THE FINANCIAL SYSTEM

Prelude: Investment and Finance

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PRELUDE: INVESTMENT AND FINANCE

When a firm wants to ***invest*** - that is, undertake an **investment project**, i.e. increase the stock of capital goods it uses for production, e.g. get a new factory, more warehouses, expand its delivery truck fleet, get more machinery, more tools, etc. it does not (and often cannot) simply pay it from the revenues it makes out of current sales. That is because the cost of the new capital good is often quite large.

e.g. suppose a bakery has pie sales of, say, $10,000 per month; it hires workers which cost it $4,000 per month in wages, ingredients (eggs, four, etc.) which cost it an additional $3,000 and rent is another $2,000. So it's total costs are $9,000, its revenues $10,000, leaving it a profit of $1,000 per month.

Suppose the firm is contemplating getting a new industrial oven to help it increase production and expand sales. The oven will allow it to increase sales from $10,000 to $12,000, but to run the oven it will also have to hire an additional worker, more ingredients and so on, so expanding production will also raise its operating costs increase from, say, $9,000 to $10,000. So profit before the new oven is $1,000 per month, and profits after the new oven are estimated to be $2,000 per month. A very nice prospect.

The problem is a new industrial oven is a hefty one-time expense. It costs $20,000 to buy an industrial baking oven from a capital-goods producing firm like General Electric. There is simply no way the bakery can come up with $20,000 this month to pay for it.

There are several ways of going about **financing** that investment project.

(1) **Retained profits** - the firm can *save* its profits over a long period of time and gradually accumulate enough savings to pay for the oven.

e.g. suppose the bakery decides to set aside $400 out of its $1,000 monthly profit into its "new oven fund" (the remaining $600 of profit goes to cover the baker's own personal expenses - the man has to live! - or is distributed as dividends to his partners, shareholders, etc. (they have demands too) By saving $400 per month for his new oven, the baker will take 50 months - that is, over four years - until he finally comes up with the $20,000 and can finally buy the oven.

Retained profits is how a lot of investment projects had to paid for back in the old days of the 18th C. or so. - businesses saved up their profits for years, before they finally had enough set aside to pay for new machinery or equipment. It is how things are still done in poor countries. And - lest we forget - it is how a lot of at least smaller investment projects are still paid for in many rich countries.

But five years is a long time. You are foregoing 5 years of extra pie sales why you patiently accumulated the funds.. It is simply not very economically sensible to wait if the opportunity of making higher sales is here *now*. If there is a way - some way - of getting the oven *now*

and paying for it *later*, it could be a lot quicker and there's no missed sales opportunities. Remember: once you expand production, you'll be making $2,000 profit per month. If you set $1,400 of those profits aside - keeping $600 for the baker's personal needs, &tc just like before - it will add up with $20,000 in a little over fourteen months.

So how do you get an oven now and pay for it later? One word: get ***finance*** from somebody else.

(2) **Shares** - the simplest and most direct way to get finance is by shares. Intuitively, issuing shares is just like bringing **partners** on board. You, the baker, want a new oven. Your mother happens to have saved $5,000 in a sock and your brother-in-law has hoarded $15,000 under his mattress. Invite them into the business. Make them partners. If *they* use their sock-and-mattress savings to pay the $20,000 for the new oven, promise them 75% or 90% or, heck, 100%, of the extra profits that extra oven will generate. The oven will generate an extra $1,000 per month from here unto the foreseeable future. Since your mother & brother-in-law were not earning anything on that money, it is an attractive offer. Suppose you negotiate on giving them 90%. Then you keep $100 of the extra profits for yourself (you can claim it is the 'wage' you earn for running the bakery), and they'll take a proportionate share of the remaining $900 - momma taking $200 (she contributed 25% of the oven's cost), brother-in-law taking $700 (for contributing 75%). Not a bad deal for them - their money wasn't earning anything in the sock or in the mattress.

Partnership shares is a very common way of financing small businesses. For bigger businesses, who undertake bigger projects - a new factory, a new ship, a new truck fleet - which cost hundreds of thousands or millions of dollars, tapping your friends and family for their mattress savings isn't likely to be enough. In this case, you take you might want to take your partnership **public** - that is, you offer ***shares*** in the new capital equipment you intend to acquire, and let anybody in the public with a little money contribute to it and take a share of the business accordingly.

(3) **Debt** - finally, there is the third alternative. Suppose your mother & brother-in-law are very annoying personalities. It was nice of them to front the money, but partnership shares also gives them a right to tell you how they want *their* oven to be used, essentially a right to tell you how to run your bakery. Too many cooks in the kitchen, literally. So how about you just ***borrow*** the money from them? Instead of having your relatives buy the oven for you, borrow the money, buy it yourself and then pay back your debt to them. This is convenient in the sense that you retain full control of your business.

Debt-financing can be done many ways. You can borrow the money from your relatives. More common (in rich countries) is that you borrow the money from the local **bank**. The bank will lend you $20,000, you buy the oven, and then repay the principal and interest back to the bank slowly over time.

The inconvenient part is that now they expect a fixed ***interest*** return on their loan. If they were given partnership shares, they could only claim a share of the profits. And if one bad month sales were down, they would get less. But with a loan, you *have to* repay them the

amount you borrowed - with interest - regardless of how the business is going, whether you're making more or less profits, or even if you are making losses.

If you're undertaking large investment projects - millions of dollars worth - borrowing from the local bank can be difficult and expensive. Banks may not have enough money or willingness to front so much at once on a single borrower's project - too many eggs in one basket for them. If you default or go bankrupt, they'll take a huge hit. As the old saying goes: if you owe $10,000 to a bank, you are in trouble; if you owe $10 million to a bank, the bank is in trouble. So to take that kind of risk on such a large loan, the bank may demand hefty interest to make that loan worthwhile for them - 20% or whatnot.

In that case, if you are borrowing large, you might want to consider borrowing directly from the public at large. That is, you announce a public debt subscription for the money you need (say, $10 million) and allow Joe Q.Public - or anybody else- the opportunity to lend you the money. In this case, you issue **bonds** to whomever lends you the money - that is an IOU certificate, acknowledging the debt and promising to repay them a certain amount on a certain day in the future (with interest). For large projects, bond issues are cheaper (i.e. lower interest) than borrowing from a bank. That is because, with bonds, you have hundreds or thousands of lenders, each of them lending you only a little bit, which isn't as much of a risk to them. So they're willing to accept a lower interest rate - say, 7 or 8%, compared to the 20% the bank was demanding.

Of course, for smaller projects, bond issues are not worthwhile. The transactions costs of hiring an investment bank to set up the public announcement, line up people and auction off your bonds can be hefty. It is worthwhile if you intend to borrow $10 million, but not if you just want to borrow $10,000. In that case, borrowing from the bank is whole lot cheaper. Small loans are a reasonably low risk for banks, so they're not going to charge you that much interest for it.

In sum: Retained profits, shares and debt. These are the three principle ways firms go about getting funds to finance their investment projects. And they come with different costs and conditions.

On the face of it, retained profits are the 'cheapest' funds. You're just doing all the saving yourself, you pay no dividends on interest on that. But it costs you a lot of time and you forego sales.

Shares are flexible - they cost you only a *share* of profits, that is dividends. Which can be a lot or a little or nothing at all - depends on how your firm is doing. The big drawback is that your partners control how the capital equipment is used - that is, you lose a little bit (or a lot) of your control of the company.

Debt is inflexible. You retain ownership of the capital equipment and control of the company, but you *must* pay the principal & interest back, a fixed sum on a fixed schedule - no matter if the business is doing well or poorly.

FINANCIAL SYSTEM

Overview

Modern industrialized economies usually have a large and elaborate **financial system**, a set of institutions and markets, dedicated to facilitating the financing the investment needs of firms.

"**Finance**" remember, is just the channeling of the *savings* of individuals to be used by firms (& individuals) for *investment* projects.

In a modern financial system, it is common to distinguish between *direct* and *indirect* financing.

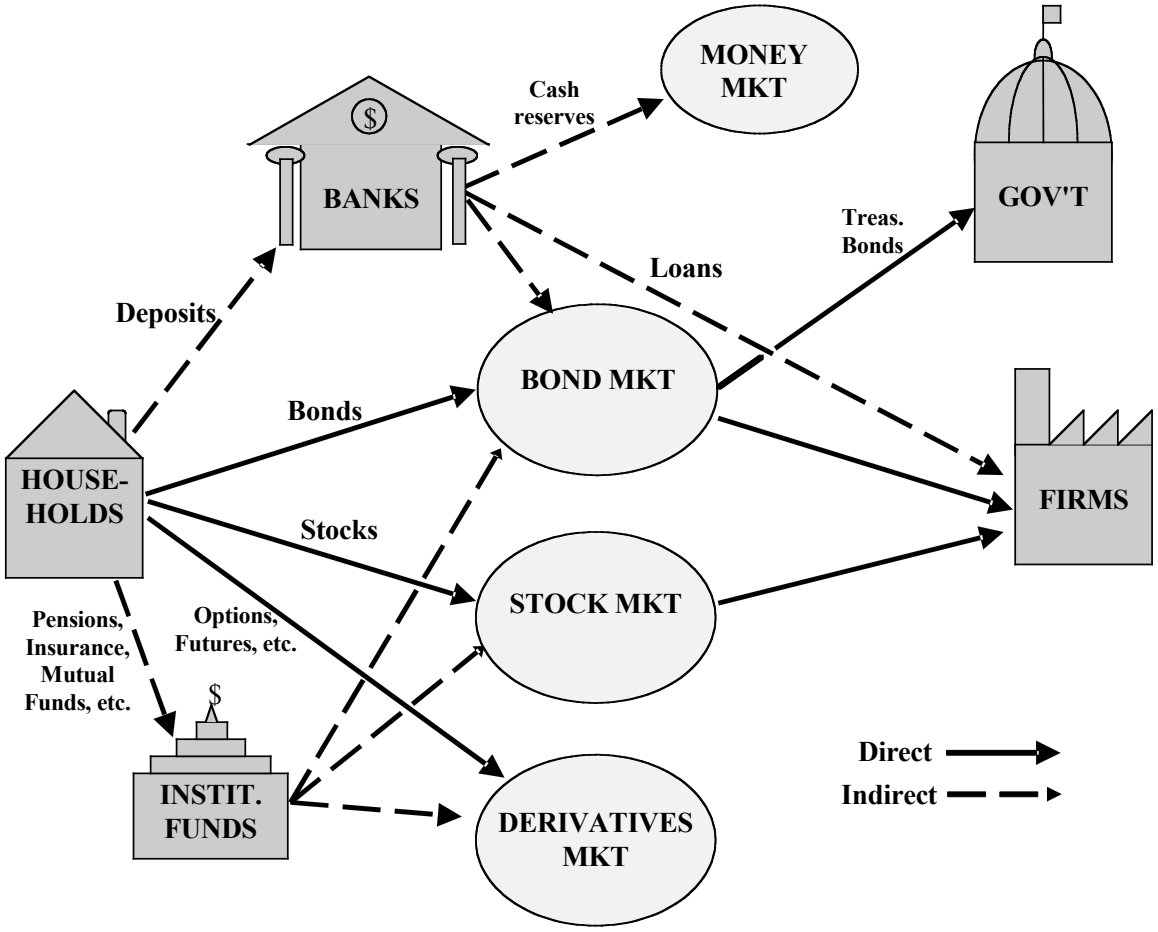
Direct Finance : this means savers provide their funds directly to those who need them via "financial markets". The two principal types of direct finance are:

-- via bonds
-- via stocks.

Indirect finance : this means savers provide their funds to an *institution*, which then channels them to those who need it. Institutions can be:

- commercial banks
- mutual funds
- pension funds
- insurance companies

We depict the essential channels of financing in the next page. (OK, maybe not the clearest diagram in the world...)


MONEY MKT
Cash reserves
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Treas. Bonds
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Bonds
HOUSE-HOLDS
FIRMS
Stocks
STOCK MKT
Pensions, Insurance, Mutual Funds, etc.
Options, Futures, etc.
INSTIT. FUNDS
DERIVATIVES MKT
Direct
Indirect

We can break down the scheme as follows:

Households can pour their savings into holding:
-- Bank deposits
-- Insurance, pension & mutual funds.
-- Government bonds
-- Corporate bonds
-- Stocks
-- Derivatives (options, futures, etc.)

Banks receive their funds from:
-- Bank deposits
and pour them into:
-- Loans
-- Bonds
-- Cash reserves

Institutional funds (sometimes called "institutional investors") receive their funds from:
-- Insurance contracts
-- Pension contracts
-- Mutual fund subscriptions
and pour them into the same range of assets that a household holds above (bonds, stocks, derivatives, etc.)

Firms receive funds via
-- Bank loans
-- New bonds (= primary bond market)
-- New equity (= primary stock market)

There are five specialized secondary financial **markets** which do *not* channel funds to firms:
-- Secondary Stock market
-- Secondary Bond market
-- Derivatives market
-- Money market
These markets are for "shifting around" asset holdings (old bonds, old stocks, derivatives, cash reserves) between holders (i.e. households, banks, institutional funds). Secondary markets do *not* providing new financing for firms or government.

PART I - DIRECT FINANCE

EQUITY FINANCE

(1) Stocks

A **stock** (also called a "share" or "equity") is a claim of *ownership* on a private company - or, more precisely, a claim of ownership on the company's ***capital stock*** (its factories, machinery, tools, computers, desks, etc.). Firms that issue *stocks* are selling pieces of their company - or again, more precisely, their capital equipment - to individuals. So firms never have to "pay back" funds raised by that method. It just a sort of glorified "**partnership**", where you put up funds to buy capital equipment the firm is going to use, and consequently share the resulting profits.

A person who owns stocks in Acme, Inc., who owns a ***share*** of that company's capital stock, is called a *partner*, or ***shareholder*** or ***stockholder*** or (in economic terms) a ***capitalist***.

A "**stock**" is merely a certificate of a share, that is, a piece of paper saying something like "The bearer of this stock certificate owns a 1/100th share of the capital stock of Acme, Inc.".

(2) Dividends

The owner of shares is entitled to receive a proportional share of the *profits* of that company. Those profits are distributed to him quarterly (i.e. four times a year) in the form of ***dividends***.

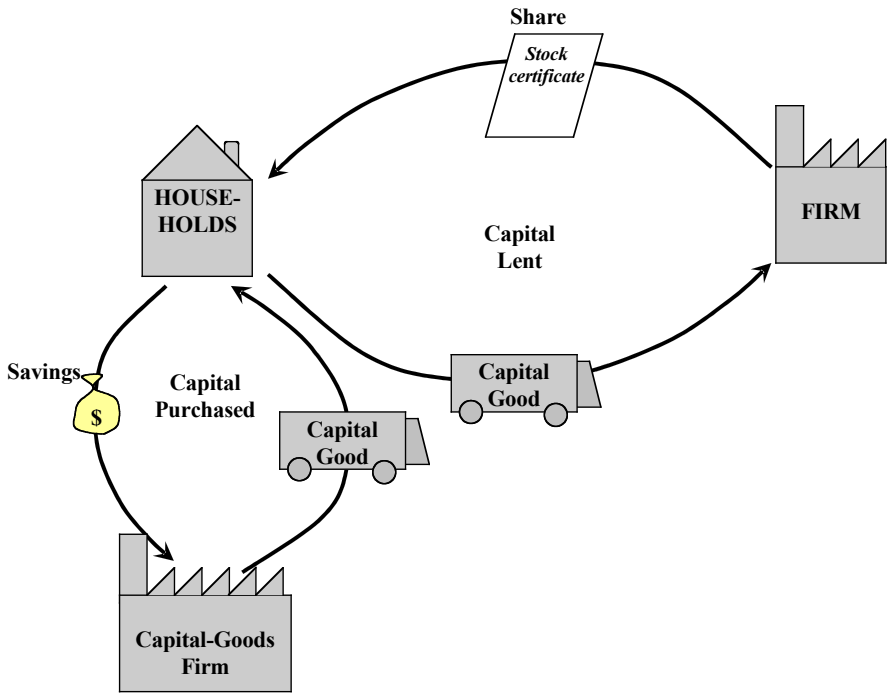
If the company makes no profits (or decides to retain those profits for itself), the stockholder receives no dividends. Stockholders are *not* guaranteed any particular amount of dividend income. It varies with the amount of profit the firm makes and sometimes (quite often, actually) dividends are not paid at all.

(3) Ownership Rights

Besides receiving dividends, stockholders also have certain *rights* as owners of the capital stock of a company -- in particular, they participate in the governance of the company. Shareholders also have a voice at the **annual general meeting** (votes are proportional to % of total stock owned). They elect the **board of directors** of the company.

Shareholders, through the board of directors, hire the **management**, that is the corporate officers that will manage the company, e.g. the Chief Executive Officer (CEO) (manager-in-chief), the Chief Financial Officer, (CFO), (the manager in charge of financial & accounting matters), the Chief Operations Officer (COO) (the manager in charge of day-to-day operations), etc. The board oversees and reviews the behavior of the managers. This is how "capitalists" (i.e. shareholders) exert their control over the firm's activities.

It is sometimes useful to think of a shareholder or capitalist as a type of lender - but not a lender of money. Rather, the shareholder or capitalist is using his savings to *buy* capital equipment, and then *lending* the capital equipment to the company, in return for which the firm issues him a *stock* certificate, a piece of paper confirming that he is, indeed, the owner of that capital equipment. He retains ownership of the capital equipment, and thus has the "right" to control how his capital equipment is used.



Although the capitalist has "lent" capital equipment, he only gets his capital equipment back when the company is "done" with it - that is, when it wears out, or is sold off. If the company goes bankrupt, it will sell off the capital equipment and the shareholder gets the proceeds of the sale of equipment - but only after all other creditors who the firm owes money to (suppliers, workers, banks, bondholders) are paid off. So the shareholder is the last to be paid.

(4) Modern Companies

There are many types of business organizations, defined by how it combines capital into enterprise - sole proprietorships, partnerships, corporations, etc.

Many a big company you hear about today is, technically speaking, an *incorporated permanent joint-stock limited liability public company*. As each of these words mean something, it might be worthwhile going through them quickly:

- "**Company**" : a "company" is merely an old term for an association of people. [1]

- "**Corporation**": an *incorporated* company is a company officially registered with the State which allows the law courts recognize it as a fully "legal person" ("incorporated" is Latin for "given a body").

[This is necessary if the company hopes to own property, sign contracts, sue or be sued, in the company's own name ("Acme, Inc."), separately from of the individuals in it (Mr. Fudd, Mr. Coyote, etc.). Many non-profit organizations (e.g. universities.) are also "corporations". Conversely, many profit businesses (e.g. sole proprietorships, partnerships) are *not* incorporated.[2]]

- "**Permanent**" - This means that when you "lend" your capital equipment to the company, you don't "get it back" at some designated point in future.

[It was not always like this. In the old days, equity could be non-permanent. e.g. many East Indies companies had a capital stock that only lasted one journey. That is, they issued shares to finance the purchase and outfitting of a ship to trade in India, but upon its return, the ship was sold and the shareholders paid off. The company then issued new shares for the next expedition.]

- "**Joint Stock**" - this means that companies don't designate which piece of capital equipment is precisely owned by whom. Instead, they "add up" all their capital equipment, and their certificates are expressed in terms of shares of the entire undifferentiated capital stock. So gains or losses in any part of the capital equipment are equally shared among all the shares.

[Not necessarily in the old days. e.g. using the East Indies example, shares could be quite explicit about which item of capital you owned, e.g. you could buy a share in the ship or a share in the ship's cargo, specified by part, etc. Losses became differential, e.g. if part of the cargo was spoiled but the rest was fine, some shareholders would lose more than others. It often meant sending your own agent along to make sure "your share" was taken care of. Joint stock eliminates that, and an elected 'board of directors' will 'take care' of the whole.]

- "**Limited Liability**" - That is, if the company does go bankrupt and they are liquidated, and the sale of the capital equipment isn't enough to cover the debt owed to others, the

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[1] Obscure Historical Note: The term comes from the Italian *compagnia*. It was a term that emerged in Medieval Italy to designate an association of men sworn to support each other in a mutual objective. It was originally a military term (as it still is today) and its Latin etymology is uncertain: either *cum paganus* ("of the same village"), or *cum panus* ("of the same cloth/banner") or *cum panis* ("eaters of the same bread"), from which we also get "companion". It acquired its commercial connotations when the term was borrowed by Medieval Italian merchants to describe a type of unlimited liability ongoing partnership agreement (as opposed to a single venture partnership, or one with differential liability (e.g. an agency contract).]

[2] Legal practice in recent years has evolved to also give unincorporated companies the convenience of using the company name to sign contracts and own property, they still do not quite have a legal personhood separate from the individuals.

creditors can't come after the individual shareholders to pay the remaining debts. A shareholder loses only the capital equipment he has committed to that firm, and no more.

[Again, in the old days, shareholder liability was often *unlimited*. If the ship was lost and there were debts to be paid, shareholders would have to sell other assets, down to their own personal belongings, to make up for the company's debts. Today, sole proprietorships and partnerships (e.g. law firms) are still unlimited liability companies.]

- "**Public** " - In this context, "public" (or **publicly-held**) company means that its shares can be purchased and traded by anyone in the general public. This is in contrast to what is called a "private" (or **privately-held**) company, where the shares are restricted to a small group of people (often friends and family), and not openly traded (e.g. a .shareholder might need the permission of the others to sell).

[A horribly confusing nomenclature, as 'public company' is often also used to refer to a government-owned company. To avoid confusion, it is preferable to use "publicly-held" and "privately-held" companies. Other countries use less confusing terms.[3]]

(5) <u>Stock Markets</u>

A shareholder is sometimes dissatisfied with how the firm is using "his" capital equipment - that it is not generating enough dividends, etc. The only way he can "get it back" earlier is if he personally sells the capital equipment to someone else, thus transferring ownership of that capital equipment. He can do this by simply selling his stock certificate on what is called the "secondary market".

There are two kinds of secondary markets he can sell his share. on a stock exchange, or over-the-counter (OTC).

(A) Stock Exchanges

A "**stock exchange**" is a specialized central market where buyers & sellers "go" to exchange (buy or sell) shares in companies which are listed there via brokers-dealers.

