

Corporate Finance

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Preamble and Sources

The financial management of assets is critical for the modern day corporation and business entity. Many of the concepts stated herein come from *Fundamentals of Financial Management*, Eugene F. Brigham and Joel F. Houston, 8th Edition, 1998, Dryden Press; *Principles of Corporate Finance*, 6th ed., Stewart C. Myers and Richard A. Brealey, Irwin McGraw-Hill, 2000; Jones, *Investments*, Chapter 4 & 5, 9th edition; Reilly & Brown, *Investment Analysis and Portfolio Management* (2000); CFA readings; and SIU-E graduate classes in Corporate Finance.

Table of Contents

Corporate Finance	1
Preamble and Sources	1
Overall Goals of Corporate Finance	2
Capital Markets	3
Management of Working Capital.....	10
Financial Statement Analysis.....	14
Capital Budgeting	17
Cost of Capital	23
Corporate Structure.....	30
Corporate Governance Issues	39

Overall Goals of Corporate Finance

The overall goal of Finance is to increase value to the shareholders. The study of Finance revolves around the Time Value of Money (TVM). The PV of future cash flows is critical. The Net Present Value (NPV), IRR, and payback are all under the heading of investment decision criteria (i.e. capital budgeting). The ultimate objective is to maximize shareholder value by investing in projects with the highest NPV projects, or projects with the lowest cost of capital.

The priority order for capital projects financing is to: 1) use available cash first; 2) then use debt financing; 3) then issue equity to raise capital. This is a theoretical ordering stemming from the costs of capital concept. Costs can be minimized from the deployment of cash and debt. As costs decrease, profit increases. Essentially, if you can issue debt at a lower cost of capital than equity, then do it. Cash has no cost, debt carries the cost of interest, then equity has the highest cost since an equity issuance directly dilutes common shares.

As to the separation of ownership and management, shareholders can transfer ownership interests without affecting the operation of the business. Managers may not be overly responsive however to the interests of shareholders. Agency problems can develop, and agency costs include: 1) when managers do not attempt to maximize value; 2) costs are incurred to monitor the managers; 3) managers may have their own agendas – i.e. ego driven empire building; 4) knowledge of information may be asymmetrical in nature. The separation of ownership and control is an important issue. The cost of cash holding is an agency cost – managers may take perks by using retained earnings unwisely. There are mechanisms to reward managers for increasing shareholder wealth: 1) call options; and 2) bonuses.

Capital Markets

Primary Markets. This is a market for new issues of securities in exchange for cash from an investor. This occurs through an IPO, typically. IPO's will often times be popular upon issuance, and issued when the company is doing very well, only to gradually lose value over the first few years.

Investment bankers specialize in the sale of new securities to the public. Investment bankers will underwrite the IPO and bring it to the market by lining up buyers with the issuing corporation. The underwriter issues a Prospectus, and ultimately assumes the risk of resale by purchasing new securities for resale. A syndicate of underwriting bankers can be formed to spread this risk. Then, brokerage houses recommend the purchase of the securities to investors. Investment bankers will buy the securities from the issuing company and then resell them to the public, with the issuing firm receiving the issuing price minus costs to compensate the under-writer. This difference is known as the spread. This process is known as a firm commitment, since the underwriter assumes the risk of the IPO. An alternative is the best effort arrangement, whereby the underwriter does not buy the equity, but arranges to sell it directly from the issuer to various buyers. The banker acts only as an intermediary here, and does not assume the risk of a loss on the IPO. In still other situations, the bankers will buy the issue from a firm, but then will sell on a best effort basis.

IPO's are announced via the underwriters through tombstone ads in newspapers and road shows around the country to line up buyer support. Indications of interest from investors are called a book, and the process of polling investors is called book building. Market demand can be gauged in the process, resulting in a revision in the issuing price and / or other terms and conditions of the issue. Underwriters will typically offer investors the shares at a reduced price versus probable market price in an effort to line up buyer support, book building, and as an incentive for the investors to share their information with the underwriters. This accounts for the price run-up on the first day of secondary trading, with many IPO's (according to the book). The prospectus provides information to the investor about the security.

Express costs of the issuance run around 7% of the funds raised, but the underpricing of the equities also should be viewed as a cost to the issuing business. IPO's are usually offered to institutional investors, and that this could be viewed as a source of discrimination against small investors. Some authors feel that underpricing may just be part of the market mechanism driving efficiency, as valuable information is exchanged along the way between the underwriters and the institutional.

An IPO can take the form of a shelf sale, whereby small sales of a business can occur over a longer period of time. This is Rule 415. A Shelf Registration is a reference to Rule 415 adopted in 1982 where firms can register the securities with the SEC and then sell them to the public for a two-year period following the registration. They can then be sold with little notice and in small amounts. This saves greatly on the costs of the issuance.

Private placements are also becoming more common, whereby securities are sold directly to financial institutions (ie life insurance companies). These securities may not have to be publicly registered, thereby saving substantial costs. Private Placements occur when an underwriter sells directly to a group of investors or institutions. This is done under Rule 144A, whereby a firm sells directly to a small group of institutions. These issues do not trade publicly, thus lowering their liquidity greatly.

Many IPO's will have poor LT performance, suggesting that the investing public is overoptimistic about prospects of these new issues.

Primary capital markets for non-equity assets also exist. The Federal Reserve has primary market auctions for T bills, T notes, and the new I bonds. Municipal bonds can be sold by anyone of three methods: competitive bid, negotiation, and private placement. The first two methods both involve underwriting. There is a trend toward direct negotiation, however, with many bond issues. Corporate bonds are almost always sold through a negotiated arrangement whereby the underwriters put together a syndicate of other underwriters and the sell for distribution.

Secondary Markets. Generally, an auction market is a price driven auction place. The best example is the NYSE. A dealer market, such as the NASDAQ, provides liquidity by dealers who buy and sell shares for themselves and then resell to the investors. This produces a spread between the bid and ask, which is the dealer's profit. Call markets sell individual selected stocks at specified times. This is used on the NYSE during a build-up of orders, or where trading has been previously suspended. There will be an estimate of the new trading price, and then the market reopens at that designated price. A continuous market occurs wherever a market is open, and it can be priced either by a dealer or auction. The dealers sell and buy in an auction place and then act as an intermediary for other buy and sell transactions. It can end up being an auction type of market with dealer activity in it.

The NYSE is the world's largest equity auction market. The NYSE was established in 1871, but really dates to 1792 in the Buttonwood agreement signed by 24 brokers. Actually, it even precedes 1792 as an informal, handshake arrangement back when Wall Street was a street next to a wall that defended the city from invasion by water.

At the NYSE, specialists maintain the flow of sales by buying and selling from their own accounts. The specialist has both a bid and an ask quote. Specialists serve as both a broker and a dealer to maintain liquidity by buying and selling on a spread when the flow of orders is not adequate. The specialists can enter either side of the market, at any time. He is expected to move against the market. This provides liquidity, whereby the specialist builds up stocks when the market is selling, and then reduces inventory when the market is buying. In Tokyo, the specialists are called Saitori. They are not allowed to deal to public customers. In London, there are brokers and jobbers, and the jobber there acts as sort of a specialist.

On the NYSE, block transactions involving the sale of 10,000 or more shares are common, as are program trades, designed to execute trading strategies. Program trading in 2002 accounted for 32% of all NYSE volume.

At the AMEX, dealers take the place of specialists. The AMEX began by a group trading unlisted shares at the corner of Wall & Hanover Streets in NY. It was originally called the Outdoor Curb Market. Formal trading rules commenced in 1910, and it was moved indoors in 1921.

NASDAQ now comprises over half of all US stock transaction sales. The NASD self regulates the exchange. NASDAQ is comprised of an electronic market with competing market makers. NASDAQ is an electronic exchange, and has 3 levels of marketing information. (NASDAQ is also described as a 3rd market, after the national and regional). Level 1 has a representative quote on the stocks. Level 2 has instant current quotes by all market makers. So, a broker calls the dealer with the best quote and makes the deal. Level 3 allows for only the market makers to change their price quotes to coincide with their stock inventories. A 4th market exists for the direct trading of equities between 2 parties without any intermediary. This is mostly done by large institutionals, as it eliminates the commission fee altogether.

There are also regional exchanges, as well as OTC bulletin boards and pink sheet listings. Regional exchanges have differing listing requirements. Chicago, Boston, and Cincinnati are regionals in the US. Over the Counter Markets (OTC) trade in unlisted stocks, and lots of variety exists in OTC markets because of the lack of minimum requirements. OTC's are almost always a negotiated market.

ECN's are computerized trading networks for institutions and large traders. Instinet, owned by Reuters was probably the original form of ECN's, dating back to 1969. ECN's normally will take after hour trading. In-house trading by managers of different funds of the same family without the use of a broker or exchange is also a developing trend. Foreign markets exist in many areas of the world.

Stock market indexes serve as benchmarks. The DJIA is a price-weighted series of 30 equities of blue chip stocks. The S&P indexes are market-capitalized weighted, and have various indexes. The S&P 500 is commonly considered to be the benchmark for institutional equity managers. NASDAQ has a number of indexes, as well. The Russell series of indexes and Wilshire also provide various types of benchmark indexes. Foreign indexes also exist (EAFE, etc).

Bond markets exist to trade in bonds. Many bonds will trade through the NYSE, but the secondary bond market is mostly an OTC market, with large networks of dealers. T-Bonds can be bought directly from the US treasury, and many brokers will act as dealers in Treasuries. Federal Agency bonds also trade in secondary markets. Municipal bonds are thinly traded, and usually held to maturity. Corporate bonds are often traded between institutionals in direct trades.

US bonds and munis are traded by bond dealers. The major market makers are the banks and investment firms. With corporate bonds, transactions can be done by security exchanges, or Over the Counter (OTC). The major exchange is the NYSE fixed income market. The OTC will buy and sell by dealers for their own accounts, and then are resold by the dealers. Currently, 90% of all corporate bond trades are done on the OTC. The NYSE bond market is actually now considered the odd lot market for bond activity. On the financial future markets, this is a futures contract on bonds, and is largely done at the Chicago Board of Trade and the Chicago Mercantile

Exchange (Merck). On the secondary equity markets, the major national stock exchanges are the secondary markets (NYSE and the London Exchange, as examples). Regional and OTC exchanges exist, but there is a major trend towards consolidation. Almost all equity exchanges operate as secondary markets, with the IPO's being initially sold through direct negotiation between a syndicate and an institutional, and then resold on the equity exchange as a secondary market situation.

