Applied Corporate Finance

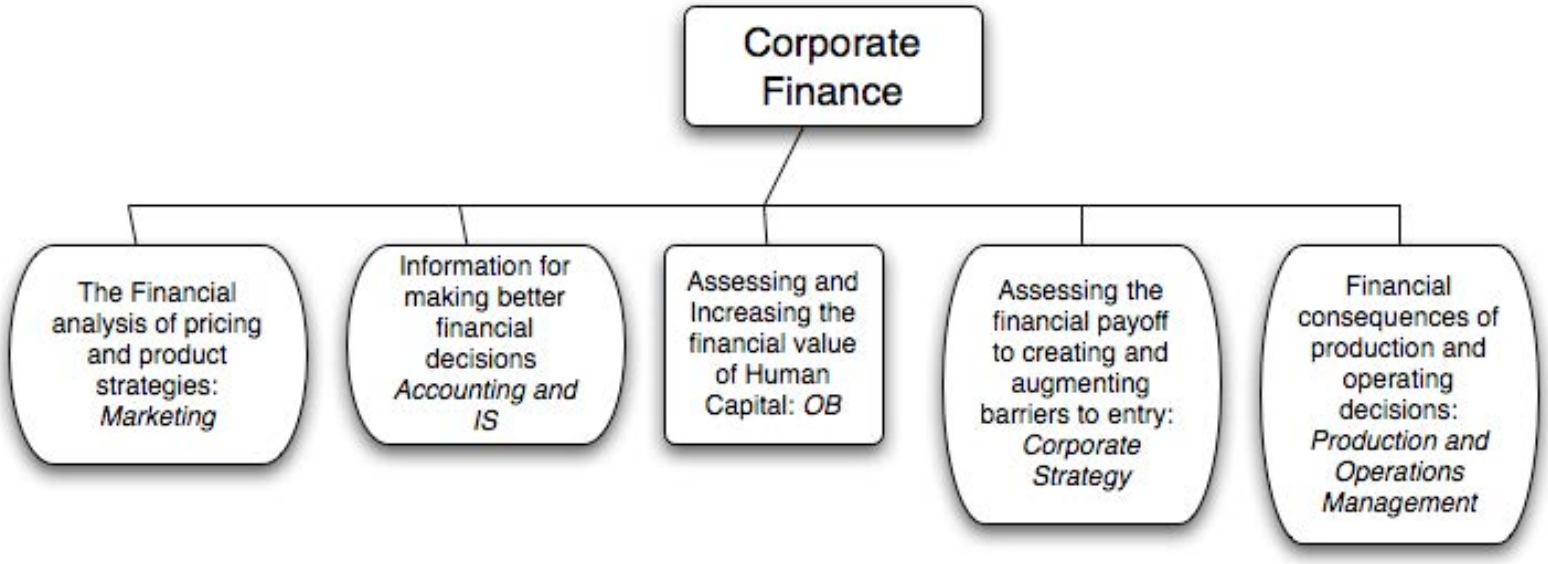
Aswath Damodaran

www.damodaran.com

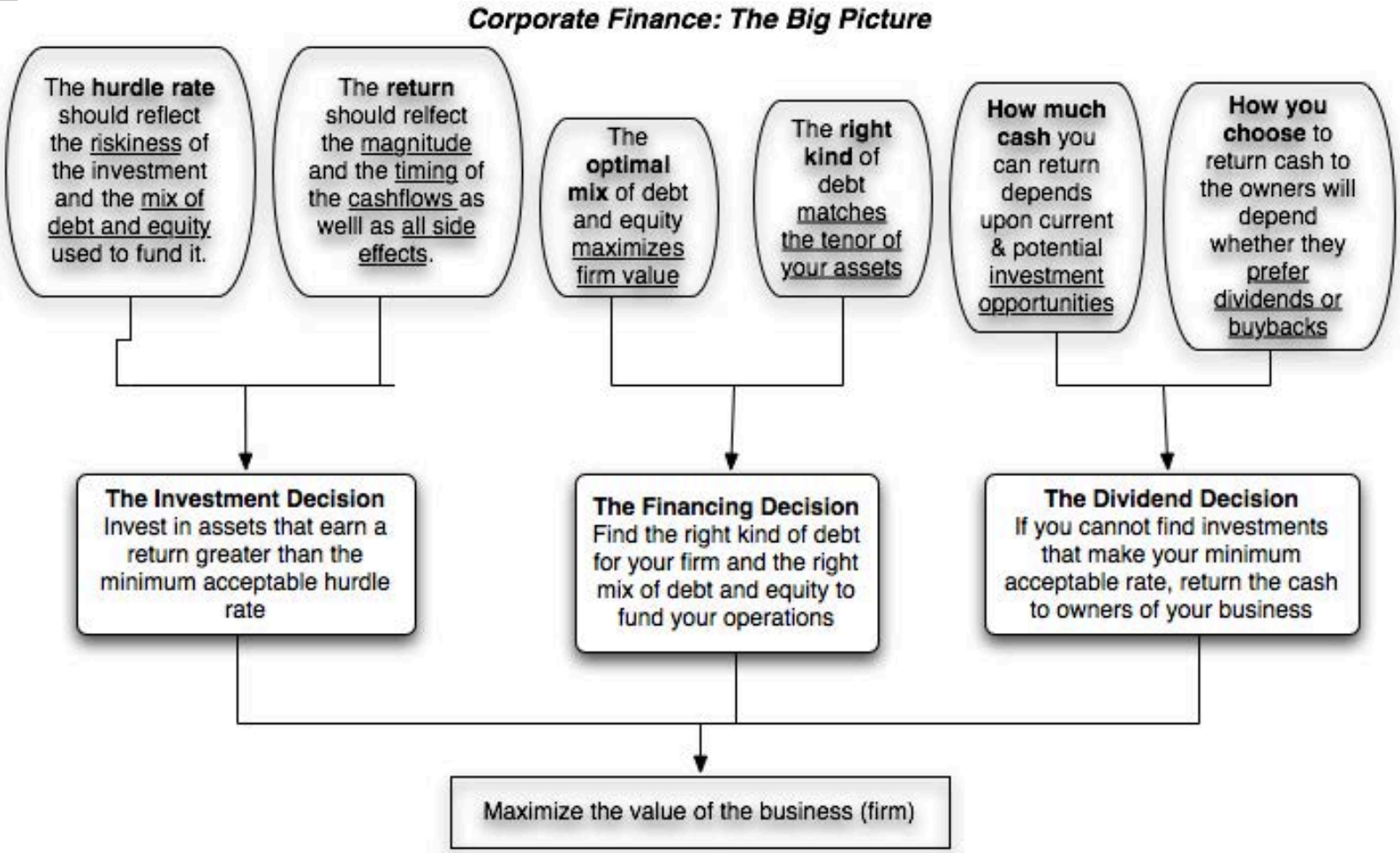
www.stern.nyu.edu/~adamodar/New_Home_Page/cf2day2010.htm

What is corporate finance?

- Every decision that a business makes has financial implications, and any decision which affects the finances of a business is a corporate finance decision.
- Defined broadly, everything that a business does fits under the rubric of corporate finance.

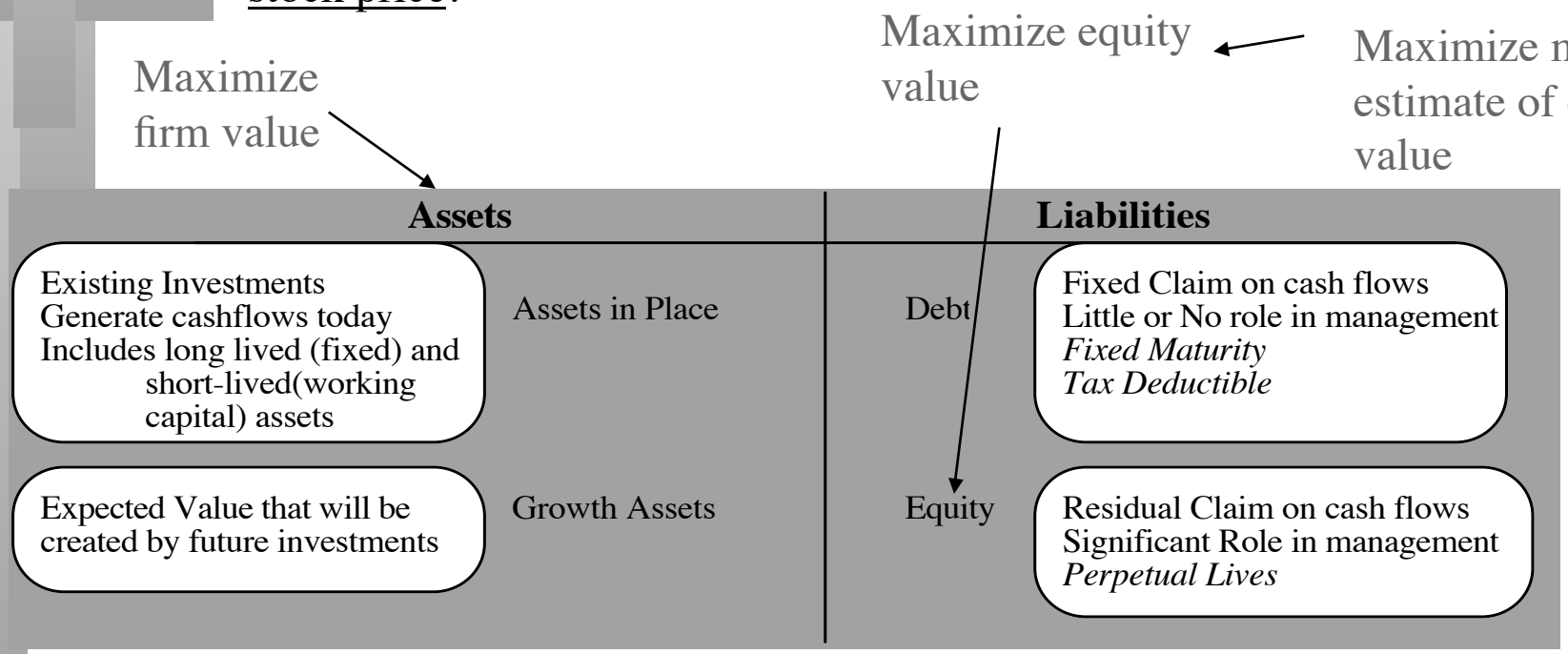


First Principles

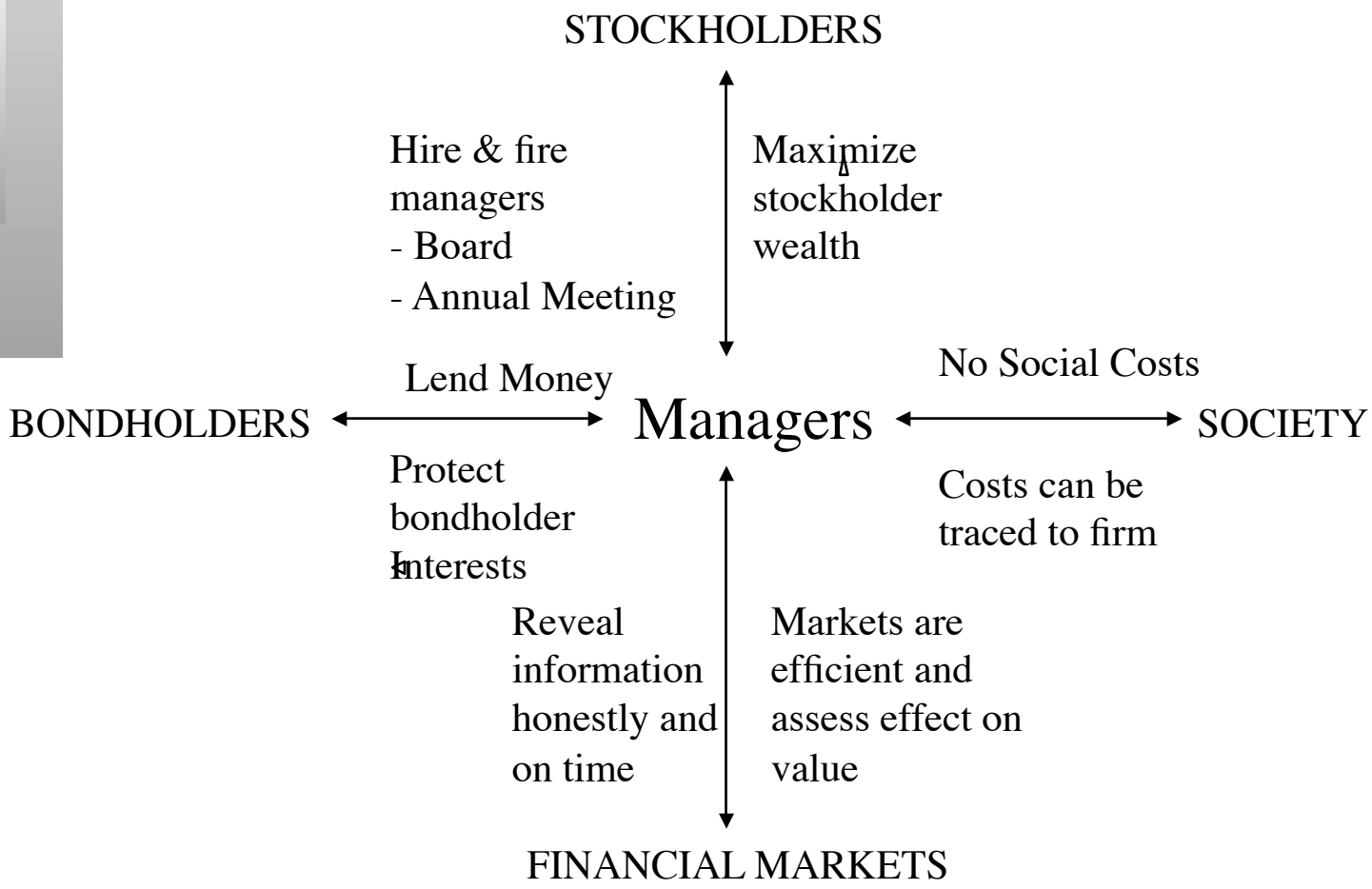


The Objective in Decision Making

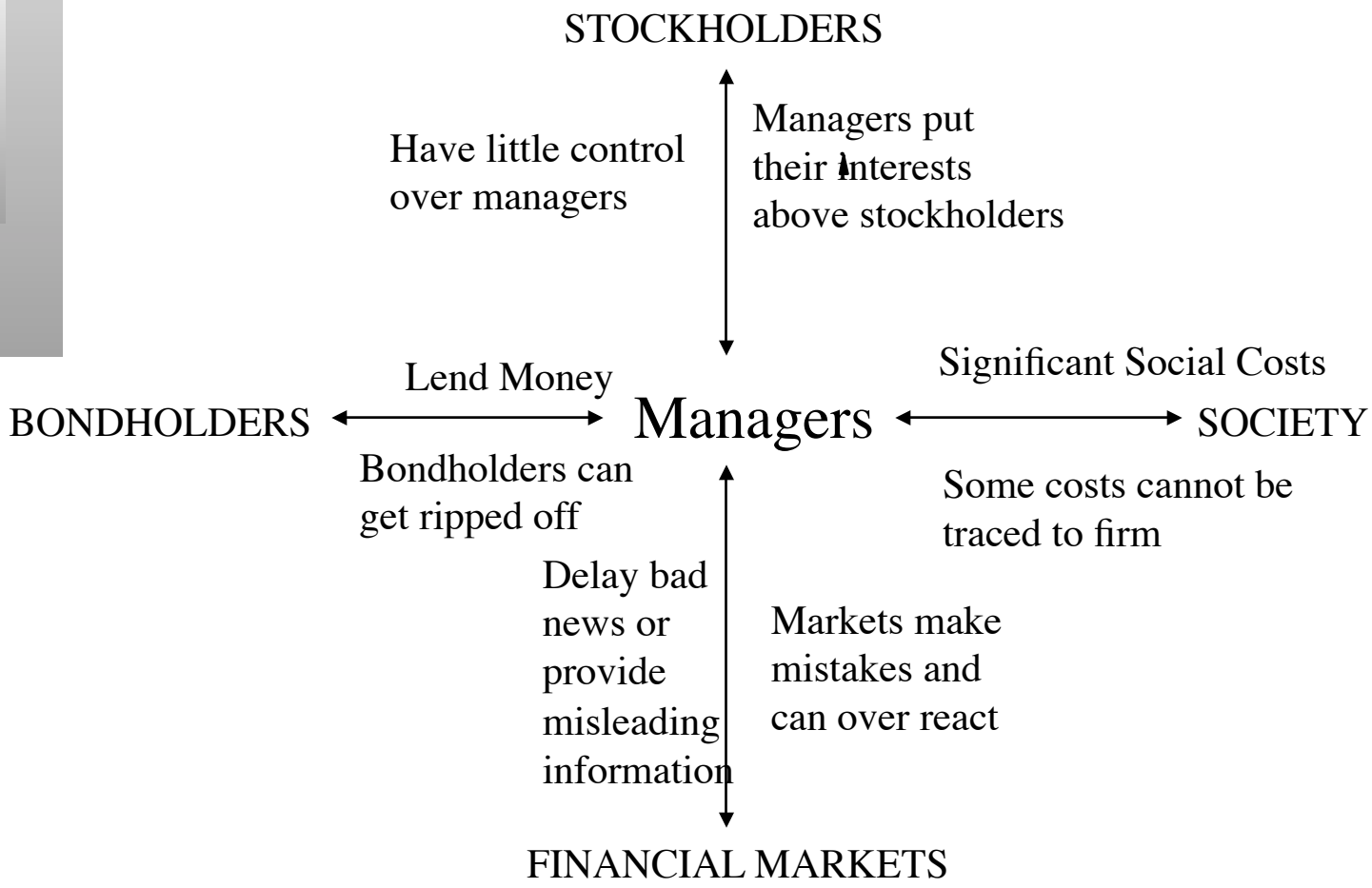
- In traditional corporate finance, the objective in decision making is to maximize the value of the firm.
- A narrower objective is to maximize stockholder wealth. When the stock is traded and markets are viewed to be efficient, the objective is to maximize the stock price.



The Classical Objective Function



What can go wrong?



Who's on Board? The Disney Experience - 1997

Reveta F. Bowers 1,5
Head of School
Center for Early Education

Roy E . Disney 3
Vice Chairman
The Walt Disney Company

Michael D. Eisner 3
Chairman and Chief Executive Officer
The Walt Disney Company

Stanley P. Gold 4,5
President and Chief Executive Officer
Shamrock Holdings, Inc.

Sanford M. Litvack
Senior Executive Vice President
and Chief of Corporate Operations
The Walt Disney Company

Ignacio E. Lozano, Jr. 1,2,4
Editor-in-Chief, LA OPINION

George J. Mitchell 5
Special Counsel
Verner, Liipfert, Bernard, McPherson
and Hand

Thomas S. Murphy
Former Chairman
Capital Cities/ABC, Inc.

Richard A. Nunis
Chairman
Walt Disney Attractions

Leo J. O'Donovan, S.J.
President
Georgetown University

Michael S. Ovitz 3
President
The Walt Disney Company

Sidney Poitier 2,4
Chief Executive Officer
Verdon-Cedric Productions

Irwin E. Russell 2,4
Attorney at Law

Robert A.M. Stern
Senior Partner Productions

E. Cardon Walker 1
Former Chairman and Chief Executive Officer
The Walt Disney Company

Raymond L. Watson 1,2,3
Vice Chairman
The Irvine Company

Gary L. Wilson 5
Co-Chairman
Northwest Airlines Corporation

1 Member of Audit Review Committee
2 Member of Compensation Committee
3 Member of Executive Committee
4 Member of Executive Performance Plan Committee
5 Member of Nominating Committee

So, what next? When the cat is idle, the mice will play ....

No stockholder approval needed.... Stockholder Approval needed

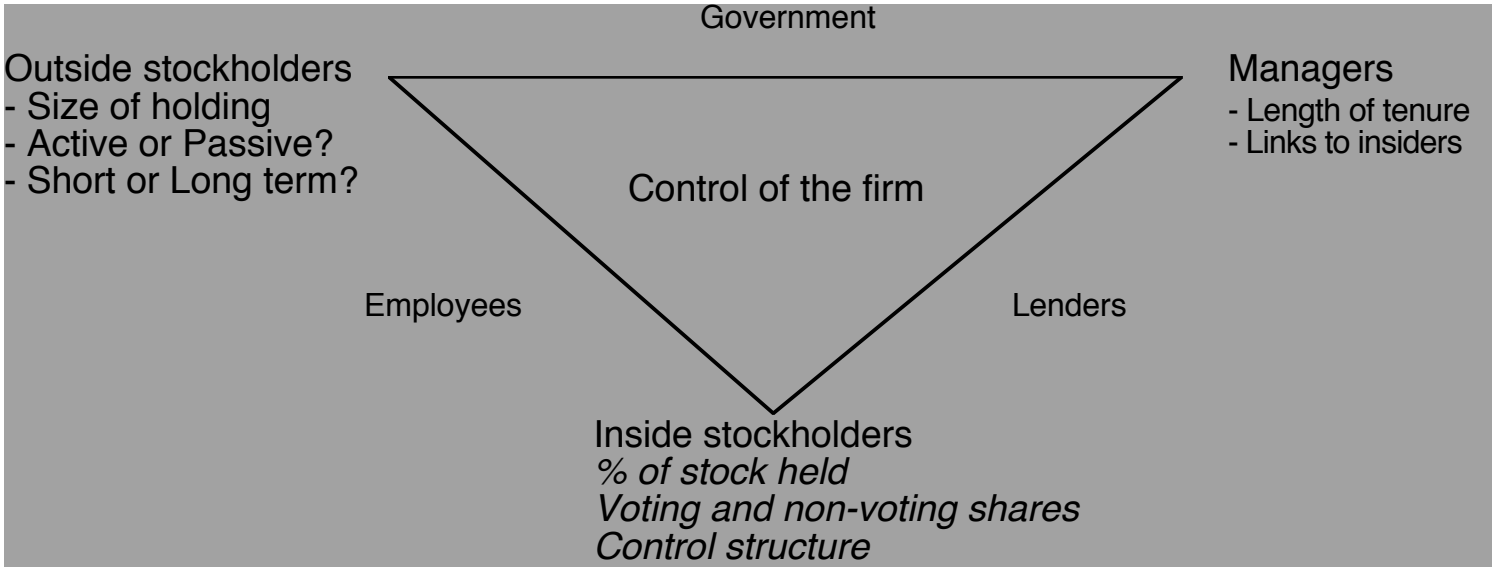
When managers do not fear stockholders, they will often put their interests over stockholder interests

- **Greenmail**: The (managers of) target of a hostile takeover buy out the potential acquirer's existing stake, at a price much greater than the price paid by the raider, in return for the signing of a 'standstill' agreement.
- **Golden Parachutes**: Provisions in employment contracts, that allows for the payment of a lump-sum or cash flows over a period, if managers covered by these contracts lose their jobs in a takeover.
- **Poison Pills**: A security, the rights or cashflows on which are triggered by an outside event, generally a hostile takeover, is called a poison pill.
- **Shark Repellents**: Anti-takeover amendments are also aimed at dissuading hostile takeovers, but differ on one very important count. They require the assent of stockholders to be instituted.
- **Overpaying on takeovers:** Acquisitions often are driven by management interests rather than stockholder interests.

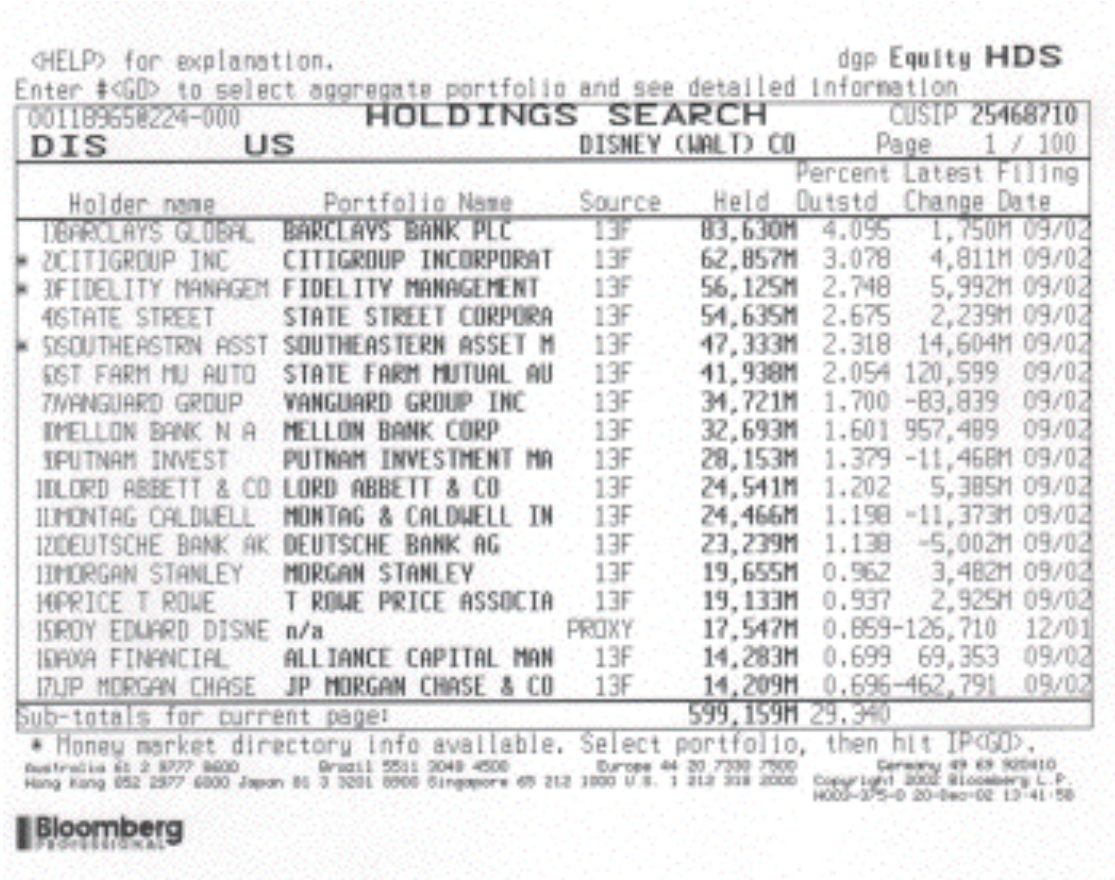
⌛Application Test: Who owns/runs your firm?

Look at: Bloomberg printout **HDS** for your firm

- Who are the top stockholders in your firm?
- What are the potential conflicts of interests that you see emerging from this stockholding structure?



Case 1: Splintering of Stockholders
Disney's top stockholders in 2003



<HELP> for explanation. dgp Equity HDS
Enter #<GO> to select aggregate portfolio and see detailed information

00118965@224-000 HOLDINGS SEARCH CUSIP 25468710
DIS US DISNEY (WALT) CO Page 1 / 100

	Holder name	Portfolio Name	Source	Held	Percent Outstd	Latest Change	Filing Date
1	BARCLAYS GLOBAL	BARCLAYS BANK PLC	13F	83,630M	4.095	1,750M	09/02
* 2	CITIGROUP INC	CITIGROUP INCORPORAT	13F	62,857M	3.078	4,811M	09/02
* 3	FIDELITY MANAGEM	FIDELITY MANAGEMENT	13F	56,125M	2.748	5,992M	09/02
4	STATE STREET	STATE STREET CORPORA	13F	54,635M	2.675	2,239M	09/02
* 5	SOUTHEASTRN ASST	SOUTHEASTERN ASSET M	13F	47,333M	2.318	14,604M	09/02
6	ST FARM MU AUTO	STATE FARM MUTUAL AU	13F	41,938M	2.054	120,599	09/02
7	VANGUARD GROUP	VANGUARD GROUP INC	13F	34,721M	1.700	-83,839	09/02
8	MELLON BANK N A	MELLON BANK CORP	13F	32,693M	1.601	957,489	09/02
9	PUTNAM INVEST	PUTNAM INVESTMENT MA	13F	28,153M	1.379	-11,468M	09/02
10	LORD ABBETT & CO	LORD ABBETT & CO	13F	24,541M	1.202	5,385M	09/02
11	MONTAG CALDWELL	MONTAG & CALDWELL IN	13F	24,466M	1.198	-11,373M	09/02
12	DEUTSCHE BANK AK	DEUTSCHE BANK AG	13F	23,239M	1.138	-5,002M	09/02
13	MORGAN STANLEY	MORGAN STANLEY	13F	19,655M	0.962	3,482M	09/02
14	PRICE T ROWE	T ROWE PRICE ASSOCIA	13F	19,133M	0.937	2,925M	09/02
15	ROY EDWARD DISNE	n/a	PROXY	17,547M	0.859	-126,710	12/01
16	AXA FINANCIAL	ALLIANCE CAPITAL MAN	13F	14,283M	0.699	69,353	09/02
17	JP MORGAN CHASE	JP MORGAN CHASE & CO	13F	14,209M	0.696	-462,791	09/02
Sub-totals for current page:				599,159M	29.340		

* Money market directory info available. Select portfolio, then hit IP<GO>.

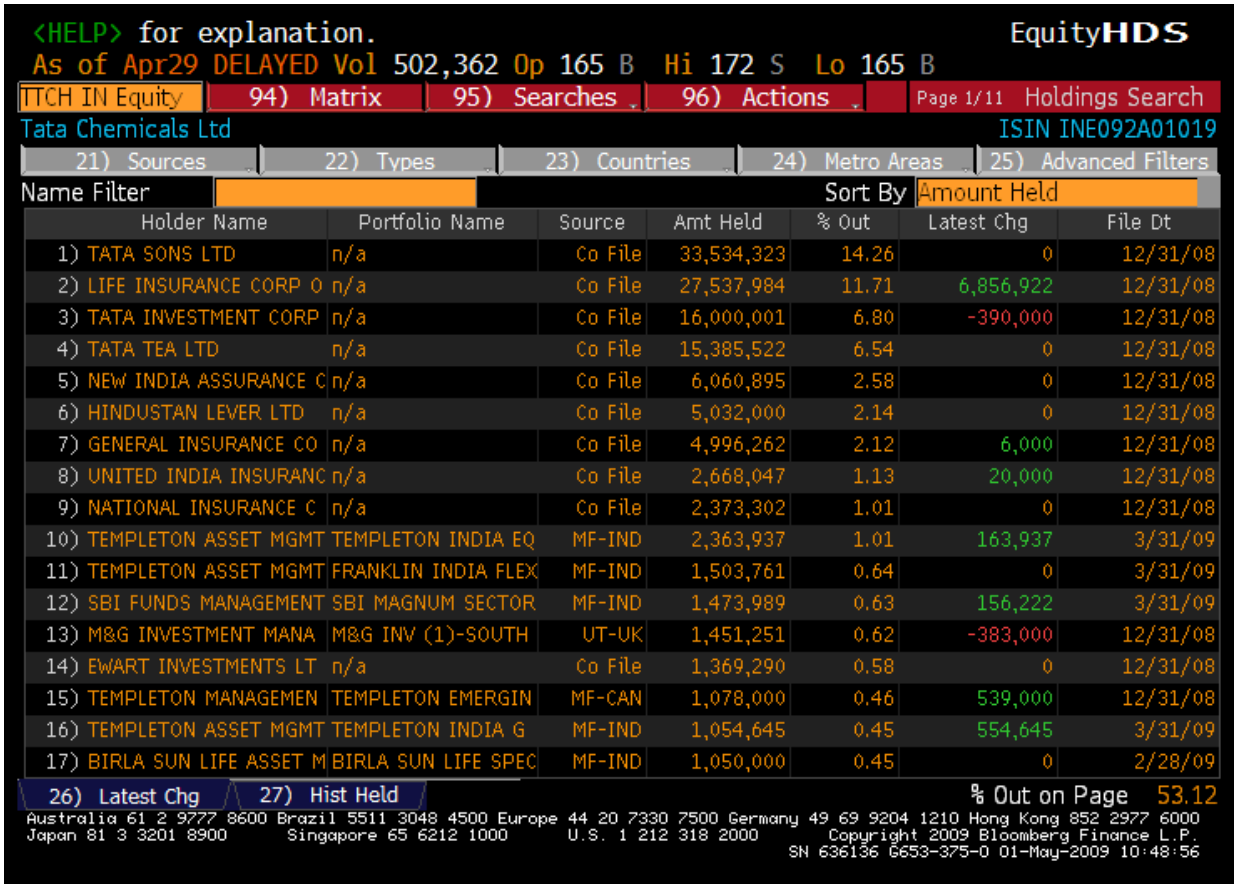
Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 920410
Hong Kong 852 2977 6000 Japan 81 3 3201 8900 Singapore 65 212 1000 U.S. 1 212 318 2000
Copyright 2002 Bloomberg L.P.
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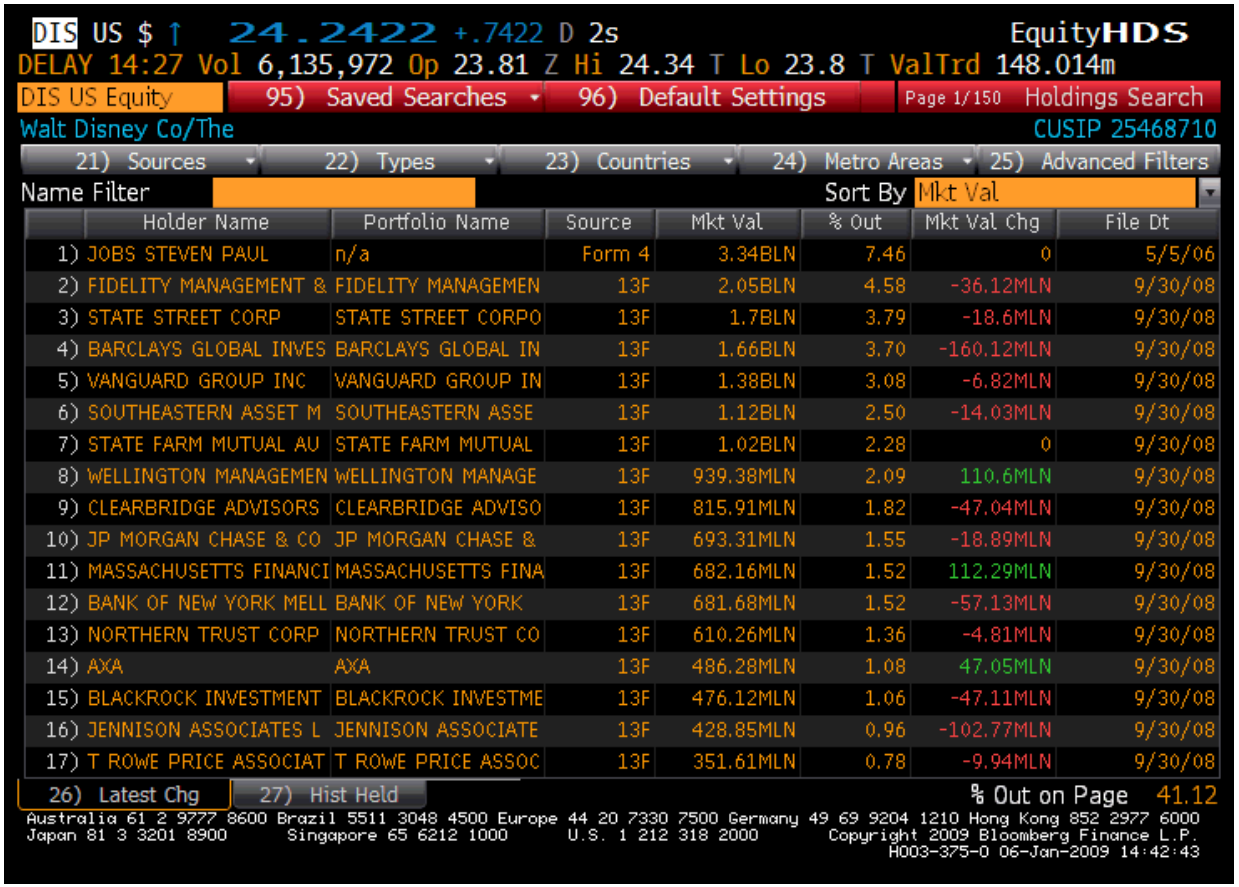
Case 2: Voting versus Non-voting Shares: Aracruz

- Aracruz Cellulose, like most Brazilian companies, had multiple classes of shares.
  - The common shares had all of the voting rights and were held by incumbent management, lenders to the company and the Brazilian government.
  - Outside investors held the non-voting shares, which were called preferred shares, and had no say in the election of the board of directors. At the end of 2002,
- Aracruz was managed by a board of seven directors, composed primarily of representatives of those who own the common (voting) shares, and an executive board, composed of three managers of the company.

