CORPORATE FINANCE LECTURE NOTE PACKET 2 CAPITAL STRUCTURE, DIVIDEND POLICY AND VALUATION

Aswath Damodaran

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#### CAPITAL STRUCTURE: THE CHOICES AND THE TRADE OFF

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

#### First principles



#### The Choices in Financing

- □ There are only two ways in which a business can raise 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.



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Figure 7.1: Debt versus Equity

#### **Global Patterns in Financing...**



### And a much greater dependence on bank loans outside the US...



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#### Assessing the existing financing choices: Disney, Vale, Tata Motors, Baidu & Bookscape

	Disney	Vale	Tata Motors	Baidu	
BV of Interest bearing Debt	\$14,288	\$48,469	535.914₹	¥17,844	
MV of Interest bearing Debt	\$13,028	\$41,143	477,268₹	¥15,403	
Lease Debt	\$2,933	\$1,248	0.00₹	¥3,051	
Type of Debt					
Bank Debt	7.93%	59.97%	62.26%	100.00%	
Bonds/Notes	92.07%	40.03%	37.74%	0.00%	
	Debt Matu	irity			
<1 year	13.04%	6.08%	0.78%	1.98%	
1- 5 years	48.93%	23.12%	30.24%	68.62%	
5-10 years	20.31%	29.44%	57.90%	29.41%	
10-20 years	4.49%	3.00%	10.18%	0.00%	
> 20 years	13.24%	38.37%	0.90%	0.00%	
Currency for debt					
Debt in domestic currency	94.51%	34.52%	70.56%	17.90%	
Debt in foreign currency	5.49%	65.48%	29.44%	82.10%	
Fixed versus Floating rate debt					
Fixed rate debt	94.33%	100.00%	100.00%	94.63%	
Floating rate debt	5.67%	0.00%	0.00%	5.37%	

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\$ Revenues/ Earnings The Lightbulb (Idea) Moment	The Product Test	The Bar Mitzvah	The Scaling up Test	The Midlife Crisis	The End Game		Revenues Earnings Time
Growth stage	Stage 1 Start-up	Stage 2 Young Growth	Stage 3: High Growth	Stage 4 Mature Growth	Stage 5 Mature Stable	Stage 6 Decline	
External funding needs	High, but constrained by other resources	High, relative to firm value.	Moderate, relative to firm value.	Declining, as a percent of firm value	Not needed		
Internal financing	Negative or low	Negative or low	Low, relative to funding needs	High, relative to funding needs	More than funding needs		
External Financing	Owner's Equity Bank Debt	Venture Capital Common Stock	Common stock Warrants Convertibles	Debt	Retire debt Repurchase	stock	
Financing Transitions Acces	ssing private equity	Inital Public offering	Seasoned equity issu	e Bond issues	•		

#### The Transitional Phases..

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

### Measuring a firm's financing mix ...

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

Debt to Capital Ratio = Debt / (Debt + Equity)

- Debt includes all interest bearing liabilities, short term as well as long term. It should also include other commitments that meet the criteria for debt: contractually pre-set payments that have to be made, no matter what the firm's financial standing.
- Equity can be defined either in accounting terms (as book value of equity) or in market value terms (based upon the current price). The resulting debt ratios can be very different.

#### The Financing Mix Question

- In deciding to raise financing for a business, is there an optimal mix of debt and equity?
  - If yes, what is the trade off that lets us determine this optimal mix?
    - What are the benefits of using debt instead of equity?
    - What are the costs of using debt instead of equity?
  - If not, why not?

#### The Illusory Benefits of Debt

- At first sight, the benefit of debt seems obvious. The cost of debt is lower than the cost of equity.
- That benefit is an illusion, though, because debt is cheaper than equity for a simple reason. The lender gets both first claim on the cash flows and a contractually pre-set cash flow. The equity investor is last in line and has to demand a higher rate of return than the lender does.
- By borrowing money at a lower rate, you are not making a business more valuable, but just moving the risk around.

#### Costs and Benefits of Debt

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#### Benefits of Debt

- Tax Benefits: The tax code is tilted in favor of debt, with interest payments being tax deductible in most parts of the world, while cash flows to equity are not.
- Adds discipline to management: When managers are sloppy in their project choices, borrowing money may make them less so.

#### Costs of Debt

- Bankruptcy Costs: Borrowing money will increase your expected probability and cost of bankruptcy.
- Agency Costs: What's good for stockholders is not always what's good for lenders and that creates friction and costs.
- Loss of Future Flexibility: Using up debt capacity today will mean that you will not be able to draw on it in the future.

#### Tax Benefits of Debt

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- 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
 The caveat is that you need to have the income to cover interest payments to get this tax benefit.

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?
- a. The real estate corporations
- b. The real estate investment trusts
- c. Cannot tell, without more information

#### Tax Law and Debt

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- At the end of 2017, the United States had one of the highest marginal corporate tax rates in the world (about 40%). Most companies had effective tax rates well below this, with the average effective tax rate closers to 22%. Which tax rate drives the tax benefit of debt and why?
  - a. Marginal tax rates
  - b. Effective tax rates
- At the end of 2017, a tax reform act passed Congress and became law, lowering the federal corporate tax rate from 36% to 21%? Holding all else constant, what should you expect to see happen to debt at US companies?

#### 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
- b. Conservatively financed, publicly traded companies, with stocks held by millions of investors, none of whom hold a large percent of the stock.
- Conservatively financed, publicly traded companies, with an activist and primarily institutional holding.

#### Bankruptcy Cost

- The expected bankruptcy cost is a function of two variables-
  - the probability of bankruptcy, which will depend upon how uncertain you are about future cash flows
  - the cost of going bankrupt
    - direct costs: Legal and other Deadweight Costs
    - indirect costs: Costs arising because people perceive you to be in financial trouble
- Proposition 2: Firms with more volatile earnings and cash flows will have higher probabilities of bankruptcy at any given level of debt and for any given level of earnings.
- Proposition 3: Other things being equal, the greater the indirect bankruptcy cost, the less debt the firm can afford to use for any given level of debt.

#### Debt & Bankruptcy Cost

- Rank the following companies on the magnitude of bankruptcy costs from most to least, taking into account both explicit and implicit costs:
- a. A Grocery Store
- b. An Airplane Manufacturer
- c. 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. A Technology firm
- b. A Large Regulated Electric Utility
- c. A Real Estate Corporation
- □ Why?

#### Loss of future financing flexibility

- When a firm borrows up to its capacity, it loses the flexibility of financing future projects with debt.
- Thus, if the firm is faced with an unexpected investment opportunity or a business shortfall, it will not be able to draw on debt capacity, if it has alread used it up.
- Proposition 5: Other things remaining equal, the more uncertain a firm is about its future financing requirements and projects, the less debt the firm will use for financing current projects.

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

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

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

#### Debt: Summarizing the trade off

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

# The Trade off for Disney, Vale, Tata Motors and Baidu

Discussion of relative benefits/costs
Marginal tax rates of 40% in US (Disney & Bookscape), 32.5% in India (Tata
Motors), 25% in China (Baidu) and 34% in Brazil (Vale), but there is an offsetting
tax benefit for equity in Brazil (interest on equity capital is deductible).
The benefits should be highest at Disney, where there is a clear separation of
ownership and management and smaller at the remaining firms.
Volatility in earnings: Higher at Baidu (young firm in technology), Tata Motors
(cyclicality) and Vale (commodity prices) and lower at Disney (diversified across
entertainment companies).
Indirect bankruptcy costs likely to be highest at Tata Motors, since it's products
(automobiles) have long lives and require service and lower at Disney and Baidu.
Highest at Baidu, largely because it's assets are intangible and it sells services and
lowest at Vale (where investments are in mines, highly visible and easily
monitored) and Tata Motors (tangible assets, family group backing). At Disney,
the agency costs will vary across its business, higher in the movie and
broadcasting businesses and lower at theme parks.
Baidu will value flexibility more than the other firms, because technology is a
shifting and unpredictable business, where future investment needs are difficult to
forecast. The flexibility needs should be lower at Disney and Tata Motors, since
they are mature companies with well-established investment needs. At Vale, the
need for investment funds may vary with commodity prices, since the firm grows
by acquiring both reserves and smaller companies. At Bookscape, the difficulty of
accessing external capital will make flexibility more necessary.

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

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- 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

Assume that you live in a world where

- (a) There are no taxes
- (b) Managers have stockholder interests at heart and do what's best for stockholders.
- (c) No firm ever goes bankrupt
- (d) Equity investors are honest with lenders; there is no subterfuge or attempt to find loopholes in loan agreements.(e) Firms know their future financing needs with certainty

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

#### The Miller-Modigliani Theorem

- In an environment, where there are no taxes, default risk or agency costs, capital structure is irrelevant.
- □ If the Miller Modigliani theorem holds:
  - A firm's value will be determined the quality of its investments and not by its financing mix.
  - The cost of capital of the firm will not change with leverage. As a firm increases its leverage, the cost of equity will increase just enough to offset any gains to the leverage.
     Figure 7.9: Cost of Capital in the MM World



#### What do firms look at in financing?

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  - There are some who argue that firms follow a financing hierarchy, with retained earnings being the most preferred choice for financing, followed by debt and that new equity is the least preferred choice. In particular,
    - Managers value flexibility. Managers value being able to use capital (on new investments or assets) without restrictions on that use or having to explain its use to others.
    - Managers value control. Managers like being able to maintain control of their businesses.
  - □ With flexibility and control being key factors:
    - Would you rather use internal financing (retained earnings) or external financing?
    - With external financing, would you rather use debt or equity?

## Preference rankings long-term finance: Results of a survey

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

#### And the unsurprising consequences..



Year

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#### 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?
- a. Nothing

- b. Healthier than the average firm
- c. In much more financial trouble than the average firm

### CAPITAL STRUCTURE: FINDING THE RIGHT FINANCING MIX

You can have too much debt... or too little..

#### The Big Picture..



#### Pathways to the Optimal

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- 1. <u>The Cost of Capital Approach</u>: The optimal debt ratio is the one that minimizes the cost of capital for a firm.
- 2. <u>The Enhanced Cost of Capital approach</u>: The optimal debt ratio is the one that generates the best combination of (low) cost of capital and (high) operating income.
- 3. <u>The Adjusted Present Value Approach</u>: The optimal debt ratio is the one that maximizes the overall value of the firm.
- 4. <u>The Sector Approach</u>: The optimal debt ratio is the one that brings the firm closes to its peer group in terms of financing mix.
- 5. <u>The Life Cycle Approach</u>: 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.
- Cost of Capital = Cost of Equity (E/(D+E)) + Pre-tax Cost of Debt (1-t) (D/(D+E)
  - The question then becomes a simple one. As the debt ratio changes, how does the cost of capital change?

### The Debt Trade off on the Cost of Capital



## Costs of Debt & Equity

- An 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?
- a. Yes

- b. No
- Can equity ever be cheaper than debt?
- a. Yes
- b. No

### Applying Cost of Capital Approach: The Textbook Example

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

				11 M 11
D/(D+E)	Cost of Equity	After-tax Cost of Debt	Cost of Capital	Firm Value
0	10.50%	4.80%	10.50%	\$2,747
10%	11.00%	5.10%	10.41%	\$2,780
20%	11.60%	5.40%	10.36%	\$2,799
30%	12.30%	5.52%	10.27%	\$2,835
40%	13.10%	5.70%	10.14%	\$2,885
50%	14.50%	6.10%	10.30%	\$2,822
60%	15.00%	7.20%	10.32%	\$2,814
70%	16.10%	8.10%	10.50%	\$2,747
80%	17.20%	9.00%	10.64%	\$2,696
90%	18.40%	10.20%	11.02%	\$2,569
100%	19.70%	11.40%	11.40%	\$2,452

200(1.03)

 $\overline{(\text{Cost of capital } - g)} \frac{1}{40}$ 

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

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### The U-shaped Cost of Capital Graph...

11.60% 11.40% 11.20% 11.00% 10.80% Cost of Capital and Firm Value



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### Current Cost of Capital: Disney

The beta for Disney's stock in November 2013 was 1.0013. The T. bond rate at that time was 2.75%. Using an estimated equity risk premium of 5.76%, we estimated the cost of equity for Disney to be 8.52%:

Cost of Equity = 2.75% + 1.0013(5.76%) = 8.52%

Disney's bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 3.75%. Using a marginal tax rate of 36.1, the after-tax cost of debt for Disney is 2.40%.

After-Tax Cost of Debt = 3.75% (1 - 0.361) = 2.40%

The cost of capital was calculated using these costs and the weights based on market values of equity (121,878) and debt (15.961):
 Cost of capital = 121,878

$$= 8.52\% \ \frac{121,878}{(15,961+121,878)} + 2.40\% \ \frac{15,961}{(15,961+121,878)} = 7.81\%$$

### Mechanics of Cost of Capital Estimation

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

## Laying the groundwork:

### 1. Estimate the unlevered beta for the firm

The Regression Beta: One approach is to use the regression beta (1.25) and then unlever, using the average debt to equity ratio (19.44%) during the period of the regression to arrive at an unlevered beta.

Unlevered beta = = 1.25 / (1 + (1 - 0.361)(0.1944)) = 1.1119

The Bottom up Beta: Alternatively, we can back to the source and estimate it from the betas of the businesses.

Business	Revenues	EV/Sales	Value of Business	Proportion of Disney	Unlevered beta	Value	Proportion
Media Networks	\$20,356	3.27	\$66,580	49.27%	1.03	\$66,579.81	49.27%
Parks & Resorts	\$14,087	3.24	\$45,683	33.81%	0.70	\$45,682.80	33.81%
Studio Entertainment	\$5,979	3.05	\$18,234	13.49%	1.10	\$18,234.27	13.49%
Consumer Products	\$3,555	0.83	\$2,952	2.18%	0.68	\$2,951.50	2.18%
Interactive	\$1,064	1.58	\$1,684	1.25%	1.22	\$1,683.72	1.25%
Disney Operations	\$45,041		\$135,132	100.00%	0.9239	\$135,132.11	100.00%

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# 2. Get Disney's current financials...

