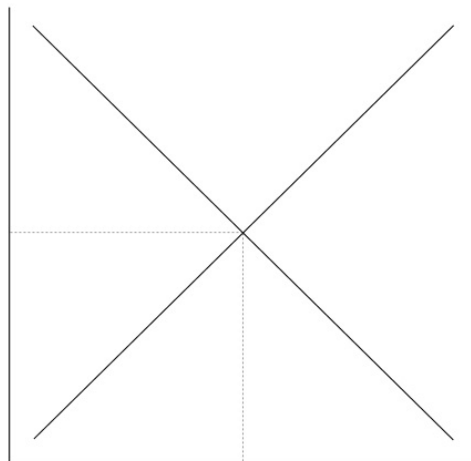
The New Keynesian Model assumes rational expectations but wages and prices are sticky. Under contracts, new information on inflation rate is useless since they cannot adjust wages. Further, most businesses may not want to lower wages when unemployment is high.

- ❖ Why?

- ❖ How do unanticipated and anticipated policies affect prices and output?

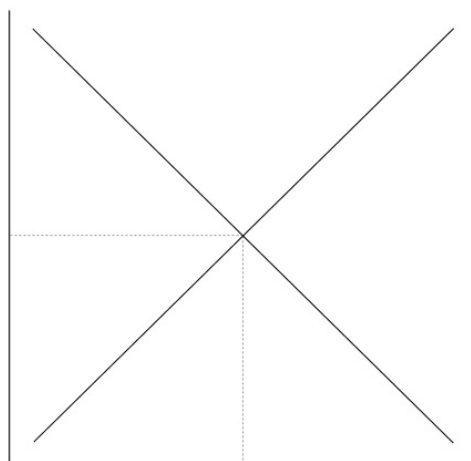
1.3.1. Anticipated and unanticipated policies

- ❖ What happens if the central bank decides to unexpectedly increase the money supply? What does the AS-AD graph look like?



Conclusion:

- ❖ What happens if the central bank announces to the public that it will increase the money supply and the public believes them? What does the AS-AD graph look like?



Conclusion:

Midterm I Information

Layout of exam

- 1) Two workout problem similar to one from the lecture notes or homework
- 2) One workout problem similar to one from the homework
- 3) One additional problem.

Exam setup

- 1) You may use a calculator.
- 2) You may use a foreign language-English dictionary.
- 3) If you have any questions, please come up and see me.
- 4) Answer all questions thoroughly and show all of your work.

What to review

- 1) Lecture notes
- 2) Homeworks
- 3) Self-test quizzes: <http://bcs.worthpublishers.com/ball2/>
- 4) Recommended textbooks.
- 5) Study guide.
- 6) Sample Exam I

Overview of material

Lecture 1: Introduction to Money

- Functions of Money
- Measuring Money

Lecture 2: Introduction to Financial System

- Function of Financial Markets
- Structure of Financial Markets
- Various Markets

Lecture 3: Asset Pricing and the Efficient Market Hypothesis

- The concept of present value
- The classical theory of asset pricing
- Interest rate risk
- Real vs. Nominal interest rates
- The effect of inflation on borrowing
- Competing investment – opportunity cost of an instrument
- Efficient Market Hypothesis

Lecture 4: Determination of Interest Rates

- Loanable Funds Theory
- The Term Structure of Interest Rates
 - Yield curves
 - Expectation theory
 - Segmented market theory
 - Liquidity premium theory
- Risk Structure of Interest Rates (Ball Ch. 4)
 - Default risk
 - Liquidity risk
 - Tax considerations
- After-tax real interest rate

Study Guide

1. Distinguish between direct finance and indirect finance. Which of these is the most important source of funds for corporations in the United States?
2. Would it make sense to buy a house when mortgage rates are 14% and expected inflation is 15%?
3. Corporations receive funds when their stock is sold in the primary market. Why do corporations pay attention to what is happening to their stock in the secondary market?
4. Explain why an expectation of Fed Funds interest rate hikes would cause Treasury prices to fall.
5. If a higher inflation rate is expected, what would you expect to happen to the shape of the yield curve?
6. Suppose Barbara looks out in the morning and sees a clear sky so she decides that a picnic for lunch is a good idea. Last night the weather forecast included a 100% chance of rain by midday but Barbara did not watch the local news program. Is Barbara's prediction of good weather at lunch time rational? Why or why not?
7. What rights does ownership interest give stockholders?
8. The spread between the interest rates on Baa corporate bonds and U.S. government bonds is very large during the Great Depression years 1930-1933. Explain this difference using the bond supply and demand analysis.
9. If the federal government were to raise the income tax rates, would this have any impact on a state's cost of borrowing funds? Explain.

Sample Exam I

1.

(a) Suppose that you make a 4-year deposit of \$1200 at Best Interest Bank, being offered an interest of 12% per year. How much money will you have at maturity (i.e., after 4 years)? What would be the real value of the deposit if the inflation rate is 8% per year?

(b) At the same time, you borrow \$1000 from The Loanshark Inc., through a simple loan with maturity in 4 years and an interest rate of 12%. How much money will you have to pay back at maturity?

(c) The reference interest rate in the economy is 8%. Calculate the present value of your deposit and of your loan and check if you are at a loss or not from this combined transaction.

2. Consider an investment strategy of buying a 5-year U.S. Treasury note (a bond) and then selling it in three years. Explain under what conditions it is possible to earn positive profits from this 'buy', 'hold', and 'sell' strategy. Assume that the face value is \$100 and that this is a zero-coupon bond.

3. Define the term structure of interest rates and provide three empirical facts regarding this structure. Use yield curves to demonstrate these facts.

4. Is it worth to refinance?

Suppose you financed \$100,000 to purchase a home 8 years ago with a fixed-rate 30-year mortgage of 5%. Today, the 30-year mortgage interest rate is 4%.

a. Calculate the monthly mortgage payments under both interest rates.

b. Under what conditions will refinancing make you better off? What rule of thumb should one follow?

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Midterm II Information

Layout of exam

- 1) Two workout problem similar to ones from the lecture notes or homework.
- 2) One workout problem an extension to one from the lecture notes or homework.
- 3) One additional problem.

Exam setup

- 1) You may use a calculator.
- 2) You may use a foreign language-English dictionary.
- 3) If you have any questions, please come up and see me.
- 4) Answer all questions thoroughly and show all of your work.

What to review

- 1) Lecture notes
- 2) Homeworks
- 3) Study guide
- 4) Sample Exam II
- 5) Self-test quizzes: <http://bcs.worthpublishers.com/ball2/>
- 6) Recommended textbooks

Overview of material

Lecture 5: Banks and Bank Regulation

- Bank's balance sheet
- Bank profits
- Managing risk
- Capital requirements

Lecture 7: Portfolio Theory

- Portfolio Theory
- Participants in Securities Markets
- Types of Securities
- Efficient Market Hypothesis

Lecture 6: Asymmetric Information

- An overview of asymmetric information
 - Adverse selection – the lemons problem
- Lemons in the securities market
- Tools to help solve adverse selection problem
- Moral hazard in the securities market
- Tools to solve moral hazard
- The Sarbanes-Oxley (SOX) Act
- Insider trading and conflicts of interest

Lecture 8: The Money Supply Process

- Balance sheets
- Control of the Monetary Base
- Multiple Deposit Creation
- Factors That Determine the Money Supply
- The Money Multiplier

Study Guide

1. Explain the principal-agent problem as it pertains to equity contracts.
2. Because there is an imbalance of information in a lending situation, we must deal with the problems of adverse selection and moral hazard. Define these terms and explain how financial intermediaries can reduce these problems.
3. How does collateral help to reduce the adverse selection problem in credit market?
4. Why does the free-rider problem occur in the debt market?
5. What three types of financial service activities have led to serious conflict of interest problems in financial markets in recent years?
6. The monetary base increased by 20% during the contraction of 1929-1933, but the money supply fell by 25%. Explain why this occurred. How can the money supply fall when the base increases?
7. Assume that no banks hold excess reserves, and the public holds no currency. If a bank sells a \$100 security to the Fed, explain what happens to this bank and two additional steps in the deposit expansion process, assuming a 10% reserve requirement. How much do deposits and loans increase for the banking system when the process is completed?
8. Explain two reasons why the Fed does not have complete control over the level of bank deposits and loans. Explain how a change in either factor affects the deposit expansion process.
9. Explain the Fed's three tools of monetary policy and how each is used to change the money supply. Does each tool affect the monetary base or the money multiplier?
10. If a corporation announces that it expects quarterly earnings to increase by 25% and it actually sees an increase of 22%, what should happen to the price of the corporation's stock if the efficient markets hypothesis holds, everything else held constant?
11. How does a mutual fund lower transaction costs?

Sample Exam II

1. The expected profits of a company depend partially on how hard the manager works. If the manager is lazy, he will surf the Internet all day and the expected profit for the firm are:

\$10,000 with probability of 60%.

\$50,000 with probability of 40%

If the manager works hard, he will incur a 'personal cost' valued at \$1,000 and the expected profit for the firm are:

\$10,000 with probability of 20%.

\$50,000 with probability of 80%

If you were the owner of the company, what fixed percentage of the profits should you offer the manager?

2. Explain five factors that contributed to the U.S. financial crisis of 2008.

3. The Great Rocky Mountain Bank reported an ROE of 15% and an ROA of 1%. How well capitalized is this bank?

5. Assume the monetary base, the currency-deposit ratio, and the reserve-deposit ratio are at their levels in March 2008. The required reserves are 10% and excess reserves are .9% of total deposits, and currency plus deposits is \$1,366 billion. Then the currency-deposit ratio rises from 1.262 to 1.5.
- a. How does the change in the currency-deposit ratio affect the money multiplier, m ? Provide numeric answers.
- b. If the Fed wants to keep the money supply constant, how must it adjust the monetary base when m changes? Provide numeric answers.
- c. Using your numeric answer from part b., what open-market operations are needed to adjust the base and keep the money supply constant?

Final Exam Information

Layout of exam

- 1) Two workout problem similar to one from the lecture notes or homework
- 2) One workout problem similar to one from the homework
- 3) One additional problem.

Exam setup

- 1) You may use a calculator.
- 2) You may use a foreign language-English dictionary.
- 3) If you have any questions, please come up and see me.
- 4) Answer all questions thoroughly and show all of your work.

What to review

- 1) Lecture notes
- 2) Homework
- 3) Self-test quizzes: <http://bcs.worthpublishers.com/ball2/>
- 4) Recommended textbooks
- 5) Study guide
- 6) Sample Exam III

Overview of material

Lecture 9: The Quantity Theories of Money

- Fisher's Quantity Theory of Money
- Keynes' Liquidity Preference Theory
- Friedman's Quantity Theory of Money
- Differences in Keynes and Friedman
- The Economics of a POW camp

Lecture 10: Monetary Tools and Policies

- Tools of the central bank
 - Open market operations
 - Discount policy
 - Reserve & capital requirements
- Monetary targets and goals
 - Monetary aggregate targets
 - Interest rate targets
- Taylor rule
- Asset bubbles and monetary policy

Lecture 11: Exchange Rates and Stabilization Policies

- Exchange rate determination
 - Capital flight
- Exchange rate interventions
 - Interest rate adjustment intervention
- International reserves intervention
 - Sterilized intervention
 - Unsterilized intervention
- Capital controls
- Fixed exchange rate regimes

Lecture 12: The AD-AS and Inflation

- AS-AD model
- Causes of persistent inflation

Lecture 13: Policy Evaluation

- Discretionary/nondiscretionary effects
- The effect of expansionary policy
 - Unanticipated/anticipated policy
- Monetary theory and the great capitol hill babysitting co-op crisis

Study Guide

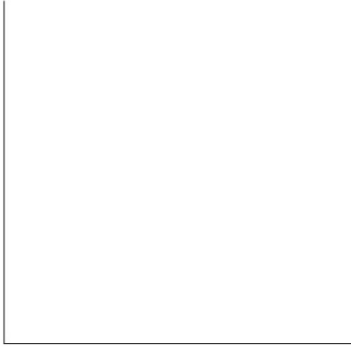
1. Explain the Keynesian theory of money demand. What motives did Keynes think determined money demand? What are the two reasons why Keynes thought velocity could not be treated as a constant?
2. What factors determine money demand in Friedman's modern quantity theory? How does each affect money demand? What determines velocity in Friedman's theory? What effect do interest rates have on velocity?
3. Explain the Fed's three tools of monetary policy and how each is used to change the money supply. Does each tool affect the monetary base or the money multiplier?
4. Using the aggregate demand-aggregate supply model, explain and demonstrate graphically the short-run and long-run effects of an increase in the money supply.
5. Explain and demonstrate graphically the effects of a negative supply shock in both the short-run and long-run.
6. Explain through the component parts of aggregate demand why the aggregate demand curve slopes down with respect to the price level. Be sure to discuss two channels through which changes in prices affect demand.
7. Explain and demonstrate graphically how targeting the federal funds rate can result in fluctuations in non-borrowed reserves.
8. Explain what inflation targeting is. What are the advantages and disadvantages of this type of monetary policy strategy?
9. Suppose the economy is at the natural rate of output. Explain how a tax increase reduces demand and increases unemployment. Why is the speed of the adjustment of wages and/or the role of expectations important in this situation?
10. Explain and show graphically why continuous monetary growth is needed to generate inflation. Describe how the inflation process is generated
11. Explain and show graphically the effect of an increase in the expected future exchange rate on the equilibrium exchange rate, everything else held constant.
12. Assume that a fixed exchange rate is overvalued. Describe the situation of a speculative crisis against this currency. What can the central bank do to defend the currency? Why might the alternative of devaluation be preferable?
13. Demonstrate graphically and explain the short-run and long-run effects of an unanticipated monetary expansion in the new classical model.
14. Explain the Taylor rule, including the formula for setting the federal funds rate target, and the components of the formula. If the Fed were to use this rule, how many goals would it use to set monetary policy?
15. In the new Keynesian model, explain and depict graphically why an expected increase in the money supply increases real output in the short run. What is the long-run result?

Sample Exam III

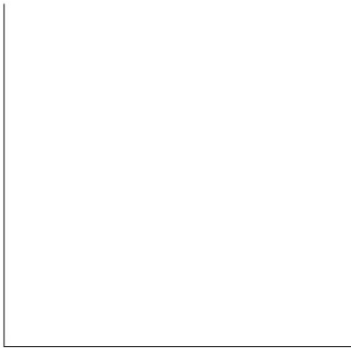
1. What is the relationship between money and output and how does this relate to the fatal flaw in Milton Friedman's optimal monetary policy of setting $\% \Delta MS = \% \Delta Y$ (the growth in the money supply equal to the growth rate of GDP)?

2. Using the supply and demand analysis of the market for reserves, indicate on the graph what happens to the federal funds rate, borrowed reserves, and non-borrowed reserves, holding everything else constant, under the following situations. Assume that NBR intersects demand on its downward sloping portion.

a. The economy is surprisingly strong, leading to an increase in the amount of checkable deposits.



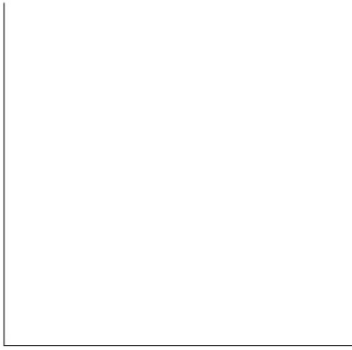
b. Banks expect an unusually large increase in withdrawals from checking accounts.



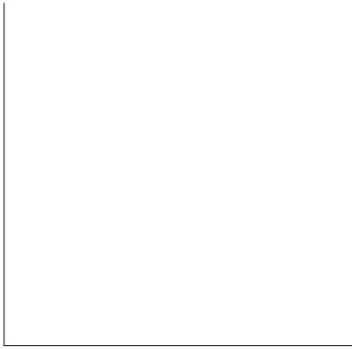
c. The Fed raises the target federal funds rate.



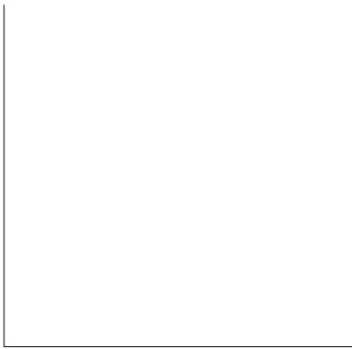
d. The Fed raises the interest rate on reserves above the current equilibrium federal funds rate.



e. Individuals raise their currency-to-deposit ratio.

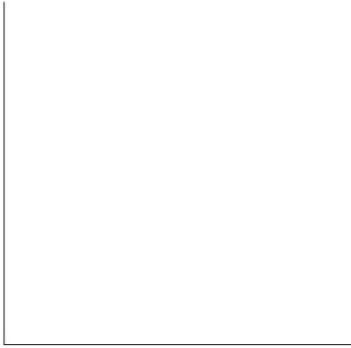


f. The Fed reduces reserve requirements, and conducts an open market sale of securities to maintain the federal funds rate target.



3. Using the AD-AS model, show and describe the effects in both the short and long run of the following situations.

a. The effects of Hurricane Sandy.

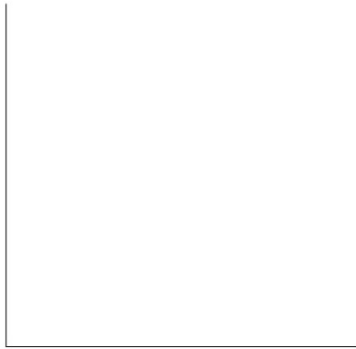


b. The effects of the 2009 stimulus package that encouraged investment in research and development of new technologies and infrastructure investment.

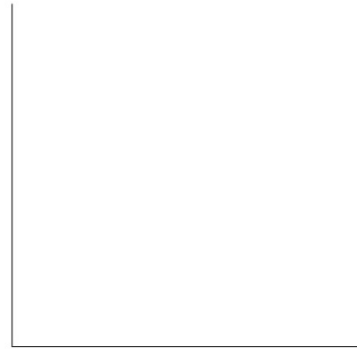


4. Suppose the economy is in recession, and monetary policymakers lower interest rates to stabilize the economy. Use an AD-AS model to demonstrate the effects of a monetary easing when the transmission mechanisms are functioning normally, and when the transmission mechanisms are weak, such as during a deep downturn or when significant financial frictions are present.

Functioning Normally



Significant Financial Frictions



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Group Research Project

Overview

Over the semester, you will write a research paper and present your findings on a topic of your choice. Your topic can be anything related to money, banking, or financial institutions.

- Do not have too broad of topic
 - Smaller topics are easier to get at the analysis.
 - Evaluating the TARP program is too big.
 - Economic analysis is required.

Think of the topic prior to writing about it and formulate an economic analysis. An economic analysis is an explanation of the behavior of individuals, firms, and the governments involved.

- This can be done by using economic theories. This entails:
 - Describing the participants.
 - Laying out assumptions.
 - Discussing incentives and influences on participants.
 - Indicate how participants respond as policy or other influences change.
- May want to include a list of pros and cons, if suitable.
- Useful to Google topic and then click on the ‘more’ and then ‘scholar’ buttons.
- Opportunity to apply the concepts you have learned in class to an issue or area that interests you and for you to show me that you’ve learned to critically analyze a topic.

