CORPORATE FINANCE
LECTURE NOTE PACKET 2
CAPITAL STRUCTURE, DIVIDEND POLICY AND VALUATION
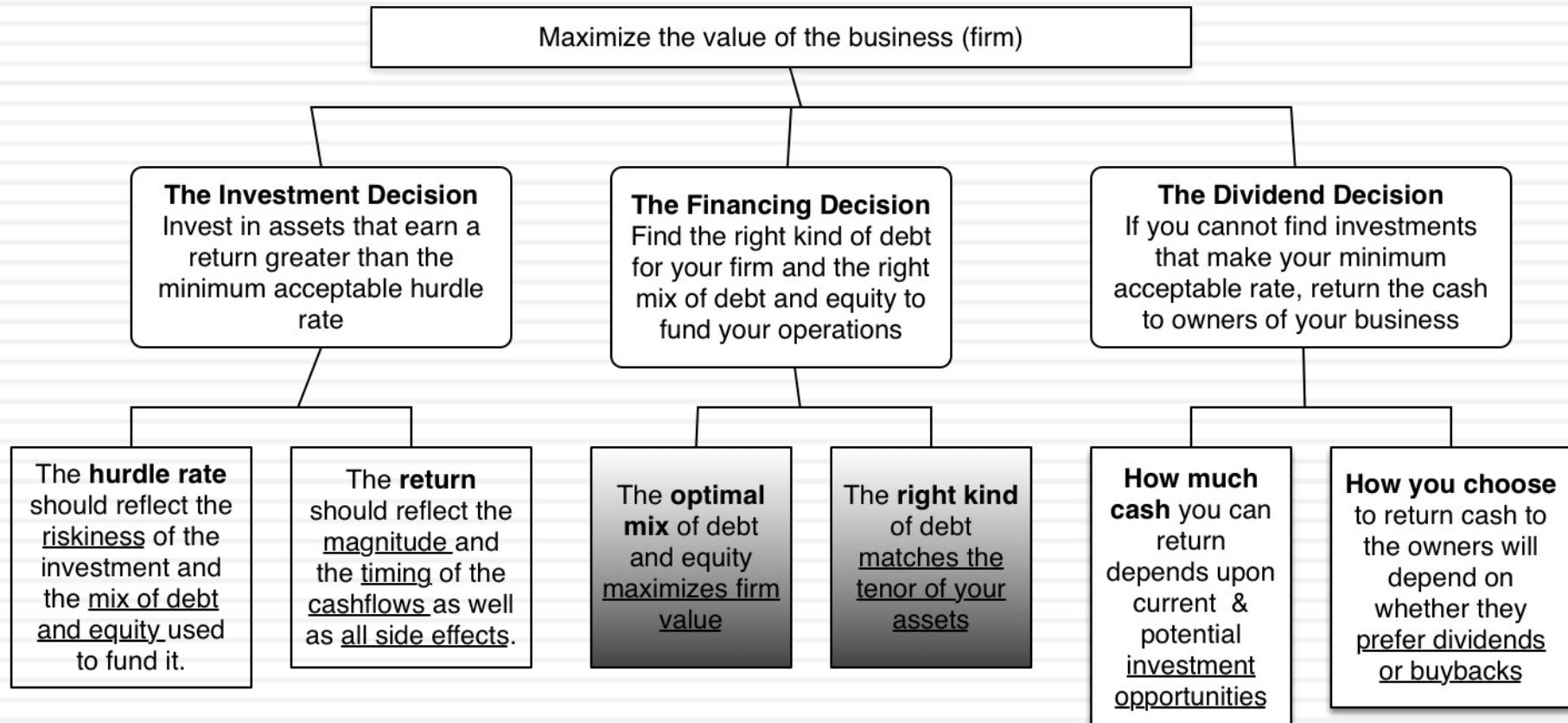
Aswath Damodaran   Spring 2023

CAPITAL STRUCTURE: THE CHOICES AND THE TRADE OFF

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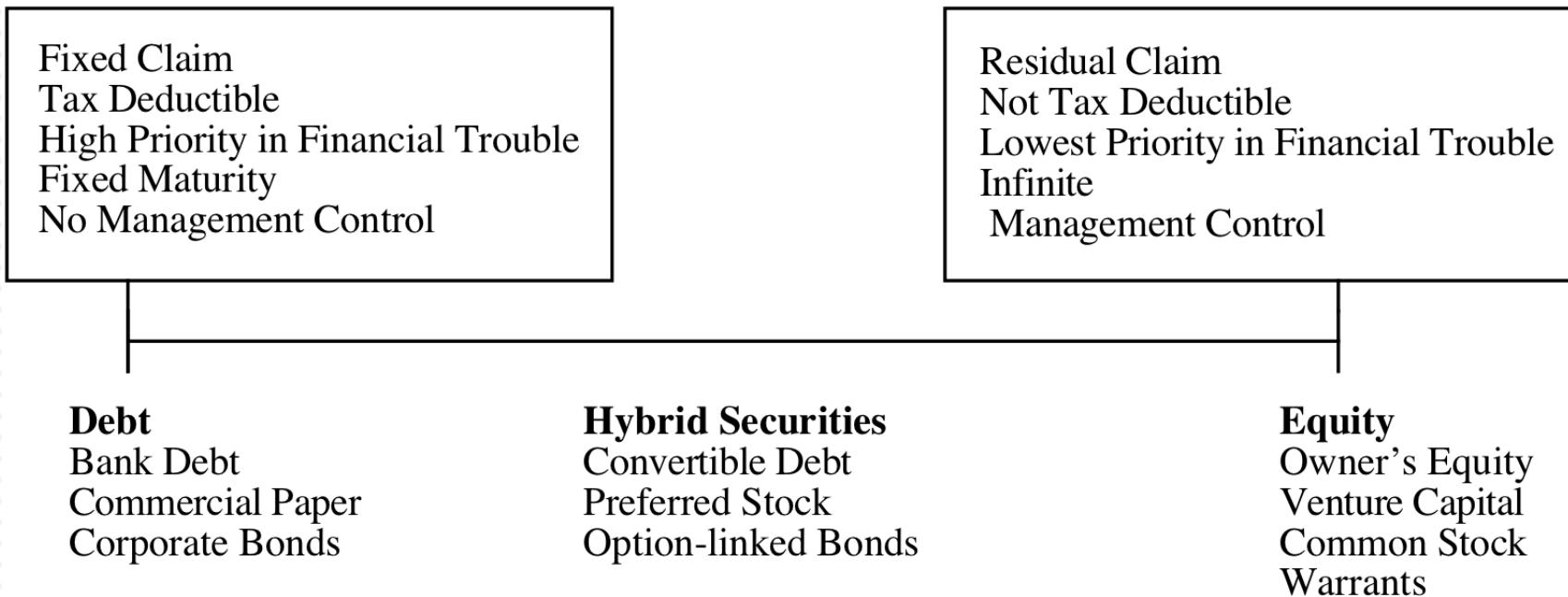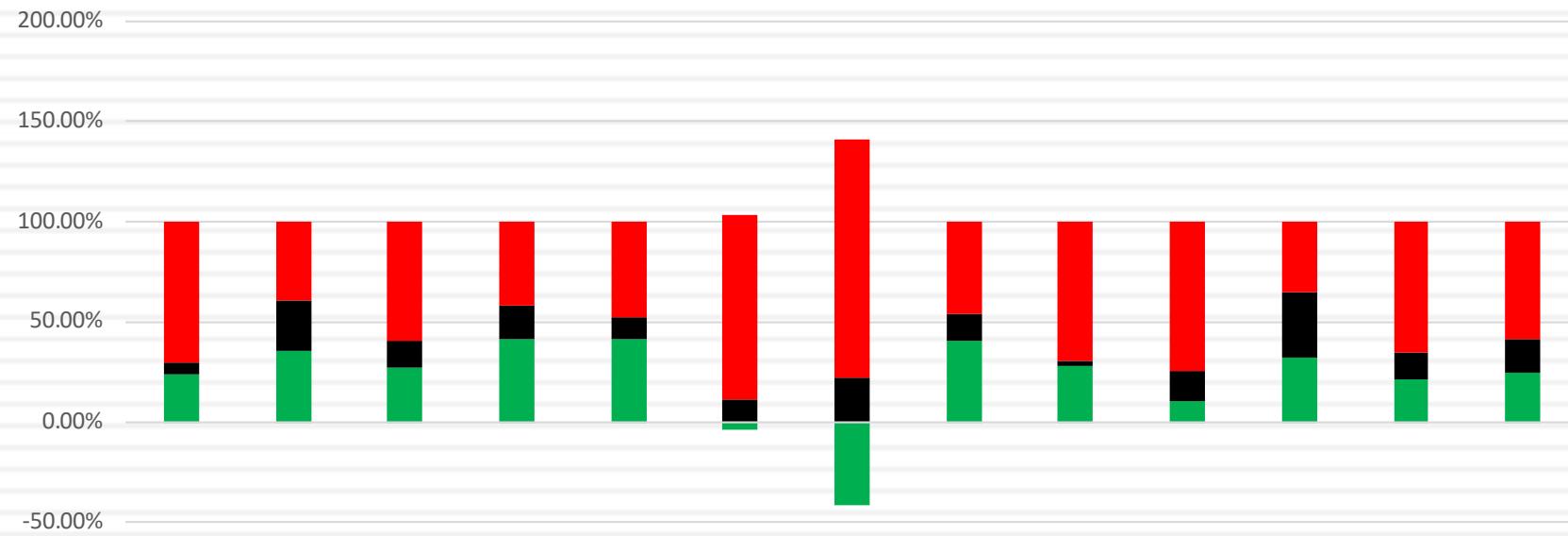
First principles

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                    Maximize the value of the business (firm)
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The Investment Decision
Invest in assets that earn a return greater than the minimum acceptable hurdle rate

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

The Dividend Decision
If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

The **hurdle rate** should reflect the riskiness of the investment and the mix of debt and equity used to fund it.

The **return** should reflect the magnitude and the timing of the cashflows as well as all side effects.

The **optimal mix** of debt and equity maximizes firm value

The **right kind** of debt matches the tenor of your assets

How much cash you can return depends upon current & potential investment opportunities

How you choose to return cash to the owners will depend on whether they prefer dividends or buybacks

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The Choices in Financing

Figure 7.1: Debt versus Equity

Fixed Claim		Residual Claim
Tax Deductible		Not Tax Deductible
High Priority in Financial Trouble		Lowest Priority in Financial Trouble
Fixed Maturity		Infinite
No Management Control		Management Control

Debt	**Hybrid Securities**	**Equity**
Bank Debt	Convertible Debt	Owner's Equity
Commercial Paper	Preferred Stock	Venture Capital
Corporate Bonds	Option-linked Bonds	Common Stock
		Warrants

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Global Patterns in Financing...

Financing Mix in 2022

	Eastern Europe & Russia	Australia & NZ	Latin America & Caribbean	Canada	India	Africa and Middle East	UK	Small Asia	Japan	EU & Environs	China	United States	Global
Retailed Eannings	70.30%	39.40%	59.72%	41.88%	47.41%	92.31%	118.81%	45.75%	69.33%	74.62%	35.22%	65.09%	58.29%
Equity issuances	5.83%	24.82%	13.08%	17.00%	10.75%	11.45%	22.57%	13.99%	2.71%	14.86%	32.11%	13.32%	17.08%
Debt Raised	23.87%	35.78%	27.19%	41.13%	41.84%	-3.76%	-41.38%	40.26%	27.96%	10.52%	32.67%	21.59%	24.63%

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And a much greater dependence on bank loans outside the US…
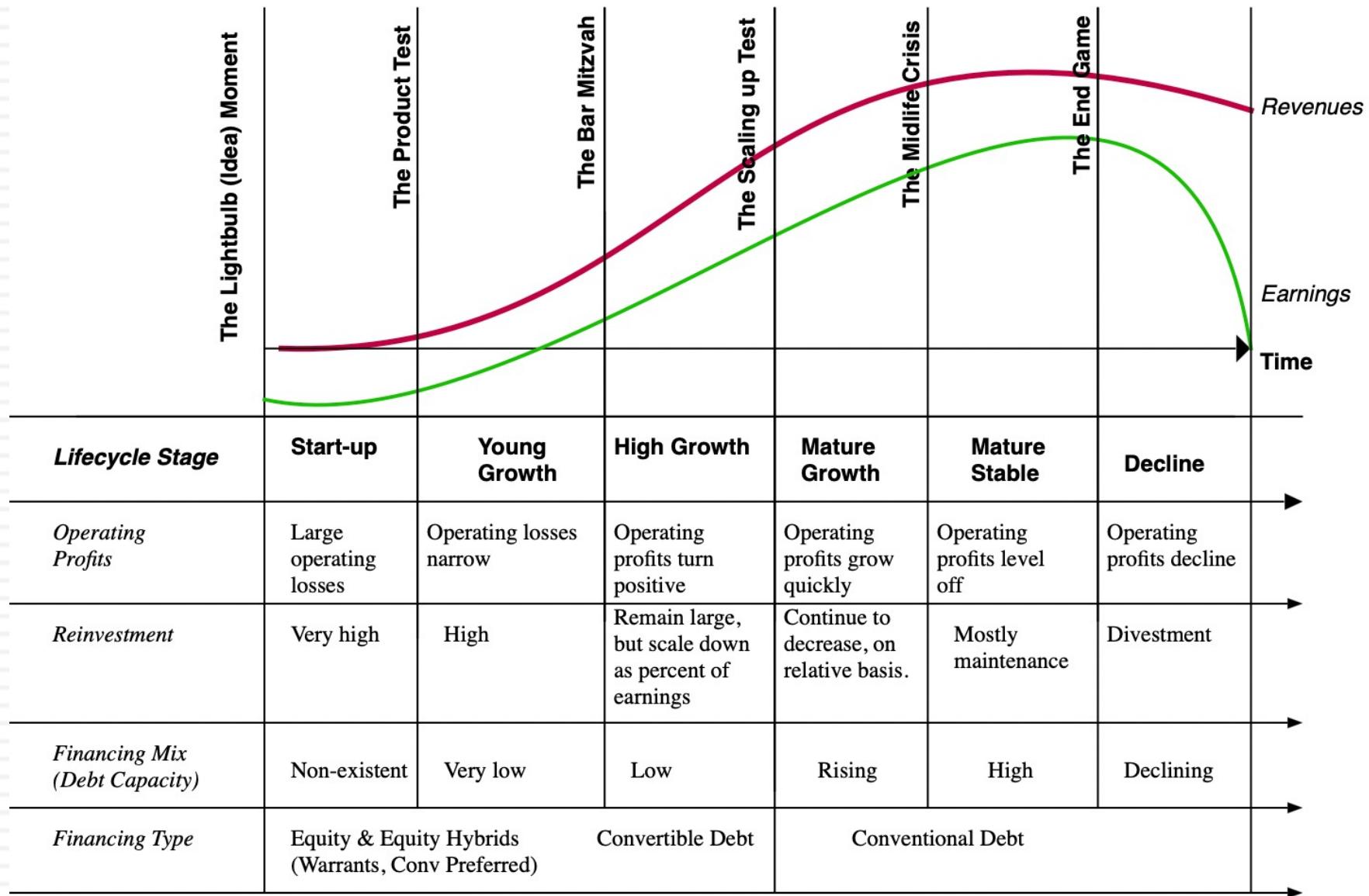
- In broad terms, borrowing can come from banks/lenders or from issuing corporate bonds.

- In the United States, companies have had more access to corporate bonds than companies in other markets.
    - That access which initially started for larger companies expanded to cover smaller ones.
    - In the 1980s, Mike Milken opened up the bond market to issuers who had below investment grade ratings with the junk bond market.

- In the last two or three decades, bond markets have opened up for companies in the rest of the world as well.

- As a borrower, with a choice of issuing corporate bonds or raising bank loans, why might you pick one over the other?

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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 Maturity				
<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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Vertical milestone labels (left to right across the chart):
The Lightbulb (Idea) Moment · **The Product Test** · **The Bar Mitzvah** · **The Scaling up Test** · **The Midlife Crisis** · **The End Game**

Curves: **Revenues**, **Earnings**; axis: **Time**

Lifecycle Stage	Start-up	Young Growth	High Growth	Mature Growth	Mature Stable	Decline
Operating Profits	Large operating losses	Operating losses narrow	Operating profits turn positive	Operating profits grow quickly	Operating profits level off	Operating profits decline
Reinvestment	Very high	High	Remain large, but scale down as percent of earnings	Continue to decrease, on relative basis.	Mostly maintenance	Divestment
Financing Mix (Debt Capacity)	Non-existent	Very low	Low	Rising	High	Declining
Financing Type	Equity & Equity Hybrids (Warrants, Conv Preferred)		Convertible Debt	Conventional Debt		

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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

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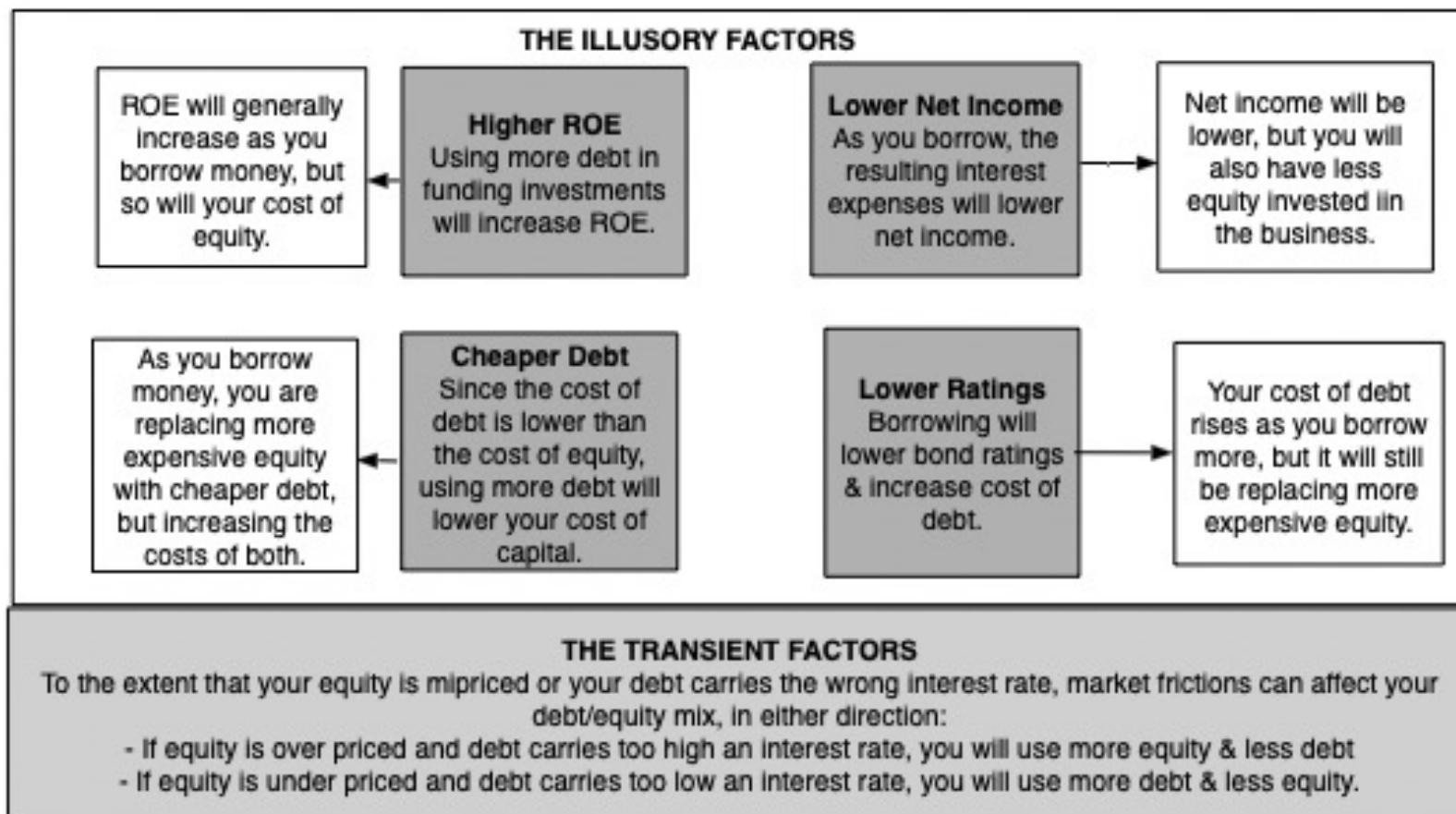
- In deciding to raise financing for a business, is there an optimal mix of debt and equity?
  - If yes, what is the trade off that lets us determine this optimal mix?
    - What are the benefits of using debt instead of equity?
    - What are the costs of using debt instead of equity?
  - If not, why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

- To answer this question, you have to decide what you are optimizing first, and in corporate finance, that is firm value.

The Illusory Benefits of Debt

Debt versus Equity: The Illusory Benefits

THE ILLUSORY FACTORS

ROE will generally increase as you borrow money, but so will your cost of equity. ← **Higher ROE** Using more debt in funding investments will increase ROE.

Lower Net Income As you borrow, the resulting interest expenses will lower net income. → Net income will be lower, but you will also have less equity invested iin the business.

As you borrow money, you are replacing more expensive equity with cheaper debt, but increasing the costs of both. ← **Cheaper Debt** Since the cost of debt is lower than the cost of equity, using more debt will lower your cost of capital.

Lower Ratings Borrowing will lower bond ratings & increase cost of debt. → Your cost of debt rises as you borrow more, but it will still be replacing more expensive equity.

THE TRANSIENT FACTORS
To the extent that your equity is mipriced or your debt carries the wrong interest rate, market frictions can affect your debt/equity mix, in either direction:
- If equity is over priced and debt carries too high an interest rate, you will use more equity & less debt
- If equity is under priced and debt carries too low an interest rate, you will use more debt & less equity.

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Costs and Benefits of Debt

- ☐ **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

- 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.*

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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

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Tax Law and Debt

- 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?

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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.

- It is not the bankruptcy, per se, that makes managers disciplined, but the loss of such a job and personal wealth.

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?

  a. 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.

  c. 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

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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.*

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Debt and Agency Costs

- Assume that you are a lender. 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

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Debt: Summarizing the trade off

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

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

Debt trade off	*Discussion of relative benefits/costs*
Tax benefits	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).
Added Discipline	The benefits should be highest at Disney, where there is a clear separation of ownership and management and smaller at the remaining firms.
Expected Bankruptcy Costs	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.
Agency Costs	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.
Flexibility needs	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?

- □ Consider, for your firm,
  - a. The potential tax benefits of borrowing
  - b. The benefits of using debt as a disciplinary mechanism
  - c. The potential for expected bankruptcy costs
  - d. The potential for agency costs
  - e. 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?

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A Hypothetical…

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.
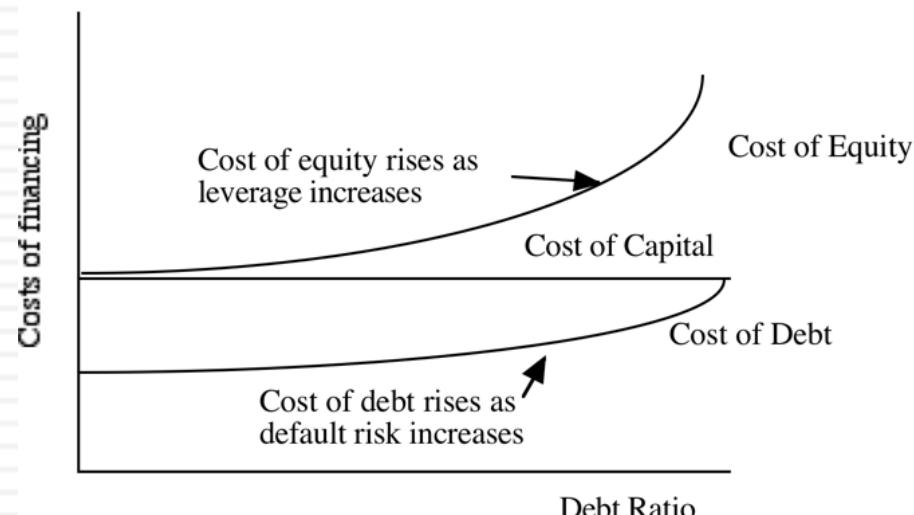
(e) Firms know their future financing needs with certainty

□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.
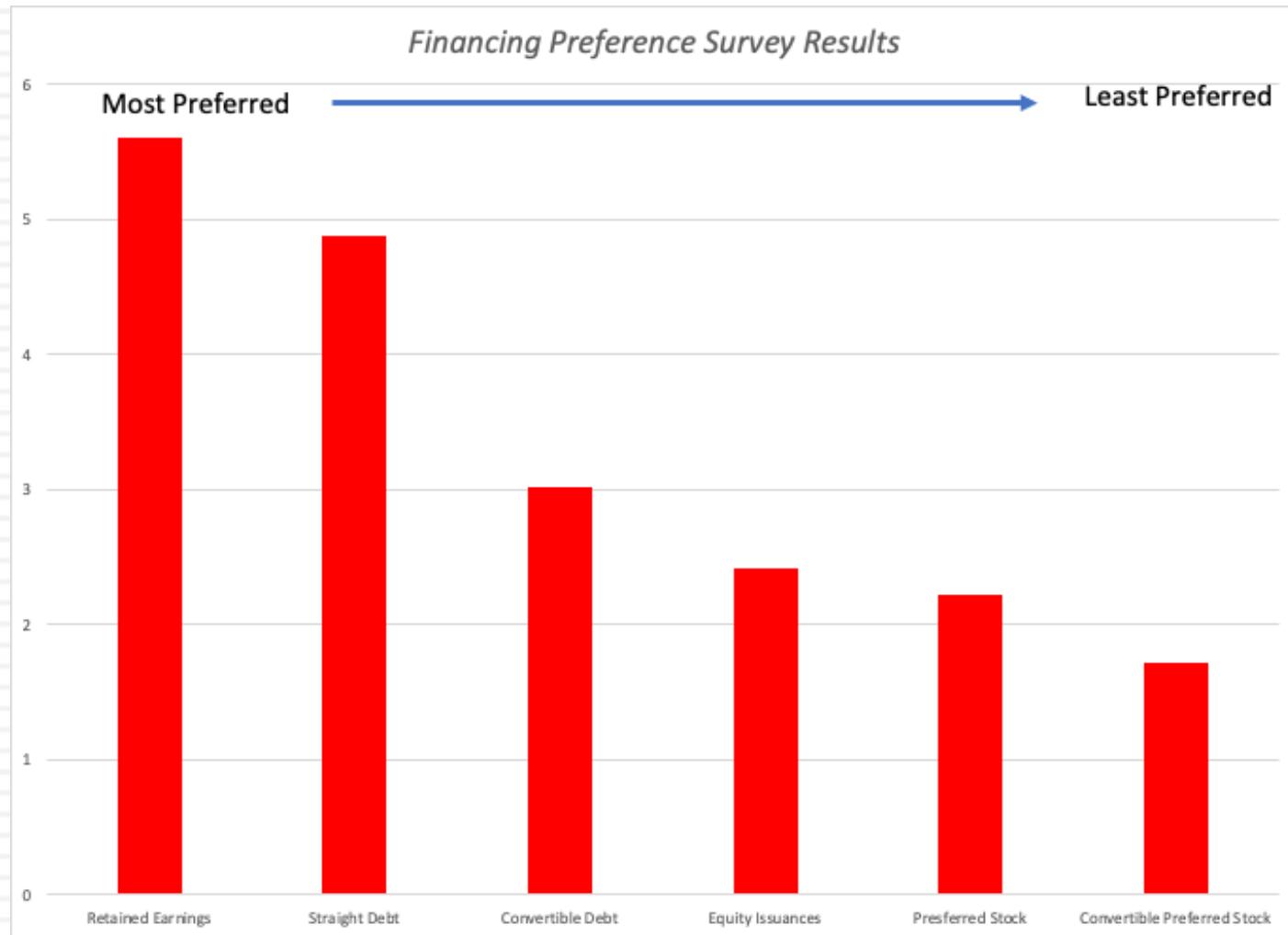
Figure 7.9: Cost of Capital in the MM World

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What do firms look at in financing?

□ 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 flexibil**ity. 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?

