

Packet 2: Corporate Finance

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The Financing Principle
The Dividend Principle
Valuation

Finding the Right Financing Mix: The Capital Structure Decision

“Neither a borrower nor a lender be”

Someone who obviously hated this part of corporate finance

First Principles

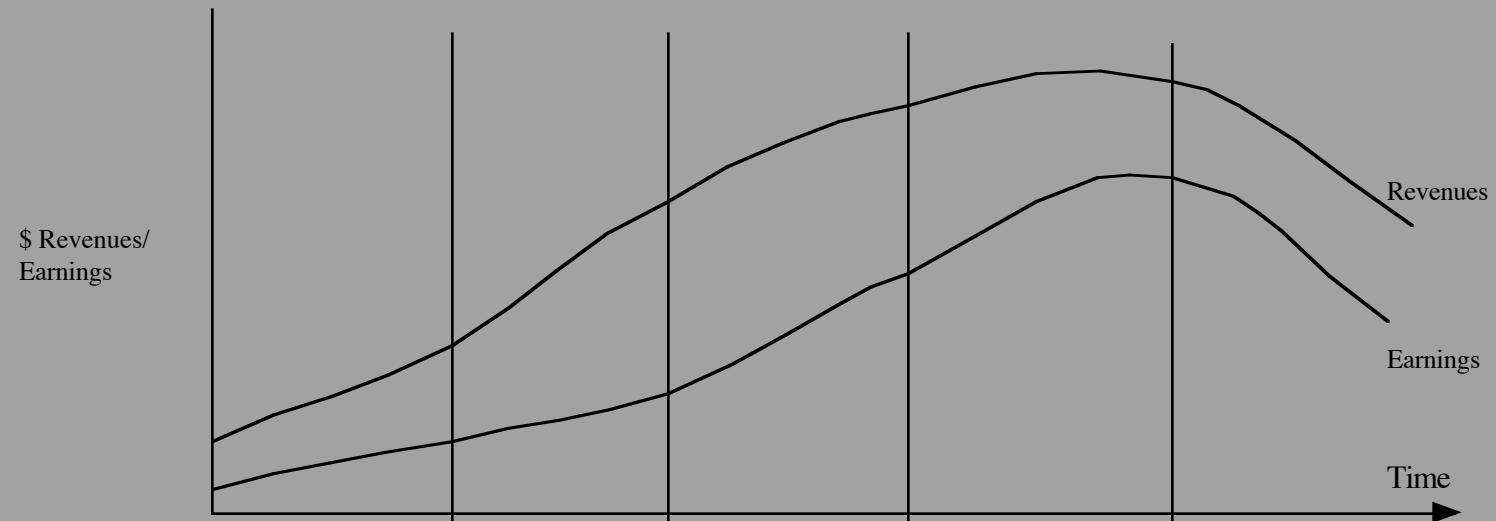
- Invest in projects that yield a return greater than the minimum acceptable hurdle rate.
 - The hurdle rate should be higher for riskier projects and reflect the financing mix used - owners' funds (equity) or borrowed money (debt)
 - Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders.
 - The form of returns - dividends and stock buybacks - will depend upon the stockholders' characteristics.

Objective: Maximize the Value of the Firm

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.
- The equity can take different forms:
 - For very small businesses: it can be owners investing their savings
 - For slightly larger businesses: it can be venture capital
 - For publicly traded firms: it is common stock
- The debt can also take different forms
 - For private businesses: it is usually bank loans
 - For publicly traded firms: it can take the form of bonds

Financing Choices across the life cycle



<i>External funding needs</i>	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.
<i>Internal financing</i>	Negative or low	Negative or low	Low, relative to funding needs	High, relative to funding needs	More than funding needs
<i>External Financing</i>	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
<i>Financing Transitions</i>	Accessing private equity	Initial Public offering	Seasoned equity issue	Bond issues	

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?
 - If not, why not?

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:
$$\text{Debt to Capital Ratio} = \text{Debt} / (\text{Debt} + \text{Equity})$$
- 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.

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 cost of going bankrupt
 - direct costs: Legal and other Deadweight Costs
 - indirect costs: Costs arising because people perceive you to be in financial trouble
 - the probability of bankruptcy, which will depend upon how uncertain you are about future cash flows
- As you borrow more, you increase the probability of bankruptcy and hence the expected bankruptcy cost.
- 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.

The Bankruptcy Cost Proposition

- While the direct costs of bankruptcy may not be very different across firms, the indirect costs of bankruptcy can vary widely across firms.
- 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 Borrowing

1. Tax Benefit:

Higher tax rates --> Higher tax benefit

2. Added Discipline:

Greater the separation between managers
and stockholders --> Greater the benefit

Disadvantages of Borrowing

1. Bankruptcy Cost:

Higher business risk --> Higher Cost

2. Agency Cost:

Greater the separation between stock-
holders & lenders --> Higher Cost

3. Loss of Future Financing Flexibility:

Greater the uncertainty about future
financing needs --> Higher Cost



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.
- The value of a firm is independent of its debt ratio.

Implications of MM Theorem

- Leverage is irrelevant. A firm's value will be determined by its project cash flows.
- 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

What do firms look at in financing?

- Is there a financing hierarchy?
- Argument:
 - 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.

Rationale for Financing Hierarchy

- Managers value flexibility. External financing reduces flexibility more than internal financing.
- Managers value control. Issuing new equity weakens control and new debt creates bond covenants.

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



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

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 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 closer 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

- It will depend upon:
 - (a) the components of financing: Debt, Equity or Preferred stock
 - (b) the cost of each component
- In summary, the cost of capital is the cost of each component weighted by its relative market value.

$$WACC = k_e (E/(D+E)) + k_d (D/(D+E))$$

Recapping the Measurement of cost of capital

- The cost of debt is the market interest rate that the firm has to pay on its borrowing. It will depend upon three components
 - (a) The general level of interest rates
 - (b) The default premium
 - (c) The firm's tax rate
- The cost of equity is
 1. the required rate of return given the risk
 2. inclusive of both dividend yield and price appreciation
- The weights attached to debt and equity have to be market value weights, not book value weights.



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

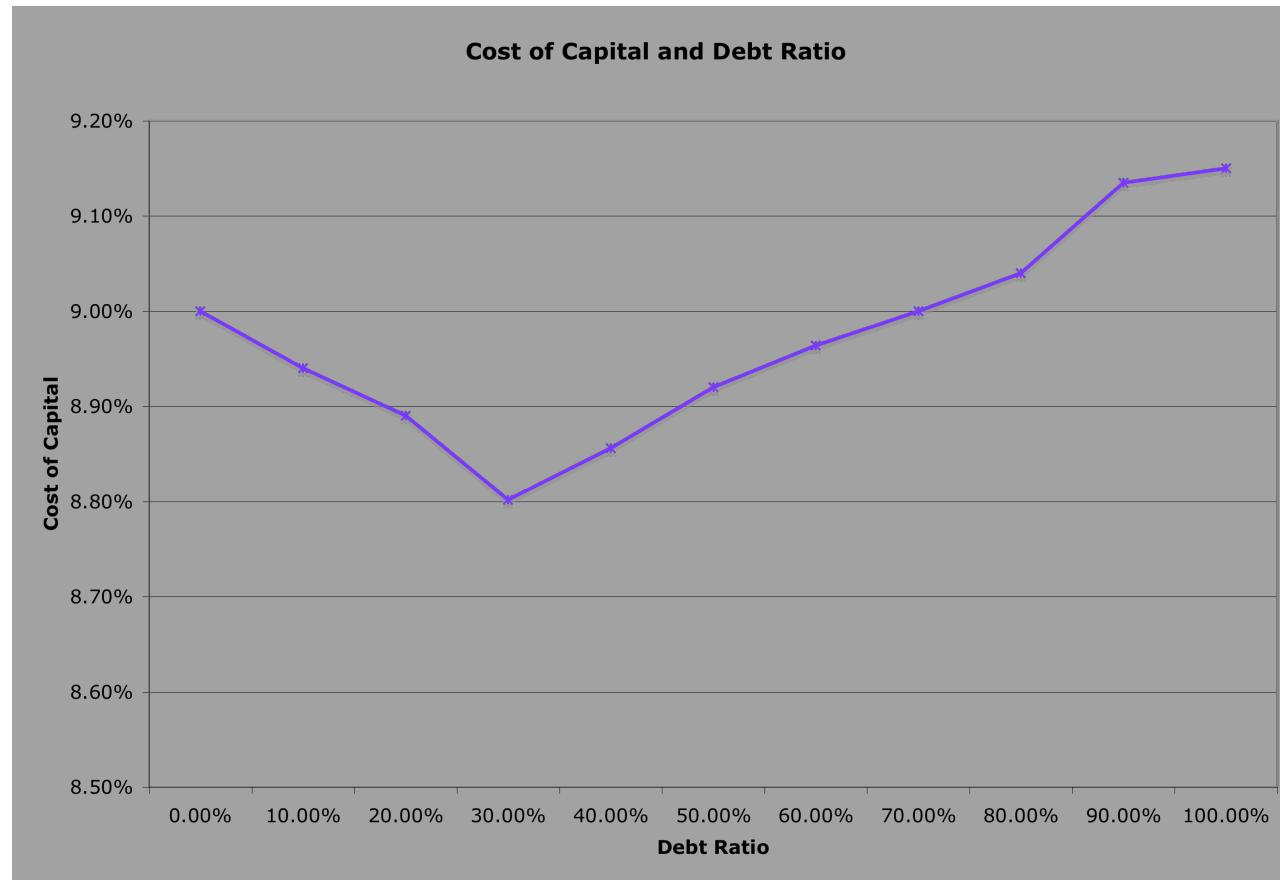
Can equity ever be cheaper than debt?

- Yes
- No

Applying Cost of Capital Approach: The Textbook Example

Debt Ratio	Cost of equity	Cost of Debt	After-tax Cost of Debt	Cost of Capital
0.00%	9.00%	6.00%	3.60%	9.00%
10.00%	9.50%	6.50%	3.90%	8.94%
20.00%	10.10%	6.75%	4.05%	8.89%
30.00%	10.80%	6.90%	4.14%	8.80%
40.00%	11.60%	7.90%	4.74%	8.86%
50.00%	12.50%	8.90%	5.34%	8.92%
60.00%	13.50%	9.90%	5.94%	8.96%
70.00%	14.60%	11.00%	6.60%	9.00%
80.00%	15.80%	12.25%	7.35%	9.04%
90.00%	17.10%	13.75%	8.25%	9.14%
100.00%	18.50%	15.25%	9.15%	9.15%

The U-shaped Cost of Capital Graph...



Current Cost of Capital: Disney

■ Equity

- Cost of Equity = Riskfree rate + Beta * Risk Premium
 $= 4\% + 1.25 (4.82\%) = 10.00\%$
- Market Value of Equity = \$55.101 Billion
- Equity/(Debt+Equity) = 79%

■ Debt

- After-tax Cost of debt = (Riskfree rate + Default Spread) (1-t)
 $= (4\%+1.25\%) (1-.373) = 3.29\%$
- Market Value of Debt = \$ 14.668 Billion
- Debt/(Debt +Equity) = 21%

■ Cost of Capital = $10.00\%(.79)+3.29\%(.21) = 8.59\%$

$$55.101(55.101+14.668)$$

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.

Interest Coverage Ratios and Bond Ratings: Large market cap, manufacturing firms

Interest Coverage Ratio	Rating
> 8.5	AAA
6.50 - 6.50	AA
5.50 – 6.50	A+
4.25 – 5.50	A
3.00 – 4.25	A-
2.50 – 3.00	BBB
2.05 - 2.50	BB+
1.90 – 2.00	BB
1.75 – 1.90	B+
1.50 - 1.75	B
1.25 – 1.50	B-
0.80 – 1.25	CCC
0.65 – 0.80	CC
0.20 – 0.65	C
< 0.20	D

For more detailed interest coverage ratios and bond ratings, try the [ratings.xls](#) spreadsheet on my web site.

Spreads over long bond rate for ratings classes: 2003

<i>Rating</i>	<i>Typical default spread</i>	<i>Market interest rate on debt</i>	
AAA	0.35%	4.35%	
AA	0.50%	4.50%	
A+	0.70%	4.70%	
A	0.85%	4.85%	
A-	1.00%	5.00%	Riskless Rate = 4%
BBB	1.50%	5.50%	
BB+	2.00%	6.00%	
BB	2.50%	6.50%	
B+	3.25%	7.25%	
B	4.00%	8.00%	
B-	6.00%	10.00%	
CCC	8.00%	12.00%	
CC	10.00%	14.00%	
C	12.00%	16.00%	
D	20.00%	24.00%	

Estimating Cost of Equity

Unlevered Beta = 1.0674 (Bottom up beta based upon Disney's businesses)

Market premium = 4.82%

T.Bond Rate = 4.00%

Tax rate=37.3%

Debt Ratio

D/E Ratio

Levered Beta

Cost of Equity

0.00%

0.00%

1.0674

9.15%

10.00%

11.11%

1.1418

9.50%

20.00%

25.00%

1.2348

9.95%

30.00%

42.86%

1.3543

10.53%

40.00%

66.67%

1.5136

11.30%

50.00%

100.00%

1.7367

12.37%

60.00%

150.00%

2.0714

13.98%

70.00%

233.33%

2.6291

16.67%

80.00%

400.00%

3.7446

22.05%

90.00%

900.00%

7.0911

38.18%

Estimating Cost of Debt

Start with the current market value of the firm = $55,101 + 14668 = \$69,769$ mil

D/(D+E)	0.00%	10.00%	Debt to capital
D/E	0.00%	11.11%	D/E = 10/90 = .1111
\$ Debt	\$0	\$6,977	10% of \$69,769
EBITDA	\$3,882	\$3,882	Same as 0% debt
Depreciation	\$1,077	\$1,077	Same as 0% debt
EBIT	\$2,805	\$2,805	Same as 0% debt
Interest	\$0	\$303	Pre-tax cost of debt * \$ Debt
Pre-tax Int. cov	∞	9.24	EBIT/ Interest Expenses
Likely Rating	AAA	AAA	From Ratings table
Pre-tax cost of debt	4.35%	4.35%	Riskless Rate + Spread

The Ratings Table

<i>Interest Coverage Ratio</i>	<i>Rating</i>	<i>Typical default spread</i>	<i>Market interest rate on debt</i>
> 8.5	AAA	0.35%	4.35%
6.50 - 6.50	AA	0.50%	4.50%
5.50 - 6.50	A+	0.70%	4.70%
4.25 - 5.50	A	0.85%	4.85%
3.00 - 4.25	A-	1.00%	5.00%
2.50 - 3.00	BBB	1.50%	5.50%
2.05 - 2.50	BB+	2.00%	6.00%
1.90 - 2.00	BB	2.50%	6.50%
1.75 - 1.90	B+	3.25%	7.25%
1.50 - 1.75	B	4.00%	8.00%
1.25 - 1.50	B-	6.00%	10.00%
0.80 - 1.25	CCC	8.00%	12.00%
0.65 - 0.80	CC	10.00%	14.00%
0.20 - 0.65	C	12.00%	16.00%
< 0.20	D	20.00%	24.00%

A Test: Can you do the 20% level?

$D/(D+E)$	0.00%	10.00%	20.00%	2nd Iteration	3rd?
D/E	0.00%	11.11%			
\$ Debt	\$0	\$6,977			
EBITDA	\$3,882	\$3,882			
Depreciation	\$1,077	\$1,077			
EBIT	\$2,805	\$2,805			
Interest	\$0	\$303			
Pre-tax Int. cov	∞	9.24			
Likely Rating	AAA	AAA			
Cost of debt	4.35%	4.35%			

Bond Ratings, Cost of Debt and Debt Ratios

<i>Debt Ratio</i>	<i>Debt</i>	<i>Interest expense</i>	<i>Interest Coverage Ratio</i>	<i>Bond Rating</i>	<i>Interest rate on debt</i>	<i>Tax Rate</i>	<i>Cost of Debt (after-tax)</i>
0%	\$0	\$0	∞	AAA	4.35%	37.30%	2.73%
10%	\$6,977	\$303	9.24	AAA	4.35%	37.30%	2.73%
20%	\$13,954	\$698	4.02	A-	5.00%	37.30%	3.14%
30%	\$20,931	\$1,256	2.23	BB+	6.00%	37.30%	3.76%
40%	\$27,908	\$3,349	0.84	CCC	12.00%	31.24%	8.25%
50%	\$34,885	\$5,582	0.50	C	16.00%	18.75%	13.00%
60%	\$41,861	\$6,698	0.42	C	16.00%	15.62%	13.50%
70%	\$48,838	\$7,814	0.36	C	16.00%	13.39%	13.86%
80%	\$55,815	\$8,930	0.31	C	16.00%	11.72%	14.13%
90%	\$62,792	\$10,047	0.28	C	16.00%	10.41%	14.33%

Stated versus Effective Tax Rates

- You need taxable income for interest to provide a tax savings
- In the Disney case, consider the interest expense at 30% and 40%

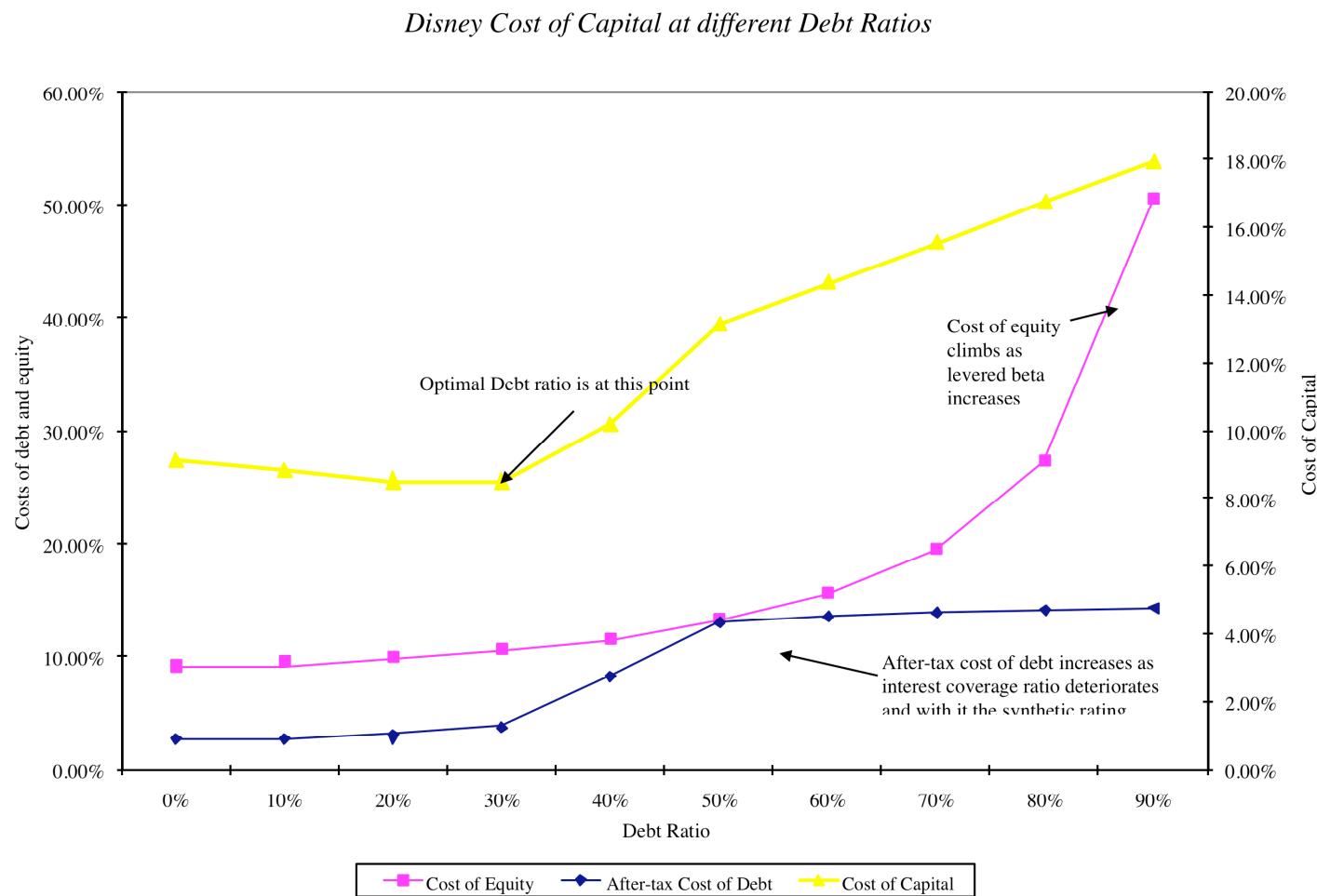
	<i>30% Debt Ratio</i>	<i>40% Debt Ratio</i>
EBIT	\$ 2,805 m	\$ 2,805 m
Interest Expense	\$ 1,256 m	\$ 3,349 m
Tax Savings	\$ 1,256*.373=468	2,805*.373 = \$ 1,046
Tax Rate	37.30%	1,046/3,349= 31.2%
Pre-tax interest rate	6.00%	12.00%
After-tax Interest Rate	3.76%	8.25%

- You can deduct only \$2,805 million of the \$3,349 million of the interest expense at 40%. Therefore, only 37.3% of \$ 2,805 million is considered as the tax savings.

