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HANDOUTS

CORPORATE FINANCE

WRITTEN BY

CORENTIN DUBREUCQ-PERUS

EDITED BY

VITTORIA NASONTE

TEACHING DIVISION

This handout is written by students with no intention of replacing university materials.

It is a useful tool for studying the subject, but does not guarantee preparation as exhaustive and complete as the material recommended by the University.

1 NOTES

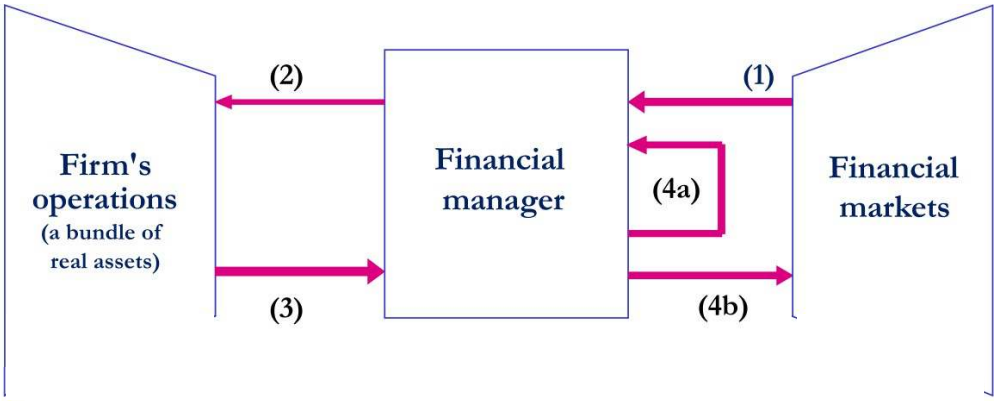
Investment decisions=Capital Budgeting decision

2 LECTURE 1

The objective in Corporate finance is maximizing value
Investment decision: Invest in assets that earn a greater return than the minimum acceptable hurdle rate. The hurdle rate reflects the riskiness of the investment and the mix of debt and eq- uity used to fund it. The return should reflect the magnitude and the timing of cashflows as well as all side effects
Financing Decisions: Finding right kind of debt and right mix of debt and equity to fund operations. Includes reinvesting profit. The optimal mix maximizes firm value and the right kind of debt must match the tenor of the assets.
Dividend decision: If no investments that make the minimum acceptable rate, return the cash to owners of the business. The amount returned depends on current and potential investment opportunities and how you choose to return can be dividends or buybacks
6 stages of Growth:

1. Start-up: Have idea for a business that meets an anmet need
2. Young Growth: Create a business model that converts ideas into potential revenues and earnings
3. High Growth: Build the business, convert potential into revenue
4. Mature Growth: Shift from losses to profits
5. Mature Stable: Defend your business from competition and find new markets
6. Scale down your business as market shrinks

In primary markets, prices are usually predetermined, it is generally used to generate equity capital, whereas on the secondary market is generally used by companies to gauge shareholder confidence
Both sole proprietorships and partnerships have unlimited liability and personal tax on profits whereas corporations have limited liability and corporate tax on profits and personal tax on dividends
Agency costs are incurred when managers do not attempt to maximise firm value and shareholders incur cost to monitor the managers and constrain their actions
Board of directors: group of people who represent the interests of a company's shareholders. They also provide guidance and advice to the CEO and executive team. They establish broad policies, explain firm's performance to shareholders, decide on dividends, decide on executive compensation, approve annual budgets, hire and fire top executives, appoint, support and assess the CEO.
A CEO only does three things: Culture, talent, numbers (defining metrics)
Financial manager: Interface between Financial Markets and firm's operations.
When cash is reinvested, the opportunity cost is the expected rate of returns shareholders could have obtained from other financial assets.
If the firm's investments can earn a higher return than the opportunity cost of capital, stock price increases and vice versa. Financial managers can observe the opportunity cost of capital for safe investments by looking at current interest rates on safe debt securities



Flow of cash between financial markets and the firm's operations. Key: (1) Cash raised by selling financial assets to investors; (2) cash invested in the firm's operations and used to purchase real assets; (3) cash generated by the firm's operations; (4*a*) cash reinvested; (4*b*) cash returned to investors.

Figure 1: Enter Caption

3 REVISIONS FOR DRAFTKINGS

Discount Cash flows depending on how risky the investment is
You should accept all projects with a positive NPV and reject all projects with a negative NPV. The discount rate represents the highest rate of return (opportunity cost) that investors could obtain in the market in an investment with equal risk
The discounting rate that makes NPV equal to zero is called the "internal rate of return" (IRR) or "yield to maturity"
Accept if IRR > hurdle rate
There can be as many IRRs as there are sign changes
Some companies use the payback rule to help make investment decisions. In other words, they accept only those projects that recover their initial investment within a specified period. Payback ignores the timing of cash flows within the payback period, and it ignores subsequent cash flows entirely. It therefore takes no account of the time value of money.
Rules: Discount CF, not profits (as you need to add back depreciation and subtract capital expenditure to go from accounting profit to cash flow)
You should neither subtract the debt proceeds from the required investment nor recognize the interest and principal payments on the debt as cash outflows
Real discount rate$=\frac{1+nominaldiscountrate}{1+inflationrate}-1$

3.1 LECTURE 5

The longer a bond's maturity, the more affected its price is by changes in interest rate (= to YTM)
Duration $=\frac{1\times PV(C_1)}{PV}+\frac{2\times PV(C_2)}{PV}+\frac{3\times PV(C_3)}{PV}+\ldots+\frac{T\times PV(C_T)}{PV}$ and Modified duration = volatility(%) = $\frac{duration}{1+yield}$ (It measures the % change in bond price for a 1%-point change in yield.)
An increase in coupon rate decreases duration and a decline in yield to maturity increases dura- tion
The yied curve graphs the relationship between bond yields and bond maturity, a normal yield curve is increasing (as higher maturity implies higher risk)
An inverted yield curve has indicated a worsening economic situation in the future 5 out of 6

- You should obtain the same final payoff if you invest by either investing
  - at the 4-year spot rate today, or
  - at the 3-year spot rate today, and then in the forward rate starting in 3 years from now, for one year
- Therefore, we must have

$$(1+s_4)^4 = (1+s_3)^3 \times (1+f_{3,1})$$

This gives:

$$f_{3,1} = 8.51\%$$

- This holds for any maturity (T) and length of forward rate (T-t):

$$(1+s_T)^T = (1+s_{T-t})^{T-t} \times (1+f_{T-t,t})^t$$

times since 1970
The spot rate is the interest rate today for a given maturity t and the forward rate 'interest rate fixed today on a loan made in the future at a fixed time). The latter can be directly observable or be implied in spot rates. Future rates are expected future spot rates
$1+r = \frac{1+i}{1+\pi}$
Treausry inflation protected securities (TIP) are securities whose principal is tied to nominal prices. The principal increases with inflation, and at maturity the Treasury pays the greater of the original or the adjusted principal
Bonds with a term shorter than 1 year are called commercial papers, those with more are called corporate bonds
Bonds can have a fixed or variable coupon rate (floaters and inverse floaters)
The putability of a bond is whether the bondholder can demand payment of the loan before ma- turity
Bonds rated BBB or above are investment grade and the rest are called high yield/junk bonds
The YTM is equal to the Risk free rate (Swap curve for Euro, US and UK treasuries for their re- spective currencies) +Credit Spread (Fair value + New Issue premium) are all the factors that de- termine the risk of the bond
Factors that increase credit Spread are