Derivatives markets also exist. CBOE uses a system of market makers, with a bid and ask price. Futures are trade in designated pits.

Foreign exchanges exist in Tokyo, which was established in 1878, and with the present form dating to 1949. This is a price driven market with a 1st and 2nd section division. London has a market similar to NASDAQ. The electronic version started in 1973, although trading activity of one form or another has been going on for a long time. Frankfurt, Germany also has a national exchange.

The securities markets are changing dramatically. Institutional trading has increased by large amounts, and the exchanges and markets are becoming more electronic in nature. ECN's are likely to continue growing. Markets are becoming increasingly globalized in nature, and with 24 hour trading becoming more common.

Commission rates are going down. Previously, NYSE had a minimum schedule outlining the commissions. Soft dollars transactions then resulted as a way to for the brokers to compete without violating the schedule. Negotiated commissions began in 1970, and currently, commissions are 5 to 10 cents per share. The emerging trend is for a flat fee (\$10 to 20 a trade). Block trading are now occurring, too. Investment firms are trading directly between each other, in massive amounts of shares. These are the so-called "upstairs" traders.

Also, there is a trend to centralize many of the national markets, and to move towards more computerized trading patterns. The super dot system is an example – member firms can transmit market and limit orders directly to member booths on the trading floor. Global trading is on the rise, and this has eroded the NYSE market share. The Exchange has responded by extending hours and offering foreign stocks on the NYSE. In the future, there will be a continuing trend towards the consolidation of exchanges, the further development of computers, and changes in the financial services industry. There are more block trades and institutional activity, now. Volatility has increased, and there are national market trends in almost every developed country.

Brokerage Transactions. Full service brokers offer a full range of services. Discount brokers offer execution services for transactions. Cash accounts are those in which the customer can make transactions from cash. Margin accounts permit margin trading by the customer, and a minimum deposit of 2,000 is required per account. Asset management accounts are those with varying degrees of services, such as check writing privileges, and the like. Wrap accounts are those that wrap all costs into one fee.

DRPs allow investors the ability to directly invest in securities through dividend reinvestment programs. Direct stock purchase programs are similar, and allow an investor to directly buy the

initial shares of a security and then start a drip. Treasuries can be obtained directly from Treasury direct.

There are various people involved in a transaction. Commission brokers are the typical brokerage houses types of brokers. Floor brokers act as brokers for other members on an as needed basis. Registered market makers will take various orders, and will act hold an inventory of stocks for the buy and sells. Specialists on the NYSE are market makers that handle specific stocks (15 or so). Buyers and sellers have made 85% of NYSE trades, and only 15% have been done by buying or selling from a specialist's own account. In 2002, almost 98.9% of all transactions occurred with no change in price of within the minimum permissible, and the spread on the NYSE was 25 cents or less in 98% of the trades. Super Dot and other programs are allowing greater automation on the NYSE. Stock quote have now moved to decimals, hopefully generated narrower spreads.

Market orders sell at the best price, and take the current market pricing. Limit orders sell or buy at a specified (or better) price (these are normally used for upside buying). Limit orders could be good for a specific time, or until cancelled (GTC). Stop orders specify a price at which the transaction can be executed (these are used primarily for downside selling). Orders can be limited to day orders or GTC, or open orders for a set time period. A standard order is a round lot of 100 shares, and these are normally executed on a computer on the trading floor. It is becoming increasingly common to ordered irregular lots, but most of these orders are actually done through a dealer or specialist.

Short sales have a sale first, with a buy later, hopefully at a much lower price (more discussion on shorts, below). The short seller actually will be responsible for any dividends due while he is short on a stock. A special order is a stop loss order or stop buy order. (sell if the price drops to a certain \$ amount or buy if the price goes up a certain amount). Special orders are typically part of a filter system with TA.

A Settlement date is the date in which funds are balanced in the brokerage account and the shares are legally transferred. The street name means that the shares are held in the name of the brokerage. Use of stock certificates is becoming increasingly outdated.

Margin Accounts. A bank will charge a broker a margin call rate, and then the broker will charge the customer a margin interest rate. This may be close to a bank's prime rate. Margin accounts are typically used to leverage a buy or sell of shares, but can also be used to borrow money out of the margin account, and to provide overdraft protections.

The initial margin since 1974 has been 50%, and equals:

$$\text{Initial margin} = \text{amount by investor} / \text{value of transaction.}$$

In calculating the margin, cash has 100% loan value, and using stocks as collateral has 50% loan value. Regulation T authorized the Fed to specify the initial margin.

A maintenance margin is then the % of a security's value that must be on hand as equity. This is also known as the actual margin, and is:

$$\text{Maint. Margin} = (\text{current security value} - \text{amount borrowed}) / \text{current security value.}$$

NYSE currently requires a minimum of 25% maintenance margin, although individual brokers may require a higher maintenance margin, especially on highly volatile equities. This comes into play if the investor meets the initial margin of 50%, but the value of the security has now dropped to a point where the maintenance margin is no longer met. In such an event, The investor will have a margin call made on him or her, whereby the broker demands more cash or equity (at 50% face value) to prevent the actual margin from declining below the maintenance levels. If the investor does not meet the margin call, the broker has the right typically to sell any or all of the account to satisfy the margin call. The margin call can be calculated as:

$$\text{MC price} = \text{amount borrowed} / (\# \text{ of shares } (1 - \text{maint margin } \%),$$

Short sales are sales of stocks not yet owned by the investors in order to take advantage of an expect decline in stock price. The investor essentially bets that the price of the security will fall, by selling first, and then buying later, hopefully at a lower price. This is accomplished by the broker borrowing a security held in the broker's accounts. The seller must pay for dividends while he is shorting the stock, and all short sales occur in margin accounts, necessitating a margin account by the investor. This opens the possibility of a margin call on a short sale that rises in value instead of declining in value, as expected.

The short interest ratio is the ratio of total shares sold short / the daily trading volume. It is an important indicator of the overall bearishness of investors, and academic research supports the usefulness of this ratio as a measure of a bullish or bearish market. In 2002, 10% of all volume on the NYSE was from short sales. Much of this was from specialists, who have to sell short in many instances in order to provide for an inflow of buy orders proceeding in an orderly manner.

As to the use of shorts, investors will sometimes use a short sale rather than a put on a stock option, because many stocks do not have publicly traded puts. Also options are a wasting asset designed to expire, whereas a short can go for an indefinite time period. Further, sophisticated finance strategies sometimes call for long and short positions in a portfolio to dampen overall volatility while producing good returns. One study found that 65% long and 35% short is 50% as volatile as a portfolio that is 100% long.

Security Market Indicator Series. Indexes are designed to compute total returns in an aggregate market or market component. The indexes are then used as a benchmark. An index portfolio can then be developed. TA folks are also interested in Indexes for past and future performance trends. Systematic risk is calculated from the volatility risk of an entire index.

Market indexes can be constructed by size, breadth, or source. The weighting can be price weighted, as with the DJIA; Value or Market cap weighted (S&P Index); or un-weighted.

The DJIA has 30 stocks, and is price weighted. A divisor adjusts so that the index value equalizes on the splits. $DJIA = \text{sum of Price of each stock} * \text{Divisor}$. Thus, the high priced stocks carry more weight. The Dow has been criticized from the small sample of only 30 stocks, and by the mature blue chips chiefly composing the Index. And, the weighting of any stock is effectively reduced after a split, due to the price weighting. This makes little sense analytically, since the total value of the company at hand is still the same regardless of whether the company split or not.

The Nikkei has 225 stocks in the 1st section of the Tokyo market, and is also price weighted.

Value weighted indexes are those that utilize the total market value of the series. The base line (say 100 or 1000) is the initial index value, and then it moves from there. The index = (the sum of the market cap of all stocks on the measuring day / the sum of the market caps of all stocks on the base day) * beginning index value. So, there will be an automatic adjustment for stock splits with the value weighting because the market cap stays the same. The criticism of this type of index is that the larger market cap firms will have a disproportionate impact on the Index, while the small caps will have a non-existent impact on a larger index, such as the S&P 500.

Equally weighted indexes have each stock in the index weighted the same, regardless of size or share pricing of the companies in the index. .

The Value-Line Geometric Index uses a geometric weighting instead of an arithmetic averaging. This is mostly used for regional comparisons. It may not be directly comparable across countries due to a lack of consistency in the sample selection, weighting, computation, and the like.

MSCI Index actually uses several international indexes.

Bond Market series are more difficult than a stock series. Bonds are much broader than stocks in terms of composition and the pricing of bonds is less than continuous. There are several bond indexes, and Lehman has many types of bond indexes.

Composite stock and bond indexes are an aggregate of various Merrill Lynch and Wilshire investment vehicles. They measure the total return for all US taxable fixed income AND equity markets. They are the combination of all ML fixed income indexes and the Wilshire 5000 equity index.

Sampling differences account for correlation variances between the market and the indexes. There is a high correlation between the S&P 500 and the NYSE composite (.92), as well as between the Wilshire 5000 and the NYSE composite. There is a lower correlation between the NYSE and the AMEX and NASDAQ (.72 and .78). The typical correlation between the various bond indexes and the broad markets are much lower (.40 to .54).

Management of Working Capital

Liquidity. Various sources of liquidity exist. Primary sources of liquidity include cash available in bank accounts, coming from payment collections, investment income, liquidation of near-cash securities; ST funds including trade credit, bank lines of credit, ST investment portfolios; and CF management (primarily at decentralization of collection). Secondary sources of liquidity are negotiating debt contracts, relieving pressures from high interest payments or principal repayments; liquidation of assets; and filing for bankruptcy.

Factors affecting liquidity (drags) are uncollected receivables; obsolete inventory; tight credit. Pulls on payments include making payments early; reduced credit limits; limits on ST lines of credit; low liquidity positions.

There are several measure of liquidity.

Credit worthiness is the perceived ability of borrower to pay what is owed on the borrowing in a timely manner and represents the ability of a company to withstand adverse impacts on CF. High credit worthiness lowers borrowing costs. The less liquid a company, the greater the risk it will suffer financial distress. For ST financial management, emphasis is on changes and levels of current assets and liabilities.

$$\text{Current ratio} = \text{current Assets} / \text{current liabilities.}$$

This is a very common measure of liquidity with assets being converted to cash. Quick assets are those current assets that can be converted to cash, so inventory is taken out of current assets, generating the quick ratio:

$$\text{Quick ratio} = \text{cash} + \text{ST marketable instruments} + \text{receivables} / \text{current liabilities.}$$

The greater the current and quick ratio, the higher the liquidity of the company.

