The Money Market

In this section we will cover various aspects of the capital markets and financial intermediaries (banks) although our emphasis will be on the role of monetary mechanisms in macroeconomic policy, hence the title, The Money Market. From an economic perspective, markets and banks link savers and borrowers together. Markets do it without middlemen, thus at a lower cost than banks, but they are more limited in the types of transactions that they can accommodate. Markets and banks perform two essential economic functions. They bridge the gaps in time and in space (location) to move resources, which in this case is capital, and they provide information in the form of prices, as well as other forms.

We will cover in detail the various definitions of money, interest rates and other monetary aggregates in our discussion of Money Supply and Demand. In the following section on Money, Credit and Banking, we shall examine the interrelationship of money, credit and banking in determining economic activity. America's central bank, the Federal Reserve, will begin our commentary on Monetary Policy. A topic which is almost daily in the news. Finally we will finish our tour of the money market by looking at broader credit markets and asset pricing.

Money Market Overview

Money has an important effect on economic activity because of its functions. One, money functions as a universally accepted medium of exchange. Money is held to facilitate transactions because there is a lag between receipt and disbursement of income. Therefore, it can affect the volume of goods and services, and the price level. Second, money functions as a store of value, holding money instead of other assets as its nominal value is more predictable, and it can buy other assets at little transactions cost. Third, money functions as a unit of account allowing us to measure changes in our prosperity. From these functions, it can be deduced that money is demanded for transactions and asset purposes. As in any supply and demand situation, an increase in supply relative to demand will cause price to fall. An increase in the supply of money will cause the price (the interest rate) of money to fall. Consequently, changes in the yield of monetary (certificates of deposits, Treasury bills, bonds etc) assets will cause demand for other assets to change, thus causing a change in investment spending, therefore changing the level of income and employment.

Definitions of Money

What is money? It's not as simple as you think. Generally, currency and checking accounts (checking accounts are also known as demand deposits) are considered money. Credit cards are not, because one has to pay the monthly bill with a check. What about debit or check cards? Yes, the cash comes straight out of your account, no further action is required. What about savings accounts? Usually no, but if you can access them with your debit card then... you see the point. Money is generally anything accepted as final payment for goods, services, or debt. To minimize confusion, the Federal Reserve has created various definitions of money based on liquidity. Why more than one definition? Each definition is useful in describing (and hopefully forecasting) an aspect of human economic behavior.

- **M1** Currency outside banks + demand deposits + other checkable deposits + traveler's checks (narrow definition)
- **M2** M1 plus savings deposits (including money market deposit accounts), small-denomination time deposits (time deposits $100,000), and retail money market mutual funds (broad definition)
- **M3** M2 plus large-denomination time deposits (in amounts of $100,000 or more), institutional money funds, repurchase liabilities (overnight and term) issued by all depository institutions, and Eurodollars (overnight and term)

- **L** long-term liquid assets; T-bills, savings bonds, commercial paper, bankers' acceptances, & Eurodollar holdings of US residents

Selected Monetary Measures, 1998
Billions of dollars

Currency	464.2
Travelers Checks	8.0
Demand Deposits	392.4
Other Checkable Deposits	250.7
M-1	**1,115.3**
Savings	1,600.9
Time Deposits	951.1
Retail Money Funds	751.7
M-2	**4,418.9**
Institutional Money Funds	523.3
Large Time Deposits	626.0
Repurchase Agreements	290.6
Eurodollars	154.5
M-3	**6,013.3**

Source: Federal Reserve Statistical Release H.6

Money Supply

What determines money supply? Money is printed by governments. As we will see in our discussion of fractional reserve banking, the financial system can amplify changes in the money supply. In the United States, and in many other countries, management of the money supply is delegated to the central bank, and forms one of the most important tools of monetary policy. With the increasing use of the American dollar as a global currency and the ease of which money can be transferred around the world, managing the supply of dollars is both more complex and more critical to the stability of the world financial system.

Quantity Theory of Money

Let’s examine one aspect of money supply, its relationship to inflation. The quantity theory of money says that money has an influence on nominal income and inflation. Where M = money supply, V = Velocity of money, P = Price level and Q = Quantity of goods and services, the theory is expressed as the equation of exchange MV = PQ. Increasing M, while holding V constant must increase the right hand side PQ. The quantity PQ represents national income (GDP if you prefer). The question that arises is does national income increase because of an increase in Q, which is a real increase in the amount of goods and services produced, or because of P, the price level goes up with no real increase in the standard of living. It really depends on unemployment, if the economy is operating at full employment, then Q cannot increase and the price level would have to increase. This underlies the observation that money supply and inflation are correlated in the long run. Monetarists have maintained that inflation is a monetary phenomenon caused by excessive increases in the money supply over the long run. Milton Friedman has done pioneering research in this area. If on the other hand there is unemployment, then increasing the money supply may increase Q more than P causing unemployment to fall. Under the

discussion of the IS-LM analysis it will be explained in detail how this could occur.

Real vs. Nominal Money Supply

It is important to understand the difference between the current stock of cash and deposits, which is called the nominal money supply, and the purchasing power of that money stock, which is called the real money supply. Mathematically, Nominal Money Supply / Price Index = Real Money Supply. Visualize a small remote island with ten people and ten coconuts. Give each person $10 and each coconut will cost $10. Give each person $100 and the price of each coconut becomes $100. There is more money but with the same quantity of goods and services, each unit of currency buys less. This argument parallels that earlier of the quantity theory of money. The question may arise concerning the assumption establishing the constancy of velocity. It does vary somewhat. The variation may be small enough as to not affect the monetary policy action outcome.

Money Demand

Transactional needs

Why do people demand money? Greed and power? Well, I was thinking more in terms of economic theory. We need cash to pay the monthly bills like rent, car loans, phone, food, entertainment, etc. These are for transactional needs. As our income increases, our transactional demand for money increases. Why? Consider rent. Possibly we live in a two bedroom two bath apartment that rents for $600 a month, but now our disposable personal income jumps to $3,000 monthly. It's time to upgrade to that $1,200 townhouse. Consequently, we had better leave a higher balance in our checking account to pay the rent. We may want to leave a little extra in the checking account to cover emergencies. That could be separately called a precautionary need, although many economists consider it just another type of transactional demand.

In today's computerized financial markets, it is easy to minimize balances in checking accounts by keeping those funds in money market accounts that earn considerably more interest, transferring money as needed by ATM or internet access. This reduces the need for transactional balances.

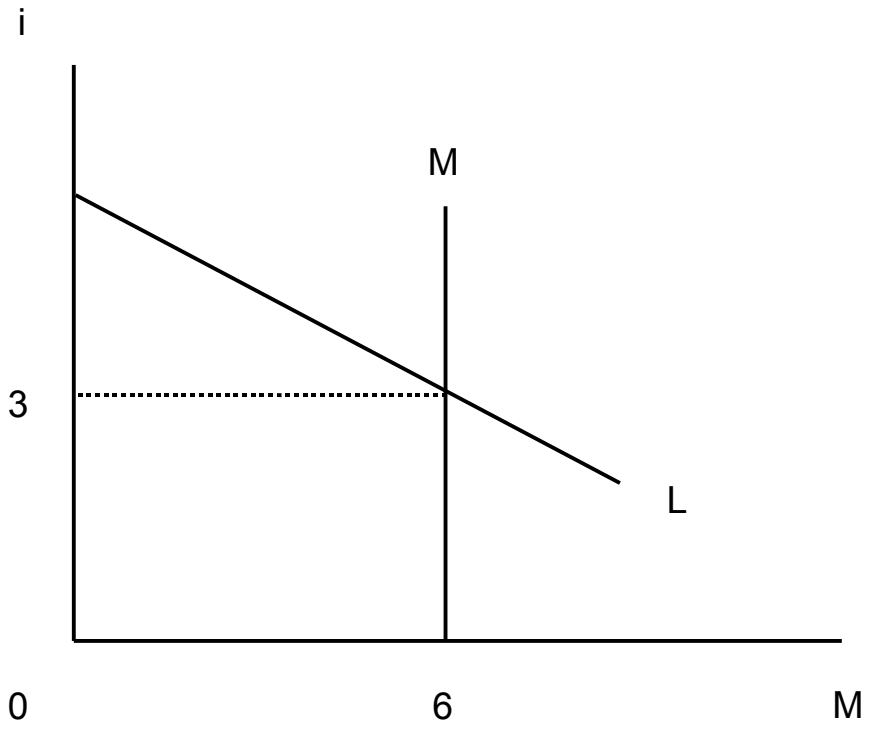
Asset needs

Money is not just to spend however, we like to purchase financial assets as means of saving for retirement or some other purpose. This is an asset demand for money. This demand is determined by income (which increases asset demand) and interest rates (which as they increase decreases demand as holders of money seek to convert into interest paying assets).

As income increases, people seek to add to their funds for savings purposes and are able to do so. Traditional economics theory says that funds held as money do not earn interest. The alternative use of money, cash, is to buy bonds. As interest or yield on bonds increases then the lose of potential income becomes great. Eventually, so much so that people switch funds from money into the higher yielding bonds. This loss of income is often referred to as opportunity cost. Bonds yielding 8% means you are losing 8% on the use of your funds if you hold them as cash in demand deposits (checking accounts).

In today's economy, demand deposits can earn some interest. Money market accounts which previously were not checkable now have some checking access although it may be more limited than regular checking accounts such as 4 to 6 checks per month. Consequently, with money market accounts now defined as M-2 money, it follows that demand for bonds may be less than before as the opportunity cost of holding money has dropped.

We graph money demand as a downward sloping curve. At higher interest rates we want to hold less cash and more bonds. As interest rates drop, the advantage to holding bonds drops so we want to hold more cash. The interest rate graphed is really the interest rate of bonds, not cash.



In Exhibit 1.0 money supply is graphed as a straight vertical line. At least for the purposes of this course we assume that money supply is fixed by the monetary authorities and does not vary in response to the interest rate (in reality money supply does react to interest rates). Money demand, which very often is designated as L, which stands for Liquidity preference (and that is what demand implies), varies inversely with the interest rate due to the asset demand for money. Increasing money supply shifts the money supply curve to the right. At the new intersection, interest rates are lower. This is true, for small increases in the money supply. Larger increases trigger an inflationary impact that can actually increase the nominal interest rate.