	Most recent fiscal year (2012-13)	Prior year
Revenues	\$45,041	\$42,278
EBITDA	\$10,642	\$10,850
Depreciation & Amortization	\$2,192	\$1,987
EBIT	\$9,450	\$8,863
Interest Expenses	\$349	\$564
EBITDA (adjusted for leases)	\$12,517	\$11,168
Depreciation (adjusted for leases)	\$ 2,485	\$2,239
EBIT (adjusted for leases)	\$10,032	\$8,929
Interest Expenses (adjusted for leases)	\$459	\$630

### I. Cost of Equity

Debt to Capital Ratio	D/E Ratio	Levered Beta	Cost of Equity
0%	0.00%	0.9239	8.07%
10%	11.11%	0.9895	8.45%
20%	25.00%	1.0715	8.92%
30%	42.86%	1.1770	9.53%
40%	66.67%	1.3175	10.34%
50%	100.00%	1.5143	11.48%
60%	150.00%	1.8095	13.18%
70%	233.33%	2.3016	16.01%
80%	400.00%	3.2856	21.68%
90%	900.00%	6.2376	38.69%

Levered Beta = 0.9239 (1 + (1- .361) (D/E)) Cost of equity = 2.75% + Levered beta \* 5.76%

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### **Estimating Cost of Debt**

Start with the market value of the firm = = 121,878 + \$15,961 = \$137,839 million					
D/(D+E)	0.00%	10.00%	Debt to capital		
D/E	0.00%	11.11%	D/E = 10/90 = .1111		
\$ Debt	\$0	\$13,784	10% of \$137,839		
EBITDA	\$12,517	\$12,517	Same as 0% debt		
Depreciation	\$ 2,485	\$ 2,485	Same as 0% debt		
EBIT	\$10,032	\$10,032	Same as 0% debt		
Interest	\$0	\$434	Pre-tax cost of debt * \$ Debt		
Pre-tax Int. cov	$\infty$	23.10	EBIT/ Interest Expenses		
Likely Rating	AAA	AAA	From Ratings table		
Pre-tax cost of debt	t 3.15%	3.15%	Riskless Rate + Spread		

### The Ratings Table

Interest coverage ratio is	Rating is	Spread is	Interest rate
> 8.50	Aaa/AAA	0.40%	3.15%
6.5 - 8.5	Aa2/AA	0.70%	3.45%
5.5 - 6.5	A1/A+	0.85%	3.60%
4.25 - 5.5	A2/A	1.00%	3.75%
3 - 4.25	A3/A-	1.30%	4.05%
2.5 -3	Baa2/BBB	2.00%	4.75%
2.25 - 2.5	Ba1/BB+	3.00%	5.75%
2-2.25	Ba2/BB	4.00%	6.75%
1.75 -2	B1/B+	5.50%	8.25%
1.5 – 1.75	B2/B	6.50%	9.25%
1.25 -1.5	B3/B-	7.25%	10.00%
0.8 -1.25	Caa/CCC	8.75%	11.50%
0.65 - 0.8	Ca2/CC	9.50%	12.25%
0.2 - 0.65	C2/C	10.50%	13.25%
<0.2	D2/D	12.00%	14.75%

T.Bond rate =2.75%

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### A Test: Can you do the 30% level?

		Iteration 1	Iteration 2
		(Debt @AAA rate)	(Debt @AA rate)
D/(D+E)	20.00%	30.00%	30.00%
D/E	25.00%	30/70=42.86%	
\$ Debt	\$27,568	\$41,352	
EBITDA	\$12,517	\$12.517	
Depreciation	\$2,485	\$2,485	
EBIT	\$10,032	\$10.032	
Interest expense	\$868	41352*.0315=1,302	41352*.0345=1427
Interest coverage ratio	11.55	10032/1302=7.7	10032/1427=7.03
Likely rating	AAA	AA	AA
Pretax cost of debt	3.15%	3.45%	3.45%

# Bond Ratings, Cost of Debt and Debt Ratios

			Interest		Pre-tax		After-tax
Debt		Interest	Coverage		cost of		cost of
Ratio	\$ Debt	Expense	Ratio	Bond Rating	debt	Tax rate	debt
0%	\$0	\$0	8	Aaa/AAA	3.15%	36.10%	2.01%
10%	\$13,784	\$434	23.10	Aaa/AAA	3.15%	36.10%	2.01%
20%	\$27,568	\$868	11.55	Aaa/AAA	3.15%	36.10%	2.01%
30%	\$41,352	\$1,427	7.03	Aa2/AA	3.45%	36.10%	2.20%
40%	\$55,136	\$2,068	4.85	A2/A	3.75%	36.10%	2.40%
50%	\$68,919	\$6,892	1.46	B3/B-	10.00%	36.10%	6.39%
60%	\$82,703	\$9,511	1.05	Caa/CCC	11.50%	36.10%	7.35%
70%	\$96,487	\$11,096	0.90	Caa/CCC	11.50%	32.64%	7.75%
80%	\$110,271	\$13,508	0.74	Ca2/CC	12.25%	26.81%	8.97%
90%	\$124,055	\$16,437	0.61	C2/C	13.25%	22.03%	10.33%

#### Stated versus Effective Tax Rates

- You need taxable income for interest to provide a tax savings. Note that the EBIT at Disney is \$10,032 million. As long as interest expenses are less than \$10,032 million, interest expenses remain fully tax-deductible and earn the 36.1% tax benefit. At an 60% debt ratio, the interest expenses are \$9,511 million and the tax benefit is therefore 36.1% of this amount.
- At a 70% debt ratio, however, the interest expenses balloon to \$11,096 million, which is greater than the EBIT of \$10,032 million. We consider the tax benefit on the interest expenses up to this amount:
  - Maximum Tax Benefit = EBIT \* Marginal Tax Rate = \$10,032 million \* 0.361
     = \$3,622 million
  - Adjusted Marginal Tax Rate = Maximum Tax Benefit/Interest Expenses = \$3,622/\$11,096 = 32.64%

# Disney's cost of capital schedule...

			Cost of Debt (after-	
Debt Ratio	Beta	Cost of Equity	tax)	WACC
0%	0.9239	8.07%	2.01%	8.07%
10%	0.9895	8.45%	2.01%	7.81%
20%	1.0715	8.92%	2.01%	7.54%
30%	1.1770	9.53%	2.20%	7.33%
40%	1.3175	10.34%	2.40%	7.16%
50%	1.5143	11.48%	6.39%	8.93%
60%	1.8095	13.18%	7.35%	9.68%
70%	2.3762	16.44%	7.75%	10.35%
80%	3.6289	23.66%	8.97%	11.90%
90%	7.4074	45.43%	10.33%	13.84%

### **Disney: Cost of Capital Chart**



Aswath Damodaran

#### Disney: Cost of Capital Chart: 1997





Aswath Damodaran

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

- Disney currently has \$15.96 billion in debt. The optimal dollar debt (at 40%) is roughly \$55.1 billion. Disney has excess debt capacity of 39.14 billion.
- To move to its optimal and gain the increase in value, Disney should borrow \$ 39.14 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?

# Why should we do it? Effect on Firm Value – Full Valuation

	<b>C</b> 1
Step 1: Estimate the cash flows to Disney as a	a firm
EBIT (1 – Tax Rate) = 10,032 (1 – 0.361) =	\$6,410
+ Depreciation and amortization =	\$2,485
– Capital expenditures =	\$5,239
<ul> <li>Change in noncash working capital</li> </ul>	\$0
Free cash flow to the firm =	\$3,657
□Step 2: Back out the implied growth rate in t	the current market value
Current enterprise value = \$121,878 + 15,961 - 3,	931 = 133,908
Value of firm = $$133,908 = FCFF_0(1+g)$	$=\frac{3,657(1+g)}{1-g}$
(Cost of Capital -g)	(.0781 -g)
Growth rate = (Firm Value * Cost of Capital – CF to	o Firm)/(Firm Value + CF to Firm)
= (133,908* 0.0781 – 3,657)/(1	133,908+ 3,657) = 0.0494 or 4.94%
Step 3: Revalue the firm with the new cost of Firm value = $\frac{FCFF_0(1+g)}{(Cost of Capital -g)} = \frac{3,657(1.049)}{(.0716 - 0.049)}$	$\frac{94)}{84} = \$172,935 \text{ million}$
Increase in firm value = \$172,935 - \$133,908 =	\$39,027 million

### Effect on Value: Incremental approach

In this approach, we start with the current market value and isolate the effect of changing the capital structure on the cash flow and the resulting value.

Enterprise Value before the change = \$133,908 million

Cost of financing Disney at existing debt ratio = \$ 133,908 \* 0.0781 = \$10,458 million

Cost of financing Disney at optimal debt ratio = \$ 133,908 \* 0.0716 = \$ 9,592 million

Annual savings in cost of financing = \$10,458 million - \$9,592 million = \$866 million Increase in Value= $\frac{\text{Annual Savings next year}}{(\text{Cost of Capital - g})} = \frac{\$866}{(0.0716 - 0.0275)} = \$19,623 \text{ million}$ 

Enterprise value after recapitalization

= Existing enterprise value + PV of Savings = \$133,908 + \$19,623 = \$153,531 million

# From firm value to value per share: The Rational Investor Solution

- Because the increase in value accrues entirely to stockholders, we can estimate the increase in value per share by dividing by the <u>total number of shares</u> <u>outstanding (1,800 million)</u>.
  - Increase in Value per Share = \$19,623/1800 = \$10.90
  - New Stock Price = \$67.71 + \$10.90 = \$78.61
- Implicit in this computation is the assumption that the increase in firm value will be spread evenly across both the stockholders who sell their stock back to the firm and those who do not and that is why we term this the "rational" solution, since it leaves investors indifferent between selling back their shares and holding on to them.

# The more general solution, given a buyback price

- Start with the buyback price and compute the number of shares outstanding after the buyback:
  - Increase in Debt = Debt at optimal Current Debt
  - # Shares after buyback = # Shares before Increase in Debt

Share Price

- Then compute the equity value after the recapitalization, starting with the enterprise value at the optimal, adding back cash and subtracting out the debt at the optimal:
  - Equity value after buyback = Optimal Enterprise value + Cash Debt
- Divide the equity value after the buyback by the postbuyback number of shares.
  - Value per share after buyback = Equity value after buyback/ Number of shares after buyback

# Let's try a price: What if can buy shares back at the old price (\$67.71)?

- Start with the buyback price and compute the number of shares outstanding after the buyback
  - Debt issued = \$55,136 \$15,961 = \$39,175 million
  - # Shares after buyback = 1800 \$39,175/\$67.71 = 1221.43 m
- Then compute the equity value after the recapitalization, starting with the enterprise value at the optimal, adding back cash and subtracting out the debt at the optimal:
  - Optimal Enterprise Value = \$153,531
  - Equity value after buyback = \$153,531 + \$3,931 \$55,136 = \$102,326
- Divide the equity value after the buyback by the postbuyback number of shares.
  - Value per share after buyback = \$102,326/1221.43 = \$83.78

# Back to the rational price (\$78.61): Here is the proof

Start with the buyback price and compute the number of shares outstanding after the buyback

# Shares after buyback = 1800 - \$39,175/\$78.61 = 1301.65 m

- Then compute the equity value after the recapitalization, starting with the enterprise value at the optimal, adding back cash and subtracting out the debt at the optimal:
  - Optimal Enterprise Value = \$153,531
  - Equity value after buyback = \$153,531 + \$3,931 \$55,136 = \$102,326
- Divide the equity value after the buyback by the postbuyback number of shares.
  - Value per share after buyback = \$102,326/1301.65 = \$78.61

### 2. What if something goes wrong? The Downside Risk

#### Sensitivity to Assumptions

#### A. "What if" analysis

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

#### B. "Economic Scenario" Approach

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

#### Constraint on Bond Ratings/ Book Debt Ratios

Alternatively, we can put constraints on the optimal debt ratio to reduce exposure to downside risk. Thus, we could require the firm to have a minimum rating, at the optimal debt ratio or to have a book debt ratio that is less than a "specified" value.

## Disney's Operating Income: History

Year	EBIT	% Change	Year	EBIT	% Change
		in EBIT			in EBIT
1987	\$756		2001	\$2,832	12.16%
1988	\$848	12.17%	2002	\$2,384	-15.82%
1989	\$1,177	38.80%	2003	\$2,713	13.80%
1990	\$1,368	16.23%	2004	\$4,048	49.21%
1991	\$1,124	-17.84%	2005	\$4,107	1.46%
1992	\$1,287	14.50%	2006	\$5,355	30.39%
1993	\$1,560	21.21%	2007	\$6,829	27.53%
1994	\$1,804	15.64%	2008	\$7,404	8.42%
1995	\$2,262	25.39%	2009	\$5,697	-23.06%
1996	\$3,024	33.69%	2010	\$6,726	18.06%
1997	\$3,945	30.46%	2011	\$7,781	15.69%
1998	\$3,843	-2.59%	2012	\$8,863	13.91%
1999	\$3,580	-6.84%	2013	\$9,450	6.62%
2000	\$2,525	-29.47%		ת	· D

Standard deviation in % change in EBIT = 19.17%

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Recession Decline in	or Operating Income
2009	Drop of 23.06%
2002	Drop of 15.82%
1991	Drop of 22.00%
1981-82	Increased by 12%
Worst Year	Drop of 29.47% 63

## **Disney: Safety Buffers?**

EBIT drops by	EBIT	Optimal Debt ratio
0%	\$10,032	40%
10%	\$9,029	40%
20%	\$8,025	40%
30%	\$7,022	40%
40%	\$6,019	30%
50%	\$5,016	30%
60%	\$4,013	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.
  - The cost of a rating constraint is the difference between the unconstrained value and the value of the firm with the constraint.
  - Managers need to be made aware of the costs of the constraints they impose.

### **Ratings Constraints for Disney**

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

Cost of AA Rating Constraint = Value at 40% Debt – Value at 30% Debt = \$153,531 m – \$147,835 m = \$5,696 million

 If managers insisted on a AAA rating, the optimal debt ratio would drop to 20% and the cost of the ratings constraint would rise:

Cost of AAA rating constraint = Value at 40% Debt – Value at 20% Debt = \$153,531 m – \$141,406 m = \$12,125 million

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

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

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

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Enterprise Value
0%	0.8601	12.76%	Aaa/AAA	9.22%	32.45%	6.23%	12.76%	1,286,997₹
10%	0.9247	13.22%	Aa2/AA	9.52%	32.45%	6.43%	12.54%	1,333,263₹
20%	1.0054	13.80%	A3/A-	10.12%	32.45%	6.84%	12.41%	1,363,774₹
30%	1.1092	14.55%	B2/B	15.32%	32.45%	10.35%	13.29%	1,185,172₹
40%	1.2475	15.54%	Caa/CCC	17.57%	32.45%	11.87%	14.07%	1,061,143₹
50%	1.4412	16.93%	Ca2/CC	18.32%	32.45%	12.38%	14.65%	984,693₹
60%	1.7610	19.23%	Ca2/CC	18.32%	30.18%	12.79%	15.37%	904,764₹
70%	2.3749	23.65%	C2/C	19.32%	24.53%	14.58%	17.30%	741,800₹
80%	3.5624	32.19%	C2/C	19.32%	21.46%	15.17%	18.58%	663,028₹
90%	7.1247	57.81%	C2/C	19.32%	19.08%	15.63%	19.85%	599,379₹

Tata Motors looks like it is over levered (29% actual versus 20% optimal), perhaps because it is drawing on the debt capacity of other companies in the Tata Group.

