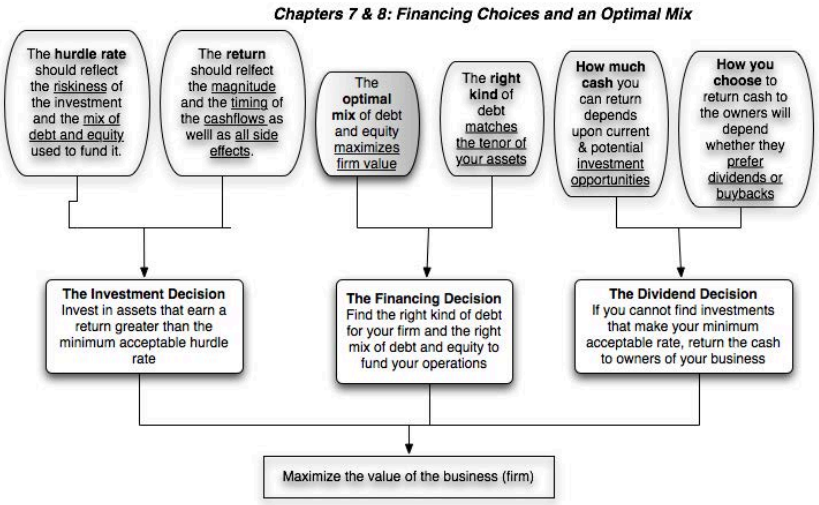
Corporate Finance
Lecture Note Packet 2
Capital Structure, Dividend Policy and Valuation

B40.2302
Aswath Damodaran

Capital Structure: The Choices and the Trade off

"Neither a borrower nor a lender be"
Someone who obviously hated this part of corporate finance

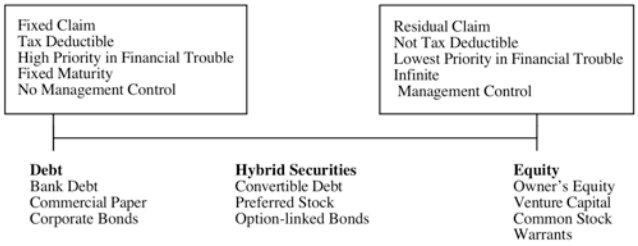
First Principles



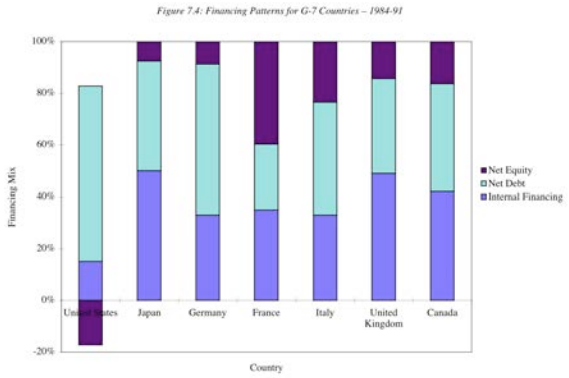
The Choices in Financing

- There are only two ways in which a business can make money.
  - The first is debt. The essence of debt is that you promise to make fixed payments in the future (interest payments and repaying principal). If you fail to make those payments, you lose control of your business.
  - The other is equity. With equity, you do get whatever cash flows are left over after you have made debt payments.

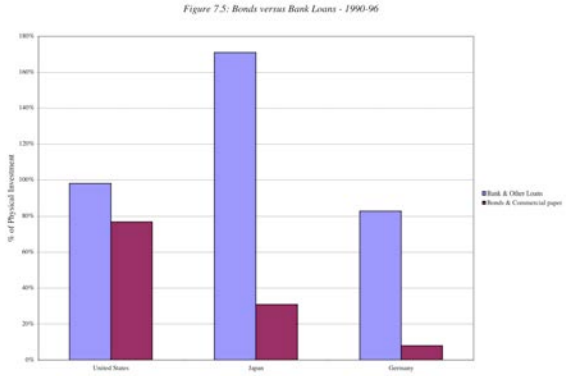
Figure 7.1: Debt versus Equity



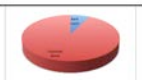
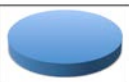
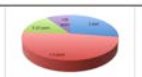
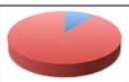
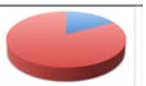
Global Patterns in Financing…



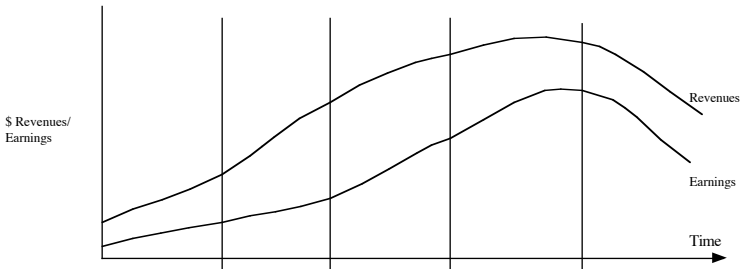
And a much greater dependence on bank loans outside the US…



Assessing the existing financing choices: Disney, Aracruz and Tata Chemicals

	Disney	*Aracruz*	*Tata Chemicals*
Debt due	*$13.27 billion*	*R$ 24.20 billion*	*Rs 42.22 billion*
Loans vs Bonds			
Maturity			
Leases	Has operating leases with a debt value of $1.46 billion (see chapter 4)	No stated lease commitments	Small lease commitments.
Fixed vs Floating	76% Fixed Rate 24% Floating Rate	100% Fixed Rate	100% Fixed Rate
Currency	90% US dollar 10% Japanese Yen	100% R$	97% Rupees 3% US dollar
Other	43% of bonds are callable 10% of bonds are putable	Small portion of debt is convertible Bank debt is term loans	Bank debt is term loans

Financing Choices across the life cycle



External funding needs	High, but constrained by infrastructure	High, relative to firm value.	Moderate, relative to firm value.	Declining, as a percent of firm value	Low, as projects dry up.
Internal financing	Negative or low	Negative or low	Low, relative to funding needs	High, relative to funding needs	More than funding needs
External Financing	Owner's Equity Bank Debt	Venture Capital Common Stock	Common stock Warrants Convertibles	Debt	Retire debt Repurchase stock
Growth stage	Stage 1 Start-up	Stage 2 Rapid Expansion	Stage 3 High Growth	Stage 4 Mature Growth	Stage 5 Decline
Financing Transitions	Accessing private equity	Inital Public offering	Seasoned equity issue	Bond issues	

The Transitional Phases..

- The transitions that we see at firms – from fully owned private businesses to venture capital, from private to public and subsequent seasoned offerings are all motivated primarily by the need for capital.
- In each transition, though, there are costs incurred by the existing owners:
  - When venture capitalists enter the firm, they will demand their fair share and more of the ownership of the firm to provide equity.
  - When a firm decides to go public, it has to trade off the greater access to capital markets against the increased disclosure requirements (that emanate from being publicly lists), loss of control and the transactions costs of going public.
  - When making seasoned offerings, firms have to consider issuance costs while managing their relations with equity research analysts and rat

Measuring a firm's financing mix …

- The simplest measure of how much debt and equity a firm is using currently is to look at the proportion of debt in the total financing. This ratio is called the debt to capital ratio:

  Debt to Capital Ratio = Debt / (Debt + Equity)
- Debt includes all interest bearing liabilities, short term as well as long term.
- Equity can be defined either in accounting terms (as book value of equity) or in market value terms (based upon the current price). The resulting debt ratios can be very different.

The Financing Mix Question

In deciding to raise financing for a business, is there an optimal mix of debt and equity?

- If yes, what is the trade off that lets us determine this optimal mix?
  - What are the benefits of using debt instead of equity?
  - What are the costs of using debt instead of equity?
- If not, why not?

Costs and Benefits of Debt

- Benefits of Debt
  - Tax Benefits
  - Adds discipline to management
- Costs of Debt
  - Bankruptcy Costs
  - Agency Costs
  - Loss of Future Flexibility

Tax Benefits of Debt

- When you borrow money, you are allowed to deduct interest expenses from your income to arrive at taxable income. This reduces your taxes. When you use equity, you are not allowed to deduct payments to equity (such as dividends) to arrive at taxable income.
- The dollar tax benefit from the interest payment in any year is a function of your tax rate and the interest payment:
  - Tax benefit each year = Tax Rate * Interest Payment
- Proposition 1: Other things being equal, the higher the marginal tax rate of a business, the more debt it will have in its capital structure.

The Effects of Taxes

You are comparing the debt ratios of real estate corporations, which pay the corporate tax rate, and real estate investment trusts, which are not taxed, but are required to pay 95% of their earnings as dividends to their stockholders. Which of these two groups would you expect to have the higher debt ratios?

- The real estate corporations
- The real estate investment trusts
- Cannot tell, without more information

Debt adds discipline to management

- If you are managers of a firm with no debt, and you generate high income and cash flows each year, you tend to become complacent. The complacency can lead to inefficiency and investing in poor projects. There is little or no cost borne by the managers
- Forcing such a firm to borrow money can be an antidote to the complacency. The managers now have to ensure that the investments they make will earn at least enough return to cover the interest expenses. The cost of not doing so is bankruptcy and the loss of such a job.

Debt and Discipline

Assume that you buy into this argument that debt adds discipline to management. Which of the following types of companies will most benefit from debt adding this discipline?

- Conservatively financed (very little debt), privately owned businesses
- Conservatively financed, publicly traded companies, with stocks held by millions of investors, none of whom hold a large percent of the stock.
- Conservatively financed, publicly traded companies, with an activist and primarily institutional holding.

Bankruptcy Cost

- The expected bankruptcy cost is a function of two variables--
  - the probability of bankruptcy, which will depend upon how uncertain you are about future cash flows
  - the cost of going bankrupt
    - direct costs: Legal and other Deadweight Costs
    - indirect costs: Costs arising because people perceive you to be in financial trouble

Proposition 2: Firms with more volatile earnings and cash flows will have higher probabilities of bankruptcy at any given level of debt and for any given level of earnings.

Proposition 3: Other things being equal, the greater the indirect bankruptcy cost, the less debt the firm can afford to use for any given level of debt.

Debt & Bankruptcy Cost

Rank the following companies on the magnitude of bankruptcy costs from most to least, taking into account both explicit and implicit costs:

- A Grocery Store
- An Airplane Manufacturer
- High Technology company

Agency Cost

- An agency cost arises whenever you hire someone else to do something for you. It arises because your interests(as the principal) may deviate from those of the person you hired (as the agent).
- When you lend money to a business, you are allowing the stockholders to use that money in the course of running that business. Stockholders interests are different from your interests, because
  - You (as lender) are interested in getting your money back
  - Stockholders are interested in maximizing their wealth
- In some cases, the clash of interests can lead to stockholders
  - Investing in riskier projects than you would want them to
  - Paying themselves large dividends when you would rather have them keep the cash in the business.
- Proposition 4: Other things being equal, the greater the agency problems associated with lending to a firm, the less debt the firm can afford to use.

Debt and Agency Costs

Assume that you are a bank. Which of the following businesses would you perceive the greatest agency costs?

- A Large technology firm
- A Large Regulated Electric Utility

Why?

Loss of future financing flexibility

- When a firm borrows up to its capacity, it loses the flexibility of financing future projects with debt.
- Proposition 5: Other things remaining equal, the more uncertain a firm is about its future financing requirements and projects, the less debt the firm will use for financing current projects.

What managers consider important in deciding on how much debt to carry...

- A survey of Chief Financial Officers of large U.S. companies provided the following ranking (from most important to least important) for the factors that they considered important in the financing decisions

Factor	Ranking (0-5)
1. Maintain financial flexibility	4.55
2. Ensure long-term survival	4.55
3. Maintain Predictable Source of Funds	4.05
4. Maximize Stock Price	3.99
5. Maintain financial independence	3.88
6. Maintain high debt rating	3.56
7. Maintain comparability with peer group	2.47

Debt: Summarizing the trade off

Advantages of Debt	*Disadvantages of debt*
1. Tax Benefit: Interest expenses on debt are tax deductible but cash flows to equity are generally not. *Implication: The higher the marginal tax rate, the greater the benefits of debt.*	**1. Expected Bankruptcy Cost**: The expected cost of going bankrupt is a product of the probability of going bankrupt and the cost of going bankrupt. The latter includes both direct and indirect costs. The probability of going bankrupt will be higher in businesses with more volatile earnings and the cost of bankruptcy will also vary across businesses. *Implication:* *1. Firms with more stable earnings should borrow more, for any given level of earnings.* *2. Firms with lower bankruptcy costs should borrow more, for any given level of earnings.*
2. Added Discipline: Borrowing money may force managers to think about the consequences of the investment decisions a little more carefully and reduce bad investments. *Implication: As the separation between managers and stockholders increases, the benefits to using debt will go up.*	**2. Agency Costs**: Actions that benefit equity investors may hurt lenders. The greater the potential for this conflict of interest, the greater the cost borne by the borrower (as higher interest rates or more covenants). *Implication: Firms where lenders can monitor/ control how their money is being used should be able to borrow more than firms where this is difficult to do.*
	3. Loss of flexibility: Using up available debt capacity today will mean that you cannot draw on it in the future. This loss of flexibility can be disastrous if funds are needed and access to capital is shut off. *Implication:* *1. Firms that can forecast future funding needs better should be able to borrow more.* *2. Firms with better access to capital markets should be more willing to borrow more today.*

The Trade off for three companies..

Item	*Disney*	*Aracruz*	*Tata Chemicals*
Tax benefits	Significant. The firm has a marginal tax rate of 38%. It does have large depreciation tax shields.	Significant. The firm has a marginal tax rate of 34%, as well. It does not have very much in noninterest tax shields.	Significant. The firm has a 33.99% tax rates It does have significant non-interest tax shields in the form of depreciation.
Added discipline	Benefits will be high, because managers are not large stockholders.	Benefits are smaller, because the voting shares are closely held by insiders.	Since the Tata family runs the firm, the benefits from added discipline are small.
Bankruptcy costs	Movie and broadcasting businesses have volatile earnings. Direct costs of bankruptcy are likely to be small, but indirect costs can be significant.	Variability in paper prices makes earnings volatile. Direct and indirect costs of bankruptcy likely to be moderate, since assets are marketable (timber, paper plants)	Firm is mature, with fairly stable earnings and cash flows from its chemicals and fertilizer business. Indirect bankruptcy costs should be low, since physical assets are marketable.
Agency costs	High. Although theme park assets are tangible and fairly liquid, is much more difficult to monitor movie and broadcasting businesses.	Low. Assets are tangible and liquid.	Biggest concern is that debt may be utilized in other (riskier) Tata companies.
Flexibility needs	Low in theme park business but high in media businesses because technological change makes future investment uncertain.	Low. Business is mature and investment needs are well established.	Low. Tata Chemicals is a mature company with established reinvestment needs.

⌛Application Test: Would you expect your firm to gain or lose from using a lot of debt?

- Considering, for your firm,
  - The potential tax benefits of borrowing
  - The benefits of using debt as a disciplinary mechanism
  - The potential for expected bankruptcy costs
  - The potential for agency costs
  - The need for financial flexibility
- Would you expect your firm to have a high debt ratio or a low debt ratio?
- Does the firm's current debt ratio meet your expectations?

A Hypothetical Scenario

(a) There are no taxes

(b) Managers have stockholder interests at heart and do what's best for stockholders.

(c) No firm ever goes bankrupt

(d) Equity investors are honest with lenders; there is no subterfuge or attempt to find loopholes in loan agreements.

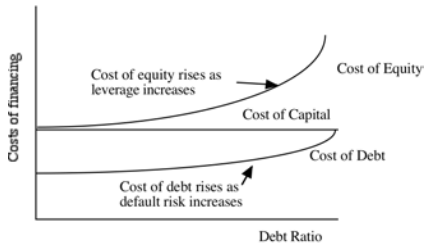
(e) Firms know their future financing needs with certainty

What happens to the trade off between debt and equity? How much should a firm borrow?

The Miller-Modigliani Theorem

- In an environment, where there are no taxes, default risk or agency costs, capital structure is irrelevant.
- If the Miller Modigliani theorem holds:
  - A firm's value will be determined the quality of its investments and not by its financing mix.
  - The cost of capital of the firm will not change with leverage. As a firm increases its leverage, the cost of equity will increase just enough to offset any gains to the leverage.

Figure 7.9: Cost of Capital in the MM World



What do firms look at in financing?

- Is there a financing hierarchy?

  There are some who argue that firms follow a financing hierarchy, with retained earnings being the most preferred choice for financing, followed by debt and that new equity is the least preferred choice.

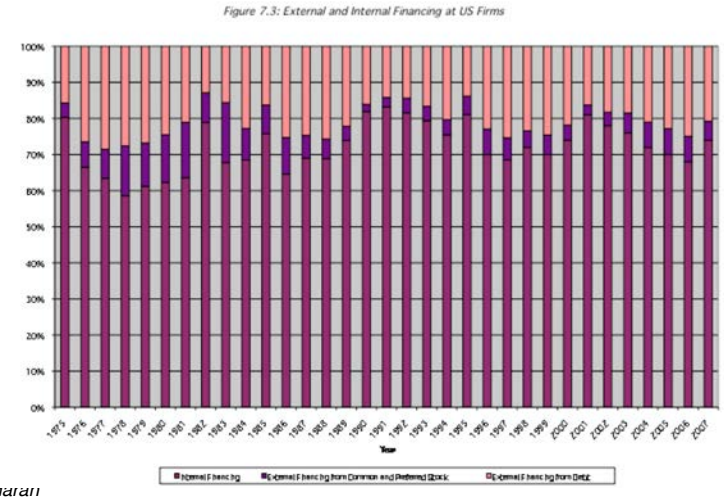
  In particular,
  - Managers value flexibility. Managers value being able to use capital (on new investments or assets) without restrictions on that use or having to explain its use to others.
  - Managers value control. Managers like being able to maintain control of their businesses.

  With flexibility and control being key factors:
  - Would you rather use internal financing (retained earnings) or external financing?
  - With external financing, would you rather use debt or equity?

Preference rankings long-term finance: Results of a survey

Ranking	Source	Score
1	Retained Earnings	5.61
2	Straight Debt	4.88
3	Convertible Debt	3.02
4	External Common Equity	2.42
5	Straight Preferred Stock	2.22
6	Convertible Preferred	1.72

And the unsurprising consequences..



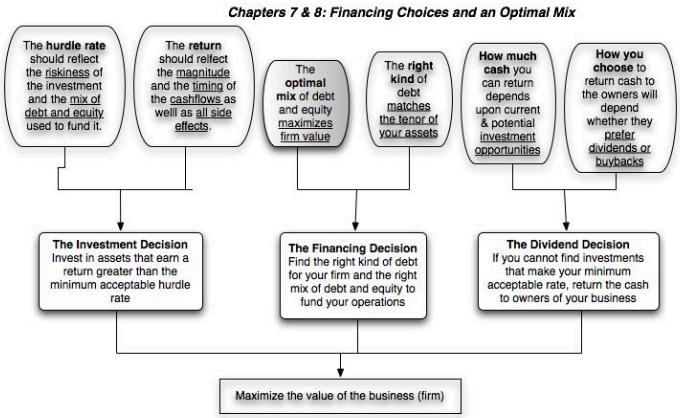
Financing Choices

You are reading the Wall Street Journal and notice a tombstone ad for a company, offering to sell convertible preferred stock. What would you hypothesize about the health of the company issuing these securities?

- Nothing
- Healthier than the average firm
- In much more financial trouble than the average firm

Capital Structure: Finding the Right Financing Mix

The Big Picture..



Pathways to the Optimal

- The Cost of Capital Approach: The optimal debt ratio is the one that minimizes the cost of capital for a firm.
- The Enhanced Cost of Capital approach: The optimal debt ratio is the one that generates the best combination of (low) cost of capital and (high) operating income.
- The Adjusted Present Value Approach: The optimal debt ratio is the one that maximizes the overall value of the firm.
- The Sector Approach: The optimal debt ratio is the one that brings the firm closes to its peer group in terms of financing mix.
- The Life Cycle Approach: The optimal debt ratio is the one that best suits where the firm is in its life cycle.

I. The Cost of Capital Approach

- Value of a Firm = Present Value of Cash Flows to the Firm, discounted back at the cost of capital.
- If the cash flows to the firm are held constant, and the cost of capital is minimized, the value of the firm will be maximized.

Measuring Cost of Capital

- Recapping our discussion of cost of capital:
- The cost of debt is the market interest rate that the firm has to pay on its long term borrowing today, net of tax benefits. It will be a function of:
  (a) The long-term riskfree rte
  (b) The default spread for the company, reflecting its credit risk
  (c) The firm's marginal tax rate
- The cost of equity reflects the expected return demanded by marginal equity investors. If they are diversified, only the portion of the equity risk that cannot be diversified away (beta or betas) will be priced into the cost of equity.
- The cost of capital is the cost of each component weighted by its relative market value.

Cost of capital = Cost of equity (E/(D+E)) + After-tax cost of debt (D/(D+E))

Costs of Debt & Equity

A recent article in an Asian business magazine argued that equity was cheaper than debt, because dividend yields are much lower than interest rates on debt. Do you agree with this statement?

- Yes
- No

Can equity ever be cheaper than debt?

- Yes
- No

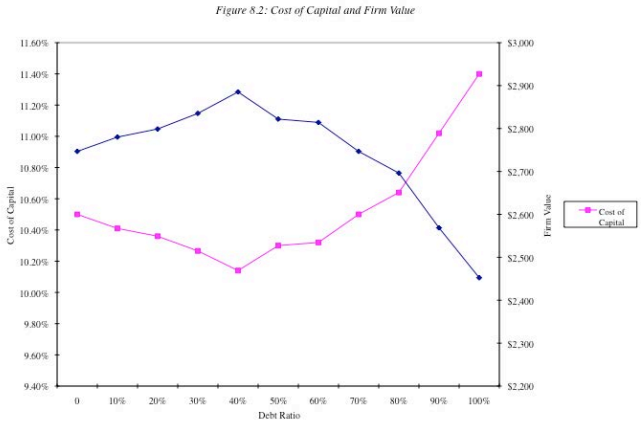
Applying Cost of Capital Approach: The Textbook Example

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

Assume the firm has $200 million in cash flows, expected to grow 3% a year forever.

$$\text{Value} = \frac{\text{Expected Cash flow to firm next year}}{(\text{Cost of capital} - g)} = \frac{200(1.03)}{(\text{Cost of capital} - g)}$$

The U-shaped Cost of Capital Graph…



Current Cost of Capital: Disney

- The beta for Disney's stock in May 2009 was 0.9011. The T. bond rate at that time was 3.5%. Using an estimated equity risk premium of 6%, we estimated the cost of equity for Disney to be 8.91%:
  Cost of Equity = 3.5% + 0.9011(6%) = 8.91%
- Disney's bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 6%. Using a marginal tax rate of 38%, the after-tax cost of debt for Disney is 3.72%.
  After-Tax Cost of Debt = 6.00% (1 – 0.38) = 3.72%
- The cost of capital was calculated using these costs and the weights based on market values of equity (45,193) and debt (16,682):
  Cost of capital = $8.91\% \frac{45,193}{(16,682+45,193)} + 3.72\% \frac{16,682}{(16,682+45,193)} = 7.51\%$

Mechanics of Cost of Capital Estimation

1. Estimate the Cost of Equity at different levels of debt:
   - Equity will become riskier -> Beta will increase -> Cost of Equity will increase.
   - Estimation will use levered beta calculation
2. Estimate the Cost of Debt at different levels of debt:
   - Default risk will go up and bond ratings will go down as debt goes up -> Cost of Debt will increase.
   - To estimating bond ratings, we will use the interest coverage ratio (EBIT/ Interest expense)
3. Estimate the Cost of Capital at different levels of debt
4. Calculate the effect on Firm Value and Stock Price.