Previous Topics

- The Effect of China’s FDI Policy on China’s Loanable Funds Market
- Chinese Housing Bubble
- Greece and the Effect on the Euro
- Establishing Agricultural Credit in the Ukraine
- Bank Crisis: Wachovia and Wells Fargo Merge
- MF Global Bankruptcy
- The Volcker Rule and Its Impacts
- Grameen bank
- Payday loans

Due date

The schedule provided in the front of this packet has the dates for group formation and project proposal. For the rough and final drafts of the paper and your presentation, your group will select due dates and provide them with your project proposal.

Deliverables

1. Research proposal
Submit printed copy at the beginning of class.
2. Rough draft
Submit documentation that a group member visited the writing center for editing of rough draft.
Submit printed copy at the beginning of class or put in my mailbox.
3. Final draft
Turn in marked-up rough draft with final draft.
Submit printed copy at the beginning of class or put in my mailbox.
Submit digital copy to D2L to be analyzed by turnitin.com.
4. Presentation
5. 2 multiple choice questions based on your group presentation.
Create 2 multiple choice questions based on your group presentation for the final exam.
Email me the questions and answers.
Example:

How many rounds of Quantitative Easing has the Federal Reserve implemented?

- A. 1.
- B. 3.
- C. 5.
- D. 8.

Answer: B

Grading

The breakdown of grades is as follows: 10 pts. for the proposal, 18 pts. for the presentation, and 72 pts. for the paper. . Grades are determined by the quality of outputs. After the project is completed, each group member will evaluate each group members' level of participation. Those students who inadequately participate will only receive a fraction of the group's grade.

Collaboration

Groups can work in a cloud network (such as google documents). Keep in good contact with each other and if issue arise that cannot be resolved internally, talk with me immediately.

Name: _____
 Group Number: _____

Peer Evaluation on Group Research Project

Individual contribution is important to any team-based collaboration. When group members fail to adequately prepare their parts, the entire group suffers. As such, individuals who do not conduct themselves professionally will be penalized individually. The purpose of this scorecard is to evaluate your group members' participation on constructing your group's research paper and presentation. I will determine a raw score for the team and will apply the individual accumulated percentages to each member for their individual grade. As an evaluator, you will not be asked to confront any of your group members concerning your scores. Please note that low scores due to a lack of ability/scholastic aptitude are unacceptable.

<u>Scale</u>	10	Full participation
	8	Came to all meetings, contributed their assignment, but was not proactive in assuring the project got done.
	6	Came to all meetings but did not contribute
	4	Made a few email/call attempts, seldom came to meetings, and was unprepared
	2	Made a few email/call attempts, but did not attend any meetings
	0	No participation

Please use the above scale to grade each group member's participation (including your own).

Name	Score	Times Absent from Meetings
Me _____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

If any of your scores are below an 8, please provide further details why such a score was given.

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Group Formation and Project Brainstorming Sheet

The topic can be a more thorough investigation of one of the group member's analysis paper topic or any topic in money, banking, or financial institutions. Topics that have been thoroughly discussed in class rarely gain high marks. Previous topics include microfinance, bank mergers, hyperinflation, China's manipulation of exchange rates, and how India has conducted monetary policy given the rise of its middle class.

After the project is completed, each group member will have the chance to rate each group member's level of participation. Those students who inadequately participate will only receive a fraction of the group's grade. Grades are determined by the quality of outputs.

1. Form a group

Select individuals that you think you will work well together. Use below to obtain contact information. Circle best way to contact group member.

1. Name: _____ Email: _____ Phone: _____
2. Name: _____ Email: _____ Phone: _____
3. Name: _____ Email: _____ Phone: _____
4. Name: _____ Email: _____ Phone: _____
5. Name: _____ Email: _____ Phone: _____

2. Brainstorming

Brainstorm on various topics in money, banking, and financial institutions that interest you and your group. When working on a topic, attempt to understand it from an economic point of view. Also, note that the research topic must include the work of two field experts.

Project Proposal

1. Layout of paper proposal

1. Description of topic: 1 quarter-page length paragraph (minimum).
2. Structure of analysis: Include bullet points on main points.
3. Cite sources.
4. Provide due date

2. Due dates

1st draft: _____

Presentation preference date (See course schedule for available presentation dates.):

1. _____

2. _____

3. _____

Final draft (must be after presentation): _____

3. Examples

There are examples of previous' groups paper proposals provided, review them.

Paper Requirements

The research paper is a formal economic analysis that includes a broad overview of the topic, main economic analysis points, and concluding remarks. It is expected that the paper will be free of grammatical mistakes and have one voice. The topic should be of sufficient depths that students will learn something new that they have not learned from taking this course.

1. Paper expectations

1. 2.5 pages per group member excluding graphs.
2. Graphics must be included inside of the paper (not at the end of the paper).
 - a. Use at least 1 table per group member to visualize any numbers.
 - b. Use at least 1 figure per group member to visualize any models.
3. Must include an economic framework to study the topic. Examples include:
 - a. Supply and demand
 - b. Moral hazard
 - c. Adverse selection
 - d. General equilibrium
4. 3-4 sources per group member.
5. Proper citations in APA or MLA.
6. Mandatory sentences
 - i. In the introduction: “Our research topic is “
 - ii. In the conclusion: “We learned that ...”

2. Formatting

1. Use provided template.

3. Researching the topic

While many topics are from the media, research sources must be both non-scientific and scientific. That is, you may use non-scientific sources (Wall Street Journal, The Economist, CNN, etc.), but you must also use academic papers related to your topic. To find academic sources, use google and google scholar. You can also review the reference section of the initial papers found to identify potential sources. There are some other databases that act as depositors of academic and professional articles: SSRN, NBER Working papers, Ebsco, JSTOR, Econ lit, Web of knowledge, Web of science, ideas - <http://ideas.repec.org/>, AEA database.

There is a very convenient Firefox add-on (or stand-alone application) called Zotero. It adds a button in the address bar to add a journal article you are currently viewing to a list that you can manage/edit, export as a bibliography, etc.

4. Tips

1. If unfamiliar with referencing in research papers, get help from MSU's writing center.
2. May find that finding one voice is most easily done by letting one group member thread the parts together.
3. Visual aids greatly assist in explaining what you are saying.
4. Examples of final drafts provided, review them.
5. Follow research paper rubric (on the back of this page).
6. Start early and give yourself plenty of time. This is not a night-before-it-is-due assignment.
7. Make expectations on assignments and due dates clear with names and due dates for the following tasks (at a minimum):
 - a. Introduction
 - b. Body sections
 - i. Economic analysis
 - c. Conclusion
 - d. Piece individual sections together
 - e. Visit to writing center prior to submitting Writing center

Research Paper Rubric

Group: _____

Score: _____

	1	2	3	4	Score
Title Page	Evidence of 2 or less	Evidence of 3	Evidence of four	Title, names, date, neat, no errors	
Introduction	There is no clear introduction or main topic and the structure of the paper is missing.	The introduction states the main topic but does not adequately preview the structure of the paper.	The introduction states the main topic and previews the structure of the paper.	The introduction is engaging, states the main topic and previews the structure of the paper.	
Thesis Statement	Incomplete and/or unfocused.	States the paper’s purpose in a single sentence.	Clearly states the paper’s purpose in a single sentence.	Clearly and concisely states the paper’s purpose in a single sentence, which is engaging, and thought provoking.	
Body	Each paragraph fails to develop the main idea.	Each paragraph lacks supporting detail sentences.	Each paragraph has sufficient supporting detail sentences that develop the main idea.	Each paragraph has thoughtful supporting detail sentences that develop the main idea.	
Conclusion	Incomplete and/or unfocused.	The conclusion does not adequately restate the thesis.	The conclusion restates the thesis.	The conclusion is engaging and restates the thesis.	
Organization	No evidence of structure or organization.	Logical organization; organization of ideas not fully developed.	Paragraph development present but not perfect.	Demonstrate logical and subtle sequencing of ideas through well-developed paragraphs; transitions are used to enhance organization.	
Development of Ideas	Minimal idea development, limited and/or unrelated details.	Unelaborated idea development; unelaborated and/or repetitious details	Depth of idea development supported by elaborated, relevant details	Depth and complexity of ideas supported by rich, engaging and pertinent details; evidence analysis, reflection and insight	
Mechanics	Numerous and distracting errors in punctuation, capitalization and spelling.	Many errors in punctuation, capitalization and spelling.	Almost no errors in punctuation, capitalization and spelling.	No errors in punctuation, capitalization and spelling.	
Usage	Numerous and distracting errors in sentence structure and word usage.	Many errors in sentence structure and word usage.	Almost no errors in sentence structure and word usage.	No errors sentence structure and word usage.	
Citation	Few cited works, both text and visual, are done in the correct format.	Inconsistencies evident.	Some cited works, both text and visual, are done in the correct format.	All cited works, both text and visual, are done in the correct format with no errors.	
References	Done in the correct format with many errors.	Done in the correct format with some errors. Basic Internet sites sourced.	Done in the correct format with few errors.	Done in the correct format with no errors.	

Presentation Requirements

1. Presentation expectations

1. Each group member is assigned 3 minutes each.
 - 1-2 students do introduction/conclusion.
 - 2-3 students do overviews on individual findings.
2. Construct a presentation using Powerpoint, Prezi, or other presentation software.
3. Include visuals to explain points.

2. Layout of presentation is as follows:

1. Introduce topic
 - a. This should include both an oral and visual (if possible) description of the research topic (about 2-3 minutes).
 - b. Mandatory sentence in the introduction: “Our research topic is “
2. Broad overview on findings
 - a. This may include historical contexts, economic framework for the topic, various benefits and costs, other findings which are relevant to the topic
3. Conclusion
 - a. What you learned! (about 2 minutes)
 - b. Mandatory sentence in the conclusion: “We learned that ...”
4. Questions
 - a. Permit 2 minutes for questions.

3. Tips

1. You may find it helpful to write out what you are going to say and practice it a few times.
2. You can bring 3x5 cards as a helper, but you can't read verbatim off of the cards.
3. Visual aids greatly assist in explaining what you are saying.
4. Example of previous year's presentation are provided, review them.
5. Follow group presentation rubric (on the back of this page).
6. Meet together and do a dry run.
7. Time your group as there is a penalty for being going over on time.

Rubric For Evaluating Group Presentations

	1	2	3	4	Score
Organization	Unstructured and strays from the subject. Much of the presentation out of logical order. Goes over time limit.	Somewhat structured but too much time spent on unimportant material. Disjointed sequence.	Mostly structured, precise but parts unconnected to the rest of the presentation.	Well-structured and presented in a logical sequence, used time wisely.	
Subject Knowledge	Do not seem to understand the topic very well.	Show a good understanding of parts of the topic.	Show a good understanding of the topic.	Show a full understanding of the topic.	
Comprehension	Unable to accurately answer questions about the topic.	Able to accurately answer a few questions about the topic.	Able to accurately answer most questions about the topic.	Able to accurately answer almost all questions about the topic.	
Clarity	Unclear and confusing. Not understood.	Somewhat clear but leaves the listener a little lost.	Mostly clear but some confusion in the presentation.	Clear and easily understood.	
Value	Presentation contained little to no valuable material.	Presentation had moments where valuable material was present but as a whole content was lacking.	Presentation had a good amount of material and benefited the class.	Presentation had an exceptional amount of valuable material and was extremely beneficial to the class.	
Depth	Shows a surface knowledge only.	Some understanding of subject but little depth.	Certain areas show depth of thought.	Shows depth of thought.	
Quality of Material	No presentation materials, or material that was inadequate or too small to see.	Some material was of high quality.	Most materials were of high quality with some questionable sources. Some variety.	Presentation materials were high quality and useful.	
Mechanics	Low volume, poor posture, and no eye contact. All are disinterested in the topic.	Low volume, poor posture, and eye contact. Individuals are not very confident or engaging.	Great volume, posture, and eye contact. Individuals are not very confident or engaging.	Great volume, posture, and eye contact. Individuals are confident and engaging.	

Group #

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The Economic Organisation of a P.O.W. Camp

By R. A. RADFORD

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After allowance has been made for abnormal circumstances, the social institutions, ideas and habits of groups in the outside world are to be found reflected in a Prisoner of War Camp. It is an unusual but a vital society. Camp organisation and politics are matters of real concern to the inmates, as affecting their present and perhaps their future existences. Nor does this indicate any loss of proportion. No one pretends that camp matters are of any but local importance or of more than transient interest, but their importance there is great. They bulk large in a world of narrow horizons and it is suggested that any distortion of values lies rather in the minimisation than in the exaggeration of their importance. Human affairs are essentially practical matters and the measure of immediate effect on the lives of those directly concerned in them is to a large extent the criterion of their importance at that time and place. A prisoner can hold strong views on such subjects as whether or not all tinned meats shall be issued to individuals cold or be centrally cooked, without losing sight of the significance of the Atlantic Charter.

One aspect of social organisation is to be found in economic activity, and this, along with other manifestations of a group existence, is to be found in any P.O.W. camp. True, a prisoner is not dependent on his exertions for the provision of the necessaries, or even the luxuries of life, but through his economic activity, the exchange of goods and services, his standard of material comfort is considerably enhanced. And this is a serious matter to the prisoner: he is not "playing at shops" even though the small scale of the transactions and the simple expression of comfort and wants in terms of cigarettes and jam, razor blades and writing paper, make the urgency of those needs difficult to appreciate, even by an ex-prisoner of some three months' standing.

Nevertheless, it cannot be too strongly emphasised that economic activities do not bulk so large in prison society as they do in the larger world. There can be little production; as has been said the prisoner is independent of his exertions for the provision of the necessities and luxuries of life; the emphasis lies in exchange and the media of exchange. A prison camp is not to be compared with the seething crowd of hagglers in a street market, any more than it is to be compared with the economic inertia of a family dinner table.

Naturally then, entertainment, academic and literary interests, games and discussions of the "other world" bulk larger in everyday life than they do in the life of more normal societies. But it would be wrong to underestimate the importance of economic activity. Everyone receives a roughly equal share of essentials; it is by trade that individual preferences are given expression and comfort increased. All at some time, and most people regularly, make exchanges of one sort or another.

Although a P.O.W. camp provides a living example of a simple economy which might be used as an alternative to the Robinson Crusoe economy beloved by the text-books, and its simplicity renders the demonstration of certain economic hypotheses both amusing and instructive, it is suggested that the principal significance is sociological. True, there is interest in observing the growth of economic institutions and customs in a brand new society, small and simple enough to

prevent detail from obscuring the basic pattern and disequilibrium from obscuring the working of the system. But the essential interest lies in the universality and the spontaneity of this economic life; it came into existence not by conscious imitation but as a response to the immediate needs and circumstances. Any similarity between prison organisation and outside organisation arises from similar stimuli evoking similar responses.

The following is as brief an account of the essential data as may render the narrative intelligible. The camps of which the writer had experience were Oflags and consequently the economy was not complicated by payments for work by the detaining power. They consisted normally of between 1,200 and 2,500 people, housed in a number of separate but intercommunicating bungalows, one company of 200 or so to a building. Each company formed a group within the main organisation and inside the company the room and the messing syndicate, a voluntary and spontaneous group who fed together, formed the constituent units.

Between individuals there was active trading in all consumer goods and in some services. Most trading was for food against cigarettes or other foodstuffs, but cigarettes rose from the status of a normal commodity to that of currency. RMk.s existed but had no circulation save for gambling debts, as few articles could be purchased with them from the canteen.

Our supplies consisted of rations provided by the detaining power and (principally) the contents of Red Cross food parcels-tinned milk, jam, butter, biscuits, bully, chocolate, sugar, etc., and cigarettes. So far the supplies to each person were equal and regular. Private parcels of clothing, toilet requisites and cigarettes were also received, and here equality ceased owing to the different numbers dispatched and the vagaries of the post. All these articles were the subject of trade and exchange.

THE DEVELOPMENT AND ORGANISATION OF THE MARKET

Very soon after capture people realised that it was both undesirable and unnecessary, in view of the limited size and the equality of supplies, to give away or to accept gifts of cigarettes or food. "Goodwill" developed into trading as a more equitable means of maximizing individual satisfaction.

We reached a transit camp in Italy about a fortnight after capture and received $\frac{1}{4}$ a Red Cross food parcel each a week later. At once exchanges, already established, multiplied in volume. Starting with simple direct barter, such as a non-smoker giving a smoker friend his cigarette issue in exchange for a chocolate ration, more complex exchanges soon became an accepted custom. Stories circulated of a padre who started off round the camp with a tin of cheese and five cigarettes and returned to his bed with a complete parcel in addition to his original cheese and cigarettes; the market was not yet perfect. Within a week or two, as the volume of trade grew, rough scales of exchange values came into existence. Sikhs, who had at first exchanged tinned beef for practically any other foodstuff, began to insist on jam and margarine. It was realised that a tin of jam was worth 4 lb. of margarine plus something else; that a cigarette issue was worth several chocolate issues: and a tin of diced carrots was worth practically nothing.

In this camp we did not visit other bungalows very much and prices varied from place to place; hence the germ of truth in the story of the itinerant priest. By the end of a month, when we reached our permanent camp, there was a lively trade in all commodities and their relative values were well known, and expressed not in terms of one another-one didn't quote bull in terms of sugar-but in terms of cigarettes. The cigarette became the standard of value. In the permanent camp people started by wandering through the bungalows calling their offers - "cheese for seven" (cigarettes) - and the hours after parcel issue were Bedlam. The inconveniences of this system soon led to its replacement by an Exchange and Mart notice board in every bungalow, where under the headings "name", "room number", "wanted" and "offered" sales and wants were advertised. When a deal went through, it was crossed off the board. The public and semipermanent records of transactions led to cigarette prices being well known and thus tending to equality throughout the camp, although there were always opportunities for an astute trader to make a profit from arbitrage. With this development everyone, including nonsmokers, was willing to sell for cigarettes, using them to buy at another time and place. Cigarettes became the normal currency, though, of course, barter was never extinguished.

The unity of the market and the prevalence of a single price varied directly with the general level of organisation and comfort in the camp. A transit camp was always chaotic and uncomfortable: people were overcrowded, no one knew where anyone else was living, and few took the trouble to find out. Organisation was too slender to include an Exchange and Mart board, and private advertisements were the most that appeared. Consequently a transit camp was not one market but many. The price of a tin of salmon is known to have varied by two cigarettes in 20 between one end of a hut and the other. Despite a high level of organisation in Italy, the market was morcellated in this manner at the first transit camp we reached after our removal to Germany in the autumn of 1943. In this camp- Stalag VIIA at Moosburg in Bavaria-there were up to 50,000 prisoners of all nationalities. French, Russians, Italians and Jugo-Slavs were free to move about within the camp: British and Americans were confined to their compounds, although a few cigarettes given to a sentry would always procure permission for one or two men to visit other compounds. The people who first visited the highly organised French trading centre, with its stalls and known prices, found coffee extract-relatively cheap among the tea-drinking English-commanding a fancy price in biscuits or cigarettes, and some enterprising people made small fortunes that way. (Incidentally we found out later that much of the coffee went "over the wire" and sold for phenomenal prices at black market cafes in Munich: some of the French prisoners were said to have made substantial sums in RMk.s. This has one of the few occasions on which our normally closed economy came into contact with other economic worlds.)