- Tenor: The longer the higher the CS
- The rating: The lower the higher the CS
- The absence of rating increases the CS
- The cyclical nature of the sector increases the CS
- Subordination in capital structure increases CS

The Benchmark in the Eurozone is typically the German Bund and in the US it's treasury bills with one or three month maturity
The less safety there is, the bigger the CS

3.2 LESSON 6

The Specialist acts as an auctioneer, matching buyers and sellers in auction market. In dealer markets, trades are done directly between investor and dealer
Payout ratio is the fraction of earnings paid out as dividends and the plowback ratio is the fraction of earnings retained by the firm
The growth rate is the ROE times the plowback ratio (how profitable the RE turn out to be)
Growth enhances company value only if it is achieved by investment in projects with attractive profit opportunities (i.e ROE > k)

4 LECTURE 1

Investment decisions: Investing in assets
Financing decision: Finding the right kind of debt and right mix of debt and equity
Dividend Decision: How much to return to investors and in what way?
On the primary market, prices are usually predetermined

Sole proprietorships and partnerships have unlimited liability and only personal taxes on profits, whereas corporations have limited liability and both corporate and personal tax on dividends The role of a CEO according to Trey Taylor: Culture, talent recruitment and development and define the metrics to evaluate progress

5 LECTURE 1

Non Cash Working capital= Accounts receivables +Inventories -Accounts payables
Net Financial Position= Total Financial debt-cash and equivalents
An increase in working capital reduces CF in that year and inversely
A shorter working capital cycle is useful as it lets you free up cash for use elsewhere
We use four types of ratios: Liquidity, leverage, activity and profitability
Liquidity:

Current ratio: $\frac{Current\ Assets}{Curret\ Liabilities}$
Quick ratio: $\frac{Cash, Marketable Secur\ \ ities and\ \ AR}{Current\ Liabilities}$
Leverage:
Financial leverage: $\frac{Total\ Assets}{Total\ Liabilities}$
Total Debt/Equity: $\frac{Financial\ Debt}{Equity}$
Total Debt/Total Assets: $\frac{LT\ Debt}{Total\ Assets}$
Interest Coverage: $\frac{EBIT}{Interest\ Expense}$
NFP/Equity: $\frac{Financial\ Debt - Cash and equivalents}{Equity}$
Activity Ratios:
Days of Receivables (DSO): $\frac{Accounts Receivable}{\frac{Sales}{365}}$
Days of inventories (DSI): $\frac{Inventory}{\frac{COGS}{365}}$
Days of Payables (DPO): $\frac{Accounts Payable}{\frac{COGS}{365}}$
Asset Turnover: $\frac{Total\ Sales}{Total\ Assets}$
Inventory Turnover (X): $\frac{COGS}{Inventory}$
Working capital cycle (days): $DI + DSO - DPO$
The working capital cycle starts upon payment to creditors and ends when receiving cash
Profitability Ratios:
ROA: $\frac{Net\ Income}{Total\ Assets}$
ROE: $\frac{Net\ Income}{Total\ Equity}$ (Equity is measured at end of year (EOY))
ROS: $\frac{Net\ Income}{Total\ Sales}$ (N.B.: Total sales=Total Revenue, Net Sales excludes returns, discounts and allowances)

Dupont Formula: ROE= ROS x Asset Tur nover x Financialleverage= *Net Income/Total Asset x Revenue/AverageTotalAssets x a=AverageTotalAssets/AverageTotalEquity*

6 UNIDENTIFIED INDUSTRIES: CASE

7 LECTURE 4

NPV and IRR are the most popular techniques to evaluate investment projects (75% of CFOs always or almost always use it)
Present Value formulas:
Perpetuity: $\frac{C}{r}$
Annuity that pays a fixed sum: $C * [\frac{1}{r} - \frac{1}{r(1+r)^t}$
Growing perpetuity: $PV_0 = \frac{C_1}{r-g}$
Constant growth annuity: $PV = C\left[\frac{1}{r-g} - \frac{(1+g)^t}{(r-g)(1+r)^t}\right]$
NPV of a project: $\sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - I_0$
NPV Rule: Accept all projects with a positive NPV, reject all those with a negative one

NPV depends on all forecast CF, so all of them must be taken into account
The discounting rate that makes NPV equal to zero is called the internal rate of return (IRR). Can be calculated through trial and error or Excell with the IRR function
The decision rule for the IRR is that we should accept if IRR> hurdle rate
There can be multiple IRR due to changes in sign
Some companies use the Payback rule: Accept only projects that receiver the initial investment within the payback period and ignores subsequent CF. It also doesn't take time value of money into account
Important: Discount Cash flows, not profits (you need to add back depreciation and subtract capex)
Rules:

- Include the projects effect on other businesses of the firm
- Remember salvage value, ignore sunk costs, include opportunity costs
- Separate Investment and financing decisions (don't take into account payment of debt)
- Forecast CF after taxes
- Take working capital into account (A change in NWWC is a cash flow)
- Treat inflation consistently (use nominal interest rates to discount nominal cf or real inter- est rates to discount real CF)

remember salvage value, ignore sunk costs, include opportunity costs. Separate Investment and financing decisions (don't take into account payment of debt), forecast CF after taxes. Finally, remember to take into

Real discount rate: $\frac{1+nominldiscountrate}{1+inflationrate} - 1$

8 LECTURE 5: VALUING BONDS

price of a bond: $P_0 = \sum_{t=1}^{T} \frac{C_t}{(1+YTM)^t} + \frac{F_t}{(1+YTM)^T}$ and YTM is the rate such that price=0. It's the internal rate of return of an investment in an annual pay bond held until maturity with payments done as scheduled
If data is given in an annual form, for a semi-annual bond divide the ytm and coupon rate by two
If a bond's coupon rate is above the YTM, it sells at a premium
Bonds with different maturities have different IRR
Price sensitivity is linked to the average time you need to wait for payments: $Duration = \frac{1\times PV(C_1)}{PV} + \frac{2\times PV(C_2)}{PV} + \frac{3\times PV(C_3)}{PV} + \ldots + \frac{T\times PV(C_T)}{PV}$
Modified duration=volatility=$\frac{duration}{1+yield}$