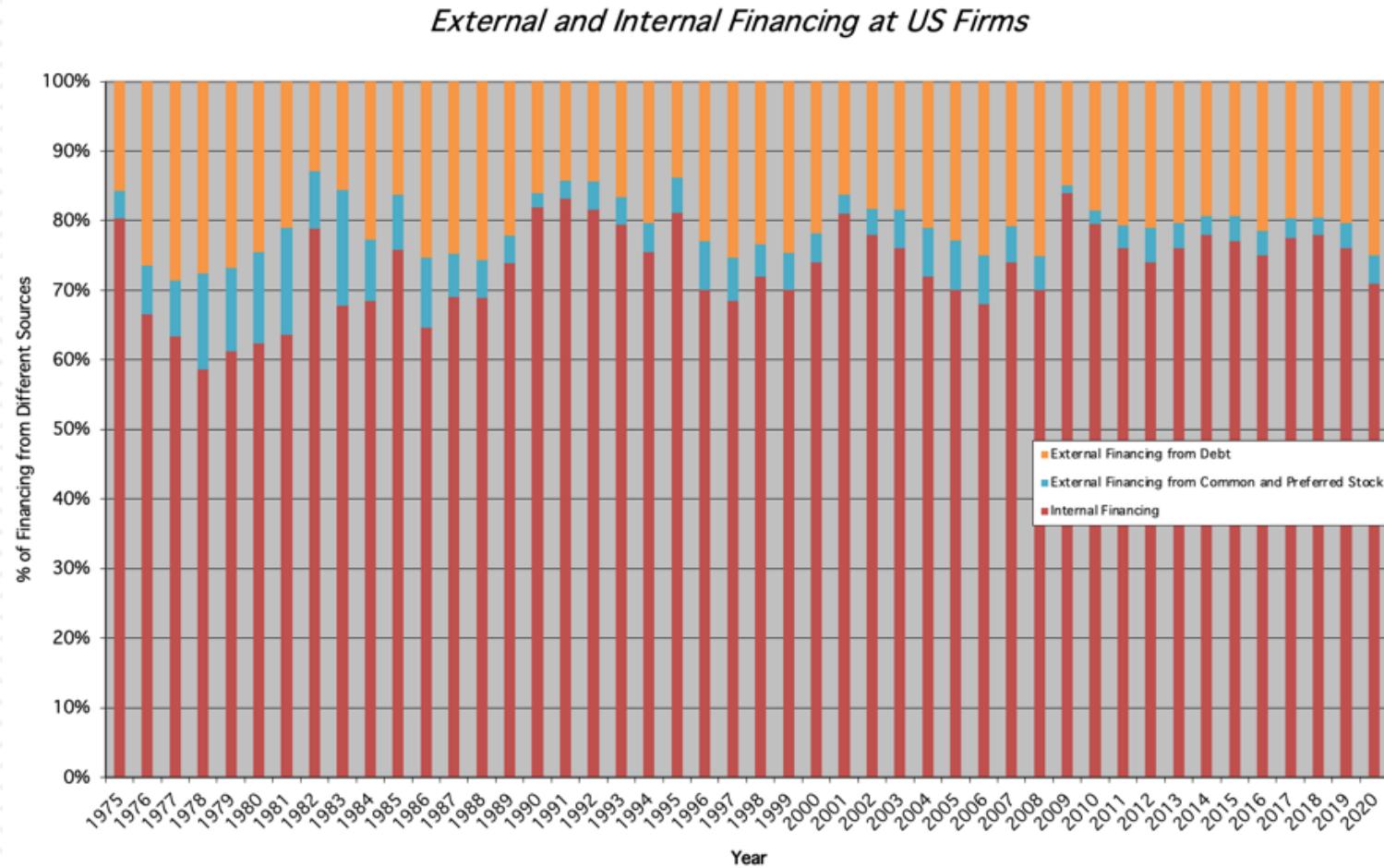 ◘ With external financing, would you rather use debt or equity?

A Financing Heirarchy

Financing Preference Survey Results

Most Preferred → Least Preferred

(bar chart: Retained Earnings, Straight Debt, Convertible Debt, Equity Issuances, Presferred Stock, Convertible Preferred Stock)

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And the unsurprising consequences..

External and Internal Financing at US Firms
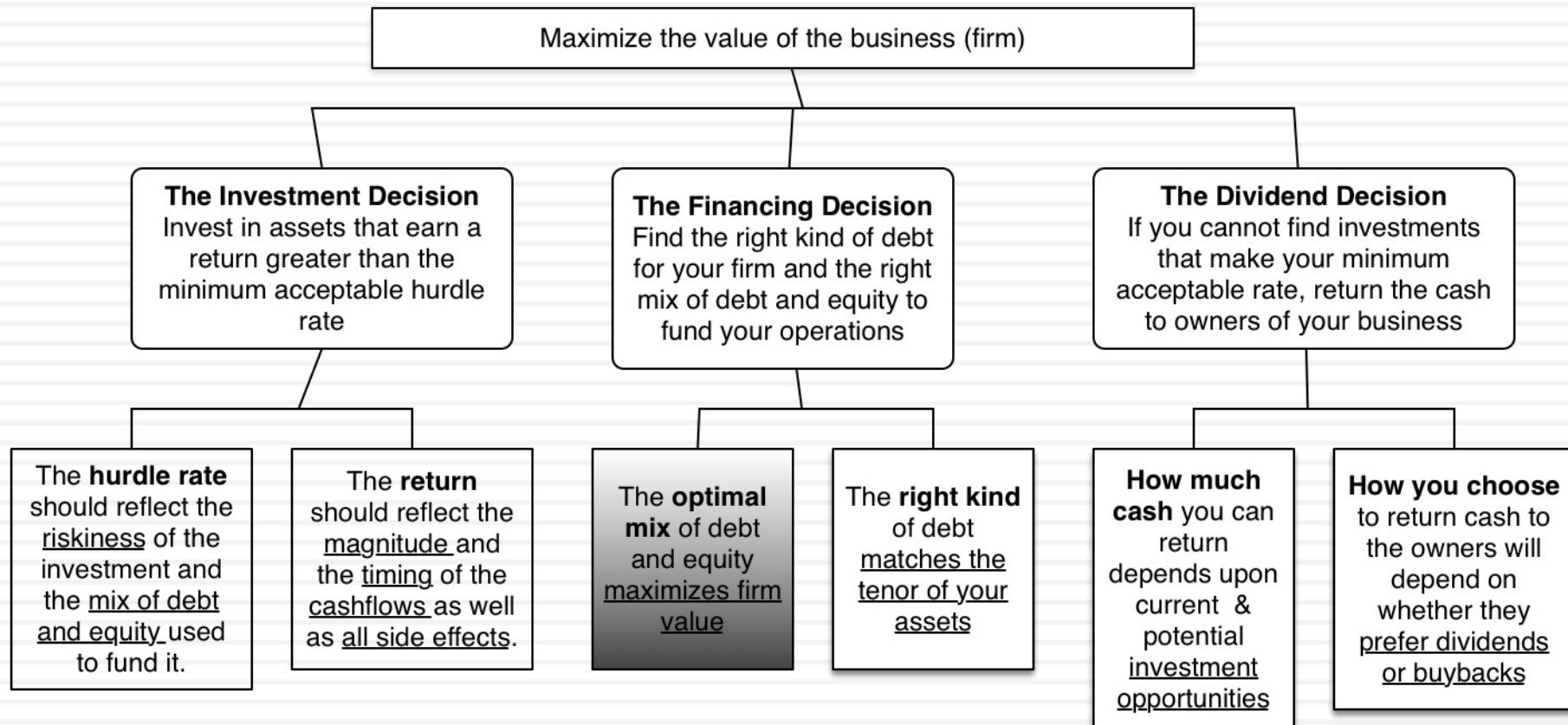
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Financing Choices

□ 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..

Maximize the value of the business (firm)

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

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

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If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

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The **return** should reflect the magnitude and the timing of the cashflows as well as all side effects.

The **optimal mix** of debt and equity maximizes firm value

The **right kind** of debt matches the tenor of your assets

How much cash you can return depends upon current & potential investment opportunities

How you choose to return cash to the owners will depend on whether they prefer dividends or buybacks

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Pathways to the Optimal

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.
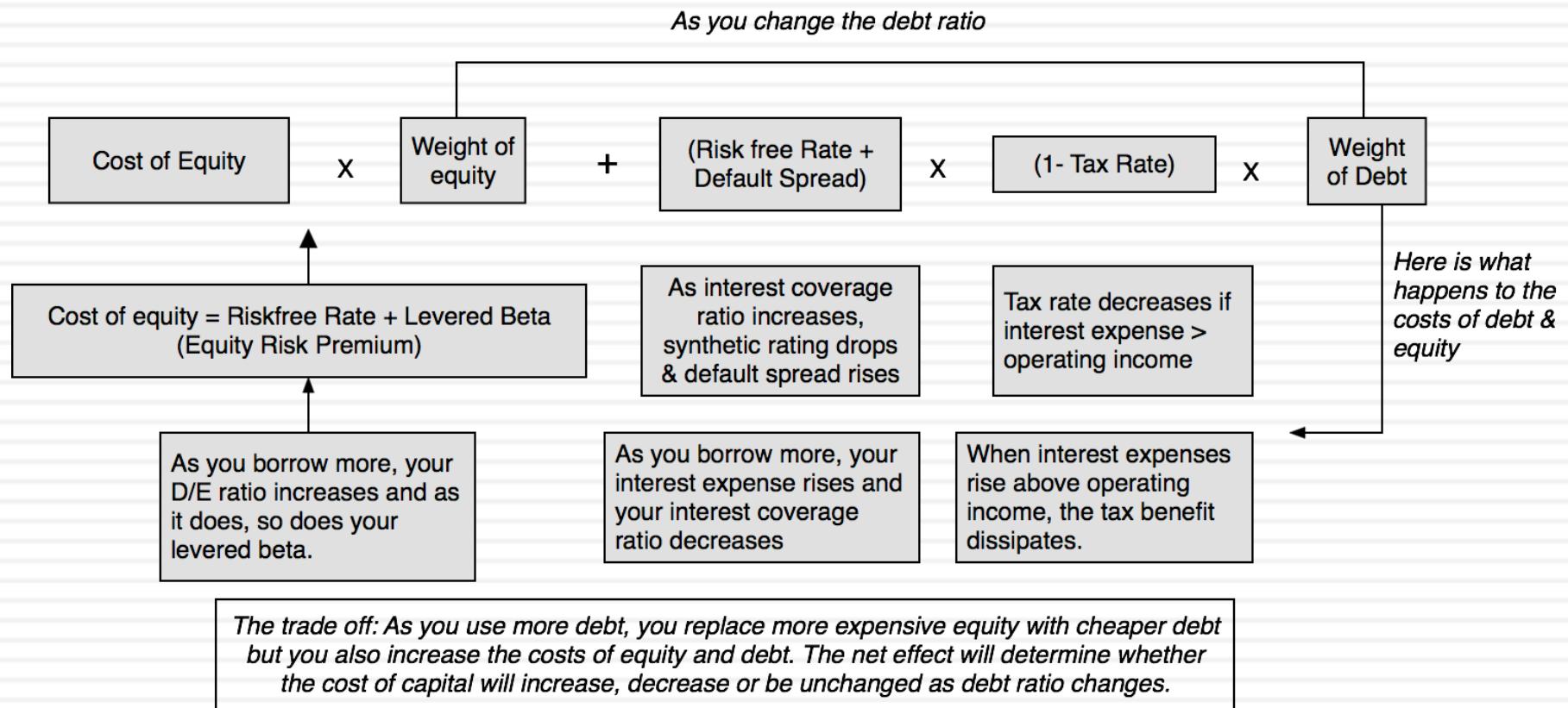
I. The Cost of Capital Approach

- 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- tax rate) (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

As you change the debt ratio

Cost of Equity	X	Weight of equity	+	(Risk free Rate + Default Spread)	X	(1- Tax Rate)	X	Weight of Debt

Cost of equity = Riskfree Rate + Levered Beta (Equity Risk Premium)

As interest coverage ratio increases, synthetic rating drops & default spread rises

Tax rate decreases if interest expense > operating income

Here is what happens to the costs of debt & equity

As you borrow more, your D/E ratio increases and as it does, so does your levered beta.

As you borrow more, your interest expense rises and your interest coverage ratio decreases

When interest expenses rise above operating income, the tax benefit dissipates.

The trade off: As you use more debt, you replace more expensive equity with cheaper debt but you also increase the costs of equity and debt. The net effect will determine whether the cost of capital will increase, decrease or be unchanged as debt ratio changes.

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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

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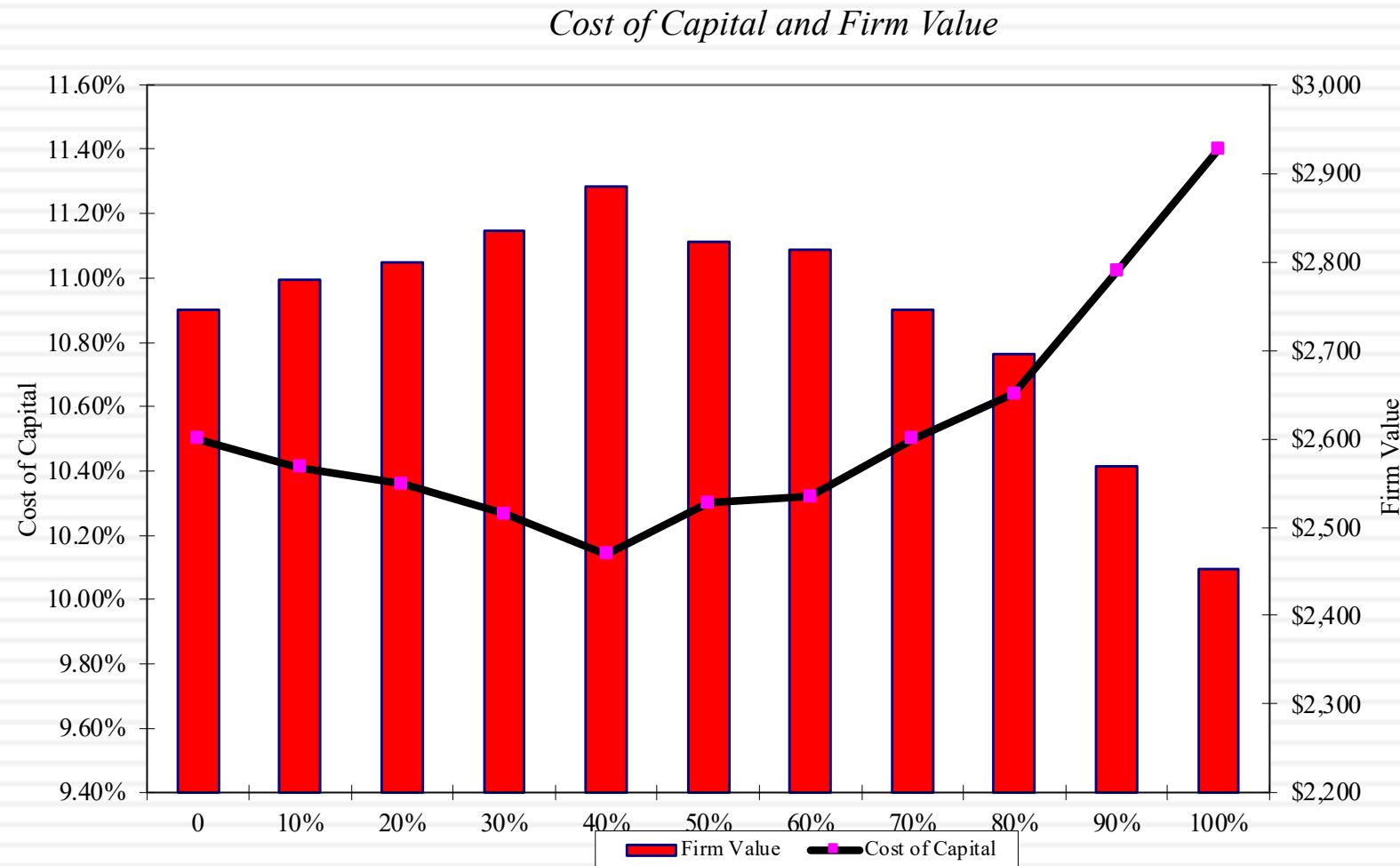# Applying Cost of Capital Approach: The Textbook Example

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

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

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

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The U-shaped Cost of Capital Graph...

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

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.

$$\text{Unlevered beta} = = 1.25 / (1 + (1 - 0.361)(0.1944)) = 1.1119$$

□ **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%**

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

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Step 1: 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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Step 2: 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	∞	23.10	EBIT/ Interest Expenses
Likely Rating	AAA	AAA	From Ratings table
Pre-tax cost of debt	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 (Debt @AAA rate)	Iteration 2 (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%

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Bond Ratings, Cost of Debt and Debt Ratios

Debt Ratio	$ Debt	Interest Expense	Interest Coverage Ratio	Bond Rating	Pre-tax cost of debt	Tax rate	After-tax cost of debt
0%	$0	$0	∞	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%

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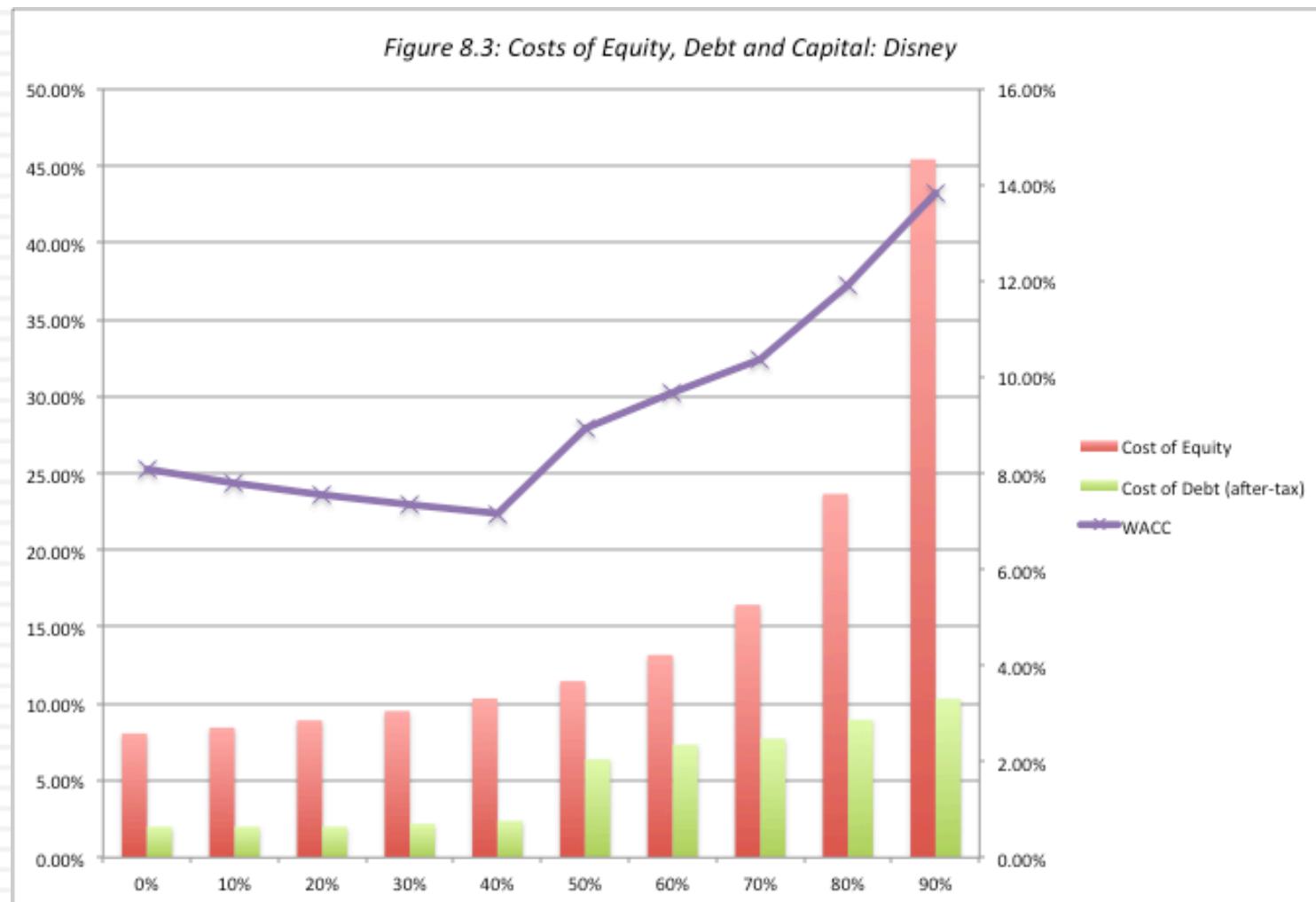
Stated versus Effective Tax Rates

- 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%
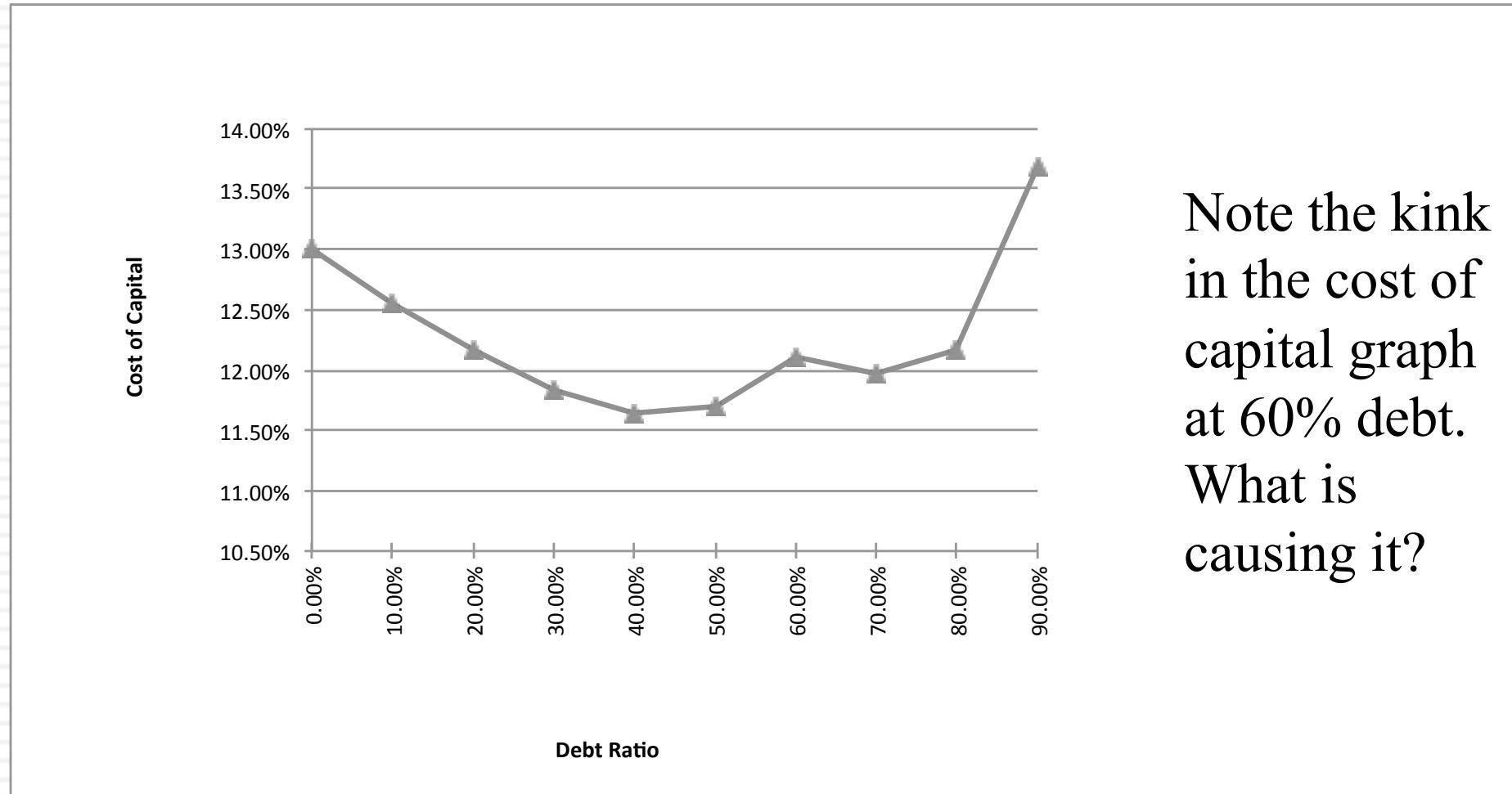
Step 3: Disney's cost of capital schedule...

Debt Ratio	Beta	Cost of Equity	Cost of Debt (after-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%

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Disney: Cost of Capital Chart

Figure 8.3: Costs of Equity, Debt and Capital: Disney

Disney: Cost of Capital Chart: 1997

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Note the kink in the cost of capital graph at 60% debt. What is causing it?

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

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

EBIT (1 – Tax Rate) = 10,032 (1 – 0.361) =	$6,410
+ Depreciation and amortization =	$2,485
– Capital expenditures =	$5,239
– Change in noncash working capital	$0
Free cash flow to the firm =	$3,657

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

Current enterprise value = $121,878 + 15,961 - 3,931 = 133,908

Value of firm = $ 133,908 =
$$\frac{FCFF_0(1+g)}{(\text{Cost of Capital } -g)} = \frac{3,657(1+g)}{(.0781 \ -g)}$$

Growth rate = (Firm Value * Cost of Capital – CF to Firm)/(Firm Value + CF to Firm)

= (133,908* 0.0781 – 3,657)/(133,908+ 3,657) = 0.0494 or 4.94%

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

☐Firm value =
$$\frac{FCFF_0(1+g)}{(\text{Cost of Capital } -g)} = \frac{3,657(1.0494)}{(.0716 \ -0.0484)} = \$172,935 \text{ million}$$

☐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

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

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 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 – $\dfrac{\text{Increase in Debt}}{\text{Share Price}}$

- 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 post-buyback 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 post-buyback 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 post-buyback 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 in EBIT	Year	EBIT	% Change 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%			

Standard deviation in %
change in EBIT = 19.17%

Recession	Decline in 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%

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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%

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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

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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.

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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%.

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Optimal Debt Ratio for a young, growth firm: Baidu

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Enterprise 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.

