

FIM – SUMMARY OF THE THEORY

CHAPTER 1 – WHY FIM IS RELEVANT TO STUDY

▪ **Why are Financial Markets crucial in economy?**

1. Channeling funds from savers to investors, promoting economic efficiency
2. Market activity affects: personal wealth, business firms, and economy

▪ **Why regulate financial markets?**

To increase the information available to investors and to ensure the soundness

Activities in **financial markets** have direct effects on individual's wealth, the behaviour of business and the efficiency of our economy. 3 financial markets deserve particular attention:

Debt markets allow governments, corporations, and individuals to borrow
(where interest rates are determined)

Security = financial instrument which is a claim on the issuer's future income or asset

Bond = debt security that promises to make payments periodically for a specified amount of time

interest rates (=costs of borrowing; great impact on the overall economy activity, because they affect not only consumers' willingness to spend or save but also businesses' investment decisions.

Stock market = is the market where common stock (or just stock) are traded
(which has a major effect on people's wealth and on firms' investment decisions)

stock = A share of ownership in a corporation that is a claim on the earnings and assets of the corporation

primary market: company sells newly issued stocks to investor in order to raise capital

secondary market: investors trade amongst investors.

Foreign exchange market = is where international currencies trade and exchange rates are set
(because fluctuation in the foreign exchange rate have major consequences for the US economy)

▪ **Why are Financial Institutions crucial in economy?**

-> Corporations, organizations, and networks that operate the "market places"

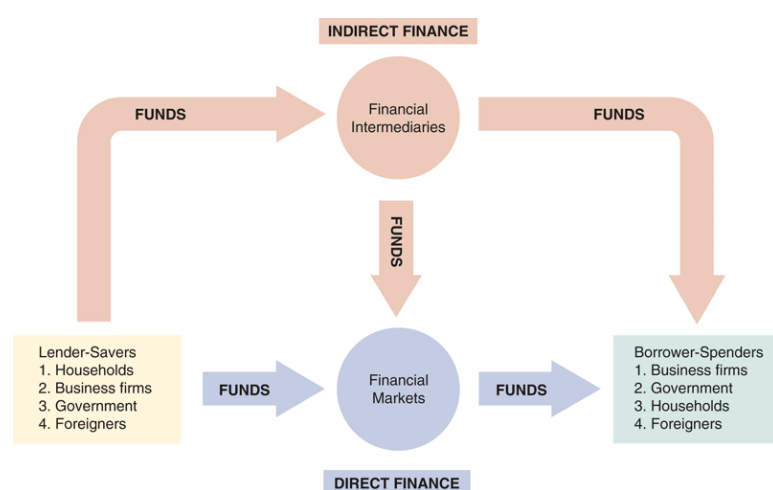
1. Structure: helps funds move from savers to investors
2. Financial Crises: why do they happen? ("Great Recession" of 2007–09 was the worst financial crisis since the Great Depression (world war II))
3. Central Banks and the Conduit of **Monetary Policy**: role of Fed and foreign counterparts;
Because monetary policy affects interest rates, inflation and business cycles, all of which have an important impact on financial markets and institutions, we need to understand how monetary policy is conducted by central banks in the US and abroad.

4. **The International Financial System:** international capital flows between countries affecting national economy. Need to understand exchange rates, capital controls, and the role of agencies such as the IMF
5. **Banks and Other Financial Institutions:** insurance companies, pension funds...
Banks and other FIs channel funds from people who might not put them to productive use to people who can do so and thus play a crucial role in improving crisis, financial firms fail, which causes serve damage to the economy.
6. **Financial Innovation:** technological improvements and impact on financial product delivery
7. **Managing Risk in Financial Institutions:** risk management in financial institution

2. OVERVIEW OF THE FINANCIAL SYSTEM

Overall Financial system

A framework for describing set of markets, organizations, and individuals that engage in the transaction of financial instruments (securities), as well as regulatory institutions



1. Function of Markets

The Basic function of FMs is to channel funds from households, firms and governments that have saved surplus funds by spending less than their income to those that have shortage of funds because their wish to spend more than their income.

- **lender-savers** who have an excess of funds (principally households but may also be business enterprises, government and foreigners)
- **borrow-spenders** who have a shortage of funds and must borrow to finance their spending. (principally businesses and governments, but may also be households and foreigners)

Two forms of exchange (segments):

- **indirect finance**, which involves a **financial intermediary** that stands between the lender-savers and the borrower-spenders and helps transfer funds from one to the other.
- **direct finance**, in which borrowers borrow funds directly from lenders by selling them securities, also called financial instruments

- **Securities** are assets for the person who buys them, but liabilities for the individual or firm who sells them.
 - Bond: Debt security that promises to make payments periodically from a specified period of time
 - Stock: Security that entitles the owner to a share of the company's profits and assets

Benefits of FMs:

This **channelling of funds improves the economic welfare of everyone in society**. Because they allow funds to move from people who have no productive investment opportunities to those who have such opportunities, FMs contribute to economic efficiency. In addition, channelling funds directly benefits consumers by allowing them to time purchases better.

- Opportunity to pay for loan – increase countries productivity
- Providing efficient allocation of capital (investment opportunity)
- Improved well-being of consumers

2. Structure of Markets/ classification

Trading object:

Issue a Debt (bonds, mortgage)	Raising funds by issuing equity (stocks)
<i>Debt instrument</i> : Contractual agreement by the borrower to pay the holder of the instrument fixed amounts at regular intervals until a specific date, when a final payment is made.	<i>Equities</i> : Claims to share the net income and the assets of a business, such as common stocks. <i>Dividends</i> : Periodic payments received by the holder of an equity. (Holder earns a share of the borrower's enterprise's income (dividends))
<i>Maturity</i> of a debt: number of years until that instrument's expiration date. <ul style="list-style-type: none"> ▪ Short Term (<1 year) ▪ Intermediate Term (1< years <10) ▪ Long Term (>10 years) 	Do not expire and their maturity is infinite. Hence, they are considered long term securities
Holder doesn't achieve ownership	Makes lender an owner of the borrower's enterprise

To obtain funds in FMs:

Primary market	Secondary market: exchanges (central or OTC)
Financial market in which new issues of a security, such as a bond or a stock, are sold to initial buyers by the corporation or government agency borrowing the funds. (financial instruments are newly issued to borrowers)	Markets in which financial instruments already in existence are traded among lenders
<ul style="list-style-type: none"> not really well known to the public bc the selling of securities to initial buyers often happens behind closed doors <i>Investment Bank</i>: An important financial institution that assists in the initial sale of securities in the primary market <i>Underwriting securities</i>: Guaranteeing a price for a corporation's securities and then selling them to the public. 	<ul style="list-style-type: none"> <i>Brokers</i>: Agents of investors who match buyers with sellers of securities <i>Dealer</i>: Agents liking buyers and selling securities at stated prices <i>Liquid</i> financial instrument: When it is easier and quicker to sell the financial instruments to raise cash

Secondary markets can be organised in 2 different ways:

Exchanges:	OTC market (Over-the-counter)
Buyers and sellers of securities meet in one central location to conduct trades	Dealers at different locations who have an inventory of securities stand ready to buy and sell securities "over the counter" to anyone who comes to them and is willing to accept their prices
On an exchange, every party is exposed to offers by every other counterparty (central location), which may not be the case in dealer networks	There is less transparency and less stringent regulation on these exchange, so unsophisticated investors take on additional risk and could be subject to adverse conditions. Best example of an OTC is the market for Treasury Securities (different location).

Money vs Capital Markets:

Money	Capital Market
Market in which only short-term (Maturity < 1 Year) debt instruments are traded. (Usually more widely traded and tend to be more liquid)	Market in which long-term debt and equity instruments are traded. (Usually held by financial intermediaries such as insurance companies and pension funds, which have little uncertainty about the amount of funds they will have available in the future.)

3. Internationalisation of Financial Markets

An important trend in recent and years is the **growing internationalization of FMs**.

- Foreign Bonds** = denominated in foreign currency, targeted at a foreign market

- **Eurobonds** = **denominated in a currency other than that of the country in which they are sold**, are now the dominant security in the international bond market and have surpassed US corporate bonds as a source of new funds.
- **Eurocurrency market** = foreign currency deposited outside of home country, e.g. USD deposited in London → gives US borrows an alternative source for dollars.
 - **Eurodollars** = **US dollars deposited in foreign banks**, are an important source of funds for American banks.
- **World Stock Market** = total market capitalization (US no longer #1)

Foreign Stock Market Indexes = a measurement of a section of the stock market (benchmark)

BEL 20 - Euronext Brussels

DJIA, S&P500, Nasdaq Composite – USA

FTSE 100 – UK

DAX – Germany

CAC 40 – France

Hang Seng – Hong Kong

Strait Times – Singapore

Global Perspective – relative decline of US Capital Markets (e.g. cars, electronics)

Why?

1. New technology in foreign exchange
2. US regulations tighter after 9-11
3. Greater risk of lawsuit in US
4. Sarbanes-Oxley¹ has increased the cost of being a US-listed public company

4. Financial Intermediarie

Definition: an entity that acts as the middleman between two parties in a financial transaction and offer a number of benefits to the average consumer, including safety, liquidity, and economies of scale involved in commercial banking, investment banking and asset management.

Financial intermediaries are FIs that acquire funds by issuing liabilities and, in turn, use those funds to acquire assets by purchasing securities or making loans. Financial intermediaries play an important role in the financial system because they **reduce transaction costs, allow risk sharing, and solve problems created by adverse selection and moral hazard**. As a result, financial intermediaries

¹ The Act is designed to oversee the financial reporting landscape for finance professionals. Its purpose is to review legislative audit requirements and to protect investors by improving the accuracy and reliability of corporate disclosures.

allow small savers and borrowers to benefit from the existence of FMs, thereby increasing the efficiency of the economy. However, the **economies of scope** that help make financial intermediaries successful can **lead to conflicts of interest** that make the financial system less efficient.

Financial intermediation = saver buys funds from bank, bank gives loan to borrower (process) → more important source of finance than securities markets (stocks), and needed due:

- **Transaction costs:** The time and money spent in carrying out financial transactions. Financial intermediaries can substantially reduce costs because of two techniques:
 - **Economies of scale:** reduction of tran.c. per dollar of transactions as the size pf tran. Increases
 - **Liquidity service:** Service that make it easier for customers to conduct tran.
- **Risk Sharing:** Uncertainty about returns investors will earn on assets. Risk sharing is creating and selling assets with risk characteristics that people are comfortable with, and then they use the funds they acquire by selling these assets to purchase other assets that may have far more risk. (If 1000 people took loans it's not so bad if one person can't pay it back.)

Result from low transaction costs, aiding with reducing investor risks:

- **Asset transformation** = Financial Intermediaries create and sell low risk assets to one party in order to buy assets with greater risk from other party (risky assets are turned into safer ones)
- Encourage individuals and businesses to **diversify** their asset holdings: buy range of assets, pool them, the sell rights to the diversified pool to individuals. Investing in a collection of assets whose return do not always move together, with the result that overall risk is lower than for individual assets.
- **Asymmetric information:** When one party does not know enough about the other party to make accurate decisions. Lack of information creates problems in the financial system on two fronts:

Adverse selection	Moral hazard
Before transaction	After transaction
The borrower most likely to produce adverse outcome most likely to seek a loan	The borrower that has incentive to engage in immoral activities most likely to not pay back
Similar problems occur with insurance, where unhealthy people want their known medical problems covered	Similar as with insurance, people may engage in more risky activities only after being insured
	Conflict of interest

Economies of Scope may lead to Conflict of Interest

Economies of scope = FI lower production cost of information by using the information for multiple services: bank accounts, loans, auto insurance... In other words, a proportionate saving gained by producing two or more distinct goods, when the cost of doing so is less than that of producing each separately.