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

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Enterprise Value
0%	0.8440	8.97%	Aaa/AAA	5.15%	34.00%	3.40%	8.97%	\$98,306
10%	0.9059	9.43%	Aaa/AAA	5.15%	34.00%	3.40%	8.83%	\$100,680
20%	0.9833	10.00%	Aaa/AAA	5.15%	34.00%	3.40%	8.68%	\$103,171
30%	1.0827	10.74%	A1/A+	5.60%	34.00%	3.70%	8.62%	\$104,183
40%	1.2154	11.71%	A3/A-	6.05%	34.00%	3.99%	8.63%	\$104,152
50%	1.4011	13.08%	B1/B+	10.25%	34.00%	6.77%	9.92%	\$85,298
60%	1.6796	15.14%	B3/B-	12.00%	34.00%	7.92%	10.81%	\$75,951
70%	2.1438	18.56%	B3/B-	12.00%	34.00%	7.92%	11.11%	\$73,178
80%	3.0722	25.41%	Ca2/CC	14.25%	34.00%	9.41%	12.61%	\$62,090
90%	5.8574	45.95%	Ca2/CC	14.25%	34.00%	9.41%	13.06%	\$59,356

	Last 12 months	-1	-2	-3	Average
Revenues	\$48,469	\$48,058	\$61,123	\$47,343	\$51,248
EBITDA	\$19,861	\$17,662	\$34,183	\$26,299	\$24,501
EBIT	\$15,487	\$13,346	\$30,206	\$23,033	\$20,518
Pre-tax operating margin	31.95%	27.77%	49.42%	48.65%	39.45%

Replacing Vale's current operating income with the average over the last three years pushes up the optimal to 50%.

# Optimal Debt Ratio for a young, growth firm: Baidu

				Interest		Cost of		
Debt		Cost of	Bond	rate on	Tax	Debt		Enterprise
Ratio	Beta	Equity	Rating	debt	Rate	(after-tax)	WACC	Value
0%	1.3021	12.54%	Aaa/AAA	4.70%	25.00%	3.53%	12.54%	\$337,694
10%	1.4106	13.29%	A3/A-	5.60%	25.00%	4.20%	12.38%	\$343,623
20%	1.5463	14.23%	Ca2/CC	13.80%	25.00%	10.35%	13.45%	\$306,548
30%	1.7632	15.74%	Caa/CCC	14.80%	17.38%	12.23%	14.68%	\$272,853
40%	2.0675	17.85%	D2/D	16.30%	11.83%	14.37%	16.46%	\$235,510
50%	2.4810	20.72%	D2/D	16.30%	9.47%	14.76%	17.74%	\$214,337
60%	3.1012	25.02%	D2/D	16.30%	7.89%	15.01%	19.02%	\$196,657
70%	4.1350	32.20%	D2/D	16.30%	6.76%	15.20%	20.30%	\$181,672
80%	6.2024	46.54%	D2/D	16.30%	5.92%	15.34%	21.58%	\$168,808
90%	12.4049	89.59%	D2/D	16.30%	5.26%	15.44%	22.86%	\$157,646

The optimal debt ratio for Baidu is between 0 and 10%, close to its current debt ratio of 5.23%, and much lower than the optimal debt ratios computed for Disney, Vale and Tata Motors.

## Extension to a private business Optimal Debt Ratio for Bookscape

Debt value of leases = \$12,136 million (only debt)

Estimated market value of equity = Net Income \* Average PE for Publicly Traded Book

Retailers = 1.575 \* 20 = \$31.5 million

Debt ratio = 12,136/(12,136+31,500) = 27.81%

Debt Ratio	Total Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Enterprise Value
0%	1.3632	10.25%	Aaa/AAA	3.15%	40.00%	1.89%	10.25%	\$37,387
10%	1.4540	10.75%	Aaa/AAA	3.15%	40.00%	1.89%	9.86%	\$39,416
20%	1.5676	11.37%	A1/A+	3.60%	40.00%	2.16%	9.53%	\$41,345
30%	1.7137	12.18%	A3/A-	4.05%	40.00%	2.43%	9.25%	\$43,112
40%	1.9084	13.25%	Caa/CCC	11.50%	40.00%	6.90%	10.71%	\$35,224
50%	2.2089	14.90%	Ca2/CC	12.25%	37.96%	7.60%	11.25%	\$32,979
60%	2.8099	18.20%	C2/C	13.25%	29.25%	9.37%	12.91%	\$27,598
70%	3.7466	23.36%	C2/C	13.25%	25.07%	9.93%	13.96%	\$25,012
80%	5.6198	33.66%	C2/C	13.25%	21.93%	10.34%	15.01%	\$22,869
90%	11.4829	65.91%	D2/D	14.75%	17.51%	12.17%	17.54%	\$18,952

The firm value is maximized (and the cost of capital is minimized) at a debt ratio of 30%. At its existing debt ratio of 27.81%, Bookscape is at its optimal.

# The US Tax Reform Act of 2017: Effects on the Optimal Debt Ratio

- <u>Change in marginal tax rate</u>: The marginal federal tax rate for US companies on US income has been lowered from 35% to 21%. Holding all else constant, that will lower the optimal debt ratio for all firms.
- Limits on interest tax deduction: Companies can deduct interest expenses only up to 30% of EBITDA (until 2022) and 30% of EBIT (after 2022). That will add a constraint to the tax savings from debt. In the cost of capital calculation, it will show up in the tax rate that you use to compute your aftertax cost of debt, lowering the tax rate from the marginal if interest expenses> 30% of EBITDA:

Tax rate if Interest Expense> 30% of EBITDA

= Marginal Tax rate \* (.30\*EBITDA)/ Interest Expense
# Effect on tax code on Debt Impact: Disney in 2018



Aswath Damodaran

# Are US companies adjusting to the new tax code?



#### Limitations of the Cost of Capital approach

- 75
- It is static: The most critical number in the entire analysis is the operating income. If that changes, the optimal debt ratio will change.
- <u>It ignores indirect bankruptcy costs</u>: The operating income is assumed to stay fixed as the debt ratio and the rating changes.
- <u>Beta and Ratings</u>: It is based upon rigid assumptions of how market risk and default risk get borne as the firm borrows more money and the resulting costs.

#### II. Enhanced Cost of Capital Approach

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

#### Estimating the Distress Effect- Disney

Rating	Drop in EBITDA	Drop in EBITDA	Drop in EBITDA
	(Low)	(Medium)	(High)
To A	No effect	No effect	2.00%
To A-	No effect	2.00%	5.00%
To BBB	5.00%	10.00%	15.00%
To BB+	10.00%	20.00%	25.00%
To B-	15.00%	25.00%	30.00%
To C	25.00%	40.00%	50.00%
To D	30.00%	50.00%	100.00%

### The Optimal Debt Ratio with Indirect Bankruptcy Costs

		Cost of	Bond	Interest rate		Cost of Debt		Enterprise
Debt Ratio	Beta	Equity	Rating	on debt	Tax Rate	(after-tax)	WACC	Value
0%	0.9239	8.07%	Aaa/AAA	3.15%	36.10%	2.01%	8.07%	\$122,633
10%	0.9895	8.45%	Aaa/AAA	3.15%	36.10%	2.01%	7.81%	\$134,020
20%	1.0715	8.92%	Aaa/AAA	3.15%	36.10%	2.01%	7.54%	\$147,739
30%	1.1769	9.53%	Aa2/AA	3.45%	36.10%	2.20%	7.33%	\$160,625
40%	1.3175	10.34%	A2/A	3.75%	36.10%	2.40%	7.16%	\$172,933
50%	1.5573	11.72%	C2/C	11.50%	31.44%	7.88%	9.80%	\$35,782
60%	1.9946	14.24%	Caa/CCC	13.25%	22.74%	10.24%	11.84%	\$25,219
70%	2.6594	18.07%	Caa/CCC	13.25%	19.49%	10.67%	12.89%	\$21,886
80%	3.9892	25.73%	Caa/CCC	13.25%	17.05%	10.99%	13.94%	\$19,331
90%	7.9783	48.72%	Caa/CCC	13.25%	15.16%	11.24%	14.99%	\$17,311

The optimal debt ratio stays at 40% but the cliff becomes much steeper.

## Extending this approach to analyzing Financial Service Firms

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

### Capital Structure for a bank: A Regulatory Capital Approach

Consider a bank with \$ 100 million in loans outstanding and a book value of equity of \$ 6 million. Furthermore, assume that the regulatory requirement is that equity capital be maintained at 5% of loans outstanding. Finally, assume that this bank wants to increase its loan base by \$ 50 million to \$ 150 million and to augment its equity capital ratio to 7% of loans outstanding.

Loans outstanding after Expansion

Equity after expansion Existing Equity

- = 7% of \$150
- = \$ 150 million
- = \$10.5 million = \$ 6.0 million

New Equity needed

- = \$ 4.5 million
- Your need for "external" equity as a bank/financial service company will depend upon

a. Your growth rate: Higher growth -> More external equity

 b. Existing capitalization vs Target capitalization: Under capitalized -> More external equity

c.Current earnings: Less earnings -> More external equity

d.Current dividends: More dividends -> More external equity

#### Deutsche Bank's Financial Mix

Q	1	
0	Т	

	Current	1	2	3	4	5
Asset Base	439,851 €	453,047 €	466,638 €	480,637 €	495,056 €	509,908 €
Capital ratio	15.13%	15.71%	16.28%	16.85%	17.43%	18.00%
Tier 1 Capital	66,561€	71,156€	75,967€	81,002€	86,271€	91,783€
Change in regulatory						
capital		4,595 €	4,811 €	5,035€	5,269 €	5,512€
Book Equity	76,829 €	81,424 €	86,235€	91,270€	96,539€	102,051 €
ROE	-1.08%	0.74%	2.55%	4.37%	6.18%	8.00%
Net Income	-716€	602 €	2,203 €	3,988 €	5,971€	8,164 €
- Investment in						
Regulatory Capital		4,595 €	4,811 €	5,035€	5,269 €	5,512 €
FCFE		-3,993€	-2,608€	-1,047 €	702 €	2,652€

The cumulative FCFE over the next 5 years is -4,294 million Euros. Clearly, it does not make the sense to pay dividends or buy back stock.

Aswath Damodaran

#### Financing Strategies for a financial institution

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

Determinants of the Optimal Debt Ratio:

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

Tax Rate	Disney	Vale	Tata Motors	Baidu	Bookscape
0%	0%	0%	0%	0%	0%
10%	20%	0%	0%	0%	10%
20%	40%	0%	10%	10%	30%
30%	40%	30%	20%	10%	30%
40%	40%	40%	20%	10%	30%
50%	40%	40%	20%	10%	30%

#### 2. Pre-tax Cash flow Return

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			Enterprise			Optimal	Optimal Debt
Company	EBITDA	EBIT	Value	EBITDA/EV	EBIT/EV	Debt	Ratio
Disney	\$12,517	\$10,032	\$133,908	9.35%	7.49%	\$55,136	40.00%
Vale	\$20,167	\$15,667	\$112,352	17.95%	13.94%	\$35,845	30.00%
Tata							
Motors	250,116₹	166,605₹	1,427,478₹	17.52%	11.67%	325,986₹	20.00%
Baidu	¥13,073	¥10,887	¥342,269	3.82%	3.18%	¥35,280	10.00%
Bookscape	\$4,150	\$2,536	\$42,636	9.73%	5.95%	\$13,091	30.00%

Higher cash flows, as a percent of value, give you a higher debt capacity, though less so in emerging markets with substantial country risk.

#### 3. Operating Risk

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

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

Equity Risk Premiums and Bond Default Spreads 7.00% 9.00 Median ERP/ Raa Spread during period = 2.028.00 6.00% 7.00 5.00% 4.00% 6.00 pead 5.00 S σ Premium Ba 4.00 3.00% 3.00 H 2.00% 2.00 1.00% 1.00 0.00% 0.00 ERP/Baa Spread Baa - T.Bond Rate ERP

#### Separation Test: Your firm's optimal financing mix

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

## III. The APV Approach to Optimal Capital Structure

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

#### Implementing the APV Approach

- Step 1: Estimate the unlevered firm value. This can be done in one of two ways:
  - 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)
  - 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

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Rating	Likelihood of Default
AAA	0.07%
AA	0.51%
A+	0.60%
А	0.66%
A-	2.50%
BBB	7.54%
BB	16.63%
B+	25.00% <sup>I</sup>
В	36.80%
B-	45.00%
ССС	59.01%
CC	70.00%
С	85.00%
D	100.00%

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

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#### **Disney: Estimating Unlevered Firm Value**

- Current Value of firm = \$121,878 + \$15,961= \$137,839- Tax Benefit on Current Debt = \$15,961 \* 0.361= \$5,762+ Expected Bankruptcy Cost = 0.66% \* (0.25 \* 137,839) = \$227Unlevered Value of Firm == \$132,304
  - Cost of Bankruptcy for Disney = 25% of firm value
  - Probability of Bankruptcy = 0.66%, based on firm's current rating of A
  - Tax Rate = 36.1%

#### **Disney: APV at Debt Ratios**

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							Expected	Value of
			Unlevered			Probability	Bankruptcy	Levered
Debt Ratio	\$ Debt	Tax Rate	Firm Value	Tax Benefits	Bond Rating	of Default	Cost	Firm
0%	\$0	36.10%	\$132,304	\$0	AAA	0.07%	\$23	\$132,281
10%	\$13,784	36.10%	\$132,304	\$4,976	Aaa/AAA	0.07%	\$24	\$137,256
20%	\$27,568	36.10%	\$132,304	\$9,952	Aaa/AAA	0.07%	\$25	\$142,231
30%	\$41,352	36.10%	\$132,304	\$14,928	Aa2/AA	0.51%	\$188	\$147,045
40%	\$55,136	36.10%	\$132,304	\$19,904	A2/A	0.66%	\$251	\$151,957
50%	\$68,919	36.10%	\$132,304	\$24,880	B3/B-	45.00%	\$17,683	\$139,501
60%	\$82,703	36.10%	\$132,304	\$29,856	C2/C	59.01%	\$23,923	\$138,238
70%	\$96,487	32.64%	\$132,304	\$31,491	C2/C	59.01%	\$24,164	\$139,631
80%	\$110,271	26.81%	\$132,304	\$29,563	Ca2/CC	70.00%	\$28,327	\$133,540
90%	\$124,055	22.03%	\$132,304	\$27,332	Caa/CCC	85.00%	\$33,923	\$125,713

The optimal debt ratio is 40%, which is the point at which firm value is maximized.