Case 3: Cross and Pyramid Holdings
Tata Chemical's top stockholders in 2008



Things change.. Disney's top stockholders in 2009



DIS US $ ↑ 24.2422 +.7422 D 2s EquityHDS
DELAY 14:27 Vol 6,135,972 Op 23.81 Z Hi 24.34 T Lo 23.8 T ValTrd 148.014m
DIS US Equity | 95) Saved Searches | 96) Default Settings | Page 1/150 Holdings Search
Walt Disney Co/The CUSIP 25468710
21) Sources | 22) Types | 23) Countries | 24) Metro Areas | 25) Advanced Filters
Name Filter | Sort By Mkt Val

	Holder Name	Portfolio Name	Source	Mkt Val	% Out	Mkt Val Chg	File Dt
1)	JOBS STEVEN PAUL	n/a	Form 4	3.34BLN	7.46	0	5/5/06
2)	FIDELITY MANAGEMENT &	FIDELITY MANAGEMEN	13F	2.05BLN	4.58	-36.12MLN	9/30/08
3)	STATE STREET CORP	STATE STREET CORPO	13F	1.7BLN	3.79	-18.6MLN	9/30/08
4)	BARCLAYS GLOBAL INVES	BARCLAYS GLOBAL IN	13F	1.66BLN	3.70	-160.12MLN	9/30/08
5)	VANGUARD GROUP INC	VANGUARD GROUP IN	13F	1.38BLN	3.08	-6.82MLN	9/30/08
6)	SOUTHEASTERN ASSET M	SOUTHEASTERN ASSE	13F	1.12BLN	2.50	-14.03MLN	9/30/08
7)	STATE FARM MUTUAL AU	STATE FARM MUTUAL	13F	1.02BLN	2.28	0	9/30/08
8)	WELLINGTON MANAGEMEN	WELLINGTON MANAGE	13F	939.38MLN	2.09	110.6MLN	9/30/08
9)	CLEARBRIDGE ADVISORS	CLEARBRIDGE ADVISO	13F	815.91MLN	1.82	-47.04MLN	9/30/08
10)	JP MORGAN CHASE & CO	JP MORGAN CHASE &	13F	693.31MLN	1.55	-18.89MLN	9/30/08
11)	MASSACHUSETTS FINANCI	MASSACHUSETTS FINA	13F	682.16MLN	1.52	112.29MLN	9/30/08
12)	BANK OF NEW YORK MELL	BANK OF NEW YORK	13F	681.68MLN	1.52	-57.13MLN	9/30/08
13)	NORTHERN TRUST CORP	NORTHERN TRUST CO	13F	610.26MLN	1.36	-4.81MLN	9/30/08
14)	AXA	AXA	13F	486.28MLN	1.08	47.05MLN	9/30/08
15)	BLACKROCK INVESTMENT	BLACKROCK INVESTME	13F	476.12MLN	1.06	-47.11MLN	9/30/08
16)	JENNISON ASSOCIATES L	JENNISON ASSOCIATE	13F	428.85MLN	0.96	-102.77MLN	9/30/08
17)	T ROWE PRICE ASSOCIAT	T ROWE PRICE ASSOC	13F	351.61MLN	0.78	-9.94MLN	9/30/08

26) Latest Chg | 27) Hist Held % Out on Page 41.12

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2009 Bloomberg Finance L.P.
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When traditional corporate financial theory breaks down, the solution is:

- To choose a different mechanism for corporate governance, i.e, assign the responsibility for monitoring managers to someone other than stockholders.
- To choose a different objective for the firm.
- To maximize stock price, but reduce the potential for conflict and breakdown:
  - Making managers (decision makers) and employees into stockholders
  - Protect lenders from expropriation
  - By providing information honestly and promptly to financial markets
  - Minimize social costs

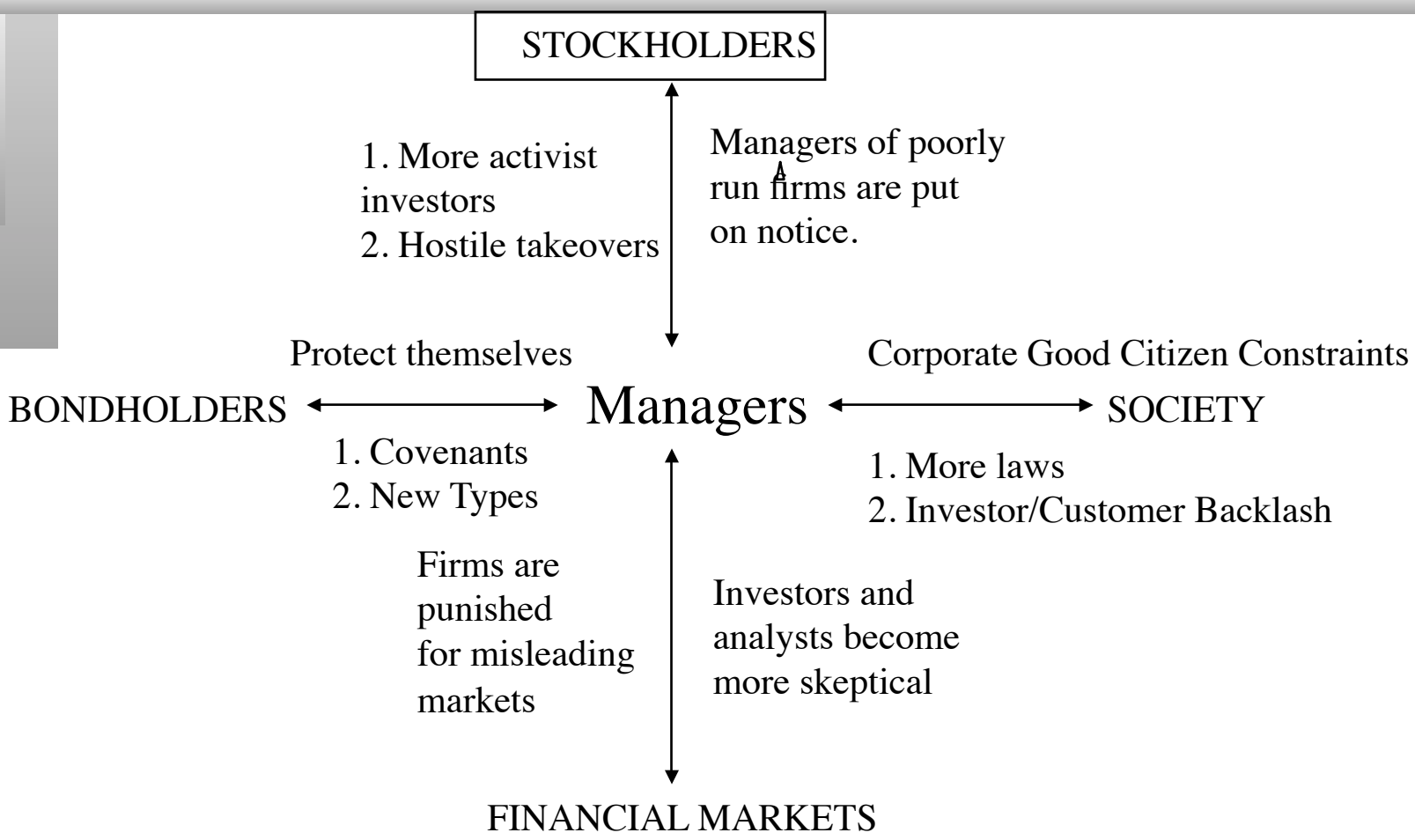
I. An Alternative Corporate Governance System

- Germany and Japan developed a different mechanism for corporate governance, based upon corporate cross holdings.
  - In Germany, the banks form the core of this system.
  - In Japan, it is the keiretsus
  - Other Asian countries have modeled their system after Japan, with family companies forming the core of the new corporate families
- At their best, the most efficient firms in the group work at bringing the less efficient firms up to par. They provide a corporate welfare system that makes for a more stable corporate structure
- At their worst, the least efficient and poorly run firms in the group pull down the most efficient and best run firms down. The nature of the cross holdings makes its very difficult for outsiders (including investors in these firms) to figure out how well or badly the group is doing.

II. Choose a Different Objective Function

- Firms can always focus on a different objective function. Examples would include
  - maximizing earnings
  - maximizing revenues
  - maximizing firm size
  - maximizing market share
  - maximizing EVA
- The key thing to remember is that these are intermediate objective functions.
  - To the degree that they are correlated with the long term health and value of the company, they work well.
  - To the degree that they do not, the firm can end up with a disaster

III. A Market Based Solution



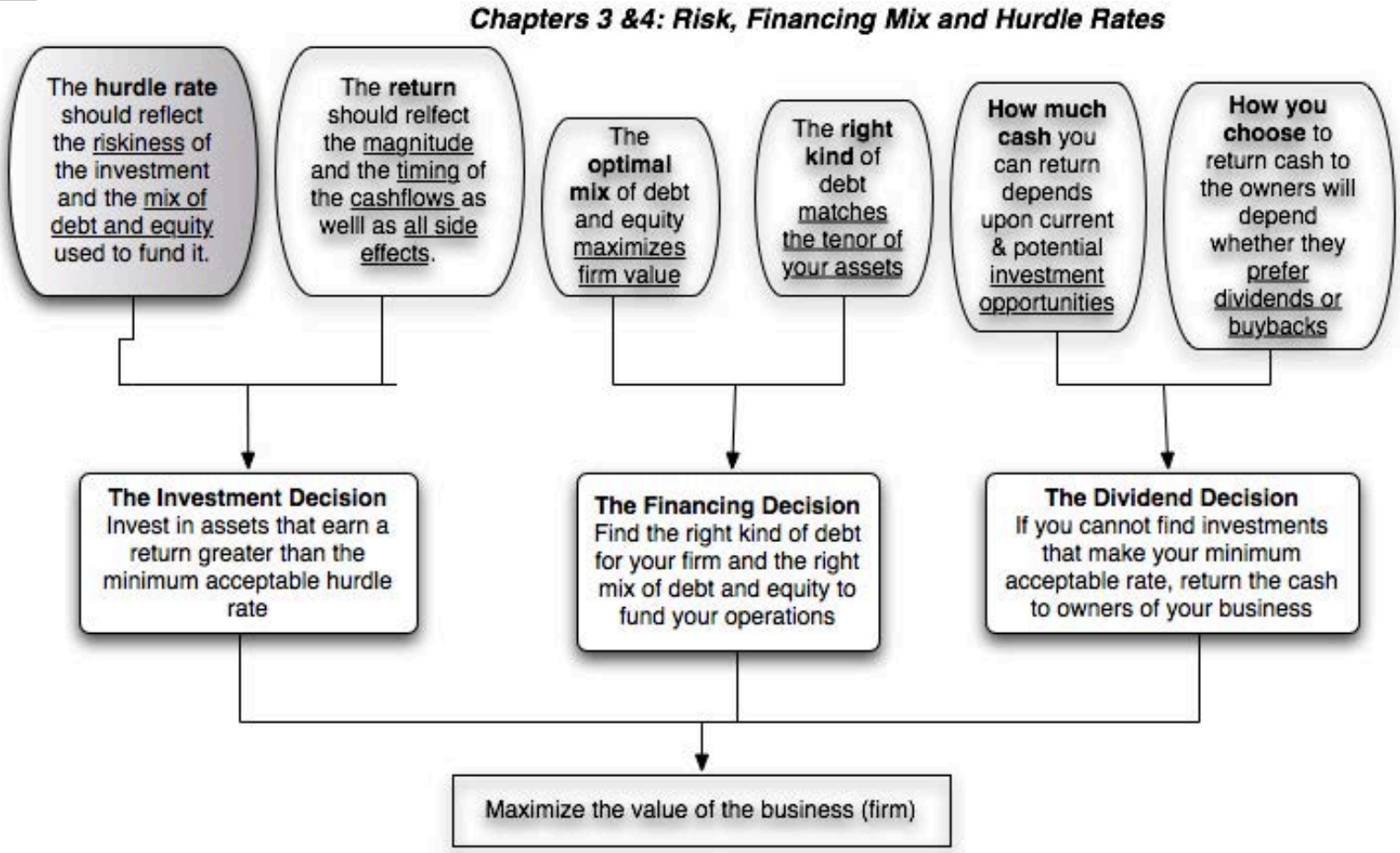
A Market Solution: Eisner's exit… and a new age dawns? Disney's board in 2008

Board Members	*Occupation*
John E. Pepper, Jr. (Chairman)	Retired Chairman and CEO, Procter & Gamble Co.
Susan E. Arnold	President, Global Business Units, Procter & Gamble Co.
John E. Bryson	Retired Chairman and CEO, Edison International
John S. Chen	Chairman,, CEO & President, Sybase, Inc.
Judith L. Estrin	CEO, JLabs, LLC.
Robert A. Iger	CEO, Disney
Steven P. Jobs	CEO, Apple
Fred Langhammer	Chairman, Global Affairs, The Estee Lauder Companies
Aylwin B. Lewis	President and CEO, Potbelly Sandwich Works
Monica Lozano	Publisher and CEO, La Opinion
Robert W. Matschullat	Retired Vice Chairman and CFO, The Seagram Co.
Orin C. Smith	Retired President and CEO, Starbucks Corporation

The Investment Principle: Risk and Return Models

"You cannot swing upon a rope that is attached only to your own belt."

First Principles



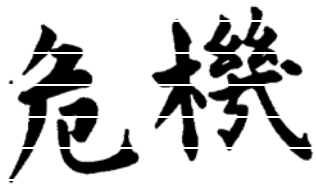
The notion of a benchmark

- Since financial resources are finite, there is a hurdle that projects have to cross before being deemed acceptable.
- This hurdle will be higher for riskier projects than for safer projects.
- A simple representation of the hurdle rate is as follows:

  Hurdle rate = Riskless Rate + Risk Premium
- The two basic questions that every risk and return model in finance tries to answer are:
  - How do you measure risk?
  - How do you translate this risk measure into a risk premium?

What is Risk?

- Risk, in traditional terms, is viewed as a 'negative'. Webster's dictionary, for instance, defines risk as "exposing to danger or hazard". The Chinese symbols for risk, reproduced below, give a much better description of risk

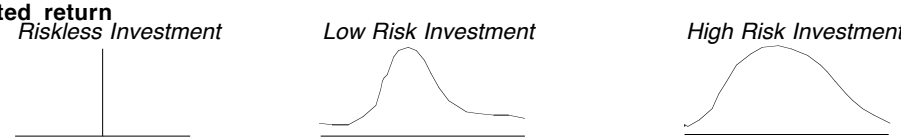


- The first symbol is the symbol for "danger", while the second is the symbol for "opportunity", making risk a mix of danger and opportunity. You cannot have one, without the other.

Alternatives to the CAPM

Step 1: Defining Risk

The risk in an investment can be measured by the variance in actual returns around an expected return



Step 2: Differentiating between Rewarded and Unrewarded Risk

Risk that is specific to investment (Firm Specific)
Can be diversified away in a diversified portfolio
1. each investment is a small proportion of portfolio
2. risk averages out across investments in portfolio

Risk that affects all investments (Market Risk)
Cannot be diversified away since most assets are affected by it.

The marginal investor is assumed to hold a "diversified" portfolio. Thus, only market risk will be rewarded and priced.

Step 3: Measuring Market Risk

The CAPM	**The APM**	**Multi-Factor Models**	**Proxy Models**
If there is 1. no private information 2. no transactions cost the optimal diversified portfolio includes every traded asset. Everyone will hold this<u>market portfolio</u> **Market Risk = Risk added by any investment to the market portfolio:**	If there are no arbitrage opportunities then the market risk of any asset must be captured by betas relative to factors that affect all investments. **Market Risk = Risk exposures of any asset to market factors**	Since market risk affects most or all investments, it must come from macro economic factors. **Market Risk = Risk exposures of any asset to macro economic factors.**	In an efficient market, differences in returns across long periods must be due to market risk differences. Looking for variables correlated with returns should then give us proxies for this risk. **Market Risk = Captured by the Proxy Variable(s)**
Beta of asset relative to Market portfolio (from a regression)	Betas of asset relative to unspecified market factors (from a factor analysis)	Betas of assets relative to specified macro economic factors (from a regression)	Equation relating returns to proxy variables (from a regression)

Limitations of the CAPM

1. The model makes unrealistic assumptions
2. The parameters of the model cannot be estimated precisely
   - Definition of a market index
   - Firm may have changed during the 'estimation' period'
3. The model does not work well
   - If the model is right, there should be
     - a linear relationship between returns and betas
     - the only variable that should explain returns is betas
   - The reality is that
     - the relationship between betas and returns is weak
     - Other variables (size, price/book value) seem to explain differences in returns better.

Why the CAPM persists…

- The CAPM, notwithstanding its many critics and limitations, has survived as the default model for risk in equity valuation and corporate finance. The alternative models that have been presented as better models (APM, Multifactor model..) have made inroads in performance evaluation but not in prospective analysis because:
  - The alternative models (which are richer) do a much better job than the CAPM in explaining past return, but their effectiveness drops off when it comes to estimating expected future returns (because the models tend to shift and change).
  - The alternative models are more complicated and require more information than the CAPM.
  - For most companies, the expected returns you get with the the alternative models is not different enough to be worth the extra trouble of estimating four additional betas.

Looking at Disney's top stockholders in 2009 (again)

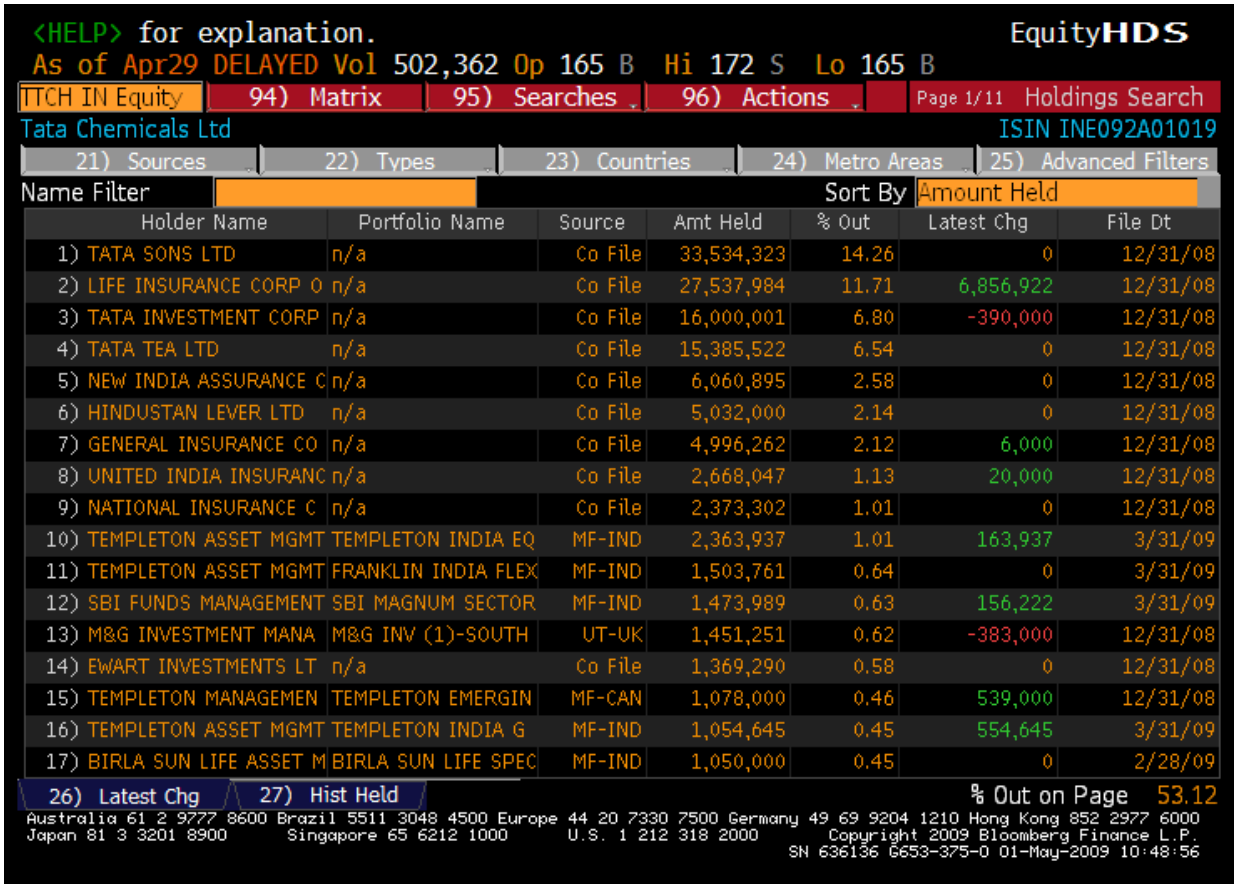
DIS US $ ↑ 24.2422 +.7422 D 2s EquityHDS
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DIS US Equity | 95) Saved Searches | 96) Default Settings | Page 1/150 Holdings Search
Walt Disney Co/The CUSIP 25468710
21) Sources | 22) Types | 23) Countries | 24) Metro Areas | 25) Advanced Filters
Name Filter | Sort By Mkt Val

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1)	JOBS STEVEN PAUL	n/a	Form 4	3.34BLN	7.46	0	5/5/06
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14)	AXA	AXA	13F	486.28MLN	1.08	47.05MLN	9/30/08
15)	BLACKROCK INVESTMENT	BLACKROCK INVESTME	13F	476.12MLN	1.06	-47.11MLN	9/30/08
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26) Latest Chg | 27) Hist Held % Out on Page 41.12

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2009 Bloomberg Finance L.P.
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Cross and Pyramid Holdings
Tata Chemical's top stockholders in 2008



<HELP> for explanation. EquityHDS

As of Apr29 DELAYED Vol 502,362 Op 165 B Hi 172 S Lo 165 B

ITCH IN Equity | 94) Matrix | 95) Searches | 96) Actions | Page 1/11 Holdings Search

Tata Chemicals Ltd ISIN INE092A01019

21) Sources | 22) Types | 23) Countries | 24) Metro Areas | 25) Advanced Filters

Name Filter | Sort By Amount Held

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2)	LIFE INSURANCE CORP O	n/a	Co File	27,537,984	11.71	6,856,922	12/31/08
3)	TATA INVESTMENT CORP	n/a	Co File	16,000,001	6.80	-390,000	12/31/08
4)	TATA TEA LTD	n/a	Co File	15,385,522	6.54	0	12/31/08
5)	NEW INDIA ASSURANCE C	n/a	Co File	6,060,895	2.58	0	12/31/08
6)	HINDUSTAN LEVER LTD	n/a	Co File	5,032,000	2.14	0	12/31/08
7)	GENERAL INSURANCE CO	n/a	Co File	4,996,262	2.12	6,000	12/31/08
8)	UNITED INDIA INSURANC	n/a	Co File	2,668,047	1.13	20,000	12/31/08
9)	NATIONAL INSURANCE C	n/a	Co File	2,373,302	1.01	0	12/31/08
10)	TEMPLETON ASSET MGMT	TEMPLETON INDIA EQ	MF-IND	2,363,937	1.01	163,937	3/31/09
11)	TEMPLETON ASSET MGMT	FRANKLIN INDIA FLEX	MF-IND	1,503,761	0.64	0	3/31/09
12)	SBI FUNDS MANAGEMENT	SBI MAGNUM SECTOR	MF-IND	1,473,989	0.63	156,222	3/31/09
13)	M&G INVESTMENT MANA	M&G INV (1)-SOUTH	UT-UK	1,451,251	0.62	-383,000	12/31/08
14)	EWART INVESTMENTS LT	n/a	Co File	1,369,290	0.58	0	12/31/08
15)	TEMPLETON MANAGEMEN	TEMPLETON EMERGIN	MF-CAN	1,078,000	0.46	539,000	12/31/08
16)	TEMPLETON ASSET MGMT	TEMPLETON INDIA G	MF-IND	1,054,645	0.45	554,645	3/31/09
17)	BIRLA SUN LIFE ASSET M	BIRLA SUN LIFE SPEC	MF-IND	1,050,000	0.45	0	2/28/09

26) Latest Chg | 27) Hist Held % Out on Page 53.12

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2009 Bloomberg Finance L.P.
SN 636136 G653-375-0 01-May-2009 10:48:56

⌛Application Test: Who is the marginal investor in your firm?

You can get information on insider and institutional holdings in your firm from:

http://finance.yahoo.com/

Enter your company's symbol and choose profile.

- Looking at the breakdown of stockholders in your firm, consider whether the marginal investor is
  a) An institutional investor
  b) An individual investor
  c) An insider

Inputs required to use the CAPM -

- The capital asset pricing model yields the following expected return:

  Expected Return = Riskfree Rate+ Beta * (Expected Return on the Market Portfolio - Riskfree Rate)

- To use the model we need three inputs:

  (a) The current risk-free rate

  (b) The expected market risk premium (the premium expected for investing in risky assets (market portfolio) over the riskless asset)

  (c) The beta of the asset being analyzed.

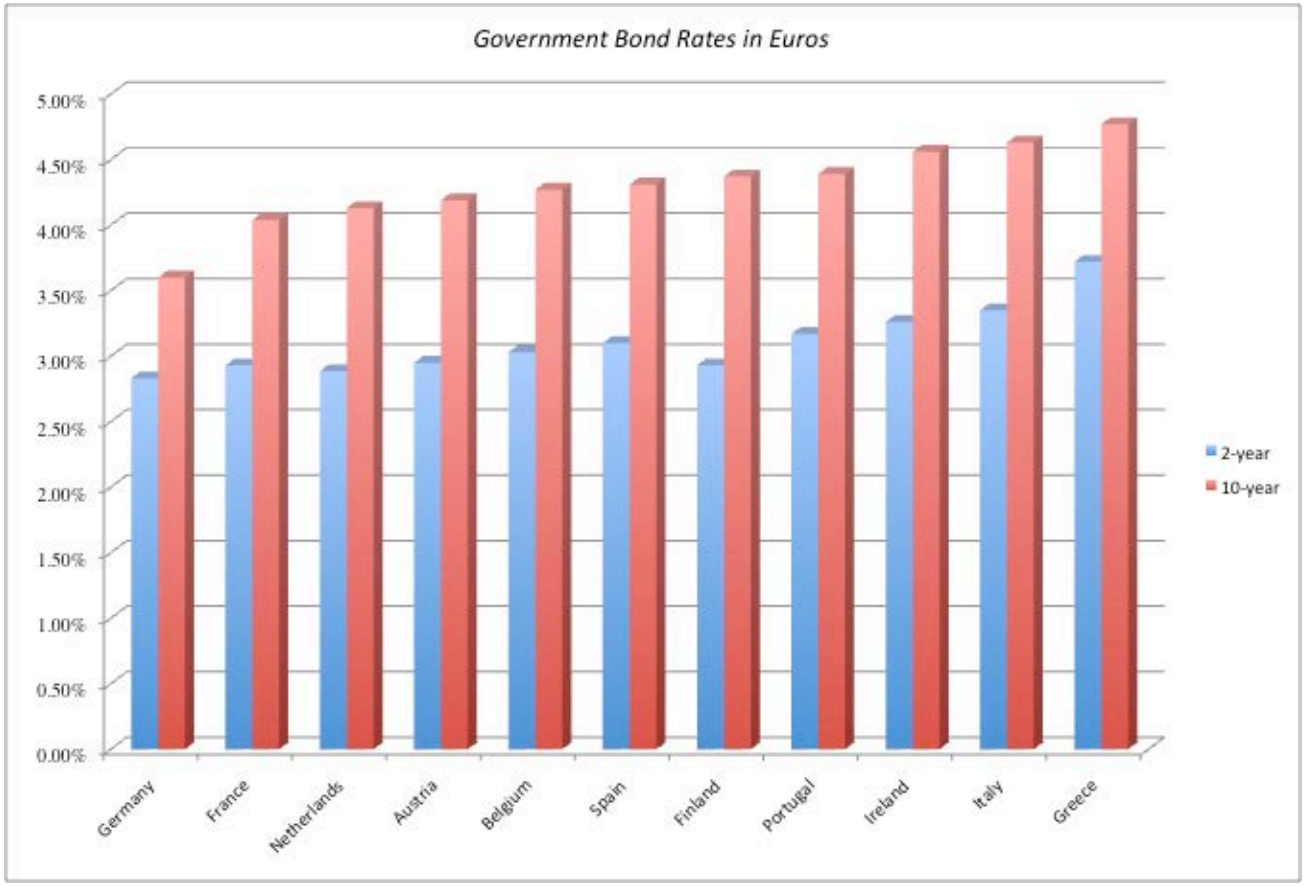
The Riskfree Rate and Time Horizon

- On a riskfree asset, the actual return is equal to the expected return. Therefore, there is no variance around the expected return.
- For an investment to be riskfree, i.e., to have an actual return be equal to the expected return, two conditions have to be met –
  - There has to be no default risk, which generally implies that the security has to be issued by the government. Note, however, that not all governments can be viewed as default free.
  - There can be no uncertainty about reinvestment rates, which implies that it is a zero coupon security with the same maturity as the cash flow being analyzed.
- Theoretically, this translates into using different riskfree rates for each cash flow - the 1 year zero coupon rate for the cash flow in year 1, the 2-year zero coupon rate for the cash flow in year 2 ...
- Practically speaking, if there is substantial uncertainty about expected cash flows, the present value effect of using time varying riskfree rates is small enough that it may not be worth it.

The Bottom Line on Riskfree Rates

- Using a long term government rate (even on a coupon bond) as the riskfree rate on all of the cash flows in a long term analysis will yield a close approximation of the true value. For short term analysis, it is entirely appropriate to use a short term government security rate as the riskfree rate.
- The riskfree rate that you use in an analysis should be in the same currency that your cashflows are estimated in.
  - In other words, if your cashflows are in U.S. dollars, your riskfree rate has to be in U.S. dollars as well.
  - If your cash flows are in Euros, your riskfree rate should be a Euro riskfree rate.
- The conventional practice of estimating riskfree rates is to use the government bond rate, with the government being the one that is in control of issuing that currency. In US dollars, this has translated into using the US treasury rate as the riskfree rate. In May 2009, for instance, the ten-year US treasury bond rate was 3.5%.

What is the Euro riskfree rate?



What if there is no default-free entity?

- If the government is perceived to have default risk, the government bond rate will have a default spread component in it and not be riskfree. There are three choices we have, when this is the case.
  - Adjust the local currency government borrowing rate for default risk to get a riskless local currency rate.
    - In May 2009, the Indian government rupee bond rate was 7%. the local currency rating from Moody's was Ba2 and the default spread for a Ba2 rated country bond was 3%.

      Riskfree rate in Rupees = 7% - 3% = 4%
    - In May 2009, the Brazilian government $R bond rate was 11% and the local currency rating was Ba1, with a default spread of 2.5%.

      Riskfree rate in $R = 11% - 2.5% = 8.5%
  - Do the analysis in an alternate currency, where getting the riskfree rate is easier. With Aracruz in 2009, we could chose to do the analysis in US dollars (rather than estimate a riskfree rate in R$). The riskfree rate is then the US treasury bond rate.
  - Do your analysis in real terms, in which case the riskfree rate has to be a real riskfree rate. The inflation-indexed treasury rate is a measure of a real riskfree rate.

Measurement of the risk premium

- The risk premium is the premium that investors demand for investing in an average risk investment, relative to the riskfree rate.
- As a general proposition, this premium should be
  - greater than zero
  - increase with the risk aversion of the investors in that market
  - increase with the riskiness of the "average" risk investment

What is your risk premium?

- Assume that stocks are the only risky assets and that you are offered two investment options:
  - a riskless investment (say a Government Security), on which you can make 5%
  - a mutual fund of all stocks, on which the returns are uncertain

How much of an expected return would you demand to shift your money from the riskless asset to the mutual fund?

a) Less than 5%
b) Between 5 - 7%
c) Between 7 - 9%
d) Between 9 - 11%
e) Between 11- 13%
f) More than 13%

Check your premium against the survey premium on my web site.

Risk Premiums do change..

Go back to the previous example. Assume now that you are making the same choice but that you are making it in the aftermath of a stock market crash (it has dropped 25% in the last month). Would you change your answer?

a) I would demand a larger premium
b) I would demand a smaller premium
c) I would demand the same premium

Estimating Risk Premiums in Practice

- Survey investors on their desired risk premiums and use the average premium from these surveys.
- Assume that the actual premium delivered over long time periods is equal to the expected premium - i.e., use historical data
- Estimate the implied premium in today's asset prices.

A. The Survey Approach

- Surveying all investors in a market place is impractical.
- However, you can survey a few individuals and use these results. In practice, this translates into surveys of the following:

Group Surveyed	Survey done by	Estimated ERP
Individual Investors	Securities Industries Assn	8.3% (December 2004)
Institutional Investors	Merrill Lynch	3.8% (2009)
CFOs	Campbell & Harvey	4.7% (2009)
Finance Academics	Fernandez	5.7% (2009)

- The limitations of this approach are:
  - there are no constraints on reasonability (the survey could produce negative risk premiums or risk premiums of 50%)
  - The survey results are extremely volatile
  - they tend to be short term; even the longest surveys do not go beyond one year.

B. The Historical Risk Premium
Evidence from the United States

	Arithmetic Average		Geometric Average	
	Stocks – T. Bills	Stocks – T. Bonds	Stocks – T. Bills	Stocks – T. Bonds
1928-2009	7.53%	6.03%	5.56%	4.29%
	(2.28%)	(2.40%)		
1960-2009	5.48%	3.78%	4.09%	2.74%
	(2.42%)	(2.71%)		
2000-2009	-1.59%	-5.47%	-3.68%	-7.22%
	(6.73%)	(9.22%)		

What is the right premium?

- Go back as far as you can. Otherwise, the standard error in the estimate will be large.

$$\text{Std Error in estimate} = \frac{\text{Annualized Std deviation in Stock prices}}{\sqrt{\text{Number of years of historical data}}})$$

- Be consistent in your use of a riskfree rate.
- Use arithmetic premiums for one-year estimates of costs of equity and geometric premiums for estimates of long term costs of equity.

What about historical premiums for other markets?

- Historical data for markets outside the United States is available for much shorter time periods. The problem is even greater in emerging markets.
- The historical premiums that emerge from this data reflects this data problem and there is much greater error associated with the estimates of the premiums.

One solution: Look at a country's bond rating and default spreads as a start

- Ratings agencies assign ratings to countries that reflect their assessment of the default risk of these countries. These ratings reflect the political and economic stability of these countries and thus provide a useful measure of country risk.
  - In May 2009, the local currency rating, from Moody's, for Brazil was Ba1. In May 2009, Brazil had dollar denominated 10-year Bonds, trading at an interest rate of 6%. The US treasury bond rate that day was 3.5%, yielding a default spread of 2.50% for Brazil.
  - India has a rating of Ba2 from Moody's but has no dollar denominated bonds. The typical default spread for Ba2 rated sovereign bonds is 3%.
- Many analysts add this default spread to the US risk premium to come up with a risk premium for a country. This would yield a risk premium of 6.38% for Brazil and 6.88% for India, if we use 3.88% as the premium for the US .

Beyond the default spread

- While default risk spreads and equity risk premiums are highly correlated, one would expect equity spreads to be higher than debt spreads.
- Risk Premium for Brazil in early 2009
  - Standard Deviation in Bovespa (Equity) = 34%
  - Standard Deviation in Brazil $ denominated Bond = 21.5%
  - Default spread on $ denominated Bond = 2.5%
  - Country Risk Premium (CRP) for Brazil = 2.5% (34%/21.5%) = 3.95%
  - Total Risk Premium for Brazil = US risk premium (in '09) + CRP for Brazil
    = 3.88% + 3.95% = 7.83%
- Risk Premium for India in May 2009
  - Standard Deviation in Sensex (Equity) = 32%
  - Standard Deviation in Indian government bond = 21.3%
  - Default spread based upon rating= 3%
  - Country Risk Premium for India = 3% (32%/21.3%) = 4.51%
  - Total Risk Premium for India = US risk premium (in '09) + CRP for India
    = 3.88% + 4.51%= 8.39%

C. Implied Premiums: Watch what I pay, not what I say..
The implied premium in January 2009

Year	Market value of index	Dividends	Buybacks	Cash to equity	Dividend yield	Buyback yield	Total yield
2001	1148.09	15.74	14.34	30.08	1.37%	1.25%	2.62%
2002	879.82	15.96	13.87	29.83	1.81%	1.58%	3.39%
2003	1111.91	17.88	13.70	31.58	1.61%	1.23%	2.84%
2004	1211.92	19.01	21.59	40.60	1.57%	1.78%	3.35%
2005	1248.29	22.34	38.82	61.17	1.79%	3.11%	4.90%
2006	1418.30	25.04	48.12	73.16	1.77%	3.39%	5.16%
2007	1468.36	28.14	67.22	95.36	1.92%	4.58%	6.49%
2008	903.25	28.47	40.25	68.72	3.15%	4.61%	7.77%
Normalized	903.25	28.47	24.11	52.584	3.15%	2.67%	5.82%

In 2008, the actual cash returned to stockholders was 68.72. However, there was a 41% dropoff in buybacks in Q4. We reduced the total buybacks for the year by that amount.

Analysts expect earnings to grow 4% a year for the next 5 years. We will assume that dividends & buybacks will keep pace..
Last year's cashflow (52.58) growing at 4% a year

After year 5, we will assume that earnings on the index will grow at 2.21%, the same rate as the entire economy (= riskfree rate).

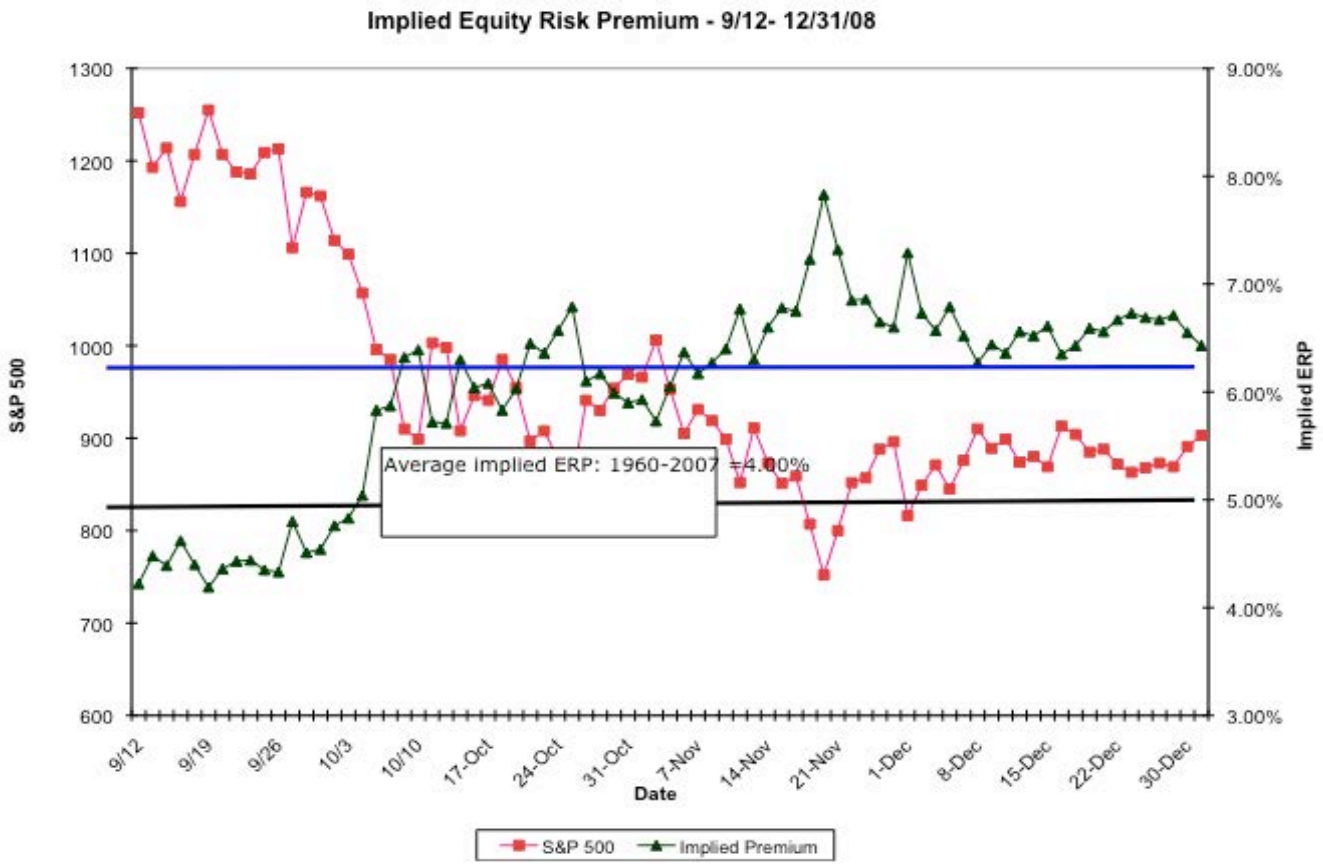
54.69 56.87 59.15 61.52 63.98

$$903.25 = \frac{54.69}{(1+r)} + \frac{56.87}{(1+r)^2} + \frac{59.15}{(1+r)^3} + \frac{61.52}{(1+r)^4} + \frac{63.98}{(1+r)^5} + \frac{63.98(1.0221)}{(r-.0221)(1+r)^5}$$

January 1, 2009
S&P 500 is at 903.25
Adjusted Dividends & Buybacks for 2008 = 52.58

Expected Return on Stocks (1/1/09) = 8.64%
Equity Risk Premium = 8.64% - 2.21% = 6.43%

The Anatomy of a Crisis: Implied ERP from September 12, 2008 to January 1, 2009



The bottom line on Equity Risk Premiums in early 2009

- Mature Markets: In May 2009, the number that we chose to use as the equity risk premium for all mature markets was 6%. While lower than the implied premium at the start of the year 6.43%, it is still much higher than the historical risk premium of 3.88%. It reflected our beliefs then that while the crisis was abating, it would leave a longer term impact on risk premiums.
- For emerging markets, we will use the melded default spread approach (where default spreads are scaled up to reflect additional equity risk) to come up with the additional risk premium.
  - ERP for Brazil = Mature market premium + CRP for Brazil = 6% + 3.95% = 9.95%
  - ERP for India = Mature market premium + CRP for India = 6% + 4.51% = 10.51%

An Updated Equity Risk Premium:

- By January 1, 2010, the worst of the crisis seemed to be behind us. Fears of a depression had receded and banks looked like they were struggling back to a more stable setting. Default spreads started to drop and risk was no longer front and center in pricing.

In 2010, the actual cash returned to stockholders was 40.38. That was down about 40% from 2008 levels.

Analysts expect earnings to grow 21% in 2010, resulting in a compounded annual growth rate of 7.2% over the next 5 years. We will assume that dividends & buybacks will keep pace.