Conflict of Interest = one area of the FI might hide or conceal information from other area → less efficient financial market

5. Types of Financial Intermediaries

The principal financial intermediaries fall into 3 categories:

			Primary Liability	Primary Asset
Depository Institutions: Financial intermediaries that accept deposits from individuals and institutions and make loans.	Depository institutions	commercial banks, savings and loan associations, credit unions	Deposits	Loans, mortgages
Thrift institutions: Savings and loan associations, mutual saving banks (=A company that's investing the money from many people), and credit unions.	Contractual savings institutions acquire funds at periodic intervals on a contractual basis	life insurance companies, pension funds, fire & causality	Premiums, contributions	Corporate bonds, mortgages, Municipal bonds, stocks
	Investment intermediaries	finance companies, mutual funds	Shares, stock, bonds, commercial papers	Loans, stocks, bonds, money market instruments

6. Regulation of the Financial System

Regulatory Agencies

SEC – Securities and Exchange Commission

CFTC – Commodities Futures Trading Commission

NCUA – National Credit Union Administration

The **government regulates FMs and financial intermediaries** for 3 main reasons:

1. **Improve Monetary Control**

Because banks play a very important role in determining the supply of money (which in turn affects many aspects of the economy), regulation of these financial intermediaries is intended to improve control over the money supply

Banks play important role in supply, so to regulate FI would improve control on money supply

Reserve requirements = obligatory for all depository institutions to keep a certain fraction of their deposits in accounts with the Fed

2. **To increase the information available to investors**

Government regulation may reduce adverse selection and moral hazard problems in financial markets and increase their efficiency by increasing the amount of information available to investors. Another goal of regulation is to reduce insider trading through SEC (Securities and Exchange Commission). The SEC requires corporations issuing securities to disclose certain information about their sales, assets and earnings to the public and restricts trading by the largest stockholders in the corporation.

3. To ensure the soundness of financial system

Financial panic: Widespread collapse of financial intermediaries due to asymmetric information. To protect the public and the economy from financial panics, the government has implemented six types of regulation:

- *Restrictions on the assets financial intermediaries can hold and activities:* Restriction on risky assets and not allowed to hold stocks
- *Restrictions on entry:* Who is allowed to set up a financial intermediation
- *Disclosure:* Must make reports available
- *The provision of deposit insurance:* The government can insure people's deposits e.g. Federal Deposit Insurance Corporation (FDIC), which insures each depositor at a commercial bank or mutual savings bank up to a loss of \$100,000 per account.
- *Limits on competition:* unbridled competition among financial intermediaries promotes failures that will harm the public.
- *Restrictions on interest rates:* restrictions on interest rates that can be paid on deposit

3. What do interest rates mean and what is their role in valuation?

3.1. Measuring Interest Rates

Interest rates are among the most closely watched variables in the economy. It is imperative that what exactly is meant by the phrase interest rates is understood. YTM most accurate measure

$$P = \frac{\$100}{(1+i)} + \frac{\$100}{(1+i)^2} + \frac{\$100}{(1+i)^3} + \dots + \frac{\$100}{(1+i)^{10}} + \frac{\$1000}{(1+i)^{10}}$$

$$P = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \frac{C}{(1+i)^3} + \dots + \frac{C}{(1+i)^n} + \frac{F}{(1+i)^n}$$

Debt instruments: have different cash flows (streams of cash payments to holder) and everything else equal, so measured based on amount and timing of each cash flow → YMD

Cash flows: different streams of cash with very different timing to the holder

In order to compare

Present Value: The concept of PV (or P discounted V) is based on the common-sense notion that: Dollar (paid today) > Dollar (paid in one year), because you could invest the dollar in a savings account that earns interest and have more than a dollar in one year.

- **Discounting the future:** calculate to present value
- **Loan Principal:** the amount of funds the lender provides to the borrower.
- **Maturity Date:** the date the loan must be repaid; the Loan Term is from initiation to maturity date.
- **Interest Payment:** the cash amount that the borrower must pay the lender for the use of the loan principal.
- **Simple Interest Rate:** the interest payment divided by the loan principal; the percentage of principal that must be paid as interest to the lender. Convention is to express on an **annual basis**, irrespective of the loan term.

3.2. Four

Simple loan of \$100					
Year:	0	1	2	3	n
	\$100	\$110	\$121	\$133	$100 \times (1+i)^n$

PV of future \$1 = $\frac{\$1}{(1+i)^n}$ types of Credit Market Instruments

Simple loan

Yield to maturity: loans

$$\$100 = \frac{\$110}{(1+i)} = +$$

$$i = \frac{\$110 - \$100}{\$100} = \frac{\$10}{\$100} = .10 = 10\%$$

- Yield to maturity = interest rate that equates today's value with present value of all future payments
- Simple loan interest rate (I = 10%)

Yield to maturity: bonds

$$P = \frac{\$100}{(1+i)} + \frac{\$100}{(1+i)^2} + \frac{\$100}{(1+i)^3} + \dots + \frac{\$100}{(1+i)^{10}} + \frac{\$1000}{(1+i)^{10}}$$

$$P = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \frac{C}{(1+i)^3} + \dots + \frac{C}{(1+i)^n} + \frac{F}{(1+i)^n}$$

- Coupon bond (coupon rate = 10% = C/F)
fixed interest payment every year until the maturity date, when a specific final amount is repaid
Discount bond (=zero-coupon bond): bought at a price below its face value (at a discount); face value is repaid at the maturity date; no interest

- Fixed coupon payments of \$C

$$P = \frac{C}{i} \quad i = \frac{C}{P}$$

- One-year discount bond (P = \$900, F = \$1000)

$$\$900 = \frac{\$1000}{(1+i)}$$

$$i = \frac{\$1000 - \$900}{\$900} = .111 = 11.1\%$$

$$i = \frac{F - P}{P}$$

Fixed-payment loan (=fully amortized loan): same payment every period + interest for a set number of years (e.g. mortgage)

> Solution
The yearly payment to the bank is \$9,439.29.

$$LV = \frac{FP}{1+i} + \frac{FP}{(1+i)^2} + \frac{FP}{(1+i)^3} + \dots + \frac{FP}{(1+i)^n}$$

where

LV = loan value amount = \$100,000
 i = annual interest rate = 0.07
 n = number of years = 20

Thus,

$$\$100,000 = \frac{FP}{1+0.07} + \frac{FP}{(1+0.07)^2} + \frac{FP}{(1+0.07)^3} + \dots + \frac{FP}{(1+0.07)^{20}}$$

To find the yearly payment for the loan using a financial calculator:

n = number of years = 20
 PV = amount of the loan (LV) = -100,000
 FV = amount of the loan after 20 years = 0
 i = annual interest rate = .07

Then push the **PMT** button = fixed yearly payment (FP) = \$9,439.29. ✓

3.3. Yield to Maturity

Yield to maturity = interest rate that equates today's value with present value of all future payments

Relationship Between Price and Yield to Maturity

Three interesting facts in Table 3.1

1. When bond is priced at par (its face value), yield to maturity equals coupon rate
2. Price of a coupon and YTM are negatively related: if YTM ↑ price of bond ↓ (and other way around)
3. Yield greater than coupon rate when bond price is below par value

TABLE 3.1 Yields to Maturity on a 10% Coupon Rate Bond Maturing in 10 Years (Face Value = \$1,000)

Price of Bond (\$)	Yield to Maturity (%)
1,200	7.13
1,100	8.48
1,000	10.00
900	11.75
800	13.81

Global perspective

- Now, we notice some yields on government bonds are negative! Investors are willing to pay more than they would receive in the future.
- Best explanation is that investors find the convenience of the bills worth something—more convenient than cash. But that can only go so far—the rates are only slightly negative.

3.4. Distinction between Real and Nominal Interest Rates

What we have up to now been calling the interest rate makes no allowance for inflation, and it is more precisely referred to as the nominal interest rate, which is distinguished from the real interest rate, the interest rate that is adjusted by subtracting expected changes in the price level (inflation) so that it more accurately reflects the true costs of borrowing.

Real interest rate: $i_r = i - p^e$

We usually refer to this rate as the **ex ante** real rate of interest because it is adjusted for the expected level of inflation. After the fact, we can calculate the **ex post** real rate based on the observed level of inflation.

The Fisher definition: The **real interest rate** is defined as the **nominal interest rate minus the expected rate of inflation**. It is both a better measure of the incentives to borrow and lend and a more accurate indicator of the tightness of credit market conditions than the nominal interest rate.

When interest rate is low, there are greater incentives to borrow and fewer incentive to lend.

Indexed bonds are bonds which are corrected with the inflation.

Real = takes inflation (price level) into account, and is found by taking the nominal rate minus the expected inflation. Reflects more accurately the true cost of borrowing. When low, greater incentive to borrow.

Nominal = doesn't take inflation into account, so if you borrow €100 at 6%, you'll expect to pay €6 interest

Example: For example, suppose a bank lends a person \$200,000 to purchase a house at a 3% rate. The 3% rate is the nominal interest rate, not factoring for inflation. Assume the inflation rate is 2%. The real interest rate the borrower is paying is 1%; the real interest rate the bank is receiving is 1%. The purchasing power of the bank only increases by 1%.

3.5. Distinction between Interest Rates and Returns

Rate of Return = used when describing amount earned on an investment, including payouts and gains/losses

Interest Rates = used in a forward-looking sense, as a return that is promised

The return on a security: which tells you how well you have done by holding this security over a stated period of time, can differ substantially from the interest rate as measured by the YTM.

Long-term bond prices have substantial fluctuations when interest rates change and thus bear interest-rate risk. The resulting capital gains and losses can be large, which is why long-term bonds are not considered to be safe assets with a sure return.

Bonds whose maturity is shorter than the holding periods also subject to **reinvestment risk**:

- Occurs if you hold a series of short bonds over a long holding period
- i at which you reinvest is uncertain
- As an investor, you gain from $i \uparrow$, you lose when $i \downarrow$

Rate of Return: we can decompose returns into two pieces:

$$\text{Return} = \frac{C + P_{t+1} - P_t}{P_t} = i_c + g$$

where $i_c = \frac{C}{P_t}$ = current yield, and

$$g = \frac{P_{t+1} - P_t}{P_t} = \text{capital gains}$$

Key findings from Table 3.2

1. Only bond whose return = yield is one with maturity = holding period
2. For bonds with maturity > holding period, $i \uparrow$ $P \downarrow$ implying capital loss
3. Longer is maturity, greater is price change associated with interest rate change
4. The longer the maturity, the more return changes with change in interest rate
5. Bond with high initial interest rate can still have negative return if $i \uparrow$

TABLE 3.2 One-Year Returns on Different-Maturity 10% Coupon Rate Bonds When Interest Rates Rise from 10% to 20%

(1) Years to Maturity When Bond Is Purchased	(2) Initial Current Yield (%)	(3) Initial Price (\$)	(4) Price Next Year* (\$)	(5) Rate of Capital Gain (%)	(6) Rate of Return (2 + 5) (%)
30	10	1,000	503	-49.7	-39.7
20	10	1,000	516	-48.4	-38.4
10	10	1,000	597	-40.3	-30.3
5	10	1,000	741	-25.9	-15.9
2	10	1,000	917	-8.3	+ 1.7
1	10	1,000	1,000	0.0	+10.0

*Calculated with a financial calculator using Equation 3.

Conclusion from Table 3.2 analysis

1. Prices and returns more volatile for long-term bonds because have higher interest-rate risk
2. No interest-rate risk for any bond whose maturity equals holding period

Interest rate risk: A paper lost means that the interest rate increases which means that the value of a bond with the old interest rate is worth less. This is because when the bonds are bought a year later when the interest rate is higher, the YTM would be way higher. This risk is higher with long-term bonds. Prices and returns for long-term bonds are more volatile than those for shorter-term bonds. Price change of +20% within a year, with corresponding variations in return, are common for bonds more than 20 years away from maturity.

4. Why do interest rates change?

Movement along curve due to price change alone

4.1. Determinants of Asset Demand

In the early 1950s, short-term Treasury bills were yielding about 1%. By 1981, the yields rose to 15% and higher. But then dropped back to 1% by 2003. In 2007, rates jumped up to 5%, only to fall back to near zero in 2008.