Laying the groundwork: 1. Estimate the unlevered beta for the firm

- To get to the unlevered beta, we can start with the levered beta (0.9011) and work back to an unlevered beta:

  Unlevered beta = $\frac{\text{Levered Beta}}{\left(1 + (1 - t)\frac{\text{Debt}}{\text{Equity}}\right)} = \frac{0.9011}{\left(1 + (1 - .38)\frac{16,682}{45,193}\right)} = 0.7333$

- Alternatively, we can back to the source and estimate it from the betas of the businesses.

Business	Revenues in 2008	EV/Sales	Estimated Value	Firm Value Proportion	Unlevered beta
Media Networks	$16,116	2.13	$34,327.78	58.92%	0.7056
Parks and Resorts	$11,504	1.51	$17,408.14	29.88%	0.5849
Studio Entertainment	$7,348	0.78	$5,754.86	9.88%	1.3027
Consumer Products	$2,875	0.27	$768.20	1.32%	1.0690
Disney	$37,843		$58,258.99	100.00%	0.7333

2. Get Disney's current financials…

	Last fiscal year	Trailing 12 months
Revenues	$37,843	$36,990
EBITDA	$8,986	$8,319
Depreciation & Amortization	$1,582	$1,593
EBIT	$7,404	$6,726
Interest Expenses	$712	$728
EBITDA (adjusted for leases)	$9,989	$8,422
EBIT(adjusted for leases)	$7,708	$6,829
Interest Expenses (adjusted for leases)	$815	$831

I. Cost of Equity

Debt to Capital Ratio	D/E Ratio	Levered Beta	Cost of Equity
0%	0.00%	0.7333	7.90%
10%	11.11%	0.7838	8.20%
20%	25.00%	0.8470	8.58%
30%	42.86%	0.9281	9.07%
40%	66.67%	1.0364	9.72%
50%	100.00%	1.1879	10.63%
60%	150.00%	1.4153	11.99%
70%	233.33%	1.7941	14.26%
80%	400.00%	2.5519	18.81%
90%	900.00%	4.8251	32.45%

Levered Beta = 0.7333 (1 + (1-.38) (D/E))
Cost of equity = 3.5% + Levered Beta * 6%

Estimating Cost of Debt

Start with the current market value of the firm = 45,193 + $16,682 = $61,875 million

D/(D+E)	0.00%	10.00%	Debt to capital
D/E	0.00%	11.11%	D/E = 10/90 = .1111
$ Debt	$0	$6,188	10% of $61,875
EBITDA	$8,422	$8,422	Same as 0% debt
Depreciation	$1,593	$1,593	Same as 0% debt
EBIT	$6,829	$6,829	Same as 0% debt
Interest	$0	$294	Pre-tax cost of debt * $ Debt
Pre-tax Int. cov	∞	23.24	EBIT/ Interest Expenses
Likely Rating	AAA	AAA	From Ratings table
Pre-tax cost of debt	4.75%	4.75%	Riskless Rate + Spread

The Ratings Table

Interest Coverage Ratio	Rating	Typical Default Spread	Pre-tax cost of debt
>8.5	AAA	1.25%	4.75%
6.5-8.5	AA	1.75%	5.25%
5.5-6.5	A+	2.25%	5.75%
4.25- 5.5	A	2.50%	6.00%
3- 4.25	A–	3.00%	6.50%
2.5-3.0	BBB	3.50%	7.00%
2.25-2.5	BB+	4.25%	7.75%
2.0-2.25	BB	5.00%	8.50%
1.75-2.0	B+	6.00%	9.50%
1.5-1.75	B	7.25%	10.75%
1.25-1.5	B–	8.50%	12.00%
0.8-1.25	CCC	10.00%	13.50%
0.65-0.8	CC	12.00%	15.50%
0.2-0.65	C	15.00%	18.50%
<0.2	D	20.00%	23.50%

T.Bond rate in early 2009 = 3.5%

A Test: Can you do the 30% level?

D/(D + E)	10.00%	20.00%	30%	
D/E	11.11%	25.00%		
$ Debt	$6,188	$12,375		
EBITDA	$8,422	$8,422		
Depreciation	$1,593	$1,593		
EBIT	$6,829	$6,829		
Interest	$294	$588		
Pretax int. cov	23.24	11.62		
Likely rating	AAA	AAA		
Pretax cost of debt	4.75%	4.75%		

Bond Ratings, Cost of Debt and Debt Ratios

Debt Ratio	$ Debt	Interest Expense	Interest coverage ratio	Bond Rating	Interest rate on debt	Tax Rate	After-tax cost of debt
0%	$0	$0	∞	AAA	4.75%	38.00%	2.95%
10%	$6,188	$294	23.24	AAA	4.75%	38.00%	2.95%
20%	$12,375	$588	11.62	AAA	4.75%	38.00%	2.95%
30%	$18,563	$975	7.01	AA	5.25%	38.00%	3.26%
40%	$24,750	$1,485	4.60	A	6.00%	38.00%	3.72%
50%	$30,938	$2,011	3.40	A-	6.50%	38.00%	4.03%
60%	$37,125	$2,599	2.63	BBB	7.00%	38.00%	4.34%
70%	$43,313	$5,198	1.31	B-	12.00%	38.00%	7.44%
80%	$49,500	$6,683	1.02	CCC	13.50%	38.00%	8.37%
90%	$55,688	$7,518	0.91	CCC	13.50%	34.52%	8.84%

Marginal tax rates and Taxable Income…

- You need taxable income for interest to provide a tax savings. Note that the EBIT at Disney is $6,829 million. As long as interest expenses are less than $6,829 million, interest expenses remain fully tax-deductible and earn the 38% tax benefit. At an 80% debt ratio, the interest expenses are $6,683 million and the tax benefit is therefore 38% of this amount.
- At a 90% debt ratio, however, the interest expenses balloon to $7,518 million, which is greater than the EBIT of $6,829 million. We consider the tax benefit on the interest expenses up to this amount:

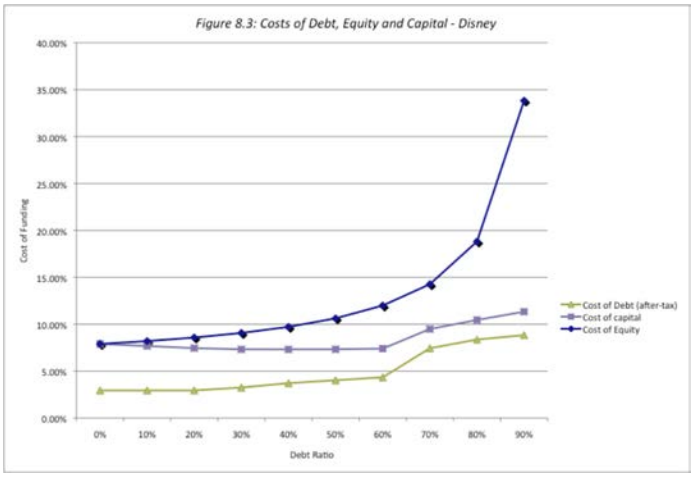
  Maximum Tax Benefit = EBIT * Marginal Tax Rate = $6,829 million * 0.38 = $2,595 million

  Adjusted Marginal Tax Rate = Maximum Tax Benefit/Interest Expenses = $2,595/$7,518 = 34.52%

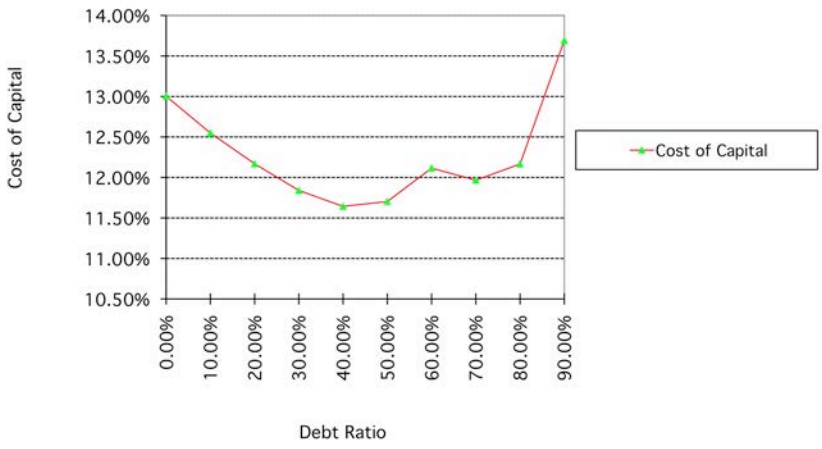
Disney's cost of capital schedule…

Debt Ratio	Beta	Cost of Equity	Cost of Debt (after-tax)	Cost of capital
0%	0.73	7.90%	2.95%	7.90%
10%	0.78	8.20%	2.95%	7.68%
20%	0.85	8.58%	2.95%	7.45%
30%	0.93	9.07%	3.26%	7.32%
40%	1.04	9.72%	3.72%	7.32%
50%	1.19	10.63%	4.03%	7.33%
60%	1.42	11.99%	4.34%	7.40%
70%	1.79	14.26%	7.44%	9.49%
80%	2.55	18.81%	8.37%	10.46%
90%	5.05	33.83%	8.84%	11.34%

Disney: Cost of Capital Chart



Disney: Cost of Capital Chart: 1997



The cost of capital approach suggests that Disney should do the following…

- Disney currently has $16.68 billion in debt. The optimal dollar debt (at 40%) is roughly $24.75 billion. Disney has excess debt capacity of $ 8.07 billion.
- To move to its optimal and gain the increase in value, Disney should borrow $ 8 billion and buy back stock.
- Given the magnitude of this decision, you should expect to answer three questions:
  - Why should we do it?
  - What if something goes wrong?
  - What if we don't want (or cannot) buy back stock and want to make investments with the additional debt capacity?

1. Why should we do it? Effect on Firm Value – Full Valuation Approach

- Step 1: Estimate the cash flows to Disney as a firm

EBIT (1 – Tax Rate) = 6829 (1 – 0.38) =	$4,234
+ Depreciation and amortization =	$1,593
– Capital expenditures =	$1,628
– Change in noncash working capital	$0
Free cash flow to the firm =	$4,199

- Step 2: Back out the implied growth rate in the current market value

$$\text{Value of firm} = \$\,61{,}875 = \frac{FCFF_0(1+g)}{(\text{Cost of Capital} - g)} = \frac{4{,}199(1+g)}{(.0751 - g)}$$

Growth rate = (Firm Value * Cost of Capital – CF to Firm)/(Firm Value + CF to Firm)
= (61,875* 0.0751 – 4199)/(61,875 + 4,199) = 0.0068 or 0.68%

- Step 3: Revalue the firm with the new cost of capital

$$\text{Firm value} = \frac{FCFF_0(1+g)}{(\text{Cost of Capital} - g)} = \frac{4{,}199(1.0068)}{(.0732 - 0.0068)} = \$63{,}665 \text{ million}$$

The firm value increases by $1,790 million (63,665 – 61,875 = 1,790)

An Alternate Approach
Effect on Value: Capital Structure Isolation…

- In this approach, we start with the current market value and isolate the effect of changing the capital structure on the cash flow and the resulting value.
- Firm Value before the change = 45,193 + $16,682 = $61,875 million

  $WACC_b$ = 7.51% Annual Cost = 61,875 * 0.0751 = $4,646.82 million

  $WACC_a$ = 7.32% Annual Cost = 61,875 * 0.0732 = $ 4,529.68 million

  Δ WACC = 0.19% Change in Annual Cost = $117.14 million
- If we assume a perpetual growth of 0.68% in firm value over time,

  Increase in firm value = $\frac{\text{Annual Savings next year}}{\text{(Cost of Capital - g)}} = \frac{\$117.14}{(0.0732 - 0.0068)} = \$1{,}763$ million

  - The total number of shares outstanding before the buyback is 1856.732 million.

  Change in Stock Price = $1,763/1856.732 = $ 0.95 per share

A Test: The Repurchase Price

- Let us suppose that the CFO of Disney approached you about buying back stock. He wants to know the maximum price that he should be willing to pay on the stock buyback. (The current price is $ 24.34 and there are 1856.732 million shares outstanding).

  If we assume that investors are rational, i.e., that the investor who sell their shares back want the same share of firm value increase as those who remain:
  - Increase in Value per Share = $1,763/1856.732 = $ 0.95
  - New Stock Price = $24.34 + $0.95= $25.29

  Buying shares back $25.29 will leave you as a stockholder indifferent between selling and not selling.
- What would happen to the stock price after the buyback if you were able to buy stock back at $ 24.34?

Buybacks and Stock Prices

- Assume that Disney does make a tender offer for it's shares but pays $27 per share. What will happen to the value per share for the shareholders who do not sell back?
  a. The share price will drop below the pre-announcement price of $24.34
  b. The share price will be between $24.34 and the estimated value (above) of $25.29
  c. The share price will be higher than $25.29

2. What if something goes wrong? The Downside Risk

- Sensitivity to Assumptions
  A. "What if" analysis

  The optimal debt ratio is a function of our inputs on operating income, tax rates and macro variables. We could focus on one or two key variables – operating income is an obvious choice – and look at history for guidance on volatility in that number and ask what if questions.

  B. "Economic Scenario" Approach

  We can develop possible scenarios, based upon macro variables, and examine the optimal debt ratio under each one. For instance, we could look at the optimal debt ratio for a cyclical firm under a boom economy, a regular economy and an economy in recession.
- Constraint on Bond Ratings/ Book Debt Ratios

  Alternatively, we can put constraints on the optimal debt ratio to reduce exposure to downside risk. Thus, we could require the firm to have a minimum rating, at the optimal debt ratio.

Explore the past: Disney's Operating Income History

Year	EBIT	% Change in EBIT
1987	756	
1988	848	12.17%
1989	1177	38.80%
1990	1368	16.23%
1991	1124	-17.84%
1992	1287	14.50%
1993	1560	21.21%
1994	1804	15.64%
1995	2262	25.39%
1996	3024	33.69%
1997	3945	30.46%
1998	3843	-2.59%
1999	3580	-6.84%
2000	2525	-29.47%
2001	2832	12.16%
2002	2384	-15.82%
2003	2713	13.80%
2004	$4,048	49.21%
2005	$4,107	1.46%
2006	$5,355	30.39%
2007	$6,829	27.53%
2008	$7,404	8.42%

Key questions:
What does a bad year look like for Disney?
How much volatility is there in operating income?

Recession	*Decline in Operating Income*
2008-09	Drop of about 10%
2002	Drop of 15.82%
1991	Drop of 22.00%
1981-82	Increased

What if? Examining the sensitivity of the optimal debt ratio..

EBITDA drops by	EBITDA	Optimal Debt ratio
0%	$8,319	40%
5%	$7,903	40%
10%	$7,487	40%
15%	$7,071	40%
20%	$6,655	30%

Constraints on Ratings

- Management often specifies a 'desired Rating' below which they do not want to fall.
- The rating constraint is driven by three factors
  - it is one way of protecting against downside risk in operating income
  - a drop in ratings might affect operating income (indirect bankruptcy costs)
  - there is an ego factor associated with high ratings
- Caveat: Every Rating Constraint Has A Cost.
  - Every rating constraint has a cost
  - Managers should be provided with an estimate of the cost of a specified ratings constraint so that they can decide whether the benefits exceed the costs.

Ratings Constraints for Disney

- At its optimal debt ratio of 40%, Disney has an estimated rating of A.
- If managers insisted on a AA rating, the optimal debt ratio for Disney is then 30% and the cost of the ratings constraint is fairly small:

  Cost of AA Rating Constraint = Value at 40% Debt – Value at 30% Debt
  = $63,651 – $63,596 = $55 million
- If managers insisted on a AAA rating, the optimal debt ratio would drop to 20% and the cost of the ratings constraint would rise:

  Cost of AAA rating constraint = Value at 40% Debt – Value at 20% Debt
  = $63,651 - $62,371 = $1,280 million

3. What if you do not buy back stock..

- The optimal debt ratio is ultimately a function of the underlying riskiness of the business in which you operate and your tax rate.
- Will the optimal be different if you invested in projects instead of buying back stock?
  - **No.** As long as the projects financed are in the same business mix that the company has always been in and your tax rate does not change significantly.
  - **Yes,** if the projects are in entirely different types of businesses or if the tax rate is significantly different.

Extension to a family group company: Tata Chemical's Optimal Capital Structure

Actual

Business	Cost of equity	Pre-tax cost of debt	After-tax cost of debt	D/(D+E)	Cost of capital
Fertilizers	14.14%	10.0%	6.60%	34.02%	11.58%
Chemicals	13.58%	10.0%	6.60%	34.02%	11.21%
Tata Chemicals	13.93%	10.0%	6.60%	34.02%	11.44%

Optimal

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	0.70	11.39%	AAA	8.25%	33.99%	5.45%	11.39%	Rs 79,626
10%	0.75	11.93%	A+	9.25%	33.99%	6.11%	11.35%	Rs 80,084
20%	0.82	12.61%	BB	12.00%	33.99%	7.92%	11.67%	Rs 76,586
30%	0.90	13.48%	B-	15.50%	33.99%	10.23%	12.51%	Rs 68,768
40%	1.01	14.64%	CC	19.00%	33.99%	12.54%	13.80%	Rs 59,257
50%	1.23	16.98%	C	22.00%	24.43%	16.63%	16.80%	Rs 44,637
60%	1.58	20.64%	D	27.00%	16.59%	22.52%	21.77%	Rs 31,272
70%	2.11	26.19%	D	27.00%	14.22%	23.16%	24.07%	Rs 27,325
80%	3.17	37.28%	D	27.00%	12.44%	23.64%	26.37%	Rs 24,189
90%	6.33	70.56%	D	27.00%	11.06%	24.01%	28.67%	Rs 21,638

Tata Chemical looks like it is over levered (34% actual versus 10% optimal), but it is tough to tell without looking at the rest of the group.

Extension to a firm with volatile earnings: Aracruz's Optimal Debt Ratio

Cost of debt includes default spread for Brazil.

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	1.01	13.52%	AAA	7.25%	34.00%	4.79%	13.52%	R$ 17,424
10%	1.08	14.26%	A-	9.00%	34.00%	5.94%	13.42%	R$ 17,600
20%	1.17	15.17%	B-	14.50%	34.00%	9.57%	14.05%	R$ 16,511
30%	1.29	16.36%	CC	18.00%	33.83%	11.91%	15.03%	R$ 15,062
40%	1.53	18.75%	C	21.00%	21.75%	16.43%	17.82%	R$ 11,994
50%	1.87	22.13%	D	26.00%	14.05%	22.35%	22.24%	R$ 9,012
60%	2.34	26.79%	D	26.00%	11.71%	22.95%	24.49%	R$ 7,975
70%	3.12	34.55%	D	26.00%	10.04%	23.39%	26.74%	R$ 7,140
80%	4.68	50.08%	D	26.00%	8.78%	23.72%	28.99%	R$ 6,452
90%	9.36	96.66%	D	26.00%	7.81%	23.97%	31.24%	R$ 5,875

Using Aracruz's actual operating income in 2008, an abysmal year, yields an optimal debt ratio of 0%. Applying Aracruz's average pretax operating margin between 2004 and 2008 of 27.24% to 2008 revenues of $R 3,697 million to get a normalized operating income of R$ 1,007 million. That is the number used in computing the optimal debt ratio in this table.

Extension to a private business Optimal Debt Ratio for Bookscape

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	Cost of capital	Firm Value (G)
0%	1.98	15.38%	AAA	4.75%	40.00%	2.85%	15.38%	$20,701.79
10%	2.11	16.18%	AAA	4.75%	40.00%	2.85%	14.84%	$21,728.94
20%	2.28	17.17%	AAA	4.75%	40.00%	2.85%	14.30%	$22,858.84
30%	2.49	18.44%	A	6.00%	40.00%	3.60%	13.99%	$23,572.02
40%	2.77	20.14%	A-	6.50%	40.00%	3.90%	13.64%	$24,403.93
50%	3.17	22.51%	BB	8.50%	40.00%	5.10%	13.81%	$24,000.23
60%	3.76	26.08%	B	10.75%	40.00%	6.45%	14.30%	$22,861.61
70%	4.75	32.02%	B-	12.00%	40.00%	7.20%	14.65%	$22,128.00
80%	6.73	43.90%	CC	15.50%	40.00%	9.30%	16.22%	$19,282.19
90%	13.20	82.73%	CC	15.50%	37.03%	9.76%	17.06%	$18,039.01

No market value because it is a private firm. Hence, we estimated value:
Estimated Market Value of Equity (in '000s) = Net Income for Bookscape *
Average PE for Publicly Traded Book Retailers = 1,500 * 10 = $15,000
Estimated Market Value of Debt = PV of leases= $9.6 milliion

Limitations of the Cost of Capital approach

- It is static: The most critical number in the entire analysis is the operating income. If that changes, the optimal debt ratio will change.
- It ignores indirect bankruptcy costs: The operating income is assumed to stay fixed as the debt ratio and the rating changes.
- Beta and Ratings: It is based upon rigid assumptions of how market risk and default risk get borne as the firm borrows more money and the resulting costs.

II. Enhanced Cost of Capital Approach

- Distress cost affected operating income: In the enhanced cost of capital approach, the indirect costs of bankruptcy are built into the expected operating income. As the rating of the firm declines, the operating income is adjusted to reflect the loss in operating income that will occur when customers, suppliers and investors react.
- Dynamic analysis: Rather than look at a single number for operating income, you can draw from a distribution of operating income (thus allowing for different outcomes).

Estimating the Distress Effect- Disney

Rating	*Drop in EBITDA*
A- or higher	No effect
A-	2.00%
BBB	10.00%
BB+	20.00%
B-	25.00%
CCC	40.00%
D	50.00%

Indirect bankruptcy costs manifest themselves, when the rating drops to A- and then start becoming larger as the rating drops below investment grade.

The Optimal Debt Ratio with Indirect Bankruptcy Costs

Debt Ratio	Bond Rating	Cost of Capital	Firm Value (G)
0%	AAA	7.90%	$58,522
10%	AAA	7.68%	$60,384
20%	AAA	7.45%	$62,368
30%	A+	7.42%	$62,707
40%	CCC	9.18%	$24,987
50%	C	12.77%	$17,569
60%	C	14.27%	$15,630
70%	C	15.77%	$14,077
80%	C	17.27%	$12,804
90%	C	18.77%	$11,743

The optimal debt ratio drops to 30% from the original computation of 40%.