After year 5, we will assume that earnings on the index will grow at 3.84%, the same rate as the entire economy (= riskfree rate).

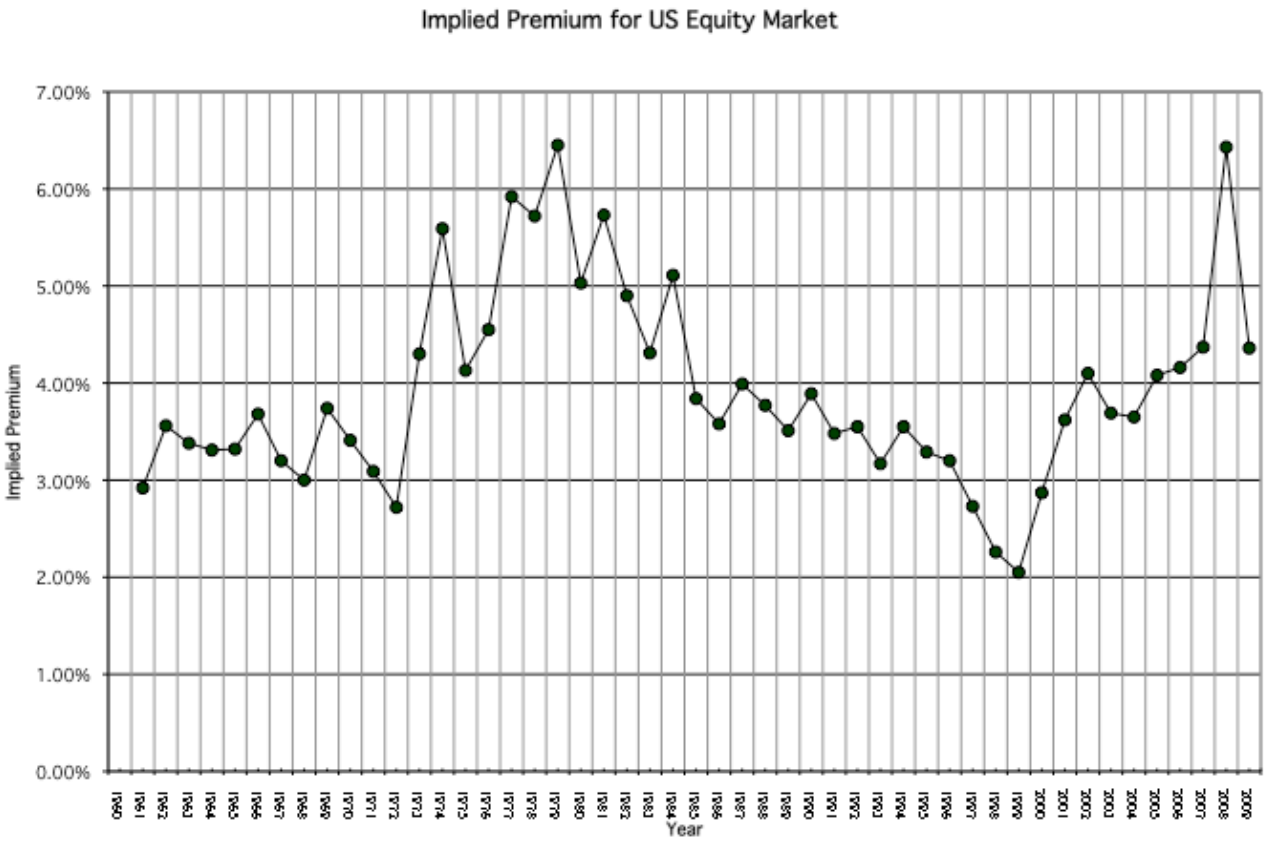
43.29 46.40 49.74 53.32 57.16

$$1115.10 = \frac{43.29}{(1+r)} + \frac{46.40}{(1+r)^2} + \frac{49.74}{(1+r)^3} + \frac{53.32}{(1+r)^4} + \frac{57.16}{(1+r)^5} + \frac{57.16(1.0384)}{(r-.0384)(1+r)^5}$$

January 1, 2010
S&P 500 is at 1115.10
Adjusted Dividends & Buybacks for 2008 = 40.38

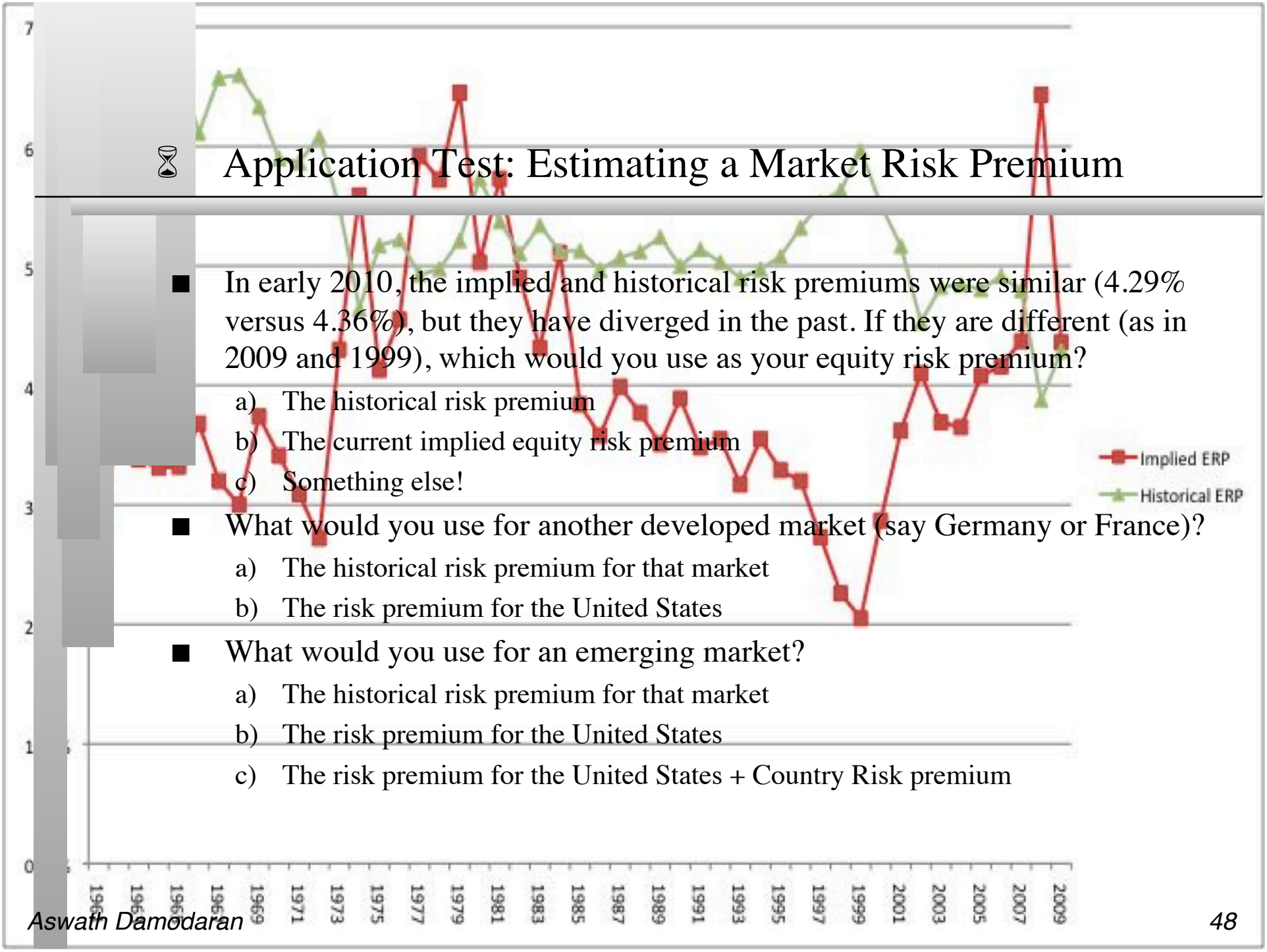
Expected Return on Stocks (1/1/10) = 8.20%
T.Bond rate on 1/1/10 = 3.84 %
Equity Risk Premium = 8.20% - 3.84% = 4.36%

Implied Premiums in the US: 1960-2009



Application Test: Estimating a Market Risk Premium

- In early 2010, the implied and historical risk premiums were similar (4.29% versus 4.36%), but they have diverged in the past. If they are different (as in 2009 and 1999), which would you use as your equity risk premium?
  a) The historical risk premium
  b) The current implied equity risk premium
  c) Something else!
- What would you use for another developed market (say Germany or France)?
  a) The historical risk premium for that market
  b) The risk premium for the United States
- What would you use for an emerging market?
  a) The historical risk premium for that market
  b) The risk premium for the United States
  c) The risk premium for the United States + Country Risk premium



Estimating Beta

- The standard procedure for estimating betas is to regress stock returns (R_j) against market returns (R_m) -

$$R_j = a + b\ R_m$$

  - where a is the intercept and b is the slope of the regression.
- The slope of the regression corresponds to the beta of the stock, and measures the riskiness of the stock.
- The R squared (R^2) of the regression provides an estimate of the proportion of the risk (variance) of a firm that can be attributed to market risk. The balance ($1 - R^2$) can be attributed to firm specific risk.

Estimating Performance

- The intercept of the regression provides a simple measure of performance during the period of the regression, relative to the capital asset pricing model.

  $R_j = R_f + b (R_m - R_f)$

  $= R_f (1-b) + b R_m$ ..... Capital Asset Pricing Model

  $R_j = a + b R_m$ ..... Regression Equation

- If

  $a > R_f (1-b)$ .... Stock did better than expected during regression period

  $a = R_f (1-b)$ .... Stock did as well as expected during regression period

  $a < R_f (1-b)$ .... Stock did worse than expected during regression period

- The difference between the intercept and $R_f (1-b)$ is Jensen's alpha. If it is positive, your stock did perform better than expected during the period of the regression.

Setting up for the Estimation

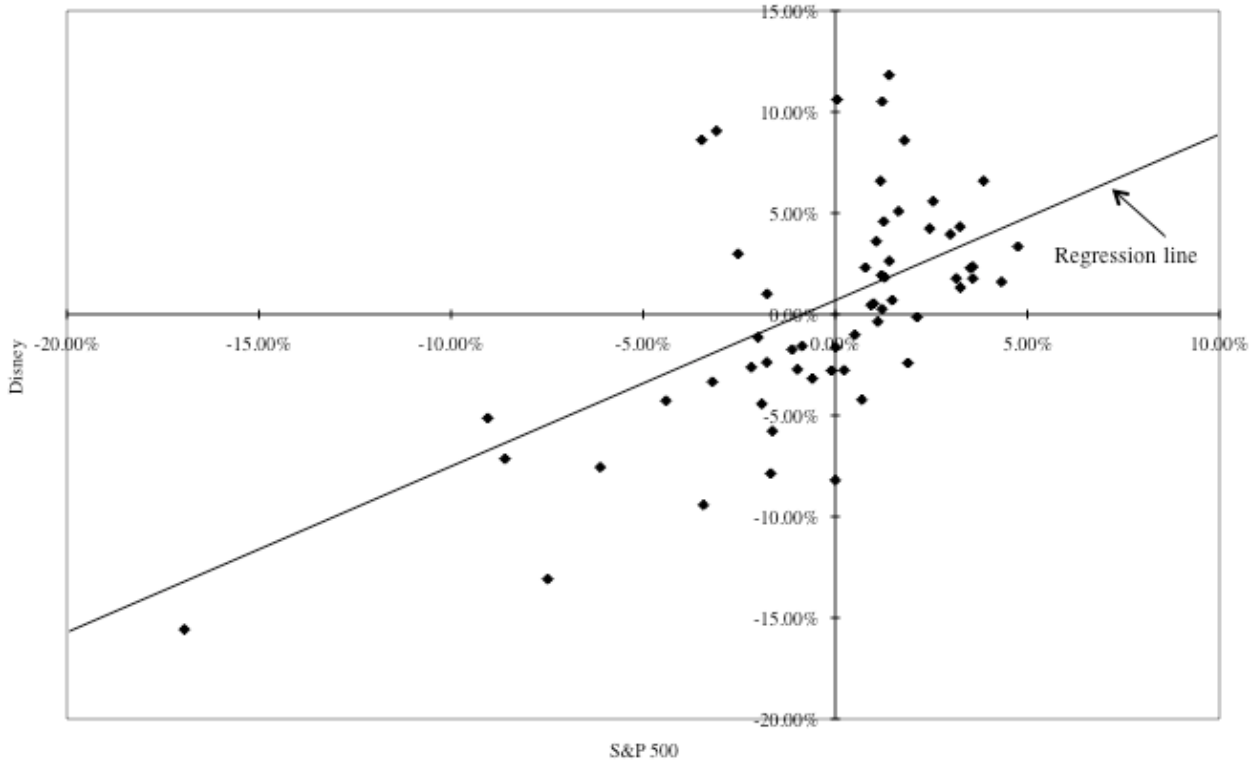
- Decide on an estimation period
  - Services use periods ranging from 2 to 5 years for the regression
  - Longer estimation period provides more data, but firms change.
  - Shorter periods can be affected more easily by significant firm-specific event that occurred during the period (Example: ITT for 1995-1997)
- Decide on a return interval - daily, weekly, monthly
  - Shorter intervals yield more observations, but suffer from more noise.
  - Noise is created by stocks not trading and biases all betas towards one.
- Estimate returns (including dividends) on stock
  - Return = $(\text{Price}_{\text{End}} - \text{Price}_{\text{Beginning}} + \text{Dividends}_{\text{Period}})/ \text{Price}_{\text{Beginning}}$
  - Included dividends only in ex-dividend month
- Choose a market index, and estimate returns (inclusive of dividends) on the index for each interval for the period.

Choosing the Parameters: Disney

- Period used: 5 years
- Return Interval = Monthly
- Market Index: S&P 500 Index.
- For instance, to calculate returns on Disney in December 2004,
  - Price for Disney at end of November 2004 = $ 26.52
  - Price for Disney at end of December 2004 = $ 27.43
  - Dividends during month = $0.237 (It was an ex-dividend month)
  - Return =($27.43 - $26.52 + $ 0.237)/$26.52= 4.33%
- To estimate returns on the index in the same month
  - Index level at end of November 2004 = 1173.92
  - Index level at end of December 2004 = 1211.92
  - Dividends on index in December 2004 = 1.831
  - Return =(1211.92 – 1173.92+1.831)/ 1173.92= 3.25%

Disney's Historical Beta

Figure 4.3: Disney versus S&P 500: 2004-2008



$$\text{Returns}_{\text{Disney}} = 0.47\% + 0.95\ \text{Returns}_{\text{S \& P 500}} \quad (\text{R squared} = 41\%)$$
$$(0.16)$$

Analyzing Disney's Performance

- Intercept = 0.47%
  - This is an intercept based on monthly returns. Thus, it has to be compared to a monthly riskfree rate.
  - Between 2004 and 2008
    - Average Annualized T.Bill rate = 3.27%
    - Monthly Riskfree Rate = 0.272% (=3.27%/12)
    - Riskfree Rate (1-Beta) = 0.272% (1-0.95) = 0.01%
- The Comparison is then between

  Intercept versus Riskfree Rate (1 - Beta)

  0.47% versus 0.01%
  - Jensen's Alpha = 0.47% -0.01% = 0.46%
- Disney did 0.46% better than expected, per month, between 2004 and 2008.
  - Annualized, Disney's annual excess return = $(1.0046)^{12}$-1= 5.62%
- This positive Jensen's alpha is a sign of good management at the firm.

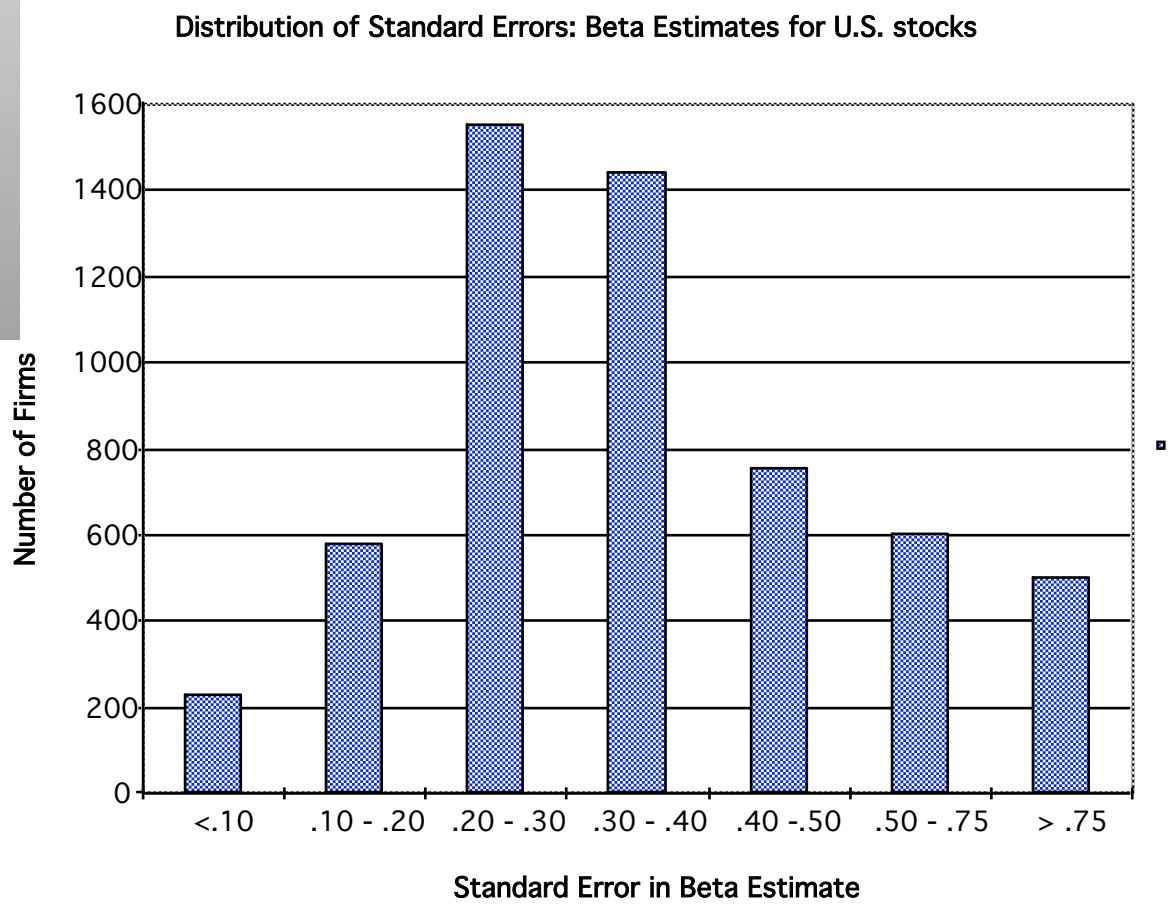
  a) True

  b) False

Estimating Disney's Beta

- Slope of the Regression of 0.95 is the beta
- Regression parameters are always estimated with error. The error is captured in the standard error of the beta estimate, which in the case of Disney is 0.16.
- Assume that I asked you what Disney's true beta is, after this regression.
  - What is your best point estimate?
  - What range would you give me, with 67% confidence?
  - What range would you give me, with 95% confidence?

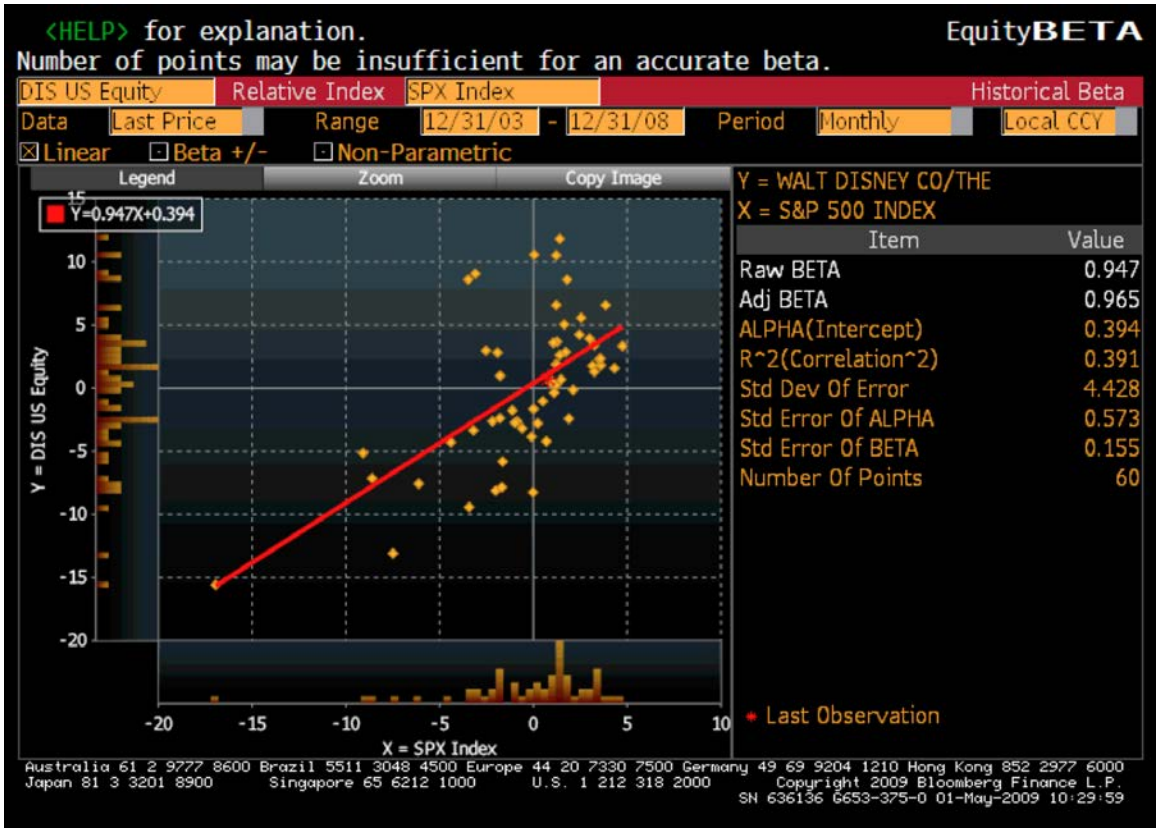
The Dirty Secret of "Standard Error"



Breaking down Disney's Risk

- R Squared = 41%
- This implies that
  - 41% of the risk at Disney comes from market sources
  - 59%, therefore, comes from firm-specific sources
- The firm-specific risk is diversifiable and will not be rewarded

Beta Estimation: Using a Service (Bloomberg)



Estimating Expected Returns for Disney in May 2009

- Inputs to the expected return calculation
  - Disney's Beta = 0.95
  - Riskfree Rate = 3.50% (U.S. ten-year T.Bond rate in May 2009)
  - Risk Premium = 6% (Based on updated implied premium at the start of 2009)
- Expected Return = Riskfree Rate + Beta (Risk Premium)
  = 3.50% + 0.95 (6.00%) = 9.2%

Use to a Potential Investor in Disney

As a potential investor in Disney, what does this expected return of 9.2% tell you?

a) This is the return that I can expect to make in the long term on Disney, if the stock is correctly priced and the CAPM is the right model for risk,

b) This is the return that I need to make on Disney in the long term to break even on my investment in the stock

c) Both

Assume now that you are an active investor and that your research suggests that an investment in Disney will yield 12.5% a year for the next 5 years. Based upon the expected return of 9.2%, you would

a) Buy the stock

b) Sell the stock

How managers use this expected return

- Managers at Disney
  - need to make at least 9.2% as a return for their equity investors to break even.
  - this is the hurdle rate for projects, when the investment is analyzed from an equity standpoint
- In other words, Disney's cost of equity is 9.2%.
- What is the cost of not delivering this cost of equity?

Application Test: Analyzing the Risk Regression

- Using your Bloomberg risk and return print out, answer the following questions:
  - How well or badly did your stock do, relative to the market, during the period of the regression?

    Intercept - (Riskfree Rate/n) (1- Beta) = Jensen's Alpha

    where n is the number of return periods in a year (12 if monthly; 52 if weekly)
  - What proportion of the risk in your stock is attributable to the market? What proportion is firm-specific?
  - What is the historical estimate of beta for your stock? What is the range on this estimate with 67% probability? With 95% probability?
  - Based upon this beta, what is your estimate of the required return on this stock?

    Riskless Rate + Beta * Risk Premium

A Quick Test

You are advising a very risky software firm on the right cost of equity to use in project analysis. You estimate a beta of 3.0 for the firm and come up with a cost of equity of 21.5%. The CFO of the firm is concerned about the high cost of equity and wants to know whether there is anything he can do to lower his beta.

How do you bring your beta down?

Should you focus your attention on bringing your beta down?

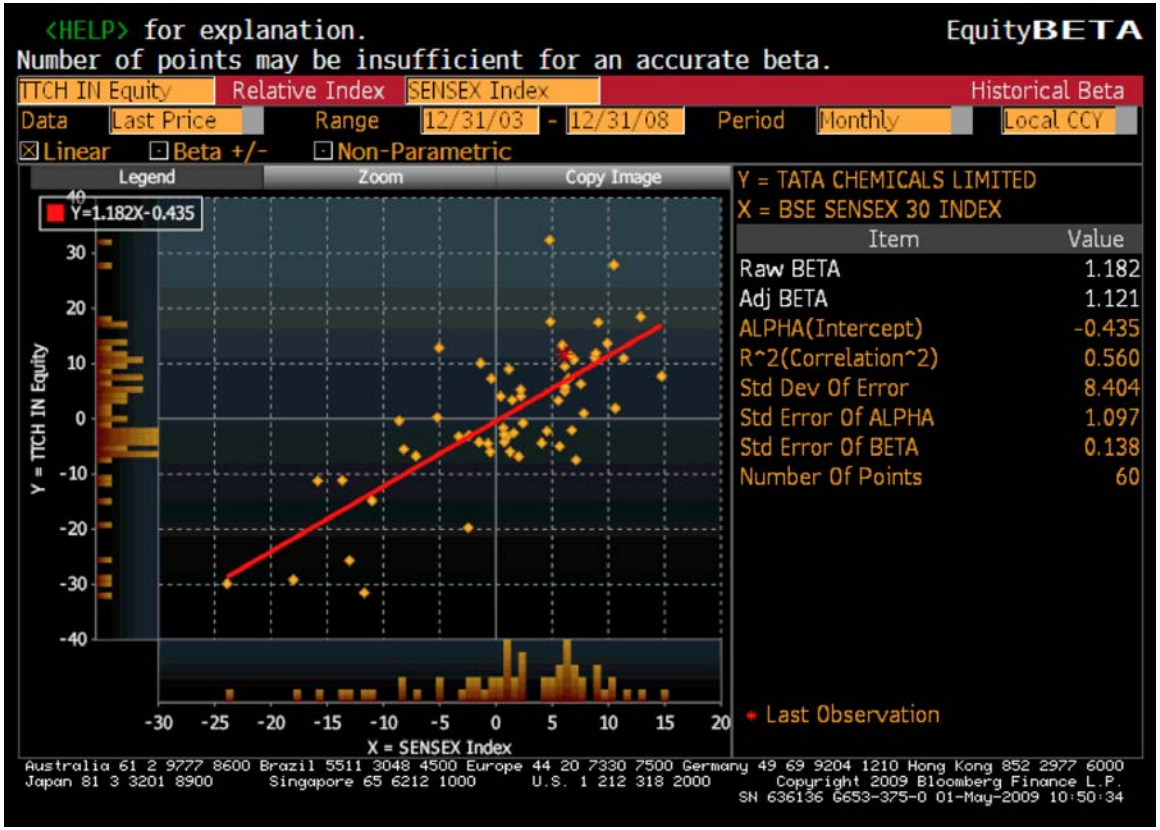
a) Yes
b) No

Jensen's α
= -0.44% - 5%/12 (1-1.18) = -0.37%
Annualized = $(1-.0037)^{12}$-1= -4.29%

Expected Return
= Riskfree Rate+ Beta*Risk premium
= 4%+ 1.18 (6%+4.51%) = 19.40%

Regression Diagnostics for Tata Chemicals

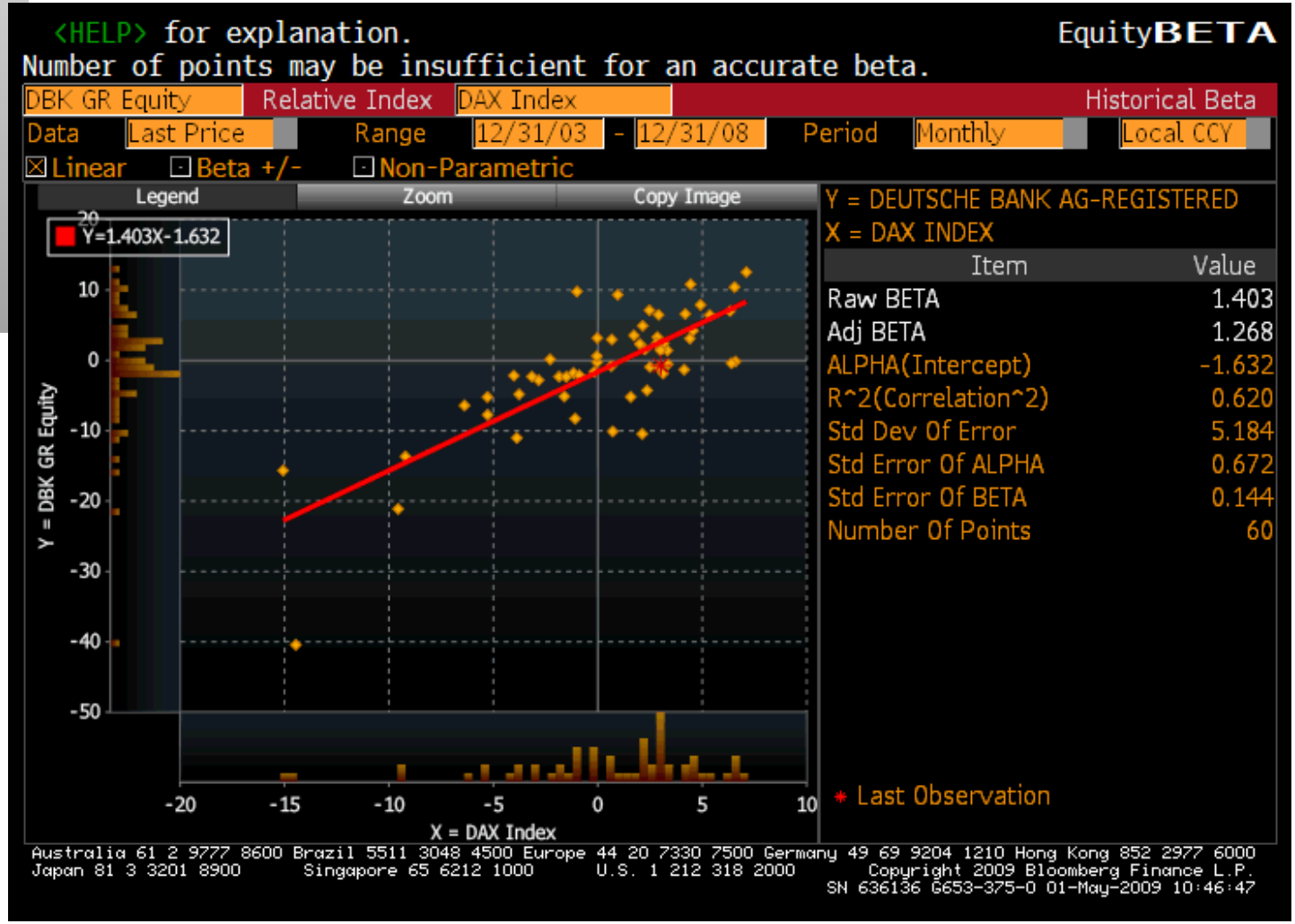
0



Beta = 1.18
67% range
1.04-1.32

56% market risk
44% firm specific

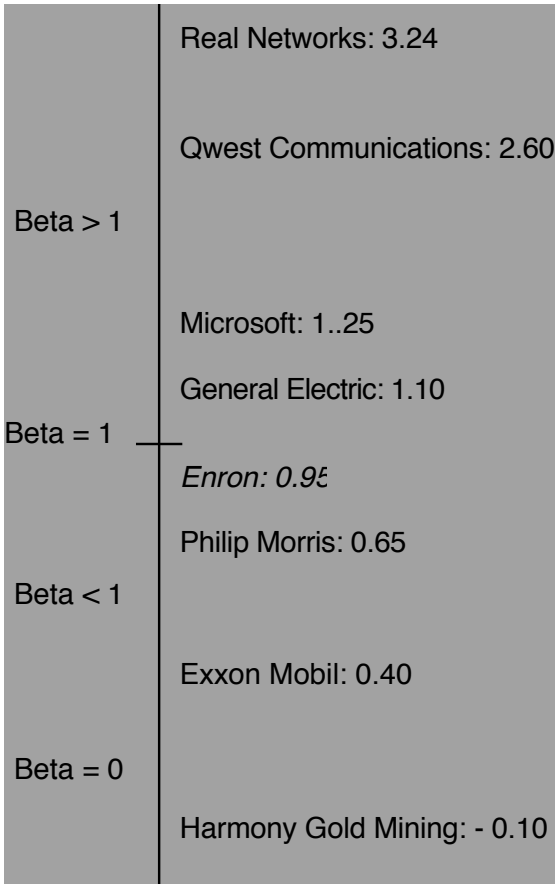
Beta Estimation and Index Choice: Deutsche Bank



Deutsche Bank: Alternate views of Risk

	DAX	*FTSE Euro 300*	*MSCI*
Intercept	-1.63%	-1.05%	-0.48%
Beta	1.40	1.52	1.99
Std Error of beta	0.14	0.19	0.21
R^2	62%	54%	50%

Beta: Exploring Fundamentals



Determinant 1: Product Type

- **Industry Effects**: The beta value for a firm depends upon the sensitivity of the demand for its products and services and of its costs to macroeconomic factors that affect the overall market.
  - Cyclical companies have higher betas than non-cyclical firms
  - Firms which sell more discretionary products will have higher betas than firms that sell less discretionary products

Determinant 2: Operating Leverage Effects

- Operating leverage refers to the proportion of the total costs of the firm that are fixed.
- Other things remaining equal, higher operating leverage results in greater earnings variability which in turn results in higher betas.

Measures of Operating Leverage

Fixed Costs Measure = Fixed Costs / Variable Costs

- This measures the relationship between fixed and variable costs. The higher the proportion, the higher the operating leverage.

EBIT Variability Measure = % Change in EBIT / % Change in Revenues

- This measures how quickly the earnings before interest and taxes changes as revenue changes. The higher this number, the greater the operating leverage.

Disney's Operating Leverage: 1987- 2008

Year	Net Sales	% Change in Sales	EBIT	% Change in EBIT
1987	$2,877		$756	
1988	$3,438	19.50%	$848	12.17%
1989	$4,594	33.62%	$1,177	38.80%
1990	$5,844	27.21%	$1,368	16.23%
1991	$6,182	5.78%	$1,124	-17.84%
1992	$7,504	21.38%	$1,287	14.50%
1993	$8,529	13.66%	$1,560	21.21%
1994	$10,055	17.89%	$1,804	15.64%
1995	$12,112	20.46%	$2,262	25.39%
1996	$18,739	54.71%	$3,024	33.69%
1997	$22,473	19.93%	$3,945	30.46%
1998	$22,976	2.24%	$3,843	-2.59%
1999	$23,435	2.00%	$3,580	-6.84%
2000	$25,418	8.46%	$2,525	-29.47%
2001	$25,172	-0.97%	$2,832	12.16%
2002	$25,329	0.62%	$2,384	-15.82%
2003	$27,061	6.84%	$2,713	13.80%
2004	$30,752	13.64%	$4,048	49.21%
2005	$31,944	3.88%	$4,107	1.46%
2006	$33,747	5.64%	$5,355	30.39%
2007	$35,510	5.22%	$6,829	27.53%
2008	$37,843	6.57%	$7,404	8.42%
Average: 87-08		13.73%		13.26%
Average: 96-08		9.91%		11.72%

Disney's operating leverage 13.26% / 13.73% = 0.97
Industry average = 1.15

Determinant 3: Financial Leverage

- As firms borrow, they create fixed costs (interest payments) that make their earnings to equity investors more volatile.
- This increased earnings volatility which increases the equity beta.
- The beta of equity alone can be written as a function of the unlevered beta and the debt-equity ratio

$$\beta_L = \beta_u (1+ ((1-t)D/E))$$

where

β_L = Levered or Equity Beta — D/E = Market value Debt to equity ratio

β_u = Unlevered or Asset Beta — t = Marginal tax rate

Earlier, we estimated the beta for Disney from a regression. Was that beta a levered or unlevered beta?

a) Levered

b) Unlevered

Effects of leverage on betas: Disney

- The regression beta for Disney is 0.95. This beta is a levered beta (because it is based on stock prices, which reflect leverage) and the leverage implicit in the beta estimate is the average market debt equity ratio during the period of the regression (2004 to 2008)
- The average debt equity ratio during this period was 24.64%.
- The unlevered beta for Disney can then be estimated (using a marginal tax rate of 38%)

  = Current Beta / (1 + (1 - tax rate) (Average Debt/Equity))

  = 0.95 / (1 + (1 - 0.38)(0.2464))= 0.8241

Disney : Beta and Leverage

Debt to Capital	Debt/Equity Ratio	Beta	Effect of Leverage
0.00%	0.00%	0.82	0.00
10.00%	11.11%	0.88	0.06
20.00%	25.00%	0.95	0.13
30.00%	42.86%	1.04	0.22
40.00%	66.67%	1.16	0.34
50.00%	100.00%	1.34	0.51
60.00%	150.00%	1.59	0.77
70.00%	233.33%	2.02	1.19
80.00%	400.00%	2.87	2.04
90.00%	900.00%	5.42	4.60

Betas are weighted Averages

- The beta of a portfolio is always the market-value weighted average of the betas of the individual investments in that portfolio.
- Thus,
  - the beta of a mutual fund is the weighted average of the betas of the stocks and other investment in that portfolio
  - the beta of a firm after a merger is the market-value weighted average of the betas of the companies involved in the merger.