What causes these changes?

Asset: Piece of property that stores value

1. Wealth (=total value of resources owned by individual)
2. Expected return (=over the next period)
3. Riskiness (=degree of uncertainty associated with this return)
4. Liquidity (=ease and speed an asset can be turned into cash)

The *quantity demanded of an asset* differs by the following factors (-> need to be considered whether to buy a certain asset or not)

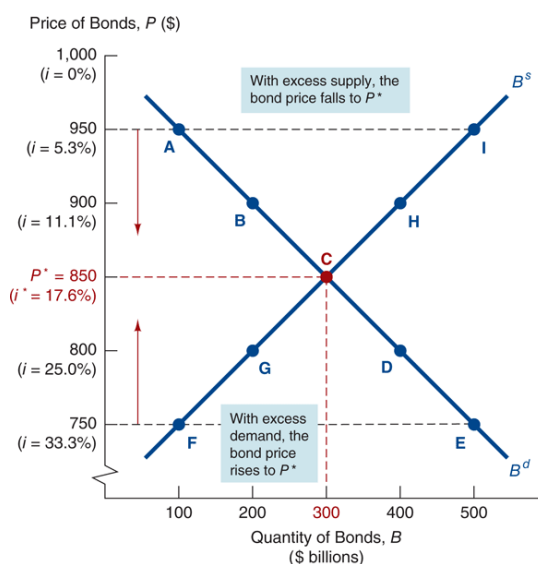
Variable	Change in Variable	Change in Quantity Demanded
Wealth Holding everything else constant an increase in wealth raises the quantity demanded of an asset (Positively related)	↑	↑
Expected return An increase in an asset's expected return relative to that of an alternative asset, holding everything else unchanged, raises the quantity demanded of the asset. (Positively related to the expected return on the asset relative to alternative assets)	↑	↓
Risk Holding everything else constant if an asset's risk rises relative to that of alternative assets, its quantity demanded will fall. (Negatively related to the Riskiness of the asset relative to alternative assets)	↑	↓
Liquidity The more liquid an asset is relative to alternative assets, holding everything else unchanged the more desirable it is, and the greater will be the quantity demanded. Supply and Demand in the Bond Market Positively related to the Liquidity of the asset relative to alternative assets	↑	↑
Expected interest rate	↑	↓
Expected inflation	↑	↓

Variable	Change in Variable	Change in Quantity Supplied
Profitability of investments	↑	↑
Expected inflation	↑	↑
Government deficit	↑	↑

4.2. Supply and Demand in the Bond Market

To understand the demand curve, supply and equilibrium
Excess supply occurs when the quantity of bonds supplied exceeds the quantity of bonds demanded. Excess demand when it is vice versa.

Because a bond is a demand for a loan, the quantity of bonds axis can also be called the loanable funds and with this argument the supply of bonds can be called the demand for loanable funds. Because supply and demand diagrams that explains how interest rates are determined in the bond market often use the loanable funds terminology, this analysis is frequently referred to as the loanable funds framework. In these



diagrams we do not use the flow i.e. the money – but we determine it in amount of stocks, this is called the asset market approach

4.3.Changes in Equilibrium Interest Rates

Market Conditions:

- **Market equilibrium** occurs when the amount that people are willing to buy (demand) equals amount that people are willing to sell (supply) at a given price;
($B^S = B^D$)
- **Excess supply** occurs when the amount that people are willing to sell (supply) is greater than the amount people are willing to buy (demand) at a given price
($B^S > B^D$)
- **Excess demand** occurs when the amount that people are willing to buy (demand) is greater than the amount that people are willing to sell (supply) at a given price
($B^D > B^S$)

The **supply-and-demand analysis for bonds** provides a theory of how interest rates are determined. It predicts that interest rates will change when there is a:

Change in DEMAND -> Shift of Demand Curve:

- Increase in **wealth increases** demand for bonds (shift to right)
- Increase in **expected interest rate** lowers the demand for bonds (shift to left)
 - This is because investors would rather wait for the interest rate to increase before buying bonds. You won't invest today if you expect the interest rate to increase tomorrow
- Increase in **expected inflation** leads to decrease in demand (shift to left)
- Increase in **riskiness** of bonds relative to other assets leads to decrease in demand (shift to left)
- Increase in **liquidity** of bonds relative to other assets leads to increase in demand for bonds (shift to right)
 - B^d = Bond Demand
 - ER or i = expected interest
 - R^e = expected return
 - π^e = expected inflation
- **Expected return on other assets** increases, bond demand decreases (shift left)
- **Expected return** decreases, demand decreases (shift left)

Change in SUPPLY -> Shift supply curve:

- **Probability of investment** increases, supply increases (shift to right)
- **Expected inflation** increases, supply increases (shift to right)
- **Government deficit** increases, supply increases

4.4 Cases

1. Fisher Effect:

Describes the relationship between inflation and both real and nominal interest rates, and states that the real interest rate equals to the nominal interest rate minus the expected inflation rate. Therefore, real interest rates fall as inflation increases, unless nominal rates increase at the same rate as inflation.

New equilibriums are formed when demand or supply shifts. For example, when expected inflation rises the supply goes up, and the demand goes down.

You can also see what to effect on the interest will be, namely, higher. This is true because accordingly to the Fisher effect when expected inflation rises, interest rates will rise. (if an economy gets better following will happen

- If expected inflation rises from 5% to 10%, the expected return on bonds relative to real assets falls and, as a result, the demand for bonds falls.

- The rise in expected inflation also means that the real cost of borrowing has declined, causing the quantity of bonds supplied to increase.

= 5 costs, 0% inflation – 5 real costs

5 costs, 2% inflation – cheaper

- When the demand for bonds falls and the quantity of bonds supplied increases, the equilibrium bond price falls.
- Since the bond price is negatively related to the interest rate, this means that the interest rate will rise.



Source: Expected inflation calculated using procedures outlined in Frederic S. Mishkin, "The Real Interest Rate: An Empirical Investigation," *Carnegie-Rochester Conference Series on Public Policy* 15 (1981): 151–200. These procedures involve estimating expected inflation as a function of past interest rates, inflation, and time trends. Nominal three-month Treasury bill rates from <http://research.stlouisfed.org/fred2/>.

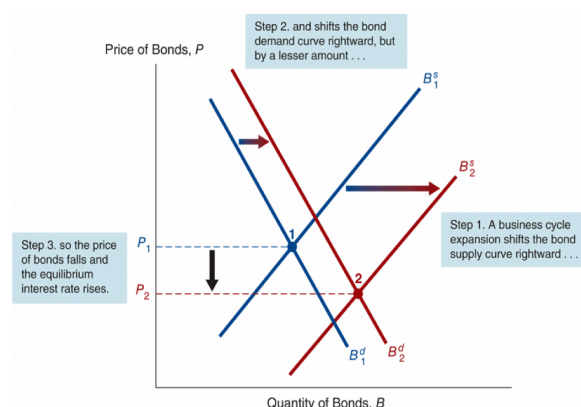
2. Business Cycle, and Interest Rates (Three-Month Treasury Bills), 1951–2013

When the goods/services of a country increase, so does national income

- Welt: bc more employment (economy well – creates jobs)
→ People: more money/ investments (buy more bonds) → demand for goods, services increases (companies need more money) → issue more bonds bond prices increase (curve moves to the right)
- When economy is doing well: interest rates go up

1. Wealth ↑, B^d ↑, B^d shifts out to right
2. Investment ↑, B^s ↑, B^s shifts right
3. If B^s shifts more than B^d then P ↓, i ↑

Figure 4.6 Response to a Business Cycle Expansion



- Poor shape: IR decreases -> money gets cheaper
- Exam: draw and explain what happens when the economy does well/ suffers – Business Cycle expansion



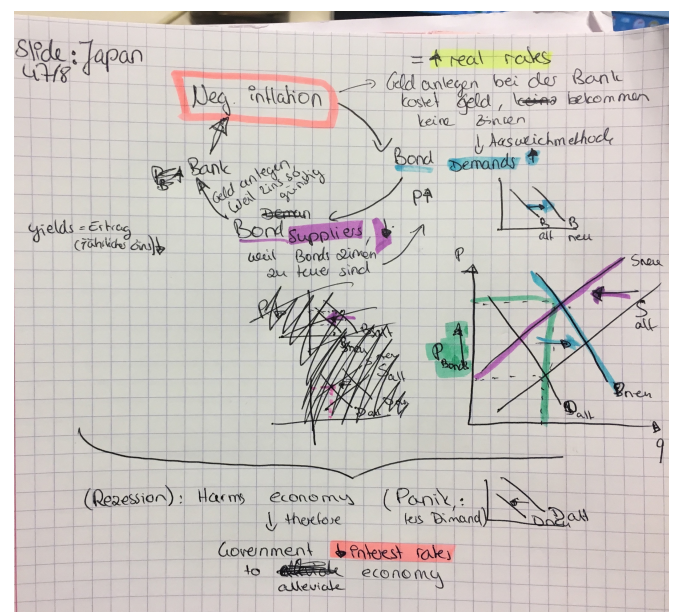
Source: Federal Reserve Bank of St. Louis FRED database: <http://research.stlouisfed.org/fred2/>.

3. Case: Low Japanese Interest Rates

In November 1998, Japanese interest rates on six-month Treasury bills turned slightly negative. How can we explain that within the framework discussed so far?

1. Negative inflation lead to $B^d \uparrow$
 - B^d shifts out to right
2. Negative inflation lead to \uparrow in real rates
 - B^s shifts out to left
3. Business cycle *contraction* lead to \downarrow in interest rates
 - B^s shifts out to left
 - B^d shifts out to left

But the shift in B^d is less significant than the shift in B^s , so the net effect was also an increase in bond prices.



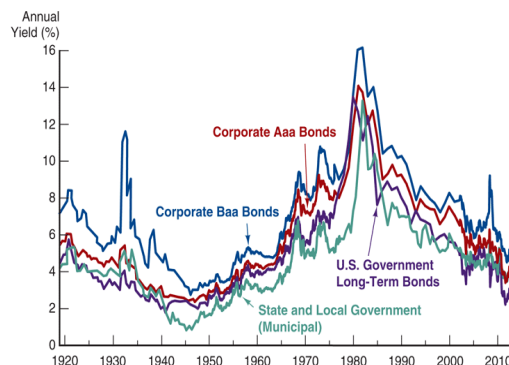
4.5 Profiting from Interest-Rate Forecasts

Methods:

1. Supply and Demand for bonds: use Flow of Funds Accounts and judgement
2. Econometric Models: large in scale, use interlocking equations that assume past financial relationships will hold in the future
 - Make decisions about **assets to hold**:
 - Forecast declining interest rate \rightarrow buy LT bonds
 - Forecast inclining interest rate \rightarrow buy ST bonds
 - Make decisions about **how to borrow**:
 - Forecast declining interest rate \rightarrow borrow ST
 - Forecast inclining interest rate \rightarrow borrow LT

5. How Do Risk and Term Structure affect Interest Rates?

5.1. Risk Structure of Interest Rates



Sources: Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics, 1941-1970*; Federal Reserve Bank of St. Louis FRED database, <http://research.stlouisfed.org/fred2/>.

Higher risk -> higher potential return

Blue: first peak (highest interest – good for investors)

Red: Triple A (highest companies, low risk)

Green: risk is higher, but tax advantage

= always move together (little differences)

Shows important features of the interest-rate behavior of bonds:

- Rates on different bond categories change from one year to the next.