Eventually public opinion grew hostile to these monopoly profits not everyone could make contact with the French - and trading with them was put on a regulated basis. Each group of beds was given a quota of articles to offer and the transaction was carried out by accredited representatives from the British compound, with monopoly rights. The same method was used for trading with sentries elsewhere, as in this trade secrecy and reasonable prices had a peculiar importance, but as is ever the case with regulated companies, the interloper proved too strong.

The permanent camps in Germany saw the highest level of commercial organisation. In addition to the Exchange and Mart notice boards, a shop was organised as a public utility, controlled by representatives of the Senior British Officer. on a no profit basis. People left their surplus

clothing, toilet requisites and food there until they were sold at a fixed price in cigarettes. Only sales in cigarettes were accepted-there was no barter- and there was no haggling. For food at least there were standard prices: clothing is less homogeneous and the price was decided around a norm by the seller and the shop manager-in agreement; shirts would average say 80, ranging from 60 to 120 according to quality and age. Of food, the shop carried small stocks for convenience; the capital was provided by a loan from the bulk store of Red Cross cigarettes and repaid by a small commission taken on the first transactions. Thus the cigarette attained its fullest currency status, and the market was almost completely unified.

It is thus to be seen that a market came into existence without labour or production. The B.R.C.S. map be considered as "Nature" of the text-book, and the articles of trade-food, clothing and cigarettes as free gifts-land or manna. Despite this, and despite a roughly equal distribution of resources, a market came into spontaneous operation, and prices were fixed by the operation of supply and demand. It is difficult to reconcile this fact with the labour theory of value.

Actually there was an embryo labour market. Even when cigarettes were not scarce, there was usually some unlucky person willing to perform services for them. Laundrvmen advertised at two cigarettes a garment. Battle-dress was scrubbed and pressed and a pair of trousers lent for the interim period for twelve. A good pastel portrait cost thirty or a tin of "Kam". Odd tailoring and other jobs similarly had their prices.

There were also entrepreneurial services. There was a coffee stall owner who sold tea, coffee or cocoa at two cigarettes a cup, buying his raw materials at market prices and hiring labour to gather fuel and to stoke; he actually enjoyed the services of a chartered accountant at one stage. After a period of great prosperity he overreached himself and failed disastrously for several hundred cigarettes. Such large-scale private enterprise was rare but several middlemen or professional traders existed. The padre in Italy, or the men at Moosburg who opened trading relations with the French, are examples: the more subdivided the market, the less perfect the advertisement of prices, and the less stable the prices, the greater was the scope for these operators. One man capitalised his knowledge of Urdu by buying meat from the Sikhs and selling butter and jam in return: as his operations became better known more and more people entered this trade, prices in the Indian Wing approximated more nearly to those elsewhere, though to the end a "contact" among the Indians was valuable, as linguistic difficulties prevented the trade from being quite free. Some were specialists in the Indian trade, the food, clothing or even the watch trade. Middlemen traded on their own account or on commission. Price rings and agreements were suspected and the traders certainly co-operated. Nor did they welcome newcomers. Unfortunately the writer knows little of the workings of these people: public opinion was hostile and the professionals were usually of a retiring disposition.

One trader in food and cigarettes, operating in a period of dearth, enjoyed a high reputation. His capital, carefully saved, was originally about 50 cigarettes, with which he bought rations on issue days and held them until the price rose just before the next issue. He also picked up a little by arbitrage; several times a day he visited every Exchange or Mart notice board and took advantage of every discrepancy between prices of goods offered and wanted. His knowledge of prices, markets and names of those who had received cigarette parcels was phenomenal. By these means he kept himself smoking steadily - his profits - while his capital remained intact.

Sugar was issued on Saturday. About Tuesday two of us used to visit Sam and make a deal: as old customers he would advance as much of the price as he could spare then, and entered the transaction in a book. On Saturday morning he left cocoa tins on our beds for the ration, and picked them up on Saturday afternoon. We were hoping for a calendar at Christmas, but Sam failed too. He was left holding a big black treacle issue when the price fell, and in this weakened state was unable to withstand an unexpected arrival of parcels and the consequent price fluctuations. He paid in full, but from his capital. The next Tuesday, when I paid my usual visit he was out of business.

Credit entered into many, perhaps into most, transactions, in one form or another. Sam paid in advance as a rule for his purchases of future deliveries of sugar, but many buyers asked for credit, whether the commodity was sold spot or future. Naturally prices varied according to the terms of sale. A treacle ration might be advertised for four cigarettes now or five next week. And in the future market "bread now" was a vastly different thing from "bread Thursday". Bread was issued on Thursday and Monday, four and three days' rations respectively, and by Wednesday and Sunday night it had risen at least one cigarette per ration, from seven to eight, by supper time. One man always saved a ration to sell then at the peak price: his offer of "bread now" stood out on the board among a number of "bread Monday's" fetching one or two less, or not selling at all - and he always smoked on Sunday night.

The Cigarette Currency

Although cigarettes as currency exhibited certain peculiarities, they performed all the functions of a metallic currency as a unit of account, as a measure of value and as a store of value, and shared most of its characteristics. They were homogeneous, reasonably durable, and of convenient size for the smallest or, in packets, for the largest transactions. Incidentally, they could be clipped or sweated by rolling them between the fingers so that tobacco fell out.

Cigarettes were also subject to the working of Gresham's Law. Certain brands were more popular than others as smokes, but for currency purposes a cigarette was a cigarette. Consequently buyers used the poorer qualities and the Shop rarely saw the more popular brands: cigarettes such as Churchman's No. 1 were rarely used for trading. At one time cigarettes hand-rolled from pipe tobacco began to circulate. Pipe tobacco was issued in lieu of cigarettes by the Red Cross at a rate of 25 cigarettes to the ounce and this rate was standard in exchanges, but an ounce would produce 30 home-made cigarettes. Naturally, people with machine-made cigarettes broke them down and re-rolled the tobacco, and the real cigarette virtually disappeared from the market. Hand-rolled cigarettes were not homogeneous and prices could no longer be quoted in them with safety: each cigarette was examined before it was accepted and thin ones were rejected, or extra demanded as a make-weight. For a time we suffered all the inconveniences of a debased currency.

Machine-made cigarettes were always universally acceptable, both for what they would buy and for themselves. It was this intrinsic value which gave rise to their principal disadvantage as currency, a disadvantage which exists, but to a far smaller extent, in the case of metallic currency; that is, a strong demand for non-monetary purposes. Consequently our economy was

repeatedly subject to deflation and to periods of monetary stringency. While the Red Cross issue of 50 or 25 cigarettes per man per week came in regularly, and while there were fair stacks held, the cigarette currency suited its purpose admirably. But when the issue was interrupted, stocks soon ran out, prices fell, trading declined in volume and became increasingly a matter of barter. This deflationary tendency was periodically offset by the sudden injection of new currency. Private cigarette parcels arrived in a trickle throughout the year, but the big numbers came in quarterly when the Red Cross received its allocation of transport. Several hundred thousand cigarettes might arrive in the space of a fortnight. Prices soared, and then began to fall, slowly at first but with increasing rapidity as stocks ran out, until the next big delivery. Most of our economic troubles could be attributed to this fundamental instability.

Price Movement

Many factors affected prices, the strongest and most noticeable being the periodical currency inflation and deflation described in the last paragraphs. The periodicity of this price cycle depended on cigarette and, to a far lesser extent, on food deliveries. At one time in the early days, before any private parcels had arrived and when there were no individual stocks, the weekly issue of cigarettes and food parcels occurred on a Monday. The non-monetary demand for cigarettes was great, and less elastic than the demand for food: consequently prices fluctuated weekly, falling towards Sunday night and rising sharply on Monday morning. Later, when many people held reserves, the weekly issue had no such effect, being too small a proportion of the total available. Credit allowed people with no reserves to meet their non-monetary demand over the week-end.

The general price level was affected by other factors. An influx of new prisoners, proverbially hungry, raised it. Heavy air raids in the vicinity of the camp probably increased the non-monetary demand for cigarettes and accentuated deflation. Good and bad war news certainly had its effect, and the general waves of optimism and pessimism which swept the camp were reflected in prices. Before breakfast one morning in March of this year, a rumour of the arrival of parcels and cigarettes was circulated. Within ten minutes I sold a treacle ration, for four cigarettes (hitherto offered in vain for three), and many similar deals went through. By 10 o'clock the rumour was denied, and treacle that day found no more buyers even at two cigarettes,

More interesting than changes in the general price level were changes in the price structure. Changes in the supply of a commodity, in the German ration scale or in the make-up of Red Cross parcels, would raise the price of one commodity relative to others. Tins of oatmeal, once a rare and much sought after luxury in the parcels, became a commonplace in 1943, and the price fell. In hot weather the demand for cocoa fell, and that for soap rose. A new recipe would be reflected in the price level: the discovery that raisins and sugar could be turned into an alcoholic liquor of remarkable potency reacted permanently on the dried fruit market. The invention of electric immersion heaters run off the power points made tea, a drug on the market in Italy, a certain seller in Germany.

In August, 1944, the supplies of parcels and cigarettes were both halved. Since both sides of the equation were changed in the same degree, changes in prices were not anticipated. But this was not the case: the non-monetary demand for cigarettes was less elastic than the demand for food,

and food prices fell a little. More important however were the changes in the price structure. German margarine and jam, hitherto valueless owing to adequate supplies of Canadian butter and marmalade, acquired a new value. Chocolate, popular and a certain seller, and sugar, fell. Bread rose; several standing contracts of bread for cigarettes were broken, especially when the bread ration was reduced a few weeks later.

In February, 1945, the German soldier who drove the ration wagon was found to be willing to exchange loaves of bread at the rate of one loaf for a bar of chocolate. Those in the know began selling bread and buying chocolate, by then almost unsaleable in a period of serious deflation. Bread, at about 40, fell slightly; chocolate rose from 15; the supply of bread was not enough for the two commodities to reach parity, but the tendency was unmistakable.

The substitution of German margarine for Canadian butter when parcels were halved naturally affected their relative values, margarine appreciating at the expense of butter. Similarly, two brands of dried milk, hitherto differing in quality and therefore in price by five cigarettes a tin, came together in price as the wider substitution of the cheaper raised its relative value.

Enough has been cited to show that any change in conditions affected both the general price level and the price structure. It was this latter phenomenon which wrecked our planned economy.

PAPER CURRENCY - Bully Marks

Around D-Day, food and cigarettes were plentiful, business was brisk and the camp in an optimistic mood. Consequently the Entertainments Committee felt the moment opportune to launch a restaurant, where food and hot drinks were sold while a band and variety turns performed. Earlier experiments, both public and private, had pointed the way, and the scheme was a great success. Food was bought at market prices to provide the meals and the small profits were devoted to a reserve fund and used to bribe Germans to provide grease-paints and other necessities for the camp theatre. Originally meals were sold for cigarettes but this meant that the whole scheme was vulnerable to the deflationary waves, and furthermore heavy smokers were unlikely to attend much. The whole success of the scheme depended on an adequate amount of food being offered for sale in the normal manner.

To increase and facilitate trade, and to stimulate supplies and customers therefore, and secondarily to avoid the worst effects of deflation when it should come, a paper currency was organised by the Restaurant and the Shop. The Shop bought food on behalf of the Restaurant with paper notes and the paper was accepted equally with the cigarettes in the Restaurant or Shop, and passed back to the Shop to purchase more food. The Shop acted as a bank of issue. The paper money was backed 100 per cent, by food; hence its name, the Bully Mark. The BMk. was backed 100 per cent, by food: there could be no over-issues, as is permissible with a normal bank of issue, since the eventual dispersal of the camp and consequent redemption of all BMk.s was anticipated in the near future.

Originally one BMk. was worth one cigarette and for a short time both circulated freely inside and outside the Restaurant. Prices were quoted in BMk.s and cigarettes with equal freedom and for a short time the BMk. showed signs of replacing the cigarette as currency. The BMk. was tied

to food, but not to cigarettes: as it was issued against food, say 45 for a tin of milk and so on, any reduction in the BMk. prices of food would have meant that there were unbacked BMk.s in circulation. But the price of both food and BMk.s could and did fluctuate with the supply of cigarettes.

While the Restaurant flourished, the scheme was a success: the Restaurant bought heavily, all foods were saleable and prices were stable.

In August parcels and cigarettes were halved and the Camp was bombed. The Restaurant closed for a short while and sales of food became difficult. Even when the Restaurant reopened, the food and cigarette shortage became increasingly acute and people were unwilling to convert such valuable goods into paper and to hold them for luxuries like snacks and tea. Less of the right kinds of food for the Restaurant were sold, and the Shop became glutted with dried fruit, chocolate, sugar, etc., which the Restaurant could not buy. The price level and the price structure changed. The BMk. fell to four-fifths of a cigarette and eventually farther still, and it became unacceptable save in the Restaurant. There was a flight from the BMk., no longer convertible into cigarettes or popular foods. The cigarette re-established itself.

But the BMk. was sound! The Restaurant closed in the New Year with a progressive food shortage and the long evenings without lights due to intensified Allied air raids, and BMk.s could only be spent in the Coffee Bar-relict of the Restaurant- or on the few unpopular foods in the Shop, the owners of which were prepared to accept them. In the end all holders of BMk.s were paid in full, in cups of coffee or in prunes. People who had bought BMk.s for cigarettes or valuable jam or biscuits in their heyday were aggrieved that they should have stood the loss involved by their restricted choice, but they suffered no actual loss of market value.

Price Fixing

Along with this scheme came a determined attempt at a planned economy, at price fixing. The Medical Officer had long been anxious to control food sales, for fear of some people selling too much, to the detriment of their health. The deflationary waves and their effects on 4 prices were inconvenient to all and would be dangerous to the Restaurant which had to carry stocks. Furthermore, unless the BMk. was convertible into cigarettes at about Dar it had little chance of gaining confidence and of succeeding as a currency. As has been explained, the BMk. was tied to food but could not be tied to cigarettes, which fluctuated in value. Hence, while BMk. prices of food were fixed for all time, cigarette prices of food and BMk.s varied.

The Shop, backed by the Senior British Officer, was now in a position to enforce price control both inside and outside its walls. Hitherto a standard price had been fixed for food left for sale in the shop, and prices outside were roughly in conformity with this scale, which was recommended as a "guide" to sellers, but fluctuated a good deal around it. Sales in the Shop at recommended prices were apt to be slow though a good price might be obtained: sales outside could be made more quickly at lower prices. (If sales outside were to be at higher prices, goods were withdrawn from the Shop until the recommended price rose: but the recommended price was sluggish and could not follow the market closely by reason of its very purpose, which was stability.) The Exchange and Mart notice boards came under the control of the Shop: advertisements which

exceeded a 5 per cent departure from the recommended scale were liable to be crossed out by authority: unauthorised sales were discouraged by authority and also by public opinion, strongly in favour of a just and stable price. (Recommended prices were fixed partly from market data, partly on the advice of the M.O.)

At first he recommended scale was a success: the Restaurant- a big buyer, kept prices stable around this level: opinion and the 5 per cent tolerance helped. But when the price level fell with the August cuts and the price structure changed, the recommended scale was too rigid. Unchanged at first, as no deflation was expected, the scale was tardily lowered, but the prices of goods on the new scale remained in the same relation to one another, owing to the BMk. while on the market the price structure had changed. And the modifying influence of the Restaurant had gone. The scale has moved up and down several times, slowly following the inflationary and deflationary waves, but it was rarely adjusted to changes in the price structure. More and more advertisements were crossed off the board, and black market sales at unauthorised prices increased: eventually public opinion turned against the recommended scale and authority gave up the struggle. In the last few weeks, with unparalleled deflation, prices fell with alarming rapidity, no scales existed, and supply and demand, alone and unmellowed, determined prices.

Public Opinion

Public opinion on the subject of trading was vocal if confused and changeable, and generalisations as to its direction are difficult and dangerous. A tiny minority held that all trading was undesirable as it engendered an unsavoury atmosphere; occasional frauds and sharp practices were cited as proof. Certain forms of trading were more generally condemned; trade with the Germans was criticised by many, Red Cross toilet articles, which were in short supply and only issued in cases of actual need, were excluded from trade by law and opinion working in unshakable harmony. At one time, when there had been several cases of malnutrition reported among the more devoted smokers, no trade in German rations was permitted, as the victims became an additional burden on the depleted food reserves of the Hospital. But while certain activities were condemned as antisocial, trade itself was practised, and its utility appreciated, by almost everyone in the camp.

More interesting was opinion on middlemen and prices. Taken as a whole, opinion was hostile to the middleman. His function, and his hard work in bringing buyer and seller together, were ignored; profits were not regarded as a reward for labour, but as the result of sharp practices. Despite the fact that his very existence was proof to the contrary, the middleman was held to be redundant in view of the existence of an official Shop and the Exchange and Mart. Appreciation only came his way when he was willing to advance the price of a sugar ration, or to buy goods spot and carry them against a future sale. In these cases the element of risk was obvious to all, and the convenience of the service was felt to merit some reward. Particularly unpopular was the middleman with an element of monopoly, the man who contacted the ration wagon driver, or the man who utilised his knowledge of Urdu. And middlemen as a group were blamed for reducing prices. Opinion notwithstanding, most people dealt with a middleman, whether consciously or unconsciously, at some time or another.

There was a strong feeling that everything had its "just price" in cigarettes. While the assessment of the just price, which incidentally varied between camps, was impossible of explanation, this price was nevertheless pretty closely known. It can best be defined as the price usually fetched by an article in good times when cigarettes were plentiful. The "just price" changed slowly; it was unaffected by short-term variations in supply, and while opinion might be resigned to departures from the "just price", a strong feeling of resentment persisted. A more satisfactory definition of the "just price" is impossible. Everyone knew what it was, though no one could explain why it should be so.

As soon as prices began to fall with a cigarette shortage, a clamour arose, particularly against those who held reserves and who bought at reduced prices. Sellers at cut prices were criticised and their activities referred to as the black market. In every period of dearth the explosive question of "should non-smokers receive a cigarette ration?" was discussed to profitless length. Unfortunately, it was the non-smoker, or the light smoker with his reserves, along with the hated middleman, who weathered the storm most easily.

The popularity of the price-fixing scheme, and such success as it enjoyed, were undoubtedly the result of this body of opinion. On several occasions the fall of prices was delayed by the general support given to the recommended scale. The onset of deflation was marked by a period of sluggish trade; prices stayed up but no one bought. Then prices fell on the black market, and the volume of trade revived in that quarter. Even when the recommended scale was revised, the volume of trade in the Shop would remain low. Opinion was always overruled by the hard facts of the market.

Curious arguments were advanced to justify price fixing. The recommended prices were in some way related to the calorific values of the foods offered: hence some were overvalued and never sold at these prices. One argument ran as follows:-not everyone has private cigarette parcels: thus, when prices were high and trade good in the summer of 1944, only the lucky rich could buy. This was unfair to the man with few cigarettes. When prices fell in the following winter, prices should be pegged high so that the rich, who had enjoyed life in the summer, should put many cigarettes into circulation. The fact that those who sold to the rich in the summer had also enjoyed life then, and the fact that in the winter there was always someone willing to sell at low prices were ignored. Such arguments were hotly debated each night after the approach of Allied aircraft extinguished all lights at 8 p.m. But prices moved with the supply of cigarettes, and refused to stay fixed in accordance with a theory of ethics.