Bottom-up versus Top-down Beta

- The top-down beta for a firm comes from a regression
- The bottom up beta can be estimated by doing the following:
  - Find out the businesses that a firm operates in
  - Find the unlevered betas of other firms in these businesses
  - Take a weighted (by sales or operating income) average of these unlevered betas
  - Lever up using the firm's debt/equity ratio
- The bottom up beta is a better estimate than the top down beta for the following reasons
  - The standard error of the beta estimate will be much lower
  - The betas can reflect the current (and even expected future) mix of businesses that the firm is in rather than the historical mix

Disney's business breakdown

Unlevered Beta = Unlevered Beta / (1 - Cash/ Firm Value)

Business	*Comparable firms*	*Number of firms*	*Median levered beta*	*Median D/ E*	*Unlevered beta*	*Median Cash/ Firm Value*	*Unlevered beta corrected for cash*
Media Networks	Radio and TV broadcasting companies -US	19	0.83	38.71%	0.6735	4.54%	0.7056
Parks and Resorts	Theme park & Resort companies - Global	26	0.80	65.10%	0.5753	1.64%	0.5849
Studio Entertainment	Movie companies - US	19	1.57	53.89%	1.1864	8.93%	1.3027
Consumer Products	Toy companies- US	12	0.83	27.21%	0.7092	33.66%	1.0690

A closer look at the process…
Studio Entertainment Betas

Short Name	Mkt Cap	Total Debt	D/E	Beta	Cash	Cash/Firm value	Enterprise Value	Revenues	EV/sales
RED ROCK PICTURE	$621,902	$100,000	16.08%	1.62	$2,436	0.34%	$719,466	$600,000	1.20
TIX CORP	$53,988,460	$129,000	0.24%	1.59	$9,192,000	16.99%	$44,925,460	$66,552,000	0.68
TM MEDIA GROUP I	$224	$265	118.52%	0.90	$10	2.05%	$479	$1,250	0.38
CAMELOT ENTERTAI	$815,505	$464,329	56.94%	0.85	$126	0.01%	$1,279,708	$750,000	1.71
AMER VANTAGE COS	$5,385,361	$523,000	9.71%	1.25	$5,353,000	90.60%	$555,361	$313,000	1.77
VALCOM INC	$1,126,042	$1,114,673	98.99%	1.63	$34,224	1.53%	$2,206,491	$689,521	3.20
ODYSSEY PICTURES	$6,963,004	$1,419,200	20.38%	2.24	$0	0.00%	$8,382,204	$4,279,035	1.96
LEONIDAS FILMS I	$2,342,000	$1,873,000	79.97%	0.57	$1,730,000	41.04%	$2,485,000	$1,077,000	2.31
BRILLIANT DIGITA	$11,304,810	$2,162,000	19.12%	1.36	$433,000	3.22%	$13,033,810	$5,970,000	2.18
METRO GLOBAL MED	$11,725	$40,679	346.93%	2.93	$4,514	8.61%	$47,890	$244,654	0.20
FAMILY ROOM ENT	$265,104	$77,491	29.23%	0.90	$31,655	9.24%	$310,940	$348,850	0.89
POINT.360	$13,292,890	$9,420,000	70.86%	1.30	$7,047,000	31.03%	$15,665,890	$45,913,000	0.34
IMAGE ENTERTAIN	$22,511,390	$32,394,002	143.90%	0.90	$780,000	1.42%	$54,125,392	$130,086,000	0.42
UNAPIX ENTERTAIN	$22,640	$39,196	173.13%	1.86	$0	0.00%	$61,836	$377,290	0.16
PEACH ARCH ENTER	$2,631,945	$605,205	22.99%	1.55	$1,753,328	54.16%	$1,483,821	$7,113,049	0.21
DREAMWORKS ANI-A	$2,367,548,000	$70,059,000	2.96%	1.90	$260,630,000	10.69%	$2,176,977,000	$755,660,976	2.88
KUSHNER-LOCKE CO	$13,981	$88,725	634.63%	2.99	$72,900	70.98%	$29,806	$198,670	0.15
LIONS GATE	$628,954,800	$319,717,984	50.83%	2.36	$130,713,000	13.78%	$817,959,784	$1,514,749,024	0.54
Average			105.30%	1.59		19.76%			1.18
Aggregate	$3,117,799,782	$440,227,749	14.12%	1.59	$417,777,193	11.74%	$3,140,250,338	2534923319	1.24
Median			53.89%	1.57		8.93%			0.78

Disney's bottom up beta

- Estimate the bottom up unlevered beta for Disney's operating assets.

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

Step 1: Start with Disney's revenues by business.

Step 2: Estimate the value as a multiple of revenues by looking at what the market value of publicly traded firms in each business is, relative to revenues.

$$\text{EV/Sales} = \frac{\text{Mkt Equity} + \text{Debt} - \text{Cash}}{\text{Revenues}}$$

Step 3: Multiply the revenues in step 1 by the industry average multiple in step 2.

- Disney has a cash balance of $3,795 million. If we wanted a beta for all of Disney's assets (and not just the operating assets), we would compute a weighted average:

$$\text{Beta for Disney's assets} = 0.7333\left(\frac{58,259}{(58,259+3,795)}\right) + 0\left(\frac{3,795}{(58,259+3,795)}\right) = 0.6885$$

Disney's Cost of Equity

- Step 1: Allocate debt across businesses

	Start with this(1)	From comparable firms(2)		As % (3)	Adjust to Disney's debt (3)*16,682	EV - Allocated Debt	Allocated Debt/ Estimated Equity
Business	Estumated Value	D/E Ratio of comps	Estimated debt	Proportions	Allocated Debt	Estimated Equity	D/E Ratio
Media Networks	$34,328	38.71%	$9,581	51.44%	$8,582	$25,746	33.33%
Parks and Resorts	$17,408	65.10%	$6,864	36.86%	$6,148	$11,260	54.61%
Studio Entertainment	$5,755	53.89%	$2,015	10.82%	$1,805	$3,950	45.70%
Consumer Products	$768	27.21%	$164	0.88%	$147	$621	23.70%
For example.			$18,624	100.00%	$16,682		
Media Networks	*$34,328*	*38.71%*	*34,328*(.3871/1.3871)*	*9581/18624*	*.5144*16,682*	*34328-8582*	*8582/25746*

- Step 2: Compute levered betas and costs of equity for Disney's operating businesses.

Business	Unlevered Beta	D/E Ratio	Levered Beta	Cost of Equity
Media Networks	0.7056	33.33%	0.8514	8.61%
Parks and Resorts	0.5849	54.61%	0.7829	8.20%
Studio Entertainment	1.3027	45.70%	1.6718	13.53%
Consumer Products	1.0690	23.70%	1.2261	10.86%
Disney	0.7333	36.91%	0.9011	8.91%

- Step 2a: Compute the cost of equity for all of Disney's assets:

$$\text{Equity Beta}_{\text{Disney as company}} = 0.6885 \ \ (1 + (1 - 0.38)(0.3691)) = 0.8460$$

Riskfree Rate = 3.5%
Risk Premium = 6%

Discussion Issue

- Assume now that you are the CFO of Disney. The head of the movie business has come to you with a new big budget movie that he would like you to fund. He claims that his analysis of the movie indicates that it will generate a return on equity of 12%. Would you fund it?
  a) Yes. It is higher than the cost of equity for Disney as a company
  b) No. It is lower than the cost of equity for the movie business.

  What are the broader implications of your choice?

Estimating Aracruz's Bottom Up Beta

Bottom up Betas for Paper & Pulp

	Number of firms	*Median Beta*	*Median D/E*	*Median Unlevered Beta*	*Cash/Value*	*Unlevered Beta Corrected for Cash*
Emerging Markets	46	1.03	4.47%	1.00	0.74%	1.01
US	13	1.16	92.29%	0.75	2.87%	0.77
Global	111	0.91	9.82%	0.86	1.24%	0.87

- The beta for emerging market paper and pulp companies of 1.01 was used as the unlevered beta for Aracruz.
- When computing the levered beta for Aracruz's paper and pulp business, we used the gross debt outstanding of 9,805 million BR and the market value of equity of 8907 million BR, in conjunction with the marginal tax rate of 34% for Brazil:
  - Gross Debt to Equity ratio = Debt/Equity = 9805/8907 = 110.08%
  - Levered Beta for Aracruz Paper business = 1.01 (1+(1-.34)(1.1008)) = 1.74

Aracruz: Cost of Equity Calculation

- We will use a risk premium of 9.95% in computing the cost of equity, composed of the mature market equity risk premium (6%) and the Brazil country risk premium of 3.95% (estimated earlier).
- U.S. $ Cost of Equity

Cost of Equity = 10-yr T.Bond rate + Beta * Risk Premium

= 3.5% + 1.74 (9.95%) = 20.82%

- To convert to a Nominal $R Cost of Equity

Cost of Equity = $$(1 + \$ \text{ Cost of Equity}) \frac{(1 + \text{Inflation Rate}_{\text{Brazil}})}{(1 + \text{Inflation Rate}_{\text{US}})} - 1$$

= 1.2082 (1.07/1.02) -1 = .2675 or 26.75%

(Alternatively, you could just replace the riskfree rate with a nominal $R riskfree rate, but you would then be keeping risk premiums which were computed in dollar terms fixed while moving to a higher inflation currency)

The bottom up beta for Tata Chemicals

Unlevered betas for Tata Chemical's Businesses

Business(# of comparables)	Revenues (millions)	EV/Sales (from comparable firms)	Estimated Value (millions)	Weights	Unlevered Beta	D/E Ratio	Levered Beta
Fertilizers (105)	INR 2,506	1.28	INR 3,208	62.18%	0.72	51.56%	0.965
Chemicals (31)	INR 1,586	1.23	INR 1,951	37.82%	0.68	51.56%	0.911
Tata Chemicals			INR 5,158		0.70		0.945

Cost of Equity

Rupee Riskfree rate =4%; Indian ERP = 6% + 4.51%

Business	Beta	Cost of equity
Fertilizers	0.965	4%+ 0.965 (10.51%) = 14.14%
Chemicals	0.911	4%+ 0.911(10.51%) = 13.58%
Tata Chemicals	0.945	4%+ 0.945 (10.51%) = 13.93%

Estimating Betas for Non-Traded Assets

- The conventional approaches of estimating betas from regressions do not work for assets that are not traded. There are no stock prices or historical returns that can be used to compute regression betas.
- There are two ways in which betas can be estimated for non-traded assets
  - Using comparable firms
  - Using accounting earnings

Using comparable firms to estimate beta for Bookscape

Company Name	Industry Name	Beta	D/E Ratio	Unlevered Beta	Cash/Firm Value	Unlevered beta corrected for cash
Courier Corp.	Publishing	0.98	12.33%	0.91	0.46%	0.92
Educational Devel.	Publishing	0.57	0.00%	0.57	15.38%	0.67
McGraw-Hill Ryerson Ltd.	Publishing	0.26	0.00%	0.26	46.97%	0.49
Meredith Corp.	Publishing	1.37	66.85%	0.98	3.11%	1.01
Presstek Inc.	Publishing	1.68	41.09%	1.35	10.83%	1.51
PRIMEDIA Inc	Publishing	1.65	340.84%	0.54	9.20%	0.60
Scholastic Corp.	Publishing	1.13	84.49%	0.75	13.36%	0.87
Torstar 'B'	Publishing	0.48	54.21%	0.36	4.93%	0.38
Wiley (John) & Sons	Publishing	1.03	52.73%	0.78	1.93%	0.80
Barnes & Noble	Retail (Special Lines)	1.34	0.00%	1.34	48.46%	2.60
Books-A-Million	Retail (Special Lines)	1.98	97.49%	1.25	7.90%	1.36
Borders Group	Retail (Special Lines)	2.44	240.87%	1.00	7.78%	1.08
Median		**1.235**	**53.47%**	**0.94**	**8.55%**	**1.02**

Estimating Bookscape Levered Beta and Cost of Equity

- Because the debt/equity ratios used in computing levered betas are market debt equity ratios, and the only debt equity ratio we can compute for Bookscape is a book value debt equity ratio, we have assumed that Bookscape is *close to the book industry median* debt to equity ratio of 53.47 percent.
- Using a marginal tax rate of 40 percent for Bookscape, we get a levered beta of 1.35.

  Levered beta for Bookscape = 1.02 [1 + (1 – 0.40) (0.5347)] = 1.35
- Using a riskfree rate of 3.5% (US treasury bond rate) and an equity risk premium of 6%:

  Cost of Equity = 3.5% + 1.35 (6%) = 11.60%

Is Beta an Adequate Measure of Risk for a Private Firm?

- Beta measures the risk added on to a diversified portfolio. The owners of most private firms are not diversified. Therefore, using beta to arrive at a cost of equity for a private firm will
  a) Under estimate the cost of equity for the private firm
  b) Over estimate the cost of equity for the private firm
  c) Could under or over estimate the cost of equity for the private firm

Total Risk versus Market Risk

- Adjust the beta to reflect total risk rather than market risk. This adjustment is a relatively simple one, since the R squared of the regression measures the proportion of the risk that is market risk.

  Total Beta = Market Beta / Correlation of the sector with the market

- In the Bookscape example, where the market beta is 1.35 and the average R-squared of the comparable publicly traded firms is 21.58%; the correlation with the market is 46.45%.

$$\frac{\text{Market Beta}}{\sqrt{\text{R squared}}} = \frac{1.35}{.4645} = 2.91$$

  - Total Cost of Equity = 3.5% + 2.91 (6%) = 20.94%

Application Test: Estimating a Bottom-up Beta

- Based upon the business or businesses that your firm is in right now, and its current financial leverage, estimate the bottom-up unlevered beta for your firm.

- *Data Source*: You can get a listing of unlevered betas by industry on my web site by going to updated data.

From Cost of Equity to Cost of Capital

- The cost of capital is a composite cost to the firm of raising financing to fund its projects.
- In addition to equity, firms can raise capital from debt

What is debt?

- General Rule: Debt generally has the following characteristics:
  - Commitment to make fixed payments in the future
  - The fixed payments are tax deductible
  - Failure to make the payments can lead to either default or loss of control of the firm to the party to whom payments are due.
- As a consequence, debt should include
  - Any interest-bearing liability, whether short term or long term.
  - Any lease obligation, whether operating or capital.

Estimating the Cost of Debt

- If the firm has bonds outstanding, and the bonds are traded, the yield to maturity on a long-term, straight (no special features) bond can be used as the interest rate.
- If the firm is rated, use the rating and a typical default spread on bonds with that rating to estimate the cost of debt.
- If the firm is not rated,
  - and it has recently borrowed long term from a bank, use the interest rate on the borrowing or
  - estimate a synthetic rating for the company, and use the synthetic rating to arrive at a default spread and a cost of debt
- The cost of debt has to be estimated in the same currency as the cost of equity and the cash flows in the valuation.

Estimating Synthetic Ratings

- The rating for a firm can be estimated using the financial characteristics of the firm. In its simplest form, we can use just the interest coverage ratio:

  Interest Coverage Ratio = EBIT / Interest Expenses

- For the four non-financial service companies, we obtain the following:

Company	Operating income	Interest Expense	Interest coverage ratio
Disney	$6,819	$821	8.31
Aracruz	R$ 574	R$ 155	3.70
Tata Chemicals	INR 6,263	INR 1,215	5.15
Bookscape	$3,575	$575	6.22

Interest Coverage Ratios, Ratings and Default Spreads- Early 2009

Interest Coverage Ratio: Small market cap(<$5 billion)	*Interest Coverage Ratio: Large market cap (>US $ 5 billion)*	*Rating*	*Typical Default*
> 12.5	>8.5	AAA	1.25%
9.50–12.50	6.5-8.5	AA	1.75%
7.50–9.50	5.5-6.5	A+	2.25%
6.00–7.50	4.25- 5.5	A	2.50%
4.50–6.00	3- 4.25	A–	3.00%
4.00-4.50	2.5-3.0	BBB	3.50%
3.50–4.00	2.25-2.5	BB+	4.25%
3.00–3.50	2.0-2.25	BB	5.00%
2.50–3.00	1.75-2.0	B+	6.00%
2.00–2.50	1.5-1.75	B	7.25%
1.50–2.00	1.25-1.5	B–	8.50%
1.25–1.50	0.8-1.25	CCC	10.00%
0.80–1.25	0.65-0.8	CC	12.00%
0.50–0.80	0.2-0.65	C	15.00%
< 0.65	<0.2	D	20.00%

Disney, Market Cap > $ 5 billion:	8.31	→	AA
Aracruz: Market Cap< $5 billion:	3.70	→	BB+
Tata: Market Cap< $ 5 billion:	5.15	→	A-
Bookscape: Market Cap<$5 billion:	6.22	→	A

Synthetic versus Actual Ratings: Disney and Aracruz

- Disney and Aracruz are rated companies and their actual ratings are different from the synthetic rating.
- Disney's synthetic rating is AA, whereas its actual rating is A. The difference can be attributed to any of the following:
  - Synthetic ratings reflect only the interest coverage ratio whereas actual ratings incorporate all of the other ratios and qualitative factors
  - Synthetic ratings do not allow for sector-wide biases in ratings
  - Synthetic rating was based on 2008 operating income whereas actual rating reflects normalized earnings
- Aracruz's synthetic rating is BB+, but the actual rating for dollar debt is BB. The biggest factor behind the difference is the presence of country risk but the derivatives losses at the firm in 2008 may also be playing a role.
- Deutsche Bank had an A+ rating. We will not try to estimate a synthetic rating for the bank. Defining interest expenses on debt for a bank is difficult…

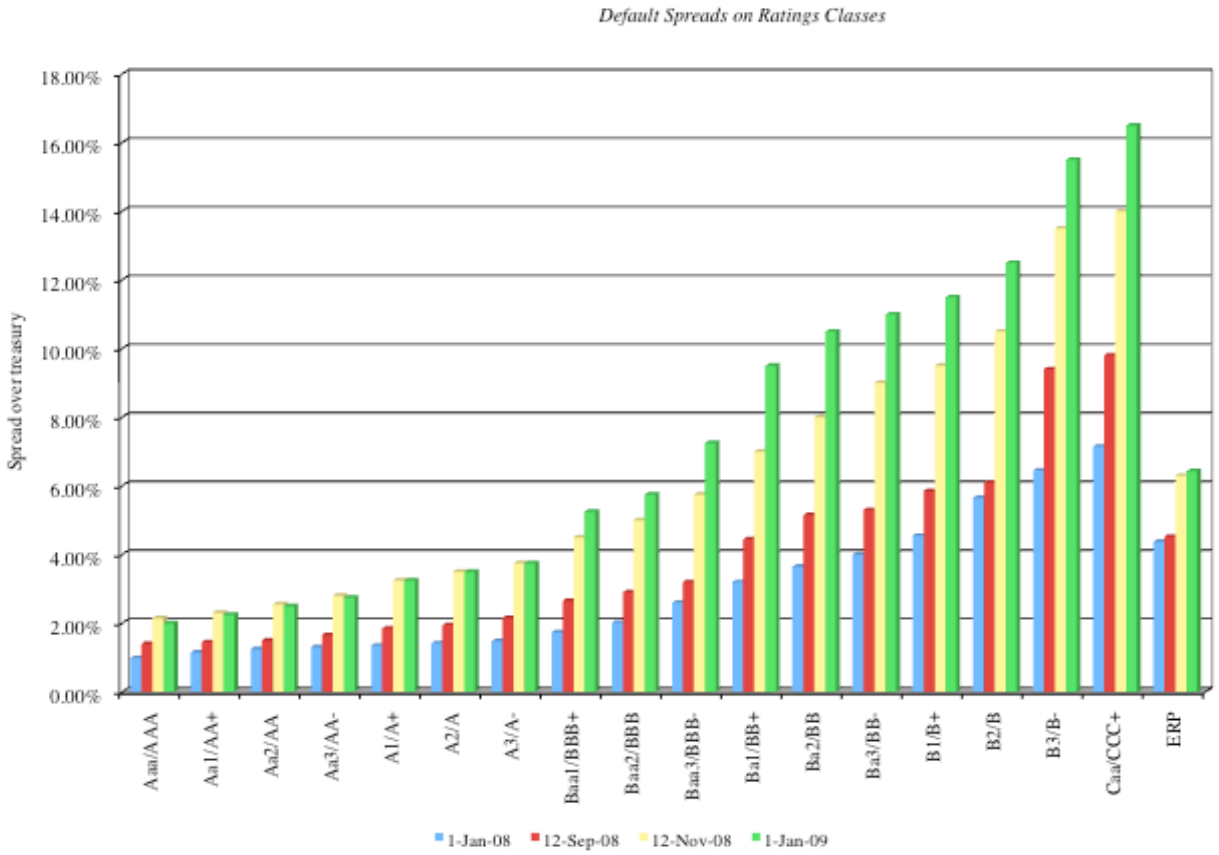
Estimating Cost of Debt

- For Bookscape, we will use the synthetic rating (A) to estimate the cost of debt:
  - Default Spread based upon A rating = 2.50%
  - Pre-tax cost of debt = Riskfree Rate + Default Spread = 3.5% + 2.50% = 6.00%
  - After-tax cost of debt = Pre-tax cost of debt (1- tax rate) = 6.00% (1-.40) = 3.60%
- For the three publicly traded firms that are rated in our sample, we will use the actual bond ratings to estimate the costs of debt:

Company	S&P Rating	Risk-Free Rate	Default Spread	Cost of Debt	Tax Rate	After-Tax Cost of Debt
Disney	A	3.50% (US $)	2.50%	6.00%	38%	3.72%
Deutsche Bank	A+	3.60% (Euros)	2.25%	5.85%	29.50%	4.12%
Aracruz	BB	3.50% (US $)	5%	8.50%	34%	5.61%

- For Tata Chemicals, we will use the synthetic rating of A-, but we also consider the fact that India faces default risk (and a spread of 3%).
  - Pre-tax cost of debt = Riskfree Rate(Rs) + Country Spread + Company spread
    = 4% + 3% + 3% = 10%
  - After-tax cost of debt = Pre-tax cost of debt (1- tax rate) = 10% (1-.34) = 6.6%

Default looms larger.. And spreads widen.. The effect of the market crisis – January 2008 to January 2009



Updated Default Spreads

Rating	*Default Spread - September 2009*
Aaa/AAA	0.70%
Aa1/AA+	0.80%
Aa2/AA	0.90%
Aa3/AA-	0.95%
A1/A+	1.10%
A2/A	1.20%
A3/A-	1.35%
Baa1/BBB+	2.15%
Baa2/BBB	2.25%
Baa3/BBB-	3.10%
Ba1/BB+	4.25%
Ba2/BB	4.50%
Ba3/BB-	4.75%
B1/B+	5.00%
B2/B	5.50%
B3/B-	6.25%
Caa1/CCC	8.25%
Caa2/CC	9.50%
Caa3/C	11.50%
D	14.00%

Application Test: Estimating a Cost of Debt

- Based upon your firm's current earnings before interest and taxes, its interest expenses, estimate
  - An interest coverage ratio for your firm
  - A synthetic rating for your firm (use the tables from prior pages)
  - A pre-tax cost of debt for your firm
  - An after-tax cost of debt for your firm

Weights for Cost of Capital Calculation

- The weights used in the cost of capital computation should be market values.
- There are three specious arguments used against market value
  - *Book value is more reliable than market value because it is not as volatile*: While it is true that book value does not change as much as market value, this is more a reflection of weakness than strength
  - *Using book value rather than market value is a more conservative approach to estimating debt ratios:* For most companies, using book values will yield a lower cost of capital than using market value weights.
  - *Since accounting returns are computed based upon book value, consistency requires the use of book value in computing cost of capital:* While it may seem consistent to use book values for both accounting return and cost of capital calculations, it does not make economic sense.
- In practical terms, estimating the market value of equity should be easy for a publicly traded firm, but some or all of the debt at most companies is not traded. As a consequence, most practitioners use the book value of debt as a proxy for the market value of debt.

Disney: From book value to market value for interest bearing debt…

- In Disney's 2008 financial statements, the debt due over time was footnoted.

Due in	Maturity	Amount due	% due
2009	1	$3,513	24.33%
2010	2	$1,074	7.44%
2011	3	$1,205	8.35%
2012	4	$1,479	10.24%
2013	5	$1,842	12.76%
Thereafter	10	$5,324	36.88%
Weighted Average	5.38 years	$14,437	

No maturity was given for debt due after 5 years. I assumed 10 years.

- Disney's total debt due, in book value terms, on the balance sheet is $16,003 million and the total interest expense for the year was $728 million. Assuming that the maturity that we computed above still holds and using 6% as the pre-tax cost of debt:

Estimated MV of Disney Debt = $$728\left[\frac{\left(1-\frac{1}{(1.06)^{5.38}}\right)}{.06}\right]+\frac{16,003}{(1.06)^{5.38}}=\$14,962 \text{ million}$$

Operating Leases at Disney

- The "debt value" of operating leases is the present value of the lease payments, at a rate that reflects their risk, usually the pre-tax cost of debt.
- The pre-tax cost of debt at Disney is 6%.

Year	Commitment	Present Value
1	$392.00	$369.81
2	$351.00	$312.39
3	$305.00	$256.08
4	$265.00	$209.90
5	$198.00	$147.96
Year 6 & 7	$309.50	$424.02
Debt Value of leases =		$1,720.17

Disney reported $619 million in commitments after year 5. Given that their average commitment over the first 5 years of $302 million, we assumed two years @ $309.5 million each.

- Debt outstanding at Disney

= MV of Interest bearing Debt + PV of Operating Leases

= $14,962 + $ 1,720= $16,682 million

Application Test: Estimating Market Value

- Estimate the
  - Market value of equity at your firm and Book Value of equity
  - Market value of debt and book value of debt (If you cannot find the average maturity of your debt, use 3 years): Remember to capitalize the value of operating leases and add them on to both the book value and the market value of debt.
- Estimate the
  - Weights for equity and debt based upon market value
  - Weights for equity and debt based upon book value

Current Cost of Capital: Disney

- Equity
  - Cost of Equity = Riskfree rate + Beta * Risk Premium
    = 3.5% + 0.9011 (6%) = 8.91%
  - Market Value of Equity = $45.193 Billion
  - Equity/(Debt+Equity) = 73.04%
- Debt
  - After-tax Cost of debt =(Riskfree rate + Default Spread) (1-t)
    = (3.5%+2.5%) (1-.38) = 3.72%
  - Market Value of Debt = $ 16.682 Billion
  - Debt/(Debt +Equity) = 26.96%
- Cost of Capital = 8.91%(.7304)+3.72%(.2696) = 7.51%

45.193/ (45.193+16.682)

Divisional Costs of Capital: Disney and Tata Chemicals

Disney

Business	Cost of Equity	After-tax cost of debt	E/(D+E)	D/(D+E)	Cost of capital
Media Networks	8.61%	3.72%	75.00%	25.00%	7.39%
Parks and Resorts	8.20%	3.72%	64.68%	35.32%	6.62%
Studio Entertainment	13.53%	3.72%	68.64%	31.36%	10.45%
Consumer Products	10.86%	3.72%	80.84%	19.16%	9.49%
Disney	8.91%	3.72%	73.04%	26.96%	7.51%

Tata Chemicals

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

Aracruz

	Cost of equity	Pre-tax Cost o	After-tax cost	D/(D+E)	Cost of capital
US dollars	20.82%	8.50%	5.61%	52.47%	12.84%
Nominal $R	26.75%	13.82%	10.79%	52.47%	18.37%
Real	18.45%	6.37%	3.54%	52.47%	10.63%

$$1.1284\frac{(1.07)}{(1.02)}-1=18.37\%$$

$$1.1284\frac{(1)}{(1.02)}-1=10.63\%$$

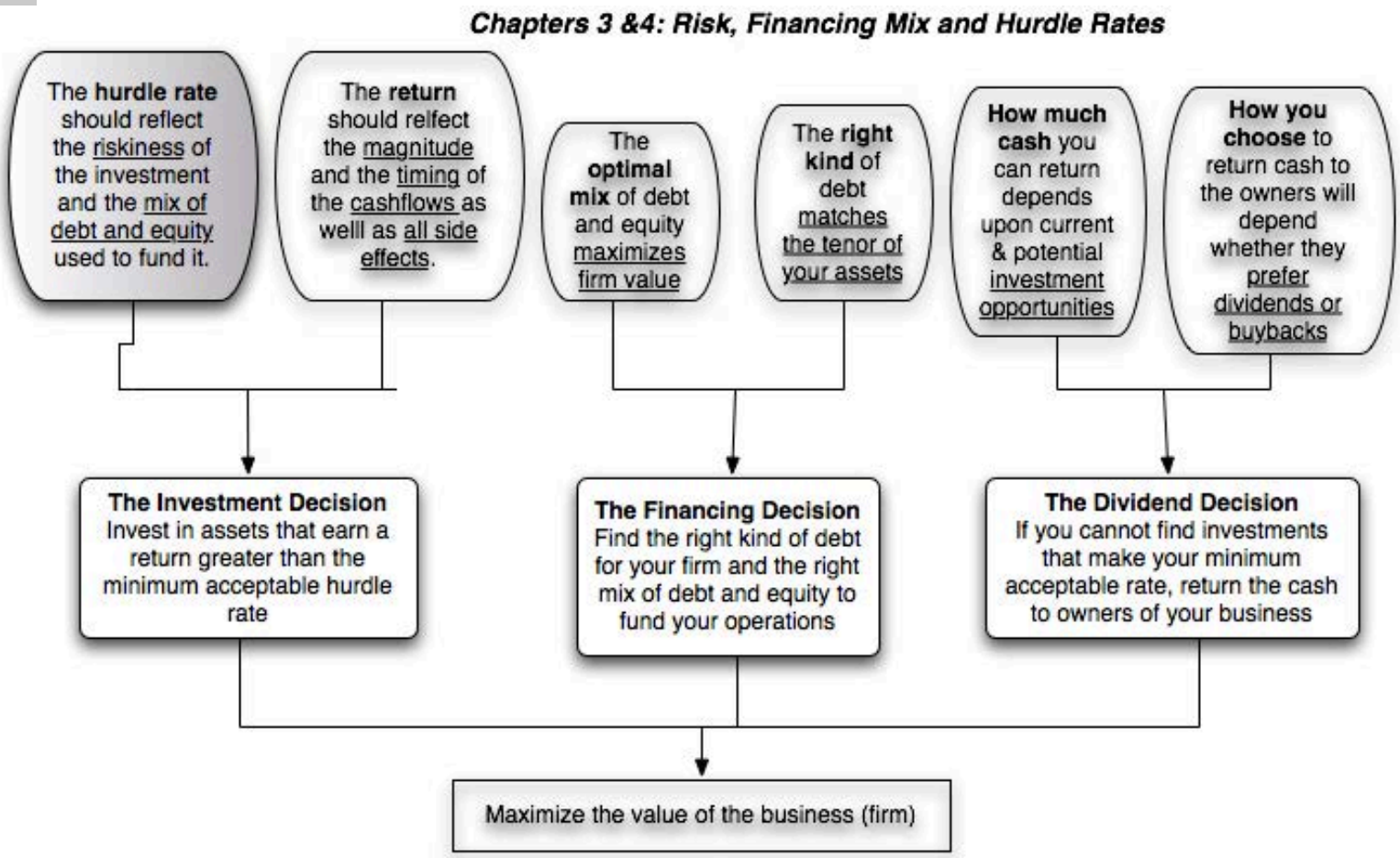
Application Test: Estimating Cost of Capital

- Using the bottom-up unlevered beta that you computed for your firm, and the values of debt and equity you have estimated for your firm, estimate a bottom-up levered beta and cost of equity for your firm.
- Based upon the costs of equity and debt that you have estimated, and the weights for each, estimate the cost of capital for your firm.
- How different would your cost of capital have been, if you used book value weights?

Choosing a Hurdle Rate

- Either the cost of equity or the cost of capital can be used as a hurdle rate, depending upon whether the returns measured are to equity investors or to all claimholders on the firm (capital)
- If returns are measured to equity investors, the appropriate hurdle rate is the cost of equity.
- If returns are measured to capital (or the firm), the appropriate hurdle rate is the cost of capital.

Back to First Principles

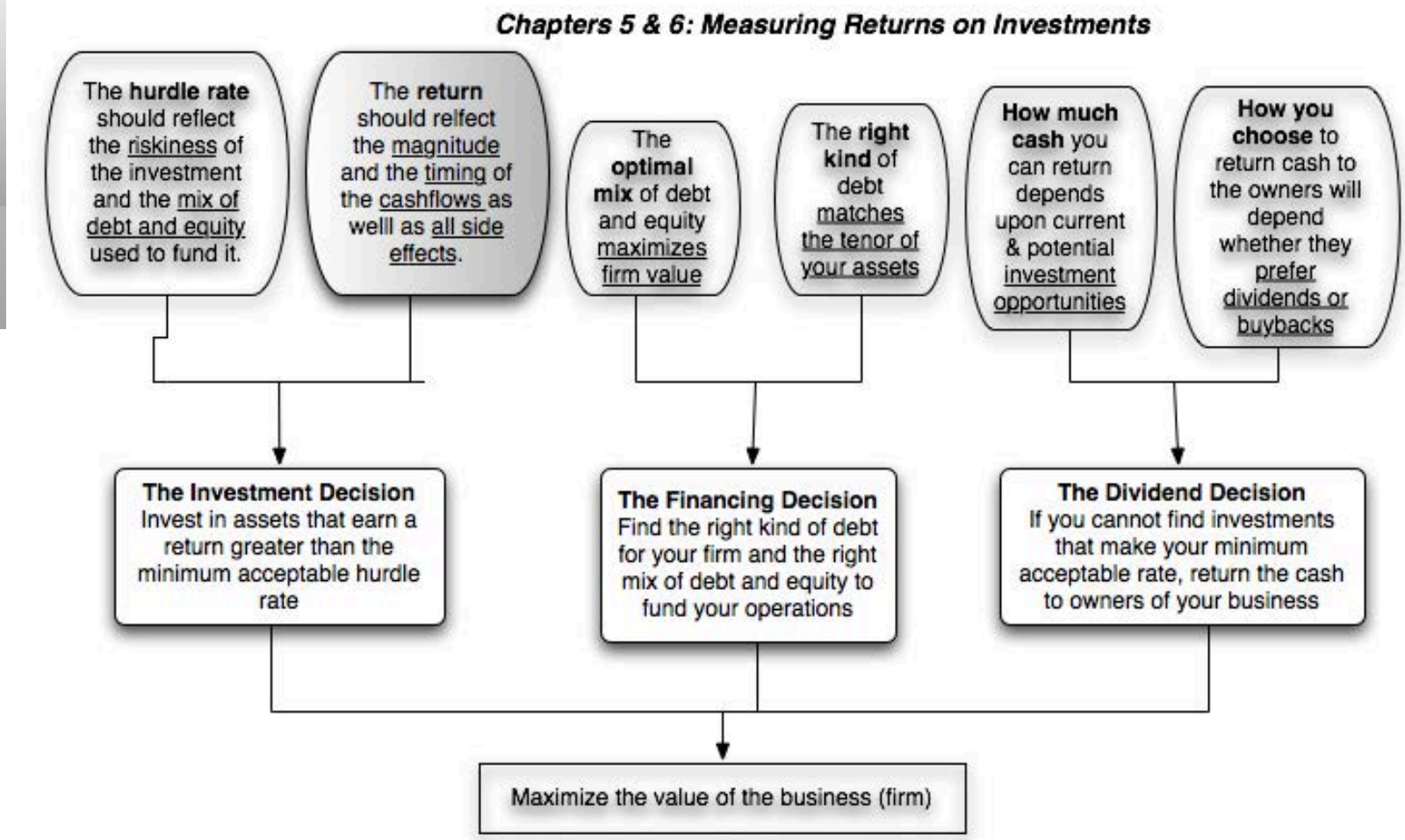


Measuring Investment Returns

"Show me the money"

from *Jerry Maguire*

First Principles



Measures of return: earnings versus cash flows

- Principles Governing Accounting Earnings Measurement
  - Accrual Accounting: Show revenues when products and services are sold or provided, not when they are paid for. Show expenses associated with these revenues rather than cash expenses.
  - Operating versus Capital Expenditures: Only expenses associated with creating revenues in the current period should be treated as operating expenses. Expenses that create benefits over several periods are written off over multiple periods (as depreciation or amortization)
- To get from accounting earnings to cash flows:
  - you have to add back non-cash expenses (like depreciation)
  - you have to subtract out cash outflows which are not expensed (such as capital expenditures)
  - you have to make accrual revenues and expenses into cash revenues and expenses (by considering changes in working capital).

Measuring Returns Right: The Basic Principles

- Use cash flows rather than earnings. You cannot spend earnings.
- Use "incremental" cash flows relating to the investment decision, i.e., cashflows that occur as a consequence of the decision, rather than total cash flows.
- Use "time weighted" returns, i.e., value cash flows that occur earlier more than cash flows that occur later.

The Return Mantra: "Time-weighted, Incremental Cash Flow Return"

Earnings versus Cash Flows: A Disney Theme Park

- The theme parks to be built near Rio, modeled on Euro Disney in Paris and Disney World in Orlando.
- The complex will include a "Magic Kingdom" to be constructed, beginning immediately, and becoming operational at the beginning of the second year, and a second theme park modeled on Epcot Center at Orlando to be constructed in the second and third year and becoming operational at the beginning of the fourth year.
- The earnings and cash flows are estimated in nominal U.S. Dollars.

Key Assumptions on Start Up and Construction

- Disney has already spent $0.5 Billion researching the proposal and getting the necessary licenses for the park; none of this investment can be recovered if the park is not built. This expenditure has been capitalized and will be depreciated straight line over ten years to a salvage value of zero.
- Disney will face substantial construction costs, if it chooses to build the theme parks.
  - The cost of constructing Magic Kingdom will be $3 billion, with $ 2 billion to be spent right now, and $1 Billion to be spent one year from now.
  - The cost of constructing Epcot II will be $ 1.5 billion, with $ 1 billion to be spent at the end of the second year and $0.5 billion at the end of the third year.
  - These investments will be depreciated based upon a depreciation schedule in the tax code, where depreciation will be different each year.

Step 1: Estimate Accounting Earnings on Project

	0	1	2	3	4	5	6	7	8	9	10
Magic Kingdom - Revenues		$0	$1,000	$1,400	$1,700	$2,000	$2,200	$2,420	$2,662	$2,928	$2,987
Epcot Rio - Revenues		$0	$0	$0	$300	$500	$550	$605	$666	$732	$747
Resort & Properties - Revenues		$0	$250	$350	$500	$625	$688	$756	$832	$915	$933
Total Revenues			**$1,250**	**$1,750**	**$2,500**	**$3,125**	**$3,438**	**$3,781**	**$4,159**	**$4,575**	**$4,667**
Magic Kingdom – Direct Expenses		$0	$600	$840	$1,020	$1,200	$1,320	$1,452	$1,597	$1,757	$1,792
Epcot Rio – Direct Expenses		$0	$0	$0	$180	$300	$330	$363	$399	$439	$448
Resort & Property – Direct Expenses		$0	$188	$263	$375	$469	$516	$567	$624	$686	$700
Total Direct Expenses			**$788**	**$1,103**	**$1,575**	**$1,969**	**$2,166**	**$2,382**	**$2,620**	**$2,882**	**$2,940**
Depreciation & Amortization		$50	$425	$469	$444	$372	$367	$364	$364	$366	$368
Allocated G&A Costs		$0	$188	$263	$375	$469	$516	$567	$624	$686	$700
Operating Income		**($50)**	**($150)**	**($84)**	**$106**	**$315**	**$389**	**$467**	**$551**	**$641**	**$658**
Taxes		($19)	($57)	($32)	$40	$120	$148	$178	$209	$244	$250
Operating Income after Taxes		**($31)**	**($93)**	**($52)**	**$66**	**$196**	**$241**	**$290**	**$341**	**$397**	**$408**

Direct expenses: 60% of revenues for theme parks, 75% of revenues for resort properties
Allocated G&A: Company G&A allocated to project, based on projected revenues. Two thirds of expense is fixed, rest is variable.
Taxes: Based on marginal tax rate of 38%

And the Accounting View of Return

Year	After-tax Operating Income	Book value of Pre-project investment	Book value of Fixed assets	Book value of Working capital	Book value of Total Capital	Average BV of Capital	ROC (a)	ROC (b)
0		$500	$2,000	$0	$2,500		NA	NA
1	-$31	$450	$3,000	$0	$3,450	$2,975	-1.04%	-1.24%
2	-$93	$400	$3,813	$63	$4,275	$3,863	-2.41%	-2.70%
3	-$52	$350	$4,145	$88	$4,582	$4,429	-1.18%	-1.22%
4	$66	$300	$4,027	$125	$4,452	$4,517	1.46%	1.44%
5	$196	$250	$3,962	$156	$4,368	$4,410	4.43%	4.39%
6	$241	$200	$3,931	$172	$4,302	$4,335	5.57%	5.52%
7	$290	$150	$3,931	$189	$4,270	$4,286	6.76%	6.74%
8	$341	$100	$3,946	$208	$4,254	$4,262	8.01%	8.00%
9	$397	$50	$3,978	$229	$4,257	$4,255	9.34%	9.34%
10	$408	$0	$4,010	$233	$4,243	$4,250	9.61%	9.59%
Average							4.05%	3.99%

(a) Based upon book capital at the start of each year
(b) Based upon average book capital over the year

What should this return be compared to?