With a modified duration of 5 for example, a 1% change in YTM results in a 5% change to the bond's price
The yield curve graphs the relationship between bond yields and maturity. A normal yield curve

increases, as bonds with a higher maturity have a higher level of risk
Spot rate: Interest rate today for a given maturity (these constitute the yield curve)
Forward rate: Interest rate, fixed today, on a loan made in the future at a fixed time (the interest rate you will pay tomorrow). These are either directly observable or implied in spot rates
Future rates: expected future spot rates
You should receive the same final payoff if you invest at the 5 year spot rate today or the 3 year spot rate and then in the forward rate starting in 3 years for two year: $(1+s_T)^T = (1+s_{T-t})^{T-t} \times (1+f_{T-t,t})^t$
$1+r = \frac{1+i}{1+\pi}$

Treasury Inflation Protected Securities (TIPS) are securities whose principal is tied to nominal prices (CPI). At maturity, the Treasury pays the original or adjusted principal, whichever is greater
Issuers of bonds can be

- US Treasury/ Government
- States, municipalities and agencies
- Corporations
- Foreign governments

If the term is lower than one it's a commercial paper, if it's higher it's a (corporate) bond
The coupon's period is typically semi-annual, the rate can be fixed or variable, nominal or inflation indexed
Bonds can be risk-free or defaultable
Bonds also have different levels of seniority and security (secured or not). Covenants can also be placed on bonds (restrictions on additional issues, dividends...)
Finally, there can be some option provisions: callability (after a certain period, the issuer has the right to pay back the loan before it matures), putability (After a certain period, the bondholder can demand payment of the loan), convertibility (after a certain period, bondholder has the right to exchange the bond for stock of the issuer)
Default/Credit risk: risk that a debt issuer fails to make the promised payment. They are rated by rating agencies, and bonds rates above BBB are investment grade, those below high-yield/junk bond
YTM=Risk Free Rate + Credit Spread

Risk free rate is determined by the swap curve for the Euro, US Treasuries for the Dollar and UK treasuries for the Pound
Credit Spread comes from Fair Value + New Issue premium, and is all the specific factor that determine the risk of the bond, namely:

The spread widens the lower the safety

9 LECTURE 6: STOCK VALUATION

Prefered stock have no voting rights unless no dividends are paid
Warrants are long-term call options
ADR represent the cross listing decision of non-US firms

The DDM assumes that the intrinsic value of a stock is equal to the PV of all expected future dividends

$P_0 = \frac{DIV_1+P_1}{1+r}$

Solving for r, we get: $r = \frac{Div_1}{P_0} + \frac{P_1-P_0}{P_0}$

Finally, we obtain: $P_0 = \sum_{t=1}^{n} \frac{DIV_t}{(1+r)^t} + \frac{P_n}{(1+r)^n} = \sum_{t=1}^{\infty} \frac{DIV_t}{(1+r)^t}$

The Gordon model is used when dividends are expected to grow at a constant rate g forever, we get: $P_0 = \frac{DIV_1}{r-g} \iff r = \frac{DIV_1}{P_0} + g$

Remember that DIV 1 is different from DIV 0

Preferred stock that pays a fixed dividend can be valued using the constant growth dividend discount model, setting g to 0

The Payout ratio is the fraction of earnings paid out as dividends and the plowback ratio is the fraction of earnings retained by the firm. A higher plowback ratio (b) can increase stock price as higher future dividends are expected

$g = ROE \times b$, substituting it in the equation we get $P_0 = \frac{D_1}{k-ROE \cdot b}$

The difference in stock price between the scenario with no plowback and the one with some plowback is the PVGO and we have : $PV_t = \frac{EPS_{t+1}}{r} + PVGO \Leftrightarrow PVGO = P - \frac{EPS_{t+1}}{r}$

Growth enhances company value only if it is achieved by investing in projects with attractive profit opportunities (ROE>K)

Two step DDM: $P_0 = \sum_{t=1}^{T} \frac{\text{Div}(1+g_1)^t}{(1+R)^t} + \frac{\frac{\text{Div}_{T+1}}{R-g_2}}{(1+R)}$

10 LECTURE 9-11

Portfolio variance $= x_1^2\sigma_1^2 + x_2^2\sigma_2^2 + 2(x_1x_2\rho_{12}\sigma_1\sigma_2)$

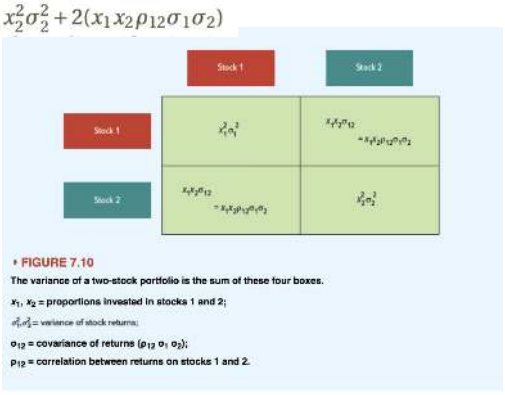
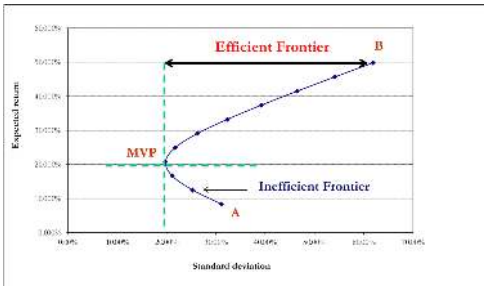


FIGURE 7.10
The variance of a two-stock portfolio is the sum of these four boxes.
x_1, x_2 = proportions invested in stocks 1 and 2;
σ_1^2, σ_2^2 = variance of stock returns;
σ_{12} = covariance of returns ($\rho_{12}\,\sigma_1\,\sigma_2$);
ρ_{12} = correlation between returns on stocks 1 and 2.