Famous stock exchanges include the venerable New York Stock Exchange (NYSE, founded 1792), the American Stock Exchange (AMEX, founded 1911) and the upstart NASDAQ (founded 1971), all three of them located in New York City.[4]

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[3] e.g. in France and Spain, publicly-held companies are called an "Anonymous Society" (thus the common suffix S.A. attached to firm names there), in Italy it is "Association by Shares" (S.p.A), similarly for Germany (AG). The UK uses the terms public & private, but restricts them to different suffixes ("plc" for public, "Ltd" for private). In the US, suffixes are not informative; as both publicly-held & privately-held corporations use the same suffixes - Co., Ltd., Inc.

[4] Cute Historical Note: in almost all other languages other than English, a securities "Exchange" is called a *Bolsa*, or *Bourse*, or *Börse*, etc. which frequently translates to "purse". That is because the earliest organized "Exchange" was set up in 1309 by expatriate Italian traders in the port of Bruges (Flanders), who met in a local hostel owned by a certain Robert van der Beurse (which is still standing today). It is sheer coincidence that Beurse also means "purse". The pun was not lost on the traders, and to "trade at Beurse's" became to "trade at

Stock exchanges are highly organized and regulated. A shareholder can't just waltz in there and start selling (or buying) shares himself. Rather, he has to place an order to sell (or buy) his shares via a **brokerage house** (e.g. an investment bank), that is a "member" of the exchange. Their specialized brokers & dealers will proceed to find the best buyer (or seller) for him and undertake the transaction on his behalf.

They won't do so with the shares of just any company a shareholder might own, but only with the shares of companies that are "**listed**" on that particular exchange. For a company's shares to be listed on a stock exchange (i.e. able to be bought and sold there), the company must follow the rules of that Exchange, which includes meeting a certain minimum size, a certain type of corporate governance, and publicly disclose a certain amount of information about its operations.

Stock exchanges are regulated by the government and overseen by the **Securities and Exchange Commision** (SEC).

(B) Over-the-Counter (OTC)

In contrast with the centralized, organized Exchange is the decentralized "**over-the-counter**" (**OTC**) market. It is just a summary term to describe direct person-to-person transactions. Effectively, you just make some phone calls around town and find someone willing to buy those shares from you (or sell them to you, if you're looking to buy) at whatever price you can negotiate with them. This is a direct private transaction between shareholders, and is not mediated by brokers & dealers.

Unlike stock exchanges, the OTC market is not located "anywhere" and, although individual traders are supposed to fulfill SEC criteria to prevent fraud, etc, the OTC market is largely unregulated.

Because of its decentralized, private and unregulated character, the OTC market is often characterized as the "wild west" of share trading.

(C) Stock Prices

Stock prices are simply the going price of a share (whether on the stock exchange or the OTC market). Like any other price, the price of a stock is determined simply by the demand and supply for it.

Who demands a stock? Any person who wants to park his savings in that company's shares. The more people desire a particular stock, the more its price goes up.

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the purse", and the term stuck. When other cities (Antwerp, Amsterdam, Paris, Milan, Zurich, etc.) organized their own Exchanges also called them "the Purse". The custom was broken (boo-hiss) when the English erected one in London in 1566 and decided to boringly call it the "Royal Exchange" rather than "the Purse".]

The desirability of a stock depends, first of all, on **dividends** (the profits the shareholder expects to earn from the company). But it can also depend on prospective "**capital gains**".

> **Capital gains** - the monetary gains made by buying an asset at a low price and selling that same asset a higher price.

(the term "capital gains" applies to any asset - stocks, bonds, real estate, van Goghs, etc.)

So a person who buys a share of Acme for $100 and sells it the next week for $120 has made $20 in "capital gains". (if he sells it for less, he is making "capital losses")

A saver aiming for 'capital gains' doesn't expect to hold the stock for long duration and calmly collect dividends over time. He will sell the stock as soon as the price of the stock is high enough on the market. The desire for capital gains frequently drives asset price bubbles. (we'll talk more about those later).

(D) Stock Index

Newspapers frequently report "**stock indexes**" - like the "Dow Jones Industrial Average" (DJIA), the "S&P 500", the "NASDAQ Composite" etc. A stock index is just an (unofficial) measure of the prices of shares on a particular stock exchange at a particular time. Essentially, what the newspapers do is construct a "basket" with a select group of listed companies (30 in the Dow Jones, 500 in the S&P), and then compile an index number, a sort "average price" of that basket, as a combination of the latest prices of the individual shares in the basket.

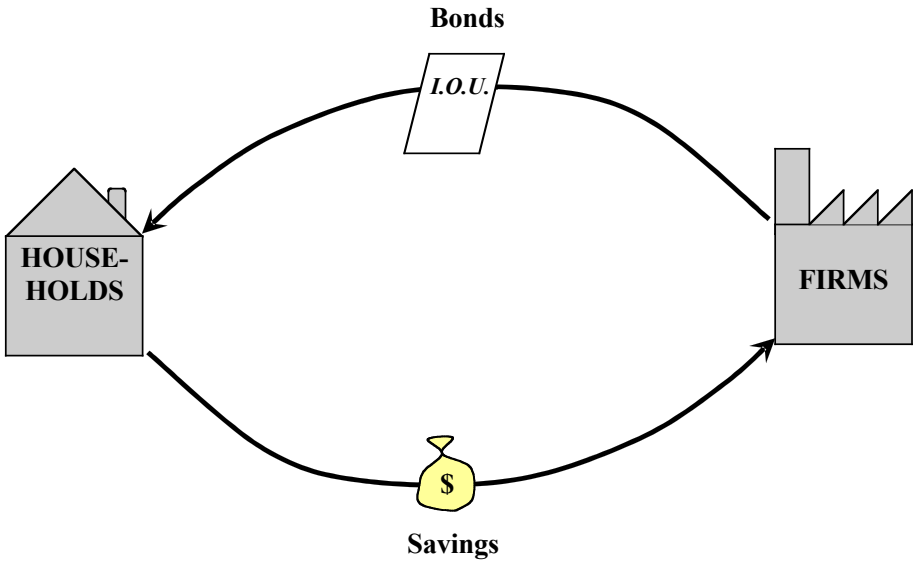
The purpose of an index is to give a rough idea of the current 'temperament' of the shareholding public. If stock indexes are rising, that means savers are finding stocks (as a whole) desirable and moving their savings into them; if indexes are falling, they are moving their savings out of them and into other things (e.g.cash).

Stock indexes are compiled usually only for the organized exchanges, where the latest share prices are clearly quoted in a centralized place. OTC markets don't have an "index", since the prices are privately set in individual deals, which are not necessarily publicly known or quoted immediately.

BOND FINANCE

(1) Bonds

A bond is a *debt claim* on a private company. Firms *borrow* money from people and give them a piece of paper ("the bond") promising to repay it. A person who buys bonds from Acme Inc. doesn't own a piece of the company, he is simply *owed* money by it. He *will* be paid back the principal on a particular day. The sum it repays is *fixed*. It does not matter whether the firm's profits are high or low.



(2) Calculating Interest

Bond have an ***interest rate*** (or *yield*) incorporated in them. How that interest is calculated depends on the type of bond you're talking about.

The most common is the **discount bond** which incorporates the interest in the final repayment. Technically, a discount bond is merely a piece of paper saying something like "Acme, Inc. promises to pay $1,000 to the holder of this bond on January 1, 2015".

January 1, 2015 is known as the "**maturity date**" of the bond. The $1000 the holder will receive on that day is known as the "**face value**" of the bond. What is the interest rate?

Interest depends on what you paid for it. Suppose it is January 1 2014 right now, and Acme Inc. offers you a one-year bond (i.e. a bond which matures one year from now, on Jan 1, 2015) with a face value of $1,000. If you paid $1,000 for it, then you'd be effectively making a $1000 loan to Acme and be receiving the exact same amount ($1,000) back in one-year's time. There's no gain to you.

However, if you paid $900 for that bond, then you're making a one year loan of $900 for which you'll receive $1,000 back in a year's time. You're making a $100 gain on a $900 loan. Or, in percentage terms, you'd be making a $100/$900 = 11.1% gain on this loan.

So the interest on a bond (or what Wall Streeters call the ***yield to maturity***) is incorporated in the difference between the buying price of the bond certificate and the face value (payment at maturity) The formula for calculating the implied interest on a discount bonds is simply:
:

interest rate = gain divided by purchase price

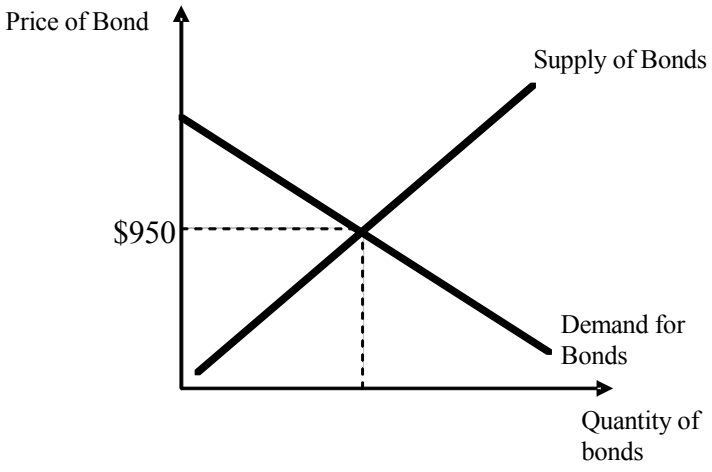
In our example, 11.1% = gain ($100) divided by selling price ($900), so our bondholder is making a one-year $900 loan to the company, for which he will receive 11.1% interest in return. But if the bondholder pays $950 for it, then the implied interest rate is 5.3% per year (= $50 gain divided by $950 price). So the *higher* the selling price of the bond, the *lower* the interest rate.

This is important: bond prices and bond interest rates are *inversely related*. A high bond price implies a low interest rate. A low bond price implies a high interest rate.

(3) <u>Bond Price</u>

Consider the usual (discount) bond. Granted the interest or yield of the bond depends on the price of a bond. But what determines the price of the bond? The **bond market** of course!

The market for a one-year bond will look something like this:



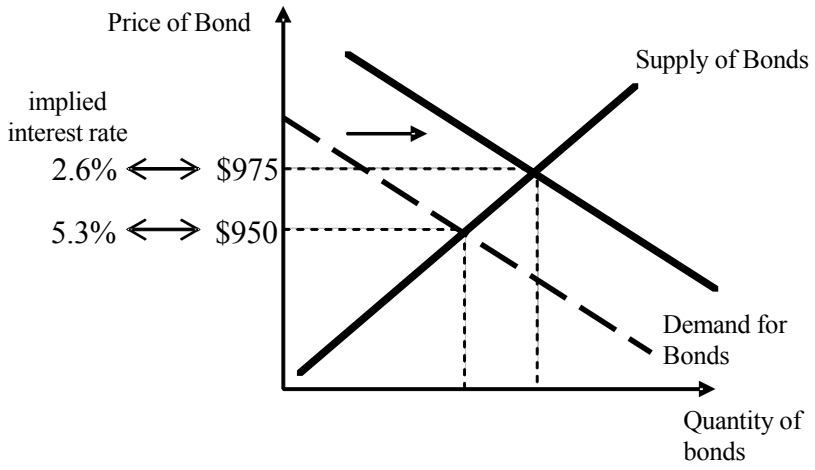
Who demands bonds? Households who have savings they want to lend.

Who supplies bonds? Firms who want to borrow. (And why do they want to borrow? To finance investment projects, e.g. a new factory, a new warehouse, etc.)

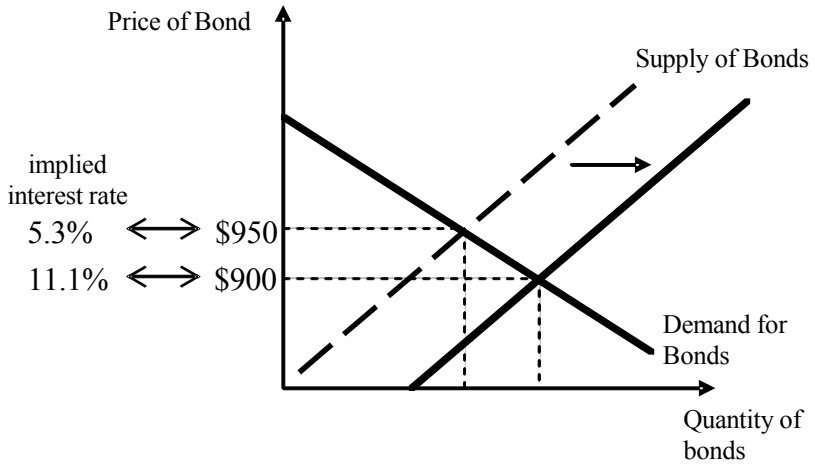
So the price of bonds depends on the amount of **savings** (by households) *and* the amount of **investment** (by firms).

For that reason we can trace the impact of things on the bond market:

e.g. If households, in a thrifty mood, increase their savings, then the demand for bonds increases, that means the price of bonds increases. And if the price of bonds increases, then, as we know, the implied interest rate on the bond has *fallen*.



Conversely, if firms, caught in optimistic "animal spirited" expectations, decide to undertake a lot of investment projects, the supply of bonds increases, and thus the price of bonds *goes down*, and the interest goes *up*.



[It is sometimes said the demand for bonds is the *supply of loanable funds*. And the supply of bonds is the *demand for loanable funds*.]

(4) <u>Compounding</u>

(*Technical. You can skip this section*.)

You might sometimes come across bonds under different names - commercial **paper**, **notes**, **bills**, **debentures**. These are all just bonds. Their different names reflects just the customary financial slang for slightly different properties, e.g. bills are short-term bonds (six months or less), debentures are medium-long term (5 years +), etc.

In short, bonds come in all shapes and sizes, with different "lengths to maturity" (four months, one year, five years, thirty years). To make bonds of different length comparable, it is common to express all bond interest rates in *annual* terms. (that is, interest *per year*), even if the bond matures only twenty years from now, or as quickly as three months.

[Why? Because it is easier to construct a borrowing & saving strategy around it. For instance, suppose you want to lend $100 for one year. You can buy a one-year bond and wait patiently ("**lock in**" strategy). Or you can buy a three-month bond, after three months get your money back, buy another three month bond, etc., doing this four times in the course of the year. ("**roll over**" strategy). In both cases, you are lending for a year. But if the interest on the three month bond is expressed on a different scale than the one year bond it is harder to compare which strategy is better for you. So you want all bonds express their interest yield on an "annualized" scale.]

Finding the annualized interest on bonds of different lengths involves math. Sorry. There's no away around that.

For bonds that mature two or more years from now, the formula for calculating the (yearly) interest rate is a little more complicated as you have to take account of **compounding.** (e.g. $100 at an annual interest rate of 5% means 5% on $100 in the first year *plus* 5% on $105 in the second year, implies the total gain is:

$5 the first year + $5.25 the second year = $10.25 gain on the original $100 loan.

However, remember that bonds do this in reverse, i.e. you calculate interest *from* the gain (face value minus cost price). So if you pay a $800 for a bond that promises to pay you back $1000 five years from now, what is the implied annual interest?.

There is a simple formula. Notice that in our first example, when the annual interest was 5%, by compounding, we gained $110.25 in the end from a $100 loan for two years. Now:

$110.25 = $100 + $5 + $5.25.

As we know, $5 = (0.05) × $100 and $5.25 = (0.05) × $105, so substituting in:

$110.25 = $100 + (0.05)$100 + (0.05)$105

Now, \$100 + (0.05)\$100 can be rewritten as (1 + 0.05)\$100. So:

$$\$110.25 = (1 + 0.05)\$100 + (0.05)\$105$$

OK. Notice we have this \$105 hanging there on the right. Now, remember that \$105 = \$100 + (0.05)\$100 or, as we just figured out, \$105 = (1 + 0.05)\$100. So :

$$\$110.25 = (1 + 0.05)\$100 + (0.05)[(1 + 0.05)\$100]$$

Almost there. Notice that (1 + 0.05)\$100 is a common term. So factoring that:

$$\$110.25 = (1 + 0.05)(1 + 0.05)\$100$$

or simply:

$$\$110.25 = (1 + 0.05)^2 \times \$100$$

This gives us an indication of the general formula:

$$\text{Future Value} = (1 + \text{interest rate})^{\text{years}} \times \text{Present Value}$$

So back to the original question: if you pay \$800 for bond which will give you \$1000 back in five years, what's the implied annual interest rate?

$$\$1000 = (1 + \text{interest rate})^5 \times \$800$$

All fine. You now have to deduce the interest rate. Algebra, ugly as it might be, is going to be your friend here.

Let's take our simple example first, where we saw that:

$$\$110.25 = (1 + 0.05)^2 \times \$100$$

To express for the interest rate, first divide by \$100:

$$\frac{\$110.25}{\$100} = (1 + 0.05)^2$$

Now we got this darn exponent 2 still there. How do we get rid of it? You might remember (from *waaay* back) that the way to get rid of a square is by square root. i.e. $3^2 = 9$, and $3 = \sqrt{9}$. So using this logic:

$$\sqrt{\left(\frac{\$110.25}{\$100}\right)} = (1 + 0.05)$$

So far so good. So just open the bracket and move 1 to the other side:

$$0.05 = \sqrt{\left(\frac{\$110.25}{\$100}\right)} - 1$$

And that's how to express the compounding formula for interest. Simple wasn't it? Well, our example was made very easy because it was only a two-year loan - that is, the exponent was merely 2. What if the exponent is higher, e.g. x^3 implies we must take the *cubic* root, x^4 we must take the fourth root and so on.

You might remember that a square root is the same as raising the exponent of ½. That is, is $\sqrt{9} = 9^{½}$. It is one and the same thing. At it always the case for higher roots - the 'cubic root' is raising an exponent of 1/3, and so on, the fourth root raises to 1/4. Generally speaking, for the *n*th root:

$$\sqrt[n]{X} = X^{\frac{1}{n}}$$

so our example equation could be simply written as:

$$0.05 = \left(\frac{\$110.25}{\$100}\right)^{\frac{1}{2}} - 1$$

which gives us the implied general function for calculating interest:

$$\text{interest} = \left(\frac{\text{Future Value}}{\text{Present Value}}\right)^{\frac{1}{\text{years}}} - 1$$

So back to our specific case. We pay \$800 for bond which will give you \$1000 back in five years, then the implied interest rate is:

$$\text{interest} = \left(\frac{\$1000}{\$800}\right)^{\frac{1}{5}} - 1$$

\$1000/\$800 = 1.25. Now, the 5th root of 1.25 is hard to calculate (you won't find it on conventional calculators, you'll have to use a scientific calculator (some free ones available online)). Since 1/5 = 0.2, that means you can just plug in $1.25^{0.2}$ in a calculator and find that it equals 1.045639, or approximately 1.046. Plugging in.

$$\text{interest} = 1.046 - 1 = 0.046$$

so the implied annual interest on this bond is 4.6%.

(If you want to double check: 4.6% of $800 = $36.8, so $800, after one year, becomes $836.8. Then calculate 4.6% of $836.8 = $38.49, so your money rises to $875.29 after two years of compounding. Third year, 4.6% of $875.29 = blah, blah. Keep going this way and you'll find out that, compounded, it adds up to $1000 after five years.)

(if you really want to make life easy for yourself, just look for a compound interest calculator online and plug in the numbers)..

But you get the main point: you can use a simple formula to calculate how much (annual) interest a bond yields by simply using the face value, the years to maturity and the present price of the bond. Notice that in the interest rate formula, price is in the denominator, meaning that price and interest are inversely related - the greater the price you pay now for the bond, the lower the implied interest. The same general principle holds.

You'll also notice that the interest rate also varies inversely with time. Paying $800 for a $1000 that matures in *five* years implies an interest rate of 4.6%. Paying $800 for a $1000 that matures in *one* year implies an interest rate of (gain/price) = $200/$800 = 25%. So bonds with the same face value ($1000) but different maturities *should* be priced differently to yield the same interest rate, i.e. if you *want* to make 4.6% on one-year bond, you $1000 year bond, then the price you *should* pay should follow the formula:

Present price = $1000/(1.046) = $956.23

You will notice this is deducible for any bond of any maturity by flipping around our earlier formula,

$$\text{Future Value} = (1 + \text{interest rate})^{\text{years}} \times \text{Present Value},$$

so that present value is to be determined:

$$\text{Present Value} = \frac{\text{Future value}}{(1 + \text{interest})^{\frac{1}{\text{years}}}}$$

So if you know the face value of the bond and the years to mature, you can figure out how much to pay for it, simply by inserting the interest rate you want to achieve and using that formula.

e.g. suppose you're looking at a 5 year bond with a $1000 face value. You want to achieve an interest yield of 10%. How much should you pay for it?

$$\text{Present Value} = \frac{\$1000}{(1 + 0.10)^{\frac{1}{5}}} = \frac{\$1000}{1.61} = \$621.12$$

and not a penny more.

[Important Note: Since we're here, we might as well point out that this formula is used by firms to calculate how much they should pay for any piece of capital equipment, or, conversely, if they know the price of the capital good, what the implied "*marginal efficiency of investment*" (or the internal rate of return on the new investment project) will be. The formula is a little more complicated since the piece of capital yields a steady stream of profits over time, not a lump sum just in the final year. But not much more complicated. The principle is the same. As an intuitive example, suppose an oven costs $800 and is expected to produce a stream of profits that will add up to $1000 after five years, when it finally conks out (don't worry how we get from streams to the end number). Then the implied rate of return on the oven is 4.6%. If the loan rate at the bank is 3% per year, then borrow and buy the oven. If the loan rate is 6%, forget about it. It is our good old theory of investment spending at work.]

(5) Other Bonds

The usual bond you'll find is a discount bond - that is bond that pays a lump sum on its maturity date. But that is not the only type of bond out there.

A **coupon bond** offers bondholders a different payment schedule where the company offers to make some yearly fixed payments (known as "coupon payments) *before* the maturity date. e.g. "Acme, Inc. promises to pay $1,000 to the holder of this certificate on January 1, 2020. It also promises to pay the holder $100 on January 1 of every year until 2020."

The coupon payments are taken into account when purchasing this type of bond. A rough-and-ready way to calculate the yield on this type of bond (in finance parlance, the "current yield") is to simply divide the coupon payment by the buying price of the bond. e.g. if this Acme coupon bond sells for $1,100, then the yield is 9.1% annually (not exactly correct, but approximate).

