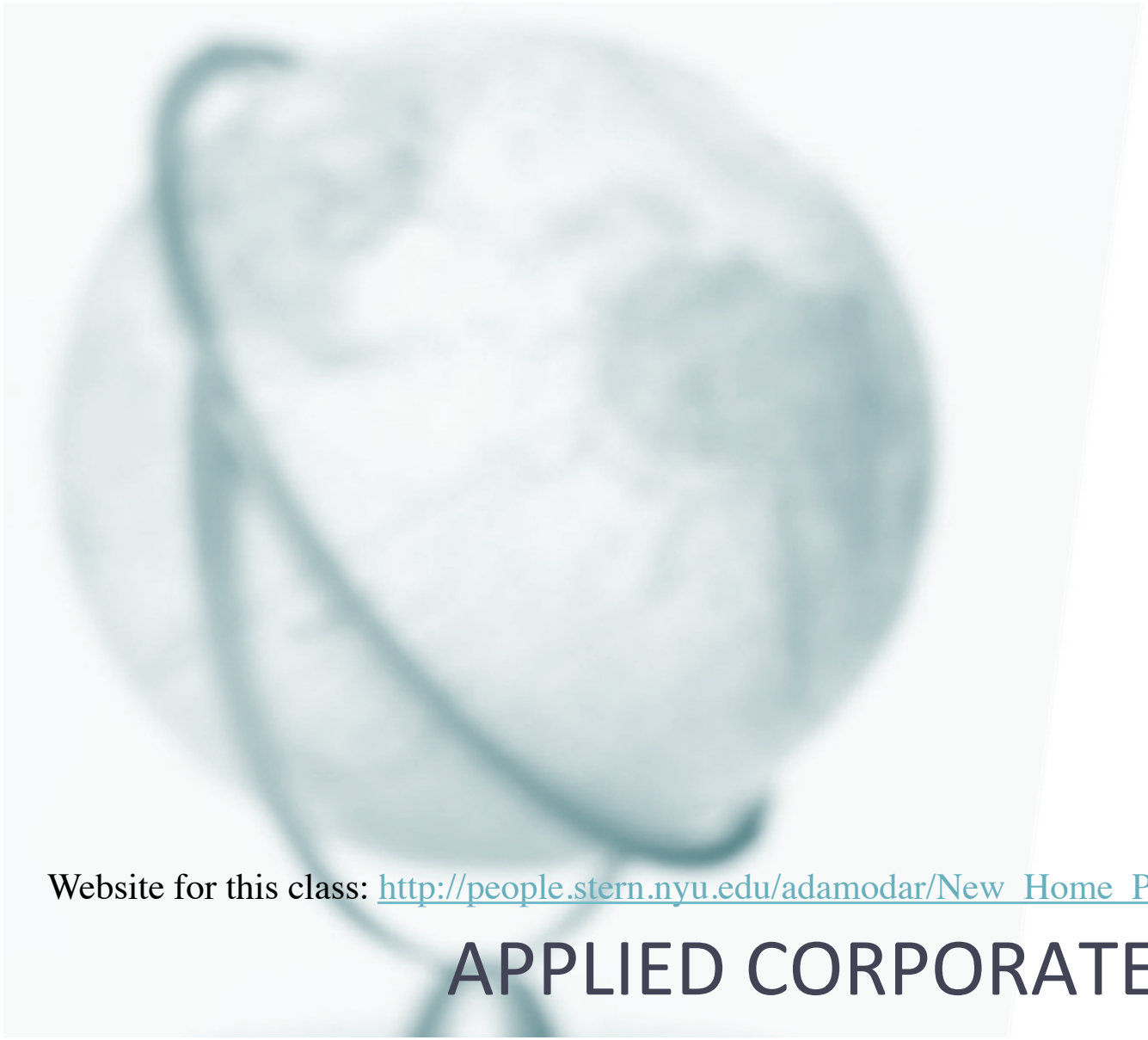
Aswath Damodaran



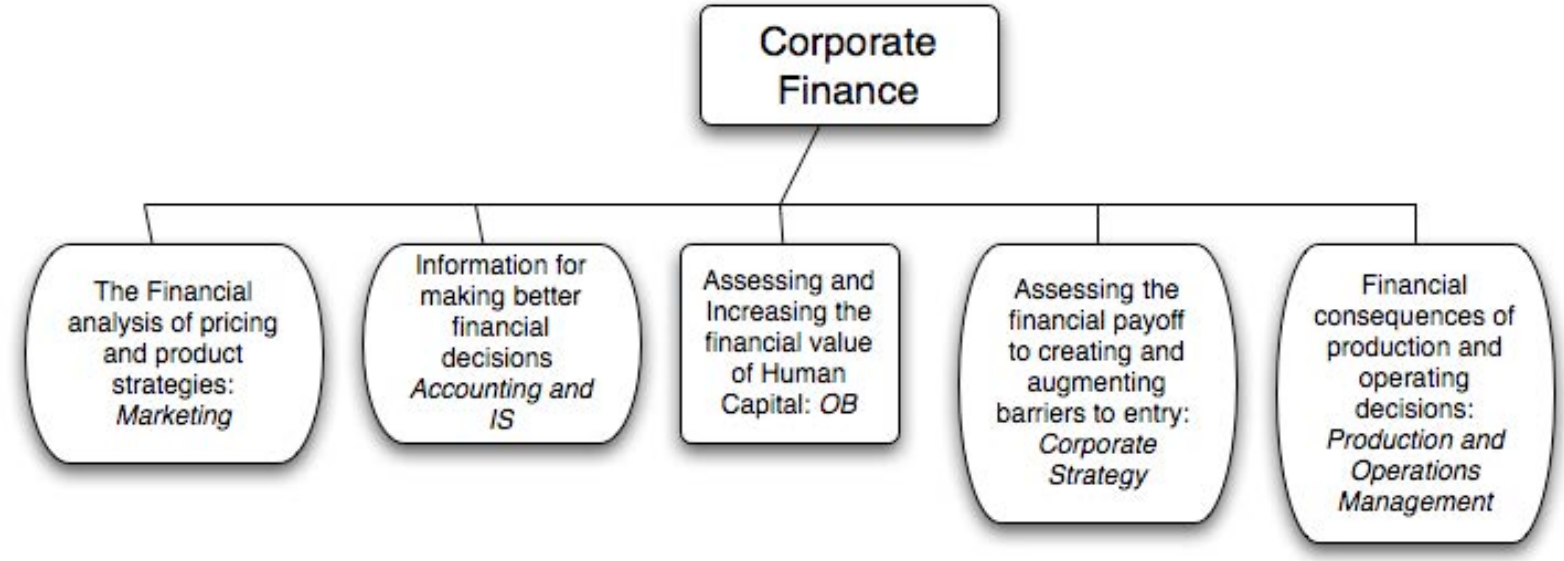
Website for this class: http://people.stern.nyu.edu/adamodar/New_Home_Page/triumdesc.html

APPLIED CORPORATE FINANCE

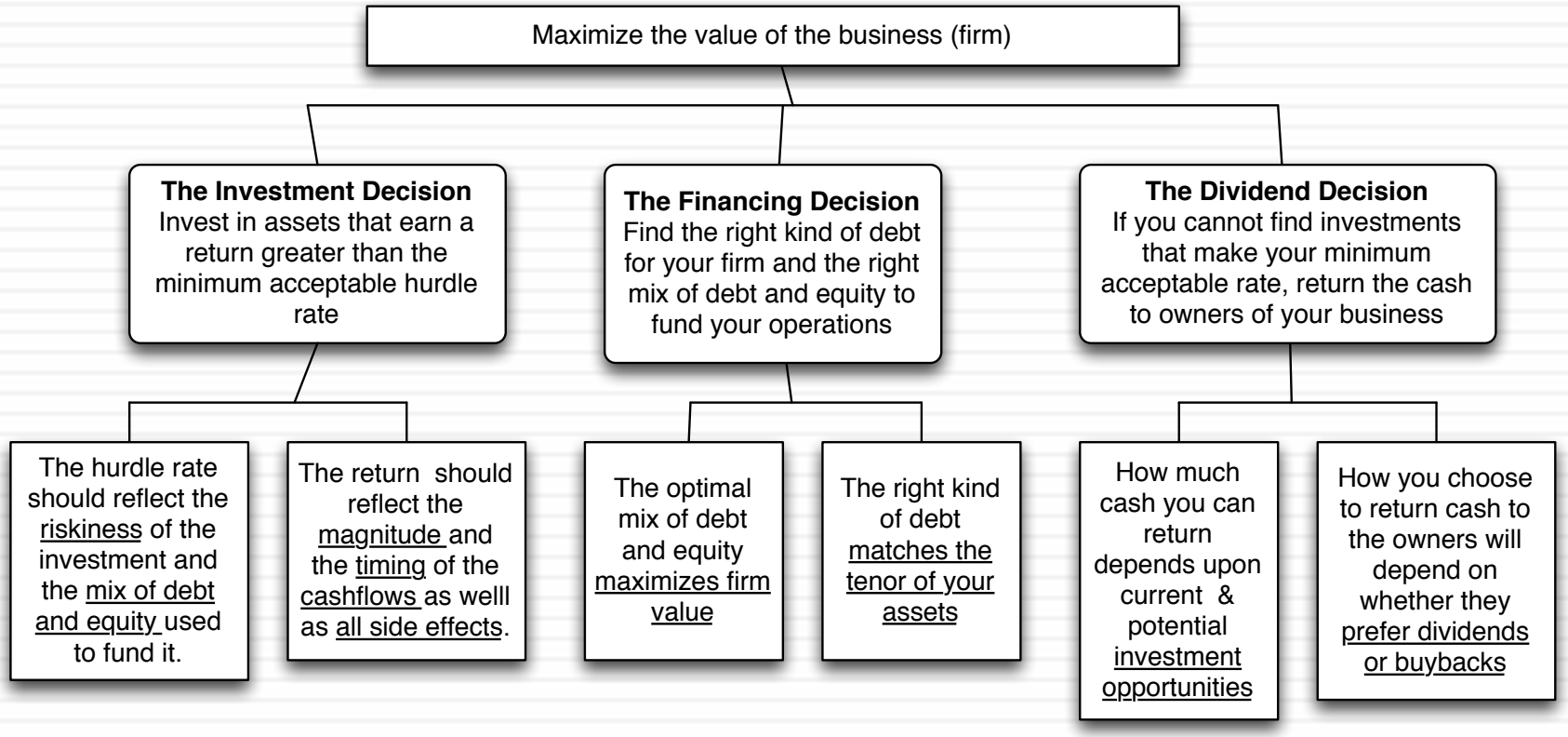
Aswath Damodaran
www.damodaran.com

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 Big Picture



Applied? Here is my try

Disney
Sector: Entertainment
Incorporated in: US
Operations: Multinational
Size: Large market cap

Bookscape
Sector: Book Retail
Incorporated in: US
Operations: New York
Other: Privately owned

Vale
Sector: Mining/Metals
Incorporated in: Brazil
Operations: Multinational
Size: Large market cap
Other: Government stake

Applied Corporate Finance

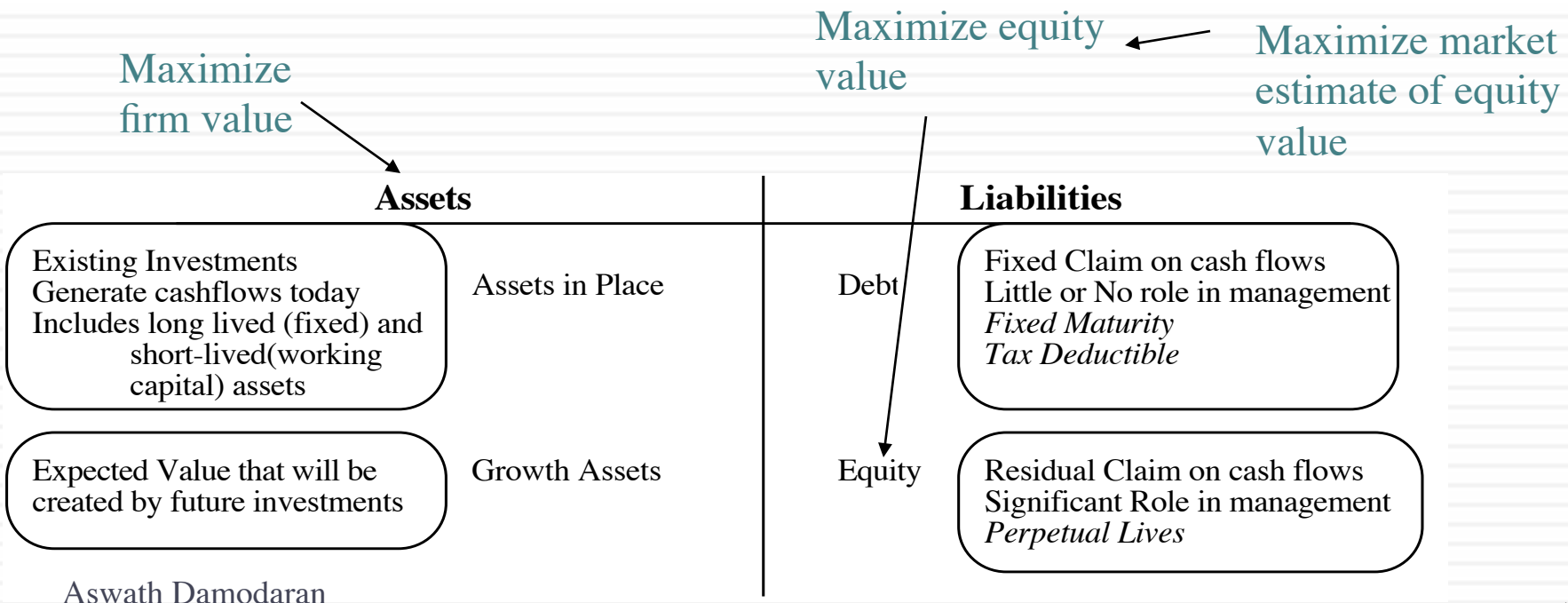
Deutsche Bank
Sector: Bank/ Investment Bank
Incorporated in: Germany
Operations: Multinational
Size: Large market cap
Other: Regulated

Tata Motors
Sector: Automotive
Incorporated in: India
Operations: Multinational
Size: Mid market cap
Other: Family Group

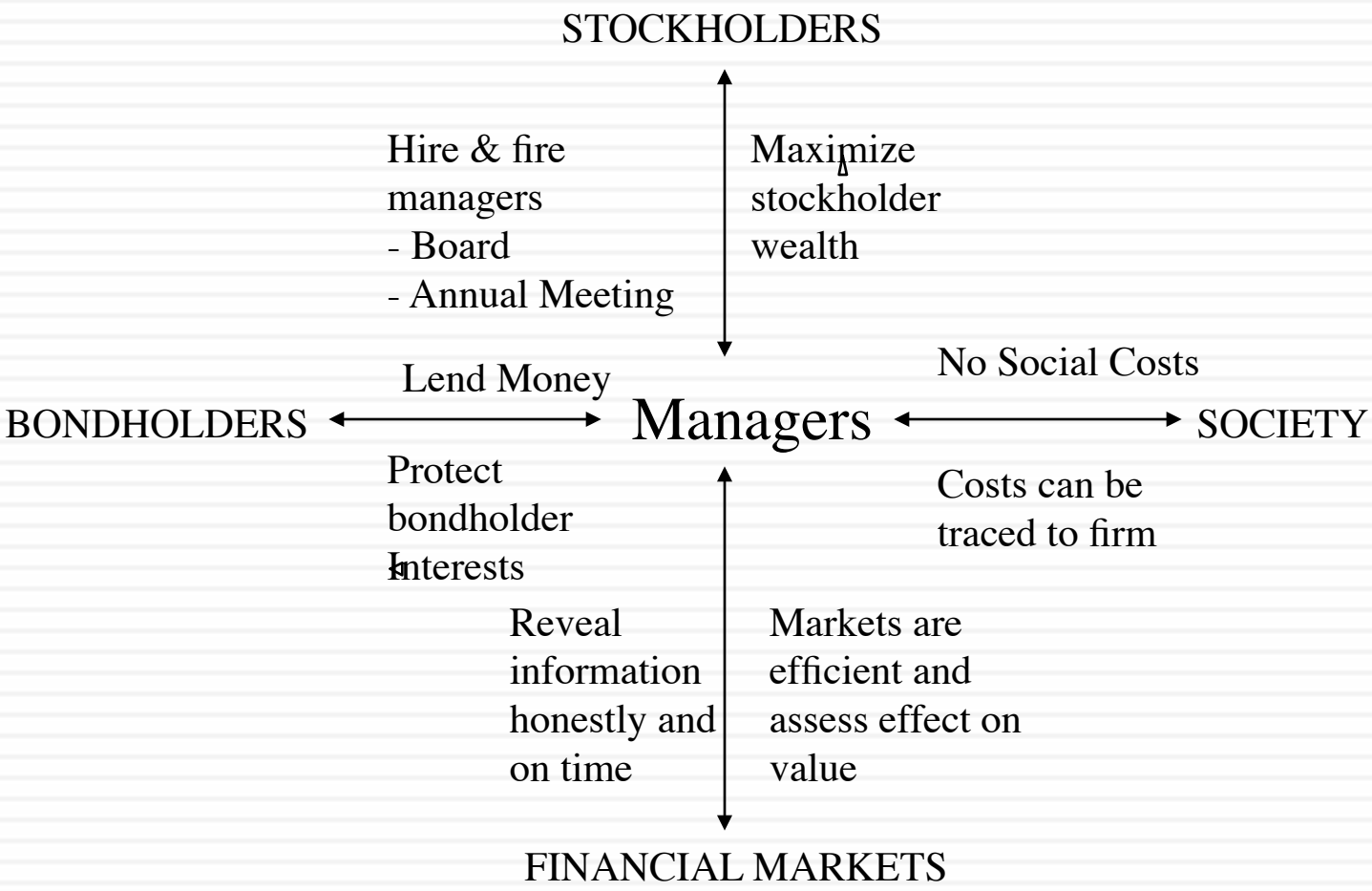
Baidu
Sector: Online Search
Incorporated in: Cayman Isl
Operations: China
Size: Mid market cap
Other: Shell company (VIE)