Portfolio variance $= x_1^2\sigma_1^2 + x_2^2\sigma_2^2 + 2(x_1x_2\rho_{12}\sigma_1\sigma_2)$

The only case with no gains from diversification is 1



The two finance axioms are investors prefer more to less and are risk-averse
Only economy wide sources of risk that affect the overall stock market (inflation rate i.e.) cannot be diversified away (systematic risk)
Because of globalization, correlations across markets and economies are increasing and reducing the effectiveness of diversification. Similalry, securitization increases correlation across classes When there is a crisis of confidence and investors become more risk averse, the correlation across risky assets increases thus undercutting the benefits of diversification
Specific risk is also known as idiosyncratic, residual, unique or unsystematic, and only affects one company/companies in a single industry. On the other hand, systematic risk is shared by most businesses: 51% of portfolio standard deviation is eliminated when diversifying from 1 to 10 securities, another ten removes 5%...
Empirically, investors are not well diversified across assets clases and across assets within a class: Average investor in the US holds three stocks and 28% of investors only have one.
Furthermore, these stocks tend to be highly correlated
With N stocks, you get N estimates of variances and $\frac{N^2-N}{2}$

The variance of the portfolio returns is :$\sigma_P^2 = \frac{1}{N} * (AverageVariance) + \left(1 - \frac{1}{N}\right) * (AverageCovariance)$, when N goes to infinity the average variance disappears and we obtain non-diversifiable risk
The investment opportunity set consist of all available risk-return combinations, an efficient portfolio has the highest possible expected return for a given standard deviation. The set of all of them forms the efficient frontier. The Minimum Variance portfolio (MVP) is the portfolio that provides the lowest variance among all possible portfolios of risky assets
We denote the risk free return R_f: its expected value is Rf and its variance is 0. TIts covariance

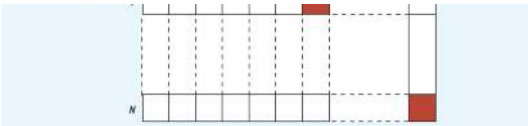


FIGURE 7.11
To find the variance of an *N*-stock portfolio, we must add the entries in a matrix like this. The diagonal cells contain variance terms ($x^2\sigma^2$) and the off-diagonal cells contain covariance terms ($x_i x_j \sigma_{ij}$).

with any asset is 0, and Rf is constant over time.
Efficient ratios are preferable to all other portfolios, the tangency portfolio is preferable to all

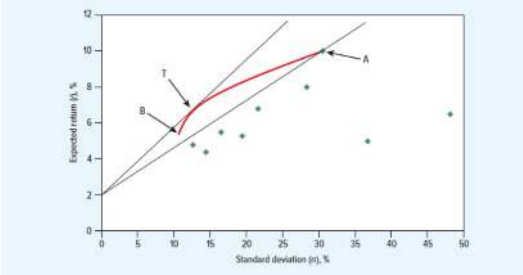


FIGURE 7.15
Lending and borrowing extend the range of investment possibilities. If you invest in portfolio A and lend or borrow at the risk-free interest rate, r_f, you can achieve any point along the straight line from r_f through A. By investing in r_f and T you can do even better. Since this is the steepest line possible, it is the best combination of risk and return that you can obtain.

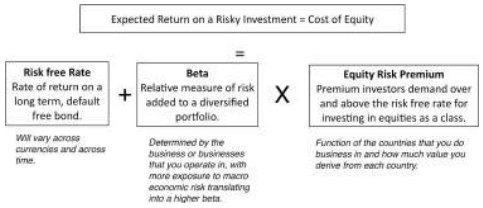
other efficient portfolios. The tangecy portfolio offers the highest ratio of risk premium to standard deviation: The ratio is called the Sharpe ratio: Sharpe r$\frac{\text{risk premium}}{\text{standard deviation}} = \frac{r_P - r_f}{\sigma_P}$

Two fund separation theorem: Create the set of possible mean-s.d. combinations from different portfolios of risky assets and find the tangency portfolio (the one with the highest Sharpe ratio). Then, choose the combination of the tangency portfolio and the risk-free asset to suit your pref-

erences
All investors hold a combination of the risk-free asset and the tangency portfolio (market portfolio), their risk aversion determines the fraction fo wealth invested in the risk-free asset.
Ledning means taking a long position in a risk-free asset and borrowing a short one

11 LECTURE 12: CAPM

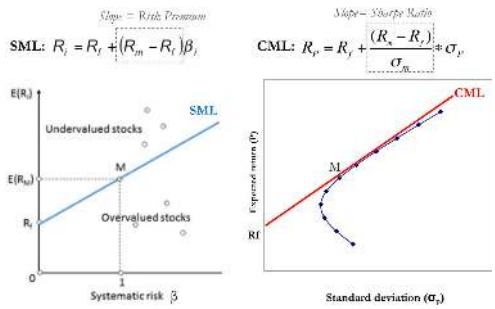
The CAPM helps us determine the equilibrium expected return of a risky asset:

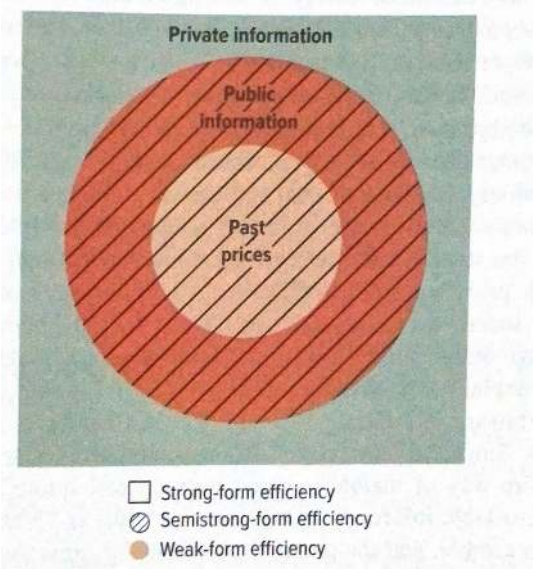


The relevant measure of risk for a security is $\beta_i = \frac{cov(\tilde{R}_i,\tilde{R}_m)}{\sigma^2(\tilde{R}_m)}$ and the expected return is $E(\tilde{R}_i) = r_F + \beta_i E(\tilde{R}_m) - R_F$¤
Important: the volatility of a security's return is not the relevant measure of risk of an individual stock. High variance of its returns could add relatively little risk to a portfolio if that volatility is diversifiable, which is the relevant risk according to the CAPM
Market portfolio: portfolio of all assets in the economy and beta (Sensitivity of a stock's return to the return on the market portfolio). Beta is a measure of the non-diversifiable risk for any asset. Assumptions of the CAPM, all investors:

- Aim to maximize economic utilities
- Are rational and risk-averse
- Are broadly diversified across a range of investments
- Are price takers
- Can lend and borrow unlimited amounts under the risk-free rate of interest
- Trade without transaction/taxation costs
- Deal with securities that are all highly divisible into small parcels
- Assume all information is available at the same time to all investors

The standard market model regression has one independent variable (simple regression): $R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$ $t = 1. \quad T$
When determining beta, three elements must be taken into account: The choice of the index, the regression period and the return interval/frequency
Ideally the security that reflects the risk-free rate should have no covariance with the market/ a beta of zero
The expected return-beta relationship is represented graphically by the security market line, with the slope the risk premium. According to the CAPM, all assets are priced to lie on the SML, i.e. the price of any security adjusts until the security lies on the SML. Those above the SML are Un- dervalued (too high return considering their risk) and vice-versa
A non parallel shift reflects a change on the risk premium and a parallel shift reflects a change in the market due to a change in interest rate. For example, a cut in interest rates normally leads to a downwards shift
SML and CML:





12 LECTURE 12

Weak form efficiency defines available information as information contained in past prices. Any information contained in those is incorporated in the current price, so knowing these prices doesn't help predict future returns. So:

What happened in the past is irrelevant as markets have no memory, stock prices follow random walks and technical analysis (using stock prices to devise trading strategies) does not produce any excess returns.