There is a weird class of English bonds (known as **consols**) which *never* mature at all but are composed entirely of yearly coupon payments for all eternity. (If that's an infinite gain, wouldn't you pay an infinite amount for a consol? No. How much do you currently value coupon payments to be made in the year 2250, long after you and possibly all your descendants are dead?).

(6) Default Risk

Regardless of *when* or *how* it is paid, bonds mature and the principal and interest will be paid in a pre-determined fashion. What you receive is *not* dependent on the profits of the company. The company must pay off its debt and meet its interest payments regardless.

Of course, there is always credit risk - that is, the risk that the firm is doing so badly that it will be unable to make the interest payments on its bonds on schedule. This is known as **default**. In that case, the firm is usually forced to **reschedule** (i.e. reorganize its loan

payments with its creditors), or declare bankruptcy and **liquidate** itself (it is dismantled, its assets (factories, equipment, etc.) are sold off and the bondholders (and other creditors) are paid off from the proceeds of the sale.

The good thing about bonds is that they are among the *first* to be repaid in case of liquidation. That is, shareholders (owners of stocks) don't get anything until the bonds (and whatever other outstanding loans the firm may have) are paid off.

(7) <u>Bond Ratings</u>

Many bondholders (& bond issuers) submit their bonds to a **rating agency** (notably the Big Three: Moody's, Standard & Poor's, Fitch) and they will take a careful look and give their opinion about the credit risk e.g. S&P rates bonds on the following grading scheme:

AAA ← lowest default risk
AA
A
BBB
-------- the boundary. Everything above is "**investment grade**", everything blow '**junk**'
BB
B
CCC
CC
C ← highest default risk

(the weird letters is because they want to reserve D for "Defaulted").

Popular jargon calls bonds with a BBB grade and higher as "**investment grade**", and bonds with BB grade and blow as "**junk grade**".

The grade a bond gets is rather important because many institutional funds (e.g. pension funds, insurance companies, long-term trust funds) automatically refuse to hold any bonds below a certain "grade". If a firm's bond ratings change, the demand for those bonds can change dramatically.

(It doesn't mean there's no market for "junk". But many big funds are conservative. That is, funds holding the savings of "widows & orphans", are supposed to be very careful with their money, and buy only assets that yield a low but reliable interest return. They are forbidden by internal rules to play with risky things. But on the other end of the market, there are high-octane "hedge funds" who just *love* playing with high risk instruments because they want to combine them & construct fancy high-yielding turbo-powered portfolios. Unfortunately, not many people have that kind of appetite or disposition, so risk-loving hedge funds are a much smaller market than risk-averse pension funds & insurance companies.)

Because of this, many have criticized the implied power of ratings agencies over the bond market. If a firm, enjoying a high grade of AAA on its bonds, is suddenly re-graded at BB, institutional funds will dump their bonds *en masse*, driving down their price (and raising the interest rate on that firm). A firm who is suddenly downgraded will find itself forced to pay high interest rates on any future borrowing via bonds. This can be a considerable bite to the firm's profits & plans.

Conversely, a ratings agency can give too generous a rating on a risky asset. The most famous case were the mortgage-backed securities of the 2000s, the senior tranches of which were rated as good as AAA. Widows & Orphans gobbled them up - and then got a terrible bout of food poisoning when they turned out to be high risk after all.

Ratings agencies are private and unregulated. Many have wondered why agencies with such "power" are allowed to be largely uncontrolled by the government. But ratings agencies claim they are just "expressing their opinion" about the risk of the bond, like a movie critic or a restaurant critic may express their opinion. And government are wary of regulating or controlling "opinions" (First Amendment and all that.).

STOCKS vs. BONDS

Many firms issue *both* stocks and bonds in order to raise funds to finance their operations and many individuals hold *both* stocks and bonds in a firm.

Which is better? Depends. Think of it this way: bondholders are the *first* to be paid, but the payment is fixed. Stockholders are the *last* to be paid, but the payment is flexible.

So, if a firm is doing really well (booming profits), stocks are probably the better thing to own since they will get all those profits as income, while bondholders will only get paid a fixed interest. On the other hand, if there are no profits, bondholders will get paid but stockholders receive nothing.

When a firm goes bankrupt and must be **liquidated** (i.e. its capital equipment is sold off), creditors (bondholders) are the *first* to be paid off from the proceeds; owners (stockholders) receive whatever is left over (which is often nothing at all).

So, in sum:

Bonds

- are a *debt* claim on a firm.(they will be "paid back")
- bondholders receive a fixed repayment on their loan (unrelated to profits).
- bondholders have no role in corporate governance.
- bondholders are the first to be paid off in case of bankruptcy

Stocks

- are an *ownership* claim on the firm (they won't be "paid back")
- entitles the stockholder to a proportional share of profits (paid out as *dividends*)
- entitles the stockholder to a proportional share in corporate governance (voting weight at AGM)
- shareholders are the last to be paid off in case of bankruptcy.

FINANCIAL MARKETS

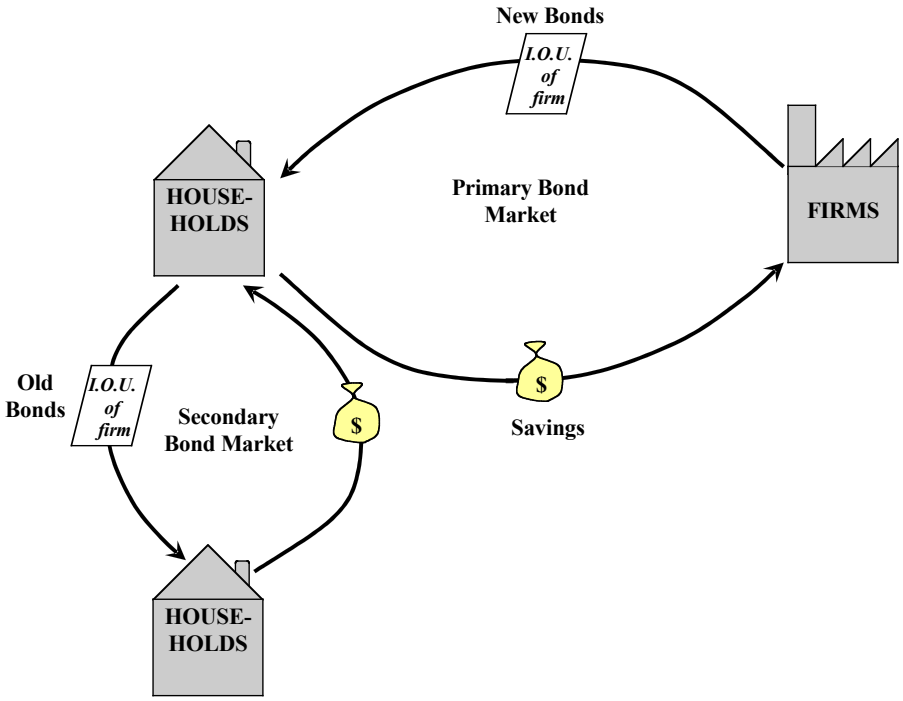
The great thing about buying a stock or a bond or any other financial asset of that type (what are sometimes collectively called "**securities**") is that you can turn around and ***trade*** them on financial markets. You are not stuck with it. If you don't like the bond or stock you bought, you can get your cash back by selling it to someone else..

(1) Primary vs. Secondary Markets

It is useful to distinguish between the ***primary market*** (where firms sell stocks and bonds to individuals) and the ***secondary market*** (where individuals swap stocks and bonds with each other).

If you buy stocks or bonds on the primary market, the money you pay is given directly to the firm, which then uses it to undertake investment projects (buying capital goods, etc.).

If you buy stocks or bonds on the secondary market, the money you pay does *not* go to the firm who originally issued it. It goes to another private saver (or institutional fund) who is holding the stock or bond and simply doesn't want to hold it anymore.



When you hear about people "playing" the stock and bond markets, they are usually operating in secondary markets. They are buying & selling stocks & bonds that have *already* been issued long ago by firms. *None* of the savings that pour into the secondary market find their way directly into the hands of firms.

(2) <u>Investment Banks and Underwriting</u>

So why not put it in the primary market? Well, most private citizens have *no access* to the primary market. Primary markets are usually "closed" affairs. It is not completely open to the general public.

Effectively the primary market works in the following way: when a firm wants to raise funds (i.e. issue stocks or bonds) it contacts an **investment bank** who will "**undewrite**" the initial public offering.

An **investment bank** is misnamed - it is not really a "bank" in the conventional sense of an institution that takes deposits and makes loans. It is a financial services institution, a "**brokerage**" firm that facilitates or undertakes the purchase and sale of bonds, stocks and other securities on financial markets, on behalf of private clients who want to operate directly in financial markets (to those who want to buy or sell bonds & shares).

Investment banks are the quintessential "**Wall Street**" firm. Some of the bigger and more famous investment banks you might have heard of include Goldman Sachs, Morgan Stanley, Merrill Lynch, Lehman Brothers and Bear Stearns (albeit the last three defunct since 2008). There are of course dozens of smaller ones, you're *not* likely to have heard of.

Since the deregulation of 1998, numerous regular commercial banks, e.g. Citibank, Bank of America, Deutsche Bank, UBS, etc. have acquired or run specialized "investment bank" divisions as part of their overall operations. (although their investment bank division is carefully 'separated' from the regular banking divisions.)

"**Underwriting**" means that the investment bank arranges the sale of the new stocks or bonds of firms who want to raise funds. The investment bank raises the funds by selling those new securities to its own 'preferred clients' at a privately negotiated price. Who are the "preferred clients"? Often rich individuals and institutional investors with a long history of association with the investment bank. The funds raised from that original sale is what goes to the firm.

That is the primary market. Once the initial sale is made, the issuing firm's involvement is over. The stocks and bonds are then *transferred* to the secondary market (New York Stock Exchange, NASDAQ, etc.), where the clients who bought the stocks & bonds from the initial sale re-sell those certificates to other people. This is where the wider public participates.

Companies issue bonds & stocks rarely & intermittently -- usually only if they need funds to undertake a large investment project (a new factory, etc.). The *first* time they do so is often

called an **IPO** ("**initial public offering**"). But there can be further offerings later on if the firm decides to buy more capital equipment.

Is there any relationship between the primary and secondary markets? Theoretically, yes. If the stocks and bonds of Acme, Inc. are being bought & sold at a very high price in the secondary market, then if Acme decides to undertake a new issue of stocks & bonds, it can demand that the investment bank handling the primary sale make sure it obtains a very good price from its preferred clients. If the secondary market price for Acme stocks is low, then the preferred clients won't be willing to pay that much for a new issue. So, the prices in a secondary market often influence the prices in the primary market.

e.g. Suppose a firm makes an initial issuing of 1,000 shares at $1 each, and thus raises $1,000 in financing from the primary market. Suppose that when these shares are then transferred to the secondary market, the process of re-selling & re-buying them by the general public raises the price of these shares to $5 each. So, the firm may be tempted to make *another* issue of 1,000 shares -- this time at, say, $4.50 each, raising an additional $4,500 in funds.

Or (analogously for bonds) suppose a firm issues a hundred bonds, each promising to pay $1,000 one year hence. In the primary market, preferred clients may pay only $800 for each, so giving the firm a total of $80,000 in funds -- and an obligation to pay back $100,000. That's an implied interest rate of 25%. Very costly. But suppose that, when thrown on the secondary market, those bonds rise in price to $950 each. There is a strong temptation to make a new bond issue, e.g. issue another hundred one-year $1,000 bonds, this time demanding at least $940 from their preferred clients -- thus raising funds at a much cheaper price (6.4% interest).

Notice: even if a firm doesn't *already* have shares issued, investment banks often calculate the IPO price by looking at the existing share prices of *comparable* firms. So, for instance, when deciding on what to charge their preferred clients for the first-ever issue of shares by the online retailer Pets.com, investment banks will look at the price of other internet-based retailers (like Amazon.com) on the secondary market. If Amazon stock is being swapped around for a high price, then the investment bank will demand a high price for Pets.com's initial stock issue.

(3) IPO Controversies

When transferring issues from the primary to secondary market, clients earn what is known as the " **bounce**" (or "pop" or "leap") reflecting the difference paid by the preferred clients in the primary market and price those assets are then sold for in the secondary market.

The most famous case of a "bounce" was that of Netscape Communications's IPO in August 1995. In the primary market, the shares of Netscape were sold to private clients for $28 each. When the shares were transferred to the secondary market, they rocketed up in price to $73 each by noon of the first day! (they closed at $54 at the end of the first day). A few months later, (December), Netscape shares were trading at $171 each.

Naturally, Netscape complained bitterly of having been undersold by their investment bank. After all, in their IPO, they sold 38,000 shares at $28 each, receiving $1.1 billion in funds from preferred clients. If the bank had sold them for the more realistic price of $54 each, the firm would have received $2.2 billion in funds. So Netscape missed out on a whole extra billion dollars in funds -- *double* the amount they raised -- if the initial price been "properly" calculated. The private clients, of course, made a killing and laughed all the way to the bank.

It is natural that some analysts point to the extraordinary Netscape bounce as evidence of investment banks "cheating" firms. The bank doesn't make a gain from the bounce -- it has a fixed fee, usually a hefty 4-5% of the value of the issue. It is the preferred clients which gain from the bounce. But, still, you'll find investment banks accused by firms of deliberately negotiating too low a primary price with their preferred clients, possibly in return for "kickbacks" (e.g. the happy clients hiring the bank later for "consulting services", or whatever).

Many new firms, hoping for a better IPO price, decided to side-step the middle-man and sold their issues directly to the public (usually via the internet). They were often not very lucky: although their first few hundred stocks sold at a high price, the remainder of the issue had to be sold at a discount.

So the advantage of going through an investment bank -- even if their fee is hefty and the firm "loses out" on the bounce, is that they *guarantee* to sell the *whole* stock or bond offering at a set price. At least with a bank underwriting the issue, you *know* how much funds you will be raising.

Moreover, although there's always a bounce, the size of the Netscape bounce was a bit exceptional. It was the first internet company to go public and nobody really anticipated how much craziness there was among the general public for internet stocks. Of course, *after* Netscape, numerous other internet companies leaped in to do the same thing -- and fabulous amounts of funds were raised. Heck, internet companies which didn't even have a clear plan or prospect for profits were "created" purely for the purpose of benefiting from IPO. Novel internet firms like AOL used their inflated stock prices to "buy out" old, profitable companies like Time-Warner. At one point in the 90s, Amazon's stock market value was greater than all of the automobile industry put together. But we all know how this "dot com craze" came to a sorry end in March 2001, when confidence in the internet stocks was lost and they came crashing down.

BUBBLES

Come with me, and we will blow
Lots of bubbles, as we go;
Bubbles bright as ever Hope
Drew from fancy -- or from soap;
Bright as e'er the South Sea sent
from its frothy element!

- Thomas Moore, 1826

As the world gets richer, people get more income and savings increase. But where do you put those savings? In bank deposits? Bonds? Stocks? Real estate? Under the mattress? The hunt for *assets* - good safe places to store your savings - is a natural side-effect of prosperous modernity. It is also the cause of lots of problems.

Savers are attracted to assets which promise to yield a high *return* on those savings - whether in the form of interest, dividends, or 'capital gains' (appreciation in value). So there is a natural tendency for savers to move their savings into high-earning assets. However, high-earning assets are few and far between, whereas savers are many. As a result, there is a tendency of savers to flock to one place - like a "**herd**" converging on the same watering hole.

Herding behavior has the danger of creating an asset price "**bubble**". If a lot of people want to buy an asset, they bid up the price of that asset. But an asset who's price is rising *becomes* attractive to *more* savers - reinforcing the herd.

Why is an asset with a rising price attractive? If you *already* hold the asset, the answer is obvious: you are making '**capital gains**' (you paid $100 for it yesterday, you can sell it today for $120 - capital gains of $20.). But if you *don't* already own the asset, why are you going out to *buy* it now? Just because it rose from $100 to $120 today *doesn't* mean it will rise from $120 to $140 tomorrow.

Today's luck doesn't mean tomorrow will also be lucky.

Random Walks vs. Persistent Patterns

Many empirical studies have shown that asset prices usually follow what financial analysts call a '**random walk**' over time, i.e. asset price movements have no 'memory'. If the price of an asset goes up today, that doesn't imply anything about how they'll move tomorrow - they might go up, or they might go down. Past movements don't determine future movements.

[Note: Of course, there are some analysts on Wall Street who claim that price movements *do* have 'memory', that they *do* follow a pattern over time - and that they (the analysts) have

secretly deciphered the pattern and promise to make money by predicting the future movements. They like to call themselves '**technical** analysts'. Serious financial analysts call them 'frauds'. The actual record of 'technical' types successfully predicting future price movements makes Coney Island clairvoyants look good.]

Of course if there is *new **information*** about the asset then you have *good reason* to believe the price is going to go up or down. If, say, you hear that a company's CEO is on the take or they have produced a defective product, you can expect the price of that company's shares to go down; if you hear it has built a better mousetrap or that the cost of its inputs have gone down, you can expect the share price to go up. That's not "seeing patterns". That's using current, real information to make an educated guess of a firm's future profitability and thus the attractiveness of its stock. Most serious Wall Street analysts are of this type. They are sometimes called "**fundamental** analysts" (since they base their judgments on 'fundamentals', i.e. facts & information about the underlying company.)

In short, random walk hypothesis suggests prices are based on fundamentals, not patterns. If price goes up from $100 to $120 today, it might go up again from $120 to $130 tomorrow *or* it might go down from $120 to $110. Unless you have some new, real information about the asset, there's no reason to believe in one case or the other. Either could happen.

The random walk record tells us that it is pointless to be attracted to assets which are rising in price today - because today's rise has no implications for how it will move tomorrow.

But many people simply don't believe in random walks. They believe that "what goes up is bound to ... continue going up." They believe in **persistent patterns**.

That belief is not justified. Just because the price has been going up lately, doesn't mean it will continue to go up. The price might go up, or it might go down. That's what the random walk evidence has shown.

But humans are strange creatures with strange psychology. They like to see persistent patterns, gives a comforting sense of order in the universe. Maybe its part animal instinct? Maybe humans just feel safe in herds? "if price of X is going up, that means lots of people are going there; they must know something I don't, so I must go there too (just in case)." Or maybe its just sheer stubborn human stupidity (never underestimate the role of stupidity in creating big events like bubbles) or willful ignorance or wide-eyed optimism, or the whole gamut of human things that Keynes just summarized as "animal spirits"

Whatever the case, this human fascination with persistent patterns means that people are attracted to assets who's prices have been rising *lately* in the hope that their prices will *continue* rising in the future.

Self-Fulfilling Prophecies

Baseless beliefs wouldn't be problematic if idiots went broke betting on it. But the problem is that baseless beliefs often *confirm* themselves. They become a **self-fulfilling prophecy**.

e.g. You see an asset that costs $100. You *believe* it will rise in price tomorrow to $120 - not for any good reason, just a baseless belief. So you rush to buy it now, offering a higher bid - maybe $101 - to make sure you get it. But your very action has raised the price of that asset. Other people will notice that rising price - and herd-like rush in to buy it too, offering $102, then $103, then $104 and so on for it. By the next day, the price might very well have risen to $120. Your 'prophecy' that the price will rise to $120 has been fulfilled! You can pat yourself on the back for the accuracy of your judgment!

But note that the price of the asset arose *because* of your action. Not because of anything inherent in the asset. But simply because you believed it. And took actions that ended up raising the price. Herding did the rest.

Fundamental Value

How much is that asset *really* worth, inherently? Fundamental analysts say it *should* be worth the '**capitalized value of its returns**'. That is, the inherent worth of an asset is the stream of returns the owner will collect over the lifetime of the asset, appropriately adjusted for time difference, risk, etc.

Sounds complicated and if you look up the formula, it looks complicated.

Intuitively, it just means that you shouldn't pay more for something than you get from it. e.g. suppose you buy an apartment building that is estimated to last for, oh, another thirty years. How much should you pay for it? Well, what are you getting out of it? Rents collected from the tenants. So you don't want to pay more for the building than the estimated rents you will be collecting over the next thirty years (with some adjustments, e.g. subtract maintenance costs, discount dollar values from future to present to account for inflation, interest, etc.). If you do the proper calculations and figure out the building is inherently worth $10 million, then you should *not* pay more than $10 million for it. $10 million is the 'correct' price, its inherent value.

The 'Greater Fool' Syndrome

But buyers of assets don't always pay close attention to inherent value. Suppose you did the rent calculations and *know* the building is worth $10 million inherently. But you know there is someone out there - call him Mr. Alphonse - who is looking for a building and willing to pay $15 million for it, no questions asked. Of course, that's a ridiculously high price - Mr. Alphonse is a fool, you say. But fools make for good profit opportunities. So even if you know the building is only worth $10 million, you may be willing to pay more for it - say, $11 or $12 million - in the belief that you can sell it to Mr. Alphonse for an even higher price of $15 million.

Yes, you realize it is foolish to pay $11 million for something that is inherently worth only $10 million. But it doesn't really matter since you believe there is a *greater* fool out there willing to pay $15 million for it, so you're going to come out ahead by $4 million. Of

course, Mr. Alphonse willing to pay $15 million for it because *he* believes there is an *even greater* fool out there - call her Ms. Beatrice - willing to pay $20 million for it. She is willing to pay $20 million because *she* believes there is a greater fool out there - call him Mr. Charlie - willing to pay $25 million. And so on down the chain.

This is known as the '**greater fool syndrome**' in asset markets. It is not that people don't realize that they are overpaying for something. It is just that people believe there is a greater fool out there who will pay *even more*.

Of course, what we frequently overlook is that we *are* each others 'greater fools'.
The 'greater fool' syndrome tends to arise when prices are rising. That is because if the price of an asset is rising - and everyone believes it will *continue* to go on rising - that means there is good reason to believe there *will* be a greater fool tomorrow. Of course, the self-fulfilling prophecy element just confirms that belief.

All these factors - herd behavior, self-fulfilling prophecies, greater fool syndromes - combine to create dangerous '**bubbles**'. By that, I mean that the price of the asset has risen so very far above its inherent value that there is a danger that there *isn't* a greater fool out there.