Nominal vs. Real Interest Rates

Although the graph shows one equilibrium interest rate, in reality, it would be more accurate to visualize equilibrium as an average of economy wide interest rates. Interest rates vary by term to maturity (yield curve) and by sector such as corporate bonds, municipal bonds, mortgage securities, etc. Within sectors, interest rates vary by risk and are rated by rating agencies such as Standard & Poors and Moody's.

Selected Interest Rates, April 1997

Federal Funds (Effective Rate)	5.51
commercial Paper (6 mo)	5.79
Bankers acceptances (6mo)	5.71

CDs (secondary market)	5.90
Eurodollar deposits (London)	5.89
Discount window borrowing	5.00
Treasury Bills (6 mo)	5.35
Treasury 5 yr	6.76
Treasury 10 yr	6.89
Treasury 20 yr	7.20
Treasury 30 yr	7.09
Corporate Bonds - Aaa	7.73
Corporate Bonds - Baa	8.34
State & Local Bonds	5.88
Conventional mortgages	8.14

Source: Federal Reserve Statistical Release G.13

Let's take a moment and discuss what affects the interest rate. First let's differentiate between real and nominal interest rates. The nominal interest rate is the current interest rate. Suppose you buy a $10,000 bond. It pays (the term most often used is yields) 12%. That 12% is the nominal interest rate (sometimes called the current interest rate). To find the real interest rate we have to adjust the nominal rate by the rate of inflation. Let's say that the rate of inflation is 7%. A simple approximation to find the real rate is to subtract 7% from the 12% to get a real rate of interest of 5%. In other words, the real interest rate reflects the purchasing power of the nominal interest rate. The addition of real interest rate and inflation is known as the Fisher Condition.

All of this assumes that the bond will never default, that is it will always pay its interest and principal on time. All bonds have some default risk, although such a risk on the US Treasury bonds is so small as to be thought of as negligible. In this case, we will need to adjust the 5% by the default risk, let's say 2%, to equal 3%, the real interest rate.

Fisher Condition

Nominal rate = Real Rate + Inflation Rate + Risk Premium

Let's discuss some of the most quoted interest rates in the media. The most commonly quoted loan rate is the prime rate. That is the rate quoted by the major money center commercial banks to their best corporate customers. Everyone else is quoted prime plus X such as prime plus 1% or prime plus 1 1/2%.

The rate at which banks borrow reserves from one another is called the Federal Funds rate. When they borrow directly from the Federal Reserve, that rate is called the discount rate. When these rates go up, the prime rate usually increases. One way to understand this relationship between these rates is to view the Federal Funds rate as the wholesale rate, the rate at which they borrow and the prime rate as the retail rate, the rate at which they lend funds. When wholesale costs rise, they frequently are passed on as higher retail prices.

Interest rates affect public demand for goods and services by affecting borrowing costs. Higher borrowing costs obviously increase costs of consumer durables, those large ticket purchases of housing, cars, computers, etc. Consequently, demand drops as interest rates rise. The question here is whether real or nominal rates are important. Debate on this issue is not settled but note that in periods of high inflation, high interest rates may not negatively impact demand as expected if real interest rates are

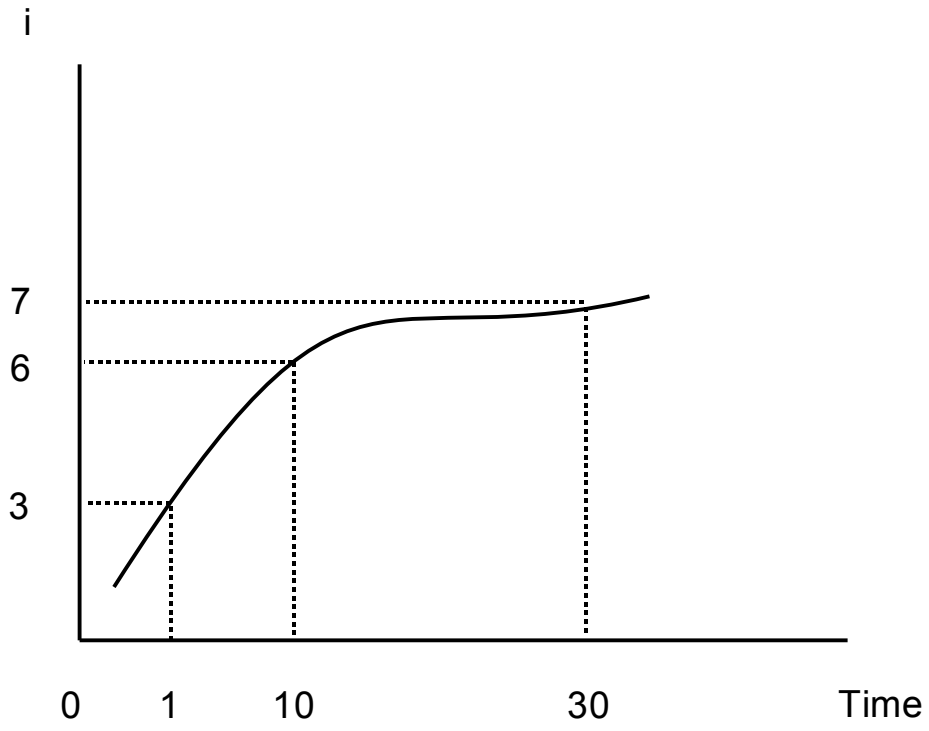
low.

Let's say inflation is running at 8%, with nominal rates at 9% the real rate would be 1%. Due to salary levels rising at a rate of 8% per year, paying a 9% nominal rate would be easy. In fact, this nominal and real rate combination could be stimulating demand.

Lower real interest rates triggering a healthy economy may increase loan supply as financial institutions are more willing to lend to businesses and individuals. They are willing to lend for several reasons: one, credit risk is perceived as being lower, secondly, loanable funds may be available due to expansion of the money supply.

Lower interest rates fuel aggregate demand by increasing investment demand. With lower interest rates, businesses find it profitable to buy more equipment and structures. Capital spending to increase capacity is enhanced by increased consumer spending due to the wealth effect. As interest rates fall, common stock tends to be a more attractive investment than bonds. With higher stock prices and low financing costs on bonds, corporations find it relatively easy to obtain financing for expansion.

Foreign exchange rates are impacted by interest rate changes. Lower domestic interest rates generally cause depreciation of the domestic currency, thus lowering prices for exports and increasing prices for imports. This increases domestic demand, output and employment, further expanding the economy.



The Yield Curve and Interest Rates

When we view money supply and demand graphs, we see the equilibrium interest rate and talk about it as though it were one interest rate. A more accurate perspective is to consider it as an average of economy wide interest rates. When interest rates are arrayed by time to maturity, they usually form a concave curve. This is called the yield curve. The relationship between these interest rates and maturity is called the term structure of interest rates.

There are three major theories to explain the term structure of interest rates: expectations hypothesis, liquidity preference hypothesis and the segmented market hypothesis. In the expectations hypothesis, long term interest rates are an average of consecutive expected short term interest rates over the long period. In the market segmentation hypothesis, financial institutions and investors have strong preferences about the maturity structure of their financial borrowing and lending. These preferences create unique supply and demand conditions for each maturity range. Liquidity preference hypothesis asserts that longer term maturities should provide higher returns than short term maturities to compensate for price risk.

The most watched yield curve is that for US Treasuries (Federal Government bonds). In finance, particularly portfolio management, the yield curve is very useful. When the yield curve inverts it is taken as a signal that a recession could be on the way. In mid-1998 we had an inverted yield curve. Empirical support favors a combination of the expectations and liquidity preference hypotheses. Market analysts examine the yield curve for clues as to future direction of interest rates and possible monetary policy changes by the Federal Reserve. That discussion I'll leave to a more advanced course.

What importance does the yield curve have for government and the taxpayers? Remember that there is a large Federal debt outstanding. Servicing that debt consumes about 16% of the Federal budget. Most of that debt is long term. Anything that lowers long term interest rates lowers the cost of servicing the debt to the taxpayer. At the beginning of the Clinton administration, the Federal Reserve in coordination with the Treasury Department (in previous administrations, cooperation wasn't so close) raised short term rates and took other measures to fight inflation.

The maneuver worked. Long term rates began to fall saving the government billions and helped to cut the deficit (now it is a surplus). I stress this example to underscore how important it is to have politicians who understand something about economics. I use as a counter example, Newt Gingerich, whom as Speaker of the House, threatened to have America default on its debt. This, what I consider a highly irresponsible action, this could have caused investors to demand a default risk premium that would have increased borrowing costs to the US Federal Government into the billions. Each of us would have had to pay another $100 or so in additional taxes to cover these costs. Fortunately, this didn't come to pass.

Interest rates and the yield curve are important to us for other reasons. Interest earned on savings deposits, certificates of deposits and money market accounts are all short term rates. Rates on car loans, consumer loans and mortgages are intermediate to long term. All of the above mentioned interest rates are responsive to changes in the yield curve. Consider how it affects consumer finances. A $100,000 30 year mortgage at 6% requires a $599.55 monthly payment. A 7% mortgage requires $655.30 monthly payment. 1% costs $55.75 per month.

Many financial analysts and the Federal Reserve watch risk spreads. A risk spread can be defined as the difference between yield on comparable Treasury and non-Treasury securities. Taking corporate bonds as an example, when economic conditions worsen the spread between corporates and treasuries tend to widen. There are two basic rationale for this. One, a flight to quality as investors buy Treasuries causing the yield to drop. Secondly, yields on corporates could be increasing as investors anticipating that corporation's ability to service debt will be impaired as economic conditions worsen, demand higher risk premiums. The Federal Reserve monitors risk spreads as one factor in determining the state of the economy before making a decision concerning the course of monetary policy.