Semi-strong efficiency: The market incorporates all information in past prices and public information (already reflected in the current stock price)

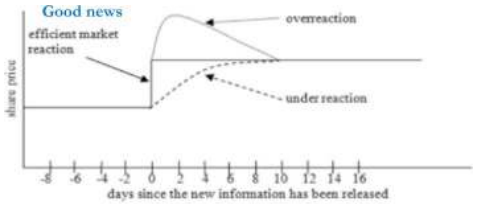
If markets are semi-strong form efficient, then fundamental analysis does not produce excess re- turns

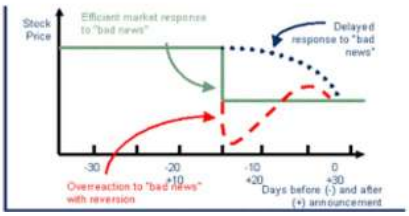
Strong efficiency: all public and private information: Even insiders can't make money

The notion of informationally efficient market means that any price change must reflect new info. Hence, one should be able to measure the value of a news event by examining price changes in a time-window around the even. An event study describes a technique of empirical financial research that enables an observer to assess the impact of a particular event on a firm's stock price. However, isolating the part of a stock movement that is attributable to a specific event is compli- cated

The general approach starts with a proxy for what the stock return would have been like without the event. The abnormal return is the difference between this and the actual return.

Several methodologies to estimate benchmark return: Market model: The market model param- eters, intercept and the slope, can be estimated via ordinary least squares regression over the estimation window. Another approach uses an asset pricing model such as the CAPM





Under CAPM $AR_t = r\,t - Rt = r\,t - [R\,f + \beta(\mathrm{R_{tM}} - \mathrm{Rf})]$, and assuming the risk free rate is 0 (narrow time window) we get $AR_t = r\,t - \beta Rt\,M$

The process: Calculate daily abnormal returns in the days surrounding the announcement of the event being studied. Can be calculated using the benchmarks like the market model or an equilibrium asset pricing model (CAPM)

This study uses the statistical market model to estimate expected returns. We ca then compare those to actual returns to find daily abnormal returns

The market model posits that the only factor determining the return on stock i, at time t, is the re- turn on the market at time t. This relation is modeled linearly, as in the following equation: $E(R_{i,t}) = b_0 + b_1 \cdot E(R_{M,t})$. Once we have our estimates of b0 and b1 we can find predicted returns in our eent windows by plugging in the market return

Widely accepted tool, used by the SEC to measure illicit gains and fraud cases

13 LECTURE 13-14

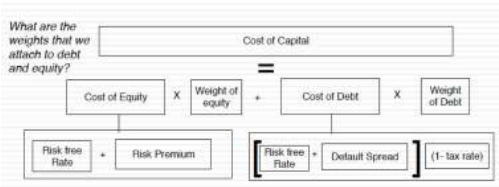
$$r_{\text{assets}} = \text{COC} = r_{\text{debt}}\left(\frac{D}{V}\right) + r_{\text{equity}}\left(\frac{E}{V}\right),$$

with r debt the YTM on bonds and r equity $r_f + B(r_m - r_f)$

and E, D and V the market values of equity, debt and total firm value

Cost of capital serves as the opportunity cost for investors, the cost of financing for a company and the hurdle rate for investment analysis

The average beta of the assets is based on the % of funds in each asset: The expected return on a



risky investment is the cost of equity. It is equal to the risk-free rate (varies across currency and time) + the beta (relative measure of risk added to a diversified portfolio) * the equity risk premium. (function of the countries you operate in and the value derived from each country)

To estimate the ERP, three approaches:

Historical premiums (assume the actual premium delivered over time is equal to the expected periods- i.e. use historical data)

Survey Premiums: Survey investors on their desired risk premium and use the average

Implied premiums: Estimate a forward looking premium using today's asset prices

Historical ERP requires to use a long term, consistent with the choice of risk-free rate

Survey premiums issues: Finding a subset of investors that reflects the aggregate market well, the survey results are more reflective of the past than the future and they tend to be short term (not above one year)

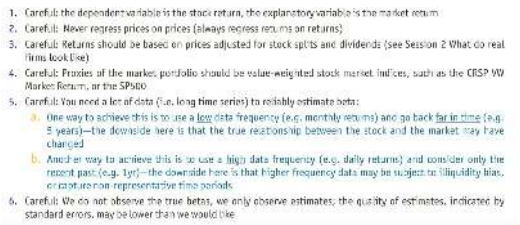
Implied Premiums: If you know the price paid for an asset and have estimates of the expected cash flows on the asset, you can estimate the IRR of these cash flows. If you paid the price, this is your expected return

On a risk free asset, the actual return is equal to the expected return => No variance on the expected returns. For an investment to be risk-free, two conditions: no default risk (generally issued by the government) and there is no uncertainty about reinvestment rate, which implies that it's a zero coupon bond security with the same maturity as the CF being analyzed

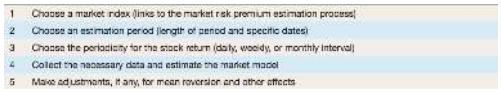
Remember that the risk free rate or the analysis must be in the same currency as the CF

Since the risk-free rate for a portfolio is the standard deviation of the portfolio's returns, we now want to determine the relevant measure of risk for an individual security in a portfolio

There is a trade-off between a long time series and a reliable beta estimate:


1. Careful: the dependent variable is the stock return, the explanatory variable is the market return
2. Careful: Never regress prices on prices (always regress returns on returns)
3. Careful: Returns should be based on prices adjusted for stock splits and dividends (see Session 2 What do real Firms look like)
4. Careful: Proxies of the market portfolio should be value-weighted stock market indices, such as the CRSP VW Market Return, or the SP500
5. Careful: You need a lot of data (i.e. long time series) to reliably estimate beta:
   a. One way to achieve this is to use a low data frequency (e.c. monthly returns) and go back far in time (e.g. 5 years)—the downside here is that the true relationship between the stock and the market may have changed
   b. Another way to achieve this is to use a high data frequency (e.g. daily returns) and consider only the recent past (e.g. 1yr)—the downside here is that higher frequency data may be subject to illiquidity bias, or capture non-representative time periods
6. Careful: We do not observe the true betas, we only observe estimates; the quality of estimates, indicated by standard errors, may be lower than we would like

To avoid biases due to changes in the industry or firm, we generally use a historical period between 2 and 5 years long. The returns (market and stock) should be calculated considering both the capital gains and the dividends received. Frequency: daily is good. The market index: Due to the emergence of internationally diversified investors who use different markets, it is more and more common to calculate beta using international indices (Morgan Stanley Capital Index i.e.)