CONCLUSION

The economic organisation described was both elaborate and smooth-working in the summer of 1944. Then came the August cuts and deflation. Prices fell, rallied with deliveries of cigarette parcels in September and December, and fell again. In January, 1945, supplies of Red Cross cigarettes ran out: and prices slumped still further: in February the supplies of food parcels were exhausted and the depression became a blizzard. Food, itself scarce, was almost given away in order to meet the non-monetary demand for cigarettes. Laundries ceased to operate, or worked for £s or RMk.s: food and cigarettes sold for fancy prices in £s, hitherto unheard of. The Restaurant was a memory and the BMk. a joke. The Shop was empty and the Exchange and Mart

notices were full of unaccepted offers for cigarettes. Barter increased in volume, becoming a larger proportion of a smaller volume of trade. This, the first serious and prolonged food shortage in the writer's experience, caused the price structure to change again, partly because German rations were not easily divisible. A margarine ration gradually sank in value until it exchanged directly for a treacle ration. Sugar slumped sadly. Only bread retained its value. Several thousand cigarettes, the capital of the Shop, were distributed without any noticeable effect. A few fractional parcel and cigarette issues, such as one-sixth of a parcel and twelve cigarettes each, led to momentary price recoveries and feverish trade, especially when they coincided with good news from the Western Front, but the general position remained unaltered.

By April, 1945, chaos had replaced order in the economic sphere: sales were difficult, prices lacked stability. Economics has been defined as the science of distributing limited means among unlimited and competing ends. On 12th April, with the arrival of elements of the 30th U.S. Infantry Division, the ushering in of an age of plenty demonstrated the hypothesis that with infinite means economic organization and activity would be redundant, as every want could be satisfied without effort.

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Monetary Theory and the Great Capitol Hill Baby Sitting Co-op Crisis: Comment
By Joan Sweeney and Richard James Sweeney

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Two of Washington D.C.'s most splendid institutions—the Board of Governors of the Federal Reserve System and the Capitol Hill Baby Sitting Co-operative—are currently fighting their own separate battles against the scourge of inflation. Neither seems to be winning.

Whatever the lessons of the board's experience, the lessons from the co-op's are clear. (1) The co-op has been increasing its money supply ("scrip") per capita, by running budget deficits, and this has generated inflationary forces. (2) However, the main "commodity" this scrip money buys is baby-sitting time, and the price of babysitting is constitutionally pegged at one unit of scrip for every one-half hour of babysitting. Hence, this system of price controls means the inflationary pressure does not drive up the scrip-price of babysitting, inflation is suppressed, and shortages are found. (3) The political process of rectifying the situation holds little hope. Few members see the problem as fundamentally monetary, but instead believe others are not doing their part in removing the shortages.

For the uninitiated, it may help to know that there are several forms of babysitting co-ops. One popular form is the bookkeeping system. In the most rudimentary version, members earn one credit for each hour of sitting, and lose one credit for every hour someone tolerates their kids. A co-op at this stage develops rules—for fairness, usefulness, for expediency—and to make the thing go at all. For example, people want to go out on Friday and Saturday more than on other days. Either there are rules—"If you go out on weekends, you must sit on weekends"—or there are rewards—"Time-and-a-half on weekends." And, of course, there must be rules to keep people from moving away when they're "down" on hours.

The major alternative to the bookkeeping system, if there are many people involved, is a "scrip" system—the scrip is pieces of heavy paper. In the Capitol Hill Baby Sitting Co-op, a splendid organization to which we belonged for two years, a unit of scrip "pays" for one-half hour of sitting time. There are good reasons for preferring scrip to bookkeeping. An arithmetic bookkeeping mistake will show members as a whole "ahead" or "down" in hours, and the problem can be hard to resolve. With scrip, the hours earned automatically cancel against the hours spent when the sitter is "paid."

The co-op has enjoyed vicissitudes that make Nixonomics look good by contrast. A few years ago the co-op had a recession. Few people felt they could go out but many wanted to babysit. Now there is great difficulty rounding up sitters for all those who want to go out. This is a classic sort of inflationary pressure—too much money (scrip) chasing too few goods (sitters).

In the previously mentioned bad old days, according to long-time members, there was a shortage of scrip. There was so little scrip to go around that holders were reluctant to squander it by going out. Those who wanted to go out but didn't have scrip were desperate to get sitting jobs. The scrip-price of babysitting couldn't adjust, and the shortage worsened. The co-op even passed a rule that everyone must go out at least once every six months. The thinking was that some

members were shirking, not going out enough, displaying the antisocial ways and bad morals that were destroying the co-op. Hence the bylaw to correct morals.

This tacky coercion naturally failed to solve the problem, but created excessive heartburn all around. In the end, despair forced resort to monetary policy-each current member was given ten more hours of scrip. New members had been given twenty hours and required to pay back twenty when leaving-now they were given thirty and required to pay back only twenty. And, behold, just as even our monetary authorities might predict, were they given to accurate predictions, the problem went away. There shortly arrived a balance between those who wanted to go out and those who wanted to sit. A golden age, on a minor scale. Those people who previously hadn't wanted to go out must have changed their morals-or maybe it was the ten hours all around.

Whatever the cause, the golden age lasted only a couple of years. (Golden ages are like that.) Maybe morals deteriorated-or perhaps the scrip was again out of whack. Now the problem was that more people wanted to go out than to sit. In fact, the ten-scrip reform has moved the co-op from a position where there was too little scrip and the amount was shrinking, to a position where there was just about the right amount of scrip but the amount was growing. After a while, it naturally followed there was too much scrip and more people wanted to go out than to sit.

A little arithmetic limns the current tragedy. First, consider co-op "expenses." Each "monthly secretary" (the poor person who gets all the requests for sitters and tries to fill them) receives 1 hour per month for every member-family in his section, and there are now four sections. Using the average membership of 150 for 1973 for convenience, these monthly secretaries "cost" the co-op 1,800 hours per year. The officers of the co-op are even more underpaid - they earn 102 hours per year. So with 150 members, yearly expenses are 1,902 hours.

But each member-family pays yearly dues of 14 hours, so total co-op "income" is 2,100 hours per year. With no membership turnover, then, co-op outgo would be 1,902, and the amount of scrip outstanding would fall by 198 hours per year. So if the amount outstanding this year is just right, next year it will be 198 hours too small. Since 4,500 hours (equal to 30 hours times 150 members) are initially outstanding, in somewhat under 30 years there would be no scrip outstanding - no one could go out. (Do I hear a small voice saying all the children would be grown anyway?)

This would be a "depression" (compared to the previous recession), and the co-op is saved from this (and from running out of children) by membership turnover. Recall, each new member is given 30 hours and pays only 20 when leaving. Thus, a one-family turnover that does not change total membership increases this total volume of scrip outstanding by 10 hours. The amount of scrip will expand by 200 hours per year if the turnover is 20 families annually; the 192-hour shrinkage noted above is offset by the 20 X 10 hours, or since 20/150 is 7.5 percent, if the turnover exceeds 7.5 percent the amount of scrip will grow. Sadly for domestic tranquility, the turnover rate has somewhat exceeded 7.5 percent, being approximately 20 percent in 1973-74.

Now, whoever promised that 7.5 percent would always be "it"? Indeed, given ups and downs, how many years in a row above or below 7.5 percent can the co-op take before it falls apart, even if the average is 7.5 percent?

It is not surprising that some members want to remedy the situation with rules to force sitting by those members who are shirking their duty. Indeed, a truth squad is envisaged to find out why individuals aren't sitting enough.

The important thing, of course, is what to do to make things work right. The short-run answer is to make the "income" and "outgo" mesh with the turnover rate. As things now stand, there is too much scrip outstanding and it is growing - one good idea is to reduce the amount through a one-time tax. But this would have to be repeated over and over, to mop up the growth in scrip due to membership turnover. Each time, it would require a majority vote in favor of this in a referendum where a certain minimum number vote. Unhappily, the minimum number seldom votes in the co-op's referenda. Sadly, giving more discretionary power to the officers, or changing the charter generally, also requires a majority with the same minimum number of votes.

Oh, how often does voter apathy tie the hands of those who serve! If the officers had the power of the United States president, what might they not do to improve welfare and well-being? It seems unlikely the co-op would be taken over by evil people to abuse power-there are better outlets in town for that sort of thing. But it does seem that even goodhearted people can err in their policies: consider the goodhearted people, by and large Washington lawyers, who designed the co-op's economic system (the rules fill seven pages of legal paper, single-spaced). The proponents of a truth squad to make sure members sit often enough seem also to have hit on the wrong solution.

The monetary nature of the co-op crisis is clear (to you and us). The recession - inflation seesaw developed when the number of units of scrip per member got out of line. Very well. Get it back in line and see to it that turnover and growth (or shrinkage) cannot change this ratio. There are lots of ways to do this, though the tendency to look for moral failings as the cause of difficulties makes discretion in the hands of the officers more than a bit iffy. One way to cut the knot is to fix the number of units per member at an amount that seems right on the basis of past ups and downs, and freeze the ratio there. Of course, the ratio may be a little off and the "best" ratio may change from time to time. But this may merely be the cost of avoiding a conversation grilling you about why you haven't sat for four weeks. Unfortunately, the co-op members seem not to understand all this. When crisis finally stirs the majority to action, who can say monetary wisdom will prevail. There are a few practical morals to draw from this unhappy tale. One is that the co-op is an organization of persons, with social and personal relations-and it's also an economy. It is simply foolish not to design the management of the economy right to begin with. The main lesson may be that there is an economy embedded in many social relationships, and while a well-run economy is no guarantee of love and peace and happiness, a poorly run economy may well prevent these goodies. Now, if goodhearted people in an area that offers little scope for chicanery can so bungle economic management, can we really be surprised at the results of turning our economy over to the tender mercies of political experts? Indeed, unlike the co-op, the national economy seems virtually indestructible, not having died yet.

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The Great Experiment

The original goal of the Great Experiment that was the founding of the Fed was the preservation of financial stability. In the words of one of the authors of the Federal Reserve Act, Robert Latham Owen (1919, p. 24), the Federal Reserve was established to “provide a means by which periodic panics which shake the American Republic and do it enormous injury shall be stopped.”

At the time, the standard view of financial panics was that they were triggered when the needs of business and agriculture for liquid funds outstripped the available supply — as when seasonal plantings or shipments of crops had to be financed, for example— and that panics were further exacerbated by the incentives of banks and private individuals to hoard liquidity during such times (Warburg 1914). The new institution was intended to relieve such strains by providing an “elastic” currency: that is, by providing liquidity as needed to individual member banks through the discount window. Commercial banks, in turn, would then be able to accommodate their customers. Interestingly, although congressional advocates hoped the creation of the Fed would help prevent future panics, they did not fully embrace the idea that the Fed should help end ongoing panics by serving as lender of last resort, as had been famously recommended by the British economist and writer Walter Bagehot (1873 [1897]), the source of the classic dictum that central banks should address panics by lending freely at a penalty rate (see also Willis 1923, p. 1407; Carlson and Wheelock 2012; Bordo and Wheelock 2013). Instead, legislators imposed limits on the Federal Reserve’s ability to lend in response to panics, for example, by denying nonmember banks access to the discount window and by restricting the types of collateral that the Fed could accept.

Soon after the Federal Reserve was founded in 1913, its mission shifted to supporting the war effort and then to managing the unwinding of that support. The year 1923 was thus one of the first in which the Federal Reserve confronted normal peacetime financial conditions, and it took the opportunity to articulate its views on the appropriate conduct of policy in such conditions in the Tenth Annual Report of the Federal Reserve Board (Board of Governors 1924).

The framework that the Federal Reserve employed in these early years to promote financial stability reflected in large measure the fact that the United States was on the gold standard as well as the influence of the so-called “real bills” doctrine.

In the real bills doctrine, the Federal Reserve saw its function as meeting the needs of business for liquidity— consistent with the idea of providing an elastic currency— with the ultimate goal of supporting financial and economic stability. When business activity was increasing, the Federal Reserve would seek to accommodate the need for credit by supplying liquidity to banks; when business was contracting and less credit was needed, the Fed would then reduce the liquidity in the system. The policy framework of the Fed’s early years has been much criticized in retrospect. Economic historians have pointed out that, under the real bills doctrine, the Fed increased the money supply precisely at those times at which business activity and upward pressures on prices were strongest; that is, monetary policy was procyclical. Thus, the

Fed's actions tended to increase rather than decrease the volatility in economic activity and prices (Friedman and Schwartz 1963; Humphrey 1982; Meltzer 2003).

As noted, the Federal Reserve pursued its real bills approach in the context of the gold standard. In the 1920s, Federal Reserve notes were redeemable in gold on demand, and the Fed was required to maintain a gold reserve equal to 40 percent of outstanding notes. In principle, the gold standard should limit discretion by monetary policymakers, but in practice US monetary policy did not appear to be greatly constrained in the years after the Fed's founding. Indeed, the large size of the US economy, together with the use of market interventions that prevented inflows and outflows of gold from being fully translated into changes in the domestic money supply, gave the Federal Reserve considerable scope during the 1920s to conduct monetary policy according to the real bills doctrine without much hindrance from the gold standard.

I've discussed the original mandate and early policy framework of the Federal Reserve. What about its accountability to the public? When the Federal Reserve was established, the question of whether it should be a private or a public institution was highly contentious. The compromise solution created a hybrid Federal Reserve System. The system was headed by a federally appointed Board of Governors, which initially included the Secretary of the Treasury and the Comptroller of the Currency. However, the 12 regional Reserve Banks were placed under a mixture of public and private oversight, including board members drawn from the private sector, and they were given considerable scope to make policy decisions that applied to their own districts. For example, Reserve Banks were permitted during this time to set their own discount rates, subject to a minimum set by the Board of Governors.

While the founders of the Federal Reserve hoped that this new institution would provide financial and hence economic stability, the policy framework and the institutional structure would prove inadequate to the challenges the Fed would soon face.

The Great Depression

The Great Depression was the Federal Reserve's most difficult test. Tragically, the Fed failed to meet its mandate to maintain financial stability. In particular, although the Fed provided substantial liquidity to the financial system following the 1929 stock market crash, its response to the subsequent banking panics of the 1930s was limited at best; the widespread bank failures and the collapse in money and credit that ensued were major sources of the economic downturn. Bagehot's dictum to lend freely at a penalty rate in the face of panic appeared to have few adherents at the Federal Reserve of that era (Friedman and Schwartz 1963).

Economists have also identified a number of instances from the late 1920s to the early 1930s when Federal Reserve officials, in the face of the sharp economic contraction and financial upheaval, either tightened monetary policy or chose inaction. Some historians trace these policy mistakes to the early death in 1928 of Benjamin Strong, Governor of the Federal Reserve Bank of New York, which left the decentralized system without an effective leader (for example, Friedman and Schwartz 1963, chapter 7). This hypothesis, whether valid or not, raises the interesting question of what intellectual framework an effective leader would have drawn on at the time to develop and justify a more activist monetary policy. The degree to which the gold standard actually constrained US monetary policy during the early 1930s is debated; but, in any case, the gold standard philosophy clearly did not encourage the sort of highly expansionary policies that were needed. The same can be said for the real bills doctrine, which apparently led policymakers to conclude, on the basis of low nominal interest rates and low borrowings from

the Fed, that monetary policy was appropriately supportive and that further actions would be fruitless (Meltzer 2003; Romer and Romer 2013). Historians have also noted the prevalence at the time of yet another counterproductive doctrine: the so-called “liquidationist view” that depressions perform a necessary cleansing function (as discussed, for example, in DeLong 1990). It may be that the Federal Reserve suffered less from lack of leadership in the 1930s than from the lack of an intellectual framework for understanding what was happening and what needed to be done.

The Fed’s inadequate policy framework ultimately collapsed under the weight of economic failures, new ideas, and political developments. The international gold standard was abandoned during the 1930s. The real bills doctrine lost prestige after the disaster of the 1930s; for example, the Banking Act of 1935 amended section 12A(c) of the Federal Reserve Act so as to instruct the Federal Reserve to use open market operations with consideration of “the general credit situation of the country,” not just to focus narrowly on short-term liquidity needs. The Congress also expanded the Fed’s ability to provide credit through the discount window, allowing loans to a broader array of counterparties, secured by a broader variety of collateral.

The experience of the Great Depression had major ramifications for all three aspects of the Federal Reserve I am discussing: its goals, its policy framework, and its accountability to the public. With respect to goals, the high unemployment of the Depression—and the fear that high unemployment would return after World War II—elevated the maintenance of full employment as a goal of macroeconomic policy. The Employment Act of 1946 made the promotion of employment a general objective for the federal government. Although the Fed did not have a formal employment goal until the Federal Reserve Reform Act of 1977 codified “maximum employment,” along with “stable prices,” as part of the Fed’s so-called dual mandate, earlier legislation nudged the central bank in that direction.⁷ For example, legislators described the intent of the Banking Act of 1935 as follows: “To increase the ability of the banking system to promote stability of employment and business, insofar as this is possible within the scope of monetary action and credit administration” (US Congress 1935). At the same time, the Federal Reserve became less focused on its original mandate of preserving financial stability, perhaps in part because it felt superseded by the creation during the 1930s of the Federal Deposit Insurance Corporation and the Securities and Exchange Commission, along with other reforms intended to make the financial system more stable.

In the area of governance and accountability to the public, policymakers also recognized the need for reforms to improve the Federal Reserve’s structure and decision-making. The Banking Act of 1935 simultaneously bolstered the legal independence of the Federal Reserve and provided for stronger central control by the Federal Reserve Board. In particular, the act created the modern configuration of the Federal Open Market Committee (FOMC), giving the Board the majority of votes on the Committee, while removing the Secretary of the Treasury and the Comptroller of the Currency from the Board. In practice, however, the US Treasury continued to have considerable sway over monetary policy after 1933, with Meltzer (2003) describing the Fed as “in the back seat.” During World War II, the Federal Reserve used its tools to support the war financing efforts by holding interest rates and government borrowing costs low. Even after the war, Federal Reserve policy remained subject to considerable Treasury influence. It was not until the 1951 Accord with the Treasury that the Federal Reserve began to recover genuine independence in setting monetary policy.

The Great Inflation and Disinflation

Once the Federal Reserve regained its policy independence, its goals centered on the price stability and employment objectives laid out in the Employment Act of 1946. In the early post–World War II decades, the Fed used open market operations and the discount rate to influence short-term market interest rates; the federal funds interest rate (that is, the interest rate that depository institutions pay each other for loans, usually overnight, to make sure that they hold sufficient reserves at the Fed) gradually emerged as the preferred target for conducting monetary policy. Low and stable inflation was achieved for most of the 1950s and the early 1960s. However, beginning in the mid-1960s, inflation began a long climb upward, partly because policymakers proved to be too optimistic about the economy’s ability to sustain rapid growth without inflation (for discussion, see Orphanides 2003; Meltzer 2009a).

Two mechanisms might have mitigated the damage from that mistaken optimism. First, a stronger policy response to rising inflation—more like that observed in the 1950s — certainly would have helped (Romer and Romer 2002b). Indeed, empirical estimates of the response of the federal funds rate to inflation for the 1970s generally show only a weak reaction (Judd and Rudebusch 1998; Taylor 1999a; Clarida, Galí, and Gertler 2000). Second, Fed policymakers could have reacted to continued high readings on inflation by adopting a more realistic and less optimistic assessment of the economy’s productive potential (Lars Svensson in the discussion following Stokey 2003, p. 63). Instead, policymakers chose to emphasize so-called cost-push and structural factors as sources of inflation and saw wage- and price- setting as having become insensitive to economic slack (for example, Poole 1979; Romer and Romer 2002a, 2013; Bernanke 2004; Nelson 2005). This perspective, which contrasted sharply with Milton Friedman’s (1963, p. 17) famous dictum that “inflation is always and everywhere a monetary phenomenon,” led to Fed support for measures such as wage and price controls rather than monetary solutions to address inflation. A further obstacle was the view among many economists during the 1970s, as discussed in DeLong (1997) and Taylor (1997), that the gains from low inflation did not justify the costs of achieving it.