The Objective in Decision Making

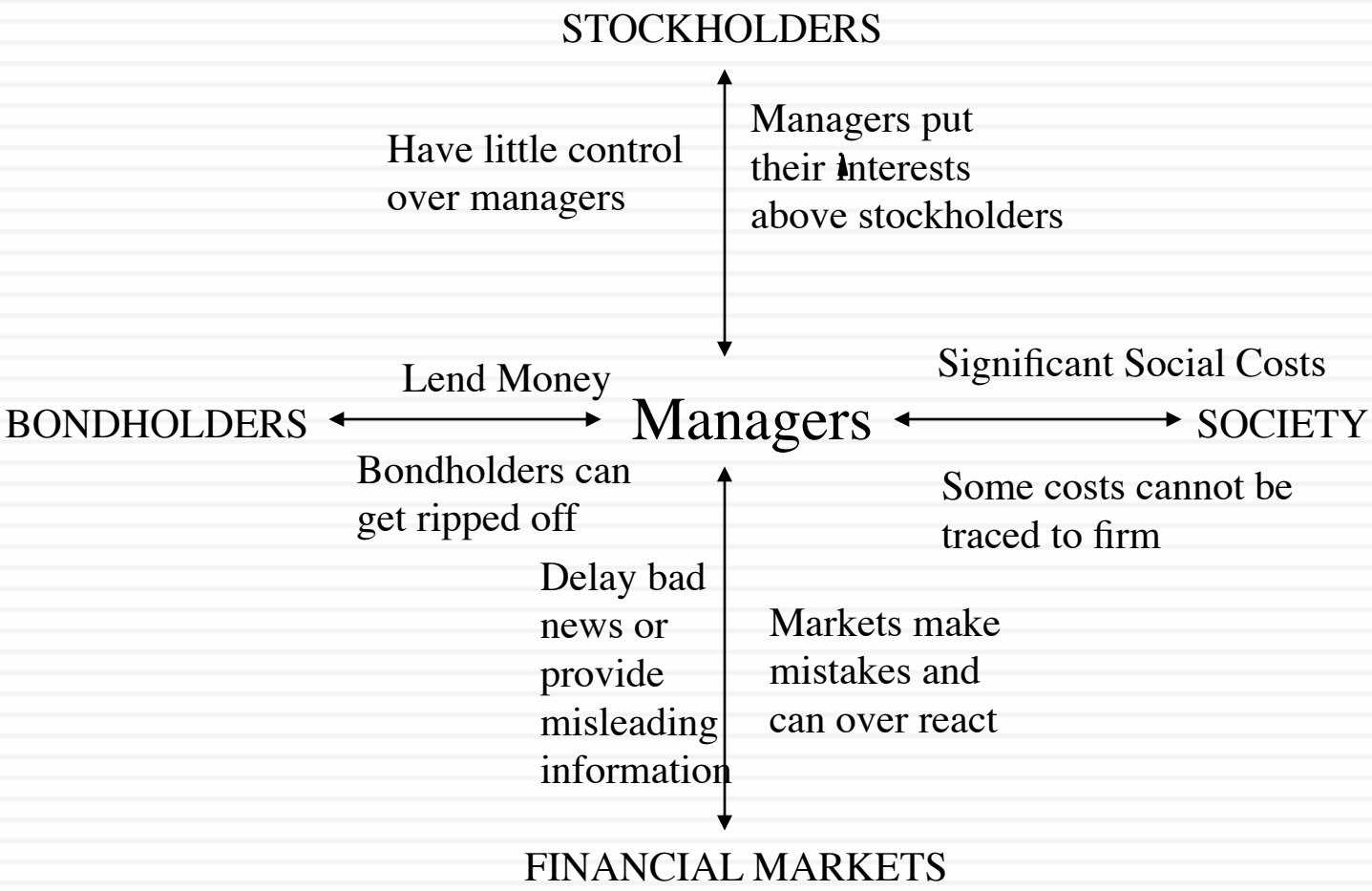
- In traditional corporate finance, the objective in decision making is to maximize the value of the firm.
- A narrower objective is to maximize stockholder wealth. When the stock is traded and markets are viewed to be efficient, the objective is to maximize the stock price.



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

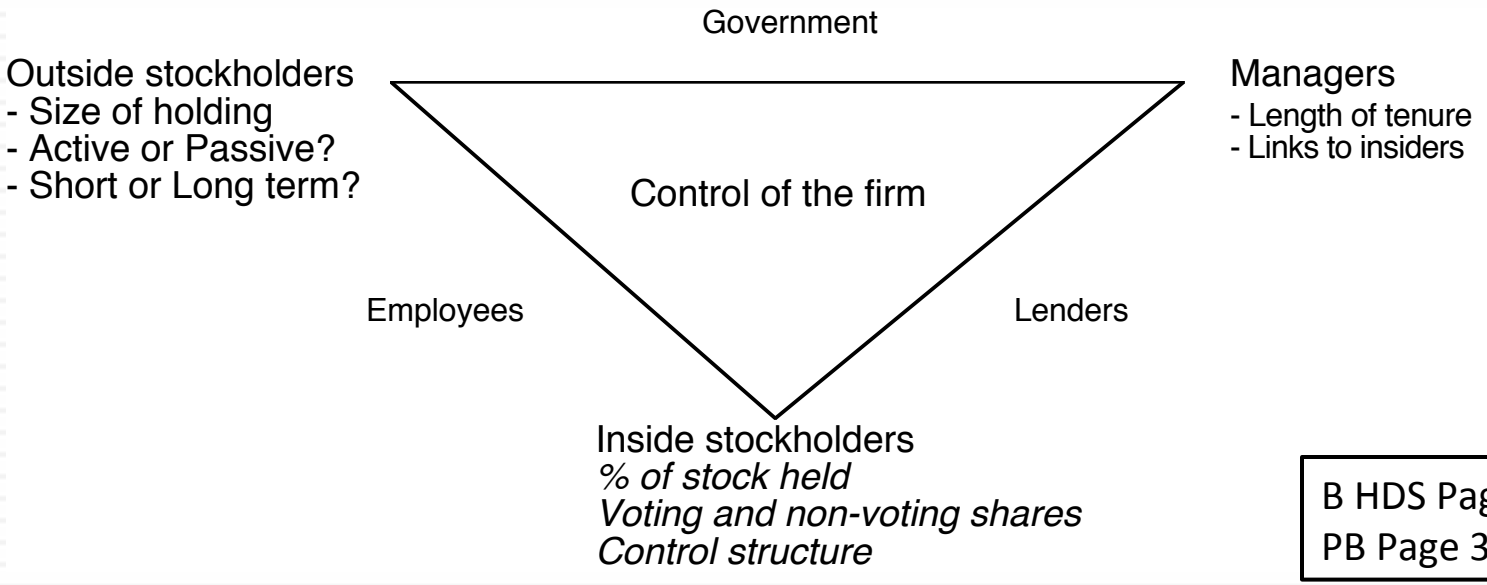
So, what next? When the cat is idle, the mice will play ....

- 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.

No stockholder approval needed.... Stockholder Approval needed

⌛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?



B HDS Page
PB Page 3-12

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

0011896502Z4-000 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
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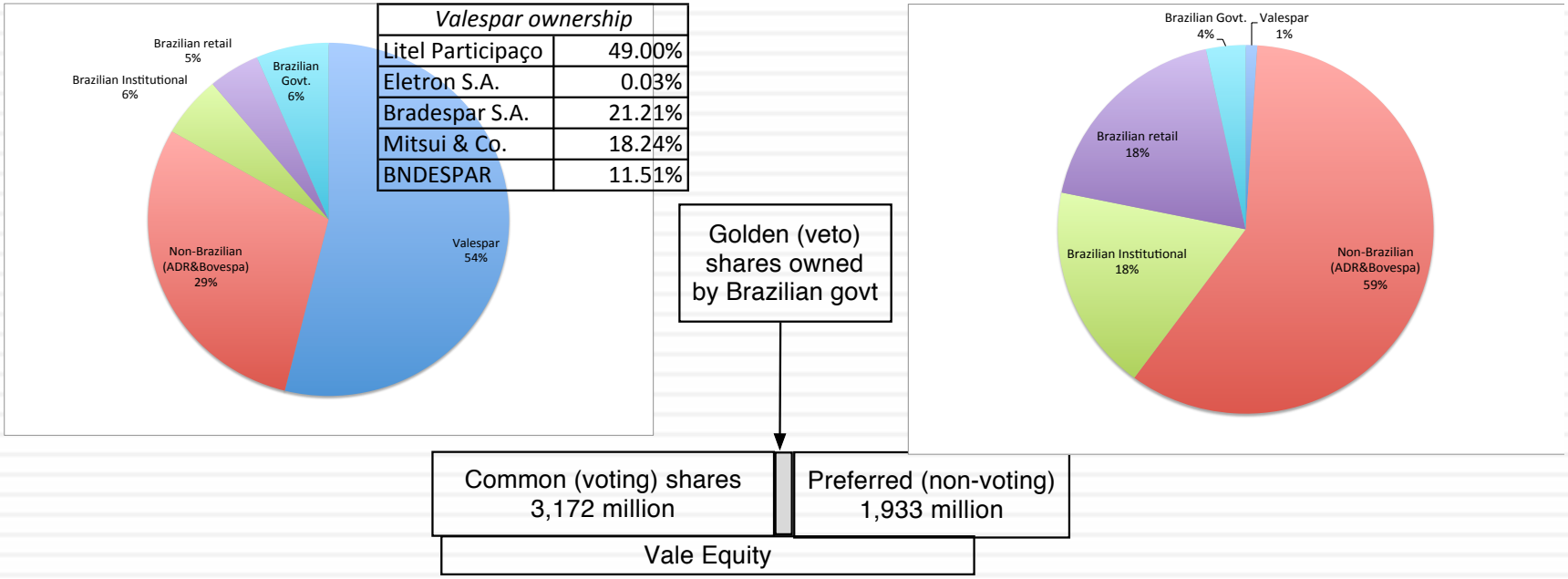
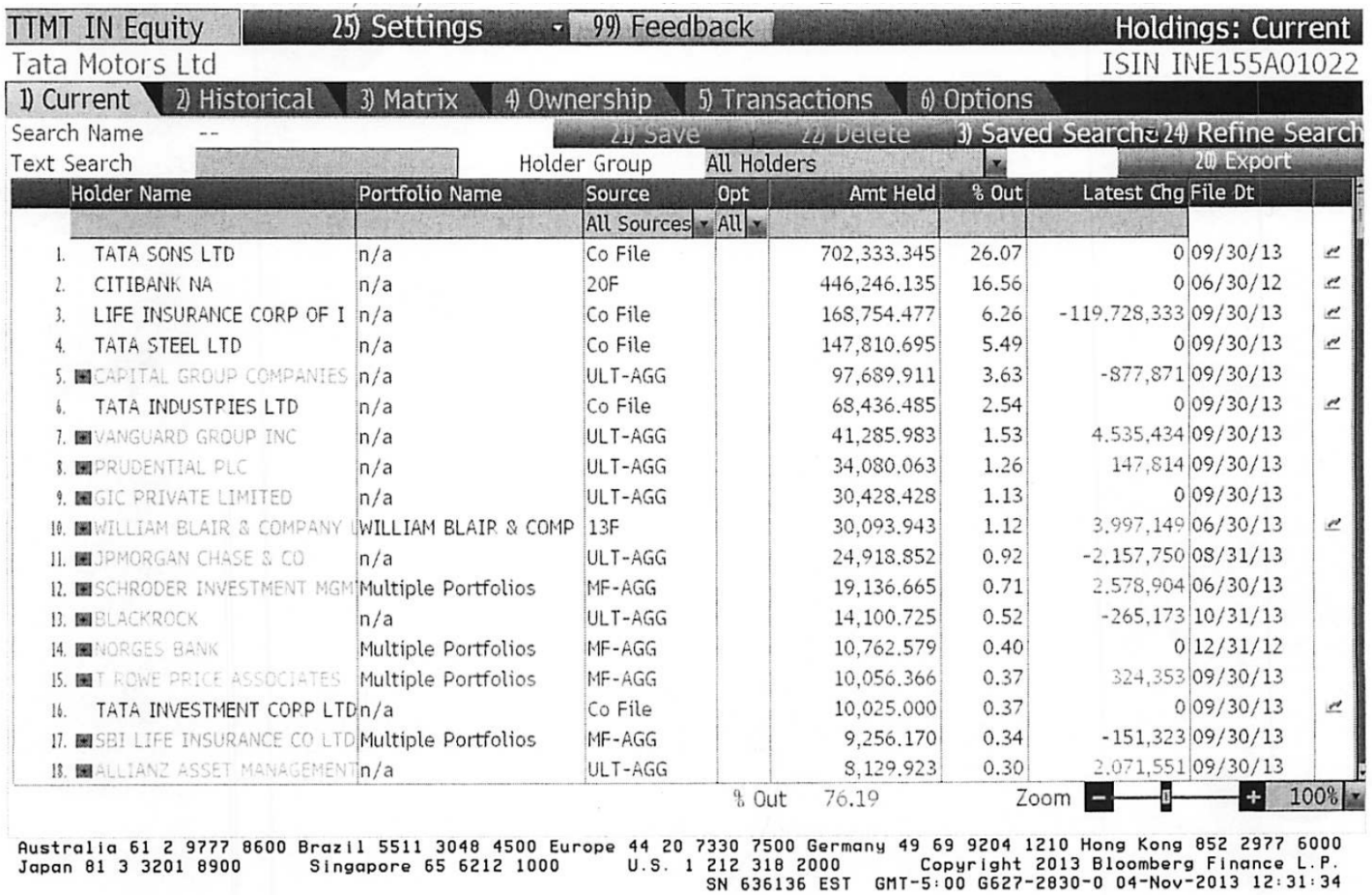
Case 2: Voting versus Non-voting Shares & Golden Shares: Vale



Vale has eleven members on its board of directors, ten of whom were nominated by Valepar and the board was chaired by Don Conrado, the CEO of Valepar.