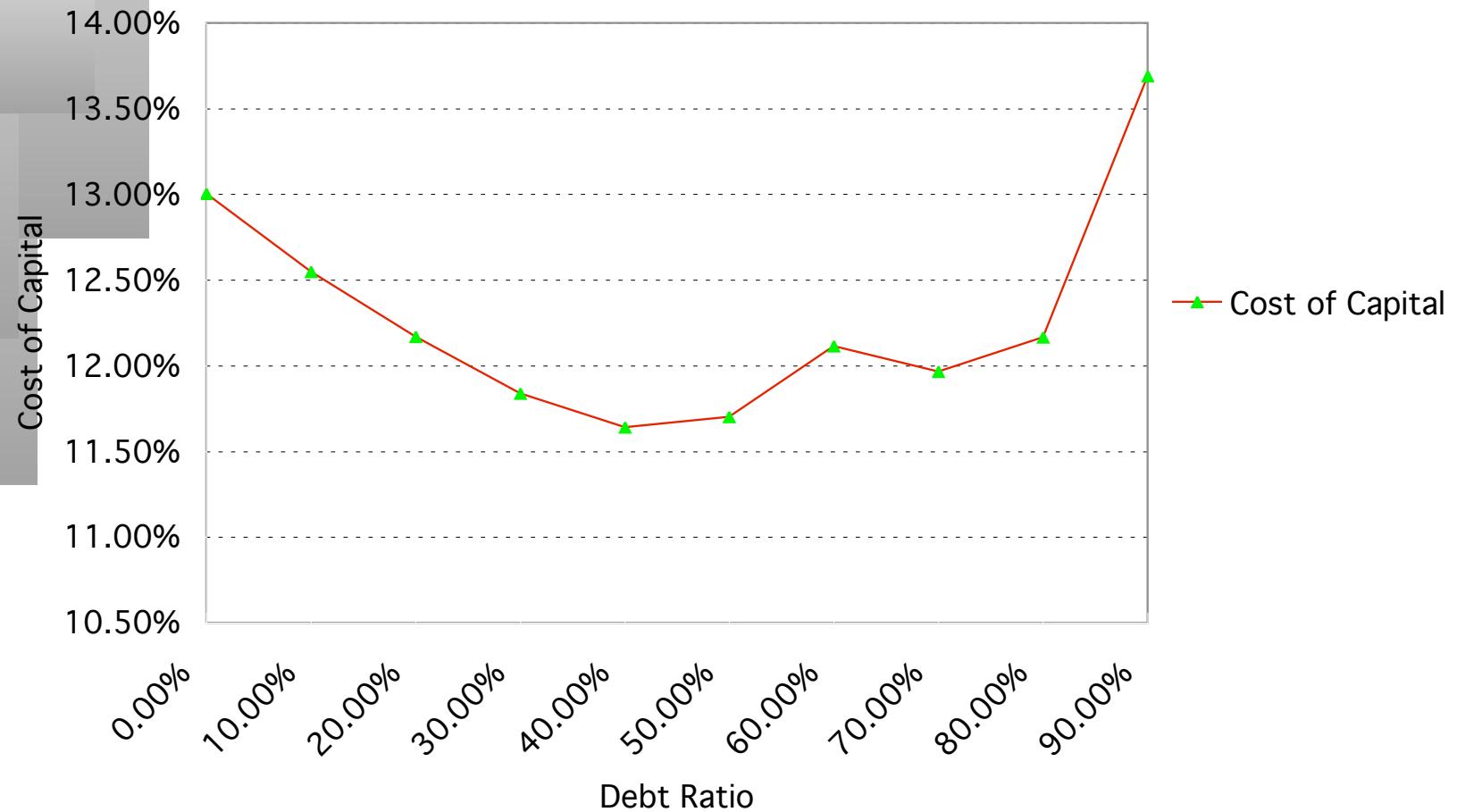
Disney's Cost of Capital Schedule

Debt Ratio	Cost of Equity	Cost of Debt (after-tax)	Cost of Capital
0%	9.15%	2.73%	9.15%
10%	9.50%	2.73%	8.83%
20%	9.95%	3.14%	8.59%
30%	10.53%	3.76%	8.50%
40%	11.50%	8.25%	10.20%
50%	13.33%	13.00%	13.16%
60%	15.66%	13.50%	14.36%
70%	19.54%	13.86%	15.56%
80%	27.31%	14.13%	16.76%
90%	50.63%	14.33%	17.96%

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 \$14.18 billion in debt. The optimal dollar debt (at 30%) is roughly \$21 billion. Disney has excess debt capacity of \$ 7 billion.
- To move to its optimal and gain the increase in value, Disney should borrow \$ 7 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

- Firm Value before the change = $55,101 + 14,668 = \$ 69,769$
 $WACC_b = 8.59\%$ Annual Cost = $\$69,769 * 8.59\% = \$5,993$ million
 $WACC_a = 8.50\%$ Annual Cost = $\$69,769 * 8.50\% = \$5,930$ million
 $\Delta WACC = 0.09\%$ Change in Annual Cost = $\$ 63$ million
- If there is no growth in the firm value, (Conservative Estimate)
 - Increase in firm value = $\$63 / .0850 = \$ 741$ million
 - Change in Stock Price = $\$741 / 2,047.6 = \0.36 per share
- If we assume a perpetual growth of 4% in firm value over time,
 - Increase in firm value = $\$63 / (.0850 - .04) = \$ 1,400$ million
 - Change in Stock Price = $\$1,400 / 2,047.6 = \$ 0.68$ per share

Implied Growth Rate obtained by

Firm value Today = $FCFF(1+g)/(WACC-g)$: Perpetual growth formula

$\$69,769 = \$1,722(1+g)/(.0859-g)$: Solve for g -> Implied growth = 5.98%

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 \$ 26.91) Assuming that firm value will grow by 4% a year, estimate the maximum price.
- What would happen to the stock price after the buyback if you were able to buy stock back at \$ 26.91?

Buybacks and Stock Prices

- Assume that Disney does make a tender offer for its shares but pays \$28 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 \$26.91
 - b. The share price will be between \$26.91 and the estimated value (above) of \$27.59
 - c. The share price will be higher than \$27.59

What if something goes wrong? The Downside Risk

- Doing What-if analysis on Operating Income
 - A. Statistical Approach
 - Standard Deviation In Past Operating Income
 - Standard Deviation In Earnings (If Operating Income Is Unavailable)
 - Reduce Base Case By One Standard Deviation (Or More)
 - B. “Economic Scenario” Approach
 - Look At What Happened To Operating Income During The Last Recession.
(How Much Did It Drop In % Terms?)
 - Reduce Current Operating Income By Same Magnitude
- Constraint on Bond Ratings

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%

Disney: Effects of Past Downturns

<i>Recession</i>	<i>Decline in Operating Income</i>
2002	Drop of 15.82%
1991	Drop of 22.00%
1981-82	Increased
Worst Year	Drop of 29.47%

- The standard deviation in past operating income is about 20%.

Disney: The Downside Scenario

<i>% Drop in EBITDA</i>	<i>EBIT</i>	<i>Optimal Debt Ratio</i>
0%	\$ 2,805	30%
5%	\$ 2,665	20%
10%	\$ 2,524	20%
15%	\$ 2,385	20%
20%	\$ 2,245	20%

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 (so do not do both)
 - a drop in ratings might affect operating income
 - there is an ego factor associated with high ratings
- Caveat: Every Rating Constraint Has A Cost.
 - Provide Management With A Clear Estimate Of How Much The Rating Constraint Costs By Calculating The Value Of The Firm Without The Rating Constraint And Comparing To The Value Of The Firm With The Rating Constraint.

Ratings Constraints for Disney

- At its optimal debt ratio of 30%, Disney has an estimated rating of BB+.
- Assume that Disney imposes a rating constraint of BBB or greater.
- The optimal debt ratio for Disney is then 25%
- The cost of imposing this rating constraint can then be calculated as follows:

Value at 30% Debt = \$ 71,239 million

- Value at 25% Debt = \$ 70,157 million

Cost of Rating Constraint = \$ 1,082 million

Effect of Ratings Constraints: Disney

Debt Ratio	Rating	Firm Value
0%	AAA	\$62,279
10%	AAA	\$66,397
20%	A-	\$69,837
30%	BB+	\$71,239
40%	CCC	\$51,661
50%	C	\$34,969
60%	C	\$30,920
70%	C	\$27,711
80%	C	\$25,105
90%	C	\$22,948

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.

Analyzing Financial Service Firms

- The interest coverage ratios/ratings relationship is likely to be different for financial service firms.
- The definition of debt is messy for financial service firms. In general, using all debt for a financial service firm will lead to high debt ratios. Use only interest-bearing long term debt in calculating debt ratios.
- The effect of ratings drops will be much more negative for financial service firms.
- There are likely to regulatory constraints on capital

Interest Coverage ratios, ratings and Operating income

<i>Long Term Interest Coverage Ratio</i>	<i>Rating is</i>	<i>Spread is</i>	<i>Operating Income Decline</i>
< 0.05	D	16.00%	-50.00%
0.05 – 0.10	C	14.00%	-40.00%
0.10 – 0.20	CC	12.50%	-40.00%
0.20 - 0.30	CCC	10.50%	-40.00%
0.30 – 0.40	B-	6.25%	-25.00%
0.40 – 0.50	B	6.00%	-20.00%
0.50 – 0.60	B+	5.75%	-20.00%
0.60 – 0.75	BB	4.75%	-20.00%
0.75 – 0.90	BB+	4.25%	-20.00%
0.90 – 1.20	BBB	2.00%	-20.00%
1.20 – 1.50	A-	1.50%	-17.50%
1.50 – 2.00	A	1.40%	-15.00%
2.00 – 2.50	A+	1.25%	-10.00%
2.50 – 3.00	AA	0.90%	-5.00%
> 3.00	AAA	0.70%	0.00%

Deutsche Bank: Optimal Capital Structure

<i>Debt Ratio</i>	<i>Beta</i>	<i>Cost of Equity</i>	<i>Bond Rating</i>	<i>Interest rate on debt</i>	<i>Tax Rate</i>	<i>Cost of Debt (after-tax)</i>	<i>WACC</i>	<i>Firm Value (G)</i>
0%	0.44	6.15%	AAA	4.75%	38.00%	2.95%	6.15%	\$111,034
10%	0.47	6.29%	AAA	4.75%	38.00%	2.95%	5.96%	\$115,498
20%	0.50	6.48%	AAA	4.75%	38.00%	2.95%	5.77%	\$120,336
30%	0.55	6.71%	AAA	4.75%	38.00%	2.95%	5.58%	\$125,597
40%	0.62	7.02%	AAA	4.75%	38.00%	2.95%	5.39%	\$131,339
50%	0.71	7.45%	A+	5.30%	38.00%	3.29%	5.37%	\$118,770
60%	0.84	8.10%	A	5.45%	38.00%	3.38%	5.27%	\$114,958
70%	1.07	9.19%	A	5.45%	38.00%	3.38%	5.12%	\$119,293
80%	1.61	11.83%	BB+	8.30%	32.43%	5.61%	6.85%	\$77,750
90%	3.29	19.91%	BB	8.80%	27.19%	6.41%	7.76%	\$66,966

Analyzing Companies after Abnormal Years

- The operating income that should be used to arrive at an optimal debt ratio is a “normalized” operating income
- A normalized operating income is the income that this firm would make in a normal year.
 - For a cyclical firm, this may mean using the average operating income over an economic cycle rather than the latest year’s income
 - For a firm which has had an exceptionally bad or good year (due to some firm-specific event), this may mean using industry average returns on capital to arrive at an optimal or looking at past years
 - For any firm, this will mean not counting one time charges or profits

Analyzing Aracruz Cellulose's Optimal Debt Ratio

- Aracruz Cellulose, the Brazilian pulp and paper manufacturing firm, reported operating income of 887 million BR on revenues of 3176 million BR in 2003. This was significantly higher than it's operating income of 346 million BR in 2002 and 196 million Br in 2001.
- In 2003, Aracruz had depreciation of 553 million BR and capital expenditures amounted to 661 million BR.
- Aracruz had debt outstanding of 4,094 million BR with a dollar cost of debt of 7.25%. Aracruz had 859.59 million shares outstanding, trading 10.69 BR per share.
- The beta of the stock is estimated, using comparable firms, to be 0.7040.
- The corporate tax rate in Brazil is estimated to be 34%.

Aracruz's Current Cost of Capital

- Current \$ Cost of Equity = $4\% + 0.7040 (12.49\%) = 12.79\%$
 - Market Value of Equity = $10.69 \text{ BR/share} * 859.59 = 9,189 \text{ million BR}$
- Current \$ Cost of Capital
- $$= 12.79\% (9,189/(9,189+4,094)) + 7.25\% (1-.34) (4,094/(9189+4,094)) = 10.33\%$$

Modifying the Cost of Capital Approach for Aracruz

- The operating income at Aracruz is a function of the price of paper and pulp in global markets. While 2003 was a very good year for the company, its income history over the last decade reflects the volatility created by pulp prices. We computed Aracruz's average pre-tax operating margin over the last 10 years to be 25.99%. Applying this lower average margin to 2003 revenues generates a normalized operating income of 796.71 million BR.
- Aracruz's synthetic rating of BBB, based upon the interest coverage ratio, is much higher than its actual rating of B- and attributed the difference to Aracruz being a Brazilian company, exposed to country risk. Since we compute the cost of debt at each level of debt using synthetic ratings, we run the risk of understating the cost of debt. The difference in interest rates between the synthetic and actual ratings is 1.75% and we add this to the cost of debt estimated at each debt ratio from 0% to 90%.

Aracruz's Optimal Debt Ratio

<i>Debt Ratio</i>	<i>Beta</i>	<i>Cost of Equity</i>	<i>Bond Rating</i>	<i>Interest rate on debt</i>	<i>Tax Rate</i>	<i>Cost of Debt (after-tax)</i>	<i>WACC</i>	<i>Firm Value in BR</i>
0%	0.54	10.80%	AAA	6.10%	34.00%	4.03%	10.80%	12,364
10%	0.58	11.29%	AAA	6.10%	34.00%	4.03%	10.57%	12,794
20%	0.63	11.92%	A	6.60%	34.00%	4.36%	10.40%	13,118
30%	0.70	12.72%	BBB	7.25%	34.00%	4.79%	10.34%	13,256
40%	0.78	13.78%	CCC	13.75%	34.00%	9.08%	11.90%	10,633
50%	0.93	15.57%	CCC	13.75%	29.66%	9.67%	12.62%	9,743
60%	1.20	19.04%	C	17.75%	19.15%	14.35%	16.23%	6,872
70%	1.61	24.05%	C	17.75%	16.41%	14.84%	17.60%	6,177
80%	2.41	34.07%	C	17.75%	14.36%	15.20%	18.98%	5,610
90%	4.82	64.14%	C	17.75%	12.77%	15.48%	20.35%	5,138

Analyzing a Private Firm

- The approach remains the same with important caveats
 - It is far more difficult estimating firm value, since the equity and the debt of private firms do not trade
 - Most private firms are not rated.
 - If the cost of equity is based upon the market beta, it is possible that we might be overstating the optimal debt ratio, since private firm owners often consider all risk.

Bookscape's current cost of capital

- We assumed that Bookscape would have a debt to capital ratio of 16.90%, similar to that of publicly traded book retailers, and that the tax rate for the firm is 40%. We computed a cost of capital based on that assumption.
- We also used a “total beta” of 2.0606 to measure the additional risk that the owner of Bookscape is exposed to because of his lack of diversification.
- Cost of Capital
 - Cost of equity = Risk-free Rate + Total Beta * Risk Premium
 $= 4\% + 2.0606 * 4.82\% = 13.93\%$
 - Pre-tax Cost of debt = 5.5% (based upon synthetic rating of BBB)
 - Cost of capital = $13.93\% (.8310) + 5.5\% (1-.40) (.1690) = 12.14\%$

The Inputs: Bookscape

- While Bookscape has no conventional debt outstanding, it does have one large operating lease commitment. Given that the operating lease has 25 years to run and that the lease commitment is \$500,000 for each year, the present value of the operating lease commitments is computed using Bookscape's pre-tax cost of debt of 5.5%:
 - Present value of Operating Lease commitments (in '000s) = \$500 (PV of annuity, 5.50%, 25 years) = 6,708
- Bookscape had operating income before taxes of \$ 2 million in the most recent financial year. Since we consider the present value of operating lease expenses to be debt, we add back the imputed interest expense on the present value of lease expenses to the earnings before interest and taxes.
 - Adjusted EBIT (in '000s) = EBIT + Pre-tax cost of debt * PV of operating lease expenses = \$ 2,000 + .055 * \$6,708 = \$2,369
- Estimated Market Value of Equity (in '000s) = Net Income for Bookscape * Average PE for publicly traded book retailers = 1,320 * 16.31 = \$21,525

Interest Coverage Ratios, Spreads and Ratings: Small Firms

Interest Coverage Ratio	Rating	Spread over T Bond Rate
> 12.5	AAA	0.35%
9.50-12.50	AA	0.50%
7.5 - 9.5	A+	0.70%
6.0 - 7.5	A	0.85%
4.5 - 6.0	A-	1.00%
4.0 - 4.5	BBB	1.50%
3.5 – 4.0	BB+	2.00%
3.0 - 3.5	BB	2.50%
2.5 - 3.0	B+	3.25%
2.0 - 2.5	B	4.00%
1.5 - 2.0	B-	6.00%
1.25 - 1.5	CCC	8.00%
0.8 - 1.25	CC	10.00%
0.5 - 0.8	C	12.00%
< 0.5	D	20.00%

Optimal Debt Ratio for Bookscape

<i>Debt Ratio</i>	<i>Total Beta</i>	<i>Cost of Equity</i>	<i>Bond Rating</i>	<i>Interest rate on debt</i>	<i>Tax Rate</i>	<i>Cost of Debt (after-tax)</i>	<i>WACC</i>	<i>Firm Value (G)</i>
0 %	1.84	12.87%	AAA	4.35%	40.00%	2.61%	12.87%	\$25,020
10 %	1.96	13.46%	AAA	4.35%	40.00%	2.61%	12.38%	\$26,495
20 %	2.12	14.20%	A +	4.70%	40.00%	2.82%	11.92%	\$28,005
30 %	2.31	15.15%	A -	5.00%	40.00%	3.00%	11.51%	\$29,568
40 %	2.58	16.42%	BB	6.50%	40.00%	3.90%	11.41%	\$29,946
50 %	2.94	18.19%	B	8.00%	40.00%	4.80%	11.50%	\$29,606
60 %	3.50	20.86%	CC	14.00%	39.96%	8.41%	13.39%	\$23,641
70 %	4.66	26.48%	CC	14.00%	34.25%	9.21%	14.39%	\$21,365
80 %	7.27	39.05%	C	16.00%	26.22%	11.80%	17.25%	\$16,745
90 %	14.54	74.09%	C	16.00%	23.31%	12.27%	18.45%	\$15,355

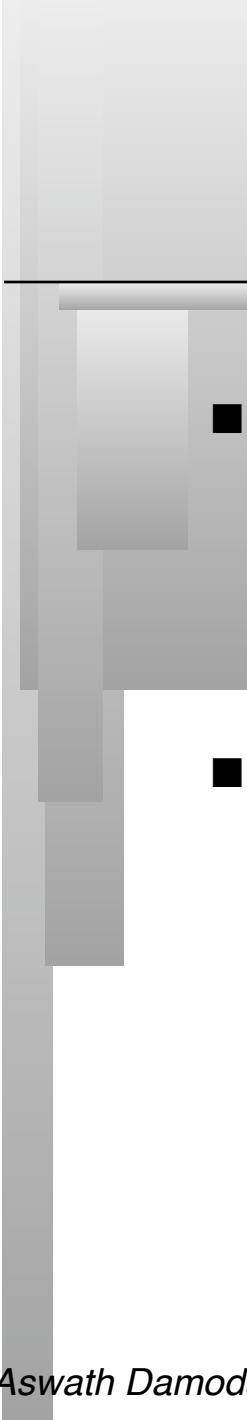
Determinants of Optimal Debt Ratios

■ Firm Specific Factors

- 1. Tax Rate
 - Higher tax rates - - > Higher Optimal Debt Ratio
 - Lower tax rates - - > Lower Optimal Debt Ratio
- 2. Pre-Tax CF on Firm = EBITDA / MV of Firm
 - Higher Pre-tax CF - - > Higher Optimal Debt Ratio
 - Lower Pre-tax CF - - > Lower Optimal Debt Ratio
- 3. Variance in Earnings [Shows up when you do 'what if' analysis]
 - Higher Variance - - > Lower Optimal Debt Ratio
 - Lower Variance - - > Higher Optimal Debt Ratio

■ Macro-Economic Factors

- 1. Default Spreads
 - Higher - - > Lower Optimal Debt Ratio
 - Lower - - > Higher Optimal Debt Ratio



⌚ 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?

II. 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

<i>Bond Rating</i>	<i>Default Rate</i>
D	100.00%
C	80.00%
CC	65.00%
CCC	46.61%
B-	32.50%
B	26.36%
B+	19.28%
BB	12.20%
BBB	2.30%
A-	1.41%
A	0.53%
A+	0.40%
AA	0.28%
AAA	0.01%

Disney: Estimating Unlevered Firm Value

Current Market Value of the Firm = \$55,101+\$14,668 = \$ 69,789

- Tax Benefit on Current Debt = $\$14,668 * 0.373 = \$ 5,479$ million

+ Expected Bankruptcy Cost = $1.41\% * (0.25 * 69,789) = \$ 246$ million

Unlevered Value of Firm = \$ 64,556 million

Cost of Bankruptcy for Disney = 25% of firm value

Probability of Bankruptcy = 1.41%, based on firm's current rating of A-

Tax Rate = 37.3%

Disney: APV at Debt Ratios

Debt Ratio	\$ Debt	Tax Rate	Unlevered Firm Value	Tax Benefits	Bond Rating	Probability of Default	Expected Bankruptcy Cost	Value of Levered Firm
0%	\$0	37.30%	\$64,556	\$0	AAA	0.01%	\$2	\$64,555
10%	\$6,979	37.30%	\$64,556	\$2,603	AAA	0.01%	\$2	\$67,158
20%	\$13,958	37.30%	\$64,556	\$5,206	A-	1.41%	\$246	\$69,517
30%	\$20,937	37.30%	\$64,556	\$7,809	BB+	7.00%	\$1,266	\$71,099
40%	\$27,916	31.20%	\$64,556	\$8,708	CCC	50.00%	\$9,158	\$64,107
50%	\$34,894	18.72%	\$64,556	\$6,531	C	80.00%	\$14,218	\$56,870
60%	\$41,873	15.60%	\$64,556	\$6,531	C	80.00%	\$14,218	\$56,870
70%	\$48,852	13.37%	\$64,556	\$6,531	C	80.00%	\$14,218	\$56,870
80%	\$55,831	11.70%	\$64,556	\$6,531	C	80.00%	\$14,218	\$56,870
90%	\$62,810	10.40%	\$64,556	\$6,531	C	80.00%	\$14,218	\$56,870

Tax benefits decrease because Disney does not have enough operating income to cover its interest expenses.

III. 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

	<i>Disney</i>	<i>Entertainment</i>	<i>Aracruz</i>	<i>Paper and Pulp (Emerging Market)</i>
Market Debt Ratio	21.02%	19.56%	30.82%	27.71%
Book Debt Ratio	35.10%	28.86%	43.12%	49.00%

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,
$$\text{Debt Ratio} = a + b (\text{Tax rate}) + c (\text{Earnings Variability}) + d (\text{EBITDA/Firm Value})$$
- 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 entertainment firms, we arrived at the following regression:

$$\text{Debt/Capital} = 0.2156 - 0.1826 (\text{Sales Growth}) + 0.6797 (\text{EBITDA/ Value})$$
$$(4.91) \quad (1.91) \quad (2.05)$$

- The R squared of the regression is 14%. This regression can be used to arrive at a predicted value for Disney of:

$$\text{Predicted Debt Ratio} = 0.2156 - 0.1826 (.0668) + 0.6797 (.0767) = 0.2555$$

or 25.55%

Based upon the capital structure of other firms in the entertainment industry, Disney should have a market value debt ratio of 25.55%.

Extending to the entire market: 2003 Data

- Using 2003 data for firms listed on the NYSE, AMEX and NASDAQ data bases. The regression provides the following results –

$$\begin{aligned} \text{DFR} = & 0.0488 + 0.810 \text{ Tax Rate} - 0.304 \text{ CLSH} + 0.841 \text{ E/V} - 2.987 \text{ CPXFR} \\ & (1.41^a) \quad (8.70^a) \quad (3.65^b) \quad (7.92^b) \quad (13.03^a) \end{aligned}$$

where,

DFR	= Debt / (Debt + Market Value of Equity)
Tax Rate	= Effective Tax Rate
CLSH	= Closely held shares as a percent of outstanding shares
CPXFR	= Capital Expenditures / Book Value of Capital
E/V	= EBITDA/ Market Value of Firm

- The regression has an R-squared of 53.3%.

Applying the Regression

Lets check whether we can use this regression. Disney had the following values for these inputs in 1996. Estimate the optimal debt ratio using the debt regression.

Effective Tax Rate = 34.76%

Closely held shares as percent of shares outstanding = 2.2%

Capital Expenditures as fraction of firm value = 2.09%

EBITDA/Value = 7.67%

Optimal Debt Ratio

$$= 0.0488 + 0.810 () - 0.304 () + 0.841() - 2.987 ()$$

What does this optimal debt ratio tell you?