#### **IV. Relative Analysis**

- 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

	Debt to R	o Capital atio	Net Debt t Rat	o Capital tio		Debt to Ra	Capital tio	Net Debt Ra	to Capital tio
Company	Book value	Market value	Book value	Market value	Comparable group	Book value	Market value	Book value	Market value
Disney	22.88%	11.58%	17.70%	8.98%	US Entertainment	39.03%	15.44%	24.92%	9.93%
Vale	39.02%	35.48%	34.90%	31.38%	Global Diversified Mining & Iron Ore (Market cap> \$1 b)	34.43%	26.03%	26.01%	17.90%
Tata Motors	58.51%	29.28%	22.44%	19.25%	Global Autos (Market Cap> \$1 b)	35.96%	18.72%	3.53%	0.17%
Baidu	32.93%	5.23%	20.12%	2.32%	Global Online Advertising	6.37%	1.83%	-27.13%	-2.76%

#### Getting past simple averages

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

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

Check this regression for statistical significance (t statistics) and predictive ability (R squared)

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

<u>Step 3</u>: Compare the actual debt ratio to the predicted debt ratio.

## Applying the Regression Methodology: Global Auto Firms

 Using a sample of 56 global auto firms, we arrived at the following regression:

Debt to capital = 0.09 + 0.63 (Effective Tax Rate) + 1.01 (EBITDA/ Enterprise Value) - 0.93 (Cap Ex/ Enterprise Value)

The R squared of the regression is 21%. This regression can be used to arrive at a predicted value for Tata Motors of:

Predicted Debt Ratio = 0.09 + 0.63 (0.252) +1.01 (0.1167) - 0.93 (0.1949) = .1854 or 18.54%

 Based upon the capital structure of other firms in the automobile industry, Tata Motors should have a market value debt ratio of 18.54%. It is over levered at its existing debt ratio of 29.28%.

#### Extending to the entire market

- **98**
- Using 2014 data for US listed firms, we looked at the determinants of the market debt to capital ratio. The regression provides the following results –

DFR = 0.27 - 0.24 ETR -0.10 g- 0.065 INST -0.338 CVOI+ 0.59 E/V

(15.79) (9.00) (2.71) (3.55) (3.10) (6.85)

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

ETR = Effective tax rate in most recent twelve months

INST = % of Shares held by institutions

CVOI = Std dev in OI in last 10 years/ Average OI in last 10 years

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

The regression has an **R-squared of 8%.** 

### Applying the Regression

 Disney had the following values for these inputs in 2014. Estimate the optimal debt ratio using the debt regression.

Effective Tax Rate (ETR)	= 31.02%
Expected Revenue Growth	= 6.45%
Institutional Holding % (INST)	= 70.2%
Coefficient of Variation in OI (CVOI)	= 0.0296
EBITDA/Value of firm (E/V)	= 9.35%

**Optimal Debt Ratio** 

= 0.27 - 0.24 (.3102) -0.10 (.0645) - 0.065 (.702) -0.338 (.0296) + 0.59 (.0935)

= 0.1886 or 18.86%

What does this optimal debt ratio tell you?

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

#### Summarizing the optimal debt ratios...

	Disney	Vale	Tata Motors	Baidu
Actual Debt Ratio	11.58%	35.48%	29.28%	5.23%
Optimal				
I. Operating income	35.00%		-	
II. Standard Cost of capital	40.00%	30.00% (actual)	20.00%	10.00%
		50.00% (normalized)		
III. Enhanced Cost of Capital	40.00%	30.00% (actual)	10.00%	10.00%
		40.00% (normalized)		
IV. APV	40.00%	30.00%	20.00%	20.00%
V. Comparable				
To industry	28.54%	26.03%	18.72%	1.83%
To market	18.86%		-	

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### GETTING TO THE OPTIMAL: TIMING AND FINANCING CHOICES

You can take it slow.. Or perhaps not...

#### Big Picture...



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

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

#### A Framework for Getting to the Optimal



### Disney: Applying the Framework



### Application Test: Getting to the Optimal

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

#### The Mechanics of Changing Debt Ratio quickly...

#### To decrease the debt ratio

Sell operating assets and use cash to pay down debt. Issue new stock to retire debt or get debt holders to accept equity in the firm.

Assets	Liabilities
Cash	Debt
Opearing Assets in place Growth Assets	Equity
<i>Sell operating assets and use cash to buy back stock or pay or special dividend</i>	Borrow money and buy back stock or pay a large special dividend

#### To increase the debt ratio

### The mechanics of changing debt ratios over time... gradually...

- To change debt ratios over time, you use the same mix of tools that you used to change debt ratios gradually:
  - Dividends and stock buybacks: Dividends and stock buybacks will reduce the value of equity.
  - Debt repayments: will reduce the value of debt.
- The complication of changing debt ratios over time is that firm value is itself a moving target.
  - If equity is fairly valued today, the equity value should change over time to reflect the expected price appreciation:
  - Expected Price appreciation = Cost of equity Dividend Yield
  - Debt will also change over time, in conjunction as firm value changes.
#### Designing Debt: The Fundamental Principle

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

# Firm with mismatched debt



# Firm with matched Debt



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# 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

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



# Debt or Equity: The Strange Case of Trust Preferred

- Trust preferred stock has
  - A fixed dividend payment, specified at the time of the issue
  - That is tax deductible
  - And failing to make the payment can give these shareholders voting rights
- 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. A firm that is under levered, but has a rating constraint that would be violated if it moved to its optimal
  - b. A firm that is over levered that is unable to issue debt because of the rating agency concerns.

# Soothe bondholder fears

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- 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 by Lenders - Less observable cash flows lead to more conflicts

Observability of Cash Flows

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

Existing Debt covenants - Restrictions on Financing

If agency problems are substantial, consider issuing convertible bond.

Convertibiles

**LYONs** 

Puttable Bonds

**Rating Sensitive** 

Notes

# 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

- Estimate expected cash flows on a typical project for the firm
- Do scenario analyses on these cash flows, based upon different macro economic scenarios

#### III. Historical Data

- Operating Cash Flows
- Firm Value

# I. Intuitive Approach - Disney

Business	Project Cash Flow Characteristics	Type of Financing	
a	Movie projects are likely to	Debt should be	
Studio	• Be short-term	1. Short-term	
entertainment • Have cash outflows primarily in dollars (because Disney makes most movies in the U.S.), but cash inflows could have a substantial foreign component (because of overseas revenues)		2. Mixed currency debt, reflecting audience make- up.	
	3. If possible, tied to the success of movies.		
Media networks	Projects are likely to be	Debt should be	
	1. Short-term	1. Short-term	
	2. Primarily in dollars, though foreign component is growing, especially for ESPN.		
	3. Driven by advertising revenues and show success (Nielsen ratings)		
		network ratings	
Park resorts	Projects are likely to be	Debt should be	
	1. Very long-term	1. Long-term	
	2. Currency will be a function of the region (rather than country) where park is located.		
	3. Affected by success of studio entertainment and media networks divisions	park.	
Consumer	Projects are likely to be short- to medium-term and linked to the success of the	Debt should be	
products	movie division; most of Disney's product offerings and licensing revenues are	1. Medium-term	
	derived from their movie productions	2. Dollar debt	
Interactive	Projects are likely to be short-term, with high growth potential and significant risk.	Debt should be short-term,	
	While cash flows will initially be primarily in US dollars, the mix of currencies will	convertible US dollar debt.	
	shift as the business ages.		

# 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
  - a. Duration (long term or short term)
  - b. Currency

- c. Fixed or Floating rate
- d. Straight or Convertible

# **II. Project Specific Financing**

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

# Duration of Disney Theme Park

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	Annual	Terminal	Present Value	Present
Year	Cashflow	Value	@8.46%	value *t
0	-\$2,000		-\$2,000	\$0
1	-\$1,000		-\$922	-\$922
2	-\$859		-\$730	-\$1,460
3	-\$267		-\$210	-\$629
4	\$340		\$246	\$983
5	\$466		\$311	\$1,553
6	\$516		\$317	\$1,903
7	\$555		\$314	\$2,200
8	\$615		\$321	\$2,568
9	\$681		\$328	\$2,952
10	\$715	\$11,275	\$5,321	\$53,206
			\$3,296	\$62,355
				18.91893724

Duration of the Project = 62,355/3296 = 18.92 years

# The perfect theme park debt...

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- The perfect debt for this theme park would have a duration of roughly 19 years and be in a mix of Latin American currencies (since it is located in Brazil), reflecting where the visitors to the park are coming from.
- If possible, you would tie the interest payments on the debt to the number of visitors at the park.

# III. Firm-wide financing

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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.

#### Operating Cash Flows

- The question of how sensitive a firm's asset cash flows are to a variety of factors, such as interest rates, inflation, currency rates and the economy, can be directly tested by regressing changes in the operating income against changes in these variables.
- This analysis is useful in determining the coupon/interest payment structure of the debt.

#### Firm Value

- The firm value is clearly a function of the level of operating income, but it also incorporates other factors such as expected growth & cost of capital.
- The firm value analysis is useful in determining the overall structure of the debt, particularly maturity.

# **Disney: Historical Data**

		1		
Date	Operating Income	Enterprise Value (V)	% Chg in OI	% Chg in V
2013	9450	\$126,815	6.62%	21.09%
2012	8863	\$104,729	13.91%	56.85%
2011	7781	\$66,769	15.69%	-9.19%
2010	6726	\$73,524	18.06%	22.84%
2009	5697	\$59,855	-23.06%	-18.11%
2008	\$7,404	\$73,091	8.42%	-6.27%
2007	\$6,829	\$77,980	27.53%	2.98%
2006	\$5,355	\$75,720	30.39%	27.80%
2005	\$4,107	\$59,248	1.46%	2.55%
2004	\$4,048	\$57,776	49.21%	9.53%
2003	\$2,713	\$52,747	13.80%	20.45%
2002	\$2,384	\$43,791	-15.82%	-9.01%
2001	\$2,832	\$48,128	12.16%	-45.53%
2000	\$2,525	\$88,355	-22.64%	35.67%
1999	\$3,264	\$65,125	-15.07%	-5.91%
1998	\$3,843	\$69,213	-2.59%	6.20%
1997	\$3,945	\$65,173	30.46%	18.25%
1996	\$3,024	\$55,116	33.69%	77.65%
1995	\$2,262	\$31,025	25.39%	39.75%
1994	\$1,804	\$22,200	15.64%	9.04%
1993	\$1,560	\$20,360	21.21%	6.88%
1992	\$1,287	\$19,049	28.19%	23.89%
1991	\$1,004	\$15,376	-21.99%	26.50%
1990	\$1,287	\$12,155	16.05%	-23.64%
1989	\$1,109	\$15,918	40.56%	101.93%
1988	\$789	\$7,883	11.60%	-23.91%
1987	\$707	\$10,360	53.03%	83.69%
1986	\$462	\$5,640	25.20%	61.23%
1985	\$369	\$3,498	157.99%	24.37%

# The Macroeconomic Data

Date	Change in T.Bond rate	% Chg in GDP	% Change in CPI	% Change in US \$	
2013	1.07%	1.83%	1.18%	4.89%	
2012	-0.11%	2.20%	-1.03%	2.75%	
2011	-1.37%	1.81%	1.48%	-4.59%	
2010	-0.53%	2.39%	1.97%	-3.64%	
2009	1.29%	-3.07%	-3.98%	5.79%	
2008	-1.44%	-1.18%	-4.26%	10.88%	
2007	-0.65%	2.93%	2.19%	-11.30%	
2006	0.30%	3.40%	-1.84%	-2.28%	
2005	0.16%	3.68%	0.66%	3.98%	
2004	0.13%	3.72%	1.34%	-3.92%	
2003	0.05%	4.32%	-0.65%	-14.59%	
2002	-0.97%	2.80%	1.44%	-11.17%	
2001	-0.18%	-0.04%	-2.50%	7.45%	
2000	-0.98%	2.24%	0.96%	7.73%	
1999	1.56%	4.70%	1.04%	1.68%	
1998	-1.03%	4.51%	0.11%	-4.08%	
1997	-0.63%	4.33%	-1.43%	9.40%	
1996	0.80%	4.43%	0.31%	4.14%	
1995	-2.09%	2.01%	-0.08%	-0.71%	
1994	1.92%	4.12%	0.27%	-5.37%	
1993	-0.83%	2.50%	-0.72%	0.56%	
1992	-0.02%	4.15%	0.64%	6.89%	
1991	-1.26%	1.09%	-2.89%	0.69%	
1990	0.12%	0.65%	0.43%	-8.00%	
1989	-1.11%	2.66%	0.51%	2.04%	
1988	0.26%	3.66%	0.60%	1.05%	
1987	1.53%	4.49%	2.54%	-12.01%	
1986	-1.61%	2.83%	-2.33%	-15.26%	12
1985	-2.27%	4 19%	3.89%	-13 51%	

### I. Sensitivity to Interest Rate Changes

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

## Firm Value versus Interest Rate Changes

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

Change in Firm Value = 0.1790 – 2.3251 (Change in Interest Rates)

(2.74) (0.39)

- T statistics are in brackets.
- The coefficient on the regression (-2.33) 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..

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- 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 –

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

- 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 = 0.1698 – 7.9339 (Change in Interest Rates) (2.69<sup>a</sup>) (1.40)

<u>Conclusion</u>: Disney's operating income has been affected a lot more than its firm value has by changes in interest rates.

# II. Sensitivity to Changes in GDP/ GNP

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

## **Regression Results**

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

Change in Firm Value = 0.0067 + 6.7000 (GDP Growth) (0.06) (2.03<sup>a</sup>)

<u>Conclusion</u>: Disney is sensitive to economic growth

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

Change in Operating Income = 0.0142 + 6.6443 (GDP Growth)

(0.13) (2.05<sup>a</sup>)

<u>Conclusion</u>: Disney's operating income is sensitive to economic growth as well.

