# FNCE30002 Corporate Finance

## Corporate Finance – Maximize Firm Value

### Financing Decisions

- Equity
- Debt/Leases
- WACC
- Capital Structure

### Investment Decisions

- Mutually Exclusive Projects
- Estimation of Project Cash Flow
- Project Risk Analysis
- Real Options

### Payout Decisions

- Dividends
- Share Buybacks

## Takeovers

## Corporate Restructuring

## Risk Management

# 1 Raising Capital – Equity

## 1. Overview of Financing Policy

### Financing Policy

- Real investment policies imply funding needs
- But what are the sources of funds?
    - Internal funds (i.e. retained earnings, cash)
    - Debt (i.e. borrowing money)
        - Company raises money today, promise to make fixed repayment w/interest at later fixed date to debt investors.
        - Failure to make this payment = firm defaults.
            - Debtholders then take over management of the company and have the highest priority in getting their money repaid. If company is profitable and making money, debtholders must be paid back before any shareholders.
            - Debtholders do not have voting rights.
        - In this sense, the firm does not necessarily have to pay shareholders unless they can afford to and debtholders have already been paid. There is no obligation to payout regular shareholders.
    - Equity (i.e. issuing new shares)
        - Transactions b/w issuing firms and investors made in the primary market. Once primary market transactions are completed, then there are new investors holding the company's equity.
        - Transactions between investors and other investors after the IPO occur in the secondary market. Consider the stock exchange - trading shares between investors.
    - Hybrids

### Choices in External Financing
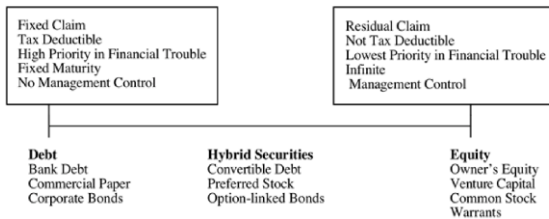


### Pecking Order Perspective

- "Pecking order" financing scheme
    - Most public firms tend to finance their projects:
      First with retained earnings, then with debt and only finally with equity (last resort)
- Why?
- **Information Asymmetry** (most prominent story)
    - Suppose that managers have more information about the firm than outside investors
        - Managers prefer to issue equity when equity is overvalued
        - Equity issues signal to investors that equity is overvalued
        - Stock price declines at equity issue announcement
        - Managers avoid issuing equity

## Big Picture of Corporate Finance
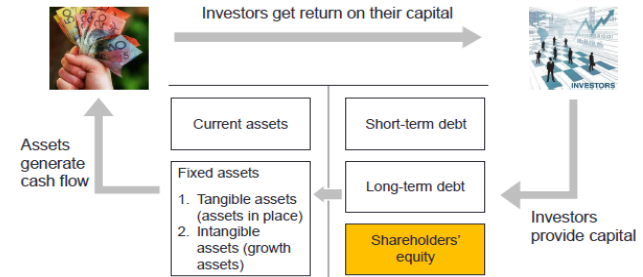


## 2. Raising Equity Capital

### Different Options to Raise Equity

- Equity financing over the firm's life cycle
- Unlisted Firms
    - Private Equity Financing
        - "Angel" Finance
        - Venture Capital
    - Initial Public Offering (IPO)
        - Listing shares for the first time
- Listed Firms
    - Private Placement
        - To small group of investors
    - Rights Issue
        - To existing shareholders
    - Dividend Reinvestment Plan
        - To existing shareholders (offered to reinvest dividend to apply for new shares)

### Private Equity

- **"Angel" Finance**
    - Informal market for direct equity finance provided by a small number of high net worth individuals
- **Venture Capital**
    - A venture capitalist is an active financial intermediary, providing financing to early-stage and high-potential start-up companies mainly in high tech industries
    - It organises and manages funds mostly raised from investors (such as pension funds and endowments/foundations) typically for about 5-7 years
    - Typically staged financing; significant control over company decisions
- Successful exist strategies – trade sales or IPO

### Public Equity

*Public equity is available to firms with larger needs for capital*

- **Initial Public Offerings** (IPOs)
    - The process by which a firm sells equity to the public for the first time
- **Seasoned Equity Offerings** (SEOs)
    - The sale of shares in an already publicly traded company
    - Alternate SEO Types: Private Placements, Rights Issues, DRPs
- Primary Market (transaction between the issuing firm and investors) vs. Secondary Market (transaction between investors; e.g. stock exchange)

## 3. Initial Public Offerings (IPOs)

### Public Shares and Private Shares

- Public shares able to be sold easily and are listed on stock exchanges
- Private shares able to be sold privately, much more difficult to trade

| Advantages of Going Public | Disadvantages of Going Public |
|---|---|
| - Access to additional capital<br>- Allow venture capitalists to cash out<br>- Current stockholders can diversify<br>- Liquidity is increased (shares can be rapidly sold with little impact on the stock price)<br>- Going public establishes firm value<br>- Makes it more feasible to use stock as employee incentives<br>- Increases customer recognition | - IPO creates substantial fees<br>- Legal, accounting, investment banking fees are often 10% of funds raised in the offering<br>- Greater degree of disclosure and scrutiny<br>- Dilution of control of existing owners<br>- Special "deals" to insiders will be more difficult to undertake<br>- Managing investor relations is time consuming<br>- *If the original owner is intent on keeping entire control of their company, then they will generally be less likely to go public – given the diluted control* |

### Typical IPO Procedure

1. Appointment of underwriter and other advisers
2. Undertake due diligence process and prepare preliminary prospectus
   - →Due Diligence – assessing the company in detail so they can prepare a prospectus, with all the information disclosure that is involved
3. Institution marketing program commences (includes IPO Road Shows)
4. Exposure Period: lodge final prospectus with Australian Securities and Investment Commission (ASIC) and lodge listing application with ASX
5. Marketing and offer period
6. Offer closes, shares allocated, trading commences

### Underwriters

- Investment banks that act as intermediaries between company seeling securities and the investing public
- Underwriters manage issue of securities on behalf of issuing firm, performing a range of services including:
  - Formulating the method used to issue the securities and marketing the issue
  - Pricing new securities
  - Selling new securities

**Firm Commitment** contract
- Underwriter promises to sell all shares the issuing firm wants to sell
- If the underwriter cannot do that, then they will purchase the remaining unsold shares.
- To hedge against undersubscription risk, syndicates are formed between multiple underwriters.

**Best Efforts** Contract
- Underwriter attempts to sell as many as they can; issuing firm bears risk of undersubscription.
- *Sometimes, underwriters form an underwriting group (syndicate)*

### Valuing IPOs – Preliminary Valuation

- Since the firm is going public, no established price
- Two common valuation methods
  - **Discounted Cash Flow** (DCF) analysis – compute the present value of cash flows over the life of the company; project future CFs to find firm's intrinsic value
  - **Comparable Firms Analysis** – compare with publicly traded firms in the same industry that have similar risk and growth prospects (using Price/Earnings ratios, Price/Sales ratios, etc.)
- On the basis of all relevant factors, the investment banker would specify a range (e.g. $28-35 in the case of Facebook) in the preliminary prospectus

### Valuing IPOs – Procedures

1. **Fixed Pricing** – traditional method (common in Australia)
- Price is set, prospectus sent out and offers are received
- Subject to market movement – high risk of under-subscription
  - High undersubscription risk with Fixed Pricing given market movements
2. **Book-Building** – most IPOs in the US
- Underwriters record the quantity institutional investors indicate they would purchase and at what price
- Lowers under-subscription risk (reducing price uncertainty) but significant costs, possible investment banking conflicts
  - Most use Book-Building method - underwriter and firm do not to decide the value early; they make a price decision just before exchange, which is a better determinant of the actual market demand and therefore hedging against undersubscription risk. This can be quite costly and time consuming, which is why there are still many firms which used Fixed Pricing.
3. **Open Auction** (Dutch auction)
- Investors are invited to submit their bids, and the securities are then sold to successful bidders (e.g. Google's IPO In 2004)
  - Open Auctions are very uncommon - Google used this, inviting all interested investors to an open auction, which Google used to determine final price. Underwriters don't like this.