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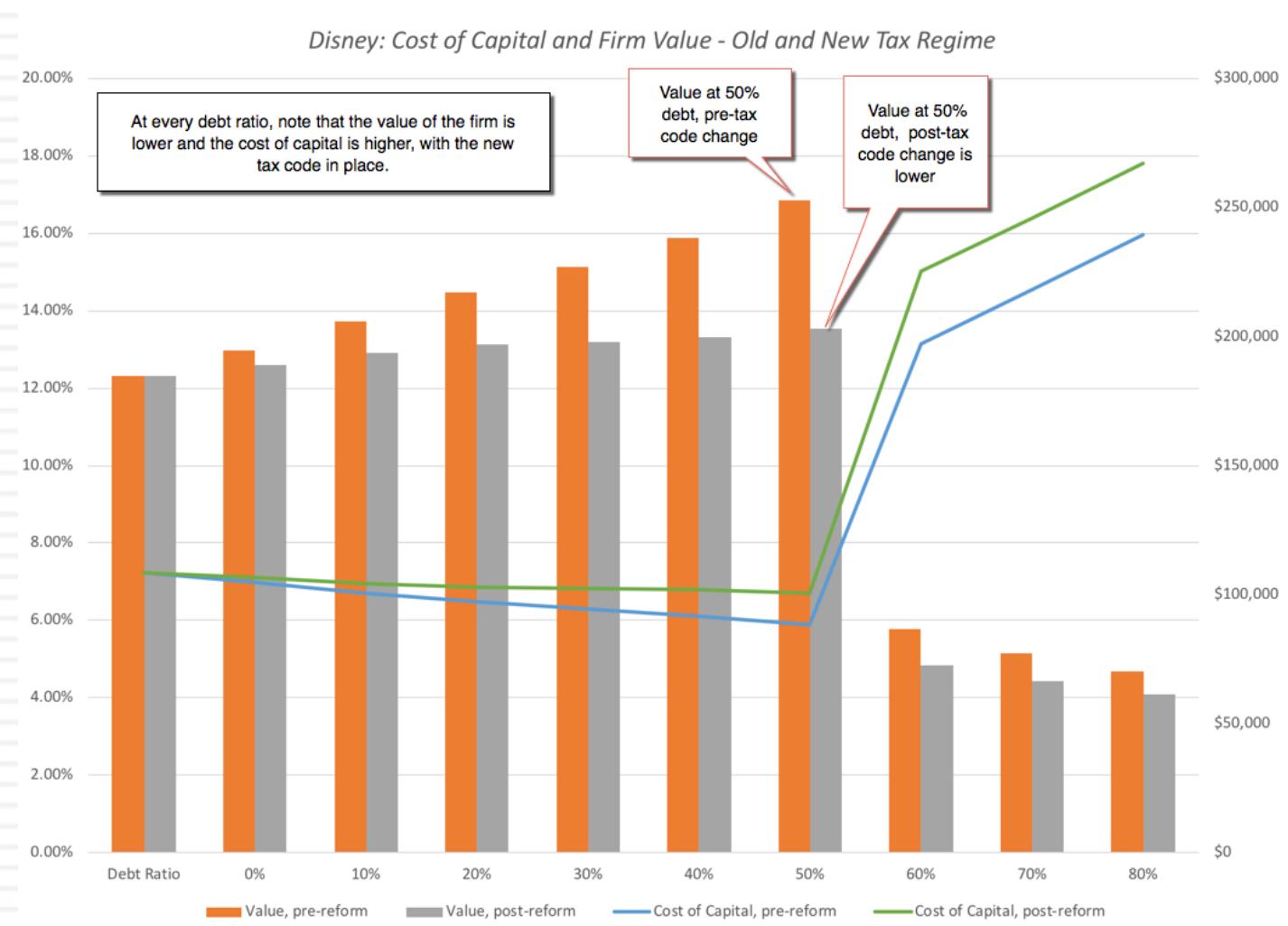
The US Tax Reform Act of 2017: Effects on the Optimal Debt Ratio

- Change in marginal tax rate: 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 after-tax 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
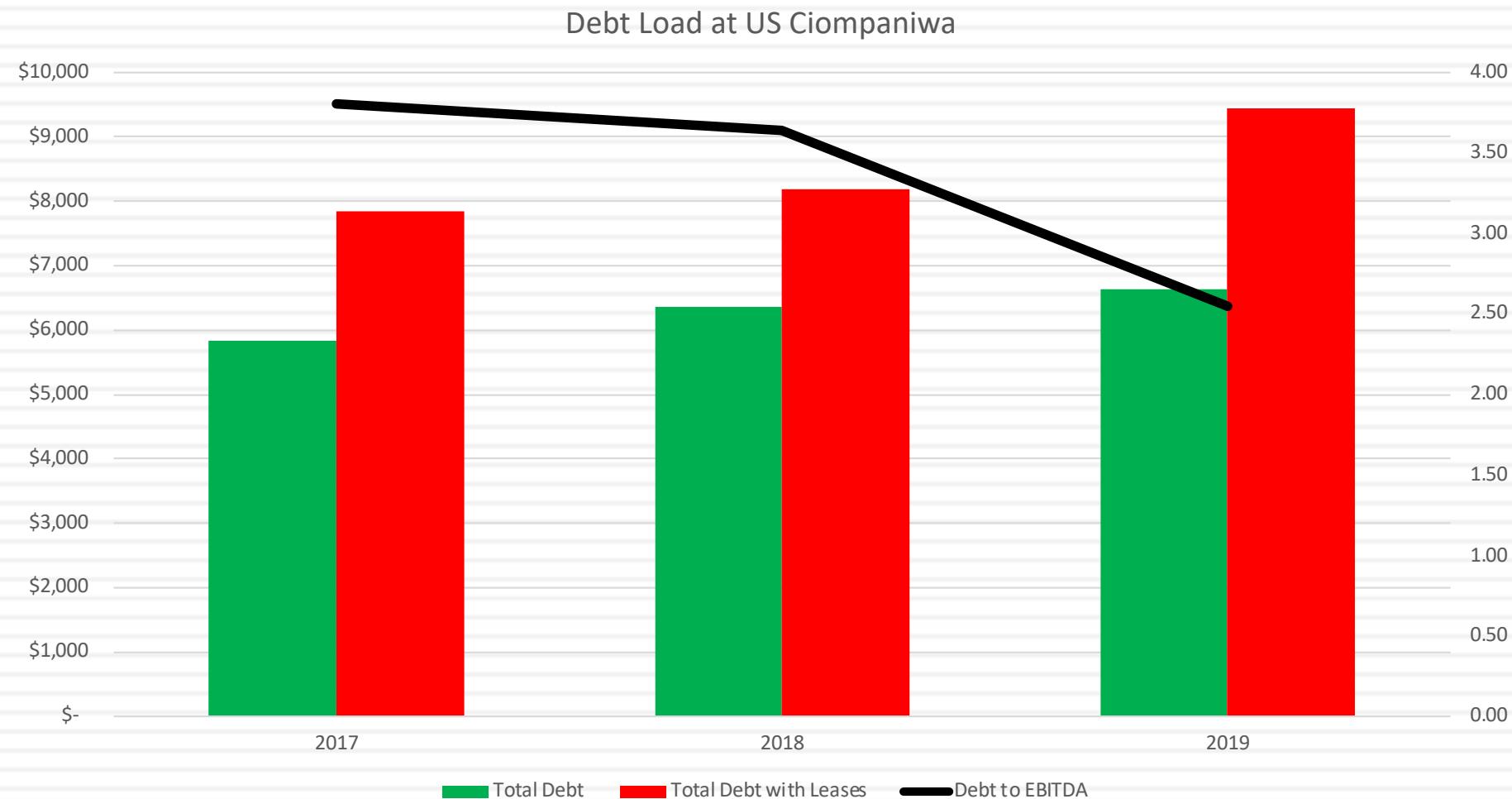
Effect on tax code on Debt Impact: Disney in 2018

Disney: Cost of Capital and Firm Value - Old and New Tax Regime

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Are US companies adjusting to the new tax code?

Debt Load at US Ciompaniwa

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Limitations of the Cost of Capital approach

- □ <u>It is static</u>: 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.

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II. Enhanced Cost of Capital Approach

- <u>Distress cost affected operating income</u>: 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).

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Estimating the Distress Effect- Disney

Rating	Drop in EBITDA (Low)	Drop in EBITDA (Medium)	Drop in EBITDA (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%

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The Optimal Debt Ratio with Indirect Bankruptcy Costs

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Enterprise 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.

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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		= $ 150 million
Equity after expansion	= 7% of $150	= $10.5 million
Existing Equity		= $ 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

	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.

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Financing Strategies for a financial institution

- The Regulatory minimum strategy: In this strategy, financial service firms try to stay with the bare minimum equity capital, as required by the regulatory ratios. In the most aggressive versions of this strategy, firms exploit loopholes in the regulatory framework to invest in those businesses where regulatory capital ratios are set too low (relative to the risk of these businesses).

- The Self-regulatory strategy: The objective for a bank raising equity is not to meet regulatory capital ratios but to ensure that losses from the business can be covered by the existing equity. In effect, financial service firms can assess how much equity they need to hold by evaluating the riskiness of their businesses and the potential for losses.

- Combination strategy: In this strategy, the regulatory capital ratios operate as a floor for established businesses, with the firm adding buffers for safety where needed..

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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%

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2. Pre-tax Cash flow Return

Company	EBITDA	EBIT	Enterprise Value	EBITDA/EV	EBIT/EV	Optimal Debt	Optimal 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.

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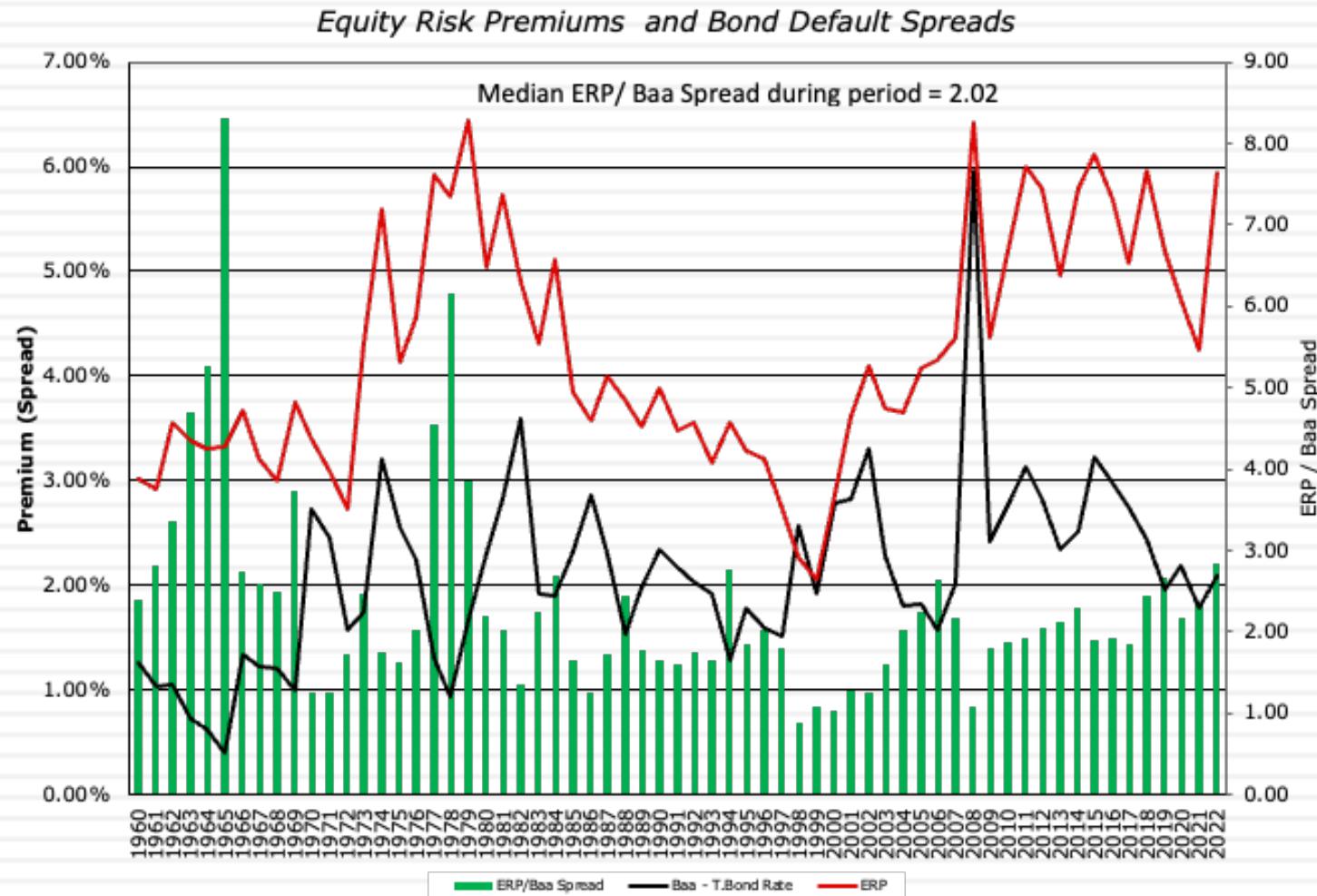
3. Operating Risk

☐ Firms that face more risk or uncertainty in their operations (and more variable operating income as a consequence) will have lower optimal debt ratios than firms that have more predictable operations.

☐ Operating risk enters the cost of capital approach in two places:

- ◻ Unlevered beta: Firms that face more operating risk will tend to have higher unlevered betas. As they borrow, debt will magnify this already large risk and push up costs of equity much more steeply.

- ◻ Bond ratings: For any given level of operating income, firms that face more risk in operations will have lower ratings. The ratings are based upon normalized income.

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

Equity Risk Premiums and Bond Default Spreads

Median ERP/ Baa Spread during period = 2.02

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⧗ Application 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?

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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

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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.

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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)

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Ratings and Default Probabilities: Results from Altman study of bonds

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

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

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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) = $ 227

Unlevered Value of Firm =   = $ 132,304

- I will assume the following parameters for Disney:

  - 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%

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Disney: APV at Debt Ratios

Debt Ratio	$ Debt	Tax Rate	Unlevered Firm Value	Tax Benefits	Bond Rating	Probability of Default	Expected Bankruptcy Cost	Value of Levered Firm
0%	$0	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.

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IV. Relative Analysis

- The "safest" place for any firm to be is close to the industry average. Me-tooism is a survival mechanism, and pushes managers towards peer group behavior.

- 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

Company	Debt to Capital Ratio		Net Debt to Capital Ratio		Comparable group	Debt to Capital Ratio		Net Debt to Capital Ratio	
	Book value	Market value	Book value	Market value		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%

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Getting past simple averages

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

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

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

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

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

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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%.

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Extending to the entire market

□ 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…
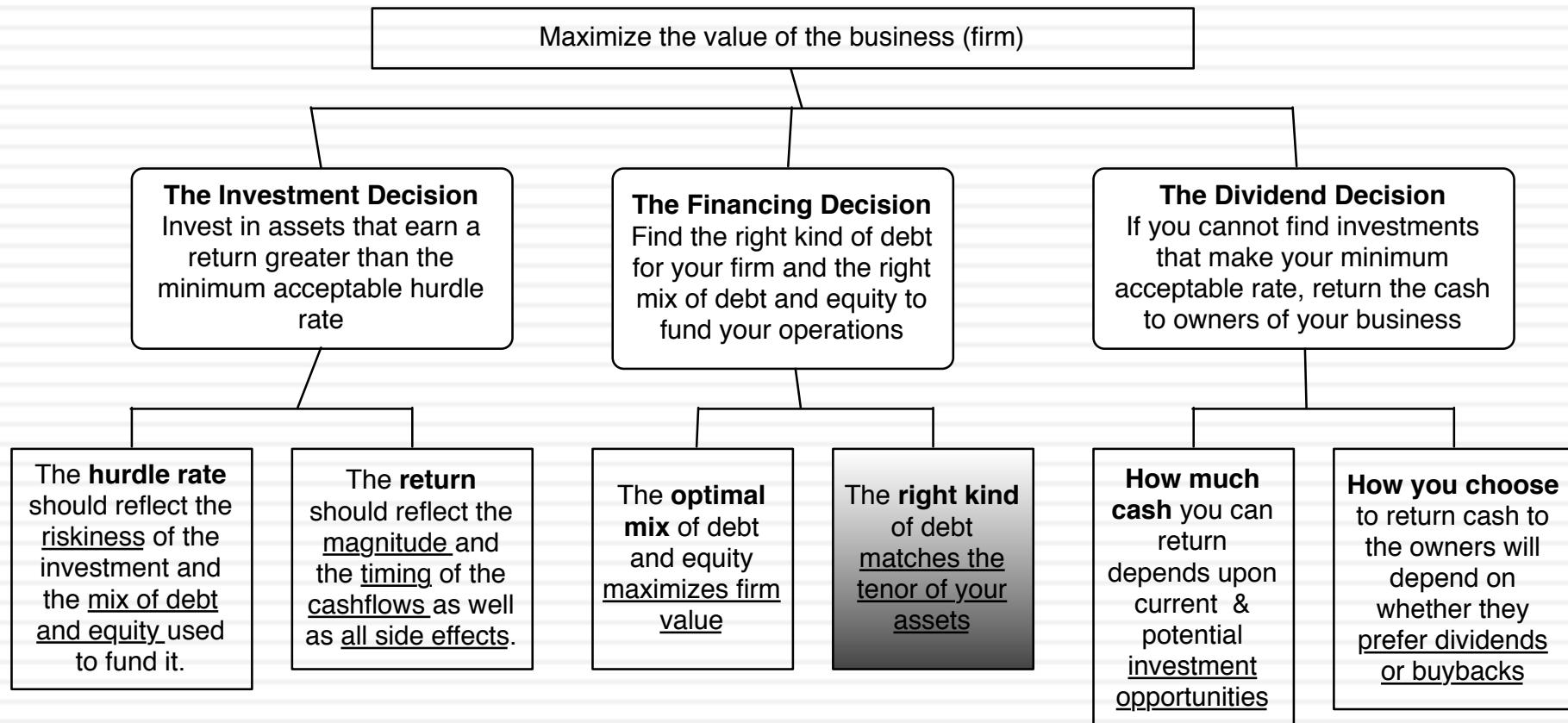
	Disney	Vale	Tata Motors	Baidu
Actual Debt Ratio	11.58%	35.48%	29.28%	5.23%
Optimal				
I. Operating income	35.00%	—	-	
II. Standard Cost of capital	40.00%	30.00% (actual) 50.00% (normalized)	20.00%	10.00%
III. Enhanced Cost of Capital	40.00%	30.00% (actual) 40.00% (normalized)	10.00%	10.00%
IV. APV	40.00%	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...

Back to the Big Picture!

Maximize the value of the business (firm)

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

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

The Dividend Decision
If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

The **hurdle rate** should reflect the riskiness of the investment and the mix of debt and equity used to fund it.

The **return** should reflect the magnitude and the timing of the cashflows as well as all side effects.

The **optimal mix** of debt and equity maximizes firm value

The **right kind** of debt matches the tenor of your assets

How much cash you can return depends upon current & potential investment opportunities

How you choose to return cash to the owners will depend on whether they prefer dividends or buybacks

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Now that we have an optimal.. And an actual.. What next?
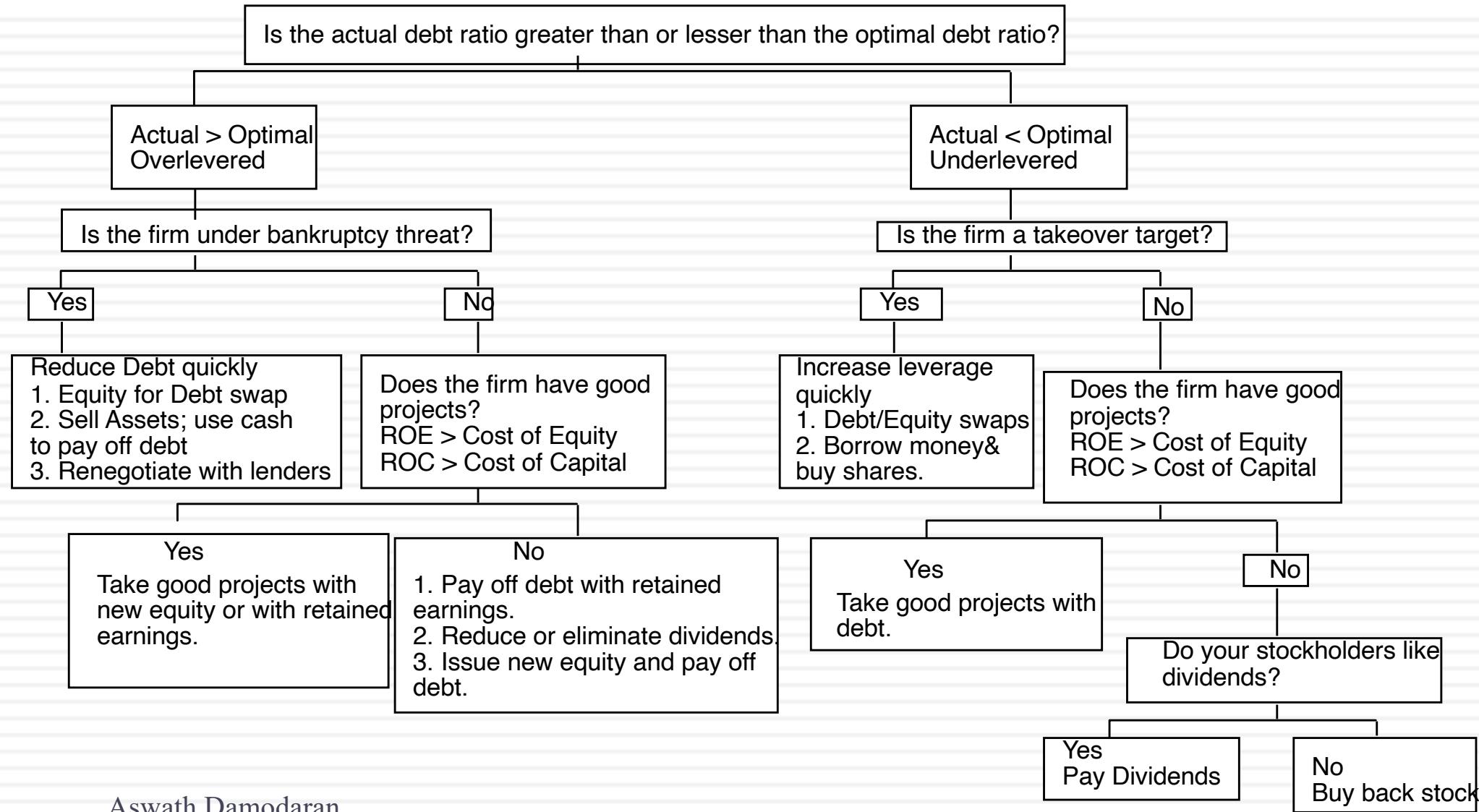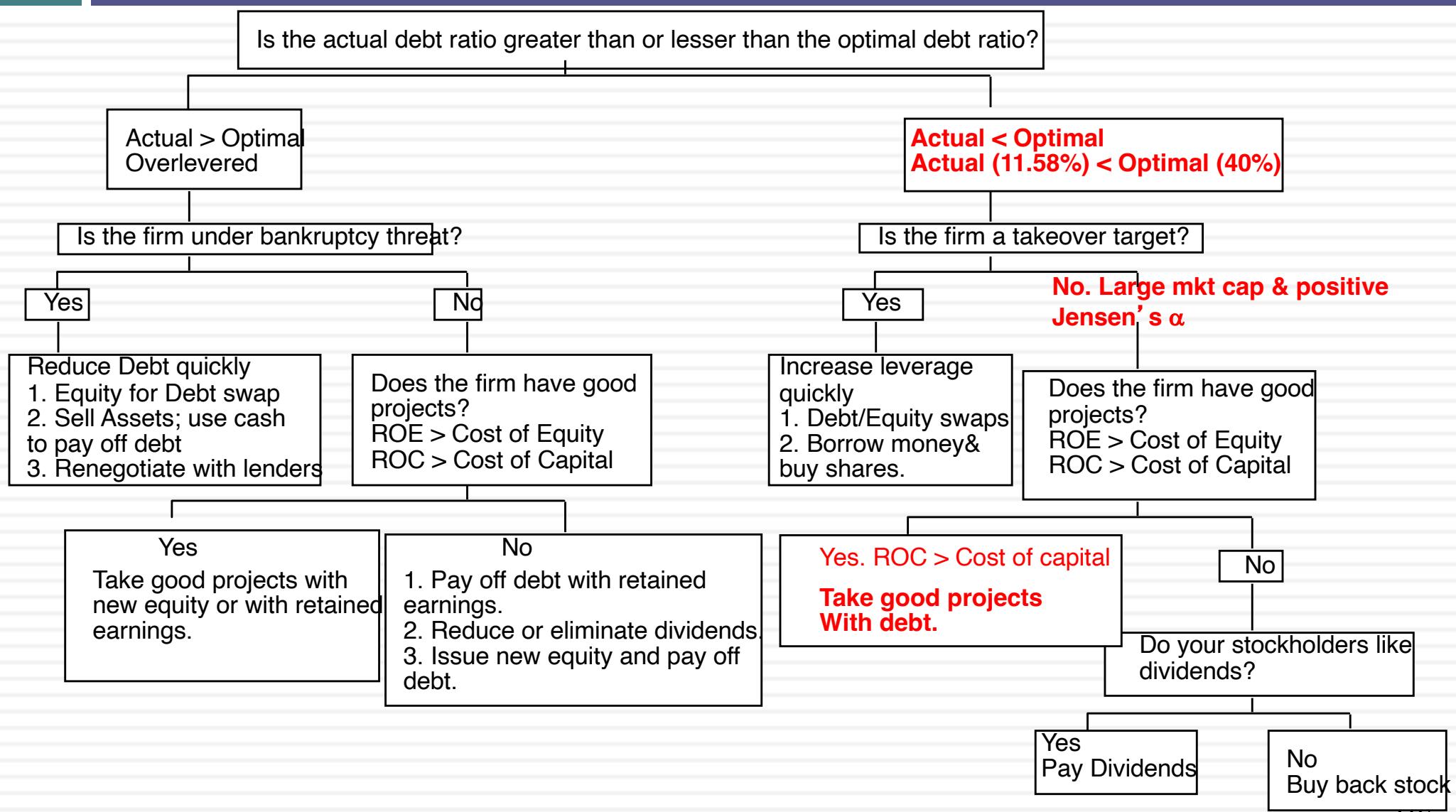
- At the end of the analysis of financing mix (using whatever tool or tools you choose to use), you can come to one of three conclusions:

  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

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A Framework for Getting to the Optimal

Is the actual debt ratio greater than or lesser than the optimal debt ratio?

Actual > Optimal — Overlevered

Actual < Optimal — Underlevered

Is the firm under bankruptcy threat?

Is the firm a takeover target?

Yes

No

Yes

No

Reduce Debt quickly
1. Equity for Debt swap
2. Sell Assets; use cash to pay off debt
3. Renegotiate with lenders

Does the firm have good projects?
ROE > Cost of Equity
ROC > Cost of Capital

Increase leverage quickly
1. Debt/Equity swaps
2. Borrow money& buy shares.

Does the firm have good projects?
ROE > Cost of Equity
ROC > Cost of Capital

Yes

Take good projects with new equity or with retained earnings.

No
1. Pay off debt with retained earnings.
2. Reduce or eliminate dividends.
3. Issue new equity and pay off debt.

Yes

Take good projects with debt.

No

Do your stockholders like dividends?

Yes
Pay Dividends

No
Buy back stock

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Disney: Applying the Framework

Is the actual debt ratio greater than or lesser than the optimal debt ratio?

Actual > Optimal
Overlevered

Actual < Optimal
Actual (11.58%) < Optimal (40%)

Is the firm under bankruptcy threat?

Is the firm a takeover target?

Yes

No

Yes

No. Large mkt cap & positive Jensen's α

Reduce Debt quickly
1. Equity for Debt swap
2. Sell Assets; use cash to pay off debt
3. Renegotiate with lenders

Does the firm have good projects?
ROE > Cost of Equity
ROC > Cost of Capital

Increase leverage quickly
1. Debt/Equity swaps
2. Borrow money& buy shares.

Does the firm have good projects?
ROE > Cost of Equity
ROC > Cost of Capital

Yes

Take good projects with new equity or with retained earnings.

No

1. Pay off debt with retained earnings.
2. Reduce or eliminate dividends.
3. Issue new equity and pay off debt.

Yes. ROC > Cost of capital

Take good projects With debt.

No

Do your stockholders like dividends?

Yes
Pay Dividends

No
Buy back stock

⧗ 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

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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

Sell operating assets and use cash to buy back stock or pay or special dividend

Borrow money and buy back stock or pay a large special dividend

To increase the debt ratio

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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.
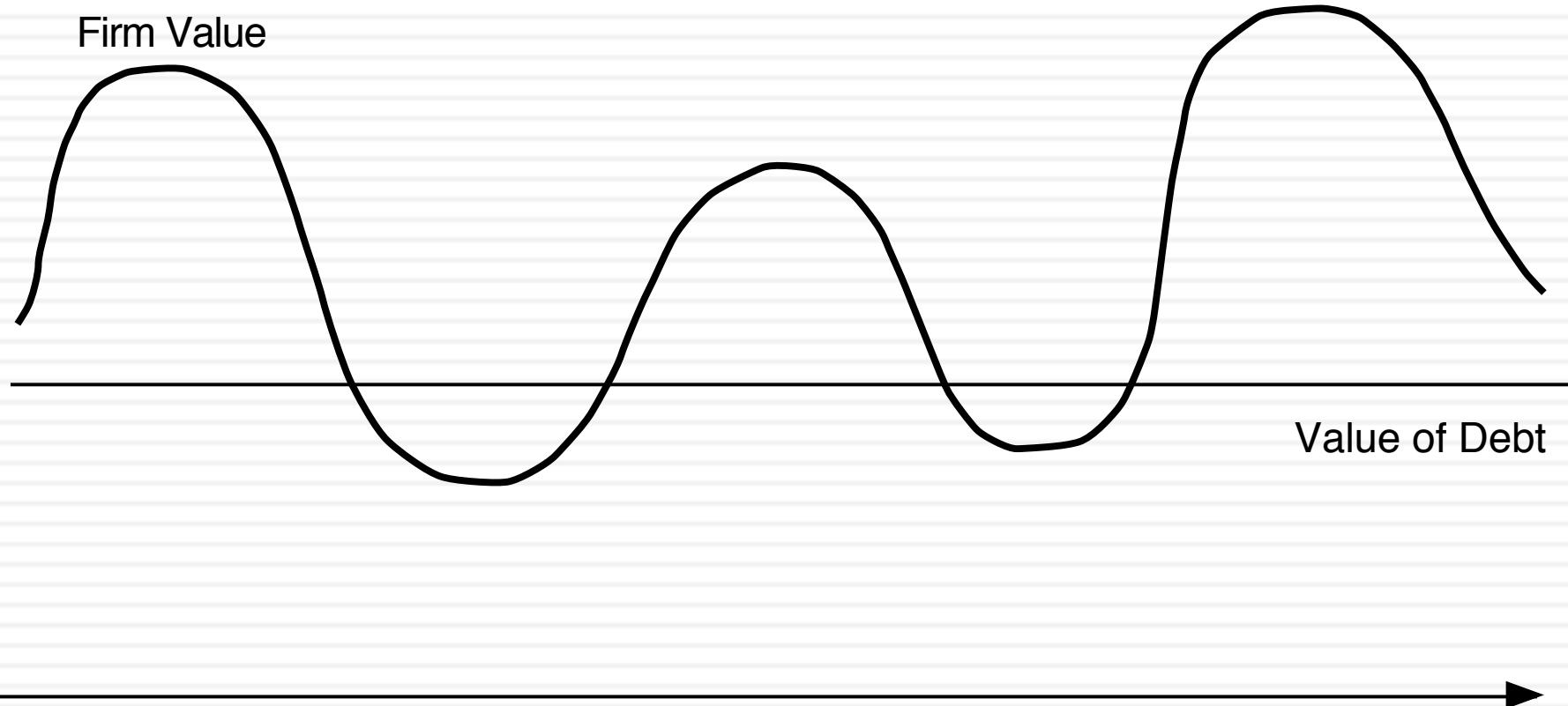
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Designing Debt: The Fundamental Principle

- 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.