# III. Sensitivity to Currency Changes

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

## **Regression Results**

- Regressing changes in firm value against changes in the dollar over this period yields the following regression –
- Change in Firm Value = 0.1774–0.5705 (Change in Dollar)

(2.76) (0.67)

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

Change in Operating Income = 0.1680 – 1.6773 (Change in Dollar)

 $(2.82^{a})$   $(2.13^{a})$ 

<u>Conclusion</u>: Disney's operating income is more strongly impacted by the dollar than its value is. A stronger dollar seems to hurt operating income.

# IV. Sensitivity to Inflation

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

## **Regression Results**

- Regressing changes in firm value against changes in inflation over this period yields the following regression –
- Change in Firm Value = 0.1855 + 2.9966 (Change in Inflation Rate)

(2.96) (0.90)

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

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

Change in Operating Income = 0.1919 + 8.1867 (Change in Inflation Rate)

(3.43<sup>a</sup>) (2.76<sup>a</sup>)

<u>Conclusion</u>: Disney's operating income increases in periods when inflation increases, suggesting that Disney does have pricing power.

### Summarizing...

- Looking at the four macroeconomic regressions, we would conclude that
  - Disney's assets collectively have a duration of about 2.33 years
  - Disney is increasingly affected by economic cycles
  - Disney is hurt by a stronger dollar
  - Disney's operating income tends to move with inflation
- All of the regression coefficients have substantial standard errors associated with them. One way to reduce the error (a la bottom up betas) is to use sector-wide averages for each of the coefficients.

## **Bottom-up Estimates**

These weights reflect the estimated values of the businesses

	Interest	GDP			
Business	rates	Growth	Inflation	Currency	Weights
Media Networks	-3.70	0.56	1.41	-1.23	49.27%
Parks & Resorts	-4.50	0.70	-3.05	-1.58	33.81%
Studio	6.47	0.22	1.45	3 21	
Entertainment	-0.47	0.22	-1.45	-3.21	13.49%
Consumer Products	-4.88	0.13	-5.51	-3.01	2.18%
Interactive	-1.01	0.25	-3.55	-2.86	1.25%
Disney Operations	-4.34	0.55	-0.70	-1.67	100.00%

# **Recommendations for Disney**

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- The debt issued should be long term and should have duration of about 4.3 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 2013 numbers at least, this would indicate that about 18% of its debt should be in foreign currencies (and perhaps more, since even their US dollar income can be affected by currency movements).

# Analyzing Disney's Current Debt

- Disney has \$14.3 billion in interest-bearing debt with a face-value weighted average maturity of 7.92 years. Allowing for the fact that the maturity of debt is higher than the duration, this would indicate that Disney's debt may be a little longer than would be optimal, but not by much.
- Of the debt, <u>about 5.49% of the debt is in non-US dollar currencies (Indian rupees and Hong Kong dollars</u>), but the rest is in US dollars and the company has no Euro debt. Based on our analysis, we would suggest that Disney increase its proportion of Euro debt to about 12% and tie the choice of currency on future debt issues to its expansion plans.
- Disney has no convertible debt and about 5.67% of its debt is floating rate debt, which looks low, given the company's pricing power. While the mix of debt in 2013 may be reflective of a desire to lock in low long-term interest rates on debt, as rates rise, the company should consider expanding its use of foreign currency debt.

# Adjusting Debt at Disney

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

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- Bookscape: Given Bookscape's dependence on revenues at its New York bookstore, we would design the debt to be

<u>Recommendation</u>: Long-term, dollar denominated, fixed rate debt <u>Actual</u>: Long term operating lease on the store

Vale: Vale's mines are spread around the world, and it generates a large portion of its revenues in China (37%). Its mines typically have very long lives and require large up-front investments, and the costs are usually in the local currencies but its revenues are in US dollars.

Recommendation: Long term, dollar-denominated debt (with hedging of local currency risk exposure) and if possible, tied to commodity prices.

<u>Actual</u>: The existing debt at Vale is primarily US dollar debt (65.48%), with an average maturity of 14.70 years. All of the debt, as far as we can assess, is fixed rate and there is no commodity-linked debt.

## And for Tata Motors and Baidu

- Tata Motors: As an manufacturing firm, with big chunks of its of its revenues coming from India and China (about 24% apiece) and the rest spread across developed markets.
  - <u>Recommendation</u>: Medium to long term, fixed rate debt in a mix of currencies reflecting operations.
  - <u>Actual</u>: The existing debt at Tata Motors is a mix of Indian rupee debt (about 71%) and Euro debt (about 29%), with an average maturity of 5.33 years and it is almost entirely fixed rate debt.
- Baidu: Baidu has relatively little debt at the moment, reflecting its status as a young, technology company.
  - Recommendation: Convertible, Chinese Yuan debt.
  - <u>Actual</u>: About 82% of Baidu's debt is in US dollars and Euros currently, with an average maturity of 5.80 years. A small portion is floating rate debt, but very little of the debt is convertible.

## RETURNING CASH TO THE OWNERS: DIVIDEND POLICY

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

## **First Principles**



# Steps to the Dividend Decision... if equity is treated as a residual claim

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## The Roots of Dividend Dysfunction

- In practice, dividend policy is dysfunctional and does not follow the logical process of starting with your investment opportunities and working your way down to residual cash.
- The two dominant factors driving dividend policy around the world are:
  - Inertia: Companies seem to hate to let of their past, when it comes to dividend policy.
  - Me-too-ism: Companies want to behave like their peer group.

## I. Dividends are sticky

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Dividend Changes at US companies



## In 2020, a crisis year for many companies...here is what they did..

- Of the S&P 500 companies, 287 companies increased their dividends and 11 companies initiated dividends.
- Of the S&P 500 companies, 27 decreased dividends and 42 suspended dividends.
- While the 42 dividend suspensions were the most in the last 20 years, the number of companies that increased divbidends (298) vastly exceeded the number that cut or suspended dividends (69).
- In perhaps the most revealing statistic of all, 133 of the 500 largest market cap companies did not pay dividends leading into 2020 or in 2020.

## II. Dividends tend to follow earnings



### III. Are affected by tax laws...

#### In 2003



#### In the last quarter of 2012

- As the possibility of tax rates reverting back to pre-2003 levels rose, 233 companies paid out \$31 billion in dividends.
- Of these companies, 101 had insider holdings in excess of 20% of the outstanding stock.

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



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## And its going global.. In 2021

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Sub Region	Number of firms	Market Cap (\$ mil)	Net Income (\$ mil)	Dividends (\$ mil)	Buybacks (\$ mil)	Dividend Payout	% of cash from Buybacks	Cash Payout Ratio
Africa and Middle East	2,356	4698102	260259	138928	\$ 12,274.95	53.38%	8.12%	58.10%
Australia & NZ	1,878	1930982	77123	45034	\$ 6,578.66	58.39%	12.75%	66.92%
Canada	2,937	3129490	162432	65382	\$ 34,780.69	40.25%	34.72%	61.66%
China	7,043	19024215	1001151	471821	\$ 50,414.13	47.13%	9.65%	52.16%
Eastern Europe & Russia	528	649262	99799	33562	\$ 6,154.50	33.63%	15.50%	39.80%
EU & Environs	6,000	17098249	868662	332208	\$ 132,019.21	38.24%	28.44%	53.44%
India	3,982	3572361	120717	35772	\$ 8,540.15	29.63%	19.27%	36.71%
Japan	3,947	6510572	448920	127328	\$ 58,087.77	28.36%	31.33%	41.30%
Latin America & Caribbean	1,043	1724743	122751	61399	\$ 17,400.56	50.02%	22.08%	64.19%
Small Asia	9,408	7205112	426861	160991	\$ 10,953.15	37.72%	6.37%	40.28%
UK	1,255	3599149	193457	86628	\$ 18,860.98	44.78%	17.88%	54.53%
United States	7,229	52446672	1789714	591709	\$ 842,299.68	33.06%	58.74%	80.12%
Global	47,607	121588908	5571847	2150763	\$ 1,198,364.43	38.60%	35.78%	60.11%

*\$ values are all in millions of US \$* 

## **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 Ratio: January 2022

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## **Dividend Yields: January 2022**

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Figure 10.7: Life Cycle Analysis of Dividend Policy

## Dividend Yields and Payout Ratios: Growth Classes



#### Dividend Yields and Payout Ratios: By Growth Class

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## Dividend Policy: Disney, Vale, Tata Motors, Baidu and Deutsche Bank

	Disney	Vale	Tata Motors	Baidu	Deutsche Bank
Dividend Yield - Last 12 months	1.09%	6.56%	1.31%	0.00%	1.96%
Dividend Payout ratio - Last 12 months	21.58%	113.45%	16.09%	0.00%	362.63%
Dividend Yield - 2008-2012	1.17%	4.01%	1.82%	0.00%	3.14%
Dividend Payout - 2008-2012	17.11%	37.69%	15.53%	0.00%	37.39%

## Three Schools Of Thought On Dividends

1. If there are no tax disadvantages associated with dividends & companies can issue stock, at no issuance 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

 If dividends create a tax advantage for investors (relative to capital gains) and/or stockholders like dividends

Dividends are good, and increasing dividends will increase value

## The balanced viewpoint

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- 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.

### The Dividends don't matter school The Miller Modigliani Hypothesis

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- 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...

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Figure 10.10: Tax rates on Dividends and Capital Gains- US

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

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



- P = Price at which you bought the stock a "while" back
- P<sub>b</sub>= Price before the stock goes ex-dividend
- P<sub>a</sub>=Price after the stock goes ex-dividend
- D = Dividends declared on stock
- t<sub>o</sub>, t<sub>cg</sub> = Taxes paid on ordinary income and capital gains respectively

### Cashflows from Selling around Ex-Dividend Day

- The cash flows from selling before ex-dividend day are:
  - $P_b (P_b P) t_{cg}$
- The cash flows from selling after ex-dividend day are:
  P<sub>a</sub> (P<sub>a</sub> P) t<sub>cg</sub> + D(1-t<sub>o</sub>)
- 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:

$$\frac{\mathbf{P}_{\mathrm{b}} - \mathbf{P}_{\mathrm{a}}}{D} = \frac{1 - t_{o}}{1 - t_{cg}}$$

## Intuitive Implications

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

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

## The empirical evidence...

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#### 1966-1969

- Ordinary tax rate = 70%
- Capital gains rate = 28%
- Price change as % of Dividend = 78%

#### 1981-1985

- Ordinary tax rate = 50%
- Capital gains rate = 20%
- Price change as % of Dividend = 85%

#### 1986-1990

- Ordinary tax rate = 28%
- Capital gains rate = 28%
- Price change as % of Dividend = 90%

## **Dividend Arbitrage**

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- 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?
  - a. Invest in the stock for the long term
  - Sell short the day before the ex-dividend day, buy on the ex-dividend day
  - c. Buy just before the ex-dividend day, and sell after.
  - d.

# 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

- <u>Argument</u>: 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.
- <u>Counter</u>: 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

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Figure 10.12: Issuance Costs for Stocks and Bonds

## Three "good" reasons for paying dividends...

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

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



Class A shares pay cash dividend

Class B shares offer the same amount as a stock dividend & can be converted to class A shares 177

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## **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

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- 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**

Dividend Yieldt = a + b t + c Aget + d Incomet + e Differential Tax Ratet + 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**

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- 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.
- b. Continue to pay the dividends that you used to and defer investment in the new markets.
- c. Continue to pay the dividends that you used to, make the investments in the new markets, and issue new stock to cover the shortfall
- d. Other

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

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# But higher or new dividends may signal bad news (not good)



Year relative to dividend initiation (Before and after)

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# Both dividend increases and decreases are becoming less informative...



Market Reaction to Dividend Changes over time: US companies

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

EXCESS RETURNS ON STOCKS AND BONDS AROUND DIVIDEND CHANGES



### What managers believe about dividends...

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

# ASSESSING DIVIDEND POLICY: OR HOW MUCH CASH IS TOO MUCH?

It is my cash and I want it now...

### The Big Picture...



## **Assessing Dividend Policy**

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

## I. The Cash/Trust Assessment

- Step 1: How much did the the company actually pay out during the period in question?
- Step 2: How much could the company have paid out during the period under question?
- Step 3: How much do I trust the management of this company with excess cash?
  - How well did they make investments during the period in question?
  - How well has my stock performed during the period in question?

# How much has the company returned to stockholders?

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

	Disi	ney	Va	ale	Tata N	<b>Notors</b>	Ba	idu	Deutscl	ne Bank
Year	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks
2008	\$648	\$648	\$2 <i>,</i> 993	\$741	7 <i>,</i> 595₹	0₹	¥0	¥0	2,274€	0€
2009	\$653	\$2,669	\$2,771	\$9	3,496₹	0₹	¥0	¥0	309€	0€
2010	\$756	\$4,993	\$3,037	\$1,930	10,195₹	0₹	¥0	¥0	465€	0€
2011	\$1,076	\$3,015	\$9,062	\$3,051	15,031₹	0₹	¥0	¥0	691€	0€
2012	\$1,324	\$4 <i>,</i> 087	\$6,006	\$0	15,088₹	970₹	¥0	¥0	689€	0€
2008-12	\$4,457	\$15,412	\$23,869	\$5,731	51,405₹	970₹	¥0	¥0	¥4,428	¥0

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

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- 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.