### Costs of IPOs – Direct

- Underwriters receive payment in the form of a **spread** (difference between the underwriters' buying price and the offering price) – underwriters purchase shares at discount to IPO price
- Usually, the underwriting spread on a new issue amounts to 7% of the proceeds to the issuer
  - Direct admin costs to management, lawyers, accountants + fees for registering new securities, etc. can be over 1% of proceeds

### Costs of IPOs – Indirect

- **Underpricing**
  - Issuing at offer price below actual market value of security (captured by first day closing price)

$$underpricing\,(\%) = \frac{First\ Day\ Closing\ Price - Offer\ Price}{Offer\ Price}$$

  - E.g. LinkedIn's IPO offer price = $45, first day closing = $94.25, which is about 110% first day return
  - The average underpricing among nearly 12 000 US IPOs from 1960 to 2008 = 16.9%
- Be careful – not all IPOs are good investments!

| Return Categories | Number of IPOs | Average First-Day Returns |
|---|---|---|
| Return ≤ 0% | 1,932 | -2.6% |
| 0% < Return ≤ 10% | 2,010 | 4.6% |
| 10% < Return ≤ 60% | 2,426 | 25.4% |
| Return > 60% | 456 | 132.5% |
| Total | 6,824 | 18.5% |

27% chance of losing or not making any money
  - Facebook's IPO:
    - IPO offer price = $38; The first-day closing price = $28.23 (0.6% underpricing)
    - The price went down as low as $17.73, but it's now around $130
- The economic consequence of underpricing is significant for the original owners of the firm:
  - Money left on the table = (First Day Closing Price – Offer Price) x Number of Shares

## Explanations of Underpricing

- 1. **Winner's Curse: Information Asymmetry**
  - o As an uninformed investor, you will likely be stuck disproportionately with shares in bad deals (overpriced shares)
  - o If the expected IPO underpricing is zero, your expected return would be negative: e.g.,

$$\underbrace{50\%}_{\substack{\%\,\text{Underpriced}\\\text{Offerings}}} \cdot \underbrace{0.5}_{\substack{\text{Expected Share}\\\text{Allocation}}} \cdot \underbrace{(+10\%)}_{\text{Underpricing}} + \underbrace{50\%}_{\substack{\%\,\text{Overpriced}\\\text{Offerings}}} \cdot \underbrace{1.0}_{\substack{\text{Expected Share}\\\text{Allocation}}} \cdot \underbrace{(-10\%)}_{\text{Overpricing}} = -2.5\%$$

  - o To keep uninformed investors in the IPO market, underwriters must underprice IPO shares on average
    - ▪ Uninformed investors are likely to get overpriced shares and lose money
  - o Evidence: More information freely available about the issuer = less underpricing
- 2. **Investment Banking Conflicts**
  - o Investment banks arrange for underpricing as a way to benefit themselves and their other clients
  - o Evidence for: Higher IPO commissions or higher underwriter's stake in the IPO = less underpricing
  - o Evidence against: Investment banks also underprice themselves when listing
    - ▪ Example: *Salomon Smith Barney, like so many firms on Wall Street, seeks to please its clients. On June 24, 1997, when it was still Salomon Brothers, it offered one of those clients, Bernie Ebbers, the CEO of WorldCom, the opportunity to buy more than two hundred thousand shares in the initial public offering of a telecommunications company called Qwest... Three days later, Qwest's stock price was up twenty-seven per cent, and Ebbersbegan selling. In the end, he cleared almost two million dollars. Clients appreciate this sort of thing, especially when it happens more than once. Between 1996 and 2001, Salomon helped Ebbers earn eleven million dollars by flipping IPO shares.*
- 3. **Litigation Insurance**
  - o Liability on the issuer and underwriter for material misstatements and omissions made about the IPO
  - o So, they tend to underprice the IPO to avoid potential lawsuits if shares subsequently do poorly
  - o Evidence against: underpricing happens even in other countries with laxer regulatory schemes
- 4. **Signaling**
  - o Leaving a 'good taste' with investors provides mechanism to signal quality of the issue
  - o Easier to subsequently raise funds at higher prices
    - ▪ Example: *Telstra was privatised with 1/3 of shares offered for sale at $3.30 in 1997; a further 16% of shares was sold at $7.40 in 1999; 16 years later the price is around $5*

## Long Run Underperformance

- Evidence on the long-run performance of IPO – "new issues puzzle"
- Reasons for long-run underperformance
  - o "Clientele effects"
    - ▪ Only optimistic investors buy into an IPO, but their optimism will disappear as more information about the firm is released
  - o "Window of opportunity"
    - ▪ Management times the issue (taking advantage of high demand for IPOs by the market – hot markets)
    - ▪ A decline in demand for IPOs (cold markets) after hot markets are generally correlated with a reduction in equity prices after IPOs

# 4. Seasoned Equity Offerings (SEOs)
## Alternative Types of SEOs

- **General Offers**      Issuing new shares to public again
- **Placement**      Company issues new shares to certain financial institutions
- **Rights Issues or DRP**   Company issues new shares to existing shareholders

*Redistribution of shares through the issuing of new shares causes dilution of existing shares*

## Determinants of Choice of Methods

- Method of how to raise equity depends upon:
  - Costs
    - Time to Implement
      - Transfer of Votes/Wealth (from old to new shareholders)

## Private Placements

- An issue of new shares to a limited number of investors (usually financial institutions)
  - o Example: *Daffy Ltd has 10 million shares on issue with a current share price of $10 each. Daffy then raises $9 million by placing 1 million shares at $9 each to a group of financial institutions. The pre and post placement financial structure of the company is set out below:*

| Issued Shares: | Pre (m) | Pre (%) | Post (m) | Post (%) | |
|---|---|---|---|---|---|
| · old s'holders | 10 | 100 | 10 | 90.9 | (10/11)*100 |
| · new s'holders | 0 | 0 | 1 | 9.1 | (1/11)*100 |
| Total | 10 | 100 | 11 | 100 | |

*new share price =10/11*$10+1/11*$9= $9.909

| Value of Equity: | ($m) | ($m) | |
|---|---|---|---|
| · old s'holders | $100 | $99.09 | ← $9.909*10m |
| · new s'holders | 0 | $9.91 | ← $9.909*1m |
| Total | $100 | $109 | |

  *- Existing shareholders' equity value reduced*
  *- They are losing money and losing equity stake*
  *- Companies are required to gain existing shareholder support before issuing these shares*
- In Comparison to Other Methods
  - o Advantages
    - ▪ Quicker to complete (few weeks)
    - ▪ Lower issue costs (no need for underwriting normally)
    - ▪ Do not generally require a prospectus
  - o Disadvantages
    - ▪ Shares issued at a discount → transfer of wealth from existing shareholders to new investors
    - ▪ Dilute control (votes) of existing shareholders

*ASX Listing Rule 7.1 prohibits a company from issuing more than 15% of its issued capital within a given 12 month period without first obtaining the approval of its shareholders*
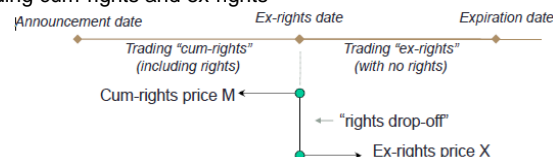
## Rights Issues

- A new share issue offered to existing shareholders at a fixed subscription price
  - This is an option, shareholders can either exercise their right or let their right expire – or if the right is renounceable, they can sell their right to someone else
- Shareholders receive an entitlement to new shares at a fixed proportion of the number of shares already held (on a pro-rata basis)
- Shareholders can (1) exercise the rights (2) let the rights expire or (3) sell the rights (on the ASX) if the issue is renounceable (in most cases)
- Subscription price is usually at 10-30% discount to the share price at the time the issue is announced
- Usually takes 2-3 months to complete

## Rights Issues - Notations

- Notations:
    - **S**         Subscription Price
    - **1:N**      Pro-rata entitlement
    - **M**        Is the market price of the share cum-rights
    - **X**         Is the theoretical price of the share ex-rights (ex-rights, share value drops)
    - **R**        Is the value of the right
- Trading cum-rights and ex-rights



## Rights Issues – Example

- Background
    - A company already has 10mil shares outstanding with a current market price of $3.50 per share
    - The company wishes to raise $5mil for a new investment
    - The company makes a 1 for 5 rights issue with a subscription price of $2.50 per share
- Questions
    - What is the theoretical ex-rights price X?
    - What is the value of a single right R?      *Calculate weighted average, this will give the price*
- Theoretical Ex-Rights Price (X)
    - What should the value of the share be once it begins trading ex-rights?
        - By owning N shares at the price of M just before the ex-rights date, we can buy another share at price S
        - On the ex-rights date, we will now have N+1 shares, and the weighted average share price is then

$$X = \frac{N}{N+1}M + \frac{1}{N+1}S = \frac{5}{6}*3.50 + \frac{1}{6}*2.50 = 3.33$$