The Crash

The building was worth $10 million. I paid $11m for it, Alphonse paid me $15m for it, Beatrice paid $20m, Charlie paid $25m, and so on down the line until Ms. Zoe, who paid $100 million for it, ten times its inherent value. She bought it in the hope that there is a greater fool out there that will buy that building from her for $110 million. But what if there isn't? What if no one steps up to offer Ms. Zoe $110? Then Ms. Zoe is saddled with an extremely overpriced asset - she paid $100m for it - that's only inherently worth $10m. The first thing she'll try to do is cut short her losses and try to sell it - for $95m or $90m or even $85m or $75m, to anyone willing to take it off her hands.

The bubble is '**pricked**'. Now the price of the asset begins to fall. And because it is falling, few people want to buy it - since they expect the price to keep falling until it reaches its inherent value. If I buy the building of Ms. Zoe for, say, $80m, and price falls to $75m tomorrow, I am going to make a $5m loss. So, no, I won't buy it until it comes back to 'normality', that is, the inherent value of $10m.

Pricked bubbles tend to cause asset prices to come crashing down and crashing down *fast*.

So what? Well, Ms. Zoe deposited $100m of her life's savings into that building. And when she finally manages to sell it to someone - say, $10m - she's basically lost $90m. That's right. $90m that she worked hard to save, that now just 'evaporate' into thin air. Poof. They're gone. She has to start saving up all over again.

That is why bubbles are so dangerous. You don't want bubbles to emerge, because when they pop, a lot of people's savings are destroyed - their nest egg, their retirement, their kids' college just disappear.

The Madness of Crowds

Alas, asset price bubbles are perennial feature of human society - at least in societies rich enough to have substantial savings. History is replete with bubbles - bubbles growing, bubbles popping, and thousands of people first losing their heads, ending up losing their shirts.

Bubbles are as old as history and they tend to follow the same pattern of frenzied buying followed by frenzied selling. Some of the more outrageous bubbles include:

- the "**Tulipmania**" of 1634-37 C. in Holland, where speculative trading on the value of rare tulip bulbs got so crazy that the price of a single flower could be more valuable than an entire East Indies ship!
- the **South-Sea Bubble** of 1720 in Great Britain, where speculation on the shares of a virtually non-existent South Sea Company (which not only never made a profit, but never even *did* anything) got to the point where the company was richer than the crown itself, and had enough funds to buy the entire British government's debt of £31 million.
- the **Mississippi Bubble** of 1720 in France (simultaneous with South Sea), this time a speculative frenzy for shares in a French company which at least had plans to set up plantations in French Louisiana, but also never did anything.
- the **Stock Market Bubble** of the 1920s saw a general stock market bubble that ended horrifically in the **Wall Street Crash** of October 1929, and led to a ten-year Great Depression.
- the **Dot-Com Bubble** of the 1990s, another stock market bubble, this time for shares in internet firms, almost all with no profits, few with any revenue or plan, the principal merit of many of them is simply that they had a website.

(Of course, to benefit from the bubble in stocks, charlatans come out of the woodwork to set up "fake" companies and benefit from the frenzy)

Stocks are not the only asset whose price can rise to astronomical heights in bubbles. **Real estate** can too. And has done so repeatedly, e.g. in Florida beachfront land in the 1923-26, in Japanese commercial real estate in the late 1980s and most recently in the US residential **real estate bubble** in 2003-2007 . These had all the same properties of a stock market bubble, except that it wasn't in the price of company stocks but rather in the price of residential real estate. The real estate bubble was sort of a carry-over from the dot-com bubble days - one can say that after so many savers got "burned" by the virtual companies they were buying in the 90s, they decided to pour their savings into the exact opposite, in " brick & mortar", i.e. real estate. Alas, real estate prices are not immune from bubble & crash. And they bring out the same kind of charlatans.)

Consequences of Crashes (A little outdated, see Crisis of 2008 notes)

The consequences of a stock market crash can often be devastating on an economy. Bubbles -- times of cheap-and-easy credit -- when pricked, are often brusquely followed by sharp contractions in financing and sharp rises in interest rates - **credit crunches**. In other words, the costs of funds shoots up sharply and firms which has borrowed a lot of money and need those loans recycled to keep going are often unable to afford to pay the higher interest rates and forced to declare bankruptcy. Bankruptcy means laying off workers, laid off workers means less demand, and less demand means less sales for firms, prompting another wave of bankruptcies and closures.

In the course of the 19th Century, the US went through several bubbles & crashes. Between the 1850s and 1880s, the most "bubbly" of stocks were those of railway companies which tended to rise to extremely overpriced heights -- and when they collapsed, there were some long depressions with terrible human consequences.

Banks are particularly important nodes in the transmission of crashes from financial market to the wider, real economy. In the "bad old days", banks often held stocks (esp. railroad stocks). So, when stocks crashed, the bank would crash too. And, if they didn't crash immediately after the stock market, nervous people would "run" on it and pull out their savings before it did, thereby *making* it collapse. And once the bank collapsed, so too would all the small farmers and businesses it had lent to, and so on.

After the devastating Wall Street Crash of October 1929, which was followed by a wave of bank failures and the complete collapse of the US economy, the federal government decided to do something to prevent this from happening again. Even if it is unable to tame people's wild spirits and manias, it can at least stop a stock market crash from destroying the rest of the economy. They focused, in particular, on keeping banks afloat. In 1933, the **Glass-Steagall Act** was passed prohibiting banks from holding corporate stocks. This way, if there is a stock market crash, at least the banks would still be left standing and solvent, ready to help the economy finance its way to recovery. The creation of the **FDIC** kept people relaxed about the safety of their bank deposits and thus prevented any follow-up bank runs.

The Glass-Steagall Act created the already-mentioned division between two types of banks in the United States.

-- **Commercial Banks**. These are the typical, traditional bank, the "Main Street" bank. They accept checking and savings deposits from the general public and use them to make loans to homeowners and small businesses. Those deposits are usually insured by the federal government (FDIC). They are allowed to hold safe bonds, but since the Glass-Steagall Act, they are *forbidden* from holding corporate stocks or bonds. Commercial banks include entities like Citibank, Chase, Bank of America, Wells Fargo, etc.

-- **Investment Banks**. These are primarily securities dealers, "Wall Street" banks. They *don't* take "deposits" from the general public in the same way; accounts at investment banks are *not* insured by the federal government. Consequently, they have no restrictions on what assets they can hold, so they usually play with stocks and bonds. Investment banks include entities like Goldman Sachs, Morgan Stanley, Merrill Lynch, Bear Stearns, Lehman Brothers, etc.

The strict partition between Commercial Banks and Investment Banks set up by the federal government in 1933 was dissolved in 1999 when the Glass-Steagall Act was **repealed** by the Financial Services Modernization Act of 1999 (i.e. the **Gramm–Leach–Bliley Act**). Investment banks became allowed to own commercial banking divisions and vice-versa (e.g. investment bank J.P. Morgan & commercial bank Chase became one company; commercial bank Citibank, investment bank Smith Barney and insurance company Traveller's became "Citigroup"). But there are still strict mandated "firewalls" between the divisions. e.g. they can't channel funds received from deposits made at Chase to finance J.P. Morgan's activities.

The Crisis of 2008 shook the industry up. Of the five "big" investment banks, three went belly up (Lehman, Bear Stearns and Merrill Lynch) and the remaining two (Goldman Sachs and Morgan Stanley) officially "recast" themselves as commercial banks. But there are plenty of smaller outfits out there, if not quite household names yet. And bank holding companies still have their investment banking divisions.

Commercial bank loans, as noted, are used by a lot by small businesses and homebuyers. Sometimes those loans are repackaged and "**securitized**" (sold off as a unit) into a secondary market. This, as we know, led to a big crisis in 2008, which we will discuss elsewhere.

Big firms don't often borrow from commercial banks (except for really short two-day or one-week "bridging loans" when they face a little bit of a cash-flow problem, - but even for that, they usually operate in the "commercial paper" or money market). They can borrow a lot more funds in one go (and at a cheaper interest rate) with a bond issue through an investment bank.

TREASURY BONDS

(1) Treasury Bonds

Bonds are the way firms can borrow on a large scale, directly from savers. But there is another important player on the bond market: the *government*. The government itself might like to borrow savings from households by issuing bonds.

(More precisely, they are usually known as **Treasury Bills** (if they mature in less than five years) and **Treasury Bonds** (if they have longer maturities)).

(2) Government Budget Deficits

Why would a government need to borrow? In order to finance a government *budget deficit*.

> **Budget deficit** is the excess of government spending over tax revenues.

e.g. suppose the government is spending $5000 on all sorts of things (salaries of public officials, food stamps, highways, military, etc.) And suppose it collects only $4,500 revenues from taxes. The government is spending $500 more than it earns. That is the **deficit**.

In order to pay for the budget deficit, the government can do two things: (1) **print** $500 in cash or (2) **borrow** $500 from household's savings. If it chooses to do the latter, then it issues T-bonds and participates in the bond market.

Governments go about it pretty much the same way as private firms do, i.e. contact an investment bank to arrange a primary sale to raise the funds, then the T-bonds are transferred to a secondary market, where the wider public participates.

Of course, the government does *not* issue stocks (you can't "own" the government!)

(3) 'Crowding Out'

It is sometimes said that the government "crowds out" private investment spending. To see why, it is simply a matter of looking at the diagram above. With the government at play, what changes in the story is that the supply of bonds is now by both private firms *plus* the government. Demand for bonds is still by the household.

If the government is running a deficit (or the deficit increases), that means the government has to issue more bonds. But by issuing more bonds, it increases the supply of bonds on the bond market, which will *lower* the price of bonds and *raise* the interest rates.

Suppose a private firm is contemplating a set of projects

- Project A - expanding the factory, expected return on the project = 15%
- Project B - outfitting a new truck fleet, expected return on the project = 8%
- Project C - updating its computers, expected return on the project = 5%

If the price of one-year $1,000 bonds is $950, then the interest rate is 5.3%. That means Projects A & B are profitable, but Project C is unprofitable. So firm will undertake A & B and not undertake C.

But if the government expands the deficit, increases the supply of bonds, drives down the price to $900 and thus the interest rate up to 11.1%, that means that for our private firm, only Project A is profitable, whereas B & C are unprofitable. Thus investment spending by our firm is *less* than it would have been.

This is what is meant by government deficits '**crowd out**' private investment. By running a deficit (i.e. issuing bonds) the government drives up interest rates on the bond markets and discourages investment spending by private firms.

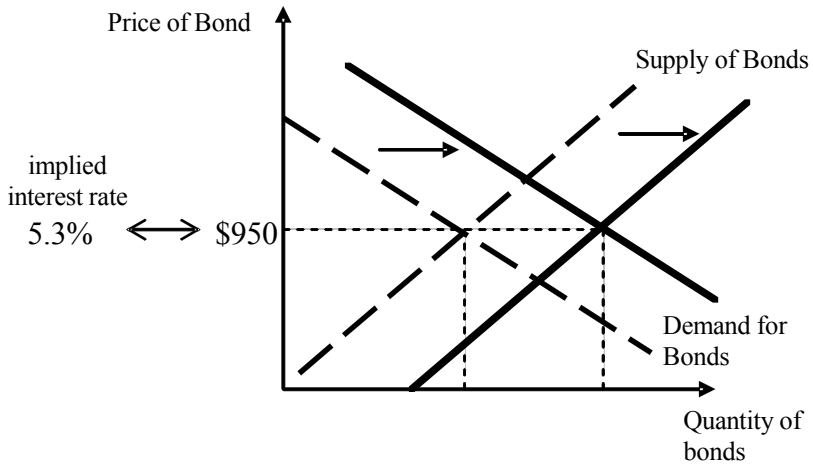
(3) Or Crowding in?

Is "crowding out" true? If it was true, then we should expect to see interest rates rise whenever the government runs a large deficit. But empirically speaking, that is not always the case. Indeed, there are many periods in history (e.g. 1980s, nows) where the government runs up huge deficits, but bond interest rates *don't* rise as a result. Sometimes they even fall.

Why?

The answer lies in what the government does with the money. Suppose the budget is balanced, and all of a sudden the government increases spending or reduces taxes that leaves it with a $500 deficit. Well, that increased spending or tax cut becomes *somebody's income* - the public official, the family on welfare, the soldier, the defense contractor, etc. And *these* people will save from that greater disposable income. (remember the multiplier?) What will they do with their extra savings? Buy bonds!

So it is is possible that a government deficit may not only increase supply of bond (which it does by definition), but it may, by this indirect channel, increase the demand of bonds *as well*. That means that the full effect of a deficit-financed expansion of government spending or tax cut might look like the following:



When *both* supply and demand for bonds increase, the net result on the interest rate is uncertain. In our diagram, it happens to be completely unchanged - it remains at 5.3%. Of course, this depends on the strength of the effect - the size of the shifts. The final interest rate could indeed end up the same, or end up a little higher ('crowding out') or even end up a little lower! (what is called 'crowding in').

Public panic about government deficits *assumes* that it will *necessarily* lead to higher interest rates and thus lower private investment spending. But empirically it is not so. And theoretically, it may not be so. It depends on the size of the shifts. Interest rates can go up, down or remain unchanged as a result of a budget deficit. Where exactly it lands is uncertain.

(4) <u>Treasuries & the Market</u>

The interest rates on T-bonds & T-bills are regarded as "benchmark" rates according to which other bonds are compared. This is because government bonds are (usually) the safest bonds around. (Governments don't go bankrupt -- they can always raise taxes to pay for it. And, if that fails, just print the money and pay it off!)

The interest rate on Treasury bonds are almost always lower than the interest rate on comparable corporate bonds. Why should a bondholder accept a lower interest rate from a private corporation -- which may go bankrupt and default -- when they can buy a government bond (which has a near-zero default risk) and receive a higher rate of return?

T-bills and T-bonds have now become a very important asset in the financial system. Since they are so "safe", they are usually mixed together with risky corporate stocks & bonds in order to reduce the overall risk of a people's asset portfolios. Banks, pension funds and insurance companies would be a lot more scared about holding corporate bonds & stocks if they could not "mix" their portfolios with safe assets like Treasury bonds.

In 1990s, when the Federal government was running surpluses and announced its intention to "pay back" a lot of the government's debt, the financial sector went into a little panic, believing that these very nice, safe assets were going to disappear.

SOVEREIGN DEBT CRISES

In the industrialized world, governments (usually) borrow savings in their own currency - US government borrows dollars, British government borrows pounds, Japanese government borrows yen, etc. Repaying debt is thus very simple: the US government can raise dollars simply by taxing the population or (if it chooses) just printing the dollars.

However, in some cases, particularly in developing countries, governments borrow savings in *foreign currency* - e.g. Peruvian government might borrow in US dollars rather than in Peruvian sols. The drawback is that it *cannot* repay that debt simply by taxing the population or printing. That yields Peruvian sols, not US dollars. And the debt has to be repaid in dollars. This can (and often does) set up the problem of a "**sovereign debt crisis**".

Why borrow in foreign currency in the first place? That is because in developing countries, governments usually can't finance deficits with a domestic bond issue. That is because these countries don't have much "financial depth" (i.e. people of that country are not rich enough to have enough savings to really form a viable bond market for government debt). In short, bond markets don't really exist in developing countries.

As a result, governments of developing countries are forced to finance budget deficits either by (1) taking loans from domestic banks, (2) borrowing from savers abroad

(1) Developing Country Banks

Banks loans are not a very happy option. When governments borrow, they tend to borrow on a grand scale. But lack of domestic savings in developing countries frequently means that domestic banks don't have that much in deposits. Whatever the government (and/or associated parastatal companies) wishes to borrow usually sweeps up all the deposits the banks have.

After lending to government & government-owned companies, domestic banks have little left over to lend to domestic private borrowers (or only at really high interest). And remember: there are no bond markets, so domestic private firms don't have many alternative options. Crowding out is a real problem in the banking systems of poor countries. It can put a real crimp on investment spending of private firms - and consequently a real crimp on economic growth.

Banks themselves don't mind too much - they get to charge the government pretty high interest rates. Moreover, in developing countries, the government is likelier to pay their debts back than private borrowers (bank officers don't have to go "track down" the borrower through the backstreets; the banks know where the president lives). Developing country banks can be extremely profitable - but also extremely narrow in their lending.

(2) Foreign Debt

Lack of domestic savings means the governments of developing countries frequently look to **borrow from abroad**. Domestic savings may be scarce, but in rich countries, savings are plentiful and relative cheap. So why not borrow from foreign savers?

The problem is the borrowing government has to pay off its loans & bonds in a *foreign currency*. If the government of Peru sells bonds to American pension funds, the pension funds expect to be paid in US dollars, not Peruvian sols. And the Peruvian government cannot simply print or tax the Peruvian population to raise the dollars. Rather, the only way the Peruvian government can get its hands on US dollars to pay off its debts is to (1) exporting more or (2) attract foreign investment into the country (i.e. get foreign savers to buy Peruvian assets).

This is easier said than done. Foreign savings is finicky and might run off, or export earnings drop for some reason. That leaves the government in a messy **sovereign debt crisis**.

Case #1 - Latin America 1980s

Sovereign debt crises happen intermittently. The classic case is Latin America during the 1980s.

The seeds lie in the 1970s with the **petrodollars**. With the formation of OPEC and the oil price spike, oil-exporting countries were suddenly avalanched in dollars from the sale of oil to industrialized countries. Not knowing quite what to do with them, OPEC countries just deposited those dollars in US banks. The US economy was then in something of a slump, with few investment opportunities, so US banks, flush with petrodollars, looked around to find more profitable borrowers elsewhere. They noticed that Latin American governments - Brazil, Argentina, Mexico, Peru, etc. - were then trying to finance a development kick. So US banks offered them heap-loads of financing at really cheap interest.

Latin American governments borrowed big in the 1970s. Latin American governments accumulated a huge amount of debt in US dollars. But so long as US banks were willing to continue lending - and they were through the 1970s - this wasn't a problem. The governments would just pay off old dollar loans with new dollar loans.

But then in 1980-81, the US Federal Reserve, in an effort to curb domestic inflation, hiked interest rates really high in the US. All of a sudden, US assets became attractive again. The banks redirected the money away from Latin America and back into the US. All of a sudden, US banks stopped lending to Latin American governments, or demanding huge interest rates for doing so. Latin American governments faced a sudden credit crunch.

Latin American governments were in a desperate situation - as there was now no foreign funds coming in, that meant no *new* dollars to pay back the old dollar-denominated loans.

To try to attract foreign savers again, developing countries jacked up their own interest rates -- but that led, predictably, to a sharp domestic economic contraction (with interest rates so high, investment spending by domestic firms ground to a near halt). This didn't help things. Despite the high interest rates, foreign lenders are hardly attracted to lend to a country that is falling into a recession. It is not even attractive to domestic savings, and Latin American savers themselves started sending their money abroad.

The other way to raise dollars was to export like mad, and hope that might generate enough dollars to at least keep paying the interest on the foreign debt off. And they went through painful herculean efforts to do so. But hardly could keep up with the burden of the foreign debt.

Running out of options, they began to print. Of course, they couldn't pay off their debts with printed money, but they could use the printed money to buy the foreign exchange needed to pay off their debts. e.g. Peru might not be able to print dollars, but they can print their domestic currency (sols) and swap it for dollars on the foreign currency markets. Of course, this very action - the government supplying more Peruvian sols and demanding more dollars, will cause exchange rates to adjust downward, e.g. exchange rate of 3 sols per $1 now goes down to 4 sols per $1.

But of course the government still needs dollars to make next week's interest payments. So it prints again and goes to the currency markets again to get dollars, this time driving the exchange rate down to 5 sols per $1. Then next week again, offering 6 sols per $1. So by printing sols & dumping them on currency markets, Peruvian government might be able to rake in the dollars it needs to pay off its dollar-denominated foreign debt.

One would imagine the foreign currency markets would soon catch on and discount the exchange rate more rapidly. And of course they did adjust. But that just means the government has to print *faster* than the currency market adjusts.

This set up the situation for rapid price **inflation**. It is not merely that the government prints a lot, it is that it prints at an *accelerating* rate.

In the hunt for dollars to finance the foreign debt, a game is set up: the Peruvian government has to print sols *faster* than foreign exchange markets discounts the exchange rate. And the more it prints, the faster the markets discount. Which means government has to print *even faster* than that.

Inflation and deepening recession were two big consequences of the Latin American sovereign debt crisis of the 1980s. Things eventually righted themselves, but for many Latin Americans, it was simply a "lost decade".

Case #2 - Hyperinflation -

Hyperinflation is a phenomenon when the inflation rate is rather nutty - 100%, 200%, 1,000% per month or more. The most extreme examples are as was seen in Germany in the 1920s, Yugoslavia (or the Serbian rump of it) in the 1990s or Zimbabwe in the 2000s .

Hyperinflation is a phenomenon that arises in a sovereign debt crisis of the kind outlined above. It is just a more extreme version of this game. While Brazil, Argentina, Peru, etc. had really terrible inflation because of this "race" in the exchange rate markets, they still had *some* dollars coming from abroad by the normal channels of exports and foreign investment. Certainly when the latter two relaxed, the inflation subsided.

This is where Germany, Serbia and Zimbabwe were different. They had *no* exports and *no* foreign investment. In Germany's case, they were saddled with a gigantic war reparations bill, a global freeze out financial lending to Germany and French occupation of the main export areas (Ruhr valley). There was simply no "normal" way the German government could get its hand on foreign currency to pay off the foreign war reparations. It *had* to print and "race" the foreign exchange markets to get the dollars.

Similarly for Serbia (under wartime international economic and financial sanctions) and Zimbabwe (exports were destroyed by ruinous domestic policies, and it was under international financial sanctions).

So hyperinflation might *seem* like sheer madness, but it is deliberate. Governments know exactly what they're doing and why - they're printing like nuts in order to vacuum foreign exchange from the currency markets. You don't "slip" into hyperinflation accidentally. You move into it deliberately. And you only do it because you have no other way of getting foreign currency - that is, your normal channels of exports or foreign borrowing are somehow "cut off".

So it takes a terrible configuration of things to force a government to undertake a hyperinflationary "race". Keep that in mind the next time you hear somebody warning about hyperinflation. Check off your list -

(1) does the government have a large volume of existing foreign debt of some sort that needs to be paid in *foreign currency*? (2) can it export? (3) can it borrow? (i.e. is it under some international finance blockade that prevents it from borrowing foreign savings?) Unless all three of conditions are met, you *are not* likely to get hyperinflation, since there is no need to set up that nutty "race" on forex markets.