- In essence, we are making debt look and behave like equity, in terms of flexibility.
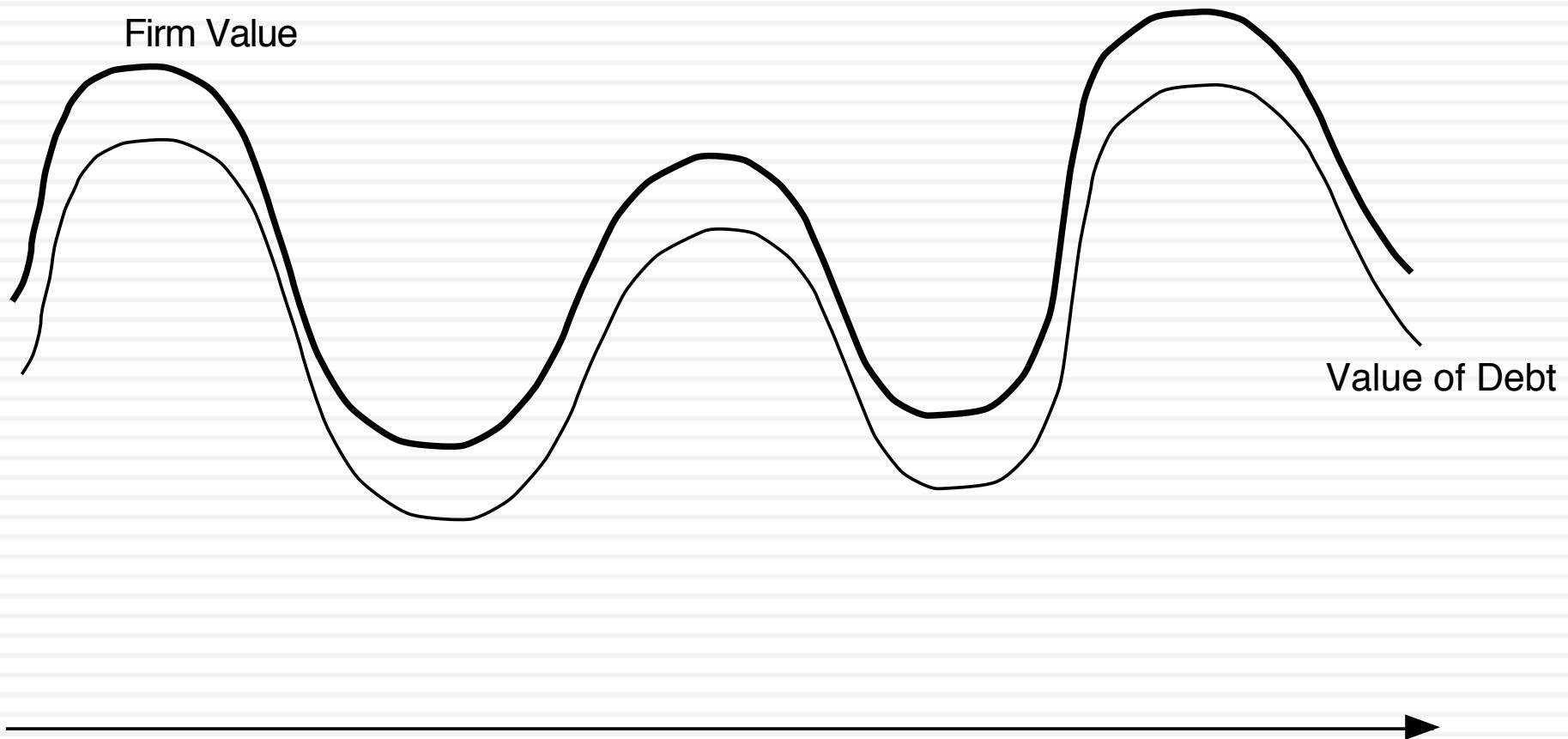
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Firm with mismatched debt

Firm Value

Value of Debt

Aswath Damodaran
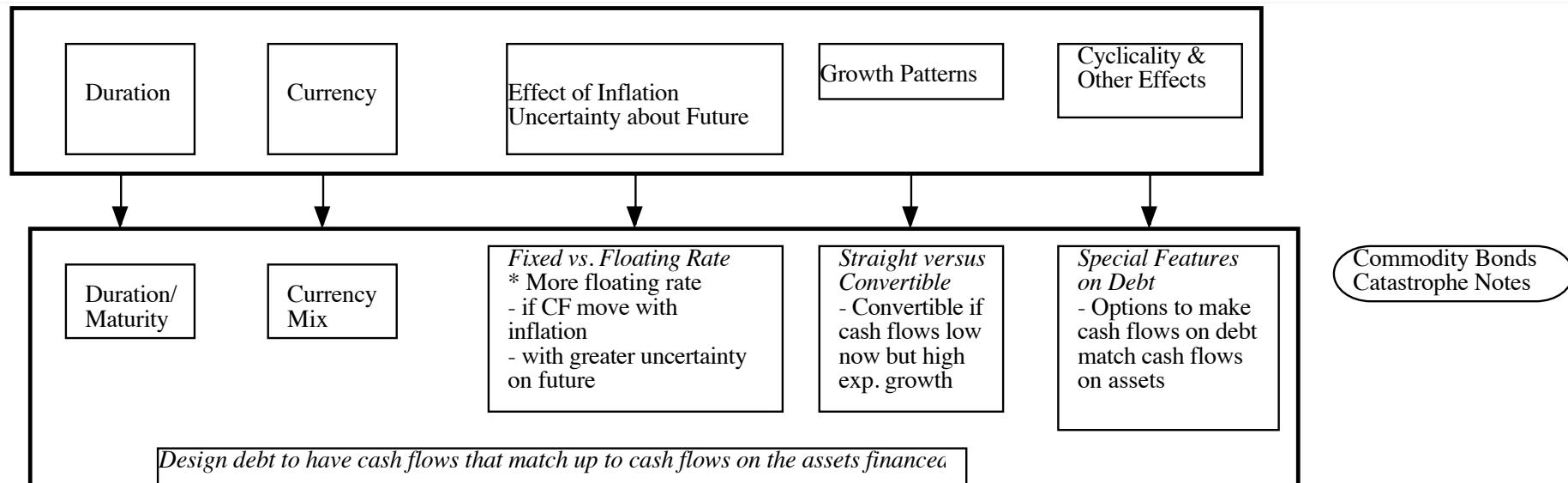
Firm with matched Debt

Firm Value

Value of Debt

Design the perfect financing instrument

□ The perfect financing instrument will

▪ Have all of the tax advantages of debt

▪ While preserving the flexibility offered by equity

Start with the Cash Flows on Assets/ Projects	Duration	Currency	Effect of Inflation Uncertainty about Future	Growth Patterns

Cyclicality & Other Effects

Define Debt Characteristics

Duration/ Maturity	Currency Mix	Fixed vs. Floating Rate * More floating rate - if CF move with inflation - with greater uncertainty on future	Straight versus Convertible - Convertible if cash flows low now but high exp. growth	Special Features on Debt - Options to make cash flows on debt match cash flows on assets

Commodity Bonds Catastrophe Notes

Design debt to have cash flows that match up to cash flows on the assets financed
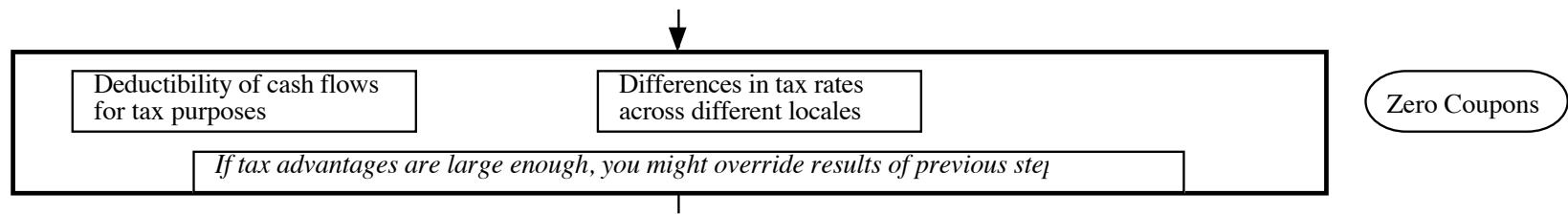
Aswath Damodaran

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.

Overlay tax preferences

Deductibility of cash flows for tax purposes	Differences in tax rates across different locales
If tax advantages are large enough, you might override results of previous step	

Zero Coupons

While keeping equity research analysts, ratings agencies and regulators applauding

- Ratings agencies want companies to issue equity, since it makes them safer.

- Equity research analysts want them not to issue equity because it dilutes earnings per share.

- Regulatory authorities want to ensure that you meet their requirements in terms of capital ratios (usually book value).

- Financing that leaves all three groups happy is nirvana.

Consider ratings agency & analyst concerns

Analyst Concerns - Effect on EPS - Value relative to comparables	Ratings Agency - Effect on Ratios - Ratios relative to comparables	Regulatory Concerns - Measures used

Operating Leases
MIPs
Surplus Notes

Can securities be designed that can make these different entities happy?

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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.
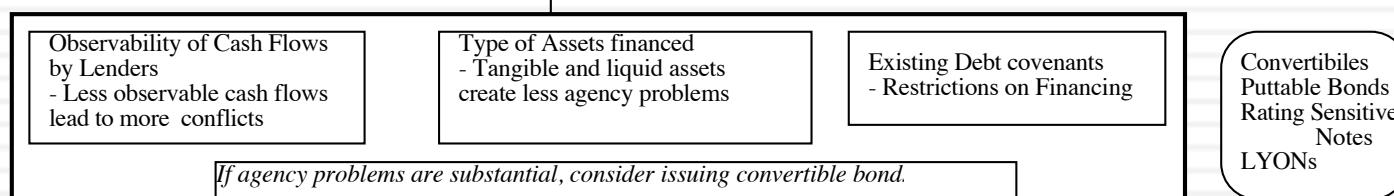
Aswath Damodaran

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

□ **There are some firms that face skepticism from bondholders when they go out to raise debt, because**

  ▫ Of their past history of defaults or other actions

  ▫ They are small firms without any borrowing history

□ **Bondholders tend to demand much higher interest rates from these firms to reflect these concerns.**

Factor in agency conflicts between stock and bond holders

Observability of Cash Flows by Lenders - Less observable cash flows lead to more conflicts	Type of Assets financed - Tangible and liquid assets create less agency problems	Existing Debt covenants - Restrictions on Financing	Convertibiles Puttable Bonds Rating Sensitive Notes LYONs

If agency problems are substantial, consider issuing convertible bond.

Aswath Damodaran

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
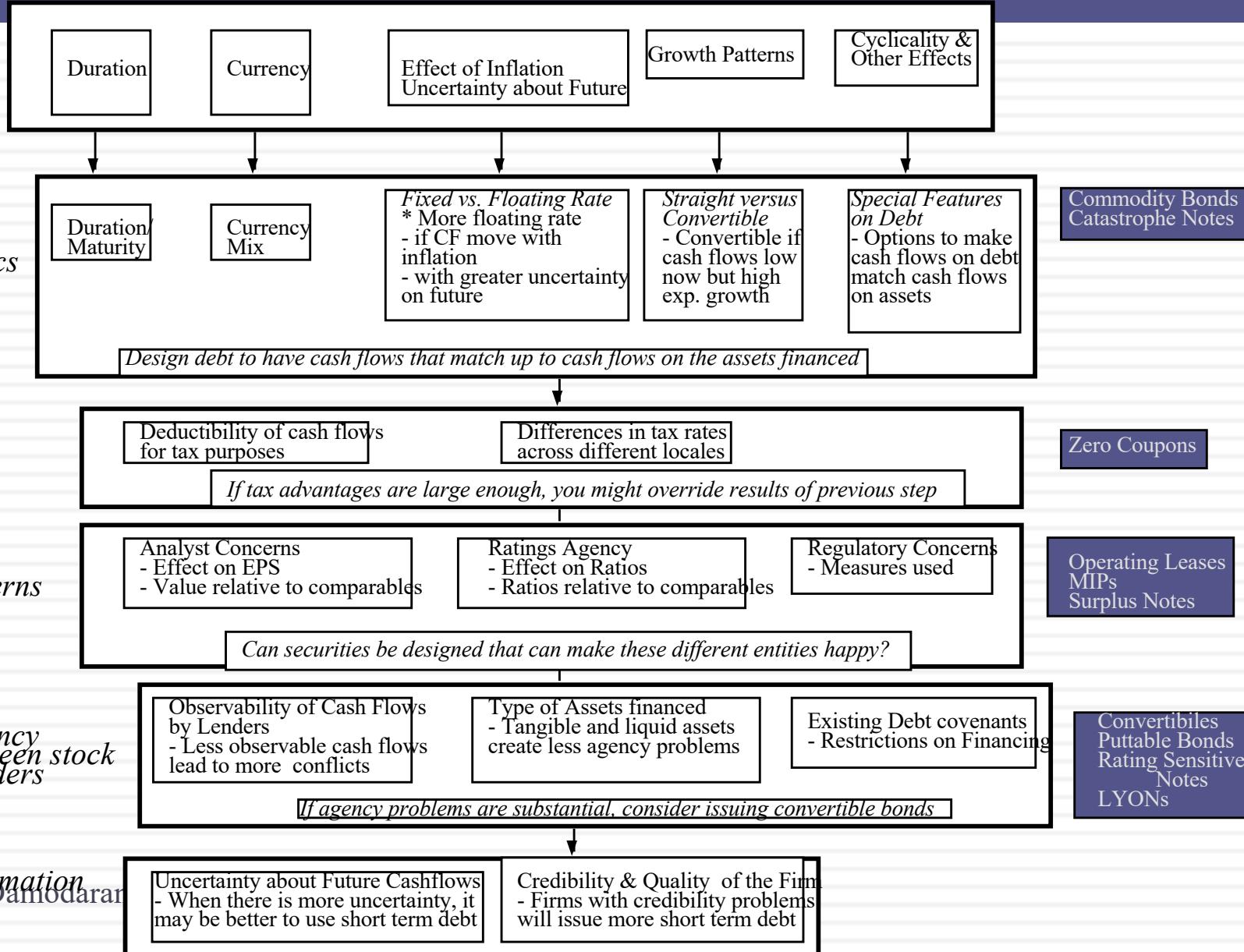
Start with the Cash Flows on Assets/Projects

Duration	Currency	Effect of Inflation Uncertainty about Future	Growth Patterns	Cyclicality & Other Effects

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Commodity Bonds
Catastrophe Notes

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Convertibiles
Puttable Bonds
Rating Sensitive Notes
LYONs

If agency problems are substantial, consider issuing convertible bonds

Consider Information Asymmetries

Uncertainty about Future Cashflows - When there is more uncertainty, it may be better to use short term debt	Credibility & Quality of the Firm - Firms with credibility problems will issue more short term debt

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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
Studio entertainment	Movie projects are likely to • Be short-term • Have cash outflows primarily in dollars (because Disney makes most of its movies in the U.S.), but cash inflows could have a substantial foreign currency component (because of overseas revenues) • Have net cash flows that are heavily driven by whether the movie is a hit, which is often difficult to predict	Debt should be 1. Short-term 2. Mixed currency debt, reflecting audience make-up. 3. If possible, tied to the success of movies.
Media networks	Projects are likely to be 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)	Debt should be 1. Short-term 2. Primarily dollar debt 3. If possible, linked to network ratings
Park resorts	Projects are likely to be 1. Very long-term 2. 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	Debt should be 1. Long-term 2. Mix of currencies, based on tourist makeup at the park.
Consumer products	Projects are likely to be short- to medium-term and linked to the success of the movie division; most of Disney's product offerings and licensing revenues are derived from their movie productions	Debt should be 1. Medium-term 2. Dollar debt
Interactive	Projects are likely to be short-term, with high growth potential and significant risk. While cash flows will initially be primarily in US dollars, the mix of currencies will shift as the business ages.	Debt should be short-term, convertible US dollar debt.

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⌛ 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.

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Duration of Disney Theme Park

Year	Annual Cashflow	Terminal Value	Present Value @8.46%	Present 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

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

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The perfect theme park debt…

☐ 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.

    ▫ You can become increasingly creative, but you have to weigh off whether the market is big enough to sustain this customization.

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III. Firm-wide financing

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

- 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.

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Disney: Historical Data

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%
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. In effect, if this regression is right, Disney's firm value drops by 2.33% for each 1% increase in interest rates.

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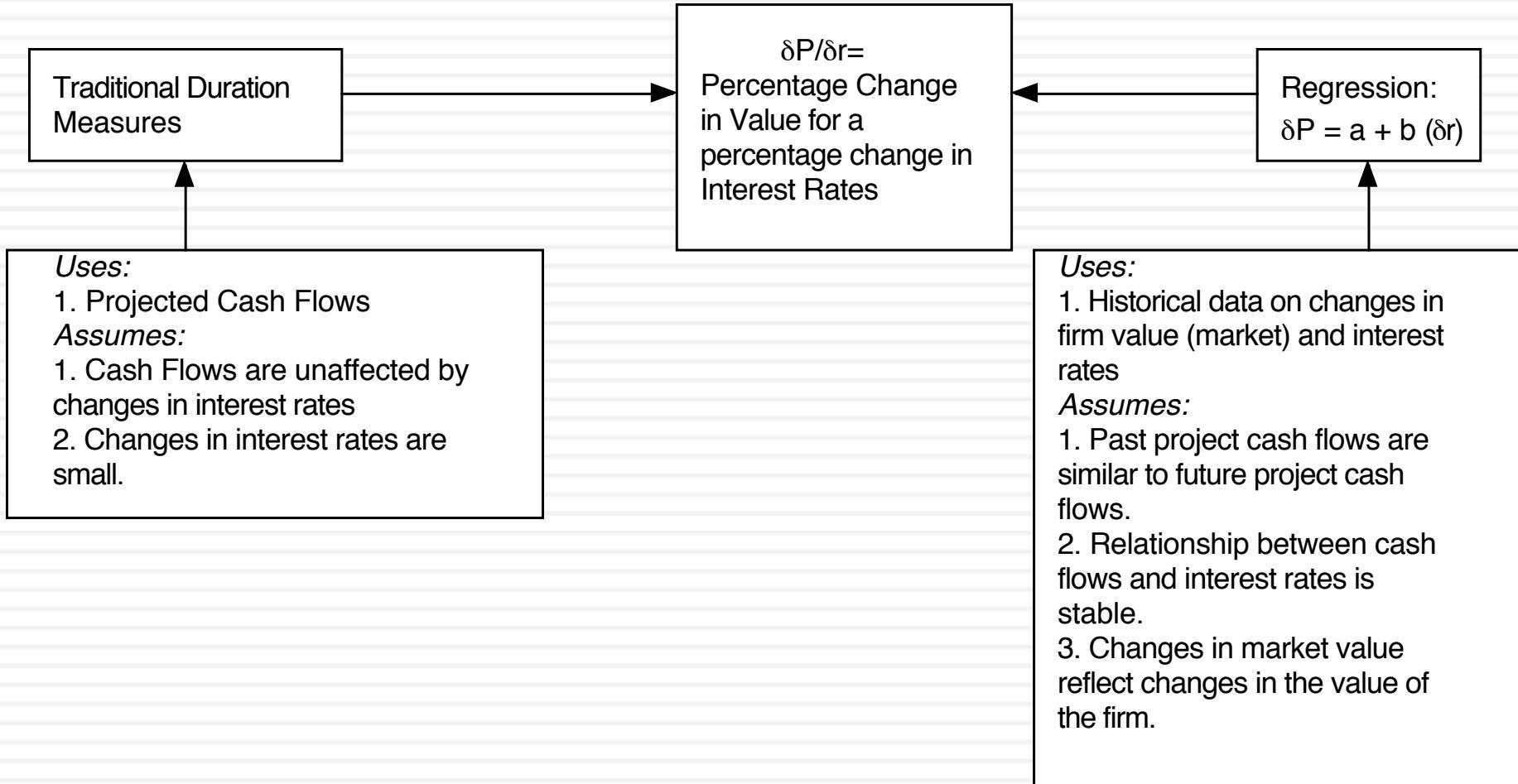
- The duration of a straight bond or loan issued by a company can be written in terms of the coupons (interest payments) on the bond (loan) and the face value of the bond to be –

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

- The duration of a bond measures how much the price of the bond changes for a unit change in interest rates.

- Holding other factors constant, the duration of a bond will increase with the maturity of the bond, and decrease with the coupon rate on the bond.

Duration: Comparing Approaches

| Traditional Duration Measures | → | $\delta P/\delta r=$ Percentage Change in Value for a percentage change in Interest Rates | ← | Regression: $\delta P = a + b\,(\delta r)$ |

Uses:
1. Projected Cash Flows
Assumes:
1. Cash Flows are unaffected by changes in interest rates
2. Changes in interest rates are small.

Uses:
1. Historical data on changes in firm value (market) and interest rates
Assumes:
1. Past project cash flows are similar to future project cash flows.
2. Relationship between cash flows and interest rates is stable.
3. Changes in market value reflect changes in the value of the firm.

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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[a])   (1.40)

Conclusion: 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[a])

 Conclusion: Disney is sensitive to economic growth

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

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

                (0.13)   (2.05[a])

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

III. Sensitivity to Currency Changes

- How sensitive is the firm's value and operating income to changes in exchange rates?

- The answer to this question is important, because
  - it provides a measure of how sensitive cash flows and firm value are to changes in the currency
  - it provides guidance on whether the firm should issue debt in another currency that it may be exposed to.

- If cash flows and firm value are sensitive to changes in the dollar, the firm should
  - figure out which currency its cash flows are in;
  - and issued some debt in that currency

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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)

Conclusion: 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])

Conclusion: 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[a])   (2.76[a])

   <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

Business	Interest rates	GDP 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 Entertainment	-6.47	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%

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Recommendations for Disney

- ☐ The debt issued should be long term and should have <u>duration of about 4.3 years.</u>

- ☐ A significant portion of the debt <u>should be floating rate debt,</u> 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 <u>portion of the debt should be in foreign currencies.</u> The specific currency used and the magnitude of the foreign currency debt should reflect where Disney makes its revenues. One simple proxy is the 18% that Disney derives in revenues from outside the US.

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, about 5.49% of the debt is in non-US dollar currencies (Indian rupees and Hong Kong dollars), 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 <u>swap some of its existing fixed rate, dollar debt for floating rate, foreign currency debt</u>. Given Disney's standing in financial markets and its large market capitalization, this should not be difficult to do.

- ☐ If Disney is <u>planning new debt issues</u>, 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

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

  Recommendation: Long-term, dollar denominated, fixed rate debt

  Actual: 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.

  - Actual: 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.

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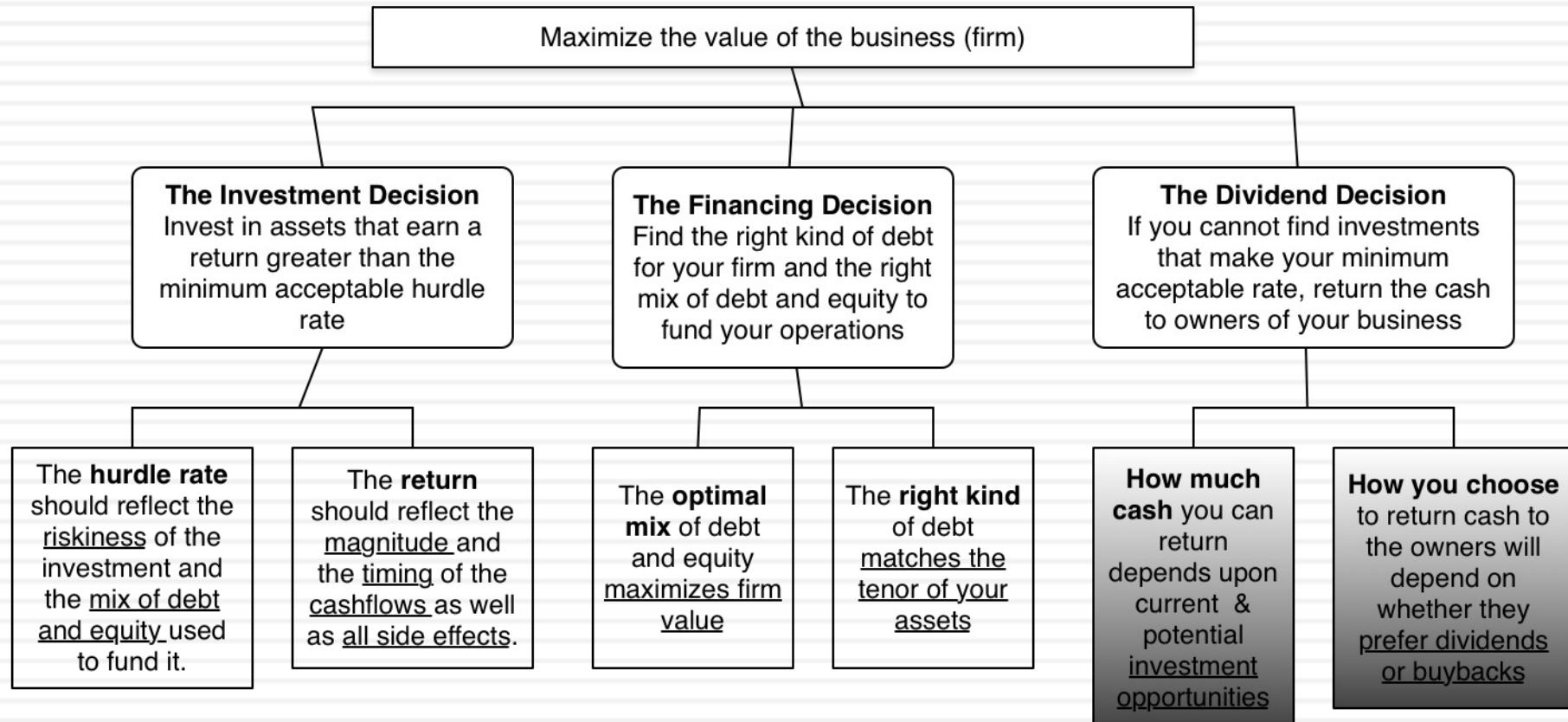
And for Tata Motors and Baidu

- *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.
  - Recommendation: Medium to long term, fixed rate debt in a mix of currencies reflecting operations.
  - Actual: 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.
  - Actual: 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.

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RETURNING CASH TO THE OWNERS: DIVIDEND POLICY

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

First Principles

Maximize the value of the business (firm)

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

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

The Dividend Decision
If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

The **hurdle rate** should reflect the riskiness of the investment and the mix of debt and equity used to fund it.

The **return** should reflect the magnitude and the timing of the cashflows as well as all side effects.