- Value of the Right (R)
    - How much would the market pay for the right to purchase one additional share at the subscription price?
        - Theoretical price per share after issue      3.33
        - Subscription price      2.50
        - Value of the right      0.83
            *Note that the right to buy a share for $2.50 that is currently worth $3.50 is not worth $1.00*
    - By buying one R and paying price S, you would own X → R+S = X → R = X-S
    - Using the equation for X,

$$R = \frac{N(M-S)}{N+1} = \frac{5(3.50-2.50)}{6} = 0.83$$

    - Suppose an investor had 5 shares in the company prior to the rights issue
    - Look at her position before and after the issue, assuming that she exercises her right to subscribe for new shares

| Before | After |
|---|---|
| 5 @ $3.50 = $17.50 | 6 @ $3.33= $20 |
| Cash = $2.50 | |
| Total Wealth = $20 | Total Wealth = $20 |
| Ownership = 5/10M | Ownership = 6/12M |

## Rights Issues – Renounceability
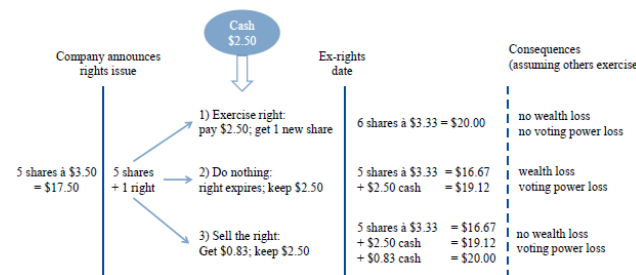


Note: Strategies 1) and 3) are equivalent:
    Take Strategy 1) and then sell 1 share ex-rights = Strategy 3)
    Take Strategy 3) and then use cash to buy one share ex-rights = Strategy 1)

## Rights Issues – Comparison with PP

- Constraints on private placements
    - Shareholder approval required during a takeover bid
    - Limited to <15% of issued capital without shareholder approval
- Convenient source of funds
- Preserves voting patterns, but
- Takes longer than private placements
- Can be costly:
    - Prospectus (no longer required by regulation, but usually submitted by companies)
    - Underwriting fees (1-3% of issue price)
    - Administration

## Rights Issues – Ex-rights Price

- Share price will not necessarily fall to theoretical ex-rights price (X) on the ex-rights date (rights drop off) due to:
    - New information may affect stock price on ex-rights date
    - General movement in share prices
    - Transaction costs/taxes related to exercising the right
    - The theoretical value R ignores the option characteristic of the right
        - Stock prices move all the time, not just on the ex-rights date
        - The right is an option to buy the new share at a fixed price later, not an obligation (similar to stock call option)
        - When would it not be exercised? (so there's undersubscription risk – underwriting may be necessary to remove the risk)
        - The theoretical value of the right (R) is likely to understate its value as its option value under stock price uncertainty is ignored

## Dividend Reinvestment Plans (DRP)

- Use part or all of dividend to apply for new shares without transaction costs and usually at a discount (5-10%) to the current market price
- Substantial source of capital for major corporations
- Rationale: Allows high dividend payout while lessening impact on cash outflows
- A DRP Is just a very small rights issue
    - Example: *You own 10 shares, price of share = $1, Dividend per share = $0.1; DRP price: You can buy 1 share at $0.9 → 9 Shares give you 1 additional share (1:9 issue)*

## 5. Regulatory Environment

### Australian Regulations

- Capital raising by companies in Australia is regulated by:
    - Corporations Act (all companies)
    - ASX Listing Rules (listed companies only)
    - Articles of Association (company specific)
    - Australian Consumer Law (all companies)
    - Special Legislation (some industries only)

### Regulation Objectives

- Objective of fundraising provisions of Corporations Act is investor protection
- Requires "full" information disclosure
- Prohibits advertising and availability of securities except under prescribed conditions
- The Basic Rule (s.1018)
    - An offer of securities of a corporation must be accompanied by a prospectus unless it is an "excluded" offer

### The Prospectus

- Must be lodged with the ASIC
- Corporations Act does not specify a checklist of contents
    - Determined by the issuer
    - Must include all information that a "reasonably careful investor might be expected to require" in relation to the securities on offer and to the issuer
- Onerous penalties for false or misleading statements in or omissions from a prospectus

### Listing Rules of ASX

- All listed corporations must continue to meet certain requirements in order to be listed on the ASX
- ASX Listing Rules Include:
    - Continuous disclosure. Companies must immediately notify ASX if there is any information likely to affect the share price
    - Rules governing how new share issues must be carried out
    - How share registries and CHESS Registration must be maintained

# 2 Raising Capital – Debt and Leases

## 1. Raising Debt Capital

### Debt Capital

- More frequent/important than equity financing
- When companies borrow money, they are obligated to:
    o Make regular interest payments and
    o Repay the principal at maturity (fixed-term)
- Interest payments are tax deductible
- Firms (stockholders) may "default" on their obligations ("default risk")
- Upon default, lenders will take over the firm's assets
- Lenders have no voting power, but protected by covenants

### Debt Covenants

- Specific provisions in the debt contract
- Designed to protect interests of lenders
    o Negative (or restricted) covenants ("not to do")
      → *ensure equity holders do right by debtholders*
        ▪ Limit access of further debt
        ▪ Restrict holdings of certain investments
        ▪ Restrict dividends paid
    o Positive (or affirmative) covenants ("to do")
      → *exist for both investment grade and speculative grade*
        ▪ Maintain assets (working capital or collateral)
        ▪ Provide audited financial statements to the lenders

### Types of Debt: Bank or Issued Debt?

- **Bank Loans** – preferred in Australia
    o Bank overdraft: *short term (0-12 months)*
    o Inventory loan: *short term*
    o Bridge loan: *short term*
    o Term loans (fixed, variable): *long term*
- **Debt Securities** – from capital markets
    o Commercial paper, Bills of exchange: *short term*
    o Debentures: *medium – long term*
        ▪ Unpopular, restricted, must be a secured asset, require IPO
    o Corporate bonds, Unsecured notes: *long term*
    o Traded on a market, listed on the ASX, traded in secondary markets

### Secured and Unsecured

- **Secured** – relying upon a physical asset
    o Bank loans are secured, in the event of a default on a home loan, the bank will seize the house (physical asset)
- **Unsecured** – not relying upon a physical asset
    o Significantly less defaulting debt recover rates compared with secured contracts

## 2. Debt versus Equity Payoffs (shareholder-debtholder conflicts)

### Example of Debt and Equity

The Popov Company has been awarded the concessions at next year's Olympic Games. The company will disband after the games. Interest and principal due next year is $800, at which the debt will be paid off in full. The firm's cash flows next year are forecast as follows:

| Popov's Cash Flow Schedule | | | | |
|---|---|---|---|---|
| | Very good | Good | Not good | Bad |
| Cash flow before interest and principal | $1,000 | $850 | $700 | $550 |
| - Interest and principal to debtholders (D) | -$800 | -$800 | -$700 | -$550 |
| Cash flow to stockholders (S) | $200 | $50 | 0 | 0 |

Source: Corporate Finance by Ross, Westerfield, Jaffe
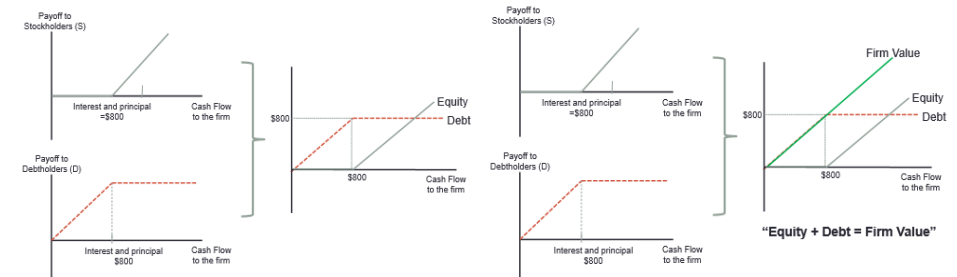


### To Sum Up

- Debt + Equity = Firm Value (market value of assets)
- Equity
    o Equity is more valuable if cash flows are more volatile (i.e. more gain on the upside)
    o Therefore S have more incentive to take risky projects
- Debt
    o D's main concern is S defaulting
    o D dislike risky projects: hence conflicting objectives between D and S
    o Through covenants, D try to reduce firm's downside risk

### *TAPPS Exercise 1*

Q. Macrohard Inc owes $400 in debt (interest plus principal). Two projects are available with the following payoffs:

| | Good (50% chance) | Bad (50% chance) |
|---|---|---|
| Project A | $400 | $400 |
| Project B | $600 | $200 |