Case 3: Cross and Pyramid Holdings
Tata Motor's top stockholders in 2013



TTMT IN Equity | 25) Settings | 99) Feedback | Holdings: Current

Tata Motors Ltd — ISIN INE155A01022

1) Current | 2) Historical | 3) Matrix | 4) Ownership | 5) Transactions | 6) Options

Search Name -- | 21) Save | 22) Delete | 23) Saved Searches | 24) Refine Search

Text Search | Holder Group: All Holders | 20) Export

	Holder Name	Portfolio Name	Source	Opt	Amt Held	% Out	Latest Chg	File Dt
			All Sources	All				
1.	TATA SONS LTD	n/a	Co File		702,333,345	26.07	0	09/30/13
2.	CITIBANK NA	n/a	20F		446,246,135	16.56	0	06/30/12
3.	LIFE INSURANCE CORP OF I	n/a	Co File		168,754,477	6.26	-119,728,333	09/30/13
4.	TATA STEEL LTD	n/a	Co File		147,810,695	5.49	0	09/30/13
5.	CAPITAL GROUP COMPANIES	n/a	ULT-AGG		97,689,911	3.63	-877,871	09/30/13
6.	TATA INDUSTRIES LTD	n/a	Co File		68,436,485	2.54	0	09/30/13
7.	VANGUARD GROUP INC	n/a	ULT-AGG		41,285,983	1.53	4,535,434	09/30/13
8.	PRUDENTIAL PLC	n/a	ULT-AGG		34,080,063	1.26	147,814	09/30/13
9.	GIC PRIVATE LIMITED	n/a	ULT-AGG		30,428,428	1.13	0	09/30/13
10.	WILLIAM BLAIR & COMPANY	WILLIAM BLAIR & COMP	13F		30,093,943	1.12	3,997,149	06/30/13
11.	JPMORGAN CHASE & CO	n/a	ULT-AGG		24,918,852	0.92	-2,157,750	08/31/13
12.	SCHRODER INVESTMENT MGM	Multiple Portfolios	MF-AGG		19,136,665	0.71	2,578,904	06/30/13
13.	BLACKROCK	n/a	ULT-AGG		14,100,725	0.52	-265,173	10/31/13
14.	NORGES BANK	Multiple Portfolios	MF-AGG		10,762,579	0.40	0	12/31/12
15.	T ROWE PRICE ASSOCIATES	Multiple Portfolios	MF-AGG		10,056,366	0.37	324,353	09/30/13
16.	TATA INVESTMENT CORP LTD	n/a	Co File		10,025,000	0.37	0	09/30/13
17.	SBI LIFE INSURANCE CO LTD	Multiple Portfolios	MF-AGG		9,256,170	0.34	-151,323	09/30/13
18.	ALLIANZ ASSET MANAGEMENT	n/a	ULT-AGG		8,129,923	0.30	2,071,551	09/30/13

% Out 76.19 | Zoom 100%

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Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2013 Bloomberg Finance L.P.
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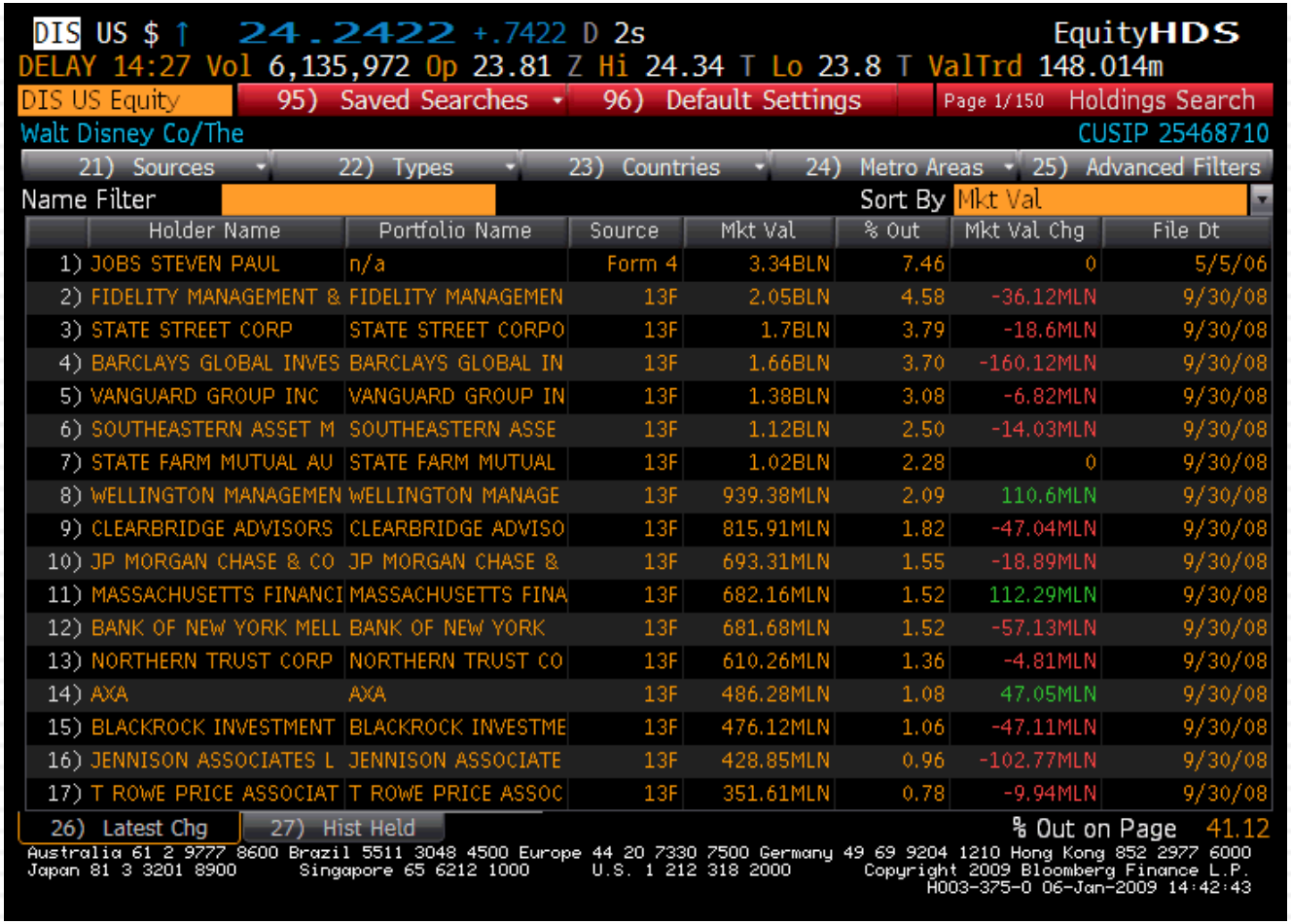
Case 4: Legal rights and Corporate Structures: Baidu

- The Board: The company has six directors, one of whom is Robin Li, who is the founder/CEO of Baidu. Mr. Li also owns a majority stake of Class B shares, which have ten times the voting rights of Class A shares, granting him effective control of the company.
- The structure: Baidu is a Chinese company, but it is incorporated in the Cayman Islands, its primary stock listing is on the NASDAQ and the listed company is structured as a shell company, to get around Chinese government restrictions of foreign investors holding shares in Chinese corporations.
- The legal system: Baidu's operating counterpart in China is structured as a Variable Interest Entity (VIE), and it is unclear how much legal power the shareholders in the shell company have to enforce changes at the VIE.

Things change.. Disney's top stockholders in 2009



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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

	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
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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

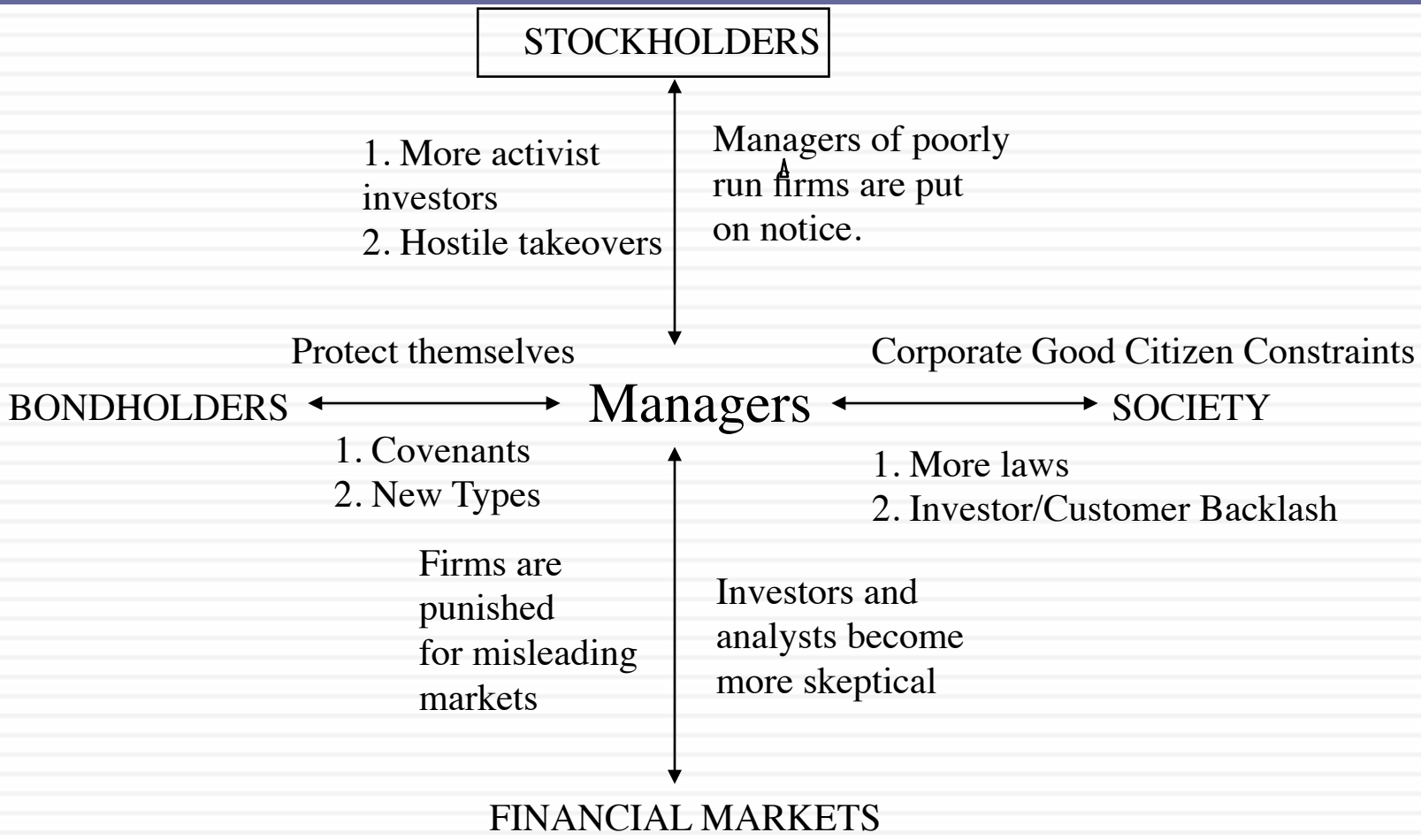
I. An Alternative Corporate Governance System

- 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



Disney: Eisner's rise & fall from grace

- In his early years at Disney, Michael Eisner brought about long-delayed changes in the company and put it on the path to being an entertainment giant that it is today. His success allowed him to consolidate power and the boards that he created were increasingly captive ones (see the 1997 board).
- In 1996, Eisner spearheaded the push to buy ABC and the board rubberstamped his decision, as they had with other major decisions. In the years following, the company ran into problems both on its ABC acquisition and on its other operations and stockholders started to get restive, especially as the stock price halved between 1998 and 2002.
- In 2003, Roy Disney and Stanley Gold resigned from the Disney board, arguing against Eisner's autocratic style.
- In early 2004, Comcast made a hostile bid for Disney and later in the year, 43% of Disney shareholders withheld their votes for Eisner's reelection to the board of directors. Following that vote, the board of directors at Disney voted unanimously to elect George Mitchell as the Chair of the board, replacing Eisner, who vowed to stay on as CEO.
- In October 2005, Eisner stepped down as CEO, to be replaced by Bob Iger.

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

But as a CEO's tenure lengthens, does corporate governance suffer?

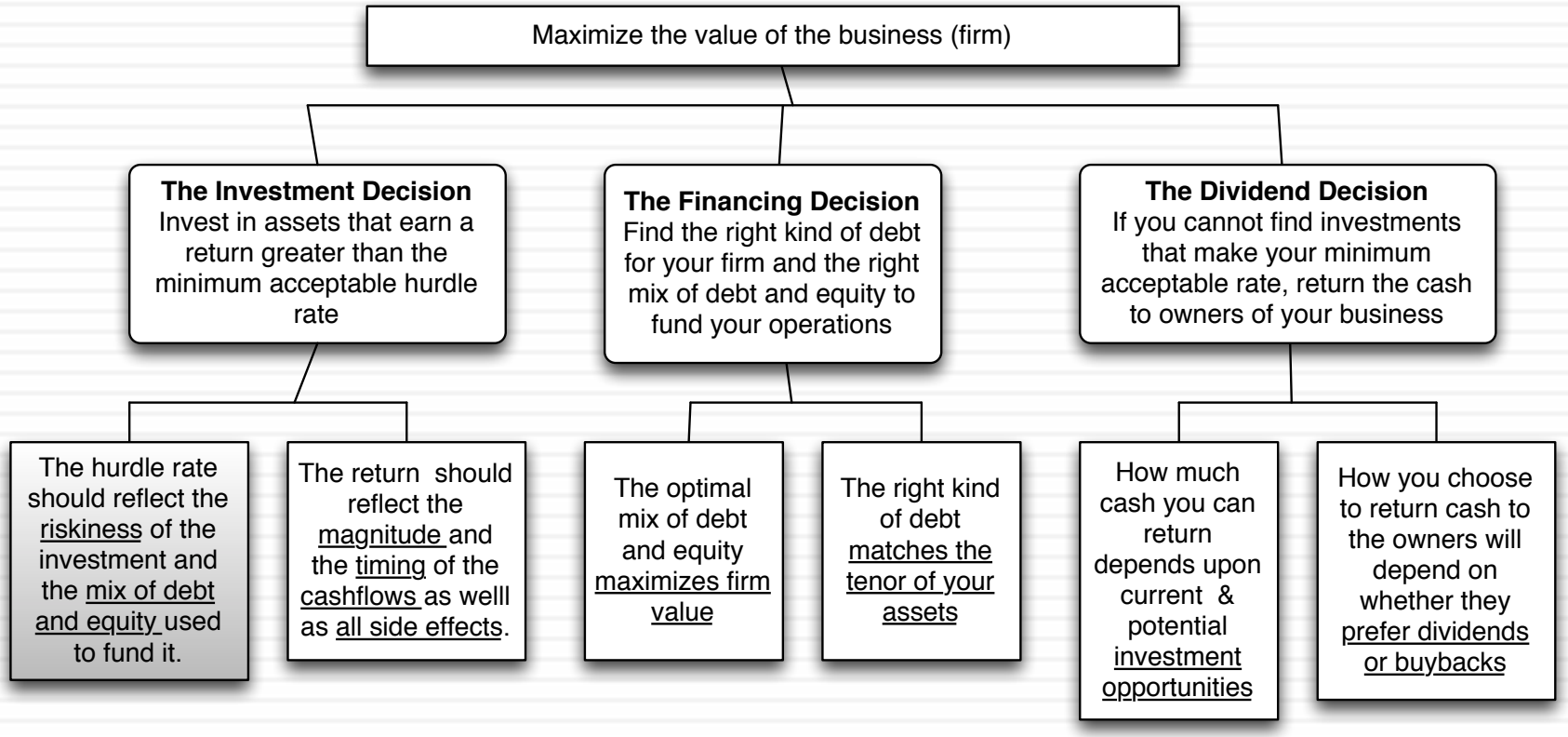
1. While the board size has stayed compact (at twelve members), there has been only one change since 2008, with Sheryl Sandberg, COO of Facebook, replacing the deceased Steve Jobs.
2. The board voted reinstate Iger as chair of the board in 2011, reversing a decision made to separate the CEO and Chair positions after the Eisner years.
3. In 2011, Iger announced his intent to step down as CEO in 2015 but Disney's board convinced Iger to stay on as CEO for an extra year, for the "the good of the company".
4. There were signs of restiveness among Disney's stockholders, especially those interested in corporate governance. Activist investors (CalSTRS) starting making noise and Institutional Shareholder Services (ISS), which gauges corporate governance at companies, raised red flags about compensation and board monitoring at Disney.

Aswath Damodaran

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:

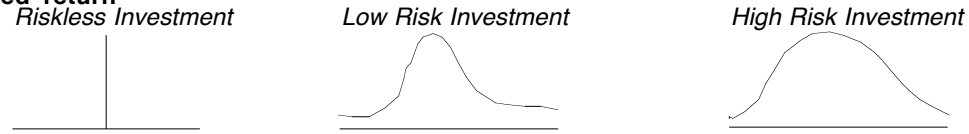
危机

- 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.
- Risk is therefore neither good nor bad. It is just a fact of life. The question that businesses have to address is therefore not whether to avoid risk but how best to incorporate it into their decision making.