Extending this approach to analyzing Financial Service Firms

- Interest coverage ratio spreads, which are critical in determining the bond ratings, have to be estimated separately for financial service firms; applying manufacturing company spreads will result in absurdly low ratings for even the safest banks and very low optimal debt ratios.
- It is difficult to estimate the debt on a financial service company's balance sheet. Given the mix of deposits, repurchase agreements, short-term financing, and other liabilities that may appear on a financial service firm's balance sheet, one solution is to focus only on long-term debt, defined tightly, and to use interest coverage ratios defined using only long-term interest expenses.
- Financial service firms are regulated and have to meet capital ratios that are defined in terms of book value. If, in the process of moving to an optimal market value debt ratio, these firms violate the book capital ratios, they could put themselves in jeopardy.

An alternative approach based on Regulatory Capital

- Rather than try to bend the cost of capital approach to breaking point, we will adopt a different approach for financial service firms where we estimate debt capacity based on regulatory capital.
- Consider a bank with $ 100 million in loans outstanding and a book value of equity of $ 6 million. Furthermore, assume that the regulatory requirement is that equity capital be maintained at 5% of loans outstanding. Finally, assume that this bank wants to increase its loan base by $ 50 million to $ 150 million and to augment its equity capital ratio to 7% of loans outstanding.

Loans outstanding after Expansion	= $ 150 million
* Equity/Capital ratio desired	= 7%
= Equity after expansion	= $10.5 million
Existing Equity	= $ 6.0 million
New Equity needed	= $ 4.5 million

This can come from retained earnings or from new equity issues.

Financing Strategies for a financial institution

- The Regulatory minimum strategy: In this strategy, financial service firms try to stay with the bare minimum equity capital, as required by the regulatory ratios. In the most aggressive versions of this strategy, firms exploit loopholes in the regulatory framework to invest in those businesses where regulatory capital ratios are set too low (relative to the risk of these businesses).
- The Self-regulatory strategy: The objective for a bank raising equity is not to meet regulatory capital ratios but to ensure that losses from the business can be covered by the existing equity. In effect, financial service firms can assess how much equity they need to hold by evaluating the riskiness of their businesses and the potential for losses.
- Combination strategy: In this strategy, the regulatory capital ratios operate as a floor for established businesses, with the firm adding buffers for safety where needed..

Deutsche Bank's Financing Mix

- Deutsche Bank has generally been much more conservative in its use of equity capital. In October 2008, it raised its Tier 1 Capital Ratio to 10%, well above the Basel 1 regulatory requirement of 6%.
- While its loss of 4.8 billion Euros in the last quarter of 2008 did reduce equity capital, Deutsche Bank was confident (at least as of the first part of 2009) that it could survive without fresh equity infusions or government bailouts. In fact, Deutsche Bank reported net income of 1.2 billion Euros for the first quarter of 2009 and a Tier 1 capital ratio of 10.2%.
- If the capital ratio had dropped below 10%, the firm would have had to raise fresh equity.

Determinants of the Optimal Debt Ratio: 1. The marginal tax rate

- The primary benefit of debt is a tax benefit. The higher the marginal tax rate, the greater the benefit to borrowing:

Tax Rate	Disney	Aracruz	Tata Chemicals	Bookscape
0%	0%	0%	0%	0%
10%	0%	0%	0%	20%
20%	20%	0%	0%	20%
30%	30%	10%	0%	40%
40%	50%	10%	10%	40%
50%	60%	20%	20%	50%

2. Pre-tax Cash flow Return

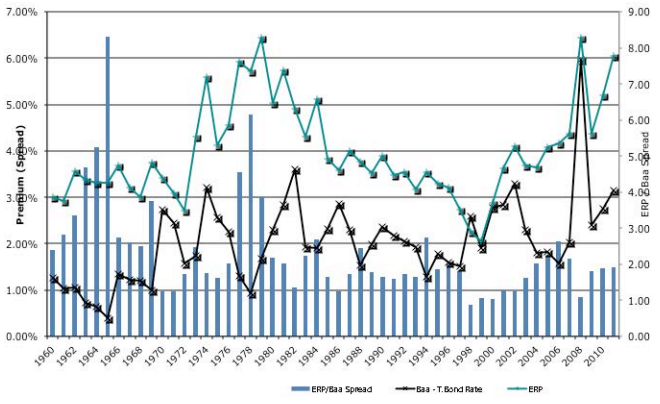
- Firms that have more in operating income and cash flows, relative to firm value (in market terms), should have higher optimal debt ratios. We can measure operating income with EBIT and operating cash flow with EBITDA.
  Cash flow potential = EBITDA/ (Market value of equity + Debt)
- Disney, for example, has operating income of $6,829 million, which is 11% of the market value of the firm of $61,875 million in the base case, and an optimal debt ratio of 40%. Increasing the operating income to 15% of the firm value will increase the optimal debt ratio to 60%.
- In general, growth firms will have lower cash flows, as a percent of firm value, and lower optimal debt ratios.

3. Operating Risk

- Firms that face more risk or uncertainty in their operations (and more variable operating income as a consequence) will have lower optimal debt ratios than firms that have more predictable operations.
- Operating risk enters the cost of capital approach in two places:
  - Unlevered beta: Firms that face more operating risk will tend to have higher unlevered betas. As they borrow, debt will magnify this already large risk and push up costs of equity much more steeply.
  - Bond ratings: For any given level of operating income, firms that face more risk in operations will have lower ratings. The ratings are based upon normalized income.

4. The only macro determinant: Equity vs Debt Risk Premiums

Figure 15: Equity Risk Premiums and Bond Default Spreads



Application Test: Your firm's optimal financing mix

- Using the optimal capital structure spreadsheet provided:
  - Estimate the optimal debt ratio for your firm
  - Estimate the new cost of capital at the optimal
  - Estimate the effect of the change in the cost of capital on firm value
  - Estimate the effect on the stock price
- In terms of the mechanics, what would you need to do to get to the optimal immediately?

III. The APV Approach to Optimal Capital Structure

- In the adjusted present value approach, the value of the firm is written as the sum of the value of the firm without debt (the unlevered firm) and the effect of debt on firm value
- Firm Value = Unlevered Firm Value + (Tax Benefits of Debt - Expected Bankruptcy Cost from the Debt)
- The optimal dollar debt level is the one that maximizes firm value

Implementing the APV Approach

- Step 1: Estimate the unlevered firm value. This can be done in one of two ways:
  1. Estimating the unlevered beta, a cost of equity based upon the unlevered beta and valuing the firm using this cost of equity (which will also be the cost of capital, with an unlevered firm)
  2. Alternatively, Unlevered Firm Value = Current Market Value of Firm - Tax Benefits of Debt (Current) + Expected Bankruptcy cost from Debt
- Step 2: Estimate the tax benefits at different levels of debt. The simplest assumption to make is that the savings are perpetual, in which case
  - Tax benefits = Dollar Debt * Tax Rate
- Step 3: Estimate a probability of bankruptcy at each debt level, and multiply by the cost of bankruptcy (including both direct and indirect costs) to estimate the expected bankruptcy cost.

Estimating Expected Bankruptcy Cost

- Probability of Bankruptcy
  - Estimate the synthetic rating that the firm will have at each level of debt
  - Estimate the probability that the firm will go bankrupt over time, at that level of debt (Use studies that have estimated the empirical probabilities of this occurring over time - Altman does an update every year)
- Cost of Bankruptcy
  - The direct bankruptcy cost is the easier component. It is generally between 5-10% of firm value, based upon empirical studies
  - The indirect bankruptcy cost is much tougher. It should be higher for sectors where operating income is affected significantly by default risk (like airlines) and lower for sectors where it is not (like groceries)

Ratings and Default Probabilities: Results from Altman study of bonds

Rating	*Likelihood of Default*
AAA	0.07%
AA	0.51%
A+	0.60%
A	0.66%
A-	2.50%
BBB	7.54%
BB	16.63%
B+	25.00%
B	36.80%
B-	45.00%
CCC	59.01%
CC	70.00%
C	85.00%
D	100.00%

Altman estimated these probabilities by looking at bonds in each ratings class ten years prior and then examining the proportion of these bonds that defaulted over the ten years.

Disney: Estimating Unlevered Firm Value

Current Market Value of the Firm = = $45,193 + $16,682	= $ 61,875
- Tax Benefit on Current Debt = $16,682 * 0.38	= $ 6,339
+ Expected Bankruptcy Cost = 0.66% * (0.25 * 61,875)	= $ 102
Unlevered Value of Firm =	= $ 55,638

Cost of Bankruptcy for Disney = 25% of firm value

Probability of Bankruptcy = 0.66%, based on firm's current rating of A

Tax Rate = 38%

Disney: APV at Debt Ratios

Debt Ratio	$ Debt	Tax Rate	Unlevered Firm Value	Tax Benefits	Expected Bankruptcy Cost	Value of Levered Firm
0%	$0	38.00%	$55,638	$0	$10	$55,629
10%	$6,188	38.00%	$55,638	$2,351	$10	$57,979
20%	$12,375	38.00%	$55,638	$4,703	$11	$60,330
30%	$18,563	38.00%	$55,638	$7,054	$94	$62,598
40%	$24,750	38.00%	$55,638	$9,405	$107	$64,936
50%	$30,938	38.00%	$55,638	$11,756	$421	$66,973
60%	$37,125	38.00%	$55,638	$14,108	$6,417	$63,329
70%	$43,313	38.00%	$55,638	$16,459	$10,636	$61,461
80%	$49,500	38.00%	$55,638	$18,810	$10,983	$63,466
90%	$55,688	34.52%	$55,638	$19,223	$11,044	$63,817

The optimal debt ratio is 50%, which is the point at which firm value is maximized.

IV. Relative Analysis

I. Industry Average with Subjective Adjustments

- The "safest" place for any firm to be is close to the industry average
- Subjective adjustments can be made to these averages to arrive at the right debt ratio.
  - Higher tax rates -> Higher debt ratios (Tax benefits)
  - Lower insider ownership -> Higher debt ratios (Greater discipline)
  - More stable income -> Higher debt ratios (Lower bankruptcy costs)
  - More intangible assets -> Lower debt ratios (More agency problems)

Comparing to industry averages

				Book Debt Ratio		Market Debt Ratio	
Company	*Book Debt Ratio*	*Market Debt Ratio*	*Comparable group*	*Average*	*Median*	*Average*	*Median*
Disney	32.89%	26.96%	US Entertainment companies	47.76%	43.59%	36.90%	37.83%
Aracruz	91.01%	52.47%	Emerging Market Paper companies	38.11%	40.74%	33.75%	34.22%
Tata Chemicals	42.95%	34.02%	Emerging Market chemical companies	33.88%	34.76%	25.56%	21.34%

Getting past simple averages

Step 1: Run a regression of debt ratios on the variables that you believe determine debt ratios in the sector. For example,

Debt Ratio = a + b (Tax rate) + c (Earnings Variability) + d (EBITDA/Firm Value)

Step 2: Estimate the proxies for the firm under consideration. Plugging into the cross sectional regression, we can obtain an estimate of predicted debt ratio.

Step 3: Compare the actual debt ratio to the predicted debt ratio.

Applying the Regression Methodology: Entertainment Firms

- Using a sample of 80 entertainment firms, we arrived at the following regression:

Debt to Capital = 0.049 + 0.543 (Effective tax rate) + 0.692 (EBITDA/Firm Value)

(1.07) (4.10[a]) (4.08[a])

- The R squared of the regression is 40%. This regression can be used to arrive at a predicted value for Disney of:

Predicted Debt Ratio = 0.049 + 0.543 (0.372) + 0.692 (0.1735) = 0.3710 or 37.10%

Based upon the capital structure of other firms in the entertainment industry, Disney should have a market value debt ratio of 37.1%.

Extending to the entire market

- Using 2008 data for firms listed on the NYSE, AMEX and NASDAQ data bases. The regression provides the following results –

$DFR = 0.327 - 0.064$ Intangible % $- 0.138$ CLSH $+ 0.026$ E/V $- 0.878\ G_{EPS}$

(25.45[a]) (2.16[a]) (2.88[a]) (1.25) (12.6[a])

where,

DFR = Debt / (Debt + Market Value of Equity)

Intangible % = Intangible Assets/ Total Assets (in book value terms)

CLSH = Closely held shares as a percent of outstanding shares

E/V = EBITDA/ (Market Value of Equity + Debt- Cash)

G_{EPS} = Expected growth rate in EPS

- The regression has an R-squared of 13%.

Applying the Regression

Lets check whether we can use this regression. Disney had the following values for these inputs in 2008. Estimate the optimal debt ratio using the debt regression.

Intangible Assets = 24%

Closely held shares as percent of shares outstanding = 7.7%

EBITDA/Value = 17.35%

Expected growth in EPS = 6.5%

Optimal Debt Ratio

= 0.327 - 0.064 (0.24) – 0.138 (0.077) + 0.0.26 (0.1735) – 0.878 (0.065)

= 0.2891 or 28.91%

What does this optimal debt ratio tell you?

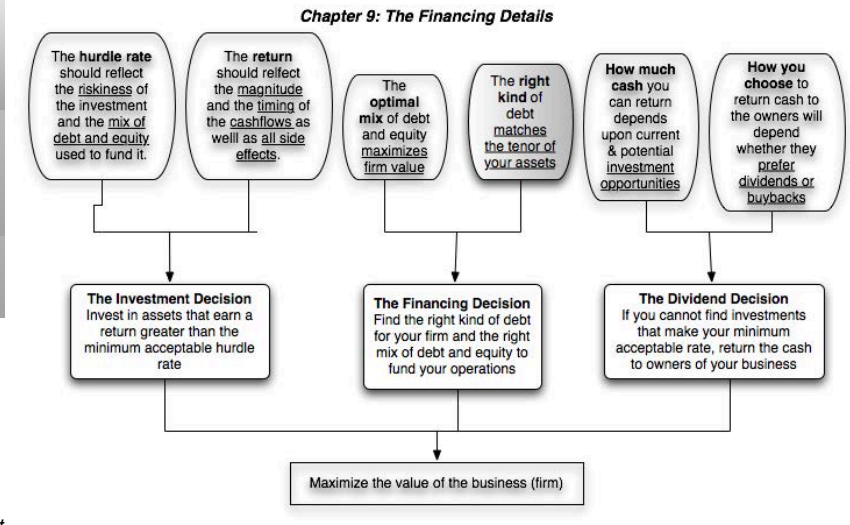
Why might it be different from the optimal calculated using the weighted average cost of capital?

Summarizing the optimal debt ratios…

	Disney	*Aracruz*	*Tata Chemicals*
Actual Debt Ratio	27%	52.58%	34.02%
Optimal			
I. Operating income	50.00%	—	-
II. Standard Cost of capital	40.00%	10.00%	10.00%
III. Enhanced Cost of Capital	30.00%	10.00%	10.00%
IV. APV	50.00%	20.00%	10.00%
V. Comparable			
To industry	37.10%	34.22%	21.34%
To market	28.91%	—	-

Getting to the Optimal: Timing and Financing Choices

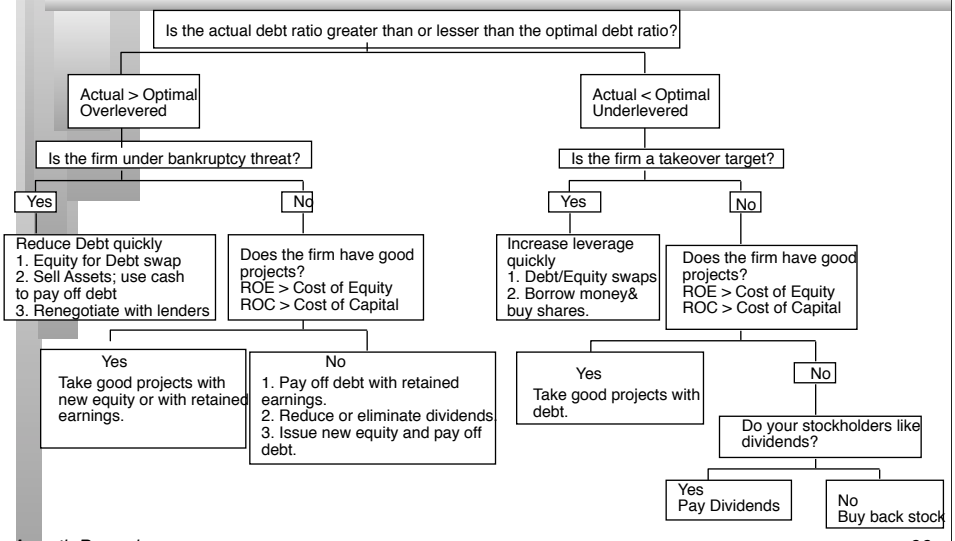
Big Picture…



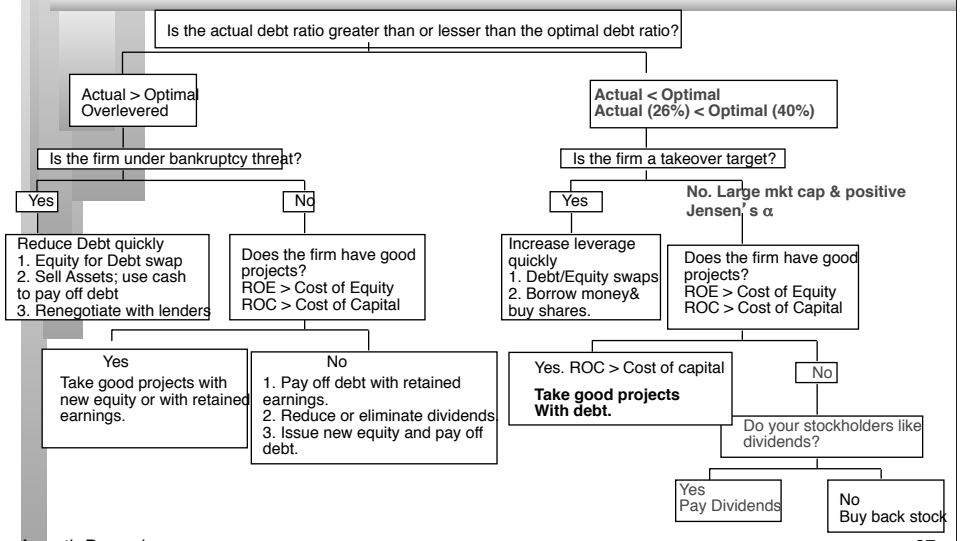
Now that we have an optimal.. And an actual.. What next?

- At the end of the analysis of financing mix (using whatever tool or tools you choose to use), you can come to one of three conclusions:
  - The firm has the right financing mix
  - It has too little debt (it is under levered)
  - It has too much debt (it is over levered)
- The next step in the process is
  - Deciding how much quickly or gradually the firm should move to its optimal
  - Assuming that it does, the right kind of financing to use in making this adjustment

A Framework for Getting to the Optimal



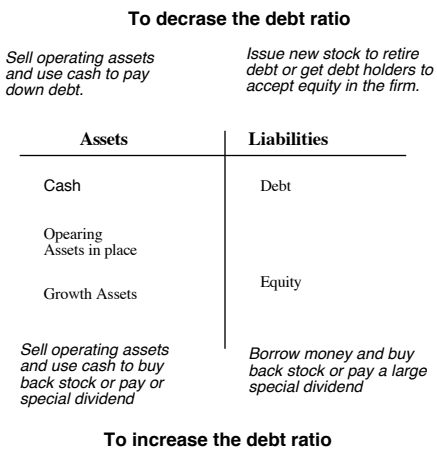
Disney: Applying the Framework



⧖ Application Test: Getting to the Optimal

- Based upon your analysis of both the firm's capital structure and investment record, what path would you map out for the firm?
  - Immediate change in leverage
  - Gradual change in leverage
  - No change in leverage
- Would you recommend that the firm change its financing mix by
  - Paying off debt/Buying back equity
  - Take projects with equity/debt

The Mechanics of Changing Debt Ratio over time… quickly…



The mechanics of changing debt ratios over time… gradually…

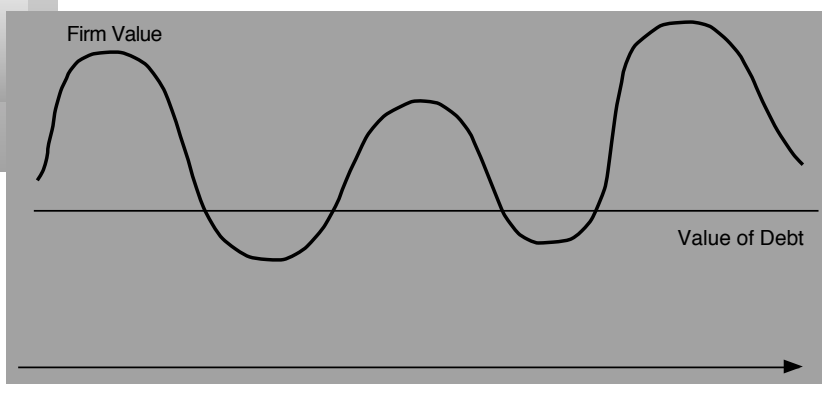
- To change debt ratios over time, you use the same mix of tools that you used to change debt ratios gradually:
  - Dividends and stock buybacks: Dividends and stock buybacks will reduce the value of equity.
  - Debt repayments: will reduce the value of debt.
- The complication of changing debt ratios over time is that firm value is itself a moving target.
  - If equity is fairly valued today, the equity value should change over time to reflect the expected price appreciation:

    Expected Price appreciation = Cost of equity – Dividend Yield
  - Debt will also change over time, in conjunction as firm value changes.

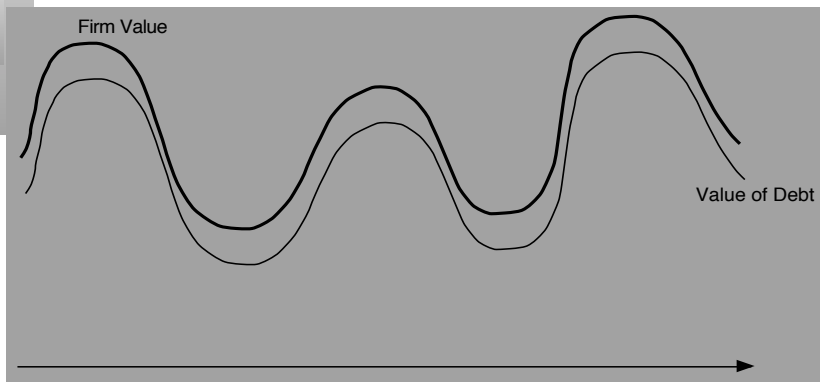
Designing Debt: The Fundamental Principle

- The objective in designing debt is to make the cash flows on debt match up as closely as possible with the cash flows that the firm makes on its assets.
- By doing so, we reduce our risk of default, increase debt capacity and increase firm value.

