A Guide To Basic Financial Literacy

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What is a hedge fund? What is return on equity? What are interest rates? What does an investment bank do? What is risk? What is volatility? What is a security? What is a mutual fund? What is the P/E ratio? What is diversification? What is a merger? What are discounted cash flows? What is a dividend? What is selling short? What is EBITDA? What is a bond? What is a balance sheet? What is leverage? What is a pension? What is an efficient market? What is insider information? What is a stock exchange? How do you value a company? What is principal? What is a capital gain? What is an acquisition? What is the buy side and the sell side? What is liquidity? What is market making? What is finance? What is a spread? What is an option? What is an IPO? What is foreign exchange? What is credit? What is the time value of money? What is GAAP? What is opportunity cost? What is compounded interest? What is a stock? What is a capital market? What is a derivative? What is a coupon? What is an option’s exercise price? What is venture capital? What is a benchmark? What is GDP? What does the Federal Reserve do? What is a mortgage? What is fiscal policy? What is a corporation? What does a company’s management do? What is return? What is moral hazard? What does the board of directors do? What is inflation? What is an institutional investor? What is an asset? What is a non-cash expense? What is a liability? What is corporate finance? What is capital structure? What is the WACC? What is bankruptcy? What are credit ratings? What is an acquisition? What is the buy side and the sell side? What is liquidity? What is market making? What is finance? What is a spread? What is an option? What is an IPO? What is the time value of money? What is credit? What is foreign exchange? What is GAAP? What is opportunity cost? What is compounded interest? What is a stock? What is a capital market? What is a derivative? What is a coupon? What is an option’s exercise price? What is venture capital? What is a benchmark? What is GDP? What does the Federal Reserve do? What is a mortgage? What is fiscal policy? What is a corporation? What does a company’s management do? What is return? What is moral hazard? What does the board of directors do? What is inflation? What is an institutional investor? What is an asset? What is a non-cash expense? What is a liability? What is corporate finance? What is capital structure? What is the WACC? What is bankruptcy? What are credit ratings? What is net present value? What is organic growth? What is an income statement? What is capital budgeting? What is depreciation? What is an option? What is an IPO? What is the time value of money?
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Introduction

I wrote this paper for many reasons, but the main reason is that I wanted to provide a concise introduction to business and finance written for a layperson. I believe that it is important for people to understand, at least in basic terms, the overwhelming, and often underestimated, influence that these powerful forces exert in society. Many people do not consider that everything that isn't nature has been financed, either by the government or by business, considering only the consumer side of the goods and services that they are using. I believe that an improved understanding of the other side may enhance their ability to understand business and economic news and its importance in all of our lives.

The major players in this paper are the government, investors, banks and corporations, which interact with each other in a fascinating way that, I believe, can be hard to appreciate until one understands the basic mechanics of each. Many universities teach these mechanics on a class-by-class basis, often limiting their students’ understanding of the grand scheme of things until they reach the very end of the business and finance curriculum. This paper is an attempt to integrate the fundamentals together so that one can appreciate the delicate balance of the economy without devoting an entire four years to studying economics and business. The world of finance can be a struggle for beginners to understand through the jargon used to describe it, so I will do my best to define all terms as soon as possible throughout the paper.

This paper will begin by explaining (1) capital markets from a structural perspective and examining why and how investors behave as they do. We will discuss (2) the government’s role in maintaining stability, through the Federal Reserve’s manipulation of interest rates. Then we will change focus, and examine the influence of corporations on markets. Our (3) study of corporations will touch on structure, accounting, capital budgeting, investor relations and corporate finance. Once equipped with a thorough understanding of corporations, we will (4) return to the markets to examine some more advanced concepts. An appendix on the 2007 Subprime financial crisis concludes the paper, in order to give the reader the perspective of what can happen when the system breaks down.
Section 1 - Capital Markets and Investors

Capitalist Structural Framework and Economic Goals of the Government

In order to understand the basics of capital markets and corporate finance, it is necessary to realize that the parameters in which all corporations and investors operate are orchestrated and maintained by the government. The government administers these laws in an attempt to manage the interests of all the economy's participants, with the ultimate goal of promoting growth.

The pursuit of growth is not an arbitrary goal; it is derived from the government's basic belief that a country's welfare increases with its wealth. **Gross Domestic Product** (GDP) is a measure of all the goods and services produced in an economy. Imagine adding up all of the dollars earned and spent in the economy for one year--this is the GDP. However, a more useful tool for understanding a country's wealth is **GDP Per Capita**, or per person. Simply take the country's GDP figure, divide it by the population, and you are left with a telling indication of the average citizen's quality of life, financially speaking. However, it is important to note that GDP per capita does not account for distribution of resources across the population.

If the government's ultimate economic goal is growth in GDP per capita, then the means to this end lie in stability. The fate of the economic climate hinges on the government's effectiveness in maintaining stability. Although this will be touched on in detail later, for now think of stability as a factor that encourages both businesses and investors. A stable economy fosters a more attractive investment climate, which in turn makes growth more likely.

A well-functioning and fair capital market is another essential precondition for growth. **Capital market** is an all-encompassing term that essentially describes the flow of capital (another word for money), or finance. **Finance** is the transfer of funds from those who have it (investors/lenders) to those who don’t (borrowers). The basis for finance rests on the principle of **interest rates**. Lenders are willing to loan capital to the borrowers in exchange for interest, which can be thought of as the price of borrowing money. This specific type of transaction is familiar to most,
because many people put deposits in bank savings accounts in exchange for interest. But to better understand finance, we need a more general understanding of these transactions between borrowers and lenders.

**Risk vs. Return**

All investment opportunities available to lenders exemplify the tradeoff between risk and return. **Risk**, in financial terms, is the uncertainty of expected future income. Will you earn as much as you expect to earn? Will you lose your money? **Return** is what all investors seek, that is, getting more money back than what one put in, as compensation for taking financial risk. When considering an investment, investors analyze **expected return**, to account for the uncertainty of future events.

Without risk, investors would obviously seek the highest possible return on their money. The reality is that we live in a world of risk, which is effectively the price of the return. In general, the higher the risk, the higher the expected return, and vice versa. Risk is sometimes measured by **volatility**, the frequency and magnitude of fluctuations in value.

Different investors have different appetites for risk. An aging retiree may choose to invest in a low risk, low return security because his or her primary interest may be in preserving his or her wealth. This person does not necessarily require fantastic returns, but prefers a small yet relatively safe return to simply sitting on stockpiled cash. A young professional may choose to invest in a high risk, high return security because he or she is interested in expanding his or her wealth as much as possible, and can look forward to decades of aggressive growth in his or her investments. This person is after large returns and is willing to take a relatively larger financial risk with his or her available cash.

**Financial Instruments and Investment Securities**

A **financial instrument**, or a **security**, is a legally-binding agreement to exchange something of value at a specified date in the future, according to specified conditions. While this definition may seem clunky, it certainly proves useful—this definition is good enough to encapsulate many types of securities the reader may
already have heard of, including (but not limited to): stocks, bonds, derivatives and many more. Without going into detail on any of these specific securities at this point, we can understand the utility of financial instruments simply by imagining a buyer and a seller of these instruments.

We can use the following two actors to better understand the relationship between borrower and lender.

Imagine Person A is a lender. This means that A has an abundance of capital, or more than he needs to hold on his person at any given time. A is faced with a choice: he can hold his capital in the form of cash, earning no interest, or he can buy a financial instrument, with the hopes of getting more money in the future than he has today. All else being equal, people like A usually prefer the latter, and so they are considered lenders.

Person B is a borrower. B may be an entrepreneur who yearns to start a business but needs capital in order to begin. In this case, B hopes to create wealth from his new business, and offers A some portion of that future wealth, as an incentive to use A's available funds today. B creates a security that offers the holder the potential to earn more than the amount that he originally lent.

The capital market is where A can connect with B and both sides can get what they want. A gives B money today in exchange for the hope of getting more in the future. Bonds and stocks are two of the most common types of securities used by investors. They are legally-binding contracts that grant their holders specific rights. These are rights to returns that vary both in scope and in risk. Thus, the legal characteristics of bonds and stock make these securities appealing to different types of investors, with different appetites for risk. It is hard to understand one without understanding the other, so I will not describe the mechanics of each extensively at this point.

**Bonds** are tradable loans. Also called **debt** or simply **borrowing**, bonds are a type of financial security in which an investor gives money today to a borrower, in exchange for repayment, plus interest, in the future. The bond's terms of repayment are explicitly defined, promising the holder a specified amount at specified times until maturity, when the payments expire. The nature of the repayment schedule explains
why bonds are also known as **fixed income** securities. The government actively enforces that any money lent to a company by a bondholder is paid back; in fact, bondholders must receive the firm’s first profits. Because bondholders are paid first, bonds have less risk. Because bondholders can only get what they initially invested (plus interest), there is a limited and upside. Thus, in general bonds can be said to have low risk and low return. **Bills** are identical to bonds except they are short-term in nature, with a maturity of less than one year from the date of issuance.

**Stocks**, also called **equity**, are a means for investors to own the right to a company’s earnings in the future. After a company pays back its bondholders, which it is legally obliged to do first, all remaining profit is then evenly divided among the company’s **stockholders**, also called **shareholders**. Stockholders purchase stock in order to own the rights to these profits, which are realized through increases in stock value and outright cash payments to the holders, called **dividends**. Stockholders buy stock because they believe the company’s prospects to be strong—there is theoretically no limit to a company’s earnings, so stock has a potentially infinite upside. However, while bondholders’ investments are protected by the government, stockholders’ investments are not. Stockholders can lose everything that they put into a company (but not more), and this characteristic enhances the risk of investing in stocks. Thus, in general, stocks can be said to have high risk and high return.

**Individual Investors vs. Institutional Investors**

Many people think of the stock market as an individual going on E*Trade and buying or selling a stock on a hunch. We can think of this act as that of an **individual investor**. While individual investors are certainly a part of the stock market, their role is somewhat limited in the grand scheme.