Relationship between Money and Economic Growth

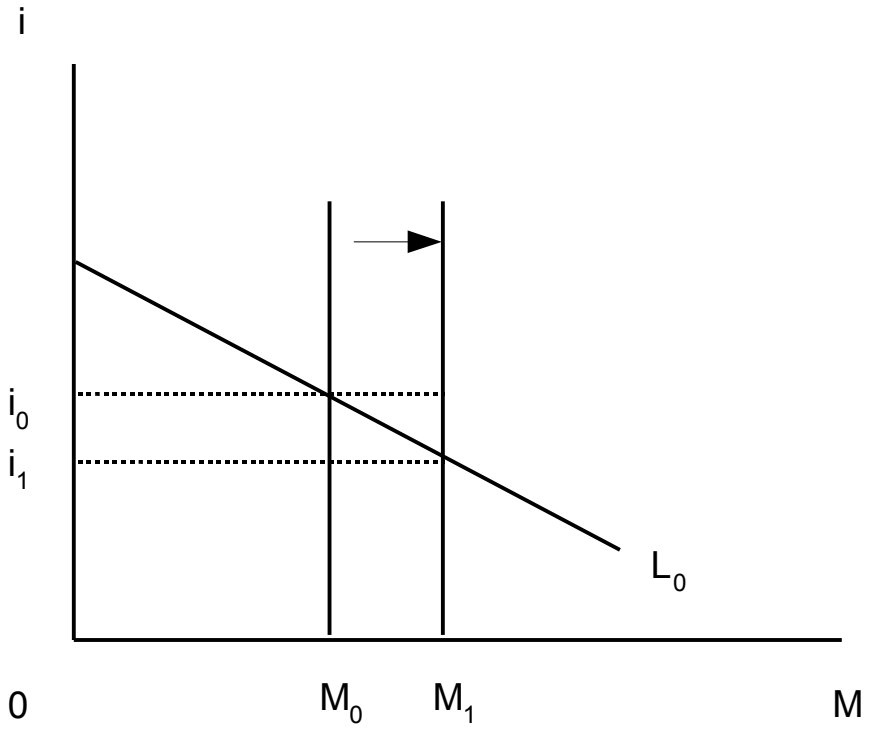
If an economy is to grow then money supply needs to grow. If it increases too fast inflation results as

predicted by the Quantity Theory of Money. If money supply grows too slowly, deflation - that is decreasing prices, result and growth slows or possibly stops. So what is the appropriate growth rate? One that facilitates transactions. As the transactions demand for money increases so should the money supply.

With an economic growth rate of 4%, one could expect that the transactions demand for money would increase roughly 4%. Demand for money will also vary according to asset considerations. If nominal GDP grows at 6% then one could expect money supply to grow roughly at the same rate.

Money Supply and Demand

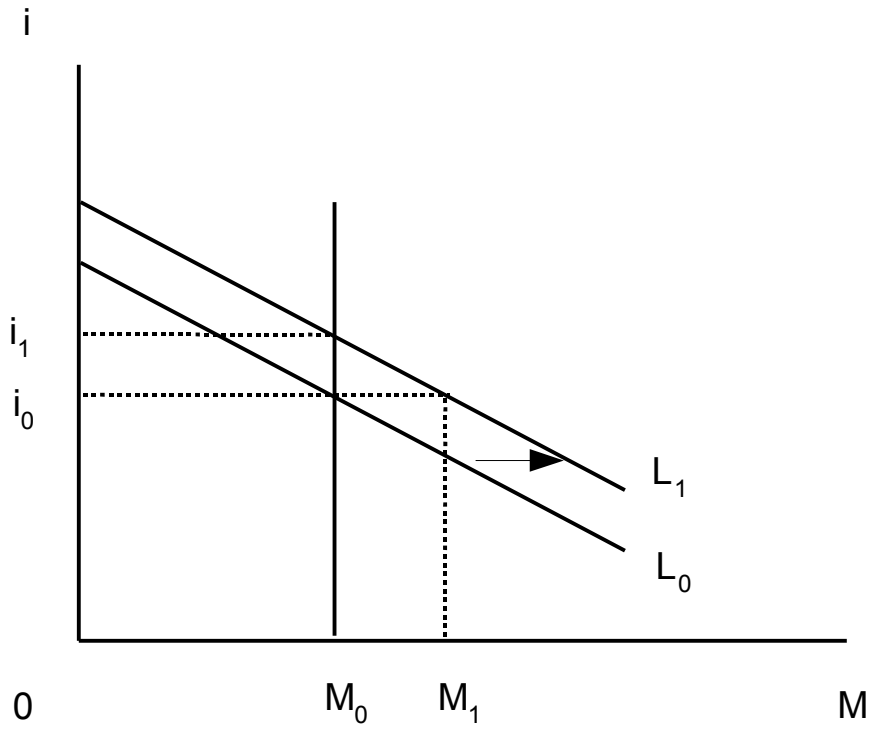
Let's examine in more detail equilibrium in the money market.



In this example, money supply increases. To understand the dynamics of movement from one equilibrium to another, suppose that there are only two assets: cash and bonds. With the shift in money supply, there is an excess of money.

At i_0 and M_1, holders of cash will purchase bonds since at i_0 the interest revenue gained is greater than any convenience of holding cash for transactions purpose. Note that despite the purchase of bonds money supply does not change. A basic explanation for this, to purchase a bond someone must sell it. They sell it because they will make a profit. The price they sell it at is higher than the purchase price. This type of profit is a capital gain. The bond seller now has cash to spend as desired. Cash is not destroyed in this simple world.

Interest rates drop as purchases of bonds drive bond prices up and yields down (Read asset pricing to understand the relationship between prices and yields). The final result will be at i_1 and M_1.



With an increase in money demand which causes it to shift rightward, at i_o there is an excess demand for money. Consequently, bonds will be liquidated causing bond prices to fall and bond yields to increase. As bond yields, that is, interest rates rise, the quantity demanded of money will fall. At i, money supply equals money demand. There is no pressure to buy or sell bonds.

From these examples, it should be clear that the interest established in the money market is due to portfolio adjustments between cash and bonds. A portfolio is a collection of financial assets (or liabilities). The interest rate reflects the relative willingness of holding cash versus bonds.

Money, Credit & Banking Overview

To understand how important banking is, consider an economy that has no money or banks. In a barter economy, all economic units are required to have a balanced budget. Households must spend entirely on consumption. Capital formation is rigidly tied to distribution of current income. Households cannot borrow money or assets to expand production, hence income. Risk-takers are unable to expand assets beyond their own net worth and rate of profitability. If your profit rate is 10%, then next year you can

buy 10% more assets. Economically productive opportunities are lost and economic growth would be low if at all. For example, you may know how to make anti-gravity cars, without any money, none will be made. With financial institutions, savers can lend their savings to businesses which purchase assets to increase production. Ultimate lenders and ultimate borrowers are matched in the economy, separating investment and saving decisions. Capital accumulation and growth are facilitated.

Consider the services that banks provide as an intermediary between savings and investment. Let's say you need $40 million for a new citrus processing plant. Without a bank you would have to do the following: find enough saver's to match the size loan you need, whom want to lend it to for the required term (maturity) and don't mind typing up their money forsaking liquidity. Of course there are the attorney's fees for each individual loan contract to be signed. Each of the lender's faces enormous risk of losing their cash - how much do they really know about lending to the citrus industry.

Enter the banking system to the rescue. Because of the large number of depositors, banks can accept deposits of an size, maturity and provide liquidity if they need the money for an emergency. And the bank can make a loan of any size for any maturity. Since only one loan contract is signed there is a savings in attorney's fees. Banks develop expertise in areas such as citrus processing lower their risk and monitor these loans. Depositors are not directly penalized if one loan defaults. Transactions costs for both depositors and borrowers are lower.

Why use banks instead of going directly to a market? The answer is asymmetric information. It is difficult for markets to judge credit worthiness directly. Borrowers have more information then lenders. They have no incentive to reveal their distress (a case of moral hazard). Consequently, lenders are very leery of making bad loans. But banks can pool, monitor, and control risks while at the same time providing liquidity to lenders who may need it from time to time. Banks can write contracts designed to force compliant behavior from borrowers. Credit is rationed by lending less than 100% of the funds needed to acquire cars, homes, etc.

Financial Institutions

From a macroeconomic view, banks convert cash savings into investment credit. Banks therefore are a key link in monetary policy, using money to influence economic activity. It is worthwhile to learn some fundamentals on bank management.

A bank's traditional source of profitability arises from the difference between interest income received from loans and interest expense paid on deposits. This difference in rates is referred to as spread or margin. Spread is very often expressed in basis points. 100 basis points equals one percent. Usually a spread of a least 500 to 600 basis points is desirable in the banking industry (but not always achievable I should add). The goal is to maximize return while minimizing risk.

Earning this spread is not without risk. Traditionally three sources of risks are defined for banks: credit risk, interest rate risk, and liquidity risk. Banks seek to minimize risk while maximizing profits. Each source of risk must be managed.

Credit risk, the risk of nonpayment of principal and/or interest can be mitigated by requiring collateral on a loan. This requires charging loans with a higher default risk (also known as credit risk) a higher interest rate. Banks try to assess credit risk for loan applicants to determine how much credit to extend, under what terms. They continue to monitor risk over the life of the loan.

Let's examine the typical balance sheet of a bank to see how interest rate risk arises. Assets are uses of funds. Liabilities are sources of funds. For banks, checking accounts, savings accounts, certificates of deposits and long term debt comprise 92% of the funds used to acquire assets. A measure of average

maturity is duration. It reflects how quickly a portfolio turns over. A portfolio of liabilities for a bank can have a duration of 2 years while the portfolio of assets may have a duration between seven and ten years. In other words, long term money is being financed by short term money. When interest rates rise, they rise faster for liabilities than for assets. The six month CD will be rolled over from 5% to 6% while the interest rate on the 15 year home mortgage is fixed until it is paid off. This puts pressure on the spread. The squeeze on profitability due to higher interest rates on liabilities compared to assets is called interest rate risk.

American Banking System

Assets		Liabilities & Capital	
Cash	6	Demand Deposits	23
Securities	15	Time Deposits	47
Loans	72	Debt	12
Other	7	Capital	8
	100		100

Source: Federal Reserve Bulletin

Liquidity risk occurs when banks don’t pay higher interest rates on their deposits, depositors withdraw their cash and buy higher yielding investments such as money market funds, bonds, etc. found in the money and capital markets. This is known as disintermediation. When it occurs, banks lack funds to make new loans and in extreme cases of disintermediation they may be forced to sell or liquidate current loans. When banks run short of cash, they may borrow it in the federal funds market. As a last resort, they may borrow directly from the Federal Reserve (sometimes known as the discount window).