The **optimal mix** of debt and equity maximizes firm value

The **right kind** of debt matches the tenor of your assets

How much cash you can return depends upon current & potential investment opportunities

How you choose to return cash to the owners will depend on whether they prefer dividends or buybacks

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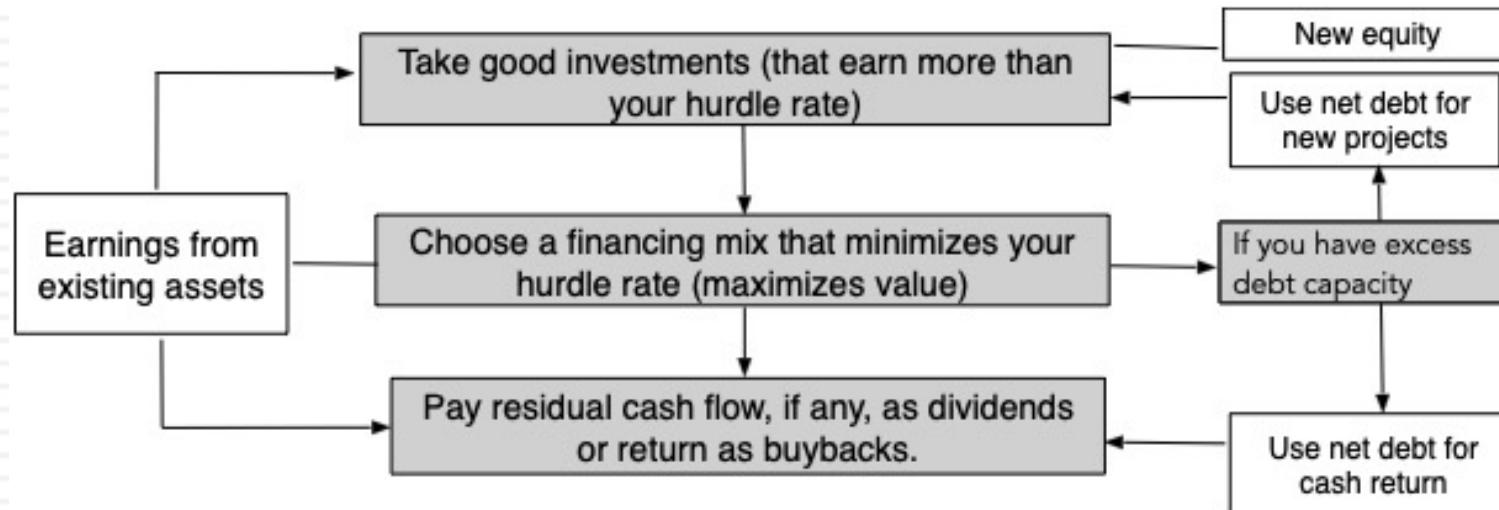
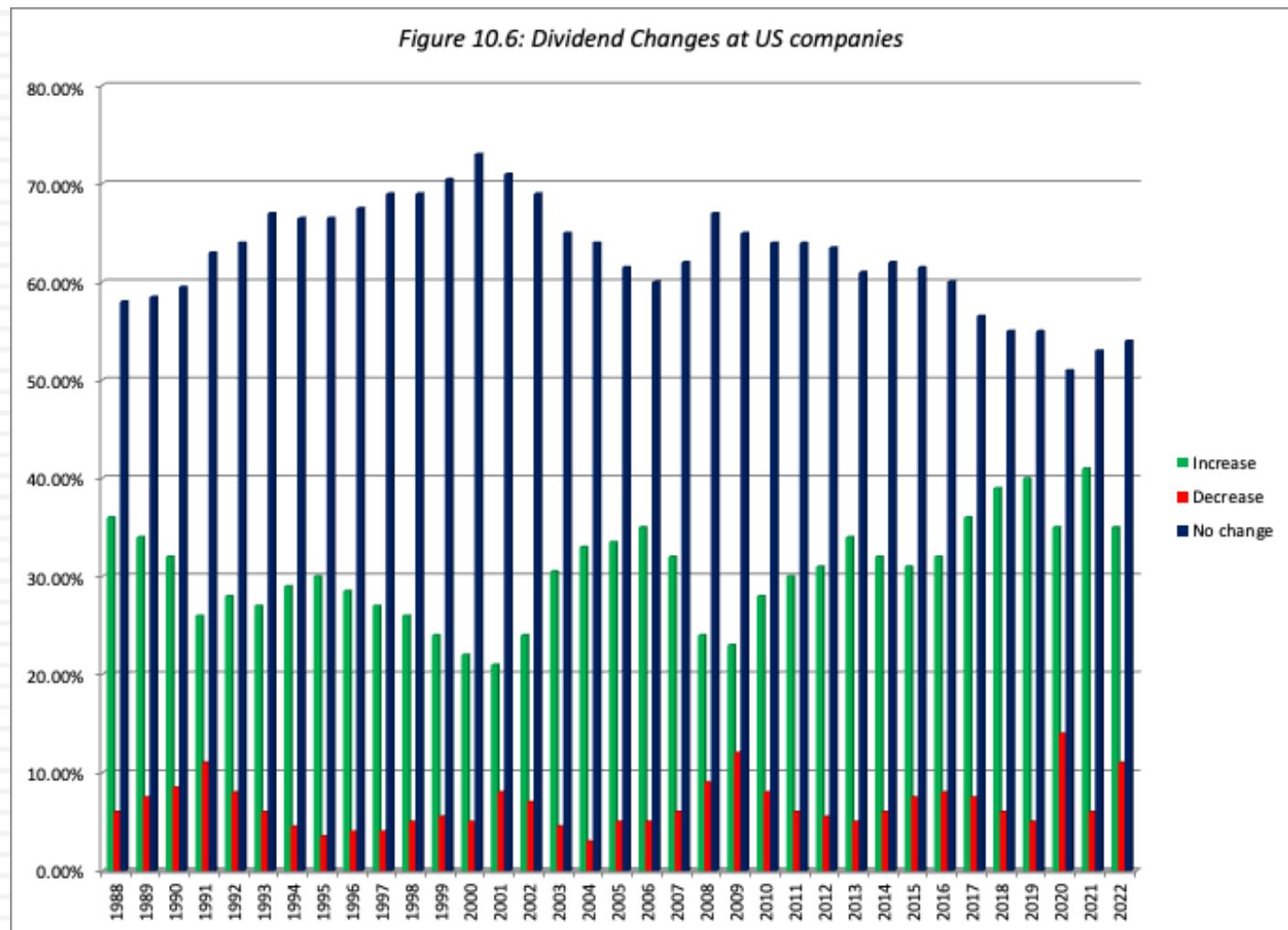# Steps to the Dividend Decision… if it is treated as a residual claim

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.

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I. Dividends are sticky

Figure 10.6: Dividend Changes at US companies

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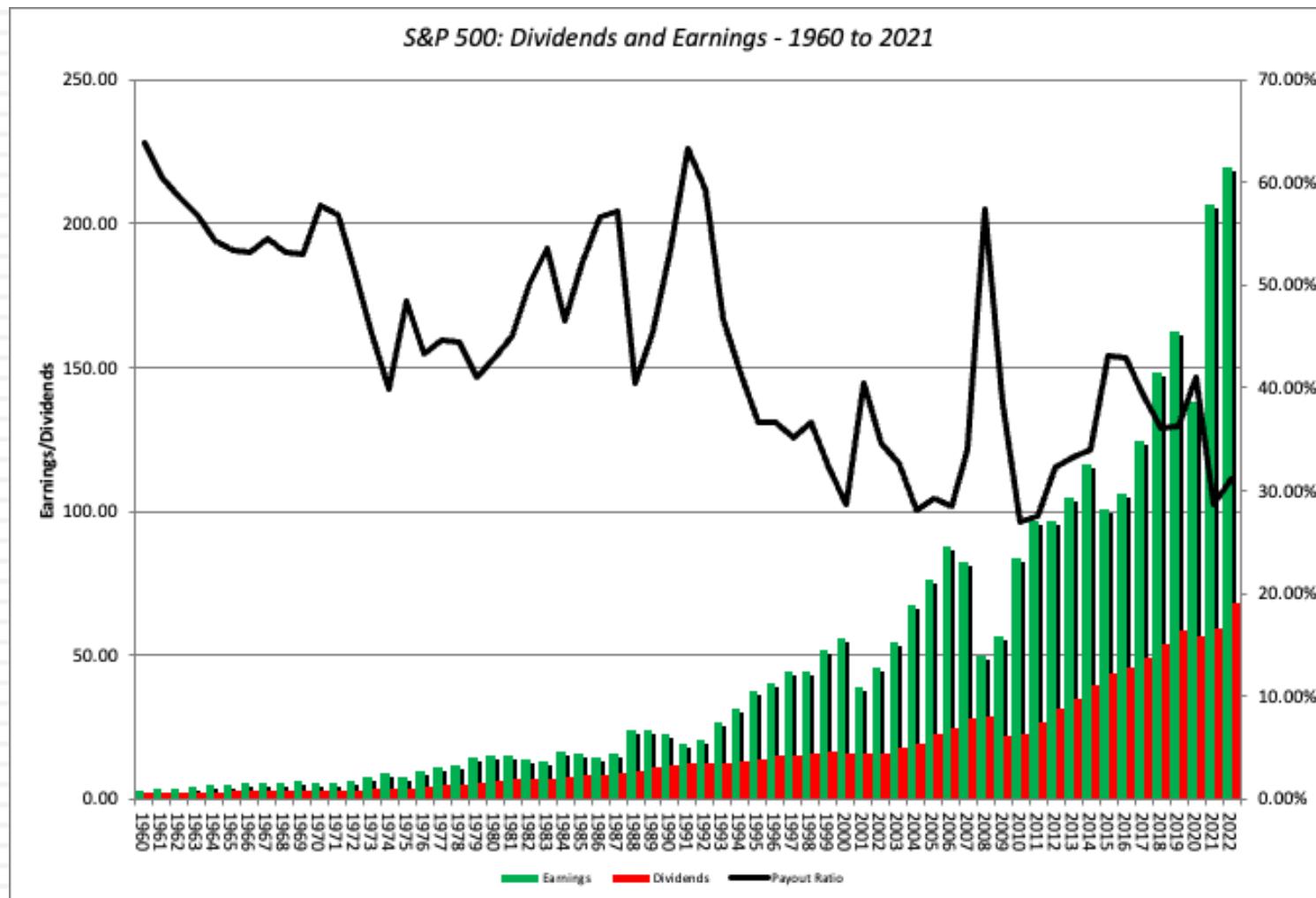# In 2020, a crisis year for many companies...here is what they did..

- 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.
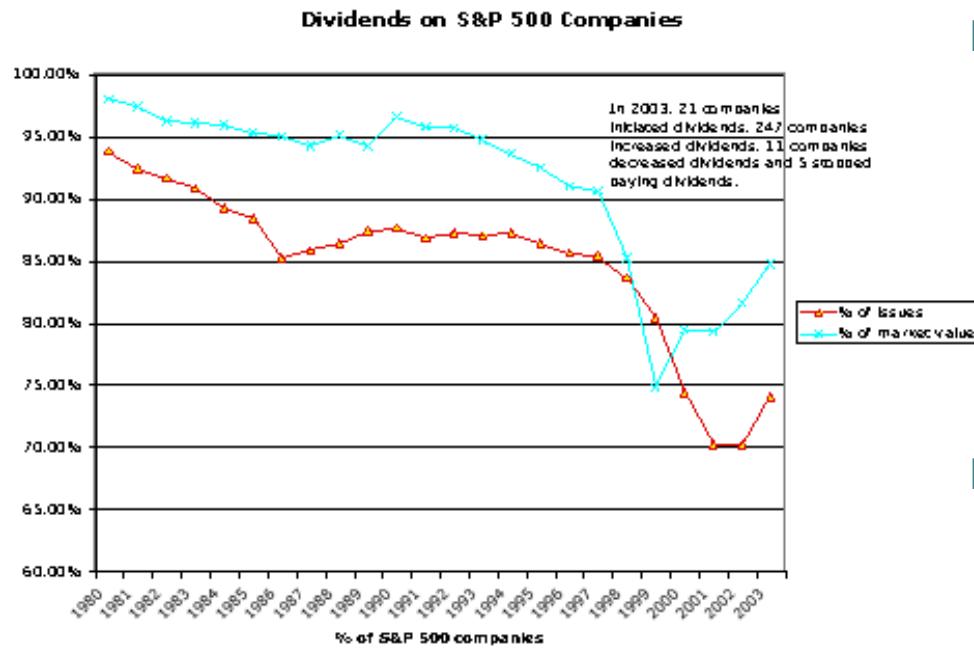
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II. Dividends tend to follow earnings

S&P 500: Dividends and Earnings - 1960 to 2021

Aswath Damodaran

III. Are affected by changes in tax laws…

In 2003

Dividends on S&P 500 Companies

In 2003, 21 companies initiated dividends, 247 companies increased dividends, 11 companies decreased dividends and 5 stopped paying dividends.
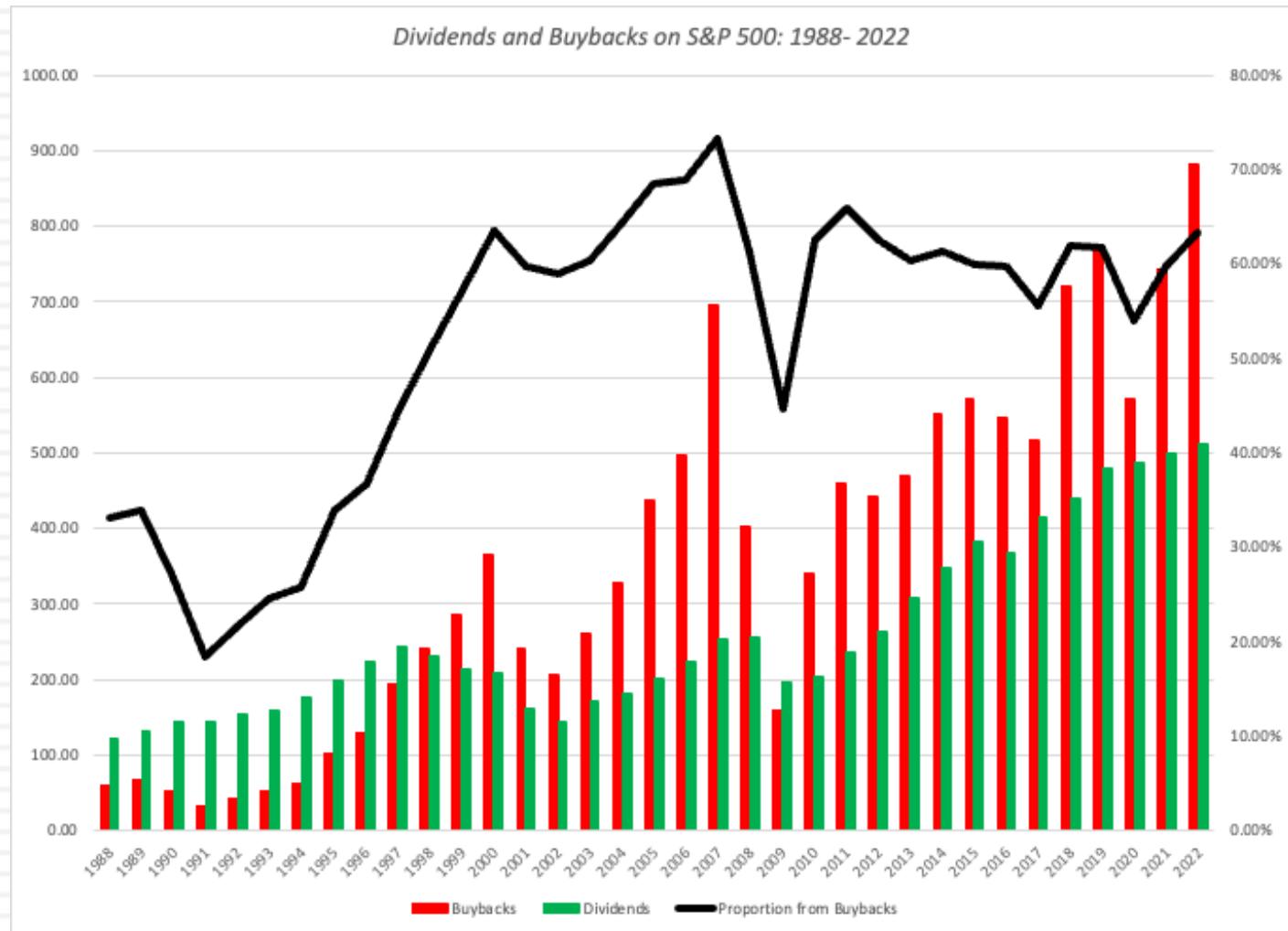
% of S&P 500 companies

Tax rates on dividends brought down to the tax rate on capital gains 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…

Dividends and Buybacks on S&P 500: 1988- 2022

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And its going global.. In 2022

Age Decile	Number of firms	Dividends			Buybacks		
		% of Payers	$ Dividends	Dividend Yield	% buying back	$ Buybacks	Buybacks as % of Cash Return
Eastern Europe & Russia	357	41.18%	$4,130	4.28%	14.01%	$674	14.03%
Australia & NZ	1,895	25.01%	$64,082	3.99%	9.92%	$20,937	24.63%
Latin America & Caribbean	1,023	60.90%	$67,914	4.26%	28.15%	$24,988	26.90%
Canada	2,900	12.45%	$71,749	2.74%	16.28%	$76,480	51.60%
India	4,149	33.00%	$45,820	1.35%	3.74%	$4,872	9.61%
Africa and Middle East	2,409	53.42%	$164,956	3.48%	12.08%	$8,015	4.63%
UK	1,232	45.62%	$107,251	3.53%	28.17%	$75,643	41.36%
Small Asia	9,591	54.49%	$184,032	3.17%	11.96%	$17,193	8.54%
Japan	3,974	68.70%	$114,262	2.15%	28.51%	$57,410	33.44%
EU & Environs	5,952	41.06%	$372,319	2.79%	21.47%	$214,706	36.58%
China	7,266	76.59%	$510,651	3.34%	20.56%	$68,615	11.85%
United States	7,165	26.20%	$636,300	1.58%	40.87%	$1,144,809	64.28%
Global	47,913	47.30%	$2,343,465	2.41%	20.39%	$1,714,342	42.25%

$ values are all in millions of US $

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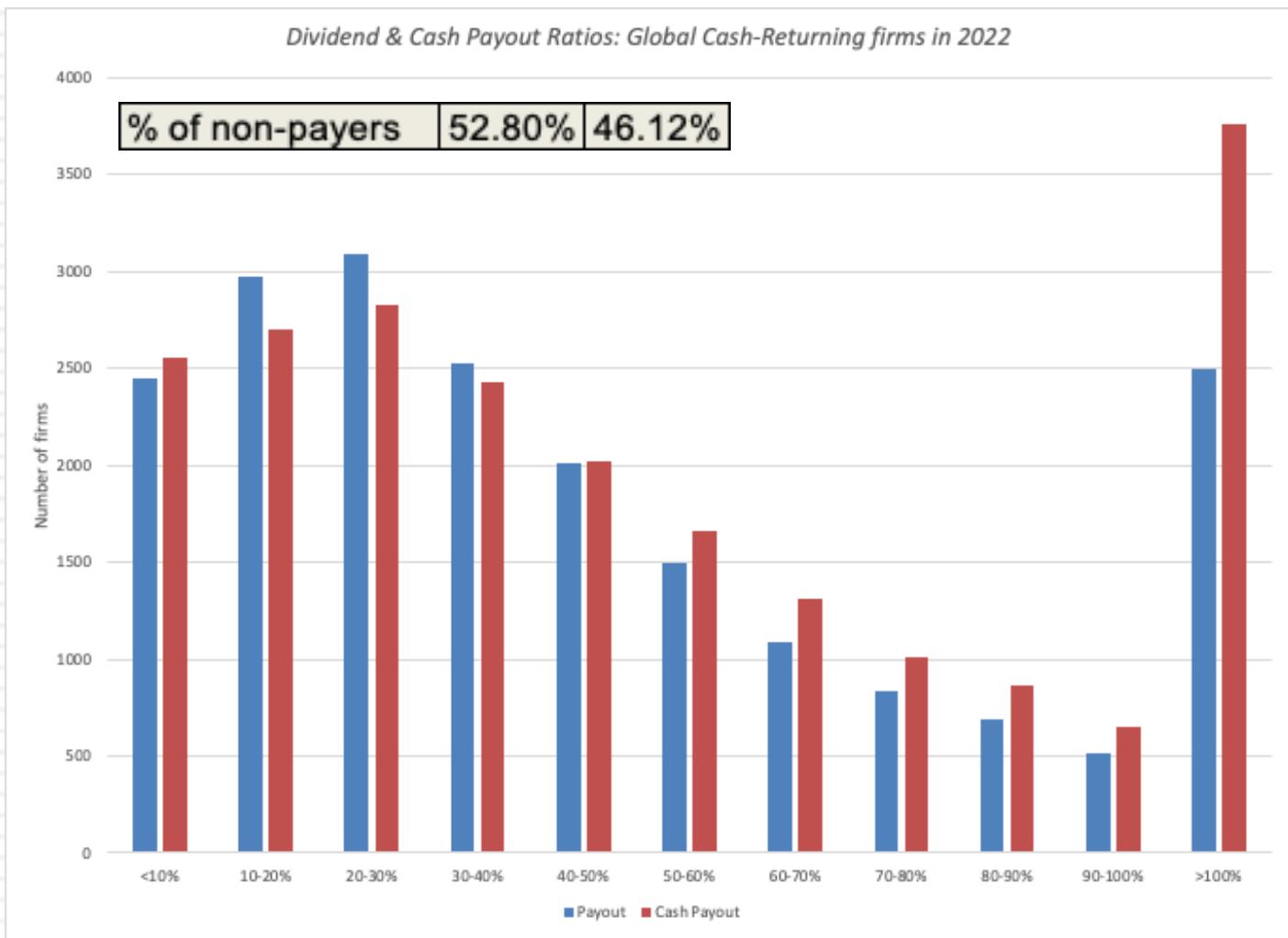# Measures of Dividend Policy

- 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.
- Both measures, though, focus on just dividends, even as companies increasingly turn to buybacks. An expanded version would replace dividends with cash returned = dividends + buybacks.
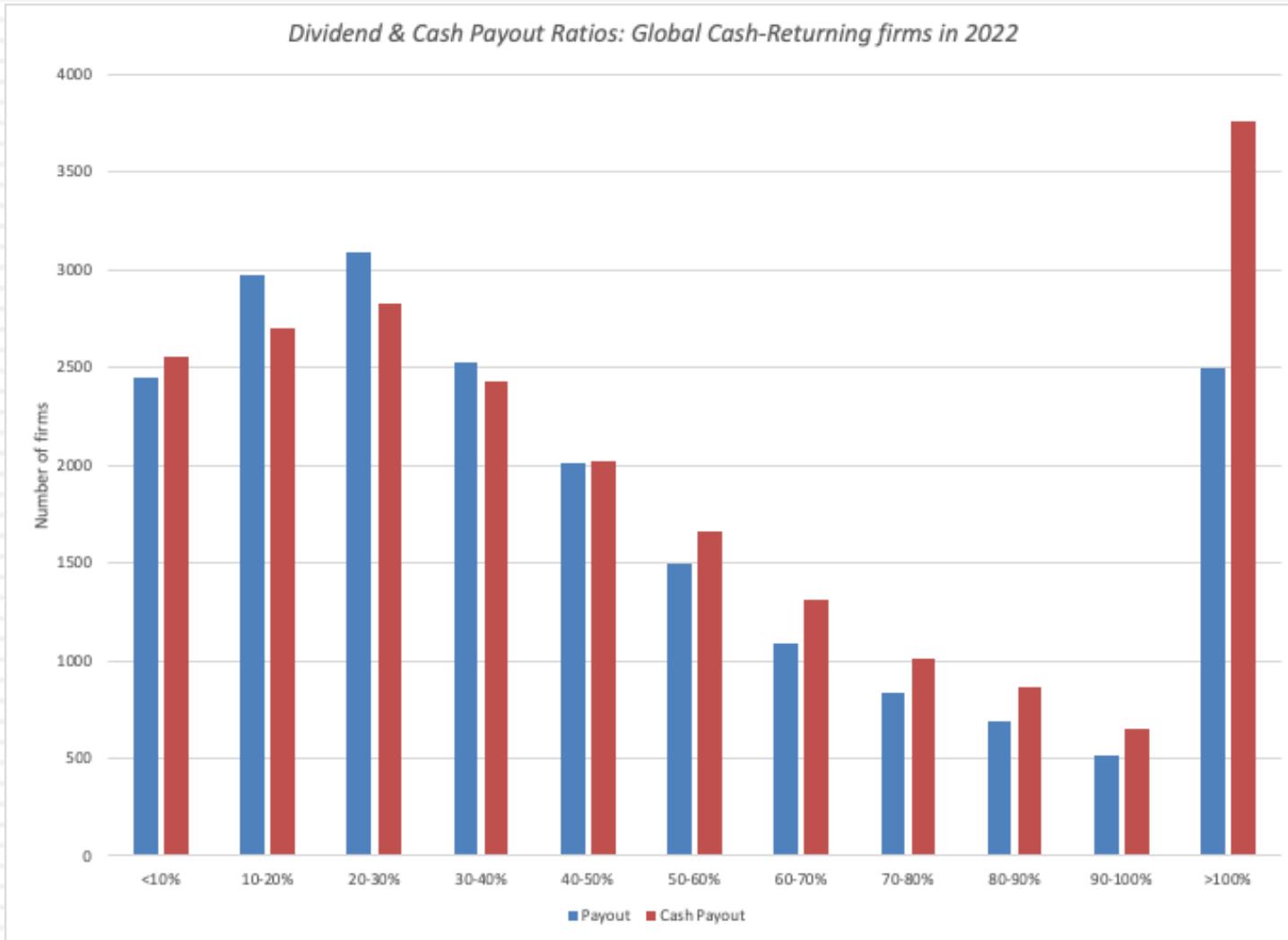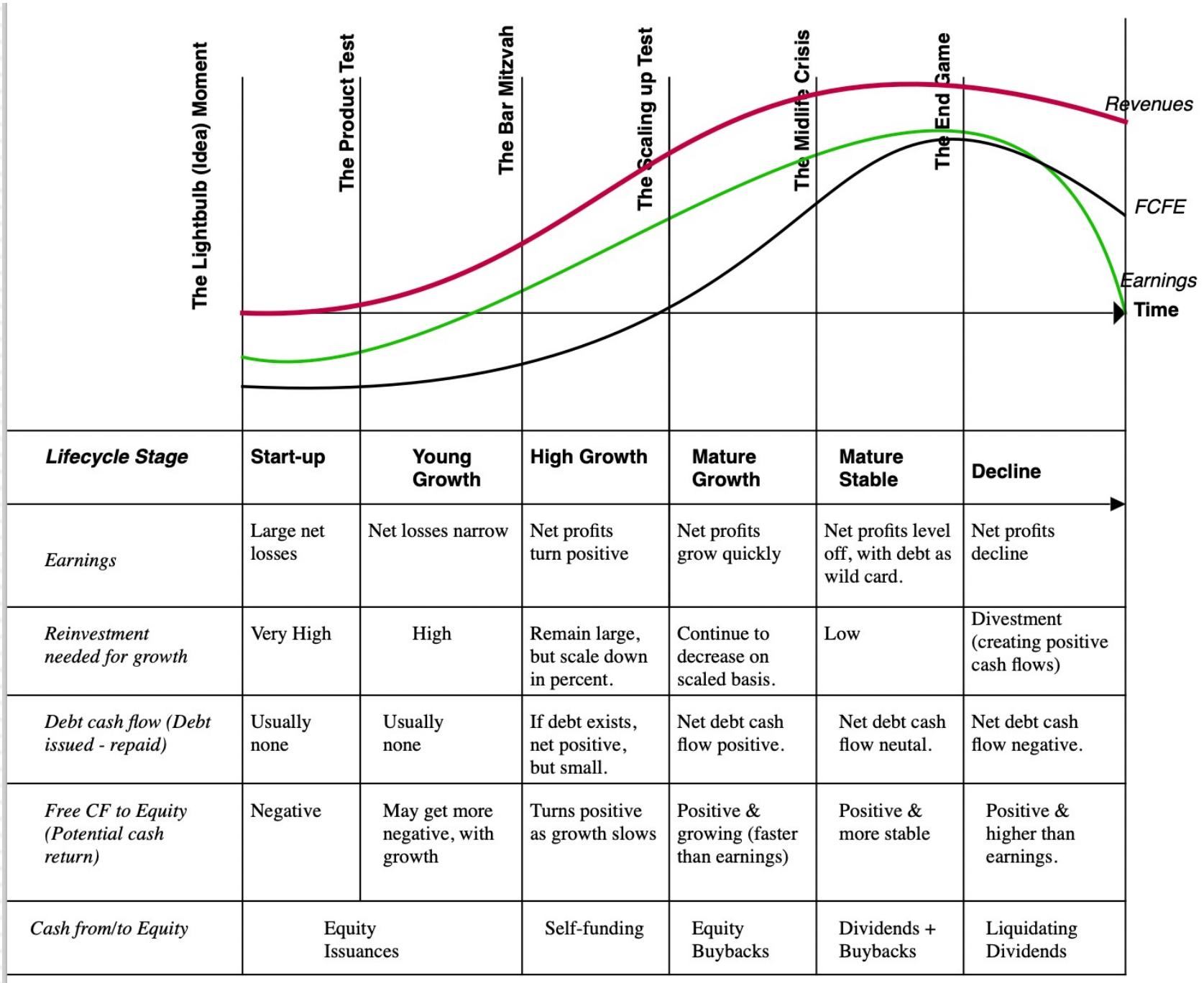
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Global Payout Ratios: January 2023

Dividend & Cash Payout Ratios: Global Cash-Returning firms in 2022

| % of non-payers | 52.80% | 46.12% |

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Global Yields: January 2023

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The Lightbulb (Idea) Moment · The Product Test · The Bar Mitzvah · The Scaling up Test · The Midlife Crisis · The End Game

Revenues · FCFE · Earnings · Time

Lifecycle Stage	Start-up	Young Growth	High Growth	Mature Growth	Mature Stable	Decline
Earnings	Large net losses	Net losses narrow	Net profits turn positive	Net profits grow quickly	Net profits level off, with debt as wild card.	Net profits decline
Reinvestment needed for growth	Very High	High	Remain large, but scale down in percent.	Continue to decrease on scaled basis.	Low	Divestment (creating positive cash flows)
Debt cash flow (Debt issued - repaid)	Usually none	Usually none	If debt exists, net positive, but small.	Net debt cash flow positive.	Net debt cash flow neutal.	Net debt cash flow negative.
Free CF to Equity (Potential cash return)	Negative	May get more negative, with growth	Turns positive as growth slows	Positive & growing (faster than earnings)	Positive & more stable	Positive & higher than earnings.
Cash from/to Equity	Equity Issuances		Self-funding	Equity Buybacks	Dividends + Buybacks	Liquidating Dividends

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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%

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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

3. 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

□ 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.