The real forces of the stock market, and all securities markets, are dominated by **institutional investors**, companies that invest in the capital markets on behalf of individuals or for their own shareholders. Institutional investors are sophisticated investors. That is, they are able to effectively analyze financial data and either buy or sell based on that data. They do not primarily buy and sell on a hunch, as an individual investor might. Because of their analytic resources, institutional investors
are able to determine the value of a stock by estimating the value today of all a company's future earnings. The four major types of institutional investors are mutual funds, hedge funds, insurance companies and pension funds.

**Mutual funds** are investment pools for the common consumer. Individuals give money in the present to institutional investors in exchange for access to professional investing, and thus the hope of more money in the future. Institutional investors are professional investors who create a variety of portfolios from which investors can choose. An investor invests in a mutual fund because she trusts the fund to offer sound judgment in buying and selling securities on her behalf. An investor can invest in a mutual fund even with a very small amount of money. Mutual funds are regulated by the government in order to ensure consumers a safe place to earn interest.

Individuals often invest in mutual funds because of benefits like *diversification*. An investor, when faced with the choice of where to invest, can choose to put $1,000 into just one stock or into an investment fund comprised of many stocks. If the investor puts the $1,000 into one stock, he is putting all of his eggs in one basket. While this investor may be very lucky—the stock could soar, and returns could be great—this investor also faces a high level of risk. The other choice, the investment fund, pools the investor’s $1,000 with many other investors' capital. The fund then invests in many stocks (and/or other securities), thus diversifying the risk. The idea here is that investors have access to multiple desirable stocks at once, without having to do all the research themselves. It makes sense for mutual funds to exist, because most investors are busy people, with jobs and other responsibilities. They don't necessarily have the time to decide how to best invest their savings, so they trust a mutual fund to do this on their behalf.

**Hedge funds** are loosely-regulated investment pools for the wealthy, many with minimum investments of $10 million. Hedge funds offer their investors high returns, though they are certainly risky. The government does not regulate hedge funds nearly as much as it does mutual funds because it believes that wealthy investors can handle the extra risk and should be able to protect themselves better than the average investor. Hedge funds are secretive and elite, with volatile returns.
Hedge fund managers are allowed to employ risky trading techniques and trade in exotic securities that mutual funds cannot. One example of a trade restricted from mutual funds is the hedge fund's ability to sell something it doesn't own, a practice called selling short. **Short-selling** allows an investor to profit from the fall in price of a security. If the investor thinks that the security’s price is too high, the investor can borrow the security and then sell it at that high price. The investor waits for the price to fall, at which point the investor buys back the security in order to return it to the lender. The investor earns the differential between the high and the low price.

Hedge funds are often highly **leveraged**, meaning they increase the riskiness of their investments by borrowing money. Imagine starting with $100, then borrowing $100 to make a $200 investment. If the price of the security goes up by 50% to $300 \( (200 \times 1.50 = 300) \), you only have to pay back $100 and get to keep $200, which is a 100% profit. However, if the security goes down 50% to $100, you must pay back the $100 you borrowed and you lose 100% of your investment. When an investment is leveraged, the risk is increased but so are the expected returns if things go well.

Hedge funds also tend to trade securities very frequently and in massive quantities. Hedge funds with only a few managers can oversee billions of dollars, and thus have a large market influence relative to the small number of investors that they represent. Hedge fund managers are notoriously well-compensated, sometimes earning “2 and 20,” or 2% of assets under management and 20% of profits.

**Insurance companies** are in the risk business. Their customers buy policies that will compensate them in the event of a problem of some sort. Insurance companies pool the risk (life, medical, dental, home, etc.) of their customers and the more customers that they have, the better they can estimate the risk of their customer base, which will then indicate how much they will likely need to pay out in a year. They then use this information to determine how much money they need to collect from all customers to cover all claims and expenses and still turn a profit. Thus the nature of an insurance company's business is to regularly take in cash in the form of premiums, explaining why insurance companies are major institutional investors. It simply doesn't make sense for insurance companies to just sit on the cash from premiums, so they invest it.
**Pension funds** collect retirement funds from workers and manage those investments institutionally. Pensions are a common component of employees’ compensation and thus pension funds are often very large and influential institutional investors. Generally, pension funds have low appetites for risk due to the profiles of their investors.

Many academics in the field of economics believe that professional investing is simply a coin toss, therefore subscribing to the **Efficient Markets Theory**. This theory essentially boils all trading down to statistics, claiming that any profit made in the markets is simply due to that investor's luck. Furthermore, it implies that even the shrewdest of investors cannot systematically beat the average market return. This theory assumes that market prices reflect all available **public information** (released by corporations to the public) and that there is no insider trading taking place. **Insider trading** is the illegal act of using **private information** (not yet released to the public) as the basis of trading for risk-free profit. The validity of the Efficient Markets Theory is debatable, but in practice institutional investors tend to ignore this theory and try to make **capital gains** (trading profit) anyway.

**The Buy Side and The Sell Side**

All of these institutional investors combined make up **the buy side**, because they buy **securities as investments**. The buy side trades based on future expectations, and every trade is an implicit agreement between buyer and seller of value at a given time. Some securities, such as stocks, are sold on a **centralized exchange**, like the New York Stock Exchange. Stocks are one of the most common types of financial instruments, but there are many other types of securities that are traded less frequently, which are considered less liquid. **Liquidity** is the ease of converting a security into cash. Something is considered liquid when there are lots of buyers and sellers because it is easy, in this market, to convert the security into cash (to sell it). Stocks can be said to be highly liquid because they are standardized and frequently traded; they are so liquid that one can simply go online, look up the price of any stock and sell it immediately. One reason stocks are so liquid is that they are
**standardized.** Standardization makes a security simpler to understand, and the security becomes more frequently traded because investors grow to be comfortable with its mechanics.

Most securities are less liquid than stocks and are therefore more complicated to trade because they do not necessarily have a single market price at any point in time. Imagine holding an illiquid security and wanting to sell it because you are expecting bad news. It wouldn’t make sense to call person after person, trying to sell your security, because the price could be falling as you called them! This is where the sell side comes into play. **The sell side,** or a **Sales and Trading** shop, is an arm of an investment bank that is in the business of **making markets,** meaning that at any time it is willing to trade in any type of security. An investment bank keeps an inventory of many types of financial instruments for the purpose of **selling the liquidity** to the buy side. The investment bank's inventory is made up of **over-the-counter (OTC) securities,** which are not traded on a centralized exchange. For any over-the-counter security, the investment bank has a **bid/asked spread,** or a **market,** which is two prices in one. The first price is the price at which the investment bank is willing to buy, or bid, and the second price is the price at which the investment bank is willing to sell that security. For example, if the market is 30/32, the bank would be willing to pay $30 to buy the security (from the buy side) and would be willing to sell the security (to the buy side) at $32. The **spread,** or difference between these two prices, is what enables the sell side to profit from its inventory. This concept may be familiar for those who have traveled abroad because there is always a spread when changing currency. Within the Sales and Trading shop, it is the **traders’** job to adjust the bid/asked spread higher or lower to accommodate market supply and demand. The traders' goal is to equalize the number of buyers and sellers at any given time by continuously adjusting the price. If the trader is able to successfully do this, then the bank is effectively matching up buyers and sellers and earns the spread.

The size of the spread depends on the security's liquidity (the more liquid, the smaller the spread and vice versa) and generally does not change unless the change
in trading volume is substantial. The reader should see now that the more trading clients a Sales and Trading shop has, the more profitable it is. The job of the sales force is to recruit and retain clients and to be the informational liaison between the traders on the sell side and the investors on the buy side. Markets thrive on information, and the ability to funnel information between these two market forces is prized by both sides. Though it does not set prices, the sales force's effectiveness is vital to an investment bank's profitability.

**Present Value vs. Future Value and the Time Value of Money**

If I offer you $100 today or $100 a year from now, do you have a preference? The obvious choice is $100 today, but why? There are three primary reasons: inflation, credit, and the time value of money.

**Inflation** is the systematic decrease in the real value of money. Think of money as having both a nominal value and a real value. The **nominal value of money** is the actual number that the bill says. A $1 bill is always worth $1. The **real value of money** is the value that that $1 has. It can buy one bottle of water, at this point in time. Inflation reduces the real value of money, so that in the future, $1 will not be worth enough to purchase one bottle of water, though it will still be worth $1 nominally. A year from now, the same bottle of water, produced in the exact same way, could cost $1.10, for example. You prefer $100 today to $100 a year from now because if you have $100 today, its real value is greater than it is to you next year, though the nominal value is the same.

**Credit** refers to the likelihood of my keeping my promise to give you $100 next year. Just because I say I’ll pay you in a year doesn’t mean I will. Thus credit is a factor in your decision: $100 today is certain, $100 next year is not.

The **time value of money** principle is that as long as you can earn interest by investing or saving, you would prefer to have a payment today than in the future. Underlying this principle is **opportunity cost**, an economic term used to describe the implied cost of not doing something. Imagine that you can go to work and earn $10 an hour, or you can stay home and play videogames. Economists would say that each hour playing videogames costs $10, because you could be spending that
hour earning money. Opportunity cost factors into your decision of $100 today or a year from now because if you got the $100 today, you could invest it and earn more money. $100 a year from now means that you have foregone one year's worth of interest.

As we will see, the concepts of **present value** and the time value of money are omnipresent in financial techniques. The valuation of financial instruments and companies may be a complicated process, but at the heart of any valuation is the following equation:

\[
\text{Present Value} = \frac{\text{Future Value}}{(1 + r)^t}
\]

or

\[
\text{Present Value} \times [ (1 + r)^t ] = \text{Future Value}
\]

(where \(r\) is the annual interest rate and \(t\) is the number of years)

We've discussed that inflation, credit, and opportunity cost lead rational people to prefer money today to money in the future. This is the equation that quantifies that preference, relating present value and future value by accounting for time and interest rates. Though we will discuss the mechanics of interest rates later, two things are important to understand at this point:

1) Interest rates quantify (take into account mathematically) inflation, risk, and the time value of money.

2) Interest rates are assumed to be compounded over time. **Compounded interest** is the earning of interest on **principal** (the amount you put in initially), plus the following year earning interest on the principal and the previous year's interest. So if in year one you put in $100 at 10% interest, at the end of the year you will have $110 in the account. At the end of the next year, it will be $121, a dollar more than if you had simply earned 10% of the $100 alone each year. The compounding frequency varies, but interest is frequently compounded either annually, quarterly, monthly, weekly or daily.
Let's return to the concept of present value with these thoughts in mind. The equation seems fairly meaningless without a few examples.