Bank Regulation

Bank regulation is very important to society. It is not uncommon for the bank to have several sets of bank examiners and auditors reviewing their operations. During the Great Depression in the United States, many people lost their life savings that they had deposited in the nation's banks. Mere rumors of bank problems caused depositors to rush to the bank to withdraw their funds before the bank ran out of money. These bank runs caused bank failures even if the bank was originally solvent. Banks were not able to make loans. Economic activity plummeted into chaos. Of particular interest to regulators and investors, is capital adequacy. Maintaining the capital requirements to provide another cushion to cover adverse events.

FDIC

As a consequence of these events, several reforms were introduced. With one of these, the Federal Deposit Insurance Corporation (FDIC) was created. The FDIC focuses on the loan loss reserve and capital adequacy. Depositors are insured against bank losses. Banks pay insurance premiums into the fund. If a bank fails, the FDIC pays the depositors. One problem with this deposit insurance arose in the 80's. Premiums, were not based on risk. Banks made risky loans knowing the government would bail out the depositors. Depositors have no incentive to discipline banks by withdrawing money as they will not incur any loss. This is an example of moral hazard. Adverse selection also plays a role as the more risky borrowers seek out bank financing. They do not have to pay a risk premium to obtain

money as they would have if would have had to obtain funds in the open market. Deposit insurance premiums became risk based due to passage of the Federal Deposit Insurance Corporation Improvement Act of 1991. Banks practicing risky lending practices will pay higher premiums. In the future lending policies may become more strict.

Federal Reserve

The Federal Reserve tends to monitor banks on compliance with reserve requirements and credit laws. It also has authority over bank mergers and buyouts. The Fed collects data from banks to use in assessing monetary conditions of the economy.

Bank for International Settlements

Based in Basel, Switzerland, The Bank for International Settlements currently fills the role of the central bank of all central banks. In fact, it is owned by the central banks of the world. It does not offer individual or corporate accounts. It can and has lent funds to troubled central banks around the world. It tries to foster international cooperation and regulation. It has established the global regulation of capital reguirements for banks. Currently, the requirement is 8% of assets.

Errata

There are national and state Offices of the Comptroller which monitor compliance with other banking regulations. Finally, public accounting firms audit bank finanical statements for compliance to accounting standards. Yet the process has problems - the regulators and auditors do not communicate nor coordinate with one another. There is duplication, and valuable information is not shared leading to gaps in audit coverage.

Another issue is the development of derivative securities. Regulators are just beginning to understand them and banks - how to manage risk with derivatives. Mismanagement of derivatives has led to some spectacular failures, such as the Barings Bank from its Singapore operations.

Loans (Credit)

Banks make money by making loans, which is credit. Deposits typically provide banks funds to lend out. More deposits equals more loans. Bank lending often is divided between consumer lending such as home loans, car loans, credit card, and line of credit (very close to credit card in which consumers write checks), and commercial credit, which finances inventories, receivables, equipment, and buildings. Banks will perform a credit analysis to determine if credit will be extended and at what rate. Banks want to minimize credit risk. Banks understand that a percentage of loans will go bad. They will set up a loan loss reserve similar to the allowance for uncollectible accounts set up by business firms. General economic conditions will affect the ability of borrowers to repay debt. Bankruptcies tend to increase in recessions.

Just as in everything else in economics, the laws of supply and demand apply here. There is a supply of loanable funds and a demand for loans. The price of credit is the interest rate. Demand for loans is conditioned on their use for capital and consumer spending. Supply is dependent on macroeconomic savings. Interestingly, both credit demand and supply are functions of income. More income generates demand for consumer goods and capital goods, hence more credit. More income also generates more savings. While some have argued that people save more when interest rates are high, loan demand is affected far more by interest rate changes. Higher interest rates can greatly diminish loan demand. For this reason and contrary to popular perception, banks do not favor high interest rates. They make money off the spread between loans and deposits. Without sufficient loan demand, they will not earn

profits.

Fractional Reserve Banking

Money supply creation and contraction is aided by the fractional reserve banking process. Fractional Reserve Banking is the process through which the banking system creates money by making loans in some multiple of the reserves on hand. That multiple is calculated by taking the inverse of the fractional reserve ratio. Fractional reserve ratio is the ratio of actual reserves to total receipts for deposits. All banks in the United States are required to hold reserves equal to at least certain percentages of their deposits. Reserve requirements are set by the Fed, the Federal Reserve Bank.

Selected list of reserve requirements

- Checkable deposits: deposits < 41 M 3%
- deposits > 41 M 12 %
- Time deposits: terms < 1.5 yrs 3%

Source: Federal Reserve Bulletin

Bank reserves may be held as vault cash, deposits at the Fed and securities. Reserves in excess of legal requirements are called excess reserves, or free reserves. The monetary base is the sum of vault cash plus free reserves. Also known as "high powered money" by some economists, it indicates some of the loan slack in the system. Vault cash is the cash the banks keeps on hand. Banks may deposit funds at the Federal Reserve and have them counted as reserves. Generally they are counted as cash. Certain types of securities must be approved to serve as reserves, these are generally Treasury or Federal securities.

Central Florida National Bank

Assets		Liabilities & Capital	
Cash	100	Deposits	900
Securities	400		
Loans	500	Capital	100
	1,000		1,000

Required reserve ratio = 15%

Central Florida National Bank (CFNB) has reserves of $500, required reserves of $135 and excess reserves of $365. Excess reserves are important as that is the maximum amount of additional loans the bank may make. In this case CFNB could make an additional $365 in loans. Banks can hold reserves greater than the legal requirement, and may choose to do so for operational needs or because of slack loan demand. Let’s say CFNB feels that a reserve ratio of 20% is warranted by economic conditions. The maximum amount CFNB would be willing to lend is $720.

For example, if SunTrust is required to maintain reserves (cash and securities) at 5% of deposits, then the multiple will be 20 (1/.05). For every $1,000 injection of new money into the system by the Federal Reserve, the total money supply will grow $20,000 as illustrated below.

Marvelous Mary wins $10,000 of newly minted money by being the lucky millionth visitor to a Federal Reserve Bank. She deposits this into her checking account at Bank of America. All banks must maintain reserves equivalent to 20% of their deposits. Given required reserve ratio of 20%, a bank

receiving a $10,000 deposit could lend out 80% or $8,000 retaining $2,000 in cash and securities. Bank of America makes an $8,000 loan for dental equipment to Dan Drill, DDS., a local dentist, whom deposits it into... JPMorganChase immediately lends out $6,400 to Frivolous Fran for a vacation in Aruba, but she deposits it into... The process continues until bank reserves are lent out. The total increase in money supply will equal the 1/RR * the initial injection. In this case, 5 * $10,000 = $50,000

Bank of America			
Cash	10,000	Deposits	10,000
Cash	2,000	Deposits	10,000
Loans	8,000		

JPMorganChase			
Cash	8,000	Deposits	8,000
Cash	1,600	Deposits	8,000
Loans	6,400		

NextBank			
Cash	6,400	Deposits	6,400

Economic activity is increased by the use of the loan proceeds which may be for consumption or investment. Money is roughly the same as credit. This is due to the identity that deposits = loans, deposits = money (broadly defined), and therefore money = credit.

Suppose the required reserve drops to 10%. Now the money expansion multiplier increases to 10 from 5. This is an example of expansionary monetary policy. Banks are required to maintain their reserves on a daily basis. If they are short they will need to borrow reserves (cash and securities) from other banks that may have excess reserves. This market is quite active and is called the federal funds market. Because of the daily balancing, any change in reserve requirements will quickly have effects. Changing the reserve requirement is one of the most powerful tools of monetary policy. Because of its potentially disruptive effects on the banking system it is the least used.

When banks need reserves they have three options: one, liquidate assets or sell securities, two, call in loans, three, borrow reserves. The least costly option is to borrow reserves, which is accomplished through the federal funds market. Banks may also borrow reserves from the Fed through the "discount window."

This provides another tool for monetary policy. Controlling the interest rate on borrowed reserves. By increasing the interest rate, the Federal Reserve increases the cost of banks borrowing reserves. This causes them to be less aggressive in making loans as funds are shifted into cash and securities to replace borrowed funds. As the costs of securing funds has increased, this cost must be passed on to corporate and individual borrowers in the form of higher interest rates on loans. Higher interest rates on loans weakens loan demand. Hence economic activity is lessened by this contractionary monetary policy.

A note of caution is warranted here. Banks do not rely heavily on borrowed funds to provide reserves. The effect of the Fed to increase rates probably has as much signaling value as direct cost impact on bank pricing.

Let’s say that the Fed wants to pursue an expansionary monetary policy, either by lowering interest rates or increasing the money supply. Can the economy be so precisely controlled? No. Like fiscal policy there are lags in the process. It takes time for a change to take effect. That period of time varies as other economic forces have an impact. Loan demand must exist for this process to work. Without demand, loans are not made, bringing the money expansion process to a stop.

Another problem is the interaction with fiscal policy. Contractionary fiscal policy can counteract expansionary monetary policy. credibility is another issue. If no one believes that the Fed is serious about controlling inflation then the Fed’s efforts may be for naught. Recall that changing the interest rate had significant signaling value. Lose credibility, lost signaling value.

Monetary Policy and the Federal Reserve

Monetary policy is the use of monetary aggregates to influence economic activity. Monetary aggregates are measures of money supply, and/or interest rates. Monetary policy is usually administered by a central bank that may or may not be independent of the central government. Central banks may target a specific monetary supply measure such as M-1 or M-2 or a specific rate such as the discount rate. Alternatively, central banks may try to balance their activities over several monetary aggregates. It is difficult, if not impossible, to effectively control all monetary aggregates. Currently the Federal Reserve monitors all aggregates before deciding the best course of action.

Generally, contemporary management of monetary policy emphasizes the establishment of target bands for the values of monetary aggregates, as there is a time lag between action and impact, due to the velocity of money, and considerable 'noise' that enters the process. The linkage between monetary growth, inflation, and output is not exact. This make fine tuning unwise and impossible. Additionally the effects of exchange rates and international monetary movements can make domestic monetary administration extraordinarily complex and frustrating. Biannually in February and July, the Federal Reserve submits the Monetary Policy Report to the Congress. In this report, the Federal Reserve discusses its view of the economy and of monetary policy. This report can be found at the Federal Reserve website and is recommended reading.