Overall capital effectiveness of a company can be evaluated, as well.

$$\text{Accts receivable turnover} = \text{credit sales} / \text{ave receivables}$$

$$\text{Inventory turnover} = \text{cost of goods sold} / \text{ave inventory}$$

$$\text{\# of days receivables} = \text{accts receivable} / \text{ave days sales on credit} = \text{accts receivable} / \text{sales of credit} / 365$$

$$\text{\# of days in inventory} = \text{inventory} / \text{ave days cos of goods sold} = \text{inventory} / \text{COGS} / 365$$

$$\text{\# of days payable} = \text{accts payable} / \text{ave days purchase}$$

When we look at the trends in these ratios over time, along with comparison to competitors, we develop a better idea of performance. Comparison should be made across time for the same company and across an industry average.

Operating cycle = # of days in inventory + # of days of receivables

New operating cycle = # of days in inventory + # of days of receivables - # of days of payables

Firms need efficient CF systems. ST CF should be forecast. A minimum cash balance should be maintained to act as a buffer. Typical CF should be identified. The uses of cash and level of Cash should be monitored.

Yields. The discount interest = difference bw face value and purchase price. Nominal rate is the interest rate based on face value. The yield is the actual return on the investment, if held to maturity. $\text{Yield} = ((\text{FV} - \text{Purchase price}) / \text{purchase price}) * \text{annualized factor}$. Specific instruments have varying annualized rules, by convention.

$\text{MM yield} = ((\text{FV} - \text{Purchase price}) / \text{purchase price}) * 360 / \# \text{ of days to maturity}$

T bills pay no interest, being sold at a discount, with the discount representing the return, when held to maturity. A 91 day T bill sold at a discount rate of 7.91% with 100,000 FV would be purchased at 98,000.53. This is calculated as: $((.0791 * 91 / 360) * (100K)) =$ The discount interest of 1999.47; then $\text{FV} - \text{discount interest} = \text{purchase value}$.

$\text{Bond equiv yield} = ((\text{FV} - \text{Purchase price}) / \text{purchase price}) * 365 / \# \text{ of days to maturity}$.

$\text{Discount basis yield} = ((\text{FV} - \text{Purchase price}) / \text{purchase price}) * 360 / \# \text{ of days to maturity}$.

ST investment strategies are of two types: passive and active; passive have only one or two decision rules for daily investing; active monitoring includes matching, mismatching, laddering. Returns should be expressed as bond equivalent yields and should be weighted towards currency size of investment.

Performance of AR. Efficient processing and maintenance of accurate, up to date records that are available to credit managers and other interested parties. Control of accounts receivables; collection on accounts; coordination and notification with credit managers; preparation of regular performance measurement reports.

A good performance measure for check deposits is a $\text{float factor} = \text{ave daily float} / \text{ave daily deposit} = \text{ave daily float} / \text{total amount of checks} / \# \text{ of days}$. It only measures how long it takes for checks to clear. Performance of an accounts receivable management function --- how effective are the receivables converted into cash. Accounts receivable aging schedule can be used. Number of days receivables gives an overall picture of accounts receivable collection.

Inventory Mgt. Inventory is a current asset. It does not create cash until sold. Motives for holding inventory – transaction motive reflects the need for inventory as part of routine production – sales cycle. Inventory need is related to manufacturing activity. Precautionary stocks can be needed to avoid stock-out losses, where there is insufficient inventory to satisfy

demand. Reliable forecasts are necessary. Speculative reasons are also relevant. For example, if paper prices will be increasing in the next year, a build-up of inventory at lower prices may be warranted. Over investment in inventory may result however in lower liquidity levels, as well as spoilage, internal theft (shrinkage), obsolescence, etc.

Economic order quantity-reorder point is based on predictability of demand and requires the determination of typical inventory levels needed to satisfy demand. There must be reliable ST forecasts. A level of safety stock provides a cushion for demand. Anticipation stock is inventory in excess of that needed for existing demand, which may fluctuate with the company sales.

The just in time (JIT) method minimizes input (raw) inventory. Manufacturing resource planning (MRP) looks more to material acquisition and production schedules. Combining JIT and MRP together provides a broader base for integrating inventory into the supply chain.

The most common way to evaluate inventory management is to use inventory turnover and # of days of inventory. Turnover calculations may differ within an industry, so care should be taken in the analysis.

Accounts Payable. AP's are a spontaneous form of credit in which purchaser is effectively financing a sale by delaying payment. Inefficiencies could occur from too early a payment, lost opportunities to pay early at a discount, or failures at using e-payments. Paying by check creates a disbursement float. Stretching payables is done sometimes by cash managers, taking advantage of grace periods. But paying too late can affect creditworthiness. 2/10 net 50 means 2% discount if paid in 10 days, otherwise, full payment in 50 days. The interest cost of ignoring the discount or trade credit is:

$$\text{Cost} = (1 + \text{discount \%} / (1 - \text{discount \%})) ^{(365 / (\text{days due} - \text{days of discount}))} - 1$$

Practice problem on above trade credit discount cost. Another equation in mgt evaluation:

$$\# \text{ of days payable} = \text{Accts Payable} / \text{ave days purchases}$$

ST Funding. Numerous sources exist for ST financing. Uncommitted lines of credit from banks can be terminated by the banks if they have other uses for the line. They require no compensation other than interest, but are not considered cash reserves, since banks will typically not even acknowledge that the line can be used. Uncommitted is considered the weakest form of ST credit. Committed lines of credit have bank commits to a defined amount of credit. They are considered ST liabilities when taken, since they are typically renewed every 365 days, but can be considered as firm ST cash reserves. Regular lines are unsecured and pre-payable without penalty. Borrowing is at prime or at LIBOR plus a spread. The spread depends upon firm creditworthiness. There is usually compensation to the bank for just the existence of credit, such as a commitment fee. This fee may be ½% or something similar of the total amount of the line. Revolving credit agreements are the strongest form of firm ST credit. These may be in effect for several years, 3 to 5 years, and may have larger lines than other forms of credit.

For financially weaker firms, collateral is typically required, such as a fixed asset or high quality receivable or inventory. A UCC lien is filed on such assets.

On asset backed loans in general, firms can generate cash from their AR thru assignment of the AR. Inventory can also be a source of CF, with liens from the banks in exchange for cash.

Major objectives of ST borrowing include: ensuring there is sufficient capacity to handle peak cash needs; maintaining sufficient sources of credit to fund ongoing cash needs; obtaining competitive rates of St borrowing. Size dictates many of the firm abilities to obtain ST cash. Borrowers should also diversify from one lender. Firms should be able to handle maturity dates. Borrowing strategies can be passive or active. Many active strategies involve matching.

$$\text{Cost of lines of credit} = (\text{interest} + \text{commitment fee}) / \text{loan amt}$$

Sometimes, costs are stated as:

$$\text{Cost} = \text{interest} / \text{net proceeds} = \text{interest} / (\text{loan amt} - \text{interest})$$

If dealer fees exist:

$$\text{Cost} = \text{interest} + \text{dealer commission} + \text{backup costs} / (\text{loan amt} - \text{interest})$$

Financial Statement Analysis

The following is a very brief review of financial accounting concepts. A far more extensive analysis is contained in Kaufhold, 2012:3, which focuses exclusively on financial statement analysis. .

Dupont Analysis. The key to the Dupont equation is the net profit margin. We can break the profit margin down into two components of operating profit margin and the tax effect. The series of breakdowns of Dupont is:

$$\begin{aligned} \text{ROA} &= \text{NI} / \text{ave total assets} \\ \text{ROA} &= \text{Net profit margin} * \text{total asset turnover} \\ \text{ROA} &= (\text{NI} / \text{revenues}) * (\text{revenues} / \text{ave total assets.}) \\ \text{Then, ROA} &= \text{op. profit margin} * \text{effect of non-op items} * \text{tax effect} \\ \text{ROA} &= (\text{op income} / \text{revenues}) * (\text{income bf taxes} / \text{op income}) * (1 - (\text{taxes} / \text{income bf taxes})) \end{aligned}$$

The effect of non-operating items is referred to as interest effect because interest is often the major item of non-operating items. Higher taxes generate low income bf taxes to op income.

ROE can be broken down similarly. The linkage with ROA is that ROE is ROA * leverage.

$$\begin{aligned} \text{ROE} &= \text{NI} / \text{ave common equity} \\ \text{Which is: } &: \text{ROA} * \text{fin. Leverage} \\ \text{Which expands into: } &\text{ROE} = (\text{op income} / \text{revenues}) * (\text{income bf taxes} / \text{op income}) * (1 - (\text{taxes} \\ & / \text{income bf taxes})) * (\text{revenues} / \text{ave total assets}) * (\text{ave total assets} / \text{ave equity}) \end{aligned}$$

This last equation completes the five point dupont triangle, as there are now 5 components to ROE. We can now compare ROA and ROE within a firm over time, or compare between firms for the same time

Leverage Issues

Operating leverage is the extent to which fixed costs are used in a firm's operations.

$$\text{OL} = \% \Delta \text{EBIT} / \% \Delta \text{sales} = (\Delta \text{EBIT} / \text{EBIT}) / (\Delta \text{sales} / \text{sales})$$

Financial leverage is the extent to which fixed income securities (debt and preferred stocks) are used in a firm's capital structure. The use of financial leverage will result in financial risk, which from above is the amount over and above business types of risk. ROE will increase as financial leverage increases, but financial risk correspondingly increases, as well. This increases overall risk of the firm.

$$\text{FL} = \% \Delta \text{EPS} / \% \Delta \text{EBIT} = \text{EBIT} / (\text{EBIT} - 1)$$

Total leverage is the combination (not summation) of operating leverage and financial leverage.

$$TL = DOL * DFL$$

The breakeven point is the volume of sales at which the total costs = total revenues, causing operating profit, or EBIT to = 0.

$$Q_{BE} = F / (P - V),$$

Then, $NI = EBIT (1 - \text{Tax rate})$
With, $EBIT = PQ - VQ - F$

where Q is the breakeven sales point, F is the fixed operating costs, V is the variable costs per unit, and P is the average sales price per unit of output.