**Example 1:**

Someone offers you a security that will pay you $500 in 3 years. For this security, you believe fair compensation for the risk is 6%. How much would you be willing to pay for this security today?

\[
\text{Present Value} = \frac{\text{Future Value}}{(1 + r)^t} \quad \text{so} \quad \text{Present Value} = \frac{500}{(1 + .06)^3} = 419.81
\]

As you can see, it’s simply a matter of plugging in the terms. This equation *prices* your preference for present value, and now you know that that security is worth no more than $419.81 to you today, even though the future value is $500.

**Example 2:**

If you invest $1000 today at 4% a year, how much will that be worth in 8 years?

\[
\text{Present Value} \times [(1 + r)^t] = \text{Future Value} \quad \text{so} \quad 1000 \times [(1 + .04)^8] = 1368.57
\]

**Example 3:**

You are offered a security that pays $1,000,000 in 30 years. Your required interest rate is 12%. How much would you be willing to pay for this security today?

\[
\text{Present Value} = \frac{\text{Future Value}}{(1 + r)^t} \quad \text{so} \quad \text{PV} = \frac{1,000,000}{(1 + .12)^{30}} = 33,377.92
\]

Look at the dramatic implications of Example 3. In any division problem, the larger a denominator gets, the more significantly it decreases the value of the numerator. In the present value equation, time is an exponent in the denominator, therefore, the longer the amount of time in question, the larger the effect on present value. Time has a *highly significant* effect on present value due to compounding interest. Over 30 years, $33,377.92 becomes one million dollars!
Finally, this implies that if a security promises cash flows each year in perpetuity (forever), the value of these cash flows is diminished each year. The cash flows nearer in time are far more valuable than those far away, to the extent that cash flows far in the future approach zero value.

**Pricing Bonds Without A Hunch**

Now that we've discussed present value extensively, we have the tools necessary to value bonds, a standardized security that facilitates the borrowing of money. We will learn valuation techniques for stocks, the most common financial security, after we examine corporate finance.

Companies *borrow* money by *selling bonds* to *lenders*, who *buy* bonds to receive interest.

When a bond is issued (created), the investor lends a certain amount of money, called the *principal*, or *face value*, or *par value*, to the borrower. Lending money is equivalent to buying, or holding, a bond. The holder of the most common type of bond is entitled to annual interest payments and full repayment of the principal at the bond’s maturity. The annual interest payments are called *coupon payments*. The nominal values of the coupons are determined by the *coupon rate*, an interest rate that is fixed over the life of the bond until maturity (when the bond contract expires). The coupon rate was the market interest rate, for a given risk level, at the time the bond was issued.

So to review, there are four essential variables:

1) Face value, or how much the lender originally loans the company (often in denominations of $1,000)

2) The coupon rate, which is fixed. The coupon rate determines the annual interest payments, so if par is $1,000 and the coupon rate is 6%, the holder of the bond will receive $60 a year until maturity
3) The maturity, which tells the holder how long he will receive coupon payments, and when the principal will be repaid

4) The market interest rate, which changes

It is absolutely fundamental to understand the difference between the coupon interest rate and the market interest rate, for this is at the root of the inverse relationship between bond prices and interest rates. In the world of bonds, a decrease in market interest rates increases bond prices and vice versa. While we will eventually examine in detail the causes of interest rate changes, for now it is only important to understand the effect of rate changes on bond prices.

The reason that bond prices and interest rates move inversely with each other has to do with relative value for the same amount of risk. Let’s examine both a fall and a rise in interest rates to understand this relationship. If a given bond has a coupon rate of 6%, the holder will always receive 6% of par value annually, as that rate is fixed.

If interest rates fall, the same bond (with the same risk), if issued again today, would promise a lower rate of interest. Thus the price of the already existing bond must rise, because investors’ demand increases for the bond promising higher interest, relative to the new bonds paying lower interest for the same risk.

If interest rates rise, the same bond (with the same risk), if issued again today, would promise a higher rate of interest. Thus the price of the already existing bond must fall, because investors’ demand logically decreases relative to a newer bond promising higher interest for the same risk.

Numerical examples of a rise and a fall in market rates should illustrate this point.

**Example 1:**

You buy a bond with $1,000 face value. The bond promises 6% interest for three years and the principal is repaid in full at the end of three years. The market interest rate rises from 6% to 7%. What is the new price of the bond?
6% of $1000, $60, is the coupon. The coupon is given three times in three successive years, so there are three $60 cash flows. There is also a cash flow of the $1,000 face value in year three. To get the price of the bond, you must compute the present value of these cash flows.

\[
\text{Bond Price} = \frac{60}{(1 + .07)} + \frac{60}{(1 + .07)^2} + \frac{1000 + 60}{(1 + .07)^3} = 973.76
\]

**Example 2:**

You buy a bond with $1,000 face value. The bond promises 6% interest for three years and the principal is repaid in full at the end of three years. The market interest rate falls from 6% to 5%. What is the new price of the bond?

\[
\text{Bond Price} = \frac{60}{(1 + .05)} + \frac{60}{(1 + .05)^2} + \frac{1000 + 60}{(1 + .05)^3} = 1027.23
\]

**The Pricing of Interest Rates Relative to a Benchmark**

While no financial instrument is literally risk-free, the U.S. government is thought creditworthy to the extent that investors consider an investment in the government to be effectively risk-free. This is primarily due to the fact that the U.S. currency is backed by the world’s largest developed economy.

All interest rates are based off of a risk-free benchmark, the level of which, at any point in time, is determined by the government. To understand this concept, think about how people describe the height of mountains in terms of height above sea level. Sea level is a standardized height that acts as a benchmark, from which all altitudes are described. Returning to interest rates, the distance between the benchmark and any given interest rate is called the spread. The size of the spread reflects the risk of the security. That is, the larger the spread, the larger the perceived risk, and vice versa.

Let’s examine two types of companies, a utility company and a high-tech company, so that we can better understand spreads. These companies have different risk profiles and different growth potentials. The utility company, say, a local provider of electricity, has an established consumer base. People don’t tend to switch electricity companies very often. There is little distinction between them; any distinction is
most likely based on price. Furthermore, prices of electricity are often regulated by the government, which wants to make sure its citizens get electricity reliably and cheaply. Each year, the government will meet with the utility company to figure out what its costs are. The government will then set the price at the consumer level. It sets this price in a manner that is also fair to the utility company. It must give the utility company a reason to be in business, and it does. A certain margin is allowed, and just like any other company, the utility company makes a net income, which is owned by the stockholders. Because this company is government-regulated and largely free from competition, it is \textit{low risk}.

The high-tech company is constantly changing. Its assets are largely intellectual property. Its employees try to create technology that hasn't yet been invented. Its products' value is unknown because the future markets are unknown. A high-tech company could be the next Microsoft, with customers numbering in the billions, or it could go out of business in a heartbeat. All of these qualities make the company \textit{high risk}.

In the example below, the utility company's bonds must pay a 2\% higher interest rate than the U.S. government. The high-tech company's bonds must pay a 5\% higher interest rate than the utility company, or a 7\% higher interest rate than the U.S. government. Again, the size of the spread reflects perceived risk. The utility company is able to borrow money more cheaply (paying less interest) than the high-tech company, because it is more creditworthy. It is more creditworthy because it is less risky, with an established customer base and predictable cash flows.
Section 2 - The Government and the Pursuit of Stability

What the Federal Reserve Does

Before he retired from his position as Chairman of the Federal Reserve, Alan Greenspan was considered by many to be the second most important man in the world, behind George W. Bush (Greenspan has since been replaced by Ben Bernanke). Yet, considering the incredible importance of the Chairman of the Federal Reserve (the Fed), surprisingly few people understand the position’s significance. The function of the Fed is to set interest rates, and more specifically, the benchmark rate discussed earlier.

Because the entire economy’s interest rates are spreads over the benchmark rate set by the Fed, this interest rate is extremely influential. When the Fed lowers interest rates, it encourages investment. This may initially seem confusing, because earlier it was revealed that investors typically prefer high rates of interest. The explanation for this is that investors generally finance their investments by borrowing money. The cheaper they can borrow (the lower the interest rate), the more easily they can finance their investments. Encouraging investment has the effect of fueling the economy. Conversely, when the Fed increases interest rates, it discourages investment. It becomes more expensive for investors to finance their investments, and they are subsequently more reluctant to invest. This has the effect of cooling down the economy.

These interest rates affect all participants in an economy, including individuals and businesses. Individuals often view interest rates in the context of their mortgages. A mortgage is a common type of financial instrument used to finance homes. When individuals speak of lower interest rates, they are referring to lower monthly payments on their mortgage. Though individuals may be investors who prefer high rates of interest on their investments, they are simultaneously homeowners who prefer lower interest rates on their mortgage.
So how does the Fed decide where to set interest rates? When would the Fed want to fuel or cool down the economy? The following two scenarios illustrate how the Fed deals with this difficult balancing act.

**Scenario 1:** The September 11th attacks dramatically shook confidence in the economy. Uncertainty was everywhere and almost everyone considered it a bad time to invest. The Fed slashed interest rates by several percentage points in an attempt to counter the economy’s negative sentiment. Though confidence remained shaken for some time, it became substantially cheaper to invest just after the attacks than it was before.

**Scenario 2:** The 90s Dot-Com bubble was out of control. Investors had unduly high confidence in the economy and were ignoring risk, paying prices for stocks that ignored the start-up companies’ lack of earnings. The Fed wanted to discourage the unhealthy level of confidence and therefore increased interest rates, making it harder for companies to invest. Although the bubble still burst, the Fed managed to minimize, to an extent, its negative repercussions.

The Fed also sets interest rates to maintain a stable and low level of inflation. As discussed previously, **inflation** is the systematic decrease in real value of money over time. Inflation happens because people have more money relative to the available quantity of goods. Producers raise the prices of the goods they sell because they expect their input costs to rise in the future. Workers demand higher salaries because they expect goods to cost more in the future. Interest rates also affect inflation: when money is made relatively cheaper by lowering the interest rate, it quickens inflation. When money is made relatively more expensive by increasing interest rates, it slows inflation. In order to achieve its goal of increasing GDP per capita, the government attempts to keep inflation at a healthy and stable level by changing the interest rate over time.