The Federal Reserve: Structure and Functions

America's central bank is the Federal Reserve System that was created in 1913 by an act of Congress. It is divided into 12 district banks located in Atlanta, Boston, Cleveland, Chicago, St. Louis, Kansas City, Dallas, Minneapolis and San Francisco. These banks may have branches. In the Atlanta region, there are branches in Jacksonville, and Miami. Federal Reserve Banks are operated as nonprofit corporations. Although technically owned by member banks in each district, the stock provides only a nominal dividend, cannot be publicly traded and have very limited powers as shareholders, picking only two-thirds of each Board of Directors. They do not control monetary policy. All profits earned by the Federal Reserve Banks are returned to the federal government.

The duties or functions of the Federal Reserve are: one, to act as fiscal agent for the United States federal government and provide other financial services to the public, financial institutions, and foreign official institutions; two, conduct the nation's monetary policy; three, supervise and regulate banking institutions and protecting the credit rights of consumers; finally, maintain the stability of the financial system.

The Federal Reserve has two major policy making bodies: the Board of Governors (BOG), whom are appointed by the President of the United States with Senate confirmation to 14 year terms, and the Federal Open Market Committee (FOMC). The FOMC is comprised of 12 members plus the Chairman of the Federal Reserve. Seven members are from the Board of Governors, the president of the FRB New York and four presidents of the other FRBs, who serve on a rotating basis. The Federal Reserve Chairman and Vice-Chairman are selected from the Board of Governors for four year terms by the President with Senate confirmation. It is the BOG and FOMC that determine monetary policy.

Monetary Instruments of Control

The Federal Reserve relies mainly on what are commonly called the instruments of control in influencing monetary aggregates to carry out monetary policy. These are open market operations, reserve requirements and the discount rate.

- Open Market Operations are the purchase or sale of US Treasury securities. Increase money supply by purchasing Treasury securities. This is the most used tool in monetary policy.
- Reserve Requirements set by the Fed dictate the amount of reserves that banks must hold against deposits. Lowering reserve requirements increases the money supply. Many consider this the most powerful tool and the least used (it too disruptive to banking to constantly make reserve changes).
- Discount Rate and Federal Funds Rate are set by the Fed. Increasing these rates, increases bank's borrowing costs which are passed on in the form of higher interest rates on loans. Higher interest rates depress loan activity which restricts economic activity. As banks borrow very little of their needed funds from the Fed, the change in interest rates has more of a signaling effect than actual cost impact on bank income. In fact, this is the most publicized of the Fed's actions.

Expansionary monetary policy achieved by either expanding the money supply or lowering interest rates, seeks to increase economic activity To the extent that there is slack loan demand or that fiscal policy is contractionary, the effectiveness of monetary policy is reduced.

Contractionary monetary policy lowers money supply (at least slows down its rate or growth) or increases interest rates. The effectiveness of this policy would be impaired by an expansionary fiscal policy

Establishing a contractionary monetary policy by increasing interest rates decreases loan demand. Recall that loans finance the acquisition of capital goods, and consumer expenditures. Consequently, aggregate demand is weakened. To the extent that higher interest rates permanently lower capital spending then long run economic growth suffers. By decreasing money supply to carry out a contractionary monetary policy lowers bank reserves thus impeding the ability of banks to make loans. As before, fewer loans cuts aggregate demand, the goal of contractionary monetary policy.

Changing levels of interest rates in the market do not always indicate monetary policy changes. Many other factors influence interest rates such as loan demand, bond market, international events, etc. While some factors impact short term rates other factors affect long term rates. Thus the yield curve can twist. The Federal Reserve operates in the short term market when changing the discount/federal funds rates. Consequently, long term rates may remain unaffected by changes in federal funds rates, unless the market perceives a fundamental change in the long term environment.

Expansionary monetary policy is appropriate to stimulate economic activity in an attempt to lower unemployment. It is not as direct as increasing government spending where the government or its contractors start hiring immediately. Nor does it usually target specific programs or industries as do

government expenditures. These attributes may be more desirable at times as it leads to a broader base of increased economic activity that may be more sustainable. Government expenditures must be financed eventually by a tax increase. Contractionary monetary policy focuses on fighting inflation.

One of the main concerns of the Fed is inflation. Keeping inflation low is one of the top priorities at the Fed. Growth and low unemployment are important but somewhat secondary in that they may be sacrificed if inflation appears. The thought here is that uncontrolled inflation can disrupt if not destroy an economy. Germany in the 20's is a good example, there are others. Keeping inflation low may be a necessary condition for sustained growth and lower unemployment in the long run. In the short run some will argue that there is a trade off between unemployment and inflation, a point that will be discussed under business cycles.

Timing is everything for Fed intervention. Apply contractionary policy too soon, a healthy economic growth is choked off. Apply the brakes too late, stronger intervention may be required which could put the economy into a recession. The problem for the Fed is that there is not a single measure that is a useful tool to tell them when and how much contractionary (or expansionary) monetary policy to apply. The usefulness of measures of money supply has declined, interest rates are not a direct measure of inflation, and many price indexes have their own biases, as will be explained later. These problems reflect recognition lag, the time after an economic change before policy makers realize the policy change is needed, administrative lag, the time between recognition of the problem and action is taken, and finally, impact lag, the time needed for a policy action to show results in the economy.

Another related problem is targeting. In the past the argument has centered on focusing on money supply growth rates versus the level of interest rates. In reality, it is inflation that is the ultimate target, money supply and interest rates were intermediate targets. Reacting when a price index shows growth is too late. The Fed must find reliable early indicators of inflation. Keep in mind that it is inflation of goods and services that we are talking about. Some have argued that asset prices should be equally of concern. Market are volatile, when asset prices reach high levels compared to historical averages, the bubble bursts, often bringing values down below historical averages in the processing causing considerable economic damage. Should the Fed take preventive steps when markets form bubbles? Is that the Fed's job? If not the Fed, then who?

Another problem arises as international capital flows may counteract domestic monetary policy. The Fed may try to choke off excessive monetary growth by increasing interest rates. Higher interest rates cause capital inflows into the country as international investors seek to maximize their return. These capital inflows increase the money supply thus effectively counteracting the original monetary policy action.

Central banks carry foreign currency reserves, which are called official reserves, that they can use to influence exchange rates. For example, if the US dollar is appreciating against the Yen and the Fed feels this undesirable (because it slows down exports) it could sell dollars and buy Yen in the market. When central banks are supporting what the market considers an unrealistically low exchange rate then foreign currency reserves may be drawn down. If speculators feel the rate is unsustainable because reserves are low, then they attack. Consider the example of the Mexican peso crisis, speculators felt the Mexican peso was overvalued vis a vis the American dollar. Because of the their attacks, the Mexican central bank was forced to devalue the Mexican peso.

The Federal Reserve has other powers to regulate financial markets to promote system stability and influence economic activity. It sets minimum margin requirements for stock purchases, options, etc. In addition, the call money rate, the interest rate paid on stock loans is regulated by the Fed.

Comptroller of the Currency

The Office of the Comptroller of the Currency is responsible to chartering, examining, supervising and liquidating all national banks. The Comptroller is appointed by the President and confirmed by the Senate. As such it play a valuable role in the regulation of the banking system. Banks can also be state chartered. States usually have some equivalant level office in the State government. In the State of Florida, that would be the Florida Office of the Comptroller.

International Monetary Fund

Another institution operates in the exchange rate market, the International Monetary Fund (IMF). Created in 1944 as a result of the Bretton Woods Agreement, its purpose is oversight of the international monetary system and to promote exchange stability and orderly exchange relations among its member countries. The IMF is funded by a quota system levied on its members. It provides short- to intermediate-term credits to members experiencing a balance of payments problem. However, the focus is to prevent these problems by encouraging good monetary and exchange policies of the member states. Membership in the IMF is voluntary. The IMF does not view itself as a bank as it does not intermediate between investors and borrowers. For nations requesting assistance, strict adherence to a disciplined monetary plan may be required even if that may cause domestic problems such as unemployment. Additional information may be found at the IMF's website, www.imf.org

Government Deficits, Money and Credit

The question arises as to what effect government debt and deficits have on the monetary system.

- Financing the deficit by increasing taxes, although government spending increases the money supply, taxes decrease it leaving it with no change.
- Financing the deficit by borrowing from the public, again the increase in money supply from government spending is offset by the decrease caused by the public purchase of bonds.
- Financing the deficit by selling bonds to the Federal Reserve. Since the Fed is buying the Treasury bonds there is an additional increase in money supply. This purchase of federal debt by the Federal Reserve is called monetarization of the debt.

Selected Countries, 1996
Debt as % of GDP

United States	63.9
Canada	100.3
Germany	64.9
Italy	125.2
France	63.0
Japan	86.4
United Kingdom	61.3

Source: STAT-USA & OECD

Cumulative federal deficits increase the amount of outstanding public debt crowding out investment. To attract funds, the interest rate must increase. As a percent of the federal budget, interest costs have been rising. This makes government spending increasingly sensitive to monetary policy. Worldwide deficits as a % of GNP averaged 3.36% during 77-81, 5.04% for 81-86 (Source: International Financial

Yearbook). Consequently real interest rates have risen as government borrowing competed against private demand for limited and declining fell. As shown in the table above the United States has a favorable debt position compared to other major industrialized countries. In the first decade of the 21st Century, under President Bush, the federal positions has reversed. Growing deficits have caused the Treasury to issue more debt.

Ownership of Federal Debt, 1997

	Billions $	%
Federal Reserve	424.5	7.9
Federal Agencies	1,598.6	29.8
Public	3,346.6	62.3
Total	5,369.7	100.0

Source: US Office of Management and Budget, Historical Tables
The Federal Reserve and Federal agencies owns approximately 35 to 38% of the Federal debt. Maintaining liquidity in the economy is an important part of monetary policy. Money supply has to grow at least as fast as GDP to maintain enough cash to meet transactions demand. Consequently the Fed does monetarize a small portion of the debt each year. Federal agencies buy a much larger portion of the debt each year.

Let's revisit the linkage between monetary growth and inflation in a more sophisticated analysis. The key will be aggregate supply, more specifically, we are interested in capacity. As production nears capacity limits, costs tend to rise. The cost of inputs such as raw materials and labor increase as shortages arise. These higher costs are passed onto the consumer.