[Remember: large debt in domestic currency doesn't count since you can pay it all off with a one time printing. You might get a single bout of quick inflation one day, but its over. Hyperinflation is a sustained and continuous printing at an ever-accelerating rate. That only happens if you need to suck foreign currency over time in a sustained race against the forex market.]

Case #3 - European PIGS Crisis

The 2008 Economic crisis provoked a sovereign debt crisis in Europe - specifically, in the peripheral countries of Portugal, Ireland, Greece and Spain (who earned the press acronym of the "PIGS").

The crisis itself started elsewhere, and the whole world was hit, and had problems with deficits. But the problem with the PIGS is that none of them controlled their own currency. They used the "**euro**" which was controlled not by their domestic governments, but by the European Central Bank. That is *almost* like borrowing in a foreign currency, i.e. they issued bonds in a currency they can't print. Indeed, they don't even have an exchange rate.

I say almost, because the PIGS have one advantage the Latin American countries didn't have: they can't print euro, but they can tax it. (Peru can't tax its people for dollars; but Ireland can tax its people for euros).

But while the PIGS can tax, that is just about *all* they can do. Other government tools normal countries have (printing money, changing interest rates, changing exchange rates), the PIGS don't.

So in a way, the PIGS were in an even more unenviable position. Because raising taxes is also self-defeating. Higher tax rates will drive the domestic economy into recession. Recession means less income. Less income means .... less tax revenues. So trying to increase taxes to "fix" a budget deficit won't actually fix the deficit. So you have to raise taxes again.

In a sense, the PIGS in the 2010s are playing the same insane "race" Latin American countries were doing in the 1980s - except not with currency markets and inflation, but with the tax rates and the real GDP, i.e. to make a dent in their deficits, they have to raise taxes faster than GDP falls. And the more GDP falls, the more they must raise taxes to close their deficits. It's not a set up with a happy ending.

Many European countries are prospectively looking at the 2010s as their “lost decade”.

US States?

The PIGS situation is, in some ways, similar to the situation of state governments in the US. The federal government can run deficits and has all the options (print, tax, exchange rates, etc.). But individual State governments, however, can't print dollars. Yes, New York, California, Maryland, etc. can tax dollars, but like the PIGS, they have no control of their currency, which is all in the hands of the federal government.

Might US states fall into a similar "crisis" as the PIGS? They already have. As the crisis of 2008 spread, state governments started increasing taxes and cutting spending, and driving down economic activity. The difference is that the federal government plays a counter-balancing role in driving *up* economic activity. States raised state taxes, but federal

government cut federal taxes simultaneously; States cut state spending, federal government raised federal spending. Indeed, some of it is automatic, as a lot of social insurance and welfare programs (e.g. food stamps, housing assistance, etc.) are already federal. In short, while individual States seem to be as "helpless" as the PIGS governments, they don't need to run a race between taxes & GDP, because the Federal government - who can print, who can run huge deficits - is making up the difference and counteracting the contractionary steps taken by the individual States.

The EU, however, does not have such "federal" institutions in place. When Ireland cuts spending and raises taxes, there are no "EU" taxes to reduce and no "EU" spending to increase to counterbalance the effect on the economy, and allow the Irish GDP to stay stable, and the Irish government deficit to close naturally. Instead, Ireland - and Greece, and Portugal and Spain - are caught in an unenviable downward spiral race of rising taxes and falling GDP.

DERIVATIVES

Finally, one final brief word must be said about **derivative securities**, which have a supporting role in the financial system.

(1) Insurance

What is an insurance contract? It is a bet, pure and simple. More precisely, a bet you make *against* yourself.

When I take out an insurance against fire, I am betting that my bakery *will* burn down this month, whereas the insurance company is betting that it *won't*. Every month that my bakery *doesn't* burn down, I lose the bet and pay the insurance company (the "premium"). When it *does* burn down, I win the bet and the insurance company pays me (the coverage).

Why would I do such a silly thing like bet against myself? Simply, I am **risk averse**. If my bakery burns down, I lose *a lot* -- my entire business, my livelihood, etc. By making a bet against myself, my prospective loss is much, much smaller. I don't mind losing the bet every month (i.e. paying the premium), since when a bad thing happens (bakery burns down), my loss won't be that great.

The insurance company agrees to bet *on* me because they are less risk averse than I am. Or, more precisely, by issuing a thousand insurance contracts on a thousand businesses, they may lose the bet on 10% of the contracts, but they win the bet (premiums) on the remaining 90%. The premium gains on the 90% are more than enough to cover the payout on the 10%. That pooling of many contracts is what makes insurance companies relatively neutral towards risk. They are willing to make a bet with me.

In sum, insurance is a bet you make against yourself, a bet which you are quite happy to lose. Normally, when you think of betting and gambling, you think of that as a risky activity. But in this instance, the opposite is true. You have risk already and you make bets to *reduce* that risk. A bet which reduces overall risk is what is called a "**hedge**".

(2) Derivatives

You can think of derivative securities (options, futures, etc.) as nothing else but a tradeable insurance contract. Insurance against what? Well, things going badly.

Suppose I open up a new bakery. I take out insurance against fire, theft, earthquakes, etc. from an insurance company. What I don't have is insurance against is simply business going badly, e.g. a shortfall in sales, or a spike in the price of flour. That's what an derivatives contract would be about.

Like insurance, derivatives are often bets I make against myself. e.g. I *bet* I won't make profits this month. Somebody else (call him Sam) bets I will. So I make the bet with him

and he pays me if my profits do fall short of target. So write out a derivative contract, i.e. a betting slip. Sam doesn't need to hold on to that betting slip. He can sell it someone else on the derivatives market (and he will probably do so if he loses his nerve and fears he is going to lose the bet). Of course, derivatives aren't usually written up on profits per se, but close enough.

(A) Futures

Futures are a very common form of derivatives found in commodities and currency markets. A futures contract specifies the right to buy a commodity (e.g. wheat) or a currency (e.g. yen) at a pre-specified price ahead of time. e.g. a contract that specifies the purchase of a quarter of wheat at $20 in December 2006.

Who is betting with whom? Very often, farmers bet *against* themselves, and commodities speculators take the bet. e.g. at the beginning of 2006, a farmer has no idea what the price of wheat is going to be at the end of the year. It can be $25 and he makes a lot of money, or it can be $15 and he may even make a loss. So he minimizes his risk by making a bet by issuing a derivatives contract selling wheat in advance at $20. He is, in effect, *betting* the wheat price at the end of the year will be bad and finds a commodity speculator willing to take that bet. If the price turns out to be $25, the speculator wins. He buys the wheat from the farmer at the pre-specified $20 and sells it on the commodity market for $25. If the wheat price turns out to be $15, the speculator holding the derivative loses, as he has to buy the farmer's wheat at $20 and sell it in the commodity market at $15.

Currency futures operate on the similar principal. They are usually betting contracts between major import/export companies (who don't want to risk currency fluctuations, so buy their needed foreign exchange at a pre-set price). The bet is taken up by currency speculators.

(B) Options

Options are similar. What it is is a betting slip on the *price* of a security (e.g. a stock or a bond). The holder of an option has the "option" to sell or buy the underlying security at a pre-set price (the "trike price") up until a certain date. Options come in two types: calls & puts.

A **call option** gives the holder the right to *buy* the underlying security at the pre-set price. e.g. the right to *buy* 100 shares of GM stock at $20 apiece before the end of 2006. A person who thinks the price of GM stock is going to go *up* before the end of the year, will be likely to hold a call option. If it in fact happens, e.g. if GM stock is trading at $25 by the end of the year, he holder will "exercise" the option and buy the stocks (buy them from whom? from the person who issued the option). If it *doesn't* happen (e.g. if the price of GM stock remains $18 for the rest of the year), he will *not* exercise it and let the call option expire.

A **put option** gives the holder the right to *sell* the underlying security at the pre-set price, e.g. the right to *sell* 100 shares of GM stock at $20 apiece before the end of 2006. A person

who thinks the price of GM stock is going to go *down* by the end of the year, If it in fact happens, e.g. if GM stock is trading at $18 by the end of the year, he holder will "exercise" the put option, i.e. buy GM stock on the market and sell it (sell it to whom? to the person who issued the option). If it *doesnit* happen, e.g. if GM stock is trading at $25 by the end of the year, the holder will not exercise it but just let it expire.

Note: options are *not* stocks or bonds themselves. They are merely betting slips on stocks & bonds. After the expiration date, options are worthless.

Derivatives such as options and futures are sold on specialized markets (the biggest markets are the Chicago Board of Trade (CBOT) & the Chicago Mercantile Exchange (CME)). These are merely markets for betting slips. But the betting slips will change in value with the underlying security. e.g. if the value of GM stock is rising in the New York Stock Exchange, across the country in Chicago, the value of the call option on GM stock will be rising and the value of put options on GM stock will be falling.

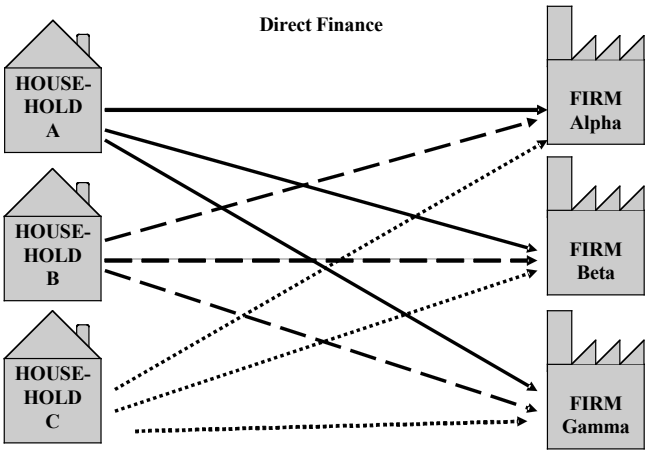
Why hold options? Well, some do it to speculate. But others do it to hedge. If you own a lot of GM stock, it is probably sensible to also own a lot of put options on GM to minimize risk. As the price of GM goes down, the value of your stocks will be less, but the value of your put options will be more. In this way, you're hedged against fluctuations in the price of GM stock.

In sum, derivatives markets don't channel funds from savers to firms. They are mere gambling dens. You trade betting slips on securities. But unlike regular casinos, their purpose is not to elevate the excitement of financing, but actually to make financing rather dull. In this, they are more like insurance. The (principal) role of derivatives markets is to provide a way to hedge against risky positions. In so doing, they make savers more *likely* to buy risky assets (i.e. provide funds on regular financial markets), since that risk can be nullified by buying the corresponding hedge on derivatives markets.

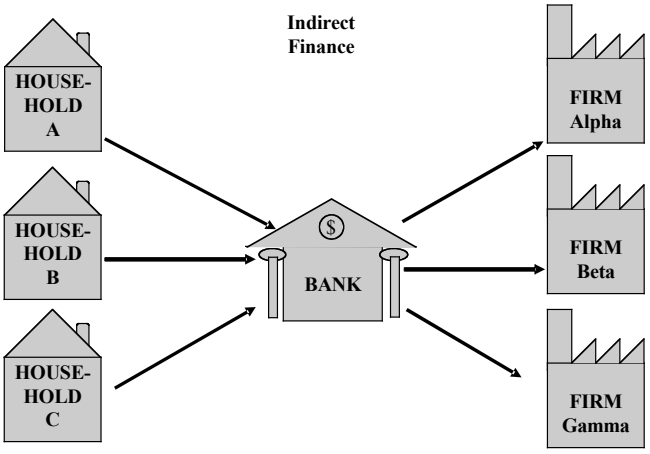
PART II - INDIRECT FINANCE

Indirect finance refers to the channeling of funds from savers to borrowers not directly but via an institution, what is called a *financial intermediary*.

Why go through a financial intermediary? It is often more economical. Suppose we have three households wishing to lend and three firms wishing to borrow. If all households try to lend to all firms via bonds, each household lending a little bit to each firm, then we're talking nine transactions. Transactions costs can be high - each household must get information about each firm, figure out how much to lend, etc.



With indirect finance, the number of transactions is reduced to six - from the three household to the bank, and from the bank to the three firms. And transactions costs are relatively low - the bank has specialized staff that can contact and vet the firms individually, and the households only need to keep tabs on how their bank is doing generally speaking.



THE COMMERCIAL BANK

Let us begin with the simplest of financial intermediary: the commercial bank.

Commercial banks and their related cousins (savings & loans, thrifts, credit unions, etc.) are the major providers of indirect finance in most economies.

The process is straightforward: savings are deposited into a bank by individuals and the bank lends out those funds, usually to borrowers drawn from a list of loan applicants or buy assets (bonds, etc.) on financial markets.

The commercial bank makes its profits from the interest it earns on its **assets** and the interest it pays out on its **liabilities**.

(1) The Balance Sheet

The financial position of a bank can be illustrated by a simple accounting device known as the bank balance sheet or "**T-account**" The finances of every household, enterprise, government & country can be represented this way. In a T-account, you divide things into two columns -- the left column for "**assets**" (amounts which are owed to me) and the right column for "**liabilities**" (amounts which I owe to others.)

A bank's T-account or balance sheet might look something like the following:

Assets	**Liabilities**
$60 million in loans to public	$100 million in deposits from the public
$20 million in treasury bonds	
$10 million in corporate bonds	
$10 million in cash	
Total = $100 million	Total = $100 million

The elements on the left are the *assets* of the bank. These are the amounts *owed to* the bank by the general public (loans), the government (treasury bonds) and private corporations (bonds). Summed up, these are the *total assets* of the bank.

The elements on the right (deposits) are the *liabilities* of the bank. The bank *owes* its clients their deposits.

Of course, bank balance sheets are a lot more complicated than that. We'll be filling in some more things as we go along.

Let us now give an example of a expanded bank balance sheet with our asset side and liability side more filled out:

Assets	**Liabilities**
Loans to public	Checking Deposits
Government securities	Savings Deposits
Corporate securities	Money Market Deposits
----------	CDs
Currency in vault	----------
Deposits at Central Bank	Interbank borrowing
----------	Repurchase Agreements
Interbank loans	Discount window borrowing
----------	----------
Fixed assets	Bank Capital (net worth)
----------	----------
Total Assets	Total Liabilities

Let us go through the various assets & liabilities briefly:

(2) <u>Bank Assets</u>

The first three are the major things on which the banks makes its earnings:

-- **Loans to public** are exactly what it means. Loans made by the bank to individual borrowers, e.g. business loans, mortgages, student loans, etc.

-- **Government securities** are the bank's holdings of government debt, i.e. treasury bills and treasury bonds owned by the bank.

-- **Corporate securities** are the bank's holdings of corporate debt, i.e. corporate bonds and corporate stocks owned by the bank.

(Note: in the US, under the 1933 Glass-Steagall Act, commercial banks are not allowed to own corporate stock. However by the deregulation act of Gramm–Leach–Bliley Act of 1999, that restriction was relaxed. Banks still can't own stocks. But they can be part of a larger company which own stocks, provided the balance sheets between the commercial banking division and the other divisions are kept strictly separate.)

The next two are things which the banks doesn't make (much) interest earnings on. They are both related to the Central Bank of a country (e.g. Federal Reserve in the US, European Central Bank (ECB) in euro-area, Bank of England in UK, etc.)

-- **Currency** held in the bank's vaults, in the form of banknotes (note: banknotes are issued by the Central Bank).

-- **Deposits at the Central Bank** are the deposits our commercial bank has at the Central Bank. (Note: commercial banks are required to make deposits at the Central Bank.).

Note that both banknotes and deposits at the Central Bank are both *liabilities* of the Central Bank and so both together are consider are called "high-powered money" or, in more popular appellation, both are considered **cash**.

Finally:

-- **Interbank loans** (sometimes called "**money market** loans") are the loans our bank makes to other banks (usually overnight).

-- **Fixed assets** -- any land, buildings, computers, etc. owned by the bank.

(3) <u>Bank Liabilities</u>

Let us now break down the liabilities further. The first four are the debts of the bank to the general public:

-- **Checking deposits** (sometimes called "demand deposits"). These deposits can be withdrawn on demand by the individual depositor (e.g. via a check, or lifted out of an ATM machine). They pay miniscule (if any) interest.

-- **Saving deposits** (sometimes called "time deposits"). To withdraw money from these deposits, the individual has to notify the bank some time in advance. Very often the individual pays a penalty if he doesn't give the bank enough advance notice. These deposits pay more interest.

-- **Money market deposits** (incl. NOW accounts). These are similar to savings deposits, but funds from these accounts are usually tied to a specific type of lending (e.g. to interbank loans or commercial paper) and, like most savings accounts, have restrictions on withdrawal (e.g. depositor can only write three checks per month on them).

-- **Certificates of deposit** (CDs). These are like time deposits, but they are fixed-term, interest-bearing & sometimes traded on secondary markets.

Other liabilities a bank may have include anything the bank itself borrowed from other institutions, like other banks, corporations and the Central Bank:

-- **Interbank borrowing** This what our bank owes to other banks. Often emergency, overnight cash loans.

-- **Repurchase agreements**. ("Repos") Where our bank borrows money from another bank or corporation, and in return allows the lender to temporarily hold some of the bank's assets. e.g. Citibank may make a repurchase agreement with GM, whereby GM temporarily "buys" some of Citibank's holdings of treasury bonds, with the agreement to sell them back to

Citibank the next day at a pre-set price. Interest rates on repurchase agreements are calculated by the difference in price.

-- **Discount window borrowing**. A short-term emergency loan (usually overnight & low interest rates) given to our bank by the Central Bank.

And finally:

-- **Bank Capital**. This is a very special term - a net worth balancing term that keeps to two columns equal to each other. This deserves some elaboration.

(4) <u>Bank Capital</u>

The "balancing" factor that keeps the asset and liability columns equal to each other at all times is known as "**bank capital**", sometimes called "**bank equity** " or the "**net worth**" of the bank. Bank capital is *defined* as the difference between total assets and total *debt* liabilities.

Bank Capital = Total Assets - Total Debt Liabilities

All deposits are considered *debt* liabilities (as that is what banks *owe* to their depositors). So bank capital is calculated residually - that is, you *deduce* the bank's capital by subtracting its debt liabilities (deposits, etc.) from its assets (loans, etc.).

For instance, if a bank has $100 in assets and $80 in deposits, then it *necessarily* has $20 in "bank capital". If it has $100 in assets and $90 in deposits, then it necessarily has $10 in "bank capital".

It is a common accounting practice to enter the bank capital of a bank in its liability column, just to keep the total sums of the columns equal to each other at all times, e.g.

Assets	**Liabilities**
$60 million in loans to public	$90 million in deposits from the public
$20 million in corporate bonds	
$15 million in treasury bonds	
$5 million in cash	
	$10 bank capital (equity)
Total = $100 million	Total = $100 million

But keep in mind that bank capital is not a fixed entry in the liability column, it is just a residual. So if anything changes anywhere in the balance sheet, bank capital is automatically adjusted to compensate for it, e.g. suppose the value of corporate bonds

collapse from $20 to $17. Then assets are now $97 and debt liabilities are $90. That necessarily means bank capital is now only $7.

The point of bank capital, as we can immediately see, is to serve as a cushion or shock-absorber for losses on the asset sheet. The value of our bonds fell, but the bank is still alive and kicking.

(Who absorbs the loss then? The owners of the bank, i.e. bank shareholders. Their shares in the bank are ownership claims on the bank's capital or equity. Before, their shares were a claim on the $10 in bank capital; now that the bank capital has contracted to $7, their shares in the bank are an ownership claim on a smaller amount ($7); once this becomes public information, the price of the bank's shares will probably fall in value on the stock market to reflect the new, smaller reality.)

Notice that bank capital can be negative. If the value of bonds above collapse dramatically, say, from $20 to $5, then assets are now $85 and debt liabilities are $90, which implies that bank capital is -$5. The bank now has a *negative* net worth. It is considered **insolvent** (its assets cannot cover its liabilities).

Aside: BIS Regulation

Although negative bank capital necessarily means a bank is insolvent, banks can be declared "insolvent" and regulators can seize it, even if their net worth is positive but considered too small. by the regulatory authorities. Every country, of course, has its own regulatory authorities. But there is a multilateral institution, known as the **Bank of International Settlements** (BIS), which has tried, since the 1980s, to provide international standards for regulation across countries. The famous "BIS **capital-asset ratios**" (or 'capital adequacy ratios') are basically the bank capital as a % of assets at which the BIS thinks a bank should be considered solvent or insolvent.

The simplest version of the capital asset ratio is simply what it says: it is the ratio of bank capital plus cash to risky assets (where by "risky asset" we mean total assets minus cash).

Capital Asset Ratio = Capital/Risky Assets

Consider the balance sheet below:

Assets	**Liabilities**
$60 million in loans to public	$90 million in deposits from the public
$20 million in corporate bonds	
$15 million in treasury bonds	
$5 million in cash	
	$10 bank capital (equity)
Total = $100 million	Total = $100 million

Then the capital = $10 and total risky assets = $95 = ($60 in loans to public + $20 in corporate bonds + $15 in treasury bonds).

Capital Asset Ratio = $10/$95 = 10.52%

Another term you might come across is the "debt-to-equity ratio" or the **leverage ratio**. This is defined simply as:

Leverage Ratio = Debt Liabilities/Capital

In our example:

Leverage Ratio = $90/$10 = 9

That means for every dollar of its own capital, that bank has nine borrowed dollars. Notice that it looks very similar to the reciprocal of the capital-asset ratio. And it is possible to think of it as such (roughly).

The 'official' BIS definition of the capital asset ratio is a little more complicated. It looks something like this:

Capital Asset Ratio = (Tier 1 Capital)/(Risk-weighted Assets)

What the BIS calls "**Tier 1 Capital**" is capital *plus* cash. "Risk-weighted assets" means it recognizes that different assets have different risks, and you don't need to worry about some of them. So looking through the asset sheet, cash, as mentioned, is riskless and so can deduct that from the asset sheet. The BIS also considers Treasury bonds practically riskless, so banks are *also* allowed to deduct that from their asset sheets. So BIS definition, roughly speking:

Capital Asset Ratio = (Bank Capital + Cash) / (Assets minus T-bonds & Cash)

(This is being very fast & loose. In reality, risk weights on the assets are a little more detailed than that - e.g. AAA bonds will be weighed different (e.g. maybe at only 50%) than BBB bonds (which are weighed at 100%), etc. Also, the bank can add "Tier 2 Capital" in the numerator, which are just some extra little things, e.g. cash that is not yet in the vault but practically there, or revalued real estate of the bank's offices, etc. We don't need to worry about this too much for our purposes.)