The consequence of the monetary framework of the 1970s was two bouts of double-digit inflation during that decade. Moreover, by the end of the decade, lack of commitment to controlling inflation had clearly resulted in inflation expectations becoming “unanchored,” or unstable, with high estimates of trend inflation embedded in longer-term interest rates.

Under the leadership of Chairman Paul Volcker, the Federal Reserve in 1979 fundamentally changed its approach to the issue of ensuring price stability. This change involved an important rethinking on the part of policymakers. By the end of the 1970s, Federal Reserve officials increasingly accepted the view that inflation is a monetary phenomenon, at least in the medium and longer term; they became more alert to the risks of excessive optimism about the economy’s potential output; and they placed renewed emphasis on the distinction between real—that is, inflation- adjusted— and nominal interest rates (for discussion, see Meltzer 2009b). The change in policy framework was initially tied to a change in operating procedures that put greater focus on growth in bank reserves, but the critical change—the willingness to respond more vigorously to inflation—endured even after the Federal Reserve resumed its traditional use of the federal funds rate as the policy instrument (Axilrod 1982). The new regime also reflected an improved understanding of the importance of providing a firm anchor for the inflation expectations of the private sector, secured by the credibility of the central bank. Finally, it entailed a changed view about the dual mandate, in which policymakers regarded achievement of

price stability as helping to provide the conditions necessary for sustained maximum employment (Lindsey, Orphanides, and Rasche 2005).

The Great Moderation

Volcker's successful battle against inflation set the stage for the so-called Great Moderation of 1984 to 2007, during which the Fed enjoyed considerable success in achieving both objectives of its dual mandate. Financial stability remained a goal, of course. The Federal Reserve monitored threats to financial stability and responded when the financial system was upset by events such as the 1987 stock market crash and the terrorist attacks of 2001. More routinely, the Fed shared supervisory duties with other banking agencies. Nevertheless, for the most part, financial stability did not figure prominently in monetary policy discussions during these years. In retrospect, it is clear that, during that period, macroeconomists—both inside and outside central banks—relied too heavily in their modeling and analysis on variants of the so-called Modigliani and Miller (1958) theorem, which shows that—under a number of restrictive assumptions—the value of a firm is not related to how that firm is financed. Influenced by the logic of Modigliani–Miller, many monetary economists and central bankers concluded that the details of the structure of the financial system could be largely ignored when analyzing the behavior of the broader economy.

An important development of the Great Moderation was the increasing emphasis that central banks around the world put on communication and transparency, as economists and policymakers reached consensus on the value of communication in attaining monetary policy objectives (Woodford 2005). Federal Reserve officials, like those at other central banks, had traditionally been highly guarded in their public pronouncements. They believed, for example, that the ability to take markets by surprise was important for influencing financial conditions (for example, Goodfriend 1986; Cukierman and Meltzer 1986). Although Fed policymakers of the 1980s and early 1990s had become somewhat more explicit about policy objectives and strategy (Orphanides 2006), the same degree of transparency was not forthcoming on monetary policy decisions and operations. The release of a post-meeting statement by the Federal Open Market Committee, a practice that began in 1994, was therefore an important watershed. Over time, these statements were expanded to include more detailed information about the reason for the policy decision and an indication of the balance of risks (Lindsey 2003).

In addition to improving the effectiveness of monetary policy, these developments in communications also enhanced the public accountability of the Federal Reserve. Accountability is, of course, essential for continued policy independence in a democracy. Moreover, central banks that are afforded policy independence in the pursuit of their mandated objectives tend to deliver better economic outcomes (Alesina and Summers 1993; Debelle and Fischer 1994).

One cannot look back at the Great Moderation today without asking whether the sustained economic stability of the period somehow promoted the excessive risk-taking that followed. The idea that this long period of relative calm lulled investors, financial firms, and financial regulators into paying insufficient attention to risks that were accumulating must have some truth in it. I don't think we should conclude, though, that we therefore should not strive to achieve economic stability. Rather, the right conclusion is that, even in (or perhaps, especially in) stable and prosperous times, monetary policymakers and financial regulators should regard safeguarding financial stability to be of equal importance as—indeed, a necessary prerequisite for—maintaining macroeconomic stability.

Macroeconomists and historians will continue to debate the sources of the remarkable economic performance during the Great Moderation: for a sampling of the debate, one might start with Stock and Watson (2003); Ahmed, Levin, and Wilson (2004); Dynan, Elmendorf, and Sichel (2006); and Davis and Kahn (2008). My own view is that the improvements in the monetary policy framework and in monetary policy communication, including, of course, the better management of inflation and the anchoring of inflation expectations, were important reasons for that strong performance. However, we have learned in recent years that while well-managed monetary policy may be necessary for economic stability, it is not sufficient.

The Financial Crisis, the Great Recession, and Today

It has now been about six years since the first signs of the financial crisis appeared in the United States in 2007, and the economy still has not fully recovered from its effects. What lessons should we take for the future from this experience, particularly in the context of a century of Federal Reserve history?

The financial crisis and the ensuing Great Recession reminded us of a lesson that we learned both in the nineteenth century and during the Depression, but had forgotten to some extent, which is that severe financial instability can do grave damage to the broader economy. The implication is that a central bank must take into account risks to financial stability if it is to help achieve good macroeconomic performance. Today, the Federal Reserve sees its responsibilities for the maintenance of financial stability as coequal with its responsibilities for the management of monetary policy, and we have made substantial institutional changes in recognition of this change in goals. In a sense, we have come full circle, back to the original goal of the Federal Reserve of preventing financial panics (Bernanke 2011).

How should a central bank seek to enhance financial stability? One means is by assuming the lender-of-last-resort function that Bagehot (1873 [1897]) understood and described 140 years ago, under which the central bank uses its power to provide liquidity to ease market conditions during periods of panic or incipient panic. The Fed's many liquidity programs played a central role in containing the crisis of 2008 to 2009. However, putting out the fire is not enough; it is also important to foster a financial system that is sufficiently resilient to withstand large financial shocks. Toward that end, the Federal Reserve, together with other regulatory agencies and the Financial Stability Oversight Council, is actively engaged in monitoring financial developments and working to strengthen financial institutions and markets. The reliance on stronger regulation is informed by the success of New Deal regulatory reforms, but current reform efforts go even further by working to identify and defuse risks not only to individual firms but to the financial system as a whole, an approach known as "macroprudential regulation."

Financial stability is also linked to monetary policy, though these links are not yet fully understood. Here the Fed's evolving strategy is to make monitoring, supervision, and regulation the first line of defense against systemic risks; to the extent that risks remain, however, the Federal Open Market Committee strives to incorporate these risks in the cost-benefit analysis applied to all monetary policy actions (Bernanke 2002).

What about the monetary policy framework? In general, the Federal Reserve's policy framework inherits many of the elements put in place during the Great Moderation. These features include the emphasis on preserving the Fed's inflation credibility, which is critical for anchoring inflation expectations, and a balanced approach in pursuing both parts of the Fed's dual mandate in the medium term. We have also continued to increase the transparency of

monetary policy. For example, the Federal Open Market Committee's communications framework now includes a statement of its longer-run goals and monetary policy strategy. In the statement issued January 25, 2012, the Committee indicated that it judged that inflation at a rate of 2 percent (as measured by the annual change in the price index for personal consumption expenditures) is most consistent over the longer run with the FOMC's dual mandate. FOMC participants also regularly provide estimates of the longer-run normal rate of unemployment; those estimates currently have a central tendency of 5.2 to 6.0 percent. By helping to anchor longer-term expectations, this transparency gives the Federal Reserve greater flexibility to respond to short-run developments. This framework, which combines short-run policy flexibility with the discipline provided by the announced targets, has been described as constrained discretion (for example, as discussed in Bernanke and Mishkin 1997, in this journal). Other communication innovations include early publication of the minutes of FOMC meetings and quarterly post-meeting press conferences by the Chairman.

The framework for implementing monetary policy has evolved further in recent years, reflecting both advances in economic thinking and a changing policy environment. Notably, following the ideas of Svensson (2003) and others, the Federal Open Market Committee has moved toward a framework that ties policy settings more directly to the economic outlook, a so-called forecast-based approach. In a forecast-based approach, monetary policymakers inform the public of their medium-term targets — say, a specific value for the inflation rate — and attempt to vary the instruments of policy as needed to meet that target over time. In contrast, an instrument-based approach involves providing the public information about how the monetary policy committee plans to vary its policy instrument—typically, a short-term interest rate, like the federal funds interest rate—in response to economic conditions. In particular, the FOMC has released more detailed statements following its meetings that have related the outlook for policy to prospective economic developments and has introduced regular summaries of the individual economic projections of FOMC participants (including for the target value of the federal funds interest rate). The provision of additional information about policy plans has helped Fed policymakers deal with the constraint posed by the effective lower bound on short-term interest rates; in particular, by offering guidance about how policy will respond to economic developments, the Committee has been able to increase policy accommodation, even when the short-term interest rate is near zero and cannot be meaningfully reduced further (as elaborated in Yellen 2012). The Committee has also sought to influence interest rates of securities that mature farther into the future (that is, farther out on the “yield curve”), notably through its securities purchases. Other central banks in advanced economies that also confronted the situation that short-term interest rates had been lowered to their effective lower bound of near-zero percent have taken similar measures.

In short, the recent crisis has underscored the need both to strengthen monetary policy and financial stability frameworks and to better integrate the two. We have made progress on both counts, but more needs to be done. In particular, the complementarities among regulatory and supervisory policies (including macro-prudential policy), lender-of-last-resort policy, and standard monetary policy are increasingly evident. Both research and experience are needed to help the Fed and other central banks develop comprehensive frameworks that incorporate all of these elements. The broader conclusion is what might be described as the overriding lesson of the Federal Reserve's history: that central banking doctrine and practice are never static. We and other central banks around the world will have to continue to work hard to adapt to events, new ideas, and changes in the economic and financial environment.

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DECISION OF THE
RESERVE BANK ORGANIZATION COMMITTEE DETERMINING THE FEDERAL
RESERVE DISTRICTS AND THE LOCATION OF FEDERAL RESERVE BANKS UNDER
FEDERAL RESERVE ACT APPROVED DECEMBER 23, 1913

APRIL 2, 1914

WITH STATEMENT OF THE COMMITTEE IN RELATION THERETO

APRIL 10, 1914

WASHINGTON GOVERNMENT PRINTING OFFICE
1914

The Federal Reserve Act directs the Reserve Bank Organization Committee to "designate not less than eight nor more than twelve cities to be known as Federal reserve cities"; to "divide the continental United States, excluding Alaska, into districts, each district to contain only one of such Federal reserve cities," and to apportion the districts "with due regard to the convenience and customary course of business." The act provides that the districts may not necessarily be coterminous with any State or States.

In determining the reserve districts and in designating the cities within such districts where Federal Reserve banks shall be severally located, the organization committee has given full consideration to the important factors bearing upon the subject. The committee held public hearings in eighteen of the leading cities from the Atlantic to the Pacific and from the Great Lakes to the Gulf, and was materially assisted thereby in determining the districts and the reserve cities.

Every reasonable opportunity has been afforded applicant cities to furnish evidence to support their claims as locations for Federal Reserve banks.

More than 200 cities, through their clearing-house associations, chambers of commerce, and other representatives, were heard. Of these, thirty-seven cities asked to be designated as the headquarters of a Federal Reserve bank.

The majority of the organization committee, including its chairman and the Secretary of Agriculture, were present at all hearings, and stenographic reports of the proceedings were made for more deliberate consideration. Independent investigations were in addition, made through the Treasury Department and the preference of each bank as to the location of the Federal Reserve bank with which it desired to be connected was ascertained by an independent card ballot addressed to each of the 7,471 national banks throughout the country which had formally assented to the provisions of the Federal reserve act.

Among the many factors which governed the committee in determining the respective districts and the selection of the cities which have been chosen were:

First. The ability of the member banks within the district to provide the minimum capital of \$4,000,000 required for the Federal Reserve bank, on the basis of six per cent of the capital stock and surplus of member banks within the district.

Second. The mercantile, industrial, and financial connections existing in each district and the relations between the various portions of the district and the city selected for the location of the Federal Reserve bank.

Third. The probable ability of the Federal Reserve bank in each district, after organization and after the provisions of the Federal Reserve Act shall have gone into effect, to meet the legitimate demands of business, whether normal or abnormal, in accordance with the spirit and provisions of the Federal Reserve Act.

Fourth. The fair and equitable division of the available capital for the Federal Reserve banks among the districts created.

Fifth. The general geographical situation of the district, transportation lines, and the facilities for speedy communication between the Federal Reserve bank and all portions of the district.

Sixth. The population, area, and prevalent business activities of the district, whether agricultural, manufacturing, mining, or commercial, its record of growth and development in the past and its prospects for the future.

In determining the several districts the committee has endeavored to follow State lines as closely as practicable, and wherever it has been found necessary to deviate the division has been along lines which are believed to be most convenient and advantageous for the district affected.

The twelve Districts and the twelve Cities selected for the location of the Federal Reserve banks are as follows:

DISTRICT No.1.

The New England States: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, with the city of Boston as the location of the Federal Reserve bank.

This district contains 445 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Boston, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$9,924,543.

DISTRICT No. 2.

The State of New York, with New York City as the location of the Federal Reserve bank.

This district contains 477 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of New York, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$20,621,606; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$20,687,606.

DISTRICT No. 3.

The States of New Jersey and Delaware and all that part of Pennsylvania located east of the western boundary of the following counties: McKean, Elk, Clearfield, Cambria, and Bedford, with the Federal Reserve bank in the city of Philadelphia.

This district contains 757 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Philadelphia, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$12,488,138; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$12,500,738.

DISTRICT No. 4.

The State of Ohio; all that part of Pennsylvania lying west of district No.3; the counties of Marshall, Ohio, Brooke, and Hancock, in the State of West Virginia; and all that part of the State of Kentucky located east of the western boundary of the following counties: Boone, Grant, Scott, Woodford, Jessamine, Garrard, Lincoln, Pulaski, and McCreary; with the city of Cleveland, Ohio, as the location of the Federal Reserve bank.

This district contains 767 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Cleveland, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$12,007,384; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$12,100,384.

DISTRICT No. 5.

The District of Columbia, and the States of Maryland, Virginia, North Carolina, South Carolina, and all of West Virginia except the counties of Marshall, Ohio, Brooke, and Hancock, with the Federal Reserve bank located in the city of Richmond, Va.

This district contains 475 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Richmond, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$6,303,301; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$6,542,713.

The States of Alabama, Georgia, and Florida; all that part of Tennessee located east of the western boundary of the following counties: Stewart, Houston, Wayne, Humphreys, and Perry; all that part of Mississippi located south of the northern boundary of the following counties: Issaquena, Sharkey, Yazoo, Kemper, Madison, Leake, and Neshoba; and all of the southeastern part of Louisiana located east of the western boundary of the following parishes: Pointe Coupee, Iberville, Assumption, and Terrebonne, with the city of Atlanta, Ga., as the location of the Federal Reserve bank. This district contains 372 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Atlanta, on the basis of six percent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$4,641,193; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$4,702,558.

DISTRICT No. 7.

The State of Iowa; all that part of Wisconsin located south of the northern boundary of the following counties: Vernon, Sank, Columbia, Dodge, Washington, and Ozaukee; all of the southern peninsula of Michigan, viz, that part east of Lake Michigan; all that part of Illinois located, north of a line forming the southern boundary of the following counties: Hancock; Schuyler, Cass, Sangamon, Christian, Shelby, Cumberland, and Clark; and all that part of Indiana north of a line forming the southern boundary of the following counties: Vigo, Clay, Owen, Monroe, Brown, Bartholomew, Jennings, Ripley, and Ohio, with the Federal Reserve bank located in the city of Chicago, Ill.

This district contains 952 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Chicago, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$12,479,876; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$12,967,701.

DISTRICT No. 8.

The State of Arkansas; all that part of Missouri located east of the western boundary of the following counties: Harrison, Daviess, Caldwell, Ray, Lafayette, Johnson, Henry, St; Clair, Cedar, Dade, Lawrence, and Barry; all that part of Illinois not included in district No. 7; all that part of Indiana not included in district No. 7; all that part of Kentucky not included in district No.4; all that part of Tennessee not included in district No.6; and all that part of Mississippi not included in district No.6, with the city of St. Louis, Mo., as the location of the Federal Reserve bank.

This district contains 458 national bank which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of St. Louis, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$4,990,761; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$6,367,006.

DISTRICT No. 9.

The States of Montana, North Dakota, South Dakota, Minnesota; all that part of Wisconsin not included in district No.7, and all that part of Michigan not included in district No. 7, with the city of Minneapolis, Minn., as the location of the Federal Reserve bank.

This district contains 687 national banks, which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Minneapolis, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$4,702,925.

DISTRICT No. 10.

The States of Kansas, Nebraska, Colorado, and Wyoming; all that part of Missouri not included in district No. 8; all that part of Oklahoma north of a line forming the southern boundary of the following counties: Ellis, Dewey, Blaine, Canadian, Cleveland, Pottawatomie, Seminole, Okfuskee, McIntosh, Muskogee, and Sequoyah; and all that part of New Mexico north of a line forming the southern boundary of the following counties: McKinley, Sandoval, Santa Fe, San Miguel, and Union, with the city of Kansas City, Mo., as the location of the Federal Reserve bank.

This district contains 836 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Kansas City, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$5,590,015; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$5,600,977.

DISTRICT No. 11.

The State of Texas; all that part of New Mexico not included in district No. 10; all that part of Oklahoma not included in district No.10; all that part of Louisiana not included in district No.6; and the following counties In the State of Arizona: Pima, Graham, Greenlee, Cochise, and Santa Cruz, with the city of Dallas, Tex., as the location of the Federal Reserve bank.

This district contains 731 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of Dallas, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$5,540,020; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total, capital stock will be \$5,653,924.

DISTRICT No. 12.

The States of California, Washington, Oregon, Idaho, Nevada, and Utah, and all that part of Arizona not included in district No. 11, with the city of San Francisco, Cal., as the location of the Federal Reserve bank.

This district contains 514 national banks which have accepted the provisions of the Federal Reserve Act. The capital stock of the Federal Reserve Bank of San Francisco, on the basis of six per cent of the total capital stock and surplus of the assenting national banks in the district, will amount to \$7,825,375; and if there be added six per cent of the capital stock and surplus of the State banks and trust companies which have applied for membership up to April 1, 1914, the total capital stock will be \$8,115,494.

The committee was impressed with the growth and development of the States of Idaho, Washington, and Oregon, but on the basis of six per cent of the capital stock and surplus of national banks and State banks and trust companies which have applied for membership, that section could not provide the \$4,000,000 minimum capital stock required by the law. With the continued growth of that region it is reasonable to expect that in a few years the capital and surplus of its member banks will be sufficient to justify the creation of an additional Federal Reserve district, at which time application may be made to the Congress for a grant of the necessary authority.