Firm with mismatched debt

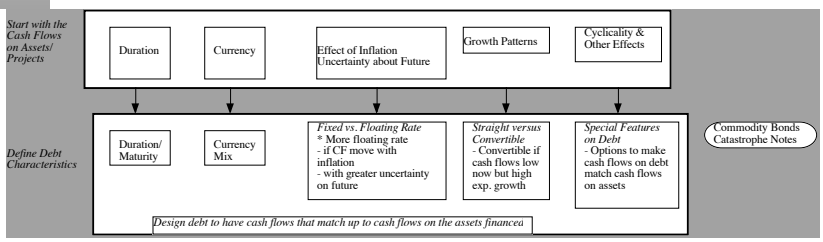


Firm with matched Debt



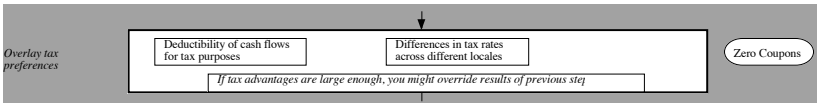
Design the perfect financing instrument

- The perfect financing instrument will
  - Have all of the tax advantages of debt
  - While preserving the flexibility offered by equity



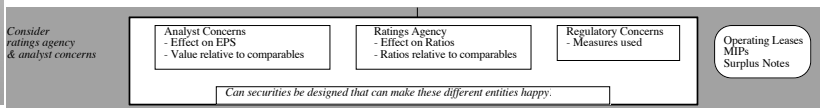
Ensuring that you have not crossed the line drawn by the tax code

- All of this design work is lost, however, if the security that you have designed does not deliver the tax benefits.
- In addition, there may be a trade off between mismatching debt and getting greater tax benefits.



While keeping equity research analysts, ratings agencies and regulators applauding

- Ratings agencies want companies to issue equity, since it makes them safer. Equity research analysts want them not to issue equity because it dilutes earnings per share. Regulatory authorities want to ensure that you meet their requirements in terms of capital ratios (usually book value). Financing that leaves all three groups happy is nirvana.



Debt or Equity: The Strange Case of Trust Preferred

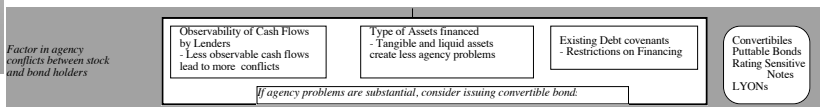
- Trust preferred stock has
  - A fixed dividend payment, specified at the time of the issue
  - That is tax deductible
  - And failing to make the payment can cause ? (Can it cause default?)
- When trust preferred was first created, ratings agencies treated it as equity. As they have become more savvy, ratings agencies have started giving firms only partial equity credit for trust preferred.

Debt, Equity and Quasi Equity

- Assuming that trust preferred stock gets treated as equity by ratings agencies, which of the following firms is the most appropriate firm to be issuing it?
  - A firm that is under levered, but has a rating constraint that would be violated if it moved to its optimal
  - A firm that is over levered that is unable to issue debt because of the rating agency concerns.

Soothe bondholder fears

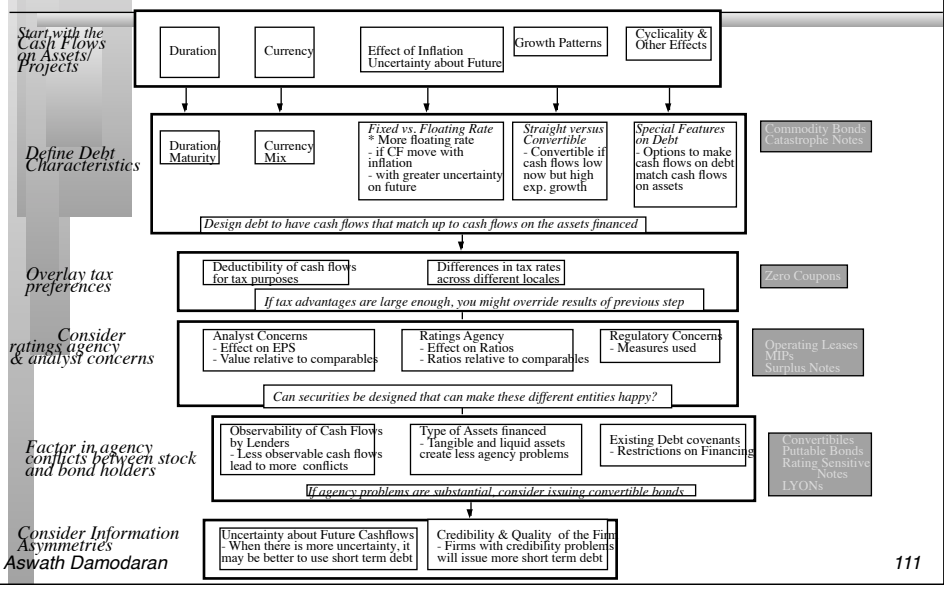
- There are some firms that face skepticism from bondholders when they go out to raise debt, because
  - Of their past history of defaults or other actions
  - They are small firms without any borrowing history
- Bondholders tend to demand much higher interest rates from these firms to reflect these concerns.



And do not lock in market mistakes that work against you

- Ratings agencies can sometimes under rate a firm, and markets can under price a firm's stock or bonds. If this occurs, firms should not lock in these mistakes by issuing securities for the long term. In particular,
  - Issuing equity or equity based products (including convertibles), when equity is under priced transfers wealth from existing stockholders to the new stockholders
  - Issuing long term debt when a firm is under rated locks in rates at levels that are far too high, given the firm's default risk.
- What is the solution
  - If you need to use equity?
  - If you need to use debt?

Designing Debt: Bringing it all together



Approaches for evaluating Asset Cash Flows

- I. Intuitive Approach
  - Are the projects typically long term or short term? What is the cash flow pattern on projects?
  - How much growth potential does the firm have relative to current projects?
  - How cyclical are the cash flows? What specific factors determine the cash flows on projects?
- II. Project Cash Flow Approach
  - Project cash flows on a typical project for the firm
  - Do scenario analyses on these cash flows, based upon different macro economic scenarios
- III. Historical Data
  - Operating Cash Flows
  - Firm Value

I. Intuitive Approach - Disney

Business	*Project Cash Flow Characteristics*	*Type of Financing*
Studio entertainment	Movie projects are likely to 1. Be short-term 2. Have cash outflows primarily in dollars (because Disney makes most of its movies in the U.S.), but cash inflows could have a substantial foreign currency component (because of overseas revenues) 3. Have net cash flows that are heavily driven by whether the movie is a hit, which is often difficult to predict	Debt should be 1. Short-term 2. Primarily dollar debt 3. If possible, tied to the success of movies (Lion King or Mulan bonds)
Media networks	Projects are likely to be 1. Short-term 2. Primarily in dollars, though foreign component is growing 3. Driven by advertising revenues and show success (Nielsen ratings)	Debt should be 1. Short-term 2. Primarily dollar debt 3. If possible, linked to network ratings
Park resorts	Projects are likely to be 1. Very long-term 2. Primarily in dollars, but a significant proportion of revenues come from foreign tourists, who are likely to stay away if the dollar strengthens 3. Affected by success of studio entertainment and media networks divisions	Debt should be 1. Long-term 2. Mix of currencies, based on tourist makeup
Consumer products	Projects are likely to be short- to medium-term and linked to the success of the movie division; most of Disney's product offerings are derived from their movie productions	Debt should be a. Medium-term b. Dollar debt

⌛ Application Test: Choosing your Financing Type

- Based upon the business that your firm is in, and the typical investments that it makes, what kind of financing would you expect your firm to use in terms of
  - Duration (long term or short term)
  - Currency
  - Fixed or Floating rate
  - Straight or Convertible

II. Project Specific Financing

- With project specific financing, you match the financing choices to the project being funded. The benefit is that the the debt is truly customized to the project.
- Project specific financing makes the most sense when you have a few large, independent projects to be financed. It becomes both impractical and costly when firms have portfolios of projects with interdependent cashflows.

Duration of Disney Theme Park

Year (t)	Annual Cashflow	Terminal Value	Present Value @ 8.62%	Present value *t
0	-$2,000		-$2,000	$0
1	-$1,000		-$921	-$921
2	-$860		-$729	-$1,457
3	-$270		-$211	-$632
4	$332		$239	$956
5	$453		$300	$1,500
6	$502		$305	$1,833
7	$538		$302	$2,112
8	$596		$307	$2,460
9	$660		$313	$2,821
10	$692	$10,669	$4,970	$49,704
			$2,877	$58,375

Duration of the Project = 58,375/2,877 = 20.29 years

The perfect theme park debt…

- The perfect debt for this theme park would have a duration of roughly 20 years and be in a mix of Latin American currencies (since it is located in Brazil), reflecting where the visitors to the park are coming from.
- If possible, you would tie the interest payments on the debt to the number of visitors at the park.

III. Firm-wide financing

Rather than look at individual projects, you could consider the firm to be a portfolio of projects. The firm's past history should then provide clues as to what type of debt makes the most sense. In particular, you can look at

1. Operating Cash Flows
   - The question of how sensitive a firm's asset cash flows are to a variety of factors, such as interest rates, inflation, currency rates and the economy, can be directly tested by regressing changes in the operating income against changes in these variables.
   - This analysis is useful in determining the coupon/interest payment structure of the debt.
2. Firm Value
   - The firm value is clearly a function of the level of operating income, but it also incorporates other factors such as expected growth & cost of capital.
   - The firm value analysis is useful in determining the overall structure of the debt, particularly maturity.

Disney: Historical Data

Date	Operating Income (OI)	Firm Value (V)	% Chg in OI	% Chg in V
2008	$7,404	$72,357	8.42%	-6.55%
2007	$6,829	$77,428	27.53%	-2.13%
2006	$5,355	$79,116	30.39%	35.81%
2005	$4,107	$58,256	1.46%	3.09%
2004	$4,048	$56,510	49.21%	8.41%
2003	$2,713	$52,125	13.80%	19.03%
2002	$2,384	$43,792	-15.82%	-7.02%
2001	$2,832	$47,099	12.16%	-46.31%
2000	$2,525	$87,716	-22.64%	34.80%
1999	$3,264	$65,073	-15.07%	1.50%
1998	$3,843	$64,110	-2.59%	-1.63%
1997	$3,945	$65,173	30.46%	19.16%
1996	$3,024	$54,695	33.68%	70.95%
1995	$2,262	$31,995	25.43%	38.75%
1994	$1,804	$23,059	15.59%	3.69%
1993	$1,560	$22,238	21.23%	8.65%
1992	$1,287	$20,467	28.18%	26.57%
1991	$1,004	$16,171	-21.98%	27.90%
1990	$1,287	$12,643	16.01%	-24.90%
1989	$1,109	$16,834	40.64%	-2.64%
1988	$789	$17,290	11.65%	65.50%
1987	$707	$10,447	53.02%	85.24%
1986	$462	$5,640	25.15%	61.24%
1985	$369	$3,498	157.99%	24.37%

The Macroeconomic Data

Date	T.Bond Rate	Change in rate	GDP (Deflated)	% Chg in GDP	CPI	Change in CPI	Weighted Dollar	% Change in $
2008	2.52%	-1.44%	11989	-1.18%	-0.14%	-4.26%	81.01	10.88%
2007	4.02%	-0.65%	12133	2.93%	4.30%	2.19%	73.06	-11.30%
2006	4.70%	0.30%	11787	3.40%	2.07%	-1.84%	82.37	-2.28%
2005	4.39%	0.16%	11399	3.68%	3.99%	0.66%	84.29	3.98%
2004	4.22%	0.13%	10994	3.72%	3.30%	1.34%	81.06	-3.92%
2003	4.08%	0.05%	10600	4.32%	1.93%	-0.65%	84.37	-14.59%
2002	4.03%	-0.97%	10161	2.80%	2.60%	1.44%	98.78	-11.17%
2001	5.05%	-0.18%	9884	-0.04%	1.14%	-2.50%	111.20	7.45%
2000	5.24%	-0.98%	9888	2.24%	3.73%	0.96%	103.49	7.73%
1999	6.28%	1.56%	9671	4.70%	2.74%	1.04%	96.06	1.68%
1998	4.65%	-1.03%	9237	4.51%	1.68%	0.11%	94.47	-4.08%
1997	5.74%	-0.63%	8838	4.33%	1.57%	-1.43%	98.49	9.40%
1996	6.41%	0.80%	8471	4.43%	3.04%	0.31%	90.03	4.14%
1995	5.57%	-2.09%	8112	2.01%	2.72%	-0.08%	86.45	-0.71%
1994	7.82%	1.92%	7952	4.12%	2.80%	0.27%	87.07	-5.37%
1993	5.79%	-0.83%	7637	2.50%	2.52%	-0.72%	92.01	0.56%
1992	6.68%	-0.02%	7451	4.15%	3.26%	0.64%	91.50	6.89%
1991	6.70%	-1.26%	7154	1.09%	2.60%	-2.89%	85.60	0.69%
1990	8.06%	0.12%	7077	0.65%	5.65%	0.43%	85.01	-8.00%
1989	7.93%	-1.11%	7031	2.66%	5.20%	0.51%	92.40	2.04%
1988	9.14%	0.26%	6849	3.66%	4.67%	0.60%	90.55	1.05%
1987	8.86%	1.53%	6607	4.49%	4.05%	2.54%	89.61	-12.01%
1986	7.22%	-1.61%	6323	2.83%	1.47%	-2.33%	101.84	-15.26%
1985	8.98%	-2.27%	6149	4.19%	3.89%	3.89%	120.18	-13.51%
1984	11.51%		5902				138.96	

I. Sensitivity to Interest Rate Changes

- How sensitive is the firm's value and operating income to changes in the level of interest rates?
- The answer to this question is important because it
  - it provides a measure of the duration of the firm's projects
  - it provides insight into whether the firm should be using fixed or floating rate debt.

Firm Value versus Interest Rate Changes

- Regressing changes in firm value against changes in interest rates over this period yields the following regression –

  Change in Firm Value = 0.1949 - 2.94 (Change in Interest Rates)
  (2.89) (0.50)

  T statistics are in brackets.

- The coefficient on the regression (-2.94) measures how much the value of Disney as a firm changes for a unit change in interest rates.

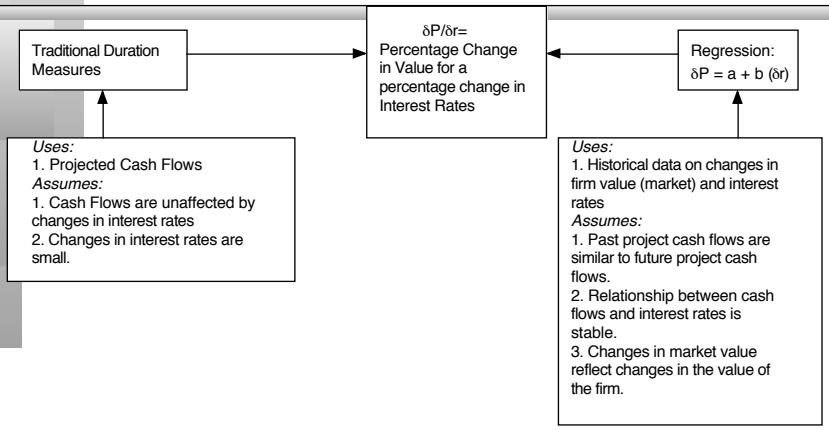
Why the coefficient on the regression is duration..

- The duration of a straight bond or loan issued by a company can be written in terms of the coupons (interest payments) on the bond (loan) and the face value of the bond to be –

$$\text{Duration of Bond} = \frac{dP/P}{dr/r} = \frac{\left[\sum_{t=1}^{t=N} \frac{t * \text{Coupon}_t}{(1+r)^t} + \frac{N * \text{Face Value}}{(1+r)^N}\right]}{\left[\sum_{t=1}^{t=N} \frac{\text{Coupon}_t}{(1+r)^t} + \frac{\text{Face Value}}{(1+r)^N}\right]}$$

- The duration of a bond measures how much the price of the bond changes for a unit change in interest rates.
- Holding other factors constant, the duration of a bond will increase with the maturity of the bond, and decrease with the coupon rate on the bond.

Duration: Comparing Approaches



Operating Income versus Interest Rates

- Regressing changes in operating cash flow against changes in interest rates over this period yields the following regression –

  Change in Operating Income = 0.1958 + 6.59 (Change in Interest Rates)
  (2.74) (1.06)

  - Conclusion: Disney's operating income, unlike its firm value, has moved with interest rates.
- Generally speaking, the operating cash flows are smoothed out more than the value and hence will exhibit lower duration that the firm value.

II. Sensitivity to Changes in GDP/ GNP

- How sensitive is the firm's value and operating income to changes in the GNP/GDP?
- The answer to this question is important because
  - it provides insight into whether the firm's cash flows are cyclical and
  - whether the cash flows on the firm's debt should be designed to protect against cyclical factors.
- If the cash flows and firm value are sensitive to movements in the economy, the firm will either have to issue less debt overall, or add special features to the debt to tie cash flows on the debt to the firm's cash flows.

Regression Results

- Regressing changes in firm value against changes in the GDP over this period yields the following regression –

Change in Firm Value = 0.0826 + 8.89 (GDP Growth)
(0.65) (2.36)

  - Conclusion: Disney is sensitive to economic growth
- Regressing changes in operating cash flow against changes in GDP over this period yields the following regression –

Change in Operating Income = 0.04 + 6.06 (GDP Growth)
(0.22) (1.30)

  - Conclusion: Disney's operating income is sensitive to economic growth as well.

III. Sensitivity to Currency Changes

- How sensitive is the firm's value and operating income to changes in exchange rates?
- The answer to this question is important, because
  - it provides a measure of how sensitive cash flows and firm value are to changes in the currency
  - it provides guidance on whether the firm should issue debt in another currency that it may be exposed to.
- If cash flows and firm value are sensitive to changes in the dollar, the firm should
  - figure out which currency its cash flows are in;
  - and issued some debt in that currency

Regression Results

- Regressing changes in firm value against changes in the dollar over this period yields the following regression –

  Change in Firm Value = 0.17 -2.04 (Change in Dollar)

  (2.63) (0.80)

  - Conclusion: Disney's value is sensitive to exchange rate changes, decreasing as the dollar strengthens.
- Regressing changes in operating cash flow against changes in the dollar over this period yields the following regression –

  Change in Operating Income = 0.19 -1.57(Change in Dollar)

  (2.42) (1.73)

  Conclusion: Disney's operating income is also impacted by the dollar. A stronger dollar seems to hurt operating income.

IV. Sensitivity to Inflation

- How sensitive is the firm's value and operating income to changes in the inflation rate?
- The answer to this question is important, because
  - it provides a measure of whether cash flows are positively or negatively impacted by inflation.
  - it then helps in the design of debt; whether the debt should be fixed or floating rate debt.
- If cash flows move with inflation, increasing (decreasing) as inflation increases (decreases), the debt should have a larger floating rate component.

Regression Results

- Regressing changes in firm value against changes in inflation over this period yields the following regression –

  Change in Firm Value = 0.18 + 2.71 (Change in Inflation Rate)
  (2.90) (0.80)

  Conclusion: Disney's firm value does seem to increase with inflation, but not by much (statistical significance is low)

- Regressing changes in operating cash flow against changes in inflation over this period yields the following regression –

  Change in Operating Income = 0.22 +8.79 (Change in Inflation Rate)
  (3.28) (2.40)

  Conclusion: Disney's operating income seems to increase in periods when inflation increases, suggesting that Disney does have pricing power.

Summarizing…

- Looking at the four macroeconomic regressions, we would conclude that
  - Disney's assets collectively have a duration of about 3 years
  - Disney is increasingly affected by economic cycles
  - Disney is hurt by a stronger dollar
  - Disney's operating income tends to move with inflation
- All of the regression coefficients have substantial standard errors associated with them. One way to reduce the error (a la bottom up betas) is to use sector-wide averages for each of the coefficients.

Bottom-up Estimates

	Sensitivity of firm value to				
Business	Interest rates	GDP Growth	Inflation	Currency	Disney weights
Studio entertainment	-3.7	0.56	1.41	-1.23	9.88%
Media networks	-4.5	0.7	-3.05	-1.58	58.92%
Park resorts	-6.47	0.22	-1.45	-3.21	29.88%
Consumer products	-4.88	0.13	-5.51	-3.01	1.32%
Disney	*-5.01*	*0.54*	*-2.16*	*-2.05*	

These weights reflect the estimated values of the businesses

Recommendations for Disney

- The debt issued should be long term and should have duration of about 5 years.
- A significant portion of the debt should be floating rate debt, reflecting Disney's capacity to pass inflation through to its customers and the fact that operating income tends to increase as interest rates go up.
- Given Disney's sensitivity to a stronger dollar, a portion of the debt should be in foreign currencies. The specific currency used and the magnitude of the foreign currency debt should reflect where Disney makes its revenues. Based upon 2008 numbers at least, this would indicate that about 20% of the debt should be in Euros and about 10% of the debt in Japanese Yen reflecting Disney's larger exposures in Europe and Asia. As its broadcasting businesses expand into Latin America, it may want to consider using either Mexican Peso or Brazilian Real debt as well.

Analyzing Disney's Current Debt

- Disney has $16 billion in debt with a face-value weighted average maturity of 5.38 years. Allowing for the fact that the maturity of debt is higher than the duration, this would indicate that Disney's debt is of the right maturity.
- Of the debt, about 10% is yen denominated debt but the rest is in US dollars. Based on our analysis, we would suggest that Disney increase its proportion of debt in other currencies to about 20% in Euros and about 5% in Chinese Yuan.
- Disney has no convertible debt and about 24% of its debt is floating rate debt, which is appropriate given its status as a mature company with significant pricing power. In fact, we would argue for increasing the floating rate portion of the debt to about 40%.

Adjusting Debt at Disney

- It can swap some of its existing fixed rate, dollar debt for floating rate, foreign currency debt. Given Disney's standing in financial markets and its large market capitalization, this should not be difficult to do.
- If Disney is planning new debt issues, either to get to a higher debt ratio or to fund new investments, it can use primarily floating rate, foreign currency debt to fund these new investments. Although it may be mismatching the funding on these investments, its debt matching will become better at the company level.

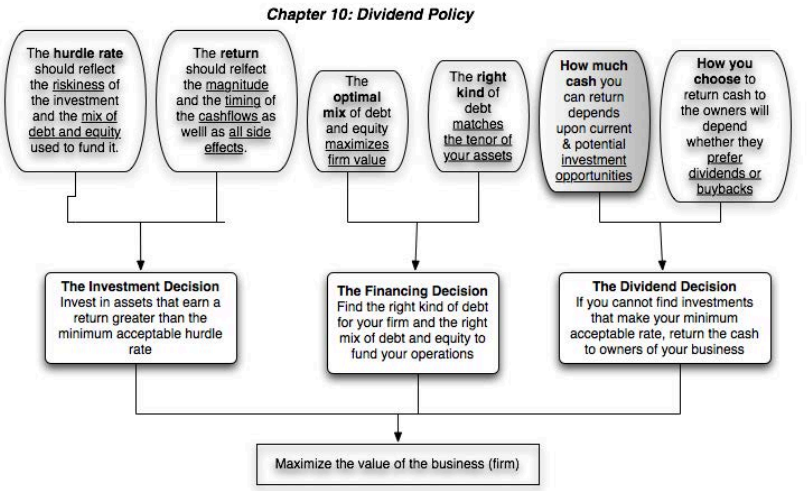
Debt Design for other firms..