Both projects have the same expected cash flow of $400. Do stockholders and bondholders care about which project is chosen?
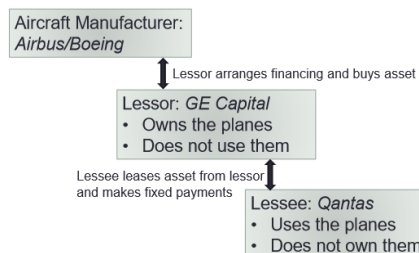
Bondholder = A → either way, make money back (-/+ $400)

Stockholder = B → potential for a +$200 payoff

# 3. Operating and Finance Leases

## What is Leasing?

- In the US, about 30% of new capital equipment is leased (e.g.: trucks, farm machinery, railroad cars, aircraft, ships)
- Important terms
  - Lessor = legal owner/financier of asset
  - Lessee = the asset user
  - Lease = contract where the lessor receives fixed payments from the lessee in return for the use of the asset

Aircraft Manufacturer:
*Airbus/Boeing*

Lessor arranges financing and buys asset

Lessor: *GE Capital*
- Owns the planes
- Does not use them

Lessee leases asset from lessor
and makes fixed payments

Lessee: *Qantas*
- Uses the planes
- Does not own them

## Two Types of Leases

- **Operating Lease**
  - Operating lease is like a rental agreement (generally, short term)
    - E.g. cars, telephones, computers, coffee machines
  - Cancellable by lessee at short notice or without substantial penalty
  - Risk of ownership borne by lessor
    - Lessee can relinquish asset, lessor must find someone else to lease asset
  - Lessor is often (or closely related to) a supplier of the asset
  - "Lease versus Buy" decision
- **Finance Lease**
  - A long term agreement (generally over the life of the asset)
  - Non-cancellable without substantial penalty
  - Risks of ownership transferred to lessee
    - Substantial penalty and obligation (like debt) means risk of ownership is borne by the lessee
  - Lessor is generally a financial institution
  - Effectively lessor is a source of finance for lessee
    - An alternative to borrowing funds to buy an asset
  - "Lease versus Borrow-to-buy" decision

**Summary**

| Characteristics | Operating Lease | Finance Lease |
|---|---|---|
| Term of lease | Short-term | Long-term |
| Cancellable? | Yes | No (penalties) |
| Legal Ownership | Lessor | Lessor |
| Risks of ownership are borne by | Lessor | Lessee |
| Lessor is often a… | Supplier | Financial institution |
| Lease is essentially a… | Rental agreement | Alternative to borrowing to buy |
| Accounting treatment (AASB117 and AASB1008) | Not on B/S | Recognized as asset and liability on B/S (will use up some of debt capacity) |
| Decision | Lease vs. buy | Lease vs. borrow-buy |

# 4. Financial Evaluation of Leasing

## Financial Lease Value

- Key Question: Lease VS Borrow to Buy
- Use the NPV Method to value a finance lease
  - Identify the incremental cash flows from leasing as opposed to borrowing to buy
  - Discount these cash flows and sum them up to get NPV

$$NPV_0 = C_0 + \frac{C_1}{(1+k)^2} + \cdots + \frac{C_T}{(1+k)^T} = \sum_{t=0}^{T} \frac{C_t}{(1+k)^t}$$

  - But which discount rate $k$? (The opportunity cost of capital)
    - For investor – k is rate of return I would get if I took my money elsewhere

## Finance Lease Value – Discount Rate

- Discount Rate: Opportunity Cost of Capital
  - Our alternatives are 1) Lease, or 2) Borrow to Buy
- The opportunity cost of capital for the lease is the after-tax cost of borrowing on an equivalent loan to buy the asset
  - *After-tax cost of borrowing = interest rate x (1 – corporate tax rate)*
  - We implicitly assume that the cash flows from leasing are as safe as the interest and principal payments on a loan issued by the lessee

## Finance Lease Value – Tax Shield Effects

| | Company A | Company B |
|---|---|---|
| Income | 1000 | 1000 |
| Allowable deduction | | |
| (e.g. interest or lease payment) | - | 100 |
| Taxable income | 1000 | 900 |
| Tax Payable ($t_c$=0.30) | 300 | 270 |

**Company B has a tax-shield of $30 = $t_c$× Deduction=0.3*$100**

What are the tax-shields or tax payments related to a lease contract?

- Tax-shields from lease payments *(lessee)*
- Tax-shields from asset depreciation *(lessor - owner of the asset)*
- Tax on gain from the sale of asset *(lessor - owner of the asset)*

## Finance Lease Value

- Cash flows from leasing vs. borrow-to-buy:

| **Leasing** | |
|---|---|
| Lease payments | (-) |
| Tax-shields from lease payment | (+) |

| **Borrow-to-Buy** | |
|---|---|
| Amount borrowed (+) & Interest and Principal paid (-) *perfectly offset in present value terms* | 0 |
| Cost of asset | (-) |
| Tax-shields from asset depreciation | (+) |
| Residual asset value | (+) |
| Tax on gain from sale of asset | (-) |

- Incremental CF from leasing vs. borrow-to-buy (from lessee's viewpoint):

**CFs(Leasing) - CFs(Borrow-to-Buy)**

## Finance Lease Value – *Example*

*Required return is irrelevant – this a financial question not investment question*

- Davids Ltd needs to use a machine for its project that costs $78,000 and has an expected life of 4 years and a residual (or salvage) value of $20,600
- The machine can be leased over four years with annual payments of $21,300 payable in advance
- The company annual tax rate is 34%
- Straight-line depreciation (full depreciation) is used
- The cost of borrowing is 15% p.a. (before-tax)
- The required rate of return for the machine is 22% p.a.

Q. Should Davids Ltd lease or borrow-buy?

**Leasing (1)**

| | | |
|---|---|---|
| Lease payments | -$21,300 | From year 0 |
| Tax-shields from lease payment | 0.34 x $21,300 = | +$7,242 | From year 0 |

**Borrow-to-Buy (2)**

| | | |
|---|---|---|
| Cost of asset | | -$78,000 | In year 0 |
| Tax-shields from asset depreciation | 0.34 x ($78,000/4) = | +$6,630 | From year 1 |
| Residual asset value | | +$20,600 | In year 4 |
| Tax on gain from sale of asset* | -($20,600 - 0) x 0.34 = | -$7,004 | In year 4 |

*Gain on sale = Residual Value - Book Value*
*Book value = Historical cost - Accumulated depreciation = $0*

### Incremental Cash Flow for each period = (1) - (2)

**(1) Incremental cash-flows from leasing – Cont'd**

| Description | July 2010 | July 2011 | July 2012 | July 2013 | July 2014 |
|---|---|---|---|---|---|
| Cost | +78,000 | | | | |
| Lease Payment | -21,300 | -21,300 | -21,300 | -21,300 | |
| Tax Shield | +7,242 | +7,242 | +7,242 | +7,242 | |
| Depreciation Tax Shield | | -6,630 | -6,630 | -6,630 | -6,630 |
| Residual | | | | | -20,600 |
| Tax on Gain/Loss | | | | | +7,004 |
| Total | 63,942 | -20,688 | -20,688 | -20,688 | -20,226 |

**(2) After-tax cost of borrowing = 15%×(1 – 0.34) = 9.9%**

(This discount rate captures tax-shields on interest payments when borrowing money i.e. the net cost of borrowing)

(3) Calculate the NPV of incremental cash flows

$$\text{NPV} = 63,942 - \frac{20,688}{(1.099)} - \frac{20,688}{(1.099)^2} - \frac{20,688}{(1.099)^3} - \frac{20,226}{(1.099)^4}$$

$$= 63,942 - 65,403.68$$

$$= -\$1,461.68$$

So, Davids Ltd should reject this lease contract and borrow money to buy the machine!