The actual interest rate that the Fed sets is called the **Federal Funds Rate**. To understand what the Federal Funds Rate is, the reader must know that a bank collecting deposits is legally required to retain a certain percentage, say 10%, of its deposits as liquidity reserves (essentially cash on hand), enforced at the end of each
day. So, if a bank has deposits of $100, it can invest $90, keeping $10 available. This is so that customers can reliably reclaim their deposits by withdrawing money. But it is impossible for banks to predict exactly how many customers will withdraw money on any given day. Imagine two banks, bank A and bank B, each with $100 of total deposits. By law, each bank must have $10 on its books by the end of the day. Bank A has an unusually high number of withdrawals, and before closing only has $5 still on hand. Bank B only has a small number of withdrawals, so it has $15 on hand. To comply with the law of keeping 10% at the end of each day, A must borrow from B the $5 it needs, overnight. The next day, A gives B back the $5, plus interest. This interest rate is the Federal Funds Rate. This is the rate that the Fed can change, effectively the most basic rate in the entire economy.

**Monetary vs. Fiscal Policy**

The Federal Reserve’s manipulation of interest rates is called **monetary policy**, and it is one of the two tools that the government has to affect the economy. The Fed is **independent** from influences from elsewhere in the government—that is, the president of the United States cannot tell the Fed what should be done with interest rates. The reason for this is that governments are notoriously short-sighted, focusing on short term political agendas, rather than long-term growth. The Fed’s independence eliminates partisan biases and short-term focuses, allowing the Fed to use interest rates to positively influence the economy over the long-term.

**Fiscal policy** is the second of the two government tools to affect the economy, and it is controlled by the executive and legislative branches of government— it is totally unaffected by the Fed. Fiscal policy refers to government spending (e.g. on public schools, roads, etc.) and taxes. These can both be used to stimulate the economy. A new school is an investment in the country’s human capital. A new road can increase productivity, by allowing businesses to be more efficient and reach more customers. A decrease in the tax rate gives people more income to spend and will promote economic growth.
The Foreign Exchange Market

Both monetary and fiscal policy affect the foreign exchange market, the market in which currencies are traded. The foreign exchange market is the largest and most liquid market in the world, with trillions of dollars exchanging hands each day. Buyers of one currency must use another currency as a means of payment. So a buyer of US dollars is also a seller of another currency, such as British pounds. This is why exchange rates, or the prices of currency, are in terms of another currency. So if a pound is worth $2.10, that means that one pound is equivalent, at that point in time, to $2.10, or one would need $2.10 to buy one pound.

What makes the foreign exchange market so interesting is the variety of and myriad factors affecting the market. The most basic is simple supply and demand for the currency due to international commerce. A Toyota salesman in the US would need to buy Japanese yen (in exchange for US dollars) in the foreign exchange market in order to purchase the cars from Toyota. On a small scale, this would lead to increased demand for yen, and this would drive up the value of yen, called an appreciation. This is where it gets confusing—an appreciation in yen makes the exchange rate decrease. If the value of dollars is quoted in terms of yen, then it might take 108 yen to buy a single dollar. So if the Japanese yen appreciates, it will take fewer yen to buy that same dollar. A depreciation is the reverse. If demand for the yen decreased, the yen would depreciate, and one would need to spend more than 108 yen to buy a single dollar.

The foreign exchange market is also driven by variations in interest rates across countries. If the Japanese government offers very low interest rates on its bonds, and the US government offers relatively higher interest rates, investors in Japan will buy dollars (selling yen) in order to invest in the US government, taking advantage of the higher returns achievable internationally. This will cause the dollar to appreciate and the yen to depreciate. In fact, this particular trading method is so common that it has its own name, the carry trade.

Not all currencies are traded freely, with valuations dependant on supply and demand factors and interest rates. Some currencies are pegged, artificially
stabilized at a specific level. An example of a pegged currency is the Chinese yuan. A government can decide to peg a currency so that economic factors tied to exchange rates will be stable. China is a major exporting country and its producers will sell higher quantities of goods if they are cheap in the eyes of the importing country’s businesses. If a US seller of electronics can buy the goods from China at a lower price than it can buy them in the US, the seller of electronics will do so to achieve higher profits. He/she will buy yuan (selling dollars) to pay the Chinese electronics producer. On a large scale, this would cause the yuan to appreciate. At a certain point, these electronics would become more expensive, in dollar terms, relative to other countries that might produce electronics. The reason that the Chinese government has decided to peg the currency is so that this yuan appreciation does not occur. They believe that exports drive their economy, and would like things to stay the way they are. The government manipulates the currency by acting in the financial markets, buying other currencies while selling yuan. The government does this on a scale massive enough to artificially depreciate the yuan, which counteracts the market’s tendency for the yuan to appreciate. Thus, the yuan stays constant, and China continues to thrive on its exports.

Having a “weak” or “strong” currency does not mean that the country’s economy is weak or strong. As we just discussed, China has a very strong economy because its currency is weak. The United Kingdom has a strong economy as well as a strong currency. Having a weak currency, or a strong currency, is simultaneously good and bad, for many reasons. China’s weak currency is good for exports, but it cannot afford to import many goods, as they are too expensive. The United Kingdom’s pound is very strong, so it is hard to be competitive when attempting to export, but it is very cheap to import.
Section 3 - A Study of Corporations

The Structure of Corporations

At this juncture, remember that the framework in which companies operate is defined by the government. The government has set up several types of legal entities (also called companies), each structure having certain advantages and disadvantages. Starting a company, from a legal perspective, is equivalent to creating a citizen. However, instead of being a “natural person” (a human being), the citizen is a “legal person” (a company). When someone wants to start a company, the person must weigh these advantages and disadvantages and decide which legal structure is most appropriate for his or her company. The most widely-employed types of entities are partnerships, sole proprietorships, limited liability corporations and corporations, which can be public or private. We’ll come back to the details of these distinctions later. For now, the reader should be aware that we have been and will continue to be discussing public corporations. Public corporations should be quite familiar to the reader, because most household name companies, such as Starbucks, Apple, Google, and many others, are public corporations. Public corporations have information disclosure requirements and their securities can be bought and sold by the public.

Public corporations are structured so that the interests of their shareholders, or owners, are legally protected. This means that a company's management must make decisions with its stockholders' interests in mind. Though the government protects bondholders first, laws do not ignore stockholders.

The day-to-day decisions of the company are made by the management. Chief Executive Officers (CEOs), Chief Financial Officers (CFOs), Chief Operating Officers (COOs), and others make up the management. The management team runs the business, deciding which investments to make and how to finance them.

But the shareholders' risk, the risk of losing one's entire investment in stock, could not be guarded against with only the management. To see why, the reader must remember that the management makes all the decisions. If management were
unregulated, the management could consider a new jet ski to be an asset to the business. The management could make their salaries unjustly high. In short, an unregulated management could waste an investor’s money.

(Remember that the government wants people to invest, in order to steadily increase GDP per capita. If prospective investors know that they are legally protected, they will be more willing to invest, thus further achieving the government’s goal of more investment. The government wants to make it impossible for management to unnecessarily waste investors' money, in order to maintain the investors' confidence. )

The inherent conflicts of interest between the investors and the management can be termed moral hazard. Moral hazard is the barrier to the trust that an investor must place in the manager to act in his or her interest. Pragmatically, the government attempts to reduce or eliminate moral hazard with governance by structuring corporations with the shareholders in mind. Public corporations are legally required to have a board of directors to oversee management. The members of the board of directors are chosen to oversee management by representing the investors. It is their responsibility to protect investors by ensuring that the management does in fact make every decision in the shareholders' interest. Thus the board of directors hires the management to create a profitable business that will maximize the return on investors' capital, and will fire the management if they do not. The board of directors is made up of shareholders. A significant portion of their wealth may be in the company's stock. They should naturally look out for the shareholders’ interests because they too are shareholders, and their personal money is at risk.

**Accounting Basics - The Balance Sheet**

Everything a public company does, under law, must be documented by accounting. Accounting is a highly regulated field, and there are many laws pertaining to the manner in which companies' actions must be presented. But accounting is very complicated, and not necessary for a beginner to learn about in detail. The major components of accounting are the balance sheet and the income statement (see Capital Budgeting and the Income Statement).
An entire company can be summed up in one equation, the skeleton of the balance sheet:

Assets = Liabilities + Owners' Equity

Think of this as "What the Business Has" on the left and "How the Business Got It" on the right. Let's examine each element of the equation.

An asset is something controlled by the company, from which future economic benefits are expected to flow. This may be a machine, land, a factory, inventory or any number of other things. A company's employees are not assets because the company does not legally own them. However, if a company pays an employee in advance for future labor, then a company could call the right to that future labor an asset. All of a company's assets must be financed by liabilities and owners' equity.

A liability is something a company owes, or an obligation that the company has. All not-yet-paid taxes, interest, labor costs, invoices, etc. could be called liabilities. When a company issues bonds, they are classified as liabilities because the company must pay the investor back interest in the future.

Owner's equity (also called shareholder's or stockholder's Equity) is made up of all the company’s value beyond the value directly financed by liabilities. A company's profit goes in this section, as well as any stock that the company issues.

The equation must always balance throughout the life of a company. Let's see how:

Example:

Imagine a company starting from scratch. At this point, the equation is:

0 = 0 + 0

The company wants to buy assets in order to produce wealth, say a machine that produces goods that can be sold for more than the cost of inputs. Imagine this machine costs $100. This money must come from somewhere. The company can go to the capital market and finance the machine by creating financial instruments. So,
B can meet up with A, and A will provide the $100 (for the asset on the left), in exchange for stock (which is recorded on the right). Assets are worth $100 and the owner’s equity is also worth $100. Now the equation is:

\[ 100 = 0 + 100 \]

Imagine the machine creates a profit of $20. Now the left side of the equation is made up of $100 of the machine’s value and $20 in cash. The right side of the equation also equals $120, because the profit of $20 is added to the equity portion.

\[ 120 = 0 + 120 \]

**Investment Banking and Corporate Finance**

We have discussed how interest rates affect corporations’ desire to invest, and that all investments must be financed, typically with bonds or stock. **Investment banking** is the business that assists corporations in the maintenance of the right side of their balance sheet, often by raising money through debt and equity financing. The first time a company’s bonds or stock is sold, it takes place in the **primary market**. The investment bank buys all of the new bonds or stock. At the time of this sale, the company receives cash in exchange for the securities it sells to the bank. The securities sit in the investment bank’s balance sheet as an asset until the investment bank sells the securities to the secondary market for a premium, compensating the bank for temporarily holding the risky securities. The **secondary market**, such as the New York Stock Exchange or the buy side and the sell side, is a market in which securities are traded based on perceptions of future value.