It is no part of the duty of the organization committee to locate branches of the Federal Reserve banks. The law specifically provides that "each Federal Reserve bank shall establish branch banks within the Federal Reserve district in which it is located." All the material collected by the committee will be placed at the disposal of the Federal Reserve banks and the Federal Reserve Board when they are organized and ready to consider the establishment of branch banks.

Reference is made to the Map of the Districts and to tables A, B, C, D, E, and F hereto attached.

W. G. McAdoo,
D. F. Houston,
Jno. Skelton Williams
Reserve Bank Organization Committee

Washington, D. C., April 2, 1914.

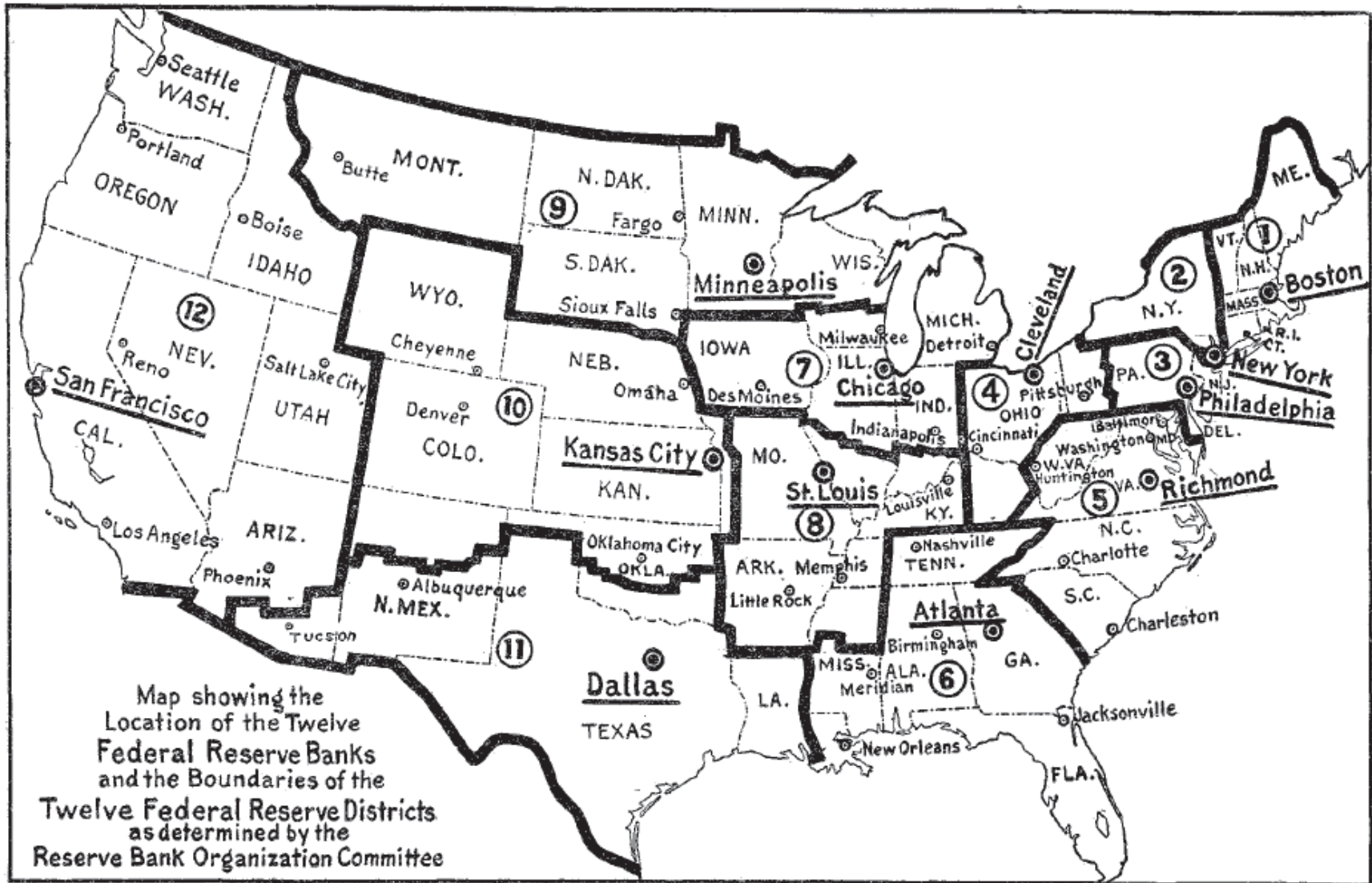


TABLE A.—Showing subscriptions to stock of Federal reserve banks by national banks, State banks, and trust companies, with area and population of each district.

[PART 1.]

District No.	Federal reserve cities.	Districts.		National banks March 4, 1914.			Including State banks and trust companies that have applied for membership up to April 1, 1914.		
		Land area in square miles. ¹	Population. ¹	Number of banks.	Capital and surplus.	6 per cent subscription.	Number of banks.	Capital and surplus.	6 per cent subscription.
1	Boston.....	61,976	6,552,681	445	\$165,409,043	\$9,924,543	445	\$165,409,043	\$9,924,543
2	New York.....	47,654	9,113,614	477	343,693,437	20,621,606	478	344,793,437	20,687,606
3	Philadelphia.....	40,449	7,932,065	757	203,135,631	12,488,138	758	208,345,631	12,500,738
4	Cleveland.....	72,693	8,326,668	767	200,123,060	12,007,384	769	201,673,060	12,100,384
5	Richmond.....	152,931	8,519,310	475	105,055,023	6,303,301	484	109,045,223	6,542,713
6	Atlanta.....	233,821	8,677,288	372	77,353,221	4,641,193	382	78,375,971	4,702,558
7	Chicago.....	171,306	12,348,767	952	207,997,941	12,479,876	967	216,128,363	12,967,701
8	St. Louis.....	194,767	8,747,662	458	83,179,348	4,990,761	469	106,116,764	6,367,006
9	Minneapolis.....	433,281	5,195,886	687	78,382,081	4,702,925	687	78,382,081	4,702,925
10	Kansas City, Mo.....	450,831	5,671,051	836	93,166,912	5,590,015	839	93,349,612	5,600,977
11	Dallas.....	430,329	5,797,970	731	92,333,673	5,540,020	737	94,232,073	5,653,924
12	San Francisco.....	683,852	5,089,304	514	130,422,921	7,825,375	529	135,258,231	8,115,494
	Total.....	2,973,890	91,972,266	7,471	1,785,252,291	107,115,137	7,544	1,831,109,489	109,866,569

¹ United States census of 1910.

TABLE A.—Showing amount due to and due from banks, amount of individual deposits and all deposits, also cash in vault, for all national banks in each Federal reserve district as of March 4, 1914.

[PART 2.]

District No.	Federal reserve cities.	Total due to banks.	Total due from banks.	Net balance due to banks.	Net balance due from banks.	Individual deposits.	All deposits.	Per capita deposit.	Cash in vault.
1	Boston.....	\$125,363,123	\$125,087,628	\$275,495	.....	\$500,636,637	\$631,355,974	\$96	\$53,354,398
2	New York.....	863,414,285	192,806,668	670,607,617	.....	1,191,533,728	2,061,858,058	226	359,715,324
3	Philadelphia.....	214,326,384	189,222,922	25,103,462	.....	718,185,010	937,181,166	118	77,909,120
4	Cleveland.....	186,273,482	170,831,707	15,441,775	.....	654,985,827	851,157,633	102	75,287,748
5	Richmond.....	71,963,378	72,983,655	.....	\$1,020,277	317,659,065	399,579,841	47	25,524,694
6	Atlanta.....	39,603,415	61,442,028	.....	21,838,613	215,744,303	262,318,818	30	18,752,412
7	Chicago.....	441,078,660	278,661,678	162,416,982	.....	811,307,271	1,265,208,464	162	150,414,811
8	St. Louis.....	131,446,049	92,813,994	38,632,055	.....	241,740,690	378,858,307	43	40,866,167
9	Minneapolis.....	80,671,243	104,873,520	.....	24,202,277	389,088,959	475,684,697	92	34,917,883
10	Kansas City, Mo.....	146,742,582	134,726,219	12,016,363	.....	365,978,140	521,318,350	92	44,118,906
11	Dallas.....	51,172,553	78,083,730	.....	26,911,177	252,490,607	307,130,732	53	25,979,225
12	San Francisco.....	120,188,341	122,927,748	.....	2,739,407	444,274,574	573,243,051	113	60,077,300
	Total.....	2,472,243,495	1,624,461,497	924,493,749	76,711,751	6,103,624,811	8,664,896,091	94	966,917,988

TABLE B.—Number of national banks on September 9, 1903, and August 9, 1913, with increase or decrease; also amount of capital stock and surplus, loans and discounts, and individual deposits (in thousands), with amount and percentage of increase or decrease.

	Number of national banks.			Capital and surplus.				Loans and discounts.				Individual deposits.			
	1903	1913	Increase or decrease. ³	1903	1913	Increase or decrease. ³	Per cent.	1903	1913	Increase or decrease. ³	Per cent.	1903	1913	Increase or decrease. ³	Per cent.
New York, N. Y.....	43	36	- 7	\$173,185	\$249,305	\$76,120	44	\$631,595	\$936,908	\$305,343	48	\$450,732	\$636,544	\$185,812	41
Chicago, Ill.....	12	9	- 3	38,625	69,050	30,425	79	181,416	329,024	147,608	81	125,352	202,335	76,983	62
Philadelphia, Pa.....	34	32	- 2	45,630	62,065	16,435	36	142,378	218,748	76,368	53	122,387	162,437	40,050	33
Boston, Mass.....	32	17	-15	46,836	48,081	1,245	2.7	156,869	189,872	33,003	21	118,670	171,327	52,657	45
Pittsburgh, Pa.....	35	22	-13	45,200	48,514	3,314	7.3	115,086	129,802	14,716	13	86,146	113,796	27,650	32
San Francisco, Cal.....	7	9	2	11,238	44,880	33,642	300	27,658	113,959	86,301	313	21,860	88,894	67,034	308
St. Louis, Mo.....	7	7	-----	25,910	29,140	3,230	13	89,312	109,161	19,849	22	46,752	61,380	14,628	32
Cincinnati, Ohio.....	13	8	- 5	14,405	20,350	5,945	41.3	41,543	53,443	11,900	29	32,320	38,459	6,139	19
Baltimore, Md.....	19	16	- 3	18,926	19,760	834	4.4	47,222	63,703	16,481	35	32,191	44,547	12,356	38
Cleveland, Ohio.....	13	7	- 6	15,372	14,400	-972	- 6.5	49,155	60,945	11,790	24	27,656	46,110	18,454	67
Minneapolis, Minn.....	5	6	1	6,120	13,710	7,590	124	20,898	55,281	34,383	164	13,590	42,930	29,340	216
Kansas City, Mo.....	6	12	6	3,855	11,650	7,795	203	38,735	69,673	30,938	80	27,085	40,600	13,515	50
Washington, D. C.....	11	11	-----	6,102	11,165	5,063	83	14,343	26,834	12,491	89	18,699	26,319	7,620	40
St. Paul, Minn.....	6	4	- 2	5,036	9,600	4,564	91	14,870	34,188	19,318	130	14,990	29,712	14,722	99
Richmond, Va. ¹	5	8	3	2,970	9,484	6,514	219	11,372	34,732	23,360	207	9,668	24,391	14,723	152
Indianapolis, Ind.....	7	5	- 2	5,860	9,410	3,550	60	17,850	28,420	10,570	60	18,033	22,790	4,757	27
Atlanta, Ga. ¹	4	6	2	2,330	8,600	6,270	269	10,128	26,856	16,728	165	8,702	20,842	12,139	140
New Orleans, La.....	6	5	- 1	5,790	8,230	2,440	42	17,389	24,467	7,078	41	16,675	20,611	3,936	24
Louisville, Ky.....	8	8	-----	6,497	8,225	1,728	26.6	15,800	25,553	9,753	61	10,540	20,766	10,226	97
Denver, Colo.....	5	6	1	3,250	7,538	4,288	132	15,292	29,212	13,920	91	29,691	35,587	5,896	20
Houston, Tex.....	6	6	-----	2,350	7,050	4,700	200	6,923	25,612	18,689	270	6,794	22,597	15,803	233
Portland, Oreg.....	3	5	2	1,250	6,675	5,425	434	5,880	21,947	16,067	273	8,619	23,751	15,132	176
Omaha, Nebr.....	7	7	-----	3,820	6,560	2,740	72	16,020	32,810	16,790	105	14,608	27,731	13,123	90
Dallas, Tex.....	4	5	1	2,168	5,900	3,732	172	6,388	19,816	13,428	210	5,815	18,918	13,003	220
Seattle, Wash. ²	5	6	1	1,460	5,560	4,100	281	8,616	25,857	17,241	200	12,297	28,931	16,634	135
Fort Worth, Tex. ²	6	8	2	1,865	4,950	3,085	165	4,803	15,507	10,704	223	3,934	11,707	7,773	199
Columbus, Ohio.....	6	8	2	3,270	4,673	1,403	43	11,639	17,429	5,790	50	12,582	21,597	9,015	72
Nashville, Tenn. ¹	4	5	1	2,389	4,198	1,809	76	7,850	17,335	9,485	121	6,132	14,759	8,627	140
Spokane, Wash. ²	4	5	1	890	4,172	3,282	370	4,847	16,056	11,209	230	6,366	16,436	10,070	158
Birmingham, Ala. ¹	2	2	-----	815	3,114	2,299	282	4,629	9,697	5,068	110	5,367	9,604	4,237	79
Des Moines, Iowa.....	4	4	-----	1,060	3,055	1,995	190	5,071	13,485	8,414	166	2,803	6,669	3,866	138
Charlotte, N. C. ¹	4	5	1	1,167	1,850	683	58	3,354	6,364	3,010	90	2,435	4,421	1,986	83
Columbia, S. C. ¹	2	5	3	750	1,825	1,075	143	2,029	7,311	5,282	264	2,002	5,062	3,060	153
Savannah, Ga.....	2	2	-----	975	1,600	625	64	2,090	3,339	1,249	59.7	703	1,358	655	93
Memphis, Tenn. ¹	4	3	- 1	1,600	1,590	- 10	- 0.6	7,990	5,523	-2,467	-31	6,869	4,276	-2,593	-37.7
Lincoln, Nebr.....	3	4	1	559	1,330	771	137	3,040	6,314	3,274	107	2,649	4,717	2,068	78
Kansas City, Kans.....	2	2	-----	1,470	800	-670	-45.5	4,225	4,263	38	1	2,306	2,765	459	20

¹ Nonreserve cities.

² Not a reserve city in 1903.

³ Minus (-) shows decrease; other changes show increase.

TABLE C.—Total loans and discounts by geographical divisions, made by national banks in the cities named as of January 13, 1914. Compiled from special statements submitted to the Comptroller of the Currency.

	Total loans.	New England States.		Eastern States.		Southern States.		Middle Western States.		Western States.		Pacific States.	
		Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
New York	\$920,804,000	\$36,819,000	4.00	\$654,322,000	71.12	\$86,843,000	9.43	\$116,424,000	12.64	\$12,663,000	1.38	\$13,228,000	1.43
Chicago	303,498,000	2,055,000	.68	7,027,000	2.31	17,736,000	5.85	257,427,000	84.82	11,358,000	3.74	7,895,000	2.60
Philadelphia	219,044,000	3,789,000	1.73	188,594,000	86.10	9,398,000	4.29	16,013,000	7.31	580,000	.27	670,000	.30
Boston	190,973,000	145,411,000	76.14	18,137,000	9.50	4,779,000	2.50	19,731,000	10.33	1,419,000	.74	1,496,000	.79
Pittsburgh	126,358,000	785,000	.62	119,999,000	94.97	598,000	.47	4,410,000	3.49	382,000	.30	184,000	.15
San Francisco	104,696,000	63,000	.06	1,125,000	1.08	30,000	.03	1,130,000	1.08	25,000	.02	102,323,000	97.73
St. Louis	104,006,000	1,240,000	1.19	3,769,000	3.62	13,593,000	13.07	80,208,000	77.12	4,701,000	4.52	495,000	.48
Kansas City, Mo.	67,237,000	15,000	.02	304,000	.43	6,419,000	9.55	38,101,000	56.69	21,804,000	32.43	594,000	.88
Cleveland	60,763,000	385,000	.63	3,566,000	5.87	186,000	.31	56,303,000	92.66	208,000	.34	115,000	.19
Baltimore	59,435,000	278,000	.47	50,893,000	85.63	6,891,000	11.59	1,359,000	2.29	6,000	.01	8,000	.01
Minneapolis	58,021,000			332,000	.57	25,000	.04	52,657,000	90.76	4,745,000	8.18	262,000	.45
Buffalo	55,084,000	660,000	1.20	49,061,000	89.07	314,000	.57	4,858,000	8.82	150,000	.27	41,000	.07
Cincinnati	52,290,000	313,000	.60	2,145,000	4.10	4,017,000	7.68	45,699,000	87.40	56,000	.11	60,000	.11
Los Angeles	47,985,000			935,000	1.95	20,000	.04	231,000	.48	90,000	.19	46,709,000	97.34
St. Paul	38,018,000	155,000	.40	1,306,000	3.43	187,000	.48	32,157,000	84.62	2,751,000	7.23	1,462,000	3.84
Richmond	35,721,000	125,000	.35	1,619,000	4.53	33,473,000	93.71	489,000	1.37	5,000	.01	10,000	.03
Omaha	31,536,000	125,000	.40	567,000	1.79	200,000	.63	2,172,000	6.89	28,212,000	89.46	260,000	.83
Washington	27,790,000	11,000	.04	26,620,000	95.79	915,000	3.29	81,000	.29	24,000	.09	139,000	.50
Atlanta	26,916,000	120,000	.45	277,000	1.03	26,117,000	97.03	397,000	1.47	5,000	.02		
Louisville	26,452,000			77,000	.29	25,342,000	95.80	1,026,000	3.88	7,000	.03		
Providence	25,032,000	15,442,000	61.69	4,674,000	18.67	536,000	2.14	3,586,000	14.33	436,000	1.74	358,000	1.43
Seattle	24,486,000	85,000	.35	568,000	2.32	161,000	.66	1,444,000	5.89	244,000	1.00	21,984,000	89.78
Albany	23,950,000	778,000	3.25	22,134,000	92.42	180,000	.75	721,000	3.01	85,000	.35	52,000	.22
Houston	23,659,000			205,000	.87	23,391,000	98.86	25,000	.11	38,000	.16		
Portland, Oreg.	21,446,000			47,000	.21	15,000	.08	382,000	1.78	8,000	.04	20,994,000	97.89
Hartford	21,202,000	16,019,000	75.55	1,384,000	6.53	1,059,000	5.00	2,301,000	10.85	287,000	1.35	152,000	.72
Dallas	19,731,000	10,000	.05	214,000	1.08	19,123,000	96.92	251,000	1.28	130,000	.66	3,000	.01
New Orleans	19,677,000			171,000	.87	19,477,000	98.98	20,000	.10			9,000	.05
Nashville	18,031,000			25,000	.14	17,735,000	98.36	271,000	1.50				
Brooklyn	17,437,000	60,000	.39	16,659,000	95.54	17,000	.10	562,000	3.22	5,000	.03	125,000	.72
Memphis	7,977,000			6,000	.07	7,913,000	99.20	58,000	.73				

NOTE.—The above statement has been compiled from special statements made to the Comptroller of the Currency showing all loans in the United States. Foreign loans are not included. The differences between this statement and the abstract of Jan. 13, 1914, are made up of foreign loans, bonds loaned and other minor items.