In the example from our balance sheet, the Bank Capital = $10, Cash Reserves = $5, so total Tier 1 Capital = $15. Our risky assets are $60 in loans and $20 in corporate bonds (the $15 in T-bonds & $5 in cash are deducted), so our risk-weighted assets are $80. Thus by the BIS definition:

Capital Asset Ratio = $15/$80 = 18.75%

Substantially higher. Current BIS requirements is that the CAR ratio must be *at least* above 6% for a bank to be considered "well capitalized".

Suppose there is a sudden collapse in the value of the corporate bonds from $20 to $17. Then the total asset sheet falls from $100 to $97, bank capital remember, falls to $7. Risky assets fall to $77. So:

Capital Asset Ratio = ($7 + $5)/$77 = $15.56%

So a fall in the value of any of the risky assets (loans, corporate bonds, securities, etc.) will lower the bank's capital-asset ratio. The way to "bring" the CAR ratio back up is to reduce risky assets and raise and stockpile more cash & T-bonds somehow.

FRACTIONAL RESERVE BANKING

Today, most private commercial banks operate on the principle of **fractional-reserve banking**. In other words, for every $100 received as a deposit from the public, banks set aside a fraction (e.g. $10) as "**cash reserves**", and lend out the remaining ($90) to borrowers (consumers, firms, etc.), either by granting them loans or holding their bonds. Banks make their profits from the interest received from these loans & bonds minus the interest paid to depositors.

The reason banks can afford to lend out the deposits they receive is because they know (or hope) that their depositors won't be all coming back together on one day and withdraw their entire deposits all at once. Keeping 10% in cash reserves at all times is usually more than enough to satisfy the average daily withdrawals of their depositors.

In the US, the Federal Reserve imposes legal requirement, known as the **required reserve ratio**, which stipulates the % of deposits that must be held as cash, i.e.

Required Reserve Ratio = Cash Reserves/Deposits

[Note: one of the major differences between different types of deposits is precisely that they have different required reserve ratios. Checking deposits have high reserve ratios, while savings & money market deposits have small reserve requirements.]

But a massive, concerted withdrawal of deposits by the public -- known as a "**bank run**" -- can and has happened. In such cases, the bank will be unable to meet the withdrawal requests and forced to freeze accounts or go bankrupt. These panics happen occasionally and often have devastating effects

To prevent bank panics, many developed countries have introduced some form of **deposit insurance** by which banks contribute premiums to government-sponsored corporation (e.g. Federal Deposit Insurance Corporation (FDIC) which, in turn, guarantees deposits (up to a certain amount). So, if a bank panic builds up, depositors need not worry their deposits will evaporate. The government has guaranteed they will be paid.

It was precisely because of a series of bank runs and collapses that many governments decided to create or grant a charter to a **Central Bank** as a "**lender of last resort**". In Britain, that is the Bank of England, in Japan the Bank of Japan, in the US the Federal Reserve, in the euro-area, it is the European Central Bank (ECB), etc.

THE FEDERAL RESERVE

In the aftermath of a series of bank runs and collapses in the Panic of 1907, the United States government decided to set up the "Federal Reserve System" in 1913. The Fed is the "central bank" of the United States. It is a rather peculiar institution, delicately balancing regional and national concerns and private and public interests.

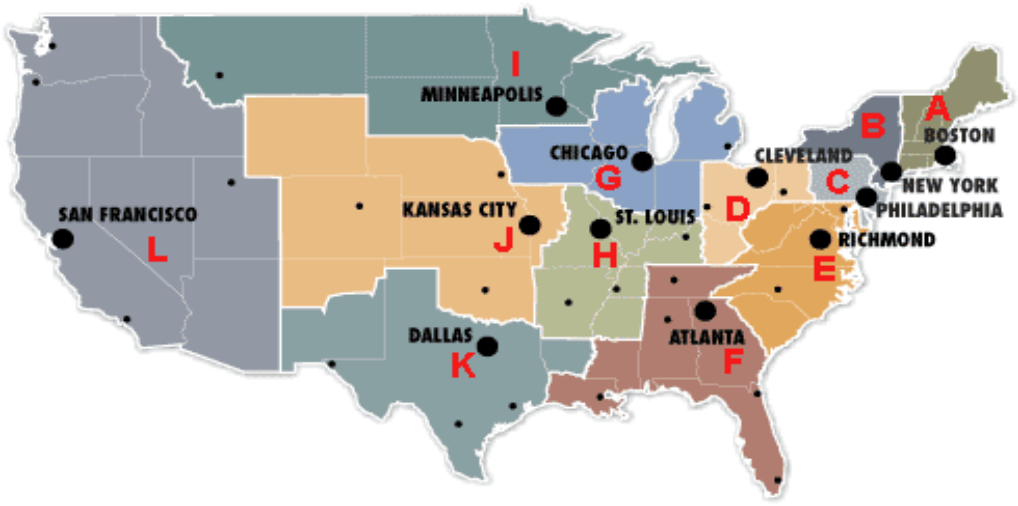
(1) Federal Reserve System

The Federal Reserve system is composed of a Board of Governors and 12 regional Federal Reserve Banks.

The **Board of Governors** is located in Washington DC and is composed of seven "governors", each of which is appointed by the President of the United States (and approved by the Senate) for a non-renewable term of fourteen years. At least one governor must be replaced every second year. The Board is chaired by one of the governors for a four-year term (right now, that's Ben Bernanke, who's on his second term as chairman, I believe.

(Three names you might come across: Paul A. Volcker, chairman from 1979 to 1987; Alan Greenspan, from 1987 to 2006, and Ben from 2006 until now).

The 12 regional banks are the **Federal Reserve Banks** of Atlanta, Boston, Chicago, Cleveland, Dallas, Kansas City, Minneapolis, New York, Richmond, San Francisco and St. Louis. The regional FRB banks partition the United States into areas of their authority. (the regional FRBs are denoted by letter codes -- e.g. A = Boston, B = New York, etc. You can see which of the banks issued a particular dollar note by looking at the letter at the beginning of the serial number).



Each of these Federal Reserve banks is owned by the private commercial banks of their region. Each of the FRBs has nine directors, six of which are appointed by the private commercial banks, the remaining three appointed by the Board of Governors in DC.

(2) <u>Functions of the Fed</u>

Keep in mind that each Fed Reserve Bank is still a *bank* itself. It has liabilities and assets. But it is a very special kind of bank with some very special privileges and obligations.

(A) *Lender of Last Resort*

The Fed was originally designed as a safety valve, the "lender of last resort" from which banks experiencing a run could borrow emergency reserves at super-cheap interest. This emergency borrowing is known as the "**Discount Window**" of the Fed.

The Federal Reserve is required to perform the function of "lender-of-last resort" and keep the banking system functioning. True, the Fed *can* deny a particular bank access to the discount window if it believes that bank is abusing it (e.g. routinely overlending, and then coming and begging at the discount window), but the overall obligation to lend to the banking system in times of real crisis is there.

[This discount window was also designed to end predatory practices in the banking sector. In the bad old days before the Fed, it was common for a cartel of big banks to "gang up" on a little bank and bring it down, e.g. a gang of big banks would hold back cheques drawn on a target bank for a time and then, on a single prearranged day, they would all come at once and demand full payment, prompting the target bank to collapse. The Fed's discount window put an end to such big bank bullying.]

(B) *Regulation*

The Federal Reserve has wide powers to oversee & regulate commercial banks. It is not the only bank regulator. In fact, the "official" bank regulator is the **Office of the Comptroller of the Currency** (OCC), an agency subordinate the US Treasury. But the OCC regulates according to federal legislation passed by Congress. The Federal Reserve regulates by the rules it imposes on the 'member banks' of its region, whatever it sees "suitable" to preserve the health of the banking system.

The principal regulatory function is to ensure banks have enough cash reserves. So the federal reserve bank has the power to set the **reserve requirement ratio** and verify that it is being met.

It can also require that private commercial banks make **deposits** at the Federal Reserve Bank. This is to help the Federal Reserve's "clearing facilities" (i.e. make sure checks from one bank to another are 'cleared') and its regulator functions.

(C) *Liabilities*

The Federal Reserve bank has two kinds of liabilities: (1) deposits (made by commercial banks at the Fed; the general public can't deposit there); (2) **banknotes**.

Banknotes are, of course, just IOUs of the Federal Reserve - a cheque to the bearer of the note, redeemable at the Fed. Redeemable for what? In the old days, redeemable for gold. That is, you could bring you $1 banknote to the Federal Reserve Bank, present it to the teller and get $1 worth of gold. Today, it is payable in nothing. Fed will redeem that "cheque", yes, with another $1 banknote. Federal Reserve banknotes are unbacked by real assets, they are ***fiat*** *money*.

(Prior to 1913, private banks routinely issued their own notes now they are legally forbidden from doing so. Only the Federal Reserve banks can issue banknotes. It has a **monopoly** on note issue)

The liabilities of the Federal Reserve (Banknotes + Deposits from Banks) have a special feature: they are ***money***. Or, more precisely, they are referred to as "high-powered money", or simply "**cash**".

"**Cash**" = Liabilities of the Federal Reserve
= Banknotes + Deposits by banks at the Fed

Remember, in a fractional reserve banking system, private commercial bank hold a certain proportion of the deposits they receive from the public as "cash reserves". The Fed regulates this proportion and the law stipulates that these reserves must be either (a) held in the form of Federal Reserve banknotes in the private bank's vaults or (b) held in the form of private bank deposits at the Fed. Both add up to total cash reserves.

(D) *Assets*

So, what does the Fed do with all the money it gets from deposits & banknotes? It lends it out of course. But (well, up until 2008) it could only lend out to two types of assets: (1) Discount Loans to Commercial Banks (see above); (2) US Treasury bills or Treasury bonds

It is not allowed to hold any other assets.

It makes interest on the discount loans & T-bonds, of course. And that interest is a heck of a lot more than what it pays its depositors and noteholders (basically, nothing). But while "privately owned" it is not a profit-making bank. Any **profits** the Fed makes from the interest earned on holding T-bills & T-bonds are returned to the federal government (i.e. the US Treasury), after deducting expenses.

So, a typical asset-liability balance sheet for a Federal Reserve Bank would look something like the following:

Assets	**Liabilities**
$176 billion in T-Bills & T-Bonds	$150 billion in banknotes issued to public
$10 billion in Discount Window Loans	$36 billion in deposits from private banks
Total = $186 billion	Total = $186 billion

Table - A Federal Reserve balance sheet

THE MONEY MARKET

Private banks hate having money tied up in either banknotes or their deposits at Federal Reserve for obvious reasons: they earn practically no interest on them. But they need them, because of prudence and the law. But they'd prefer to hold the minimum amount of reserves possible, and lend the remainder out.

Now banks receive & pay out deposits every day and make & extinguish loans every day. If a bank **overlends** on a particular day, it will find itself short of reserves to back those loans up. If it **underlends**, it will have excess reserves.

Take a typical private bank's balance sheet (call it Citibank). It might look like the following:

Assets	**Liabilities**
$70 million in loans to public	$100 million in deposits from the public
$20 million in T-Bills & T-Bonds	
$2 million in banknotes in vaults	
$8 million in deposits at the Fed	
Total = $100 million, of which $90 million are lent out, $10 million are in reserves	Total = $100 million

Table - Citibank's balance sheet (balanced)

Assuming the reserve requirement is 10%, then this is perfectly balanced. Citibank took in $100 million in deposits from the public, lent $90 million out ($70m in loans, $20m in bonds) and keeps $10 million in reserves ($2m in banknotes, $8m in deposits at Fed).

But suppose that on one particular day, Citibank makes a mistake and lends out $90 million. It is in trouble. Now it faces this situation:

Assets	**Liabilities**
$90 million in loans to public	$120 million in deposits from the public
$20 million in T-Bills & T-Bonds	
$2 million in banknotes in vaults	
$8 million in deposits at the Fed	
Total = $120 million, of which $110 million are lent out, $10 million are in reserves	Total = $120 million

Table - Citibank's balance sheet (overlent)

(remember: when a bank makes a loan it simultaneously "creates" a deposit from which the borrower will draw, so the assets & liabilities totals continue to balance)

Citibank is in trouble because now it has $120 million in liabilities, but only $10 million in reserves. That's 8.3%, less than the 10% reserve requirement. It needs to find at least $2 million worth of cash quickly.

An overlent bank has three options:
(a) call back some loans or sell some bonds to raise the necessary cash.
(b) go borrow reserves from the Fed's Discount Window
(c) go borrow reserves from another bank at the money market.

(a) Sell Assets

This is the most straightforward way. If it sold $2 million in Treasury bonds on the bond market for cash then it would be in this situation:

Assets	**Liabilities**
$90 million in loans to public	$120 million in deposits from the public
$18 million in T-Bills & T-Bonds	
$4 million in banknotes in vaults	
$8 million in deposits at the Fed	
Total = $120 million, of which $108 million are lent out, $12 million are in reserves	Total = $120 million

Table - Citibank's balance sheet (if assets sold)

And the problem is quickly solved: it as $12 in reserves. However, it's got to do this operation before 5PM. And may not get a good price for its bonds and end up having to sell them for less than they're worth.

(b) Discount Borrowing

Let us assume (for the moment) that it can't (or won't) extinguish loans/bonds. Suppose then it borrows $2.2 billion from the Federal Reserve's Discount Window. So, the Fed lends Citibank $2.2 million by crediting its deposit at the Fed (raising it from $8m to $10.2m). Now, Citibank's balance sheet looks like the following:

Assets	Liabilities
$90 million in loans to public	$120 million in deposits from the public
$20 million in T-Bills & T-Bonds	$2.2 million in discount window debt to the Fed
$2 million in banknotes in vaults	
$10.2 million in deposits at the Fed	
Total = $122.2 million, of which $110 million are lent out, $12.2 million are in reserves	Total = $122.2 million

Table - Citibank's balance sheet (if Discount Window loan

So now the bank is back in compliance with the reserve requirement. Total reserves are $12.2 million, which is (about) 10% of the $122.2 million it has in liabilities, and thus can maintain its asset portfolio of $110 million.

(c) Interbank (Money Market) loan

The alternative option (c) is to borrow the $2.2m from another private bank.

Suppose another bank (Chase) had the following balance sheet:

Assets	Liabilities
$45 million in loans to public	$75 million in deposits from the public
$20 million in T-Bills & T-Bonds	
$2 million in banknotes in vaults	
$8 million in deposits at the Fed	
Total = $75 million, of which $65 million are lent out, $10 million are in reserves	Total = $75 million

Table - Chase's balance sheet (underlent)

Notice that Chase is *underending*. It has $10m in reserves, but only lent $65m out (in loans & bonds). It is holding greater reserves (13.3%) than it the required 10%. It only *needs* to hold $7.5 m. So it has *excess reserves* of $2.5m, a large chunk of useless money on which it isn't earning any interest.

So it is natural for Citibank (who has overlent) to approach Chase (who has underlent) and borrow some of its excess reserves for the night. Chase can easily lend $2.2 m of its reserves to Citibank. It does so by transferring $2.2m of its deposits at the Fed to Citibank's account at the Fed. Citibank's balance sheet thus becomes:

Assets	Liabilities
$90 million in loans to public	$120 million in deposits from the public
$20 million in T-Bills & T-Bonds	$2.2 million in debt to Chase
$2 million in banknotes in vaults	
$10.2 million in deposits at the Fed	
Total = $122.2 million, of which $110 million are lent out, $12.2 million are in reserves	Total = $122.2 million

Table - Citibank's balance sheet with money market loan

And so, with the $2.2m loan from Chase, Citibank is back in compliance with its reserve requirement.

How long are such loans? Usually overnight. The reserves of commercial banks are checked by regulators every evening. It must be in compliance. Which is one reason why banks close so early (3 PM or so). They need to have time to check their reserves and, if not enough, take appropriate measures on the money market (or, if they need to extinguish assets, the bond market) before the financial markets close at 5 PM.

The borrowing & lending of cash reserves between banks is generally known generally as the "**interbank market**" or more simply, the **"money market**".

In the United States, the overnight money market is specifically called the "**Federal Funds Market**" (because cash, liquid money, as we noted earlier, are nothing but "liabilities of the Federal Reserve") and the rate of interest banks charge each other for such loans is known as the "**Federal Funds Rate**".

[In the UK, it is called the LIBOR - the "London Interbank Offered Rate". In Eurozone, there is the "Euribor" (Euro Interbank Offered Rate")]

The overnight interbank rate is highly important for an economy since it forms the benchmark rate upon which all other bank loan rates are made. If the FFrate rises, the interest rates on consumer loans, mortgages, etc. tend to rise accordingly. And that can determine the rate of borrowing and investment spending by firms in an economy.

MONETARY POLICY

Since the 1930s, Central Banks have been actively intervening in the money market and influencing the interbank rate. Indeed, when you hear in the news that the Fed has "raised" or "lowered" interest rates to, say, 2%, that means specifically the Federal Funds Rate (the rate banks charge each other overnight) and *not* (as is commonly assumed) the Discount Rate (the rate the Fed charges on its loans to private banks via the discount window).

The mechanics of interest-rate setting -- sometimes called **monetary policy** or **open market operations** deserve careful explanation.

(1) Open Market Operations

How does the Federal Reserve "set" the overnight interest rate banks charge each other? After all, those loans are private, interbank affairs. What's the Fed got to do with it?

The Fed can influence it. Remember, in the Federal Funds market, banks with excess reserves lend to banks with insufficient reserves. The interest rate Citibank will pay when it goes searching for reserves will depend on the relative abundance/scarcity of such excess reserves. It seems obvious that if very few banks have excess reserves, the interest rate Citibank will be charged for borrowing them will be rather high. Conversely, if a lot of banks have excess reserves, the interest rate will be rather low.

The Fed influences the interbank interest rate by increasing or decreasing the total amount of reserves. It does so by means of **Open-Market Operations**.

The procedure is simple: if the Federal Reserve wants to increase the total amount of reserves out there, all it has to do is *buy* Treasury bonds from the banks. It pays for this bond purchase by crediting the bank electronically at its Fed deposit. For instance, suppose the Citibank was at its initial balanced position (with $70m in loans, $20 m in T-bonds, $2m in cash & $8m in deposits at the Fed). Suppose the Fed buys $5m in T-bonds from Citibank and pays for it by crediting Citibank's deposit by $5m. The Citibank balance sheet now becomes:

Assets	**Liabilities**
$70 million in loans to public	$100 million in deposits from the public
$15 million in T-Bills & T-Bonds	
$2 million in banknotes in vaults	
$13 million in deposits at the Fed	
Total = $100 million, of which $85 million are lent out, $15 million are in reserves	Total = $100 million

Table - Citibank's balance sheet after Fed purchase of T-bonds

Notice that Citibank has moved from a balanced position to an underlending position. It has $15 m in reserves, which is more than the 10% requirement needed. It can therefore expand the amount of lending and/or make those excess reserves available to other banks for overnight borrowing. This new supply of reserves will thus bring the Federal Funds rate down.

A quick question: what about the Fed's own balance sheet? When the Fed is buying bonds, where does the Fed get the $5m in reserves to pay for them? Easy. It creates them out of thin air! It just credits Citibank electronically. It can do this because reserves are its own creation. That is equivalent to the Fed just "printing money".

e.g. in balance sheet terms, suppose the Fed's initial position is:

Fed Assets	**Fed Liabilities**
$176 m in T-Bills & T-Bonds	$150 m in banknotes issued to public
$10 m in Discount Window Loans	$36 m in deposits from private banks
Total = $186 m	Total = $186 m

Then the Fed's position (after the $5m purchase from Citibank) changes to:

Fed Assets	**Fed Liabilities**
$181 m in T-Bills & T-Bonds	$150 m in banknotes issued to public
$10 m in Discount Window Loans	$41 m in deposits from private banks
Total = $191 m	Total = $191 m

The Fed's balance sheet remains balanced: the Fed has just expanded its asset side (bonds) by $5m-worth and expanded its liabilities (deposits) by $5m-worth. It remains balanced.

Thus, by buying bonds from banks, the Fed simultaneously *expands* the total supply of reserves (i.e. "increases the money supply" is the way economists normally say it), which will lead to *lower* interest rates on the interbank market.

Conversely, suppose it wants to raise the Federal Funds rate. All it does is *sell* some of the T-Bills/T-bonds that it holds to private banks. Starting from the Citibank's balanced position, suppose the Fed sells $3m worth of bonds to Citibank. Citibank pays for them with a $3m cheque on its deposit at the Fed.

Assets	Liabilities
$70 million in loans to public	$100 million in deposits from the public
$23 million in T-Bills & T-Bonds	
$2 million in banknotes in vaults	
$5 million in deposits at the Fed	
Total = $100 million, of which $93 million are lent out, $7 million are in reserves	Total = $100 million

Table - Citibank's balance sheet after Fed sale of T-bonds

So Citibank's bond holdings increase while simultaneously its deposit at the Fed declines from $8m to $5m. Clearly, total reserves held by Citibank ($7 m) are *not enough* to fulfill its 10% requirement. Citibank has moved from a balanced position to an overlent position. It has insufficient reserves. It must now go out to the Federal Funds market to find more. Citibank's increased demand for reserves on the money market will drive up the interbank rate.

And what does the Fed do with the $3m in reserves it receives? It just extinguishes them. That is equivalent to the Fed just "burning money".

e.g. In balance sheet terms, starting from its initial position of $186m total, we get after the sale:

Fed Assets	Fed Liabilities
$173 m in T-Bills & T-Bonds	$150 m in banknotes issued to public
$10 m in Discount Window Loans	$33 m in deposits from private banks
Total = $183 m	Total = $183 m

The Fed has reduced its assets (bonds) by $3m-worth (from $176m to $173) and reduced its liabilities (deposits) by $3m-worth (from $36 to $33). Again, the Fed's own balance sheet remains balanced.

In sum, buy buying & selling bonds to banks is *how the Federal Reserve influences the interest rate*.

Does it work? Yes. The Fed uses some very specialized traders who buy and sell bonds all the time to keep the Federal Funds Rate at the right "target".