An **initial public offering** (IPO) is the first time that a corporation sells equity to the public markets. Before an IPO, a company is **private**, with all equity belonging to private owners and unavailable to trade on a public exchange. Companies decide to go **public** because of the possibility of raising large amounts of capital. But it is important to note that not all sales of stock are initial public offerings; companies can continue to raise equity throughout their lives, just like they can raise debt many times. For the most part, companies finance their assets with debt and equity securities, though other financing methods are available. The proportional
composition of the right side of the balance sheet is called the \textbf{capital structure}. The ideal proportions of debt and equity vary across industries.

When a company is deciding whether to finance with debt or equity, it must consider its cost of capital. Just like a homeowner must pay interest on her mortgage, so must a company pay to finance its assets. Companies always wish to reduce their cost of capital because such a reduction is equivalent to an increase in profit margins. A firm’s \textbf{weighted average cost of capital (WACC)} is the cost of debt and the cost of equity, weighted according to the company’s capital structure. The \textbf{cost of debt} is the interest rate on the firm’s debt, multiplied by \((1 - \text{the tax rate})\). This is because debt is \textbf{tax-deductible} in the U.S., meaning that it is effectively subsidized. The \textbf{cost of equity} is the expected rate of return required by a firm’s stockholders. Because bonds are tax-deductible and less risky than stocks, it is cheaper for a company to issue bonds. Companies tend to issue as much debt as they can tolerate, but debt cannot make up the entire capital structure.

As a company increases its proportion of debt in the capital structure, this increases the risk of the existing bonds to investors. Because bonds require corporations to pay regular interest payments, an increase in these payments (without a higher cash flow) implies higher probability of default. This is because once a company borrows money it has an obligation to make fixed payments, regardless of any potential changes in its operating performance. \textbf{Bankruptcy} is a legal scenario that occurs when a firm is unable to meet its liabilities. In \textbf{Chapter 7 Bankruptcy}, the firm is simply liquidated, selling all of its assets for market value and distributing its value to investors (bondholders are paid first; shareholders receive the remains). In \textbf{Chapter 11 Bankruptcy}, the firm must prove in a court that it is worth more as a \textbf{going concern} (a firm continuing to operate) than its liquidation value. Investors are alerted to increased corporate risk by \textbf{ratings agencies}, such as Standard and Poor’s, Moody’s, and Fitch. Ratings agencies evaluate companies’ business and financial risks, summing up these risks in a letter grade, called \textbf{credit ratings}. The higher the letter grade, the lower the interest rate the company must pay in order to borrow. Companies tend to not take on very high levels of debt because of their sensitivity to credit ratings. Corporations actually pay rating agencies for this service, because standardized ratings make it easier to borrow money.
Mergers and Acquisitions

Investment banks have an advisory role to corporations in addition to assisting them in their financing. **Mergers and acquisitions** (M&A) is the fusion of two companies in order to attain synergies and economies of scale. A **synergy** is when the value of the two companies combined is greater than the value of the two companies separately. **Economies of scale** is an economic term used to describe the phenomenon of diminishing costs as production is increased. A good example of a company that enjoys economies of scale is Wal-Mart, who is such a powerful buyer of goods (that it then resells to its customers) that it can demand extremely low prices from the original producers of the goods. An increase in a business’ size due to a merger or an acquisition often leads to economies of scale and ultimately increased profitability. When two companies mutually agree to achieve synergies by fusing together, this is called a **merger**. An **acquisition** is when a larger company buys a smaller company to achieve synergies. Growth in income due to acquisitions is called **inorganic growth**, as contrasted with **organic growth**, growth from a business’ own investment projects.

Capital Budgeting and the Income Statement

Capital budgeting refers to the management of the left side of the balance sheet, the assets. Quite literally, **capital budgeting** refers to how the management (who makes the day-to-day decisions) **budgets the capital** that the investors have invested. Capital flows into the company, in the form of liabilities and owners' equity, and must be spent on assets. The management must choose how to best spend these assets.

When deciding whether or not to invest capital, the management considers the expected net present value of the investment. The **net present value** (NPV) is the present value of all future cash flows from the investment, minus the initial investment. NPV is a useful measure because it tells the management how much the investment is worth after accounting for all costs.

The management tries to maximize profit by choosing investments that have NPV greater than zero and as high as possible. The management must, by law, seek to
maximize profit because it must look out for shareholders' best interests. The financial results are summarized by accountants in a company's annual report, in the **income statement**. The framework of the income statement follows. Follow along with the explanatory paragraph below the framework.

<table>
<thead>
<tr>
<th>Revenues</th>
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<tbody>
<tr>
<td>— Costs of Goods Sold</td>
<td></td>
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<tr>
<td>— Selling, General and Administrative Expenses</td>
<td></td>
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<tr>
<td>— Depreciation</td>
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<tr>
<td>— Amortization</td>
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<tr>
<td>Earnings Before Interest and Taxes</td>
<td></td>
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<tr>
<td>— Interest Expense</td>
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<td>— Tax</td>
<td></td>
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<tr>
<td>Net Income</td>
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**Revenues** are equivalent to **sales**, and are the proceeds from the goods produced or services provided by the company. Next come the **cost of goods sold** (COGS), the direct costs associated with bringing goods or services to market, followed by **selling, general and administrative expenses**, the indirect costs of production. **Depreciation** is an accounting term that describes the loss of value over time of a business' physical capital. Depreciation exists because the usefulness of fixed assets declines over time. Imagine a business purchases a car that it intends to use for five years, at which point it intends to sell the car. The market value after five years will be significantly lower because of the use—this is depreciation. The **Generally Accepted Accounting Principals** (GAAP) have quantified this type of loss of value through depreciation, so that each year a company incurs a **depreciation expense**.
Each of the depreciable assets a company owns has specific guidelines for accounting for depreciation, and each year the company accounts for the aggregate loss of value in its depreciation expense. Similar to depreciation, amortization is the accounting practice of spreading a cost over time, although it refers to intangible assets, such as a patent or copyright. A large expenditure is made all at once, but accountants spread that cost over a given amount of years to reduce its immediate effect on earnings. While depreciation and amortization are non-cash expenses, they do affect the company's accounting bottom line, reducing the earnings before interest and taxes. Interest expense, the annual interest payments on the company's borrowings, is then subtracted, yielding pretax income. The company is taxed at the corporate tax rate, finally yielding net income. Net income is the accounting bottom line, prominently featured in the company's annual financial statements.

**Earnings Per Share and Dividends**

Investors often talk about earnings per share (EPS), a measure of profitability. Earnings per share is simple to understand; it is the net income divided by the number of shares of stock.

| Example 1: If a company earns $100,000,000 in a year, and there are 100,000,000 shares of stock, then EPS is $1. |
| Example 2: If a company earns $5,052,463,754, and there are 560,000,000 shares, then EPS is $9.02. |

Investors care about earnings per share more than net income for the same reason that governments care more about GDP per capita than GDP. It is simply easier to understand a company's standing in terms of each share.

Each year, the management of a profitable company has a decision to make. After bondholders are paid back, the net income is legally owned by the shareholders. It is the management's choice as to how to best optimize this value to the shareholders. The management has two options with what to do with net income. It can pay a dividend, or it can reinvest the net income.
A dividend is a one-time payment of a portion of net income to stockholders. The size of this percentage of net income is determined by the management. Like earnings per share, investors frequently speak of dividends per share. If the management chooses to issue dividends, investors will literally receive checks in the mail, directly proportional in size to the number of shares they own.

**Example:** If a company has EPS of $1, and the dividend payout ratio is 30%, the dividend per share is $0.30. Each shareholder will receive thirty cents per share that they own.

The management may also choose to reinvest net income back into the company. This can be true even if the company pays a dividend. In the previous example, the dividend payout ratio was 30%. This implies that the amount reinvested, or the retention ratio, is 70%. For every $1 earned per share, seventy cents are reinvested into the company. This is also true if the management elects to pay zero dividends. In this case, the entire earnings per share are reinvested. An example will illustrate this.

**Example:** Let's take the same company as before, with:

120 = 0 + 120. Assume that the company has earnings of $20 the following year, and a dividend payout ratio of 30%.

Net income = $20

Paid as dividends = $20 * .3 = $6

Reinvested = $20 * (1 - .3) = $14

So what happens? $6 is divided proportionally among all the shareholders, and they receive a check in the mail.

The $14 is added to each side of the equation, so that assets are made up of $100 in machine value, $20 of cash from last year's earnings, and $14 of cash from this year's earnings. The assets add up to $134.

The use of the additional, reinvested $14, must be financed. Think of the company financing the additional $14 in cash with internal funds.
Thus the equation ends up looking like: 134 = 0 + 134.

**Dividends vs. Reinvestment: Management’s Investor Relations Decision**

How does management decide these ratios? How does management decide how best to benefit its stockholders, who have claim to these earnings?

This decision depends on the growth opportunities available to that company. To see this, imagine a graph with Risk on the X-axis and Return on the Y-axis. On this graph are an infinite number of points, each representing a security available to investors. Each point has both a risk and a return. We have discussed the fact that every investor has a certain appetite for risk. The farther right you move on this graph, the riskier the investment. For each level of risk on this graph, for each tick on the x-axis, there is a security that offers a maximum return, given this risk. It is logical that as an investor, you desire the security with the highest return for the level of risk you are willing to tolerate.