As financial leverage increases, NI and ROE should increase, as there will be higher sales and income for the same equity. But financial risk also increases.

Equity vs Debt Preferences on leverages. Many owners of capital may prefer a high ROE and a high net income generated by high financial leverage. There may also be a preference for high operating leverage, as an increase in operating leverage as fixed assets being put to work will also increase firm's expected rate of return. In stressful times, however, there could be a flight to safety, with a preference occurring by the owners of capital for low debt to equity, a high ROE, and more reliance on ROIC and ROTC concepts.

Both of these leverages could be disliked by debt holders. The higher the financial leverage, the higher the likelihood of default on the bond payments. The higher the operating leverage, the higher the fundamental business risk from variability in sales.

Ultimately, the optimal capital and asset structure is the one that maximizes firm valuation and stock price. At some point, EPS can be expected to peak and then fall as a result of financial leverage. This can be calculated by the CAPM, with Beta of the firm increasing as the financial leverage increases, resulting in a higher required rate of return. k_s increases from a constant RFRR, constant business risk premium, but then an increasing financial risk premium. As EPS peaks, WACC is minimized. The minimum WACC point will result in a maximum stock price.

Pro Forma Analysis. Financial ratios and common size statements are used to gauge the financial condition and performance over recent time periods. This is useful for past and forward trends, as well as comparisons with other firms. Pro forma are income and balance sheets based on projections. Revenues are projected and then use the other ratios to project future firm conditions. We can make a simple revenue projection, holding all ratios the same, but this is prone to severe mis-estimation. A better analysis is:

- Estimate typical relation between revenues and sales driven account
- Estimate fixed burdens, such as interest and taxes
- Forecast revenues (probably most important single variable)
- Estimate sales driven accounts based on forecasted revenues

- Estimate fixed burdens
- Construct future income and balance sheet

We can refine the projections by determining which income and expense items vary by revenues and which do not. Accounts that do not vary include interest and non-operating income. Accounts that vary by income include: COGS; Selling, general, and admin expenses (SGA); and working capital accounts included in current A and current L.

Fixed burdens are usually interest and taxes. If the tax rate does not change ST to NT, this will change very narrowly. The capital structure in the future also has to be reviewed, to determine fixed burdens, since capital usage will generate interest.

Revenues can be forecasted in a number of ways. If a simple projection is made of sales, large errors can occur. Time series linear regression can be done. Past projections do not account for other factors affecting revenues (acquisitions;; macro events; etc). So, we should consider:

- Past events
- Company specific current and forward events
- Market, sector, and industry events
- Macro-economic climate

Capital Budgeting

The Process. Capital budgeting revolves around the proper use of cash flows. The capital budgeting process can be summarized as a series of steps to undertake.

Step 1: generate ideas.

Step 2: analyzing individual proposals

Step 3: planning the capital budget

Step 4: monitoring and post-auditing

Decisions are based on CF. In general, cost of the project must initially be determined. The expected cash flows are estimated, including terminal value. CF is based on opportunity cost. This involves estimating the discount rate, also known as the required rate of return and the cost of capital. Timing of CF is critical. CF is analyzed on an after-tax basis. Riskiness of projected is estimated. Cost of capital is determined, for the given riskiness. Financing costs are generally ignored. Cash inflows are done on a PDV basis. PDV of cash inflows are compared to costs of the project. Capital budgeting CF is not accounting net income. Depreciation is not a CF item, for instance.

Categories include:

- Replacement projects. This is for replacement of worn-out or damaged equipment. This could be part of the regular budgeting process, with an eye towards changes in technology.
- Expansion projects. These decisions are more complex, and mistakes are likely.
- New products and services. These involve strategic moves of the company, and must be highly detailed.
- Regulatory, safety, environmental projects. Insurance, liability, regulatory issues.
- Other. Office buildings and the like.

Terminology includes:

- Sunk cost. This has already occurred. Current decisions should be based on future CF and not prior sunk costs.
- Opportunity cost is the next best use of capital, if the current proposal is not chosen.
- Incremental CF is the CF realized because of a capital decision. It is a with and without project type of analysis.

- Externality is an effect of an investment on things other than investment itself. Society at large, etc.
- Conventional vs unconventional CF. a conventional CF is a pattern of initial outflow and then a series of Cash inflows. Unconventional may have CF in and out flipping back and forth (like a second call for cash in with private equity investment).

Project interaction. Various projects can interact with each other. Independent projects do not affect each other, whereas mutually exclusive projects are intertwined to the point where only one can be accepted (two competing projects for the manufacture of the same product, for instance). Project sequencing occurs when several projects are lined up in consecutive order for the use of capital; this ensures that redundant projects are not built, for example. Unlimited funds almost never occur in practice. Normally, there will be a limited amount of capital that will be allocated to the various projects.

Methods of Evaluating Projects.

Net present value (NPV) ranks investments by Discounted CF techniques.

$$\begin{aligned}
 & PV = CF / (1 + r) \\
 NPV &= CF_0 + CF_1 / (1+k)^1 + CF_2 / (1+k)^2 \dots CF_n / (1+k)^n \\
 & \text{Generalizing ... } NPV = CF_0 + \sum_{t=1}^n CF_t / (1+k)^t
 \end{aligned}$$

Where CF_1 , etc, are the after-tax cash inflows, and CF_0 is the cash outflow necessary to fund the project, CF_0 would be negative. In practice, there could be several years of cash outflows. This would then also be projected on a PV basis. Accept the project if $NPV > 0$; reject if $NPV < 0$. The rationale for this decision rule is that only projects should be considered that cover their WACC. If more than one project has positive NPV, then a ranking of projects is done.

The Internal rate of return (IRR) is the discount rate that makes the PV of the after-tax CF = project cost. It is an iterative process, with the discount rate being adjusted until PV of CF = costs.

$$\begin{aligned}
 & PV \text{ in} = PC \text{ costs, or} \\
 CF_0 &+ CF_1 / (1+IRR)^1 + CF_2 / (1+IRR)^2 \dots CF_n / (1+IRR)^n = 0
 \end{aligned}$$

The process is made easier with financial calculators, as they will run the iteration. Note that the IRR is merely the NPV set to 0 and solved for a certain discount rate. It will generate the same accept / reject rule as the NPV rule for independent projects, although NPV allows a ranking by highest to lowest NPV on competing proposals. For mutually exclusive projects, the two methods can give conflicting results. IRR is useful to determine the required investment return to justify the project. Anything $< IRR$ (or NPV of ≤ 0) is a no-go.

The payback period is the length of time required for investment net revenues to cover its cost. This was the first formal method used in capital budgeting. Simply count up the cash inflows until costs of the project are achieved. To arrive at a more exact determination (in between a year):

$\text{Payback} = \text{Year \# before recovery} + \text{unrecovered cost at start of year} / \text{cash flow during year.}$

There are some drawbacks to this method. No discounting is used, just count up the number of years it takes to recoup the investment. Thus, TVM is ignored since no PV is used. The method also ignores CF after payback is reached.

Discounted payback uses the original payback scheme, above, but with the CF in each year discounted back to the present. This results in a longer period for the payback. The disadvantage of both payback methods is that they ignore CF after payback is achieved, and do not really compare to the cost of capital. Discounted payback is considered somewhat more useful than the original payback method, since at least PV is used up until date of payback. Since CF after payback is still ignored, it is not a good measure of profitability, and do not account for negative CF after payback, with a potential negative NPV and lowered IRR overall.

As to the average accounting rate of return (AAR),

$$\text{AAR} = \text{ave NI} / \text{ave book value}$$

This is an accounting standard, as does not use CF. It thus has no TVM concept. This is not reflective of cash types of profitability, and thus is not a reliable indicator of economic activity. There is also no sound cut-off of profitable vs unprofitable investments. AAR is frequently calculated in different ways, and since it uses an average, assumes an expected type of return. It is easy to understand however.

The profitability index (PI) is PV of future CF / initial investment.

$$\text{PI} = \text{PV of FCF} / \text{Initial investment}$$

This method is closely related to NPV, since it essentially is NPV, but only with investment being divided in. The PI is the ratio of PV of FCF to investment, whereas, NPV is the difference between PV of FCF and investment. We do not necessarily take the highest ranking project on a NPV basis, however, but the one that has the greatest return for its capital outlays. The ratio will not be overly useful for mutually exclusive projects or where the projects are dependent upon one another. Benefits refer to the method as the cost-benefit ratio. NPV and IRR are considered more economically sound, but PI is useful for determining the [“bang for the buck”] CF for a given level of investment. Note that one of the problems has PV of FCF and not the full NPV equation, including the CF₀, which is negative.

On related items, usage of cash flow for dividends is important. The expectation of dividends must occur to generate any valuation in a business (or else, use liquidation value or net cash asset value, rather than going concern valuation).

$$\begin{aligned} \text{Plowback Ratio} &= \text{CF \% retained by firm} \\ \text{Payout Ratio} &= \% \text{ of CF after tax that is paid in dividends} \\ \text{Plowback} + \text{Payback} &= 1.00 \end{aligned}$$

The NPV profile is a graph showing the relationship between the NPV of firm projects and the cost of capital (ie discount rate) of the firm. The NPV is on the y axis, and the cost of capital, k , (in % terms) will be on the x axis. The IRR will be the x intercept, as NPV is set to zero with the IRR. The profile will be downward sloping, with high NPV at low k 's, and low NPV when the cost of capital is high. Basically, NPV at the varying discount rates will be sketched out on the graph. $NPV = 0$ at the IRR %, which will be the x axis intercept; The y axis intercept will be where the cost of capital is 0%.

Contrasting the Methods. More than one project can be sketched out to see which one will be preferred at the various k 's. There may be a cross over rate, where the NPV's of two projects will cross each other. This is the transition point, where both project's NPV are equal. Before the crossover rate, the IRR and the NPV will be in disagreement, since the IRR will select one project while the NPV method will select the other project. This will occur for mutually exclusive projects, for instance. For independent projects, the highest IRR is selected in any event. The NPV profile is very useful for two competing (ie. Exclusive) projects, as varying the discount rate may then generate a different conclusion as to which project to accept.