The above classification by geographical groups, which has been observed in the reports of the comptroller's office for the past 18 years, is as follows: New England States: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. Eastern States: New York, New Jersey, Pennsylvania, Delaware, Maryland, and District of Columbia. Southern States: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Kentucky, and Tennessee. Middle Western States: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, and Missouri. Western States: North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, New Mexico, and Oklahoma. Pacific States: Washington, Oregon, California, Idaho, Utah, Nevada, Arizona, and Alaska.

¹ \$7,457,000 less than abstract Jan. 13, which included report from branches.

² Includes \$1,075,000 not localized.

TABLE D.—Showing bank and trust company credit balances with the national banks in some of the principal cities of the United States; also showing amounts loaned by the national banks in the same cities to their correspondent banks; also bought paper and collateral loans to noncustomers of the lending banks, securities owned, and cash reserve in vaults, as of dates named.

Cities.	Amount on deposit from all banks and trust companies throughout the United States, Feb. 14, 1914.	Amount loaned to all banks and trust companies on bills payable, and rediscounts, including indirect loans with guarantee of directors, etc., Jan. 13, 1914.	Per cent loaned banks Jan. 13, 1914, to bank deposits Feb. 14, 1914.	Bought paper, stock-exchange loans, etc., made by national banks to noncustomers throughout the United States, Jan. 13, 1914.	Bonds and securities (exclusive of bonds for circulation held by national banks, Jan. 13, 1914.	Reserve in vaults (specie and legal tenders), Jan. 13, 1914.
New York.....	\$742,386,939	\$59,107,399	7.96	\$263,803,618	\$165,827,533	\$313,586,128
Chicago.....	278,824,567	25,663,706	9.20	29,716,830	31,734,647	88,732,480
Philadelphia.....	173,584,087	6,859,243	3.95	38,239,408	37,837,529	43,280,798
Boston.....	97,136,156	3,695,480	3.80	47,402,893	19,958,013	32,661,707
St. Louis.....	90,430,968	14,271,230	15.78	16,840,657	6,326,699	26,880,206
Pittsburgh.....	1,382,363,317	109,597,058	7.92	396,053,406	261,684,421	565,141,319
Kansas City, Mo.....	79,314,345	710,415	.89	16,808,600	37,565,648	24,301,181
San Francisco ¹	54,835,438	18,844,099	34.36	4,869,204	4,035,117	8,703,544
Albany.....	45,859,188	3,296,431	7.19	13,850,432	17,859,369	18,683,813
Cleveland.....	39,528,280	276,052	.70	1,815,045	8,340,938	4,756,442
Cincinnati.....	36,746,820	1,183,551	3.17	6,177,657	6,684,800	10,025,546
Minneapolis.....	32,593,282	1,955,816	6.00	7,675,667	13,281,317	8,859,630
Baltimore.....	31,316,864	2,620,504	8.37	2,449,329	3,649,749	7,365,849
Omaha.....	27,421,904	2,404,815	8.04	4,939,093	9,120,902	8,715,311
Los Angeles.....	18,533,959	5,768,762	31.12	3,507,878	2,675,002	4,596,702
St. Paul.....	16,290,131	1,374,958	8.44	2,297,638	5,212,186	8,178,093
Houston.....	16,002,069	792,594	4.95	12,637,337	8,036,166	6,425,836
Louisville.....	12,616,553	1,865,678	14.79	1,685,948	1,366,532	3,596,044
Buffalo.....	11,750,499	2,204,727	18.76	1,879,833	5,525,095	3,322,604
Richmond.....	11,388,536	109,557	.96	3,298,005	13,297,773	4,471,788
Portland, Oreg.....	10,970,088	1,629,449	14.85	4,257,523	2,444,639	2,276,451
Seattle.....	8,427,674	572,100	6.79	1,574,059	5,437,032	5,387,374
New Orleans.....	7,518,865	602,937	8.02	3,064,245	4,937,661	4,654,524
Dallas.....	7,229,470	1,134,102	15.70	1,234,109	5,587,233	2,830,769
Nashville.....	6,237,357	1,335,687	22.21	587,558	1,293,061	2,546,927
Washington.....	5,536,719	1,158,622	20.91	489,888	91,632	1,164,930
Atlanta.....	5,516,705	1,714,076	31.07	3,266,983	9,790,823	4,053,193
Brooklyn.....	4,436,974	892,612	20.12	865,180	1,408,350	1,855,427
Memphis.....	4,017,811	10,000	.25	4,124,955	5,684,913	4,322,537
Providence.....	2,377,836	496,005	20.86	453,088	128,081	1,189,721
Hartford.....	1,983,787	125,000	6.30	13,518,890	6,336,469	1,804,614
	835,334			9,850,001	1,367,390	1,348,465

The cities included in the above list are all either central reserve or reserve cities, except the cities of Buffalo, N. Y.; Providence, R. I.; Hartford, Conn.; Richmond, Va.; Atlanta, Ga., Memphis and Nashville, Tenn., which are not reserve cities.

¹ Does not include loans and deposits from banks, in other cities, of branches of Bank of California, N. B. A.

TABLE E.—Statement showing population, capital and surplus, individual deposits, and loans and discounts of all national banks, as of March 4, 1914, in the 37 cities which asked to be designated as Federal reserve cities.

Location.	Population. ¹	Number of banks.	Capital and surplus.	Per capita.	Individual deposits.	Per capita.	Loans and discounts.	Per capita.
1. Boston.....	670,585	15	\$47,896,000	\$71	\$176,088,004	\$268	\$200,480,934	\$299
2. New York.....	4,766,883	35	248,505,000	52	771,724,999	161	1,082,272,650	227
3. Philadelphia.....	1,549,008	32	62,215,000	40	184,643,392	119	232,906,822	153
4. Cleveland.....	560,663	7	14,400,000	25	40,479,025	72	62,588,735	112
5. Cincinnati.....	363,591	8	20,350,000	56	39,154,843	108	55,761,638	153
6. Columbus.....	181,511	8	4,685,500	25	21,853,183	120	17,169,907	95
7. Pittsburgh.....	533,905	21	46,714,000	88	120,260,088	225	124,568,231	233
8. Wheeling.....	41,641	2	1,700,000	40	4,331,394	104	4,915,613	118
9. Baltimore.....	558,485	15	19,205,720	34	42,553,451	76	60,312,953	108
10. Washington.....	331,039	11	11,365,000	34	28,491,402	86	25,405,554	77
11. Richmond.....	127,628	7	9,314,392	73	25,705,866	201	35,593,044	279
12. Charlotte.....	34,014	5	1,850,000	54	4,578,573	135	6,785,057	199
13. Columbia.....	26,319	5	1,887,500	72	6,398,138	243	7,322,262	278
14. Atlanta.....	154,839	6	8,600,000	56	24,348,912	157	26,038,731	168
15. Savannah.....	65,064	2	1,600,000	24	1,443,161	22	3,244,938	50
16. Louisville.....	223,928	8	8,280,000	37	20,430,574	91	27,999,427	125
17. Birmingham.....	132,685	2	3,300,000	25	9,995,561	75	10,449,274	79
18. Montgomery.....	38,136	4	2,515,000	66	6,115,197	160	5,658,213	148
19. Chattanooga.....	44,604	3	2,975,000	66	10,109,930	226	11,565,519	259
20. Memphis.....	131,105	3	2,140,000	16	7,511,216	57	7,014,359	53
21. New Orleans.....	339,075	4	6,730,000	20	16,857,832	50	17,285,254	51
22. Chicago.....	2,185,283	9	69,050,000	31	211,558,247	97	335,820,233	154
23. St. Louis.....	687,039	7	29,140,000	42	61,685,925	90	102,138,744	149
24. Minneapolis.....	301,408	6	13,710,000	45	45,453,532	150	57,973,491	192
25. St. Paul.....	214,744	5	9,887,081	46	35,788,142	167	37,437,913	174
26. Kansas City, Mo.....	248,381	12	11,660,000	47	40,415,210	162	66,205,054	267
27. Omaha.....	124,096	7	6,570,000	53	27,258,869	220	32,848,397	265
28. Denver.....	213,331	6	7,545,000	35	34,124,272	160	28,022,377	131
29. Lincoln.....	43,973	4	1,330,000	32	4,439,212	101	6,066,192	138
30. Dallas.....	92,104	5	5,900,000	64	18,551,847	201	18,622,564	202
31. Fort Worth.....	73,312	7	4,275,000	58	11,629,158	159	12,632,408	172
32. Houston.....	78,800	6	7,125,000	90	25,013,951	317	25,923,087	329
33. San Francisco.....	416,912	9	45,185,000	108	95,756,484	230	120,287,608	288
34. Seattle.....	237,194	6	5,596,500	23	29,498,646	124	23,948,338	101
35. Portland.....	207,214	5	6,780,000	32	22,595,277	109	20,173,774	97
36. Spokane.....	104,402	5	4,175,000	40	16,156,830	155	13,985,084	134
37. Salt Lake City.....	92,777	6	3,482,500	37	11,103,182	120	11,791,043	127

¹ United States census of 1910.

TABLE F.—Statement showing population, capital and surplus, individual deposits, and loans and discounts of all reporting banks (National, State, savings, and loan and trust companies), as of June 4, 1913, in the 37 cities which asked to be designated as Federal reserve cities.

Location.	Popula- tion. ¹	Number of banks and trust com- panies.	Capital and surplus.	Per capita.	Individual deposits.	Per capita.	Loans and discounts.	Per capita.
1. Boston.....	670,585	60	\$100,779,114	\$150	\$661,950,254	\$987	\$561,625,627	\$803
2. New York.....	4,766,883	142	563,221,701	118	2,866,351,069	601	2,306,503,682	483
3. Philadelphia.....	1,549,008	100	177,448,741	114	592,533,612	382	413,298,566	268
4. Cleveland.....	560,663	35	41,635,100	74	271,693,217	484	188,499,403	338
5. Cincinnati.....	363,591	39	31,813,107	87	98,178,794	270	88,845,791	244
6. Columbus.....	181,511	21	7,099,000	39	30,498,790	168	24,188,704	133
7. Pittsburgh.....	533,905	83	130,037,145	243	350,298,872	656	291,668,678	547
8. Wheeling.....	41,641	11	4,949,393	118	18,845,965	452	16,802,317	405
9. Baltimore.....	558,485	55	47,952,469	85	190,679,440	341	118,912,253	213
10. Washington.....	331,069	36	29,161,731	88	72,552,236	219	63,012,066	190
11. Richmond.....	127,628	26	16,810,955	131	35,371,126	277	50,004,572	393
12. Charlotte.....	34,014	7	2,630,000	78	6,616,642	194	9,242,936	271
13. Columbia.....	26,319	9	2,365,318	89	5,894,711	223	8,511,384	326
14. Atlanta.....	154,839	28	15,313,448	98	28,371,032	183	33,494,035	216
15. Savannah.....	65,064	16	8,129,605	125	20,622,523	316	28,061,700	431
16. Louisville.....	223,928	18	18,100,297	67	41,437,599	185	38,701,079	172
17. Birmingham.....	132,685	11	6,685,620	50	23,182,608	174	21,494,705	162
18. Montgomery.....	38,136	9	3,396,762	89	6,018,942	157	7,756,141	204
19. Chattanooga.....	44,604	10	4,294,114	96	15,166,950	340	16,355,760	366
20. Memphis.....	131,105	22	7,346,214	56	23,343,841	179	24,442,321	186
21. New Orleans.....	339,075	19	20,532,500	60	70,854,415	209	64,845,722	194
22. Chicago.....	2,185,283	88	151,882,559	69	682,498,992	312	690,799,087	315
23. St. Louis.....	687,029	44	72,222,500	105	205,443,737	299	233,385,655	339
24. Minneapolis.....	301,408	33	20,731,391	68	78,258,930	260	82,720,056	274
25. St. Paul.....	214,744	20	11,260,845	52	40,490,496	189	42,322,465	197
26. Kansas City, Mo.....	248,381	30	17,415,500	70	66,562,431	268	91,686,871	370
27. Omaha.....	124,096	14	8,165,000	65	28,038,694	226	34,989,699	282
28. Denver.....	213,381	31	11,489,551	53	57,371,171	269	41,365,143	194
29. Lincoln.....	43,973	15	2,042,000	46	7,253,010	165	8,696,240	198
30. Dallas.....	92,104	13	9,997,000	108	24,808,891	269	27,517,338	299
31. Fort Worth.....	73,312	18	6,667,724	90	14,375,274	196	16,861,831	231
32. Houston.....	78,800	13	13,599,100	172	26,551,714	329	32,775,530	415
33. San Francisco.....	416,912	45	73,623,325	176	313,153,942	752	281,447,424	675
34. Seattle.....	237,194	32	11,567,020	48	67,527,325	285	48,963,007	206
35. Portland.....	207,214	22	12,097,718	58	56,805,140	274	44,132,644	213
36. Spokane.....	104,402	18	7,660,876	73	25,821,751	249	23,235,697	223
37. Salt Lake City.....	92,777	18	7,838,696	84	33,623,133	362	30,676,029	330

¹ United States census of 1910.

ON APRIL 10, 1914, THE FEDERAL RESERVE BANK ORGANIZATION COMMITTEE MADE PUBLIC THE FOLLOWING STATEMENT RELATING TO ITS DECISION OF APRIL 2, 1914, DEFINING THE BOUNDARIES OF THE FEDERAL RESERVE DISTRICTS AND DESIGNATING THE LOCATION OF THE FEDERAL RESERVE BANKS.

WASHINGTON, D. C., April 10, 1914.

Congress imposed on the committee the duty of dividing the country into not less than 8 nor more than 12 districts, and the location of a Federal reserve bank in each. Thirty-seven cities asked to be chosen. The committee could select at most only 12. Necessarily 25 cities had to be disappointed.

Following its policy declared at the very outset, the committee refused to be influenced by the purely local and selfish claims of cities or individuals, and discharged the duty imposed upon it by Congress after exhaustive investigation and study of the entire country, with unbiased minds and according to its best judgment. With so many conflicting claims, somebody had to judge. Congress constituted the committee a court and gave the Federal Reserve Board the power of review. Disappointed competitors should seek a remedy through the orderly processes the law prescribes.

Considerable comment has been occasioned by the failure of the committee to create districts suggested by New Orleans, with New Orleans as the location for a reserve bank; by Baltimore, with Baltimore as the location for a reserve bank; by Omaha, with Omaha as the location for a reserve bank; and by Denver, with Denver as the location for a reserve bank.

The committee realized that the division of the country into districts was far more important and complex than the designation of the reserve cities, and that the latter duty was subsidiary and relatively simple, waiving considerations of local pride or prestige. In arranging the districts the consideration of the character and growth of industry, trade, and banking, no less than the traditions, habits, and common understandings of the people was much more intimately involved.

It became clear, in the hearings, that comparatively few people realized, or seemed to realize, what the act was intended to accomplish; what the nature and functions of the reserve banks were to be; and how little change would occur in the ordinary financial relations of the communities, the business establishments, and the individual banks.

Critics of the decision of the committee reveal misunderstanding in these directions, and either do not know, or appear not to know, that the Federal reserve banks are bankers' banks and not ordinary commercial banks; that they are to hold the reserves and to clear the checks of member banks, make rediscounts for them, and engage in certain open-market operations. As a matter of fact, the ordinary every-day banking relations of the community, of business men, and of banks will not be greatly modified or altered. The purpose of the system is to remove artificiality, promote normal relations, and create better conditions under which everybody will transact business.

Every city can continue to do business with individuals, firms, or corporations, within its own limits, or in its own region, or in any other part of the Union or the world in which it has heretofore done business.

Reserves are to be held in a new way and in new places, so far as this act controls them, but banking and business generally will no more be confined within districts than heretofore, and it is simply misleading for any city or individual to represent that the future of a city will be injuriously affected by reason of its failure to secure a Federal reserve bank. Every city which has the foundations for prosperity and progress will continue to grow and expand, whether it has such a reserve bank or not, and well-informed bankers, especially, are aware of this.

The facts which the committee had to consider will throw light on its decision in reference to these cities.

NEW ORLEANS' CLAIMS.

New Orleans selected a district extending from New Mexico to the Atlantic Ocean, including all of Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, and that part of Tennessee south of the Tennessee River.

It was represented by Texas that it would do great violence to her trade to connect her with New Orleans. It was claimed, and evidence was submitted in support of the claim, that her trade was with her own cities or with Kansas City and St. Louis. In a poll of the banks of Texas made by the Comptroller of the Currency, 212 banks expressed a first choice, 121 a second choice, and 30 a third choice for Dallas. No bank in Texas expressed a first choice for New Orleans, only 4 a second choice, and 44 a third choice. The whole State protested against being related to New Orleans.

The banks of Alabama generally desired to be connected either with Birmingham or Atlanta, only three expressing a first choice for New Orleans. The banks of Georgia desired to be connected with Atlanta, none expressing a first or second choice for New Orleans, and only 12 a third choice. They represented that it would do violence to them to be connected with a city to the west and claimed that their relations were mainly with Atlanta or cities, to the northeast. Of 44 banks in Florida 19 gave Atlanta as their first choice, 19 as their second choice, and 5 as their third choice. Only 5 expressed a first preference for New Orleans, and these were in the western corner, 4 a second choice, and 3 a third choice. No bank in Tennessee expressed a first or second choice for New Orleans, and only 2 a third choice, while 7 expressed a first choice for Atlanta, 14 a second choice, and 13 a third choice. Generally speaking, the only banks which desired to be connected with New Orleans and expressed a first preference for her were 25 of the 26 banks reporting in Louisiana, and 19 of the 32 in Mississippi. On a poll made from the comptroller's office of all banks expressing their preference as to the location for a Federal reserve city, 124 expressed a first preference for Atlanta, 232 for Dallas, and only 52 for New Orleans. The views of the bankers were supported by chambers of commerce, other business organizations, and by many business men.

It will thus be seen that if the committee was to give weight to the views of business men and bankers in the section of the country affected, to consider the opposition of the States of Texas, Alabama, Georgia, Florida, and Tennessee, and to be guided by economic considerations, it could not have designated New Orleans as the location for a reserve bank to serve either the western or the eastern part of the district that city asked for. The course of business is not from the Atlantic seaboard toward New Orleans, nor largely from the State of Texas to that city, and if Dallas and Atlanta had been related to New Orleans a better grounded complaint could and would have been lodged by them against the committee's decision than that made by New Orleans.

Some of the banking statistics which the committee had to consider throw light on the problem. It should be borne in mind that the committee could consider primarily only the statistics with reference to assenting banks. In this section of the country, as in most others, the assenting banks were the national banks. In March, 1914, the capital stock and surplus, loans and discounts, and individual deposits of the national banks in the three cities named, as shown by the sworn reports to the Comptroller of the Currency, were as follows:

	Capital and surplus.	Loans and discounts.	Individual deposits.
Atlanta.....	\$8,600,000	\$26,038,000	\$24,348,000
Dallas.....	5,900,000	18,622,000	18,551,000
New Orleans.....	6,730,000	17,285,000	16,857,000

Even more significant are the statistics of growth from September, 1904, to March, 1914.