(2) Purposes of Monetary Policy

Who decides what the target interest rate is? The **Federal Open Market Committee** (FOMC), which was created in 1933 during the New Deal. It is a super-committee of the Federal Reserve system, composed of all seven governors of the Board of Governors plus five regional FRB directors (one of which must always be from the New York FRB -- which makes sense given that New York City is the financial center of this country). The FOMC meets intermittently and decides upon the target rate.

What's the purpose of setting the interbank rate? Well, the interbank rate is the benchmark upon which banks set their loan rates. If the interbank rate rises, banks naturally raise the interest on loans. That is because the "cost" of getting reserves to back up new loans has gone up.

And if the loan rate rises, so does the cost of funds for businesses interested in investing (and individuals interested in building homes and the like). Remember how we explained the rate of interest determines the volume of investment?

And that is the ultimate point of all this. By setting the interest rate, the Federal Reserve influences the amount of investment spending by firms in the economy. The higher the interest rate, the lower the investment spending. The lower the interest rate, the higher the investment spending. And since investment spending is one of the principal drivers of GDP, the Federal Reserve possesses a very important tool by which to speed up or curb the economy as a whole.

In sum, Monetary Policy (conducted by the Fed) can be either expansionary or contractionary:

(1) **Expansionary** Monetary Policy: Federal Reserve buys bonds/increases the supply of money → interest rates decline → investment spending increases → output increases.

(2) **Contractionary** Monetary Policy: Federal Reserve sells bonds/decreases the supply of money → interest rate rises → investment spending falls → output decreases.

Under what circumstance would the Fed choose an expansionary or contractionary monetary policy? This depends. As we shall discuss more fully later, the Fed often tries to keep output growth on a even path, with as little unemployment and inflation as possible. If the economy goes into a recession, the evil of unemployment sets in, so the Fed usually lowers interest rats to spur it back into recovery. If the economy goes into a boom and overheats, the evil of inflation sets in, and the Fed usually raises interest rates to bring output back down.

(3) Criticisms of the Fed

One of the most important criticisms of the Federal Reserve is its lack of democratic accountability. Although the appointment of Fed governors goes through a political process, that is the full extent of the government's involvement. The decisions of the FOMC, as important as they are for the course of the economy, are completely independent of the government.

Many, naturally, bewail this. For here is an institution, with such great power for good or evil, yet completely above democratic review. The personal opinions of the governors are by far the biggest determinants of the kind of monetary policy the Fed will follow. Some governors worry unduly about inflation and are prepared to tolerate large amounts of unemployment, even if the whole country is clamoring for the opposite. The most famous case of such a scenario was back in 1980, when in an effort to curb inflation, the Fed deliberately set interest rates sky-high, creating a recession, without asking anybody's permission. Unemployment rose to above 10%, the highest level since the Great Depression. "Who elected these guys?", was angrily asked.

On the other hand, the imperviousness of the Fed to political pressure can also be seen as a virtue, not a vice. Many a White House has tried to persuade the Fed to unwisely lower interest rates during election years and had the Fed not been independent, it would have succumbed.

But the independence is not complete. Congress still has the power to set broad goals upon the Fed. For instance, the 1946 Employment Act legally obliged the Fed to pursue policies which ensure "maximum employment", although it gave it broad discretion of when and how to achieve that. The commercial bank regulations which the Fed is charged with implementing and overseeing are also set by Congress. The Fed chairman is required to make regular presentations before Congress to explain his decisions and outlook and prove his compliance which such acts.

The Fed also coordinates its actions closely with the US Treasury. The Fed is required to assist the Treasury in conducting exchange rate policy (even though it has no role in *setting* that policy). The Fed also helps the Treasury smooth out bumps in government spending, tax receipts and bond issues.

So, although the Fed is relatively independent, it is not completely without accountability. But accountability & control are very broad and, relative to many other Central Banks, the Fed does have a great amount of independence.

The US Federal Reserve System performs a role in the American monetary system analogous to that of other central banks in virtually every country from Australia to Zimbabwe. Of course, there are institutional differences between central banks, especially regarding the degree of independence they have from their respective governments.

Nonetheless, the goals, function and tools they have at their disposal are almost identical. Sources of differences depend very much on historical evolution and circumstance.

The Swedish Riksbank and the Bank of England, two of the oldest central banks in the world, have actually relatively little independence from their governments. In contrast, one of the newest, the European Central Bank (ECB), enjoys perhaps the greatest independence -- much to the chagrin of many euro-area governments who would like it to be a little less paranoid about inflation, and a little more concerned with unemployment.

(4) Impact on the Bond Market

We have already explained how the Central Bank, by increasing or decreasing the total amount of money, affects the interbank rate. And we've mentioned how that, in turn, affects bank lending rates.

What about interest rates on bonds? Well, the Central Bank's actions affect these too. Remember the interest rate (or yield) of a bond is calculated *from* the price of the bond, roughly by dividing the gain by the purchase price. Remember also there is an inverse relationship between the bond price and the interest rate on the bond.

So, let's go back to the Central Bank's story. Remember, when the Central Bank wants to expand the money supply, it buys treasury bonds from private banks. Thus, the Central Bank is taking treasury bonds *away* from the market, i.e. *decreasing* the supply of bonds. Decreasing the supply of anything will tend to raise its price. Thus, because of this Central Bank action, bond prices rise, and interest rates fall.

Similarly, when the Central Bank wants to *contract* the money supply, it sells treasury bonds to banks, thus is inserting more bonds into the market, i.e. *increasing* the supply of bonds, thus lowering their price and raising interest rates.

So, Central Bank increasing money supply *reduces* interest rates all around, while the Central Bank *decreasing* the money supply *raises* interest rates all around.

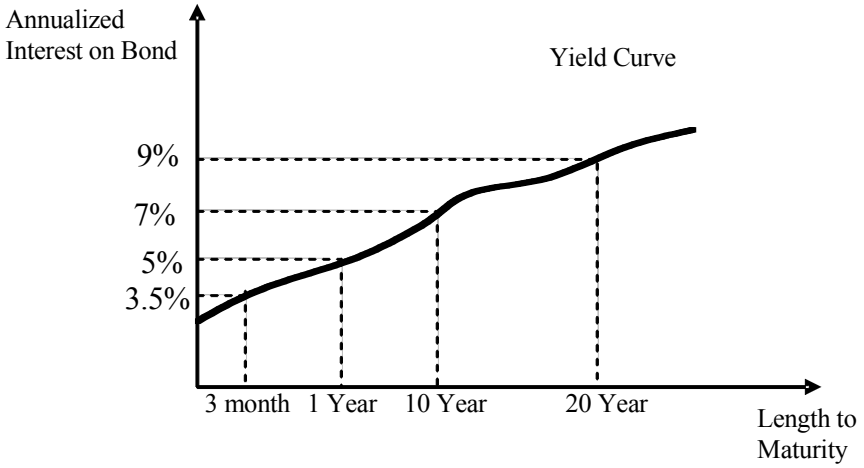
[Note: It is worth emphasizing that this is a side-effect. Central Banks, as a matter of policy, do *not* deliberately target a specific bond market interest rate. It targets only the interbank rate. Bond rates just happen to move in the same direction.]

ADDENDUM : THE YIELD CURVE

Yields and Maturity

There are different types of bonds with different lengths of maturity. Three-month bonds, one year bonds, 10-year bonds, 20-year bonds, etc. You can say that each 'type' of bond has a different market as some people prefer to hold long bonds and other people like to hold shorter ones. So the interest of a three-month bond can be very different from the price of a 20 year bond.

Financial analysts like to plot bond interest rates against the bond maturity lengths to get a glimpse of the entire bond market at a particular point in time. This plot is known as the "**yield curve**"



In the financial press, you will see a lot of talk a lot about the current "shape" of the yield curve, whether it is downward-sloping, or upward sloping, steepening or flattening, and sometimes they will take two maturities and talk about the "interest rate differentials" - sometimes with a big sense of alarm.

Expectations

Lots of lingo. But the reason yield curves are often revealing of how bond markets are predicting the future.

Think of it this way: suppose it is January right now, and you are contemplating making a one-year loan to Acme Inc. Acme has issued both three-months bonds and one year bonds. You *could* buy a one-year bond and **hold** it until maturity. But you could also just "**roll over**" three month bonds over the course of one year, i.e. buy a three-month bond, get paid in March, then buy another three-month bond, get paid in June, buy another three month bond, get paid in September, and then buy another three month, and get paid in December.

(if it issues 10-year bonds, you could also buy that, hold it for a year, then sell it on the bond market - 9 years before it matures).

In either strategies, you are lending money to Acme for one year. In *theory*, it shouldn't make a difference which strategy you use: holding a one-year bond for one year, or rolling over three-month bonds for one year. Since this is the same company with the same default risk, both strategies *should* yield the same interest over the course of the year. So the 'annualized' interest rate (i.e. interest rate per one year) of a three-month bond *should be* the same as a one-year bond, e.g. 5% on both.

But if you look at an actual yield curve, the (annualizeed) interest rate on a three-month bond is often different from the interest rate on a one-year bond. Why?

Because which strategy you follow depends on your **expectations** of how interest rates might change in the course of the year.

Think of this as follows: suppose this is January, and you decide to buy a one-year bond for a year with a 5% yield. Then in March, bond prices suddenly plummet, and interest rates rise to 6%. Nice? No, not really - not for you anyway. Because *you* are still holding a one-year bond at 5%. You cannot avail yourself of the opportunity to lend at the higher rate. Your savings are tied up in the one-year bond, and you will only get them back when your bond matures. But if you were following the strategy of rolling over three-month bonds, then when March comes around, you get repaid (with the 5% interest), and now can lend your money *again* at the *higher* interest rate of 6%. So when bond interest suddenly rises, those people rolling over short term bonds avail themselves of the opportunity, but those who are locked into long-term bonds miss out.

So why hold long-term bonds? Well, suppose the opposite happens. Suppose that in March interest rates suddenly *fall* from, say, 5% to 4%. Those who were rolling over three-month bonds are screwed. They lend in January, got repaid in March at 5% but now can only lend again at 4%. But if you were holding a one-year bond at 5% then you have 'locked in' your interest rate at 5% for the rest of the year. The fall in bond interest in March doesn't affect you.

In short, when interest rates rise, those who were following a strategy of 'rolling-over' short-term bonds win, while those who were 'locked in' to long-term bonds lose. When interest rates fall, those who follow "rolling over" lose, those who were follow "lock-in" win.

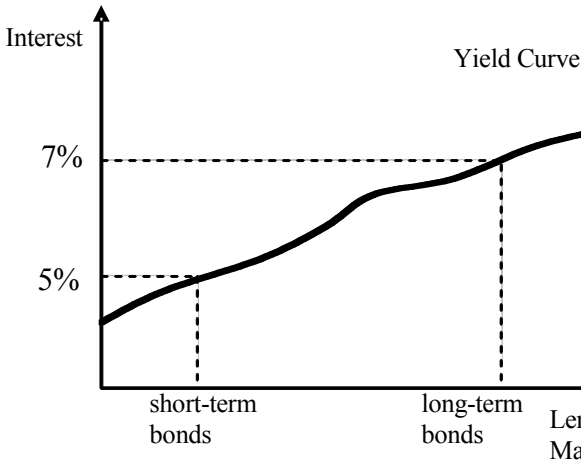
So go back to your original decision: which strategy should *you* follow? Should you roll-over three-term bonds for a year, or lock in a one year bond? Depends on your **expectations**, i.e. what you believe will happen to interest rates in the course of the year. If you *believe* interest rates will rise, you want to roll-over so that when the opportunity does arise, you'll have your money back and available to lend at the higher interest. If you believe interest rates might fall, you want to lock-in at the higher interest rate now.

The yield curve this gives a clue of what expectations are in bond markets.

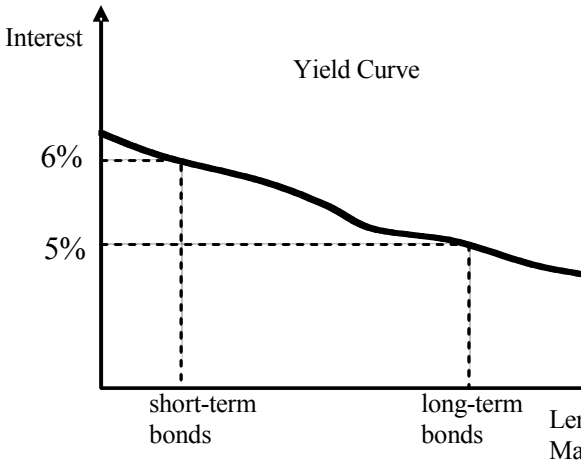
If the yield curve is **upward**-sloping, that means that *currently* interest rates on short-term bonds are low and interest rates on long-term bonds are high. Now remember that interest rates are inversely related to bond prices. So if it is upward sloping that means the price of a short-term bond is higher than the price of a long-term bond - i.e. everyone seems to be trying to buy short-term bonds (thus price high, yield low), and few people want to buy long-term bonds (thus price low, yield high). In other words, people are flocking to a rolling-over strategy and few want to lock-in. So an upward-sloping yield curve indicates that, generally speaking, people are expecting interest rates to rise in the future.

If the yield curve is **downward**-sloping, that means short-term interest is high, but long-term interest is low. In other words, most people are trying to lock in to long-term bonds and few are interested in rolling over short-term bonds. That is, people are generally expecting interest rates *to fall* in the future, so everyone is hurrying to lock-in now.

So the shape of the yield curve reveals a lot about how people think interest rates will change in the future. It is the closest financial analysts have to a "crystal ball" (or at least, a way to gauge expectations in the bond market).



Everyone prefers to roll-over
(expect interest rates to rise in future)



Everyone prefers to lock-in
(expect interest rates to fall in future)

Liquidity Preference

What if you don't expect anything either way? That is, you don't have strong expectations of interest rates rising or falling in the future. Should you roll-over or lock-in? In principle, you should roll-over. Even if you don't expect interest rates to change, at least the rolling over strategy gives you flexibility - you get your money back every three months and can decide what to do then. If you're locked into long-term bonds, then you don't have flexibility to adjust as circumstances change. In financial lingo, flexibility called "**liquidity**". We say short-term bonds are "more liquid" than long-term bonds.

So, even if you don't have strong expectations of anything, you should *still* prefer rolling over to locking in, simply because it gives you flexibility. Keynes called this phenomenon "**liquidity preference**", i.e. that savers naturally prefer flexibility, and thus usually prefer to roll over short-term bonds rather than be locked into long-term ones, even if they don't have any expectations of any sort.

(The most liquid of assets is, of course, the shortest of shortest ones: that is, *cash*. Holding cash is liquidity at its extreme, since it gives you the maximum flexibility to lend your savings at a moment's notice.)

The human preference for liquidity means that *generally* speaking, even if markets don't have expectations about how interest rates will move in the future, the yield curve should always be upward-sloping - at least a little bit upward-sloping. Because people like liquidity, shorter-term bonds should usually have higher prices (i.e. lower interest rates) than long-term bonds.

This doesn't mean it will always be upward sloping. No, if bond markets strongly expect interest rates to fall, our previous lesson applies: people will flock to lock-in and avoid rolling over, thus the yield curve will be downward-sloping. Strong expectations of falling interest rates will make it downward-sloping, and strong expectations of rising interest rates will make it *steeply* upward sloping.

The liquidity preference story just tells us to keep in mind that *usually* it will be gently upward-sloping and so the measure expectations against the usually gently-sloping 'no-expectation' liquidity benchmark.

Acknowledging liquidity preference changes our story a little bit. *Because* yield curves are usually a little upward sloping, then just looking at the shape alone isn't enough to deduce which direction expectations are going. We must compare it to the "normal" or "benchmark" case, that is, when there are no expectations either way, but the curve is still gently-upward sloping because of liquidity preference.

As a result, financial analysts like talking about interest rate "**differentials**" in addition to yield curve shapes. A "differential" is just the difference between the interest rates on two types of bond. e.g. if 3-month bonds have a 4.5% interest and one-year bonds have a 5.25% interest, then the differential is "0.75%"

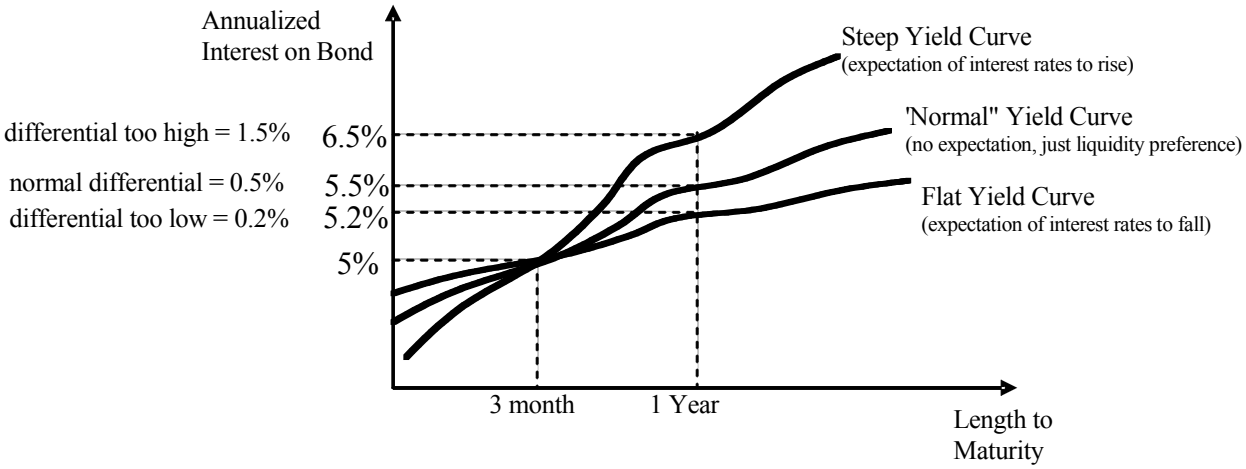
The 'differential' is just a kind of measure of "steepness" of the yield curve. Big differentials between short-term and long-term bonds mean the yield curve is quite steep.

The reason differentials are useful is to reference how far we deviate from normal. For instance, we might deduce that liquidity preference implies that, historically speaking, with no expectations either way, a one-year bond will usually be 0.5% above the yield of a three-month bond. So when short-tem bonds are 3%, long-term is 3.5%, when short term bonds are 6.5%, then long-term bonds are 7% and so on. So if you look at the market, see an

upward-sloping yield curve, but notice the differential between the three-month and one-year bond is only 0.5%, then "there's nothing to worry about". The current differential is more or less the same as the historical differential. It's just natural liquidity preference. There's no strong expectations implied either way.

When you should worry is when you see the differential deviate from the historical norm, e.g. if currently short-term bonds are 5% and long-term bonds are 6.5%, that's a 1.5% differential, much greater than normal. That indicates the yield curve has steepened - meaning bond markets are expecting interest rates to rise.

Conversely, when short-term bonds are 5% and long-term bonds are 5.20%, the yield curve is still upward-sloping. But the differential is only 0.2%, which is much smaller than normal. So even though our yield curve is still upward-sloping, the smaller-than-normal differential indicates that markets are expecting interest rates to fall.



Liquidity Traps

When the yield curve is very steep, economists go into a panic about "credit crunches" and "liquidity traps". Why? Well, a steep yield curve indicates that everyone is flocking to liquidity, that is, trying to roll-over short-term bonds, and few people want to hold long-term ones. That indicates that there are strong expectations that interest rates will rise in the future.

So what? Well, a lot of big investment projects by firms, a lot of bank lending (mortgages, etc.) tend to be on the longer end - 5 years, 10 years and such. So they are interested in borrowing on the long-term market, not the short-term one.

This makes economic policy very difficult. Because the Federal Reserve can only directly manipulate the very liquid end of the debt market - that is, it can print money and manipulate overnight loans and maybe affect one-month or three-month bonds. But it does not directly manipulate the longer-term debt, like 1 year 10 year or 20 year bonds.

Now under normal circumstances, if the Federal Reserve pushes the short-term rates down, the long-term rates fall down accordingly according to their differential. e.g. if the Fed manages to bring three-month rates from 3% to 2%, then longer-term rates should go down from 3.5% to 2.5% accordingly and maintain that historical 0.5% differential.

What if the long-term rates don't fall? What if the Fed pushes three-month rates from 3% to 2% but long-term rates stay at 3.5%? The differential has widened from 0.5% to 1.5%.

So what? The 'so what' is that if the yield curve steepens in response to Fed action, then the Fed isn't influencing the real economy. That is because a lot of big investment projects, a lot of bank lending, etc. tend to be on the longer end - 5 years, 10 years and such. So they are interested in borrowing on the long-term rates. But the Fed can only push down the short-end. If the Fed's manipulation on the short-end fails to have an effect on the longer end, the Fed is *not* having much of any influence on the real economy - the long-term rates relevant for borrowing for investment projects are not coming down, so investment spending by firms won't be affected by the Fed's actions.

Such a situation is often called a **liquidity trap**. Nobody wants to be locked into long-term lending. Everyone wants to roll over and hold only very short-term debt (in the extreme, hold only money). A liquidity trap is a also known as a type of **credit crunch**. Rapidly steepening yields curves are thus a worrisome indicator that a liquidity trap or credit crunch is in the making.

Why might a liquidity trap arise? Possibly because of a fear that the economy is going to hit the skids in the near future, and there is a general mistrust that borrowers will be able to pay them back.

Liqudity traps are dangerous because attempts by the Fed to manipulate interest rates fail - they pump in money and short-term debt, and the markets say thank you very much, we'll take it. But they are still *not* going to lend to long-term borrowers. So the long-rate stays high. In a liquidity trap, the Fed is 'neutered'. Its tools have no impact on long-term rates and thus cannot help firms undertake investment projects. The Fed can't help the economy.