- The computed return on capital on this investment is about 4%. To make a judgment on whether this is a sufficient return, we need to compare this return to a "hurdle rate". Which of the following is the right hurdle rate? Why or why not?
  - The riskfree rate of 3.5% (T. Bond rate)
  - The cost of equity for Disney as a company (8.91%)
  - The cost of equity for Disney theme parks (8.20%)
  - The cost of capital for Disney as a company (7.51%)
  - The cost of capital for Disney theme parks (6.62%)
  - None of the above

Should there be a risk premium for foreign projects?

- The exchange rate risk should be diversifiable risk (and hence should not command a premium) if
  - the company has projects is a large number of countries (or)
  - the investors in the company are globally diversified.

  For Disney, this risk should not affect the cost of capital used. Consequently, we would not adjust the cost of capital for Disney's investments in other mature markets (Germany, UK, France)
- The same diversification argument can also be applied against some political risk, which would mean that it too should not affect the discount rate. However, there are aspects of political risk especially in emerging markets that will be difficult to diversify and may affect the cash flows, by reducing the expected life or cash flows on the project.

  For Disney, this is the risk that we are incorporating into the cost of capital when it invests in Brazil (or any other emerging market)

Estimating a hurdle rate for Rio Disney

- We did estimate a cost of capital of 6.62% for the Disney theme park business, using a bottom-up levered beta of 0.7829 for the business.
- This cost of equity may not adequately reflect the additional risk associated with the theme park being in an emerging market.
- The only concern we would have with using this cost of equity for this project is that it may not adequately reflect the additional risk associated with the theme park being in an emerging market (Brazil).

  Country risk premium for Brazil = 2.50% (34/21.5) = 3.95%

  Cost of Equity in US$= 3.5% + 0.7829 (6%+3.95%) = 11.29%

  We multiplied the default spread for Brazil (2.50%) by the relative volatility of Brazil's equity index to the Brazilian government bond. (34%/21.5%)
- Using this estimate of the cost of equity, Disney's theme park debt ratio of 35.32% and its after-tax cost of debt of 3.72% (see chapter 4), we can estimate the cost of capital for the project:

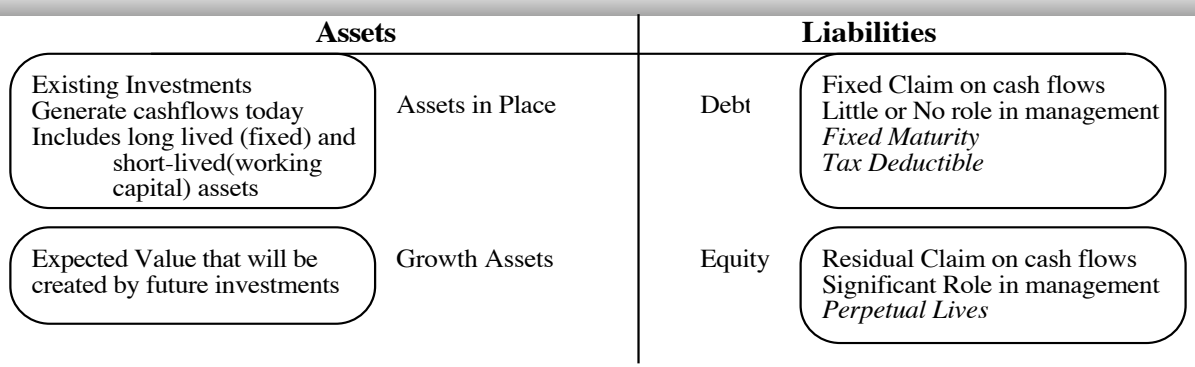
  Cost of Capital in US$ = 11.29% (0.6468) + 3.72% (0.3532) = 8.62%

Would lead us to conclude that...

- Do not invest in this park. The **return on capital of 4.05%** is lower than the **cost of capital for theme parks of 8.62%**; This would suggest that the project should not be taken.
- Given that we have computed the average over an arbitrary period of 10 years, while the theme park itself would have a life greater than 10 years, would you feel comfortable with this conclusion?
  a) Yes
  b) No

A Tangent: From New to Existing Investments: ROC for the entire firm

How "good" are the existing investments of the firm?



Measuring ROC for existing investments..

Company	*EBIT (1-t)*	*BV of Debt*	*BV of Equity*	*Cash*	*BV of Capital*	*Return on Capital*	*Cost of Capital*	*ROC - Cost of Capital*
Disney	$4,359	$16,892	$30,753	$3,670	$43,975	9.91%	7.51%	2.40%
Aracruz	R$ 379	R$ 3,090	R$ 5,361	R$ 22	R$ 8,430	4.49%	10.63%	-6.14%
Bookscape	$2.15	$9.59	$6.00	$0.40	$15.59	13.76%	14.90%	-1.14%
Tata Chemicals	INR 4,134	INR 12,614	INR 23,928	INR 725	INR 36,542	11.31%	11.44%	-0.12%

Old wine in a new bottle.. Another way of presenting the same results…

- The key to value is earning excess returns. Over time, there have been attempts to restate this obvious fact in new and different ways. For instance, Economic Value Added (EVA) developed a wide following in the the 1990s:

EVA = (ROC – Cost of Capital) (Book Value of Capital Invested)

- The excess returns for the four firms can be restated as follows:

Company	ROC - Cost of Capital	BV of Capital	EVA
Disney	2.40%	$43,975	$1,057
Aracruz	-6.14%	R$ 8,430	-R$ 517
Bookscape	-1.14%	$15.59	-$0.18
Deutsche Bank	NMF	NMF	NMF
Tata Chemicals	-0.12%	INR 36,542	-INR 45

Application Test: Assessing Investment Quality

- For the most recent period for which you have data, compute the after-tax return on capital earned by your firm, where after-tax return on capital is computed to be

After-tax ROC = EBIT (1-tax rate)/ (BV of debt + BV of Equity-Cash)$_{\text{previous year}}$

- For the most recent period for which you have data, compute the return spread earned by your firm:

Return Spread = After-tax ROC - Cost of Capital

- For the most recent period, compute the EVA earned by your firm

EVA = Return Spread * ((BV of debt + BV of Equity-Cash)$_{\text{previous year}}$

The cash flow view of this project..

	0	1	2	3	4	5	6	7	8	9	10
Operating Income		-$50	-$150	-$84	$106	$315	$389	$467	$551	$641	$658
Taxes		-$19	-$57	-$32	$40	$120	$148	$178	$209	$244	$250
Operating Income after Taxes		-$31	-$93	-$52	$66	$196	$241	$290	$341	$397	$408
+ Depreciation & Amortization		$50	$425	$469	$444	$372	$367	$364	$364	$366	$368
- Capital Expenditures	$2,500	$1,000	$1,188	$752	$276	$258	$285	$314	$330	$347	$350
- Change in Working Capital	$0	$0	$63	$25	$38	$31	$16	$17	$19	$21	$5
Cash flow to Firm	-$2,500	-$981	-$918	-$360	$196	$279	$307	$323	$357	$395	$422

To get from income to cash flow, we

- added back all non-cash charges such as depreciation. Tax benefits:

	1	2	3	4	5	6	7	8	9	10
Depreciation	$50	$425	$469	$444	$372	$367	$364	$364	$366	$368
Depreciaton * t	$19	$162	$178	$169	$141	$139	$138	$138	$139	$140

- subtracted out the capital expenditures
- subtracted out the change in non-cash working capital

The incremental cash flows on the project

$ 500 million has already been spent & $ 50 million in depreciation will exist anyway

	0	1	2	3	4	5	6	7	8	9	10
Operating Income		-$50	-$150	-$84	$106	$315	$389	$467	$551	$641	$658
Taxes		-$19	-$57	-$32	$40	$120	$148	$178	$209	$244	$250
Operating Income after Taxes		-$31	-$93	-$52	$66	$196	$241	$290	$341	$397	$408
+ Depreciation & Amortization		$50	$425	$469	$444	$372	$367	$364	$364	$366	$368
- Capital Expenditures	$2,500	$1,000	$1,188	$752	$276	$258	$285	$314	$330	$347	$350
- Change in Working Capital	$0	$0	$63	$25	$38	$31	$16	$17	$19	$21	$5
Cash flow to Firm	-$2,500	-$981	-$918	-$360	$196	$279	$307	$323	$357	$395	$422
+ Pre-Project Investment	500										
- Pre-project Deprecn * t		$19	$19	$19	$19	$19	$19	$19	$19	$19	$19
+ Fixed G&A (1-t)		$0	$78	$109	$155	$194	$213	$234	$258	$284	$289
Incremental Cash flow to Firm	-$2,000	-$1,000	-$859	-$270	$332	$454	$501	$538	$596	$660	$692

2/3rd of allocated G&A is fixed.
Add back this amount (1-t)
Tax rate = 38%

To Time-Weighted Cash Flows

- Incremental cash flows in the earlier years are worth more than incremental cash flows in later years.
- In fact, cash flows across time cannot be added up. They have to be brought to the same point in time before aggregation.
- This process of moving cash flows through time is
  - discounting, when future cash flows are brought to the present
  - compounding, when present cash flows are taken to the future

Present Value Mechanics

Cash Flow Type	Discounting Formula	Compounding Formula
1. Simple CF	$CF_n / (1+r)^n$	$CF_0 (1+r)^n$
2. Annuity	$A\left[\frac{1 - \frac{1}{(1+r)^n}}{r}\right]$	$A\left[\frac{(1+r)^n - 1}{r}\right]$
3. Growing Annuity	$A(1+g)\left[\frac{1 - \frac{(1+g)^n}{(1+r)^n}}{r-g}\right]$	
4. Perpetuity	A/r	
5. Growing Perpetuity	Expected Cashflow next year/(r-g)	

Discounted cash flow measures of return

- **Net Present Value (NPV)**: The net present value is the sum of the present values of all cash flows from the project (including initial investment).

  NPV = Sum of the present values of all cash flows on the project, including the initial investment, with the cash flows being discounted at the appropriate hurdle rate (cost of capital, if cash flow is cash flow to the firm, and cost of equity, if cash flow is to equity investors)

  - Decision Rule: Accept if NPV > 0

- **Internal Rate of Return (IRR)**: The internal rate of return is the discount rate that sets the net present value equal to zero. It is the percentage rate of return, based upon incremental time-weighted cash flows.

  - Decision Rule: Accept if IRR > hurdle rate

Closure on Cash Flows

- In a project with a finite and short life, you would need to compute a **salvage value**, which is the expected proceeds from selling all of the investment in the project at the end of the project life. It is usually set equal to book value of fixed assets and working capital
- In a project with an infinite or very long life, we compute cash flows for a reasonable period, and then compute a **terminal value** for this project, which is the present value of all cash flows that occur after the estimation period ends..
- Assuming the project lasts forever, and that cash flows after year 10 grow 2% (the inflation rate) forever, the present value at the end of year 10 of cash flows after that can be written as:
  - Terminal Value in year 10= CF in year 11/(Cost of Capital - Growth Rate)
    =692 (1.02) /(.0862-.02) = $ 10,669 million

Which yields a NPV of..

Discounted at Rio Disney cost of capital of 8.62%

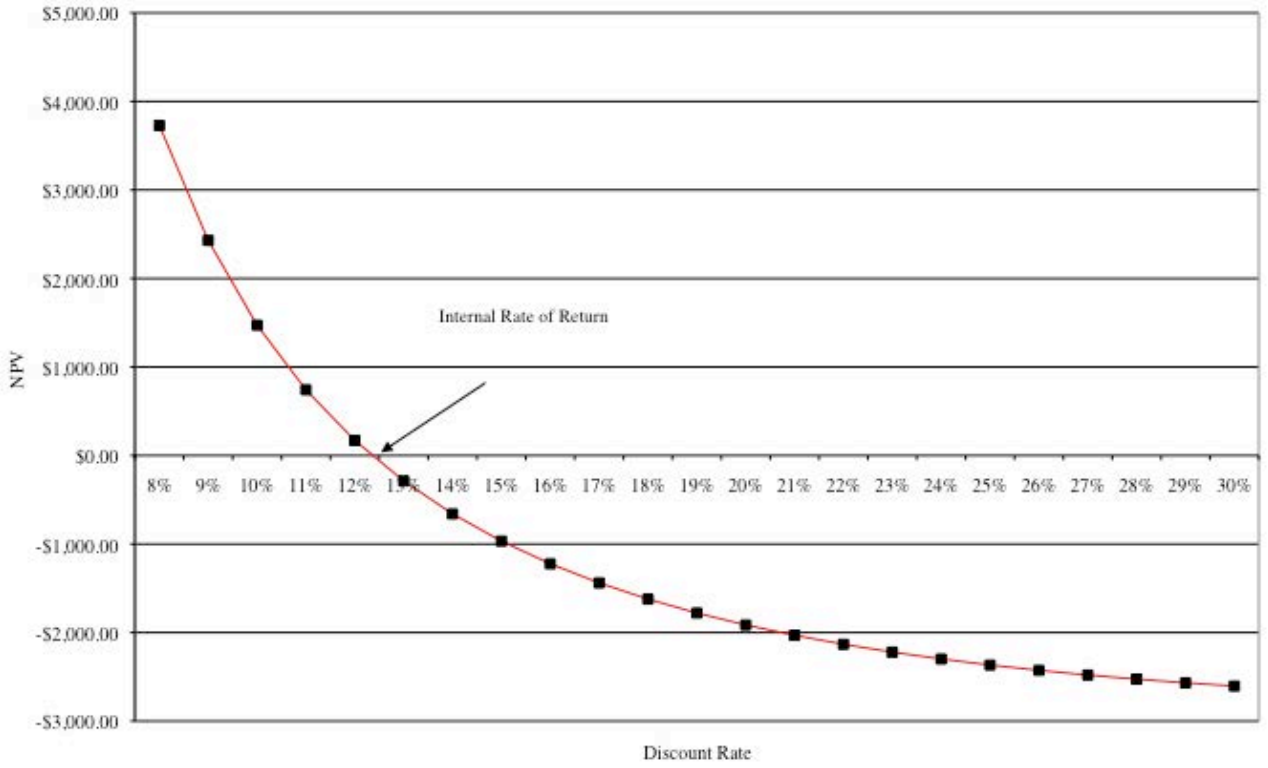
Year	Annual Cashflow	Terminal Value	Present Value
0	-$2,000		-$2,000
1	-$1,000		-$921
2	-$860		-$729
3	-$270		-$211
4	$332		$239
5	$453		$300
6	$502		$305
7	$538		$302
8	$596		$307
9	$660		$313
10	$692	$10,669	$4,970
Net Present Value =			$2,877

Which makes the argument that..

- **The project should be accepted**. The positive net present value suggests that the project will add value to the firm, and earn a return in excess of the cost of capital.
- By taking the project, Disney will increase its value as a firm by $2,877 million.

The IRR of this project

Figure 5.5: NPV Profile for Disney Theme Park



The IRR suggests..

- **The project is a good one**. Using time-weighted, incremental cash flows, this project provides a return of 12.35%. This is greater than the cost of capital of 8.62%.
- The IRR and the NPV will yield **similar results** most of the time, though there are differences between the two approaches that may cause project rankings to vary depending upon the approach used. They can yield different results, especially why comparing across projects because
  - A project can have only one NPV, whereas it can have more than one IRR.
  - The NPV is a dollar surplus value, whereas the IRR is a percentage measure of return. The NPV is therefore likely to be larger for "large scale" projects, while the IRR is higher for "small-scale" projects.
  - The NPV assumes that intermediate cash flows get reinvested at the "hurdle rate", which is based upon what you can make on investments of comparable risk, while the IRR assumes that intermediate cash flows get reinvested at the "IRR".

Does the currency matter?

- The analysis was done in dollars. Would the conclusions have been any different if we had done the analysis in Brazilian Reais?
  a) Yes
  b) No

Disney Theme Park: $R NPV

Expected Exchange Rate$_t$
= Exchange Rate today * $(1.07/1.02)^t$

Discount at $R cost of capital
= (1.0862) (1.07/1.02) – 1 = 13.94%

Year	Cashflow ($)	R$/$	Cashflow (R$)	Present Value
0	-$ 2,000.00	R$ 2.04	-R$ 4,080.00	-R$ 4,080.00
1	-$ 1,000.00	R$ 2.14	-R$ 2,140.00	-R$ 1,878.14
2	-$ 859.50	R$ 2.24	-R$ 1,929.49	-R$ 1,486.19
3	-$ 270.06	R$ 2.35	-R$ 635.98	-R$ 429.92
4	$ 332.50	R$ 2.47	R$ 821.40	R$ 487.32
5	$ 453.46	R$ 2.59	R$ 1,175.12	R$ 611.87
6	$ 501.55	R$ 2.72	R$ 1,363.46	R$ 623.06
7	$ 538.06	R$ 2.85	R$ 1,534.43	R$ 615.39
8	$ 595.64	R$ 2.99	R$ 1,781.89	R$ 627.19
9	$ 659.64	R$ 3.14	R$ 2,070.10	R$ 639.48
10	$ 11,360.86	R$ 3.29	R$ 37,400.49	R$ 10,139.72
				R$ 5,869.78

NPV = R$ 5,870/2.04= $ 2,877 Million

NPV is equal to NPV in dollar terms

Uncertainty in Project Analysis: What can we do?

- Based on our expected cash flows and the estimated cost of capital, the proposed theme park looks like a very good investment for Disney. Which of the following may affect your assessment of value?
  a) Revenues may be over estimated (crowds may be smaller and spend less)
  b) Actual costs may be higher than estimated costs
  c) Tax rates may go up
  d) Interest rates may rise
  e) Risk premiums and default spreads may increase
  f) All of the above
- How would you respond to this uncertainty?
  a) Will wait for the uncertainty to be resolved
  b) Will not take the investment
  c) Ignore it.
  d) Other

One simplistic (but effective) solution: See how quickly you can get your money back…

- If your biggest fear is losing the billions that you invested in the project, one simple measure that you can compute is the number of years it will take you to get your money back.

Year	Cash Flow	Cumulated CF	PV of Cash Flow	Cumulated DCF
0	-$2,000	-$2,000	-$2,000	-$2,000
1	-$1,000	-$3,000	-$921	-$2,921
2	-$860	-$3,860	-$729	-$3,649
3	-$270	-$4,130	-$211	-$3,860
4	$332	-$3,797	$239	-$3,621
5	$453	-$3,344	$300	-$3,321
6	$502	-$2,842	$305	-$3,016
7	$538	-$2,304	$302	-$2,714
8	$596	-$1,708	$307	-$2,407
9	$660	-$1,049	$313	-$2,093
10	$692	-$357	$303	-$1,790
11	$706	$350	$284	-$1,506
12	$720	$1,070	$267	-$1,239
13	$735	$1,804	$251	-$988
14	$749	$2,554	$236	-$753
15	$764	$3,318	$221	-$531
16	$780	$4,097	$208	-$324
17	$795	$4,892	$195	-$129
18	$811	$5,703	$183	$55
19	$827	$6,531	$172	$227
20	$844	$7,374	$162	$388

Payback = 10.5 years →

Discounted Payback = 17.7 years

A slightly more sophisticated approach: Sensitivity Analysis and What-if Questions…

- The NPV, IRR and accounting returns for an investment will change as we change the values that we use for different variables.
- One way of analyzing uncertainty is to check to see how sensitive the decision measure (NPV, IRR..) is to changes in key assumptions. While this has become easier and easier to do over time, there are caveats that we would offer.

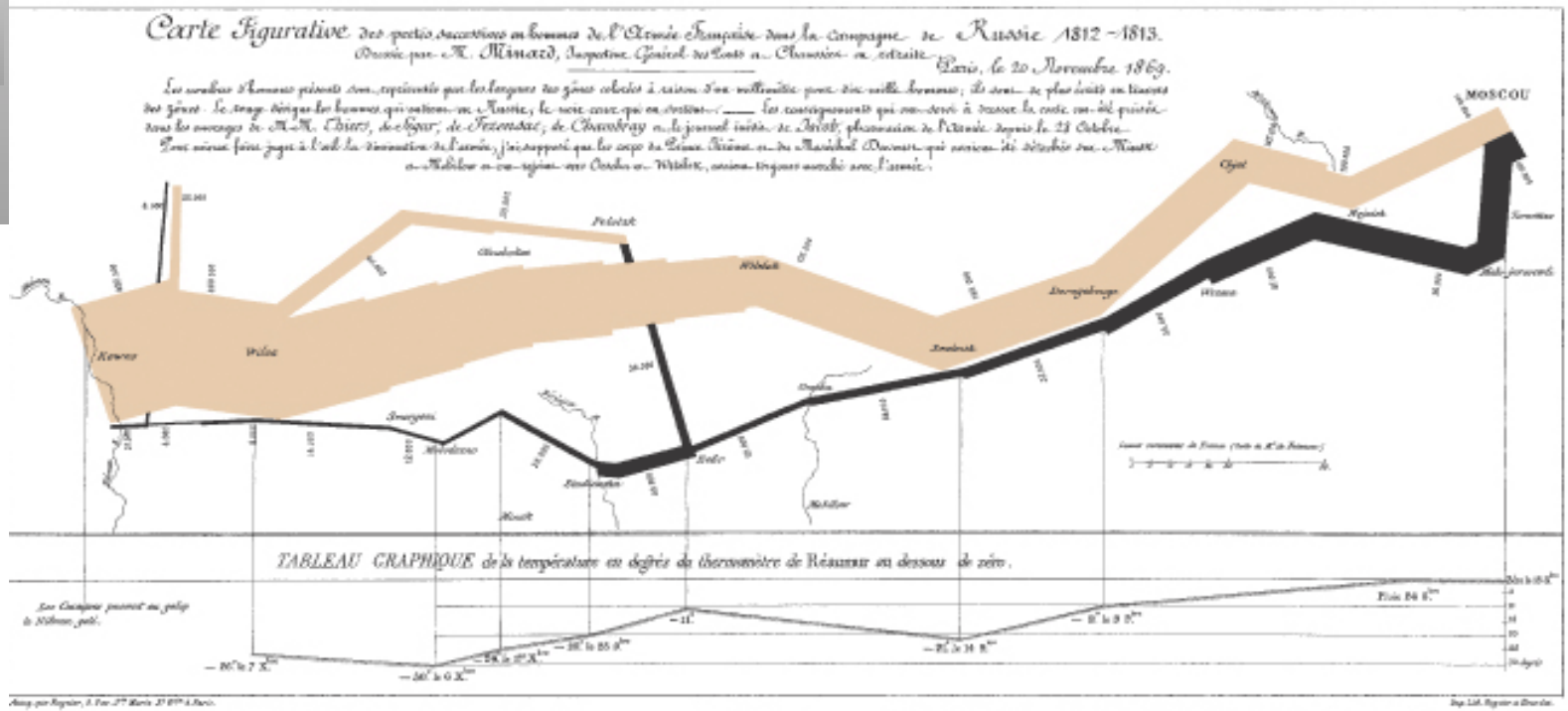
Caveat 1: When analyzing the effects of changing a variable, we often hold all else constant. In the real world, variables move together.

Caveat 2: The objective in sensitivity analysis is that we make better decisions, not churn out more tables and numbers.

Corollary 1: Less is more. Not everything is worth varying…

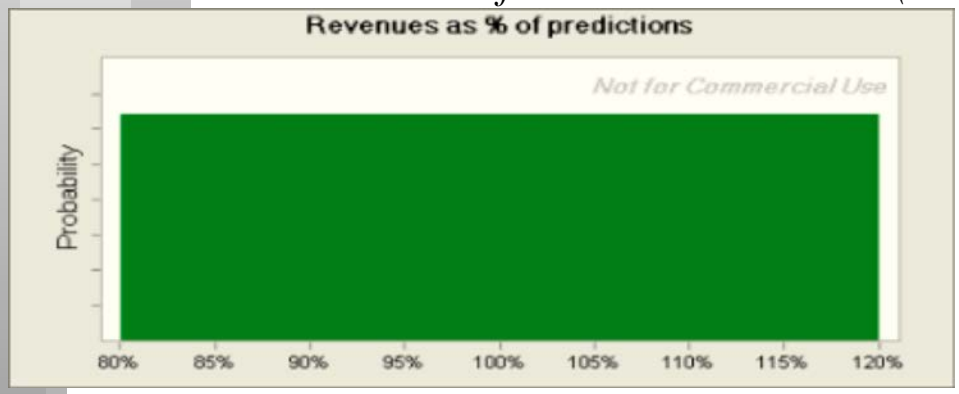
Corollary 2: A picture is worth a thousand numbers (and tables).

And here is a really good picture…

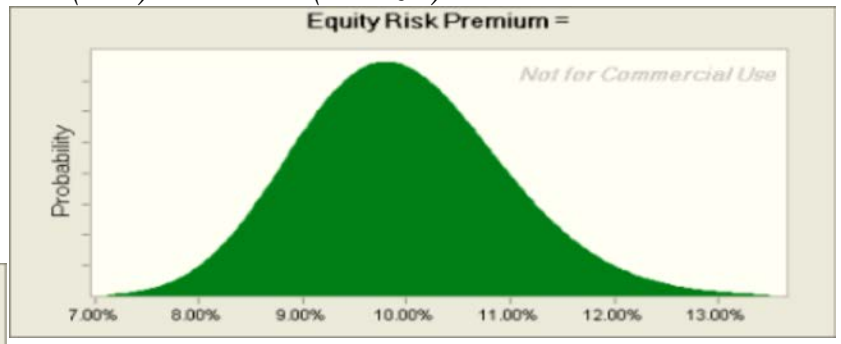


The final step up: Incorporate probabilistic estimates.. Rather than expected values..

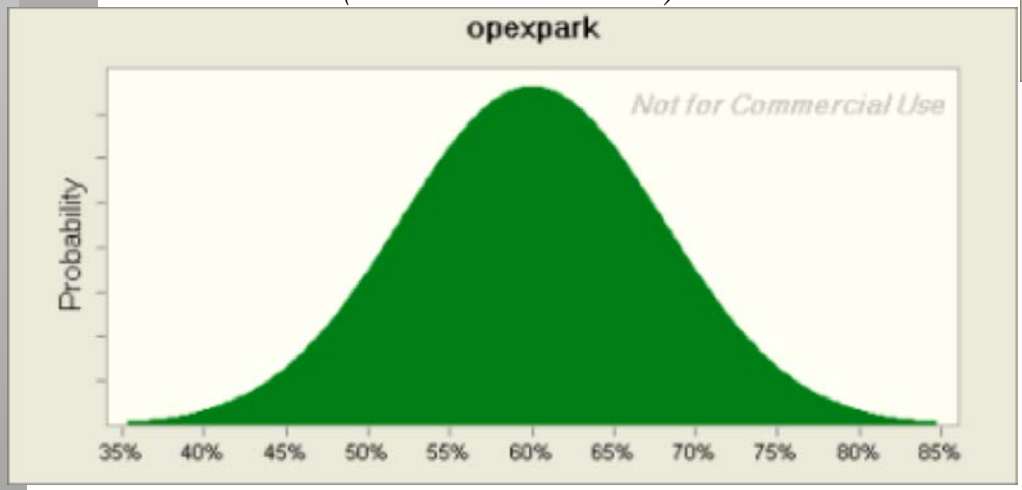
Actual Revenues as % of Forecasted Revenues (Base case = 100%)



Equity Risk Premium (Base Case = 6% (US)+ 3.95% (Brazil) = 9.95%

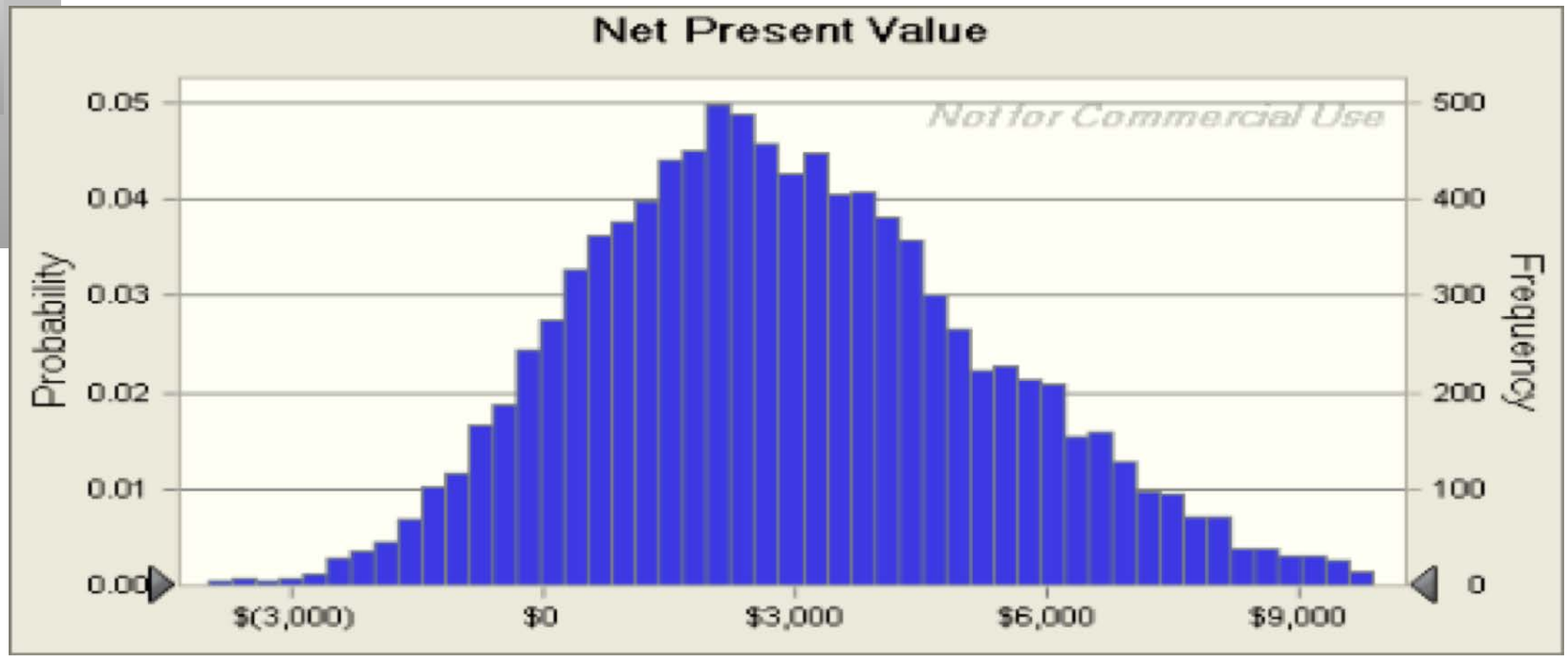


Operating Expenses at Parks as % of Revenues (Base Case = 60%)



The resulting simulation…

Average = $2.95 billion
Median = $2.73 billion

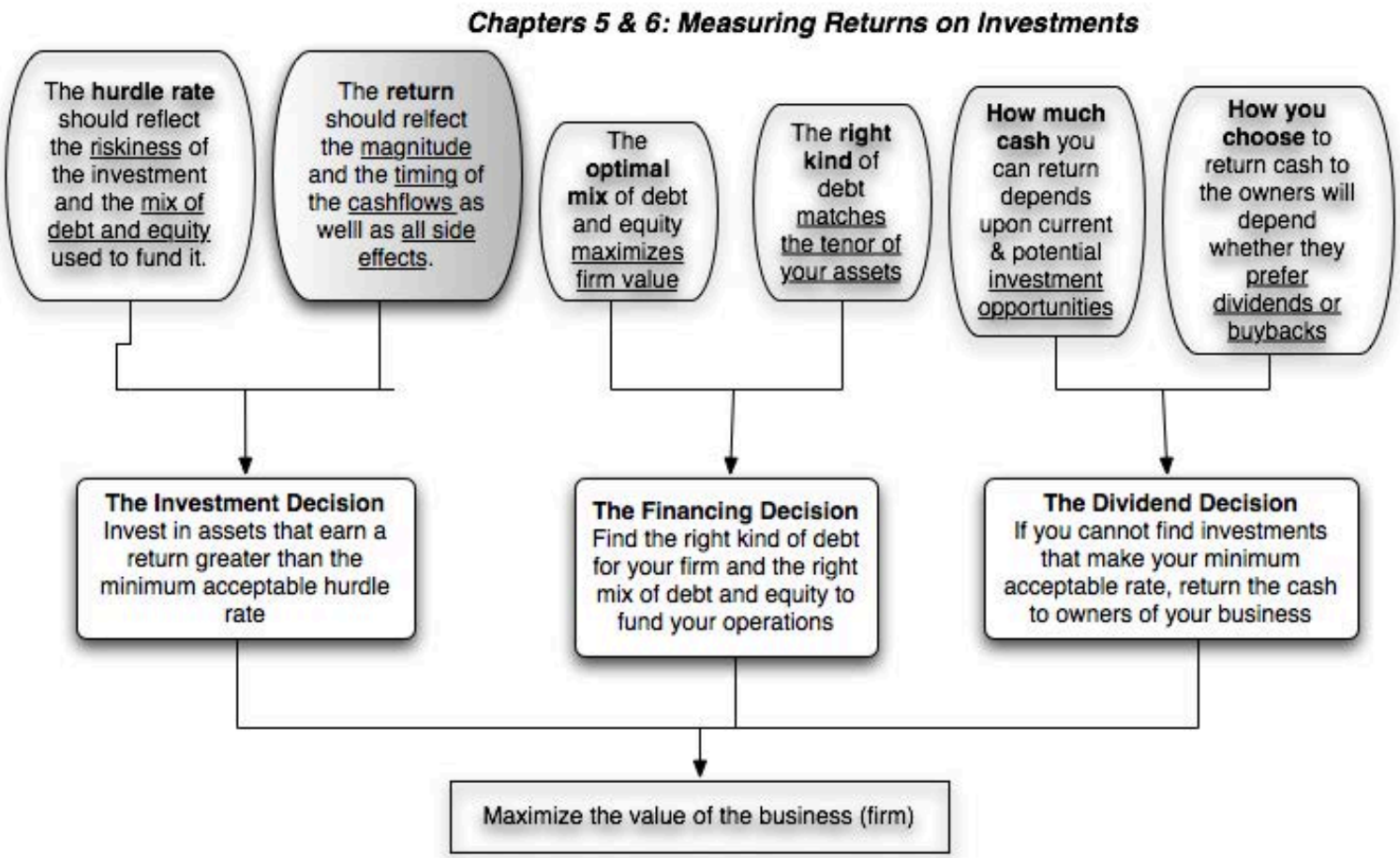


NPV ranges from -$4 billion to +$14 billion. NPV is negative 12% of the time.

A final thought: Side Costs and Benefits

- Most projects considered by any business create side costs and benefits for that business.
  - The side costs include the costs created by the use of resources that the business already owns (opportunity costs) and lost revenues for other projects that the firm may have.
  - The benefits that may not be captured in the traditional capital budgeting analysis include project synergies (where cash flow benefits may accrue to other projects) and options embedded in projects (including the options to delay, expand or abandon a project).
- The returns on a project should incorporate these costs and benefits.

First Principles

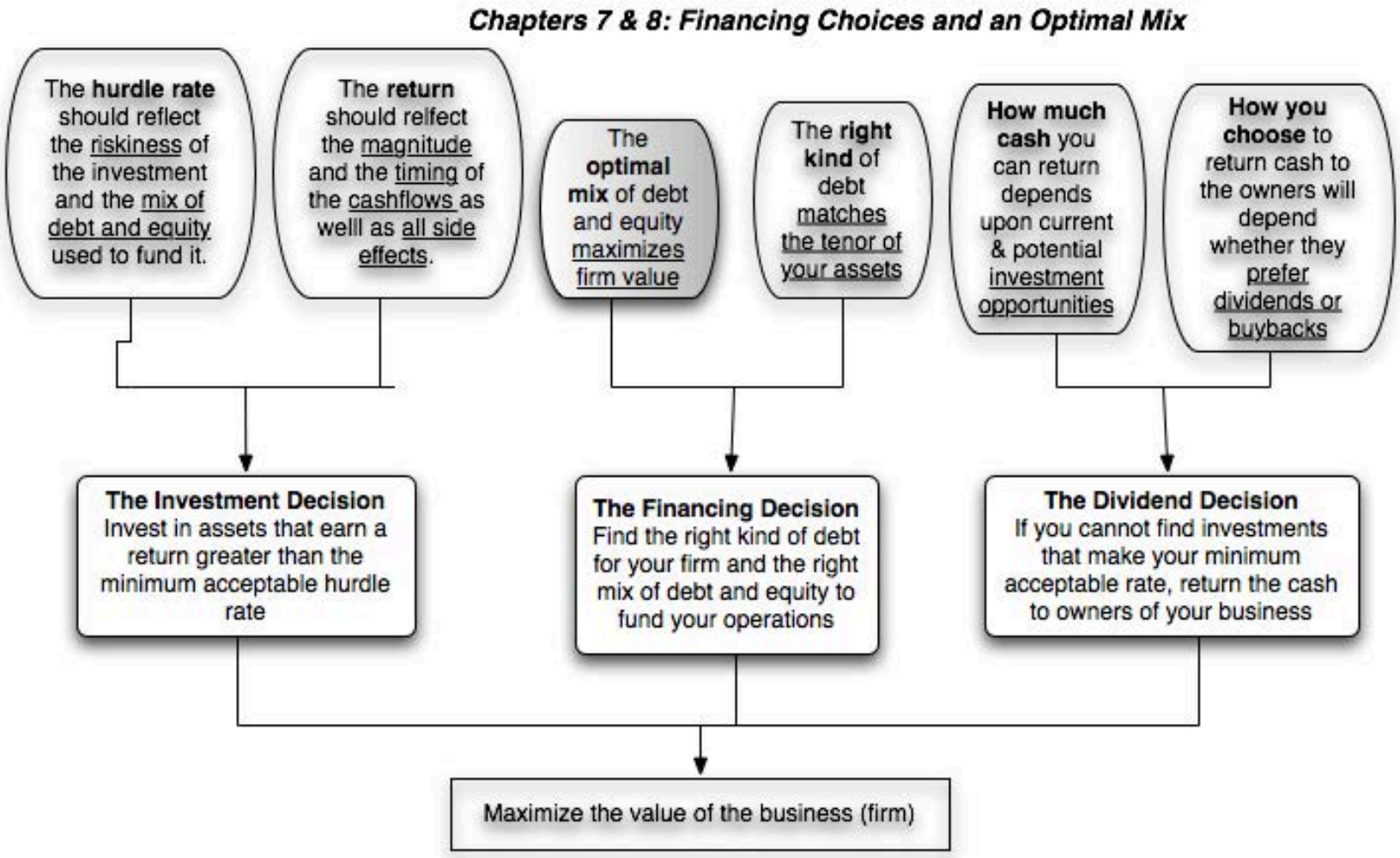


Capital Structure: The Choices and the Trade off

"Neither a borrower nor a lender be"

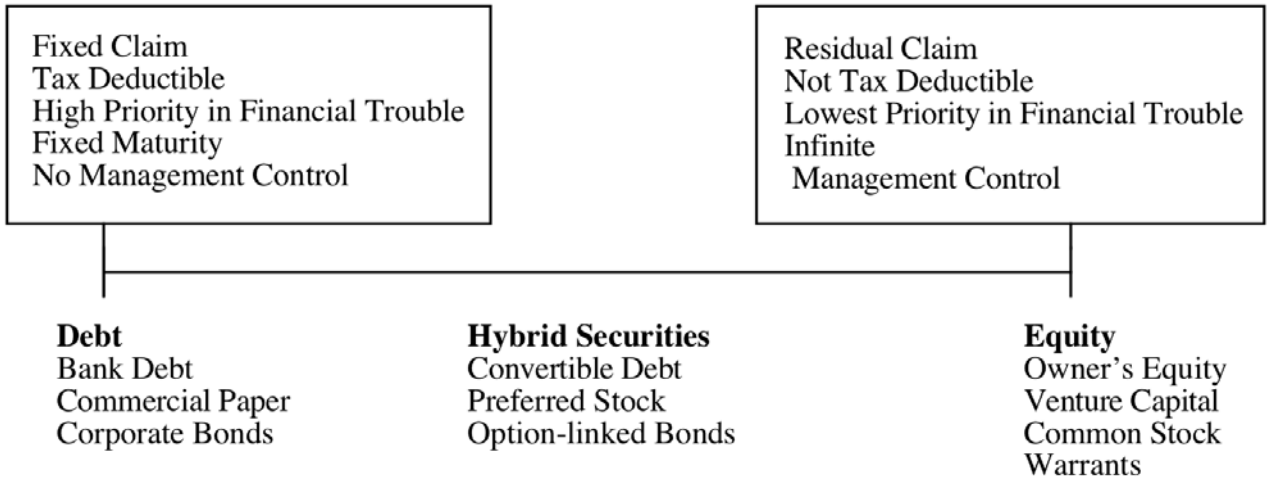
Someone who obviously hated this part of corporate finance

First Principles



Debt or Equity: The Continuum

Figure 7.1: Debt versus Equity

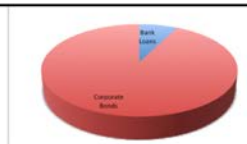
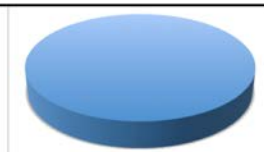
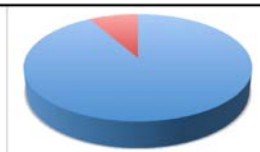
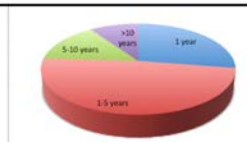
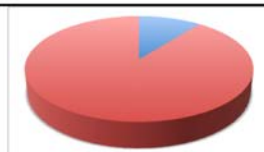
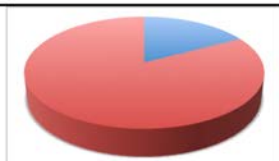


- The simplest measure of how much debt and equity a firm is using currently is to look at the proportion of debt in the total financing. This ratio is called the debt to capital ratio:

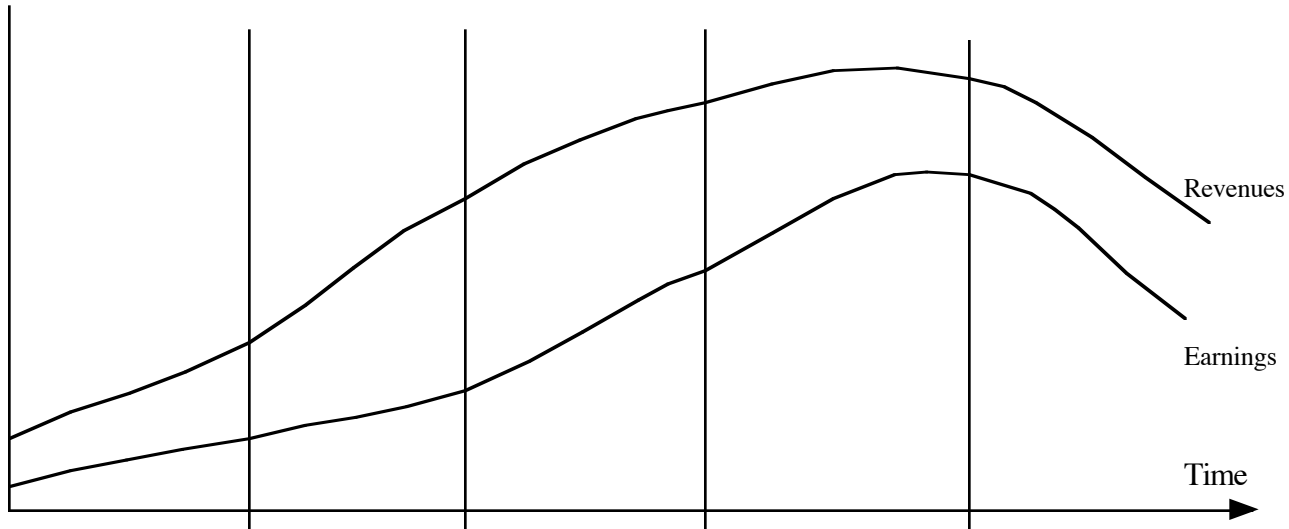
  Debt to Capital Ratio = Debt / (Debt + Equity)

- In general, this ratio should be computed using market values for both debt and equity, and include all debt.