1	Choose a market index (links to the market risk premium estimation process)
2	Choose an estimation period (length of period and specific dates)
3	Choose the periodicity for the stock return (daily, weekly, or monthly interval)
4	Collect the necessary data and estimate the market model
5	Make adjustments, if any, for mean reversion and other effects

The standard procedure for estimating betas is to regress stock returns (Rj) against market returns (Rm): $R_j = +bR_m$. The slope corresponds to the beta and measures the riskiness. The risk

of any asset is the risk that it adds to the mkt portfolio: $\beta_i = \frac{\text{Cov}(R_i, R_M)}{\sigma^2(R_M)}$

Beta is a standardized measure of this covariance, it is a measure of the non diversifiable risk for any asset can be measured by the covariance of its returns with returns on a market index

We are confident at 68% percent that the true value of beta falls within one standard deviation

The standard approach to estimating betas is to run a regression of returns of an individual stock against returns on a market index. Which of the following is a problem with this approach?

a. It yields an estimate with significant standard error.
b. It is subject to estimation choices: different regression periods, return intervals and market indices.
c. It will not yield a "good" estimate for the future, if a company's business mix has changed recently.
d. It will not yield a "good" estimate for the future, if a company's financial leverage has changed over the regression period
e. All of the above.

and 95% within 1.96

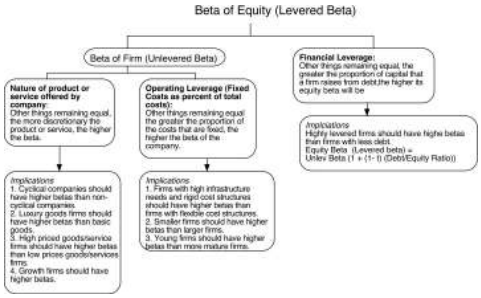
When doing a beta analysis, R squared is the market risk and 1-R squared is the unique risk

Unique variance is Variance*Unique risk

Confidence Level= Estimate+/- 1.96*SE

The firm-specific risk is diversifiable and will not be rewarded.

Projects that have the same risk as the company' existing assets can be discounted at the WACC.



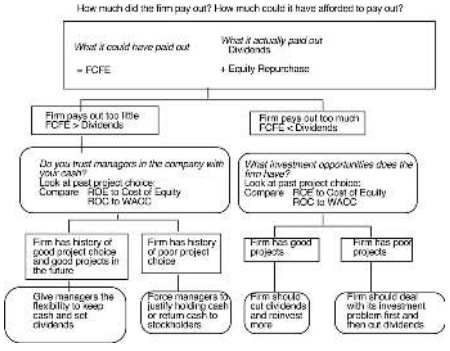
It takes into account the tax benefits of debt financing
In practice, we generally obtain the CAPM empirically
The cost of capital of a firm reflects its systematic risk and not idiosyncratic risk.

14 LECUTRE 15

Dividend decision: How much to return and how
Measures of policy: DPS: $\frac{Dividends}{N.Shares}$
EPS: $\frac{Net\,Income}{N.Shares}$
Dividend payout: $\frac{Dividends}{Net\,Income}$
Dividend yield: $\frac{DPS}{StockPrice}$: Measures the return that an investor can make from dividends alone
The free CF to Equity (FCFE) is a measure of how much cash is let in the business after non-equity claimholders (debt and preferred stock) have been paid and after any reinvestment needed to sustain the firm's assets and future growth

Net Income
\+ Depreciation & Amortization
\- Capital Expenditures
+/- Change in Working Capital
\+ New Debt Issues
\- Debt Repayments
= FCFE

If a company does not have excess cash, and/or has several good investment opportunities, re-



turning money to stockholders (dividends or stock repurchases) is bad. Cash can also be kept to increase cash reserves
The benefit of a buyback os that it reduces the number of shares outstanding for a company, in- creasing per-share measures of profitability and measures like ROE

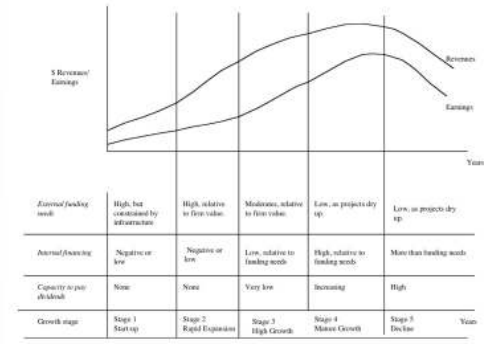
Dividend: A pro rata distribution to shareholders that is declared by a firm's board of directors and may or may not require approval by shareholders.: Can be paid in cash or stock. A stock dividend is essentially the same as a stock split
Repurchased shares become treasury stock (non voting, non
dividend) 4 ways: buy shares on the market (95% of them)
Tender offer: firm offers to bu shares at a prespecified price during short time period (usually 20 days and 10-20% premium)
Dutc auction: he firm lists different prices at which it is prepared to buy shares, and shareholders in turn indicate how many shares they are willing to sell at each price. The firm then pays the lowest price at which it can buy back its desired number of shares
Private negotiation: directly from a specific shareholder
Greemail is the practice of buying enough shares to threaten a hostile takeover, forcing the company to repurchase its shares as a premium
Four dates for dividends: Declaration date, ex dididvend date (Shares starts to trade ex-dividend), the record date (Dividends are paid to shareholders registered on that date, one day after ex-

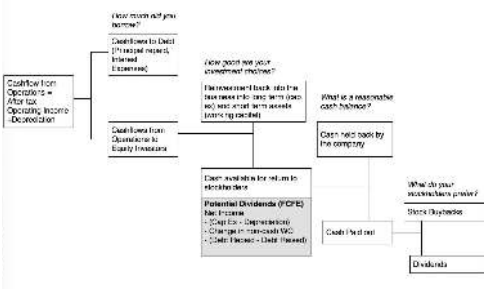
dividend date), payment date
Empirically, the price drop is less than the dividend and occurs in a few minutes of the ex-date In a perfect capital market, an open market share repurchase has no effect on the stock price, and it's the same as the cum-dividend price if dividends were paid instead
Stock buy backs are increasingly popular in the US
Managers fo no want to reverse dividends change and smooth out their flow instead

Empirical evidence o the message contained in a dividend change is mixed, the first dividend payment signals good earnings prospects, dividends increase lead to a +% in stock and ceasing dividend leads to an announcement effect of -9.5%
Dividends are sticky and tend to follow earnings
Recap: Dividend initiations increase prices and predict earnings increase (43% on average), dividends increases predict safer earnings, cuts areassociated with price drops
An important question is whether payout change the value of the stock: According to Modigliani-Miller's view it is irrelevant, according to others one or the other increases value. Some argue dividend payout increase value due to high demand for dividend paying stocks, whereas tax treatment is more favourable for share repurchases
Miller and Modigliani: No taxes, transaction costs and other imperfections. We also keep con-

stant the investment and borrowing choices. MM published proof that the payout policy is irrelevant in the absence of imperfections (taxes, transactions costs...). Fixing investments, a firm can increase dividends by issuing equity or decrease dividends by buying shares back
If dividends are taxed more heavily then capital gains, taxpaying investors should welcome share repurchases instead of dividends (historically the case in the US)
Why dividends?: Some institutions' mandates require them to hold stocks that pay dividends,

trust and endowments may have restriction on selling their assets, some investors (especially el- derly) appreciate a steady source of cash flows from dividend paying stocks, some investors have self-control problem, dividend make it harder for managers to waste money...