Expansionary monetary policy can alleviate unemployment by increasing aggregate demand that in turn is met by increasing output (ie. aggregate supply) which is accomplished by hiring more labor. Once excess capacity (or put another way, unemployment) has been absorbed, then further expansionary monetary policy does not increase output but does produce inflation.

In analyzing monetary policy effects, international economic conditions must be considered. Excess capacity worldwide could dampen domestic wage pressure. Domestic workers will not want to price themselves out of a job. Not every service or good can be imported so some industries may experience less competitive pressure from foreign firms. For example, steel is easily purchased from around the world but hair cutters are not. Consequently, steel workers may need to moderate their wage demands relative to hair cutters.

Although excess foreign supply dampens domestic price movements, the effect is limited by counter movements in the foreign exchange market. For example, let's say that Canadian lumber becomes cheaper than domestic lumber. As domestic companies by Canadian lumber, the supply of US dollars and demand for Canadian dollars rise. The Canadian dollar will appreciate against the US dollar. Consequently, prices of Canadian lumber in US dollars, rises. Over time, this will offset some the initial Canadian advantage.

The Money and Capital Markets

Savers are linked to investment in the credit market. There is a supply of funds, supplied by savers, and a demand for funds, used by firms. Savings buy debt issues of firms and governments whom use the funds to acquire inventories, equipment, buildings, and land. Savings are determined by income. More income, more savings. Interest rates determine how much of the savings is kept as cash and how much

is invested. The demand side of the credit market can be thought of as the traditional macroeconomic investment. Investment is also a function of income. Business expand to service increased sales and generate increased profit. The interest rate is a cost of investment, when it rises it increases the cost. Business maximize profit by expanding to the point where marginal cost equals marginal revenue. To increase beyond that point lowers profit, not reaching that point gives up some profit. As income increases, the credit market expands.

There are two major types of instruments that firms issue to raise funds to support operations and acquire assets for expansion or modernization: debt capital or equity capital. Debt capital has the defining characteristics of repayment and nonownership. Equity capital by contrast is not repaid and has ownership of assets and earnings. Corporations issue both debt, in the form of bonds, and equity, in stocks. Timing, amount, and mix of financing depends on market conditions and relative cost of debt versus equity. Although we will cover equity capital, the primary emphasis will be on debt capital, hence the title, the credit market. The credit market encompasses the market for loans adding the market for bonds, commercial paper, and other debt instruments.

Credit markets provide an alternative to financial institutions as a means for corporations, and government entities to acquire funds. Credit worthy organizations can borrow directly in the credit market by issuing debt instruments such as commercial paper, notes, and bonds. New varieties of financial instruments are being created constantly to facilitate this process. Corporations have the added ability to issue stock to acquire needed capital. Hybrids of debt and equity have been created such as bonds with options to purchase stock. The financing process is a creative one.

Market Mechanics

Let's discuss in detail briefly some features of securities markets that are important for their operation, hence that of an economy. In nearly all securities markets buyers and sellers do not actually meet. They are completely autonomous. The transactions are conducted through brokers. Brokers arrange the trades but do not take a position in the security. They do not absorb any market risk of loss (or gain) by owning the security. They make their money by charging a fee for their service, called a commission.

In contrast a dealer takes a position, i.e. owns an inventory of the security and will buy or sell from that inventory. The dealer makes her profit from the buy/sell (bid/ask) spread. She would buy (bid) for IBM at $100 per share and and ask (sell) it for $100.75 per share, earning .75 on each share transacted.

The New York Stock Exchange has both brokers and dealers (called specialists). An advantage of dealers is that they can provide liquidity to the market when buyers or sellers are scarce by using their own inventory thus maintaining a more orderly market.

Markets can also be classified as to whether they are primary markets or secondary markets. In a primary market new issues of securities are offered to the public. Whereas in a secondary market shares are traded among existing owners. To facilitate new issues of securities, an underwriter is hired. An underwriter purchases the new shares and subsequently resells them in the market. This is a risky enterprise as new shares and particularly new shares of a new relatively unknown company may not sell well.

Most securities markets operate as an auction system. Sellers demand an asking price and buyers offer a bidding price. The difference between the ask and bid price is called the spread. The rules vary offering a wide variety of types of auctions but the basic idea is to give all buyers and sellers a fair opportunity to conduct transactions. This helps to eliminate some types of price fixing.

In this setting, it is important to set up an ethical framework so that market participants have

confidence, otherwise market participation would decline as would the attendant economic benefits. Strong honest government regulation and enforcement are crucial to a market's success, as are good accounting standards.

In the US, as in many industrialized countries, most retirement plans are heavily invested in the local securities markets. Failure of the financial system will generate catastrophic consequences on future retirees and economic growth.

Sources of Funds

Savings is the primary source of funds into the capital markets. It is channeled both directly and indirectly into the markets. Directly, savers buy stocks, bonds, real estate, etc. Indirectly, savers put money into the financial sector through mutual funds, pension funds, life insurance, and banks. In the table below are listed the major sources of funds, also known as lending.

As can be seen from the table, the vast amount of savings comes indirectly through financial institutions. However, note the dramatic rise since 2000 of the contribution of foreign savings. It has increased fourfold. This certainly raises some interesting concerns and issues. If the dollar were to begin a prolonged decline, this flow could decrease dramatically causing distress in the American capital markets.

Uses of Funds	2000	2001	2002	2003	2004
Domestic nonfederal nonfinancial sectors	1132	1121	1058	1266	1554
Federal Government	-296	-6	258	396	363
Foreign	57	-50	6	-16	65
Financial sector	805	903	866	1057	802

Sources of Funds	2000	2001	2002	2003	2004
Domestic nonfederal nonfinancial sectors	14	-23	-2	229	135
Federal Government	12	6	10	-3	4
Foreign	242	305	423	538	807
Financial sector	1432	1681	1757	1938	1838
Total	1699	1969	2187	2702	2783

Source: Table F.1 Net Borrowing and Lending in Credit Markets, Release Z.1, March 10, 2005

Uses of Funds

There are several main users of funds. They are the Federal government, State and Local governments, Private, Foreign, and Financial.

The dramatic story unfolding here is the change in the Federal government from a net lender of $296 Billion in 2000 to a net borrower of $464 Billion in 2004. While the nonfederal sectors have recently increased borrowing, the financial sector dropped in 2004. It is not clear from this data that Federal deficits have crowded out private investment spending. Somewhat hinted at and more apparent on other data series is the fact that the Federal deficit is being financed by foreign savings, more specifically, the

central banks of China and Japan.

Municipalities, which are state and local governments such as cities, counties, lighting districts, etc. use the funds to purchase infrastructure improvements such as parks, schools, fire engines, police stations, lighting, etc. Football stadiums often are financed with local municipal funds. State governments also issue bonds that may finance universities, major road improvements such as bridges, airports, etc. In some cases, either state or local backed bonds could be issued for an improvement such as a major international airport. Revenues from those improvements may be used to service that debt. Most of these bonds have collateral. That is a specific asset is pledged to the bond so that in case of default, the bondholder assumes ownership. Presumably, the bondholder would sell the asset to pay off the bond. Municipal bonds are considered somewhat safe because of the taxing power of the municipality to raise additional funds to service the debt. Some municipalities have greater borrowing power than others because they have a better tax base.

As in the above example, as national income increases, tax receipts increase and can support more borrowing. Most state governments must maintain a balanced budget by law. Consequently, they normally do not issue debt to cover deficit spending.

Federal Treasury bonds are issued when expenditures exceed revenues. Usually Treasury issues are not designated for a specific improvement. Their safety relies on the general taxing power of the Federal government, which is considerable, and the power to print money to pay the bonds. Because of this backing, Treasury debt issues are considered among the safest. Consequently, Federal debt pays the lowest interest rate.

The Federal government is now issuing inflation protected bonds. The interest rate increases as inflation increases, decreases as the inflation decreases.

There is another type of Federal debt issued by Federal agencies. These are special purpose institutions set up by Congress. Their status varies slightly from agency to agency. Some are strongly backed by the Federal government while others are less so. The major agencies issue debt securities based on a pool of mortgages such as the Freedie Mac, the Federal National Mortgage Association (also affectionally known as Fannie Mae) and the Government National Mortgage Association (Ginnie Mae). These are among the original bonds arising from asset securization (described below). These bonds are paid off as mortgage payments are made and mortgages are liquidated. They are secured by the underlying mortgages and by varying degrees of guarantees (some would not use the word guarantee) of the Federal government.

In many countries the supply of credit is heavily dependent on the banking system as the result of a poorly developed credit market. If there is a banking crisis then the shortage of funds for corporate investment causes stagnation in economic growth. In the banking crisis of the late 80's in American corporations found themselves in this position but were able to acquire funds from the bond markets thereby bypassing the US banking system. They were so successful that some doubted traditional banking would survive. In the late 90's, as shown in the table above, banks have recaptured their lost market share.

Several federal government entities, called agencies, issue their own securities to finance their operations. These agencies function as financial intermediaries by issuing securities using the proceeds to make loans. Sometimes the loans are repackaged and sold directly to the market (asset securitization). The majority of this agency activity is focused on the mortgage market. GNMA, FNMA, FHLMC provide mortgage guarantees and structure the loans as pass throughs.

U.S. Credit Market Debt Outstanding; By Borrower Category
Billions of dollars

	1995	1996	1997	1998
Federal Government	$3,637	$3,782	$3,805	$3,752
State & Local	1,070	1,063	1,119	1,200
Private	9,028	9,631	10,337	11,331
Foreign	442	519	570	604
Financial	4,279	4,828	5,447	6,516
Total	$18,456	$19,823	$21,278	$23,403

Source: Flow of Funds Account, Federal Reserve Statistical Release Z.1

Mutual Funds

It would be remiss of me to not discuss one of the, if not the, major player in the securities markets, mutual funds. A mutual fund is a fund that invests in securities. It is usually run by an investment company. A firm that invests or manages investments to earn profit. The investment company typically charges funds a management fee. Cash to buy securities is acquired by selling shares in the fund. All income, gains and losses are divided equally among the shareholders.

There are two generic types of mutual funds; open and closed. Under an open fund when shareholders liquidate their shares, the fund is buying them back directly. When they buy shares, they are directly buying from the fund. Under a closed fund, shareholders are actually selling their shares to another investor. When they buy shares, they are buying shares from someone who is selling them, not from the fund. The number of shares in a closed fund does not vary daily unlike that of the open fund.