## Setting Lease Payments

- Another question regarding a finance lease:
  - What is the maximum annual lease payment the lessee would be willing to pay?
- How? Set the NPV of leasing, which is from the lessee's perspective, equal to zero
- Let's work with the same example of Davids Ltd except that we now need to find a new lease payment (L)

## Basic Present Value Formula

- Annuity (a coupon payment every period until n)
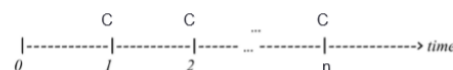


$$PV = \frac{C}{(1+k)} + \frac{C}{(1+k)^2} + \cdots + \frac{C}{(1+k)^n}$$

← the sum of finite geometric series:
$a + ar + ar^2 + \cdots + ar^{n-1}$
$= a\frac{1-r^n}{1-r}$

← substitute 'r' with $\frac{1}{1+k}$ and 'a' with $\frac{C}{1+k}$ then simplify

So, $$PV = \frac{C}{k}\left[1 - \frac{1}{(1+k)^n}\right]$$

### Earlier example of Davids Ltd.

| | | | | | |
|---|---|---|---|---|---|
| Cost | +78,000 | | | | |
| Lease Payment | -L | -L | -L | -L | |
| Tax Shield | +0.34L | +0.34L | +0.34L | +0.34L | |
| Depreciation Tax Shield | | -6,630 | -6,630 | -6,630 | -6,630 |
| Residual | | | | | -20,600 |
| Tax on Gain/Loss | | | | | +7,004 |
| Total | 78,000 | -6,630 | -6,630 | -6,630 | -20,226 |
| | -0.66L | -0.66L | -0.66L | -0.66L | |

$$\text{NPV} = 78000 - 0.66L - \frac{0.66L}{0.099}\left[1 - \frac{1}{(1.099)^3}\right] - \frac{6630}{0.099}\left[1 - \frac{1}{(1.099)^3}\right] - \frac{20226}{(1.099)^4}$$   ← Annuity formula  $\frac{C}{k}\left(1 - \frac{1}{(1+k)^n}\right)$

$$0 = 78000 - 0.66L - \frac{0.66L}{0.099}\left[1 - \frac{1}{(1.099)^3}\right] - \frac{6630}{0.099}\left[1 - \frac{1}{(1.099)^3}\right] - \frac{20226}{(1.099)^4}$$

$$0 = 78000 - 2.304216L - 16517 - 13865$$

$$0 = 47618 - 2.304216L$$   ← $-\left[0.66 + \frac{0.66}{0.099}\left(1 - \frac{1}{(1.099)^3}\right)\right] = -2.304216$

$$L = \$20666$$

## Finance Lease Value – Wrap-Up

- Financing can complement investment strategy
  - Lease or Buy – using debt
- This is a financing decision, not an investment decision
- Whether to invest in this project is a separate question
- But a favourable lease may create wealth, that is: NPV(project via leasing) > NPV(project via borrowing)

## Operating Lease Value

- Lessee has the option to cancel an operating lease without (significant) penalty – riskier for a lessor than a finance lease
- The cancellation option is valuable to the lessee:
  - Insurance against premature obsolescence
  - Allows lessee to reduce operating expenses when demand is weak to remain profitable

$$NPV_{operating\ lease} = NPV_{finance\ lease} + PV_{option\ to\ cancel}$$

## 5. Suggested Advantages of Leasing

### Why does leasing exist?

- Think about the NPV of a finance lease from the lessor's point of view:

| $NPV_{Lessee} =$ | $NPV_{Lessor} =$ |
|---|---|
| +Cost of Asset | −Cost of Asset* |
| −PV(Lease Payments) | +PV(Lease Payments)* |
| +PV$\left(\begin{array}{c}\text{Tax Saving/Cost on}\\ \text{Lease Payments}\end{array}\right)$ | −PV$\left(\begin{array}{c}\text{Tax Saving/Cost on}\\ \text{Lease Payments}\end{array}\right)^*$ |
| −PV$\left(\begin{array}{c}\text{Tax Savings on}\\ \text{Depreciation}\end{array}\right)$ | +PV$\left(\begin{array}{c}\text{Tax Savings on}\\ \text{Depreciation}\end{array}\right)^*$ |
| −PV(After Tax Residual Value) | +PV(After Tax Residual Value)* |

- Without any "market frictions", the lessor and lessee have the same discount rates and their payoffs are equivalent, but with opposite signs (i.e. NPV$_{lessor}$ = -NPV$_{lessee}$
- If NPV$_{lessee}$ > 0, then NPV$_{lessor}$ <0 so leasing would not exist; however, real world market frictions enable both NPV$_{lessee}$ > 0 and NPV$_{lessor}$ > 0 such that we observe leasing in real life

### List of Advantages of Leasing

- How can we get NPV$_{lessee}$ > 0 and NPV$_{lessor}$ > 0 and thus create wealth?
- Suggested advantages of leasing:
  - Company Taxation (sensible)
  - Different Costs of Capital (sensible)
  - Transaction Costs (sensible)
  - Off-balance Sheet Financing (dubious)

### Company Taxation (sensible)

- If the lessor's tax rate is higher than the lessee's, and if the lessor shares some of the tax benefits to the lessee in the form of low lease payment, leasing exists
- In what circumstances are firms on different tax rates?
        E.g. Cross border leases, progressive tax rates, tax loss carry-forwards

### Different Costs of Capital (sensible)

$NPV_{lessor} = -Asset\ Cost + PV(lease\ payments)^* + Residual\ Value$

$NPV_{lessee} = +Asset\ Cost - PV(lease\ payments) - Residual\ Value$

- If the cost of capital for the lessor is (sufficiently) lower than that of the lessee, we can have both NPV$_{lessee}$ > 0 and NPV$_{lessor}$ > 0
  i.e. when k$_{lessor}$ < k$_{lessee}$
- Lessor can borrow at cheaper rates – why?
  - Lessee bears the risks of ownership (in a finance lease)

### Transaction Costs (sensible)

- If lessee defaults on lease payment, lessors may do better than secured lenders because they own the asset; simpler and less costly bankruptcy process.
- Standardisation also leads to low administrative and transaction costs
  - E.g. one lessor can buy multiple trucks in bulk and lease them to multiple firms
- These potential costs will be reflected in the interest rate charged by lenders, making leasing more attractive

### Off Balance Sheet Financing (dubious)

- Historically in some countries, finance leases were off balance sheet financing
- What's the problem?
  - BS Basically understated the true leverage ratio or debt capacity (and thus, true financial risk)
- Accounting standards now require capitalisation of finance lease obligations where the lease is non-cancellable and
  - Lease term >/= 75% of the asset's useful life or
  - PV(Lease Payments) >/= 90% of the fair value of the asset to the lessor

### TAPPS Exercise 2

*Q. Is the following statement True or False?*
*"Leasing increases debt capacity because it is off-balance sheet"*

> *False – financing risk is still going to increase even if you don't disclose to the market*

## 6. Propensity to Lease

### Asset Characteristics for Leasing

*What factors contribute to some assets being more likely to be leased rather than purchased*

### Sensitivity to Use and Maintenance

- Lessee has little incentive to care for an asset when they have no right to its salvage value
- Lessor incorporates the risk of abuse into lease payments
- Assets that are more sensitive to use and maintenance will be more expensive to lease rather than purchase        **SO, PURCHASE!**

### Specialised Assets

- Lessee values specialised assets more than lessor
- Disposal value for lessor is uncertain if no active second-hand market
- Therefore, specialised assets have higher likelihood of a purchase        **SO, PURCHASE!**

### Flexibility and Transaction Costs

- Quality assessment and ownership transfers involve transaction costs
- The higher these costs, the more likely an asset will be leased        **SO, LEASE!**

### Comparative Advantage in Asset Acquisition/Disposal

$NPV_{lessor} = -Asset\ Cost + PV(lease\ payments)^* + Residual\ Value$

$NPV_{lessee} = +Asset\ Cost - PV(lease\ payments) - Residual\ Value$

- If the lessor can get higher disposal value than lessee or obtain asset at lower market price, asset is more likely to be leased        **SO, LEASE!**

# 3 Issues with WACC

## 1. Weighted Average Cost of Capital (WACC)

### Cost of Capital

- Projects must earn at least a minimum acceptable rate of return to be accepted – *the rate of return required for investors to invest in the firm*
- The benchmark return should be higher for riskier projects than for safer ones
- How to find this benchmark rate of return?
- Different terminology reflects different viewpoints of the same thing
    - From investors' viewpoint: required rate of return or market-determined opportunity cost
    - From the firm (issuer)'s viewpoint: cost of capital

### WACC Formula

- WACC puts weights on cost of debt and cost of equity

$$WACC = k' = k_d(1 - t_e)\left(\frac{D}{V}\right) + k_e\left(\frac{E}{V}\right)$$

$K_d$ = Cost of Debt     $K_e$ = Cost of Equity     $t_e$ = Effective Company Tax Rate
D, E= Debt and Equity Market Values     Firm Value V = D + E

- Interpretations:
    - The overall return the firm must earn on its existing assets to maintain the value of its securities, or
    - The required return on any investments by the firm that essentially have the same risk as existing operations
        - $K_e/k_d$ = required rate of return for debtholders/shareholders