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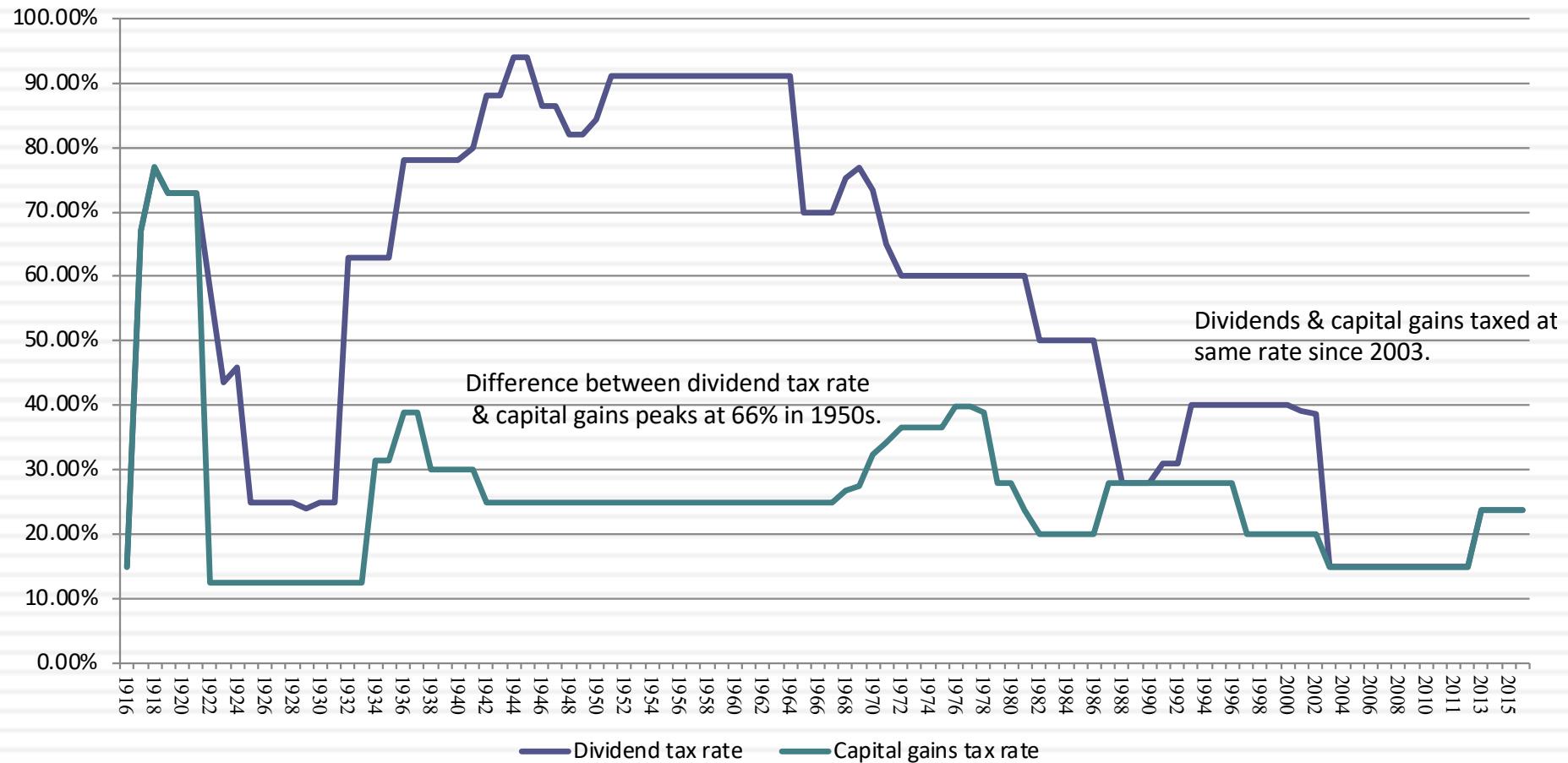# The Dividends don't matter school
The Miller Modigliani Hypothesis

- The Miller-Modigliani Hypothesis: Dividends do not affect value
- Basis:
  - If a firm's investment policies (and hence cash flows) don't change, the value of the firm cannot change as it changes dividends.
  - If a firm pays more in dividends, it will have to issue new equity to fund the same projects. By doing so, it will reduce expected price appreciation on the stock but it will be offset by a higher dividend yield.
  - If we ignore personal taxes, investors have to be indifferent to receiving either dividends or capital gains.
- Underlying Assumptions:

  (a) There are no tax differences to investors between dividends and capital gains.

  (b) If companies pay too much in cash, they can issue new stock, with no flotation costs or signaling consequences, to replace this cash.

  (c) If companies pay too little in dividends, they do not use the excess cash for bad projects or acquisitions.

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

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

Difference between dividend tax rate & capital gains peaks at 66% in 1950s.

Dividends & capital gains taxed at same rate since 2003.

Dividend tax rate   Capital gains tax rate

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

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

Initial buy P_b P_a

At \$P

Ex-dividend day

Dividend = \$ D

P = Price at which you bought the stock a "while" back

P_b = Price before the stock goes ex-dividend

P_a = Price after the stock goes ex-dividend

D = Dividends declared on stock

t_o, t_{cg} = Taxes paid on ordinary income and capital gains respectively

Cashflows from Selling around Ex-Dividend Day

- The cash flows from selling before ex-dividend day are:

  $P_b - (P_b - P) t_{cg}$

- The cash flows from selling after ex-dividend day are:

  $P_a - (P_a - P) t_{cg} + D(1-t_o)$

- Since the average investor should be indifferent between selling before the ex-dividend day and selling after the ex-dividend day -

  $P_b - (P_b - P) t_{cg} = P_a - (P_a - P) t_{cg} + D(1-t_o)$

- Some basic algebra leads us to the following:

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

Intuitive Implications

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

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

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The empirical evidence…

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%

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Dividend Arbitrage

□ Assume that you are a tax exempt investor, and that you know that the price drop on the ex-dividend day is only 90% of the dividend. How would you exploit this differential?

    a.   Invest in the stock for the long term

    b.   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.   _____

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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

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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…

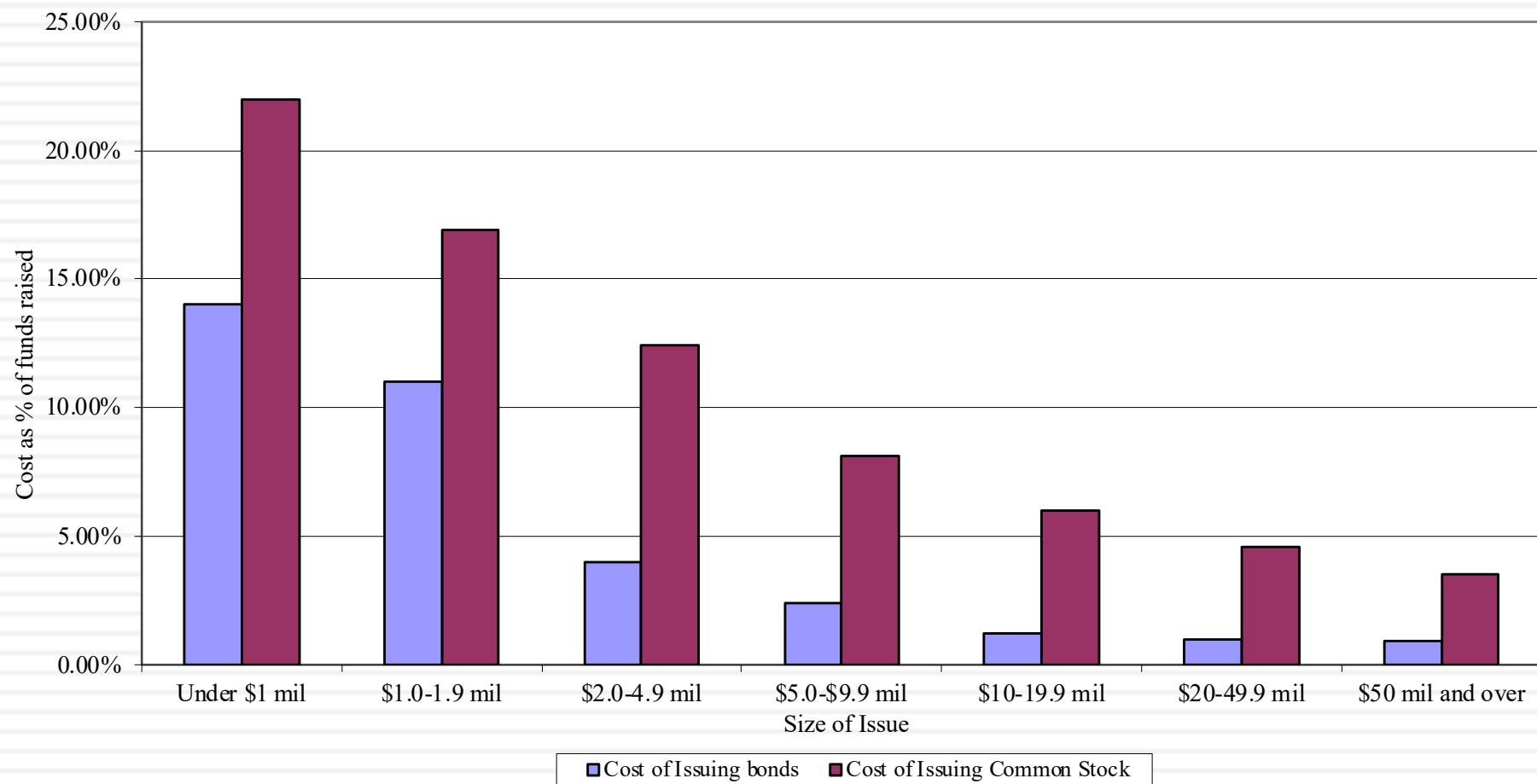- **<u>Argument</u>**: The firm has excess cash on its hands this year, no investment projects this year and wants to give the money back to stockholders.

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

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The Cost of Raising Capital

Figure 10.12: Issuance Costs for Stocks and Bonds

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Three "good" reasons for paying dividends...
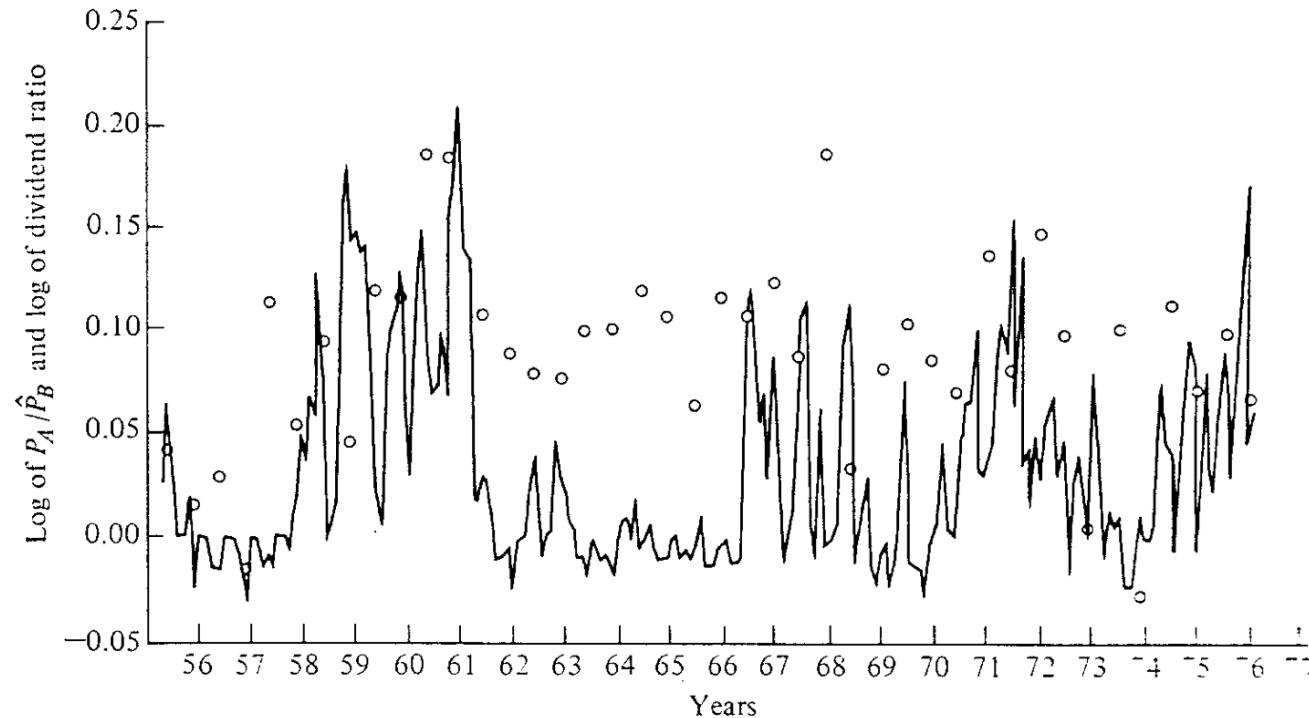
- <u>Clientele Effect</u>: The investors in your company like dividends.

- <u>The Signalling Story</u>: Dividends can be signals to the market that you believe that you have good cash flow prospects in the future.

- <u>The Wealth Appropriation Story</u>: Dividends are one way of transferring wealth from lenders to equity investors (this is good for equity investors but bad for lenders)

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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

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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%

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A clientele-based explanation

- Basis: Investors may form clienteles based upon their tax brackets. Investors in high tax brackets may invest in stocks which do not pay dividends and those in low tax brackets may invest in dividend paying stocks.

- Evidence: A study of 914 investors' portfolios was carried out to see if their portfolio positions were affected by their tax brackets. The study found that
  - (a) Older investors were more likely to hold high dividend stocks and
  - (b) Poorer investors tended to hold high dividend stocks

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Results from Regression: Clientele Effect

Dividend Yield$_t$ = a + b β_t + c Age$_t$ + d Income$_t$ + e Differential Tax Rate$_t$ + ϵ_t

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

Dividend Policy and Clientele
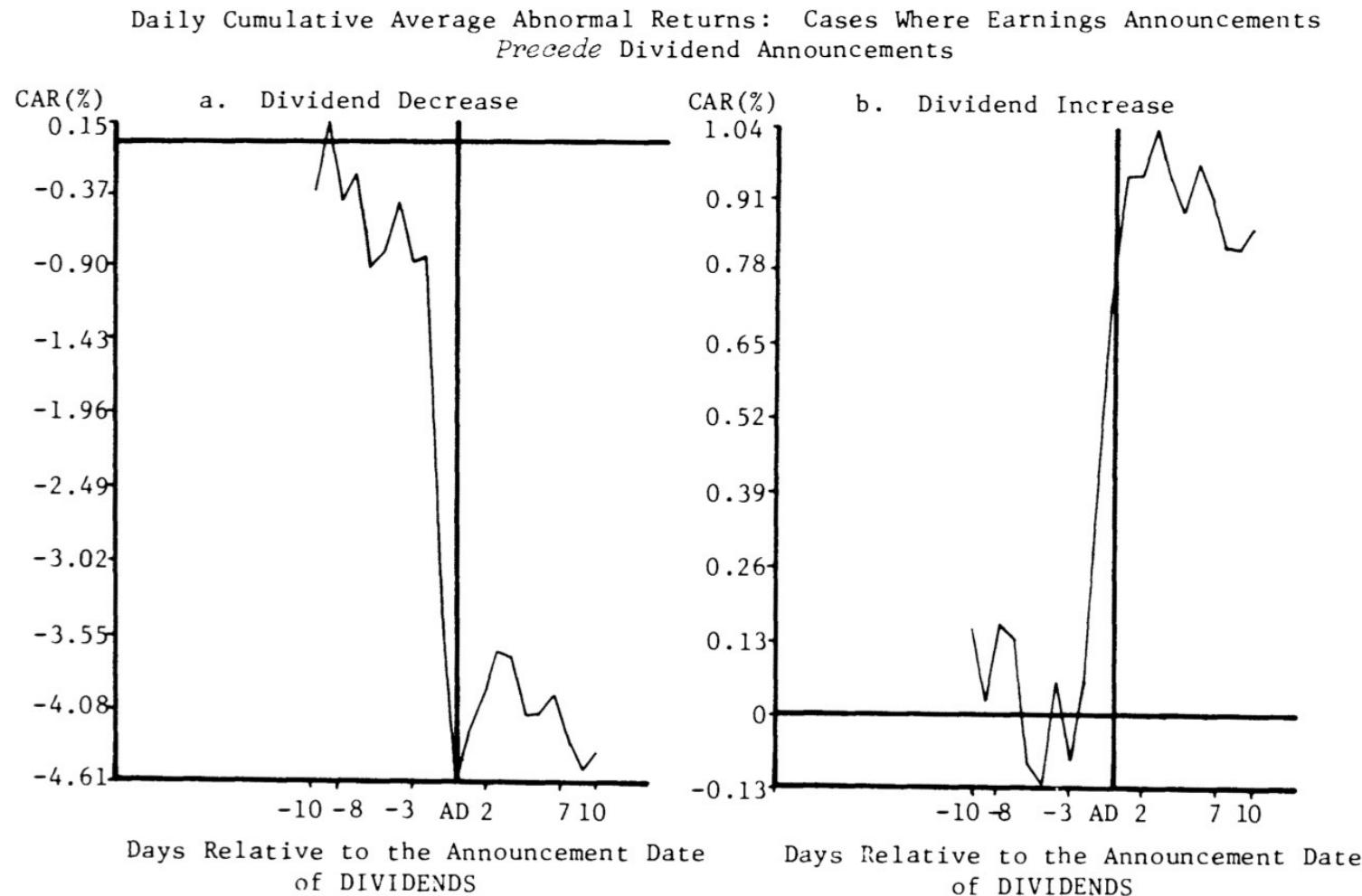
□ Assume that you run a phone company, and that you have historically paid large dividends. You are now planning to enter the telecommunications and media markets. Which of the following paths are you most likely to follow?

a. 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

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2. Dividends send a "signal"
Increases in dividends are good news..
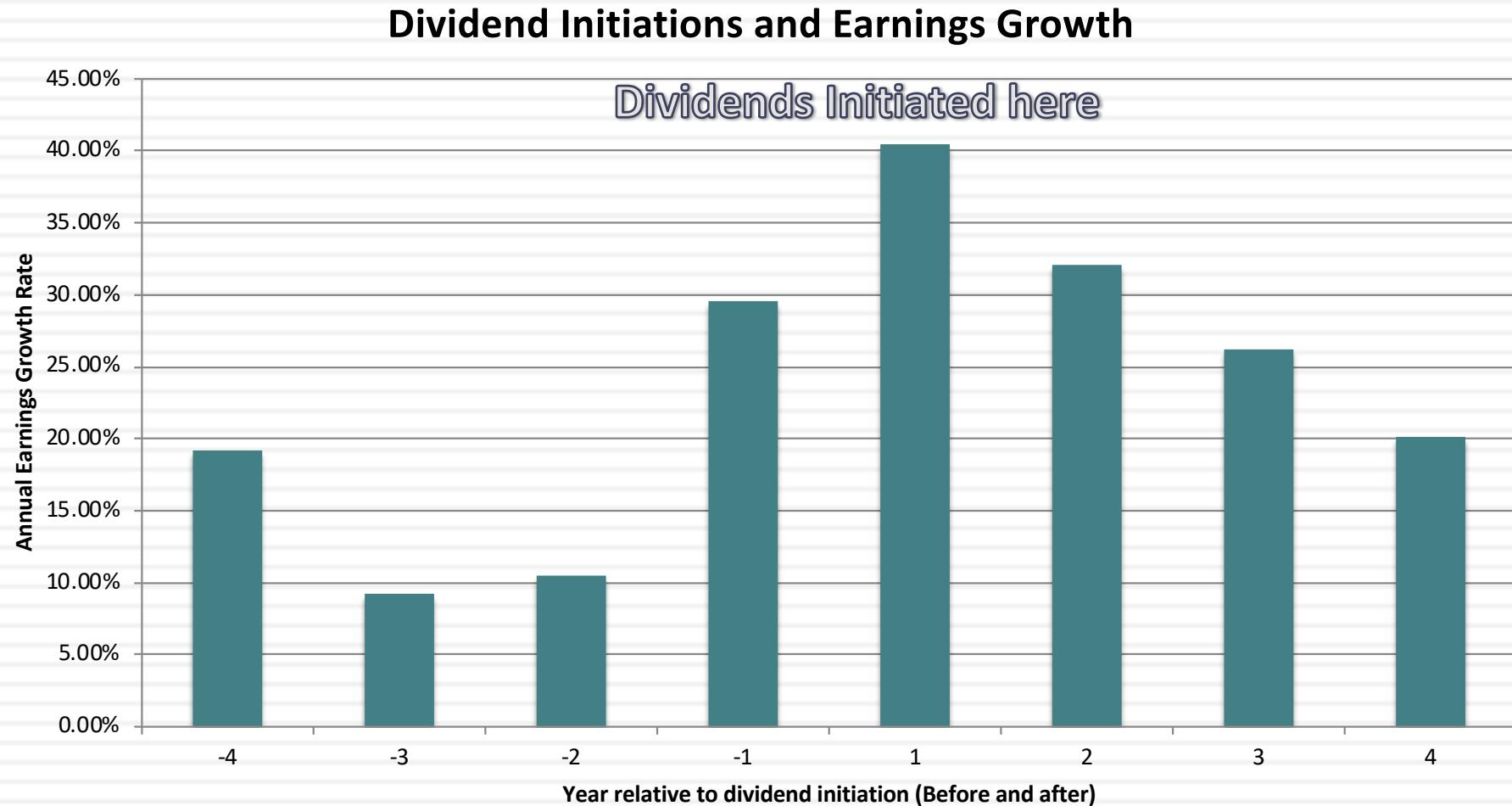
Daily Cumulative Average Abnormal Returns: Cases Where Earnings Announcements *Precede* Dividend Announcements
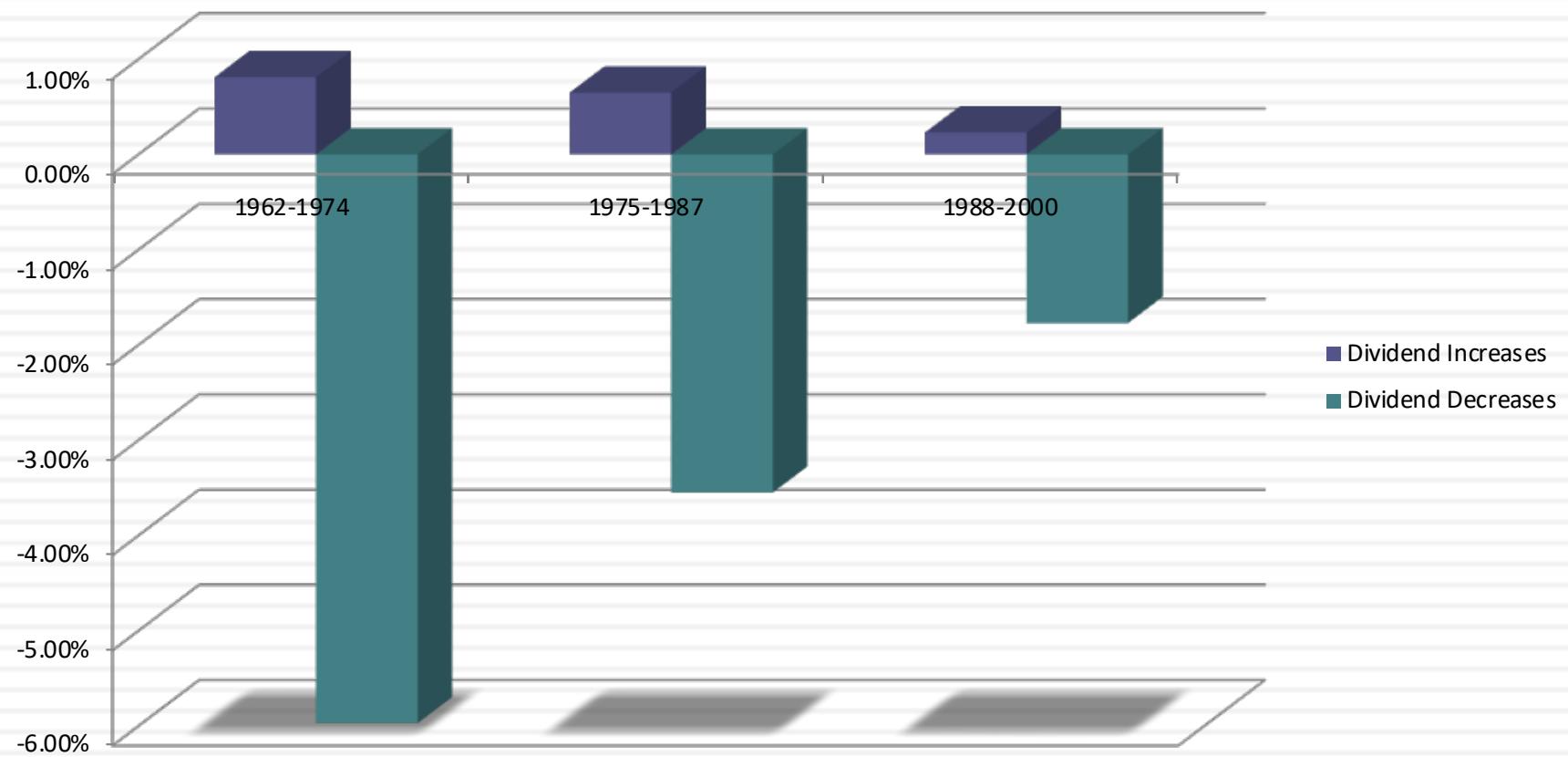
But higher or new dividends may signal bad news (not good)

Dividend Initiations and Earnings Growth
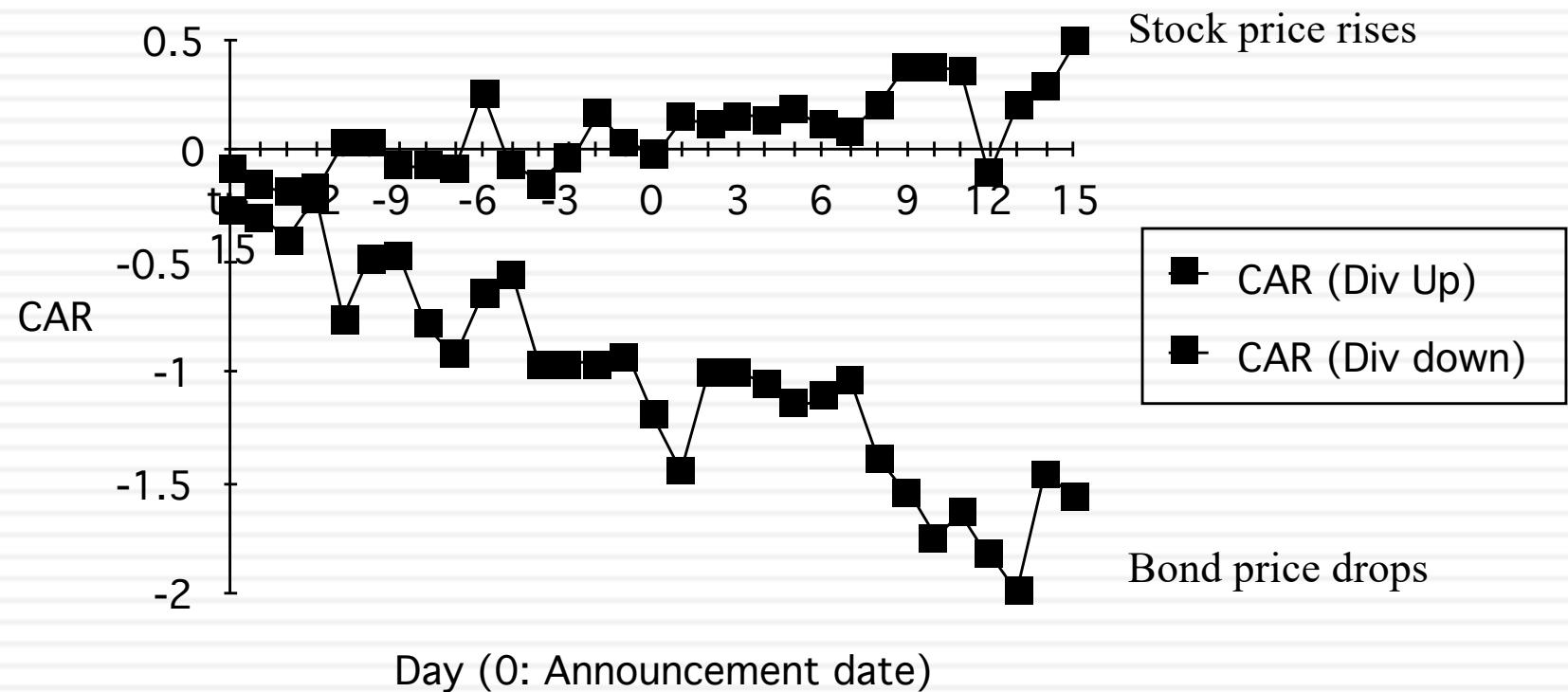
Both dividend increases and decreases are becoming less informative…