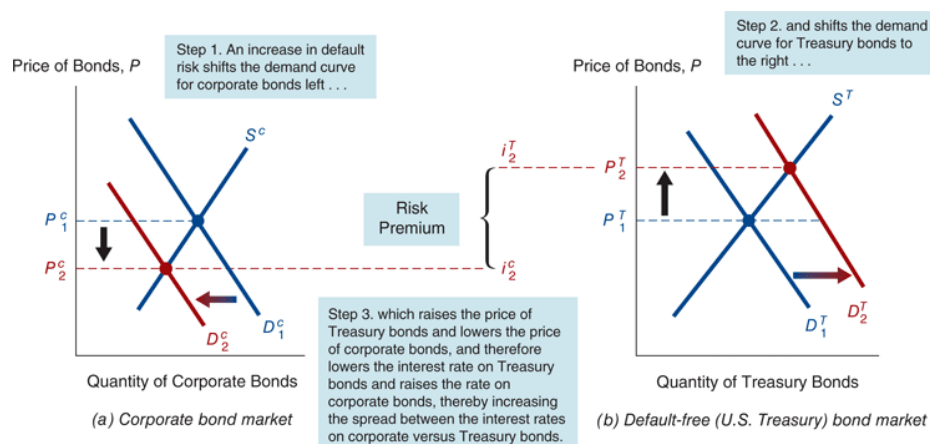
- Spreads on different bond categories change from one year to the next.

Bonds with the same maturity will have different interest rates bc of 3 factors:

The relationship among interest rates on bonds with the same maturity that arise because of these 3 factors is known as the risk structure of interest rates.

1. **Default risk:** the greater a bond's default risk, the higher its interest rates relative to other bonds (When issuer is unable to pay money back)

- The spread between the interest rates on bonds with default risk and default-free bonds, called the *risk premium*, indicates how much additional interest people must earn in order to be willing to hold that risky bond.
- Reward you get bc you are willing to take a higher risk
- Response to an Increase in Default Risk on Corporate Bonds (graphic below)
- **Treasury bonds** = “no default risk” as government always can increase taxes to pay off its obligation
- Truly default-free bonds? No, Republicans threatened to let Treasury bonds default (1995-1996, 2011-2013), resulting in an impact on the bond market
- **Risk premium** = the spread between interest rates on bonds with default risk and default-free risk indicates how much additional interest people must earn in order to be willing to hold that risky bond. It's a form of compensation for investors who tolerate the extra risk, compared to that of a risk-free asset, in a given investment.



- Default risk important component of the **size** of the risk premium. Because of this, bond investors would like to know as much as possible about the default probability of a bond. How? **Moody's, Fitch or S&P**
- Aaa to C or AAA to D – Lowest risk to highest

2. **Liquidity**: assets than can quickly and cheaply be converted into cash if the need arises

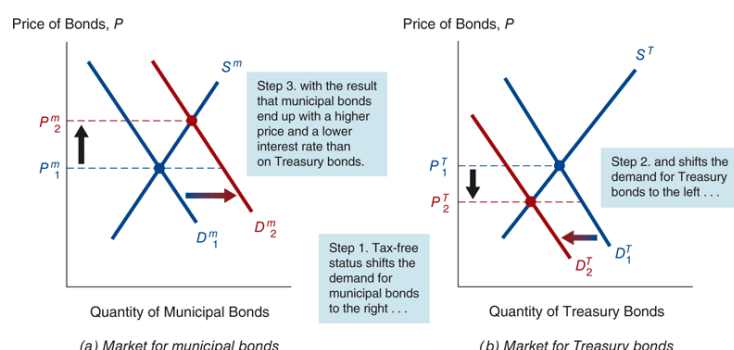
The greater a bond's liquidity, the lower its interest rate

- Liquid: able to change investment into cash or buy more; The more Liq. the more desirable
- Good because: able to buy/ sell more at the good time
- Panic -> less liquidity -> markets drop
Not wise to sell when panic, because lack of liq. And therefore bad price (year after price might double)
- Corporate bonds become less liquid compared T-bonds → Outcome: risk premium rises
- The differences between interest rates on corporate bonds and Treasury bonds (that is, the risk premiums) reflect not only the corporate bond's default risk but its liquidity too. This is why a risk premium is sometimes called a **risk and liquidity premium**.

Liquidity (more to less): Treasury Bonds > Municipal Bonds > Corporate Bonds

3. **Tax consideration**: bonds with tax-exempt status will have lower interest rates than they otherwise would

- **Municipal bonds** tend to have lower rate than T-bonds, due they are **exempt from federal income tax** = has the same effect on the demand for municipal bonds as an increase in their expected return (Munis are not as liquid a Treasuries.)
- Instrument: Government is promoting to buy certain bonds and get TAX advantage for it (**Treasury bonds** are exempt from state and local income taxes, while interest payments from corporate bonds are fully taxable)
(! Always higher risk)



	Corporate Bond Market	Treasury Bond Market	Outcome
Default risk	1. Re on corporate bonds ↓, Dc ↓, Dc shifts left 2. Risk of corporate bonds ↑, Dc ↓, Dc shifts left 3. Pc ↓, ic ↑	1. Relative Re on Treasury bonds ↑, DT ↑, DT shifts right 2. Relative risk of Treasury bonds ↓, DT ↑, DT shifts right PT ↑, iT ↓	Risk premium, ic - iT, rises
Liquidity	1. Liquidity of corporate bonds ↓, Dc ↓, Dc shifts left 2. Pc ↓, ic ↑	1. Relatively more liquid Treasury bonds, DT ↑, DT shifts right 2. PT ↑, iT ↓ Treasury, always lot of liquid, why? 1. They are the bench mark (not much risk) 2. because its so huge – can absorb shocks better	Risk premium, ic - iT, rises

TAX consideration	Municipal Bond Market 1. Tax exemption raises relative Re on municipal bonds, Dm ↑, Dm shifts right 2. Pm ↑	1. Relative Re on Treasury bonds ↓, DT ↓, DT shifts left 2. PT ↓	im < iT
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Case: The Global Financial Crisis and the Baa-Treasury Spread (related to default risk)

In 2007 the subprime mortgage market collapsed, leading to large losses for Financial Institutions. The Quality of the Baa bonds was questioned, as the demand for lower-credit bonds fell, and a flight-to-quality followed. Demand for T-securities increased → Result: Baa-treasury spread increased

Case: Bush Tax Cut and Obama Repeal on Bond Interest Rates

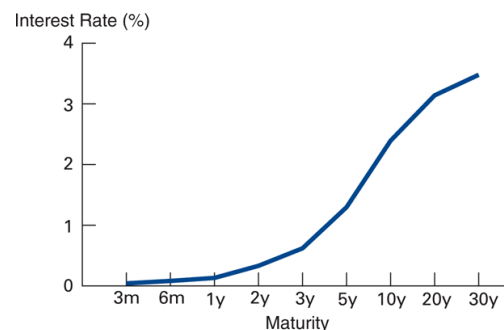
The 2001 tax cut called for a reduction in the top tax bracket, from 39% to 35% over a 10-year period. This reduces the advantage of municipal debt over T-securities since the interest on T-securities is now taxed at a lower rate. The Bush tax cuts were repealed under President Obama. Our analysis is reversed. The advantage of municipal debt increased relative to T-securities, since the interest on T-securities is taxed at a higher rate.

5.2. Term Structure – maturity

(Bonds with different maturities tend to have **different required rates**, all else equal.)

Besides explaining the shape of the yield curve, a good theory must explain why:

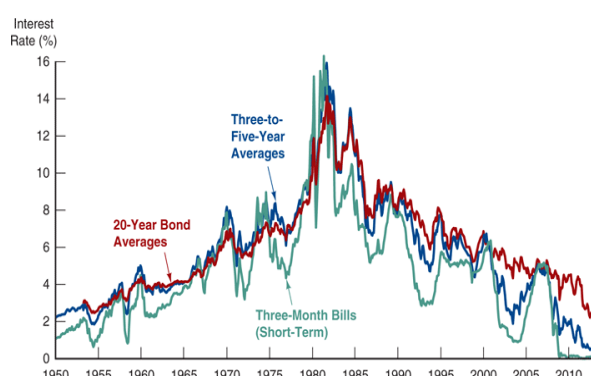
1. Interest rates for different maturities **move together**.
(Expectations Theory: When short rates are low, they are expected to rise to normal level, and long rate = average of future short rates will be well above today's short rate; yield curve will have steep upward slope.)
2. Yield curves tend to have steep upward slope when short rates are low and a downward slope when short rates are high. (Expectations Theory: When short rates are high, they will be expected to fall in future, and long rate will be below current short rate; yield curve will have downward slope.)
3. Yield curve is **typically upward sloping**.
(Market Segmentation Theory)



Movements over Time of Interest Rates on U.S. Government Bonds with Different Maturities.

Several theories of the term structure provide explanations of how interest rates on bonds with different terms to maturity are related.

The **expectations theory** views LT interest rates as equalling



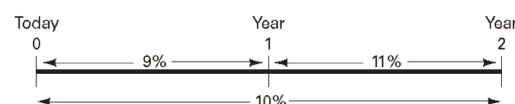
the average of future ST interest rates expected to occur over the life of the bond. By contrast, the market **segmentation theory** treats the determination of interest rates for each bond's maturity as the outcome of supply and demand in that market only. Neither of these theories by itself can explain the fact that interest rates on bonds of different maturities move together over time and that yield curves usually upward.

The three theories to explain this:

1. Expectation Theory:

- **Key Assumption:** Bonds of different maturities are **perfect substitutes**

You can buy €1 of 1-y-bond now and again in one year, or buy €1 of 2-y-bond and hold → the *expected* wealth is the same (at the start) for both strategies, but the actual wealth might differ if rates change unexpectedly.



- Implication: R^e on bonds of different maturities are equal
- Numerical example

$$i_{nt} = \frac{i_t + i_{t+1} + i_{t+2} + \dots + i_{t+(n-1)}}{n}$$

- One-year interest rate over the next five years are expected to be 5%, 6%, 7%, 8%, and 9%
- Interest rate on two-year bond today: $(5\% + 6\%)/2 = 5.5\%$
- Interest rate for five-year bond today: $(5\% + 6\% + 7\% + 8\% + 9\%)/5 = 7\%$
- Interest rate for one- to five-year bonds today: 5%, 5.5%, 6%, 6.5% and 7%
- Explains why yield curve has different slopes:
 - *When short rates are expected to rise in future, average of future short rates = i_{nt} is above today's short rate; therefore, yield curve is upward sloping.*
 - *When short rates expected to stay same in future, average of future short rates same as today's, and yield curve is flat.*
 - *Only when short rates expected to fall will yield curve be downward sloping.*

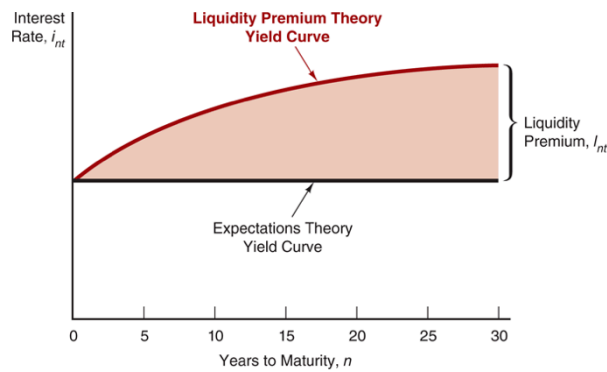
2. Market segmentation theory – (C) – Bonds of different maturities **aren't substitutes** at all (segmented market)

- Explains C due: people typically prefer S holding periods, so higher demand on ST bonds, so higher prices and lower interest rates on ST than on LT bonds.
- Doesn't explain A & B due: it assumes LT and ST rates are determined independently

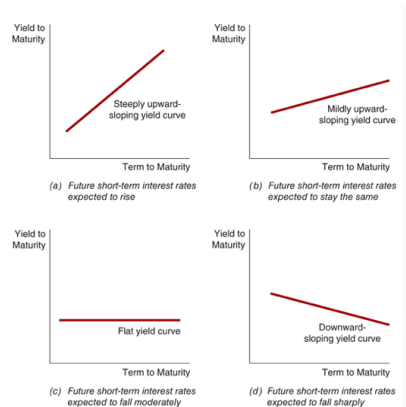
3. The **liquidity premium theory** combines the features of the other 2 theories, and by so doing is able to explain the facts just mentioned. It views LT interest rates as equalling the average of future ST interest rates expected to occur over the life of the bond plus a liquidity premium. This theory allows us to infer the market's expectations about the movement of future ST interest rates from the yield curve.