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)

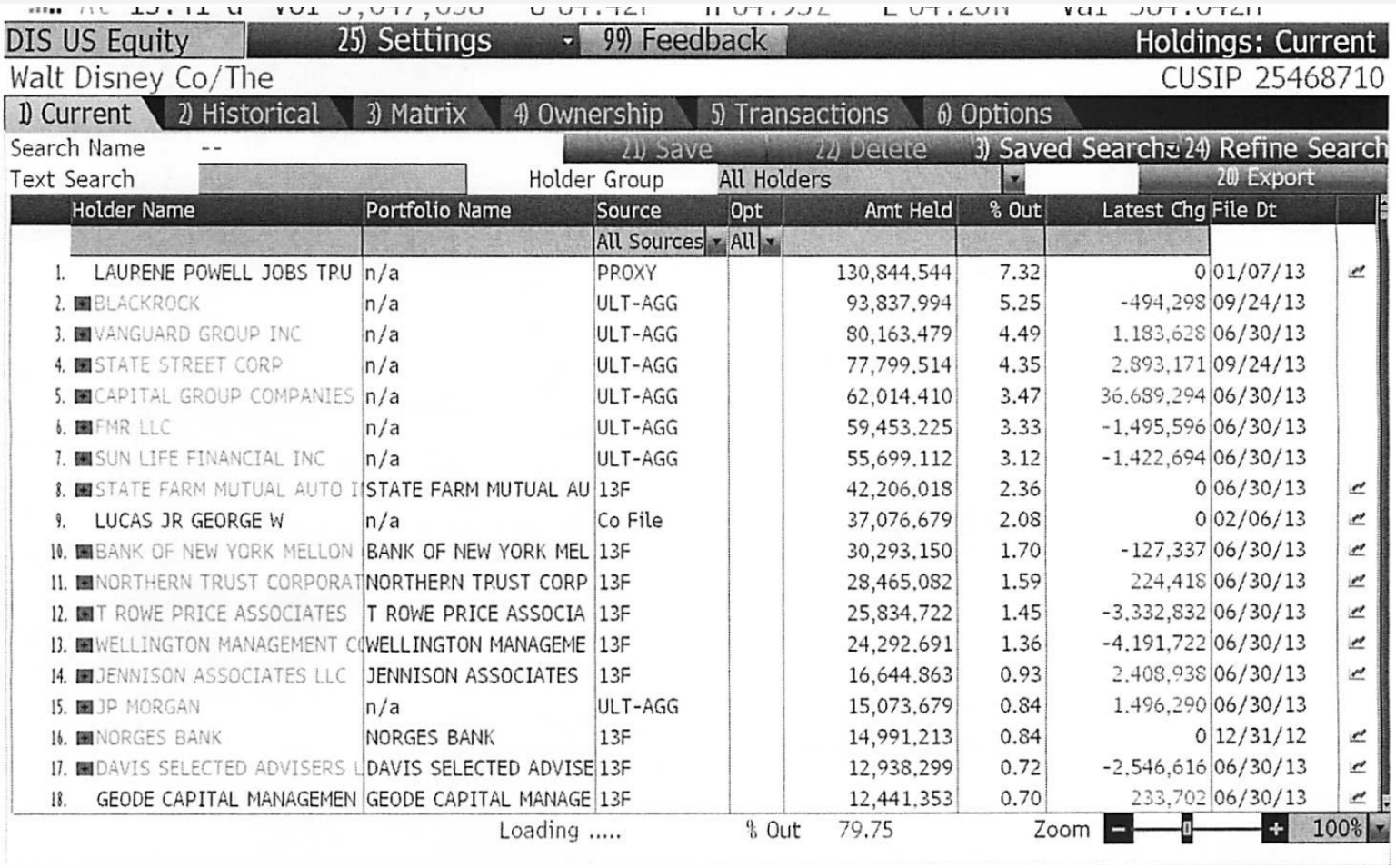
Limitations of the CAPM

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.

Gauging the marginal investor: Disney in 2013



DIS US Equity | 25) Settings | 99) Feedback | Holdings: Current

Walt Disney Co/The — CUSIP 25468710

1) Current | 2) Historical | 3) Matrix | 4) Ownership | 5) Transactions | 6) Options

Search Name -- | 21) Save | 22) Delete | 23) Saved Searches | 24) Refine Search

Text Search | Holder Group: All Holders | 20) Export

	Holder Name	Portfolio Name	Source	Opt	Amt Held	% Out	Latest Chg	File Dt
			All Sources	All				
1.	LAURENE POWELL JOBS TRU	n/a	PROXY		130,844,544	7.32	0	01/07/13
2.	BLACKROCK	n/a	ULT-AGG		93,837,994	5.25	-494,298	09/24/13
3.	VANGUARD GROUP INC	n/a	ULT-AGG		80,163,479	4.49	1,183,628	06/30/13
4.	STATE STREET CORP	n/a	ULT-AGG		77,799,514	4.35	2,893,171	09/24/13
5.	CAPITAL GROUP COMPANIES	n/a	ULT-AGG		62,014,410	3.47	36,689,294	06/30/13
6.	FMR LLC	n/a	ULT-AGG		59,453,225	3.33	-1,495,596	06/30/13
7.	SUN LIFE FINANCIAL INC	n/a	ULT-AGG		55,699,112	3.12	-1,422,694	06/30/13
8.	STATE FARM MUTUAL AUTO I	STATE FARM MUTUAL AU	13F		42,206,018	2.36	0	06/30/13
9.	LUCAS JR GEORGE W	n/a	Co File		37,076,679	2.08	0	02/06/13
10.	BANK OF NEW YORK MELLON	BANK OF NEW YORK MEL	13F		30,293,150	1.70	-127,337	06/30/13
11.	NORTHERN TRUST CORPORAT	NORTHERN TRUST CORP	13F		28,465,082	1.59	224,418	06/30/13
12.	T ROWE PRICE ASSOCIATES	T ROWE PRICE ASSOCIA	13F		25,834,722	1.45	-3,332,832	06/30/13
13.	WELLINGTON MANAGEMENT C	WELLINGTON MANAGEME	13F		24,292,691	1.36	-4,191,722	06/30/13
14.	JENNISON ASSOCIATES LLC	JENNISON ASSOCIATES	13F		16,644,863	0.93	2,408,938	06/30/13
15.	JP MORGAN	n/a	ULT-AGG		15,073,679	0.84	1,496,290	06/30/13
16.	NORGES BANK	NORGES BANK	13F		14,991,213	0.84	0	12/31/12
17.	DAVIS SELECTED ADVISERS L	DAVIS SELECTED ADVISE	13F		12,938,299	0.72	-2,546,616	06/30/13
18.	GEODE CAPITAL MANAGEMEN	GEODE CAPITAL MANAGE	13F		12,441,353	0.70	233,702	06/30/13

Loading ..... | % Out 79.75 | Zoom 100%

Extending the assessment of the investor base

- In all five of the publicly traded companies that we are looking at, institutions are big holders of the company's stock.

	Disney	*Deutsche Bank*	*Vale (preferred)*	*Tata Motors*	*Baidu (Class A)*
Institutions	70.2%	40.9%	71.2%	44%	70%
Individuals	21.3%	58.9%	27.8%	25%	20%
Insiders	7.5%	0.2%	1.0%	31%*	10%

Company	*Largest holder*	*Number of institutional investors in top ten holdings*
Disney	Laurene Jobs (7.3%)	8
Deutsche Bank	Blackrock (4.69%)	10
Vale Preferred	Aberdeen (7.40%)	8
Tata Motors	Tata Sons (26.07%)	7
Baidu (Class A)	Capital Group (12.46%)	10

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

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

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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.

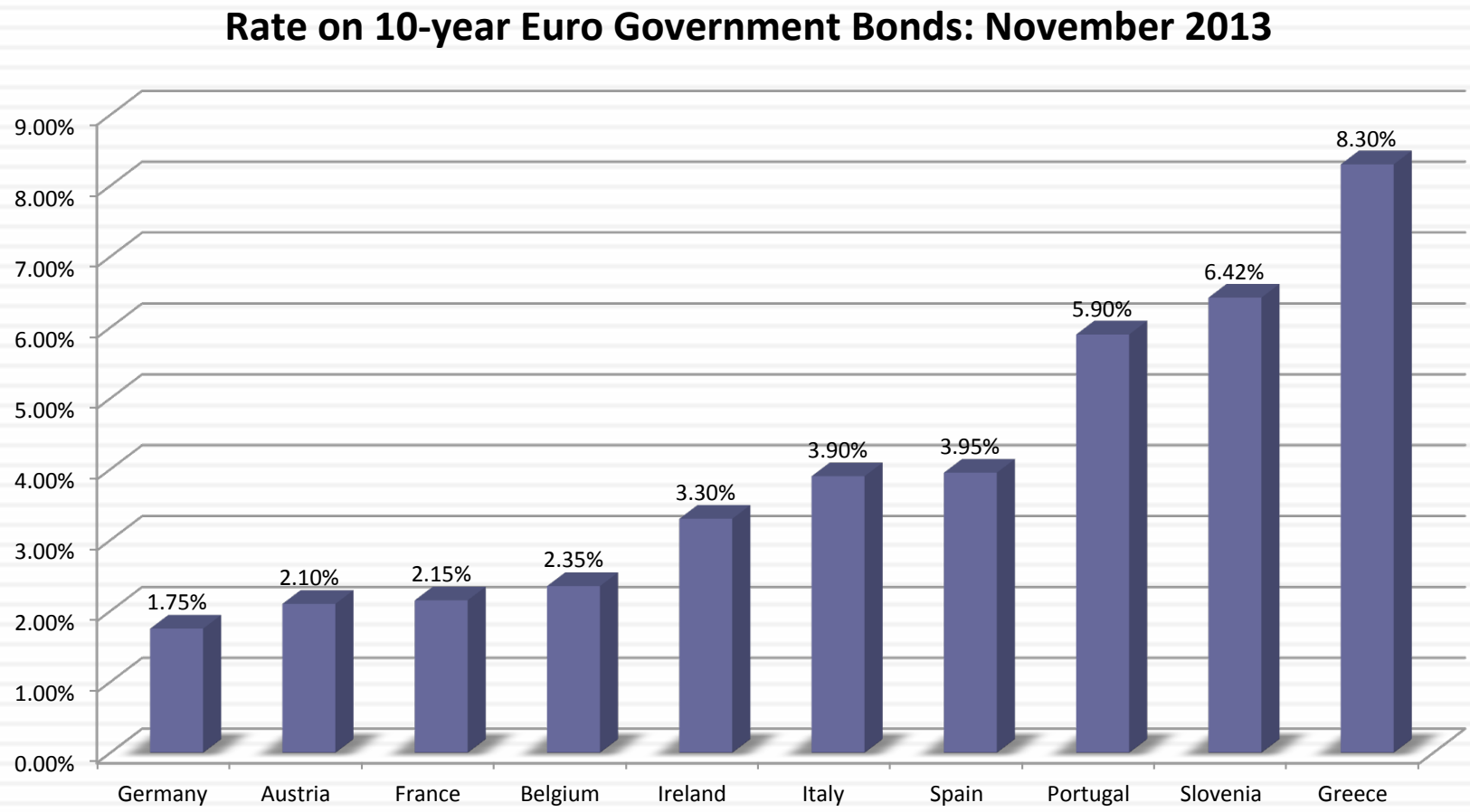
The Riskfree Rate and Time Horizon

- 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.

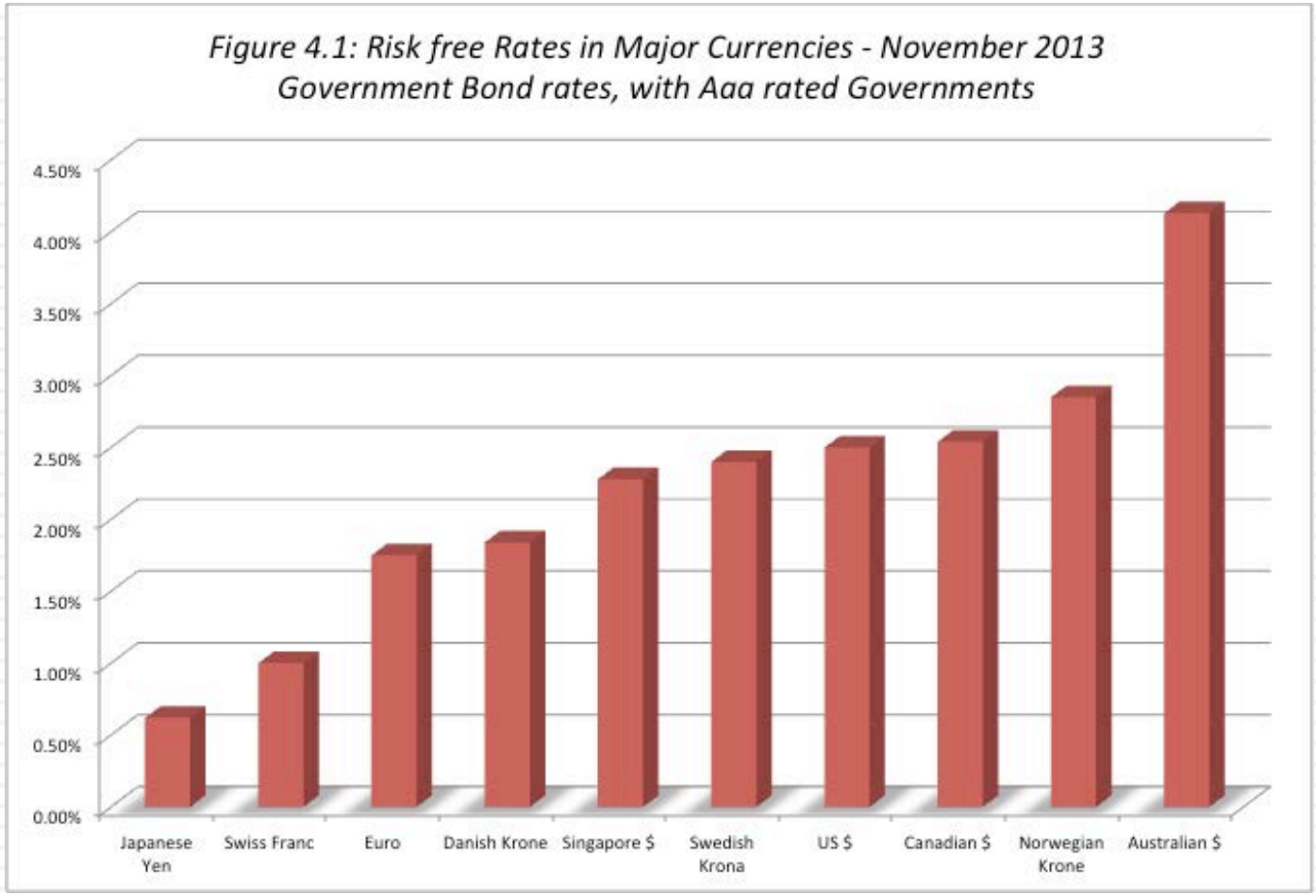
The Bottom Line on Riskfree Rates

- 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 November 2013**, for instance, the rate on a ten-year US treasury bond (2.75%) is used as the risk free rate in US dollars.

What is the Euro riskfree rate? An exercise in November 2013



When the government is default free: Risk free rates – in November 2013



What if there is no default-free entity? Risk free rates in November 2013

PB Page 14-21

- 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 November 2013, the Indian government rupee bond rate was 8.82%. the local currency rating from Moody's was Baa3 and the default spread for a Baa3 rated country bond was 2.25%.

    Riskfree rate in Rupees = 8.82% - 2.25% = 6.57%

    - In November 2013, the Chinese Renmimbi government bond rate was 4.30% and the local currency rating was Aa3, with a default spread of 0.8%.

    Riskfree rate in Chinese Renmimbi = 4.30% - 0.8% = 3.5%
  - Do the analysis in an alternate currency, where getting the riskfree rate is easier. With Vale in 2013, 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 3%
  - 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 3%
  b. Between 3 - 5%
  c. Between 5 - 7%
  d. Between 7 -9%
  e. Between 9%- 11%
  f. More than 9%

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*	*Notes*
Individual Investors	Securities Industries Association	8.3% (2004)	One year premium
Institutional Investors	Merrill Lynch	4.8% (2013)	Monrthly updates
CFOs	Campbell Harvey & Graham	4.48% (2012)	5-8% response rate
Analysts	Pablo Fernandez	5.0% (2011)	Lowest standard deviation
Academics	Pablo Fernandez	5.7% (2011)	Higher for emerging markets

- 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 United States – January 2014

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2013	7.93%	6.29%	6.02%	4.62%
Std Error	*2.19%*	*2.34%*		
1964-2013	6.18%	4.32%	4.83%	3.33%
Std Error	*2.42%*	*2.75%*		
2004-2013	7.55%	4.41%	5.80%	3.07%
Std Error	*6.02%*	*8.66%*		

- What is the right premium?

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

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

2. Be consistent in your use of a riskfree rate.
3. 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.
- Put simply, if you distrust historical risk premiums in the United States, because the estimates are backward looking and noisy, you will trust them even less outside the US, where you have less data.

One solution: Bond default spreads as CRP – November 2013

- In November 2013, the historical risk premium for the US was 4.20% (geometric average, stocks over T.Bonds, 1928-2012)

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2012	7.65%	5.88%	5.74%	4.20%
	2.20%	2.33%		

- Using the default spread on the sovereign bond or based upon the sovereign rating and adding that spread to the mature market premium (4.20% for the US) gives you a total ERP for a country.