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

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

Financing Choices across the life cycle



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

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.*

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

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

A Hypothetical Scenario

(a) There are no taxes

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

(c) No firm ever goes bankrupt

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

(e) Firms know their future financing needs with certainty

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

The Miller-Modigliani Theorem

- In an environment, where there are no taxes, default risk or agency costs, capital structure is irrelevant.
- In this world,
  - Leverage is irrelevant. A firm's value will be determined by its project cash flows.
  - The cost of capital of the firm will not change with leverage. As a firm increases its leverage, the cost of equity will increase just enough to offset any gains to the leverage

Pathways to the Optimal

- The Cost of Capital Approach: The optimal debt ratio is the one that minimizes the cost of capital for a firm.
- The Sector Approach: The optimal debt ratio is the one that brings the firm closes to its peer group in terms of financing mix.

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.

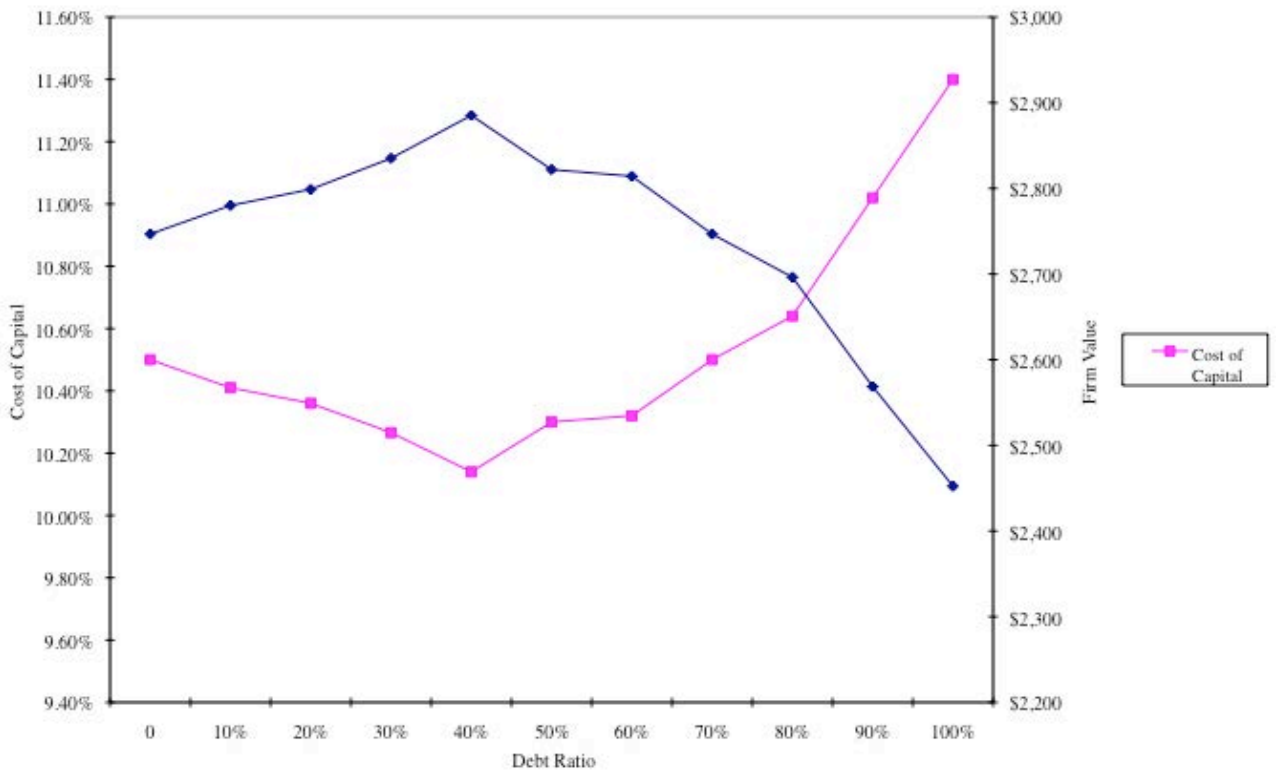
Applying Cost of Capital Approach: The Textbook Example

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

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

The U-shaped Cost of Capital Graph…

Figure 8.2: Cost of Capital and Firm Value



Current Cost of Capital: Disney

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

  Cost of Equity = 3.5% + 0.9011(6%) = 8.91%

- Disney's bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 6%. Using a marginal tax rate of 38%, the after-tax cost of debt for Disney is 3.72%.

  After-Tax Cost of Debt = 6.00% (1 – 0.38) = 3.72%

- The cost of capital was calculated using these costs and the weights based on market values of equity (45,193) and debt (16,682):

  Cost of capital =

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

Mechanics of Cost of Capital Estimation

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

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

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

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

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

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

2. Get Disney's current financials…

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

I. Cost of Equity

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

Levered Beta = 0.7033 (1 + (1- .38) (Debt/Equity))

Estimating Cost of Debt

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

D/(D+E)	0.00%	10.00%	Debt to capital
D/E0.00%	11.11%	D/E = 10/90 = .1111	
$ Debt	$0	$6,188	10% of $61,875
EBITDA	$8,422	$8,422	Same as 0% debt
Depreciation	$1,593	$1,593	Same as 0% debt
EBIT	$6,829	$6,829	Same as 0% debt
Interest	$0	$294	Pre-tax cost of debt * $ Debt
Pre-tax Int. cov	∞	23.24	EBIT/ Interest Expenses
Likely Rating	AAA	AAA	From Ratings table
Pre-tax cost of debt	4.75%	4.75%	Riskless Rate + Spread

The Ratings Table

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

T.Bond rate in early 2009 = 3.5%

A Test: Can you do the 30% level?

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

Bond Ratings, Cost of Debt and Debt Ratios

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

Stated versus Effective Tax Rates

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

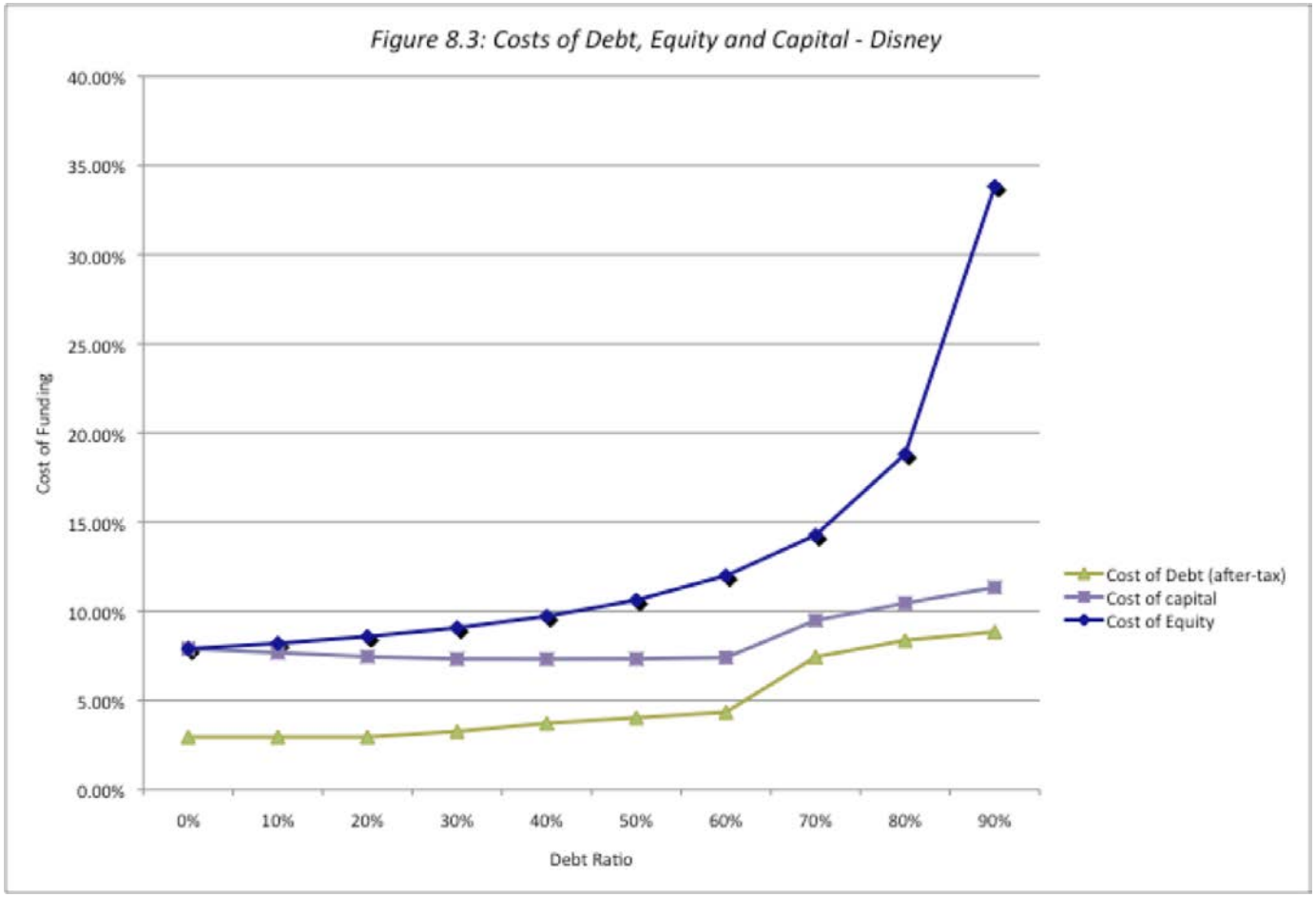
  Maximum Tax Benefit = EBIT * Marginal Tax Rate = $6,829 million * 0.38 = $2,595 million

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

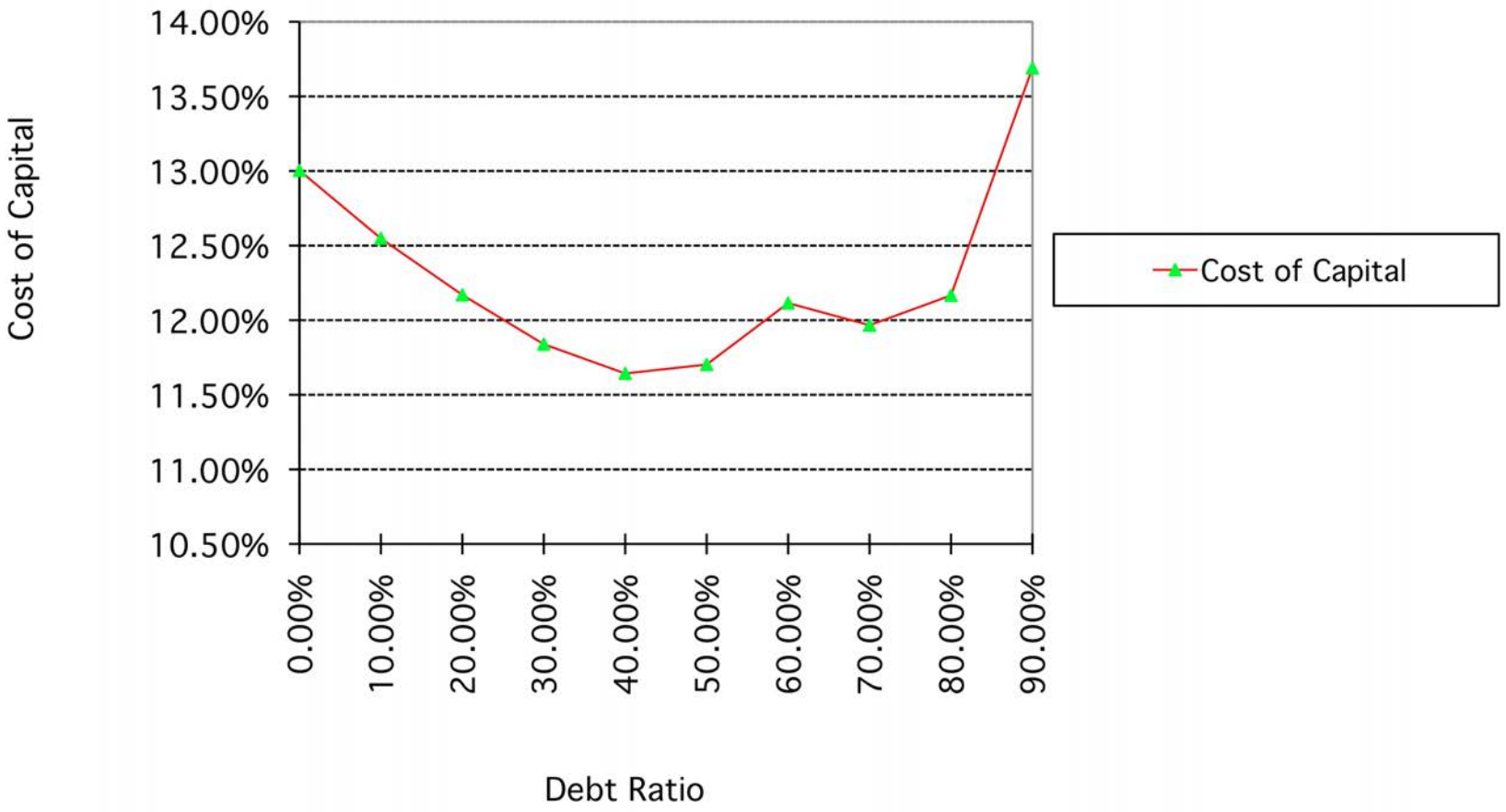
Disney's cost of capital schedule…

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

Disney: Cost of Capital Chart



Disney: Cost of Capital Chart: 1997



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

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

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

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

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

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

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

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

= (61,875* 0.0751 – 4199)/(61,875 + 4,199) = 0.0068 or 0.68%

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

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

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

Effect on Value: Capital Structure Isolation…

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

$WACC_b$ = 7.51%	Annual Cost = 61,875 * 0.0751 = $4,646.82 million
$WACC_a$ = 7.32%	Annual Cost = 61,875 * 0.0732 = $ 4,529.68 million
Δ WACC = 0.09%	Change in Annual Cost = $117.14 million

- If we assume a perpetual growth of 0.68% in firm value over time,

$$\text{Increase in firm value} = \frac{\text{Annual Savings next year}}{(\text{Cost of Capital} - g)} = \frac{\$17.14}{(0.0732 - 0.0068)} = \$1{,}763 \text{ million}$$

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

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

A Test: The Repurchase Price

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

  If we assume that investors are rational, i.e., that the investor who sell their shares back want the same share of firm value increase as those who remain:

  - Increase in Value per Share = $1,763/1856.732 = $ 0.95
  - New Stock Price = $24.34 + $0.95= $25.29

  Buying shares back $25.29 will leave you as a stockholder indifferent between selling and not selling.

- What would happen to the stock price after the buyback if you were able to buy stock back at $ 24.34?

2. What if something goes wrong? The Downside Risk

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

Disney's Operating Income: History

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

Disney: Safety Buffers?

RecessionDecline in Operating Income	
2002	Drop of 15.82%
1991	Drop of 22.00%
1981-82	Increased
Worst Year	Drop of 29.47%

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

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

Constraints on Ratings

- Management often specifies a 'desired Rating' below which they do not want to fall.
- The rating constraint is driven by three factors
  - it is one way of protecting against downside risk in operating income (so do not do both)
  - a drop in ratings might affect operating income
  - there is an ego factor associated with high ratings
- Caveat: Every Rating Constraint Has A Cost.
  - Provide Management With A Clear Estimate Of How Much The Rating Constraint Costs By Calculating The Value Of The Firm Without The Rating Constraint And Comparing To The Value Of The Firm With The Rating Constraint.

Ratings Constraints for Disney

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

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

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

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

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

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

Actual

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

Optimal

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

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

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

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

Applied Aracruz's average pretax operating margin between 2004 and 2008 to be 27.24% to 2008 revenues of $R 3,697 million to get a normalized operating income of R$ 1,007 million.

Extension to a private business
Optimal Debt Ratio for Bookscape

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

Estimated Market Value of Equity (in '000s) = Net Income for Bookscape *
Average PE for Publicly Traded Book Retailers = 1,500 * 10 = $15,000

Capital Structure for a bank: An Alternative Approach

- Banks are governed by regulatory capital ratios, where capital is defined as book equity and stated as a percent of assets or loans.
- 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

- Deutsche Bank: In October 2008, it raised its Tier 1 Capital Ratio to 10%, well above the Basel 1 regulatory requirement of 6%. At the end of the first quarter of 2009, it reported a Tier 1 capital ratio of 10.2%. If the capital ratio had dropped below 10%, the firm would have had to raise fresh equity.

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

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

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

2. Pre-tax Cash flow Return

- Firms that have more in operating income and cash flows, relative to firm value (in market terms), should have higher optimal debt ratios. We can measure operating income with EBIT and operating cash flow with EBITDA.

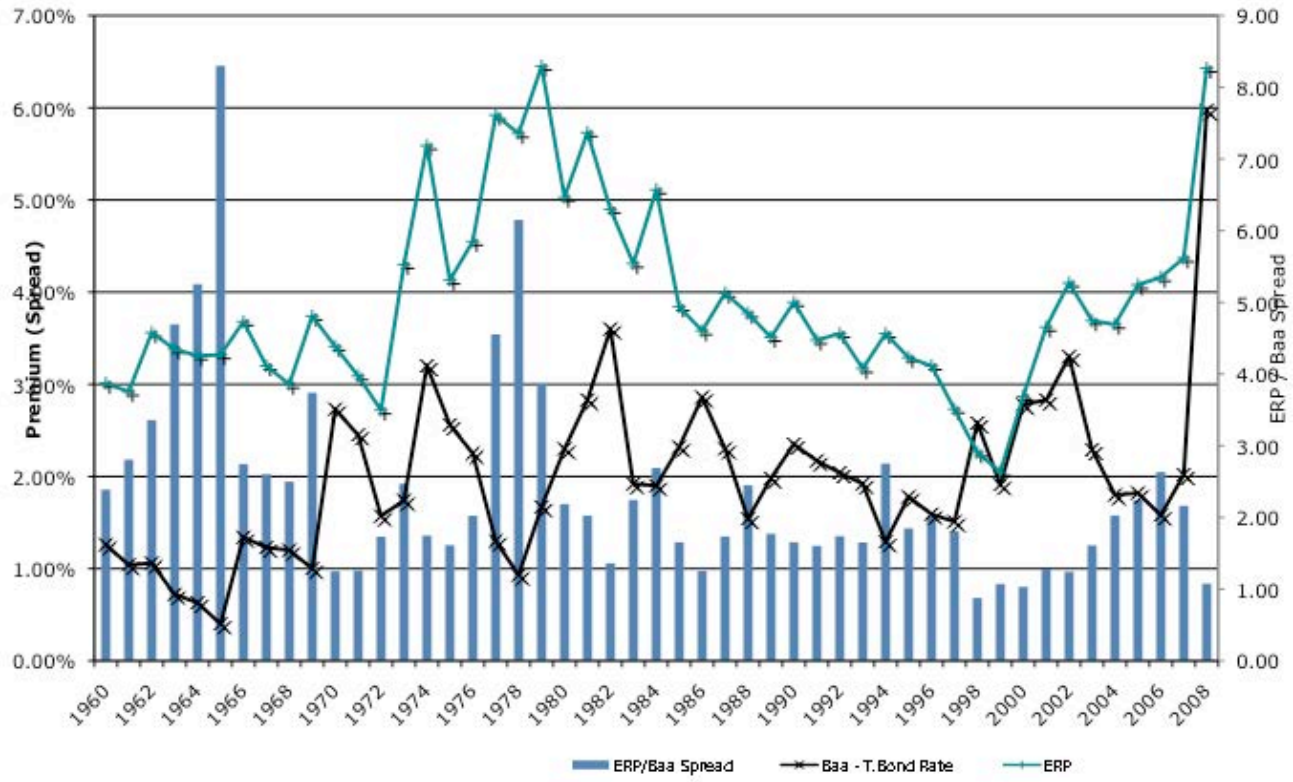
  Cash flow potential = EBITDA/ (Market value of equity + Debt)
- Disney, for example, has operating income of $6,829 million, which is 11% of the market value of the firm of $61,875 million in the base case, and an optimal debt ratio of 40%. Increasing the operating income to 15% of the firm value will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

3. Operating Risk

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

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

Figure 9: Equity Risk Premiums and Bond Default Spreads



Application Test: Your firm's optimal financing mix

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

Another Approach to the Optimal: Relative Analysis

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

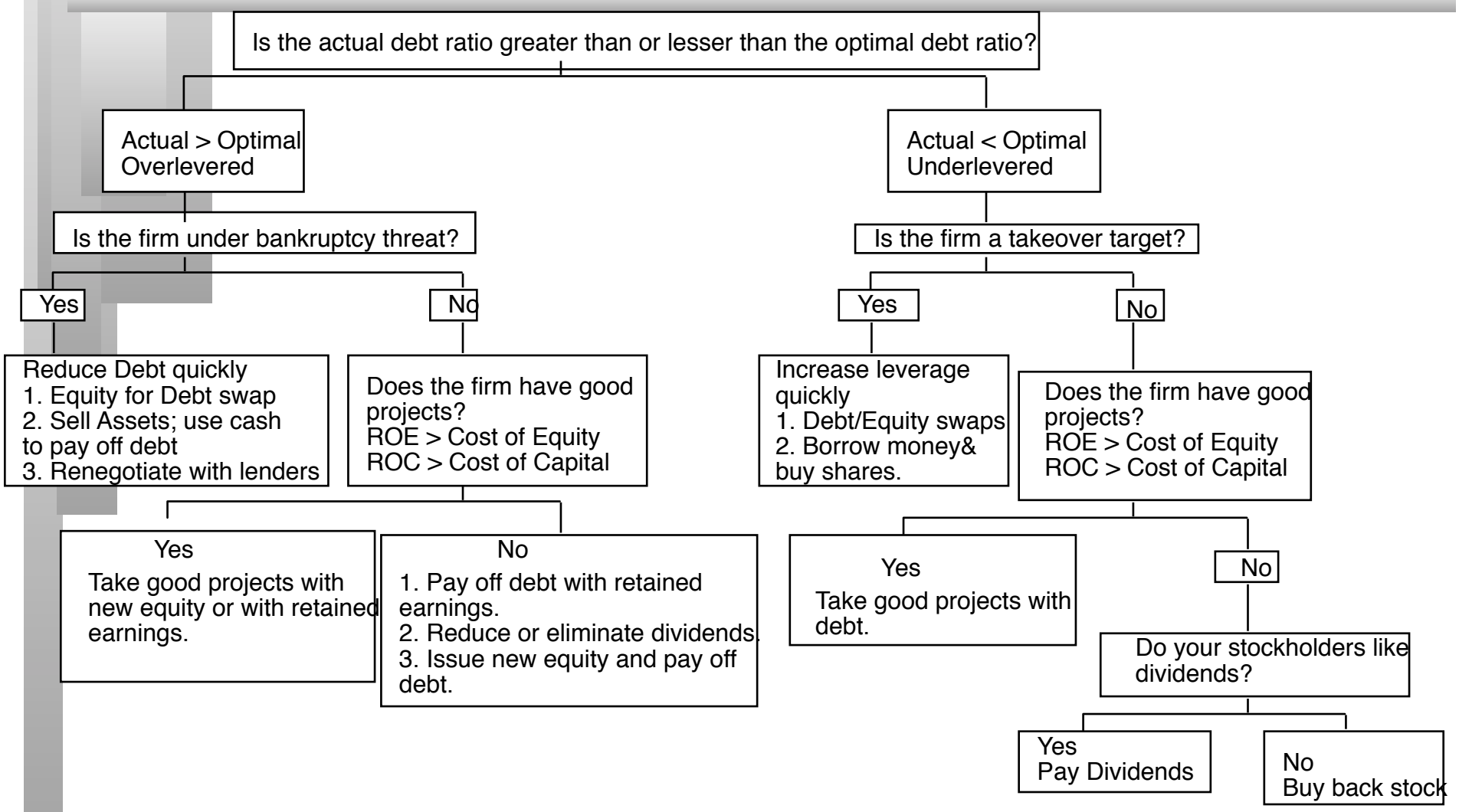
Comparing to industry averages

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

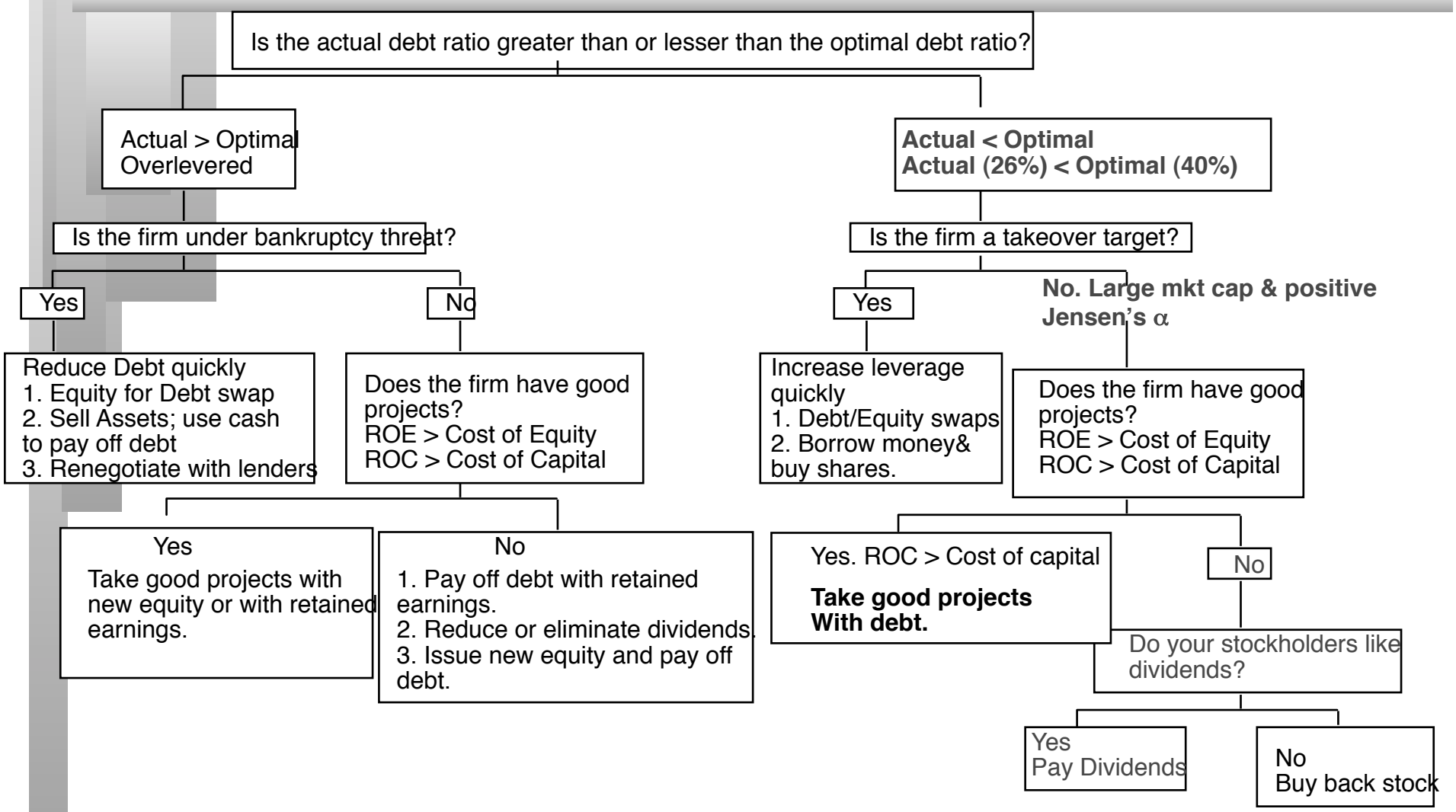
Now that we have an optimal.. And an actual.. What next?

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

A Framework for Getting to the Optimal



Disney: Applying the Framework



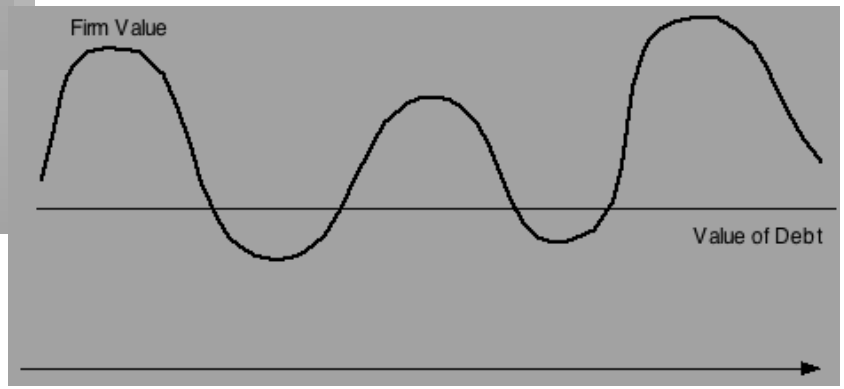
Application Test: Getting to the Optimal

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

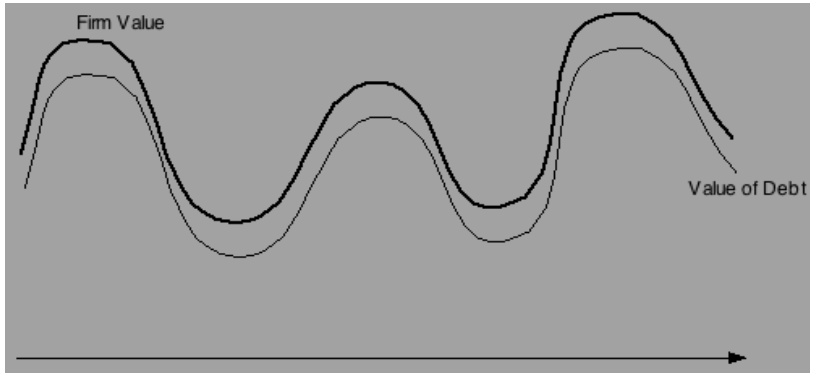
Designing Debt: The Fundamental Principle

- 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.

Unmatched Debt

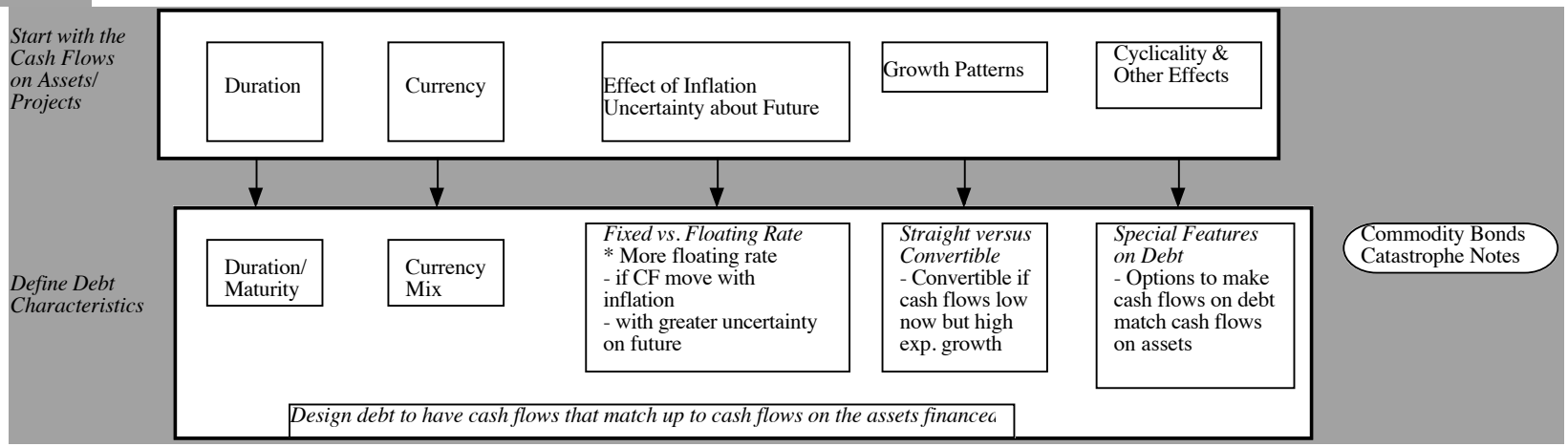


Matched Debt



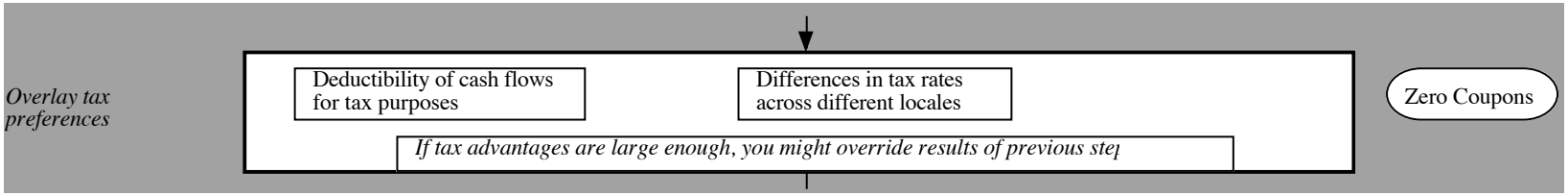
Design the perfect financing instrument

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



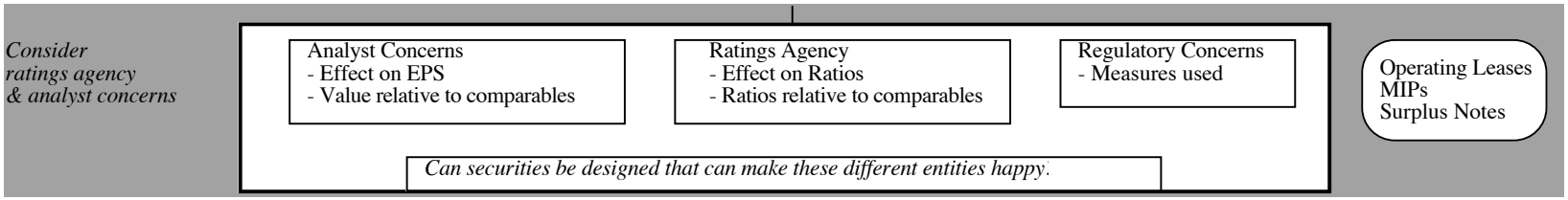
Ensuring that you have not crossed the line drawn by the tax code

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



While keeping equity research analysts, ratings agencies and regulators applauding

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

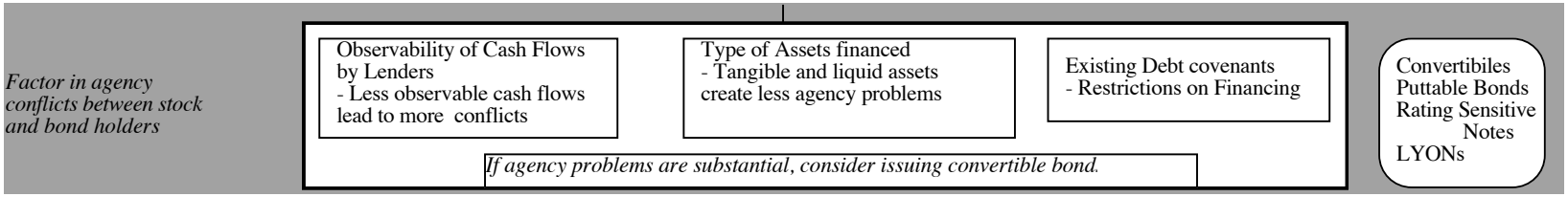


Debt or Equity: The Strange Case of Trust Preferred

- Trust preferred stock has
  - A fixed dividend payment, specified at the time of the issue
  - That is tax deductible
  - And failing to make the payment can cause ? (Can it cause default?)
- When trust preferred was first created, ratings agencies treated it as equity. As they have become more savvy, ratings agencies have started giving firms only partial equity credit for trust preferred.
- Assuming that trust preferred stock gets treated as equity by ratings agencies, which of the following firms is the most appropriate firm to be issuing it?
  - A firm that is under levered, but has a rating constraint that would be violated if it moved to its optimal
  - A firm that is over levered that is unable to issue debt because of the rating agency concerns.