Company	*The "right" debt*
Bookscape	• Long-term, because the store is a long-term investment; • Dollar-denominated, because all the cash flows are in dollars; and • Fixed rate debt, because Bookscape's lack of pricing power makes it unlikely that they can keep pace with inflation. *Exisitng debt: is an operating lease, which matches up to the right debt.*
Aracruz	• Long term, because a typical paper plant has a life in excess of twenty years; • Dollar-denominated, because the cash inflows are primarily in dollars; and • Given the volatility of paper prices, we would try to link the interest rate on debt to pulp prices, if possible. *Existing debt: is too $R based and has average maturity of 3.2 years. While Aracruz is is no position to renegotiate this debt right now, it should consider shifting to longer term, US $ based debt.*
Tata Chemicals	• Medium to long term debt, reflecting the life of the plant and equipment used to produce its fertilizer and chemical products • Fixed rate debt, since the company is unlikely to have much pricing power in this business. • Rupee denominated debt, since almost 90% of Tata Chemical's revenues come from India. *Existing debt: matches up for the most part though average duration (3 years) is lower than we would expect.*

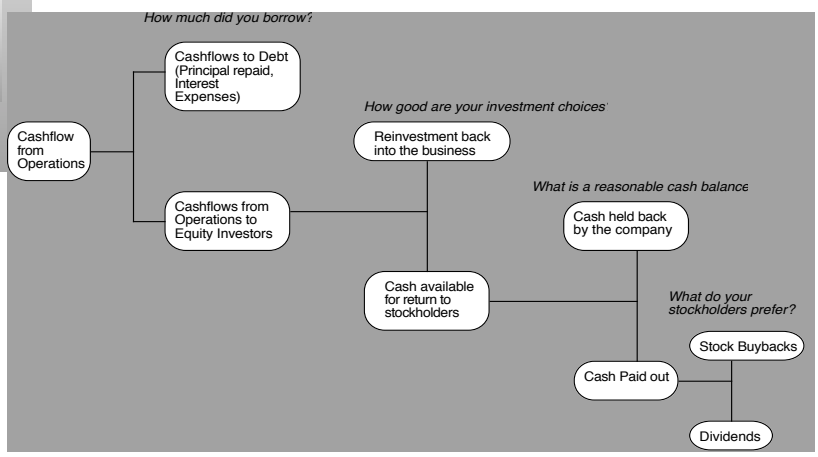
Returning Cash to the Owners: Dividend Policy

"Companies don't have cash. They hold cash for their stockholders."

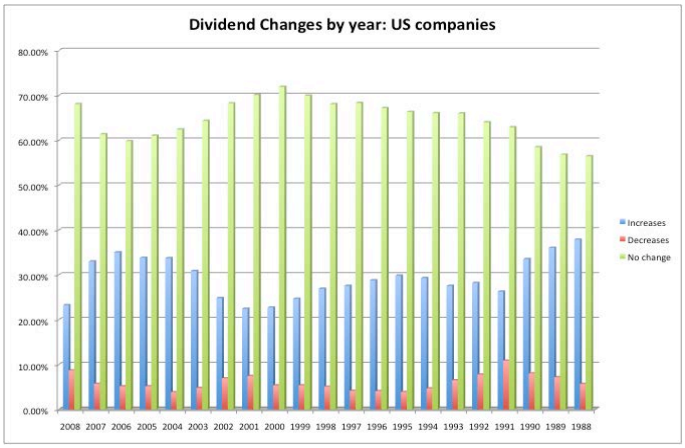
First Principles



Steps to the Dividend Decision…



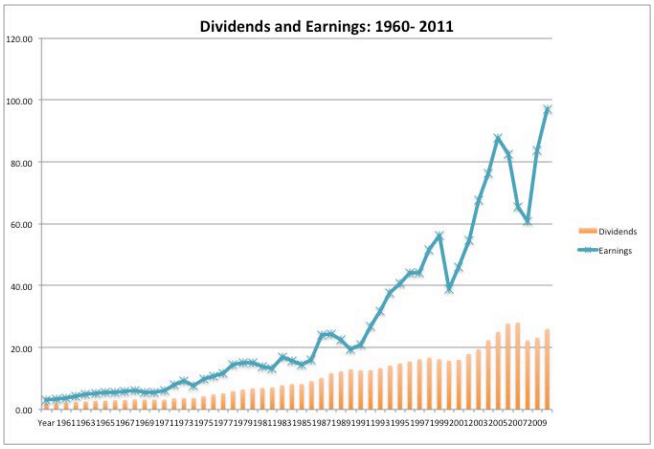
I. Dividends are sticky



The last quarter of 2008 put stickiness to the test.. Number of S&P 500 companies that…

Quarter	Dividend Increase	Dividend initiated	Dividend decrease	Dividend suspensions
Q1 2007	102	1	1	1
Q2 2007	63	1	1	5
Q3 2007	59	2	2	0
Q4 2007	63	7	4	2
Q1 2008	93	3	7	4
Q2 2008	65	0	9	0
Q3 2008	45	2	6	8
Q4 2008	32	0	17	10

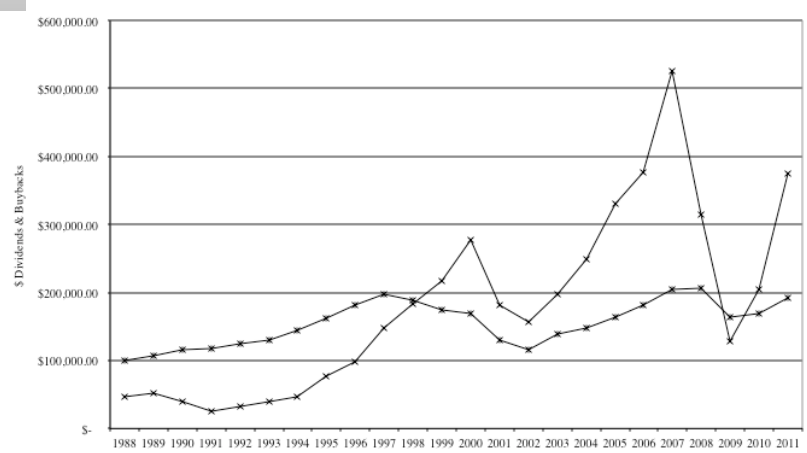
II. Dividends tend to follow earnings



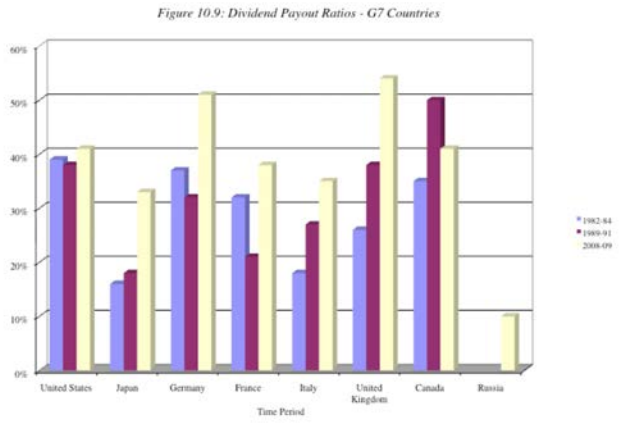
III. Are affected by tax laws…

Figure 10.11: Dividends on S&P 500 Companies

IV. More and more firms are buying back stock, rather than pay dividends...



V. And there are differences across countries…



Measures of Dividend Policy

- Dividend Payout = Dividends/ Net Income
  - Measures the percentage of earnings that the company pays in dividends
  - If the net income is negative, the payout ratio cannot be computed.
- Dividend Yield = Dividends per share/ Stock price
  - Measures the return that an investor can make from dividends alone
  - Becomes part of the expected return on the investment.

Dividend Payout Ratios: January 2012

Dividend Yields in the United States: January 2012

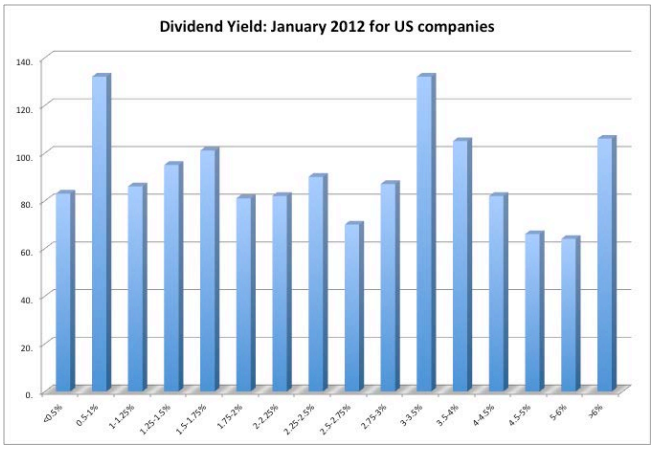
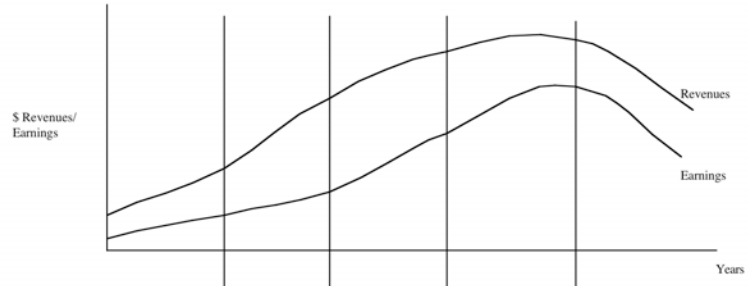


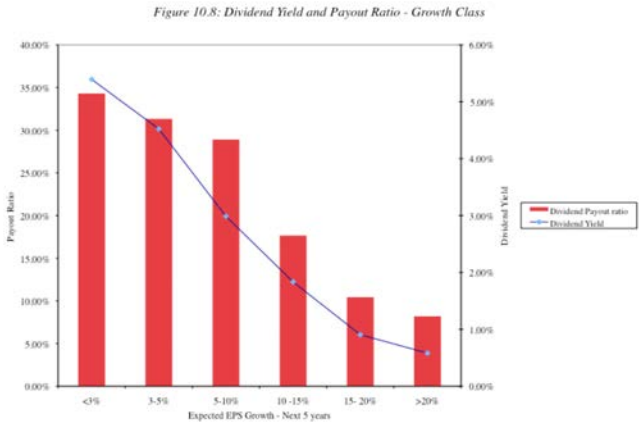
Figure 10.7: Life Cycle Analysis of Dividend Policy



External funding needs	High, but constrained by infrastructure	High, relative to firm value.	Moderates, relative to firm value.	Low, as projects dry up.	Low, as projects dry up.
Internal financing	Negative or low	Negative or low	Low, relative to funding needs	High, relative to funding needs	More than funding needs
Capacity to pay dividends	None	None	Very low	Increasing	High
Growth stage	Stage 1 Start-up	Stage 2 Rapid Expansion	Stage 3 High Growth	Stage 4 Mature Growth	Stage 5 Decline

Years

Dividend Yields and Payout Ratios: Growth Classes



Dividend Policy: Disney, Tata, Aracruz and Deutsche Bank

	Disney		Aracruz		Tata Chemicals		Deutsche Bank	
	2007	2008	2007	2008	2007	2008	2007	2008
Dividends per share	$0.35	$0.35	R$ 0.43	R$ 0.33	Rs 8.00	Rs 9.00	4.00 €	0.50 €
Earnings per share	$2.25	$2.28	R$ 1.01	-R$ 4.09	Rs 42.82	Rs 20.65	13.65 €	-7.61 €
Stock price at end of year	$32.28	$22.69	R$ 15.97	R$ 3.98	Rs 413.05	Rs 165.25	89.47 €	27.83 €
Dividend Yield	1.08%	1.54%	2.69%	8.19%	1.94%	5.45%	4.47%	1.8%
Dividend Payout	15.56%	15.35%	42.43%	-7.97%	18.68%	43.58%	29.30%	-6.57%

Three Schools Of Thought On Dividends

- 1. If
  - (a) there are no tax disadvantages associated with dividends
  - (b) companies can issue stock, at no cost, to raise equity, whenever needed
  - **Dividends do not matter, and dividend policy does not affect value.**
- 2. If dividends create a tax disadvantage for investors (relative to capital gains)
  - **Dividends are bad, and increasing dividends will reduce value**
- 3. If stockholders like dividends or dividends operate as a signal of future prospects,
  - **Dividends are good, and increasing dividends will increase value**

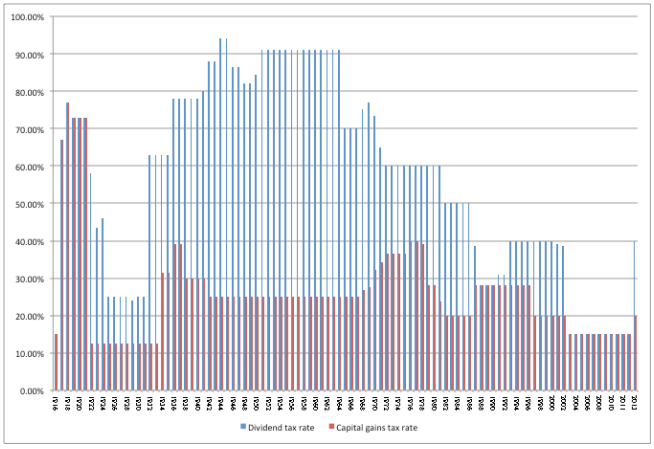
The balanced viewpoint

- If a company has excess cash, and few good investment opportunities (NPV>0), returning money to stockholders (dividends or stock repurchases) is good.
- If a company does not have excess cash, and/or has several good investment opportunities (NPV>0), returning money to stockholders (dividends or stock repurchases) is bad.

I. The Dividends don't matter school
The Miller Modigliani Hypothesis

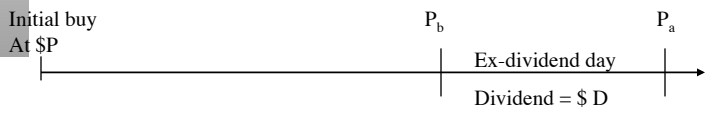
- The Miller-Modigliani Hypothesis: **Dividends do not affect value**
- Basis:
  - If a firm's investment policies (and hence cash flows) don't change, the value of the firm cannot change as it changes dividends.
  - If a firm pays more in dividends, it will have to issue new equity to fund the same projects. By doing so, it will reduce expected price appreciation on the stock but it will be offset by a higher dividend yield.
  - If we ignore personal taxes, investors have to be indifferent to receiving either dividends or capital gains.
- Underlying Assumptions:
  (a) There are no tax differences to investors between dividends and capital gains.
  (b) If companies pay too much in cash, they can issue new stock, with no flotation costs or signaling consequences, to replace this cash.
  (c) If companies pay too little in dividends, they do not use the excess cash for bad projects or acquisitions.

II. The Dividends are "bad" school: And the evidence to back them up…



What do investors in your stock think about dividends? Clues on the ex-dividend day!

Assume that you are the owner of a stock that is approaching an ex-dividend day and you know that dollar dividend with certainty. In addition, assume that you have owned the stock for several years.



Let P = Price at which you bought the stock a "while" back
P_b= Price before the stock goes ex-dividend
P_a=Price after the stock goes ex-dividend
D = Dividends declared on stock
t_o, t_{cg} = Taxes paid on ordinary income and capital gains respectively

Cashflows from Selling around Ex-Dividend Day

- The cash flows from selling before the ex-dividend day are-
$$P_b - (P_b - P)\, t_{cg}$$
- The cash flows from selling after the ex-dividend day are-
$$P_a - (P_a - P)\, t_{cg} + D(1-t_o)$$
- Since the average investor should be indifferent between selling before the ex-dividend day and selling after the ex-dividend day -
$$P_b - (P_b - P)\, t_{cg} = P_a - (P_a - P)\, t_{cg} + D(1-t_o)$$
- Some basic algebra leads us to the following:

$$\frac{P_b - P_a}{D} = \frac{1 - t_o}{1 - t_{cg}}$$

Intuitive Implications

- The relationship between the price change on the ex-dividend day and the dollar dividend will be determined by the difference between the tax rate on dividends and the tax rate on capital gains for the typical investor in the stock.

Tax Rates	*Ex-dividend day behavior*
If dividends and capital gains are taxed equally	Price change = Dividend
If dividends are taxed at a higher rate than capital gains	Price change < Dividend
If dividends are taxed at a lower rate than capital gains	Price change > Dividend

The empirical evidence…

1966-1969
- Ordinary tax rate = 70%
- Capital gains rate = 28%
- Price chg/ Dividend = 0.78

1981-1985
- Ordinary tax rate = 50%
- Capital gains rate = 20%
- Price chg/ Dividend = 0.85

1986-1990
- Ordinary tax rate = 28%
- Capital gains rate = 28%
- Price chg/ Dividend = 0.90

Dividend Arbitrage

- Assume that you are a tax exempt investor, and that you know that the price drop on the ex-dividend day is only 90% of the dividend. How would you exploit this differential?
  - Invest in the stock for the long term
  - Sell short the day before the ex-dividend day, buy on the ex-dividend day
  - Buy just before the ex-dividend day, and sell after.
  - _____

Example of dividend capture strategy with tax factors

- XYZ company is selling for $50 at close of trading May 3. On May 4, XYZ goes ex-dividend; the dividend amount is $1. The price drop (from past examination of the data) is only 90% of the dividend amount.
- The transactions needed by a tax-exempt U.S. pension fund for the arbitrage are as follows:
  - 1. Buy 1 million shares of XYZ stock cum-dividend at $50/share.
  - 2. Wait till stock goes ex-dividend; Sell stock for $49.10/share (50 - 1* 0.90)
  - 3. Collect dividend on stock.
- Net profit = - 50 million + 49.10 million + 1 million = $0.10 million

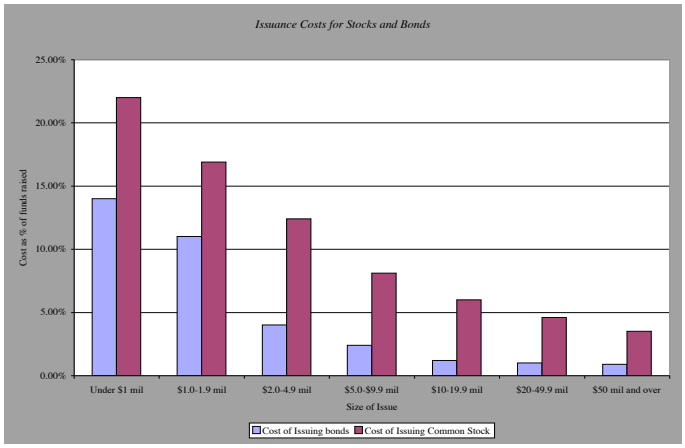
Two bad reasons for paying dividends
1. The bird in the hand fallacy

- **Argument**: Dividends now are more certain than capital gains later. Hence dividends are more valuable than capital gains. Stocks that pay dividends will therefore be more highly valued than stocks that do not.
- **Counter:** The appropriate comparison should be between dividends today and price appreciation today. The stock price drops on the ex-dividend day.

2. We have excess cash this year…

- **Argument**: The firm has excess cash on its hands this year, no investment projects this year and wants to give the money back to stockholders.
- **Counter**: So why not just repurchase stock? If this is a one-time phenomenon, the firm has to consider future financing needs. The cost of raising new financing in future years, especially by issuing new equity, can be staggering.

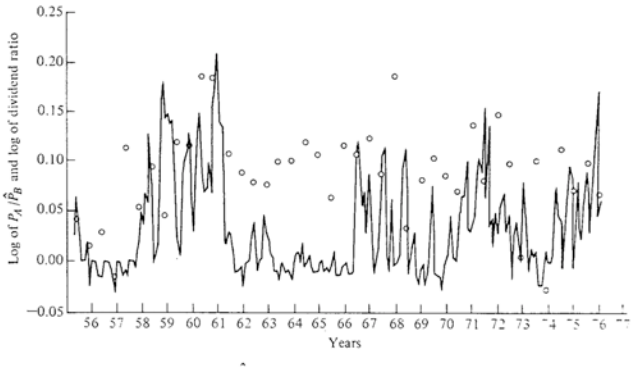
The Cost of Raising Capital



Three "good" reasons for paying dividends…

1. Clientele Effect: The investors in your company like dividends.
2. The Signalling Story: Dividends can be signals to the market that you believe that you have good cash flow prospects in the future.
3. The Wealth Appropriation Story: Dividends are one way of transferring wealth from lenders to equity investors (this is good for equity investors but bad for lenders)

1. The Clientele Effect
The "strange case" of Citizen's Utility



Class A shares pay cash dividend;

Class B shares offer the same amount as a stock dividend & can be converted to class A shares

Evidence from Canadian firms

Company	Premium for cash dividend shares
Consolidated Bathurst	+ 19.30%
Donfasco	+ 13.30%
Dome Petroleum	+ 0.30%
Imperial Oil	+12.10%
Newfoundland Light & Power	+ 1.80%
Royal Trustco	+ 17.30%
Stelco	+ 2.70%
TransAlta	+1.10%
Average across companies	+ 7.54%

A clientele based explanation

- **Basis**: Investors may form clienteles based upon their tax brackets. Investors in high tax brackets may invest in stocks which do not pay dividends and those in low tax brackets may invest in dividend paying stocks.
- **Evidence**: A study of 914 investors' portfolios was carried out to see if their portfolio positions were affected by their tax brackets. The study found that
  - (a) Older investors were more likely to hold high dividend stocks and
  - (b) Poorer investors tended to hold high dividend stocks

Results from Regression: Clientele Effect

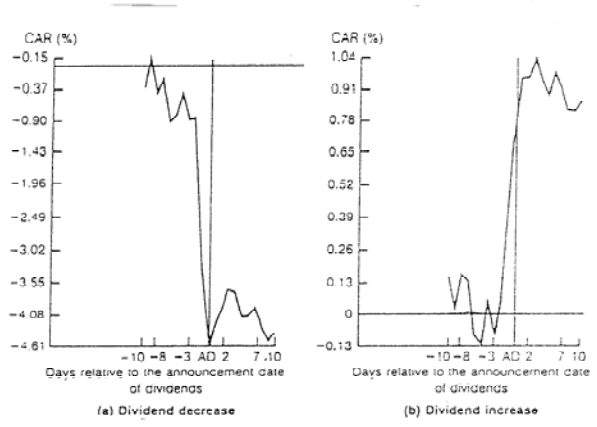
$$\text{Dividend Yield}_t = a + b\,\beta_t + c\,\text{Age}_t + d\,\text{Income}_t + e\,\text{Differential Tax Rate}_t + \varepsilon_t$$

Variable	Coefficient	Implies
Constant	4.22%	
Beta Coefficient	-2.145	Higher beta stocks pay lower dividends.
Age/100	3.131	Firms with older investors pay higher dividends.
Income/1000	-3.726	Firms with wealthier investors pay lower dividends.
Differential Tax Rate	-2.849	If ordinary income is taxed at a higher rate than capital gains, the firm pays less dividends.