(LP = rate of return that an investor expects above other rates or returns in order to make an illiquid investment)

- (A, B & C) – Bonds of different maturities **are substitutes, but not perfect ones**
Investors prefer ST to LT bonds, implying that investors must be paid **positive liquidity premium**



to hold LT



- **Key Assumption:** Bonds of different maturities are substitutes, but are not perfect substitutes
- **Explains all facts:** the upward sloped yield curve by liquidity premium for LT-bonds, and that the average of future ST as determinant for LT rate
 - Explains fact 3—that usual upward sloped yield curve by liquidity premium for long-term bonds
 - Explains fact 1 and fact 2 using same explanations as pure expectations theory because it has average of future short rates as determinant of long rate
 - **Implication:** Modifies Pure Expectations Theory with features of Market Segmentation Theory

$$i_{nt} = \frac{i_t + i_{t+1}^e + i_{t+2}^e + \dots + i_{t+(n-1)}^e}{n} + l_{nt}$$

Yield curve has a lot of information about very short-term and long-term rates, but says little about medium-term rates. (see interpretation in illustration above to the right)

The Relationship Between the Liquidity Premium and Expectations Theories

- A *steeply upward-sloping* curve indicates that future ST rates are expected to rise
- A *mildly upward-sloping* curve that ST rates are expected to stay the same
- A *flat* curve that ST rates are expected to decline slightly

5.3. Cases

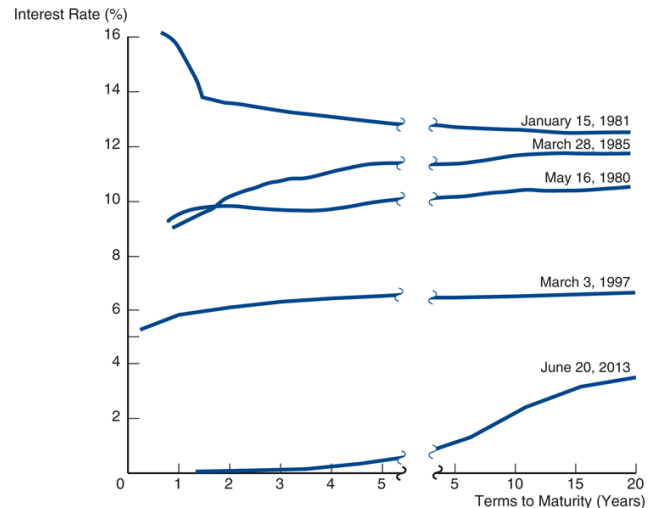
Interpreting Yield Curves for U.S. Government Bonds

80– normal, not much was happening

97 – bit to flat, close to normal

85 bit to steep, close to normal

- The steep downward curve in 1981 suggested that short-term rates were expected to decline in the near future. This played-out, with rates dropping by 300 bps in 3 months.
- The upward curve in 1985 and 2013 suggested a rate increase in the near future.
- The moderately upward slopes in 1980 and 1997 suggest that short term rates were not expected to rise or fall in the near term.
- The steep upward slope in 2013 suggests short term rates in the future will rise.



Sources: Federal Reserve Bank of St. Louis; FRED database, <http://research.stlouisfed.org/fred2/>; Wall Street Journal, various dates.

The Term Structure as a Forecasting Tool

The yield curve does have information about future interest rates, and so it should also help forecast inflation and real output production.

- Rising (falling) rates are associated with economic booms (recessions) [chapter 4]
- Rates are composed of both real rates and inflation expectations [chapter 3]

6. Are Financial Markets efficient?

Preview Expectations of:

- Return, risk, and liquidity are central elements in the demand for assets
- Inflation have a major impact on bond prices and interest rates
- The likelihood of default are the most important factors that determines the risk structure of interest rates
- Future ST interest rates play a central role in determining the term structure of interest rates

6.1. The Efficient Market Hypothesis (EMH)

- The **efficient market hypothesis** states that current security prices will fully reflect all available information because in an efficient market, all unexploited profit opportunities are eliminated. The elimination of unexploited profit opportunities necessary for a financial market to be efficient does not require that all markets participants be well informed.
 - When an **unexploited profit opportunity** arises on a security (so-called because, on average, people would be earning more than they should, given the characteristics of that security), **investors will rush to buy until the price rises to the point that the returns are normal again.**
 - **In an efficient market, all unexploited profit opportunities will be eliminated.**
 - Not every investor need be aware of every security and situation. As long as a few keep their eyes open for unexploited profit opportunities, they will eliminate the profit opportunities that appear because in so doing, they make a profit.
 - All unexploited profit opportunities eliminated
 - **Efficient market condition holds even if there are uninformed, irrational participants in market**
- At the start of a period, the unknown element is the future price: P_{t+1} . But, investors do have some expectation of that price, thus giving us an expected rate of return.
(Exam: When we make an investment, we'll get a future price and cash change Calculate what kind of return we want on our investment) (cash payments (C))

$$R^e = \frac{P_{t+1}^e - P_t + C}{P_t}$$

- The Efficient Market Hypothesis views the expectations as equal to optimal forecasts using all available information. This implies:

$$P_{t+1}^e = P_{t+1}^{of} \rightarrow R^e = R^{of}$$

Assuming the market is in equilibrium: $R^e = R^*$

Put these ideas together: efficient market hypothesis $R^{of} = R^*$

- This equation tells us that **current prices in a financial market will be set so that the optimal forecast of a security's return using all available information equals the security's equilibrium return.**
- Financial economists state it more simply: A **security's price fully reflects all available information in an efficient market.**

EXAMPLE 6.1

The Efficient Market Hypothesis

Suppose that a share of Microsoft had a closing price yesterday of \$90, but new information was announced after the market closed that caused a revision in the forecast of the price for next year to go to \$120. If the annual equilibrium return on Microsoft is 15%, what does the efficient market hypothesis indicate the price will go to today when the market opens? (Assume that Microsoft pays no dividends.)

> Solution

The price would rise to \$104.35 after the opening.

$$R^{of} = \frac{P_{t+1}^{of} - P_t + C}{P_t} = R^*$$

where R^{of} = optimal forecast of the return = 15% = 0.15
 R^* = equilibrium return = 15% = 0.15
 P_{t+1}^{of} = optimal forecast of price next year = \$120
 P_t = price today after opening
 C = cash (dividend) payment = 0

$$\begin{aligned} 0.15 &= \frac{\$120 - P_t}{P_t} \\ P_t \times 0.15 &= \$120 - P_t \\ P_t(1.15) &= \$120 \\ P_t &= \$104.35 \end{aligned}$$

- Why **efficient market hypothesis** makes sense
 If $R^{of} > R^* \rightarrow P_t \uparrow \rightarrow R^{of} \downarrow$
 If $R^{of} < R^* \rightarrow P_t \downarrow \rightarrow R^{of} \uparrow$
 Until $R^{of} = R^*$
 - All unexploited profit opportunities eliminated
 - Efficient market condition holds even if there are uninformed, irrational participants in market**
- The EMH indicates that hot tips, investment advisers' published recommendations, and technical analysis cannot help an investor outperform the market. The prescription for investors is to pursue a buy-and-hold strategy – purchase stocks and hold them for long periods of time. Empirical evidence generally supports these implications of the EMH in the stock market.
- The existence of market crashes and bubbles have convinced many financial economists that the stronger version of the EMH, which states that asset prices reflect that true fundamental (intrinsic) value of securities, is not correct. It is far less clear that the stock market crashes show that the EMH is wrong. Even if the stock market crashes were driven by factors other than fundamental, the crashes do not clearly demonstrate that many of the basic lessons of the EMH are no longer valid as long as the crashes could not have been predicted.

6.2. Evidence on the Efficient Market Hypothesis

- The evidence on the EMH is quite mixed. Early evidence on the performance of investment analysts and mutual funds:
 - Investment analysts and mutual funds don't be able to consistently** beat the market (note: insider trading!)
 - whether **stock prices reflect publicly available information**
 - If information is already publicly available, a positive announcement about a company will not, on average, raise the price of its stock because this information is already reflected in the stock price.
 - Early empirical evidence confirms: favorable earnings announcements or announcements of stock splits (a division of a share of stock into multiple shares, which is usually followed by higher earnings) do not, on average, cause stock prices to rise.
- the **random-walk behaviour of stock prices**, that is, future changes in stock prices should, for all practical purposes, be unpredictable
 - If stock is predicted to rise, people will buy to equilibrium level; if stock is predicted to fall, people will sell to equilibrium level (both in concert with EMH)

- Thus, *if stock prices were predictable*, thereby causing the above behavior, price changes would be near zero, which has not been the case historically

- Or the [success of so-called technical analysis](#), is the study past stock price data, searching for patterns such as trends and regular cycles, suggesting rules for when to buy and sell stocks

6.3.Evidence against market efficiency theory

However, in recent years, evidence on the small-firms effect, the January effect market overreaction, excessive volatility, mean reversion, and that new information is not always incorporated into stock prices suggests that the hypothesis may not always be entirely correct. The evidence seems to suggest that the EMH may be a reasonable starting point for evaluating behaviour in FMs, but it may not be generalizable to all behaviours in FMs.

Unfavorable Evidence:

- [Small-firm effect](#): small firms have abnormally high returns
- [January effect](#): high returns in January, due to Tax advantage if they sell in Dec and buy in Jan to drive up their stocks
= inconsistent with random-walk behavior
- [Market overreaction](#): recent research suggests that stock prices may overreact to news announcements and that the pricing errors are corrected only slowly. This violates the EMH because an investor could earn abnormally high returns, on average, by buying a stock immediately after a poor earnings announcement and then selling it after a couple of weeks when it has risen back to normal levels.)
- [Excessive volatility](#): the stock market appears to display excessive volatility; that is, fluctuations in stock prices may be much greater than is warranted by fluctuations in their fundamental value.
- [Mean reversion](#): Some researchers have found that stocks with low returns today tend to have high returns in the future, and vice versa.
- [New information is not always immediately incorporated into stock prices](#)
Although generally true, recent evidence suggests that, inconsistent with the efficient market hypothesis, stock prices do not instantaneously adjust to profit announcements. Instead, on average stock prices continue to rise for some time after the announcement of unexpectedly high profits, and they continue to fall after surprisingly low profit announcements.

6.4.Implications for Investing

1. How valuable are published reports by investment advisors?
 - YES. The EMH indicates that you should be skeptical of hot tips since, if the stock market is efficient, it has already priced the hot tip stock so that its expected return will equal the equilibrium return.
 - Thus, the hot tip is not particularly valuable and will not enable you to earn an abnormally high return.
2. Should you be skeptical of hot tips?

- As soon as the information hits the street, the unexploited profit opportunity it creates will be quickly eliminated.
 - The stock's price will already reflect the information, and you should expect to realize only the equilibrium return.
3. Do stock prices always rise when there is good news?
- NO. In an efficient market, stock prices will respond to announcements only when the information being announced is new and unexpected.
 - So, if good news was expected (or as good as expected), there will be no stock price response.
 - And, if good news was unexpected (or not as good as expected), there will be a stock price response.
4. Efficient Markets prescription for investor
- Investors should not try to outguess the market by constantly buying and selling securities. This process does nothing but incur commissions costs on each trade.
 - Instead, the investor should pursue a "buy and hold" strategy—purchase stocks and hold them for long periods of time. This will lead to the same returns, on average, but the investor's net profits will be higher because fewer brokerage commissions will have to be paid.
 - It is frequently a sensible strategy for a small investor, whose costs of managing a portfolio may be high relative to its size, to buy into a mutual fund or tracker rather than individual stocks. Because the EMH indicates that no mutual fund can consistently outperform the market, an investor should not buy into one that has high management fees or that pays sales commissions to brokers but rather should purchase a no-load (commission-free) mutual fund that has low management fees.