![Graph showing risk on the x-axis and return on the y-axis](image)

When management is deciding how to distribute their earnings, if at all, they have this graph in mind. To see why, we will return to the utility company and the high-tech company. The utility company has a mature customer base that does not change very often. Furthermore, there are few growth opportunities available for the future. Thus, the managers of the utility company, when presented with a net income each year, select a high dividend payout ratio. This is implicitly saying: the
The investor is better off getting this money as a dividend, so that they might find a security providing a higher return for the same amount of risk (think of the ticks on the x-axis). Note that this is not the management accepting defeat; they are simply doing what they are legally required to do—look out for the best interest of the shareholder.

The high-tech company's customer base is unclear because the future is unclear—it must constantly be on the cutting edge of innovation. The business is highly competitive, and therefore the company is high risk. This is not a bad thing necessarily; it just means that the high-tech company's securities fall to the right on the x-axis of securities available to investors. With this risk comes the possibility of high returns. There is great potential for success, with many markets that could be served and many growth opportunities. Thus, when the high-tech company's management is faced with a net income every year, they elect not to issue a dividend but to reinvest in the company. The investors still have a right to the earnings, it just means that the management thinks that for the company's level of risk (position on the x-axis), an investor holding its stock is receiving the highest available return in the market. This is implicitly saying: the investor is better off with his or her share of the earnings reinvested, because our company's growth potential is so high that investors cannot obtain a higher return anywhere else in the market (for that risk level).

**How to Value a Company**

The valuation of a company is very complicated, and for this reason we will only touch on the surface of this fascinating process. The most common valuation technique, discounted cash flows (DCF), values a company by discounting all future cash flows back to present value. At the heart of the DCF technique are many assumptions about the future. It is important to note that the value of a company is highly subjective and sensitive to all assumptions made. Thus each of these variables must be estimated carefully so as not to distort the company's true value. To do a DCF valuation, each line of the income statement is estimated for a given time frame, often ten years into the future (because assumptions more than ten years away are hard to make). Beginning with the current year, percentage increases and decreases in future revenues and costs are estimated. One is then left
with ten consecutive years of income statements. But finding future net income is not enough; one must find future cash flows. Recall from our study of the income statement that, for accounting purposes, the net income is reduced by the non-cash expenditures depreciation and amortization. Valuing a company is a financial technique (with guidelines focused on understanding true cash flows), not an accounting technique (with rules that do not necessarily focus on cash flows), and therefore any non-cash expenditures must be added back to reflect true cash flows in order to see the financial perspective. Interest and tax expenses are added back in as well, because they reflect costs separate from the company's business operations. The financial bottom line that results is called EBITDA, Earnings Before Interest, Tax, Depreciation and Amortization. EBITDA is then discounted back to present value at the WACC (weighted average cost of capital) interest rate.

At this point, you have the present value of the next ten years of EBITDA. To account for the entire future of the company after ten years, you must add to this present value a terminal value. The terminal value is the value of the company if it were sold after these ten years. It is often simply a multiple of the 10th year's EBITDA, representing a premium for the future. The proportional size of the multiple depends on the expected long-term growth of the company. The terminal value is also discounted back to the present and then added to the present value of the next ten years of EBITDA.
Section 4 - Advanced Concepts in the Capital Markets

Pricing Stock Without a Hunch

The reader should be aware that stocks are, in large part, valued mathematically. It is true that stock prices are ultimately determined by market supply and demand, but what most don't realize is that this supply and demand is primarily calculated based on expected earnings and dividends.

The discounted cash flow valuation technique drives stock prices. The difference in opinion of a stock’s value lies in the potentially huge variation in each assumption. The subjectivity of each assumption, and thus each valuation, explains the difference in opinion of stock values. If the future were certain, stock prices would be fixed.

But the DCF method of valuation is not the only method used, so we will discuss three other models frequently used by investment management professionals. The first is the **dividend discount model**. This equation values stock relative to the following year's expected dividend per share, the **discount rate** (interest rate), and the expected growth rate of dividends in the future. Note that this valuation technique does not work for companies that do not pay dividends.

\[
\text{Share Value} = \frac{\text{Expected Dividend Next Year}}{\text{Discount Rate} - \text{Expected Dividend Growth Rate}}
\]

To find the growth rate of dividends, first find **return on equity (ROE)**, simply Net Income / Total Equity. ROE is similar to the earnings per share concept, except instead of dividing by the number of shares you divide by the total value of all shares put together. The growth rate of dividends is equal to the ROE * Dividend Payout Ratio.

Let's try an example.
Example:

You expect dividend per share next year to be $.53. Total equity is $500,000,000 and this year's net income was $48,000,000. You expect the company to pay 60% of earnings per share as dividends in the future. Your required rate of interest is 9%. The market share price is currently $14. Should you buy or sell?

First find the dividend growth rate.

\[
\text{ROE} = \frac{48,000,000}{500,000,000} = 0.096 = 9.6\%
\]

Expected dividend growth rate = \(0.096 \times 0.6 = 0.0576 = 5.76\%\)

\[
\text{Share Value} = \frac{0.53}{(0.09 - 0.0576)} = 16.36
\]

According to your model, the stock is currently undervalued, because it is trading at $14 when the value is $16.36. You should buy.

To price the stock of a company that does not pay dividends, the dividend discount model cannot be used. The **NPVGO** (Net Present Value of Growth Opportunities) model can be used instead. This model is less quantitative, essentially claiming the obvious: the stock price is equal to the value of this year's earnings plus the value of all future growth. The equation for this model is:

\[
\text{Price of Stock} = \frac{\text{Earnings Per Share}}{\text{Discount Rate}} + \text{NPVGO}
\]

The final stock pricing method that we will explore is somewhat easier to use in practice. **Multiples analysis** assumes that the market is willing to pay for more than one year of a company's earnings at a time. This is fairly logical—assuming that a company will operate indefinitely, you should be willing to purchase the stock at a higher price than just next year's earnings. You are paying not only for that year's earnings, but every year's earnings indefinitely. The equation for multiples analysis is:
Share Value = Expected Earnings per Share Next Year * P/E Ratio

The **P/E ratio** (Price/Earnings ratio) is simply the price of the stock divided by EPS. It shows you the premium people are willing to pay for each year of earnings. The P/E ratio is wholly defined by historical market supply and demand. Though you can calculate the P/E ratio yourself, in practice one usually just goes to a financial Web site, where the P/E ratio is listed for every stock.

The P/E ratio can also be useful to gauge market sentiment at any time, especially relative to a given sector or industry. It gives you a good indication of the market's opinion of a company's growth prospects. Stockholders have claim on *uncertain* future earnings. Though the utility company's future earnings could never be called certain, they are certainly far more predictable than the high-tech company's future earnings. The high-tech company has the potential to increase earnings dramatically in the future, and thus the market will pay a higher premium, a higher P/E ratio. P/E ratios were especially telling during the 1990s, when internet companies' stocks were being valued so highly. These companies often did not have *any* earnings, and all future earnings were completely speculative. Thus, P/E ratios for many internet companies during this time approached infinity!

---

**Example:**

A stock's historical P/E ratio is 6. Next year’s expected earnings per share is $1.40. The market price of the stock is currently $8.75. **Should you buy or sell?**

Share Value = $1.40 * 6 = $8.40

According to your model, *the market is overvaluing the shares, relative to historical data. You should sell.*

(Note that you can figure out the *implied* P/E ratio if the market is overvaluing or undervaluing the share.)

Price of the share / Expected earnings per share = P/E ratio

$8.75/$1.40 = 6.25, so the implied P/E ratio is 6.25, higher than the historical level of 6.)
The CAPM and Beta of a Stock

The rate of return that equity investors require to invest in a risky asset is determined by the Capital Asset Pricing Model, or the CAPM. The CAPM quantifies the investors' required rate of return by accounting for risk, and is the corporation's cost of equity.

Required Rate of Return = Risk-Free Rate + Beta (Market Risk Premium)

A stock's beta is its sensitivity to the market's performance. In general, stocks are sensitive to the market. Market risk cannot be diversified away (like individual stock risks can be), so a stock's sensitivity to the market is a measure of its risk. Stocks with a high beta are risky stocks, and stocks with a low beta are less risky. The high-tech company would have a high beta, while the utility company would have a low beta. Betas range from -1 (moves exactly opposite to market performance) to any number above zero, but generally hover around 1 and do not go above 3 (magnifies market movements by three times). Betas are useful to look at when considering the purchase of a stock because they can give you a good indication of what's to come. If you buy a high beta stock, know that you're not only making a play on the company itself, but also a play on the market. If the market decreases, so will your positive-beta stock (most likely). Of course, the opposite is true as well, and a high beta stock may also give you great returns. A stock's perceived beta can be easily looked up on financial Web sites.

Private Equity

We've looked at all the tools necessary to value stocks, and we've examined why the methodology is subjective. This subjectivity is the basis for an entire industry, the private equity industry. Private equity firms value many companies in order to identify those that the market undervalues. They then make a bid for all of the stock that exists in the public market, offering to pay a higher price than the market price. If the board of directors approves the bid on behalf of shareholders, the shareholders receive cash in exchange for their shares. At this point, the private equity firm owns all of the company's equity, and has taken the company private, essentially the opposite of an IPO. The board of directors is no longer necessary, and the private
An equity firm frequently replaces the management in exchange for its own people. The private equity firm changes the company in order to realize the increase in value that it identified before the privatization, then resells the company to the public after a holding period of 3-5 years, typically. Essentially, private equity firms make big, undiversified plays on stocks, changing the company in between buying and selling. But fundamentally, it is still buying low, selling high.

**Venture Capital**

Similar to private equity, venture capital firms make large bets on companies by buying stakes of equity, although venture capital firms specialize in companies in their infancy. Where private equity companies look for already-public, typically large companies, venture capital firms invest in companies that are very new and could not survive without capital. Venture capital firms invest in many infant companies, with the understanding that the majority of them will go out of business, because they hope to be investing in the next Google, making up for the investments in businesses that failed.

**Derivatives**

Throughout this paper, discussions of financial instruments have been limited to stocks and bonds. In practice, a variety of types of financial instruments are traded by the buy side. Many of these are derivatives, financial instruments whose value is derived from the value of another financial instrument. Like any other security, it is an agreement between two counterparties, where the agreement is based on the fluctuations of the underlying security, which could be a stock or a bond, or any number of other securities. I like to think of derivatives as the “adverbs” of finance. An adverb describes a verb, which describes a noun. Similarly, a derivative is a security based on another security, which is based on a company.