Increasing payouts is a good decision when these three conditions are met: The firm's debt ratio is prudent, the company's holdings of cash are a sufficient cushion for unexpected setbacks and enough for unexpected opportunities, the company is generating positive free cash flows after making all investments with a positive NPV and those cash flows are likely to continue
The two dominant factors driving dividend policy are inertia and me too-ism: Companies want to behave like their peer group.

15 LECTURE 16

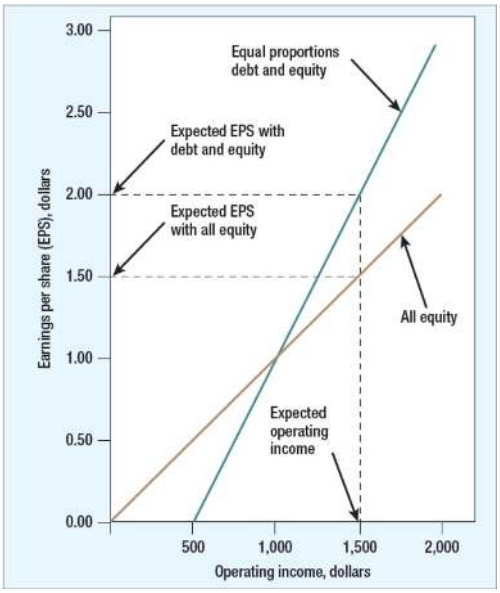
Financing decisions: Finding the right mix and the right kind of debt (matches the tenor of assets)
Modigliani and Miller argue that in perfect capital markets, the firm is unaffected by its capital structure. This is because fairly priced securities are zero-NPV projects
In perfect capital markets, the firm value is independent of its capital structure

Fricitionless capital markets mean:

- No taxes
- No bankruptcy costs or other costs of financial distress
- No agency problems between managers and shareholder
- No assymetric information between firms and investors
- No transaction costs or issuance costs
- Firms and investors with identical borrowing and lending costs

Law of one price: Two investments with the same payoffs must have the same price, and the value of the unlevered firm must equal the value of the levered firm
Law of the Conservation of value: the value of an asset is the same regardless of the nature of the

claims against it. Thus, the firm's value is determined by real assets on the left-hand side of the balance sheet.



Leverage increases the EPS but not the price, because the change in earning is offset by the change in the discount rate:

Expected return on Asset= $\frac{ExpectedOI}{Marketvalueofallsecurities} \Rightarrow r_a = \left(\frac{D}{D+E} \times r_D\right) + \left(\frac{E}{D+E} \times r_E\right) \Rightarrow r_e = r_a + (r_a - r_d) \times \frac{D}{E}$

MM proposition 2: A levered firm's expected ROE increases with the D/E ratio expressed in market values

The rate of increase depends on the spread between the expected ROA and the return on debt

Overall, we can say that investors require aa higher rate o return due to increased financial risk.

The beta asset is the weighted average of the debt and equity betas: $\beta_A = \left(\beta_D \times \frac{D}{V}\right) + \left(\beta_E \times \frac{E}{V}\right)$ and so $\beta_E = \beta_A + (\beta_A - \beta_D)\frac{D}{E}$

Borroing creates financial leverage which pushes Common stock risk higher, leading to share- holders demanding a higher return E

The tax benefit from interest expense deductibility must be included, it reduces the effective cost of debt by the marginal tax rate:

$$WACC = \boxed{r_D \times (1 - Tc)} \times \left(\frac{D}{V}\right) + \left(r_E \times \frac{E}{V}\right)$$

"MM also show that both the expected return on equity and EPS increase with leverage. And yet, this does not increase firm value, as it merely compensates investors for the increase in risk brought about by the increase in leverage."

16 LECTURE 17

The simple MM model lacks corporate and personal taxes, as well as the costs of financial distress, transaction costs for issuing debt or equity and asymmetric information about the firm's investments

In reality, bankruptcy is expensive, slow and painful, and conflicts of interest between different stake holders of the firm are frequent and severe

The interest tax shield is equal to the tax rate time the interest

Its PV is PV(tax shield) = $\frac{Annual\ \text{tax shield}}{Interest\ \text{rate on debt}} = \frac{T_C(r_D \times D)}{r_D} = T_C \times D$

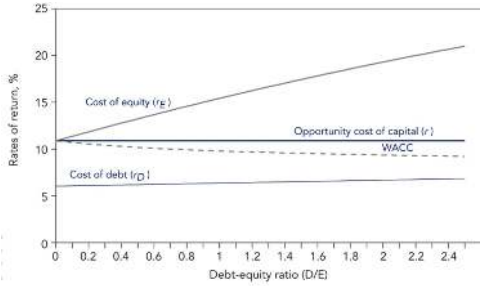
An assumption is that the risk of the tax shields is the same as that of the interest payments gen- erating them.

Hence, $Value_{firm} = Value_{All\,Equity\,financed} + PV(Taxshield)$

If debt is fixed and permanent: $Value_{firm} = Value\,All - Equity\,Financed + T_C D$

Caveats: Debt may not be fixed and perpetual, no interest tax shields unless there are sufficient profits, the amount of interest that can be deducted is limited to 30% of EBIT.