NPV assumes the rate at which the CF can be reinvested is the cost of capital, whereas the IRR assumes that the firm can reinvest at the IRR. Studies show that the best assumption is that reinvestment occurs at the cost of capital, and thus the NPV is the preferred method to use, in cases of conflict. NPV shows the amount of gain or wealth increase, whereas a higher IRR may only be for a smaller project (size problems) or for a relatively small time period.

With NPV, when $NPV > 0$, the project is acceptable. On the IRR, the project is acceptable when $IRR > \text{expected rate of return}$. Multiple IRR's could be generated however, and IRR's may end up favoring short lived projects that have higher IRR but lower NPV's than long-lived ones. The IRR could also be misleading if the total project CF occurs later in the project, since rapid payback would occur but with less total NPV over the projected life.

The discounted payback is seen as an improvement over simple payback in that it considers the TVM. Simple payback accepts the project whenever payback takes less than the allotted payback period.

Thus, payback and even IRR rules tend to be ad hoc in nature which could lead to bad results at times.

As to multiple IRR's, non-normal or variable CF's can generate multiple IRR's, where there will be two or more points with $NPV = 0$. In this instance, either the NPV must be used and the IRR ignored, or a modified IRR (MIRR) approach is utilized. Multiple IRR's will typically occur with non-conventional CF.

In general, capital budgeting decision rules: **invest if $NPV > 0$; if IRR / r ; or if $PI > 1.0$.** payback and AAR has no decision rules, as they are not based on TVM concepts.

As to popularity of the methods, most firms use all of the above methods, for a further comparison. Payback shows the illiquidity of the project. Long payback indicates a long time in which the reinvestment dollars will be locked away. NPV gives a direct measure of the total dollar benefit of the project, and is probably the best measure of the profitability of the various projects. IRR impliedly provides a safety margin, and will give the same answer as NPV for independent projects.

NPV can be used in developing estimates for stock valuation. This can be done by comparing the NPV of a project with the various the stock valuation methods. Future dividends are estimated, which are brought back to PDV; the riskiness of the stock is evaluated, which can be done as the variability of the CF's (which is a more fundamental measure of risk than pricing volatility); then the PDV is compared to current market price to determine over or under valuation. The value of a firm should increase if it methodically chooses projects based on NPV. The more effective a firm's capital budgeting procedures, the higher should be its stock price. In general, positive NPV projects should theoretically increase the value of the firm on a per share basis, and this may explain the popularity of NPV among analysts.

The Investment Decision. With competing and mutually exclusive projects, consideration should be given to:

- What is the time frame of the project, capital, and firm? The capital outlays should be matched in the same time horizon as the project.
- Which project fits better with the firm business model? (all projects may or may not fit).
- Are there tax implications on the various projects?
- What financing vehicle is to be used? (tie back to matching principle on time).
- Is there reinvestment risk? This is the possibility fo salvage value.

Sequence for decision making.

1. What is the CF over the life of the project?
2. Determine opportunity cost of capital.
3. Discount the project CF.
4. Sum of DCF = PV
5. NPV = PV – Initial investment
6. Invest if NPV > 0.
7. Invest in highest NPV within capital budget limitations (profitability index).

Overall return. The return of the entire firm, its beta, and the WACC, can all be affected by the capital investment decisions to pay for projects from either equity or debt, as follow:

$$r_{\text{assets}} = (\text{Debt} / \text{Firm value}) r_{\text{debt}} + (\text{Equity} / \text{Firm value}) r_{\text{equity}}$$

$$\beta_{\text{assets}} = (D/V) \beta_{\text{debt}} + (E/V) \beta_{\text{equity}}$$
$$\text{WACC} = (D/V) r_{\text{debt}} (1 - T_c) + (E/V) r_{\text{equity}}$$

Cost of Capital

Opportunity Costs. The opportunity cost of capital is the expected pay-off of a project, and is simply the average of all possible outcomes where all possibilities are equally probable. The opportunity cost is the expected rate of return in many applications, of similar projects demanded by investors. The expected pay-offs are discounted at its opportunity costs, and is equal to the PV that investors would pay for the project. Opportunity cost is not the interest rate on the debt of the project, nor is it the RFRR. If NPV of a project is positive, then the project is acceptable.

The costs of capital follow general principles of finance. The 1st basic principle is that a dollar today is worth more than a dollar tomorrow. This gives rise to present value calculations. The 2nd basic principle states that a safe dollar is worth more than a risky one. As the uncertainty of future pay-offs increases, the PV decreases because the discount rate, or expected rate of return, must increase to compensate for the extra riskiness. Where the rate of return (often calculated as the WACC), exceeds the cost of capital, the investment is worth taking. Generally, projects should be accepted with a positive net PV, and the rate of return > cost of capital.

Two important decisions in Finance: 1) the investment decision; and 2) the financing decision. In most finance equations, investments will be in the numerator of PV equation of $PV = CF / r$, while financing is in the denominator (i.e. discount rate). In past years, emphasis was given to increasing the return rate through M&A activity (e.g., the financing decision). Managing diverse businesses proved to be difficult however, as well as costly. Currently, more focus is given to the CF of the business (e.g., the investment decision).

Methods

The WACC is the rate of return that the suppliers of capital (bond and equity) require as compensation for the contribution of capital. It reflects the average cost of the various sources of the LT funds used, and not just the firm's cost of equity. The logic behind this is that the firm should be viewed as an on-going concern, and the cost of capital should be calculated on a weighted average or composite of the various types of funds used, regardless of sources (equity, debt, etc). This is consistent with M&M I and II. Capital can come from debt (at various interest rates), preferred stock, common stock, and retained earnings.

$$WACC = w_d k_d (1 - t) + w_{ps} k_{ps} + w_{cs} (k_s \text{ or } k_e).$$

All forms of potential capital should be considered in estimating WACC, rather than the exact capital that is actually used on the project. This is because the firm could use any available form of capital for all firm projects. As shown in the above equation, taxes impact the cost of debt capital, by a factor of $1 - t$, with t being the marginal tax rate. This is because in the US, debt interest is tax deductible, and this lowers the cost of debt capital. Project costs of capital are sometimes evaluated separately however, especially in instances where specific projects are riskier than most other activities of the business.

In general, cost of debt is lower than the cost of equity or cost of preferred, partly because of the interest deduction on debt interest. Additionally, if the CF stream is fluctuating, a higher discount rate may be appropriate, to compensate for the lack of a steady future stream.

On a statistical note, the arithmetic mean average is normally used for calculating opportunity costs rather than the geometric mean

Taxes impact the cost of capital. Since interest on debt is tax deductible (unlike equity financing), the cost of debt is calculated on an after tax basis, or $k_d (1 - T)$. The government effectively pays part of the cost of debt because interest is deductible. We will want to maximize the after-tax firm cash flows, so we should place CF and debt on a comparable basis. Note that the interest rate is on new debt, not outstanding debt. The marginal cost of debt of particular importance.

Alternative Methods of Calculations. The target capital structure is the optimized percentages of debt, preferred and common that will cause a firm's stock price to be maximized. Thus, the target structure will be an optimal mix of capital that then is used to calculate the WACC, at optimality of capital usage. The mix of capital will minimize the WACC at the optimal capital structure. To calculate the weighting, the target D/E ratio can be used: $D/E / (1+D/E) = \text{Debt \%}$; $\text{Equity \%} = 1 - \text{Debt \%}$.

In arriving at the weights, several approaches can be used ---

- the target capital rates is appropriate. This is often only vaguely known or followed, where known, but is theoretically the optimal combination of the various forms of capital.
- Market value for components, such as using forward estimated market values for both debt and equity, rather than the current market or book values.
- Examine trends in the company's capital structure, or at least the current structure.
- Use averages of comparable firm's capital structure.
- Another way of calculating the WACC is the marginal cost of capital (MCC). This is the cost of obtaining one additional dollar of capital, or the WACC of the last dollar of capital raised. See below discussion for MCC.

Marginal costs of capital. Because of estimation difficulties, the exact MCC may not be known. Instead, a probability band should be used. There will also be serious limitations of the method when applied to small firms, generating the need for manager judgment. Also, various external factors will influence the MCC that cannot be controlled by the firm (interest rates, tax rates). Other problems include: depreciation generated funds; costs of capital will vary for projects of differing riskiness; and practical problems exist as to measurement.

The MCC schedule shows how WACC changes as more and varied types of capital is raised during a year. Maintaining a certain mix of capital can keep the WACC at a designated

percentage (say 10%), until the MCC begins to rise when it uses all of its retained earnings and is forced to sell common stocks. This is referred to as the retained earnings break point. There could also be other rises in the MCC schedule, representing points where other more expensive capital is needed. Also, as more demand exists for capital, a higher rate of return is generally required, and this will also raise the WACC.

The investment opportunity schedule is a graph of the firm's investment opportunities ranked in order of each project's rate of return. Cost of capital (interest rate or rate of return required) is on y axis, and amount of new capital is on x axis. MCC increases as amount of capital increases. The IOS generally decreases as new capital is added, since the return on capital usually decreases as more capital is needed for the larger projects. The IOS – MCC curve is thus analogous to the MR – MC curves of micro theory (ie diminishing returns and increases costs to scale). Where the IOS = MCC, the firm optimal amount of capital exists, establishing both the optimal WACC and the optimal amount of capital to be raised during the year.

Also, the minimum WACC can produce a maximum stock price. The minimum will be where the FOC is set to zero. With the 1st derivative being the marginal cost curve, $MCC = 0$ at the minimum WACC and maximum stock price. (From Fin 420).

NPV is the really the PV of CF in – PV of CF out. $NPV = 0$ where, $PV_{in} = PV_{out}$ on the CF. If we use WACC as the discount rate for NPV calculations, we are assuming that the project has the same risk as the average-risk project of the company and will have a constant target capital structure thru the life of the project. This may not be realistic at times, but alternatives have drawbacks. Alternates to WACC include FCF to the firm, and FCF to equity in the estimation of cost of capital, by focusing more on these specific sources of capital.

Thus, the WACC has gained popularity as the default discount rate in NPV calculations. At optimality of the IOS – MCC curve, the marginal costs of capital is at an optimum, producing the ideal or optimal WACC from the IOS schedule.

Calculations. The cost of debt is the cost from a bank loan or bond.