Country	Rating	Default Spread (Country Risk Premium)	US ERP	Total ERP for country
India	Baa3	2.25%	4.20%	6.45%
China	Aa3	0.80%	4.20%	5.00%
Brazil	Baa2	2.00%	4.20%	6.20%

- If you prefer CDS spreads:

Country	*Sovereign CDS Spread*	*US ERP*	*Total ERP for country*
India	4.20%	4.20%	8.40%
China	1.20%	4.20%	5.40%
Brazil	2.59%	4.20%	6.79%

Beyond the default spread? Equities are riskier than bonds

- While default risk spreads and equity risk premiums are highly correlated, one would expect equity spreads to be higher than debt spreads. One approach to scaling up the premium is to look at the relative volatility of equities to bonds and to scale up the default spread to reflect this:

$$\text{Country Risk Premium} = \text{Country Default Spread} * \left(\frac{\sigma_{\text{Equity}}}{\sigma_{\text{Country Bond}}}\right)$$

- Brazil: The annualized standard deviation in the Brazilian equity index over the previous year is 21 percent, whereas the annualized standard deviation in the Brazilian C-bond is 14 percent.

$$\text{Brazil's Total Risk Premium} = 4.20\% + 2.00\%\left(\frac{21\%}{14\%}\right) = 7.20\%$$

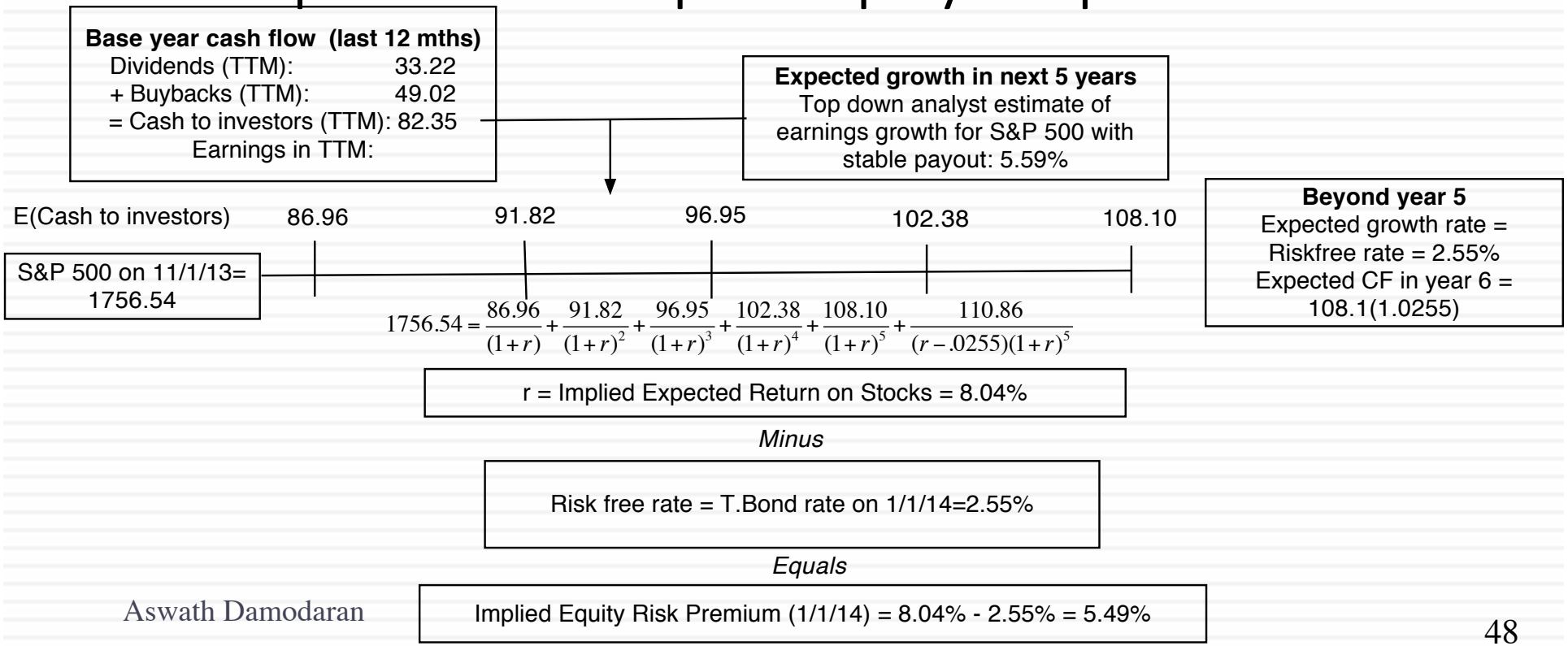
- Using the same approach for China and India:

$$\text{Equity Risk Premium}_{\text{India}} = 4.20\% + 2.25\%\left(\frac{24\%}{17\%}\right) = 7.80\%$$

$$\text{Equity Risk Premium}_{\text{China}} = 4.20\% + 0.80\%\left(\frac{18\%}{10\%}\right) = 5.64\%$$

C. Implied ERP in November 2013: Watch what I pay, not what I say..

- If you can observe what investors are willing to pay for stocks, you can back out an expected return from that price and an implied equity risk premium.



The bottom line on Equity Risk Premiums in November 2013

- Mature Markets: In November 2013, the number that we chose to use as the equity risk premium for all mature markets was 5.5%. This was set equal to the implied premium at that point in time and it was much higher than the historical risk premium of 4.20% prevailing then (1928-2012 period).

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2012	7.65%	5.88%	5.74%	4.20%
	2.20%	2.33%		
1962-2012	5.93%	3.91%	4.60%	2.93%
	2.38%	2.66%		
2002-2012	7.06%	3.08%	5.38%	1.71%
	5.82%	8.11%		

- 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 that we will add to the mature market premium. Thus, markets in countries with lower sovereign ratings will have higher risk premiums that 5.5%.

Emerging Market ERP = 5.5% + $\text{Country Default Spread} * \left(\frac{\sigma_{\text{Equity}}}{\sigma_{\text{Country Bond}}} \right)$

A Composite way of estimating ERP for countries

Step 1: Estimate an equity risk premium for a mature market. If your preference is for a forward looking, updated number, you can estimate an implied equity risk premium for the US (assuming that you buy into the contention that it is a mature market)

- My estimate: In January 2014, my estimate for the implied premium in the US was 5%. That will also be my estimate for a mature market ERP.

Step 2: Come up with a generic and measurable definition of a mature market.

- My estimate: Any AAA rated country is mature.

Step 3: Estimate the additional risk premium that you will charge for markets that are not mature. You have two choices:

- The default spread for the country, estimated based either on sovereign ratings or the CDS market.
- A scaled up default spread, where you adjust the default spread upwards for the additional risk in equity markets.

ERP : Nov 2013

Andorra	7.45%	1.95%
Austria	5.50%	0.00%
Belgium	6.70%	1.20%
Cyprus	22.00%	16.50%
Denmark	5.50%	0.00%
Finland	5.50%	0.00%
France	5.95%	0.45%
Germany	5.50%	0.00%
Greece	15.63%	10.13%
Iceland	8.88%	3.38%
Ireland	9.63%	4.13%
Italy	8.50%	3.00%
Liechtenstein	5.50%	0.00%
Luxembourg	5.50%	0.00%
Malta	7.45%	1.95%
Netherlands	5.50%	0.00%
Norway	5.50%	0.00%
Portugal	10.90%	5.40%
Spain	8.88%	3.38%
Sweden	5.50%	0.00%
Switzerland	5.50%	0.00%
Turkey	8.88%	3.38%
United Kingdom	5.95%	0.45%
Western Europe	**6.72%**	**1.22%**

Canada	5.50%	0.00%
United States of America	5.50%	0.00%
North America	**5.50%**	**0.00%**

Argentina	15.63%	10.13%
Belize	19.75%	14.25%
Bolivia	10.90%	5.40%
Brazil	8.50%	3.00%
Chile	6.70%	1.20%
Colombia	8.88%	3.38%
Costa Rica	8.88%	3.38%
Ecuador	17.50%	12.00%
El Salvador	10.90%	5.40%
Guatemala	9.63%	4.13%
Honduras	13.75%	8.25%
Mexico	8.05%	2.55%
Nicaragua	15.63%	10.13%
Panama	8.50%	3.00%
Paraguay	10.90%	5.40%
Peru	8.50%	3.00%
Suriname	10.90%	5.40%
Uruguay	8.88%	3.38%
Venezuela	12.25%	6.75%
Latin America	**9.44%**	**3.94%**

Country	*TRP*	*CRP*
Angola	10.90%	5.40%
Benin	13.75%	8.25%
Botswana	7.15%	1.65%
Burkina Faso	13.75%	8.25%
Cameroon	13.75%	8.25%
Cape Verde	12.25%	6.75%
Egypt	17.50%	12.00%
Gabon	10.90%	5.40%
Ghana	12.25%	6.75%
Kenya	12.25%	6.75%
Morocco	9.63%	4.13%
Mozambique	12.25%	6.75%
Namibia	8.88%	3.38%
Nigeria	10.90%	5.40%
Rwanda	13.75%	8.25%
Senegal	12.25%	6.75%
South Africa	8.05%	2.55%
Tunisia	10.23%	4.73%
Uganda	12.25%	6.75%
Zambia	12.25%	6.75%
Africa	**11.22%**	**5.82%**

Albania	12.25%	6.75%
Armenia	10.23%	4.73%
Azerbaijan	8.88%	3.38%
Belarus	15.63%	10.13%
Bosnia	15.63%	10.13%
Bulgaria	8.50%	3.00%
Croatia	9.63%	4.13%
Czech Republic	6.93%	1.43%
Estonia	6.93%	1.43%
Georgia	10.90%	5.40%
Hungary	9.63%	4.13%
Kazakhstan	8.50%	3.00%
Latvia	8.50%	3.00%
Lithuania	8.05%	2.55%
Macedonia	10.90%	5.40%
Moldova	15.63%	10.13%
Montenegro	10.90%	5.40%
Poland	7.15%	1.65%
Romania	8.88%	3.38%
Russia	8.05%	2.55%
Serbia	10.90%	5.40%
Slovakia	7.15%	1.65%
Slovenia	9.63%	4.13%
Ukraine	15.63%	10.13%
E. Europe & Russia	**8.60%**	**3.10%**

Bahrain	8.05%	2.55%
Israel	6.93%	1.43%
Jordan	12.25%	6.75%
Kuwait	6.40%	0.90%
Lebanon	12.25%	6.75%
Oman	6.93%	1.43%
Qatar	6.40%	0.90%
Saudi Arabia	6.70%	1.20%
United Arab Emirates	6.40%	0.90%
Middle East	**6.88%**	**1.38%**

Bangladesh	10.90%	5.40%
Cambodia	13.75%	8.25%
China	6.94%	1.44%
Fiji	12.25%	6.75%
Hong Kong	5.95%	0.45%
India	9.10%	3.60%
Indonesia	8.88%	3.38%
Japan	6.70%	1.20%
Korea	6.70%	1.20%
Macao	6.70%	1.20%
Malaysia	7.45%	1.95%
Mauritius	8.05%	2.55%
Mongolia	12.25%	6.75%
Pakistan	17.50%	12.00%
Papua NG	12.25%	6.75%
Philippines	9.63%	4.13%
Singapore	5.50%	0.00%
Sri Lanka	12.25%	6.75%
Taiwan	6.70%	1.20%
Thailand	8.05%	2.55%
Vietnam	13.75%	8.25%
Asia	**7.27%**	**1.77%**

Australia	5.50%	0.00%
Cook Islands	12.25%	6.75%
New Zealand	5.50%	0.00%
Australia & NZ	**5.00%**	**0.00%**

Black #: Total ERP
Red #: Country risk premium
AVG: GDP weighted average

Estimating ERP for Disney: November 2013

- Incorporation: The conventional practice on equity risk premiums is to estimate an ERP based upon where a company is incorporated. Thus, the cost of equity for Disney would be computed based on the US equity risk premium, because it is a US company, and the Brazilian ERP would be used for Vale, because it is a Brazilian company.
- Operations: The more sensible practice on equity risk premium is to estimate an ERP based upon where a company operates. For Disney in 2013:

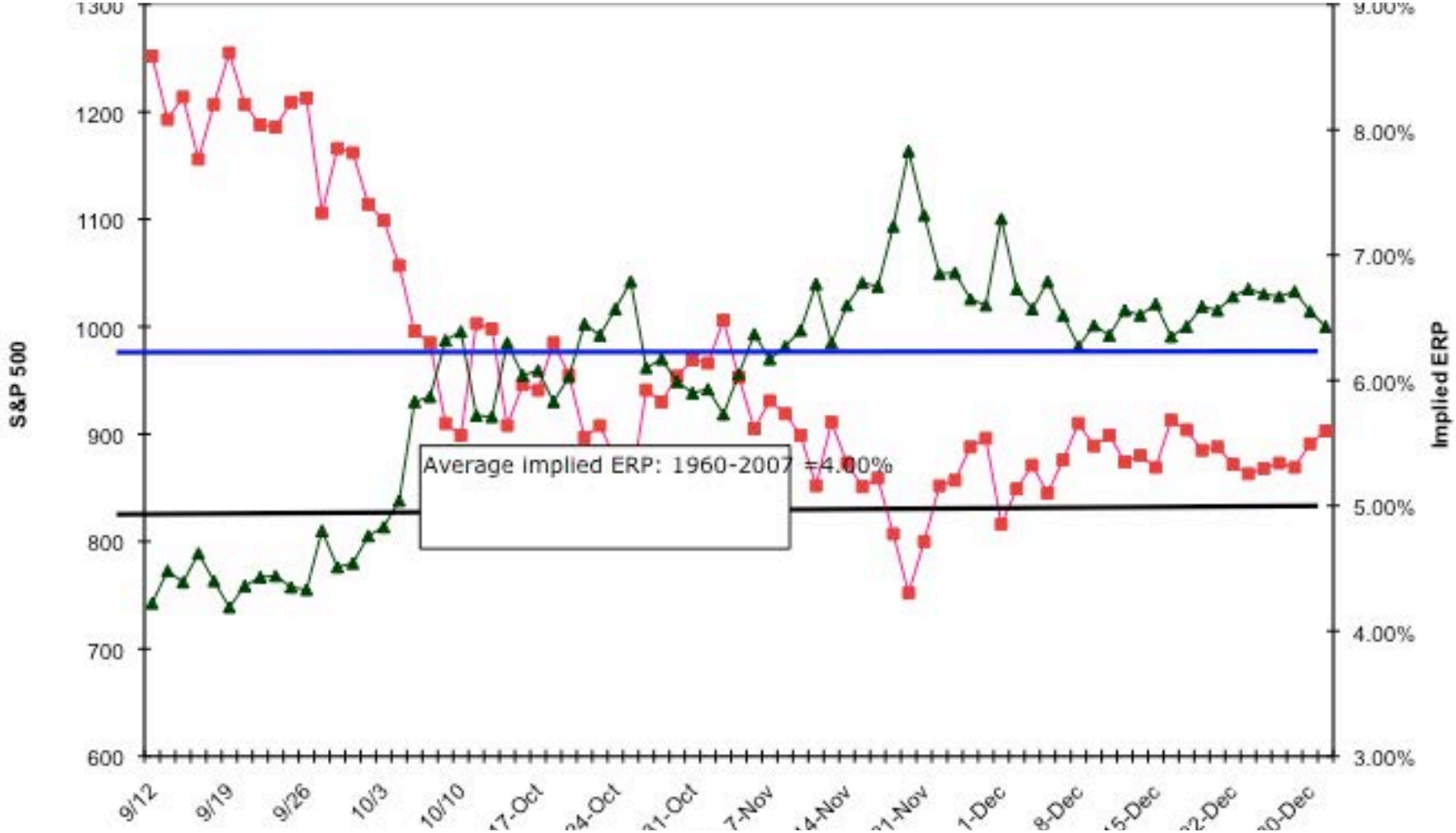
Region/ Country	*Proportion of Disney's Revenues*	*ERP*
US& Canada	82.01%	5.50%
Europe	11.64%	6.72%
Asia-Pacific	6.02%	7.27%
Latin America	0.33%	9.44%
Disney	**100.00%**	**5.76%**

ERP for Companies: November 2013

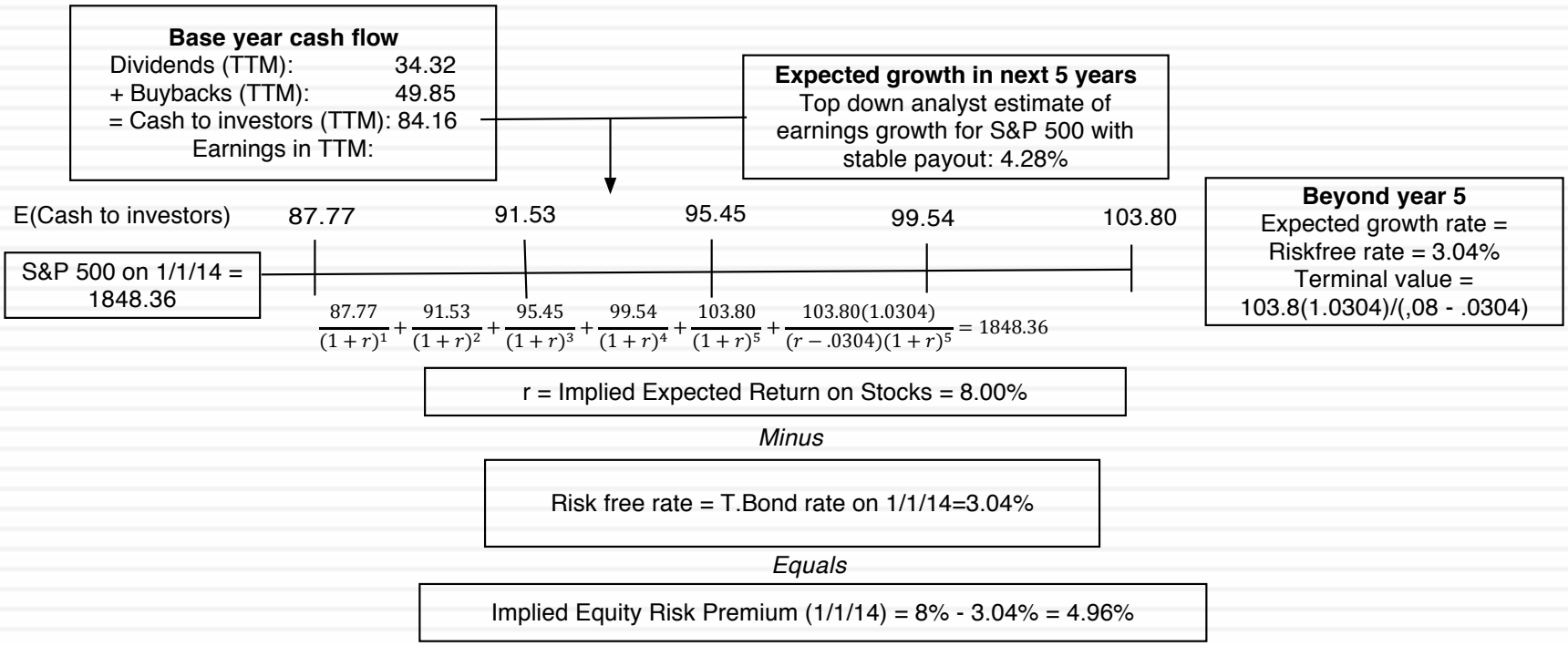
In November 2013, the mature market premium used was 5.5%