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

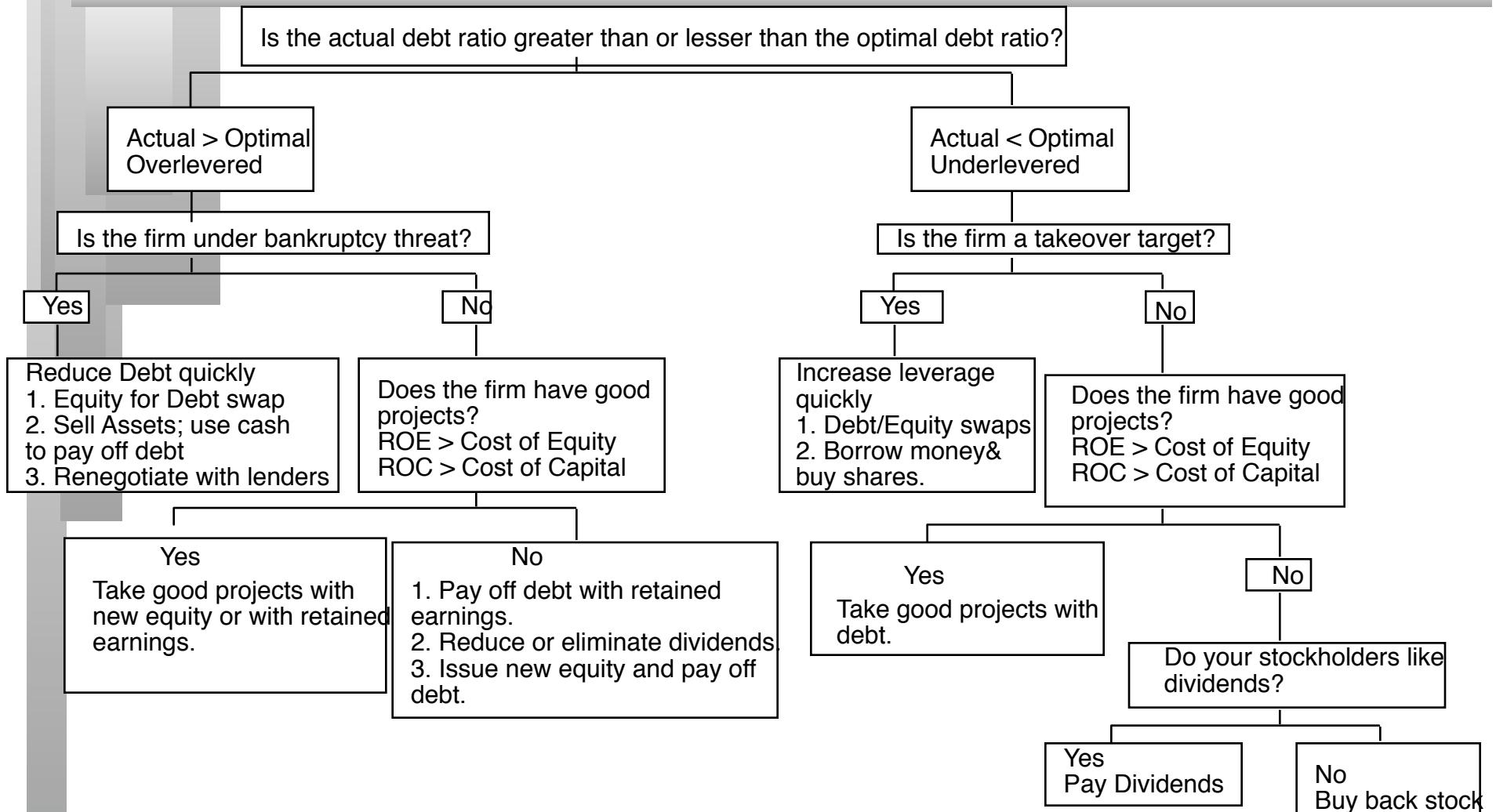
IV. The Debt-Equity Trade off and Life Cycle

	Stage 1 Start-up	Stage 2 Rapid Expansion	Stage 3 High Growth	Stage 4 Mature Growth	Stage 5 Decline
\$ Revenues/ Earnings					
Revenues					
Earnings					
Time					
<i>Tax Benefits</i>	Zero, if losing money	Low, as earnings are limited	Increase, with earnings	High	High, but declining
<i>Added Discipline of Debt</i>	Low, as owners run the firm	Low. Even if public, firm is closely held.	Increasing, as managers own less of firm	High. Managers are separated from owners	Declining, as firm does not take many new investments
<i>Bankruptcy Cost</i>	Very high. Firm has no or negative earnings.	Very high. Earnings are low and volatile	High. Earnings are increasing but still volatile	Declining, as earnings from existing assets increase.	Low, but increases as existing projects end.
<i>Agency Costs</i>	Very high, as firm has almost no assets	High. New investments are difficult to monitor	High. Lots of new investments and unstable risk.	Declining, as assets in place become a larger portion of firm.	Low. Firm takes few new investments
<i>Need for Flexibility</i>	Very high, as firm looks for ways to establish itself	High. Expansion needs are large and unpredictable	High. Expansion needs remain unpredictable	Low. Firm has low and more predictable investment needs.	Non-existent. Firm has no new investment needs.
<i>Net Trade Off</i>	Costs exceed benefits Minimal debt	Costs still likely to exceed benefits. Mostly equity	Debt starts yielding net benefits to the firm	Debt becomes a more attractive option.	Debt will provide benefits.

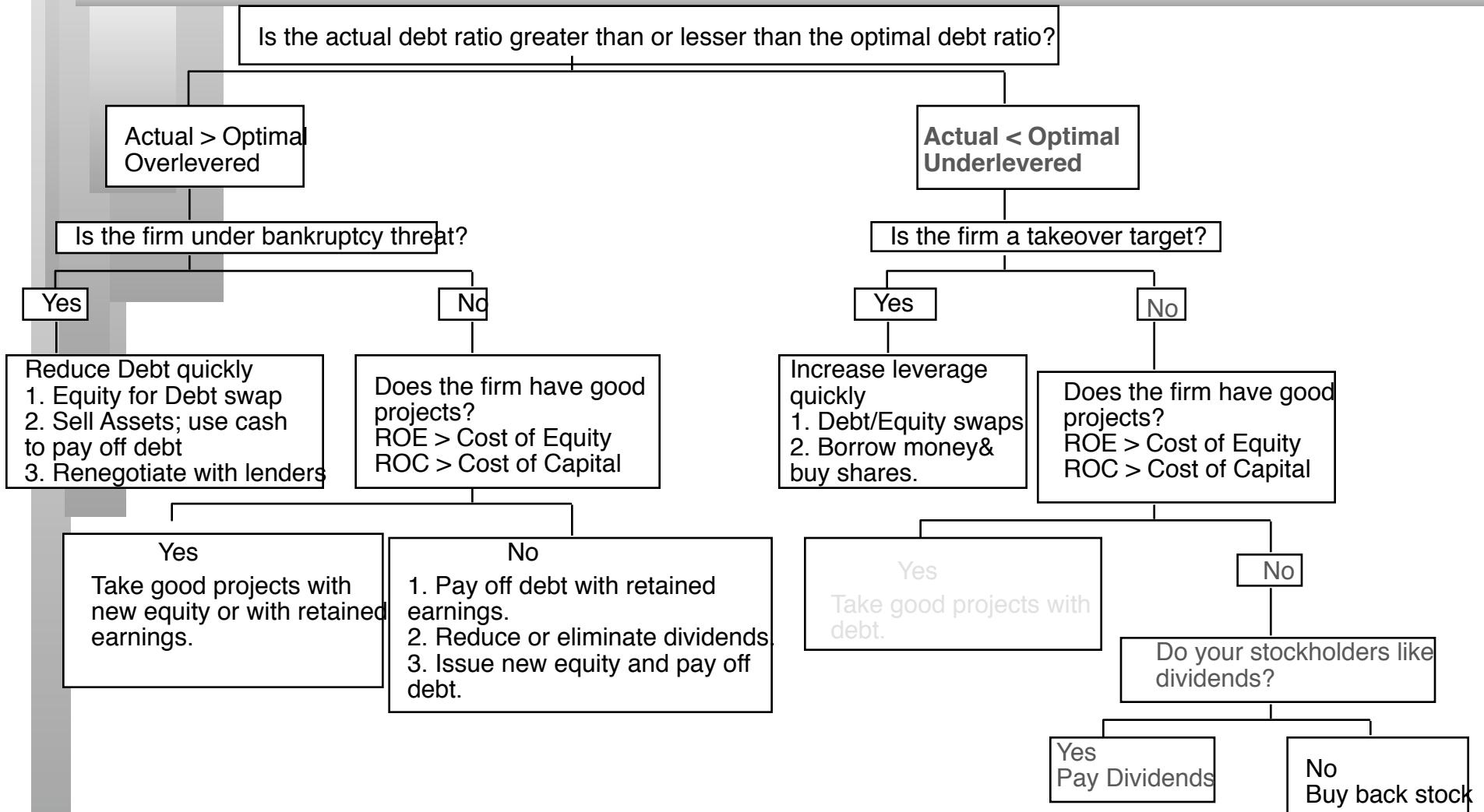
Summarizing for Disney

Approach Used	Optimal
Ia. Cost of Capital unconstrained	30%
1b. Cost of Capital w/ lower EBIT	20%
1c. Cost of Capital w/ Rating constraint	25%
II. APV Approach	30%
IIIa. Entertainment Sector Regression	25.55%
IIIb. Market Regression	32.57%
IV. Life Cycle Approach	Mature Growth
Actual Debt Ratio	21%

A Framework for Getting to the Optimal



Disney: Applying the Framework





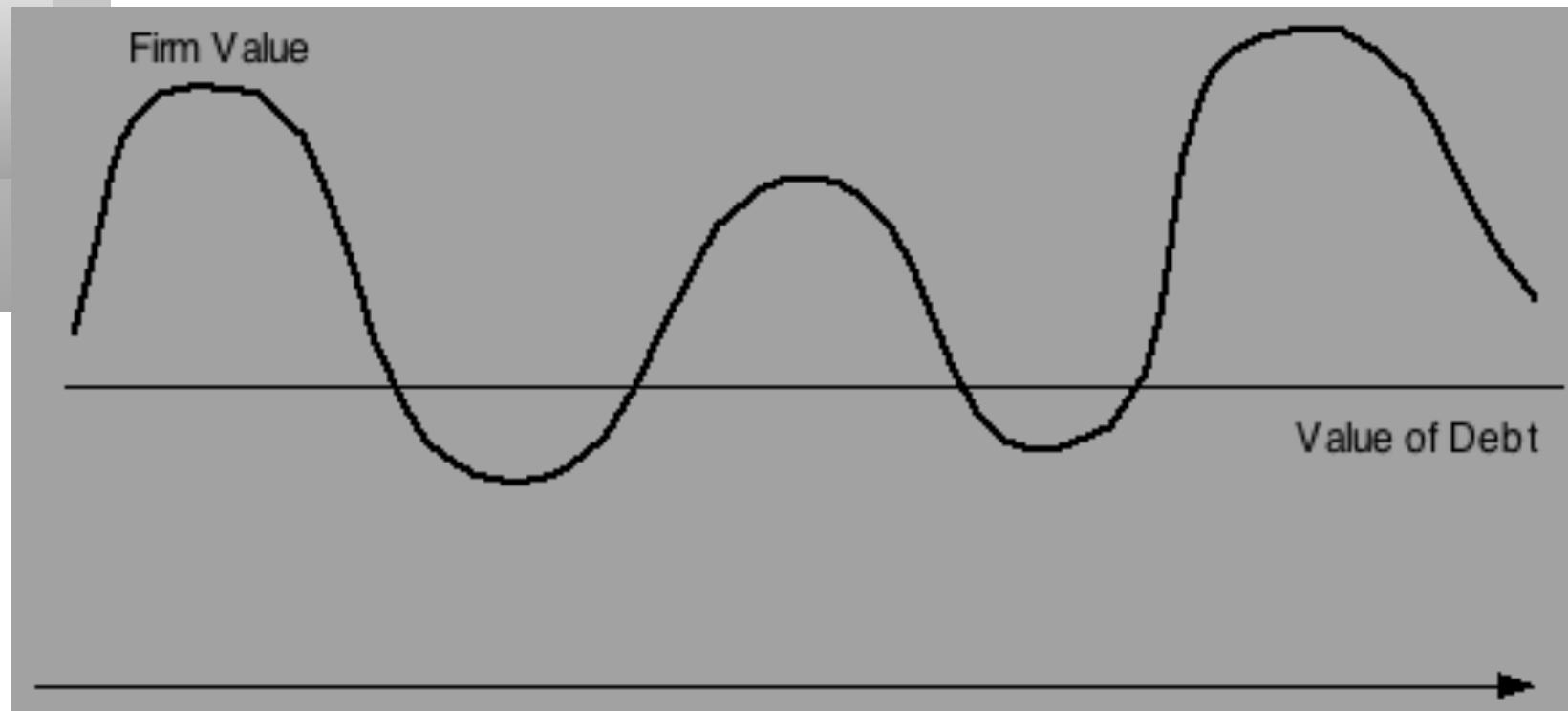
Application Test: Getting to the Optimal

- 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

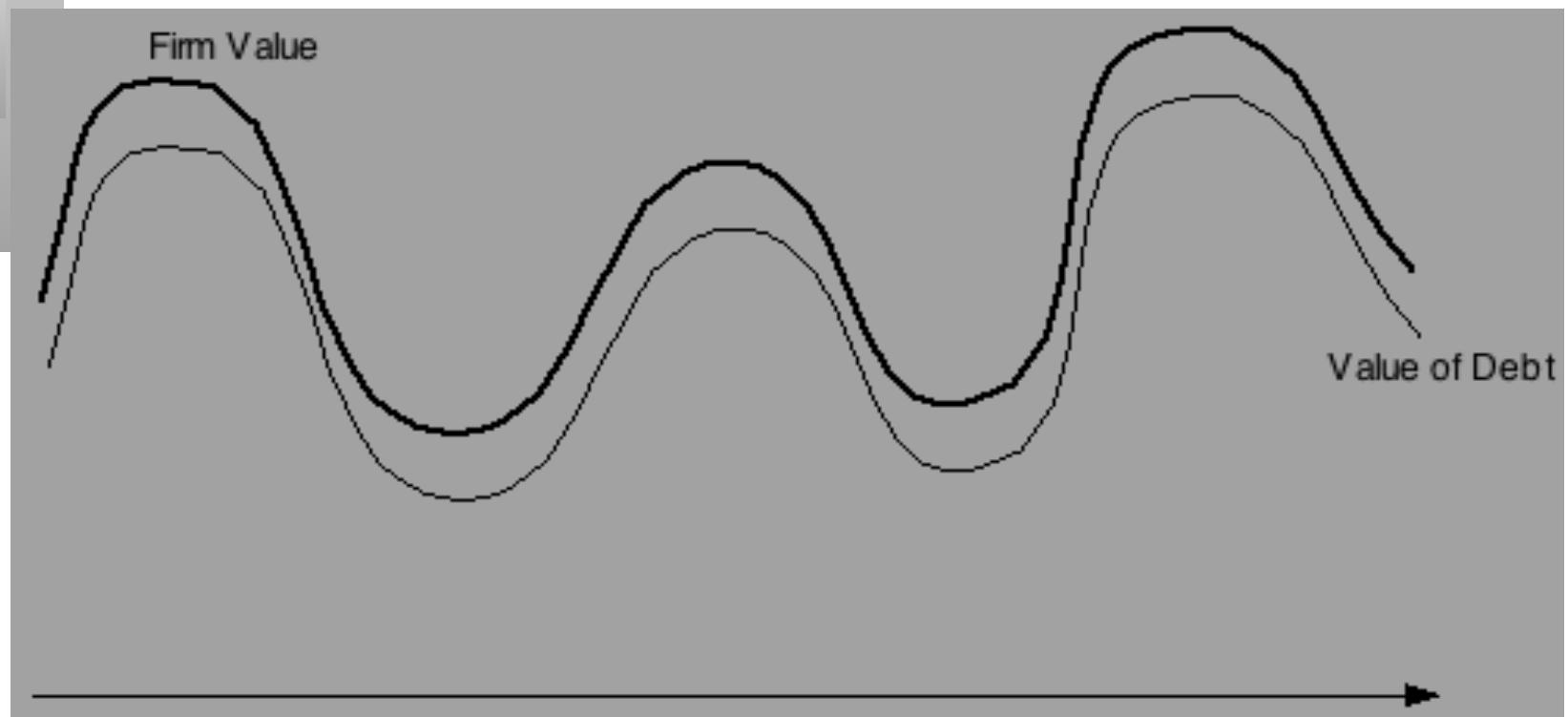
Designing Debt: The Fundamental Principle

- 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

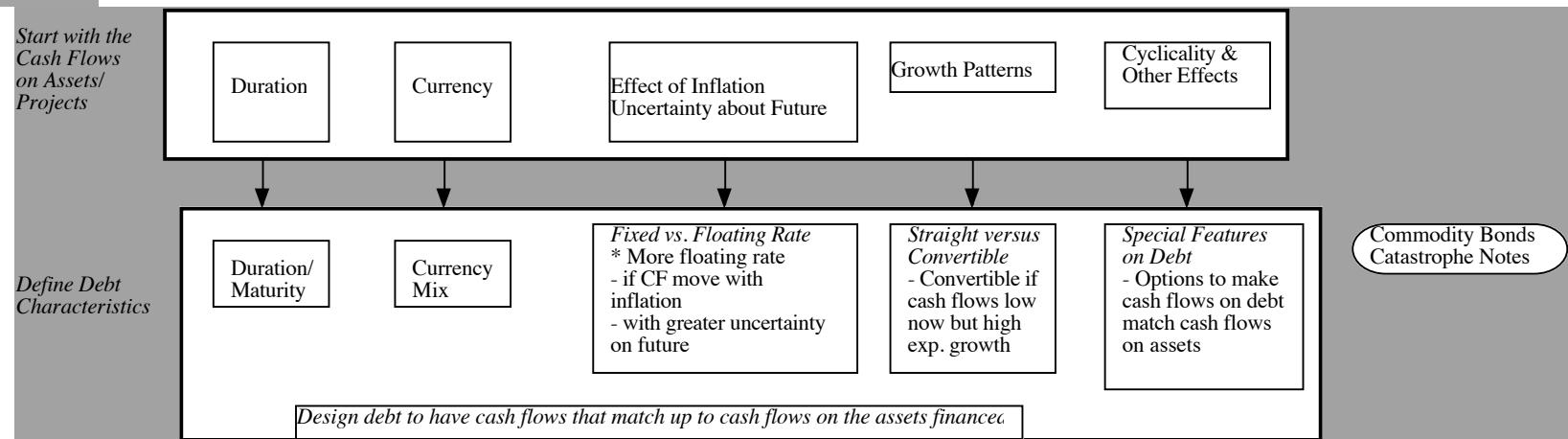


Firm with matched Debt



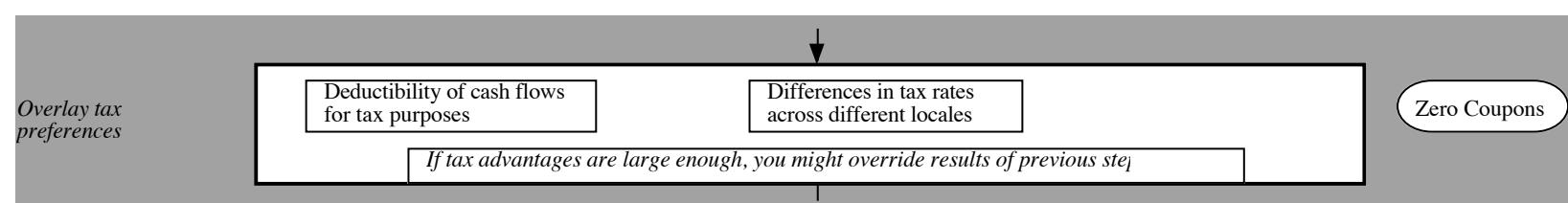
Design the perfect financing instrument

- 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.

Consider
ratings agency
& analyst concerns

Analyst Concerns
- Effect on EPS
- Value relative to comparables

Ratings Agency
- Effect on Ratios
- Ratios relative to comparables

Regulatory Concerns
- Measures used

Operating Leases
MIPs
Surplus Notes

Can securities be designed that can make these different entities happy

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.

Factor in agency conflicts between stock and bond holders

Observability of Cash Flows by Lenders
- Less observable cash flows lead to more conflicts

Type of Assets financed
- Tangible and liquid assets create less agency problems

Existing Debt covenants
- Restrictions on Financing

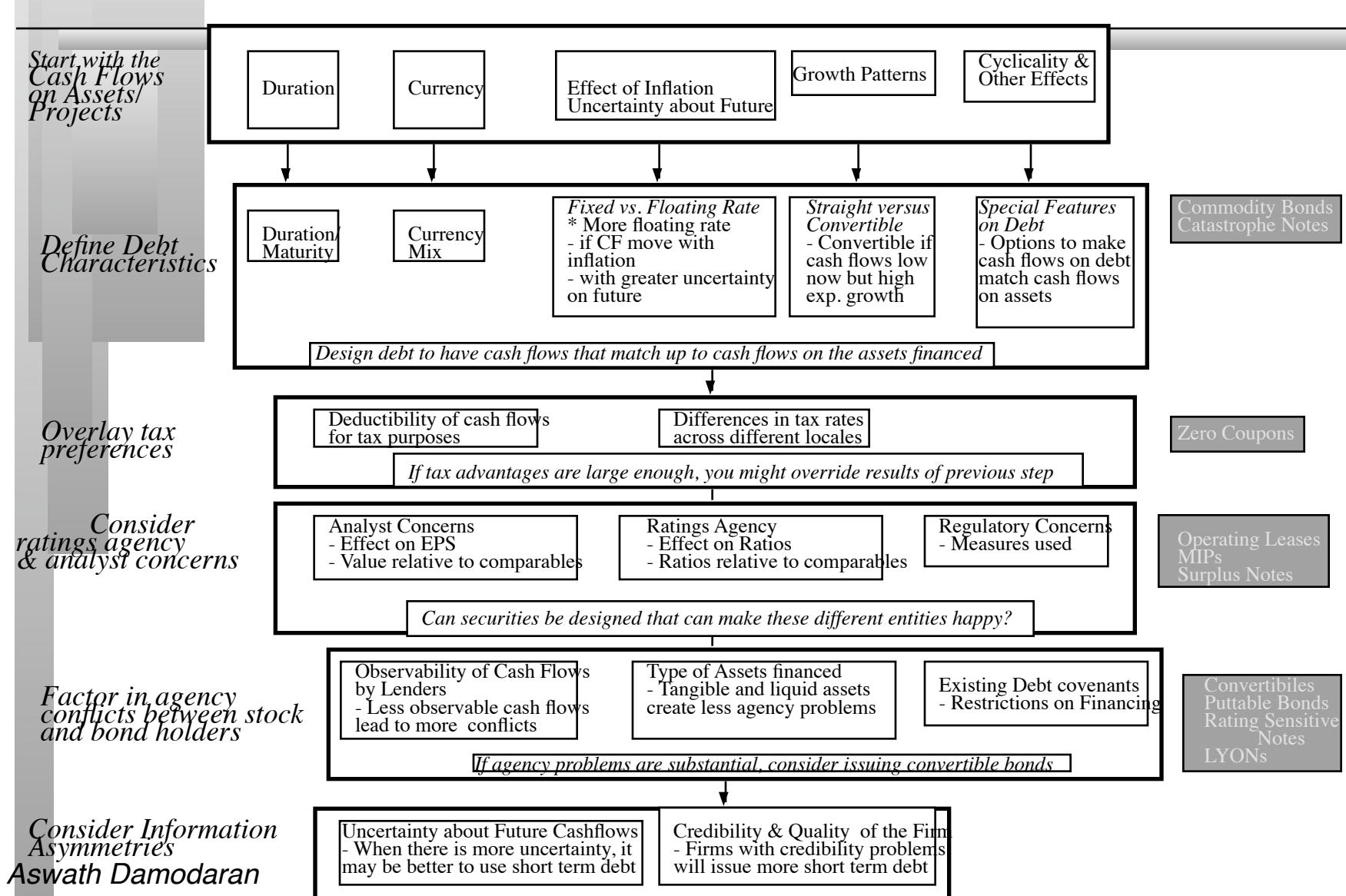
Convertibles
Puttable Bonds
Rating Sensitive Notes
LYONs

If agency problems are substantial, consider issuing convertible bond

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

<i>Business</i>	<i>Project Cash Flow Characteristics</i>	<i>Type of Financing</i>
Movies	Projects are likely to 1. Be short term 2. Have cash outflows primarily in dollars (since Disney makes most of its movies in the U.S.) but cash inflows could have a substantial foreign currency component (because of overseas sales) 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 Nemo Bonds)
Broadcasting	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	Debt should be 1. Short term 2. Primarily dollar debt 3. If possible, linked to network ratings.
Theme Parks	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 movie and broadcasting divisions.	Debt should be 1. Long term 2. Mix of currencies, based upon tourist make up.
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 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	Annual Cashflow	Terminal Value	Present Value	Present value * _t
0	-\$2,000		-\$2,000	\$0
1	-\$1,000		-\$904	-\$904
2	-\$833		-\$680	-\$1,361
3	-\$224		-\$165	-\$496
4	\$417		\$278	\$1,112
5	\$559		\$337	\$1,684
6	\$614		\$334	\$2,006
7	\$658		\$324	\$2,265
8	\$726		\$323	\$2,582
9	\$802		\$322	\$2,899
10	\$837	\$9,857	\$3,882	\$38,821
			\$2,050	\$48,609
	Duration =	48609/2050 = 23.71 years		

The perfect theme park debt...