YTM is the annual return an investor earns on the bond if held to maturity. The PV of the bond payments = the yield.

$$P_o = \left(\sum PMT / (1 + r_d / 2)^t \right) + (FV / (1 + r_d / 2)^n)$$

Where P_o = current market price of the bond; PMT is the interest payment; r_d is the yield to maturity; n is the number of periods to maturity, and FV is the maturity value of the bond. The equation assumes a semi-annual interest on the CF reinvested at the rate of $r_d / 2$.

The debt rating approach is used to estimate the before-tax cost of debt when current market pricing is not available. This approach depends upon valuation relative characteristics, referred to as matrix pricing, which looks at factors such as debt security, etc. $r_d (1 - t)$ is the basic equation, where r_d is the yield on debt of comparably rated debt, and t is the marginal tax rate (because of tax deductions of interest payments).

Problems that may arise: the firm may use a floating rate of debt, such as a rate tied to LIBOR or prime, rather than an assumed fixed rate. Debt may also have option calls or conversions. There may also be no comparably rated debt.

The cost of a non-callable, nonconvertible preferred stock:

$$r_d = D_p / P_p$$

Where, P = current price per share; D = preferred dividend (not common), and r = costs of preferred stock. No tax adjustments are made for the cost of preferred, because preferred is non-deductible. The dividend is assumed to be fixed rate and with no maturity date, i.e. a perpetual preferred stock. The equation is basically the same format as a perpetual bond, with $P = D / r$.

The stock may have items that affect valuation. Call options, cumulative dividends, adjustable dividends, conversion rights, etc, all affect the valuation.

The cost of equity is generally the return required by shareholders.

The CAPM approach for retained earnings is: $k_s = k_{rf} + (k_m - k_{rf}) B$, where k_{rf} is the RF rate of capital, usually considered to be a 30 day T bill or US ST bond rate; k_m is the return of the market, and B is beta of the firm. This is a measure of the firm riskiness. Sometimes, a project riskiness is used for beta as this approach focuses on the project, but in practice the equity market index is often used for the beta source. The CAPM may appear to be statistically precise, but is subject to great estimation problems as to almost all of the variables of the equation. A multi-factor model of risk premium is an alternate to the equity market (F&F articles). Large differences exist however in equity risk premium in various countries, so, it would be useful to identify the premium on a country basis.

The expected return of the CAPM can be used as a single discount rate in the standard PV equation, $PV = \sum CF / r$.

The DDM approach is: $k_s = (D_1 / P_0) + g$, where D is the common dividend in the next period, P is the current stock price, and g is the expected growth rate in dividends. This is essentially the dividend yield + dividend growth rate. The growth rate is the hardest variable to estimate, as past growth may be too high for the future, or visa versa, due to business cycle and firm life cycle issues.

The forecasted growth rate from published sources can be used for the growth rate. Another option is to use the sustainable growth rate. This is:

$$g = (1 - D / EPS) * ROE$$

Where D/ EPS is the assumed dividend payout ratio and ROE is the hx return on equity.

The bond yield plus risk premium approach is simple: 3 to 5% is added onto the firm's LT debt interest rate. This 3 to 5% is the risk premium, effectively. This will produce a rough ballpark figure to use. It is based on the belief that the cost of capital of riskier CF is higher than the cost of less risky CF. The risk premium is forward looking, although an estimation of the premium is often done using hx spreads between stock and bond yields. $r = rd + \text{risk premia}$.

Beta calculations. This is for company beta (market beta would be data on whole equity market). A regression can be done on individual stock return data over T periods to develop a regression line of best fit of the data of risk vs return. The slope of the regression line is beta (rise / run). $R = a + B R_m$. Beta estimates are sensitive to:

- Estimation periods. Longer periods are used with stable companies; shorter periods may be useful for companies with recent and major structural changes.
- Daily return (periodicity of return data) may generate a smaller standard error.
- Selection of appropriate market index.
- Adjustment may be needed for small cap stocks because they exhibit greater risk and returns than large caps.

Business risk, sales risk, operating risk, financial risk may all affect the company beta or project beta. The pure play method compares a publicly traded company's beta with financial leverage differences of the company at issues. This is one of the easiest ways to determine leverage. Asset beta is "unleveraged" with only the business risk of the asset factored in. steps include:

1. Select a comparable company with similar business risk
2. Estimate the comparable beta
3. Un-lever the comparable beta's by removing the financial risk component of the equity beta. This develops the company's beta, adjusted for leverage of other businesses used as a comparable.

Bu = beta unlevered

BL = beta leveraged comparable

rc = marginal tax rate of the comparable

Dc = debt of the comparable

Ec = Equity of the comparable

$$Bu = B_L / (1 + (1 - tc) * Dc / Ec)$$

4. Lever the business risk for the project's financial risk. This is done by adjusting the asset beta for the financial risk of the project.

$$B_{L\text{project}} = Bu / (1 + (1 - t_{\text{project}}) D_{\text{project}} / E_{\text{project}})$$

BL project = beta levered for the project
t project = marginal tax rate of company sponsoring the project
D / E = D to E ratio of company sponsoring the project.

The process generates company beta estimated per CAPM for use as the cost of equity capital of a project. This would be the equity cost of capital, to then be combined with debt cost in a WACC formula. A firm's new company D/E with new capital added is appropriate to use for when converting asset beta to project beta. This generally flows the above equations of $BL_{project} \approx Bu (\dots D_{project} / E_{project})$, with $Bu \approx BL (\dots D_{comparable} / E_{comparable})$.

Asset beta does not change with an increase in firm D/E ratio, but equity beta does increase due to higher equity risk from higher debt loads. Asset betas are determined largely by the cyclical nature of the asset base. Also, higher operating leverages will have higher betas.

The country risk premium. Equity beta does not capture the country risk of a project in many studies. The cost of equity is adjusted by a country spread or country equity risk premium. The simplest estimate of this spread is the sovereign yield spread = govt bond yield in that country denominated in the currency of a developed nation – Treasury bond yield on a similar maturity bond in the developed nation.

Another approach = sovereign yield spread * annualized std dev of developing nation equity index / annualized std dev of sovereign bond market denominated in terms of the currency of a developed nation.

The logic for this is that the sovereign yield spread captures the general risk of the country, which is then adjusted for volatility of the stock market index relative to the bond market.

Marginal cost of capital schedule. The WACC is likely to change or increase as more funds are needed for projects. This results in the MCC schedule with WACC on y axis and amount of new capital on x axis. It is typically upward sloping due to restrictions or covenants on raising new debt on top of existing debt. A debt incurrence test provides for less senior debt to be issued once a certain threshold is reached. Less senior debt means higher interest rates needed, while prohibitions on new debt forces a firm to move to equity for new capital, which is even higher in the cost of capital. MCC may also increase when ST deviations occur in the optimal capital structure.

When the cost of raising capital from various sources increase, a break-point in the MCC schedule occurs. The MCC schedule is not smooth in its upward slope, but has a stair-step shape to it, with break-points at each step, as new and more expensive sources of capital is accessed.

Break-point = amt of capital at which the cost of capital changes / proportion of new capital raised from the source. The break point will be stated in \$ amounts of capital, say at \$2 million and then another break point at \$5 million.

A floatation fee is the charge assessed by investment bankers for assistance in raising new debt or equity. In the case of debt and preferred equity, these costs are rather small, something along the lines of 1%, so that are not factored into many equations on the cost of capital. However, with common equity, the floatation costs may be substantial, so they should be taken into account. Average floatation costs for common equity may be as high as 7.11%. In Germany however, the costs may be 1.65% while in the UK 5.78%, and 4.52% in Switzerland. Cash underwritten offers are more expensive than rights offerings, which are more common in Europe. Some texts treats floatation costs are a cost of capital. Another route is to consider it as part of valuation analysis.

The recommended approach is to make adjustments in PV of CF and NPV in valuations of the company. But it is often difficult to identify financing with a particular project. It is also often easier to show financing costs associated with changes in sources of capital.

Estimating Cost of Capital – Steps

- 1) Estimate company level beta.
- 2) Estimate an industry beta, along with standard error, and then compare back to company beta
- 3) Use the standard CAPM equation to derive the expected rate of return on equity
- 4) A constant growth DCF equation can be used as a check on the expected rate of return on equity.
- 5) Calculate WACC.

Corporate Structure

Usage of Cash. Earnings and an abundance of cash flow can be committed to various activities –

- 1) Retaining the cash as surplus cash
- 2) Engaging in a capital project of some kind (follow NPV / IRR rules). This would include M&A activity.
- 3) Reduce ST or LT loads. This would affect ROE, leverage and liquidity ratios.
- 4) Repurchase shares of the firm.
- 5) Dividend payments or dividend increases; stock splits.

In general, the firm should do whatever will maximize shareholder value. Retaining earnings should be done when there are no attractive alternatives. A comparison should be made between the expected return on cash (as through a diversified portfolio) vs expected return to shareholder value from the other activities. Additionally, keeping cash to act as a cushion against future macro or industry-level shocks should also be factored into the process.

Further, using available cash to add business units in an attempt to diversify the firm may not add value to the business and increase share value since investors themselves can diversify across businesses by simply buying equities in different sectors and industries. Vertical or horizontal integration may generate efficiencies of scales at times, but can also introduce too big of a bureaucratic function that does not increase overall value to the company.

On repurchasing shares, several reasons exist for this ---

- Repurchasing shares will alter the existing capital structure. The D/E ratio can thereby be changed very quickly, even to the point of using debt to buy back equities in order to change the capital structure.
- Share buyback reduces capital supply and therefore will increase price / share in a very direct way. Earnings will be the same, but EPS will increase, thereby increasing the valuation per share.
- Managers may want to send a signal to the markets that intrinsic value is below market pricing.
- Managers may repurchase as a practical way to take the stock private again. There may be a desire to increase shareholder value, to take control again of the company by dominant owners, or to avoid SEC requirements for public trades.
- There may be an effort to offset stock options. This prevents share dilution. This becomes an indirect way to compensate employees, with employees exercising options, and then the company repurchasing shares to avoid share pricing drops.

Why repurchase rather than issue dividends?

- Dividends tend to be sticky, with adverse actions by investors upon discontinuance of dividends. A share repurchase could bolster the share pricing as much as a dividend increase, but not give any expectations of future dividends.
- Repurchases of shares do not commit to continual CF outflow, unlike dividend streams.
- Repurchases are normally done when it is to the firm's advantage to do so, i.e. when market value is lower than PV of expected FCF.