Company	*Region/ Country*	*Weight*	*ERP*
Bookscape	United States	100%	5.50%
Vale	US & Canada	4.90%	5.50%
	Brazil	16.90%	8.50%
	Rest of Latin America	1.70%	10.09%
	China	37.00%	6.94%
	Japan	10.30%	6.70%
	Rest of Asia	8.50%	8.61%
	Europe	17.20%	6.72%
	Rest of World	3.50%	10.06%
	Company	100.00%	7.38%
Tata Motors	India	23.90%	9.10%
	China	23.60%	6.94%
	UK	11.90%	5.95%
	United States	10.00%	5.50%
	Mainland Europe	11.70%	6.85%
	Rest of World	18.90%	6.98%
	Company	100.00%	7.19%
Baidu	China	100%	6.94%
Deutsche Bank	Germany	35.93%	5.50%
	North America	24.72%	5.50%
	Rest of Europe	28.67%	7.02%
	Asia-Pacific	10.68%	7.27%
	South America	0.00%	9.44%
	Company	100.00%	6.12%

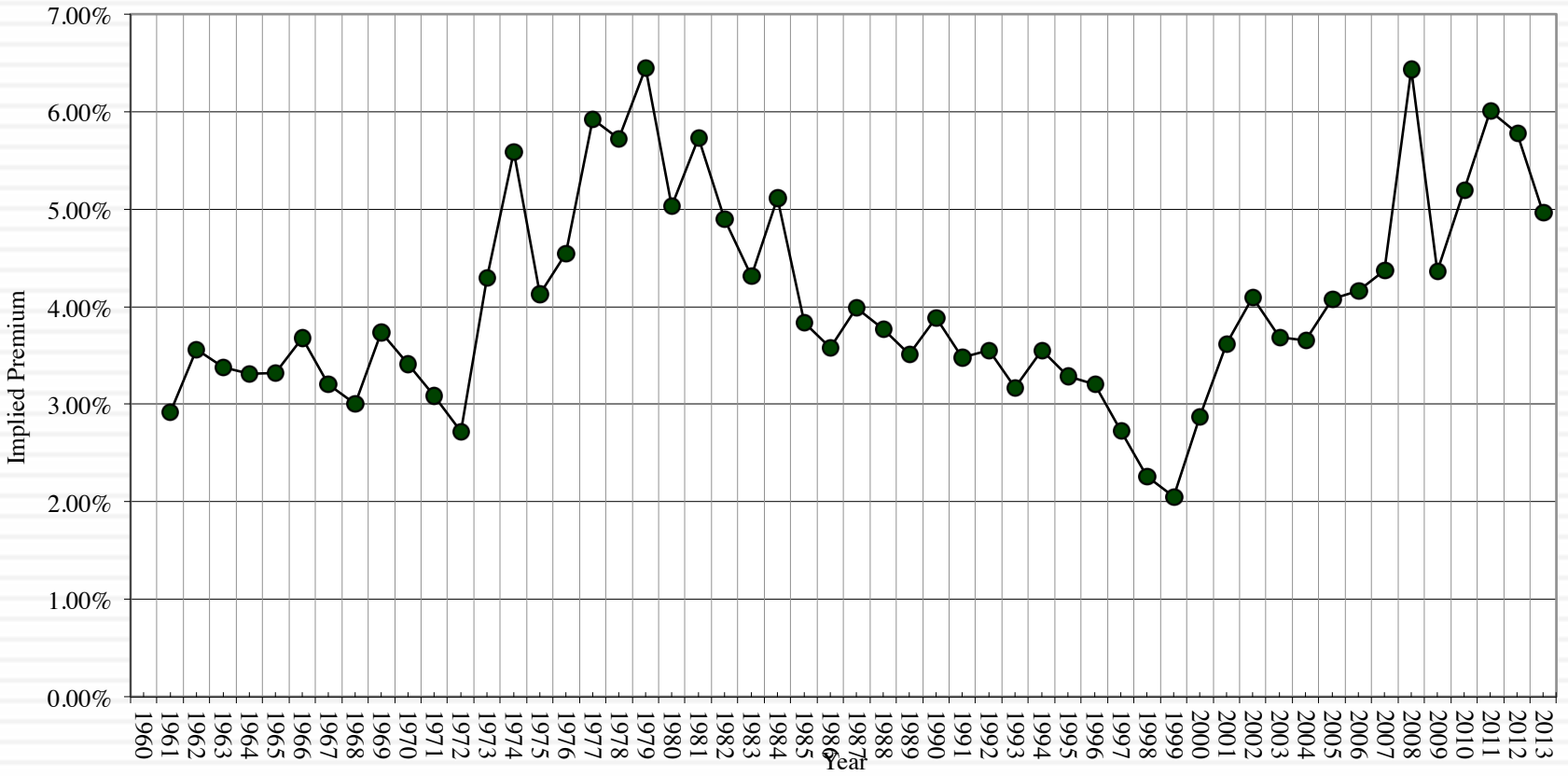
The Anatomy of a Crisis: Implied ERP from September 12, 2008 to January 1, 2009



An Updated Equity Risk Premium: January 2014



Implied Premiums in the US: 1960-2013



ERP : Jan 2014

Andorra	6.80%	1.80%
Austria	5.00%	0.00%
Belgium	5.90%	0.90%
Cyprus	20.00%	15.00%
Denmark	5.00%	0.00%
Finland	5.00%	0.00%
France	5.60%	0.60%
Germany	5.00%	0.00%
Greece	20.00%	15.00%
Iceland	8.30%	3.30%
Ireland	8.75%	3.75%
Italy	7.85%	2.85%
Liechtenstein	5.00%	0.00%
Luxembourg	5.00%	0.00%
Malta	6.80%	1.80%
Netherlands	5.00%	0.00%
Norway	5.00%	0.00%
Portugal	10.40%	5.40%
Spain	8.30%	3.30%
Sweden	5.00%	0.00%
Switzerland	5.00%	0.00%
Turkey	8.30%	3.30%
United Kingdom	5.60%	0.60%
Western Europe	**6.29%**	**1.29%**

Canada	5.00%	0.00%
United States of America	5.00%	0.00%
North America	**5.00%**	**0.00%**

Argentina	14.75%	9.75%
Belize	18.50%	13.50%
Bolivia	10.40%	5.40%
Brazil	7.85%	2.85%
Chile	5.90%	0.90%
Colombia	8.30%	3.30%
Costa Rica	8.30%	3.30%
Ecuador	16.25%	11.25%
El Salvador	10.40%	5.40%
Guatemala	8.75%	3.75%
Honduras	13.25%	8.25%
Mexico	7.40%	2.40%
Nicaragua	14.75%	9.75%
Panama	7.85%	2.85%
Paraguay	10.40%	5.40%
Peru	7.85%	2.85%
Suriname	10.40%	5.40%
Uruguay	8.30%	3.30%
Venezuela	16.25%	11.25%
Latin America	**8.62%**	**3.62%**

Angola	10.40%	5.40%
Benin	13.25%	8.25%
Botswana	6.28%	1.28%
Burkina Faso	13.25%	8.25%
Cameroon	13.25%	8.25%
Cape Verde	13.25%	8.25%
DR Congo	14.75%	9.75%
Egypt	16.25%	11.25%
Gabon	10.40%	5.40%
Ghana	11.75%	6.75%
Kenya	11.75%	6.75%
Morocco	8.75%	3.75%
Mozambique	11.75%	6.75%
Namibia	8.30%	3.30%
Nigeria	10.40%	5.40%
Rep Congo	10.40%	5.40%
Rwanda	13.25%	8.25%
Senegal	11.75%	6.75%
South Africa	7.40%	2.40%
Tunisia	10.40%	5.40%
Uganda	11.75%	6.75%
Zambia	11.75%	6.75%
Africa	**10.04%**	**5.04%**

Albania	11.75%	6.75%
Armenia	9.50%	4.50%
Azerbaijan	8.30%	3.30%
Belarus	14.75%	9.75%
Bosnia and Herzegovina	14.75%	9.75%
Bulgaria	7.85%	2.85%
Croatia	8.75%	3.75%
Czech Republic	6.05%	1.05%
Estonia	6.05%	1.05%
Georgia	10.40%	5.40%
Hungary	8.75%	3.75%
Kazakhstan	7.85%	2.85%
Latvia	7.85%	2.85%
Lithuania	7.40%	2.40%
Macedonia	10.40%	5.40%
Moldova	14.75%	9.75%
Montenegro	10.40%	5.40%
Poland	6.28%	1.28%
Romania	8.30%	3.30%
Russia	7.40%	2.40%
Serbia	11.75%	6.75%
Slovakia	6.28%	1.28%
Slovenia	8.75%	3.75%
Ukraine	16.25%	11.25%
E. Europe & Russia	**7.96%**	**2.96%**

Abu Dhabi	5.75%	0.75%
Bahrain	7.85%	2.85%
Israel	6.05%	1.05%
Jordan	11.75%	6.75%
Kuwait	5.75%	0.75%
Lebanon	11.75%	6.75%
Oman	6.05%	1.05%
Qatar	5.75%	0.75%
Saudi Arabia	5.90%	0.90%
United Arab Emirates	5.75%	0.75%
Middle East	**6.14%**	**1.14%**

Bangladesh	10.40%	5.40%
Cambodia	13.25%	8.25%
China	5.90%	0.90%
Fiji	11.75%	6.75%
Hong Kong	5.60%	0.60%
India	8.30%	3.30%
Indonesia	8.30%	3.30%
Japan	5.90%	0.90%
Korea	5.90%	0.90%
Macao	5.90%	0.90%
Malaysia	6.80%	1.80%
Mauritius	7.40%	2.40%
Mongolia	11.75%	6.75%
Pakistan	16.25%	11.25%
Papua New Guinea	11.75%	6.75%
Philippines	8.30%	3.30%
Singapore	5.00%	0.00%
Sri Lanka	11.75%	6.75%
Taiwan	5.90%	0.90%
Thailand	7.40%	2.40%
Vietnam	13.25%	8.25%
Asia	**6.51%**	**1.51%**

Australia	5.00%	0.00%
Cook Islands	11.75%	6.75%
New Zealand	5.00%	0.00%
Australia & New Zealand	**5.00%**	**0.00%**

Black #: Total ERP
Red #: Country risk premium
AVG: GDP weighted average

⌛ Application Test: Estimating a Market Risk Premium

- For your company, get the geographical breakdown of revenues in the most recent year. Based upon this revenue breakdown and the most recent country risk premiums, estimate the equity risk premium that you would use for your company.

- This computation was based entirely on revenues. With your company, what concerns would you have about your estimate being too high or too low?

Bloomberg DES Pg 4

Estimating Beta

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

  $R_j = a + b\ R_m$

  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.

  Rj = Rf + b (Rm - Rf)

  = Rf (1-b) + b Rm .....Capital Asset Pricing Model

  Rj = a + b Rm .....Regression Equation

- If

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

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

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

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

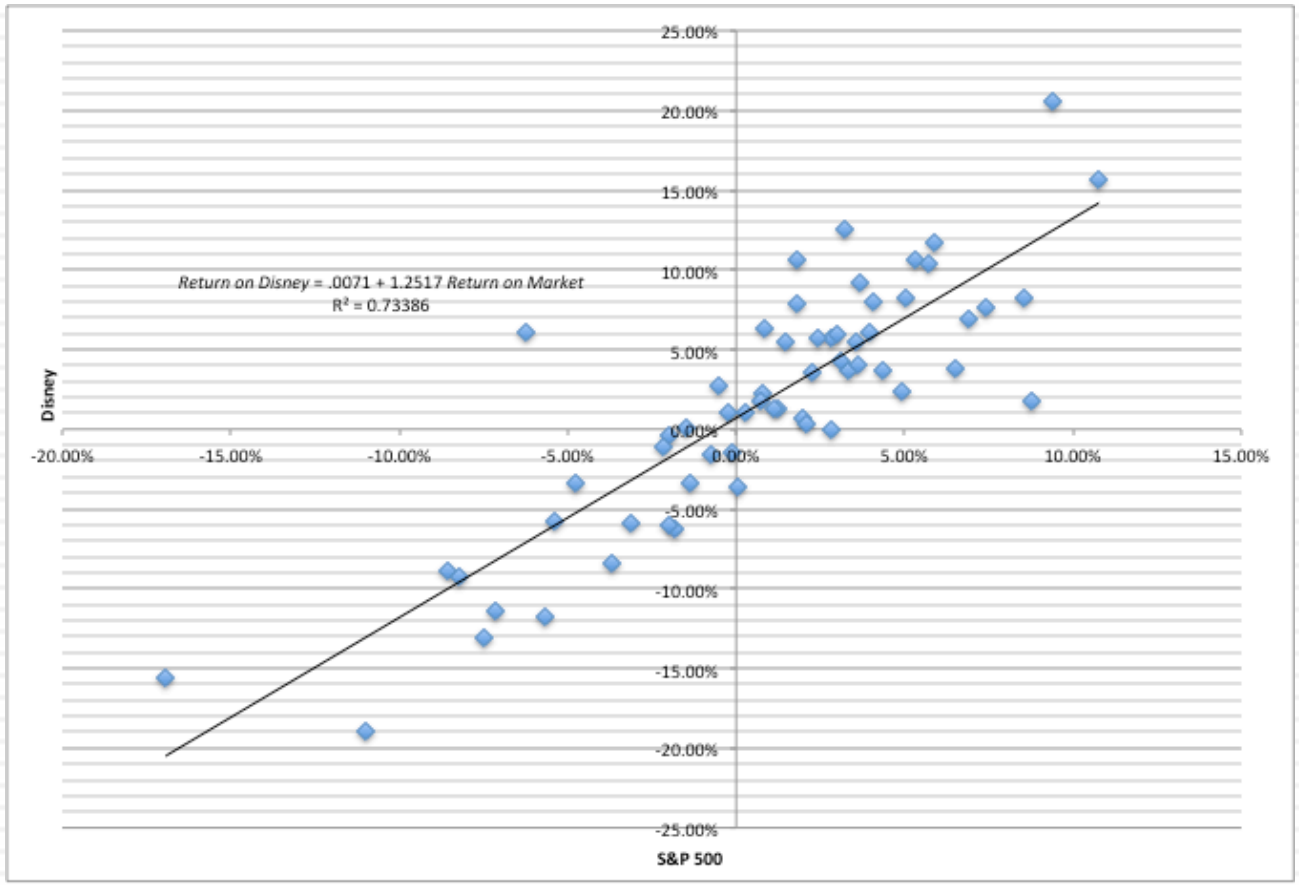
Setting up for the Estimation

- 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.
- 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 = $(Price_{End} - Price_{Beginning} + Dividends_{Period})/ Price_{Beginning}$
  - 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 2009,
  - Price for Disney at end of November 2009 = $ 30.22
  - Price for Disney at end of December 2009 = $ 32.25
  - Dividends during month = $0.35 (It was an ex-dividend month)
  - Return =($32.25 - $30.22 + $ 0.35)/$30.22= 7.88%
- To estimate returns on the index in the same month
  - Index level at end of November 2009 = 1095.63
  - Index level at end of December 2009 = 1115.10
  - Dividends on index in December 2009 = 1.683
  - Return =(1115.1 – 1095.63+1.683)/ 1095.63 = 1.78%

Disney's Historical Beta



Return on Disney = .0071 + 1.2517 *Return on Market* $R^2 = 0.73386$

(0.10)