Dividend Policy and Clientele

- Assume that you run a phone company, and that you have historically paid large dividends. You are now planning to enter the telecommunications and media markets. Which of the following paths are you most likely to follow?
- Courageously announce to your stockholders that you plan to cut dividends and invest in the new markets.
- Continue to pay the dividends that you used to, and defer investment in the new markets.
- Continue to pay the dividends that you used to, make the investments in the new markets, and issue new stock to cover the shortfall
- Other

2. Dividends send a signal" Increases in dividends are good news..



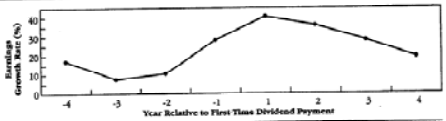
An Alternative Story..Increasing dividends is bad news…

TABLE 1
EARNINGS GROWTH RATES IN YEARS SURROUNDING FIRST-TIME DIVIDEND PAYMENTS BY 131 FIRMS IN THE PERIOD 1970 TO 1979*

Year Relative to Dividend Initiation	Number of Firms	Mean Earnings Growth Rate	Median Earnings Growth Rate
−4	150	14.9%	17.4%
−3	129	−7.1	7.6
−2	128	12.9	10.5
−1	131	42.7**	28.0
1	130	55.0**	40.2
2	130	22.0**	35.9
3	130	35.0**	28.2
4	128	3.5	19.5

* In our original research we compare earnings performance as earnings changes standardized by stock prices. Here we convert these values to earnings growth rates by assuming that the average price earnings ratio for the sample firms is ten.
** Significantly different from zero at the 10% level or lower.

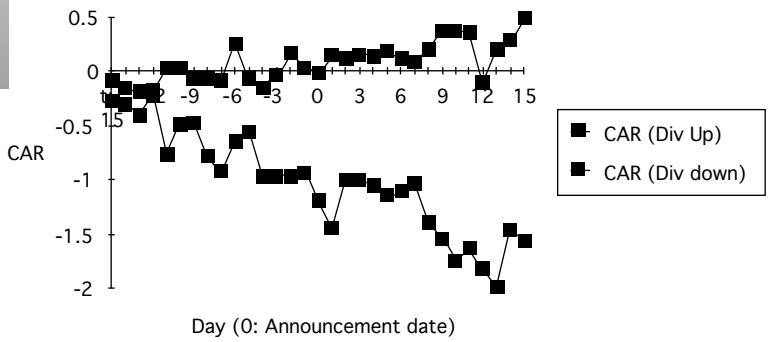
FIGURE 1
MEDIAN EARNINGS GROWTH RATES IN YEARS SURROUNDING FIRST TIME DIDIDEND PAYMENTS*



*In our original research we compare earnings performance as earnings changes standardized by stock prices. Here we convert these values to earnings growth rates by assuming that the average price-earnings ratio for the sample firms is ten.

3. Dividend increases may be good for stocks… but bad for bonds..

EXCESS RETURNS ON STRAIGHT BONDS AROUND DIVIDEND CHANGES



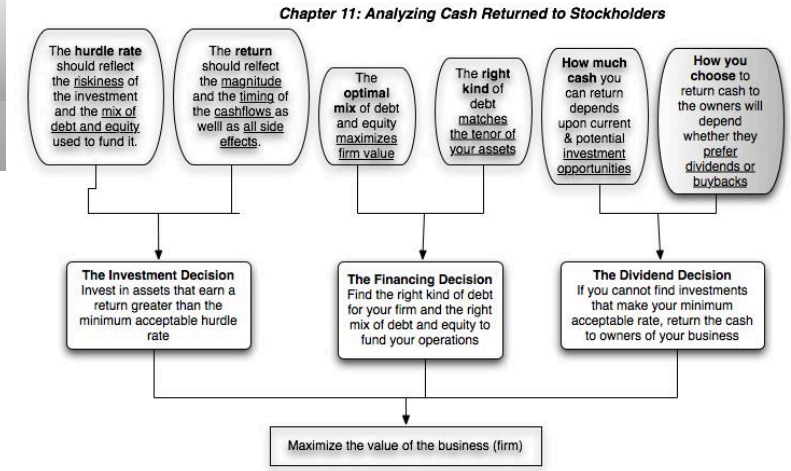
Day (0: Announcement date)

What managers believe about dividends…

Statement of Management Beliefs	*Agree*	*No Opinion*	*Disagree*
1. A firm's dividend payout ratio affects the price of the stock.	61%	33%	6%
2. Dividend payments provide a signaling device of future prospects.	52%	41%	7%
3. The market uses divided announcements as information for assessing firm value.	43%	51%	6%
4. Investors have different perceptions of the relative riskiness of dividends and retained earnings.	56%	42%	2%
5. Investors are basically indifferent with regard to returns from dividends and capital gains.	6%	30%	64%
6. A stockholder is attracted to firms that have dividend policies appropriate to the stockholder's tax environment.	44%	49%	7%
7. Management should be responsive to shareholders' preferences regarding dividends.	41%	49%	10%

Assessing Dividend Policy: Or how much cash is too much?

The Big Picture…



Assessing Dividend Policy

- Approach 1: The Cash/Trust Nexus
  - Assess how much cash a firm has available to pay in dividends, relative what it returns to stockholders. Evaluate whether you can trust the managers of the company as custodians of your cash.
- Approach 2: Peer Group Analysis
  - Pick a dividend policy for your company that makes it comparable to other firms in its peer group.

I. The Cash/Trust Assessment

Step 1: How much did the the company actually pay out during the period in question?

Step 2: How much could the company have paid out during the period under question?

Step 3: How much do I trust the management of this company with excess cash?

- How well did they make investments during the period in question?
- How well has my stock performed during the period in question?

How much has the company returned to stockholders?

- As firms increasing use stock buybacks, we have to measure cash returned to stockholders as not only dividends but also buybacks.
- For instance, for the four companies we are analyzing the cash returned looked as follows.

	Disney		Aracruz		Tata Chemicals		Deutsche Bank	
Year	*Dividends*	*Buybacks*	*Dividends*	*Buybacks*	*Dividends*	*Buybacks*	*Dividends*	*Buybacks*
2004	$430	$335	$74	$0	Rs 1,307	$0	€ 924	€ 0
2005	$490	$2,420	$109	$0	Rs 1,338	$0	€ 1,386	€ 0
2006	$519	$6,898	$199	$0	Rs 1,589	$0	€ 1,995	€ 0
2007	$637	$6,923	$139	$0	Rs 1,716	$0	€ 2,255	€ 0
2008	$664	$4,453	$252	$0	Rs 2,010	$0	€ 285	€ 0

A Measure of How Much a Company Could have Afforded to Pay out: FCFE

- The Free Cashflow to Equity (FCFE) is a measure of how much cash is left 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
  = Cash flows from Operations to Equity Investors
  - Preferred Dividends
  - Capital Expenditures
  - Working Capital Needs
  - Principal Repayments
  + Proceeds from New Debt Issues
  = Free Cash flow to Equity

Disney's FCFE

Year	Net Income	Capital Expenditures	Depreciation	Chg in WC	Change in Net Debt	FCFE
1999	$1,300	$6,113	$3,779	-$363	$176	-$495
2000	$920	$1,091	$2,195	-$1,184	$2,118	$5,326
2001	-$158	$2,015	$1,754	$244	-$77	-$740
2002	$1,236	$3,176	$1,042	$27	-$1,892	-$2,817
2003	$1,267	$1,034	$1,077	-$264	$1,145	$2,719
2004	$2,345	$1,484	$1,210	$51	$2,203	$4,223
2005	$2,533	$1,691	$1,339	$270	$699	$2,610
2006	$3,374	$1,300	$1,437	-$136	-$941	$2,706
2007	$4,687	$627	$1,491	$45	-$2,696	$2,810
2008	$4,427	$2,162	$1,582	$485	-$528	$2,834
Aggregate	$21,931	$20,693	$16,906	-$825	$207	$19,176
Average					$21	$1,918

Comparing Payout Ratios to Cash Returned Ratios.. Disney

Year	Dividends	Earnings	Payout Ratio	Cash Returned	FCFE	Cash/FCFE
1999	$0.00	$1,300.00	0.00%	$19.00	-$495.00	-3.84%
2000	$434.00	$920.00	47.17%	$600.00	$5,326.00	11.27%
2001	$438.00	-$158.00	-277.22%	$1,511.00	-$740.00	-204.19%
2002	$428.00	$1,236.00	34.63%	$428.00	-$2,817.00	-15.19%
2003	$429.00	$1,267.00	33.86%	$429.00	$2,719.00	15.78%
2004	$430.00	$2,345.00	18.34%	$765.00	$4,223.00	18.12%
2005	$490.00	$2,533.00	19.34%	$2,910.00	$2,610.00	111.49%
2006	$519.00	$3,374.00	15.38%	$7,417.00	$2,706.00	274.09%
2007	$637.00	$4,687.00	13.59%	$7,560.00	$2,810.00	269.04%
2008	$664.00	$4,427.00	15.00%	$5,117.00	$2,834.00	180.56%
Aggregate	$4,469.00	$21,931.00	20.38%	$26,756.00	$19,176.00	139.53%

Estimating FCFE when Leverage is Stable

Net Income

- (1- δ) (Capital Expenditures - Depreciation)
- (1- δ) Working Capital Needs

= Free Cash flow to Equity

δ = Debt/Capital Ratio

For this firm,

- Proceeds from new debt issues = Principal Repayments + δ (Capital Expenditures - Depreciation + Working Capital Needs)

An Example: FCFE Calculation

- Consider the following inputs for Microsoft in 1996. In 1996, Microsoft's FCFE was:
  - Net Income = $2,176 Million
  - Capital Expenditures = $494 Million
  - Depreciation = $ 480 Million
  - Change in Non-Cash Working Capital = $ 35 Million
  - Debt Ratio = 0%
- FCFE = Net Income - (Cap ex - Depr) (1-DR) - Chg WC (!-DR)
  = $ 2,176 - (494 - 480) (1-0) - $ 35 (1-0)
  = $ 2,127 Million

Microsoft: Dividends?

- By this estimation, Microsoft could have paid $ 2,127 Million in dividends/ stock buybacks in 1996. They paid no dividends and bought back no stock. Where will the $2,127 million show up in Microsoft's balance sheet?

FCFE for a Bank?

- To estimate the FCFE for a bank, we redefine reinvestment as investment in regulatory capital. Since any dividends paid deplete equity capital and retained earnings increase that capital, the FCFE is:

  $FCFE_{Bank}$= Net Income – Increase in Regulatory Capital (Book Equity)
- As a simple example, consider a bank with $ 10 billion in loans outstanding and book equity (Tier 1 capital) of $ 750 million. Assume that the bank wants to maintain its existing capital ratio of 7.5%, intends to grow its loan base by 10% (to $11 billion) and expects to generate $ 150 million in net income next year.

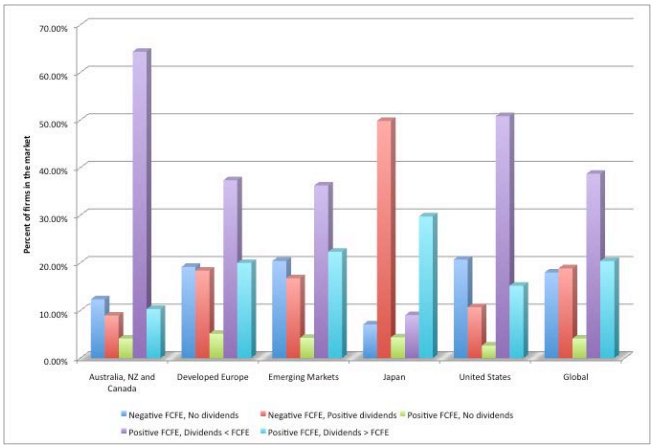
  FCFE = $150 million – (11,000-10,000)* (.075) = $75 million
- If this bank wants to increase its regulatory capital ratio to 8% (for precautionary purposes) while increasing its loan base to $ 11 billion

  FCFE = $ 150 million – ($ 880 - $750) = $20 million

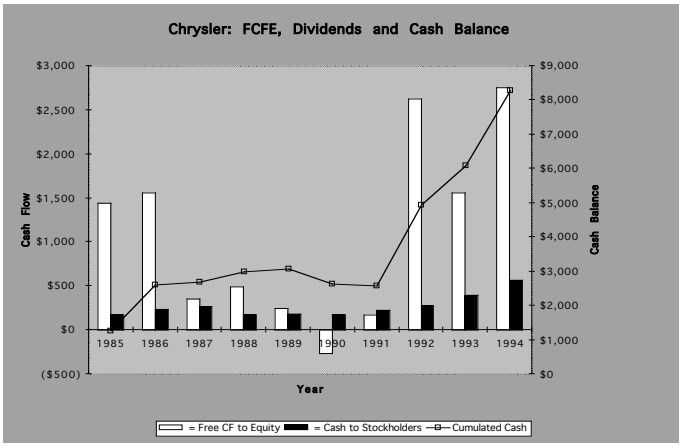
Deutsche Bank's FCFE

	Current	2009	2010	2011	2012	2013	Steady state (2014)
Asset Base	312,882 €	325,398 €	338,414 €	351,950 €	366,028 €	380,669 €	392,089 €
Capital ratio	10.20%	10.16%	10.12%	10.08%	10.04%	10.00%	10.00%
Regulatory Capital	31,914 €	33,060 €	34,247 €	35,477 €	36,749 €	38,067 €	39,209 €
Change in regulatory capital		1,146 €	1,187 €	1,229 €	1,273 €	1,318 €	1,142 €
ROE	9.40%	9.52%	9.64%	9.76%	9.88%	10.00%	10.00%
Net Income	3,000 €	3,147 €	3,302 €	3,463 €	3,631 €	3,807 €	3,921 €
- Investment in Regulatory Capital		1,146 €	1,187 €	1,229 €	1,273 €	1,318 €	1,142 €
FCFE		2,001 €	2,114 €	2,233 €	2,358 €	2,489 €	2,779 €

Dividends versus FCFE: Cash Deficit versus Buildup



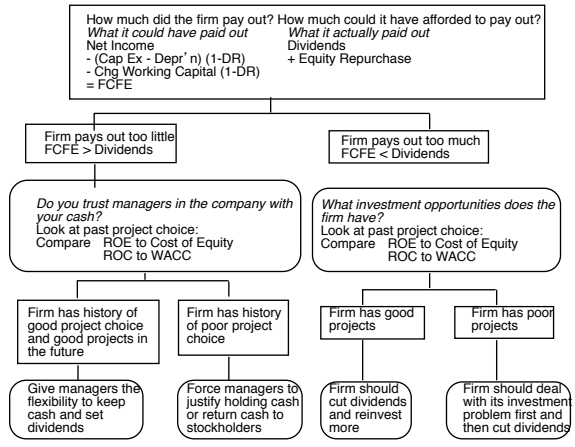
The Consequences of Failing to pay FCFE



⌛ Application Test: Estimating your firm's FCFE

In General,	If cash flow statement used
Net Income	Net Income
+ Depreciation & Amortization	+ Depreciation & Amortization
- Capital Expenditures	+ Capital Expenditures
- Change in Non-Cash Working Capital	+ Changes in Non-cash WC
- Preferred Dividend	+ Preferred Dividend
- Principal Repaid	+ Increase in LT Borrowing
+ New Debt Issued	+ Decrease in LT Borrowing
	+ Change in ST Borrowing
= FCFE	= FCFE
Compare to	
Dividends (Common)	-Common Dividend
+ Stock Buybacks	- Decrease in Capital Stock
	+ Increase in Capital Stock

A Practical Framework for Analyzing Dividend Policy



A Dividend Matrix

Dividends paid out relative to FCFE	Quality of projects taken: ROE versus Cost of Equity	
	Poor projects	Good projects
Cash Surplus	*Cash Surplus + Poor Projects* Significant pressure to pay out more to stockholders as dividends or stock buybacks	*Cash Surplus + Good Projects* Maximum flexibility in setting dividend policy
Cash Deficit	*Cash Deficit + Poor Projects* Cut out dividends but real problem is in investment policy.	*Cash Deficit + Good Projects* Reduce cash payout, if any, to stockholders

More on Microsoft

- Microsoft had accumulated a cash balance of $ 43 billion by 2003 by paying out no dividends while generating huge FCFE. At the end of 2003, there was no evidence that
  - Microsoft was being penalized for holding such a large cash balance
  - Stockholders were becoming restive about the cash balance. There was no hue and cry demanding more dividends or stock buybacks.
- Why?
- In 2004, Microsoft announced a huge special dividend of $ 33 billion and made clear that it would try to return more cash to stockholders in the future. What do you think changed?

Case 1: Disney in 2003

- FCFE versus Dividends
  - Between 1994 & 2003, Disney generated $969 million in FCFE each year.
  - Between 1994 & 2003, Disney paid out $639 million in dividends and stock buybacks each year.
- Cash Balance
  - Disney had a cash balance in excess of $ 4 billion at the end of 2003.
- Performance measures
  - Between 1994 and 2003, Disney has generated a return on equity, on it's projects, about 2% less than the cost of equity, on average each year.
  - Between 1994 and 2003, Disney's stock has delivered about 3% less than the cost of equity, on average each year.
  - The underperformance has been primarily post 1996 (after the Capital Cities acquisition).

Can you trust Disney's management?

- Given Disney's track record between 1994 and 2003, if you were a Disney stockholder, would you be comfortable with Disney's dividend policy?
  - Yes
  - No
- Does the fact that the company is run by Michael Eisner, the CEO for the last 10 years and the initiator of the Cap Cities acquisition have an effect on your decision.
  - Yes
  - No

The Bottom Line on Disney Dividends in 2003

- Disney could have afforded to pay more in dividends during the period of the analysis.
- It chose not to, and used the cash for acquisitions (Capital Cities/ABC) and ill fated expansion plans (Go.com).
- While the company may have flexibility to set its dividend policy a decade ago, its actions over that decade have frittered away this flexibility.
- Bottom line: Large cash balances would not be tolerated in this company. Expect to face relentless pressure to pay out more dividends.

Following up: Disney in 2009

- Between 2004 and 2008, Disney made significant changes:
  - It replaced its CEO, Michael Eisner, with a new CEO, Bob Iger, who at least on the surface seemed to be more receptive to stockholder concerns.
  - It's stock price performance improved (positive Jensen's alpha)
  - It's project choice improved (ROC moved from being well below cost of capital to above)
- The firm also shifted from cash returned < FCFE to cash returned > FCFE and avoided making large acquisitions.
- If you were a stockholder in 2009 and Iger made a plea to retain cash in Disney to pursue investment opportunities, would you be more receptive?

a) Yes
b) No

Case 2: Aracruz Celulose - Assessment of dividends paid in 2003

- FCFE versus Dividends
  - Between 1999 and 2003, Aracruz generated $37 million in FCFE each year.
  - Between 1999 and 2003, Aracruz paid out $80 million in dividends and stock buybacks each year.
- Performance measures
  - Between 1999 and 2003, Aracruz has generated a return on equity, on it's projects, about 1.5% more than the cost of equity, on average each year.
  - Between 1999 and 2003, Aracruz's stock has delivered about 2% more than the cost of equity, on average each year.

Aracruz: Its your call..

- Aracruz's managers have asked you for permission to cut dividends (to more manageable levels). Are you likely to go along?
  - ❑ Yes
  - ❑ No
- The reasons for Aracruz's dividend problem lie in it's equity structure. Like most Brazilian companies, Aracruz has two classes of shares - common shares with voting rights and preferred shares without voting rights. However, Aracruz has committed to paying out 35% of its earnings as dividends to the preferred stockholders. If they fail to meet this threshold, the preferred shares get voting rights. If you own the preferred shares, would your answer to the question above change?
  - ❑ Yes
  - ❑ No

Mandated Dividend Payouts

- Assume now that the government decides to mandate a minimum dividend payout for all companies. Given our discussion of FCFE, what types of companies will be hurt the most by such a mandate?
  - Large companies making huge profits
  - Small companies losing money
  - High growth companies that are losing money
  - High growth companies that are making money

What if the government mandates a maximum dividend payout? (No company can pay more than the mandated payout ratio)

Aracruz: Ready to reassess?

- In 2008, Aracruz had a catastrophic year, with losses in excess of a billion. The reason for the losses, though, was speculation on the part of the company's managers on currency derivatives. The FCFE in 2008 was -$1.226 billion but the company still had to pay out $448 million in dividends. As owners of the non-voting, dividend receiving shares, would you reassess your unwillingness to accept dividend cuts now?

a) Yes
b) No

Case 3: BP: Summary of Dividend Policy: 1982-1991

	Summary of calculations			
	Average	*Standard Deviation*	*Maximum*	*Minimum*
Free CF to Equity	$571.10	$1,382.29	$3,764.00	($612.50)
Dividends	$1,496.30	$448.77	$2,112.00	$831.00
Dividends+Repurchases	$1,496.30	$448.77	$2,112.00	$831.00
Dividend Payout Ratio	84.77%			
Cash Paid as % of FCFE	262.00%			
ROE - Required return	-1.67%	11.49%	20.90%	-21.59%

BP: Just Desserts!

B.P.'s Shares Plummet After Dividend Is Slashed

By MATTHEW L. WALD

British Petroleum said yesterday that it would cut its dividend by 65 percent, take a pretax restructuring charge of $1.82 billion for the second quarter and lay off 11,500 employees, or 10 percent of its worldwide work force. The moves came five weeks after Robert B. Horton, B.P.'s chairman, resigned under pressure from the company's outside directors.

Analysts anticipated a dividend cut by the oil company, the world's third largest, but the one announced was at the low end of their expectations. In response, shares of the company's American depositary shares, each of which represents 12 shares of the London-based company, dropped 43.625, or 7.36 percent, to $45.375. It was the most active issue on the New York Stock Exchange, with 5.89 million shares traded.

The Royal Dutch/Shell group also reported a disappointing quarter yesterday, with earnings on a replacement cost basis — excluding gains or losses on inventory holdings — of $665 million, down 22 percent.

Quick Recovery Seems Unlikely

Adding to the gloom at B.P., the new chief executive, David A. G. Simon, said the prospects for a quick recovery were poor. "External trading conditions are expected to remain difficult, particularly for the downstream oil and chemicals businesses, with growth prospects for the world's economies remaining uncertain," he said in a statement. Downstream oil is an industry term for refining and marketing operations, as distinct from oil production.

Downstream margins in the United States would be hurt later this year, he predicted, when clean air rules take effect and gasoline must be reformulated to reduce pollution. "In Europe, recovery will depend upon seasonal heating oil de- md," Mr. Simon said.

The crude oil marke,, he predicted, would remain balanced unless Iraqi oil was allowed to re-enter the market. The compar y said it was well positioned to t- e advantage of any

The giant British oil company bet on rising oil prices.

increase in oil prices, but the company's oil production in the United States is declining. B.P. is the largest producer in Alaska.

The market for petrochemicals in Europe remains weak.

B.P.'s second quarter profits, before one-time transactions, declined to $183 million from $513 million, valuing inventories on a replacement-cost basis. James J. Murchie, an analyst at Stanford C. Bernstein, estimated that after exceptional items, earnings per share fell to 36 cents in the second quarter, compared with 62 cents a year earlier.

Analysts attributed B.P.'s problems to the company's acquisitions in the last few years, and heavy capital expenditures. Summing up the company's recent history, Frank P. Knutel of Prudential Securities Research said, "Debt rose, interest expense rose, and profits have gone to hell."