On dividends, firms will pay a dividend because ---

- To provide income for shareholders
- To reduce excess cash (this also reduces agency costs for using the cash for management perks and excessive M&A activity)
- Firm is in a mature status, unable to use available cash for growth (ex: MSFT circa 2010).
- Expectations by investors that the company will pay dividends (closely tied to valuation levels of dividend paying companies)

Theories on dividend payment ---

Client effect. Investors come to expect the company will pay dividends and will invest in firms that pay dividends. Shareholders looking for dividends become the clientele of the firm. Investors may excessively sell off firms that stop paying dividends (ex: BAC, circa 2010).

Bird in hand effect. \$1 in hand is more valuable than the potential for the firm to waste it in other things.

Taxation effect. This is an historical argument involving the difference between capital gain tax and dividend tax rates. Now that the rates are more equal, this argument is less powerful.

As to the need for regular dividends, firms want to ensure that they are sustainable. Since investors prefer sticky dividends, the dividend stream should be sustainable and regular in order to avoid a sell-off. Investors also prefer dividend growth over time, with the DDM model and others expressly accounting for dividend growth in valuation calculations. False signals given out by firms (i.e. paying dividends paid with debt, etc), do not work over the LT, as investors tend to seek out companies with regular and predictable dividend streams.

On Stock Splits, this is a book entry in accounting, primarily. In theory, there so be no effect on the stock price, since same valuation is now spread over more shares. Thus, share pricing for a 2:1 stock split should end up being ½ of what it was before the split, resulting in same overall total valuation to the shareholders who now have twice as many shares. Studies do show an impact however upon announcement of the split. This may be due to enhanced liquidity of share

pricing (or signaling future growth), but otherwise may not be overly rationale in terms of paying more for a business with the same total valuation levels as before the split.

Firms will split stock because ---

- Shares are more affordable to shareholders.
- The firm may be signaling future growth, expecting pricing to increase, and thus wanting to get the pricing down prior to forward growth.
- Firms may want to stay within a perceived optimal trading range, maybe between \$30 / share and \$60 per share in the US.
- Liquidity issues for both institutional and individuals.

Reverse splits will occur too

- This is often due to exchange minimum pricing requirements (e.g. \$5 / share).
- Other times, this is done to get back into the optimal trading zone
- Or, firms will want to garner the attention of analysts who have a minimum share pricing screen (e.g. \$10 / share).
- Firms will use reverse splits to appear more successful, with an increasing share pricing, even if it is merely due to reverse splits causing the price increase.

But often, reverse splits will send a negative signal to the market. Also, note that at the aggregate level, reverse splits may affect price weighted indexes.

Corporate Financing. Three ways to finance:

- 1) internal sources (cash, retained earnings);
- 2) raise debt;
- 3) raise equity through either common or preferred share issuance.

Many companies primarily obtain the financing internally, thus reinforcing internal rates of growth. Various studies have suggested however, that firms may rely too heavily on internal cash, as growth opportunities are thereby limited. Firms have been raising more debt than equity in recent times, but very recently (circa 2008 +), that trend may be diminishing with a renewed emphasis on internal sources (or no capital project increases at all in an effort to stockpile available cash).

Preferred is considered equity, and thus the dividends to preferred are not tax deductible to the firm. In fact, debt vs. equity is generally favored in the tax code, as interest on debt is deductible while dividend payments are not deductible, coming out of retained earnings instead.

Businesses will buy and sell derivatives to act as a hedge against risks such as currency fluctuations. While not a type of financing, options, forward and futures contracts, and swaps are

necessary at times to protect from various risks of financing as well as risks of normal business operations.

Capital Irrelevance Theory. Starting in the 1950's, Modigliani and Miller (MM) wrote a series of very important papers which paved new ground on capital financing issues. Essentially, without corporate tax assumption, the capital structure of a firm was irrelevant. Once taxation issues were included, debt became more favored as a financing vehicle. MM also showed that dividend policy does not matter in perfect capital markets, either (1958).

There are two ways of looking at the same problem/ First, Is the value of a levered firm ($V_L = B + S$) different from the value of an unlevered (V_u) firm? (MM1) Second, is the WACC of a levered firm different from the WACC of an unlevered firm? (MM2). Starting assumptions include:

- perfect capital markets, no taxes or transaction costs
- Homogeneous preferences and beliefs
- Single risk-free rate, same for everyone

MM Proposition I: $V_L = V_u$. M&M's first paper involved arbitrage of two portfolios. In portfolio I, composition has equity in the levered firm. Initial cost: $\alpha * S_L$. Returns will be the perpetual cash flows of $\alpha * (C - r_B * B_L)$. Composition of Portfolio 2 is a dollar investment of $\alpha * V_L$ in the unlevered firm. This is partly financed by borrowing of αB_L . The initial net cost is $\alpha * S_L - \alpha B_L = \alpha V_L - \alpha B_L$. Returns will be perpetual cash flows from eth equity and debt. With both portfolios having the same initial cost, if cash flows of portfolio 1 are higher than portfolio 2, then arbitrage would occur with buys into portfolio 1 and sells on portfolio 2. This generates a riskless cash flow in perpetuity. Thus, at equilibrium, cash flows of both portfolios must be equal, as arbitrage would occur between the two portfolios until cash flows were the same.

The capital structure of a firm is this irrelevant to a firm's value – no combination of Debt to Equity is better than another. The overall market value of the securities of a firm is independent of its capital structure. A firm cannot change the total value of its securities just by splitting its CF into different streams. The value of the firm is determined by its real assets, and not by the types of securities that it issues. This allows a complete separation between capital investment and financing decisions. The intuition is that if investors want leverage, they can create it by themselves. They do not need firms to create or undo leverage. A critical assumption is that investors can finance at the same rate at which firms can borrow.

The capital structure of a firm may be more a marketing problem than anything else - the 'marketing" goal of the firm should be to find the right mix of securities that will have the greatest overall appeal to investors. The financial manager should not be concerned with the combination of securities by which to finance the firm. The value of the firm is unaffected by the choice of capital structure.

Modigliani and Miller Proposition II (with no taxes): $= r_o + (r_a - r_b) (B / S) (1 - T_c)$. In a second paper, MM showed that WACC is invariant to the capital structure. The value of the firm, V , is cash flows discounted by WACC. Consider the levered and unlevered firms in the

previous paper. Both had the same cash flows, and both had the same value. They must therefore have the same WACC. With a non-levered firm having the same WACC as a levered firm, the return on equity should therefore be seen as having both business risk and financial risk components. The overall required ROE would therefore increase with leverage. Financial leverage increases the sensitivity of ROE to changes in earnings, and it would typically increase the expected ROE but also increase the riskiness of those returns. $ROA = w_b * r_b + w_s * ROE$.

To maintain the same WACC, as ROE increases, Return on the debt should decrease to the same extent. The increase in EPS and ROE would be offset exactly by the rate that the earnings are capitalized at. Without any debt, then $ROA = ROE$. As debt is taken on in the capital structure, ROE increases linearly, and so long as the debt is risk-free, the expected return on equity would increase in linear proportion to the D/E ratio. Once the debt becomes risky, ROE will slow down form a linear increases and the return to debt will increase more. All the while, ROA remains constant. Shareholders should therefore be indifferent to changes in the capital structure because any increase in the expected rate of return to equity (ROE) will be offset exactly by an increase in debt based risk.

The traditional response to MM. WACC is calculated to determine the NPV that would not change the business risk to the firm. With an overall goal of WACC minimization, there still should be an optimal level of D/E. ROE may not increase by as much as suggested by MM with typical borrowing situations, as a result of D/E loads being needed to minimize WACC. But an extreme D/E ratio will then escalate ROE far beyond what is anticipated by MM. MM's approach is basically to maximize net operating income, without considering an optimal debt load. It is the net CF that matters, not the allocation of equity or debt within the capital structure.

Traditionalists believe that markets are less than perfect, with moderate increases in financial risk being initially ignored. Additionally, with investors experiencing some resistance to increases in personal borrowings (either through inconvenience, risk, unavailability of credit, etc), a market level advantage does exist for businesses to engage in leveraging, as investors may be somewhat limited in doing so.

M&M (1963) with taxes. If debt policy does not matter, D/E ratios should be randomly sorted. Instead, D/E considerations are highly consistent across the various industries, so there must be other factors in play. These factors include taxes, bankruptcy time delays, etc. The real question then becomes how do the markets respond to these items.

By 1963, M&M relaxed the no tax assumption, concluding that the value of a firm does increase as debt load increases because of a tax shield effect. Debt has a tax code advantage. It is tax deductible whereby the government pays 35% of the interest expense of the Levered company, L. Tax shields can be a valuable asset. The PV of the tax shield is independent of the return to debt, (ala MM prop). The tax shield = $T * D$. Or,

$$PV(\text{tax shield}) = (\text{corp tax rate} * \text{expo Interest payment}) / \text{exp. rtn on debt}$$

$$PV \text{ shield} = T_c (rd D) / rd = T_c * D$$

The tax deductibility of the interest income increases the income that can be paid out to shareholders or bondholders, effectively. The pre-tax asset value is not changed by a changing D/E ratio, according to MMI, but the after-tax value of the firm goes up by the value of the PV shield.

Corporate and Personal Taxes. When personal taxes are introduced, the firm should attempt to minimize the PV of all taxes paid on corporate income, and to maximize the after-tax income. The relative tax advantage of debt over equity is $(1 - T_p) / (1 - T_{pe})(1 - T_e)$. If all debt and equity income is taxed at the same effective personal rate, then the relative advantage of debt depends upon only the corporate tax rate, so that: $1 / (1 - T_c)$. We then can forget about the personal taxes and concentrate on the corporate tax rates since the MM theory of debt and equity only require that they be taxed at the same rate.

A tax equilibrium exists when corporate tax savings = personal tax loss, where $T_p \sim T_c$. If corporate tax rates increase, migration occurs from equity investment to debt investment at both the personal and corporate levels, leading to a higher D / E ratio. If personal tax rates increase, then a lower debt to equity ratio occurs until the migration stops where $T_p = T_c$ and a tax equilibrium is reestablished. This was Merton Miller's thesis presented in his 1976 presidential address at the American Finance Assn. Miller's thoughts were meant as a way to illustrate how corporate and personal taxes end up canceling, thereby leaving firm value to be independent of the capital structure. Neutrality will only hold however, when the effective tax rate of equity income is substantially less than that on debt based interest, and lower by enough to offset the corporate interest tax shield. The majority of financial managers certainly believe that the tax system favors debt borrowing at the corporate level. In practice however, this tax favoring of debt only will hold so long as profit is being generated by the business. If a firm shows a loss and cannot carry it against back taxes, then the interest tax must be carried-forward with only the hopes of using it in the future. The firm will lose the TVM in the process.