One of the most common derivatives is a stock option. There are two primary types of options, but the most common, a call option, grants the holder the right, but not the obligation, to buy the security at a predetermined price (the exercise price), on or before a predetermined date (maturity). The investor buys the option to buy, so if the market price of the underlying security exceeds the exercise price at any point
before the option matures, the investor can make use of his option to purchase the security at a below-market price. Once he does so, he can instantly sell back the security to someone in the market, capturing profit. The reverse of this is a put option, which grants the holder the right, but not the obligation, to sell the security at the exercise price, at or before the contract’s maturity. Stock options are a very risky security in which to trade. An example will illustrate why this is so.

Imagine the market price of a stock is currently $100. If you have $100 to invest, you could simply buy the stock, or you could buy, for $5 each, twenty options to buy the stock within a month at an exercise price of $105. Let’s study 3 scenarios of the price of the stock: a fall to $85, a rise to $105, and a rise to $115.

### Scenario 1: Stock falls from $100 to $85

You have invested your $100 in twenty options. It is important to understand that you only own options—you do not own stock until you exercise the options. If the price falls to $85, you have no reason to exercise your option to buy at $105—if you wanted to buy so badly, you could simply buy at the market price of $85! When the options expire at maturity, they are worth nothing, so you have lost your entire $100. This is known as being out of the money.

### Scenario 2: Stock rises from $100 to $105

When the stock’s market price reaches $105 it is equal to the exercise price. You are indifferent between using your option and not using it, because you could not make any profit from it. You have already paid for all of the options, so you have lost your entire $100. This is known as being at the money.

### Scenario 3: Stock rises from $100 to $115

When the market price exceeds the exercise price, you are thrilled because you can use your twenty options to buy at $105 and instantly resell it to the market at $115. This is known as being in the money. Using your options, you purchase twenty shares at $105 each, for a total of $2100. Then you sell the twenty shares in the market at $115 each, for a total of $2300. Subtracting $2100 from $2300, you can see that you have received a payout of $200. The $100 that you initially invested has grown to $200. This is a 100% profit!
The second type of option is the right to sell, called a **put**. The mechanics are similar to the option to buy, but reversed. Though there are two types of options, you can *buy or sell the option to buy (a call) or the option to sell (a put)*, so effectively there are four basic ways to invest using options.

Another increasingly-common derivative is the credit derivative. Credit derivatives are relatively new to the financial markets, but the market size has been doubling year after year. **Credit derivatives** are based on bonds, similar to how options are based on stocks. By far, the most common type of credit derivative is a **credit default swap (CDS)**, which provides a way to insure the holder from the possibility of corporate default. A bondholder on the buy side can call the sell side if he believes the likelihood of default has increased and if he agrees to pay annual payments to the bank in exchange for protection. If the bond issuer does not default, the annual payments simply continue until the agreement expires. If there is a default, the insurance takes effect. The bank must pay the bondholder the face value (*not* the market value) in exchange for ownership of the bond, which the bondholder forfeits to the bank. Upon becoming the owner of the bond, the bank effectively receives the dilapidated market value.

Credit derivatives are not only bought by institutional investors and sold by the banks. They travel both ways between the buy side and the sell side, and are now traded without the prerequisite of bond ownership. To understand why there would be a desire to trade these without ownership of the underlying security, remember that interest rates on corporate debt are comprised of the company’s risk and are priced from a benchmark. Market interest rates on corporate debt are thus sensitive to both the company’s individual risk and fluctuations of the benchmark. Also remember that bond interest payments are fixed; that is, though market interest rates may change due to supply and demand, the interest payments to the bondholders do not vary. Thus bondholders cannot invest based on their views of a company’s credit alone; they must also formulate expectations for fluctuations in the benchmark. Credit derivatives offer the ability to trade on corporate credit risk alone. This is why investors often trade credit derivatives without actually holding
the bonds. Similarly, there are interest rate derivatives that can be used to make pure play bets on rate fluctuations.

The most common interest rate derivative is an interest rate swap. Interest rates (on a bond, mortgage, etc.) can be fixed, constant throughout the contract, or floating, changing throughout the contract depending on market interest rate conditions. The floating rate moves as the Fed changes the benchmark. An interest rate swap allows one to convert a fixed rate to a floating rate, or vice versa.

An example of when this might be useful is for a lender of mortgages. The lender offers the choice to its customers of either a fixed or a floating rate mortgage, and must accommodate its customers’ choices. Even if the mortgage lender prefers receiving fixed rate payments from its customers, some may choose to make payments that change according to market interest rate levels—floating payments. To accommodate its preference to receive fixed rate payments, the mortgage company can arrange an interest rate swap that changes these floating rates into fixed rates.

![Diagram of mortgage and interest rate swap]

**Securitization and Asset-Backed Securities**

Securitization is the repackaging of financial assets, designed to change them to another type of financial asset. We have discussed the concept of a company’s cash flows as being an asset, and why the stock’s value is tied to those cash flows (recall the discounted cash flow technique for valuing stock based on expectations of future cash flows). Securitization takes non-traded financial assets, such as student loans, mortgages and credit card portfolios, and transforms them into securities called asset-backed securities. Let’s examine a type of asset-backed security, a mortgage-backed security, to understand this process. Mortgage companies make
loans to prospective homeowners to finance the purchase of their houses. The borrowers make periodic payments to the mortgage companies until the full amount of the loan, plus interest, is repaid. If the borrower fails to pay the full amount, the mortgage company takes control of the house and resells it. So the mortgage company looks at the cash flows (the interest payments and the repayment of principal at the end of the contract) as an asset, an asset made more secure because there is real estate that can be sold if the borrower defaults. An investment bank can buy these cash flow assets from many mortgage companies and create a pool of mortgages. The investment bank then repackages the pool to a fixed-income security, paying interest to investors who want exposure to the credit risk of the borrowers. This security behaves like a bond, but instead of the cash flows coming from a company, the cash flows come from the mortgage interest repayments. Thus the credit risk on the bond is the combined risk of each individual homeowner not repaying the mortgage.

The same structure also works with other types of assets, such as student loans. Loans made to students are paid back after the student graduates and begins to earn a salary. Because a college or graduate school education typically leads to a higher salary for a student, it is logical that an investor would be willing to take credit risk on a student loan in exchange for interest.
Collateralized Debt Obligations

As if it weren’t complex enough already, there are derivatives of derivatives, and derivatives of derivatives of derivatives. Although this guide is aimed at basic financial literacy, the Subprime financial crisis that began in the summer of 2007 has shown us that even the most obscure type of financial instruments can ultimately affect everybody. One such obscure security is the **collateralized debt obligation (CDO)**. CDOs are derivatives that use other derivatives, credit default swaps (CDS), as the underlying asset from which the value of the CDO is derived. As you recall, CDS are derivative securities used to insure credit risk of bonds. An investment bank can create a pool of CDS contracts that it repackages, similar to the mortgage-backed security that we looked at previously.

Like a bond, investors in mortgage-backed securities are offered a standard, fixed interest rate to compensate for the credit risk of the borrowers. If a default occurs, it will affect all holders of the securities equally, with each investor losing some of the value of his or her investment. In a CDO structure, instead of a default affecting all investors equally, the pool of CDS contracts is separated and divided into slices, with one slice absorbing the first portion of defaults and insulating the slices that are more senior in the CDO’s capital structure.
These slices are called **tranches** ("tranche" is French for "slice") and the riskiest tranches are the ones that are the first to absorb defaults. Recall that a CDS contract loses its value when the company defaults. The CDO pool, made up of CDS contracts, also loses part of its value when one of the companies defaults. The reason the CDO is divided into tranches is so that investors can bet on the proportion of the CDO portfolio’s value that will be eroded if defaults occur. If an investor believes that no defaults will occur and wants to take a lot of risk, he/she can invest in the “0–3%” tranche, which would absorb the first 0–3% of losses in the portfolio. This is the highest risk part of the CDO structure, but also the part that offers the highest interest rate, compensating the investor for the risk. If only 2% of the portfolio were eroded, the “0-3%” investor would lose 66% of his investment ($2\% ÷ 3\% = 66\%$) but the investor in the “3-7%” tranche would be unaffected, because his/her losses only begin after 3% has been eroded. Interest rates increase, along with risk, as you go down the capital structure of the CDO. The variety of investment profiles that the CDO offers, as well as the potentially interesting trading strategies, have made the CDO a very popular product for sophisticated investors.

Rating agencies assess the risk of each tranche in a CDO by looking at the relative safety of one tranche with respect to another. One of the most important factors that the rating agencies examine when looking at CDOs is called correlation. **Correlation** refers to how related the assets in the CDO are related to each other. Low correlation in the pool of CDS contracts means lower risk for someone holding a less-risky tranche (towards the top of the CDO structure). A single default will probably not mean that other defaults will occur. High correlation in the pool of CDS contracts is far riskier, as it means that if one default occurs, many could occur. This means that the cushions provided by investors in the riskiest part of the CDO structure could be wiped away and makes the possibility of losses in the senior tranches more likely. The classic analogy to explain correlation is that of a minefield.

Imagine having to walk through a minefield with ten mines, knowing that you could withstand the impact of two mines and survive the walk. Enduring three mine blasts or more would not be sustainable. Low correlation in the mine locations (the mines are spread out throughout the field) means lower probability of hitting three or more mines if you walk straight through. High correlation in the mine locations
(mines are clustered together) means higher probability of hitting three or more mines.

This is why the ratings agencies have to examine correlation when looking at the risks of a CDO. To call a portion of a CDO “low risk,” when the portfolio of CDS contracts itself could be risky, the rating agency would have to believe that the assets were relatively uncorrelated, and even a few defaults in the portfolio would not impact investors in the senior part of the structure, due to this correlation.

**Structured Investment Vehicles**

**Structured investment vehicles (SIVs)** are somewhat similar to CDOs in that they are fixed-income securities that use portfolios of securities as assets for collateral. SIVs are formed by investment banks or are independently operated, to finance themselves in a succession of short-term borrowings in order to invest in long-term asset-backed securities. Recall from our discussion of the time value of money that would prefer $100 today to $100 a year from now. It is because of the time value of money that long-term promises of payment demand a higher rate of interest than short-term promises of payment.