Market Reaction to Dividend Changes over time: US companies

Legend: Dividend Increases, Dividend Decreases

X-axis categories: 1962-1974, 1975-1987, 1988-2000

Y-axis: 1.00%, 0.00%, -1.00%, -2.00%, -3.00%, -4.00%, -5.00%, -6.00%

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

EXCESS RETURNS ON STOCKS AND BONDS AROUND DIVIDEND CHANGES

Stock price rises

CAR

■ CAR (Div Up)

■ CAR (Div down)

Bond price drops

Day (0: Announcement date)

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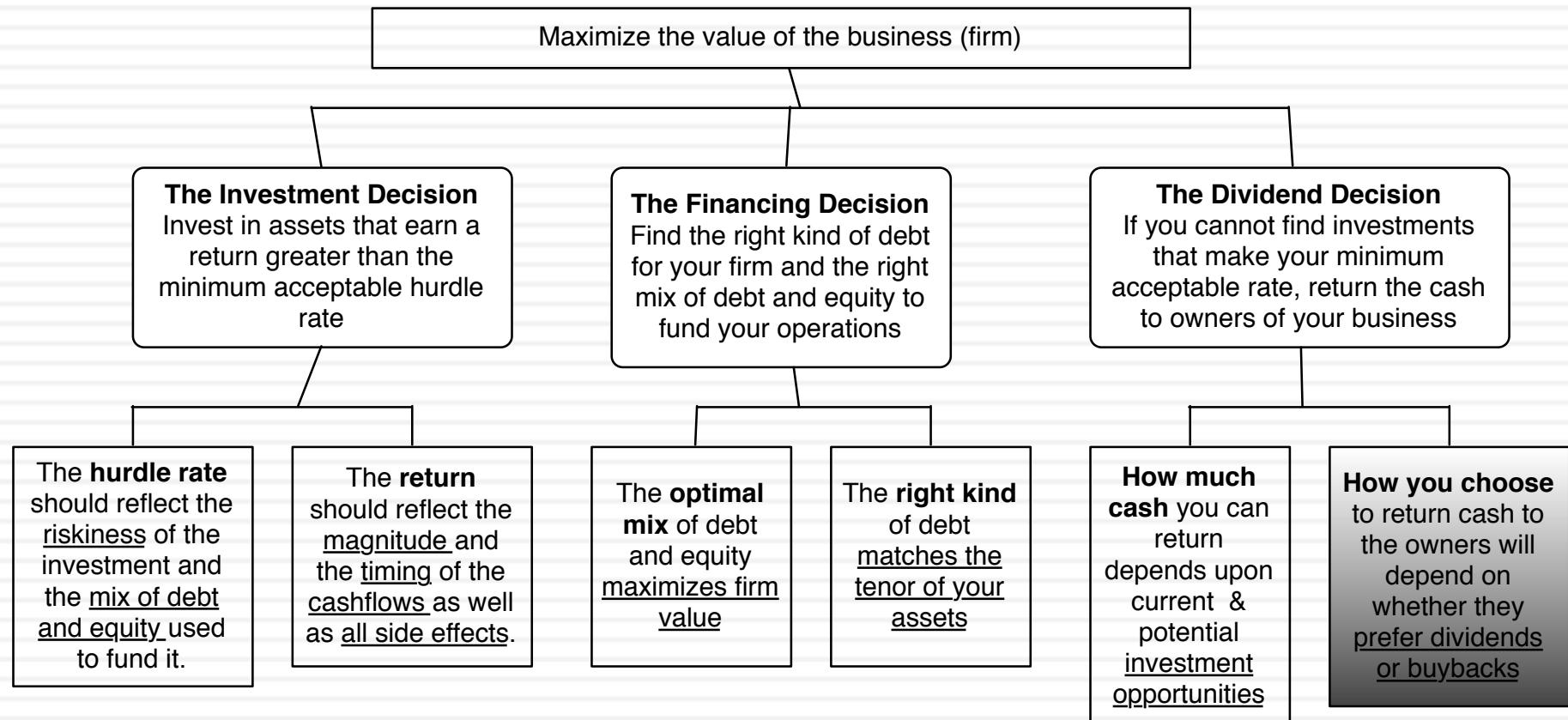
Statement of Management Beliefs	Agree	No Opinion	Disagree
1. A firm's dividend payout ratio affects the price of the stock.	61%	33%	6%
2. Dividend payments provide a signaling device of future prospects.	52%	41%	7%
3. The market uses divided announcements as information for assessing firm value.	43%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

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

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

The Big Picture…

Maximize the value of the business (firm)

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

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

The Dividend Decision
If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

The **hurdle rate** should reflect the riskiness of the investment and the mix of debt and equity used to fund it.

The **return** should reflect the magnitude and the timing of the cashflows as well as all side effects.

The **optimal mix** of debt and equity maximizes firm value

The **right kind** of debt matches the tenor of your assets

How much cash you can return depends upon current & potential investment opportunities

How you choose to return cash to the owners will depend on whether they prefer dividends or buybacks

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Assessing Dividend Policy

- ☐ Approach 1: The Cash/Trust Nexus
  - ◻ Assess how much cash a firm has available to pay in dividends, relative what it returns to stockholders. Evaluate whether you can trust the managers of the company as custodians of your cash.

- ☐ Approach 2: Peer Group Analysis
  - ◻ Pick a dividend policy for your company that makes it comparable to other firms in its peer group.

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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?

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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.

	Disney		*Vale*		*Tata Motors*		*Baidu*		*Deutsche Bank*	
Year	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks
2008	$648	$648	$2,993	$741	7,595₹	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	$4,087	$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**

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

Standard Definition	Modified Version	Simplified (if debt ratio = constant)
Net Income	Net Income	Net Income
+ Depreciation	**Reinvestment** - (Cap Ex - Depreciation + Change in Working Capital)	
- Cap Ex		
- Change in WC		**Reinvestment from Equity** - (Cap Ex - Depreciation + Change in Working Capital) (1 - Debt Ratio)
FCFE before debt cash flow	*FCFE before debt cash flow*	
+ New Debt Issued	**Net CF from Debt** + (New Debt Issued - Debt Repaid)	
- Debt Repaid		
FCFE	*FCFE*	*FCFE*

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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

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.

$FCFE_{Bank}$= 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

Deutsche Bank: FCFE estimates (November 2013)
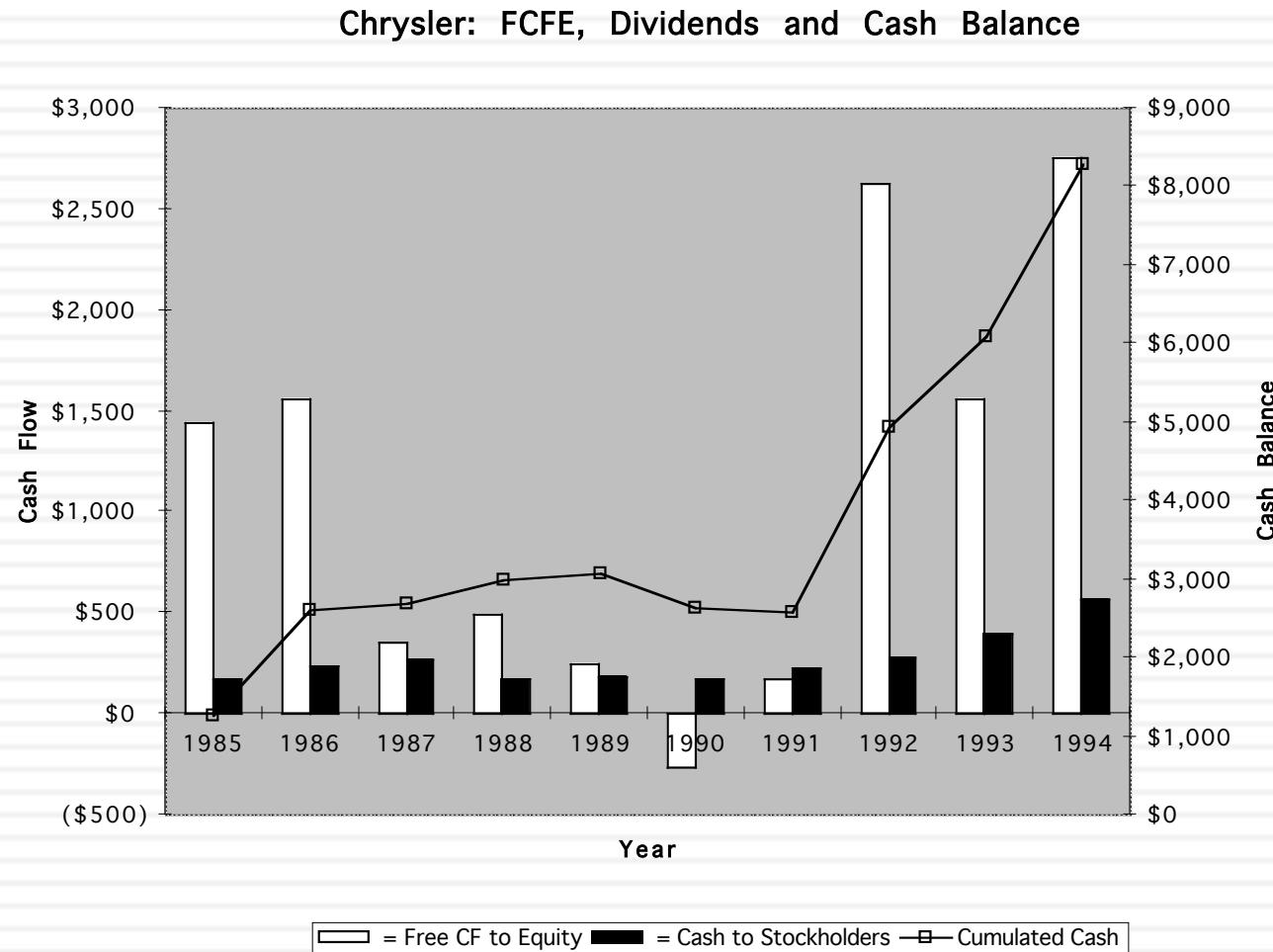
	Current	1	2	3	4	5
Risk Adjusted Assets (grows 3% each year)	439,851 €	453,047 €	466,638 €	480,637 €	495,056 €	509,908 €
Tier 1 as % of Risk Adj assets	15.13%	15.71%	16.28%	16.85%	17.43%	18.00%
Tier 1 Capital	66,561 €	71,156 €	75,967 €	81,002 €	86,271 €	91,783 €
Change in regulatory capital		4,595 €	4,811 €	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 €

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Dividends versus FCFE: Across the globe

	Africa and Middle East	Australia & NZ	Canada	China	Eastern Europe & Russia	EU & Environs	India	Japan	Latin America & Caribbean	Small Asia	UK	United States	Grand Total
No Cash Return, FCFE >0	21.42%	8.55%	14.07%	6.29%	34.17%	23.08%	34.47%	14.47%	16.72%	17.71%	11.77%	25.44%	18.54%
Cash Returned, < Positive FCFE	9.67%	5.59%	3.62%	8.67%	6.72%	7.61%	3.83%	9.59%	12.61%	10.02%	10.31%	9.30%	8.29%
Cash Accumulators	31.09%	14.14%	17.69%	14.96%	40.90%	30.70%	38.30%	24.06%	29.33%	27.73%	22.08%	34.74%	26.83%
No Cash Return, FCFE <0	22.67%	63.75%	64.00%	14.93%	20.73%	28.65%	31.45%	12.96%	15.05%	23.93%	36.53%	27.36%	27.45%
Cash Returned, Negative FCFE	18.60%	10.40%	11.24%	49.08%	13.73%	19.29%	11.86%	30.65%	27.17%	27.30%	25.00%	23.01%	25.67%
Cash Returned, >Positive FCFE	27.65%	11.72%	7.07%	21.03%	24.65%	21.37%	18.39%	32.34%	28.45%	21.04%	16.40%	14.89%	20.05%
Cash Burners	68.91%	85.86%	82.31%	85.04%	59.10%	69.30%	61.70%	75.94%	70.67%	72.27%	77.92%	65.26%	73.17%

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Cash Buildup and Investor Blowback: Chrysler in 1994

Chrysler: FCFE, Dividends and Cash Balance

Legend: □ = Free CF to Equity   ■ = Cash to Stockholders   —□— Cumulated Cash

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⧖ Application 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

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

☐ **Compare to**

Dividends (Common)
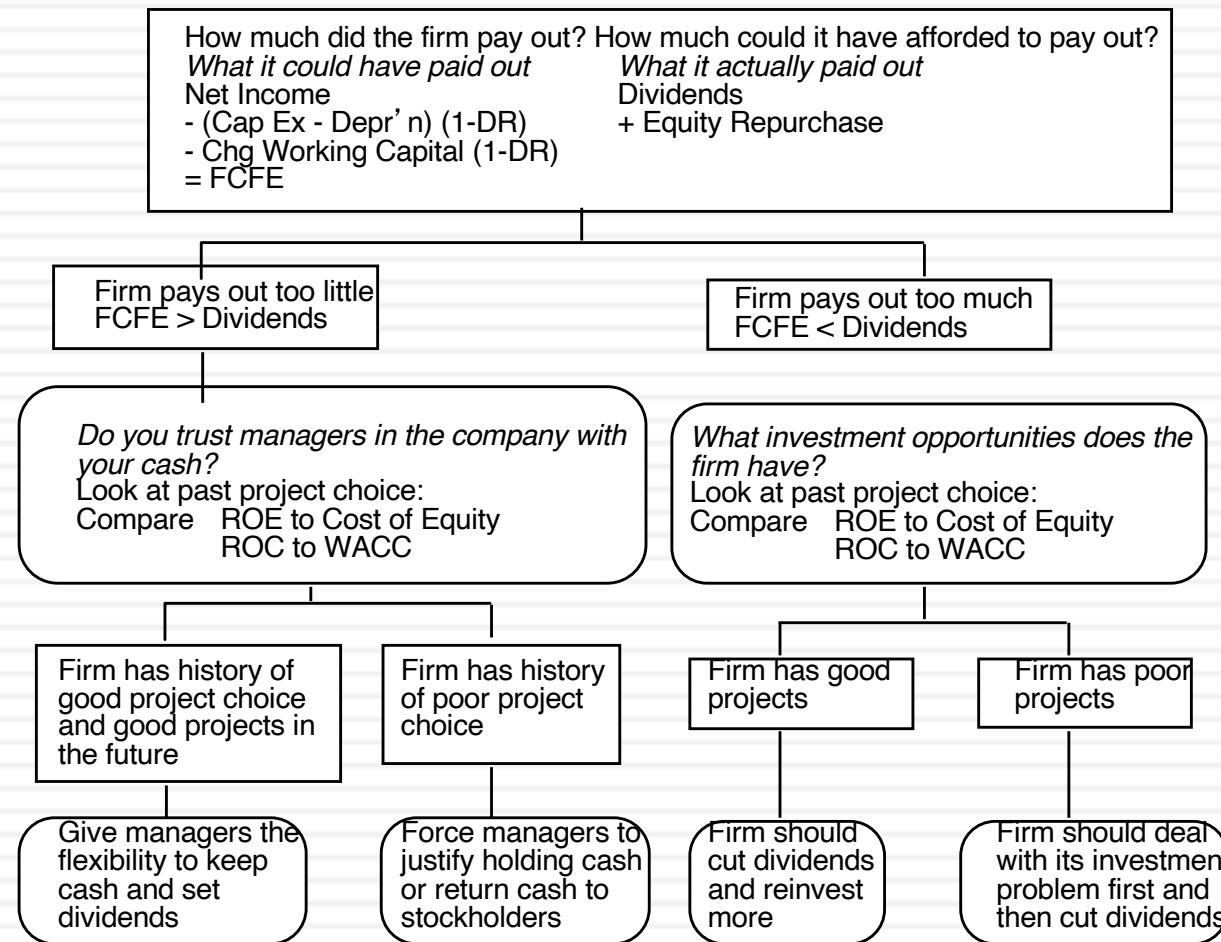
+ Stock Buybacks

Common Dividend

Stock Buybacks

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A Practical Framework for Analyzing Dividend Policy

How much did the firm pay out? How much could it have afforded to pay out?

What it could have paid out	*What it actually paid out*
Net Income	Dividends
- (Cap Ex - Depr'n) (1-DR)	+ Equity Repurchase
- Chg Working Capital (1-DR)	
= FCFE	

Firm pays out too little
FCFE > Dividends

Firm pays out too much
FCFE < Dividends

Do you trust managers in the company with your cash?
Look at past project choice:
Compare   ROE to Cost of Equity
            ROC to WACC

What investment opportunities does the firm have?
Look at past project choice:
Compare   ROE to Cost of Equity
            ROC to WACC

Firm has history of good project choice and good projects in the future

Firm has history of poor project choice

Firm has good projects

Firm has poor projects

Give managers the flexibility to keep cash and set dividends

Force managers to justify holding cash or return cash to stockholders

Firm should cut dividends and reinvest more

Firm should deal with its investment problem first and then cut dividends

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A Dividend Matrix

Quality of projects taken: Excess Returns

	Poor projects	Good projects
Cash Return < FCFE	*Cash Surplus + Poor Projects* Significant pressure to pay out more to stockholders as dividends or stock buybacks	*Cash Surplus + Good Projects* Maximum flexibility in setting dividend policy
Cash return > FCFE	*Cash Deficit + Poor Projects* Reduce or eliminate cash return but real problem is in investment policy.	*Cash Deficit + Good Projects* Reduce cash payout, if any, to stockholders

Cash Returned, relative to Free Cash flow to Equity

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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?

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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).

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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

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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.*

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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

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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	$5,920.00
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	$2,650.49
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%	

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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

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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	84.77%			
Cash Paid as % of FCFE	262.00%			
ROE - Required return	-1.67%	11.49%	20.90%	-21.59%

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BP: Just Desserts!

Managing changes in dividend policy

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

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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%

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Growth Firms and Dividends

☐ High growth firms are sometimes advised to initiate dividends because its increases the potential stockholder base for the company (since there are some investors - like pension funds - that cannot buy stocks that do not pay dividends) and, by extension, the stock price. Do you agree with this argument?

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…

Quality of projects taken: ROE versus Cost of Equity

	Poor projects	Good projects
Cash Surplus	*Cash Surplus + Poor Projects* Significant pressure to pay out more to stockholders as dividends or stock buybacks	Baidu *Cash Surplus + Good Projects* Maximum flexibility in setting dividend policy
Cash Deficit	Deutsche Bank *Cash Deficit + Poor Projects* Cut out dividends but real problem is in investment policy.	Disney *Cash Deficit + Good Projects* Reduce cash payout, if any, to stockholders — Vale, Tata Mtrs

Dividends paid out relative to FCFE

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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.

Company	Dividend Yield		Dividend Payout		Comparable Group	Dividend Yield	Dividend Payout
	2013	Average 2008-12	2013	Average 2008-12			
Disney	1.09%	1.17%	21.58%	17.11%	US Entertainment	0.96%	22.51%
Vale	6.56%	4.01%	113.45%	37.69%	Global Diversified Mining & Iron Ore (Market cap> $1 b)	3.07%	316.32%
Tata Motors	1.31%	1.82%	16.09%	15.53%	Global Autos (Market Cap> $1 b)	2.13%	27.00%
Baidu	0.00%	0.00%	0.00%	0.00%	Global Online 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%**

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Going beyond averages... Looking at the market

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

$$PYT = 0.649 \quad - 0.296 \ (BETA) \qquad -.800 \ (EGR) \quad + .300 \ (DCAP) \qquad R^2 = 19.6\%$$

$$(32.16) \quad (15.40) \qquad\qquad (8.90) \qquad\quad (7.33)$$

$$YLD = 0.0324 \qquad - .0154 \ (BETA) \qquad -.038 \ (EGR) \quad + .023 \ (DCAP) \quad R^2 = 25.8\%$$

$$(38.81) \qquad\quad (19.41) \qquad\qquad (13.25) \qquad\quad (13.45)$$

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)

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Using the market regression on Disney
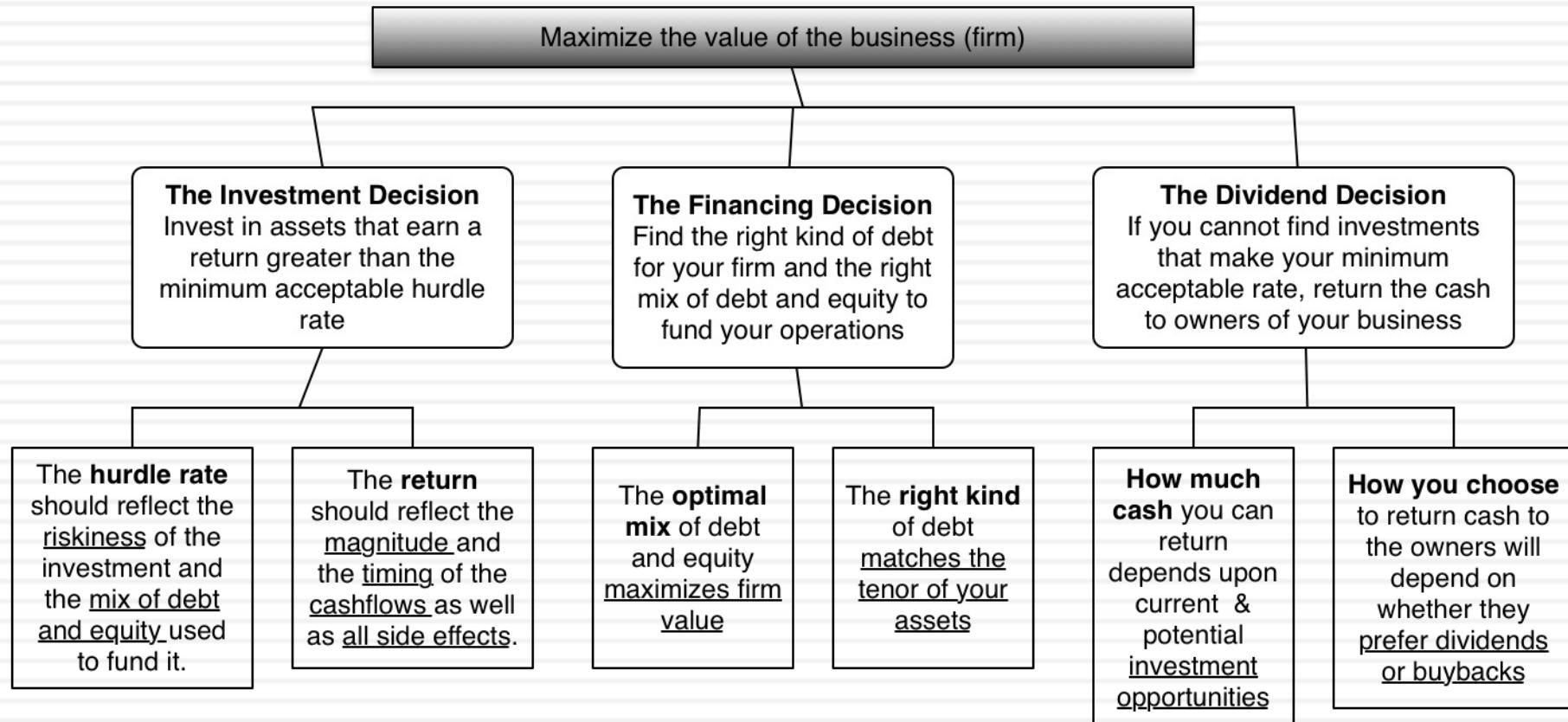
- ☐ To illustrate the applicability of the market regression in analyzing the dividend policy of Disney, we estimate the values of the independent variables in the regressions for the firm.
  - ◻ Beta for Disney (bottom up)   = 1.00
  - ◻ Disney's expected growth in earnings per share = 14.73% (analyst 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.

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VALUATION

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

First Principles

Maximize the value of the business (firm)

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

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

The Dividend Decision
If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

The **hurdle rate** should reflect the riskiness of the investment and the mix of debt and equity used to fund it.

The **return** should reflect the magnitude and the timing of the cashflows as well as all side effects.

The **optimal mix** of debt and equity maximizes firm value

The **right kind** of debt matches the tenor of your assets

How much cash you can return depends upon current & potential investment opportunities

How you choose to return cash to the owners will depend on whether they prefer dividends or buybacks

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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.

- Pricing: The value of an asset is estimated based upon what investors are paying for similar assets. In general, this takes the form of value or price multiples and comparing firms within the same business.

- Contingent claim valuation: When the cash flows on an asset are contingent on an external event, the value can be estimated using option pricing models.

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Intrinsic Valuation 101
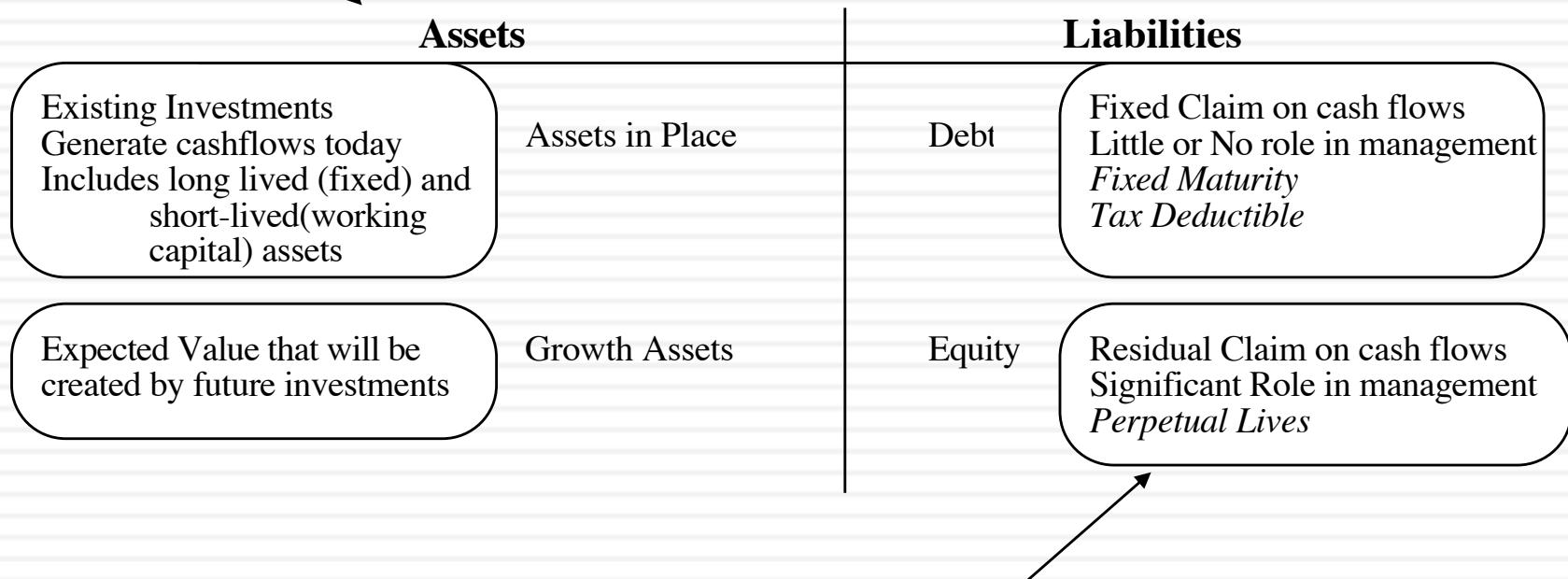
□ The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

$$\text{Value of asset } = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \ldots + \frac{E(CF_n)}{(1+r)^n}$$

□ The intrinsic value of a business or asset is determined by three fundamentals:

▫ Its capacity to generate cash flows from existing assets

▫ Its capacity to grow these cash flows in the future

▫ The risk in these expected cash flows

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DCF Choices: Equity Valuation versus Firm Valuation

Firm Valuation: Value the entire business

Assets		Liabilities	
Existing Investments Generate cashflows today Includes long lived (fixed) and short-lived(working capital) assets	Assets in Place	Debt	Fixed Claim on cash flows Little or No role in management *Fixed Maturity* *Tax Deductible*
Expected Value that will be created by future investments	Growth Assets	Equity	Residual Claim on cash flows Significant Role in management *Perpetual Lives*

Equity valuation: Value just the equity claim in the business

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Equity Valuation

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

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

where,

CF to Equity $_t$ = Expected Cashflow to Equity in period t

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.