Also, tax shields at the corporate level occur with other than debt based instruments. Examples include accelerated write-downs for plant and equipment; immediate expensing of intangible assets; a firm's pension plan contribution; etc.

Financial Distress Trade-Off. One of the implications of the tax shield analysis was that the optimal capital structure should be 100%, it was always beneficial to interest into a capital budget to increase deductions. A trade-off then developed in the literature to account for financial distress. The theory could thus be stated as: value of firm = value of all equity financing + PV tax shield – PC costs of financial distress.

The distress will serve to effectively reduce the value of the tax shield that is generated by an increased usage of debt. When PV of tax savings from increased debt usage = the PV of the costs of distress, then the tax advantage of debt will disappear generate a trade-off to the capital structure. The managers will believe that a trade-off exists between tax shields from debt versus costs of financial distress in bearing that debt. Target debt ratios may vary from firm to firm, however and by industry. The trade-off theory (unlike MM which implies that the firm should take on as much debt as possible) would imply that moderate debt ratios may be preferable.

In 1977, Miller (alone) wrote that value could be gained by leveraging debt. The goal of the firm was to maximize shareholder wealth after all taxes are accounted for. The equation is:

$$V_l = V_u [((1 - T_c) (1 - T_s)) / (1 - T_b)] * B,$$

where T_b is the bond coupon taxes; T_s = the capital gain income taxes; and T_c is the corporate tax rate. If dividend taxes = GC taxes (like they are now), then it becomes like MM in 1963, reducing down to that 1963 paper. The gain from leverage is the part of the equation that lies between the two brackets $[((1 - T_c) (1 - T_s)) / (1 - T_b)]$.

In 1977, Miller also added personal taxes, and equity may have an historical advantage in terms of adding value to a leveraged firm. The Miller 1977 model is very important because it is closer to the real world. Basically, at what point does the 1st derivative of the curve between PV of tax shield versus PV of default ratio increase kick in? At what point is the PV of debt offset by the PV of the financial distress? When does the firm begin to miss the interest and principal payments?

The trade-off theory explains why many firms go private in LBO's. Also, trade-off explains the difference in capital structure between industries - a high tech and very risky CF business has little debt because the costs of financial distress are high whereas a cash cow will take high debt loads because of low default ratios. Tradeoff theory also suggests that firms with high debt should issue stock, constrain dividends, or sell off assets to raise cash. But the theory cannot explain some other firm activities such as thriving with little debt (Berkshire) even though it would make sense to take a debt load / tax shield. An odd fact exists with many industries: the most profitable firms are the ones that borrow least. Trade-off fails to explain this situation, since the theory would predict the opposite. In general, it appears that a firm will rarely engage in a major capital structure shift merely because of tax shields.

The Agency Cost of Debt Theory. Debt is not always better with this theory (unlike the MM 1958 era theory). Adding debt will increase the probability of bankruptcy at some point. When the FCF = coupon payments, that is where a probability of default occurs (especially where FCF just barely equals the coupon payments at the market top). The #1 risk premium of businesses is inflation; the #2 risk premium is default risk. This agency cost is difficult to quantify.

There are direct and indirect costs of default. The direct costs include the professional fees of a bankruptcy (around 3% of the total value of a firm, possibly). The indirect costs include reluctance of other businesses to do business with a firm in distress or bankruptcy.

Stockholders of a levered firm will gain when the business risk increases, and this is the "first game" of businesses when they get into financial trouble. Risks are shifted to the bondholders, as the managers of the firm attempt to outrun the distress by engaging in ever riskier projects in an attempt to generate greater cash flows. If it works, shareholders will gain, but in the interim, the bondholders face more of a default risk.

In the "second game", equity owners may refuse to contribute new equity (i.e secondary public offerings dry up), even where the firm would gain in the process from a net positive NPV

project. There are three more "games". Stockholders are happy to take money out of the firm in the form of a dividend. Then, stockholders and / or the managers will play for time with the bondholders. Lastly, a game of bait and switch could occur whereby a company is taken private and then starts its new life with very high debt in a LBO (RJR Nabisco example in 1988).

The probability of financial distress should be factored in with the loss of value if distress comes to a firm.

The Pecking Order of Financial Choices. This theory starts with asymmetric information (the managers have more info). This affects the choices between internal and external capital structure. Many managers will finance internally first; then they will finance with debt; then with equity. It may simply be easier to use internal funds than to issue debt; and certainly easier than issuing new equity. With this theory, there is no well-defined D / E ratio, only two kinds of equity, one internal, and the external (with a secondary offering). The pecking order would explain why very successful firms do not borrow much - they simply do not need outside money (Berkshire). The tax shield is assumed to be a second order effect. Highly profitable firms with little growth potential will work down to low debt levels, but growth firms that outrun their internal CF will then have to take on debt. The pecking order thus appears to explain the case of mature cash cows in anyone industry, but less successful in explaining inter-industry DIE ratio differences.

The main implication of this theory is that the direct costs of using retained earnings vs debt and equity are lower. Additionally, managers may hold asymmetric info by the managers, sending out signals that the managers believe the project can be financed adequately whereas equity financing suggests that the managers do not know about the FCF ability of the projected to finance itself. Also, there may be an agency cost in that additional people are brought into a debt issuance, and still more "monitors" are brought into an equity issuance.

This theory would further suggest that financial slack has value. This is where a firm with lots of cash, at the top of the pecking order is more valuable than the one that has worked its way down into high debt crisis. In the long run, a firm's value rests more capital investment and operating than it does on its financing decisions. Financial slack is best with firms that have plenty of net positive NPV projects. Too much-financial slack has a "dark side", however. Managers may take it easy, sit back, not do anything aggressive, let growth opportunities pass, then simply take huge perks of management instead of growing the firm or paying the shareholders dividends. Too much FCF leads to either excessive perks or ill advised acquisitions. Debt will force a business to be more efficient in such a case, as it would lead to a firm with just enough cash to finance all net positive NPV projects. Debt can discipline managers who are tempted to invest too much cash reserves instead of engaging in operational efficiencies.

Empirical facts of capital structures. Small firms have lower DIE ratios because of the difficulty in debt financing. In general, many firms do not use all available tax shelters. Stock pricing may increase as a result of debt issuance and fall in response to equity issuances. Equity is viewed as being issued because of lack of confidence in CF of the project. Also, under 1963 MM, the debt issuance increases the value of the firm.

There are persistent inter-industry differences. Firms with significant tangible assets carry a high debt where there is adequate CF to finance the debt. In growth industries with erratic debt structures, you will tend to find little or no debt because of the possibility of a default eventually on the debt when no CF occurs at some point in a business cycle. The very risky CF enterprises will typically carry little debt, although highly profitable firms will also issue little debt. Managers will simply like to keep their FCF. Profitable firms need tax shelters so would think that they would want to take on debt.

Corporate Governance Issues

Overview. Corporate governance is a system of internal controls that defines the various responsibilities and roles of shareholders, management, etc. Checks and balances exist as well as incentives to minimize conflicts within insiders and external shareholders. The goal is to prevent any one group to control and move CF to them. The Board should act in the best interest of shareholders; company acts in a lawful manner; shareholders have rights of participation in governance and receive fair treatment for the board and management.

A number of studies show a link between good corporate governance and strong profitability and investment performance. Portfolios of firms with strong governance outperformed with weaker protections by some 8.5% per year. The effect is not new and also not limited to the US.

Frequency of election matters. Shareholders should have control over frequency. An annual election may provide more flexibility, but a staggered board may serve an anti-takeover role (pro and con on this from an investor perspective). Can shareholders remove board members? Is the board an appropriate size?

On compensation, is there transparency on compensation? Has there been an analysis done on compensation in recent years? Are there share based compensation terms (pro and con)? Is there stock option expensing? Is compensation performance based? How many shares do management own?

Independence and Experience of Board. To be independent, board members must not have a material business or other relationship with the company or its subs, individual groups or entities that can exert significant influence on the management; the management itself; company advisors; and any cross director relationship. Boards that have experience relevant to the firm's business are best able to evaluate best interest of shareholders.

Mechanisms should exist to support independent work of the board, including the authority to hire outside consultant without management intervention or approval. Has nomination committee used external advisors in the past? Has the compensation committee hired external advisors?

A non-independent board is more likely to benefit the interests of management. The majority of the board at a minimum should be independent; the independent members should be able to meet without management and report to the shareholders. Combining chair of the board and CEO may give too much influence to inside board members. If the board chair is former CEO, insiders may be able to exert too much influence. Members who align with suppliers or customers may be good as well, but there should be mechanisms to monitor conflicts.

Investors should decide whether members have the required experience, as board members without experience are more likely to defer to management. Factors to consider:

- Members should be able to make informed decisions;
- Able to act with care and competence as a result of expertise;

- Public statements support ethical activities;
- No legal problems working with other boards or firms;
- Have experience on other boards; (pro and con)
- Time constraints if there is service on multiple boards.
- Regular attend committee meetings
- Investors should review disclosures about a member; whether a governance code exists;

Code of Ethics. The primary reason for a strong code of ethics is improved performance (various studies). Investors should decide whether the firm engages in outside business relationships with management or board members. Receiving compensation for outside business activities with the company creates inherent conflicts. Is there an ethics code on this? Has the company disclosed any related party transactions? Have board members or executive officers lent, leased, or provided property or equipment to the company? Has there been finder fees to the board members for acquisitions etc?

Committee Composition.

Audit committee composed of ALL independent members, although JA and some other nations allow non-independent members. Are any of the audit committee members financial experts? Is there an external audit firm coordinating with the audit committee?

Compensation committee should be composed of independent members. Purpose is to enhance LT profitability and value, ensuring that management compensation is appropriate in light of firm performance. Is the compensation appropriate? Has the firm provided loans or property to board members on this committee? Do committee members attend meetings? Policies in existence on compensation? Will the company receive approval from shareholders on compensation? Are there cross-director links with members of this committee?

Nomination committee – this committee looks for new board members with appropriate qualities and expertise; policies on nomination? Search firm? Succession plan for management?