### $K_d$

- Market interest rate that the firm has to pay on its long term borrowing today
    > Interest rate company's debtholders expect to receive; reason why we talk about the risk-free rate is because investors want to be compensated for inflation. Given the time value of money involved in the role of a lender - giving money today and receiving their money back + interest at a later date, need to consider inflation over this time period
- $K_d$ = risk-free rate + default spread
- If the firm is rated, use the rating and a typical default spread on bonds with that rating

| Company | S&P Rating | Risk-Free Rate | Default Spread | Cost of Debt |
|---|---|---|---|---|
| Disney | A | 2.75% (US $) | 1.00% | 3.75% |
| Deutsche Bank | A | 1.75% (Euros) | 1.00% | 2.75% |
| Vale | A- | 2.75% (US $) | 1.30% | 4.05% |

- If not rated, use the interest rate on a bank loan or estimate a proper default spread based on a synthetic rating – how?
- Estimating a Synthetic Rating:
    - Can be estimated by using one or a collection of financial ratios
    - A simple, common ratio that seems to work best is:
      Interest Coverage Ratio = EBIT / Interest Expenses

| If ICoverage Ratio is | Estimated Bond Rating | Default Spread |
|---|---|---|
| > 8.50 | AAA | 0.20% |
| 6.50 - 8.50 | AA | 0.50% |
| 5.50 - 6.50 | A+ | 0.80% |
| 4.25 - 5.50 | A | 1.00% |
| 3.00 - 4.25 | A– | 1.25% |
| 2.50 - 3.00 | BBB | 1.50% |
| 2.00 - 2.50 | BB | 2.00% |
| 1.75 - 2.00 | B+ | 2.50% |
| 1.50 - 1.75 | B | 3.25% |
| 1.25 - 1.50 | B – | 4.25% |
| 0.80 - 1.25 | CCC | 5.00% |
| 0.65 - 0.80 | CC | 6.00% |
| 0.20 - 0.65 | C | 7.50% |
| < 0.20 | D | 10.00% |

> If the ratio is higher, the company can actually use its money to make its payments. The ratio can capture the company's default risk; at higher ratios, the company has a reduced risk of default

### $T_e$

- $(1 - t_e)k_d$ reflects tax savings associated with debt
- Under an imputation tax system in Canada, Australia and NZ, corporate tax is reimbursed to resident shareholders as tax credits attached to dividends (so-called franking credits)
- Effective corporate tax can be lower than statutory corporate tax rate ($t_c$ = 30%): $t_e = t_c(1 - \lambda)$
- Where λ is the proportion of corporate tax claimed by shareholders
    - λ = 0, a classical tax system; λ = 1 a pure imputation tax system
    - λ depends on a proportion of overseas operations/shareholders and whether to distribute profit as fully franked dividends or not

### Basic Present Value Formula 2

- Perpetuity (a coupon payment every period forever; g < k)

$$PV_\infty = \frac{C_1}{(1+k)^1} + \frac{C_1(1+g)}{(1+k)^2} + \frac{C_1(1+g)^2}{(1+k)^3} \cdots$$

← the sum of infinite geometric series: $a + ar + ar^2 + \cdots$
$= \frac{a}{1-r}$ if $|r| < 1$

So, $$PV_\infty = \frac{C_1}{(1+k)} \times \frac{1}{1 - (1+g)/(1+k)} = \frac{C_1}{k-g}$$

### $K_e$

- Two methods to calculate $k_e$
    - **1. Capital Asset Pricing Model (CAPM)**     $k_e = R_f + \beta e[E(R_M) - R_f]$

    - **2. DCF Approach (Gordon Growth Model)**     $P_0 = \frac{D_1}{k_e - g} \to k_e = \frac{D_0(1+g)}{P_0} + g$

      Where $D_0$ = current period dividend per share

      ISSUES:
      Dividends not always paid; does not capture risk shareholders need to bear; growth rate is assumed to be constant

### Using CAPM to Estimate $k_e$

- CAPM Formula     $k_e = R_f + \beta_e[E(R_M) - R_f]$
- Beta reflects how underlying stock moves with market (correlation or diversification measure)
- Stocks contributing more risk (high beta) require a higher expected rate of return for an investor who holds the overall stock market (a diversified portfolio)
- Using CAPM to Estimate $k_e$ - Disney

· Inputs to CAPM
· Disney's Beta = 1.25 (right-hand side)
· Risk-free Rate = 2.75% (current U.S. ten-year T Bond rate)
· Market Risk Premium = 5.76% (current)

· Calculation of $k_e$
Expected Return = Risk-free Rate + Beta×(Market Risk Premium)
= 2.75% + 1.25 (5.76%) = 9.95%

Estimating Beta

Return on Disney = .0071 + 1.2517 Return on Market

Period used: past 5 years
Return Interval = Monthly
Market Index: S&P 500 Index

### Each Component in WACC – Weights

$$WACC = k' = k_d(1 - t_e)\left(\frac{D}{V}\right) + k_e\left(\frac{E}{V}\right)$$

- Weights should be calculated using market values rather than book values
- Ideally, use the firm's target (or optimal) capital structure
- The firm's current capital structure can be used if it's optimally chosen and will not change following acceptance of the project.

Q. Assume that Wesfarmers has a WACC of 17% p.a. The annual meeting is being held to decide capital expenditure for the following year.

- Head of the *resources* division proposes a mining project with expected return of 24%
- Head of the *retail* division proposes a project opening a new Coles store in growth region with expected return of 12%

Is the following statement true or false?

*"As the companywide WACC is 17%, the CEO should choose the mining project that will generate a higher return than the benchmark return."*

## Single WACC for Diversified Firm

- What could be the problem of using the companywide WACC?
  - ○ Likely to accept negative NPV projects
  - ○ Likely to have a natural bias towards riskier projects
- The company cost of capital should only be used as a benchmark rate of return for a new project if
  - ○ The project has the same basic risk as the rest of the company
- If not, the company needs to find publicly traded companies in the same industry as the project and obtain their average info

## 2. Optimal Debt Ratio – Cost of Capital Approach

## Optimal Capital Structure

- Common measure of a firm's capital structure
  - *Debt to Capital Ratio* (or *leverage ratio*) = Debt / (Debt + Equity)
- An optimal mix between debt and equity that maximises firm value
- How to find it for a given firm?

$$Value\ of\ Firm = \sum_{t=1}^{\infty} \frac{CF_t\ to\ Firm}{(1+WACC)^t} \qquad \text{(DCF method)}$$

*Firm value will be maximised when the cost of capital is minimised – cost of capital approach*

## Cost of Capital Approach

$$WACC = k' = k_d(1 - t_e)\left(\frac{D}{V}\right) + k_e\left(\frac{E}{V}\right)$$

**Increase in Debt Ratio:**

- What will happen to the cost of debt ($k_d$)?
  - ○ Increase w/leverage → default risk ↑, bond rating ↓, requiring a higher default spread
- What will happen to the cost of equity ($k_e$)?
  - ○ Will also increase with leverage. Why?
    - Two types of risks shareholders of leveraged firm need to bear: *Business Risk* and *Financial Risk*
    - Stock beta (so, $k_e$), captures both types of risks
    $\beta_L$: unlevered beta (stock beta of a firm with leverage)
    $\beta_U$: unlevered beta (or asset beta) only reflecting business risk

    *All companies levered/unlevered must bear $B_U$ business risk; financial risk is additional for levered beta firms and takes into account Debt/Equity ratio (capital structure)*

    $$\beta_L = \beta_U\left(1 + (1 - t_e)\left(\frac{D}{E}\right)\right)$$

- Levered beta is a function of unlevered beta and D/E ratio

$$\beta_L = \beta_U\left(1 + (1 - t_e)\frac{D}{E}\right) = \underbrace{\beta_U}_{\text{business risk}} + \underbrace{\beta_U(1 - t_e)\frac{D}{E}}_{\text{financial risk}}$$

- What is intuition here?
  - ○ Consider a firm whose cash flows (subject to business risk) can be decomposed into safe cash flows ($200m) and risky cash flows ($300m on average)
  - ○ Suppose that it is an all equity firm. Then both cash flows go to shareholders (S' risky CF ratio = ?)
  - ○ Now suppose that it has debt outstanding of $100m. Then, a large part of the safe cash flows goes to debtholders and the residual cash flows left to shareholders is mostly from risky cash flows (S' risky CF ratio = ?), thereby placing an additional risk on shareholders (financial risk).