Standard Definition	Modified Version	Simplified (if debt ratio = constant)
Net Income	Net Income	Net Income
+ Depreciation	Reinvestment	
- Cap Ex	- (Cap Ex - Depreciation +	
- Change in WC	Change in Working Capital)	Reinvestment from Equity
FCFE before debt cash flow	FCFE before debt cash flow	- (Cap Ex - Depreciation + Change
+ New Debt Issued	Net CF from Debt	
- Debt Repaid	+ (New Debt Issued - Debt Repaid)	
FCFE	FCFE	FCFE

### Estimating FCFE when Leverage is Stable

- The cash flow from debt (debt issue, netted out against repayment) can be a volatile number, creating big increases or decreases in FCFE, depending upon the period examined.
- To provide a more balanced measure, you can estimate a FCFE, assuming a stable debt ratio had been used to fund reinvestment over the period.
   Net Income
  - (1- Debt Ratio) (Capital Expenditures Depreciation)
  - (1- Debt Ratio) Working Capital Needs
  - = Free Cash flow to Equity
  - Debt Ratio = Debt/Capital Ratio (either an actual or a target)

# Disney's FCFE and Cash Returned: 2008 – 2012

	2012	2011	2010	2009	2008	Aggregate
Net Income	\$6,136	\$5,682	\$4,807	\$3,963	\$3,307	\$23,895
- (Cap. Exp - Depr)	\$604	\$1,797	\$1,718	\$397	\$122	\$4,638
- ∂ Working Capital	(\$133)	\$940	\$950	\$308	(\$109)	\$1,956
Free CF to Equity (pre-debt)	\$5,665	\$2,945	\$2,139	\$3,258	\$3,294	\$17,301
+ Net CF from Debt	\$1,881	\$4,246	\$2,743	\$1,190	(\$235)	\$9,825
= Free CF to Equity (actual debt)	\$7,546	\$7,191	\$4,882	\$4,448	\$3,059	\$27,126
Free CF to Equity (target debt ratio)	\$5,720	\$3,262	\$2,448	\$3,340	\$3,296	\$18,065
Dividends	\$1,324	\$1,076	\$756	\$653	\$648	\$4,457
Dividends + Buybacks	\$5,411	\$4,091	\$5,749	\$3,322	\$1,296	\$19,869

Disney returned about \$1.5 billion more than the \$18.1 billion it had available as FCFE with a normalized debt ratio of 11.58% (its current debt ratio).

# How companies get big cash balances: Microsoft in 1996...

- Consider the following inputs for Microsoft in 1996.
  - Net Income = \$2,176 Million
  - Capital Expenditures = \$494 Million
  - Depreciation = \$480 Million
  - Change in Non-Cash Working Capital = \$35 Million
  - Debt = None

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FCFE = Net Income - (Cap ex - Depr) – Change in non-cash WC – Debt CF

\$ 2,176 - (494 - 480) - \$ 35 - 0 = \$ 2,127 Million

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

### FCFE for a Bank?

We redefine reinvestment as investment in regulatory capital.

FCFE<sub>Bank</sub>= Net Income – Increase in Regulatory Capital (Book Equity)

Consider a bank with \$ 10 billion in loans outstanding and book equity of \$ 750 million. If it maintains its capital ratio of 7.5%, intends to grow its loan base by 10% (to \$11 and expects to generate \$ 150 million in net income:

FCFE = \$150 million – (11,000-10,000)\* (.075) = \$75 million

	Current	1	2	3	4	5
Risk Adjusted Assets (grows						
3% each year)	439,851€	453,047 €	466,638 €	480,637 €	495,056 €	509,908 €
Tier 1 as % of Risk Adj assets	15.13%	15.71%	16.28%	16.85%	17.43%	18.00%
Tier 1 Capital	66,561€	71,156 €	75,967€	81,002€	86,271 €	91,783€
Change in regulatory capital		4,595€	4,811€	5,035€	5,269 €	5,512€
Book Equity	76,829€	81,424 €	86,235€	91,270€	96,539€	102,051€
ROE (increases to 8%)	-1.08%	0.74%	2.55%	4.37%	6.18%	8.00%
Net Income	-716€	602 €	2,203 €	3,988 €	5,971€	8,164 €
- Investment in Regulatory						
Capital		4,595 €	4,811 €	5,035€	5,269 €	5,512€
FCFE		-3,993 €	-2,608 €	-1,047€	702 €	2,652 €

Deutsche Bank: FCFE estimates (November 2013)

## Dividends versus FCFE: Across the globe

					Cash		
		Cash returned,			returned,	FCFE	
	Positive FCFE,	FCFE >		FCFE<0, No	FCFE	Negative,	
	No cash	Dividends +	Total Cash	Cash	<dividends +<="" td=""><td>Cash</td><td>Cash</td></dividends>	Cash	Cash
	returned	Buybacks	Accumulators	Return	Buybacks	Returned	Burners
Australia, NZ and							
Canada	9.45%	9.19%	18.63%	67.71%	3.92%	9.74%	81.37%
Developed Europe	18.01%	22.12%	40.13%	33.30%	7.46%	19.10%	59.87%
Emerging Markets	14.66%	24.29%	38.96%	24.62%	8.25%	28.18%	61.04%
Japan	13.93%	36.89%	50.81%	13.59%	7.61%	27.98%	49.19%
United States	10.88%	18.47%	29.35%	35.11%	8.10%	27.44%	70.65%
Global	14.06%	22.77%	36.82%	30.75%	7.61%	24.82%	63.18%

# Cash Buildup and Investor Blowback: Chrysler in 1994





### Separation Test: Estimating your firm's FCFE

□ In General,

Net Income

- + Depreciation & Amortization
- Capital Expenditures
- Change in Non-Cash Working Capital
- Preferred Dividend
- Principal Repaid
- + New Debt Issued
- = FCFE
- Compare to
  Dividends (Common)
  + Stock Buybacks

- If cash flow statement used Net Income
- + Depreciation & Amortization
- + Capital Expenditures
- + Changes in Non-cash WC
- + Preferred Dividend
- + Increase in LT Borrowing
- + Decrease in LT Borrowing
- + Change in ST Borrowing
- = FCFE

Common Dividend Stock Buybacks

# A Practical Framework for Analyzing Dividend Policy



Aswath Damodaran

# A Dividend Matrix

	Quality of projects taken: Excess Returns				
	Poor projects	Good projects			
<i>to Free Cash flow to Equity</i> Cash Return < FCFE	<i>Cash Surplus + Poor</i> <i>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 Returned, relative Cash return > FCFE	<i>Cash Deficit + Poor Projects</i> Reduce or eliminate cash return 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 2002 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 or that stockholders were becoming restive about the cash balance. There was no hue and cry demanding more dividends or stock buybacks. Why?
- In 2004, Microsoft announced a huge special dividend of \$ 33 billion and made clear that it would try to return more cash to stockholders in the future. What do you think changed?

### Case 1: Disney in 2003

#### FCFE versus Dividends

- Between 1994 & 2003, Disney generated \$969 million in FCFE each year.
- Between 1994 & 2003, Disney paid out \$639 million in dividends and stock buybacks each year.
- Cash Balance
  - Disney had a cash balance in excess of \$4 billion at the end of 2003.

#### Performance measures

- Between 1994 and 2003, Disney has generated a return on equity, on it's projects, about 2% less than the cost of equity, on average each year.
- Between 1994 and 2003, Disney's stock has delivered about 3% less than the cost of equity, on average each year.
- The underperformance has been primarily post 1996 (after the Capital Cities acquisition).

# Can you trust Disney's management?

Given Disney's track record between 1994 and 2003, if you were a Disney stockholder, would you be comfortable with Disney's dividend policy?

a. Yes

- b. No
- Does the fact that the company is run by Michael Eisner, the CEO for the last 10 years and the initiator of the Cap Cities acquisition have an effect on your decision.
- a. Yes
- b. No

### The Bottom Line on Disney Dividends in 2003

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

## Following up: Disney in 2009

- Between 2004 and 2008, Disney made significant changes:
  - It replaced its CEO, Michael Eisner, with a new CEO, Bob Iger, who at least on the surface seemed to be more receptive to stockholder concerns.
  - Its stock price performance improved (positive Jensen's alpha)
  - Its project choice improved (ROC moved from being well below cost of capital to above)
- The firm also shifted from cash returned < FCFE to cash returned > FCFE and avoided making large acquisitions.
- If you were a stockholder in 2009 and Iger made a plea to retain cash in Disney to pursue investment opportunities, would you be more receptive?
  - a. Yes
  - b. No

## Final twist: Disney in 2013

- Disney did return to holding cash between 2008 and 2013, with dividends and buybacks amounting to \$2.6 billion less than the FCFE (with a target debt ratio) over this period.
- Disney continues to earn a return on capital well in excess of the cost of capital and its stock has doubled over the last two years.
- Now, assume that Bob Iger asks you for permission to withhold even more cash to cover future investment needs. Are you likely to go along?
- a. Yes
- b. No

# Case 2: Vale – Dividends versus FCFE

	Aggregate	Average
Net Income	\$42,948.00	\$8,589.60
Dividends	\$23,869.00	\$4,773.80
Dividend Payout Ratio	55.58%	87.76%
Stock Buybacks	\$5,731.00	\$1,146.20
Dividends + Buybacks	\$29,600.00	\$5 <i>,</i> 920.00
Cash Payout Ratio	68.92%	
Free CF to Equity (pre-debt)	(\$3,076.00)	(\$615.20)
Free CF to Equity (actual debt)	(\$1,266.00)	(\$253.20)
Free CF to Equity (target debt ratio)	\$13,252.43	\$2 <i>,</i> 650.49
Cash payout as % of pre-debt FCFE	FCFE negative	
Cash payout as % of actual FCFE	FCFE negative	
Cash payout as % of target FCFE	223.36%	

### Vale: Its your call..

- Vale's managers have asked you for permission to cut dividends (to more manageable levels). Are you likely to go along?
  - a. Yes
  - b. No
- The reasons for Vale's dividend problem lie in it's equity structure. Like most Brazilian companies, Vale has two classes of shares common shares with voting rights and preferred shares without voting rights. However, Vale 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?
  - a. Yes
  - b. 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?
- a. Large companies making huge profits
- b. Small companies losing money
- c. High growth companies that are losing money
- d. High growth companies that are making money
- What if the government mandates a cap on the dividend payout ratio (and a requirement that all companies reinvest a portion of their profits)?

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

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

### **BP: Just Desserts!**

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

#### By MATTHEW L. WALD

British Petroleum said yesterday that it would cut its dividend by 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 \$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 trad-ing conditions are expected to remain difficult, particularly for the down-stream 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.

1. 1

take effect and gasoline must be re-formulated to reduce pollution. "In Europe, recovery will dezend upon seasonal heating oil de ... nd," Mr. Simon said,

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

#### The giant British oil company bet on rising oil prices.

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

The market for petrochemicals in Europe remains weak.

B.P.'s second quarter profits, before one-time transactions, declined to \$193 million from \$515 million, valuing inventories on a replace-ment-cost basis. James J. Murchle, 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 prob-

lems to the company's acquisitions in the last few years, and heavy capital expenditures. Summing up the com-pany's recent history, Frank P. Kneuttel of Prudential Securities Repense rose, and profits have gone to hell."

Mr. Murchle, who worked for Standard Oil of Ohio and then B.P.

#### Entren Petroleum<sup>1</sup>8 1992 stock price, weekly olosings stances don the New York Stock Exchange induge address and eatnings, excluding extraordinaty trans gains and losses on inventory in dollars. 50 \$3:0 billion First half 40 2.5 20 '88 '89 '90 '91 Jan, Feb. March April May Junet July A

after B.P. acquired Sohlo, said, "What you've got is a company that thought oil prices were going to go to \$25 and spent like it, in terms of capital." If B.P.'s costs of finding oil are the same as the industry average, he said, then the company has been spending enough to replace 120 percent to 130 percent of its annual production, which is not a successful strategy if prices do not rise.

Britain's Oll Colossus

In addition, he said, the companyhad been spending twice as much on its refining and marketing operation 1.

1101-1930 A. A. W. S. 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 Sohlo stations and turned them into modern B.P. sta-tions; they took all the B.P. stations and turned them into ultramodern .\*

and turned them stations." The analyst said that while some of the cuts were obvious "some came i the cuts were obvious "some came i continued on Page D2

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Aswath Damodaran

# Managing changes in dividend policy

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

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

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

### **Growth Firms and Dividends**

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

### 5. Tata Motors

	Aggregate	Average
Net Income	\$421,338.00	\$42,133.80
Dividends	\$74,214.00	\$7,421.40
Dividend Payout Ratio	17.61%	15.09%
Stock Buybacks	\$970.00	\$97.00
Dividends + Buybacks	\$75,184.00	\$7,518.40
Cash Payout Ratio	17.84%	
Free CF to Equity (pre-debt)	(\$106,871.00)	(\$10,687.10)
Free CF to Equity (actual debt)	\$825,262.00	\$82,526.20
Free CF to Equity (target debt ratio)	\$47,796.36	\$4,779.64
Cash payout as % of pre-debt FCFE	FCFE negative	
Cash payout as % of actual FCFE	9.11%	
Cash payout as % of target FCFE	157.30%	

Negative FCFE, largely because of acquisitions.
## Summing up...

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	<i>Quality of projects taker</i> Poor projects	n: ROE versus Cost of Equity Good projects
<i>it relative to FCFE</i> Cash Surplus	<i>Cash Surplus + Poor</i> <i>Projects</i> Significant pressure to pay out more to stockholders as dividends or stock buybacks	Baidu Cash Surplus + Good Projects Maximum flexibility in setting dividend policy
Dividends paid ou Cash Deficit	Deutsche Bank Cash Deficit + Poor Projects Cut out dividends but real problem is in investment policy.	Disney <i>Cash Deficit + Good</i> <i>Projects</i> Reduce cash payout, if any, to stockholders Vale Tata Mtrs

- Application Test: Assessing your firm's dividend policy
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- 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

In the peer group approach, you compare your company to similar companies (usually in the same market and sector) to assess whether and if yes, how much to pay in dividends.