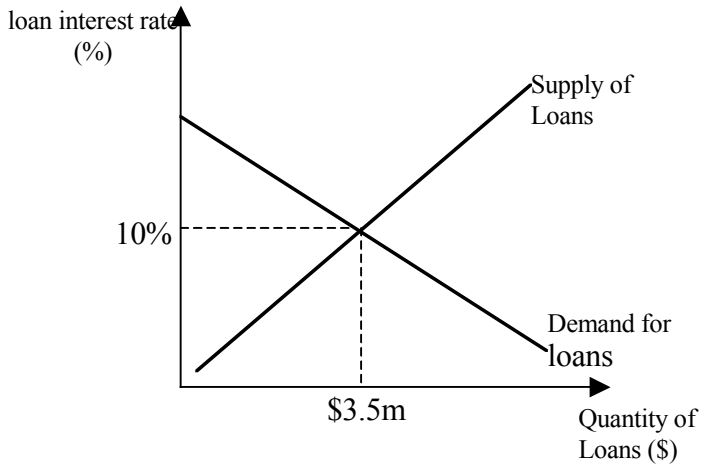
When caught in liquidity traps, Fed has tried lots of unorthodox tricks to bring long rates down - but they haven't always worked. Back in the early 1960s, when a liquidity trap seemed to be in the making, the Fed tried to manipulate long-term rates down with a complicated mechanism they called "Operation Twist". It didn't really work as well as they hoped. More recently, in March 2008, in face of the credit crunch brought about by the sub-prime crisis, the Fed hurriedly invented the " **Term Securities Lending Facility**" (TSLF). With this facility, banks were allowed to take out cheap, short-term loans (overnight etc) from the Federal Reserve, in return for which they put up long-term debt (10 year bonds, mortgage securities, etc.) as collateral. The idea was that banks might be willing to buy long-term bonds they wouldn't otherwise want to buy, if they had the possibility of quickly getting rid of those long bonds by passing them on to the Fed as collateral for a short-term cash they can roll over. By the TSLF, the Fed hoped to raise (via banks) the demand for long term bonds, and thus drive down long-term rates, thus easing the credit crunch and

allowing private firms to borrow again for their investment projects. Whether it worked or not has been much debated.

LOAN MARKET

(1) The Loan Market

Commercial banks lend to borrowers. They charge **interest** on the amount lent. What determines the interest they charge? Well, demand & supply of course! Loan markets are just like any markets: there is demand for loans by the public and there is supply of loans by the banks and there is a price (the loan market interest rate). It can be represented by the following diagram:



The demand for loans is by the *public*.
The supply of loans is by the *bank*.

-- The reason the demand curve is downward sloping is that the higher the interest rate, the less people want to borrow.

-- The reason the supply curve is upward sloping, is because the bank must acquire funds itself by promising their own depositors interest. The higher the interest rate on loans, the higher the interest rates banks can afford pay to their depositors, and thus the more deposits they will get and thus the more funds they will have available to lend.

The above diagram gives us a loan market equilibrium at 10%, where $3.5m in loans will be made.

(A) Loan market collapse

Many developing countries face the simple problem that loans are scarce and interest rates are very high. Many speculate this is simply due to the lack of supply of funds. Possibly. But it may also be the outcome of an **information** problem. Information problems can cause a loan market to collapse.

Banks are often unable to distinguish between good borrowers and bad borrowers. This information can often have great repercussions on the loan market as a whole.

High-risk borrowers often don't intend or don't expect to pay their loans back. As a result, they are often quite willing to borrow at very high rates. The reasoning is simple. If my business fails, I don't have to pay the loan back. So the higher the probability of my failure, the higher the interest rate I am willing to consider borrowing at. At the extreme, if my probability of failure is 100%, I don't particularly care *what* interest rate the bank charges me since I'll never pay it back. It's no skin off my back if it charges me 2% or 200% or 2,000,000%. At the other extreme, if my probability of failure is 0%, I very much care about the interest since I'm definitely going to be paying it. The higher it is, the less I am willing to borrow.

Consider the following situation: suppose a bank faces three loan applicants: A (low risk), B (medium risk) and C (high risk). Suppose that:

-- (A) Low-risk types (with, say, 0% probability of failure) will not consider loans above 7% interest.
-- (B) Medium risk types (with, say, 25% probability of failure) will not consider loans above 10% interest
-- (C) High-risk types (with 50% probability of failure) will not consider loans above 20% interest.

Ideally, the bank should give each type a different loan to meet their risk type, i.e. lend to A at 7%, to B at 10% and to C at 20%.

But if the bank cannot tell if a borrower is an A, B & C type, it's got a problem deciding which interest rate to charge. It may have some sort of idea of the proportion of bad, medium & high risk borrowers in the population, so it can calculate the "average" risk of the population (e.g. say that the *average* is 25% probability of failure). It then charges the interest rate calculated to cover that average risk, i.e. an interest rate at which people of average risk will take and the bank will make money (in this case 10%).

But the loan market begins to unravel immediately. You see, the high risk person will certainly take the loan. So will the medium risk person. But the low risk person will find it excessive. The interest is too high for them. So they'll cancel their loan applications and pull out.

Because the low risk types pull out, that leaves only high risk and medium risk in the borrowing pool. In other words, the average risk among borrowers is now *higher* than among the population as a whole. If the bank doesn't adjust the rate to reflect that, it will lose money. Once it realizes that, the bank will naturally raise the interest rate to cover the new average risk of the borrower pool. But that, of course, will cause more exodus. Again, the high risk borrower will take it, but the medium-risk borrower won't and will pull out.

So the bank ends up with the situation that it *only* has high-risk borrowers in its borrowing pool. As that is the only kind of borrower, it must charge really high interest (20%) on its loans.

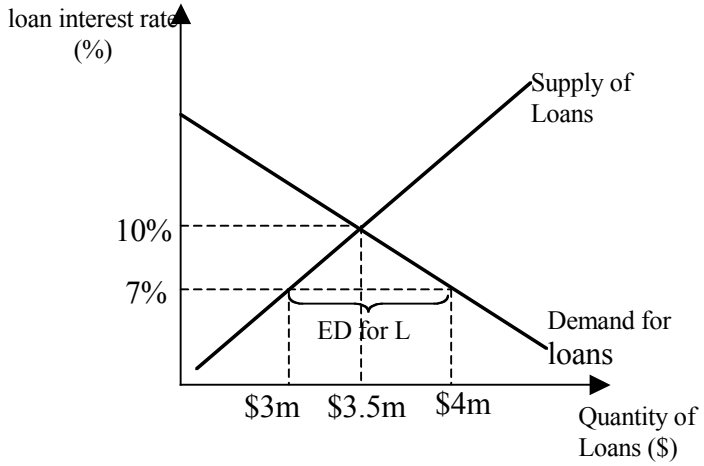
(Note: although we assumed the bank made money at 20% interest to high-risk type, but that is not necessarily the case. It may very well be that 20% is the maximum the high-risk type will consider, but to make money, the bank may need to charge a high-risk type at least 30% to cover its risk and costs. In this case, the high-risks pull out as well. We have a complete collapse in the loan market!)

This "collapsing" of the loan market is a phenomenon often observed in many countries. It is not necessarily lack of funds that makes loans expensive. It is an information problem, the inability of the bank to differentiate between borrowers, forcing them to aim for the average, but end up with only high-risk borrowers (if any) in their loan applicant pool.

(B) Credit Rationing

How does the bank prevent the bottom falling out of the loan market like this? One way is by **rationing** loans. In other words, it sets an interest rate ceiling and rations its loans, e.g. it charges 7% on its loans, period, and refuses to raise the rate *even if demand for loans is very high*. (and with interest rates so low, the demand will be enormous). Of course, putting a ceiling on its lending rate doesn't solve the information problem, but it prevents low-risk types from leaving the pool.

If the bank refuses to charge high interest on its borrowers, it can not pay high interest to its depositors. And so the supply of funds will be lower than normal. It faces a situation like the following:



In short, this self-imposed interest rate ceiling will create an excess demand for loans. Normally, excess demands are resolved by raising prices (in this case, the interest rate). But, because of the danger of creating an exodus of good borrowers, the bank will refuse to do so.

It is this excess demand for loans that creates the phenomenon of loan market rationing. Some people get loans, others simply don't.

How does the bank decide who gets their loans and who doesn't? One of the most common ways is simply by address. This is known as **red-lining**. It refers to the old practice of bankers handing city maps to their loan officers with entire neighborhoods circled in red -- no loans are to be given to any applicant from that area, period. It should probably come as no surprise that these neighborhoods were often the poorer parts of town.

While red-line rationing is a rather ugly phenomenon, keep in mind that banks would prefer not to have to do so. There are profits to be made on every loan, in every neighborhood. It is a simple matter of adjusting the loan rate to the borrower risk type. It is lack of information that leads to rationing, and red-lining is just a type of rationing.

(C) Collateral

Red-lining would be unnecessary if there was a way of getting the borrower to "reveal" his risk type to the bank officer. There is. It's called "**collateral**". Collateral is the good or asset (e.g. a house) you provide to the bank as security on the loan. If you default on the loan, the bank keeps the asset. If you pay it back, then the asset is returned.

The purpose of providing collateral is not really that the bank really would like to own your home (or whatever you're putting up as collateral). Banks are in the business of financing, not in the business of buying & selling houses. They'd prefer it if you just paid your loan back and avoided the whole trouble of them having to unload your collateral on the market. The gain the bank makes from liquidating the collateral in a fire sale is often rather pathetic. It certainly does not make up for the lost loan.

But as a **signal** of borrower type, collateral is invaluable. A high risk borrower *won't* want to put up collateral since he has a higher probability of losing it. A low risk borrower (who intends to pay the loan back) will have fewer or no worries about losing his collateral.

So, banks often use collateral to set up a **screening** device. They provide several interest rate & collateral packages which they offer to their customers. Suppose it offers two packages:

Package A -- 7% interest & high collateral
Package B - 20% interest & low collateral.

Low risk types will flock to A, high risk types will take B. Problem solved. You know your types & have tailored the interest rate to them.

Or is it? Well, the problem should be self-evident: what if you *don't* own anything you can put up as collateral? This is a serious problem facing may people in poor countries. Now, not owning things can be seen merely as a side-effect of being poor. But it is also a side-

effect of lack of title on what is *effectively* owned. The economist Hernando de Soto has highlighted this problem recently. If governments can somehow organize themselves and give the poor title to their effectively-owned assets, these can be used as collateral in the loan market. It will, he assures us, eliminate redline rationing or even the collapse of the loan market.

(2) <u>Financial Disintermediation</u>

The prospect of loan market collapse because of information is a tremendous problem in developing countries. But there are other problems which related to the degree of financial intermediation.

The first thing to remember about banks is the following: they make profits off the difference between lending rates and borrowing rates. Now, if a bank is just breaking even, do they charge the same interest on loans as they do on deposits? The answer is no. The reason is the reserve requirement ratio.

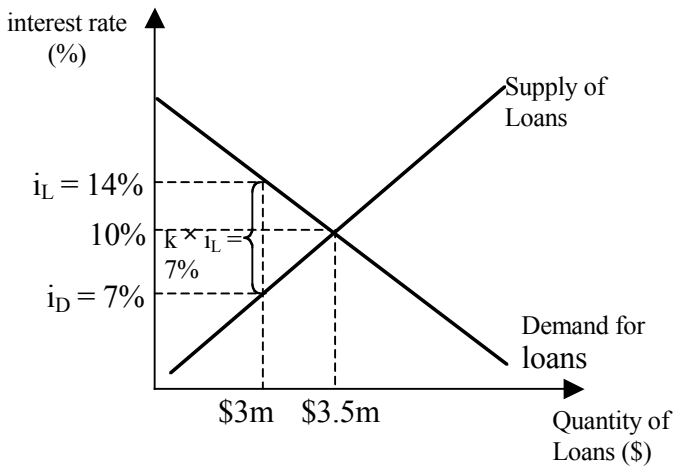
To understand this, let us examine the reserve requirement ratio a little closer. To make a $100 loan, a bank needs *more* than $100 in deposits because it must keep a portion of it in reserves. This creates a gap between the interest rate on loans and the interest rate on deposits. More precisely, just to break even (assuming no other costs), it must be that

$$\text{interest on loans} = [1/(1 - k)] \times \text{interest on deposits}$$

where k = reserve requirement ratio. So, if k = 0.5 (half of every deposit must be kept in reserves), then (1/(1-k) = 2, i.e. the interest rate on loans must be *twice* the interest rate on deposits for the bank to break even. The reasoning should be obvious. If the bank is paying 2% on $100 worth of deposits and it is only allowed to lend out $50, then those $50 must earn *at least* 4% just for the bank not to lose money.

The *less* the reserve requirement ratio, the *less* the bank's assets need to earn to break even, e.g. if k = 0.2 (i.e. 20% reserve requirement), then the interest on loans need only be 1.25 times the deposit rate. Obviously, the lower the reserve requirement, the smaller the difference between loan & deposit interest rates.

In diagrammatic terms, we adjust our depiction of the loan market should change so that we have a ***wedge*** created between the loan interest rate (i_L) and the deposit interest rate (i_D). The size of the difference is merely $k \times i_L$.



The reasoning should be simple. If there was *no* reserve requirement, if banks lent out every dollar they got in deposits, then in a perfectly competitive system, the interest rates on loans & deposits would be equal (or nearly so, just covering operating expenses & some minimum profit). In our diagram, that would be at 10% with $3.5m in loans made.

But now that we have the reserve requirement, the interest rates can no longer be equal. There must be a gap between them. Again, to break even, the bank loan interest rate must be (1/(1-k) times the deposit rate. Or, put differently, $i_L = i_D + ki_L$, the loan rate is equal to the deposit rate plus the gap ki_L (= reserve requirement × interest rate on loans). This creates a wedge which we have to fit snugly in between the loan demand and loan supply curves. The loan market clears with a gap. In our diagram, a 7% interest on deposits raises $3m in funds available for lending (Supply of Loans), a 14% interest on loans creates demand for $3 million worth of loans. Demand = supply, but there is a gap in the interest rate the bank pays for supply and charge to lenders.

One immediate consequence we see of this gap is that the volume of total lending ($3m) is *less* than if there was no reserve requirement at all ($3.5). And notice that the larger the necessary *gap* between loan rates and deposit rates, the *smaller* the amount of total lending will be.

So, anything that *increases* the gap means *less* financial intermediation. What sort of things increase this gap?

-- **Reserve requirements** as we have seen create the gap. The *higher* the reserve requirement (k), the *bigger* the gap and so the smaller the volume of financial intermediation.

-- The simple **administrative costs** of lending also increases the gap. Forget collateral for the moment. Just *reaching* borrowers in developing countries is costlier. Operating costs in development country banks run as high as 10% of total assets (in comparison to around 3% or less in developed countries). That forces the bank to increase the gap between lending & deposit rates & lowers the overall level of financial intermediation.

-- The problem of **cartelization** in bank lending is rather large. Banks are few and far between, with the result that banks (like any other monopolistic corporation) face little competition and can make monopoly profits. Lack of competition means they aren't forced to break even by competition. Rather, they can expand their gap at will. They don't need to pay much interest on deposits and can charge exorbitant interest on loans. That increases the gap voluntarily & lowers intermediation.

-- **Taxation** is also a problem. Many developing country governments face enormous problems finding revenues since so much economic activity goes underground. The formal banking sector is usually an easy target. Developing country banks are on the receiving end of a lot of taxes, which cut into profits. To make up for it, banks have to widen the difference between loan and deposit rates. Again, intermediation declines.

-- The problem of **inflation** is a particularly knotty one. Inflation erodes the real value of money-denominated assets, like bank deposits. Low interest rates and high inflation means that bank deposits effectively pay *negative* interest rates to their depositors. That does not seem to be a way to attract funds into the financial system.

In interaction with the reserve requirement ratio, inflation is lethal. To understand this, let us keep in mind inflation raises the price of everything. It also reduces the real value of an interest rate. So, if interest rate is 14% and inflation is 10%, then the *real* interest rate is 4%.

But reserve requirements are defined on the nominal (money-denominated) amounts. So look at the problem again. Suppose, again, that we have 50% reserve requirement (so $1/(1-k) = 2$). Suppose inflation is zero and loans are earning 4%. Then, by the formula, notice that $4 = 2 \times 2$, i.e. the maximum rate the bank can pay depositors is 2%.

Now, suppose inflation hits and is running around 10%. To keep the same real earning on loans, bank loans must be earning earn at least 14% to maintain their 4% real return. *But* by the reserve requirement formula, the *maximum* the bank can pay to depositors in this case is 7%. (i.e. $14\% = 2 \times 7\%$). But look at that closely. Inflation is running 10% and depositors are earning only 7% on their money-denominated bank deposits. *Their* real rate of return is now -3%! They are losing money by keeping their money in the bank. So they'll withdraw and invest in something else (usually convert it into durable goods).

So, the reserve requirements makes the inflation problem *worse*. It is impossible for banks to pay more than 7%, or else they'll be making losses. But if they only pay 7%, depositors will make losses. Since many developing countries do have acute inflation problems, this causes a lot of financial disintermediation..

-- **arrears, deliquency and default rates** tend to be higher in developing countries. This arises out of a whole set of reasons. One list runs through a whole series of reasons:(a) failure to tie lending to productive investment, (b) neglect of marketing and linking credit recovery to sale of the product; (c) defective loan policies -- e.g. delayed loan disbursement, too much or too little credit, unrealistic repayment schedules (d) misapplication of loans, (e) ineffective supervision, (f) apathy and indifference of bank managements to recovering

loans (g) lack of discipline or responsibility on the part of borrowers. All this leads to an enormous amount of non-performing loans (average about 40% of total) in the portfolios of developing country banks. Exact numbers are difficult to calculate because of accounting tricks (e.g. classifying rescheduled loans as fully repaid, then treating the new loan as a performing asset until the next deliquency). The costs of all this are pad up the gap.

-- rash **government intervention** can also mess things up. One popular mistake is to impose ceilings on deposit rates. The objective is to discourage banks from having to lend to risky enterprises to make up for it. But, ironically, a ceiling just forces the gap to get wider and thus raises loan interest rates.

(3) <u>Development Banking</u>

Development banking, or banking with development objectives as conducted by numerous agricultural or industrial development banks, have their own additional problems. These include the following:

-- Development lending tends to have a higher proportion of non-performing loans than commercial banks. Borrowers are not assessed for probability to repay, but because of development **goals**, which is usually not linked to profitability. Directing credit in certain directions can be useful in the long-run, but can also cause short-term problems in terms of mounting costs.

-- **Subsidized interest**, too, is a problem because (coupled with inflation) that means loan interest rates can be negative, giving borrowers an incentive to delay payment, and again increasing the deliquency costs to the bank. There is also the curious, but seemingly persistent problem of confusion among recipients as to whether they are receiving a grant or a loan (packages often have a bit of both), which leads to substantial amounts of inadvertent defaulting.

-- Development lending usually brings up the problem of **financial layering**, i.e. multiple institutions used to channel a development loan to the ultimate borrower, e.g. county cooperatives borrowing from a national agricultural board, which in turn borrows from the government or the big development bank, etc. These layers are often placed to ensure that the right borrower gets it, i.e. meet development priorities, but every institution adds a new layer of administrative costs. By the time the money goes from the saver to the borrower, the loan is extremely costly and it has gone through increasingly more distant scrutiny. There is a good case for removing a lot of the layering, e.g. microcredit, or allowing lower-tier layers to raise funds themselves on the financial markets rather than having to kick a loan application upstairs to the national government or big development bank.

-- **Universal banking** is another topic broached. The idea is to follow the development financing as happened in many bank-based systems like in 19th C. Germany. A universal bank not only lends, but also owns shares in the company they lend to, thus allowing them to guide the company's policy. There are pros and cons to this. The most obvious con is lack of competition on both the borrowing and the lending side creates problems. Firms

have to either borrow high interest loans from the institution which "owns" them, or firms which are basically inept get loans from their owners on extremely generous terms, freezing out financing for those which are not so owned. Another con is the one that provoked the American law forbidding it: banks overspeculating on the stock market and stock-market crashes leading to waves of bank failures.

The basic pro on universal banks is that since equity markets are so shallow in developing countries, the hopes of a firm to raise funds by stock issues on the open market is low. If commercial banks are allowed to own shares, they can make up for that deficiency, giving equity markets some "depth". Furthermore, the banks' "expertise" in financial matters can help the firm overall.

INSTITUTIONAL FUNDS

We have spoken a lot about banks. But banks are not the only financial intermediaries. The following three types of financial intermediaries - often called "institutional funds" or institutional investors" - are also worth mentioning:

(1) **Insurance companies**. In return for providing insurance services to the public, it uses the income from its premiums to acquire financial assets. It uses the interest earnings on these assets to cover their liabilities (i.e. insurance payouts).

(2) **Mutual funds** (sometimes also called "unit trusts" or "investment trusts") & their related cousins (hedge funds, etc.). These institutional funds pool the savings of households to buy assets in direct financial markets and disburse the net income earned.

The point of mutual funds is **diversification**. If a household saves only $1,000, it may only be able to buy, say, one bond from one company (if that). It is putting all its eggs in one basket. If the company does badly, the household may lose all its savings.

But if a *hundred* households pool their $1,000 savings together and hand them over to mutual fund, the fund will have $100,000 to play with. It will distribute that amount between bonds & stocks from several different companies. If one company's bonds or stocks do badly it will probably be counterbalanced by another company doing quite well. It is unlikely they will *all* do badly (but it is possible!)

We can say that commercial banks play a similar diversifying role too, but commercial banks are often forbidden by law from holding certain types of risky assets. Mutual funds have no such constraints. Mutual funds distinguish themselves from each other by the type of assets which they hold. Their selling point is often that they "specialize" in particular "types" of assets which individuals are interested in but are usually too afraid of holding by themselves. For instance, in the late 90s there were several hedge funds which specialized in holding of the risky shares of tech companies. If you wanted to "get in" on the internet boom, but were afraid of picking any particular dot-com, you could give your savings into a mutual fund which held a mix of internet-related assets. Other hedge funds specialized in the risky bonds of fledgling East European governments. Others in holding bank deposits in various volatile Asian currencies. There's a fund for every taste.

[Note: You get into a mutual fund by buying a "share" of it. There are two ways of doing that, depending on the type of fund. In "closed-end" mutual funds, the subscription price to get into the fund (i.e. the price of the share) is calculated by the fund's managers. In "open-end" funds, shares in the mutual fund are traded freely on financial markets and you just buy it at the price the market calculates for it.]

(3) **Pension funds**. These resemble mutual funds, but their tax and legal status are quite different. Often the return from pension funds is untaxed until the income is actually paid out (and, until then, payments are even tax-deductible). In return, the sale of subscriptions is

laden with time constraints and there are restrictions on the range of assets the pension fund can hold. Pension funds typically hold portfolios of very low-risk stocks & bonds (e.g. a mix of bonds and shares in so-called "blue chip" companies (big safe companies with good track records, like IBM or DuPont), US government bonds plus some bank deposits in reliable currencies. Pension funds are the primary vehicles for very long-term investments (retirement, college, etc.)