**Steps for Cost of Capital Approach**

1. Estimate the cost of equity ($k_e$) at different levels of debt
   - D/E increases → Beta will increase → $k_e$ will increase
   - Estimation requires levered beta calculation
2. Estimate the cost of debt ($k_d$) at different levels of debt
   - Default risk will go up and bond ratings will go down as debt goes up → $k_d$ will increase
   - Estimation requires estimation of bond ratings
3. Calculate the cost of capital at different levels of debt and choose the optimal level
4. Calculate the effect on firm value and stock price

Here's an example: Don't worry about the exact numbers!
Just understand the trends here and choose optimal ratio!

| D/(D+E) | Cost of Equity | After-tax Cost of Debt | Cost of Capital |
|---|---|---|---|
| 0 | 10.50% | 4.80% | 10.50% |
| 10% | 11.00% | 5.10% | 10.41% |
| 20% | 11.60% | 5.40% | 10.36% |
| 30% | 12.30% | 5.52% | 10.27% |
| 40% | 13.10% | 5.70% | 10.14% |
| 50% | 14.50% | 6.10% | 10.30% |
| 60% | 15.00% | 7.20% | 10.32% |
| 70% | 16.10% | 8.10% | 10.50% |
| 80% | 17.20% | 9.00% | 10.64% |
| 90% | 18.40% | 10.20% | 11.02% |
| 100% | 19.70% | 11.40% | 11.40% |

More weight (D/(D+E)) on cheaper $k_d$; so, decreasing!

Both $k_e$ & $k_d$ increases more sharply at high debt ratio; so, increasing!

Assume the firm has an annual cash flow of $200 million, expected to grow 3% a year forever regardless of D/(D+E):

$$Firm\ Value = \frac{Expected\ Cash\ Flow\ next\ year}{Cost\ of\ Capital - g} = \frac{200 \times 1.03}{Cost\ of\ Capital - 0.03}$$

| D/(D+E) | Cost of Equity | After-tax Cost of Debt | Cost of Capital | Firm Value |
|---|---|---|---|---|
| 0 | 10.50% | 4.80% | 10.50% | $2,747 |
| 10% | 11.00% | 5.10% | 10.41% | $2,780 |
| 20% | 11.60% | 5.40% | 10.36% | $2,799 |
| 30% | 12.30% | 5.52% | 10.27% | $2,835 |
| 40% | 13.10% | 5.70% | 10.14% | $2,885 |
| 50% | 14.50% | 6.10% | 10.30% | $2,822 |
| 60% | 15.00% | 7.20% | 10.32% | $2,814 |
| 70% | 16.10% | 8.10% | 10.50% | $2,747 |
| 80% | 17.20% | 9.00% | 10.64% | $2,696 |
| 90% | 18.40% | 10.20% | 11.02% | $2,569 |
| 100% | 19.70% | 11.40% | 11.40% | $2,452 |

## What is Our Plan Now?

- **Modigliani-Miller Irrelevance Theorem (Benchmark):**
  - ○ Capital Structure is irrelevant
- What's missing from the M-M view?
  - ○ Taxes
  - ○ Costs of financial distress
  - ○ "Trade-off" Theory (benefits and Costs of Debt)
- What's missing from the target-leverage view
  - ○ "Pecking Order" Perspective
- An integrative approach

### 3. Modigliani-Miller "Irrelevance" Theorem

#### M-M's Irrelevance Theorem

- Assume "perfect" markets:
  - No transaction or bankruptcy costs; no agency costs
  - No taxes and no asymmetric information
  - Market efficiency and perfect market competition (no arbitrage opportunity)
- Then
  - The value of the firm is independent of its capital structure ($V_L = V_U$); that is the value of an unlevered firm U is equal to the value of a levered firm L
  - Financing decisions do not matter
- MM Theorem: Proof (Pie Theory)



  - The value of a firm is that of the cash flows generated by its operating assets (e.g. plant and inventories)
  - The firm's financial policy divides up this cash flow "pie" among different claimants (debtholders and shareholders)
  - But the size (value) of the pie is independent of how the pie is divided up
  - MM Theorem was initially meant for capital structure
  - But it applies to all aspects of financial policy under perfect market assumptions
    - Capital structure is irrelevant
    - Long-term versus Short-term debt is irrelevant
    - Dividend policy is irrelevant
    - Risk management is irrelevant

### 4. Capital Structure Theory I: Trade-off Theory

#### Trade-Off Theory
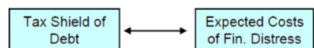


- Optimal target capital structure found by balancing taxes and exp. costs of financial stress
- These two ingredients can change the size of the pie that goes to the firm's claimholders (firm value) in the opposite directions
- Trading off the two gives an "optimal" capital structure (but, this theory does not aim at providing a precise target but rather a range)
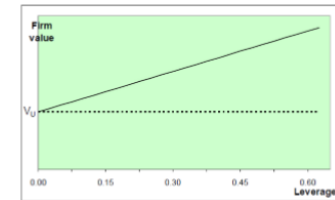
#### Debt Tax Shields

- Debt increases firm value by reducing the tax burden
- Now the pie is divided like



- Size of the pie = value of before-tax cash flows
- Government gets a slice too
- Because interest payments are tax deductible, the PV of the government 'slice' can be reduced by using debt rather than equity

#### Debt Tax Shields: Value Implications

- With corporate taxes (but no other imperfections), the value of a levered firm equals:



This suggests that having enough debt financing is optimal so as to reduce the tax bill (realistic?)
Imputation tax neutralises tax benefit of debt (e.g., the PV of tax-shields, $t_e D$, is zero in pure imputation system), implying lower leverage

$$V_L = V_U + PV(interest\ tax\ shields)$$

- If the firm is a going concern and debt is a perpetuity,
  - Annual interest payment: $k_d D$
  - Tax shield on interest payment: $t_e \times k_d D$
  - PV of interest tax shields: PV of a perpetuity $= \frac{t_e * k_d D}{k_d} = t_e D$
- Leverage and firm value: $V_L = V_U + t_e D$

#### Expected Costs of Financial Distress

- If taxes were the only issue, companies would be 100% debt financed
- Common sense suggests otherwise
  - If the debt burden is too high, company will have trouble
  - The result: "financial distress" → bankruptcy (court supervision) in some cases



- Now the pie is divided like

#### Probability of Financial Distress

- Expected costs of financial distress = (Probability of distress) * (Costs if actually in distress)
- Probability of distress
  - "Cash flow volatility" or business risk
    - Is the industry risky? Is the firm's strategy risky?
    - Are there uncertainties induced by competition?
    - Is there a risk of technological change?
    - Sensitive to macroeconomic shocks or seasonal fluctuations?
  - As debt increases, probability of financial distress also increases

#### Costs of Financial Distress

- Direct costs (tend to be small)
  - Legal expenses, court costs, advisory fees…
- Indirect costs (tend to be larger, but hard to measure)
  - Opportunity costs (e.g. management distraction and effort)
  - Scare off customers and suppliers (damage to reputation)
  - Debt overhang (underinvestment, passing up +NPV projects)
  - Excessive risk-taking behaviour (asset substitution, gambling for salvation)

If the company is in financial distre
expenditures, sell assets, etc. but
the company as earnings will also
company from its state of financia
regular functions which will result
earnings suffer accordingly.

The company's inability to focus o
ability to retain its consumers and

Agency Costs of Debt - debt overh
(poor investment decisions)

## Agency Costs of Debt

- In the MM world, investment policy is fixed
- In reality this is not true and potentially "agency costs of debt" arise
  1) Debt overhang (underinvestment) problem
  2) Excessive risk-taking (asset substitution) problem
- Recall TAPPS in lecture 2, firm with debt outstanding of $400 is considering two potential

|  | Good (50% chance) | Bad (50% chance) |
|---|---|---|
| Project A | $400 | $400 |
| Project B | $600 | $200 |

  projects

- **Debt Overhang (underinvestment)**
  - When a firm is in financial distress, shareholders may prefer to pay out cash to shareholders than fund projects (even positive NPV projects) because most of the benefits would go to the firm's existing creditors
- **Excessive Risk-Taking (asset substitution)**
  - Shareholders have unlimited upside potential but bounded losses
  - When a firm faces financial distress, shareholders are tempted to gain by gambling (negative NPV projects) at the expense of debt holders

## Expected Costs of Distress

- Expected costs of financial distress increase sharply with leverage (both probability and actual costs increase)
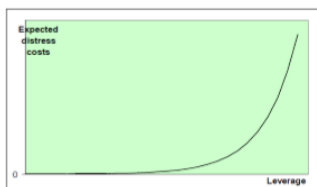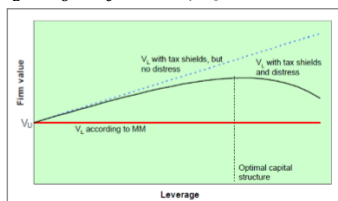


- Shareholders bear expected distress costs in form of more expensive debt (higher interest rates, more covenants)
- Companies with high expected distress costs should be more conservative in using debt

## Trade-off Theory: Optimal Leverage

- The value of a levered firm is now
$$V_L = V_U + t_e D - PV(exp.\,distress\,costs)$$