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Firm Valuation

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

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

where,

CF to Firm$_t$ = Expected Cashflow to Firm in period t

WACC = Weighted Average Cost of Capital

How fundamentals play out in intrinsic value…

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

Cash flows from existing assets
The base earnings will reflect the earnings power of the existing assets of the firm, net of taxes and any reinvestment needed to sustain the base earnings.

$$\text{Value of asset} = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \cdots + \frac{E(CF_n)}{(1+r)^n}$$
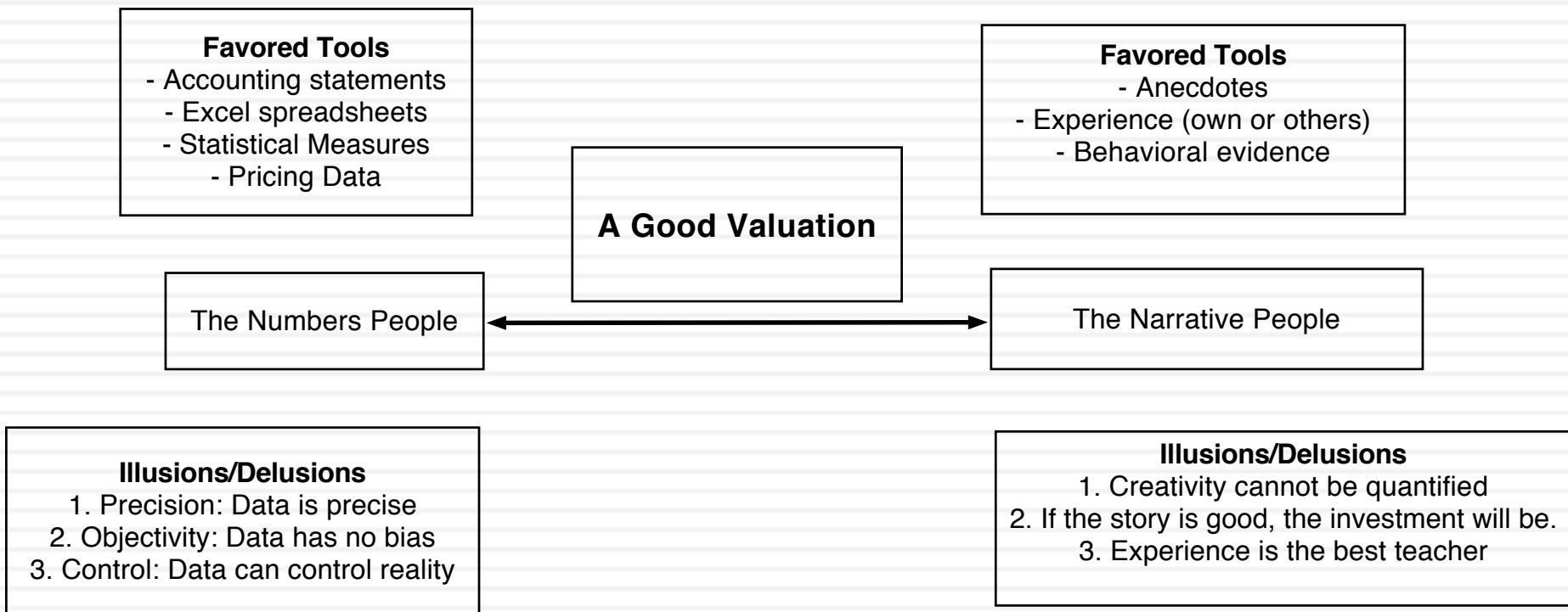
Steady state
The value of growth comes from the capacity to generate excess returns. The length of your growth period comes from the strength & sustainability of your competitive advantages.

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.
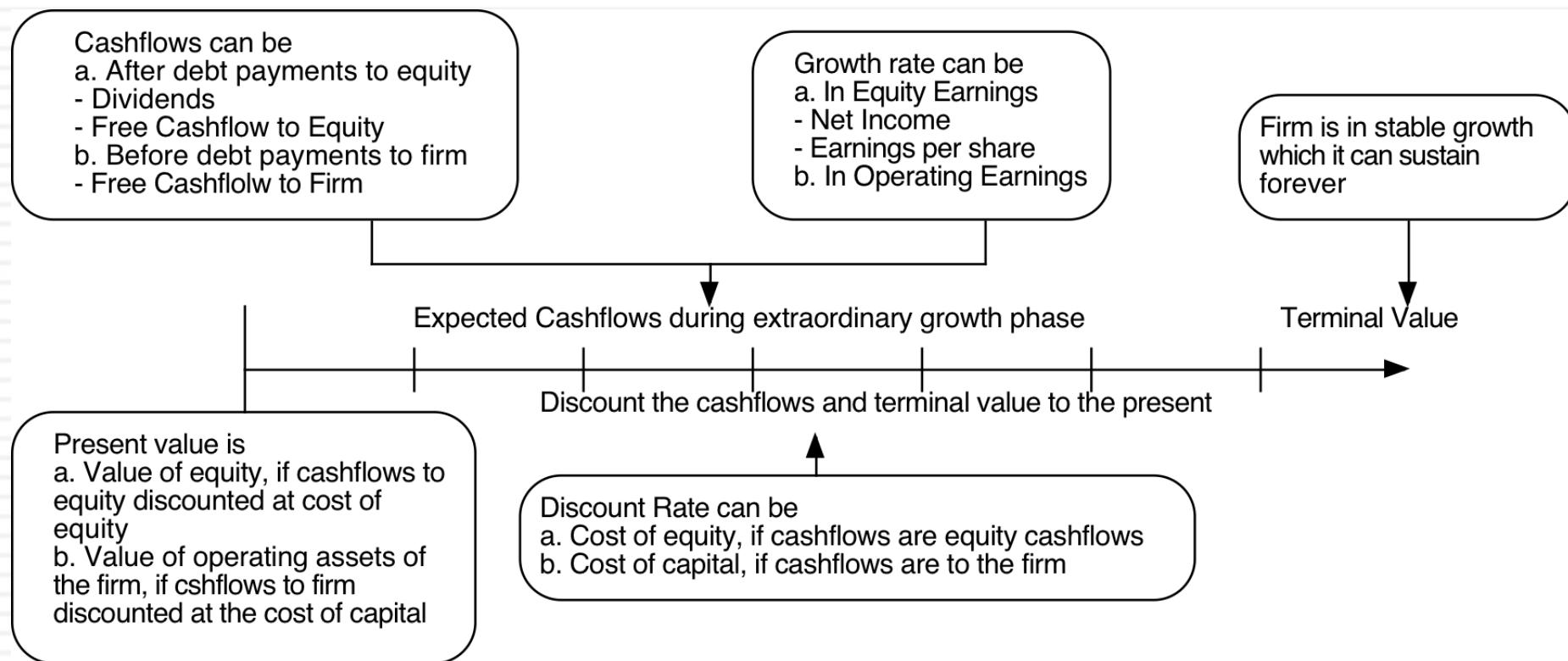
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Stories + Numbers = Value

Favored Tools
- Accounting statements
- Excel spreadsheets
- Statistical Measures
- Pricing Data

Favored Tools
- Anecdotes
- Experience (own or others)
- Behavioral evidence

A Good Valuation

The Numbers People ←——————→ The Narrative People

Illusions/Delusions
1. Precision: Data is precise
2. Objectivity: Data has no bias
3. Control: Data can control reality

Illusions/Delusions
1. Creativity cannot be quantified
2. If the story is good, the investment will be.
3. Experience is the best teacher

The Ingredients that determine value.

Cashflows can be
a. After debt payments to equity
- Dividends
- Free Cashflow to Equity
b. Before debt payments to firm
- Free Cashflolw to Firm

Growth rate can be
a. In Equity Earnings
- Net Income
- Earnings per share
b. In Operating Earnings

Firm is in stable growth
which it can sustain
forever

Expected Cashflows during extraordinary growth phase

Terminal Value

Discount the cashflows and terminal value to the present

Present value is
a. Value of equity, if cashflows to
equity discounted at cost of
equity
b. Value of operating assets of
the firm, if cshflows to firm
discounted at the cost of capital

Discount Rate can be
a. Cost of equity, if cashflows are equity cashflows
b. Cost of capital, if cashflows are to the firm

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I. Estimating Cash Flows

```
                          ┌──────────────────────┐
                          │   Cash Flow used      │
                          └──────────────────────┘
                          /                        \
          ┌──────────────┐            ┌────────────────────────────────┐
          │  Cash flow   │            │  Free Cash flow to Firm        │
          │  to equity   │            │  EBIT (1- tax rate)            │
          └──────────────┘            │  - (Cap Ex - Depreciation)     │
          /      |       \            │  - Change in Workiing Capital  │
                                      └────────────────────────────────┘
```

Cash Flow used

Cash flow to equity

Free Cash flow to Firm
EBIT (1- tax rate)
- (Cap Ex - Depreciation)
- Change in Workiing Capital

Dividends

Augmented Dividends
Dividends
+ Stock Buybacks

Free Cash flow to Equity
(Potential Dividend)
Net Income
- (Cap Ex - Depreciation)
- Change in Working Capital
- (Debt issued - Debt repaid)

Dividends for Deutsche bank & FCFE for Tata Motors

- In 2007, Deutsche Bank paid out dividends of 2,146 million Euros on net income of 6,510 million Euros.

  - In my 2008 valuation, I am assuming the dividends are not only reasonable but sustainable.

  - In my 2016 valuation, Deutsche had suspended paying dividends and was losing money.

- For Tata Motors, we can estimate FCFE by looking at its ingredients:

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%**

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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
= 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

- Critical ingredient in discounted cashflow valuation. Errors in estimating the discount rate or mismatching cashflows and discount rates can lead to serious errors in valuation.

- At an intuitive level, the discount rate used should be consistent with both the riskiness and the type of cashflow being discounted.

- The cost of equity is the rate at which we discount cash flows to equity (dividends or free cash flows to equity). The cost of capital is the rate at which we discount free cash flows to the firm.

Cost of Equity: Deutsche Bank in 2008 & Tata Motors in 2013

- 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

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

- 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%.

  $$\text{Cost of Equity} = 6.57\% + 0.964\ (7.19\%) = 13.50\%$$

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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):

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

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

Year	Beta	Cost of Equity	After-tax Cost of 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%

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III. Expected Growth

- Value is driven by expected future growth, not past growth, and generically there are three approaches to estimating growth:
  - By looking at the past
  - Outsourcing: Ask management or look at other analysts
  - Fundamentals: By looking at how much a firm is reinvesting and how well it is reinvesting.

- For a company with stable margins and returns on equity/capital, the expected growth becomes a product of how much the firm reinvests (as a percent of earnings) and how well it reinvests (a return on equity or capital).

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Reinvestment and Return: Measures

Earnings Measure	Reinvestment Measure	Return Measure
Earnings per share	Retention Ratio = % of net income retained by the company = 1 – Payout ratio	Return on Equity = Net Income/ Book Value of Equity
Net Income from non-cash assets	Equity reinvestment Rate = (Net Cap Ex + Change in non-cash WC – Change in Debt)/ (Net Income)	Non-cash ROE = Net Income from non-cash assets/ (Book value of equity – Cash)
Operating Income	Reinvestment Rate = (Net Cap Ex + Change in non-cash WC)/ After-tax Operating Income	Return on Capital or ROIC = After-tax Operating Income/ (Book value of equity + Book value of debt – Cash)

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Estimating growth in Equity Earnings: Deutsche Bank in January 2008

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

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

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

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

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

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

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

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

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

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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%**

Year	Net Income	BV of Equity at 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%**

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

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ROE and Leverage

- A high ROE, other things remaining equal, should yield a higher expected growth rate in equity earnings.

- The ROE for a firm is a function of both the quality of its investments and how much debt it uses in funding these investments. In particular

    ROE = ROC + D/E (ROC – After-tax cost of Debt)

- Consider two firms with the same return on equity, with two different pathways there. Which one would you value more highlY

	ROC	D/E	tax cost of	ROE
Company A	20%	0.00%	4.00%	20.0%
Company B	12%	100.00%	4.00%	20.0%

Estimating Growth in EBIT: Disney

- We started with the reinvestment rate that we computed from the 2013 financial statements:

  Reinvestment rate $= \dfrac{(3,629 + 103)}{10,032\,(1-.3102)} = 53.93\%$

- We compute the return on capital, using operating income in 2013 and capital invested at the start of the year:

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

- 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%

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When everything is in flux: Changing growth and margins

- The elegant connection between reinvestment and earnings growth, captured by a sustainable growth rate, when you have a company in transition, and 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).

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1. Revenue Growth

Revenue Growth and Magnitude
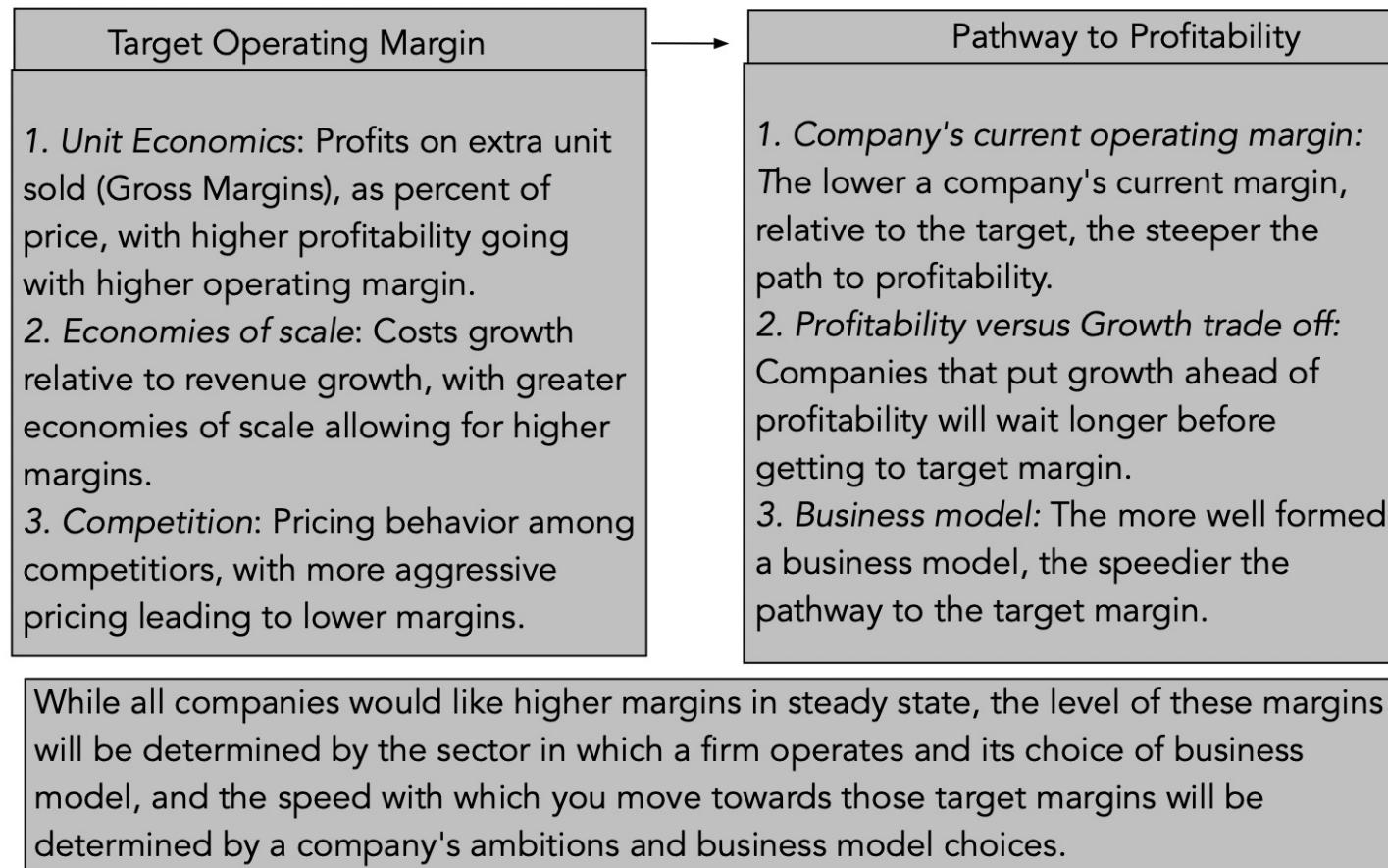
Market Size and Growth		Market Share
1. *Current Market size:* The size of the market for the company's products & services, given geography it is targeting and product type. 2. *Expected Growth in Market:* Gowth in total market, as technology and market conditions change.	X	1. *Company's current market share:* If company's current market share is low, potential for growth in market share at expense of competition. 2. *Industry economics:* Nature of the business (a few big winners or splintered competition). 3. *Strength of company's competitive advantages:* Stronger and more sustainable competitive advantages should allow for higher market share.

The potential for revenue growth is greater for companies with small revenues (and market share) in a big and growing market, especially if the company has strong competitive advantages in winner-take-all businesses.

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2. Target Margins (and path there)…

Operating Margin: Target and Pathway

Target Operating Margin	→	Pathway to Profitability
1. *Unit Economics*: Profits on extra unit sold (Gross Margins), as percent of price, with higher profitability going with higher operating margin. 2. *Economies of scale*: Costs growth relative to revenue growth, with greater economies of scale allowing for higher margins. 3. *Competition*: Pricing behavior among competitiors, with more aggressive pricing leading to lower margins.		1. *Company's current operating margin:* The lower a company's current margin, relative to the target, the steeper the path to profitability. 2. *Profitability versus Growth trade off:* Companies that put growth ahead of profitability will wait longer before getting to target margin. 3. *Business model:* The more well formed a business model, the speedier the pathway to the target margin.

While all companies would like higher margins in steady state, the level of these margins will be determined by the sector in which a firm operates and its choice of business model, and the speed with which you move towards those target margins will be determined by a company's ambitions and business model choices.

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3. Sales to Invested Capital: A Pathway to estimating Reinvestment

Sales to Invested Capital: Reinvestment

Current (Historical) Sales to Capital	Future Sales to Capital
The sales to invested capital ratio relates the revenues of the firm to its invested capital, with the latter defined the same way that you would in the return on invested capital calculation. Sales to Capital = Revenues/ (Book Equity + Book Debt – Cash) The ratio measures the efficiency with which a firm delivers its revenue growth, with higher values indicating more efficiency. You can look at: 1. The company's historical sales to capital ratio 2. The industry average sales to capital ratio	1. Scaling Effects: As companies get bigger, the sales to invested capital ratio can rise or fall, depending on the sector being analyzed. (Looking at the peer group may give some guidance). 2. Excess Capacity: If a company has excess capacity, created by past investments, it should be able to generate revenue growth with less investment, i.e., with higher sales to capital ratios. 3. Lag between investment and growth: If reinvestment creates growth quickly (or instantaneously), the reinvestment in a year can be estimated based upon revenue change in that year. If there is a lag, the reinvestment may have to be tied to revenue change in a future year.

A company with higher expected growth in revenues will need to reinvest more, though how much will be determined by the businesss that it operates in, with less reinvestment needed if it has excess capacity and a lag between reinvestment and growth.

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Here is an example: Baidu's Expected FCFF

Revenue Growth
Baidu is the dominant search engine in China, one of the fastest-growing online markets in the world. That growth rate = overall market growth.

Operating Margin
Competition from the other big tech players in China, Alibaba, Tencent & Others, will cause margins to drop towards those enjoyed by Google.

Sales to Capital (Reinvestment)
Baidu operates in a low capital intensity business, where investments are in R&D and technology, and the occassional acquisition.

Year	Revenue growth	Revenues	Operating Margin	EBIT	Tax rate	EBIT (1-t)	Chg in Revenues	Sales/Capital	Reinvestment	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

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IV. Getting Closure in Valuation

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

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

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

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

  where,

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

  g = Expected growth rate forever.

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

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Terminal Value: Myths and Realities

| Myth 5.1: The only way to estimate terminal value is to use the perpetual growth model. | Myth 5.2: The perpetual growth model can give you an infinite value. | Myth 5.3: The growth rate is your biggest driver of terminal value. | Myth 5.4: Your growth rate cannot be negtive in a perpetual growth model. | Myth 5.5: If your terminal value is a high proportion of your DCF value, it is flawed. |

$$\text{Value of an asset with life} > n \text{ years} = \frac{E(CF_1)}{(1+r)^1} + \frac{E(CF_2)}{(1+r)^2} + .. + \frac{E(CF_n)}{(1+r)^n} + \frac{Terminal\ Value_n}{(1+r)^n}$$

| Truth 5.1: The terminal value can be based on annuities or a liquidation value. | Truth 5.2: Not if growth forever is capped at the growth rate of the economy. | Truth 5.3: Growth is not free & increasing growth can add or destory value. | Truth 5.4: Growth can be negative forever & is often more reflective of reality. | Truth 5.5: The terminal value should be a high percent of value today. |

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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	$59,766	$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

Business	Sample size	Unlevered beta of business	Revenues	Peer Group EV/Sales	Value of Business	Proportion 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	$5,741	5.39%
Logistics	223	0.75	$1,644	1.14	$1,874	1.76%
Vale Operations		*0.8440*	*$47,151*		*$106,543*	*100.00%*

	% 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%**

Market D/E = 54.99%
Marginal tax rate = 34.00% (Brazil)
Levered Beta = 0.844 (1+(1-.34)(.5499)) = 1.15
Cost of equity = 2.75% + 1.15 (7.38%) = 10.87%

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	= $ 42,879
Value of equity	= $167,086
Value per share	=$ 32.44
Stock price (11/2013)	= $ 13.57

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

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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%).

- <u>Stable period excess returns</u>: 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	PV = Value of operating assets + Cash & Near Cash investments + Value of minority cross holdings -Debt outstanding = Value of equity -Value of equity options =Value of equity in common stock / Number of shares

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Disney - November 2013

Current Cashflow to Firm
EBIT(1-t)= 10,032(1-.31)=   6,920
- (Cap Ex - Deprecn)   3,629
- Chg Working capital   103
= FCFF   3,188
Reinvestment Rate = 3,732/6920
              =53.93%
Return on capital = 12.61%

| Reinvestment Rate 53.93% |

| Return on Capital 12.61% |

Stable Growth
g = 2.75%; Beta = 1.00;
Debt %= 20%; k(debt)=3.75
Cost of capital =7.29%
Tax rate=36.1%; ROC= 10%;
Reinvestment Rate=2.5/10=25%

Expected Growth
.5393*.1261=.068 or 6.8%

Growth declines gradually to 2.75%

Terminal Value$_{10}$= 7,980/(.0729-.025) = 165,323

First 5 years

Op. Assets   125,477
+ Cash: 3,931
+ Non op inv   2,849
- Debt   15,961
- Minority Int 2,721
=Equity   113,575
-Options   972
Value/Share $ 62.56

	1	2	3	4	5	6	7	8	9	10
EBIT * (1 - tax rate)	$7,391	$7,893	$8,430	$9,003	$9,615	$10,187	$10,704	$11,156	$11,531	$11,819
- Reinvestment	$3,985	$4,256	$4,546	$4,855	$5,185	$4,904	$4,534	$4,080	$3,550	$2,955
FCFF	$3,405	$3,637	$3,884	$4,148	$4,430	$5,283	$6,170	$7,076	$7,981	$8,864

Term Yr
10,639
2,660
7,980

Cost of capital declines gradually to 7.29%

Cost of Capital (WACC) = 8.52% (0.885) + 2.40% (0.115) = 7.81%

Cost of Equity
8.52%

Cost of Debt
(2.75%+1.00%)(1-.361)
= 2.40%
Based on actual A rating

Weights
E = 88.5% D = 11.5%

In November 2013, Disney was trading at $67.71/share

Riskfree Rate:
Riskfree rate = 2.75%

+

Beta
1.0013

X

ERP for operations
5.76%

Unlevered Beta for Sectors: 0.9239

D/E=13.10%

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

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

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

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

Strategic investments determine length of growth period

Existing Investments ROC = 12.61%

New Investments Return on Capital 12.61%

Reinvestment Rate 53.93%

Financing Mix D=11.5%; E=88.5%

Financing Choices Mostly US $ debt with duration of 6 years

Current EBIT (1-t) $ 6,920

Expected Growth Rate = 12.61% * 53.93%= 6.8%

Cost of capital = 8.52% (.885) + 2.4% (.115) = 7.81%

Year	Expected Growth	EBIT (1-t)	Reinvestment	FCFF	Terminal Value	Cost of capital	PV
1	6.80%	$7,391	$3,985	$3,405		7.81%	$3,158
2	6.80%	$7,893	$4,256	$3,637		7.81%	$3,129
3	6.80%	$8,430	$4,546	$3,884		7.81%	$3,099
4	6.80%	$9,003	$4,855	$4,148		7.81%	$3,070
5	6.80%	$9,615	$5,185	$4,430		7.81%	$3,041
6	5.94%	$10,187	$4,904	$5,283		7.71%	$3,367
7	5.08%	$10,704	$4,534	$6,170		7.60%	$3,654
8	4.22%	$11,156	$4,080	$7,076		7.50%	$3,899
9	3.36%	$11,531	$3,550	$7,981		7.39%	$4,094
10	2.50%	$11,819	$2,955	$8,864	$189,738	7.29%	$94,966

Value of operating assets of the firm =	$125,477
Value of Cash & Non-operating assets =	$6,780
Value of Firm =	$132,257
Market Value of outstanding debt =	$15,961
Minority Interests	$2,721
Market Value of Equity =	$113,575
Value of Equity in Options =	$972
Value of Equity in Common Stock =	$112,603
Market Value of Equity/share =	$62.56

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Disney: Corporate Financing Decisions and Firm Value

Ways of changing value…

Are you investing optimally for future growth?

Growth from new investments
Growth created by making new investments; function of amount and quality of investments

Efficiency Growth
Growth generated by using existing assets better

Is there scope for more efficient utilization of exsting assets?

How well do you manage your existing investments/assets?

Cashflows from existing assets
Cashflows before debt payments, but after taxes and reinvestment to maintain exising assets

Expected Growth during high growth period

Stable growth firm, with no or very limited excess returns

Are you building on your competitive advantages?

Length of the high growth period
Since value creating growth requires excess returns, this is a function of
- Magnitude of competitive advantages
- Sustainability of competitive advantages

Are you using the right amount and kind of debt for your firm?

Cost of capital to apply to discounting cashflows
Determined by
- Operating risk of the company
- Default risk of the company
- Mix of debt and equity used in financing

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Disney (Restructured)- November 2013

Current Cashflow to Firm
EBIT(1-t)= 10,032(1-.31)=   6,920
- (Cap Ex - Deprecn)   3,629
- Chg Working capital   103
= FCFF   3,188
Reinvestment Rate = 3,732/6920
            =53.93%
Return on capital = 12.61%

Reinvestment Rate 50.00%

More selective acquisitions & payoff from gaming

Return on Capital 14.00%

Expected Growth
.50* .14 = .07 or 7%

Stable Growth
g = 2.75%; Beta = 1.20;
Debt %= 40%; k(debt)=3.75%
Cost of capital =6.76%
Tax rate=36.1%; ROC= 10%;
Reinvestment Rate=2.5/10=25%

Growth declines gradually to 2.75%

Terminal Value$_{10}$= 9,206/(.0676-.025) = 216,262

First 5 years

	1	2	3	4	5	6	7	8	9	10
EBIT * (1 - tax rate)	$7,404	$7,923	$8,477	$9,071	$9,706	$10,298	$10,833	$11,299	$11,683	$11,975
- Reinvestment	$3,702	$3,961	$4,239	$4,535	$4,853	$4,634	$4,333	$3,955	$3,505	$2,994
Free Cashflow to Firm	$3,702	$3,961	$4,239	$4,535	$4,853	$5,664	$6,500	$7,344	$8,178	$8,981

Term Yr
12,275
3,069
9,206

Op. Assets   147,704
+ Cash: 3,931
+ Non op inv   2,849
- Debt   15,961
- Minority Int 2,721
=Equity   135,802
-Options   972
Value/Share $ 74.91

Cost of Capital (WACC) = 8.52% (0.60) + 2.40%(0.40) = 7.16%

Cost of capital declines gradually to 6.76%

In November 2013, Disney was trading at $67.71/share

Cost of Equity 10.34%

Cost of Debt
(2.75%+1.00%)(1-.361)
= 2.40%
Based on synthetic A rating

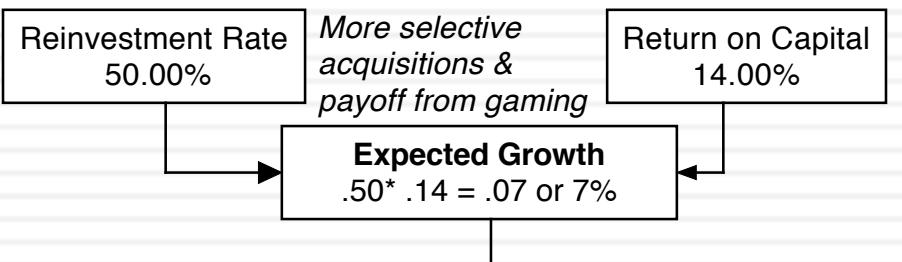**Weights**
E = 60% D = 40%

Move to optimal debt ratio, with higher beta.

Riskfree Rate:
Riskfree rate = 2.75%

+

Beta 1.3175

X

ERP for operations 5.76%

Unlevered Beta for Sectors: 0.9239

D/E=66.67%

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First Principles

Maximize the value of the business (firm)

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

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

The Dividend Decision
If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

The **hurdle rate** should reflect the riskiness of the investment and the mix of debt and equity used to fund it.

The **return** should reflect the magnitude and the timing of the cashflows as well as all side effects.

The **optimal mix** of debt and equity maximizes firm value

The **right kind** of debt matches the tenor of your assets

How much cash you can return depends upon current & potential investment opportunities

How you choose to return cash to the owners will depend on whether they prefer dividends or buybacks

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