6.5. Why the EMH Does Not Imply That Financial Markets Are Efficient

A strong view of EMH states that (1) expectations are **rational**, and (2) prices are **always correct** and reflect **market fundamentals**.

This has three important implications:

1. One investment is just as good as any other (stock picking is pointless)
2. Prices reflect all information
3. Cost of capital can be determined from security prices, assisting in capital budgeting decisions

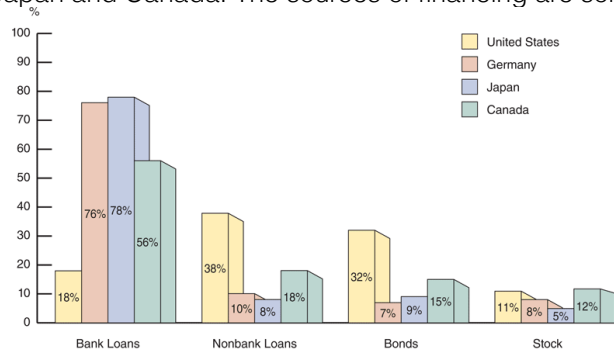
6.6. Behavioral Finance

The new field of behavioural finance applies concepts from other social sciences, such as anthropology, sociology, and particular psychology, to understand the behaviour of securities prices. Loss aversion, overconfidence, and social contagion can explain why trading volume is so high, stock prices get overvalued and speculative bubbles occur.

7. Why Do Financial Institutions Exist?

Basic facts about the financial structure throughout the world

- The financial system is a complex structure including many different institutions: banks, insurance companies, mutual funds, stock and bonds market
- This chart shows how nonfinancial business attain external funding in the US, Germany, Japan and Canada. The sources of financing are somewhat consistent except in the US.



Source: Andreas Hackethal and Reinhard H. Schmidt, "Financing Patterns: Measurement Concepts and Empirical Results," Johann Wolfgang Goethe-Universität Working Paper No. 125, January 2004. The data are from 1970-2000 and are gross flows as percentages of the total, not including trade and other credit data, which are not available.

Facts about US financial structure

1. Stocks are not the most important source of external financing for businesses
2. Issuing marketable debt and equity securities is not the primary way in which businesses finance their operations
3. Indirect finance (involves intermediaries) > direct finance (raise funds directly from lenders in financial markets)
4. Financial intermediaries are the most important source of external funds used to finance businesses
5. The financial system is among the most heavily regulated sectors of economy
6. Only large, well-established corporations have easy access to securities markets to finance their activities
7. Collateral is a prevalent feature of debt contracts for households and businesses
8. Debt contracts are typically extremely complicated legal documents that place substantial restrictions on the behaviour of the borrowers

Transaction costs

Influence the financial structure as it can hinder flows of funds to people with productive investment opportunities. Financial intermediaries make profits by reducing transaction costs

1. Financial intermediaries can take advantage of economies of scale
2. and are better able to develop expertise to lower transaction costs, thus enabling their savers and borrowers to benefit from the existence of FMs.)

Asymmetric Information:

Agency theory = the analysis of how asymmetric information problems affect behaviour

Assumption: Symmetric information – all parties to a transaction or contract have the same information, be that little or a lot. In many situations this is not the case -> Asymmetric information

Asymmetric information results in 2 problems:

1. **Adverse selection**, which occurs before the transaction
(One party in a transaction has better information than the other party. Potential borrowers most likely to produce adverse outcome are ones most likely to seek loan and be selected)
2. **Moral hazard**, which occurs after the transaction
(refers to the risk of the borrower's engaging in activities that are undesirable from the lender's point of view)

7.1. Adverse selection

- *The Lemons Problem*: How **adverse selection** influences Financial Structure (used cars)
- If we can't distinguish between "good" and "bad", we are willing to pay only an average of good and bad
- Result: good cars won't be sold, bad will be overvalued and the used car market will function inefficiently
- Lemons problem in securities markets
 - If we can't distinguish between good and bad securities, we are only willing to pay on average price of the good and bad securities' value
 - Result: good securities are undervalued, and firms won't issue them; bad securities are overvalued so there are too many issued
 - Investors don't want to buy bad securities, so markets don't function well
 - Explains fact 1 and 2
- Explains fact 6: less asymmetric info for well-known firms, so smaller lemons problem
- Adverse selection interferes with the efficient functioning of FMs. Tools help reduce the adverse selection problem include:
 - (1) **private production and sale of information**: free-rider problem interferes though
 - (2) **government regulation to increase information**
E.G.: annual audits of public corporations (Enron -> didn't eliminate problem)
 - (3) **financial intermediation**
 - a. Analogy to solution to lemons problem provided by used car dealers
 - b. Avoid free-rider problem by making private loans (explains fact 3 & 4)
The **free-rider problem** occurs when people who do not pay for information take advantage of information that other people have paid for. This problem explains why financial intermediaries, especially banks, play a more important role in financing the activities of business than securities markets do.
 - c. Large firms are more likely to use direct financing (explains fact 6)
 - (4) **collateral and net worth** -> explains fact 7

The Enron Implosion

- Up to 2001, Enron appeared to be a very successful firm engaged in energy trading
- However, the firm had severe financial problems and hid them in complex financial structure which allowed them not to report them
- Even if Enron regularly filed records with the SEC, the problem wasn't prevented
- Arthur Anderson (the auditor) plead guilty to obstruction of justice charges. With that plea, one of the largest and trusted auditors closed its doors forever

7.2. Moral hazard

Principle-agent problem = Moral hazard in equity contracts is known as the principal-agent problem because managers (the agents) have less incentive to maximize profits than stockholders (the principals) as a result of separation of ownership by stockholders(principals) from control by managers (agents)

The principal-agent problem explains why debt contracts are so much more prevalent in FMs than equity contracts.

Example: Suppose you become a silent partner in an ice cream store, providing 90% of the equity capital (\$9,000). The other owner, Steve, provides the remaining \$1,000 and will act as the manager. If Steve works hard, the store will make \$50,000 after expenses, and you are entitled to \$45,000 of it. However, Steve doesn't really value the \$5,000 (his part), so he goes to the beach, relaxes, and even spends some of the "profit" on art for his office. How do you, as a 90% owner, give Steve the proper incentives to work hard?

Tools to help reduce/solve the principal-agent problem include:

- (1) **Production of information**: monitoring
- (2) **Government regulation to increase information**: discourage/encourage behaviour

- (3) **Financial intermediation**: e.g. Venture capital; intermediaries have special advantages in monitoring)
- (4) **Debt contracts**: most contracts require fixed amount of interest otherwise still subject to hazard

How moral hazard influences financial structure in debt markets

- Debt is still subject to moral hazard
- In fact, it may create incentives to take on risky projects
- Most debt contracts require the borrower to pay a fixed amount (interest) and keep any cash flow above this amount
 - E.G.: if a firm owes 100\$ but only has 90\$, it's bankrupt. The firm has then nothing to lose by looking for risky projects to raise the needed cash.
- Tools to help **solve Moral Hazard in debt contracts**
 - **Net worth and collateral**
 - **Monitoring and enforcement of restrictive covenants that**
 - Discourage undesirable behavior
 - Encourage desirable behavior
 - Keep collateral valuable
 - Provide information
 - **Financial intermediation** – banks and other intermediaries have special advantages in monitoring -> explains facts 1 to 4

Asymmetric Information Problem	Tools to Solve It	Explains Fact Number
Adverse selection	Private production and sale of information	1, 2
	Government regulation to increase information	5
	Financial intermediation	3, 4, 6
	Collateral and net worth	7
Moral hazard in equity contracts (principal-agent problem)	Production of information: monitoring	1
	Government regulation to increase information	5
	Financial intermediation	3
	Debt contracts	1
Moral hazard in debt contracts	Collateral and net worth	6, 7
	Monitoring and enforcement of restrictive covenants	8
	Financial intermediation	3, 4

Note: List of facts:

1. Stocks are not the most important source of external financing.
2. Marketable securities are not the primary source of finance.
3. Indirect finance is more important than direct finance.
4. Banks are the most important source of external funds.
5. The financial system is heavily regulated.
6. Only large, well-established firms have access to securities markets.
7. Collateral is prevalent in debt contracts.
8. Debt contracts have numerous restrictive covenants.

7.3. Cases:

1. Case: Financial development and economic growth

- Financial repression leads to low growth
 - Poor legal system
 - Weak accounting standards
 - Government directs credit (state-owned banks)
 - Financial institutions nationalized
 - Inadequate government regulation
- Financial Crises

2. Mini-Case: should we kill all the lawyers?

- Lawyers are an easy target cause of problems

- Most legal work is about contract enforcement
 - Establish and maintain important property rights
 - Without such rights, limited investments
 - The US has more lawyers per capita than any nation. Arguable the richest too
3. Financial crises and aggregate economic activity
- Our analysis of the effects of adverse selection and moral hazard can also assist us in understanding financial crises, major disruptions in financial markets. The end result of most financial crises is the inability of markets to channel funds from savers to productive investment opportunities
4. Is China a counter-example?
- With a booming economy, China's financial development is still very young
 - Per capita income is around 10000\$, but savings are around 40%, allowing China to build up capital stock as labor moves out of subsistence agriculture
 - But, this will not work for long
 - To continue its growth, China needs to allocate capital more efficiently. Many financial repression problems are being addressed by Chinese authorities today.

7.4. Conflicts of interest

Conflicts of interest is a type of moral hazard which arises when financial services providers or their employees are serving multiple interests and have incentives to misuse or conceal information needed for the effective functioning of FMs, thereby preventing them from channelling funds to parties with the most productive investment opportunities.

Types of financial service activities have had the greatest potential for conflicts of interest:

1. **Underwriting and research in Investment banking**
research is expected to be unbiased and accurate, reflecting facts about firm, but underwriters can better serve the firm if research is positive, so might have an influence on how they perform the research → spinning; under-priced equity allocated to executives promising future business, when so wasn't the case
2. **Auditing and consulting in accounting firms**
auditors check assets for quality and accuracy under unbiased perspective, but consultants help with strategic moves against a fee
3. **Credit assessment and consulting in rating agencies**
Rating agencies assign credit rating to help determine riskiness of a security, but consultants help with strategic moves against a fee

Two major policy measures have been implemented to deal with conflict of interests: the Sarbanes-Oxley Act of 2002 and the Global Legal Settlement of 2002, which arose from a lawsuit by the New York attorney general against the 10 largest investment banks.