- The perfect debt for this theme park would have a duration of roughly 23.71 years and be in a mix of Asian currencies, 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

- λ 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.
- λ This analysis is useful in determining the coupon/interest payment structure of the debt.

2. Firm Value

- λ 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.
- λ The firm value analysis is useful in determining the overall structure of the debt, particularly maturity.

Disney: Historical Data

<i>Period</i>	<i>Operating Income</i>	<i>Firm value</i>
2003	\$2,713	\$68,239
2002	\$2,384	\$53,708
2001	\$2,832	\$45,030
2000	\$2,525	\$47,717
1999	\$3,580	\$88,558
1998	\$3,843	\$65,487
1997	\$3,945	\$64,236
1996	\$3,024	\$65,489
1995	\$2,262	\$54,972
1994	\$1,804	\$33,071
1993	\$1,560	\$22,694
1992	\$1,287	\$25,048
1991	\$1,004	\$17,122
1990	\$1,287	\$14,963
1989	\$1,109	\$16,015
1988	\$789	\$9,195
1987	\$707	\$8,371
1986	\$281	\$5,631
1985	\$206	\$3,655
1984	\$143	\$2,024
1983	\$134	\$1,817
1982	\$141	\$2,108

The Macroeconomic Data

<i>Period</i>	<i>T.Bond Rate</i>	<i>Change in rate</i>	<i>GDP (Deflated)</i>	<i>% Chg in GDP</i>	<i>CPI</i>	<i>Change in CPI</i>	<i>Weighted Dollar</i>	<i>% Change in \$</i>
2003	4.29%	0.40%	10493	3.60%	2.04%	0.01%	88.82	-14.51%
2002	3.87%	-0.82%	10128	2.98%	2.03%	-0.10%	103.9	-3.47%
2001	4.73%	-1.20%	9835	-0.02%	2.13%	-1.27%	107.64	1.85%
2000	6.00%	0.30%	9837	3.53%	3.44%	0.86%	105.68	11.51%
1999	5.68%	-0.21%	9502	4.43%	2.56%	1.05%	94.77	-0.59%
1998	5.90%	-0.19%	9099	3.70%	1.49%	-0.65%	95.33	0.95%
1997	6.10%	-0.56%	8774	4.79%	2.15%	-0.82%	94.43	7.54%
1996	6.70%	0.49%	8373	3.97%	2.99%	0.18%	87.81	4.36%
1995	6.18%	-1.32%	8053	2.46%	2.81%	0.19%	84.14	-1.07%
1994	7.60%	2.11%	7860	4.30%	2.61%	-0.14%	85.05	-5.38%
1993	5.38%	-0.91%	7536	2.25%	2.75%	-0.44%	89.89	4.26%
1992	6.35%	-1.01%	7370	3.50%	3.20%	0.27%	86.22	-2.31%
1991	7.44%	-1.24%	7121	-0.14%	2.92%	-3.17%	88.26	4.55%
1990	8.79%	0.47%	7131	1.68%	6.29%	1.72%	84.42	-11.23%
1989	8.28%	-0.60%	7013	3.76%	4.49%	0.23%	95.10	4.17%
1988	8.93%	-0.60%	6759	4.10%	4.25%	-0.36%	91.29	-5.34%
1987	9.59%	2.02%	6493	3.19%	4.63%	3.11%	96.44	-8.59%
1986	7.42%	-2.58%	6292	3.11%	1.47%	-1.70%	105.50	-15.30%
1985	10.27%	-1.11%	6102	3.39%	3.23%	-0.64%	124.56	-10.36%
1984	11.51%	-0.26%	5902	4.18%	3.90%	-0.05%	138.96	8.01%
1983	11.80%	1.20%	5665	6.72%	3.95%	-0.05%	128.65	4.47%
1982	10.47%	-3.08%	5308	-1.61%	4%	-4.50%	123.14	6.48%

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 –

$$\text{Change in Firm Value} = 0.2081 - 4.16 (\text{Change in Interest Rates})$$
$$(2.91) \quad (0.75)$$

T statistics are in brackets.

- The coefficient on the regression (-4.16) measures how much the value of Disney as a firm changes for a unit change in interest rates.

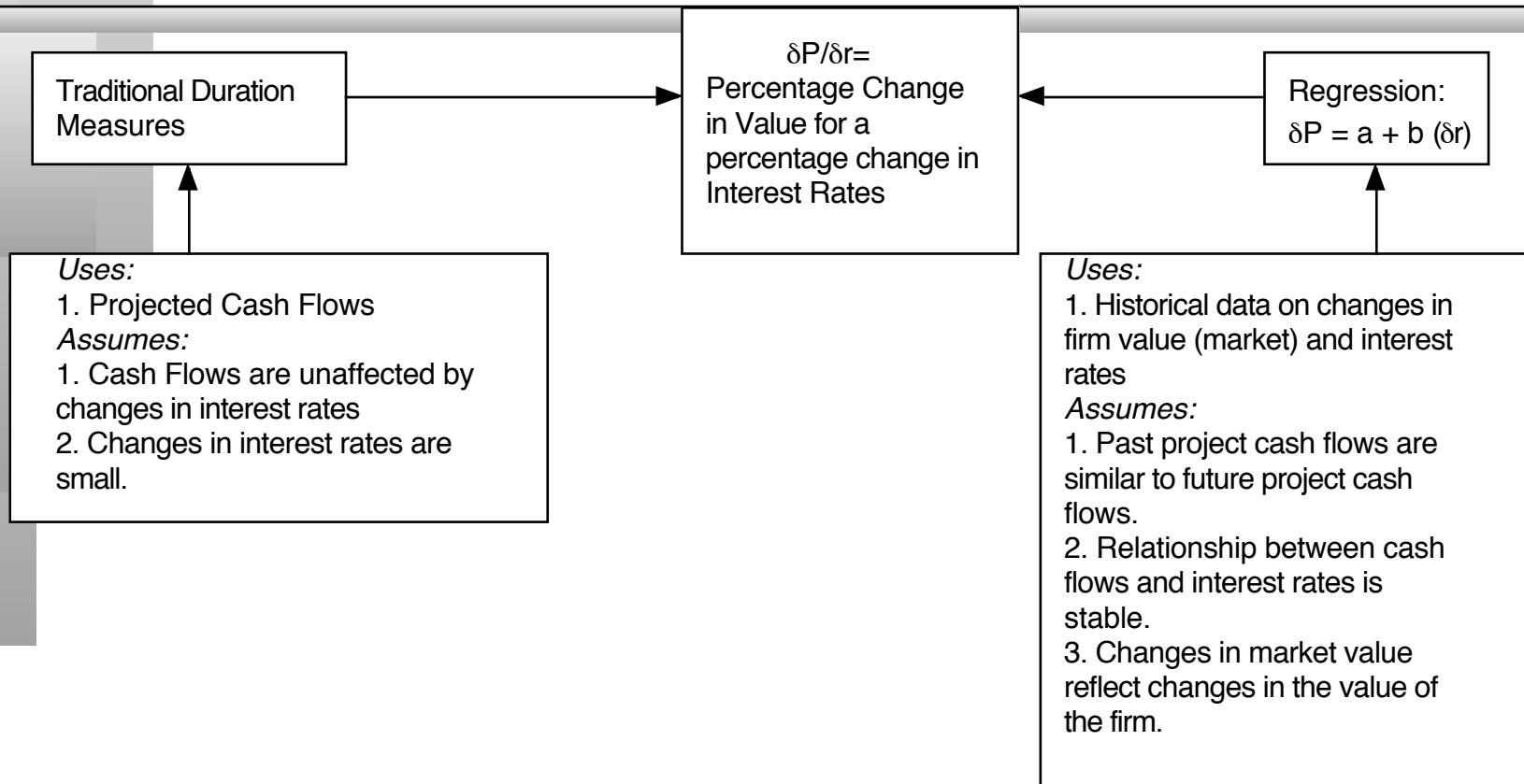
Why the coefficient on the regression is duration..

- 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 = 0.2189 + 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 than 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 –

$$\begin{array}{ll} \text{Change in Firm Value} = 0.2165 & + 0.26 \text{ (GDP Growth)} \\ & (1.56) \quad (0.07) \end{array}$$

- Conclusion: Disney is not sensitive to economic growth

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

$$\begin{array}{ll} \text{Change in Operating Income} = 0.1725 & + 0.66 \text{ (GDP Growth)} \\ & (1.10) \quad (0.15) \end{array}$$

- Conclusion: Disney's operating income is not sensitive to economic growth either.

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 –

$$\begin{array}{ll} \text{Change in Firm Value} = & 0.2060 \quad -2.04 \text{ (Change in Dollar)} \\ & (3.40) \quad (2.52) \end{array}$$

- 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 –

$$\begin{array}{ll} \text{Change in Operating Income} = & 0.1768 \quad -1.76 \text{ (Change in Dollar)} \\ & (2.42) \quad (1.81) \end{array}$$

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 –

$$\begin{aligned}\text{Change in Firm Value} &= 0.2262 + 0.57 (\text{Change in Inflation Rate}) \\ &\quad (3.22) \quad (0.13)\end{aligned}$$

Conclusion: Disney's firm value does not seem to be affected too much by changes in the inflation rate.

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

$$\begin{aligned}\text{Change in Operating Income} &= 0.2192 + 9.27 (\text{Change in Inflation Rate}) \\ &\quad (3.01) \quad (1.95)\end{aligned}$$

Conclusion: Disney's operating income seems to increase in periods when inflation increases. However, this increase in operating income seems to be offset by the increase in discount rates leading to a much more muted effect on value.

Summarizing...

- Looking at the four macroeconomic regressions, we would conclude that
 - Disney's assets have a duration of 4.17 years
 - Disney is not a cyclical firm
 - 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

	Coefficients on firm value regression					
	Interest Rates	GDP Growth	Inflation	Currency	Disney Weights	
Movies	-3.70	0.56	1.41	-1.23	25.62%	
Theme Parks	-6.47	0.22	-1.45	-3.21	20.09%	
Broadcasting	-4.50	0.70	-3.05	-1.58	49.25%	
Consumer Products	-4.88	0.13	-5.51	-3.01	5.04%	
Disney	-4.71	0.54	-1.71	-1.89	100%	

Recommendations for Disney

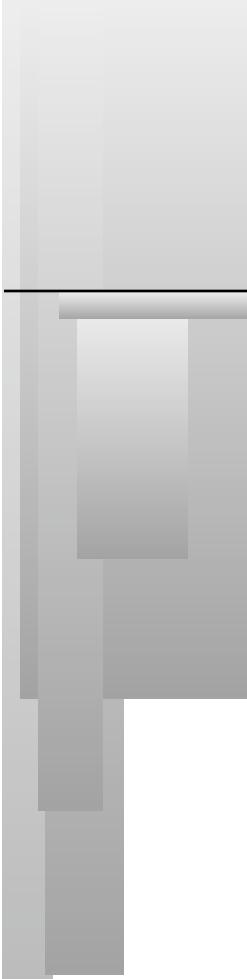
- The debt issued should be long term and should have duration of between 4 and 5 years.
- A significant portion of the debt should be floating rate debt, reflecting Disney's capacity to pass inflation through to its customers and the fact that operating income tends to increase as interest rates go 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 2003 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 \$13.1 billion in debt with an average maturity of 11.53 years. Even allowing for the fact that the maturity of debt is higher than the duration, this would indicate that Disney's debt is far too long term for its existing business mix.
- Of the debt, about 12% is Euro debt and no yen denominated debt. Based upon our analysis, a larger portion of Disney's debt should be in foreign currencies.
- Disney has about \$1.3 billion in convertible debt and some floating rate debt, though no information is provided on its magnitude. If floating rate debt is a relatively small portion of existing debt, our analysis would indicate that Disney should be using more of it.

Adjusting Debt at Disney

- It can swap some of its existing long term, fixed rate, dollar debt with shorter term, 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 short term, floating rate, foreign currency debt to fund these new investments. While it may be mismatching the funding on these investments, its debt matching will become better at the company level.



Returning Cash to the Owners: Dividend Policy

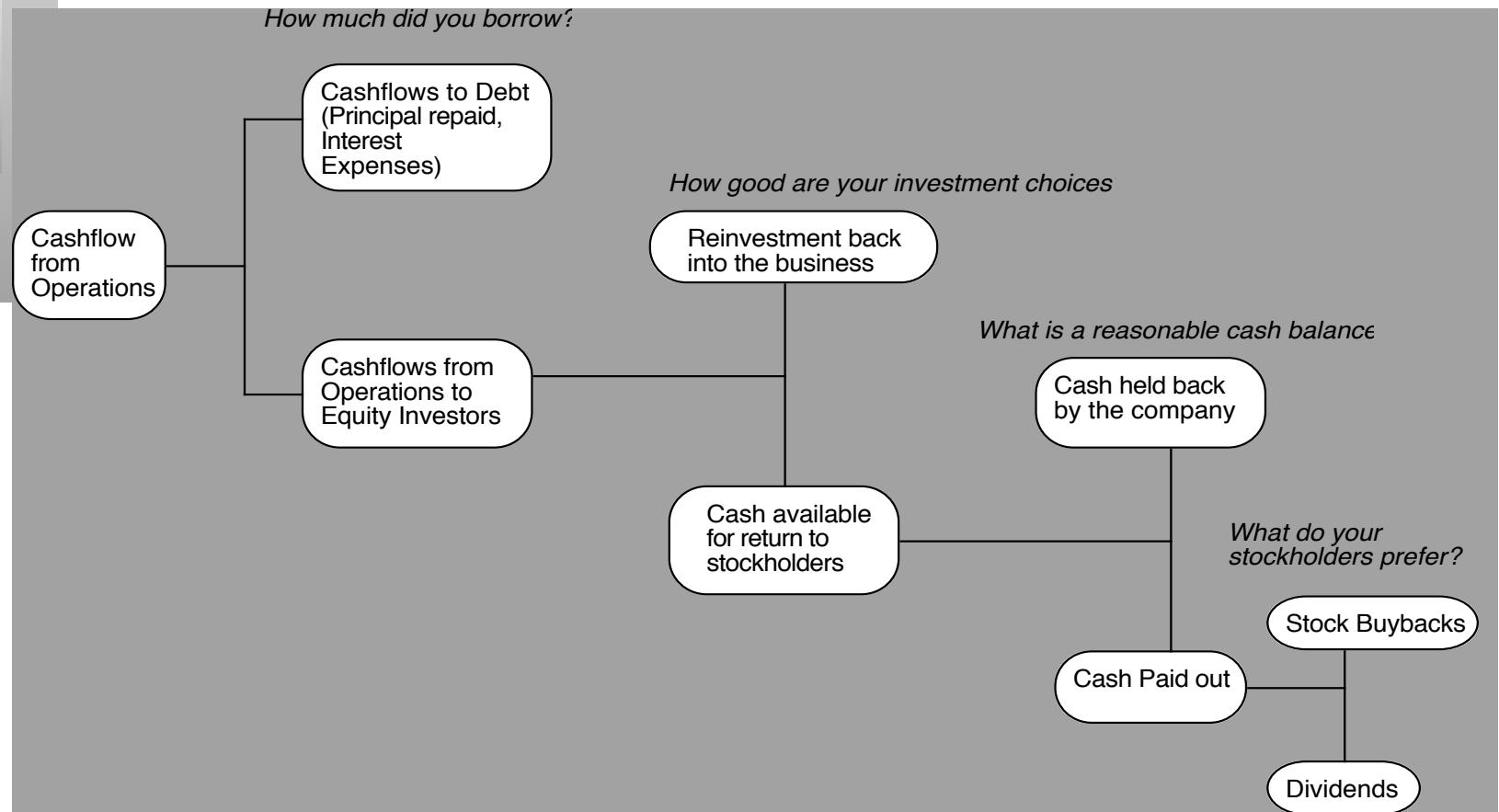
“Companies don’t have cash. They hold cash for their stockholders.”

First Principles

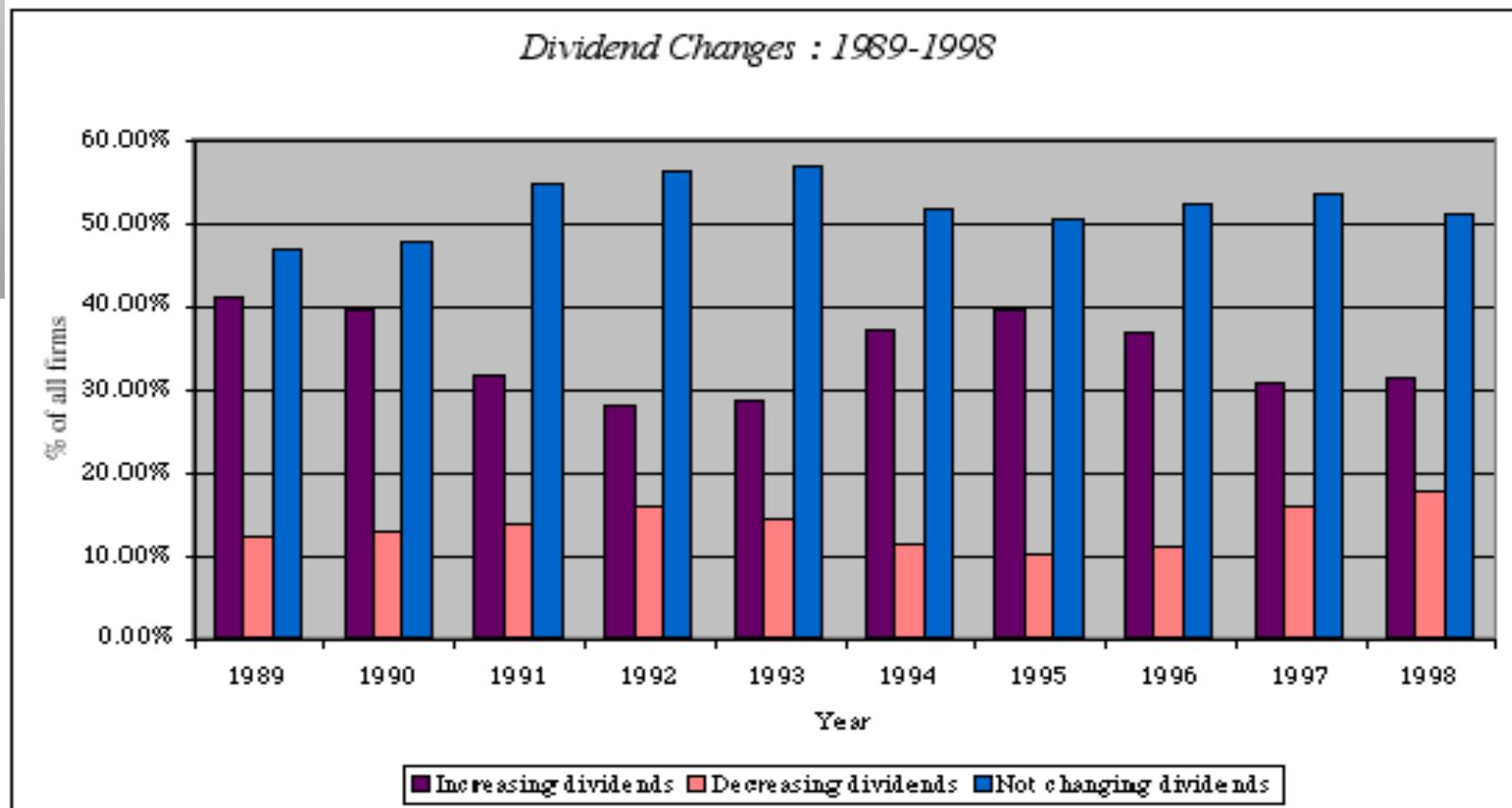
- Invest in projects that yield a return greater than the minimum acceptable hurdle rate.
 - The hurdle rate should be higher for riskier projects and reflect the financing mix used - owners' funds (equity) or borrowed money (debt)
 - Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders.
 - The form of returns - dividends and stock buybacks - will depend upon the stockholders' characteristics.

Objective: Maximize the Value of the Firm

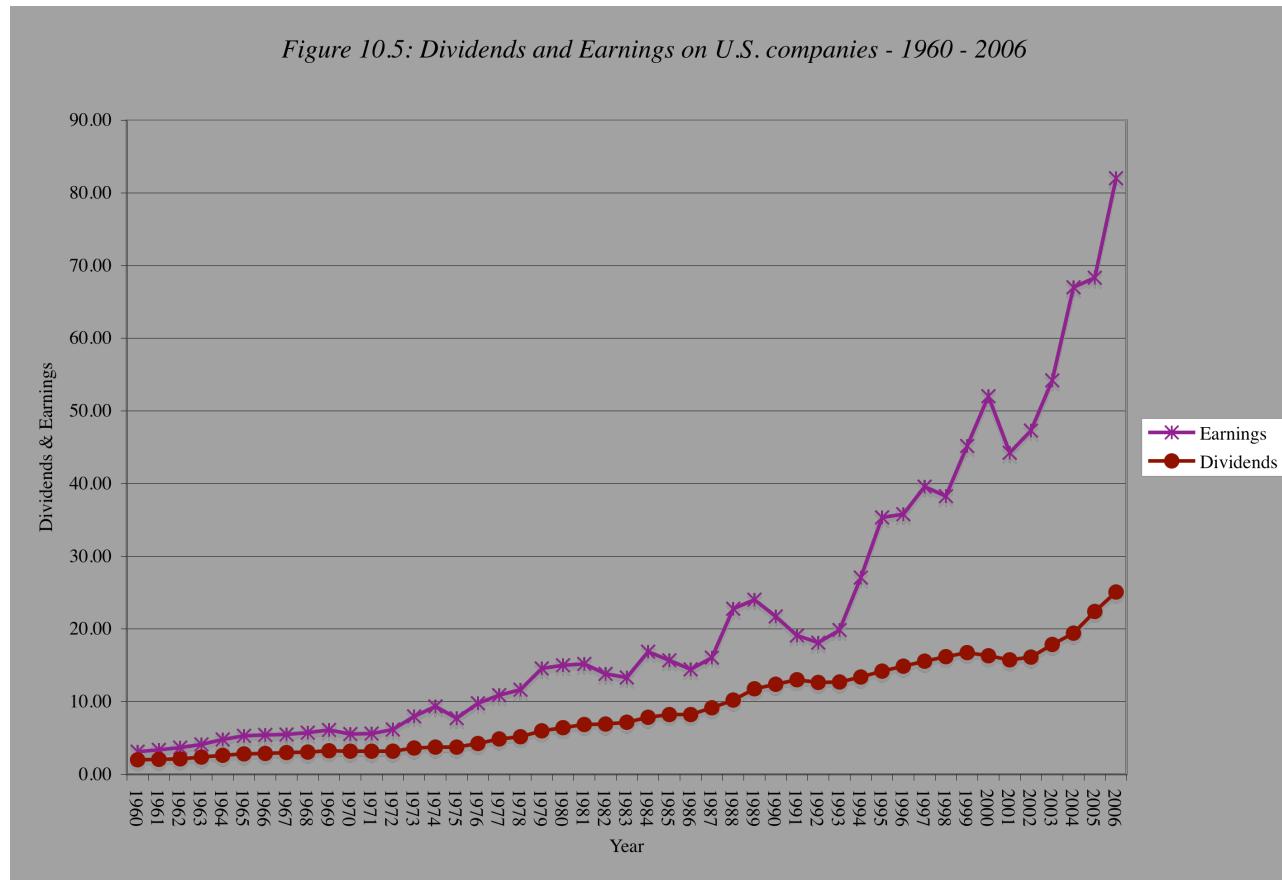
Steps to the Dividend Decision...