Another classification for mutual funds stems from sales charges. Some funds are called load funds because they charge a fee (load) when selling or redeeming shares. Funds that do not charge a load are called no-load funds.

Funds differ in the types of securities they buy and in their investment philosophy. Some target specific industries, countries, and regions. Others seek to mimic what is called an index. Indexes often seek to mimic the behavior of the market rather than try to beat the market with certain investment strategies. Indexed funds tend to have much lower management costs and therefore, return more of their profit to shareholders.

The mutual fund industry has an association called the Investment Company Institute. Their website is a good source of information on mutual funds in general.

Insurance Companies

Another major player in the capital markets are insurance companies. Insurance companies often specialize in lines of insurance that they offer. The major lines are life, health, auto and property and causalty. Particularly for life insurance, somewhat for health insurance, companies, the premiums they collect accumulate into large reserves against possible claims. Many of these claims will not be paid for years. Consequently, they are invested in longer term bonds, mortgages, and stocks. Incidentally, generally the higher the return on assets, the lower the premiums needed to fund the reserves.

Financial Assets and Liabilities

Before going further, let me take another approach to understanding capital markets. Financial assets to one party are financial liabilities to another. The total of financial assets must equal the total of

financial liabilities. A collection of financial assets or liabilities is called a portfolio. The types of financial assets will determine the return and risk characteristics of the portfolio.

In one form or another, all financial assets and liabilities represent a promise to pay. With debt instruments the promise to repay is strong. For equity instruments, well, you hope a profit is generated, there is no guarantee. Some people like to use the phrase IOU's for debt instruments. They are but that can be used as a derogatory term. Often, I hear that term in reference to investments by the Social Security Trust Fund. Students will sometimes write that the Trust Fund has been ripped off by the government who leaves mere "IOU's" in its place, as if a crime has been committed. Actually, the Social Security Administration is investing in very high grade securities. Something we all want them to do to make sure the money is there when we retire. I usually give students a non-passing grade to those comments. The truth is any bond issued by any corporation or government is a promise to repay, a legal contract. The financial strength of the party determines how much reliance can be placed on repayment of the bond. Since the Federal government can always print money, there is little chance of default. Corporate bonds have a much higher risk of non-payment, often called credit risk.

As an individual investor, I may buy several US Treasury securities for my retirement fund, just like the Social Security Administration. Why would I want to have some bonds in my portfolio? Let's talk about risk and return. When one is in retirement, losing 25% of value of the investments due a price change, the risk of which is called price risk, causes problems. Few want to work after retirement. If I buy bonds, I get a stable cash flow from coupons and there is little price risk. They may not increase in value by 15% in a given year, but neither are they going to decrease 15% in a year. I change the risk characteristics of the portfolio by simply adjusting the mix of bonds and stock. Investors differ in their ability to take risk. It is not surprising that mutual funds offer so much variety to cater to investor's risk and return preferences.

If you do not consider this important, let me leave you with this thought, let's say the Social Security Administration invests all of its funds in the stock market of which it loses 40%, how many voters would be pissed?

Market Regulation

One of the major regulators of the capital markets in the United States is the Securities and Exchange Commission (SEC). In fact, the SEC lists as its primary mission "...to protect investors and maintain the integrity of the securities markets." Several major laws passed by Congress establish the legal foundation upon which the SEC oeprates; the Securites Act of 1933, the Securities Exchange Act of 1935, the Investment Advisors Act of 1940 and recently, the Sarbanes-Oxley Act. The governing board of the Commission is comprised of five presidentially appointed commissioners.

Two basic concepts are the focus of SEC enforcement goals: One, information about securities must be available, and two, Anyone involved in the selling and trading of securities must be fair and honest, putting investor's interest ahead of their own.

The accounting and finance professions are extremely important to a properly functioning market. Investors and analysts have no choice but to base their decisions on accounting information released by firms and governments. To be able to analyze such information requires a high degree of accounting consistency for and disclosure of business transactions. Needless to say, there must be confidence that the numbers are accurate and truthful. One of the key roles of auditing is to make tha happen. However, if the auditors or accountants circumvent that process, then investor confidence will diminish, possibly causing the market to collaspe as in the case of used car dealers selling lemons.

Various professions within the markets have established professional organizations which have attempted to set boundaries of ethical behavior, promote professional standards and competency, and in some areas, have attempted to self-regulate the profession.

One of the most important is the accounting profession. Up until recently the American Institute of Certified Public Accountants through the Financial Accounting Standards Board was allowed considerable freedom to regulate its profession in lieu of regulation by the government. With several major scandals and banruptcies in which accounting malfeasance played a major role, the SEC now is establishing itself as the regulatory body over accountants and accounting. It always has regualted investment advisors.

Even experienced investors rely on advice and opinion. No one person can follow the market. Enter the financial analyst. While there are many professional certifications for financial occupations, the CFA is worldwide and the largest. But again, as with accountants, problems have arisen. Many analysts make buy recommendations for securities sold by their firms. Objectivity is clearly compromised. Reforms enforcing the separation of analysis from trade are evolving but far from perfect.

Nevertheless, while these issues support government regulation, one the best hopes for an efficient and effective functioning market is an educated skeptical investor.

Asset Pricing

In this section we will discuss the fundamental basis of asset pricing and then proceed to talk about various types of financial assets.

To understand the importance of interest rates to you, you need to understand its role in asset pricing. Let's consider an asset that generates $1,000 income per year. If the market rate of interest is 5%, then the asset price or value is found by dividing income by the rate.

Value = Income/Rate

$20,000 = $1,000/5%

To understand how this works, note that $20,000 deposited into a savings account would earn $1,000 a year. Suppose the interest rate increases to 10%. Now the value of your asset equals $1,000/10% = $10,000. Again, note that a savings deposit of $10,000 earning 10% yields $1,000 of income each year. For a general rule on financial asset pricing, as interest rates increase the values of financial assets fall.

If you had bought that asset at $20,000, you would now have a 50% loss in value. This assumes income is paid at the same rate indefinitely into the future. Bonds that never mature are called consoles. Stocks also exhibit this behavior. While bonds actually pay income in the form of coupon interest, most stocks usually do not pay out income except for a few that pay a small dividend. Corporations typically reinvest their earnings, retained earnings (aka business savings) to finance expansion. However, stocks still experience declines as interest rates increase.

So how do you establish value for financial assets with a limited time until maturity? Use time value of money (TVM) calculations. Let's use a simple example to illustrate this. Let's say you buy a US Treasury bill that matures in one year with a maturity value of $1,000. Given that the market rate of interest is 10%, how much would you pay for it today?

Interest rate risk is the risk of changes in the interest rate. This is really two components, price risk and reinvestment risk. Not only does the change in interest rates affect asset pricing but when interest rates drop, the opportunity to reinvest at higher rates has disappeared. A lower return results.

Bonds

Bonds are debt instruments. They can be issued by corporations, and governments. A bond is in essence a loan that is usually going to be repaid at a definite time in the future (at the maturity date). The exception to the rule are consoles, which are a type of bond that do not have a maturity date. Bonds pay interest, again usually semi-annually, twice per year. The payments are based on the interest rate, which is stated in the bond's legal documents. The rate is known as the coupon rate, and the payment is a coupon. Years ago bonds were issued in bearer form, which meant that if you had possession of the bond, it was payable to you. Attached to the bond were coupons which represented the interest payments. They were clipped off and redeemed at the issuing firm or its representative, usually a bank. Currently, all of this is done through computers.

For example, Ford Motor Co. may issue a $10,000 bond due 2022 at 6% payable semiannually. That means every six months it pays 3% or $300. In 2022, it will pay its maturity value (also known as its principal) of $10,000.

The value of the Treasury bill today is known as its present value (in the financial section of the paper is it called current price). Its maturity value is known as its future value. Interest earned on the present value is added to get the future value.

$PV + PV*i = FV$

$PV(1 + i) = FV$

To solve for PV:

$PV = FV / (1 + i)$

In this example:

$PV = 1,000/1.10 = 909$

Interest is calculated as 909 * 10% = $91

909 + 91 + $1,000

To adjust the formula for multiple years, change (1+i) to $(1+i)^n$ where n = number of years. To continue the example:

$1000/1.10^2 = \$826$

826 + 83 = 909 + 91 = 1,000

Financial assets with longer maturities have more volatile prices.

For example,

one year

1,000/1.12 = 893

16 1.8%

1,000/1.10 = 909

five year

$1,000/1.12^5 = 621$

54 8.7%

$1{,}000/1.10^5 = 567$

The Difference Between Coupon and Yield

The term interest rate can applied in many different contexts. One of the more confusing contexts is between coupon (also known as coupon rate) and yield. Both the coupon and yield are a type of interest rate. The market prices based upon yield. Yield is the return on the asset over its life. It will include both any coupon and return from changes in price. Coupon indicates what the semi-annual interest payments will be.

In the two tables below, I show the relationship between the coupon and yield. A simple formula for yield for one period is: (Coupon + Change in Price)/Initial Price. For example, look at the entries for bond B. At a coupon rate of 2%, it pays $20 per year in interest. Priced at$980.77 at the end of the year it returns $1,000 for a $19.23 gain. Add the gain of $19.23 to the coupon of $20 to get $39.23. Divided this by the initial price of $980.77 and you should get a yield of 4%. For bond C, you lose $38.46 of value but earn $80.00 in income for a net return of $41.54 and a yield of 4% (41.54/1,038.46). So regardless of the coupon, the market prices each bond to yield 4%. All prices are fair as they give the same yield.

Bond	Price	Maturity Value	Coupon
A	$1,000	$1,000	4%
B	$980.77	$1,000	2%
C	$1,038.46	$1,000	8%

Bond	Income	Change in Price	Yield
A	40	0	4%
B	20	19.23	4%
C	80	-38.46	4%

Loans

Loans are similar to bonds with one important exception, periodic payments are made to reduce the principal. The amount of the periodic payments are made to reduce the principal. The amount of the periodic loan payment varies with the interest rate, term of the loan (its life) and the original principal. Financial calculators can easily compute loan terms.