- **Sarbanes-Oxley act of 2002**
 - Established an oversight board to supervise accounting firms
 - Increased the SEC's budget for supervisory activities
 - Limited consulting relationships between auditors and firms
 - Enhanced criminal charges for obstruction
 - Improved the quality of the financial statements and board
- **Global Legal Settlement of 2002**
 - Required investment banks to sever links between research and underwriting
 - Spinning is explicitly banned
 - Imposed a \$1.4 billion fine on accused investment banks
 - Added additional requirements to ensure independence and objectivity of research reports
- Will this work?
 - Too early to determine

- There is much criticism over the cost involved with these separations. In other words, financial institutions can no longer take advantage of the economies of scope gained from relationships
- Some say that SOX has brought down the value of US Capital Markets

8. Why financial crises occur

Financial crises = major disruptions in financial markets, characterized by sharp declines in asset prices and firm failures. Basis to understand and define financial crisis is asymmetrical information, which creates barriers between savers and firms with productive investment opportunities. So, when information flows experience a particularly large disruption, the markets stop working properly

8.1 Three stages of financial crises:

(1) **Initiation**

- **Credit Boom and Bust:**
 - Mismanagement of financial liberalization or innovation (elimination of restrictions, introduction of new types of loans or other financial products)
 - Government safety nets weaken incentives for risk management as depositors ignore bank risk-taking
 - Eventually loan losses accrue, and asset values fall, leading to a reduction in capital
 - Financial Institutions cut back in lending, a process called **deleveraging**. Banking funding falls.
 - As FI cuts back on lending, no one is left to evaluate firms, so Financial System loses its primary institution to address asymmetric information.
 - Economic spending contracts as loans become scarce
- **Asset-Price Boom and Bust:**
 - A pricing **bubble** starts, where assets exceed their fundamental values, and when it bursts and prices fall, corporate net worth falls as well. Moral hazard increases as firms have little to lose
 - FIs also see a fall in their assets, leading again to deleveraging
- **Increase in Uncertainty:**
 - Periods with high uncertainty can lead to crises, e.g. stock market crashes or failure of a major FI
 - With information hard to come by, asymmetric information problems increase, reducing lending and economic activity

(2) **Banking crisis**

- **Bank panic & bank run:**
 - Panics occur when depositors are unsure which banks are insolvent, causing all depositors to withdraw all funds immediately
 - As cash balances fall, FIs must sell assets quickly, further deteriorating their balance sheet
 - Asymmetric information becomes severe – take years for a full recovery

(3) **Debt deflation**

- **Debt deflation:**
 - Caused by sharp decline in prices, where asset prices fall, but debt levels don't adjust, increasing debt burdens
 - Leads to increase in asymmetric information, which is followed by decreasing lending
 - Economic activity remains depressed for a long time

8.2. Cases

- **The Great Depression:**
 - In 1928 and 1929, stock prices doubled in the U.S. The Fed tried to curb this period of excessive speculation with a tight monetary policy. But this led to a stock market collapse of more than 20% in October of 1929, and losing an additional 20% by the end of 1929.
 - What might have been a normal recession turned into something far worse, when severe droughts in 1930 in the Midwest led to a sharp decline in agricultural production.

- Between 1930 and 1933, one-third of U.S. banks went out of business as these agricultural shocks led to bank failures.
- For more than two years, the Fed sat idly by through one bank panic after another.
- Adverse selection and moral hazard in credit markets became severe. Firms with productive uses of funds were unable to get financing. As seen in the next slide, credit spreads increased from 2% to nearly 8% during the height of the Depression in 1932.
- The deflation during the period led to a 25% decline in price levels.
- The prolonged economic contraction led to an unemployment rate around 25%.
- The Depression was the worst financial crisis ever in the U.S. It explains why the economic contraction was also the most severe ever experienced by the nation.
- Bank panics in the U.S. spread to the rest of the world, and the contraction of the U.S. economy decreased demand for foreign goods.
- The worldwide depression caused great hardship, and the resulting discontent led to the rise of fascism and WWII.

Figure 8.2 Stock Price Data During the Great Depression Period

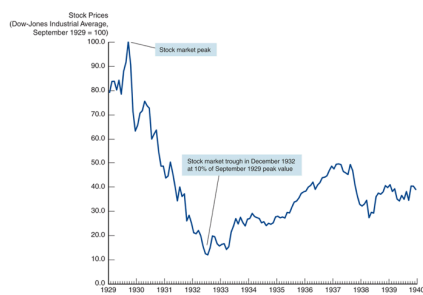
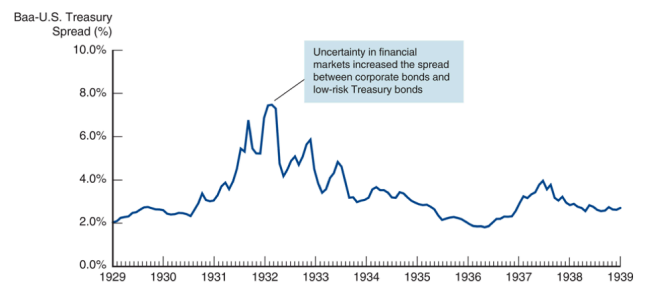


Figure 8.3 Credit Spreads During the Great Depression



■ The Global Financial Crisis 2007-2009:

Three central factors:

■ Financial innovation in mortgage markets

- Less-than-credit worthy borrowers found the ability to purchase homes through subprime lending
- Financial engineering developed new financial products to further enhance and distribute risk from mortgage lending

■ Agency problems in mortgage markets

- Mortgage originators did not hold the actual mortgage, but sold the note in the secondary market
- Mortgage originators earned fees from the volume of the loans produced, not the quality
- In the extreme, unqualified borrowers bought houses they could not afford through either creative mortgage products or outright fraud (such as inflated income)

■ The role of asymmetric information in the credit rating process

- Agencies consulted with firms on structuring products to achieve the highest rating = clear conflict
- The rating system was hardly designed to address the complex nature of the structured debt designs
- The result was meaningless ratings that investors had relied on to assess the quality of their investments

Who suffered loss: US residential housing, FIs BS, the “shadow” banking system, global financial markets, the failure of major financial firms

Better to watch documentary about the two crises – also Fannie May and Freddie Mac

8.3 How does Collateralized Debt Obligations (CDOs) play a role in crisis?

- A special purpose vehicle (SPV) is created to buy assets, create securities from those assets, and then sell those securities to investors.
- In a CDO, the securities (or **tranches**) are created based on default priorities. The first defaults go to the lowest rated tranches. The highest rated tranches suffer defaults if most of the assets default.
 - Super senior – highest rated tranches
 - Senior – little more risk, but pays a higher interest rate
 - Mezzanine – bears more risk, but has even higher interest
 - Equity – first tranche that suffers losses from defaults
- Bottom line - increased complexity of structured products can actually reduce the amount of information in financial markets. Makes you wonder who is willing to buy these in the first place!

12. The Bond Market

12.1 Capital Market

Purpose: original maturity greater than one year, typically for long-term securities (stocks and bonds)

Issuers: federal and local governments (debt), corporations (equity and debt), you and me

1. Primary market for initial sale (IPO)
2. Secondary market for Over-the-counter (bonds) Organized exchanges (stocks)

12.2 Relationship between Bond Prices and Bond Yields

Bond price	Yield
↑	↓
↓	↑

Bond = fixed interest security represent debt owed by the issuer to the investor; when government issues a bond, the bond itself pays a fixed annual (exceed one year) amount of **interest** (coupon), can be paid in any currency. The **yield** is the interest rate on a bond.

⇒ The coupon is **fixed**, but the yield **may vary** inversely with the market price of a bond

Ex: Consider 10-year government bond issued 2016. Nominal value €5000, pays annual (fixed) interest rate of €200 (coupon). The yield on the bond is calculated by formula:

$$\text{Yield} = (\text{interest on bond} / \text{market price on bond}) * 100$$
$$(200/5000) * 100 = 4\%$$

This means that whoever holds the bond, will annually receive €200 in interest representing 4% yield if the bond has a face value of €5000. If the coupon would've been €500 instead, the yield would've been 10%.

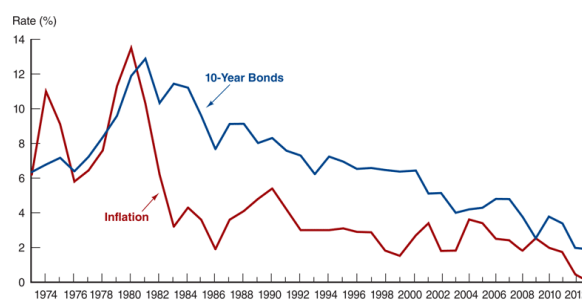
If the market price of the bond increases to €5500, due strong investor demand, the **coupon remains the same**, so the yield decreases: $(200/5500) * 100 = 3,4\%$

If the market price of the bond falls to €4300, due speculative selling of bonds, the **coupon remains the same**, so the yield increases: $(200/4300) * 100 = 4,65\%$

Nominal value/Face value/Par value = the stated value of an issued security, and disregards an item's market value. For stocks, it is the original cost of the stock shown on the certificate. For bonds, it is the amount paid to the holder at maturity, generally \$1,000.

12.3 Treasury Bonds

- **Treasury bonds** = LT government bonds that make interest payments semi-annually, and the income received is only **taxed** at the federal level. They are known in the market as **primarily risk-free**; they are issued by the U.S. government with very little risk of default as they just can print money to pay off debt.



Sources: <http://www.federalreserve.gov/releases> and <http://ftp.bls.gov/pub/special.requests/cpi/cpiial.txt>

Type	Maturity
Treasury bill	Less than 1 year
Treasury note	1-10 years
Treasury bond	10-30 years

■ Treasury Bonds: Recent Innovation

- **Treasury Inflation – Indexed securities**: the principal amount is tied to the current rate of inflation to protect investor purchasing power
- **Treasury STRIPS**: the coupon and principal payments are 'stripped' from a T-bond and sold as individual zero-coupon bonds

■ Treasury Bonds: Agency bonds

- Although not technically Treasury securities, agency bonds are issued by government-sponsored entities, such as GNMA, FNMA and FHLMC
- The debt has an 'implicit' guarantee that the US government will not let the debt default. This 'guarantee' was clear during the 2008 bailout...

■ Municipal bonds = issued by local, country, and state governments, used to finance public interest projects

Tax-free municipal interest rate = taxable interest rate * (1 - marginal tax rate)

- Two types: **General obligation bonds**, **Revenue bonds**

■ Municipal Bonds: Examples

1. Suppose the rate on a corporate bond is 9% and the rate on a municipal bond is 6,75%. Which should you choose?

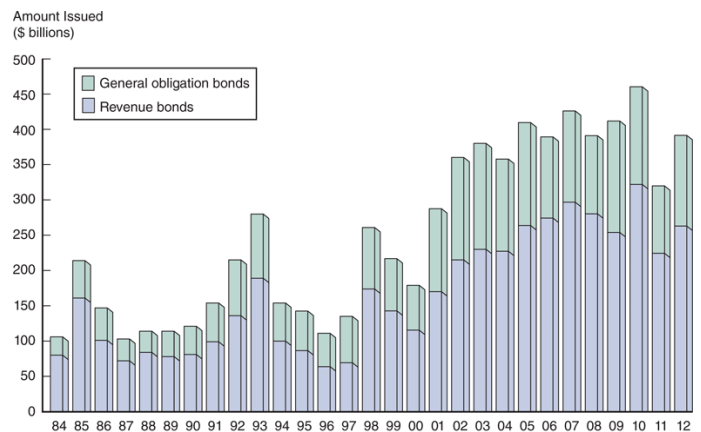
Answer: $6.75\% = 9\% \times (1 - \text{MTR}) \rightarrow \text{MTR} = 25\%$

If you are in a MTR above 25%, the municipal bond offers a higher after-tax cash flow

2. Suppose the rate on a corporate bond is 5% and the rate on a municipal bond is 3.5%. Which should you choose? Your MTR is 28%. Find the equivalent tax-free rate (ETFR)

Answer: $\text{ETFR} = 5\% \times (1 - \text{MTR}) = 5\% \times (1 - 0.28) \rightarrow \text{ETFR} = 3,36\%$

If the actual municipal rate is above this \rightarrow chose the municipal rate



Source: <http://www.federalreserve.gov/econresdata/releases/govsecure/current.htm>.