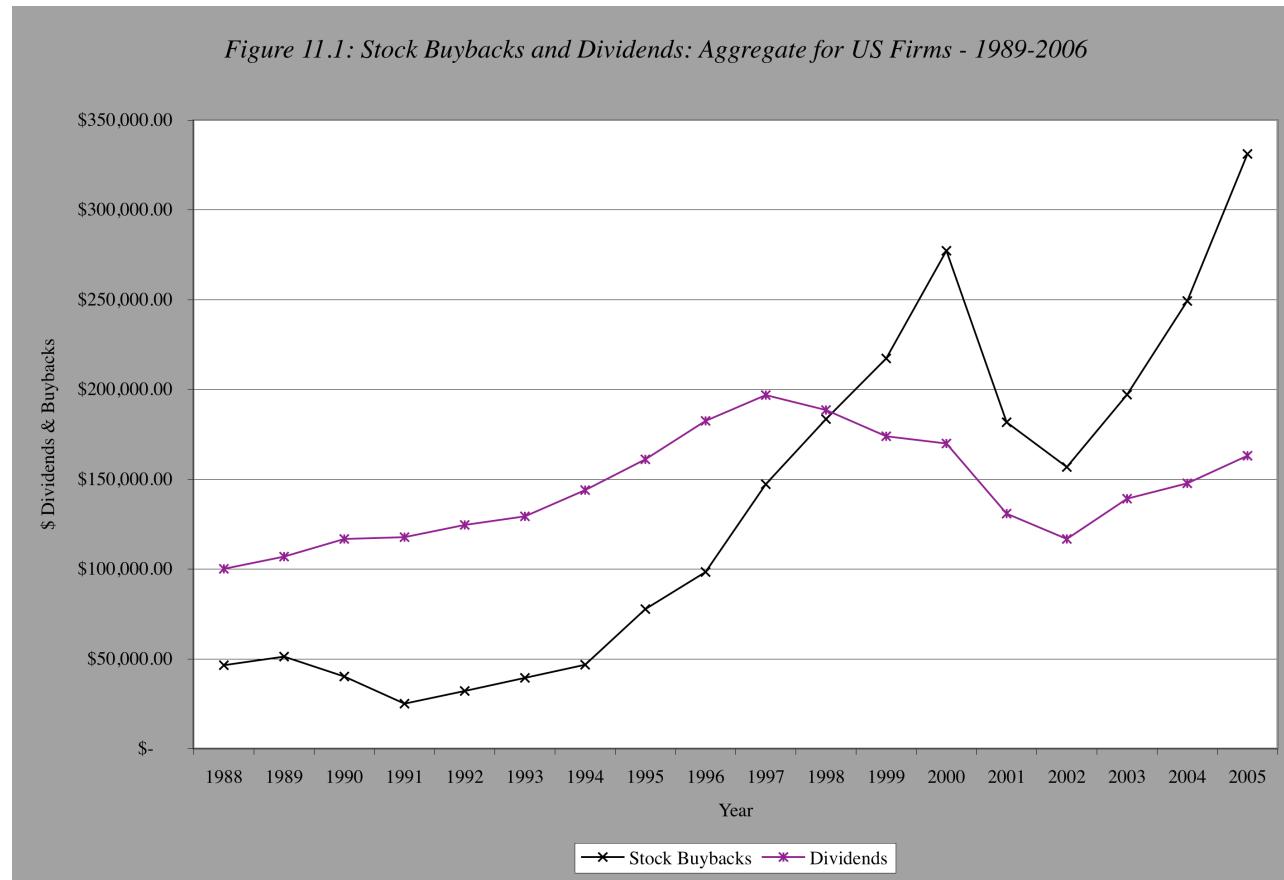
I. Dividends are sticky



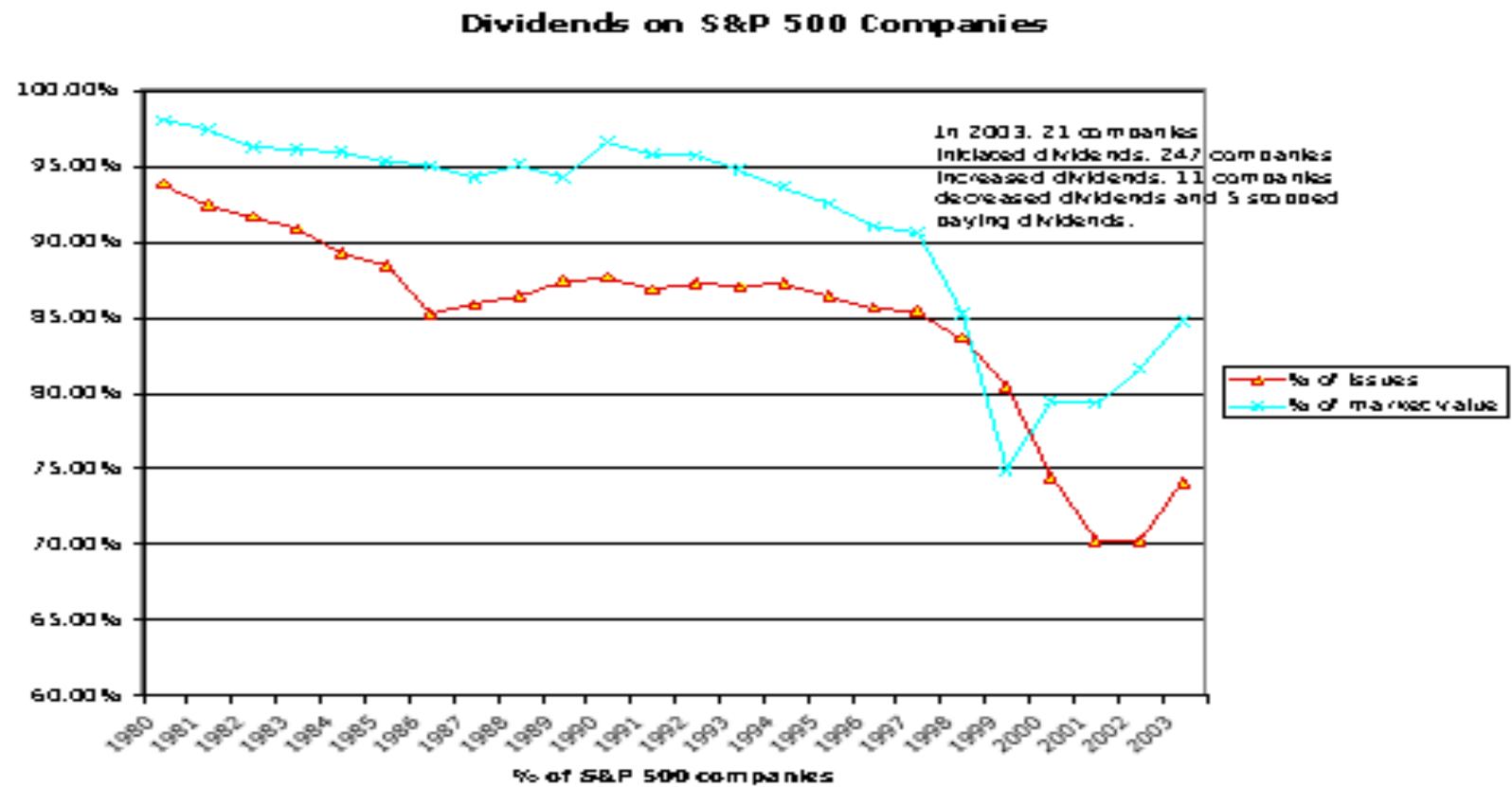
II. Dividends tend to follow earnings



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



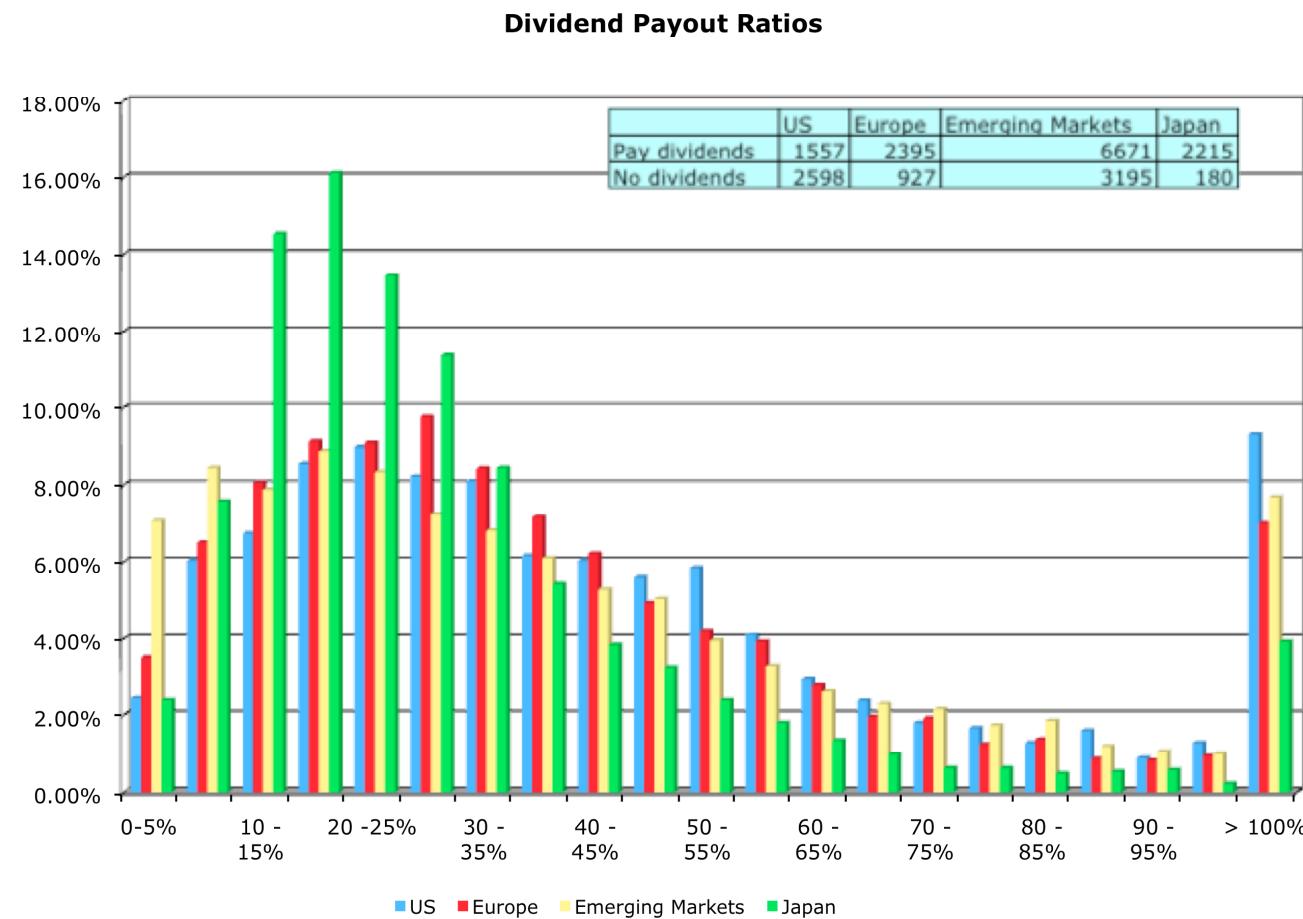
IV. But the change in dividend tax law in 2003 may cause a shift back to dividends



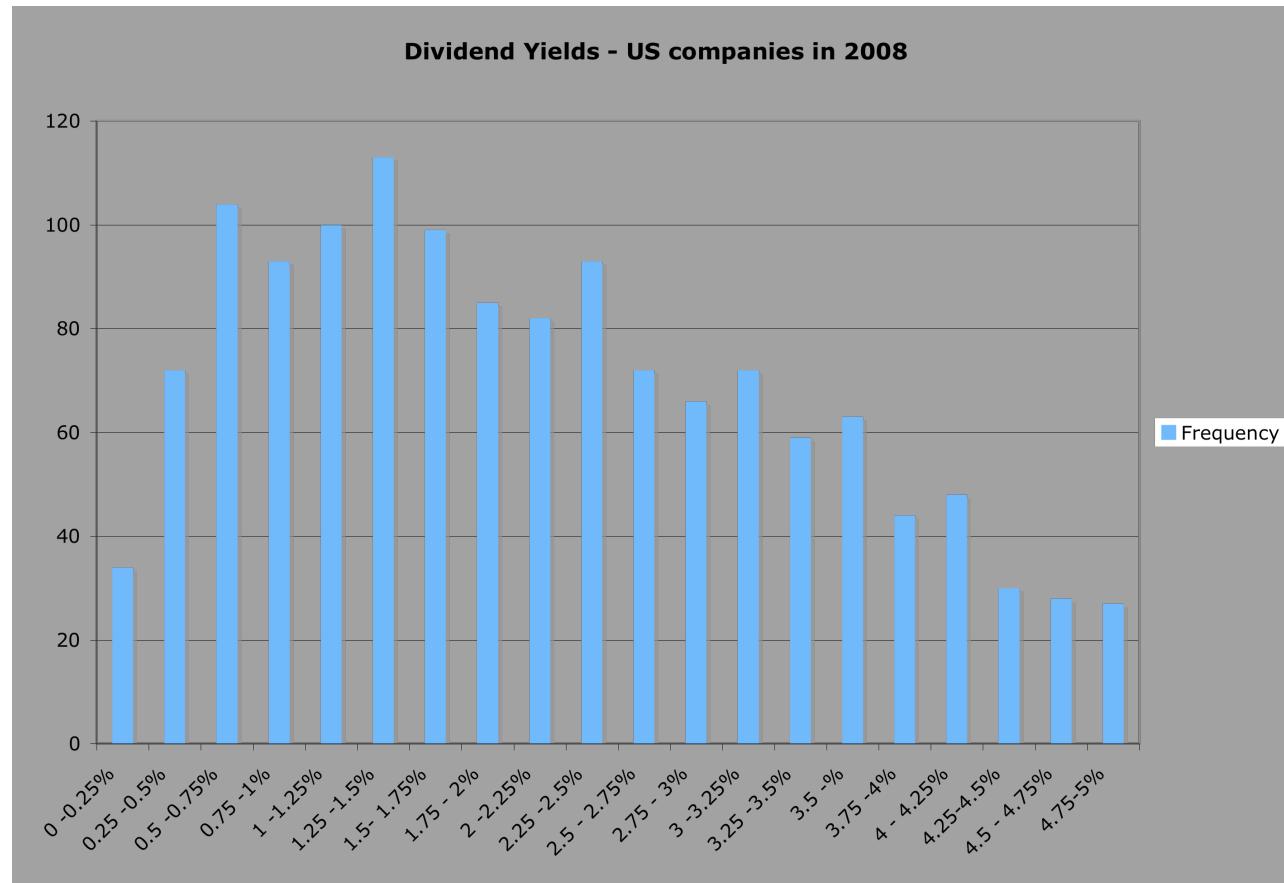
Measures of Dividend Policy

- **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 2008



Dividend Yields in the United States: January 2008



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

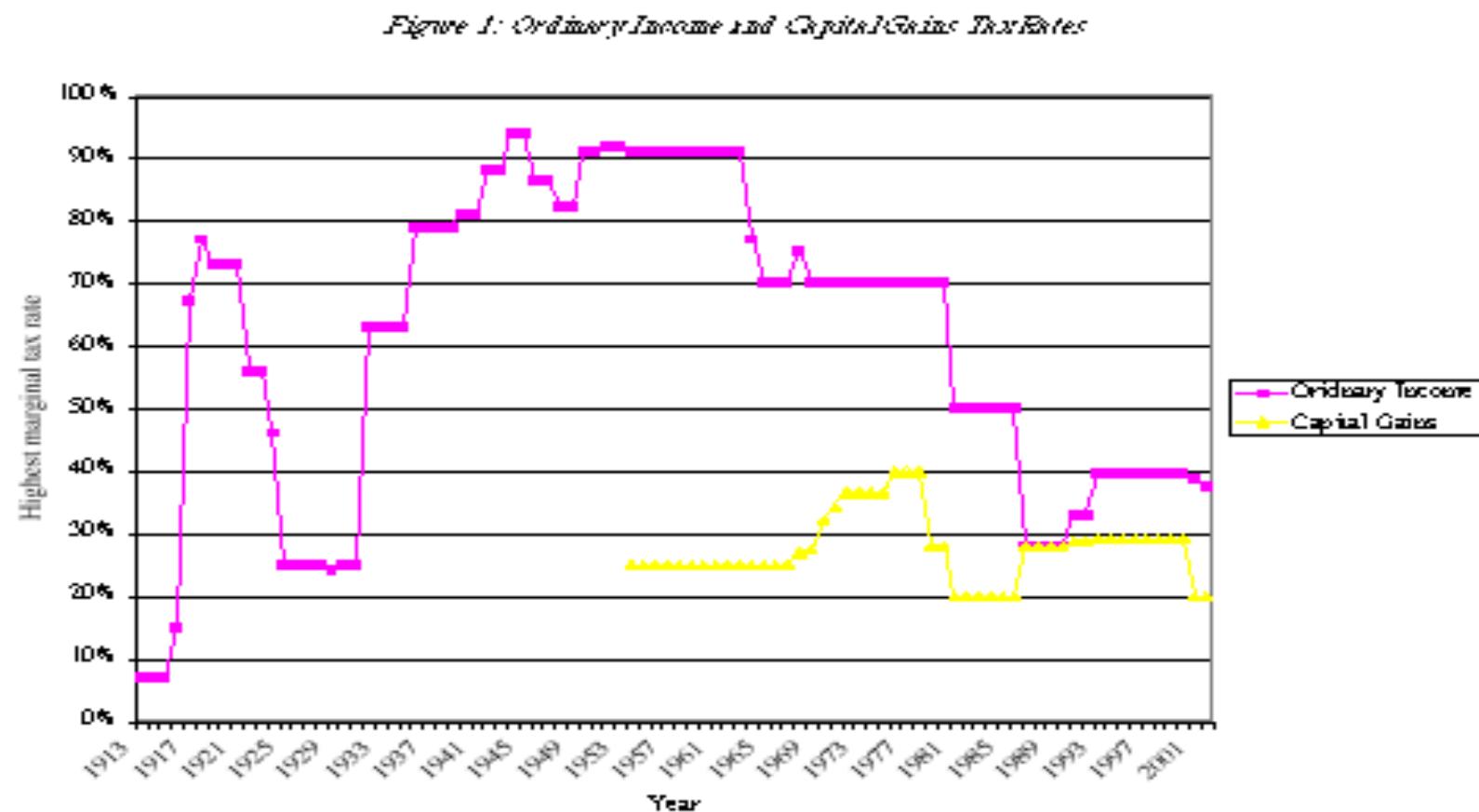
- If a company has excess cash, and few good investment opportunities ($NPV > 0$), returning money to stockholders (dividends or stock repurchases) is good.
- If a company does not have excess cash, and/or has several good investment opportunities ($NPV > 0$), returning money to stockholders (dividends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

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

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.

<i>Tax Rates</i>	<i>Ex-dividend day behavior</i>
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

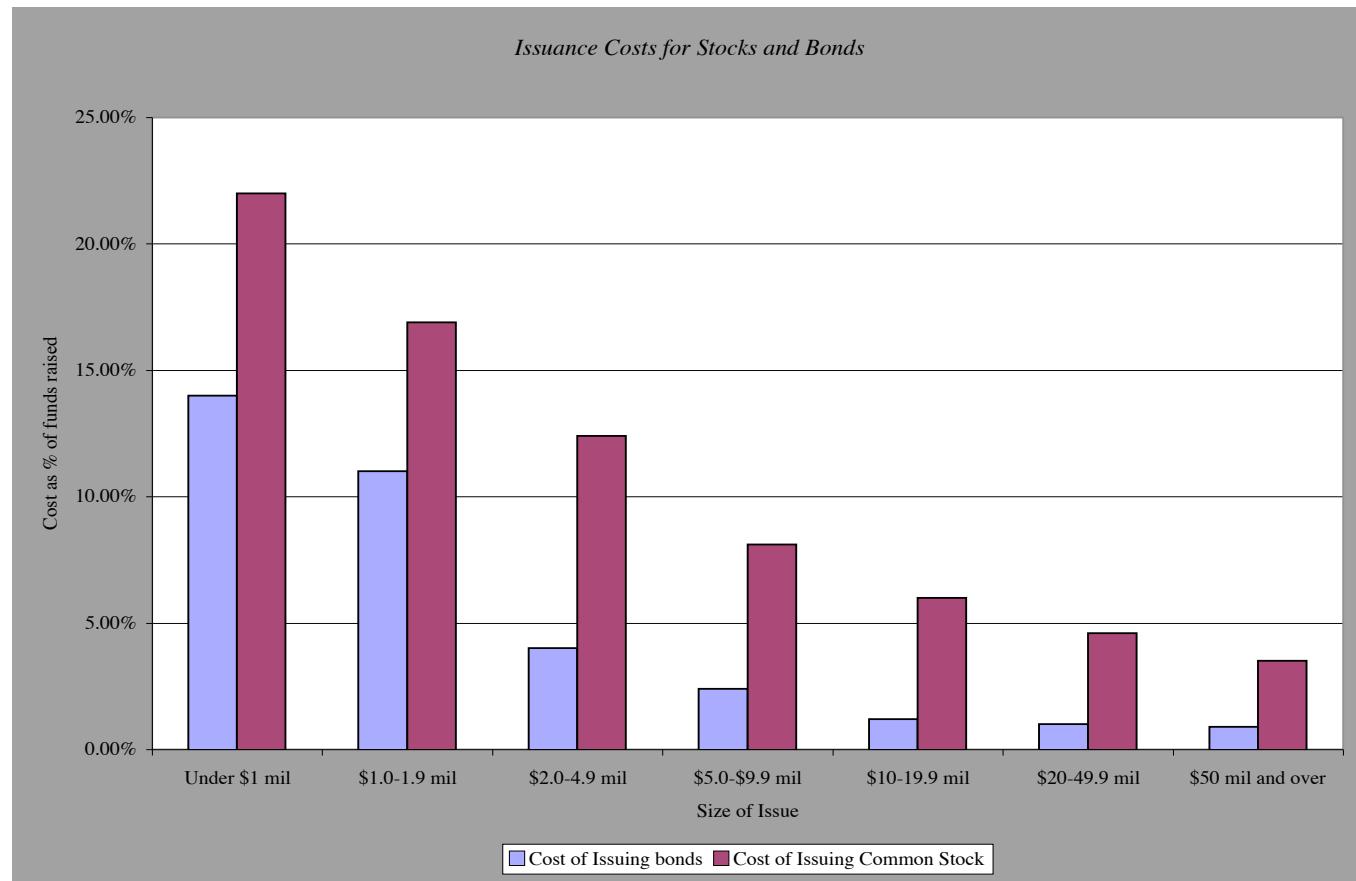
1. The bird in the hand fallacy

- **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

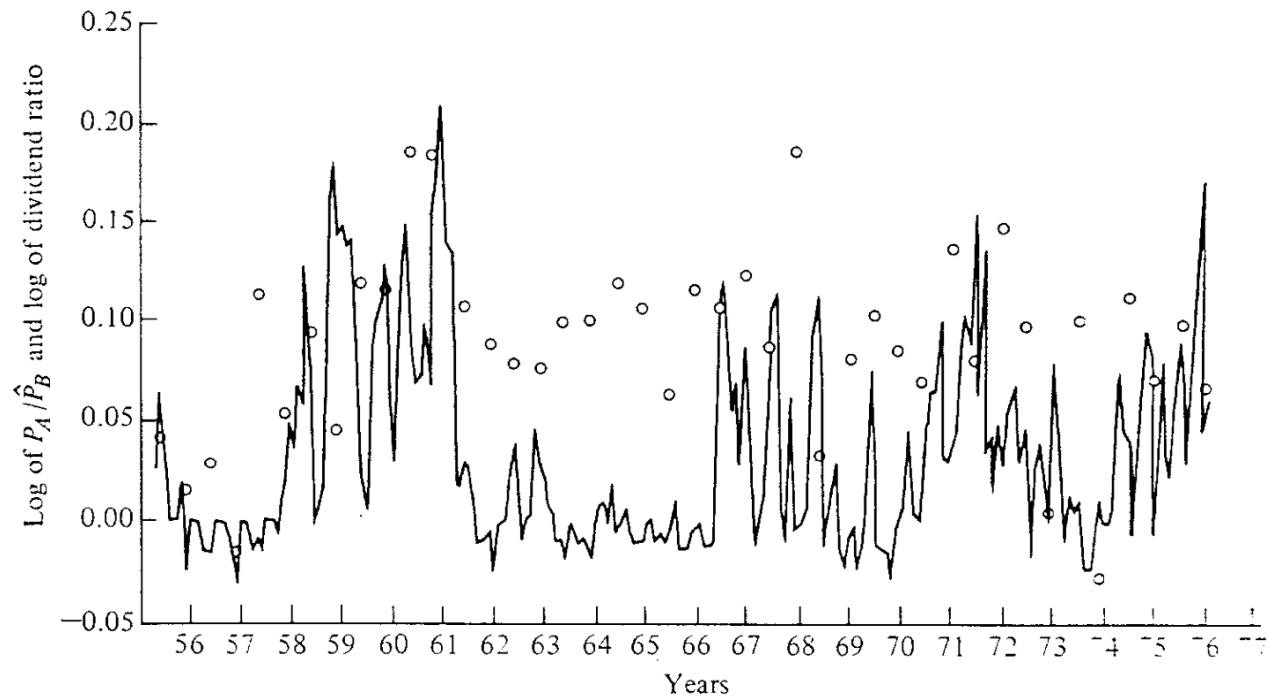


Three “good” reasons for paying dividends...