The SIVs borrow in **money markets**, bond markets for maturities of under one year. These short-term corporate bonds are called **commercial paper**, and have the exact same characteristic as bonds, with the exception of the short-term maturity. Many commercial paper issues have maturities of 30 days.

The SIVs issue commercial paper because it is cheaper to promise to repay debt in 30 days than in 10 years. Every 30 days, the SIV consults with the investors from
the last issue to see if they want to roll, or re-invest, in the new issue. Investors often decide to continue their investment; if they don’t, the SIV can simply resell the unwanted portion of the commercial paper elsewhere. These commercial paper borrowings are the liability component of the SIV capital structure.

Meanwhile, the SIV purchases investment assets. These assets are asset-backed securities of very high credit quality, generally rated AAA (the highest possible credit rating) or slightly lower by the rating agencies. These asset-backed securities have long-dated maturities; even though they are of high credit quality (which would demand a low interest rate to compensate for the minimal credit risk), they offer a higher interest rate than the SIV must pay to issue commercial paper in the short-term.

The difference between the higher return from the asset-backed security investments and the lower interest rate that the SIV must pay for financing is the SIV’s profit. This profit is distributed to the capital note holders, the SIV equivalent to stockholders.

Recall that a bond has interest payments and then a repayment of the full principal at maturity. Just like a bond, when one commercial paper issue matures at the end of 30 days, the SIV must repay the full principal. As we discussed before, every 30 days, the SIV must issue more commercial paper. The influx of new capital from the new issue is used to pay the maturing previous issue. Because of this funding method, the SIV is subject to the whims of the liquidity and pricing available in the commercial paper market.
Appendix – Understanding the 2007 Subprime Financial Crisis

—Written as of December 28, 2007—

The story of this crisis really begins in the housing boom that took place in the 2000s, in which house prices rose dramatically in many parts of the US. As prices increased, mortgage lenders were incentivized to extend increasing amounts of loans. When a mortgage holder stops making interest payments, this results in a foreclosure, a seizure of the house by the mortgage lender. The reason the lenders wanted to increase the number of loans they were making is because, in an environment where house prices are rising substantially, the act of taking control of a house in the event of a default did not seem so bad to the mortgage companies. The mortgage companies could simply resell the house in the market for price that reflected the house’s appreciation in value. They could extend profitable loans, even in a default scenario.

This led to a disregard for credit quality of borrowers. More and more loans were made to a class of borrowers deemed “subprime” borrowers. These were borrowers with poor credit histories—they had previously entered personal bankruptcy, or had taken on high personal leverage by borrowing too much, or any number of activities that might have given them a bad credit rating. The share of subprime mortgages as a percentage of all mortgages in the US doubled since the mid-nineties.

Many of these mortgages were overly complex, arguably for the sake of tricking unsophisticated borrowers into taking out mortgages that they couldn’t afford. An example of this are adjustable-rate mortgages, that charge a “teaser” rate of, say 5% for the first several years and then revert to a higher rate, say 9%, for the duration of the mortgage. The borrowers often did not have to prove their income level (normally a standard requirement when extending a loan) and were sometimes tantalized with almost no paperwork required. Finally, the mortgage companies frequently did not demand “money down,” or upfront payment of part of the mortgage.
The homeowners that were sophisticated enough to understand that they would not be able to afford the increased payments of the adjustable-rate mortgages believed that they could always refinance. With interest rates so low, many mortgage borrowers believed that before they payments increased, they could take out a new mortgage and pay down the old one. However, as the US began to emerge from the recession that followed September 11th and the bursting of the stock market, the Fed had been systematically raising interest rates by 25 basis points at each meeting (one basis point is 1/100th of one percent, so 25 basis points is 0.25%). The interest rate climate started to be problematic for many subprime borrowers that had floating rate mortgages. The steady increase of rates soon made refinancing impossible for many.

Without the prospect of refinancing, the interest payments on these adjustable mortgages were simply too expensive and defaults began to occur all over the country. At the same time, housing prices finally started to cool off and began to decline. The period of low interest rates and rising home prices came to an end, and with it the conditions that enabled such risky loans to be extended. With the end of this period came the frightening prospect of widespread defaults. Each defaulted mortgage would require the sale of the house, which would weigh down on home prices and the economy.

In many states, mortgage companies were not legally required to extend only those mortgages that were suitable for the borrower, who is presumably less informed than the lender. Had these regulations been in place, far fewer of these confusing and unaffordable mortgages would have been extended.

Most mortgages were sold in pools to investment banks to create mortgage-backed securities. With these mortgage-backed securities as the assets, structured investment vehicles (SIVs) were formed. Investment banks also formed CDO structures, but with mortgages as the underlying securities instead of credit default swap contracts. Any SIVs or CDOs that the banks expected to sell to investors first had to be rated by the credit rating agencies, who rated these instruments based on their assessment of correlation. Unfortunately, the rating agencies failed to appropriately estimate the correlation of the mortgages in these pools, which would
prove to be very troubling later on.

Wall Street was in the middle of a credit boom. The notional amount of credit default swap contracts outstanding were in the trillions of dollars, though still relatively new to the markets. There had not been a corporate default for years, which had led credit investors to have a high risk appetite. Accordingly, required rates of return for investing in risky credit securities fell, reflecting the market’s disregard for credit risk.

Investors started to realize that the mortgage lenders still had lots of exposure to these defaults, as they had not been selling the entirety of their own mortgage portfolios to investment banks for repackaging. Investors feared that the mortgage lenders themselves might default due to the deteriorating assets on their balance sheets. The stock values of the mortgage lenders plummeted. The word “subprime” became a media catch-phrase, and investors quickly became spooked of anything touching the subprime market.

As discussed previously, SIVs use asset-backed securities or occasionally corporate bonds as the assets in the investment vehicles. One SIV had significant subprime exposure and became unable to attract funding in the commercial paper market. Recall that without this funding, an SIV cannot survive. Following this development, “SIV” became a media catch-phrase that scared investors. As a result, even those SIVs that did not have subprime exposure, or even investment grade mortgage-backed security exposure, could not attract investors to issue commercial paper. As investors panicked, the broader commercial paper market, an essential way for companies to fund their day-to-day operations, dried up. Liquidity in this market was gone, leading to interest rate spreads (over the benchmark risk-free rate) to widen dramatically.

Many of the banks that had created these SIVs could not determine how much exposure they themselves had to subprime assets, and thus became very apprehensive about what exposure the other banks had. The interest rate at which top-quality banks lend each other dollars overnight, LIBOR (the London Inter-bank Offered Rate), jumped tremendously. Even the most respected financial institutions
were having trouble financing themselves. Recall that banks need to keep certain amount of capital on their books every day to accommodate regulations. A spike in the LIBOR rate is a sign of extremely serious trouble in the financial system, as banks enable the entire rest of the economy to function. If banks cannot fund themselves, then corporations certainly cannot either.

Contagion, the spreading of fear throughout the financial system, emerged. The credit markets lost a tremendous amount of liquidity. The spreads that had been extremely low due to the credit boom were reversed, increasing across the spectrum even for companies who arguably should not have been affected by the crisis. Any companies that needed to issue bonds would either have to wait, potentially for a very long time, for interest rate spreads to return to appropriate levels, or would have to pay dearly to fund themselves.

Other parts of the market were also affected dramatically. Investment banks, in addition to mortgage lenders, also had lots of CDO exposure. Anything labeled a CDO, even if it had safe, prime assets in it, received no demand from investors, so the investment banks ended up unable to sell them and were forced to keep the CDOs on their own balance sheets. Even banks that were not in the business of creating CDOs had large proprietary trading bets (bets putting the bank’s own money at risk) on subprime assets. Some banks were forced to fund the troubled SIVs themselves, incurring massive losses. Most large investment banks announced in the third quarter of 2007 losses of billions of dollars due to subprime exposure. Two of the most powerful CEOs in business were fired from top investment banks.

This “credit crunch” was not an isolated problem in the financial markets. Unbelievably, the dollar was extremely weak against other major currencies and oil prices were at record highs. The price of oil is closely-watched because it is a significant input cost for most businesses and consumers. High oil prices are regarded as being bad for the economy. These factors, coupled with the subprime crisis, caused the financial crisis to broaden. The stock market lost 10% of its value in a month, a very sharp drop.
Another serious problem was that of the monolines. Monolines are insurers that focus on insuring bonds. When investment banks were creating SIVs and CDOs, they would need a AAA-rated tranche to sell to investors, in order to offer a high-quality part of the capital structure. In some cases, the assets that made up the SIV or the CDO were not sufficient to merit the AAA rating. The investment bank could employ a monoline, AAA-rated themselves, to insure a part of the structure in order to enhance the credit quality. The problem in the subprime crisis was that the monolines took more exposure to these risky securities than they could handle. Many of the monolines lost their own AAA ratings, effectively putting them out of business—no one would employ a monoline with a lesser rating. Even the monolines that were not downgrades were increasingly regarded by many as worthless.

At the time of writing, perhaps the scariest thing is that this crisis may be far from over. Many of the adjustable-rate mortgages have yet to reset to the higher rates, so more homeowner defaults are likely to occur. This could lead to major bankruptcies for financial institutions, which provide the grease that allows financial markets to run smoothly in good times. This brings into question whether the government would bail-out a failed bank, as it might be “too big to fail,” with ramifications of failure almost impossible to conceive of. The government has not overtly stated whether this would be the case. It is almost certain that investors will continue to lose money for some time, even if a major financial institution does not fail, as the market’s liquidity has dried up.

This deterioration of the financial markets is scary because it shows the system’s fragility and significant impact on the rest of the world. Our economy thrives in stability and normalcy, and deconstructs in periods of turmoil. The crisis is still ongoing as I write, so I unfortunately cannot appropriately conclude my work. But I encourage the reader to think about the impact of the financial system on their own lives, in the context of this crisis. Imagine if the financial system were to completely collapse. How would companies continue to supply us with the very products that enable us to survive? How would the government maintain order? This crisis will certainly change the way things currently work, but thankfully not to this extent. With the understandings gained in this paper, I encourage you to stay abreast of the business news. This will facilitate the completion of this work’s aim: to illustrate the
importance of finance, business and economics in all of our lives.
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