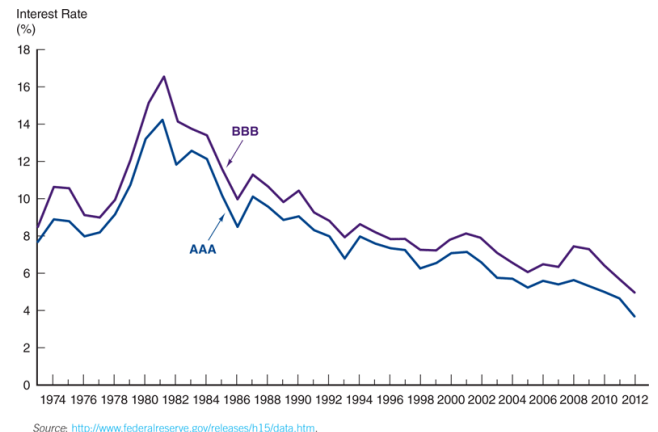
■ Corporate bonds:

- Typically have a face value of €1000, although some have a face value of €5000 or €10000.
- Pay interest semi-annually (USD) or annually (EUR)
- Cannot be redeemed anytime issuer wishes, unless a specific clause states this (**call option**)

- Degree of risk varies with each bond, even from the same issuer. A degree of risk ranges from low (AAA) to high (BBB). Any bonds rated below BBB are considered **sub-investment grade debt**

- Characteristics of Corporate Bonds

- Restrictive Covenants
 - Mitigates conflicts with shareholder interests
 - May limit dividends, new debt, ratios, etc
 - Usually includes a cross-default clause
- Conversion
 - Some debt may be converted to equity
 - Similar to a stock option, but usually more limited
- Secured bonds
 - Mortgage bonds
 - Equipment trust certificates
- Unsecured bonds
 - Debentures
 - Subordinated debentures
 - Variable-rate bonds
- Junk bonds
 - Debt that is rated below BBB
 - Often, trusts and insurance companies are not permitted to invest in junk debt
 - Michael Milken developed this market in the 1980s, although he was subsequently convicted of insider trading



Corporate bonds = private debt instruments, specified maturity (LR tendency) → capital market instruments

Corporate stocks = private equity instruments, infinite maturity → capital market instruments

- **Convertible Bonds**

E.G.: 1000\$ face of value

- Share price at issue of convertible = \$20
- Conversion premium = 25%
- Conversion period = 5 year
- Investor will convert bonds in shares if shares trade at \$25 or higher
- Conversion will typically only happen near maturity of the bonds

- **Financial guarantees for bonds**

Some debt issuers purchase *financial guarantees* to lower the risk of their debt. The guarantee provides for timely payment of interest and principal, and are usually backed by large insurance companies.

Not all guarantees make sense: CDSs²

12. 4 Calculations

Bond Yield Calculation

- Bond yields are quoted using a variety of conventions, depending on both the type of issue and the market
- We'll examine the current yield calculation that is commonly used for long-term debt
- What is the **current yield** for a bond with a face value of \$1000, a current price of \$921.01, and a coupon rate of 10,95%?
- Answer: $I = C/P = 109,50/921,01 = 11,89\% \rightarrow C(\text{coupon}) = 10,95\% \times 1000\$$
- Bond pricing is, in theory, no different than pricing any set of known cash flows
- Once the cash flows have been identified, they should be discounted to time zero at an appropriate discount rate

Finding the value of coupon bonds

- What is the price of two-year, 10% coupon bond (semi-annual payments) with a face value of \$1000 and a required rate of 12%?
- Answer: Identify the cash flows
 - \$50 is received every six months in interest
 - \$1000 is received in two years as the principal repayment
- Find the present value of cash flows (TVM solver)
 - $N = 4, FV = 1000, PMT = 50, I = 6\%$
 - $PV \rightarrow 965,35$

Coupon interest rate	The stated annual interest rate on the bond. It is usually fixed for the life of the bond.
Current yield	The coupon interest payment divided by the current market price of the bond.
Face amount	The maturity value of the bond. The holder of the bond will receive the face amount from the issuer when the bond matures. <i>Face amount</i> is synonymous with <i>par value</i> .
Indenture	The contract that accompanies a bond and specifies the terms of the loan agreement. It includes management restrictions, called covenants.
Market rate	The interest rate currently in effect in the market for securities of like risk and maturity. The market rate is used to value bonds.
Maturity	The number of years or periods until the bond matures and the holder is paid the face amount.
Par value	The same as <i>face amount</i> .
Yield to maturity	The yield an investor will earn if the bond is purchased at the current market price and held until maturity.

13. The Stock market

- Investing in stocks:
 1. Represents ownership in a firm
 2. Earn a return in two ways:
 - a. price of the stock rises over time
 - b. dividends are paid to stockholders
 3. Stockholders have claim on all assets
 4. Right to vote for directors and on certain issues
 5. Two types:
 - a. common stock (right to vote, receive dividends)
 - b. preferred stock (receive a fixed dividend, do not usually vote)
- How Stocks are Sold:

	Organized exchange:	Over-The-Counter:
Type	<ul style="list-style-type: none">■ Auction markets with floor specialists (floor traders)■ 25% of trades are filled directly by specialist■ Remaining trades are filled through SuperDOT	<ul style="list-style-type: none">■ Multiple market makers set bid and ask prices■ Multiple dealers for any given security
How stocks are sold	<ul style="list-style-type: none">■ NYSE -> daily volume around 4 billion shares, with peaks at 7 billion■ The term organized used to imply a specific trading location. Although, today, computer systems (ECNs) have replaced this idea■ Others include EURONEXT, Nikkei, LSE, DAX■ Listing requirements exclude small firms	<ul style="list-style-type: none">■ NASDAQ -> best example■ Dealers stand ready to make a market■ Today, 3000 different securities are listed on NASDAQ■ Others include the dealing/trading rooms and banks■ Important market for thinly-traded securities -> securities that don't trade very often. Without a dealer ready to make a market, the equity would be difficult to trade

- **Electronic Communication Networks (ECNs)** = Allow brokers & traders to trade without a middleman.

- Pros: transparency, cost reduction, faster, after-hours trading
 - Cons: don't work as well with thinly-traded stocks, many ECNs competing for volume which can be confusing, major exchanges are fighting ECNs with an uncertain outcome

- **Exchange Traded Funds (ETFs)** are a recent innovation to help keep transaction costs down while offering diversification. Represent a basket of securities or an index, exact content of basket is known so valuation certain, traded on a major exchange, management fees are low

- **Computing the Price of Common Stock**
 - Valuing common stock is, in theory, no different from valuing debt securities:
 - determine the cash flows
 - discount them to the present
 - Four methods:
 1. **One period valuation model**
 - Simplest model, just taking using the expected dividend and price over the next year

$$\text{Price} = \frac{\text{Div}_1}{(1 + k_e)} + \frac{P}{(1 + k_e)}$$
 - *Example:* What is the price for a stock with an expected dividend and price next year of \$0,16 and \$60, respectively?

$$\text{Price} = \frac{0.16}{(1 + 0.12)} + \frac{60}{(1 + 0.12)} = 53.71$$
 2. **Generalized dividend valuation model**
 - Most general model, but the infinite sum may not converge

$$\text{Price} = \sum_{t=1}^{\infty} \frac{\text{Div}_t}{(1 + k_e)^t}$$
 - Rather than worry about computational problems, we use a simpler version, known as the *Gordon growth model*
 3. **Gordon growth model**
 - Same as the previous model, but it assumes that dividend grow at a constant rate G.

$$\text{Div}_{(t+1)} = \text{Div}_t \times (1 + g) \qquad \text{Price} = \sum_{t=1}^{\infty} \frac{\text{Div}_t}{(1 + k_e)^t} = \frac{D_1}{(k_e - g)}$$
 4. **Price earnings valuation model**
 - The price earnings ratio (PE) is a widely watched measure of how much market is willing to pay for \$1,00 of earnings from the firms

$$\text{Price} = \frac{P}{E} \times E$$
 - If the industry PE ratio for a firm is 16, what is the current stock price for a firm with earnings for \$1,13/share?
 - Answer: Price = 16 x \$1.13 = \$18.08

- **How the market sets security prices**
 - Generally speaking, prices are set in competitive markets as the price set by the buyer willing to pay the most for an item.

- The buyer willing to pay the most for an asset is usually the buyer who can make the best use of the asset.
- Superior information can play an important role.
- Consider the following three valuations for a stock with certain dividends but different perceived risk
- Example: Bud, who perceives the lowest risk, is willing to pay the most and will determine the “market” price

Investor	Discount Rate	Stock Price
You	15%	\$16.67
Jennifer	12%	\$22.22
Bud	7%	\$50.00

- **Errors in valuation:** (significant impact on Gordon)
 - Although the pricing models are useful, market participants frequently encounter problems in using them. Any of these can have a significant impact on price in the Gordon model
 - Problems with Estimating Growth
 - Problems with Estimating Risk
 - Problems with Forecasting Dividends
- Dividend growth rates
 - Stock prices for a security with $D_0 = \$2.00$, $k_e = 15\%$ and constant GRs as listed

Growth (%)	Price (\$)
1	14.43
3	17.17
5	21.00
10	44.00
11	55.50
12	74.67
13	113.00
14	228.00

- Required returns
 - Prices for a security with $D_0 = \$2.00$, $g = 5\%$, and required returns as listed

Required Return (%)	Price (\$)
10	42.00
11	35.00
12	30.00
13	26.25
14	23.33
15	21.00

- Security valuation is not an exact science
- Considering different growth rates, required rates... is important in determining if a stock is a good value as an investment

Cases:

- Case: The 2007 – 2009 **Financial Crisis** and the Stock Market
 - The crisis started in 2007 and was the start of one of the worst bear markets
 - The crisis lowered **g** in the Gordon Growth model – driving down prices
 - Also impacts **k_e** – higher uncertainty increases this value, again lowering prices
 - The expectations were still optimistic at the start of the crisis. But, as the reality of the severity of the crisis was understood, prices plummeted.
- Case: **9/11**, Enron and the Market
 - Both 9/11 and the Enron scandal were big events in 2001
 - Both should lower **g** in the Gordon Growth model – driving down prices
 - Also impacts **k_e** – higher uncertainty increases this value, again lowering prices
 - We did observe in both cases that prices in the market fell before going up again as confidence in the US market returned

Stock Market Indexes

- Frequently used to monitor the behavior of a group of stocks
- Major indexes: Dow Jones Industrial Average, S&P 500 and NASDAQ composite
- Hereunder: the 30 companies in the DJIA
- E.G. \$1.00 invested in 1980 in the DJIA (around 800) would have grown to \$16.40 in 2012 (around 1300) -> AGR of 8.8%

Company	Stock Symbol		
3M Co.	MMM	International Business Machines Corp.	IBM
American Express Co.	AXP	Johnson & Johnson	JNJ
AT&T	T	J.P. Morgan Chase & Co.	JPM
Boeing Co.	BA	McDonald's Corp.	MCD
Caterpillar Inc.	CAT	Merck & Co. Inc.	MRK
Chevron	CVX	Microsoft Corp.	MSFT
Cisco Systems	CSCO	Nike	NKE
Coca-Cola Co.	KO	Pfizer Inc.	PFE
E.I. DuPont de Nemours	DD	Procter & Gamble Co.	PG
Exxon Mobil Corp.	XOM	Travelers Corp.	TRV
General Electric Co.	GE	United Health Group	UNH
Goldman Sachs	GS	United Technologies Corp.	UTX
Home Depot Inc.	HD	Verizon Communications Inc.	VZ
Intel Corp.	INTC	Visa	V
		Walmart Stores Inc.	WMT
		Walt Disney Co.	DIS

Buying Foreign Stocks

- Useful from diversification perspective, but complicated.

- American Depositary Receipts (ARDs) allow foreign firms to trade on US exchanges, facilitating their purchase. US banks buy foreign shares and issue receipts against the shares in US markets

Regulation of the Stock Market

- Primary mission of the SEC to protect investors and maintain the integrity of the securities markets.”
- The SEC brings around 500 actions against individuals and firms each year toward this effort.
- This is accomplished through the joint efforts of four divisions.
 1. **Division of Corporate Finance:** responsible for collecting, reviewing, and making available all of the documents corporations and individuals are required to file
 2. **Division of Market Regulation:** establishes and maintains rules for orderly and efficient markets
 3. **Division of Investment Management:** oversees and regulates the investment management industry
 4. **Division of Enforcement:** investigates violations of the rules and regulations established by the other divisions.

Chapter 18

Most powerful banks

EZB, FED, IMF < (based in Basel) = BIS - Bank of international settlements (=bank of central banks)

– Decide what Bank capital (=Cash reserves) needs to be