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
price
appreciation

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

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

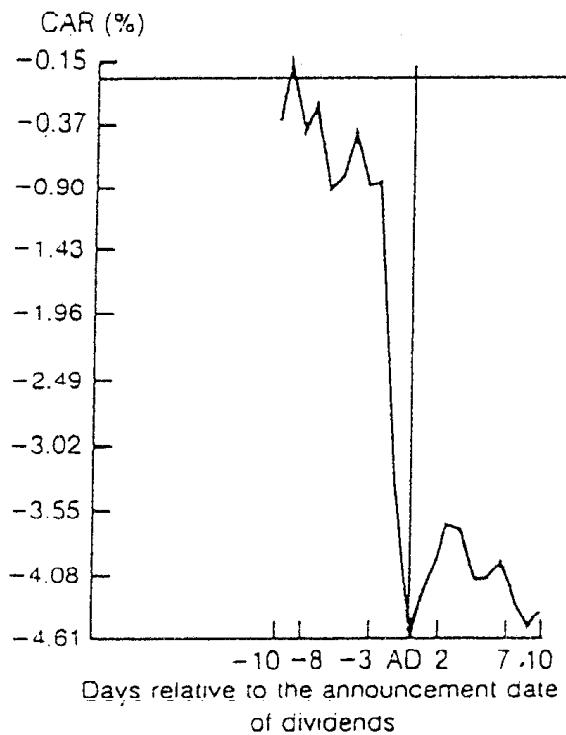
Variable	Coefficient	Implies
Constant	4.22%	
Beta Coefficient	-2.145	Higher beta stocks pay lower dividends.
Age/100	3.131	Firms with older investors pay higher dividends.
Income/1000	-3.726	Firms with wealthier investors pay lower dividends.
Differential Tax Rate	-2.849	If ordinary income is taxed at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

Dividend Policy and Clientele

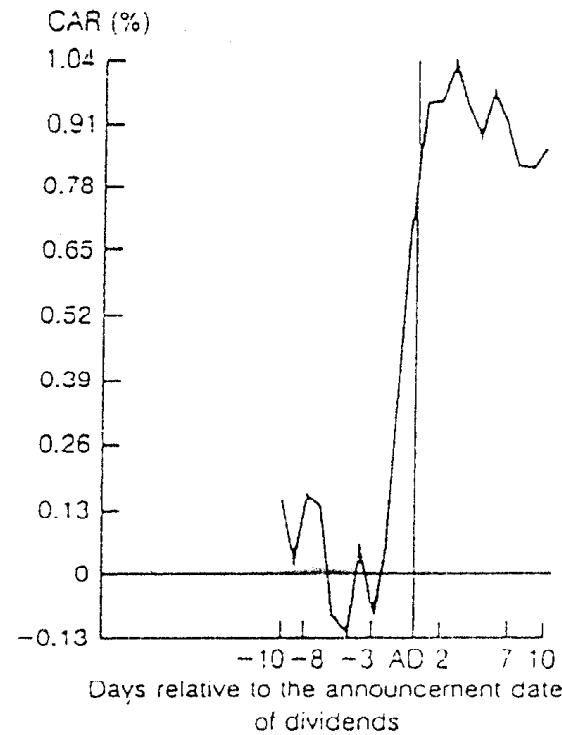
- Assume that you run a phone company, and that you have historically paid large dividends. You are now planning to enter the telecommunications and media markets. Which of the following paths are you most likely to follow?
 - Courageously announce to your stockholders that you plan to cut dividends 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..



(a) Dividend decrease



(b) Dividend increase

An Alternative Story..Increasing dividends is bad news...

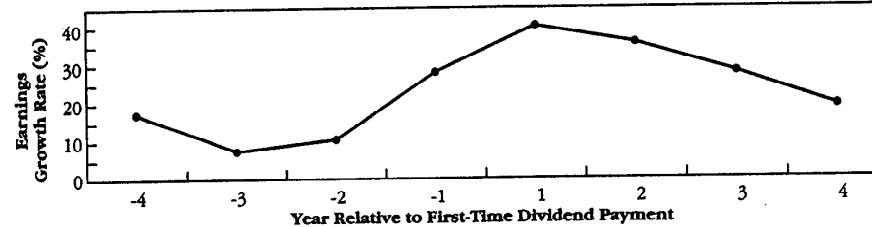
TABLE 1
EARNINGS GROWTH RATES
IN YEARS SURROUNDING
FIRST-TIME
DIVIDEND PAYMENTS BY
131 FIRMS IN THE
PERIOD 1970 TO 1979*

Year Relative to Dividend Initiation	Number of Firms	Mean Earnings Growth Rate	Median Earnings Growth Rate
-4	130	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 compute 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.

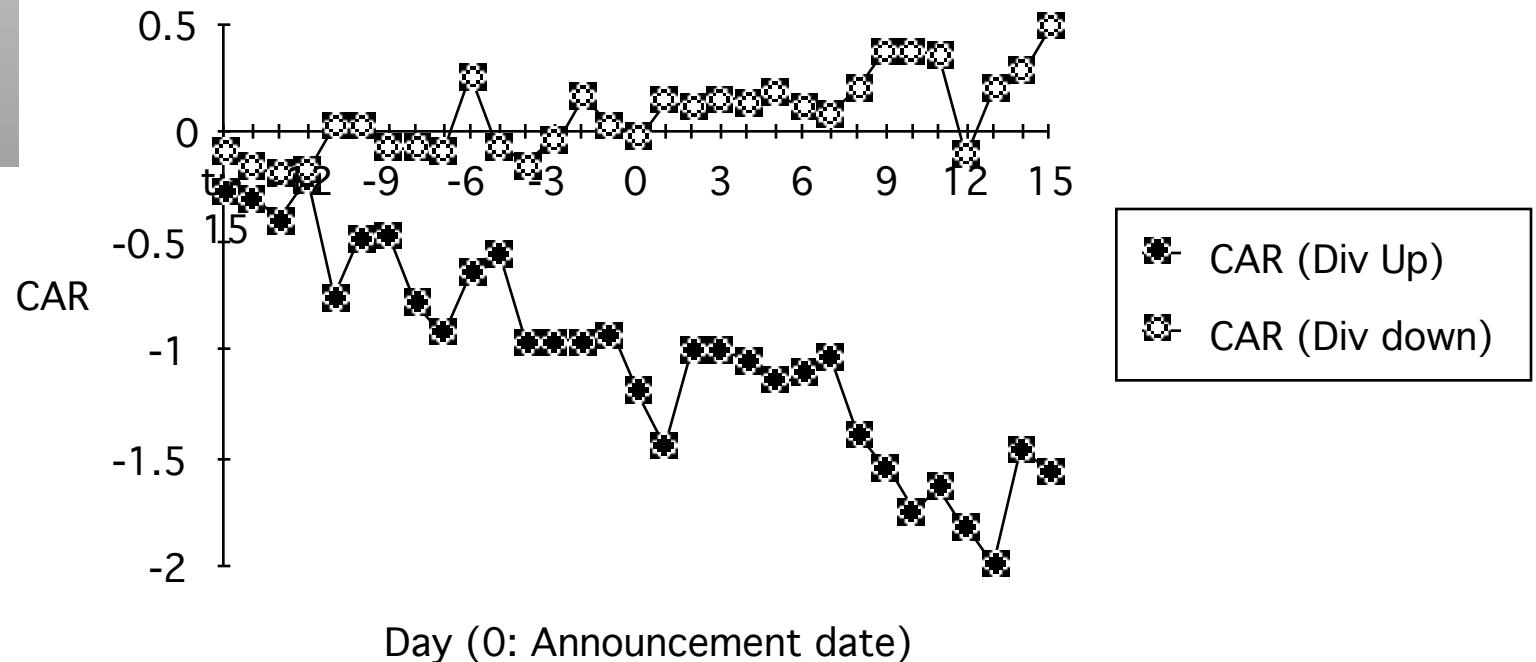
FIGURE 1
MEDIAN EARNINGS
GROWTH RATES IN YEARS
SURROUNDING FIRST TIME
DIVIDEND PAYMENTS*



* In our original research we compare earnings performance as earnings changes standardized by stock prices. Here we convert these values to earnings growth ratios 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



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 could the company have paid out during the period under question?
- Step 2: How much did the company actually pay out during the period in 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?

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

Estimating FCFE when Leverage is Stable

Net Income

- $(1 - \delta)$ (Capital Expenditures - Depreciation)
- $(1 - \delta)$ 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)

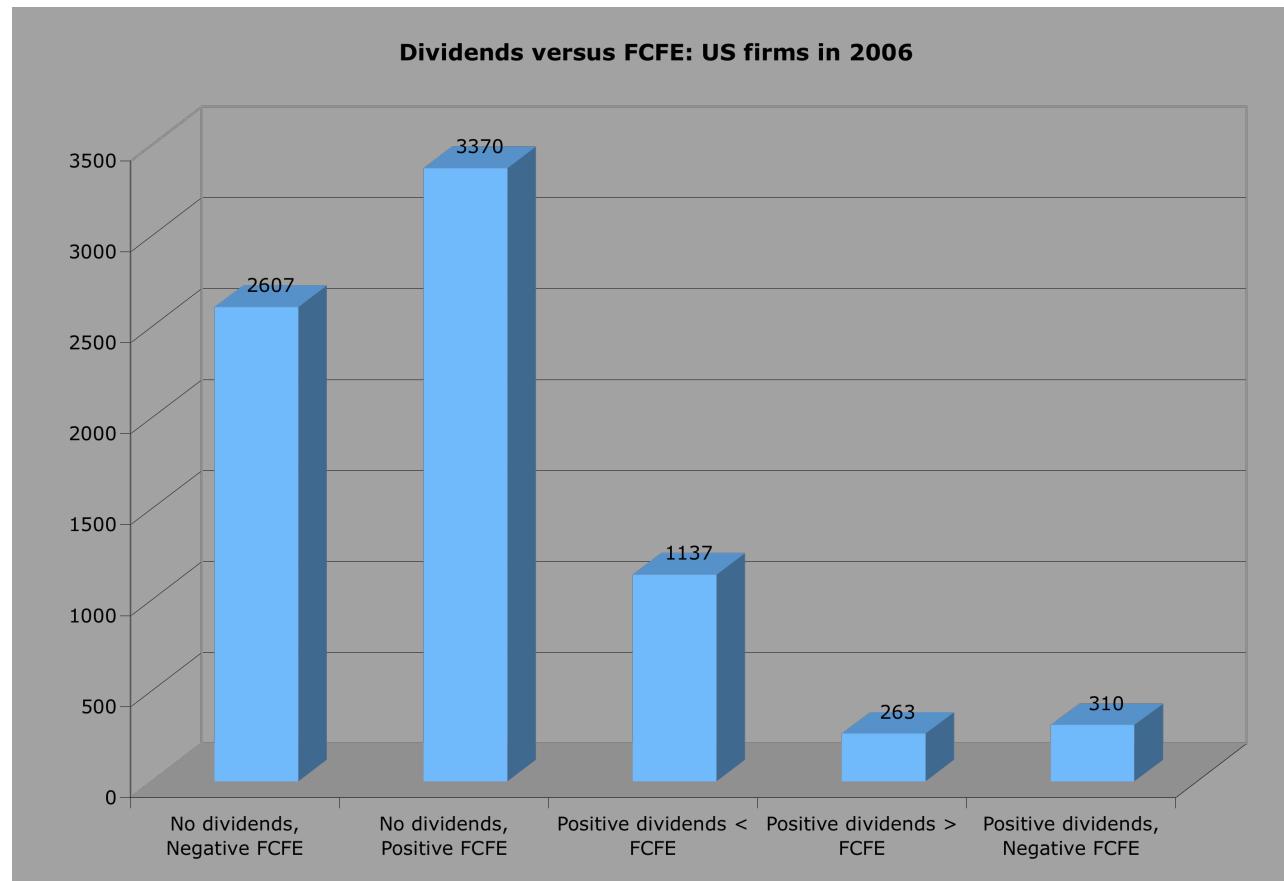
An Example: FCFE Calculation

- 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%
- $$\begin{aligned} \text{FCFE} &= \text{Net Income} - (\text{Cap ex} - \text{Depr}) (1-\text{DR}) - \text{Chg WC} (!-\text{DR}) \\ &= \$ 2,176 - (494 - 480) (1-0) - \$ 35 (1-0) \\ &= \$ 2,127 \text{ Million} \end{aligned}$$

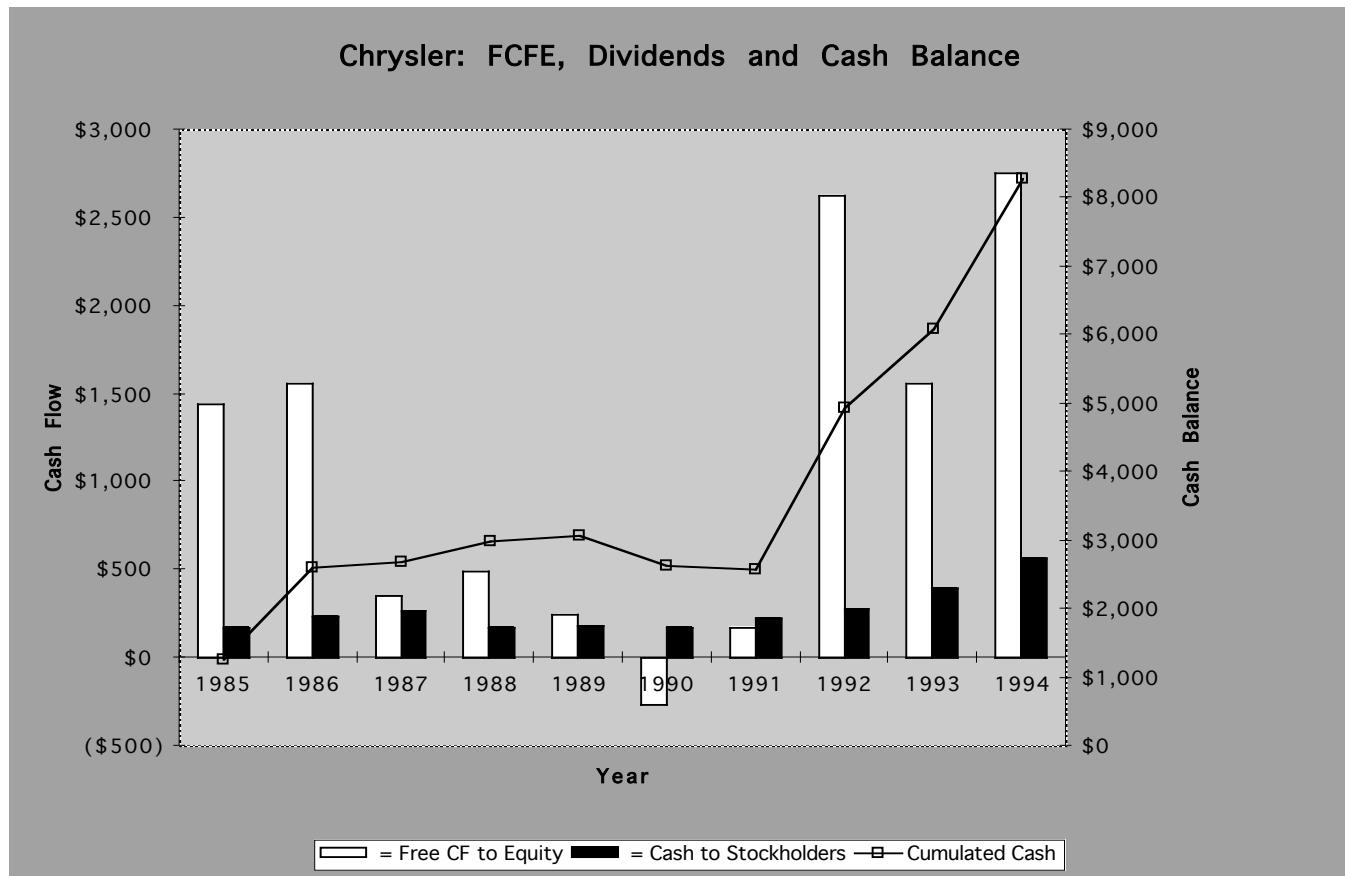
Microsoft: Dividends?

- 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?

Dividends versus FCFE: U.S.



The Consequences of Failing to pay FCFE





Application Test: Estimating your firm's FCFE

In General,

$$\begin{aligned} \text{Net Income} \\ + \text{Depreciation \& Amortization} \\ - \text{Capital Expenditures} \\ - \text{Change in Non-Cash Working Capital} \\ - \text{Preferred Dividend} \\ - \text{Principal Repaid} \\ + \text{New Debt Issued} \\ \\ = \text{FCFE} \end{aligned}$$

Compare to

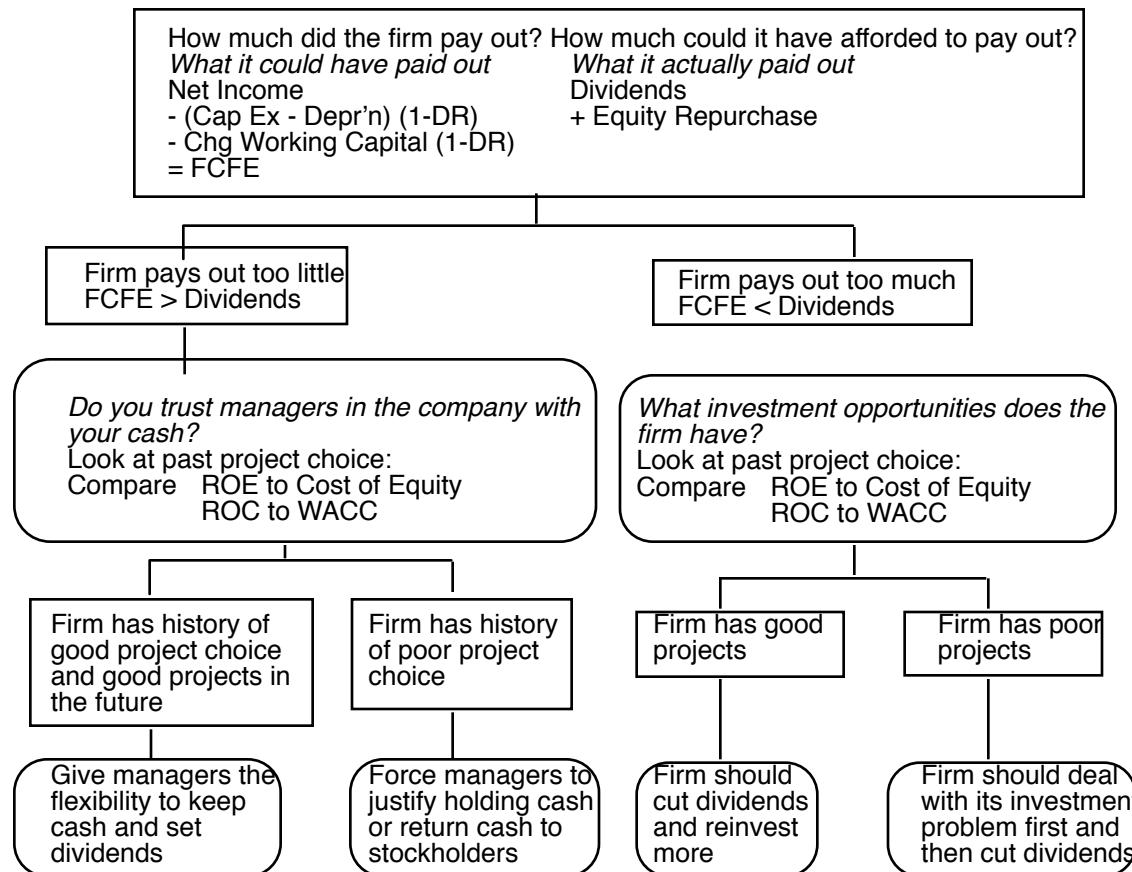
$$\begin{aligned} \text{Dividends (Common)} \\ + \text{Stock Buybacks} \end{aligned}$$

If cash flow statement used

$$\begin{aligned} \text{Net Income} \\ + \text{Depreciation \& Amortization} \\ + \text{Capital Expenditures} \\ + \text{Changes in Non-cash WC} \\ + \text{Preferred Dividend} \\ + \text{Increase in LT Borrowing} \\ + \text{Decrease in LT Borrowing} \\ + \text{Change in ST Borrowing} \\ = \text{FCFE} \end{aligned}$$

$$\begin{aligned} -\text{Common Dividend} \\ - \text{Decrease in Capital Stock} \\ + \text{Increase in Capital Stock} \end{aligned}$$

A Practical Framework for Analyzing Dividend Policy



A Dividend Matrix

		Quality of projects taken: ROE versus Cost of Equity	
		Poor projects	Good projects
Dividends paid out relative to FCFE	Cash Surplus	<i>Cash Surplus + Poor Projects</i> Significant pressure to pay out more to stockholders as dividends or stock buybacks	<i>Cash Surplus + Good Projects</i> Maximum flexibility in setting dividend policy
	Cash Deficit	<i>Cash Deficit + Poor Projects</i> Cut out dividends but real problem is in investment policy.	<i>Cash Deficit + Good Projects</i> 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?

Microsoft's big dividend in 2004

- 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?