	D	ividend Yield	Divi	dend Payout			
Company	2013	Average 2008-12	2013	Average 2008-12	Comparable Group	Dividend Yield	Dividend Payout
Disney	1.09%	1.17%	21.58%	17.11%	US Entertainment	0.96%	22.51%
					Global Diversified		
					Mining & Iron Ore		
Vale	6.56%	4.01%	113.45%	37.69%	(Market cap> \$1 b)	3.07%	316.32%
					Global Autos (Market		
Tata Motors	1.31%	1.82%	16.09%	15.53%	Cap> \$1 b)	2.13%	27.00%
					Global Online		
Baidu	0.00%	0.00%	0.00%	0.00%	Advertising	0.09%	8.66%
Deutsche Bank	1.96%	3.14%	362.63%	37.39%	European Banks	1.96%	79.32%

### A closer look at Disney's peer group

Company	Market Cap	Dividends	Dividends + Buybacks	Net Income	FCFE	Dividend Yield	Dividend Payout	Cash Return/FCFE
The Walt Disney Company	\$134.256	\$1.324	\$5.411	\$6.136	\$1.503	0.99%	21.58%	360.01%
Twenty-First Century Fox, Inc.	\$79,796	\$415	\$2,477	\$7,097	\$2,408	0.52%	6.78%	102.87%
Time Warner Inc	\$63,077	\$1,060	\$4,939	\$3,019	-\$4,729	1.68%	27.08%	NA
Viacom, Inc.	\$38,974	\$555	\$5,219	\$2,395	-\$2,219	1.42%	23.17%	NA
The Madison Square Garden Co.	\$4,426	\$0	\$0	\$142	-\$119	0.00%	0.00%	NA
Lions Gate Entertainment Corp	\$4,367	\$0	\$0	\$232	-\$697	0.00%	0.00%	NA
Live Nation Entertainment, Inc	\$3,894	\$0	\$0	-\$163	\$288	0.00%	NA	0.00%
Cinemark Holdings Inc	\$3,844	\$101	\$101	\$169	-\$180	2.64%	63.04%	NA
MGM Holdings Inc	\$3,673	\$0	\$59	\$129	\$536	0.00%	0.00%	11.00%
Regal Entertainment Group	\$3,013	\$132	\$132	\$145	-\$18	4.39%	77.31%	NA
DreamWorks Animation SKG Inc.	\$2,975	\$0	\$34	-\$36	-\$572	0.00%	NA	NA
AMC Entertainment Holdings	\$2,001	\$0	\$0	\$63	-\$52	0.00%	0.00%	NA
World Wrestling Entertainment	\$1,245	\$36	\$36	\$31	-\$27	2.88%	317.70%	NA
SFX Entertainment Inc.	\$1,047	\$0	\$0	-\$16	-\$137	0.00%	NA	NA
Carmike Cinemas Inc.	\$642	\$0	\$0	\$96	\$64	0.00%	0.00%	0.27%
Rentrak Corporation	\$454	\$0	\$0	-\$23	-\$13	0.00%	NA	NA
Reading International, Inc.	\$177	\$0	\$0	-\$1	\$15	0.00%	0.00%	0.00%
Average	\$20,462	\$213	\$1,083	\$1,142	-\$232	0.85%	41.28%	79.02%
Median	\$3,673	\$0	\$34	\$129	-\$27	0.00%	6.78%	5.63%

#### Going beyond averages... Looking at the market

 Regressing dividend yield and payout against expected growth across all US companies in January 2014 yields:

PYT = 0.649 - 0.296 (BETA)-.800 (EGR)+.300 (DCAP) $R^2 = 19.6\%$ (32.16)(15.40)(8.90)(7.33)YLD = 0.0324-.0154 (BETA)-.038 (EGR)+.023 (DCAP)  $R^2 = 25.8\%$ (38.81)(19.41)(13.25)(13.45)

PYT = Dividend Payout Ratio = Dividends/Net Income
YLD = Dividend Yield = Dividends/Current Price
BETA = Beta (Regression or Bottom up) for company
EGR = Expected growth rate in earnings over next 5 years (analyst estimates)
DCAP = Total Debt / (Total Debt + Market Value of equity)

### Using the market regression on Disney

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- To illustrate the applicability of the market regression in analyzing the dividend policy of Disney, we estimate the values of the independent variables in the regressions for the firm.
  - Beta for Disney (bottom up) = 1.00
  - Disney's expected growth in earnings per share = 14.73% (analyst estimate)
  - Disney's market debt to capital ratio = 11.58%
- Substituting into the regression equations for the dividend payout ratio and dividend yield, we estimate a predicted payout ratio:

■ Predicted Payout = .649 – 0.296 (1.00)-.800 (.1473) + .300 (.1158) = .2695

□ Predicted Yield = 0.0324 - .0154 (1.00)-.038 (.1473) + .023 (.1158) = .0140

 Based on this analysis, Disney with its dividend yield of 1.09% and a payout ratio of approximately 21.58% is paying too little in dividends. This analysis, however, fails to factor in the huge stock buybacks made by Disney over the last few years.

#### VALUATION

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

#### **First Principles**



#### Three approaches to valuation

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

#### One tool for estimating intrinsic value: Discounted Cash Flow Valuation

#### Value of growth

The future cash flows will reflect expectations of how quickly earnings will grow in the future (as a positive) and how much the company will have to reinvest to generate that growth (as a negative). The net effect will determine the value of growth. Expected Cash Flow in year t = E(CF) = Expected Earnings in year t - Reinvestment needed for growth



#### Risk in the Cash flows

The risk in the investment is captured in the discount rate as a beta in the cost of equity and the default spread in the cost of debt.

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#### **Equity Valuation**

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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.

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

ke = Cost of Equity

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

#### **Firm Valuation**

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

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

where,

CF to Firm<sub>t</sub> = 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 Tata Motors, 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 Vale and Disney, we will discount the free cash flow to the firm.

#### Stories + Numbers = Value



#### The Ingredients that determine value.



#### I. Estimating Cash Flows



## Dividends and Modified Dividends for Deutsche Bank

- In 2007, Deutsche Bank paid out dividends of 2,146 million Euros on net income of 6,510 million Euros. In early 2008, we valued Deutsche Bank using the dividends it paid in 2007. In my 2008 valuation I am assuming the dividends are not only reasonable but sustainable.
- In October 2016, Deutsche Bank had suspended dividends, was losing money and was in serious danger. Rather than focus on the dividends (which were small), we estimated the potential dividends (by estimating the free cash flows to equity after investments in regulatory capital)

	Current	1	2	3	4	5	6	7	8	9	10
Risk Adjusted Assets	\$445,570	\$450,026	\$454,526	\$459,071	\$463,662	\$468,299	\$472,982	\$477,711	\$482,488	\$487,313	\$492,186
Tier 1 Capital/ Risk Adjusted Assets (Ratio)	12.41%	13.74%	13.95%	14.17%	14.38%	14.60%	14.81%	15.03%	15.24%	15.46%	15.67%
Tier 1 Capital (Risk Adjusted Assets * Tier 1											
Capital Ratio)	\$55,282	\$61,834	\$63,427	\$65,045	\$66,690	\$68,361	\$70 <i>,</i> 059	\$71,784	\$73,537	\$75,317	\$77,126
Change in regulatory capital (Tier 1)		\$6,552	\$1,593	\$1,619	\$1,645	\$1,671	\$1,698	\$1,725	\$1,753	\$1,780	\$1,809
Book Equity	\$64,609	\$71,161	\$72,754	\$74,372	\$76,017	\$77 <i>,</i> 688	\$79 <i>,</i> 386	\$81,111	\$82,864	\$84,644	\$86,453
Expected ROE	-13.70%	-7.18%	-2.84%	0.06%	1.99%	5.85%	6.568%	7.286%	8.004%	8.722%	9.440%
Net Income (Book Equity * ROE)	\$(8,851)	\$(5,111)	\$(2,065)	\$43	\$1,512	\$4,545	\$5,214	\$5,910	\$6,632	\$7,383	\$8,161
- Investment in Regulatory Capital		\$6,552	\$1,593	\$1,619	\$1,645	\$1,671	\$1,698	\$1,725	\$1,753	\$1,780	\$1,809
FCFE		\$(11,663)	\$(3,658)	\$(1,576)	\$(133)	\$2,874	\$3,516	\$4,185	\$4,880	\$5,602	\$6,352

### Estimating FCFE (past) : Tata Motors

Year	Net Income	Cap Ex	Depreciatio n	Change in WC	Change in Debt	Equity Reinvestment	Equity Reinvestment Rate
2008-09	-25,053₹	99 <i>,</i> 708₹	25,072₹	13,441₹	25,789₹	62,288₹	-248.63%
2009-10	29,151₹	84,754₹	39,602₹	-26 <i>,</i> 009₹	5 <i>,</i> 605₹	13,538₹	46.44%
2010-11	92,736₹	81,240₹	46,510₹	50,484₹	24,951₹	60,263₹	64.98%
2011-12	135,165₹	138,756₹	56,209₹	22,801₹	30,846₹	74,502₹	55.12%
2012-13	98,926₹	187,570₹	75,648₹	680₹	32,970₹	79,632₹	80.50%
Aggregate	330,925₹	592,028₹	243,041₹	61,397₹	120,160₹	290,224₹	87.70%

### **Estimating FCFF: Disney**

- □ In the fiscal year ended September 2013, Disney reported the following:
  - Operating income (adjusted for leases) = \$10,032 million
  - Effective tax rate = 31.02%
  - Capital Expenditures (including acquisitions) = \$5,239 million
  - Depreciation & Amortization = \$2,192 million
  - Change in non-cash working capital = \$103 million
- The free cash flow to the firm can be computed as follows:
   After-tax Operating Income = 10,032 (1 .3102) = \$6,920
  - Net Cap Expenditures
     = \$5,239 \$2,192
     = \$3,629

     Change in Working Capital
     =
     = \$103

     Change in Working Capital
     =
     = \$103
  - = Free Cashflow to Firm (FCFF) = = \$3,188
- The reinvestment and reinvestment rate are as follows:
  - Reinvestment = \$3,629 + \$103 = \$3,732 million
  - Reinvestment Rate = \$3,732/ \$6,920 = 53.93%

#### II. Discount Rates

- <u>Critical ingredient</u> 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, <u>the discount rate used should</u> <u>be consistent with both the riskiness and the type of</u> <u>cashflow being discounted</u>.
- The cost of equity is the rate at which we discount cash flows to equity (dividends or free cash flows to equity). The cost of capital is the rate at which we discount free cash flows to the firm.

#### Cost of Equity: Deutsche Bank 2008 versus 2016

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

Cost of Equity  $_{Jan 2008}$  = Riskfree Rate  $_{Jan 2008}$  + Beta\* Mature Market Risk Premium = 4.00% + 1.162 (4.5%) = 9.23%

 In October 2016, the Euro riskfree rate had dropped to 0.10% and the Deutsche's cost of equity had risen to 10.2%, putting it in the 75<sup>th</sup> percentile of banks in terms of cost of equity.

### Cost of Equity: Tata Motors

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- We will be valuing Tata Motors in rupee terms. That is a choice. A company can be valued in any currency.
- Earlier, we estimated a levered beta for equity of 1.1007 for Tata Motor's operating assets. Since we will be discounting FCFE with the income from cash included in the cash, we recomputed a beta for Tata Motors as a company (with cash):

Levered  $Beta_{Company}$  = 1.1007 (1428/1630) + 0 (202/1630) = 0.964

With a nominal rupee risk-free rate of 6.57 percent and an equity risk premium of 7.19% for Tata Motors, we arrive at a cost of equity of 13.50%.

Cost of Equity = 6.57% + 0.964 (7.19%) = 13.50%

### Current Cost of Capital: Disney

The beta for Disney's stock in November 2013 was 1.0013. The T. bond rate at that time was 2.75%. Using an estimated equity risk premium of 5.76%, we estimated the cost of equity for Disney to be 8.52%:

Cost of Equity = 2.75% + 1.0013(5.76%) = 8.52%

Disney's bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 3.75%. Using a marginal tax rate of 36.1, the after-tax cost of debt for Disney is 2.40%.

After-Tax Cost of Debt = 3.75% (1 - 0.361) = 2.40%

 The cost of capital was calculated using these costs and the weights based on market values of equity (121,878) and debt (15.961):
 Cost of capital =

$$8.52\% \ \frac{121,878}{(15,961+121,878)} + 2.40\% \ \frac{15,961}{(15,961+121,878)} = 7.81\%$$

# But costs of equity and capital can and should change over time...

			After-tax		
		Cost of	Cost of		
Year	Beta	Equity	Debt	Debt Ratio	Cost of capital
1	1.0013	8.52%	2.40%	11.50%	7.81%
2	1.0013	8.52%	2.40%	11.50%	7.81%
3	1.0013	8.52%	2.40%	11.50%	7.81%
4	1.0013	8.52%	2.40%	11.50%	7.81%
5	1.0013	8.52%	2.40%	11.50%	7.81%
6	1.0010	8.52%	2.40%	13.20%	7.71%
7	1.0008	8.51%	2.40%	14.90%	7.60%
8	1.0005	8.51%	2.40%	16.60%	7.50%
9	1.0003	8.51%	2.40%	18.30%	7.39%
10	1.0000	8.51%	2.40%	20.00%	7.29%

#### III. Expected Growth

**Expected Growth** Net Income **Operating Income** Retention Ratio= Return on Equity Reinvestment Return on Capital = 1 - Dividends/Net Net Income/Book Value of Rate = (Net Cap EBIT(1-t)/Book Value of Х Х Income Ex + Chg in Capital Equity WC/EBIT(1-t)

## Estimating growth in EPS: Deutsche Bank in January 2008

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

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

Retention Ratio =

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

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

Expected Growth Rate <sub>Existing Fundamentals</sub> = 0.6703 \* 0.1945 = 13.04%

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

Normalized Return on Equity =  $\frac{\text{Average Net Income}_{2003-07}}{\text{Book Value of Equity}_{2006}} = \frac{3,954}{33,475} = 11.81\%$ Normalized Retention Ratio =  $1 \frac{\text{Dividends}}{\text{Net Income}} = 1 \frac{2,146}{3,954} = 45.72\%$ Expected Growth Rate Normalized Fundamentals = 0.4572 \* 0.1181 = 5.40%

#### Estimating growth in Net Income: Tata Motors

Year	Net Income	Cap Ex	Depreciation	Change in WC	Change in Debt	Equity Reinvestment	Equity Reinvestment Rate
2008-09	-25,053₹	99,708₹	25,072₹	13,441₹	25,789₹	62,288₹	-248.63%
2009-10	29,151₹	84,754₹	39,602₹	-26,009₹	5,605₹	13,538₹	46.44%
2010-11	92,736₹	81,240₹	46,510₹	50,484₹	24,951₹	60,263₹	64.98%
2011-12	135,165₹	138,756₹	56,209₹	22,801₹	30,846₹	74,502₹	55.12%
2012-13	98,926₹	187,570₹	75,648₹	680₹	32,970₹	79,632₹	80.50%
Aggregate	330,925₹	592,028₹	243,041₹	61,397₹	120,160₹	290,224₹	87.70%

		BV of Equity at	
Year	Net Income	start of the year	ROE
2008-09	-25,053₹	91,658₹	-27.33%
2009-10	29,151₹	63,437₹	45.95%
2010-11	92,736₹	84,200₹	110.14%
2011-12	135,165₹	194,181₹	69.61%
2012-13	98,926₹	330,056₹	29.97%
Aggregate	330,925₹	763,532₹	43.34%

		Average values:
	2013 value	2008-2013
Reinvestment rate	80.50%	87.70%
ROE	29.97%	43.34%
Expected growth	24.13%	38.01%

#### **ROE** and Leverage

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

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

where,

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

BV of Capital = BV of Debt + BV of Equity - Cash

D/E = Debt/ Equity ratio

i = Interest rate on debt

t = Tax rate on ordinary income.