Money that is paid out as equity income is further taxed through personal taxes so for 1 dollar



paid out, the final income is 1-TC-TPE*(1-TC)=(1-TC)(1-TPE) to stockholder, and 1-TP for bond-holders

Relative advantage formula: $\frac{1-T_p}{(1-T_{pE})\,(1-T_c)}$. If it's above 1, debt has the advantage and Equity if below 1

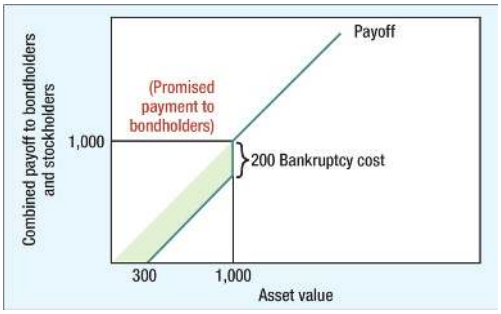
The main advantages of debt are tax benefits and added discipline (borrowing money may force managers to think more about the consequences of the investment decisions a little more carefully and reduce bad investments)

The disadvantages of debt are Expected bankruptcy cost (Expected cost of going bankrupt * Prob- ability). This includes both direct and indirect costs. The probability of going bankrupt is higher in businesses with more volatile earnings. This means firms with more stable earnings should borrow more for a given level of earnings, and so should firms with lower bankruptcy costs Agency costs are another issue, as action that benefit equity investors may hurt lenders. The greater the potential for this conflict of interest the greater the cost borne by the borrower (higher interest rates/more covenants). FInlly, there's a loss of flexibility, as using up available debt ca- pacity today will mean you can't dras on it in the future. Hence, the better you can forecast future funding needs should be able to borrow more, and those with better access to capital markets should be more willing to borrow more today

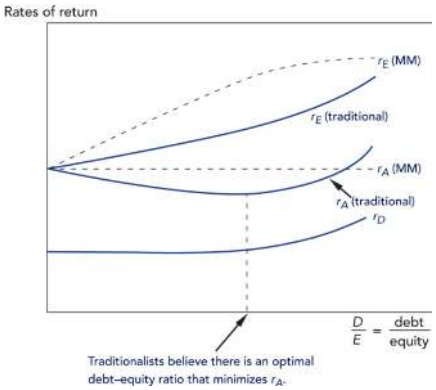
Direct bankruptcy costs include legal and accounting fees, but also the loss of customers (if you sell in advance especially), loss of suppliers and loss of employees

We now get: $Value_{Firm} = Value_{All\text{-}Equity\text{-}Financed} + PV(\text{Tax Shield}) - PV_{(\text{costs of financial distress})}$ and Management represents equityholders' interests are amplified when firms enter financial distress

Risk shifting (management invests in risky projects with a negative NPV), Underinvestment: A leveraged company foregoes'investment opportunities because debt holders capture too much of the value of the project, leaving insufficient returns for shareholders. Finally, cash in and run is when stakeholders take the money out



Overall, to optimize, there three approaches: Cost of Capital, Life Cycle and Sector. The first indicates that the optimal mix is the one that minimizes the cost of capital for a firm, the second that the optimal debt ratio is the one that best suits where the firm is in its life cycle and finally, the sector approach: The optimal debt ratio is the one that brings the firm closest to its peer group in terms of mix.
Large firms tend to have higher debt ratios, firms with high ratios of fixed assets to total assets have higher debt ratio, market to book: Firms with higher ratios of MTB value have lower debt ratios and profitability, more profitable firms have lower debt ratios
Important: Cost of equity!= Cost of capital, it is not the return you hope to make, it is not a mechanism to reverse engineer a desired rate and it is not constant



17 LECTURE 18

Valuing and pricing an assets are two different things: The drivers of intrinsic value are cashflows from existing assets, growth in CF and its quality, whereas drivers of price are market moods and momentum and surface stories about fundamentals
The first one we use DCF, the second one relative valuations using multiples.
A publicly traded firm potentially has an infinite life, so Value = $\sum_{t=1}^{t=\infty} \frac{CF_t}{(1+r)^t}$. Since we can't estimate cash flows forever, we estimate cf for a growth period and then estimate a terminal value to capture the value at the end of the period
The market value of equity is Cash and other non-operating assets+ Operating assets - debt
How to account for the value of a financing decision: adjust the discount rate to the new after-tax WACC and adjust the present value: Start with a NPV from an all equity financed firm and add/subtract the value of financing decisions: APV= base case value + value of financingside effects

The assumptions behind using the wacc as a discount rate are that risk and leverage stay constant

Remember that tax shields are accounted for in the after-tax WACC: $PV = \frac{FCF_1}{(1+WACC)^1} + \frac{FCF_2}{(1+WACC)^2} + \ldots + \frac{FCF_H}{(1+WACC)^H} + \frac{PV_H}{(1+WACC)^H}$

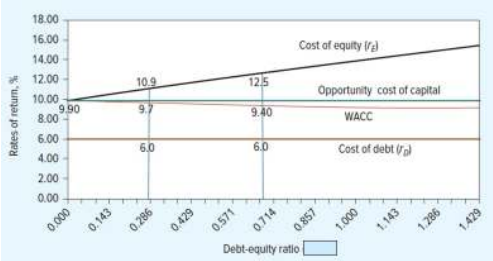
When computing acquisition value for an M&A, use the WACC of the target

FCF and NI differ: Incoem is computed after interest expense, while FCF assumes all equity financing, Income accounts for non cash expenses, Investments in fixed assets and working capital reduce cash flows but do not appear in the IS

When we include more sources of financing, we simply expand the WACC formula $WACC = (1 - Tc)\left(\frac{D}{V} \times r_D\right) + \left(\frac{P}{V} \times r_P\right) + \left(\frac{E}{V} \times r_E\right)$

Using industry WACC is more appropriate for multidivisional firms. if a company can't use all its interest tax shields, if it's temporary you ignore it, if it's permanent you use the APV method

The required return on assets is the opportunity cost of capital



Unlevering and relevering beta: 1) Unlever beta 2) Estimate the beta of debt and equity at the new debt ratio 3) Recalculate the cost of equity and the WACC at the new financing weight

When calculating the PV of financing impact, we look at all costs/benefits directly resulting from financing: Interest rax shields (+), cost of securities (-), Subsidized debt (+)

If we assume that debt is a constant proportion of the value, then the risks of the tax shield is the same as the one of the project, if we assume it has the same risk as the debt then. One advantage of APV is that we do not need to assume that Debt is a constant proportion of value

LBOs are takeovers typically of mature companies, heavily debt-financed. The new debt is not intended to be permanent. LBO business plans call for generating extra cash by selling assets, shaving costs and improving profit margins. Therefore, you can't use a single WACC as a discount rate to evaluate an LBO because its debt ratio will not be constant

APV work well for LBO. The company is first seen as fully equity financed. Then, tax shields are valued separately and added to the all equity value, also,ng with other financing side effect.

FOR DOUBTS OR SUGGESTIONS ON THE HANDOUTS

CORENTIN DUBREUCQ-PERUS

corentin.dubreucqperus@studbocconi.it

@corentin_dub

+39 3486958681

FOR INFO ON THE TEACHING DIVISION

VITTORIA NASONTE

vittoria.nasonte@studbocconi.it

@_vittorian_

+39 3274441476

ELENA CACIOLI

elena.cacioli@studbocconi.it

@elenacaciolii_

+39 3928931605

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