Disney: An analysis of FCFE from 1994-2003

<i>Year</i>	<i>Net Income</i>	<i>Depreciation</i>	<i>Capital Expenditures</i>	<i>Change in non-cash WC</i>	<i>FCFE (before debt CF)</i>	<i>Net CF from Debt</i>	<i>FCFE (after Debt CF)</i>
1994	\$1,110.40	\$1,608.30	\$1,026.11	\$654.10	\$1,038.49	\$551.10	\$1,589.59
1995	\$1,380.10	\$1,853.00	\$896.50	(\$270.70)	\$2,607.30	\$14.20	\$2,621.50
1996	\$1,214.00	\$3,944.00	\$13,464.00	\$617.00	(\$8,923.00)	\$8,688.00	(\$235.00)
1997	\$1,966.00	\$4,958.00	\$1,922.00	(\$174.00)	\$5,176.00	(\$1,641.00)	\$3,535.00
1998	\$1,850.00	\$3,323.00	\$2,314.00	\$939.00	\$1,920.00	\$618.00	\$2,538.00
1999	\$1,300.00	\$3,779.00	\$2,134.00	(\$363.00)	\$3,308.00	(\$176.00)	\$3,132.00
2000	\$920.00	\$2,195.00	\$2,013.00	(\$1,184.00)	\$2,286.00	(\$2,118.00)	\$168.00
2001	(\$158.00)	\$1,754.00	\$1,795.00	\$244.00	(\$443.00)	\$77.00	(\$366.00)
2002	\$1,236.00	\$1,042.00	\$1,086.00	\$27.00	\$1,165.00	\$1,892.00	\$3,057.00
2003	\$1,267.00	\$1,077.00	\$1,049.00	(\$264.00)	\$1,559.00	(\$1,145.00)	\$414.00
Average	\$1,208.55	\$2,553.33	\$2,769.96	\$22.54	\$969.38	\$676.03	\$1,645.41

Disney's Dividends and Buybacks from 1994 to 2003

Disney			
Year	Dividends (in \$)	Equity Repurchases (in \$)	Cash to Equity
1994	\$153	\$571	\$724
1995	\$180	\$349	\$529
1996	\$271	\$462	\$733
1997	\$342	\$633	\$975
1998	\$412	\$30	\$442
1999	\$0	\$19	\$19
2000	\$434	\$166	\$600
2001	\$438	\$1,073	\$1,511
2002	\$428	\$0	\$428
2003	\$429	\$0	\$429
Average	\$ 308.70	\$ 330.30	\$ 639

Case 1: Disney

- FCFE versus Dividends
 - Between 1994 and 2003, Disney generated \$969 million in FCFE each year.
 - Between 1994 and 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 its 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 over the last 10 years, if you were a Disney stockholder, would you be comfortable with Disney's dividend policy?
 - Yes
 - No

The Bottom Line on Disney Dividends

- 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 will not be tolerated in this company. Expect to face relentless pressure to pay out more dividends.

Case 2: Aracruz Celulose - Assessment of dividends paid

- 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 its 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)

Case 3: BP: Summary of Dividend Policy

<i>Summary of calculations</i>				
	<i>Average</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
<i>Free CF to Equity</i>	\$571.10	\$1,382.29	\$3,764.00	(\$612.50)
<i>Dividends</i>	\$1,496.30	\$448.77	\$2,112.00	\$831.00
<i>Dividends+Repurchases</i>	\$1,496.30	\$448.77	\$2,112.00	\$831.00
<i>Dividend Payout Ratio</i>	84.77%			
<i>Cash Paid as % of FCFE</i>	262.00%			
<i>ROE - Required return</i>	-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 55 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 depository rights, each of which represents 12 shares of the London-based company, dropped \$3.625, 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 \$868 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 demand," Mr. Simon said.

The crude oil market, he predicted, would remain balanced unless Iraqi oil was allowed to re-enter the market. The company said it was well positioned to take 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.

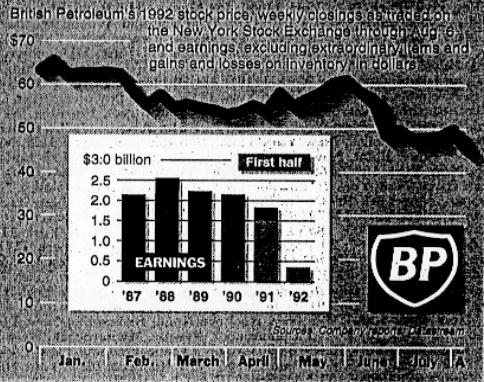
The market for petrochemicals in Europe remains weak.

B.P.'s second quarter profits, before one-time transactions, declined to \$1.93 million from \$515 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 30 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. Kneutel 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.

Britain's Oil Colossus



Source: Company 2000, First Call, The New York Times

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

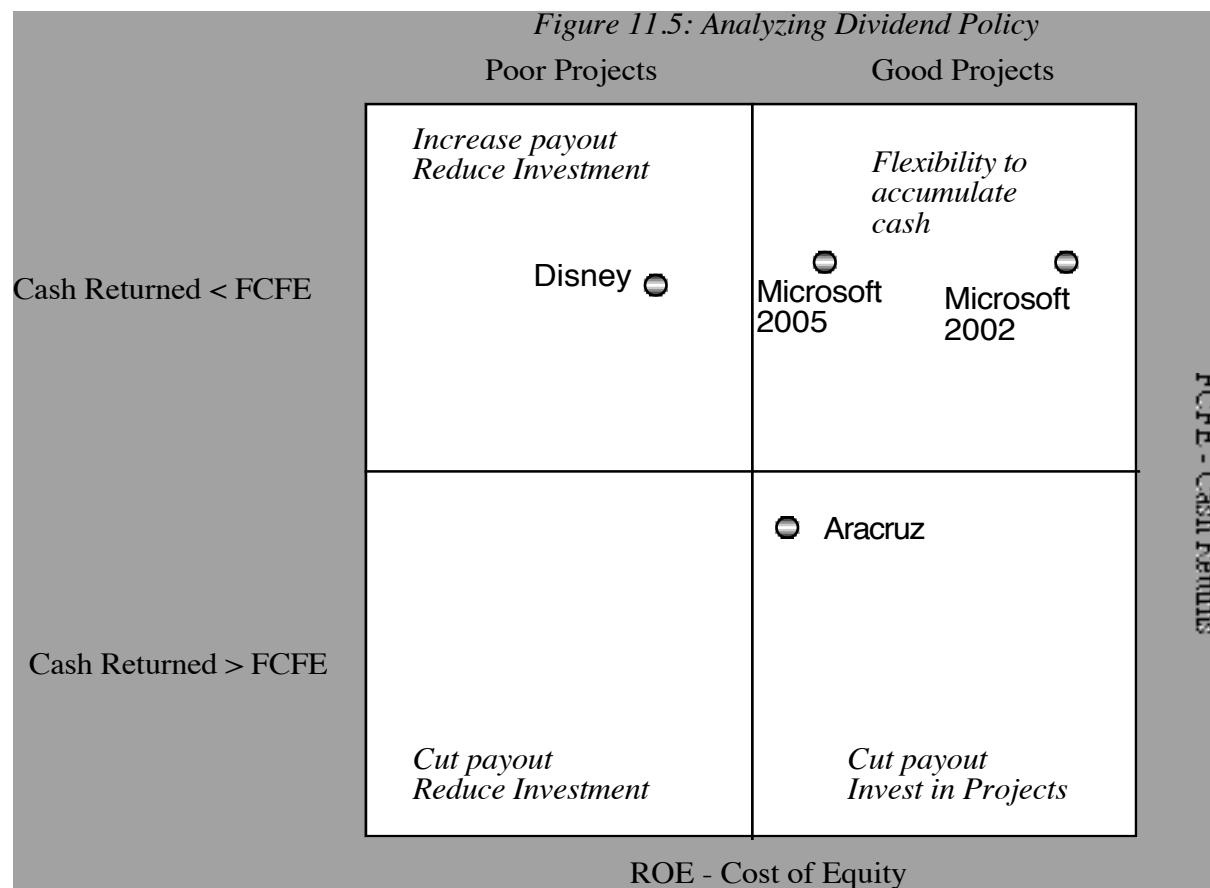
Case 4: The Limited: Summary of Dividend Policy: 1983-1992

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

Growth Firms and Dividends

- High growth firms are sometimes advised to initiate dividends because it 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?

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	Dividend Yield	Dividend Payout
Astral Media Inc. 'A'	0.00 %	0.00 %
Belo Corp. 'A'	1.34 %	34.13 %
CanWest Global Comm. Corp.	0.00 %	0.00 %
Cinram Intl Inc	0.00 %	0.00 %
Clear Channel	0.85 %	35.29 %
Cox Radio 'A' Inc	0.00 %	0.00 %
Cumulus Media Inc	0.00 %	0.00 %
Disney (Walt)	0.90%	32.31%
Emmis Communications	0.00 %	0.00 %
Entercom Comm. Corp	0.00 %	0.00 %
Fox Entmt Group Inc	0.00 %	0.00 %
Hearst-Argyle Television Inc	0.00 %	0.00 %
InterActiveCorp	0.00 %	0.00 %
Liberty Media 'A'	0.00 %	0.00 %
Lin TV Corp.	0.00 %	0.00 %
Metro Goldwyn Mayer	0.00 %	0.00 %
Pixar	0.00 %	0.00 %
Radio One INC.	0.00 %	0.00 %
Regal Entertainment Group	2.70 %	66.57 %
Sinclair Broadcast	0.00 %	0.00 %
Sirius Satellite	0.00 %	0.00 %
Time Warner	0.00 %	0.00 %
Univision Communic.	0.00 %	0.00 %
Viacom Inc. 'B'	0.56 %	19.00 %
Westwood One	0.00 %	0.00 %
XM Satellite 'A'	0.00 %	0.00 %
Average	0.24%	7.20%

Peer Group Approach: Deutsche Bank

Name	Dividend Yield	Dividend Payout
Banca Intesa Spa	1.57 %	167.50 %
Banco Bilbao Vizcaya Argentaria	0.00 %	0.00 %
Banco Santander Central Hispano	0.00 %	0.00 %
Barclays Plc	3.38 %	35.61 %
Bnp Paribas	0.00 %	0.00 %
Deutsche Bank Ag -Reg	1.98%	481.48%
Erste Bank Der Oester Sparkasse	0.99 %	24.31 %
Hbos Plc	2.85 %	27.28 %
Hsbc Holdings Plc	2.51 %	39.94 %
Lloyds Tsb Group Plc	7.18 %	72.69 %
Royal Bank Of Scotland Group	3.74 %	38.73 %
Sanpaolo Imi Spa	0.00 %	0.00 %
Societe Generale	0.00 %	0.00 %
Standard Chartered Plc	3.61 %	46.35 %
Unicredito Italiano Spa	0.00 %	0.00 %
Average	1.85%	62.26%

Peer Group Approach: Aracruz

<i>Paper & Pulp</i>	<i>Dividend Yield</i>	<i>Dividend Payout</i>
Latin America	2.86%	41.34%
Emerging Market	2.03%	22.16%
US	1.14%	28.82%
All paper and pulp	1.75%	34.55%
Aracruz	3.00%	37.41%

A High Growth Bank?

- Assume that you are advising a small high-growth bank, which is worried about the fact that its dividend payout and yield are much lower than other banks. The CEO of the bank is concerned that investors will punish the bank for its dividend policy. What do you think?
 - a. I think that the bank will be punished for its errant dividend policy
 - b. I think that investors are sophisticated enough for the bank to be treated fairly
 - c. I think that the bank will not be punished for its low dividends as long as it tries to convey information to its investors about the quality of its projects and growth prospects.

Going beyond averages... Looking at the market

- Regressing dividend yield and payout against expected growth yields:

$$\begin{aligned} PYT = & 0.3889 - 0.738 CPXFR - 0.214 INS + 0.193 DFR - 0.747 EGR \\ & (20.41) \quad (3.42) \quad (3.41) \quad (4.80) \quad (8.12) \\ & R^2 = 18.30\% \end{aligned}$$

$$\begin{aligned} YLD = & 0.0205 - 0.058 CPXFR - 0.012 INS + 0.0200 DFR - 0.047 EGR \\ & (22.78) \quad (5.87) \quad (3.66) \quad (9.45) \quad (11.53) \\ & R^2 = 28.5\% \end{aligned}$$

- PYT = Dividend Payout Ratio = Dividends/Net Income
- YLD = Dividend Yield = Dividends/Current Price
- CPXFR = Capital Expenditures / Book Value of Total Assets
- EGR = Expected growth rate in earnings over next 5 years (analyst estimates)
- DFR = Debt / (Debt + Market Value of Equity)
- INS = Insider holdings as a percent of outstanding stock

Disney and Aracruz ADR vs US Market

■ For Disney

- Payout Ratio = $0.3889 - 0.738 (0.02) - 0.214 (0.20) + 0.193 (0.31) - 0.747 (0.23) = 21.71\%$
- Dividend Yield = $0.0205 - 0.058 (0.02) - 0.012 (0.20) + 0.0200 (0.31) - 0.047 (0.23) = 1.22\%$

Disney is paying out too little in dividends, with its payout ratio of 32.31% and its dividend yield of 0.91%

■ For Aracruz ADR

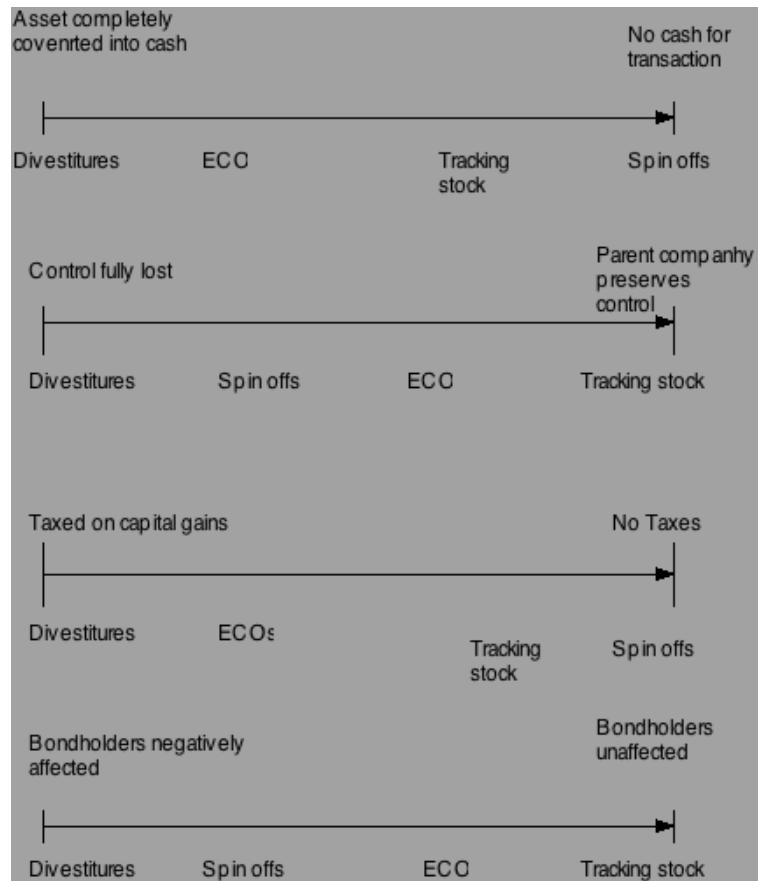
- Payout Ratio = $0.3889 - 0.738 (0.02) - 0.214 (0.20) + 0.193 (0.31) - 0.747 (0.23) = 21.71\%$
- Dividend Yield = $0.0205 - 0.058 (0.02) - 0.012 (0.20) + 0.0200 (0.31) - 0.047 (0.23) = 1.22\%$

Aracruz is paying out too much in dividends, with its payout ratio of 37.41% and its dividend yield of 3%

Other Actions that affect Stock Prices

- In the case of dividends and stock buybacks, firms change the value of the assets (by paying out cash) and the number of shares (in the case of buybacks).
- There are other actions that firms can take to change the value of their stockholder's equity.
 - *Divestitures*: They can sell assets to another firm that can utilize them more efficiently, and claim a portion of the value.
 - *Spin offs*: In a spin off, a division of a firm is made an independent entity. The parent company has to give up control of the firm.
 - *Equity carve outs*: In an ECO, the division is made a semi-independent entity. The parent company retains a controlling interest in the firm.
 - *Tracking Stock*: When tracking stock are issued against a division, the parent company retains complete control of the division. It does not have its own board of directors.

Differences in these actions



Valuation

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

Oscar Wilde

First Principles

- Invest in projects that yield a return greater than the minimum acceptable hurdle rate.
 - The hurdle rate should be higher for riskier projects and reflect the financing mix used - owners' funds (equity) or borrowed money (debt)
 - Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders.
 - The form of returns - dividends and stock buybacks - will depend upon the stockholders' characteristics.

Objective: Maximize the Value of the Firm

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 Equity_t = Expected Cashflow to Equity in period t

k_e = 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,

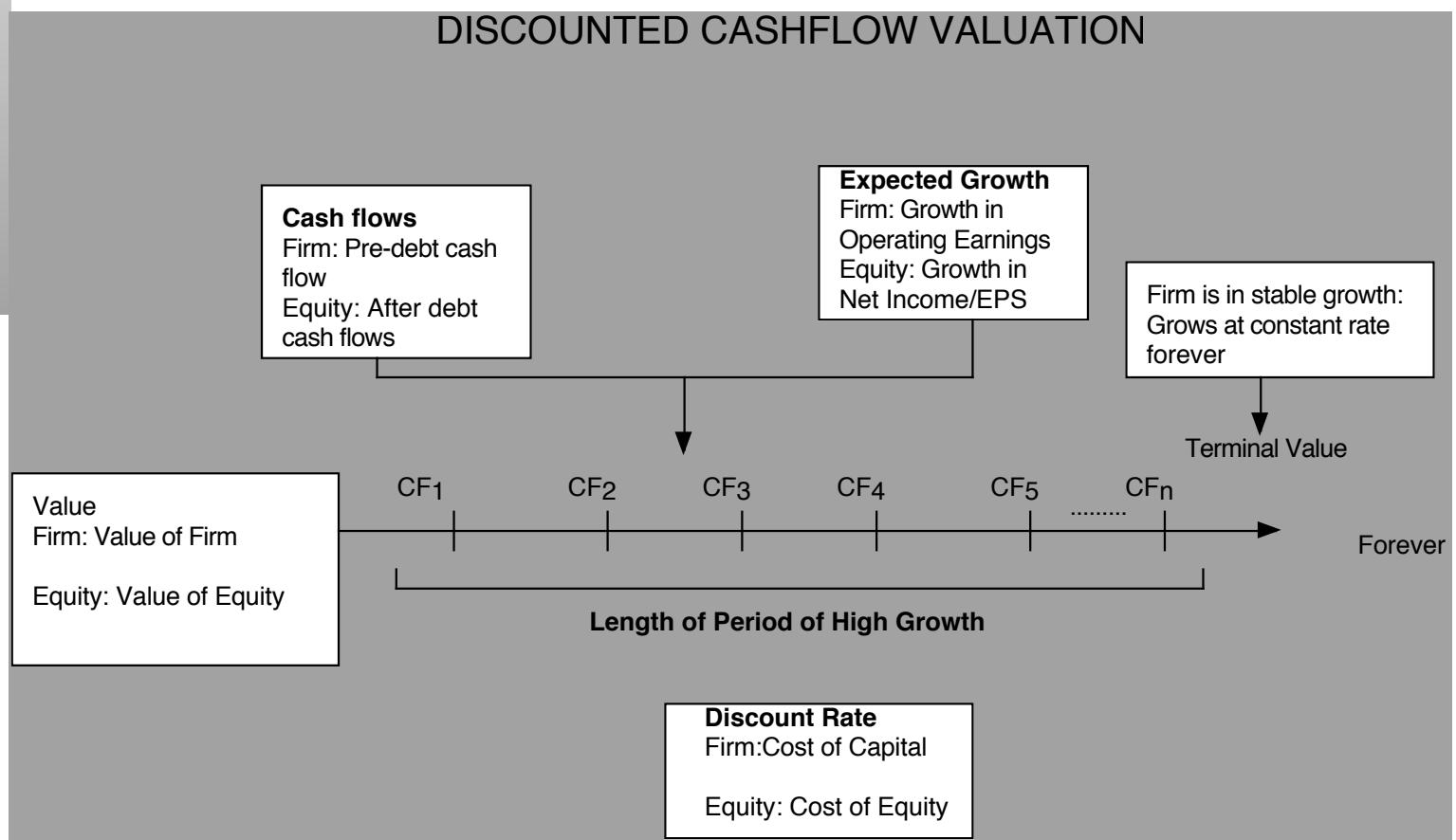
CF to Firm_t = Expected Cashflow to Firm in period t

WACC = Weighted Average Cost of Capital

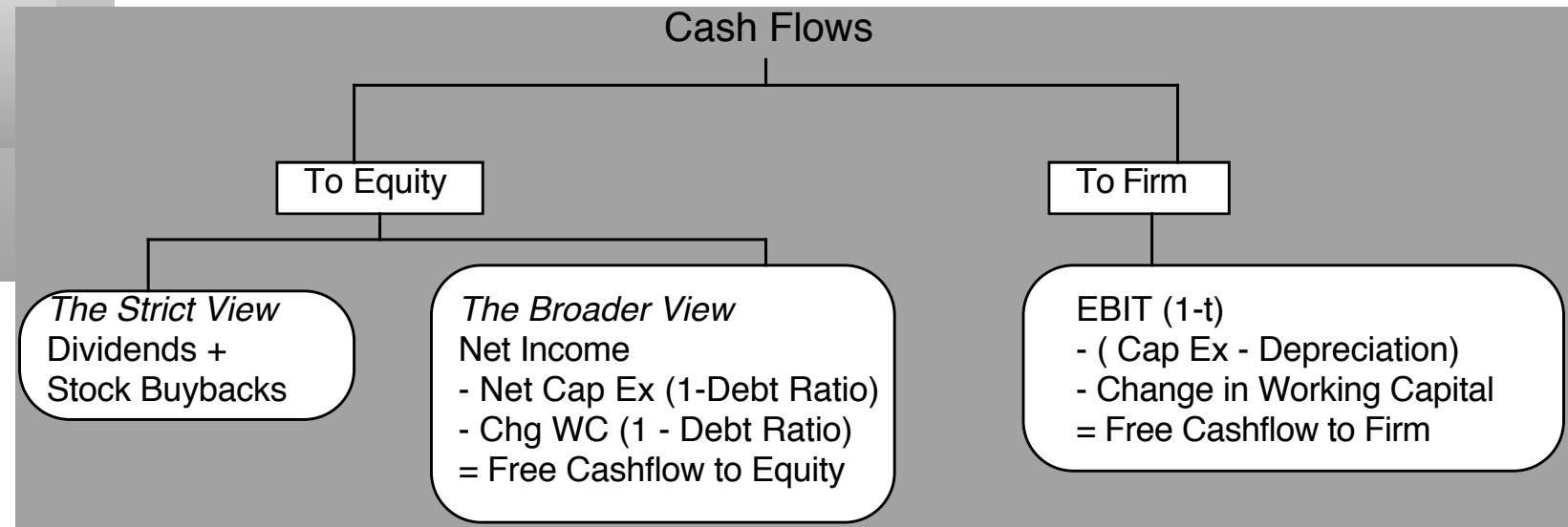
Choosing a Cash Flow to Discount

- 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.