Mr. Murchie, who worked for Standard Oil of Ohio and then B.P. after B.P. acquired Sohio, said, "What you've got is a company that thought oil prices were going to go to $35 and spent like it, in terms of capital." If B.P.'s costs of finding oil are the same as the industry average, he said, then the company has been spending enough to replace 120 percent to 130 percent of its annual production, which is not a successful strategy if prices do not rise.

In addition, he said, the company had been spending twice as much on its refining and marketing operation as it was recording in depreciation.

Another analyst at a large stock brokerage house, who spoke on the condition of anonymity, said, "They took all the old Sohio stations and turned them into modern B.P. stations; they took all the B.P. stations and turned them into ultramodern stations."

The analyst said that while some of the cuts were obvious, "some came

Continued on Page D2

Britain's Oil Colossus

Managing changes in dividend policy

	Periods Around Announcement Date		
Category	*Prior Quarter*	*Announcement Period*	*Quarter After*
Simultaneous announcement of earnings decline/loss (N = 176)	–7.23%	–8.17%	+1.80%
Prior announcement of earnings decline or loss (N = 208)	–7.58%	–5.52%	+1.07%
Simultaneous announcement of investment or growth opportunities (N = 16)	–7.69%	–5.16%	+8.79%

Case 4: The Limited: Summary of Dividend Policy: 1983-1992

	Summary of calculations			
	Average	*Standard Deviation*	*Maximum*	*Minimum*
Free CF to Equity	($34.20)	$109.74	$96.89	($242.17)
Dividends	$40.87	$32.79	$101.36	$5.97
Dividends+Repurchases	$40.87	$32.79	$101.36	$5.97
Dividend Payout Ratio	18.59%			
Cash Paid as % of FCFE	-119.52%			
ROE - Required return	1.69%	19.07%	29.26%	-19.84%

Growth Firms and Dividends

- High growth firms are sometimes advised to initiate dividends because its increases the potential stockholder base for the company (since there are some investors - like pension funds - that cannot buy stocks that do not pay dividends) and, by extension, the stock price. Do you agree with this argument?
  - Yes
  - No

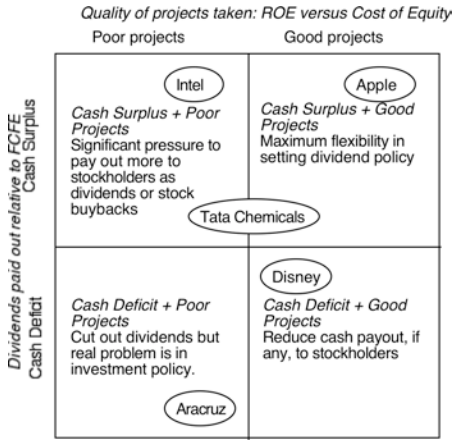
  Why?

5. Tata Chemicals: The Cross Holding Effect: 2009

	Average	Standard Deviation	Maximum	Minimum
Free CF to Equity	INR 2,258	INR 6,557	INR 11,176	(INR 7,141)
Dividends	INR 1,592	INR 290	INR 2,010	INR 1,307
Dividends+Repurchases	INR 1,592	INR 290	INR 2,010	INR 1,307
Dividend Payout Ratio	25.65%			
Cash Paid as % of FCFE	70.50%			
ROE	17.34%			
Return on Stock	17.97%			
Required Return	19.89%			
ROE - Required return	-2.55%			
Actual - Required Return	-1.91%			

Much of the cash held back was invested in other Tata companies.

Summing up…



⌛ Application Test: Assessing your firm's dividend policy

- Compare your firm's dividends to its FCFE, looking at the last 5 years of information.
- Based upon your earlier analysis of your firm's project choices, would you encourage the firm to return more cash or less cash to its owners?
- If you would encourage it to return more cash, what form should it take (dividends versus stock buybacks)?

II. The Peer Group Approach - Disney

Company Name	*Market Cap*	*Payout Ratio*	*Dividend Yield*
Astral Media Inc. 'A'	$1,221.70	0.00%	0.00%
CBS Corp. 'B'	$5,103.70	53.52%	14.22%
Central European Media Enterps	$827.70	0.00%	0.00%
Corus Entertainment Inc	$806.50	0.00%	0.00%
CTC Media Inc	$715.10	0.00%	0.00%
Discovery Communications Inc	$3,860.60	NA	0.00%
Disney (Walt)	$41,114.70	17.11%	1.67%
DreamWorks Animation	$2,074.30	0.00%	0.00%
Hearst-Argyle Television Inc	$589.10	40.59%	4.46%
IAC/InterActiveCorp	$2,215.30	NA	0.00%
Lions Gate Entertainment Corp	$705.60	NA	0.00%
News Corp.	$23,245.30	9.07%	1.35%
Regal Entertainment Group	$1,447.60	176.09%	12.70%
Scripps Networks	$3,422.30	NA	0.00%
Time Warner	$34,112.40	22.17%	2.63%
Viacom Inc. 'B'	$10,669.30	0.00%	0.00%
World Wrestling Ent.	$749.50	198.45%	13.79%
Average		39.77%	2.99%

Peer Group Approach: Deutsche Bank

Company Name	*Dividend Yield*	*Dividend Payout*
HSBC Holdings plc (LSE:HSBA)	0.00%	0.00%
Banco Santander, S.A. (CATS:SAN)	0.00%	0.00%
Intesa Sanpaolo SpA (CM:ISP)	0.00%	0.00%
Banco Bilbao Vizcaya Argentaria (CATS:BBVA)	0.00%	0.00%
BNP Paribas (ENXTPA:BNP)	0.00%	0.00%
UBS AG (VIRTX:UBSN)	0.00%	0.00%
UniCredito Italiano S.p.A. (CM:UCG)	0.00%	0.00%
Royal Bank of Scotland Group plc (LSE:RBS)	22.06%	98.61%
Credit Suisse Group (VIRTX:CSGN)	8.68%	0.00%
Societe Generale Group (ENXTPA:GLE)	0.00%	0.00%
Standard Chartered PLC (LSE:STAN)	2.84%	22.98%
Credit Agricole SA (ENXTPA:ACA)	0.00%	0.00%
Barclays plc (LSE:BARC)	0.00%	0.00%
Nordea Bank AB (OM:NDA SEK)	9.00%	45.03%
Deutsche Bank AG (DB:DBK)	15.80%	119.37%
Banca Monte dei Paschi di Siena SpA (CM:BMPS)	0.00%	0.00%
Lloyds TSB Group plc (LSE:LLOY)	35.76%	87.14%
Banco Popular Espanol SA (CATS:POP)	0.00%	0.00%
KBC Group NV (ENXTBR:KBC)	17.04%	152.94%
Svenska Handelsbanken AB (OM:SHB A)	11.54%	60.24%
National Bank of Greece SA (ATSE:ETE)	2.64%	12.49%
Unione di Banche Italiane Scpa (CM:UBI)	8.89%	64.61%
Average	6.10%	30.16%

Peer Group Approach: Aracruz and Tata Chemicals

		Paper & Pulp				Diversified Chemicals		
	Aracruz	Emerging	US	Global	Tata Chemicals	Emerging	US	Global
Dividend Yield	8.19%	3.15%	2.08%	2.81%	5.45%	3.87%	2.54%	3.18%
Payout	NA	43.93%	28.92%	35.55%	43.58%	34.33%	19.75%	26.20%

Going beyond averages… Looking at the market

- Regressing dividend yield and payout against expected growth across all US companies in January 2009 yields:

PYT = 0.683 – 0.185 ROE -1.07 STD – 0.313EGR
(27.41) (3.06) (10.85) (2.60)

R^2 = 13.3%

YLD = 0.039 – 0.039 STD – 0.010 INS – 0.093 EGR
(37.38) (9.39) (2.62) (16.23)

R^2 = 32.2%

- PYT = Dividend Payout Ratio = Dividends/Net Income
- YLD = Dividend Yield = Dividends/Current Price
- ROE – Return on Equity
- EGR = Expected growth rate in earnings over next 5 years (analyst estimates)
- STD = Standard deviation in equity values
- INS = Insider holdings as a percent of outstanding stock

Using the market regression on Disney

- To illustrate the applicability of the market regression in analyzing the dividend policy of Disney, we estimate the values of the independent variables in the regressions for the firm.
  - Insider holdings at Disney (as % of outstanding stock) = 7.70%
  - Standard Deviation in Disney stock prices = 19.30%
  - Disney's ROE = 13.05%
  - Expected growth in earnings per share (Analyst estimates) = 14.50%
- Substituting into the regression equations for the dividend payout ratio and dividend yield, we estimate a predicted payout ratio:

  Predicted Payout = 0.683 – 0.185 (.1305) -1.07 (.1930) – 0.313 (.145) =0.4069

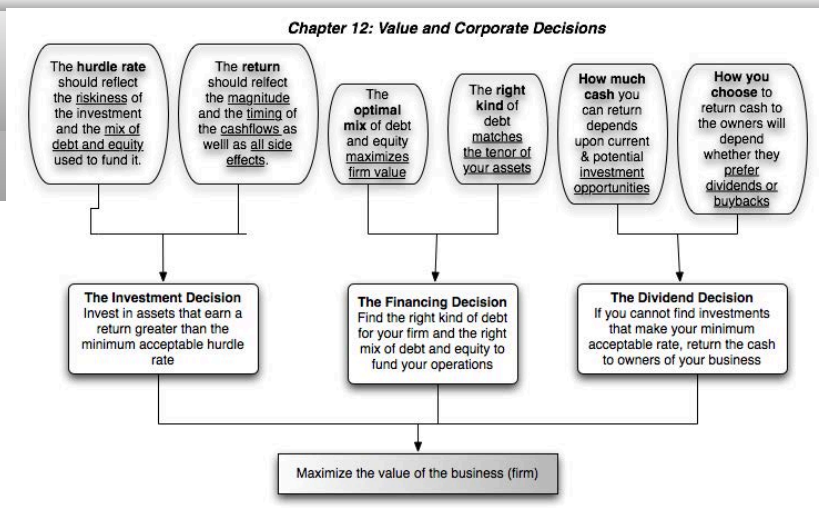
  Predicted Yield = 0.039 – 0.039 (.1930) – 0.010 (.077) – 0.093 (.145) = .0172
- Based on this analysis, Disney with its dividend yield of 1.67% and a payout ratio of approximately 20% is paying too little in dividends. This analysis, however, fails to factor in the huge stock buybacks made by Disney over the last few years.

Valuation

Cynic: A person who knows the price of everything but the value of nothing..

Oscar Wilde

First Principles



Three approaches to valuation

- Intrinsic valuation: The value of an asset is a function of its fundamentals – cash flows, growth and risk. In general, discounted cash flow models are used to estimate intrinsic value.
- Relative valuation: The value of an asset is estimated based upon what investors are paying for similar assets. In general, this takes the form of value or price multiples and comparing firms within the same business.
- Contingent claim valuation: When the cash flows on an asset are contingent on an external event, the value can be estimated using option pricing models.

Discounted Cashflow Valuation: Basis for Approach

$$\text{Value of an asset} = \sum_{t=1}^{t=n} \frac{\text{Expected Cash flow in period t}}{(1+r)^t}$$

where,

- n = Life of the asset
- r = Discount rate reflecting the riskiness of the estimated cashflows

Equity Valuation

- The value of equity is obtained by discounting expected cashflows to equity, i.e., the residual cashflows after meeting all expenses, tax obligations and interest and principal payments, at the cost of equity, i.e., the rate of return required by equity investors in the firm.

$$\text{Value of Equity} = \sum_{t=1}^{t=n} \frac{\text{CF to Equity}_t}{(1+k_e)^t}$$

where,

CF to Equityt = Expected Cashflow to Equity in period t

ke = Cost of Equity

- The dividend discount model is a specialized case of equity valuation, and the value of a stock is the present value of expected future dividends.

Firm Valuation

- The value of the firm is obtained by discounting expected cashflows to the firm, i.e., the residual cashflows after meeting all operating expenses and taxes, but prior to debt payments, at the weighted average cost of capital, which is the cost of the different components of financing used by the firm, weighted by their market value proportions.

$$\text{Value of Firm} = \sum_{t=1}^{t=n} \frac{\text{CF to Firm}_t}{(1+\text{WACC})^t}$$

where,

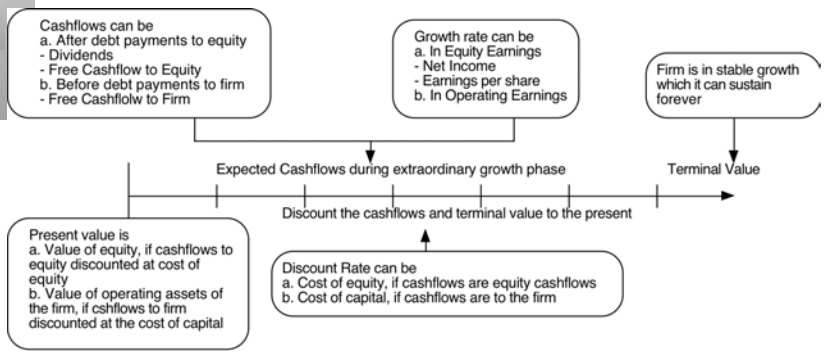
CF to Firmt = Expected Cashflow to Firm in period t

WACC = Weighted Average Cost of Capital

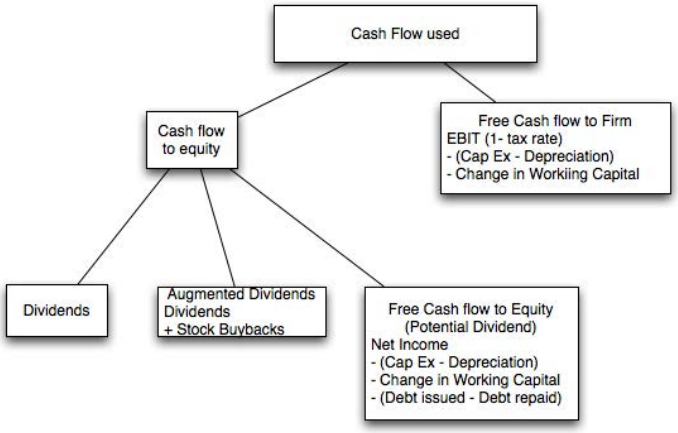
Choosing a Cash Flow to Discount

- When you cannot estimate the free cash flows to equity or the firm, the only cash flow that you can discount is dividends. For financial service firms, it is difficult to estimate free cash flows. For Deutsche Bank, we will be discounting dividends.
- If a firm's debt ratio is not expected to change over time, the free cash flows to equity can be discounted to yield the value of equity. For Aracruz, we will discount free cash flows to equity.
- If a firm's debt ratio might change over time, free cash flows to equity become cumbersome to estimate. Here, we would discount free cash flows to the firm. For Disney, we will discount the free cash flow to the firm.

The Ingredients that determine value.



I. Estimating Cash Flows



Dividends and Modified Dividends for Deutsche Bank

- In 2007, Deutsche Bank paid out dividends of 2,146 million Euros on net income of 6,510 million Euros. In early 2008, we valued Deutsche Bank using the dividends it paid in 2007. We are assuming the dividends are not only reasonable but sustainable.
- In early 2009, in the aftermath of the crisis, Deutsche Bank's dividend policy was in flux. The net income had plummeted and capital ratios were being reassessed. To forecast future dividends, we first forecast net income (ROE* Asset Base) and then estimated the investments in regulatory capital:

	Current	1	2	3	4	5
Asset Base	312,882 €	325,398 €	338,414 €	351,950 €	366,028 €	380,669 €
Capital ratio	10.20%	10.16%	10.12%	10.08%	10.04%	10.00%
Regulatory Capital	31,914 €	33,060 €	34,247 €	35,477 €	36,749 €	38,067 €
Change in Regulatory Capital		1,146 €	1,187 €	1,229 €	1,273 €	1,318 €
ROE	9.40%	9.52%	9.64%	9.76%	9.88%	10.00%
Net Income	3,000 €	3,147 €	3,302 €	3,463 €	3,631 €	3,807 €
- Investment in Regulatory Capital		1,146 €	1,187 €	1,229 €	1,273 €	1,318 €
FCFE (Potential Dividend)		2,001 €	2,114 €	2,233 €	2,358 €	2,489 €

Estimating FCFE : Tata Chemicals

Year	Net Income	Cap Ex	Depreciation	Change in WC	Change in Debt	Equity Reinvestment	Equity Reinvestment Rate
2003-04	$3,418	$357	$1,442	-$557	-$2,771	$1,129	33.04%
2004-05	$4,550	$692	$1,377	-$493	$5,448	-$6,626	-145.64%
2005-06	$5,156	$11,730	$1,389	$2,823	$867	$12,297	238.51%
2006-07	$6,338	$1,196	$1,504	-$1,662	-$4,411	$2,442	38.53%
2007-08	$11,571	$28,956	$1,488	$88	$17,054	$10,502	90.76%
Aggregate	$31,033	$42,930	$7,199	$200	$16,187	$19,744	63.62%

Estimating FCFF: Disney

	2008	2008 normalized
EBIT	$7,030	$7,030
EBIT (`1-t)	$4,359	$4,359
+ Depreciaton	$1,839	$1,839
- Cap Ex	$2,752	$3,939
- Change in WC	$241	$241
FCFF	$3,205	$2,018
Reinvestment	$1,154	$2,341
Reinvestment Rate	26.48%	53.71%

II. Discount Rates

- **Critical ingredient** in discounted cashflow valuation. Errors in estimating the discount rate or mismatching cashflows and discount rates can lead to serious errors in valuation.
- At an intuitive level, the discount rate used should be consistent with both the **riskiness** and the **type of cashflow** being discounted.
- The cost of equity is the rate at which we discount cash flows to equity (dividends or free cash flows to equity). The cost of capital is the rate at which we discount free cash flows to the firm.

Cost of Equity: Deutsche Bank 2008 versus 2009

- In early 2008, we estimated a beta of 1.162 for Deutsche Bank, which used in conjunction with the Euro risk-free rate of 4% (in January 2008) and a risk premium of 4.50% (the mature market risk premium in early 2008), yielded a cost of equity of 9.23%.

  $\text{Cost of Equity}_{\text{Jan 2008}} = \text{Riskfree Rate}_{\text{Jan 2008}} + \text{Beta}^* \text{ Mature Market Risk Premium}$

  $= 4.00\% + 1.162\ (4.5\%) = 9.23\%$

  (We used the same beta for early 2008 and early 2009. We could have looked at the betas for banks in early 2008 and used that number instead)

- In early 2009, the Euro riskfree rate had dropped to 3.6% and the equity risk premium had risen to 6% for mature markets:

  $\text{Cost of equity}_{\text{jan 2009}} = \text{Riskfree Rate}_{\text{Jan 2009}} + \text{Beta (Equity Risk Premium)}$

  $= 3.6\% + 1.162\ (6\%) = 10.572\%$

Cost of Equity: Tata Chemicals

- We will be valuing Tata Chemicals in rupee terms. (That is a choice. Any company can be valued in any currency).
- Earlier, we estimated a beta for equity of 0.945 for Tata Chemical's operating assets . With a nominal rupee risk-free rate of 4 percent and an equity risk premium of 10.51% for India (also estimated in Chapter 4), we arrive at a cost of equity of 13.93%.

  Cost of Equity = 4% + 0.945 (10.51%) = 13.93%

Current Cost of Capital: Disney

- The beta for Disney's stock in May 2009 was 0.9011. The T. bond rate at that time was 3.5%. Using an estimated equity risk premium of 6%, we estimated the cost of equity for Disney to be 8.91%:

  Cost of Equity = 3.5% + 0.9011(6%) = 8.91%
- Disney's bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 6%. Using a marginal tax rate of 38%, the after-tax cost of debt for Disney is 3.72%.

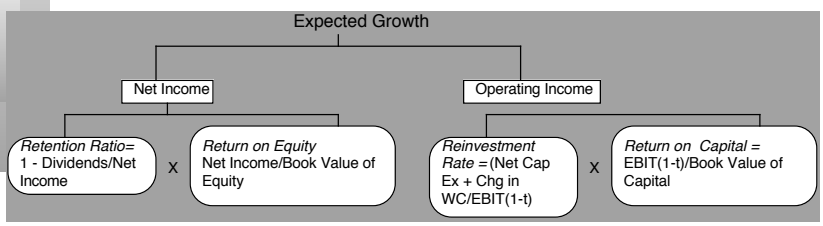
  After-Tax Cost of Debt = 6.00% (1 – 0.38) = 3.72%
- The cost of capital was calculated using these costs and the weights based on market values of equity (45,193) and debt (16,682):
- Cost of capital =

$$8.91\% \frac{45,193}{(16,682+45,193)} + 3.72\% \frac{16,682}{(16,682+45,193)} = 7.51\%$$

But costs of equity and capital can and should change over time…

Year	Beta	Cost of equity	Cost of debt	Debt Ratio	Cost of capital
1	0.90	8.91%	3.72%	26.73%	7.52%
2	0.90	8.91%	3.72%	26.73%	7.52%
3	0.90	8.91%	3.72%	26.73%	7.52%
4	0.90	8.91%	3.72%	26.73%	7.52%
5	0.90	8.91%	3.72%	26.73%	7.52%
6	0.92	9.03%	3.72%	26.73%	7.61%
7	0.94	9.14%	3.72%	26.73%	7.69%
8	0.96	9.26%	3.72%	26.73%	7.78%
9	0.98	9.38%	3.72%	26.73%	7.87%
10	1.00	9.50%	3.72%	26.73%	7.95%

III. Expected Growth



Estimating growth in EPS: Deutsche Bank in January 2008

- In 2007, Deutsche Bank reported net income of 6.51 billion Euros on a book value of equity of 33.475 billion Euros at the start of the year (end of 2006), and paid out 2.146 billion Euros as dividends.