Soothe bondholder fears

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



And do not lock in market mistakes that work against you

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

Designing Disney's Debt

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

Recommendations for Disney

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

Analyzing Disney's Current Debt

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

Adjusting Debt at Disney

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

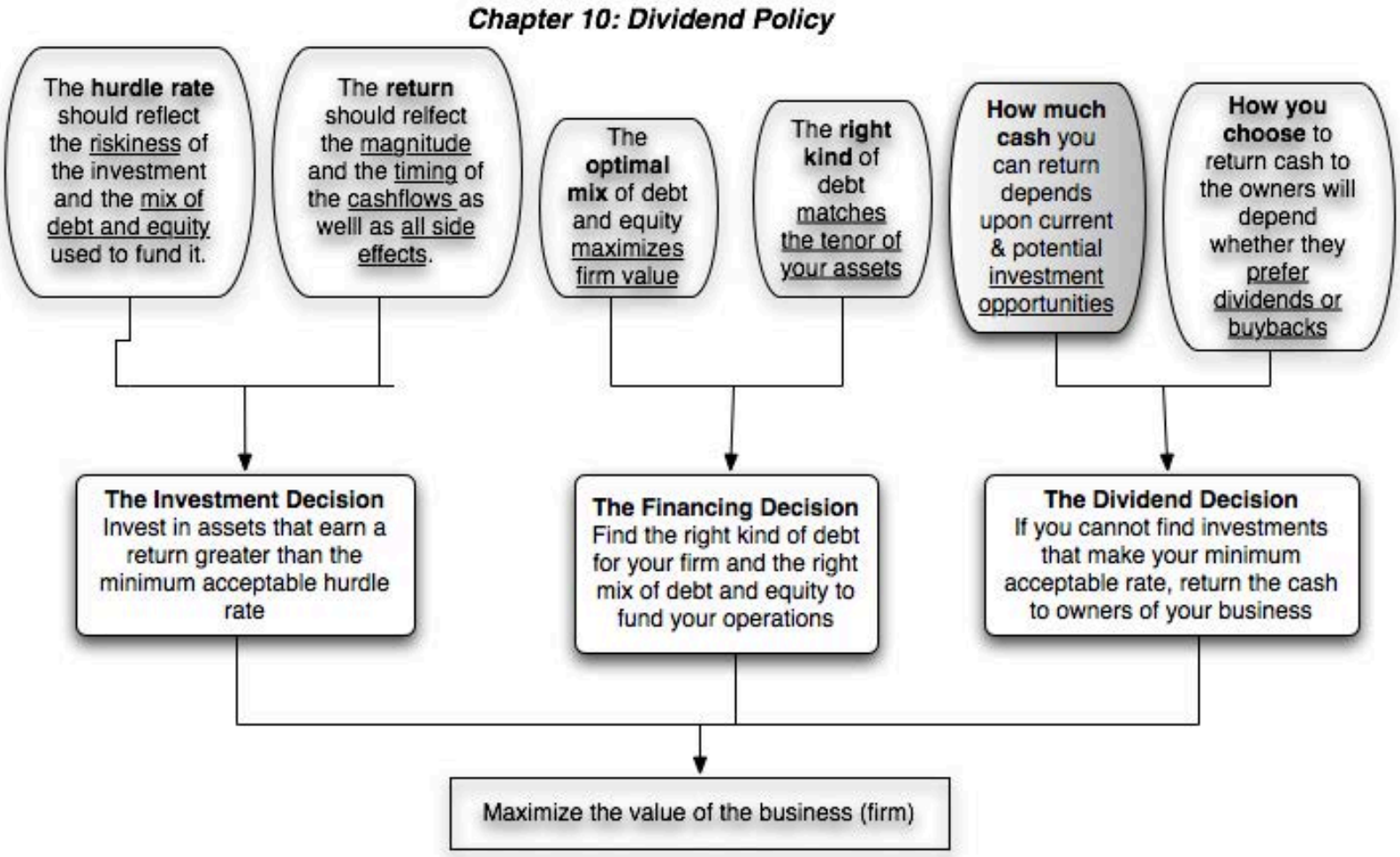
Application Test: Choosing your Financing Type

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

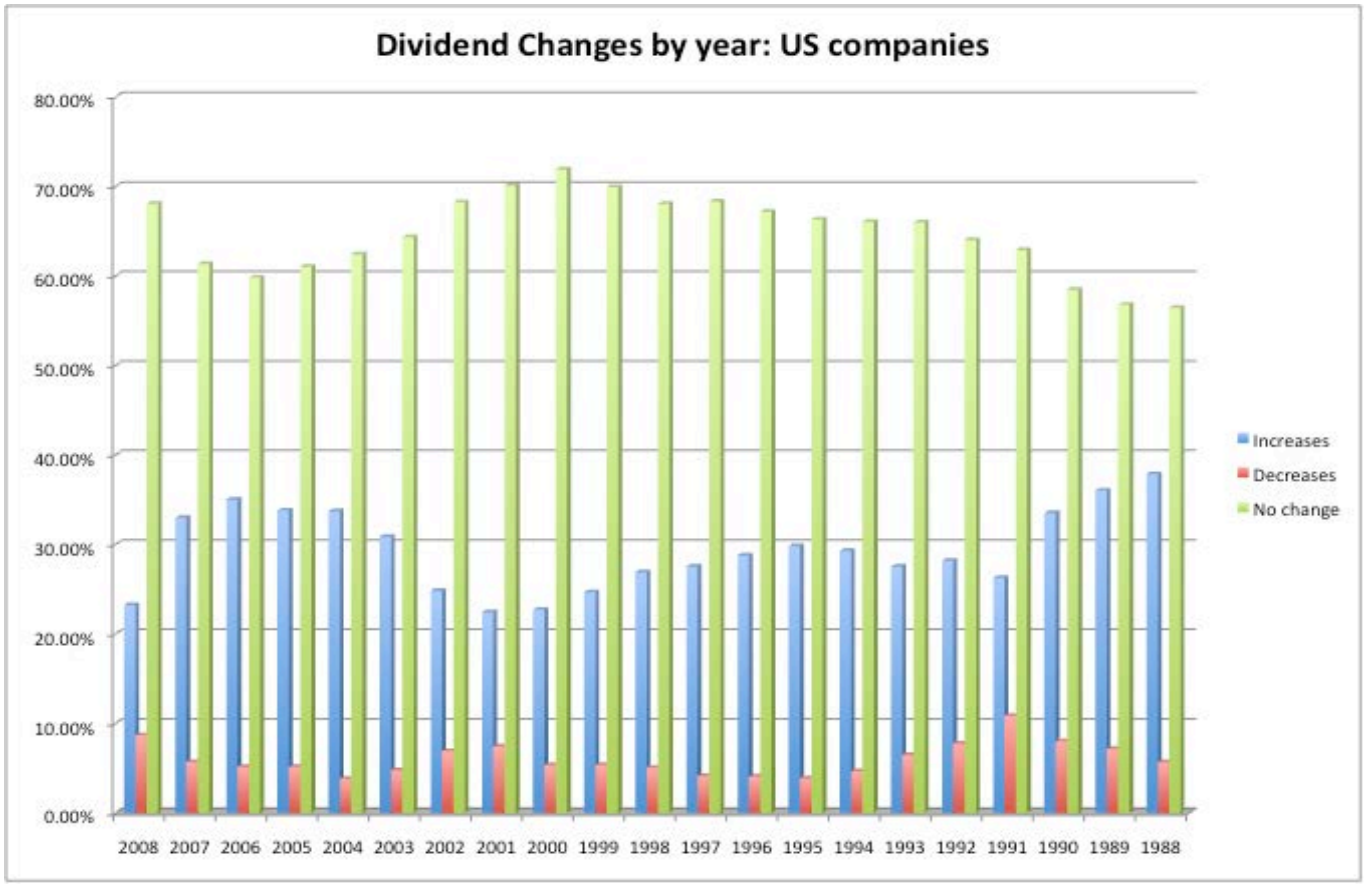
Returning Cash to the Owners: Dividend Policy

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

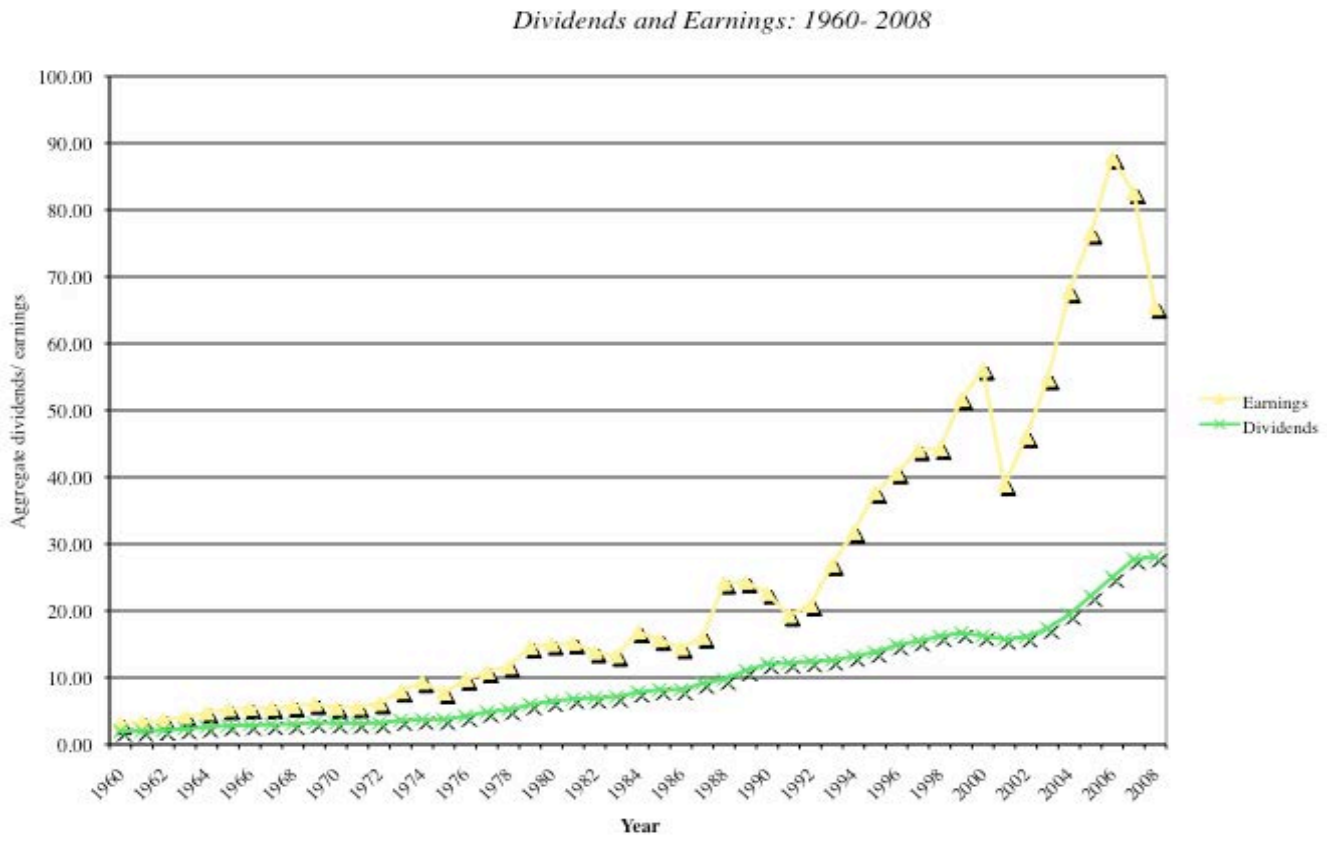
First Principles



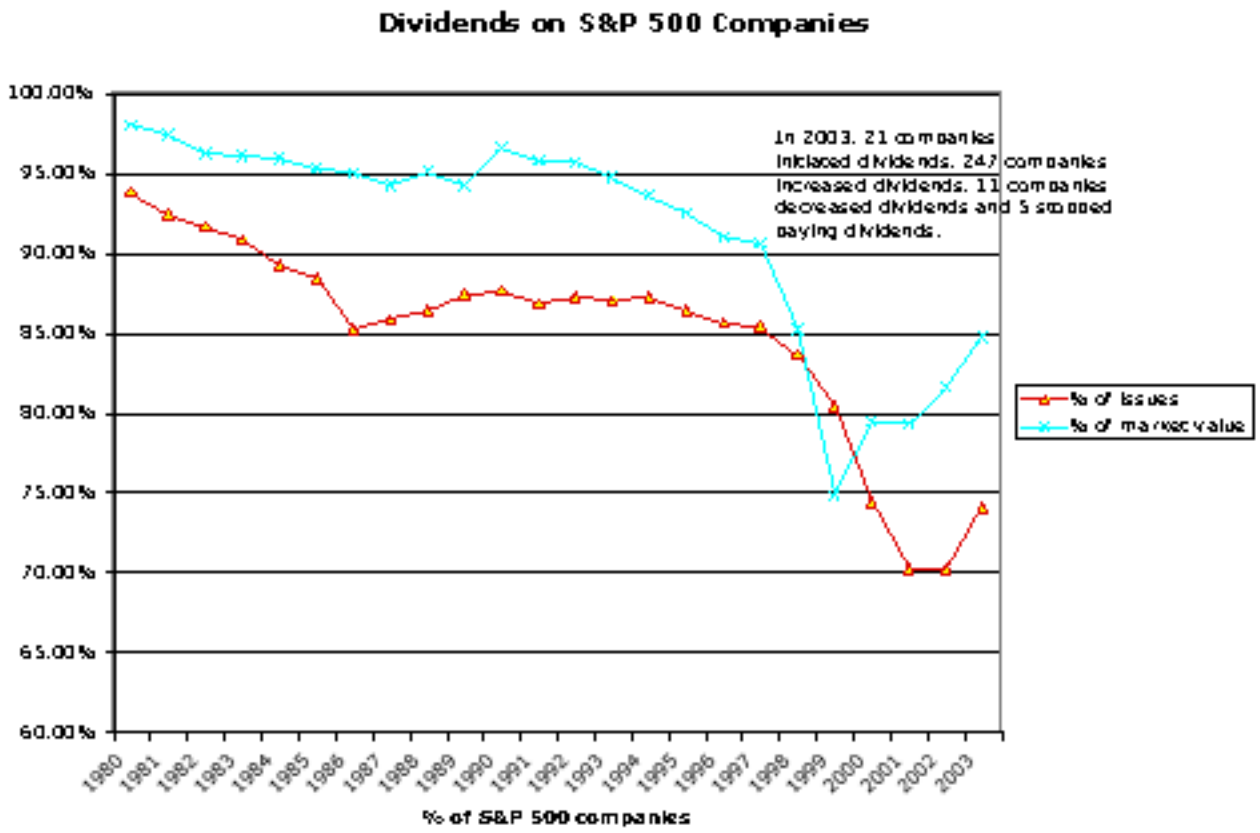
I. Dividends are sticky



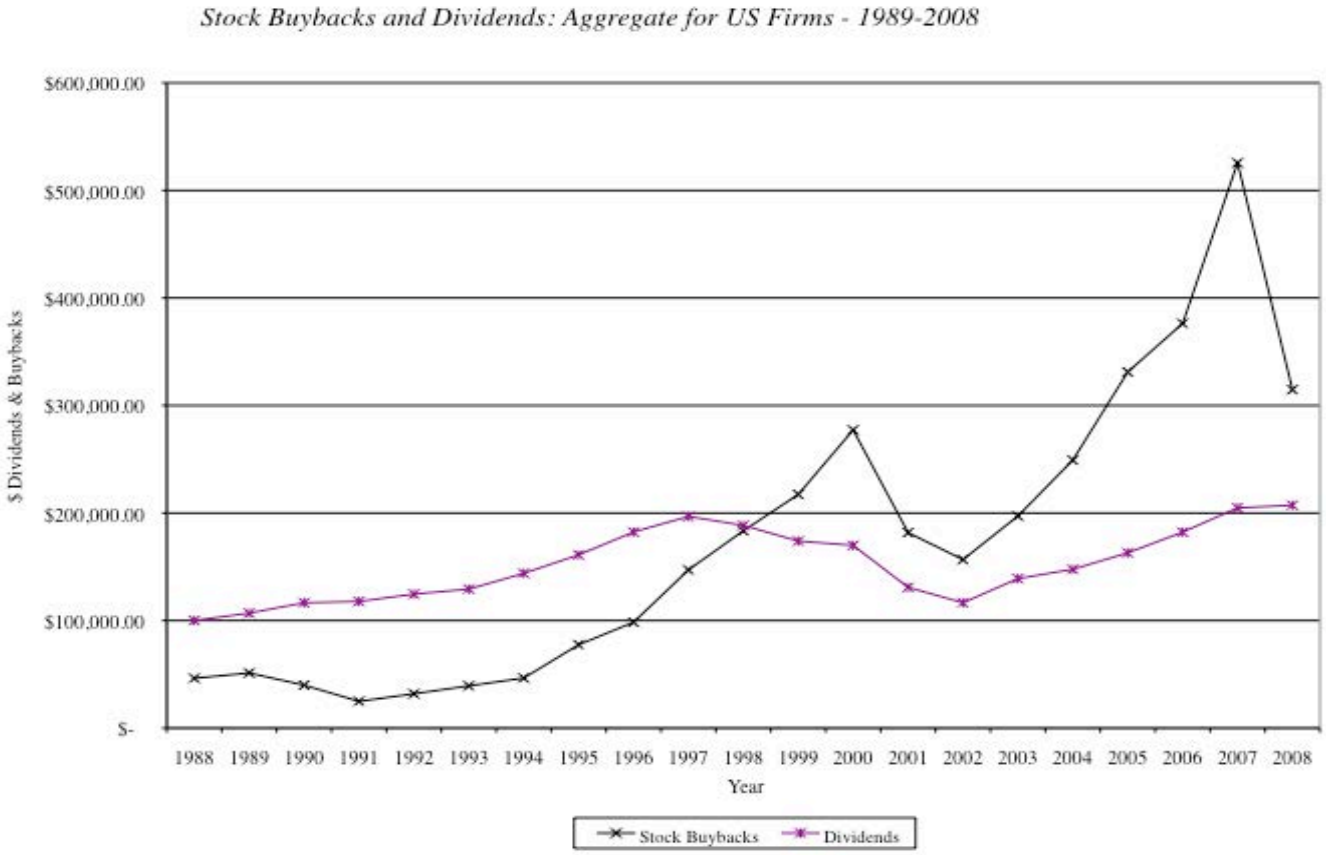
II. Dividends tend to follow earnings



III. Are affected by tax laws…

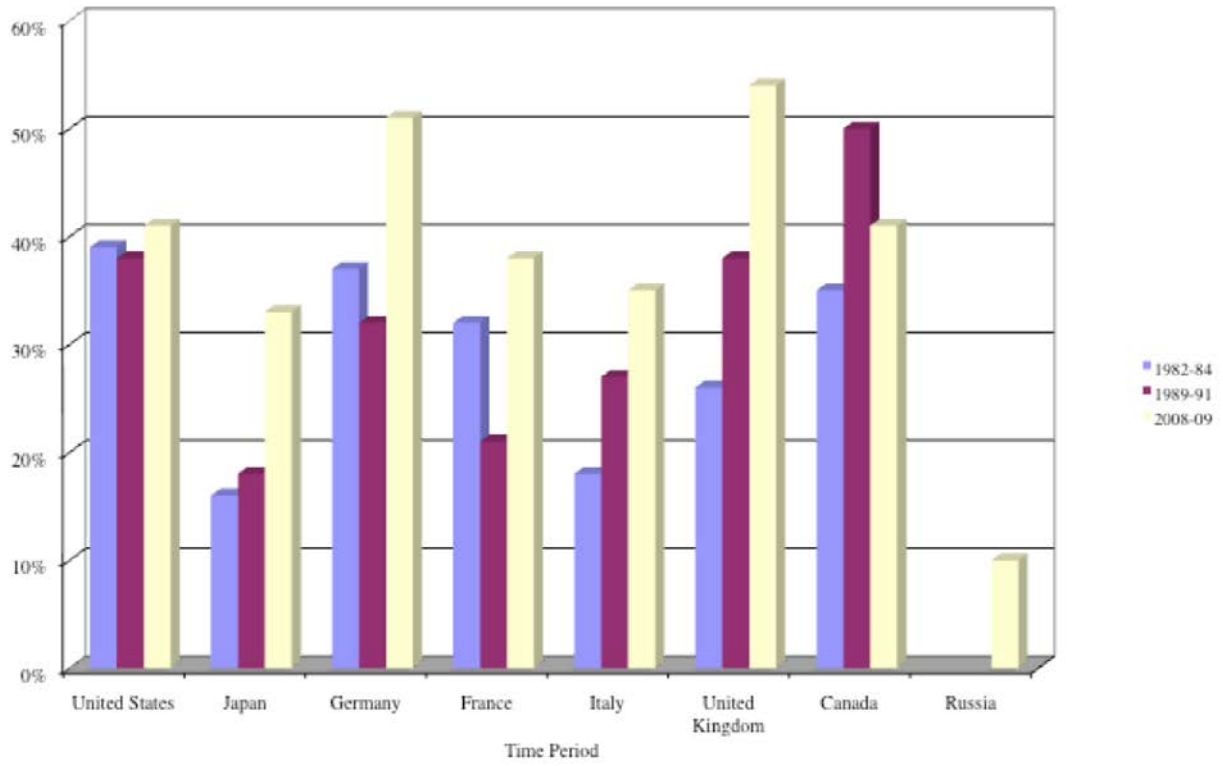


IV. More and more firms are buying back stock, rather than pay dividends...



V. And there are differences across countries…

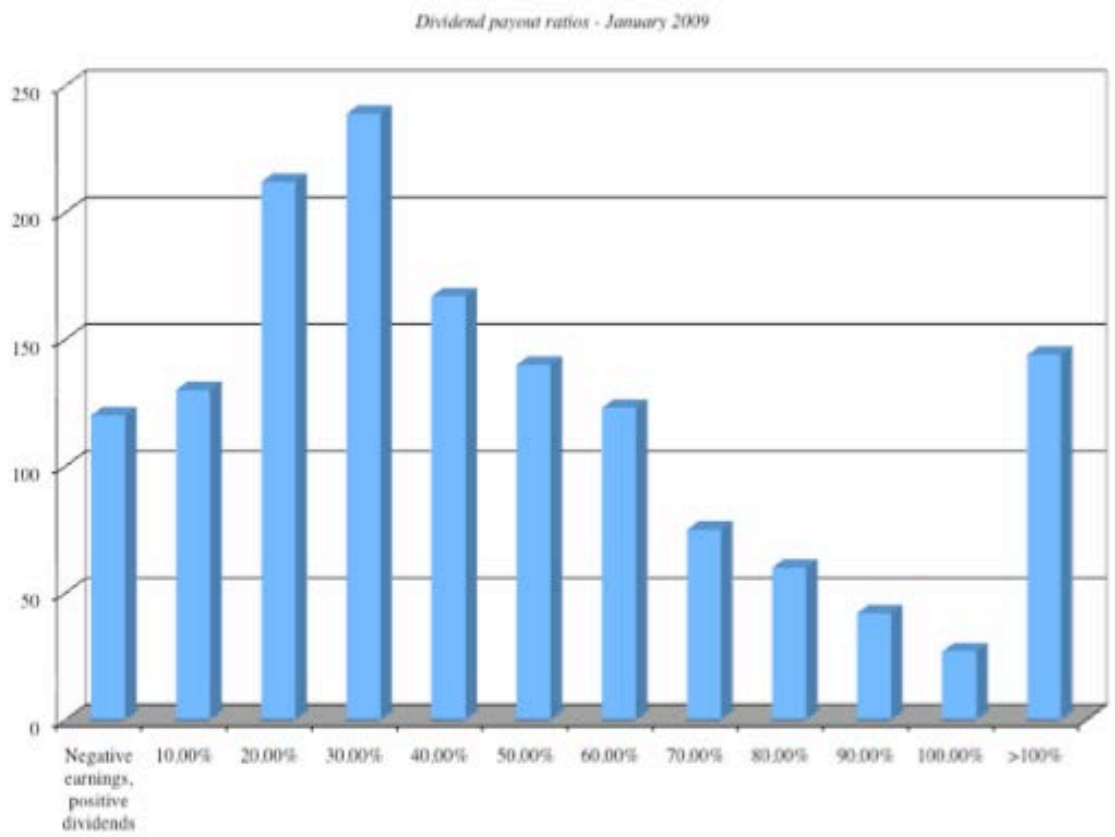
Figure 10.9: Dividend Payout Ratios - G7 Countries



Measures of Dividend Policy

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

Dividend Payout Ratios: January 2009



Dividend Yields in the United States: January 2009

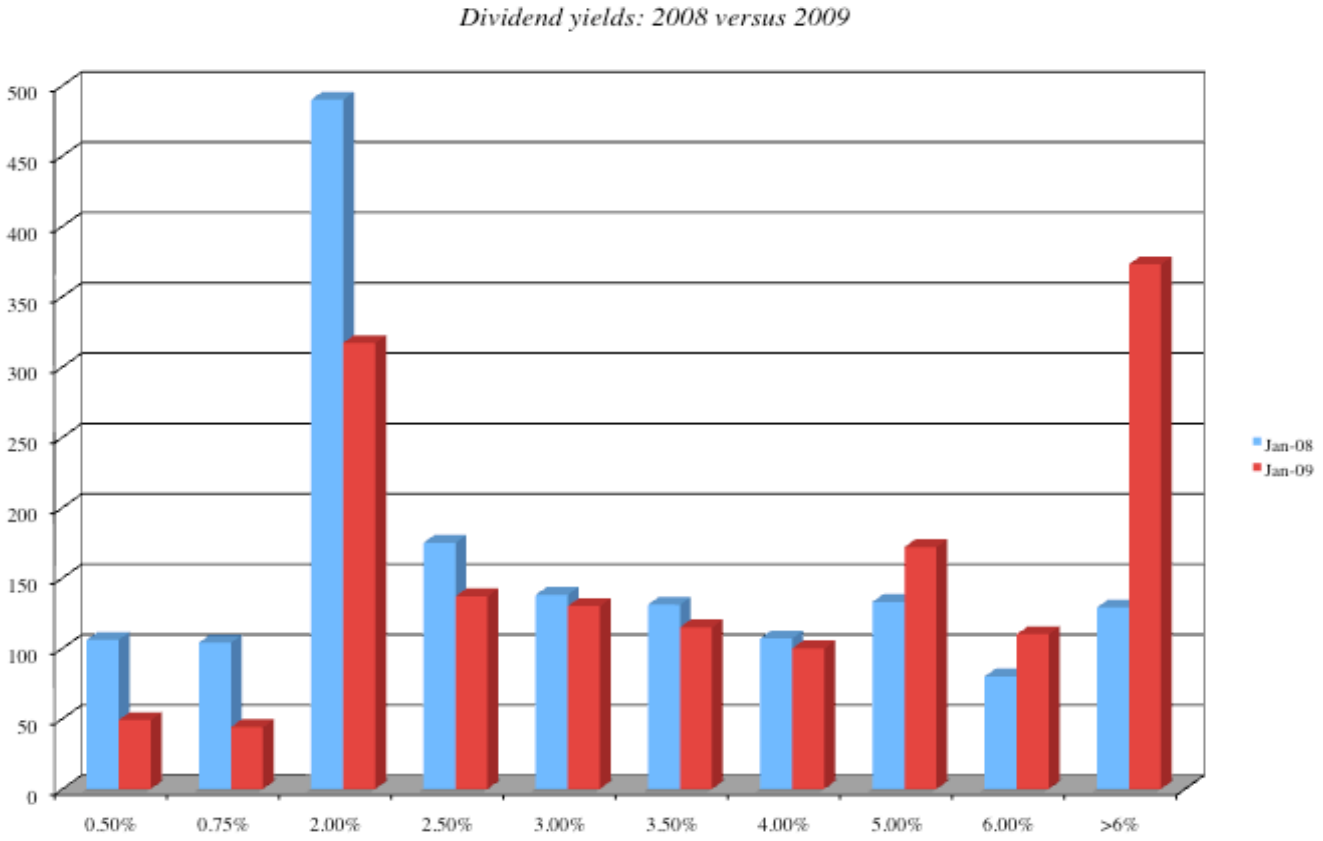
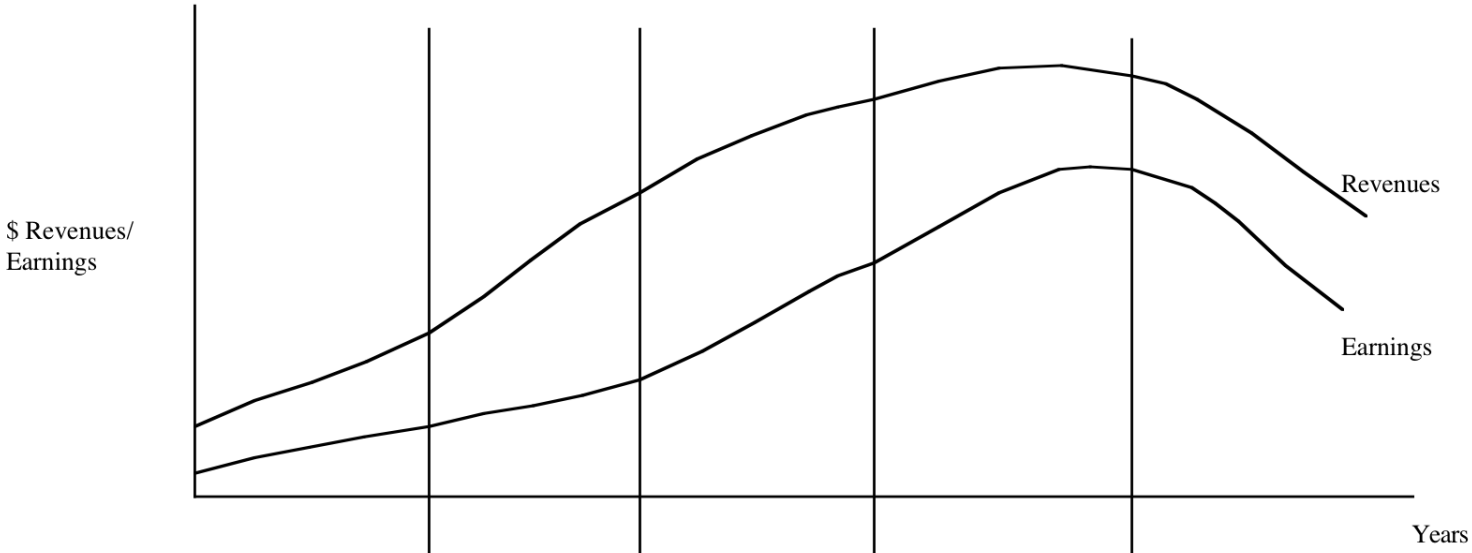


Figure 10.7: Life Cycle Analysis of Dividend Policy



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

Years

Dividend Policy: Disney, Tata, Aracruz and Deutsche Bank

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

Three Schools Of Thought On Dividends

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

The balanced viewpoint

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

Assessing Dividend Policy

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

I. The Cash/Trust Assessment

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

How much has the company returned to stockholders?

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

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

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

- The Free Cashflow to Equity (FCFE) is a measure of how much cash is left in the business after non-equity claimholders (debt and preferred stock) have been paid, and after any reinvestment needed to sustain the firm's assets and future growth.

  Net Income

  + Depreciation & Amortization

  = Cash flows from Operations to Equity Investors

  - Preferred Dividends

  - Capital Expenditures

  - Working Capital Needs

  - Principal Repayments

  + Proceeds from New Debt Issues

  = Free Cash flow to Equity

Disney's FCFE

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

Estimating FCFE when Leverage is Stable

Net Income

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

- (1- δ) Working Capital Needs

= Free Cash flow to Equity

δ = Debt/Capital Ratio

For this firm,

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

An Example: FCFE Calculation

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

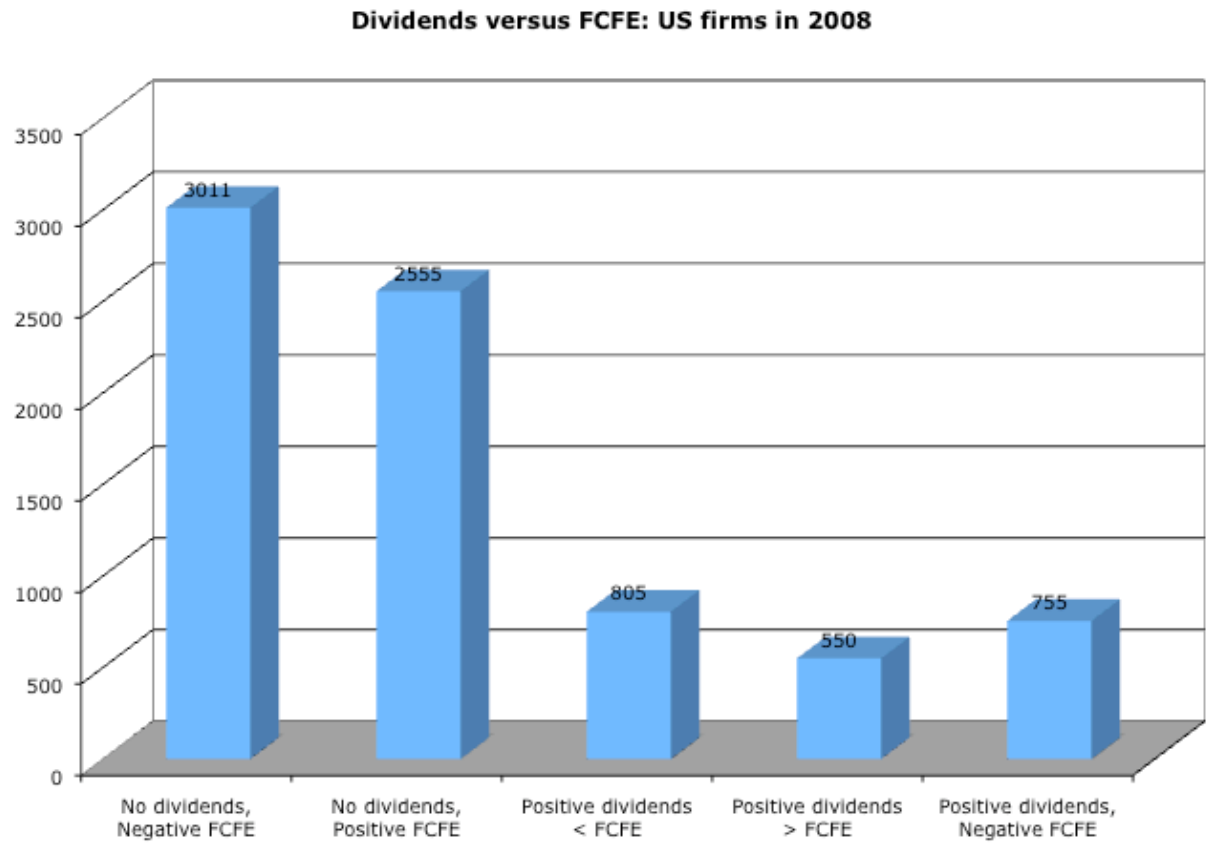
  $FCFE_{Bank}$= Net Income – Increase in Regulatory Capital (Book Equity)
- Consider a bank with $ 10 billion in loans outstanding and book equity of $ 750 million. If it maintains its capital ratio of 7.5%, intends to grow its loan base by 10% (to $11 and expects to generate $ 150 million in net income:

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

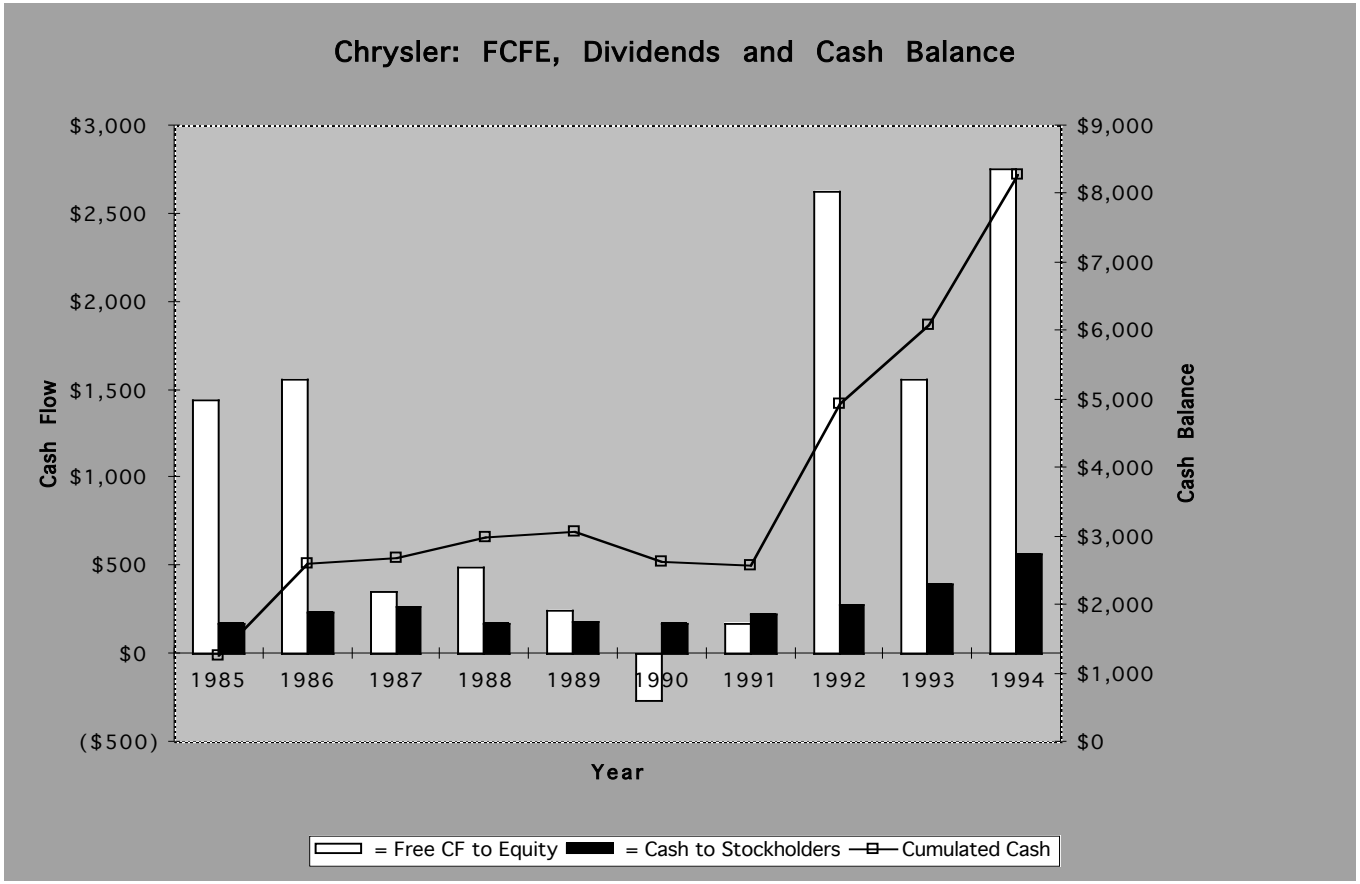
Deutsche Bank

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

Dividends versus FCFE: U.S.