- The optimal capital structure maximises firm value

## Firm and Industry Characteristics

- Young, R&D intensive firms have low leverage because:
  - Risky cash flows – high probability of financial distress
  - High human capital – large loss in case of financial distress
  - Easy to increase risk of business strategy – danger of asset substitution problem
  - Many positive NPV investment opportunities – debt overhang problem
- Low-growth, mature, capital intensive firms have high leverage because:
  - Stable cash flows – low probability of financial distress
  - Tangible assets – lower costs of financial distress
  - Few investment opportunities – debt overhang problem is unlikely

## Trade-off Theory: Implications

- Firms should:
  - Issue equity when leverage rises above the target level
  - Buy back stock when leverage falls below the target capital structure
- Stock market should:
  - React positively (or neutrally) to announcements of securities issues
- *What really happens?*

## 5. Capital Structure Theory II: Pecking Order Perspective

### What Really Happens?

- Stock prices drop (on average) at the announcements of equity issues
- Companies are reluctant to issue equity
- They follow a pecking order in which they finance investments:
  - First with internally generated funds
  - Then with debt
  - Then with hybrids and finally with equity
- Willingness to issue equity fluctuates over time
- So, something is missing from the target-leverage view

### How to Incorporate These Concerns?

- So far, we assumed
  - No distinction between existing and new shareholders
  - No conflicts between managers and shareholders
  - No costs of financial transactions
- Departing from that can explain a pecking order preference

1) Asymmetric information: managers have more information than outside investors (Myers and Majluf, 1984)
2) Agency costs of equity (free cash flow problem): managers may not act in interest of shareholders (Jensen, 1986)
3) Different flotation costs: issuing equity is more expensive than issuing debt (direct underwriting fees and legal/registration fees)

## Agency Costs of Equity

- Free Cash Flow (FCF) (Jensen, 1986)
    - Cash flow in excess of that needed to fund all positive NPV projects
- Managers may be reluctant to pay out FCF to shareholders
    - Empire building through unprofitable acquisitions
    - Pet projects, prestige investments, perks
- This problem is more severe for "cash cows"
    - Firms with lots of cash (i.e. profitable firms)
    - And few good investment opportunities
- Can leverage reduce FCF problem?
- Debt = commitment to distribute cash flows in the future
- Thus, debt reduces FCF available to managers
    - Less opportunities for managers to waste cash
- This FCF theory also explains negative stock price responses to equity issues and why cash cow firms tend to have a higher leverage

## Pecking Order and Capital Structure

- If Pecking Order holds, company's leverage ratio reflects:
    - Not an attempt to approach a target ratio:
    - But its cumulative requirements for external finance
        - High cash flow → no need to raise debt and can repay debt → leverage ratio DECREASES
        - Low cash flow → need to raise capital (but issuing debt rather than equity) → leverage ratio INCREASES

## 6. An Integrative Approach

### What should we do with these theories?

- Each theory makes a statement about what is first order issue:
    - TO: Tax shield and distress costs
    - PO: Information (market response), managerial agency costs, issuing costs
- These theories need not be incompatible
    - Use each when you think they emphasize the rights issues
    - When getting far away from target, TO type issues dominate
    - When reasonably close to target, PO type issues dominate

### Capital Structure Checklist

**Taxes**
Does the company benefit from debt tax shield?

**Expected Distress Costs**
What is the probability of distress? (cash flow volatility; business risk)
What are the costs of distress?
Competitive threat if pinched for cash, customers care about distress, assets difficult to redeploy? Agency costs of debt

**Information Problems**
Do outside investors understand the funding needs of the firm?
Would an equity issue be perceived as bad news by the market
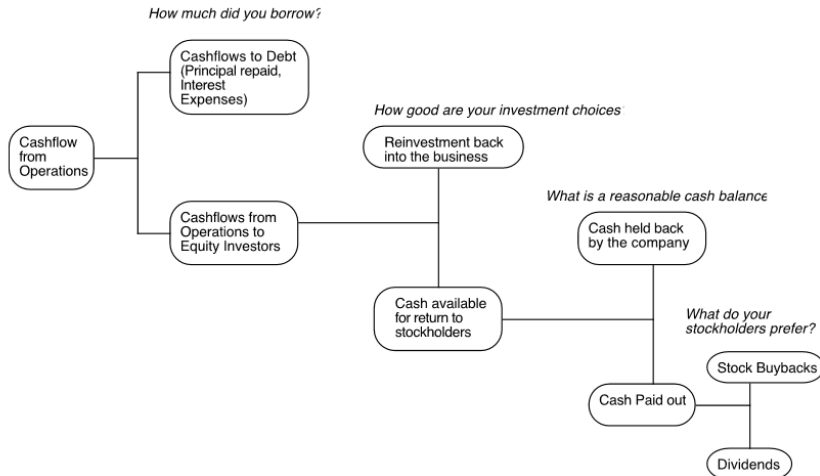
**Managerial Agency Problems**
Does the firm have a free cash flow problem?

**Issuing Costs**

### An Integrative Approach

- Establish long run "target" capital structure
- Evaluate the true economic costs of issuing equity rather than debt
    - Real cost of price hit and issuance costs vs. foregone investment or increase in exp. cost of distress
- If still reluctant to issue equity:
    - Are there ways to reduce the cost? (e.g. give more information)
    - Will the cost be lower if you issue later?
    - Can you use hybrids?

# 4 Payout Policy

*How much did you borrow?*

Cashflow from Operations → Cashflows to Debt (Principal repaid, Interest Expenses)

Cashflow from Operations → Cashflows from Operations to Equity Investors

*How good are your investment choices*

Reinvestment back into the business

*What is a reasonable cash balance*

Cash available for return to stockholders → Cash held back by the company

Cash available for return to stockholders → Cash Paid out

*What do your stockholders prefer?*

Cash Paid out → Stock Buybacks

Cash Paid out → Dividends

## 1. Dividends

### Basics of Dividends

- Usually means a cash dividend (sometimes, stock dividend)
- Level of dividends is not fixed and can be changed by the firm at any time
- Dividend restrictions may exist to protect creditors
- Companies distinguish between
  - Regular dividends: expected to be maintained in the future
  - Special dividends: unlikely to be repeated
- Measures of dividends
  - Dividend per share (DPS): dividend dollar amount per share
  - Dividend yield: DPS divided by share price
  - Dividend payout ratio: DPS divided by EPS
    - DPR >1005? Paying more dividends than earnings generated – maybe these firms are experiencing a bad period, but they believe that the conditions will improve and that the firm will eventually improve its performance. Furthermore, they believe the market will react aversely if they change their dividend payout - as such even if they are going through a rough patch, they will retain the dividend payout amount, and consequently the DPR may be >100%.

### Dividends in Australia

- Typically paid semi-annually (interim and final)
- Dividend announcements coincide with profit announcements
- The new dividend payment rules in 2010 replaced the traditional "profits test" with "solvency test"
  - Being able to pay dividends even if the firm is making negative returns
- Mostly paid in cash
- Franked dividends carry credits for tax paid by the company

### Dividends Payment Process

- **Announcement Date:** The firm announces its next dividend, as well as its record and payment dates
- **Cum-Dividend Date:** Last day when shares are traded with the right to receive the dividend
- **Ex-Dividend Date:** First day when shares are traded without the right to receive the dividend (day after the cum-dividend date)
- **Record Date (Books Close Date):** Shareholders are recorded to receive the dividend
- **Payment Date:** Dividend checks mailed out

### Dividend Drop-Off Ratio

- Cum-dividend and ex-dividend share prices

P cum-div → Drop-Off → P ex-div
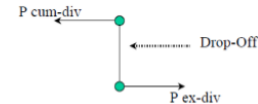
- Drop-Off Ratio $= \frac{P_{CUM} - P_{EX}}{\text{Dividend}}$
- In perfect capital markets, drop off ratio is equal to one
- Actual price might be closer to some measure of the after-tax value of the dividend for the average investor
- $t_d$ : personal tax rates on dividends
  $t_{cg}$: personal tax rates on capital gains
  P: price of the stock you bought a while back
  - Cash flows from selling before ex-dividend date are: lower payout if you accept dividend + sell
    $P_{CUM} - (P_{CUM} - P)t_{cg}$
  - Cash flows from selling after ex-dividend date are: higher payout if you decline dividend + sell
    $P_{EX} - (P_{EX} - P)t_{cg} + Div.(1 - t_d)$
  - For this market to be stable, average investor should be indifferent between selling before and after the ex-dividend date, so we have:
    $$\frac{P_{CUM} - P_{EX}}{Div} = \frac{1 - t_d}{1 - t_{cg}}$$