  Return on Equity = $\frac{\text{Net Income}_{2007}}{\text{Book Value of Equity}_{2006}} = \frac{6,510}{33,475} = 19.45\%$

  Retention Ratio = $1 - \frac{\text{Dividends}}{\text{Net Income}} = 1 - \frac{2,146}{6,510} = 67.03\%$

- If Deutsche Bank maintains the return on equity (ROE) and retention ratio that it delivered in 2007 for the long run:

  $\text{Expected Growth Rate}_{\text{Existing Fundamentals}} = 0.6703 * 0.1945 = 13.04\%$

- If we replace the net income in 2007 with average net income of $3,954 million, from 2003 to 2007:

  Normalized Return on Equity = $\frac{\text{Average Net Income}_{2003-07}}{\text{Book Value of Equity}_{2006}} = \frac{3,954}{33,475} = 11.81\%$

  Normalized Retention Ratio = $1 - \frac{\text{Dividends}}{\text{Net Income}} = 1 - \frac{2,146}{3,954} = 45.72\%$

  $\text{Expected Growth Rate}_{\text{Normalized Fundamentals}} = 0.4572 * 0.1181 = 5.40\%$

Estimating growth in Net Income: Tata Chemicals

Year	Net Income	Cap Ex	Depreciation	Change in WC	Change in Debt	Equity Reinvestment	Equity Reinvestment Rate
2003-04	INR 3,418	INR 357	INR 1,442	-INR 557	-INR 2,771	INR 1,129	33.04%
2004-05	INR 4,550	INR 692	INR 1,377	-INR 493	INR 5,448	-INR 6,626	-145.64%
2005-06	INR 5,156	INR 11,730	INR 1,389	INR 2,823	INR 867	INR 12,297	238.51%
2006-07	INR 6,338	INR 1,196	INR 1,504	-INR 1,662	-INR 4,411	INR 2,442	38.53%
2007-08	INR 11,571	INR 28,956	INR 1,488	INR 88	INR 17,054	INR 10,502	90.76%
Aggregate	INR 31,033	INR 42,930	INR 7,199	INR 200	INR 16,187	INR 19,744	63.62%

Normalized Equity Reinvestment Rate = $\frac{\text{Equity Reinvestment}_{\text{Total 2004-08}}}{\text{Net Income}_{\text{Total 2004-08}}} = \frac{19,744}{31,033} = 63.62\%$

Year	Net Income	BV of Equity	ROE
2003-04	INR 3,418	INR 20,353	16.80%
2004-05	INR 4,550	INR 19,978	22.78%
2005-06	INR 5,156	INR 39,451	13.07%
2006-07	INR 6,338	INR 37,258	17.01%
2007-08	INR 11,571	INR 61,952	18.68%
Aggregate	INR 31,033	INR 178,992	17.34%

Normalized Return on Equity = $\frac{\text{Net Income}_{\text{Total 2004-08}}}{\text{Book Value of Equity}_{\text{Total 2004-08}}} = \frac{31,033}{178,992} = 17.34\%$

Expected Growth in Net Income = 63.62% * 17.34% = 11.03%

ROE and Leverage

- A high ROE, other things remaining equal, should yield a higher expected growth rate in equity earnings.
- The ROE for a firm is a function of both the quality of its investments and how much debt it uses in funding these investments. In particular

$$ROE = ROC + D/E\ (ROC - i\ (1-t))$$

where,

ROC = (EBIT (1 - tax rate)) / Book Value of Capital
= EBIT (1- t) / Book Value of Capital

D/E = Debt/ Equity ratio

i = Interest rate on debt

t = Tax rate on ordinary income.

Decomposing ROE

- Assume that you are analyzing a company with a 15% return on capital, an after-tax cost of debt of 5% and a book debt to equity ratio of 100%. Estimate the ROE for this company.
- Now assume that another company in the same sector has the same ROE as the company that you have just analyzed but no debt. Will these two firms have the same growth rates in earnings per share if they have the same dividend payout ratio?
- Will they have the same equity value?

Estimating Growth in EBIT: Disney

- We begin by estimating the reinvestment rate and return on capital for Disney in 2008 using the numbers from the latest financial statements. We converted operating leases into debt and adjusted the operating income and capital expenditure accordingly.
  $\text{Reinvestment Rate}_{2008} = \frac{(2,752 - 1,839 + 241)}{7,030\,(1 - .38)} = 26.48\%$
- We include $516 million in acquisitions made during 2008 in capital expenditures, but this is a volatile item. Disney does not make large acquisitions every year, but it does so infrequently - $ 7.5 billion to buy Pixar in 2006 and $ 11.5 billion to buy Capital Cities in 1996. Averaging out acquisitions from 1994-2008, we estimate an average annual value of $1,761 million for acquisitions over this period:
  $\text{Reinvestment Rate}_{\text{Normalized}} = \frac{(3,939 - 1,839 + 241)}{7,030\,(1 - .38)} = 53.72\%$
- We compute the return on capital, using operating income in 2008 and capital invested at the start of 2008 (end of 2007):
  $\text{Return on Capital}_{2008} = \frac{\text{EBIT}\,(1 - t)}{(\text{BV of Equity} + \text{BV of Debt} - \text{Cash})} = \frac{7,030\,(1 - .38)}{(30,753 + 16,892 - 3,670)} = 9.91\%$
- If Disney maintains its 2008 normalized reinvestment rate of 53.72% and return on capital for the next few years, its growth rate will be 5.32 percent.
- Expected Growth Rate from Existing Fundamentals = 53.72% * 9.91% = 5.32%

IV. Getting Closure in Valuation

- Since we cannot estimate cash flows forever, we estimate cash flows for a "growth period" and then estimate a terminal value, to capture the value at the end of the period:

$$\text{Value} = \sum_{t=1}^{t=N} \frac{CF_t}{(1+r)^t} + \frac{\text{Terminal Value}}{(1+r)^N}$$

- When a firm's cash flows grow at a "constant" rate forever, the present value of those cash flows can be written as:

  Value = Expected Cash Flow Next Period / (r - g)

  where,

  r = Discount rate (Cost of Equity or Cost of Capital)

  g = Expected growth rate forever.

- This "constant" growth rate is called a stable growth rate and cannot be higher than the growth rate of the economy in which the firm operates.

Getting to stable growth…

- A key assumption in all discounted cash flow models is the period of high growth, and the pattern of growth during that period. In general, we can make one of three assumptions:
  - there is no high growth, in which case the firm is already in stable growth
  - there will be high growth for a period, at the end of which the growth rate will drop to the stable growth rate (2-stage)
  - there will be high growth for a period, at the end of which the growth rate will decline gradually to a stable growth rate(3-stage)
- The assumption of how long high growth will continue will depend upon several factors including:
  - the size of the firm (larger firm -> shorter high growth periods)
  - current growth rate (if high -> longer high growth period)
  - barriers to entry and differential advantages (if high -> longer growth period)

Choosing a Growth Period: Examples

	Disney	*Aracruz*	*Tata Chemicals*
Firm size/market size	Firm is one of the largest players in the entertainment and theme park business, but the businesses are being redefined and are expanding.	Firm has a small market share of the paper/pulp business, but the business is mature.	Firm has a large market share of Indian (domestic) market, but is small by global standards. Domestic market is also growing.
Current excess returns	Firm is earning more than its cost of capital, after a long period of negative excess returns.	Returns on capital are largely a function of paper/pulp prices, but on average have been less than the cost of capital.	Firm has a return on capital that is roughly equal to its cost of capital.
Competitive advantages	Has some of the most recognized brand names in the world. Knows more about operating theme parks than any other firm in the world. Has skilled animation studio staff.	Cost advantages because of access to Brazilian rain forests. Has invested in newer, updated plants and has skilled workforce.	Has cost advantages, because of lower labor and production costs in India.
Length of high-growth period	Ten years, entirely because of its strong competitive advantages (which have been wasted over the past few years), but the excess returns are likely to be small.	Five years, largely due to access to cheap raw material.	Five years, primarily because of high real growth in India.

Estimating Stable Period Inputs: Disney

Respect the cap: The growth rate forever is assumed to be 3%. This is set lower than the riskfree rate (3.5%).

Stable period excess returns: The return on capital for Disney will drop from its high growth period level of 9.91% to a stable growth return of 9%. This is still higher than the cost of capital of 7.95% but the competitive advantages that Disney has are unlikely to dissipate completely by the end of the 10th year.

Reinvest to grow: The expected growth rate in stable growth will be 3%. In conjunction with the return on capital of 9%, this yields a stable period reinvestment rate of 33.33%:

Reinvestment Rate = Growth Rate / Return on Capital = 3% /9% = 33.33%

Adjust risk and cost of capital: The beta for the stock will drop to one, reflecting Disney's status as a mature company.

Cost of Equity = Riskfree Rate + Beta * Risk Premium = 3.5% + 6% = 9.5%

The debt ratio for Disney will stay at 26.73%. Since we assume that the cost of debt remains unchanged at 6%, this will result in a cost of capital of 7.95%

Cost of capital = 9.5% (.733) + 6% (1-.38) (.267) = 7.95%

V. From firm value to equity value per share

Approach used	To get to equity value per share
Discount dividends per share at the cost of equity	Present value is value of equity per share
Discount aggregate FCFE at the cost of equity	Present value is value of aggregate equity. Subtract the value of equity options given to managers and divide by number of shares.
Discount aggregate FCFF at the cost of capital	PV = Value of operating assets + Cash & Near Cash investments + Value of minority cross holdings -Debt outstanding = Value of equity -Value of equity options =Value of equity in common stock / Number of shares

Valuing Deutsche Bank in early 2008

- To value Deutsche Bank, we started with the normalized income over the previous five years (3,954 million Euros) and the dividends in 2008 (2,146 million Euros). We assumed that the payout ratio and ROE, based on these numbers will continue for the next 5 years:
  - Payout ratio = 2,146/3954 = 54.28%
  - Expected growth rate = (1-.5428) * .1181 = 0.054 or 5.4% (see earlier slide)
  - Cost of equity = 9.23%

Year	*Net Income*	*Payout Ratio*	*Dividends*	*PV @ 9.23%*
2008	4,167 €	54.28%	2,262 €	2,071 €
2009	4,392 €	54.28%	2,384 €	1,998 €
2010	4,629 €	54.28%	2,513 €	1,928 €
2011	4,879 €	54.28%	2,648 €	1,861 €
2012	5,143 €	54.28%	2,791 €	1,795 €
				9,653 €

Deutsche Bank in stable growth

- At the end of year 5, the firm is in stable growth. We assume that the cost of equity drops to 8.5% (as the beta moves to 1) and that the return on equity also drops to 8.5 (to equal the cost of equity).

Stable Period Payout Ratio = 1 – g/ROE = 1 – 0.03/0.085 = 0.6471 or 64.71%

Expected Dividends in Year 6 = Expected Net Income$_5$ *(1+g_{Stable})* Stable Payout Ratio
= €5,143 (1.03) * 0.6471 = €3,427 million

Terminal Value = $\frac{\text{Expected Dividends}_6}{(\text{Cost of Equity} - g)} = \frac{3,247}{(.085 - .03)} = 62,318$ million Euros

PV of Terminal Value = $\frac{\text{Terminal Value}_n}{(1 + \text{Cost of Equity}_{\text{High growth}})^n} = \frac{62,318}{(1.0923)^5} = 40,079$ mil Euros

Value of equity = €9,653+ €40,079 = €49,732 million Euros

Value of equity per share= $\frac{\text{Value of Equity}}{\#\text{ Shares}} = \frac{49,732}{474.2} = 104.88$ Euros/share

Stock was trading at 89 Euros per share at the time of the analysis.

What does the valuation tell us? One of three possibilities…

- Stock is under valued: This valuation would suggest that Deutsche Bank is significantly overvalued, given our estimates of expected growth and risk.
- Dividends may not reflect the cash flows generated by Deutsche Bank. The FCFE could have been significantly lower than the dividends paid.
- Estimates of growth and risk are wrong: It is also possible that we have over estimated growth or under estimated risk in the model, thus reducing our estimate of value.

Valuing Tata Chemicals in early 2009: The high growth period

- We used the normalized return on equity of 17.34% (see earlier table) and the current book value of equity (Rs 35,717 million) to estimate net income:

  Normalized Net Income = 35,717 *.1734 = Rs, 6,193 million

  (We removed interest income from cash to arrive at the normalized return on equity)
- We use the average equity reinvestment rate of 63.62 percent and the normalized return on equity of 17.34% to estimate growth:

  Expected Growth in Net Income = 63.62% * 17.34% = 11.03%
- We assume that the current cost of equity (see earlier page) of 13.93% will hold for the next 5 years.

	2009	*2010*	*2011*	*2012*	*2013*	*Sum*
Net Income	Rs 6,876	Rs 7,634	Rs 8,476	Rs 9,411	Rs 10,449	
Equity Reinvestment Rate	63.62%	63.62%	63.62%	63.62%	63.62%	
FCFE	Rs 2,501	Rs 2,777	Rs 3,084	Rs 3,423	Rs 3,801	
Cost of Equity	13.93%	13.93%	13.93%	13.93%	13.93%	
Present Value	Rs 2,195	Rs 2,160	Rs 2,085	Rs 2,032	Rs 1,980	Rs 10,433

Stable growth and value….

- After year five, we will assume that the beta will increase to 1 and that the equity risk premium will decline to 7.5 percent (we assumed India country risk would drop). The resulting cost of equity is 11.5 percent.

  Cost of Equity in Stable Growth = 4% + 1(7.5%) = 11.5%
- We will assume that the growth in net income will drop to 4% and that the return on equity will rise to 11.5% (which is also the cost of equity).

  Equity Reinvestment Rate$_{\text{Stable Growth}}$ = 4%/11.5% = 34.78%

  FCFE in Year 6 = 10,449(1.04)(1 – 0.3478) = Rs 7,087 million

  Terminal Value of Equity = 7,087/(0.115 – 0.04) = Rs 94,497 million

  Value of equity = PV of FCFE during high growth + PV of terminal value + Cash

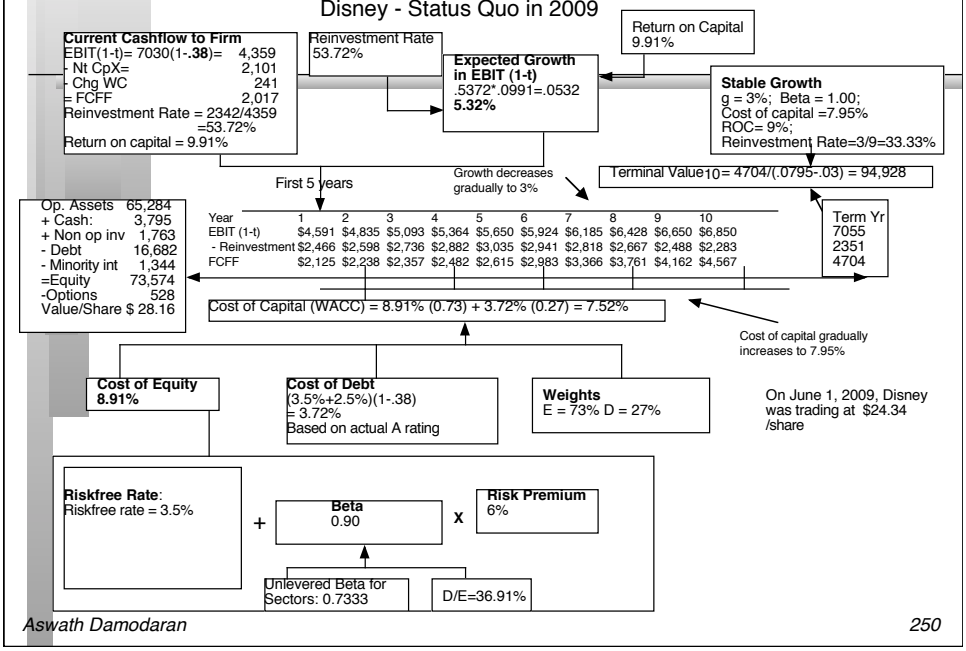
  = 10,433 + 94,497/1.1393^5 +1,759 = Rs 61,423 million

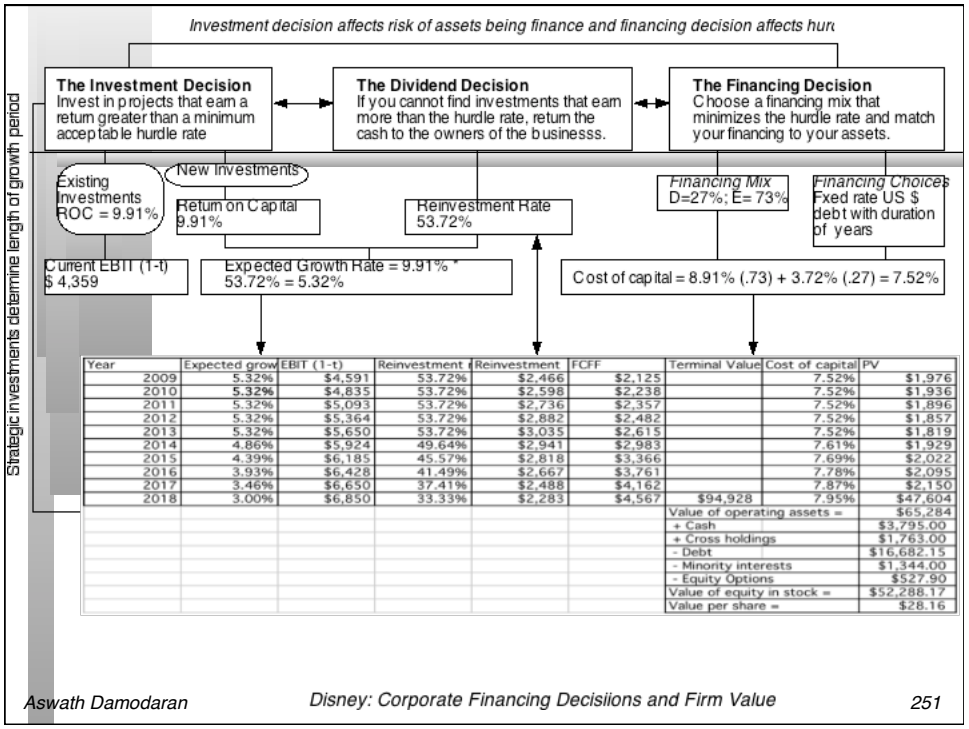
  Dividing by 235.17 million shares yields a value of equity per share of Rs 261, about 20% higher than the stock price of Rs 222 per share.

Disney: Inputs to Valuation

	High Growth Phase	*Transition Phase*	*Stable Growth Phase*
Length of Period	5 years	5 years	Forever after 10 years
Tax Rate	38%	38%	38%
Return on Capital	9.91%	Declines linearly to 9%	Stable ROC of 9%
Reinvestment Rate (Net Cap Ex + Working Capital Investments/EBIT)	53.72% (based on normalized acquisition costs)	Declines to 33.33% as ROC and growth rates drop: Reinvestment Rate = g/ROC	33.33% of after-tax operating income, estimated from stable growth rate of 3% and return on capital of 9%. Reinvestment rate = 3/9=33.33%
Expected Growth Rate in EBIT	ROC * Reinvestment Rate = 9.91%*53.72% = 5.32%	Linear decline to Stable Growth Rate of 3%	3%
Debt/Capital Ratio	26.7%	Stays unchanged	Stays unchanged
Risk Parameters	Beta = 0.9033, k_e = 8.91%% Pre-tax Cost of Debt = 6% Cost of capital = 7.52%	Beta changes linearly to 1.00; Cost of debt stays at 6% Cost of capital goes to 7.95%	Beta = 1.00; k_e = 9.5% Cost of debt stays at 6% Cost of capital = 7.95%

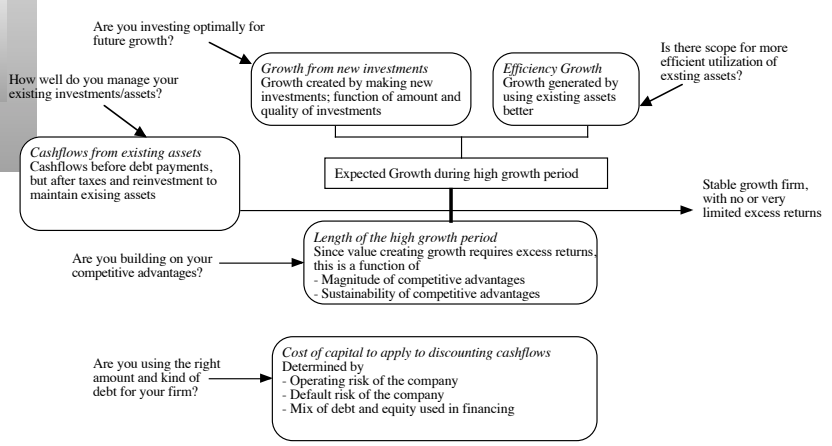
Disney - Status Quo in 2009

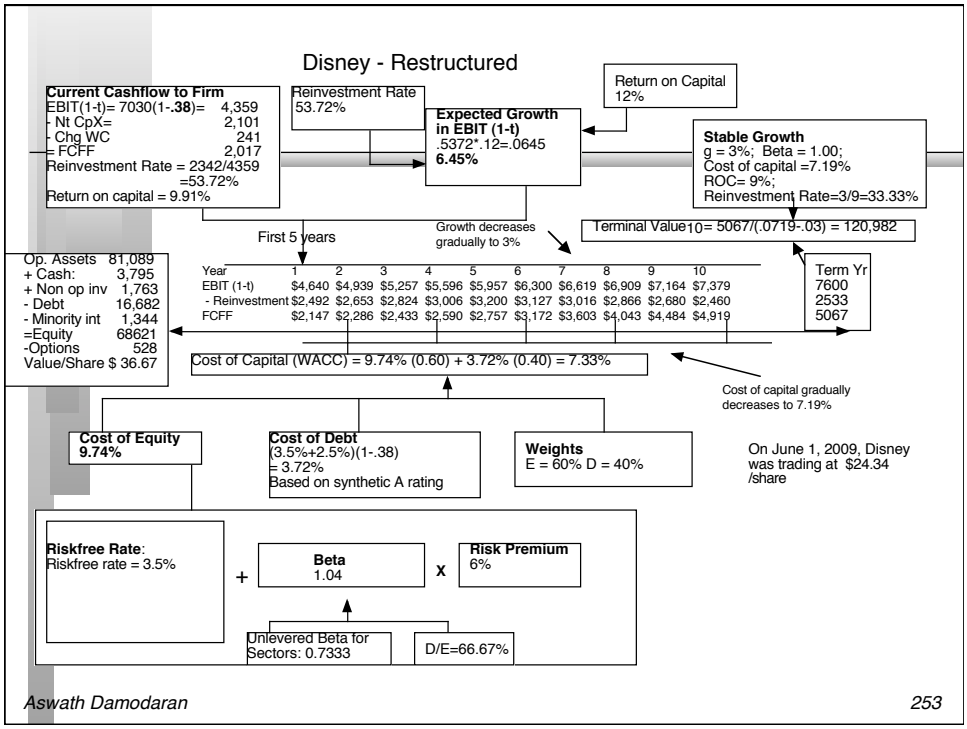




Year	Expected grow	EBIT (1-t)	Reinvestment	Reinvestment	FCFF	Terminal Value	Cost of capital	PV
2009	5.32%	$4,591	53.72%	$2,466	$2,125		7.52%	$1,976
2010	5.32%	$4,835	53.72%	$2,598	$2,238		7.52%	$1,936
2011	5.32%	$5,093	53.72%	$2,736	$2,357		7.52%	$1,896
2012	5.32%	$5,364	53.72%	$2,882	$2,482		7.52%	$1,857
2013	5.32%	$5,650	53.72%	$3,035	$2,615		7.52%	$1,819
2014	4.86%	$5,924	49.64%	$2,941	$2,983		7.61%	$1,929
2015	4.39%	$6,185	45.57%	$2,818	$3,366		7.69%	$2,022
2016	3.93%	$6,428	41.49%	$2,667	$3,761		7.78%	$2,095
2017	3.46%	$6,650	37.41%	$2,488	$4,162		7.87%	$2,150
2018	3.00%	$6,850	33.33%	$2,283	$4,567	$94,928	7.95%	$47,604
						Value of operating assets =		$65,284
						+ Cash		$3,795.00
						+ Cross holdings		$1,763.00
						- Debt		$16,682.15
						- Minority interests		$1,344.00
						- Equity Options		$527.90
						Value of equity in stock =		$52,288.17
						Value per share =		$28.16

Ways of changing value…





First Principles