Generic DCF Valuation Model



I. Estimating Cash Flows



Estimating FCFF in 2003: Disney

- EBIT = \$ 2,805 Million Tax rate = 37.30%
- Capital spending = \$ 1,735 Million
- Depreciation = \$ 1,254 Million
- Change in Non-cash Working capital = + \$ 454 Million
- Estimating FCFF
 - EBIT * (1 - tax rate) \$1,759 : 2805 (1-.373)
 - Net Capital Expenditures \$481 : (1735 - 1254)
 - Change in Working Capital \$454
 - Free Cashflow to Firm \$824**
- Total Reinvestment = Net Cap Ex + Change in WC = 481 + 454 = 935
- Reinvestment Rate = 935/1759 = 53.18%

Estimating FCFE : Aracruz

	2003 numbers	Normalized
Net Income from operating assets	\$119.68 million	\$ 119.68 million
- Net Capital Expenditures (1-DR)	\$ 37.31 million	\$ 71.45 million
-Chg. Working Capital*(1-DR)	\$ 3.05 million	\$ 7.50 million
Free Cashflow to Equity	\$ 79.32 million	\$ 40.73 million
DR = Debt Ratio = Industry average book debt to capital ratio	= 55.98%	
Equity Reinvestment	= 71.45 million + 7.50 million	= \$ 78.95 million
Equity Reinvestment Rate	= 78.95/ 119.68	= 65.97%

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.

Estimating Aracruz's Cost of Equity

- We will do the Aracruz valuation in U.S. dollars. We will therefore use a U.S. dollar cost of equity.
- We estimated a beta for equity of 0.7576 for the paper business that Aracruz. With a nominal U.S. dollar riskfree rate of 4% and an equity risk premium of 12.49% for Brazil, we arrive at a dollar cost of equity of 13.46%

$$\text{Cost of equity} = 4\% + 0.7576 (12.49\%) = 13.46\%$$

Estimating Disney's Current Cost of Capital

■ Equity

- Cost of Equity = Riskfree rate + Beta * Risk Premium
 $= 4\% + 1.25 (4.82\%) = 10.00\%$
- Market Value of Equity = \$55.101 Billion
- Equity/(Debt+Equity) = 79%

■ Debt

- After-tax Cost of debt =(Riskfree rate + Default Spread) (1-t)
 $= (4\%+1.25\%) (1-.373) = 3.29\%$
- Market Value of Debt = \$ 14.668 Billion
- Debt/(Debt +Equity) = 21%

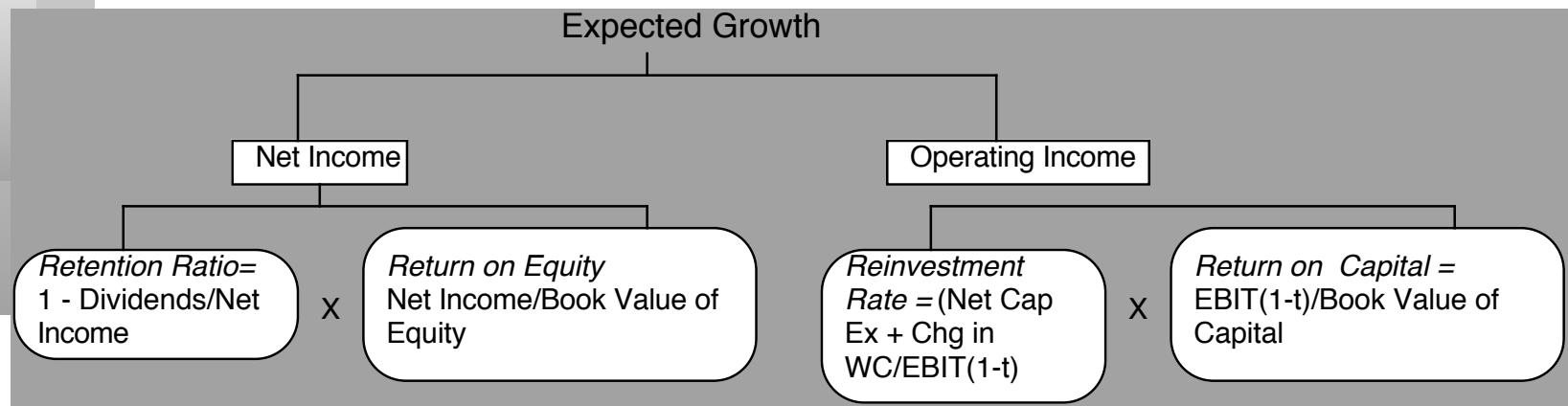
■ Cost of Capital = $10.00\%(.79)+3.29\%(.21) = 8.59\%$

$$55.101(55.101+14.668)$$


But costs of capital can and should change over time... Disney over time

Year	Expected Growth	Beta	Debt Ratio	Cost of Debt	Tax Rate	Cost of Capital
1	6.38%	1.25	21.02%	5.25%	37.30%	8.59%
2	6.38%	1.25	21.02%	5.25%	37.30%	8.59%
3	6.38%	1.25	21.02%	5.25%	37.30%	8.59%
4	6.38%	1.25	21.02%	5.25%	37.30%	8.59%
5	6.38%	1.25	21.02%	5.25%	37.30%	8.59%
6	5.90%	1.20	22.82%	5.25%	37.30%	8.31%
7	5.43%	1.15	24.61%	5.25%	37.30%	8.02%
8	4.95%	1.10	26.41%	5.25%	37.30%	7.73%
9	4.48%	1.05	28.20%	5.25%	37.30%	7.45%
10	4.00%	1.00	30.00%	5.25%	37.30%	7.16%
After yr 10	4.00%	1.00	30.00%	5.25%	37.30%	7.16%

III. Expected Growth



Estimating Growth in EBIT: Disney

- We begin by estimating the reinvestment rate and return on capital for Disney in 2003, using the numbers from the latest financial statements. We did convert operating leases into debt and adjusted the operating income and capital expenditure accordingly.
 - Reinvestment Rate₂₀₀₃ = (Cap Ex – Depreciation + Chg in non-cash WC)/ EBIT (1-t) = $(1735 - 1253 + 454)/(2805(1-.373)) = 53.18\%$
 - Return on capital₂₀₀₃ = EBIT (1-t)₂₀₀₃/ (BV of Debt₂₀₀₂ + BV of Equity₂₀₀₂) = $2805 (1-.373)/ (15,883+23,879) = 4.42\%$
 - Expected Growth Rate from existing fundamentals = $53.18\% * 4.42\% = 2.35\%$
- We will assume that Disney will be able to earn a return on capital of 12% on its new investments and that the reinvestment rate will be 53.18% for the immediate future.
 - Expected Growth Rate in operating income = Return on capital * Reinvestment Rate = $12\% * .5318 = 6.38\%$

Estimating Expected Growth in EPS: Deutsche Bank

- In 2003, Deutsche Bank reported net income of \$1,365 million on a book value of equity of \$29,991 million at the end of 2002.
 - Return on Equity = Net Income₂₀₀₃/ Book Value of Equity₂₀₀₂ = $1365/29,991 = 4.55\%$
- In the four quarters ended in March 2004, Deutsche Bank paid out dividends per share of 1.50 Euros on earnings per share of 4.33 Euros.
 - Retention Ratio = $1 - \text{Dividends per share} / \text{Earnings per share} = 1 - 1.50/4.33 = 65.36\%$
- If Deutsche maintains its existing return on equity and retention ratio for the long term, its expected growth rate will be anemic.
 - Expected Growth Rate = Retention Ratio * ROE = $.6536 * .0455 = 2.97\%$
- For the next five years, we will assume that the return on equity will improve to the industry average of 11.26% while the retention ratio will stay unchanged at 65.36%. The expected growth in earnings per share is 7.36%.
 - Expected Growth Rate_{Modified Fundamentals} = $.6536 * .1126 = 7.36\%$

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,

$$\begin{aligned} ROC &= (EBIT (1 - \text{tax rate})) / \text{Book Value of Capital} \\ &= EBIT (1 - t) / \text{Book Value of Capital} \end{aligned}$$

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 capital 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?

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

	<i>Disney</i>	<i>Aracruz</i>	<i>Deutsche Bank</i>
Firm Size/Market Size	Firm is one of the largest players in the entertainment and theme park businesses but the businesses are redefining themselves and expanding.	Firm has a small market share of the paper/pulp business, but the business is mature.	Firm has a significant market share of a mature business.
Current Excess Returns	Firm is earning less than its cost of capital, and has done so for last few years	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 equity that has lagged its cost of equity in recent years.
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 rainforests. Has invested in newer, updated plants and has skilled workforce.	Has an edge in the commercial banking business in Germany but this advantage is dissipating in the EU.
Length of High Growth period	10 years, entirely because of its strong competitive advantages (which have been wasted over the last few years) but the excess returns are likely to be small.	5 years, largely due to access to cheap raw material and labor.	5 years, mostly to allow firm to recover to pre-downturn levels.

Estimating Stable Period Inputs: Disney

Respect the cap: The growth rate forever is assumed to be 4%

Stable period excess returns: The return on capital for Disney will drop from its high growth period level of 12% to a stable growth return of 10%. This is still higher than the cost of capital of 7.16% 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 4%. In conjunction with the return on capital of 10%, this yields a stable period reinvestment rate of 40%:

$$\text{Reinvestment Rate} = \text{Growth Rate} / \text{Return on Capital} = 4\% / 10\% = 40\%$$

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

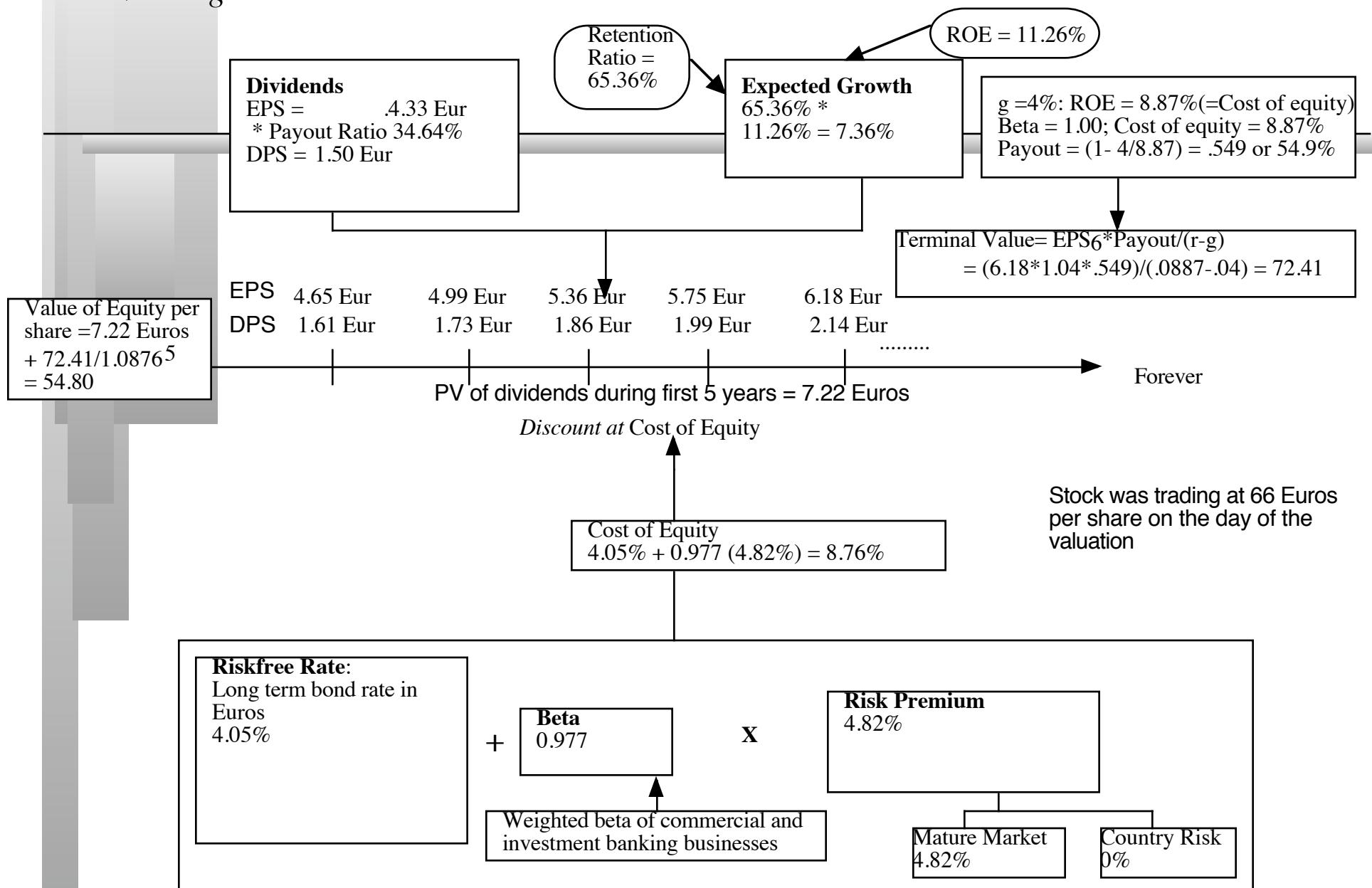
$$\text{Cost of Equity} = \text{Riskfree Rate} + \text{Beta} * \text{Risk Premium} = 4\% + 4.82\% = 8.82\%$$

The debt ratio for Disney will rise to 30%. Since we assume that the cost of debt remains unchanged at 5.25%, this will result in a cost of capital of 7.16%

$$\text{Cost of capital} = 8.82\% (.70) + 5.25\% (1-.373) (.30) = 7.16\%$$

Valuing Deutsche Bank: 2003

Use industry average rather than Deutsche's own ROE of 4.55%



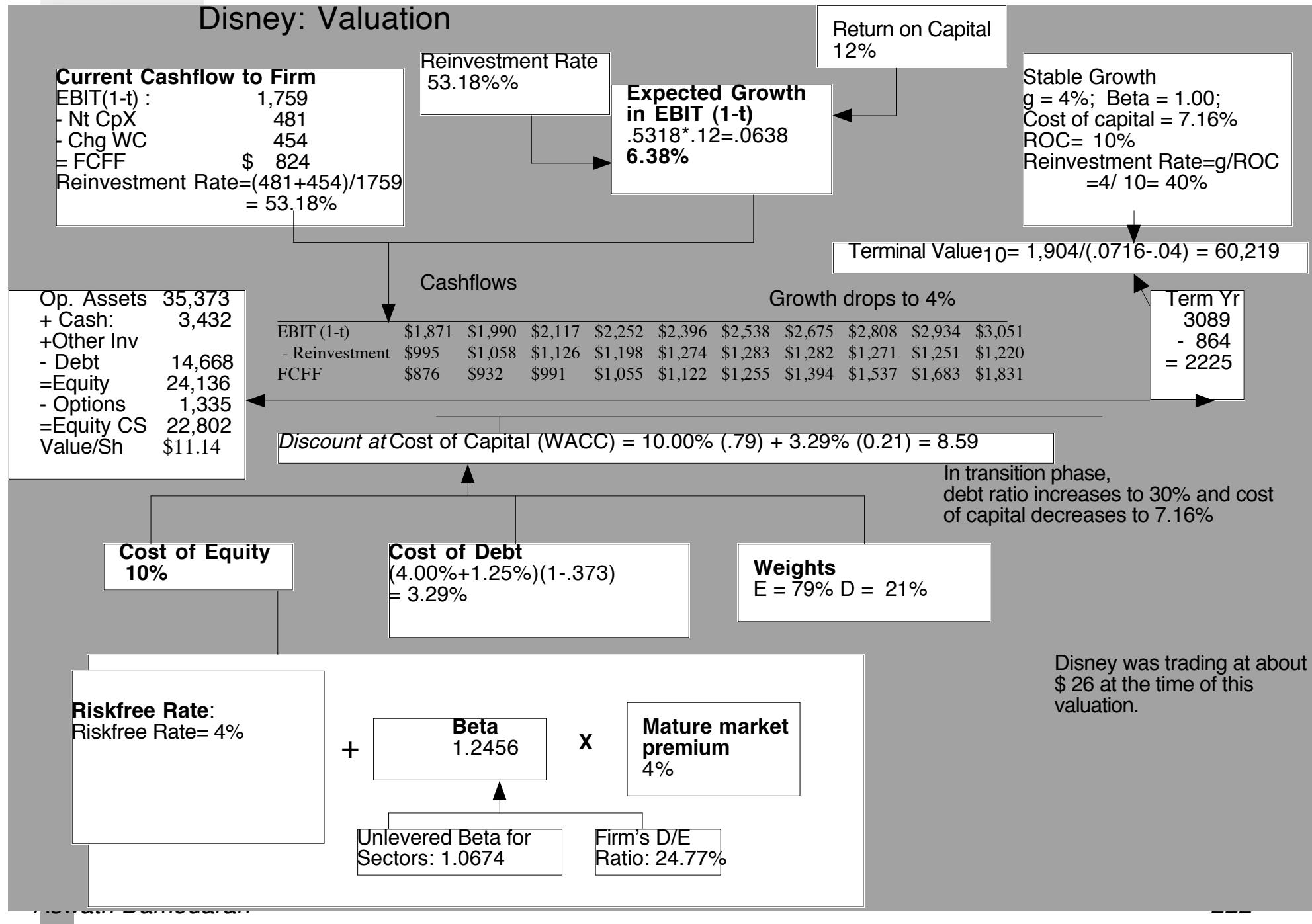
What does the valuation tell us? One of three possibilities...

- Stock is overvalued: 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 higher than the dividends paid.
- Estimates of growth and risk are wrong: It is also possible that we have underestimated growth or overestimated risk in the model, thus reducing our estimate of value.

Disney: Inputs to Valuation

	<i>High Growth Phase</i>	<i>Transition Phase</i>	<i>Stable Growth Phase</i>
Length of Period	5 years	5 years	Forever after 10 years
Tax Rate	37.3%	37.3%	37.3%
Return on Capital	12% (last year's return on capital was 4.42%)	Declines linearly to 10%	Stable ROC of 10%
Reinvestment Rate (Net Cap Ex + Working Capital Investments/EBIT)	53.18% (Last year's reinvestment rate)	Declines to 40% as ROC and growth rates drop: Reinvestment Rate = g/ROC	40% of after-tax operating income, estimated from stable growth rate of 4% and return on capital of 10%. Reinvestment rate = $4/10 = 40\%$
Expected Growth Rate in EBIT	$ROC * Reinvestment\ Rate = 12\% * 0.5318 = 6.38\%$	Linear decline to Stable Growth Rate of 4%	4%: Set to riskfree rate
Debt/Capital Ratio	21% (Existing debt ratio)	Increases linearly to 30%	Stable debt ratio of 30%
Risk Parameters	Beta = 1.25, $k_e = 10\%$ Cost of Debt = 5.25% Cost of capital = 8.59%	Beta decreases linearly to 1.00; Cost of debt stays at 5.25% Cost of capital drops to 7.16%	Beta = 1.00; $k_e = 8.82\%$ Cost of debt stays at 5.25% Cost of capital = 7.16%

Disney: Valuation



Investment decision affects risk of assets being finance and financing decision affects hurdle rate

The Investment Decision
Invest in projects that earn a return greater than a minimum acceptable hurdle rate

The Dividend Decision
If you cannot find investments that earn more than the hurdle rate, return the cash to the owners of the businesss.

The Financing Decision
Choose a financing mix that minimizes the hurdle rate and match your financing to your assets.

Existing Investments
ROC = 4.22%

New Investments

Return on Capital
12%

Reinvestment Rate
53.18%

Current EBIT (1-t)
\$ 1,759

Expected Growth Rate = $12\% * 53.18\% = 6.38\%$

Financing Mix
D=21%; E= 79%

Financing Choices
Fxed rate US \$ debt with duration of 11.5 years

Cost of capital = $10\% (.79) + 3.29\% (.21) = 8.59\%$

Year	Expected Growth	EBIT	EBIT (1-t)	Reinvestment Rate	Reinvestment	FCFF	Cost of capital	PV of FCFF
Current		\$2,805						
1	6.38%	\$2,984	\$1,871	53.18%	\$994.92	\$876.06	8.59%	\$806.74
2	6.38%	\$3,174	\$1,990	53.18%	\$1,058.41	\$931.96	8.59%	\$790.31
3	6.38%	\$3,377	\$2,117	53.18%	\$1,125.94	\$991.43	8.59%	\$774.22
4	6.38%	\$3,592	\$2,252	53.18%	\$1,197.79	\$1,054.70	8.59%	\$758.45
5	6.38%	\$3,822	\$2,396	53.18%	\$1,274.23	\$1,122.00	8.59%	\$743.00
6	5.90%	\$4,047	\$2,538	50.54%	\$1,282.59	\$1,255.13	8.31%	\$767.42
7	5.43%	\$4,267	\$2,675	47.91%	\$1,281.71	\$1,393.77	8.02%	\$788.92
8	4.95%	\$4,478	\$2,808	45.27%	\$1,271.19	\$1,536.80	7.73%	\$807.43
9	4.48%	\$4,679	\$2,934	42.64%	\$1,250.78	\$1,682.90	7.45%	\$822.90
10	4.00%	\$4,866	\$3,051	40.00%	\$1,220.41	\$1,830.62	7.16%	\$835.31
Terminal Value						\$60,219.11		\$27,477.93
						Value of Operating Assets =		\$35,372.62
						+ Cash & Non-op Assets =		\$3,432.00
						Value of firm		\$38,804.62
						- Debt		\$14,668.22
						- Options		\$1,334.67
						Value of equity in stock =		\$22,801.73
						Value per share		\$11.14

Disney: Corporate Financing Decisiions and Firm Value

Investment decision affects risk of assets being finance and financing decision affects hurdle rate

Strategic investments determine length of growth period

The Investment Decision
Invest in projects that earn a return greater than a minimum acceptable hurdle rate

Existing Investments
ROC = 8.59%

New Investments

Return on Capital
15%

The Dividend Decision
If you cannot find investments that earn more than the hurdle rate, return the cash to the owners of the businesss.

Reinvestment Rate
53.18%

The Financing Decision
Choose a financing mix that minimizes the hurdle rate and match your financing to your assets.

Financing Mix
D=30%; E= 70%

Financing Choices
Debt in different currencies with duration of 4 years

Current EBIT (1-t)
\$ 3,417

Expected Growth Rate = $15\% * 53.18\% = 7.98\%$

Cost of capital = $10.53\% (.70) + 3.45\%(.30) = 8.40\%$

Year	Expected Growth	EBIT	EBIT (1-t)	Reinvestment	Reinvestment	FCFF	Cost of capital	PV of FCFF
Current		\$5,327						
1	7.98%	\$5,752	\$3,606	53.18%	\$1,918	\$1,688	8.40%	\$1,558
2	7.98%	\$6,211	\$3,894	53.18%	\$2,071	\$1,823	8.40%	\$1,551
3	7.98%	\$6,706	\$4,205	53.18%	\$2,236	\$1,969	8.40%	\$1,545
4	7.98%	\$7,241	\$4,540	53.18%	\$2,414	\$2,126	8.40%	\$1,539
5	7.98%	\$7,819	\$4,902	53.18%	\$2,607	\$2,295	8.40%	\$1,533
6	7.18%	\$8,380	\$5,254	50.54%	\$2,656	\$2,599	8.16%	\$1,605
7	6.39%	\$8,915	\$5,590	47.91%	\$2,678	\$2,912	7.91%	\$1,667
8	5.59%	\$9,414	\$5,902	45.27%	\$2,672	\$3,230	7.66%	\$1,717
9	4.80%	\$9,865	\$6,185	42.64%	\$2,637	\$3,548	7.41%	\$1,756
10	4.00%	\$10,260	\$6,433	40.00%	\$2,573	\$3,860	7.16%	\$1,783
Terminal Value						\$126,967		\$58,645

Value of Operating Assets =	\$74,900
+ Cash & Non-op Assets =	\$3,432
Value of firm	\$78,332
- Debt	\$14,649
- Options	\$1,335
Value of equity in stock =	\$62,349
Value per share	\$30.45

Disney: The Value of Control

First Principles

- Invest in projects that yield a return greater than the minimum acceptable hurdle rate.
 - The hurdle rate should be higher for riskier projects and reflect the financing mix used - owners' funds (equity) or borrowed money (debt)
 - Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders.
 - The form of returns - dividends and stock buybacks - will depend upon the stockholders' characteristics.

Objective: Maximize the Value of the Firm