The Consequences of Failing to pay FCFE



⌛ 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

Compare to

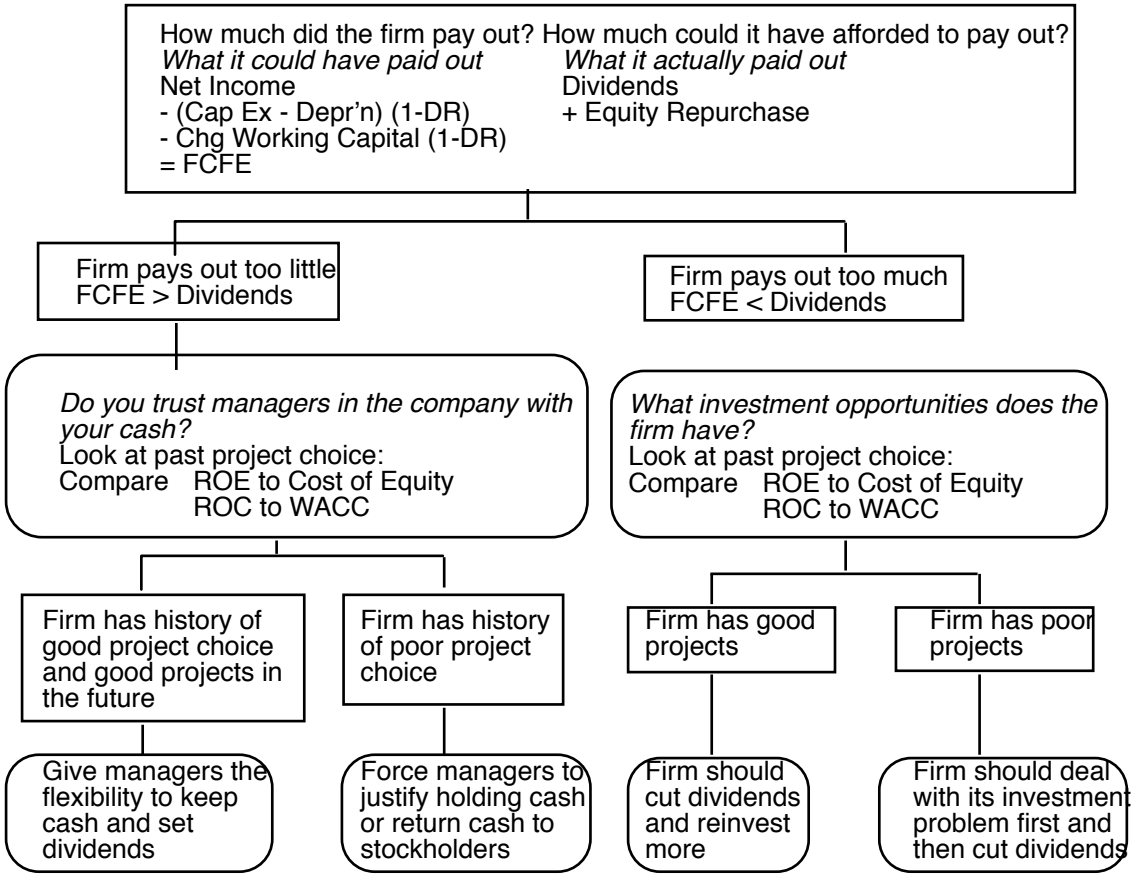
Dividends (Common)
+ Stock Buybacks

If cash flow statement used

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

-Common Dividend
- Decrease in Capital Stock
+ Increase in Capital Stock

A Practical Framework for Analyzing Dividend Policy



A Dividend Matrix

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

Case 1: Disney in 2003

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

Can you trust Disney's management?

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

Following up: Disney in 2009

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

a) Yes

b) No

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

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

Aracruz: Its your call..

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

Aracruz: Ready to reassess?

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

a) Yes

b) No

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

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

BP: Just Desserts!

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

By MATTHEW L. WALD

British Petroleum said yesterday that it would cut its dividend by 55 percent, take a pretax restructuring charge of $1.82 billion for the second quarter and lay off 11,500 employees, or 10 percent of its worldwide work force. The moves came five weeks after Robert B. Horton, B.P.'s chairman, resigned under pressure from the company's outside directors.

Analysts anticipated a dividend cut by the oil company, the world's third largest, but the one announced was at the low end of their expectations. In response, shares of the company's American depository rights, each of which represents 12 shares of the London-based company, dropped $3.625, or 7.36 percent, to $45.375. It was the most active issue on the New York Stock Exchange, with 5.89 million shares traded.

The Royal Dutch/Shell group also reported a disappointing quarter yesterday, with earnings on a replacement cost basis — excluding gains or losses on inventory holdings — of $868 million, down 22 percent.

Quick Recovery Seems Unlikely

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

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

The crude oil market, he predicted, would remain balanced unless Iraqi oil was allowed to re-enter the market. The company said it was well positioned to take advantage of any increase in oil prices, but the company's oil production in the United States is declining. B.P. is the largest producer in Alaska.

The giant British oil company bet on rising oil prices.

The market for petrochemicals in Europe remains weak.

B.P.'s second quarter profits, before one-time transactions, declined to $193 million from $515 million, valuing inventories on a replacement-cost basis. James J. Murchie, an analyst at Stanford C. Bernstein, estimated that after exceptional items, earnings per share fell to 30 cents in the second quarter, compared with 62 cents a year earlier.

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

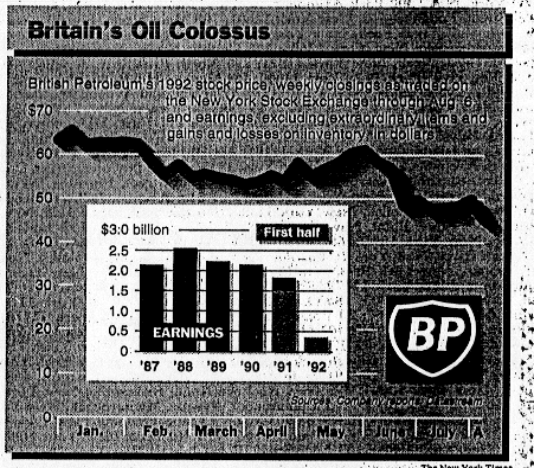
Mr. Murchie, who worked for Standard Oil of Ohio and then B.P. after B.P. acquired Sohio, said, "What you've got is a company that thought oil prices were going to go to $25 and spent like it, in terms of capital." If B.P.'s costs of finding oil are the same as the industry average, he said, then the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

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

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

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

Continued on Page D2



Managing changes in dividend policy

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

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

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

Growth Firms and Dividends

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

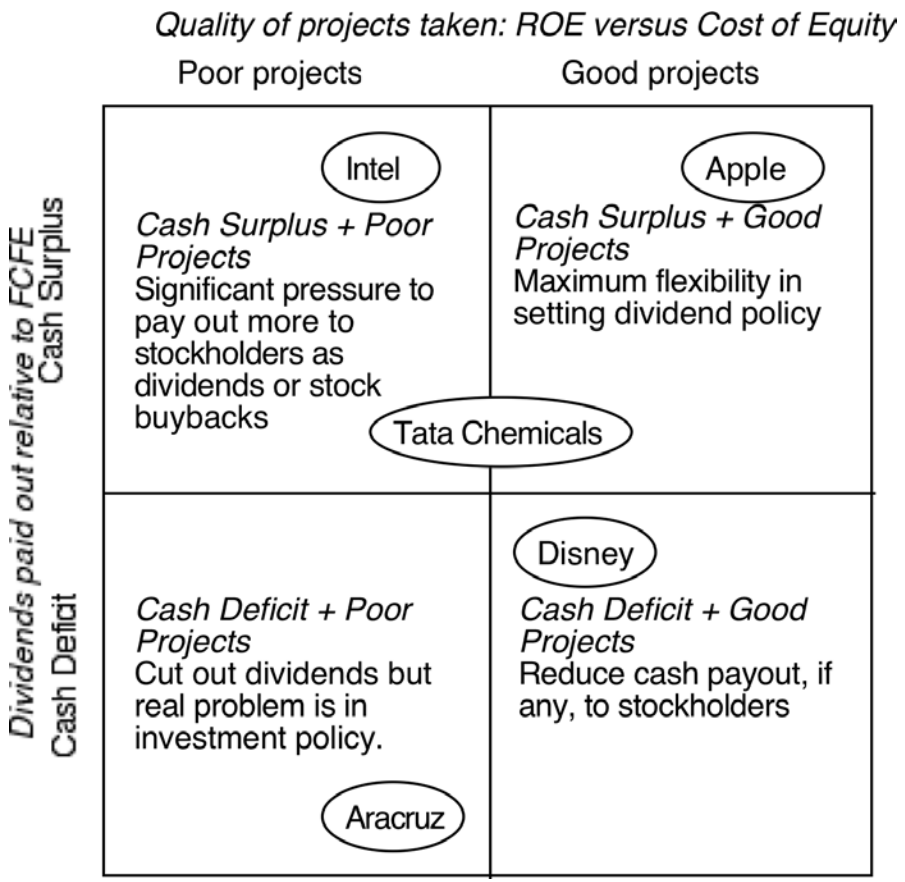
  Why?

5. Tata Chemicals: The Cross Holding Effect: 2009

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

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

Summing up…


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

Application Test: Assessing your firm's dividend policy

- Compare your firm's dividends to its FCFE, looking at the last 5 years of information.

- Based upon your earlier analysis of your firm's project choices, would you encourage the firm to return more cash or less cash to its owners?

- If you would encourage it to return more cash, what form should it take (dividends versus stock buybacks)?

II. The Peer Group Approach - Disney

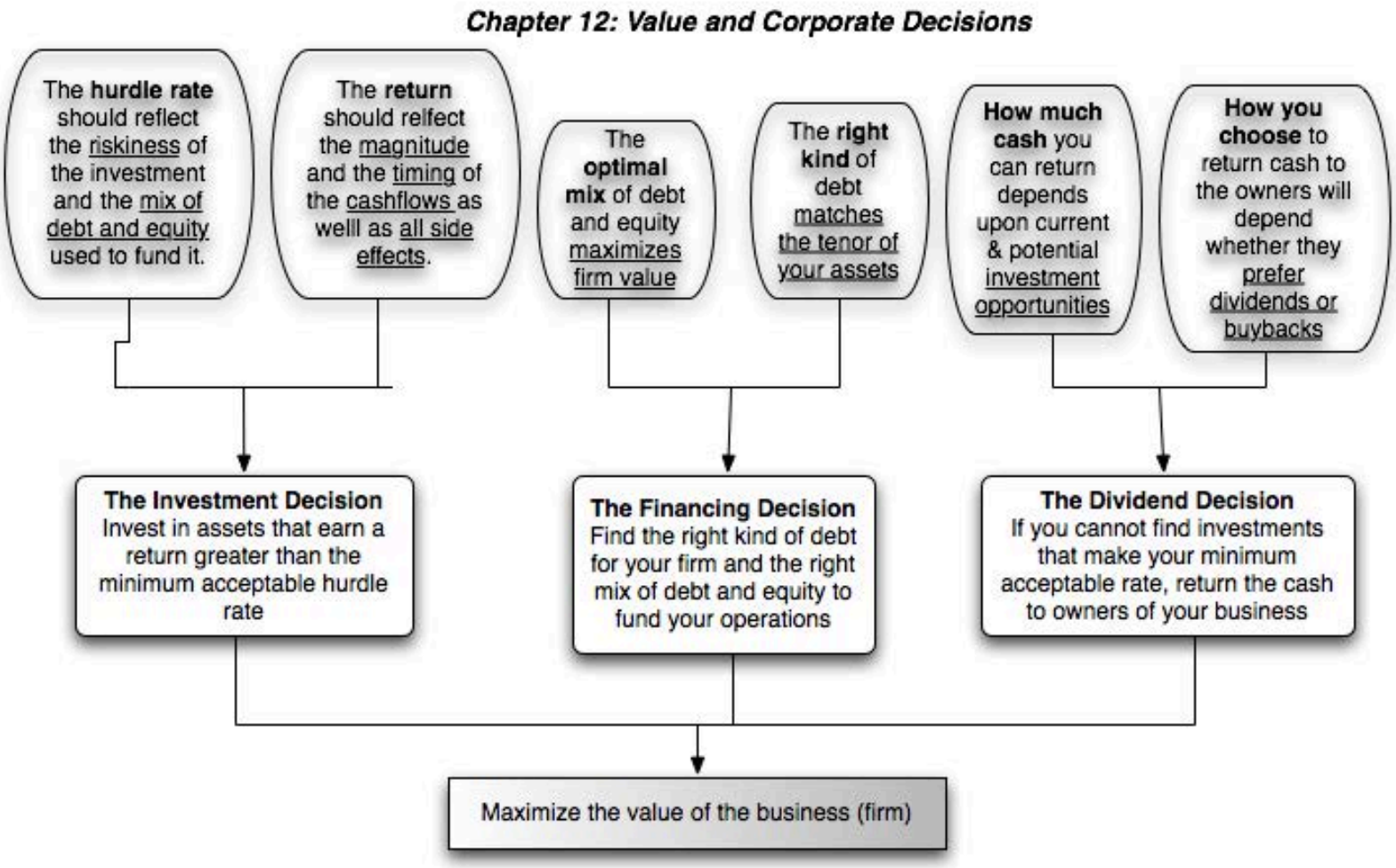
Company Name	*Market Cap*	*Payout Ratio*	*Dividend Yield*
Astral Media Inc. 'A'	$1,221.70	0.00%	0.00%
CBS Corp. 'B'	$5,103.70	53.52%	14.22%
Central European Media Enterps	$827.70	0.00%	0.00%
Corus Entertainment Inc	$806.50	0.00%	0.00%
CTC Media Inc	$715.10	0.00%	0.00%
Discovery Communications Inc	$3,860.60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

Valuation

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

Oscar Wilde

First Principles



Three approaches to valuation

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

Discounted Cashflow Valuation: Basis for Approach

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

where,

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

Equity Valuation

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

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

where,

CF to Equityt = Expected Cashflow to Equity in period t

ke = Cost of Equity

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

Firm Valuation

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

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

where,

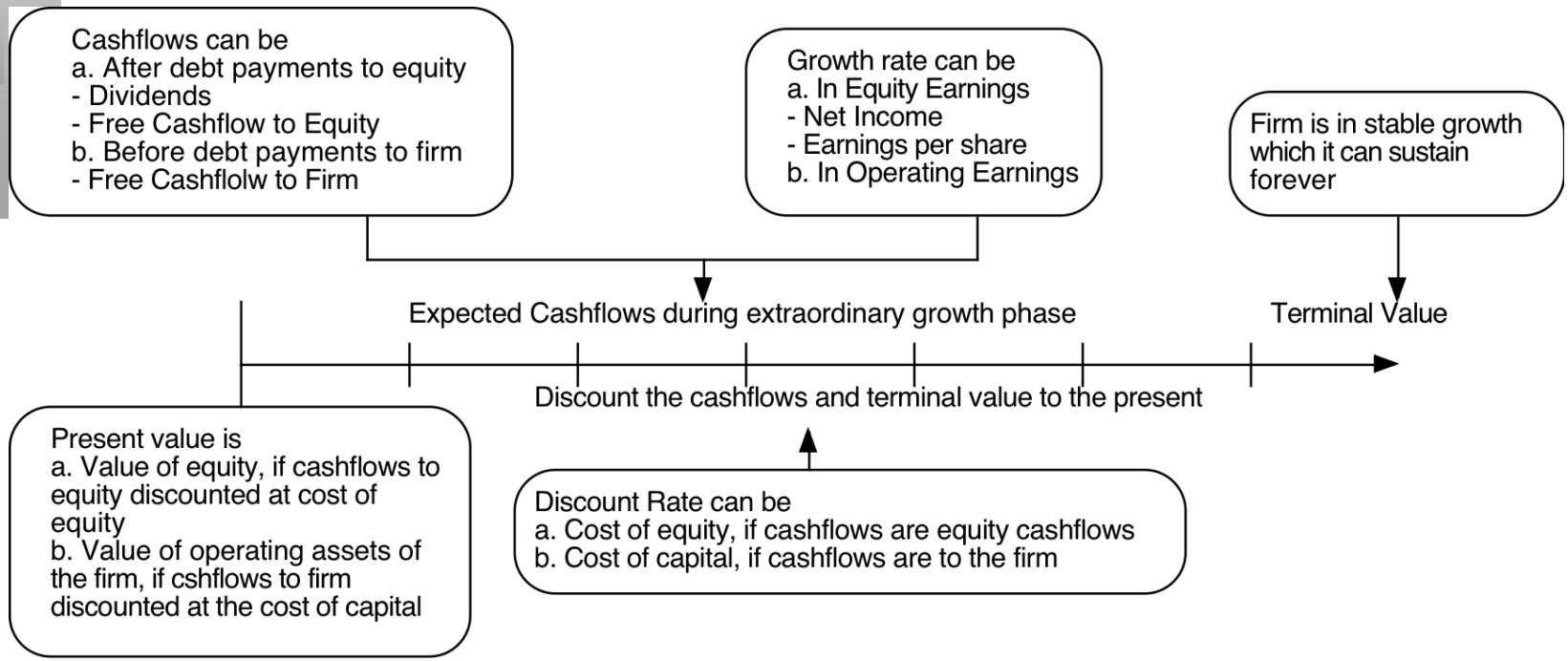
CF to Firmt = Expected Cashflow to Firm in period t

WACC = Weighted Average Cost of Capital

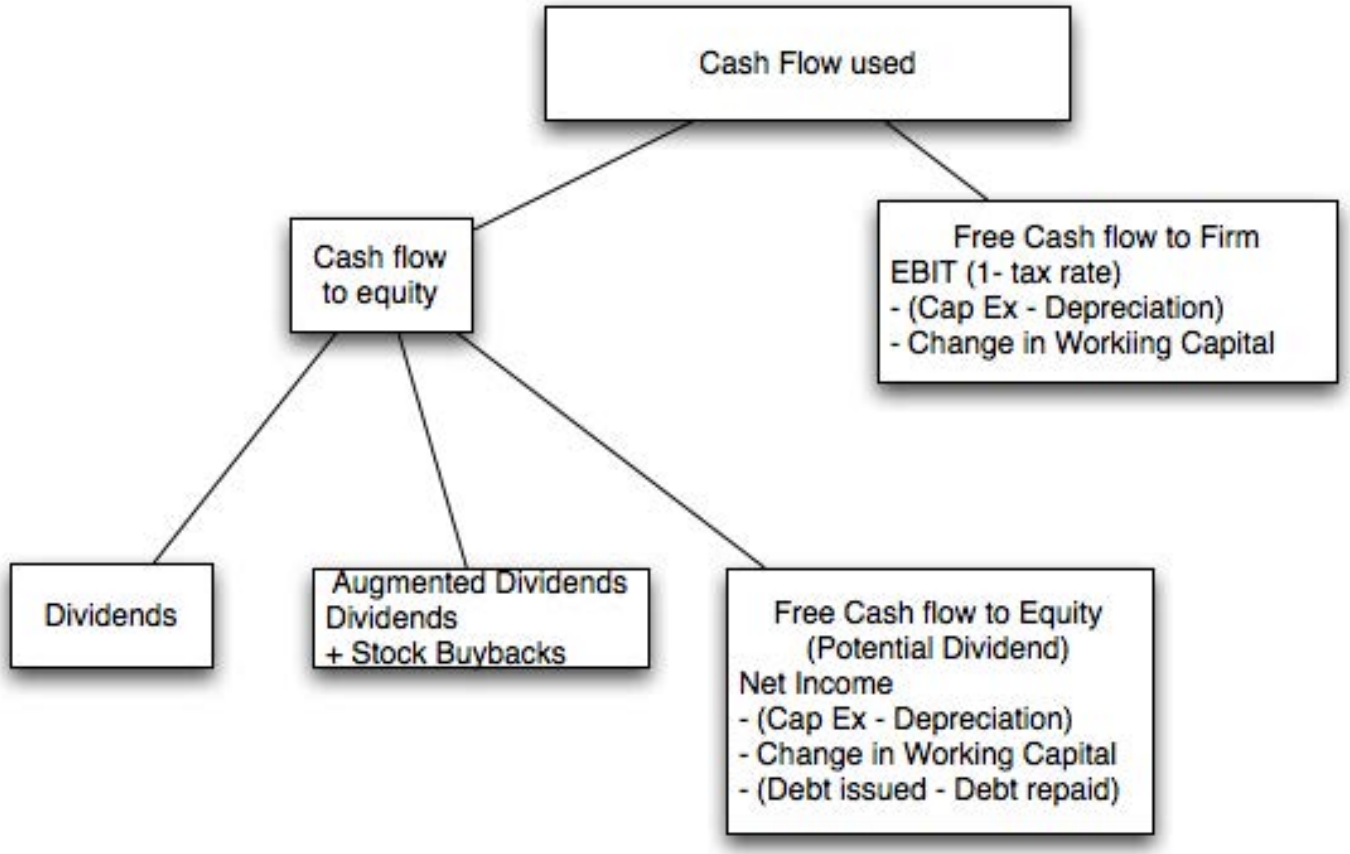
Choosing a Cash Flow to Discount

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

The Ingredients that determine value.



I. Estimating Cash Flows



Estimating FCFE : Tata Chemicals

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

Estimating FCFF: Disney

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

II. Discount Rates

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

Cost of Equity: Tata Chemicals

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

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

Current Cost of Capital: Disney

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

  Cost of Equity = 3.5% + 0.9011(6%) = 8.91%

- Disney's bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 6%. Using a marginal tax rate of 38%, the after-tax cost of debt for Disney is 3.72%.

  After-Tax Cost of Debt = 6.00% (1 – 0.38) = 3.72%

- The cost of capital was calculated using these costs and the weights based on market values of equity (45,193) and debt (16,682):

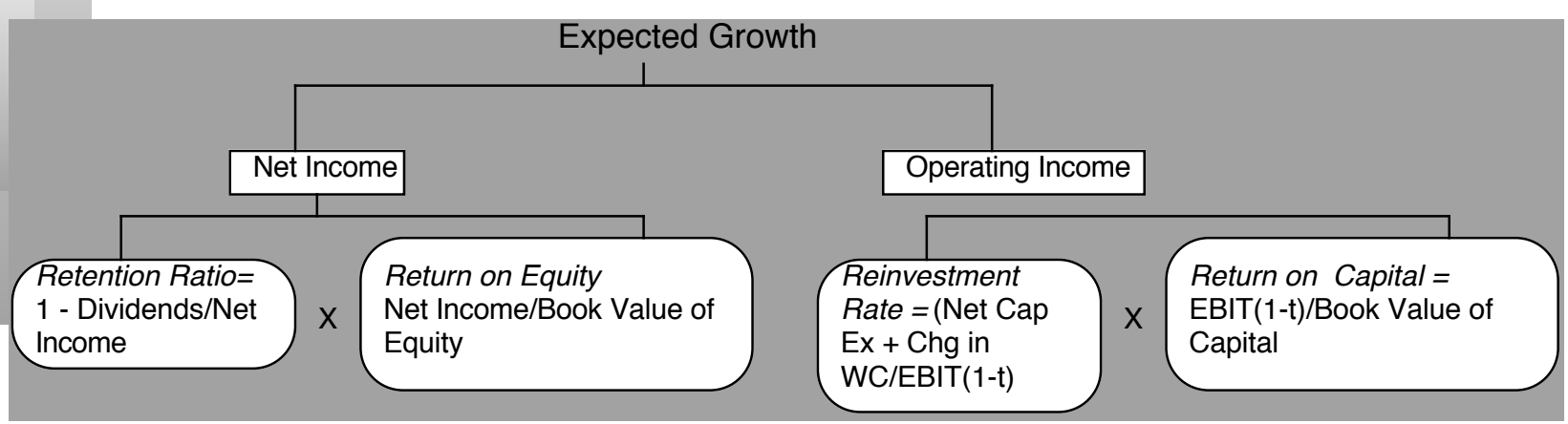
- Cost of capital =

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

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

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

III. Expected Growth



Estimating growth in Net Income: Tata Chemicals

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

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

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

Normalized [illegible]

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

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

Estimating Growth in EBIT: Disney

- We begin by estimating the reinvestment rate and return on capital for Disney in 2008 using the numbers from the latest financial statements. We converted operating leases into debt and adjusted the operating income and capital expenditure accordingly.

  $$\text{Reinvestment Rate}_{2008} = \frac{(2{,}752 - 1{,}839 + 241)}{7{,}030\,(1 - .38)} = 26.48\%$$

- We include $516 million in acquisitions made during 2008 in capital expenditures, but this is a volatile item. Disney does not make large acquisitions every year, but it does so infrequently - $ 7.5 billion to buy Pixar in 2006 and $ 11.5 billion to buy Capital Cities in 1996. Averaging out acquisitions from 1994-2008, we estimate an average annual value of $1,761 million for acquisitions over this period:

  $$\text{Reinvestment Rate}_{\text{Normalized}} = \frac{(3{,}939 - 1{,}839 + 241)}{7{,}030\,(1 - .38)} = 53.72\%$$

- We compute the return on capital, using operating income in 2008 and capital invested at the start of 2008 (end of 2007):

  $$\text{Return on Capital}_{2008} = \frac{\text{EBIT}\,(1 - t)}{(\text{BV of Equity} + \text{BV of Debt} - \text{Cash})} = \frac{7{,}030\,(1 - .38)}{(30{,}753 + 16{,}892 - 3{,}670)} = 9.91\%$$

- If Disney maintains its 2008 reinvestment rate and return on capital for the next few years, its growth rate will be only 2.35 percent.

  Expected Growth Rate from Existing Fundamentals = 53.72% * 9.91% = 5.32%

IV. Getting Closure in Valuation

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

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

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

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

  where,

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

  g = Expected growth rate forever.

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

Getting to stable growth…

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

Estimating Stable Period Inputs: Disney

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

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

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

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

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

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

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

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

V. From firm value to equity value per share

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

Valuing Tata Chemicals in early 2009: The high growth period

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

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

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

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

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

Stable growth and value….

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

  Cost of Equity in Stable Growth = 4% + 1(7.5%) = 11.5%

- We will assume that the growth in net income will drop to 4% and that the return on equity will rise to 11.5% (which is also the cost of equity).

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

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

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

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

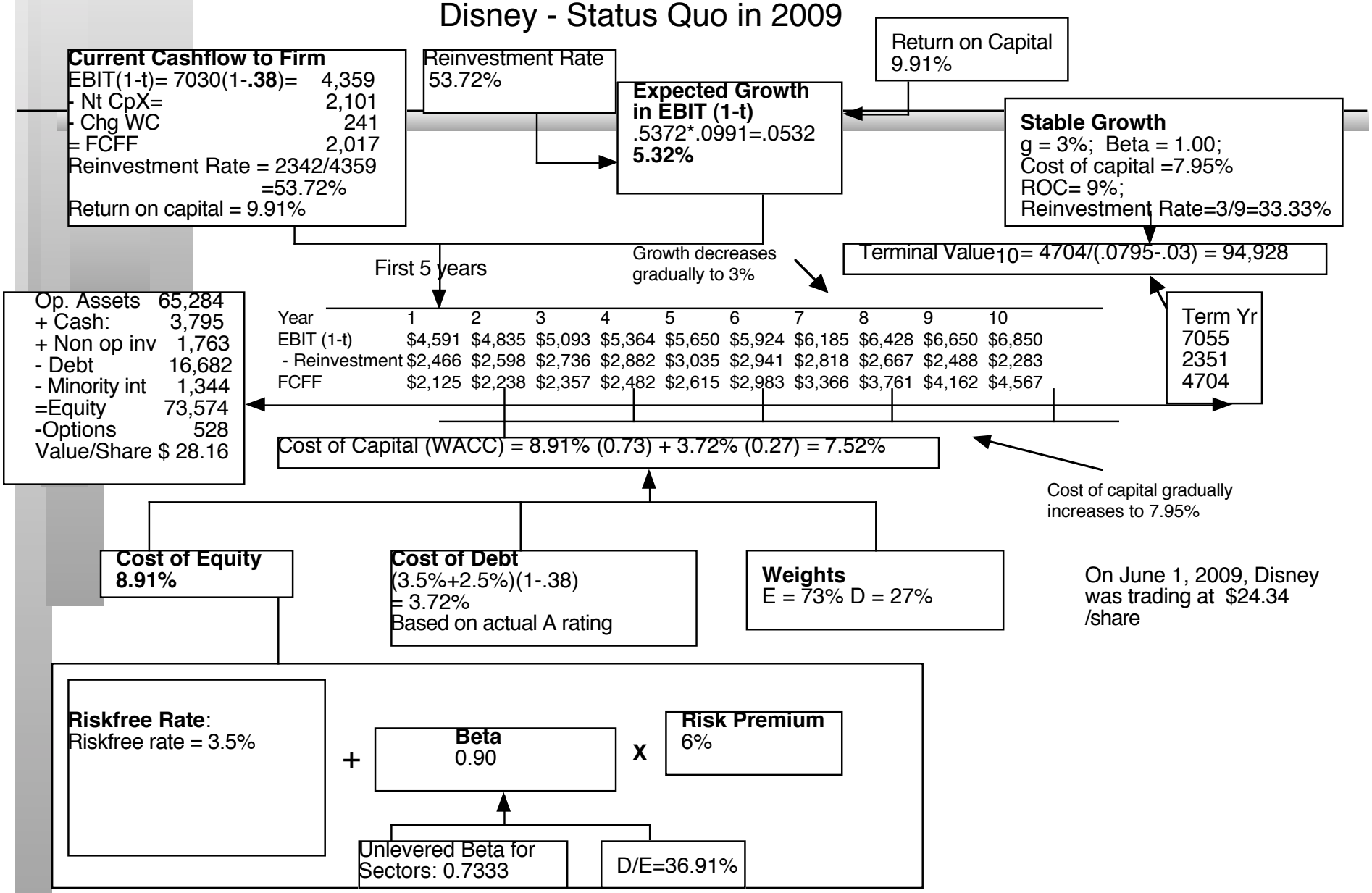
  = 10,433 + 94,497/1.1393^5 +1,759 = Rs 61,423 million

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

Disney: Inputs to Valuation

	High Growth Phase	*Transition Phase*	*Stable Growth Phase*
Length of Period	5 years	5 years	Forever after 10 years
Tax Rate	38%	38%	38%
Return on Capital	9.91%	Declines linearly to 9%	Stable ROC of 9%
Reinvestment Rate (Net Cap Ex + Working Capital Investments/EBIT)	53.72% (based on normalized acquisition costs)	Declines to 33.33% as ROC and growth rates drop: Reinvestment Rate = g/ROC	33.33% of after-tax operating income, estimated from stable growth rate of 3% and return on capital of 9%. Reinvestment rate = 3/9=33.33%
Expected Growth Rate in EBIT	ROC * Reinvestment Rate = 12%*0.5318 = 6.38%	Linear decline to Stable Growth Rate of 4%	3%
Debt/Capital Ratio	26.7%	Stays unchanged	Stays unchanged
Risk Parameters	Beta = 0.9033, k_e = 8.91%% Pre-tax Cost of Debt = 6% Cost of capital = 7.52%	Beta increases linearly to 1.00; Cost of debt stays at 6% Cost of capital goes to 7.95%	Beta = 1.00; k_e = 9.5% Cost of debt stays at 6% Cost of capital = 7.95%

Disney - Status Quo in 2009



Investment decision affects risk of assets being finance and financing decision affects hur

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 = 9.91%

New Investments

Return on Capital 9.91%

Reinvestment Rate 53.72%

Financing Mix D=27%; E= 73%

Financing Choices Fxed rate US $ debt with duration of years

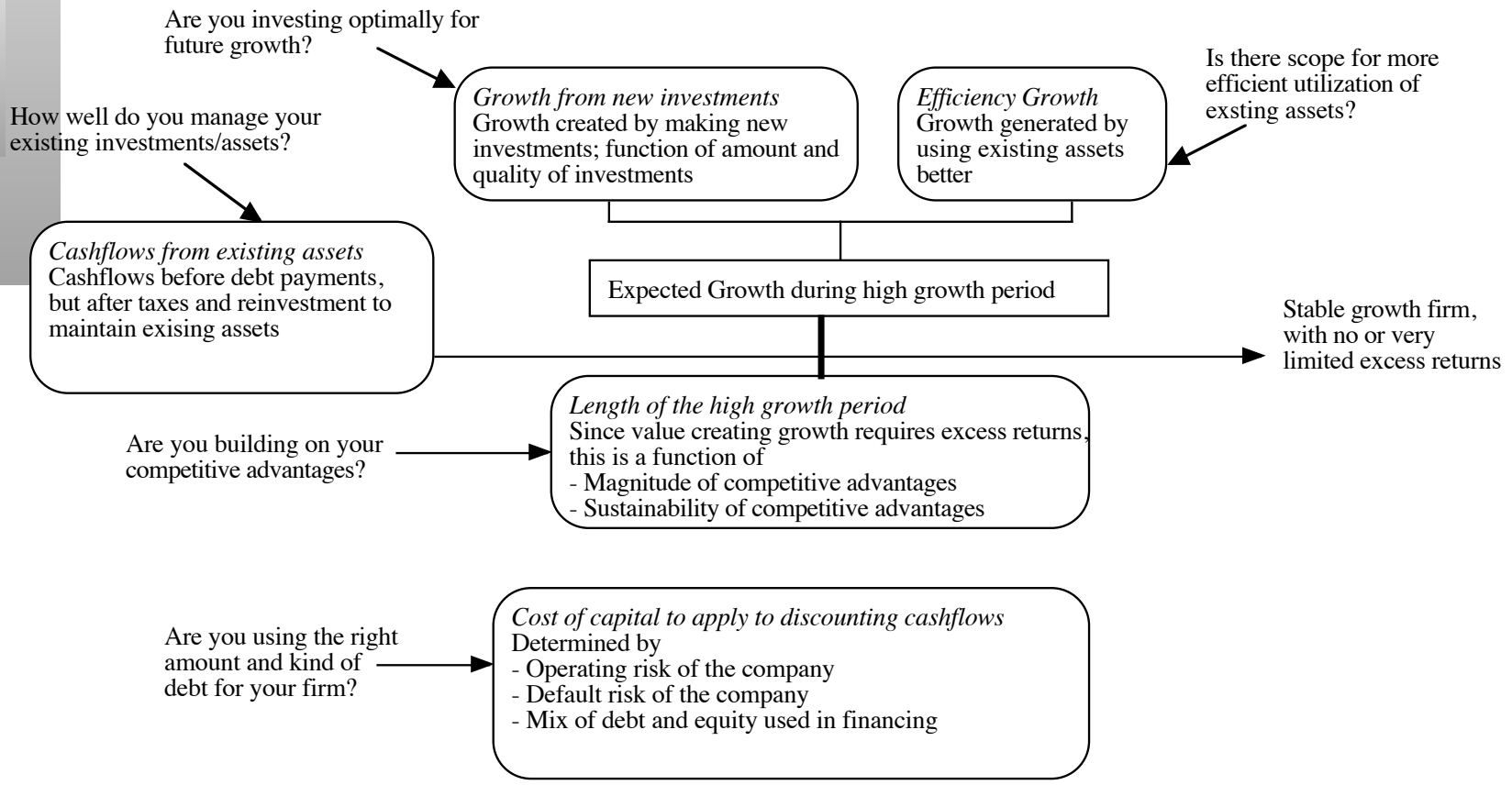
Current EBIT (1-t) $ 4,359

Expected Growth Rate = 9.91% * 53.72% = 5.32%

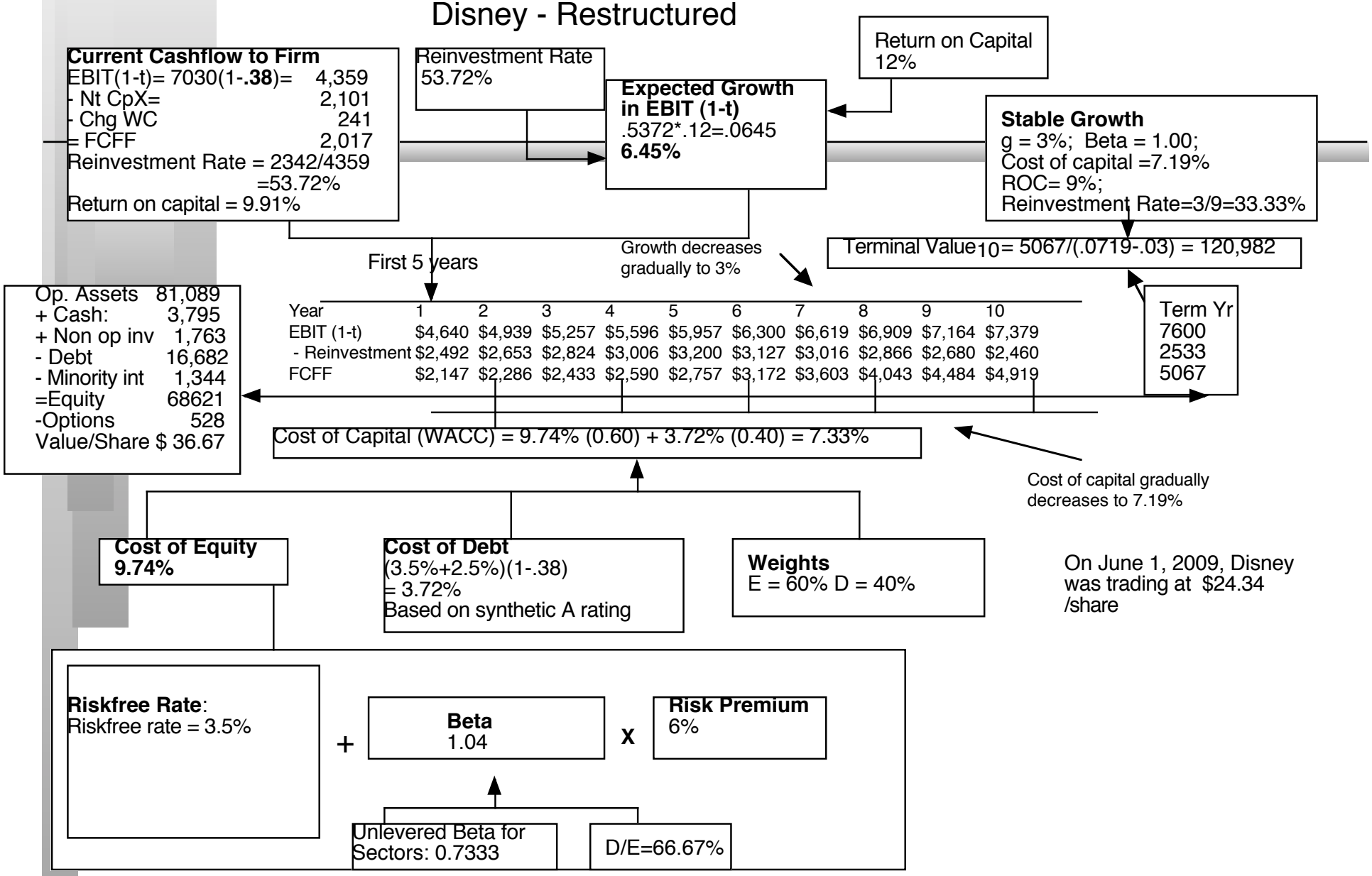
Cost of capital = 8.91% (.73) + 3.72% (.27) = 7.52%

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

Ways of changing value…



Disney - Restructured



First Principles