CAPITAL AND SURPLUS.

	September, 1904.	March, 1914.	Percentage of increase.
Atlanta.....	\$2,410,000	\$8,600,000	256
Dallas.....	2,676,000	5,900,000	120
New Orleans.....	6,250,000	6,730,000	8

LOANS AND DISCOUNTS.

	September, 1904.	March, 1914.	Percentage of increase.
Atlanta.....	\$10,329,000	\$26,038,000	152
Dallas.....	7,653,000	18,622,000	143
New Orleans.....	20,088,000	17,285,000	Decrease 13

INDIVIDUAL DEPOSITS.

	September, 1904.	March, 1914.	Percentage of increase.
Atlanta.....	\$9,931,000	\$24,348,000	145
Dallas.....	7,157,000	18,551,000	159
New Orleans.....	19,425,000	16,857,000	Decrease 13

The loans and discounts in the national banks of New Orleans at the time of the report, March 4, 1914, were less than those of the national banks of either Atlanta or Dallas.

While the committee could not figure on the resources of other than assenting banks which are in this section, the national banks, the following statistics of all reporting banks, including national banks, State banks, and trust companies, as of June 4, 1913, were regarded as significant and were given consideration:

Atlanta reported capital stock and surplus \$15,313,000, or \$98 per capita; Dallas \$9,997,000, or \$108 per capita; and New Orleans \$20,532,000, or \$60 per capita. Individual deposits, per capita, Atlanta, \$183; Dallas, \$269; New Orleans, \$209.

The loans and discounts for all reporting banks for the three cities were as follows: Atlanta, \$33,494,000, or \$216 per capita; Dallas, \$27,517,000, or \$299 per capita; New Orleans, \$64,845,000, or \$194 per capita.

The committee found that the total loans and discounts made by national banks in the cities named in the 13 Southern States on January 13, 1914, were as follows:

Atlanta.....	\$26, 117, 000
Dallas.....	19, 123, 000
New Orleans.....	19, 477, 000

while the total loans made by the national banks of Dallas throughout the entire United States on the date mentioned exceeded the loans made by the national banks of New Orleans.

Special reports, made under oath to the Comptroller of the Currency also show that on February 14, 1914, the credit balances of the banks and trust companies in the 13 Southern States with the national banks of Dallas exceeded in amount the credit balances of all banks and trust companies in these same States with the national banks of New Orleans.

In view of the comparisons and criticisms from New Orleans in connection with the designation of Dallas, Atlanta, and Richmond, and the omission of New Orleans and Baltimore, the following table is instructive:

National bank statistics for States of Texas, Virginia, Maryland, Georgia, Louisiana, and Mississippi as of March 4, 1914.

[According to sworn reports made to the Comptroller of the Currency.]

	Area (square miles).	Popula- tion, cen- sus 1910.	Capital and surplus.	Individual deposits.	Loans and discounts.
State of Texas (including Dallas).....	265,780	3,896,542	\$76,785,584	\$197,663,338	\$215,114,326
State of Virginia (including Richmond).....	42,450	2,061,612	29,732,696	90,887,858	107,410,063
State of Maryland (including Balti- more).....	12,210	1,295,346	28,267,420	83,217,376	91,326,942
State of Georgia (including Atlanta)....	59,475	2,609,121	24,479,735	51,382,061	61,852,579
State of Louisiana (including New Orleans).....	48,720	1,656,388	12,128,866	32,000,521	34,804,354
State of Mississippi.....	46,810	1,797,114	5,168,192	17,045,324	13,669,200

From the above statement it will be seen that in each item, capital and surplus, individual deposits, and loans and discounts, the national banks of Virginia, including Richmond, largely surpass the national banks of Maryland, including Baltimore.

The capital and surplus of the national banks of the State of Virginia are 60 per cent greater than the capital and surplus of the national banks of the States of Louisiana and Mississippi combined, including the city of New Orleans, while the loans and discounts by the national banks of Virginia are more than three times as great as the loans and discounts in the national banks of Louisiana, including New Orleans.

While the capital and surplus of the national banks of Georgia largely exceed the combined capital and surplus of the national banks of the States of both Mississippi and Louisiana, the loans and discounts made by the national banks of Georgia exceed by \$13,000,000 the loans and discounts of all the national banks of Louisiana and Mississippi combined, including the city of New Orleans.

The capital and surplus of the national banks of Texas amount to four times as much as the capital and surplus of the national banks of the States of Louisiana and Mississippi combined, and the individual deposits in the national banks of Texas also amount to about four times as much as the individual deposits of all national banks in Louisiana and Mississippi, the only States from which New Orleans received as much as half a dozen votes as first choice for the location for a Federal reserve bank.

KANSAS CITY DISTRICT.

The region in the middle and far West presented problems of difficulty. Careful consideration was given to the claims of Omaha, Lincoln, Denver, and Kansas City, which conflicted in this region. Denver asked for a district which included Idaho, Montana, Utah, Wyoming, Colorado, New Mexico, and the eastern two-thirds of Arizona and Texas, Kansas and Nebraska west of the one-hundredth meridian, and the Deadwood portion of South Dakota. The district gave approximately the minimum capital provided by law. Of the territory included in this district

Montana unanimously requested to be connected with Minneapolis or Chicago, saying that she had little or no trade relations with Denver. Idaho desired to go to Portland or San Francisco; Arizona preferred San Francisco, and the greater part of New Mexico asked for Kansas City. Western Texas, Kansas, and Nebraska unanimously protested against going to Denver. Kansas desired Kansas City; Nebraska preferred Omaha or Lincoln; and Texas wanted either a Texas city or Kansas City or St. Louis.

In the poll of banks, Denver received 136 first-choice votes, of which 112 were from Colorado and 12 from Wyoming. With Montana, Idaho, Arizona, Texas, Kansas, and Nebraska in opposition, it was clearly impossible to make a district with Denver as the location of a bank. Part of the territory asked to be assigned to San Francisco and the other part to Minneapolis or Kansas City.

Omaha asked for a district embracing western Iowa, all of Nebraska, part of South Dakota, part of Kansas, Colorado, Utah, Wyoming, Idaho, and Montana. All but eight of the banks in South Dakota insisted upon being connected with Minneapolis; Iowa desired to go to Chicago; Kansas practically unanimously voted for Kansas City; Montana protested against any other connection than Minneapolis or Chicago. The preferences of the other States have already been indicated.

Of the 218 banks which expressed a first preference for Omaha, 181 were from Nebraska. The committee had to consider the State of Oklahoma and part of Missouri in connection with this region, and in district No. 10, 497 banks expressed a first preference for Kansas City; western Missouri, Oklahoma, and Kansas, and part of New Mexico, especially asked for this connection. Thirty-seven banks in Colorado gave Kansas City as second choice and 26 gave Omaha.

It seemed impossible to serve the great section from Kansas City to the mountains in any other way than by creating a district with Kansas City as the headquarters, or to provide for the northwestern section except by creating a district with Minneapolis as headquarters. The only other thing that could have been done with Nebraska under the conditions which presented themselves was to relate her to Chicago, and this seemed to be inadvisable in the circumstances. The Kansas City banks serve a very distinctive territory and will serve it more satisfactorily than St. Louis could have done. The relations of that territory on the whole are much more largely with Kansas City than with any other city in the Middle West with which it could have been connected. It will, of course, be recognized by those who are informed that of the four cities Kansas City is the most dominant banking and business center. The following statistics as of March, 1914, will throw light on the situation:

	Capital and surplus.	Loans and discounts.	Individual deposits.
Kansas City.....	\$11,000,000	\$66,205,000	\$40,415,000
Omaha.....	6,570,000	32,848,000	27,258,000
Denver.....	7,545,000	28,022,000	34,124,000
Lincoln.....	1,330,000	6,066,000	4,439,000

The statistics of growth during the nine years from September, 1904, to March, 1914, are significant:

CAPITAL AND SURPLUS.

	September, 1904.	March, 1914.	Percentage of increase.
Kansas City.....	\$3,900,000	\$11,660,000	199
Omaha.....	3,880,000	6,570,000	69
Denver.....	3,325,000	7,545,000	127
Lincoln.....	768,000	1,330,000	73

LOANS AND DISCOUNTS.

Kansas City.....	\$35,598,000	\$66,205,000	83
Omaha.....	10,218,000	32,848,000	102
Denver.....	14,146,000	28,022,000	98
Lincoln.....	3,820,000	6,066,000	53

INDIVIDUAL DEPOSITS.

Kansas City.....	\$30,730,000	\$40,415,000	31
Omaha.....	15,728,000	27,258,000	73
Denver.....	27,798,000	34,124,000	22
Lincoln.....	3,283,000	4,439,000	35

The loans and discounts of all reporting banks and trust companies in Kansas City on June 4, 1913, amounted to \$91,686,000, exceeding by about \$7,000,000 the total loans and discounts of all banks and trust companies in the cities of Omaha, Denver, and Lincoln combined.

The loans and discounts of the national banks alone in Kansas City also exceeded the sum total of the loans and discounts of all national banks in the cities of Omaha and Denver combined.

The great preponderance in the movement of trade in district No. 10 is to the east. In order to place the Federal reserve bank for that region in Denver it would have been necessary to disregard these facts and the opposition and earnest protests of banks, both national and State, throughout the district.

THE RICHMOND DISTRICT.

The committee named as cities for the location of Federal reserve banks New York, Chicago, Philadelphia, St. Louis, Boston, and Cleveland. In population these are the six largest cities in the United States; their geographical situation and all other considerations fully justified their selection.

San Francisco and Minneapolis were the first choice of the great majority of the national banks in their respective sections, and their financial, industrial, and commercial relations and other factors entitled them to be chosen. Their selection appears to have evoked no criticism, but to

have received general approval. Conditions relating to the Kansas City, Dallas, and Atlanta districts have been dealt with.

For the territory from eastern Georgia to the Pennsylvania line, the committee, after fully considering all the facts, decided to create a district with the Federal reserve bank at Richmond. South Carolina and North Carolina had protested against being connected with a bank to the south or west. They said that their course of trade was northeast. It seemed undesirable to place a bank in the extreme northeastern corner or at Baltimore, not only because of its proximity to Philadelphia, but also because the industrial and banking relations of the greater part of the district were more intimate with Richmond than with either Washington or Baltimore. The States of Maryland, Virginia, West Virginia, North and South Carolina, and the District of Columbia had to be considered. North Carolina, South Carolina, and Virginia preferred to be connected with Richmond. West Virginia was divided in its preferences; Maryland and the District of Columbia, of course, desired Baltimore or Washington. In the poll of banks made directly by the comptroller's office, Richmond received more first-choice ballots than any other city in the district-167 against 128 for Baltimore, 35 for Pittsburgh; 28 for Columbia, S.C., 37 for Cincinnati, and 25 for Washington, D.C. Of the remaining 21 votes, 19 were for Charlotte, N. C., and 2 for New York. Leaving out the states of Maryland and Virginia, Richmond received from the rest of the district three times as many first-choice votes as were cast for Baltimore.

District No.5 is composed of the States of Maryland, Virginia, West Virginia (except four counties), North and South Carolina, and the District of Columbia. These States have always been closely bound together commercially and financially and their business dealings are large and intimate. The reports made to the Comptroller of the Currency on March 4, 1914, by all the national banks in each of these States show in every essential respect that the business of the national banks of Virginia, including Richmond, is greater than the business of the national banks of Maryland, including Baltimore, or any other of the five States embraced in district No. 5, as appears in the following table:

	Capital, surplus, and undivided profits.	Loans and discounts.	Total individual deposits.
Virginia.....	\$33,544,631	\$107,410,063	\$90,887,858
Maryland.....	31,390,057	91,326,942	83,217,376
West Virginia.....	18,209,346	56,789,538	61,421,332
North Carolina.....	13,527,086	44,051,033	36,051,154
South Carolina.....	10,332,439	28,860,456	23,330,916
District of Columbia.....	12,685,411	26,253,432	29,520,853

Advocates of New Orleans have criticized the decision of the organization committee and have given out comparative figures as to New Orleans, Richmond, and other cities which are incorrect and misleading. An analysis and study of the actual figures will be found instructive and can lend no support to the claims of New Orleans.

From the sworn -special reports recently submitted to the Comptroller of the Currency, it appears that the national banks in Richmond were lending in the 13 Southern States, on January 13, 1914, more money than was being loaned in those States by the national banks of any other city in the country except New York. The total loans and discounts in the 13 Southern States by the four cities referred to are as follows:

Richmond.....	\$33, 473, 000
Baltimore.....	6, 891, 000
New Orleans.....	19, 477, 000
Washington.....	915, 000

The figures also show that in these portions of district No. 5 outside of the States of Virginia and Maryland the Richmond national banks are lending twice as much money as all the national banks in Baltimore and Washington combined. They also show that although Richmond is not a reserve city, the banks and trust companies in the 13 Southern States had on deposit in the national banks of Richmond on February 14, 1914, \$9,876,000, or slightly more than the banks of this section had on deposit in the city of Baltimore, and four times as much as they carried in Washington, although these two cities have long enjoyed the benefits of being reserve cities. That southern banks should carry larger balances in Richmond, where they could not be counted in their reserves, rather than in Baltimore or Washington, where they could be counted, is suggestive.

The figures show that the capital and surplus of all reporting banks-national, State, and savings, and trust companies-per capita, in Richmond, as of June 4, 1913, was \$131; in Baltimore, \$85; in Washington, \$88; and in New Orleans, \$60, while the loans and discounts made by all banks and trust companies in Richmond, on the same date, amounted to \$393 per capita, against \$190 in Washington, \$213 in Baltimore, and \$194 in New Orleans.

The amount of money which banks and trust companies in the various parts of the country carried on deposit with Richmond, a non-reserve city, on February 14, 1914, amounted to \$10,970,000, or nearly twice as much as the balances carried by outside banks with the national banks of Washington, which on the same day amounted to \$5,516,000, and one and one-half times as much as they carried on the same day with the national banks of New Orleans, a reserve city.

The statistics furnished the organization committee show that on March 4, 1914, the capital and surplus of the national banks of Richmond, per capita, amounted to more than twice as much as the capital and surplus, per capita, of the national banks of either Baltimore or Washington, and three and fl. half times as much as New Orleans, while the individual deposits of the national banks of Richmond amounted to \$201 per capita, against \$86 for Washington and \$76 for Baltimore and \$50 for New Orleans. The loans and discounts in the national banks of Richmond on the same date were reported at \$279 per capita, against \$77 for Washington, \$108 for Baltimore and \$51 for New Orleans.

Especially significant are the following statistics showing the growth in capital and surplus, loans and discounts, and individual deposits of national banks in the four cities named:

CAPITAL AND SURPLUS.

	September, 1904.	March, 1914.	Percentage of increase.
Richmond.....	\$3,115,000	\$9,314,000	199
Washington.....	6,215,000	11,365,000	83
Baltimore.....	18,262,000	19,205,000	5
New Orleans.....	6,250,000	6,730,000	8

LOANS AND DISCOUNTS.

Richmond.....	\$12,946,000	\$35,593,000	175
Washington.....	15,018,000	25,405,000	69
Baltimore.....	48,755,000	60,312,000	23
New Orleans.....	20,088,000	17,285,000	Decrease 13

INDIVIDUAL DEPOSITS.

Richmond.....	\$11,257,000	\$25,705,000	128
Washington.....	20,017,000	28,491,000	42
Baltimore.....	40,910,000	42,553,000	4
New Orleans.....	19,425,000	16,857,000	Decrease 13

In other words, the figures show that the national banks of Richmond were lending on March 4, 1914, twice as much money as all the national banks in the city of New Orleans, and 40 per cent more than all the national banks of Washington. In the original decision of the committee the various economic and other factors which entered into and determined the committee's action were enumerated and need not be repeated here. This statement is made for the purpose of disclosing some of the details which influenced the Committee's findings.

Equation Sheet

$FV = PV(1+i)^n$ $FV = PV(1+i/t)^{nt}$ $PV = FV \cdot \sum_{i=1}^n (1+i)^{-n} = FV \left(\frac{1-(1+i)^{-n}}{i} \right)$ $P = C \cdot \sum_{i=1}^n (1+i)^{-n} + F / (1+i)^n$ $= C \left(\frac{1-(1+i)^{-n}}{i} \right) + F / (1+i)^n$ $PV = X \cdot \sum_{i=1}^{\infty} (1+i)^{-n} = \frac{X}{i}$ $P = X \cdot \sum_{i=1}^{\infty} \frac{(1+g)^n}{(1+i)^n} = \frac{X(1+g)}{i-g}$ $E[R] = \frac{E[P_{t+1}] - P_t + C}{P_t}$ $R = \frac{P_{t+1} - P_t + C}{P_t}$ $i_c = \frac{C}{P_t}$ $i = \frac{F - P}{P}$	$i = r + E[\pi] \quad \text{Approximate}$ $i = (1+r)(1+E[\pi]) - 1 \quad \text{Exact}$ $r_{AT} = i(1-\tau) - \tau E[\pi]$ $MV = PY$ $\frac{M_d}{P} = f(i, Y)$ $\frac{M_d}{P} = f(Y_p, r_b - r_m, r_e - r_m, \pi^e - r_m)$ $Y = C + I + G + NX$ $MB = C + R$ $MS = C + R$ $R = RR + ER$ $\Delta D = m * \Delta R$ $MS = m * MB$ $m = \frac{1+c}{r+e+c}$ $i_{ff}^* = \pi_t + r_t^* + a_\pi (\pi_t - \pi_t^*) + a_y (y_t - \bar{y}_t)$ $MV = PY$ $NCO = NX$ $\text{Relative } R^D = i^D - i^F + \frac{E_{t+1}^e - E_t}{E_t}$
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$$i_{n,t} = \left((1+i_{1,t}) * (1+i_{1,t+1}^e) * (1+i_{1,t+2}^e) * \dots * (1+i_{1,t+(n-1)}^e) \right)^{1/n} - 1$$

$$ROA = \text{profits} / \text{assets} \quad ROE = \text{profits} / \text{capital}$$

$$EM = \text{capital} / \text{assets} \quad LR = [EM]^{-1}$$

$$A = L + C$$

$$\mu = \pi R_{good}^b + (1 - \pi) R_{bad}^b$$

$$\sigma^b = \pi (R_{good}^b - \mu^b)^2 + (1 - \pi) (R_{bad}^b - \mu^b)^2$$

$$\sigma^{sb} = \pi (R_{good}^s - \mu^s) (R_{good}^b - \mu^b) + (1 - \pi) (R_{bad}^s - \mu^s) (R_{bad}^b - \mu^b)$$

$$\mu^P = w^s \mu^s + (1 - w^s) \mu^b$$

$$\sigma^P = \left[(w^s)^2 \sigma^s + (1 - w^s)^2 \sigma^b + 2w^s (1 - w^s) \sigma^{sb} \right]^{1/2}$$

$$\mu^C = R^F + \sigma^C \left(\frac{\mu^P - R^F}{\sigma^P - \sigma^F} \right), \sigma^C = w^C \sigma^P$$

$$VaR_p = -z_p * \sigma^{1/2} * \nu$$

$$i_{AT} = i(1 - \tau) - \pi^e$$