#### **Decomposing ROE**

Assume that you are analyzing a company with a 15% return on capital, an after-tax cost of debt of 5% and a book debt to equity ratio of 100%. Estimate the ROE for this company.

Now assume that another company in the same sector has the same ROE as the company that you have just analyzed but no debt. Will these two firms have the same growth rates in earnings per share if they have the same dividend payout ratio?

#### Will they have the same equity value?

### **Estimating Growth in EBIT: Disney**

We started with the reinvestment rate that we computed from the 2013 financial statements:  $\frac{(3,629+103)}{10,032(1-.3102)} = 53.93\%$ 

Reinvestment rate =

We computed the reinvestment rate in prior years to ensure that the 2013 values were not unusual or outliers.

□ We compute the return on capital, using operating income in 2013 and capital invested at the start of the year: EBIT (1-t) 10,032 (1-.361)

Return on Capital<sub>2013</sub> =  $\frac{\text{EBIT (1-t)}}{(\text{BV of Equity+ BV of Debt - Cash})} = \frac{10,032 (1-.361)}{(41,958+16,328-3,387)}$ = 12.61%

Disney's return on capital has improved gradually over the last decade and has levelled off in the last two years.

□ If Disney maintains its 2013 reinvestment rate and return on capital for the next five years, its growth rate will be 6.80 percent.

Expected Growth Rate from Existing Fundamentals = 53.93% \* 12.61% = 6.8%

# When everything is in flux: Changing growth and margins

- The elegant connection between reinvestment and growth in operating income breaks down, when you have a company in transition, where margins are changing over time.
- If that is the case, you have to estimate cash flows in three steps:
  - Forecast revenue growth and revenues in future years, taking into account market potential and competition.
  - Forecast a "target" margin in the future and a pathway from current margins to the target.
  - Estimate reinvestment from revenues, using a sales to capital ratio (measuring the dollars of revenues you get from each dollar of investment).

### Here is an example: Baidu's Expected FCFF

	Revenue		Operating				Chg in	Sales/Ca	Reinvestm	
Year	growth	Revenues	Margin	EBIT	Tax rate	EBIT (1-t)	Revenues	pital	ent	FCFF
Base										
year		\$28,756	48.72%	\$14,009	16.31%	\$11,724		2.64		
1	25.00%	\$35,945	47.35%	\$17,019	16.31%	\$14,243	\$7,189	2.64	\$2,722	\$11,521
2	25.00%	\$44,931	45.97%	\$20,657	16.31%	\$17,288	\$8,986	2.64	\$3,403	\$13,885
3	25.00%	\$56,164	44.60%	\$25,051	16.31%	\$20,965	\$11,233	2.64	\$4,253	\$16,712
4	25.00%	\$70,205	43.23%	\$30,350	16.31%	\$25,400	\$14,041	2.64	\$5,316	\$20,084
5	25.00%	\$87,756	41.86%	\$36,734	16.31%	\$30,743	\$17,551	2.64	\$6,646	\$24,097
6	20.70%	\$105,922	40.49%	\$42,885	18.05%	\$35,145	\$18,166	2.64	\$6,878	\$28,267
7	16.40%	\$123,293	39.12%	\$48,227	19.79%	\$38,685	\$17,371	2.64	\$6,577	\$32,107
8	12.10%	\$138,212	37.74%	\$52,166	21.52%	\$40,938	\$14,918	2.64	\$5,649	\$35,289
9	7.80%	\$148,992	36.37%	\$54,191	23.26%	\$41,585	\$10,781	2.64	\$4,082	\$37,503
10	3.50%	\$154,207	35.00%	\$53,972	25.00%	\$40,479	\$5,215	2.64	\$1,974	\$38,505

### **IV. Getting Closure in Valuation**

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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:

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

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

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

where,

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

g = Expected growth rate forever.

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

### Getting to stable growth...

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

### Choosing a Growth Period: Examples

	Disney	Vale	Tata Motors	Baidu
Firm size/market size	<i>Disney</i> Firm is one of the largest players in the entertainment and theme park business, but the businesses are being redefined and are expanding.	Vale           The company is one of the largest mining companies in the world, and the overall market is constrained by limits on resource	Tata MotorsFirm has a large marketshare of Indian (domestic)market, but it is small byglobal standards. Growth iscomingfromJaguardivisioninamarring	Baidu Company is in a growing sector (online search) in a growing market (China).
2		availability.	markets.	
Current excess returns	Firm is earning more than its cost of capital.	Returns on capital are largely a function of commodity prices. Have generally exceeded the cost of capital.	Firm has a return on capital that is higher than the cost of capital.	Firm earns significant excess returns.
Competitive	Has some of the most	Cost advantages	Has wide	Early entry into &
advantages	recognized brand names in the	because of access to	distribution/service	knowledge of the
	world. Its movie business now	low-cost iron ore	network in India but	Chinese market,
	houses Marvel superheros,	reserves in Brazil.	competitive advantages are	coupled with
	Pixar animated characters &		fading there. Competitive	government-imposed
	Star wars.		fading but	outsiders
			Landrover/Jaguar has	outsiders.
			strong brand name value	
			giving Tata pricing power	
			and growth potential.	
Length of high-	Ten years, entirely because of	None, though with	Five years, with much of	Ten years, with strong
growth period	its strong competitive	normalized earnings	the growth coming from	excess returns.
_	advantages/	and moderate excess	outside India.	
		returns.		

#### Valuing Vale in November 2013 (in US dollars)

Let's start with some history & estimate what a normalized year will look like

_	Year	Operating Income (\$)	Effective tax rate	BV of Debt	BV of Equity	Cash	Invested capital	Return on capital
	2009	\$6,057	27.79%	\$18,168	\$42,556	\$12,639	\$48,085	9.10%
	2010	\$23,033	18.67%	\$23,613	\$59 <i>,</i> 766	\$11,040	\$72,339	25.90%
	2011	\$30,206	18.54%	\$27,668	\$70,076	\$9,913	\$87,831	28.01%
-	2012	\$13,346	18.96%	\$23,116	\$78,721	\$3,538	\$98,299	11.00%
	2013 (TTM)	\$15,487	20.65%	\$30,196	\$75,974	\$5,818	\$100,352	12.25%
	Normalized	\$17,626	20.92%					17.25%

#### Estimate the costs of equity & capital for Vale

		Unlevered				
		beta of		Peer Group	Value of	Proportion
Business	Sample size	business	Revenues	EV/Sales	Business	of Vale
Metals & Mir	48	0.86	\$9,013	1.97	\$17,739	16.65%
Iron Ore	78	0.83	\$32,717	2.48	\$81,188	76.20%
Fertilizers	693	0.99	\$3,777	1.52	\$5 <i>,</i> 741	5.39%
Logistics	223	0.75	\$1,644	1.14	\$1,874	1.76%
Vale Operations		0.8440	\$47,151		\$106,543	100.00%

Market D/E = 54.99%

Marginal tax rate = 34.00% (Brazil)

Levered Beta = 0.844 (1+(1-.34)(.5499)) = 1.15Cost of equity = 2.75% + 1.15 (7.38%) = 10.87%

	% of revenues	ERP
US & Canada	4.90%	5.50%
Brazil	16.90%	8.50%
Rest of Latin America	1.70%	10.09%
China	37.00%	6.94%
Japan	10.30%	6.70%
Rest of Asia	8.50%	8.61%
Europe	17.20%	6.72%
Rest of World	3.50%	10.06%
Vale ERP	100.00%	7.38%

Vale's rating: A-

Default spread based on rating = 1.30%Cost of debt (pre-tax) = 2.75% + 1.30% = 4.05%

Cost of capital = 11.23% (.6452) + 4.05% (1-.34) (.3548) = 8.20%

Assume that the company is in stable growth, growing 2% a year in perpetuity

Reinvestment Rate = 
$$\frac{g}{ROC} = \frac{2\%}{17.25\%} = 11.59\%$$
  
Value of Operating Assets =  $\frac{17,626(1-.2092)(1-.1159)}{(.082-.02)} = $202,832$ 

Value of operating assets= 202,832+ Cash & Marketable Securities= 7,133- Debt= 42,879Value of equity= 167,086Value per share= 32.44Stock price (11/2013)= 13.57
# Estimating Stable Period Inputs after a high growth period: Disney

- <u>Respect the cap</u>: The growth rate forever is assumed to be 2.5%. This is set lower than the riskfree rate (2.75%).
- Stable period excess returns: The return on capital for Disney will drop from its high growth period level of 12.61% to a stable growth return of 10%. This is still higher than the cost of capital of 7.29% but the competitive advantages that Disney has are unlikely to dissipate completely by the end of the 10th year.
- <u>Reinvest to grow</u>: Based on the expected growth rate in perpetuity (2.5%) and expected return on capital forever after year 10 of 10%, we compute s a stable period reinvestment rate of 25%:
  - Reinvestment Rate = Growth Rate / Return on Capital = 2.5% /10% = 25%
  - <u>Adjust risk and cost of capital</u>: The beta for the stock will drop to one, reflecting Disney's status as a mature company.
    - Cost of Equity = Riskfree Rate + Beta \* Risk Premium = 2.75% + 5.76% = 8.51%
    - The debt ratio for Disney will rise to 20%. Since we assume that the cost of debt remains unchanged at 3.75%, this will result in a cost of capital of 7.29%
    - □ Cost of capital = 8.51% (.80) + 3.75% (1-.361) (.20) = 7.29%

### V. From firm value to equity value per share

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

### Valuing Deutsche Bank in early 2008

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

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

### Deutsche Bank in stable growth

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- At the end of year 5, the firm is in stable growth. We assume that the cost of equity drops to 8.5% (as the beta moves to 1) and that the return on equity also drops to 8.5 (to equal the cost of equity).
   Stable Period Payout Ratio = 1 g/ROE = 1 0.03/0.085 = 0.6471 or 64.71%
   Expected Dividends in Year 6 = Expected Net Income<sub>5</sub> \* (1+g<sub>Stable</sub>)\* Stable Payout Ratio = €5,143 (1.03) \* 0.6471 = €3,427 million
  - Terminal Value =  $\frac{\text{Expected Dividends}_{6}}{(\text{Cost of Equity-g})} = \frac{3,247}{(.085-.03)} = 62,318 \text{ million Euros}$

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

- □ Value of equity = €9,653+ €40,079 = €49,732 million Euros
- □ Value of equity per share=  $\frac{\text{Value of Equity}}{\# \text{ Shares}} = \frac{49,732}{474.2} = 104.88 \text{ Euros/share}$

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

### Valuing Deutsche Bank in 2016

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#### Deutsche Bank: A Crisis Valuation (October 2016)



## Valuing Tata Motors with a FCFE model in November 2013: The high growth period

- We use the expected growth rate of 24.13%, estimated based upon the 2013 values for ROE (29.97%) and equity reinvestment rate (80.5%):
  - □ Expected growth rate = 29.97% \* 80.5% = 24.13%
- □ The cost of equity for Tata Motors is 13.50%:

Cost of equity = = 6.57% + 0.964(7.19%) = 13.50%

□ The expected FCFE for the high growth period

	Current	1	2	3	4	5
Expected growth rate		24.13%	24.13%	24.13%	24.13%	24.13%
Net Income	98,926₹	122,794₹	152,420₹	189,194₹	234,841₹	291,500₹
Equity Reinvestment Rate	80.50%	80.50%	80.50%	80.50%	80.50%	80.50%
Equity Reinvestment	79,632₹	98,845₹	122,693₹	152,295₹	189,039₹	234,648₹
	10 20/7	22 0/0 <del>7</del>	<u>20 727<del>3</del></u>	26 800≆	/⊑ 20 <b>2</b> ₹	56 952₹
FCFE	19,2945	25,9497	29,1217	50,0997	45,0027	50,8525
PV of FCFE@13.5%		21,100₹	23,075₹	25,235₹	27,597₹	30,180₹

Aswath Damodaran

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Sum of PV of FCFE = 127,187₹

## Stable growth and value....

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- After year five, we will assume that the beta will increase to 1 and that the equity risk premium will decline to 6.98% percent (as the company becomes more global). The resulting cost of equity is 13.55 percent.
   Cost of Equity in Stable Growth = 6.57% + 1(6.98%) = 13.55%
- We will assume that the growth in net income will drop to 6% and that the return on equity will drop to 13.55% (which is also the cost of equity). Equity Reinvestment Rate <sub>Stable Growth</sub> = 6%/13.55% = 44.28%
   FCFE in Year 6 = ₹291,500(1.06)(1 0.4428) = ₹ 136,822million
   Terminal Value of Equity = ₹136,822/(0.1355 0.06) = ₹ 2,280,372 million
- To value equity in the firm today
  - Value of equity = PV of FCFE during high growth + PV of terminal value = ₹127,187 + 2,280,372/1.1355<sup>5</sup> = ₹742,008 million

Dividing by 2694.08 million shares yields a value of equity per share of ₹275.42, about 40% lower than the stock price of ₹427.85 per share.



## **Disney: Inputs to Valuation**

	High Growth Phase	Transition Phase	Stable Growth Phase	
Length of Period	5 years	5 years	Forever after 10 years	
Tax Rate	31.02% (Effective)	31.02% (Effective)	31.02% (Effective)	
	36.1% (Marginal)	36.1% (Marginal)	36.1% (Marginal)	
Return on Capital	12.61%	Declines linearly to 10%	Stable ROC of 10%	
Reinvestment Rate	53.93% (based on normalized	Declines gradually to 25%	25% of after-tax operating	
	acquisition costs)	as ROC and growth rates	income.	
		drop:	Reinvestment rate = g/ ROC	
			= 2.5/10=25%	
Expected Growth	ROC * Reinvestment Rate =	Linear decline to Stable	2.5%	
Rate in EBIT	0.1261*.5393 = .068 or 6.8%	Growth Rate of 2.5%		
Debt/Capital Ratio	11.5%	Rises linearly to 20.0%	20%	
Risk Parameters	Beta = $1.0013$ , $k_e = 8.52\%\%$	Beta changes to 1.00;	Beta = 1.00; $k_e = 8.51\%$	
	Pre-tax Cost of Debt = 3.75%	Cost of debt stays at 3.75%	Cost of debt stays at 3.75%	
	Cost of capital = 7.81%	Cost of capital declines	Cost of capital = 7.29%	
		gradually to 7.29%		



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



Disney: Corporate Financing Decisions and Firm Value

## Ways of changing value...





### **First Principles**

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