To solve a loan problem on a BAIIPlus (TI-83 use the financial menu and go to TVM_Solver) for example, consider a 48 month car loan at 8% for $20,000. The $20,000 you paid for it is the present value. The future value will be zero since the loan will be paid off. So plug the numbers into the calculator and hit CPT PMT to calculate the monthly loan payment (for TI-83 users, ALPHA SOLVE with the cursor on the PMT space). One adjustment may need to be made, the number of payments in a year. For the BAIIPlus, 2nd P/Y 12 ENTER 2nd QUIT, will set it correctly. For the TI-83, the P/Y is on the menu, there is also a C/Y (coupons per year), it should have the same number as P/Y.

N	I/Y	PV	PMT	FV
48	8	20000	PMT*	0

*Note there is no entry for PMT, just hit CPT PMT and the calculator will generate the payment. It will

have a negative sign to indicate you are paying it.

Annuities

Related to loans are annuities. Annuities are also a series of payments. While there are many applications for annuities. I will focus on one, saving for retirement. Let's say you put $1,000 into an account every year for 40 years, if that account earns 10%, what will be the total accumulated funds?

Using a financial calculator (TI-BA II Plus), PV = 0, i = 10%, n = 40, P/Y = 1, PMT = -1000, then CPT FV. The answer should be $442,592.56. It may show as a negative quantity if you forgot to enter the payment as a negative number. Although that number looks impressive remember than an inflation of 3% per year for 40 years would render $1 in today's expenses, $3.26 in 40 years. So you would need to divide the $442,592.56 by 3.26 to see that dollar value in today's dollars which would be $135,679.78. You couldn't live off of the interest. In fact, you work the annuity backwards to see how much you take out over 15 years to determine how much income it would generate for retirement. Here PV = $135,679.78, i = 10%, n = 15, P/Y = 1, FV = 0 (since you are using it all), CPT PMT and the answer should be $17,838.33. A nice little supplement to social security.

Annuities are important for a major reason, many retirement plans upon retirement are converted into annuities. Usually sold or backed by an insurance company, they often carry a guarantee of a specified rate of return. The amount you receive will depend on several factors related to life span and selection of payment options. Some of the options frequently offered are payment for the duration of your life, duration of the longer of your or your spouses life, or duration for another beneficiaries life. You may also elect to leave a portion of the annuity upon your death to a favorite charity. Remember, these services are not free, the seller charges for them.

Stocks

Before we talk about stock pricing, let's briefly cover some fundamentals of stocks. There are two major classes of stock: common and preferred. Common stock are certificates evidencing ownership in a corporation. That means the owners are entitled to a percentage of the firm's earnings. Distributions of those earnings are called dividends. Common stock usually has voting rights. Each share has one vote. Holders of common stock are called stockholders or shareholders. Shareholders vote for candidates for the Board of Directors, the governing body of a corporation. The head of the board is called the Chairman of the Board. It is the Board of Directors that establish the business policies of the firm. They hire (and fire) senior management including the President, also known as the Chief Executive Officer (CEO).

Preferred stock typically does not have voting privileges but has a preference in dividends and in liquidation. That means if only $10,000 is available for dividends then preferred stockholders are paid first. Any remaining cash for dividends are paid to common stockholders. If the company liquidates itself, that is it sells its assets, then after debts are paid, preferred stockholders are paid before any remaining cash is paid to common stockholders.

This is not meant to be the definitive guide to stock pricing, you probably will not find any secrets here to make a fortune. Call me if you do. Stocks are valued on a very basic premise, future earnings. Higher earnings increases the value of the stock, lower earnings lower the value. Interest rates also affect the value, lower interest rates increase the value, higher interest rates lower it. For example, a stock earning $40 per share discounted at 5% would be priced at 20 times earnings or $800. As before if you put $800 into a savings account earning 5%, you would receive $40 every year. Discounted at 10%, the value would be $400.

We do not expect firms to earn a flat income from year to year, we expect earnings to grow. A different formula is needed for that. A simple formula is the Gordon formula (not to be confused with the infamous Gordon Rule here in Florida).

The formula is:

Value = Income / (Rate - Growth Rate)

Traditionally, the Gordon formula is applied with income as next period's dividends. The rate is the required rate by the stock market. We will ignore how the rate is chosen but note that the growth rate cannot exceed the required rate or the formula will not make sense. Let's say that from the above example we expect our firm to grow at about 3% per year. What would be the expected value now?

$40 / (5% - 3%) = $2,000

You can see that as the expected growth rate increases, the value increases dramatically. Since Wall Street bases stock prices on future earnings, you can see that if the company misses its projections of earnings then the stock price would take a large hit. Below you can see the decrease in stock price from a mere 1% drop in the growth rate.

$40 / (5% - 2%) = $1,333

Real Estate

Property is huge. The value of residential property in America contains approximately a third of householder wealth. Commercial property is easy to value because it generates an income. The present value of the rents minus operating expenses produces operating income from which its present value is calculated. That becomes an estimate of the value of the property (called the Income approach). Other considerations such as the cost of construction (Cost approach) and current market prices (Sales approach) are factored in at arriving a realistic appraisal of the property's worth.

Residential property is more difficult. Homeowners do not charge themselves a rent. Economists estimate what should be charged for rent, called imputing rent. Nevertheless, there is a relationship between income and price. Most residential homes are financed with mortgages. Mortgage lenders will suggest that the monthly cost of servicing the mortgage should not exceed approximately a third of your budget. Different lenders may give different guidelines. As income rises, then the ability to pay more increases. In regions with depressed economies, it is not surprising to see homes go for considerably lower prices. Housing prices are not as volatile as stock prices. Nevertheless, housing prices do rise and occasionally fall. Local housing prices are determined largely by local economic conditions.

Housing demand is a function of the local economy and population growth. Housing supply is a function of costs and local regulation via the local zoning or planning boards. Land is limited, thus limiting housing supply, so as an area is built up, prices tend to rise.

National considerations such as national economic growth, mortgage interest rates, and more importantly, the rate of inflation all impact the real estate market.

Derivatives

Markets are not just about matching resources across time and space, they also allow risk pooling and risk transfer. Some participants are risk adverse while others have an ability to bear risk. Markets are made more complete when there is a larger variety of instruments to trade that allow risk and return preferences to be tailored to the investor's desires. These objectives can be achieved by the use of

derivatives. Derivatives are securities derived from real or financial assets or liabilities. No study of markets, even in this limited introduction, would be complete without talking about the role of derivatives and of the major classes of derivatives.

Derivatives are divided into just a few main categories: forward contracts, swaps, and options. Derivatives are used to hedge or speculate against risk. Forward contracts are an obligation to buy or sell at a set price at a determined time into the future. Swaps are an exchange of cash flow. Options are a right to either buy or sell a security at a set price within or at a predetermined time into the future. Options can be broken down into calls, which give the buyer the right but not obligation to buy a security at a set price, and puts, which give the buyer the right but not the obligation to sell an asset at a set price.

Derivatives are covered in detail in advanced courses in finance.

Asset Securitization

One noteworthy development in the credit market is the practice of asset securitization. Defined as the process of aggregating debt from many borrowers into a pool from which new securities are issued. It spreads risk. With thousands of loans aggregated into one pool, default risk is more easily managed as it is more predictable with such large numbers. Each security issued against this pool takes a portion of the risk. In contrast, if one investor bought one loan and it went bad that investor bears the entire loss. In a pooled arrangement, everyone bears a small amount of that default.

For example, banks make thousands of home mortgages, all with similar terms on similar properties. They package these together into a pool, sell them to investors on Wall Street and with the proceeds start the process over again. This is called loan origination and it allows the bank to make many more loans than they could otherwise which provides more opportunities for financing to potential homeowners. A similar process is now being used for automobile financing and credit card debt. In fact, the traditional role of banking has changed. Banks now originate and process the loan payments to earn fees rather than earn a spread between the loan and deposit. This also allows them to avoid banking regulations that restrict lending such as reserve and capital requirements. Consequently, it also reduces the latitude of monetary policy.

For the investor, such a pooled security has less risk of default. Additionally, as payments are received on these loans, the funds are passed through to the investor. At some point in time the security is self-liquidated as loans are paid off. The investors receive a good return on their money while receiving a nice cash flow that stocks do not pay unless they are sold, minus the brokerage fee of course.

Portfolio Management

It is obvious why borrowers need funds, but why invest in securities that pay a fixed return with little opportunity of capital gain and some risk of default? The answer is risk. Stock returns have very high variability, that is risk. Short-term bonds have little price variability and hence little risk. Long-term bonds carry more price risk. For insurance companies with liabilities that have predictable pay out dates, using long-term bonds that mature on those dates allow insurance companies to minimize risk exposure. Therefore, bonds can allow investors to manage risk. Portfolio management is managing a collection of assets or liabilities to obtain risk and return objectives.

Different investors have different risk preferences. Younger investors tend to have more ability to absorb risk than retirees. Even if the stock market drops 20% they have the time horizon to wait for the recovery. A retiree in his late 70's has no such time horizon, in essence the loss may be permanent because of a short life expectancy. Consequently, a sure return has higher utility for this investor.

A mix of bonds and stocks in an investment portfolio may be advantageous for other reasons. Some strategies alternate their emphasis between bonds and stocks depending on market conditions. These strategies may generate a higher return than a simple buy and hold stock strategy.

Bonds are also held for liquidity reasons. Investors may have some cash they can temporarily invest but cannot risk capital loss. Bonds earn a higher return than cash.

Rational Markets and Bubbles

There is a strong belief in the rationality of the market. Let me explain what this means, prices reflect all that is known about the asset. Most often this is applied to the stock market. Every time a new piece of news hits the market, prices are adjusted. They are adjusted quickly due to the large number of buyers and sellers. So by the time you hear the news, it's effect has already been factored into the stock price. In other words, very few people can profit from news.

If this is true, why are there broad movements in price going up and down? Sometimes analysts warn that values do not support prices. Enter the bubble. Asset prices soar past any reasonable explanation of underlying value and then they pop, sending prices dropping 20% to 50%. That cannot be rational. I would tend to agree. When a stock is trading 60 times it's current income then we are in what I call, the range of the greater fool theory. I know this stock is overpriced but I buy it believing I can sell it to some other greater fool who believes the same thing. It is like a game of musical chairs, when the music stops, someone is lying on the floor. No one wants to be the greatest fool, the one caught holding worthless stock.

This can happen in bonds, and in real estate.

So what does this say about investing? Know the market and know yourself. The details of which I will leave for an investment course.