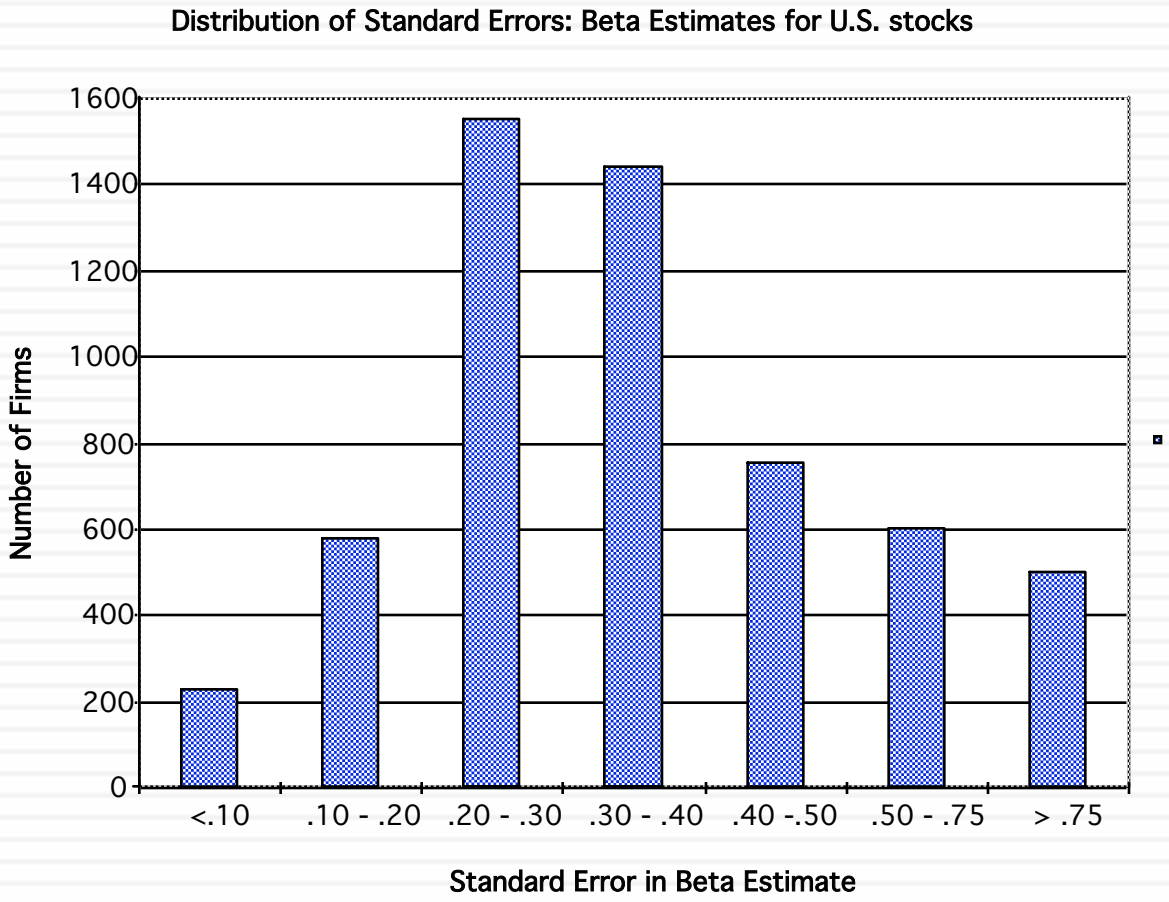
Analyzing Disney's Performance

- Intercept = 0.712%
  - This is an intercept based on monthly returns. Thus, it has to be compared to a monthly riskfree rate.
  - Between 2008 and 2013
    - Average Annualized T.Bill rate = 0.50%
    - Monthly Riskfree Rate = 0.5%/12 = 0.042%
    - Riskfree Rate (1-Beta) = 0.042% (1-1.252) = -.0105%
- The Comparison is then between
  - Intercept versus Riskfree Rate (1 - Beta)
  - 0.712% versus 0.0105%
  - Jensen's Alpha = 0.7122% - (-0.0105)% = 0.723%
- Disney did 0.723% better than expected, per month, between October 2008 and September 2013
  - Annualized, Disney's annual excess return = $(1.00723)^{12}$ -1= 9.02%
- This positive Jensen's alpha is a sign of good management at the firm.
  - True
  - False

Estimating Disney's Beta

- Slope of the Regression of 1.25 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 0.10.
- 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"

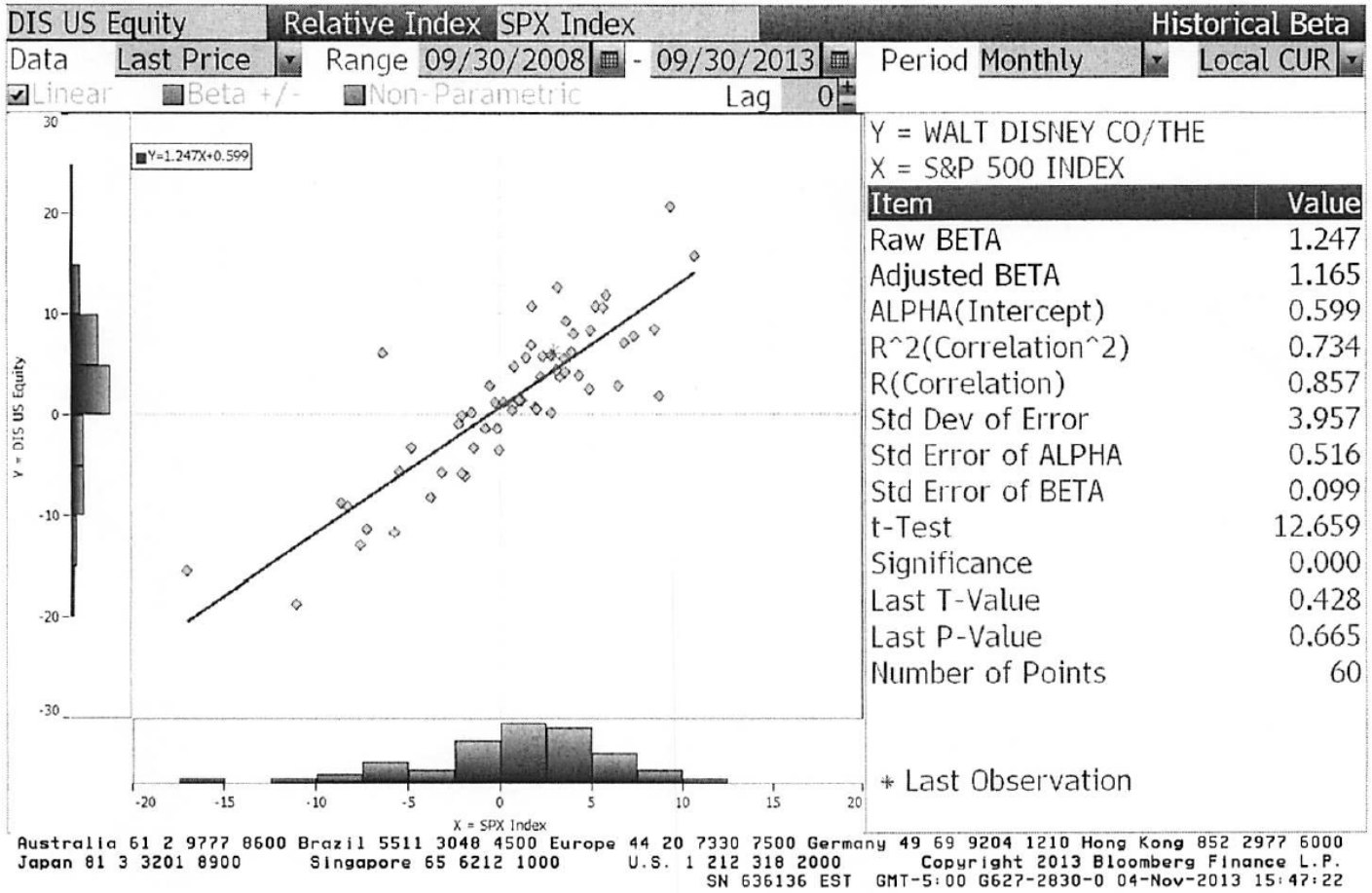


Breaking down Disney's Risk

- R Squared = 73%
- This implies that
  - 73% of the risk at Disney comes from market sources
  - 27%, therefore, comes from firm-specific sources
- The firm-specific risk is diversifiable and will not be rewarded.
- The R-squared for companies, globally, has increased significantly since 2008. Why might this be happening?

- What are the implications for investors?

Beta Estimation: Using a Service (Bloomberg)



Estimating Expected Returns for Disney in November 2013

- Inputs to the expected return calculation
  - Disney's Beta = 1.25
  - Riskfree Rate = 2.75% (U.S. ten-year T.Bond rate in November 2013)
  - Risk Premium = 5.76% (Based on Disney's operating exposure)

Expected Return = Riskfree Rate + Beta (Risk Premium)

= 2.75% + 1.25 (5.76%) = 9.95%

Use to a Potential Investor in Disney

- As a potential investor in Disney, what does this expected return of 9.95% tell you?
  - 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,
  - This is the return that I need to make on Disney in the long term to break even on my investment in the stock
  - 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 9.95%, you would
  - Buy the stock
  - Sell the stock

How managers use this expected return

- Managers at Disney
  - need to make at least 9.95% 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 9.95%.
- 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

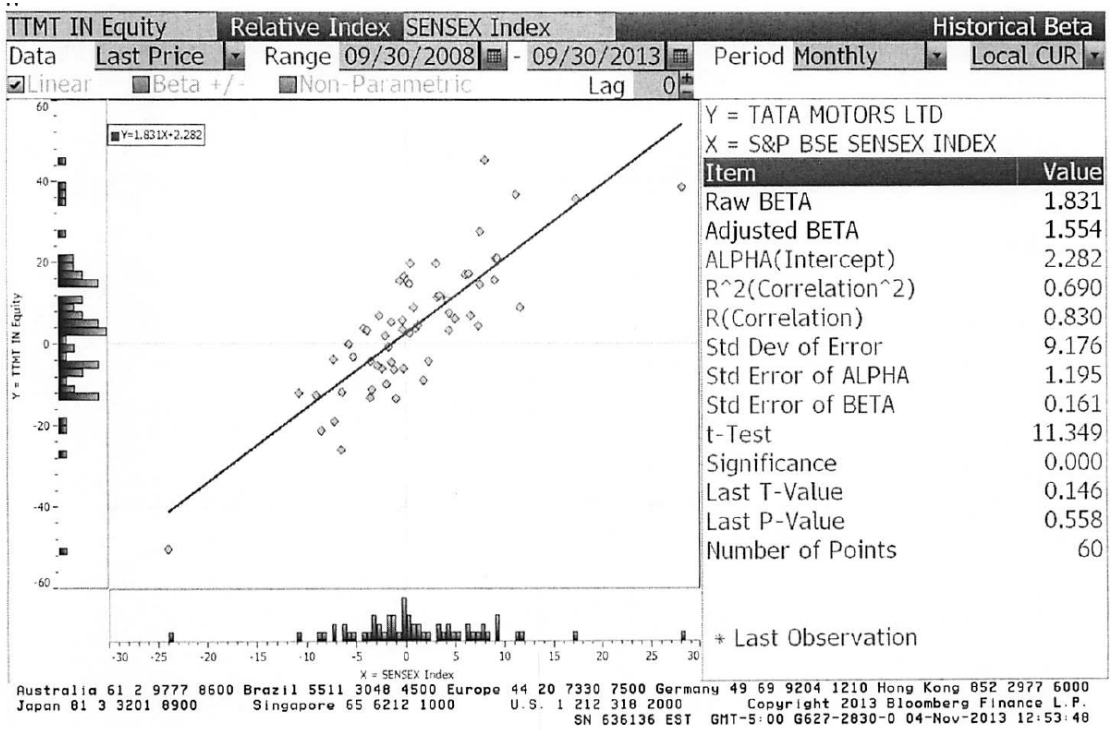
B Beta Page
PB Page 23-26

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 20%. 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?
  - Yes
  - No

Regression Diagnostics for Tata Motors



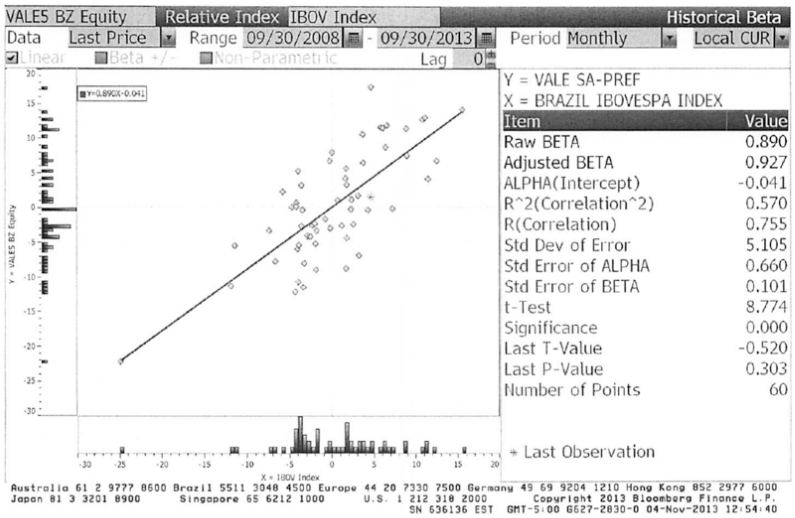
Beta = 1.83
67% range
1.67-1.99

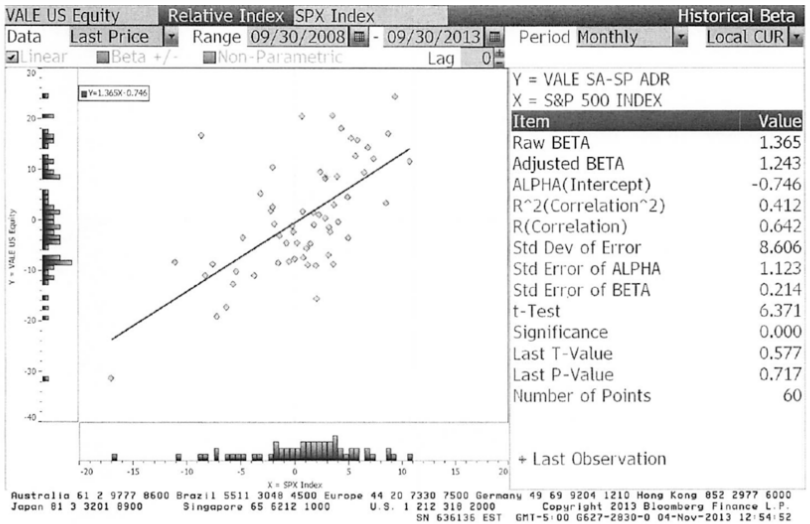
69% market risk
31% firm specific

Jensen's α
= 2.28% - 4%/12 (1-1.83) = 2.56%
Annualized = $(1-.0256)^{12}-1 = 35.42\%$
Average monthly riskfree rate (2008-13) = 4%

Expected Return (in Rupees)
= Riskfree Rate+ Beta*Risk premium
= 6.57%+ 1.83 (7.19%) = 19.73%

Beta Estimation and Index Choice: Vale





Deutsche Bank and Baidu: Index Effects on Risk Parameters

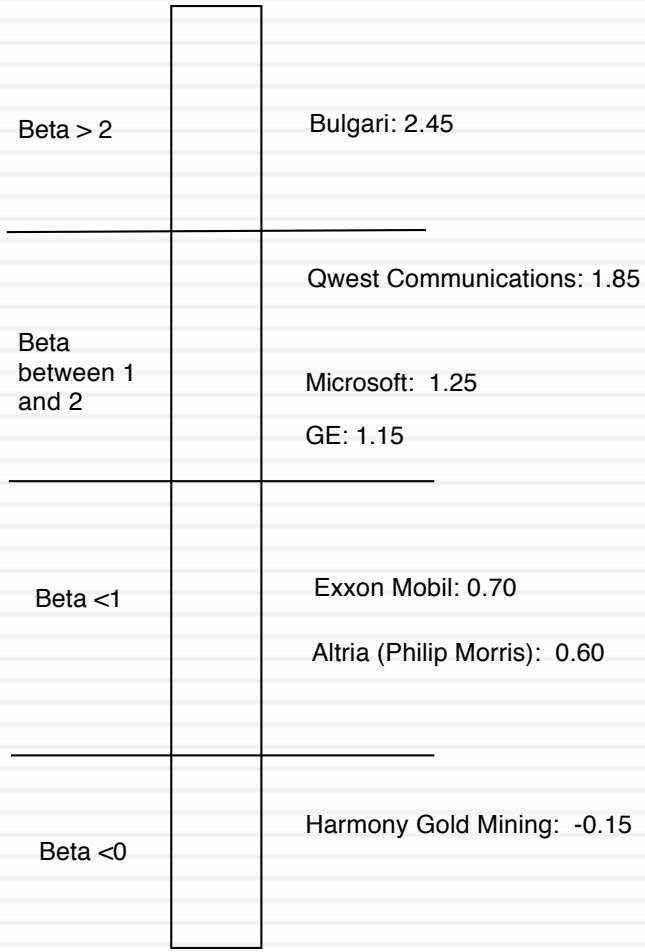
- For Deutsche Bank, a widely held European stock, we tried both the DAX (German index) and the FTSE European index.

	DAX	*FTSE Euro 100*
Intercept	-0.90%	-0.15%
Beta	1.58	1.98
Std Error of beta	0.21	0.29
R^2	51%	29%

- For Baidu, a NASDAQ listed stock, we ran regressions against both the S&P 500 and the NASDAQ.

	S&P 500	*NASDAQ*
Intercept	2.84%	2.15%
Beta	1.63	1.65
Std Error of beta	0.28	0.23
R^2	37%	47%

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- 2013

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%	
2009	$36,149	-4.48%	$5,697	-23.06%	
2010	$38,063	5.29%	$6,726	18.06%	
2011	$40,893	7.44%	$7,781	15.69%	
2012	$42,278	3.39%	$8,863	13.91%	
2013	$45,041	6.54%	$9,450	6.62%	**Operating Leverage**
Average: 87-13		**11.79%**		**11.91%**	**11.91/11.79 =1.01**
Average: 96-13		**8.16%**		**10.20%**	**10.20/8.16 =1.25**

Average across entertainment companies = 1.35

Given Disney's operating leverage measures (1.01 or 1.25), would you expect Disney to have a higher or a lower beta than other entertainment companies?

a. Higher
b. Lower
c. No effect

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 1.25. 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 (2008 to 2013)
- The average debt equity ratio during this period was 19.44%.
- The unlevered beta for Disney can then be estimated (using a marginal tax rate of 36.1%)

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

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

Disney : Beta and Financial Leverage

Debt to Capital	*Debt/Equity Ratio*	*Beta*	*Effect of Leverage*
0.00%	0.00%	1.11	0.00
10.00%	11.11%	1.1908	0.08
20.00%	25.00%	1.29	0.18
30.00%	42.86%	1.42	0.30
40.00%	66.67%	1.59	0.47
50.00%	100.00%	1.82	0.71
60.00%	150.00%	2.18	1.07
70.00%	233.33%	2.77	1.66
80.00%	400.00%	3.95	2.84
90.00%	900.00%	7.51	6.39

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 businesses: The financial breakdown (from 2013 annual report)

Business	*Revenues*	*Operating Income*	*D&A*	*EBITDA*	*S, G & A Costs*	*Cap Ex*	*Identifiable Assets*
Media Networks	$20,356	$6,818	$251	$7,069	$2,768	$263	$28,627
Parks & Resorts	$14,087	$2,220	$1,370	$3,590	$1,960	$2,110	$22,056
Studio Entertainment	$5,979	$661	$161	$822	$2,145	$78	$14,750
Consumer Products	$3,555	$1,112	$146	$1,258	$731	$45	$7,506
Interactive	$1,064	-$87	$44	-$43	$449	$13	$2,311

Unlevered Betas for businesses

$$\frac{\text{Unlevered Beta}}{(1 - \text{Cash/ Firm Value})}$$

Business	*Comparable firms*	*Sample size*	*Median Beta*	*Median D/E*	*Median Tax rate*	*Company Unlevered Beta*	*Median Cash/ Firm Value*	*Business Unlevered Beta*
Media Networks	US firms in broadcasting business	26	1.43	71.09%	40.00%	1.0024	2.80%	1.0313
Parks & Resorts	Global firms in amusement park business	20	0.87	46.76%	35.67%	0.6677	4.95%	0.7024
Studio Entertainment	US movie firms	10	1.24	27.06%	40.00%	1.0668	2.96%	1.0993
Consumer Products	Global firms in toys/games production & retail	44	0.74	29.53%	25.00%	0.6034	10.64%	0.6752
Interactive	Global computer gaming firms	33	1.03	3.26%	34.55%	1.0085	17.25%	1.2187

A closer look at the process… Studio Entertainment Betas

Company Name	Levered Beta	Market Cap	Total Debt	Firm Value	Cash	Cash/Firm Value	Enterprise Value	Marginal tax rate	Gross D/E ratio	Unlevered Beta	Pure play beta	EV/Sales
SFX Entertainment	1.12	738.80	$98.89	$837.69	$143.60	17.14%	$694.09	40.00%	13.39%	1.04	1.25	11.20
Mass Hysteria Entertainment	1.19	0.24	$1.13	$1.37	$0.00	0.00%	$1.37	40.00%	477.94%	0.31	0.31	12.45
Medient Studios	0.93	3.21	$3.18	$6.39	$0.05	0.81%	$6.34	40.00%	99.07%	0.58	0.59	1.21
POW! Entertainment	0.94	3.97	$0.34	$4.31	$0.43	9.85%	$3.89	40.00%	8.65%	0.89	0.99	1.92
MGM Holdings	1.29	3631.70	$142.16	$3,773.86	$140.70	3.73%	$3,633.16	40.00%	3.91%	1.26	1.31	1.92
Lions Gate Entertainment	1.20	4719.60	$1,283.20	$6,002.80	$67.20	1.12%	$5,935.60	40.00%	27.19%	1.03	1.04	2.28
DreamWorks Animation	1.32	2730.00	$348.30	$3,078.30	$156.40	5.08%	$2,921.90	40.00%	12.76%	1.23	1.29	3.81
Twenty-First Century Fox	1.28	77743.50	$20,943.00	$98,686.50	$6,681.00	6.77%	$92,005.50	40.00%	26.94%	1.10	1.18	3.20
Independent Film Development	1.61	1.32	$0.96	$2.28	$0.05	2.20%	$2.23	40.00%	72.35%	1.12	1.15	3.37
Odyssey Pictures Corp	2.60	0.30	$1.64	$1.94	$0.00	0.10%	$1.94	40.00%	551.12%	0.60	0.60	2.90
Average	**1.35**					**4.68%**		**40.00%**	**129.33%**	**0.92**	**0.97**	**4.43**
Aggregate	**1.35**	**$89,572.64**	**$22,822.82**	**$112,395.45**	**$7,189.43**	**6.40%**	**$105,206.02**	**40.00%**	**25.48%**	**1.17**	**1.25**	**3.09**
Median	**1.24**					**2.96%**		**40.00%**	**27.06%**	**1.03**	**1.10**	**3.05**

Backing into a pure play beta: Studio Entertainment

The Median Movie Company

Movie Business	97.04	Beta (movies) = 1.0093	Debt	21.30	Beta (debt) = 0
Cash Businesss	2.96	Beta (cash) = 0.0000	Equity	78.70	Beta (equity) = 1.24
Movie Company	100.0	Beta (company) = 1.0668			

1. Start with the median regression beta (equity beta) of 1.24
2. Unlever the beta, using the median gross D/E ratio of 27.06%
   - Gross D/E ratio = 21.30/78.70 = 27.06%
   - Unlevered beta = 1.24/ (1+ (1-.4) (.2706)) = 1.0668
3. Take out the cash effect, using the median cash/value of 2.96%
   - (.0296) (0) + (1-.0296) (Beta of movie business) = 1.0668
   - Beta of movie business = 1.0668/(1-.0296) = 1.0993

Alternatively, you could have used the net debt to equity ratio

- Net D/E ratio = (21.30-2.96)/78.70 = 23.30%
- Unlevered beta for movies = 1.24/ (1+(1-.4)(.233)) = 1.0879

Disney's unlevered beta: Operations & Entire Company

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

Disney has $3.93 billion in cash, invested in close to riskless assets (with a beta of zero). You can compute an unlevered beta for Disney as a company (inclusive of cash):

$$\beta_{\text{Disney}} = \beta_{\text{Operating Assets}} \frac{\text{Value}_{\text{Operating Assets}}}{(\text{Value}_{\text{Operating Assets}} + \text{Value}_{\text{Cash}})} + \beta_{\text{Cash}} \frac{\text{Value}_{\text{Cash}}}{(\text{Value}_{\text{Operating Assets}} + \text{Value}_{\text{Cash}})}$$

$$= 0.9239\left(\frac{135{,}132}{(135{,}132+3{,}931)}\right) + 0.00\left(\frac{3{,}931}{(135{,}132+3{,}931)}\right) = 0.8978$$

The levered beta: Disney and its divisions

- To estimate the debt ratios for division, we allocate Disney's total debt ($15,961 million) to its divisions based on identifiable assets.

Business	*Identifiable assets (2013)*	*Proportion of debt*	*Value of business*	*Allocated debt*	*Estimated equity*	*D/E ratio*
Media Networks	$28,627	38.04%	$66,580	$6,072	$60,508	10.03%
Parks & Resorts	$22,056	29.31%	$45,683	$4,678	$41,005	11.41%
Studio Entertainment	$14,750	19.60%	$18,234	$3,129	$15,106	20.71%
Consumer Products	$7,506	9.97%	$2,952	$1,592	$1,359	117.11%
Interactive	$2,311	3.07%	$1,684	$490	$1,194	41.07%
Disney	$75,250	100.00%		$15,961	$121,878	13.10%

- We use the allocated debt to compute D/E ratios and levered betas.

Business	*Unlevered beta*	*Value of business*	*D/E ratio*	*Levered beta*	*Cost of Equity*
Media Networks	1.0313	$66,580	10.03%	1.0975	9.07%
Parks & Resorts	0.7024	$45,683	11.41%	0.7537	7.09%
Studio Entertainment	1.0993	$18,234	20.71%	1.2448	9.92%
Consumer Products	0.6752	$2,952	117.11%	1.1805	9.55%
Interactive	1.2187	$1,684	41.07%	1.5385	11.61%
Disney Operations	0.9239	$135,132	13.10%	1.0012	8.52%

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 9.5%. 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 Bottom Up Betas & Costs of Equity: Vale

Business	*Sample*	*Sample size*	*Unlevered beta of business*	*Revenues*	*Peer Group EV/Sales*	*Value of Business*	*Proportion of Vale*
Metals & Mining	Global firms in metals & mining, Market cap>$1 billion	48	0.86	$9,013	1.97	$17,739	16.65%
Iron Ore	Global firms in iron ore	78	0.83	$32,717	2.48	$81,188	76.20%
Fertilizers	Global specialty chemical firms	693	0.99	$3,777	1.52	$5,741	5.39%
Logistics	Global transportation firms	223	0.75	$1,644	1.14	$1,874	1.76%
Vale Operations			*0.8440*	*$47,151*		*$106,543*	*100.00%*

Business	Unlevered beta	D/E ratio	Levered beta	Risk free rate	ERP	Cost of Equity
Metals & Mining	0.86	54.99%	1.1657	2.75%	7.38%	11.35%
Iron Ore	0.83	54.99%	1.1358	2.75%	7.38%	11.13%
Fertilizers	0.99	54.99%	1.3493	2.75%	7.38%	12.70%
Logistics	0.75	54.99%	1.0222	2.75%	7.38%	10.29%
Vale Operations	0.84	54.99%	1.1503	2.75%	7.38%	11.23%

Vale: Cost of Equity Calculation – in nominal $R

- To convert a discount rate in one currency to another, all you need are expected inflation rates in the two currencies.

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

- From US $ to R$: If we use 2% as the inflation rate in US dollars and 9% as the inflation ratio in Brazil, we can convert Vale's US dollar cost of equity of 11.23% to a $R cost of equity:

$$\text{Cost of Equity}_{\text{Nominal R\$}} = (1+\text{ Cost of Equity}_{\text{US \$}})\frac{(1+\text{Expected Inflation}_{\text{R\$}})}{(1+\text{Expected Inflation}_{\text{US \$}})}-1$$

$$= (1.1123)\ \frac{(1.09)}{(1.02)}-1 = 18.87\%$$

- Alternatively, you can compute a cost of equity, starting with the $R riskfree rate of 10.18%.

Cost of Equity in $R = = 10.18% + 1.15 (7.38%) = 18.67%

Bottom up betas & Costs of Equity: Tata Motors & Baidu

- Tata Motors: We estimated an unlevered beta of 0.8601 across 76 publicly traded automotive companies (globally) and estimated a levered beta based on Tata Motor's D/E ratio of 41.41% and a marginal tax rate of 32.45% for India:

  Levered Beta for Tata Motors = 0.8601 (1 + (1-.3245) (.4141)) = 1.1007

  Cost of equity (Rs) = 6.57% + 1.1007 (7.19%) = 14.49%

- Baidu: To estimate its beta, we looked at 42 global companies that derive all or most of their revenues from online advertising and estimated an unlevered beta of 1.30 for the business. Incorporating Baidu's current market debt to equity ratio of 5.23% and the marginal tax rate for China of 25%, we estimate Baidu's current levered beta to be 1.3560.

  Levered Beta for Baidu = 1.30 (1 + (1-.25) (.0523)) = 1.356

  Cost of Equity for Baidu (Renmimbi) = 3.50% + 1.356 (6.94%) = 12.91%

Bottom up Betas and Costs of Equity: Deutsche Bank

- We break Deutsche Bank down into two businesses – commercial and investment banking.

Business	*Sample used*	*Sample size*	*Median Levered Beta*	*Deutsche Net Revenues in 2012*	*Proportion*
Banking	European diversified banks	84	1.0665	19,019 mil €	54.86%
Investment Banking	Global investment banks	58	1.2550	15,648 mil €	45.14%
Deutsche Bank			1.1516	34,667 mil €	

- We do not unlever or relever betas, because estimating debt and equity for banks is an exercise in futility.

Business	*Beta*	*Cost of Equity*
Commercial banking	1.0665	1.75%+1.0665 (6.12%) = 8.28%
Investment Banking	1.2550	1.75%+1.2550 (6.12%) = 9.44%
Deutsche Bank	1.1516	1.75%+1.1516 (6.12%) = 8.80%

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*	*Market Capitalization*	*Levered Beta*	*Marginal tax rate*	*Gross D/E ratio*	*Cash/Firm Value*	R^2
Red Giant Entertainment	Publishing	$2.13	0.69	40.00%	0.00%	0.05%	0.1300
CTM Media Holdings	Publishing	$25.20	1.04	40.00%	17.83%	33.68%	0.1800
Books-A-Million	Book Stores	$38.60	1.42	40.00%	556.55%	4.14%	0.1900
Dex Media	Publishing	$90.50	4.92	40.00%	3190.39%	7.86%	0.2200
Martha Stewart Living	Publishing	$187.70	1.11	40.00%	19.89%	15.86%	0.3500
Barnes & Noble	Book Stores	$939.30	0.11	40.00%	164.54%	3.22%	0.2600
Scholastic Corporation	Publishing	$953.80	1.08	40.00%	21.41%	1.36%	0.2750
John Wiley	Publishing	$2,931.40	0.81	40.00%	29.58%	5.00%	0.3150
Washington Post	Publishing	$4,833.20	0.68	40.00%	21.04%	16.04%	0.2680
News Corporation	Publishing	$10,280.40	0.49	40.00%	8.73%	24.05%	0.2300
Thomson Reuters	Publishing	$31,653.80	0.62	40.00%	26.38%	1.68%	0.2680
Average			**1.1796**	**40.00%**	**368.76%**	**10.27%**	**0.2442**
Median			**0.8130**	**40.00%**	**21.41%**	**5.00%**	**0.2600**

Unlevered beta for book company = 0.8130/ (1+ (1-.4) (.2141)) = 0.7205

Unlevered beta for book business = 0.7205/(1-.05) = 0.7584

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 market debt to equity ratio of 21.41 percent.
- Using a marginal tax rate of 40 percent for Bookscape, we get a levered beta of 0.8558.

  Levered beta for Bookscape = 0.7584[1 + (1 – 0.40) (0.2141)] = 0.8558
- Using a riskfree rate of 2.75% (US treasury bond rate) and an equity risk premium of 5.5%:

  Cost of Equity = 2.75%+ 0.8558 (5.5%) = 7.46%

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 0.8558 and the average R-squared of the comparable publicly traded firms is 26.00%; the correlation with the market is 50.99%.

$$\frac{\text{Market Beta}}{\sqrt{\text{R squared}}} = \frac{0.8558}{.5099} = 1.6783$$

  - Total Cost of Equity = 2.75 + 1.6783 (5.5%) = 11.98%

⌛ 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.

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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.

The easy route: Outsourcing the measurement of default risk

- For those firms that have bond ratings from global ratings agencies, I used those ratings:

Company	S&P Rating	Risk-Free Rate	Default Spread	Cost of Debt
Disney	A	2.75% (US $)	1.00%	3.75%
Deutsche Bank	A	1.75% (Euros)	1.00%	2.75%
Vale	A-	2.75% (US $)	1.30%	4.05%

- If you want to estimate Vale's cost of debt in $R terms, we can again use the differential inflation approach we used for the cost of equity:

$$\text{Cost of debt}_{R\$} = (1+\text{Cost of debt}_{US\$})\frac{(1+\text{Expected Inflation}_{R\$})}{(1+\text{Expected Inflation}_{US\$})}-1$$

$$=(1.0405)\frac{(1.09)}{(1.02)}-1=11.19\%\%$$

A more general route: 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	$10.023	$444	22.57
Vale	$15,667	$1,342	11.67
Tata Motors	Rs 166,605	Rs 36,972	4.51
Baidu	CY 11,193	CY 472	23.72
Bookscape	$2,536	$492	5.16

Interest Coverage Ratios, Ratings and Default Spreads- November 2013

Large cap (>$5 billion)	*Small cap or risky (<$5 billion)*	*Rating is (S&P/ Moody's)*	*Spread (11/13)*
>8.50	>12,5	Aaa/AAA	0.40%
6.5-8.5	9.5-12.5	Aa2/AA	0.70%
5.5-6.5	7.5-9.5	A1/A+	0.85%
4.25-5.5	6-7.5	A2/A	1.00%
3-4.25	4.5-6	A3/A-	1.30%
2.5-3	4-4.5	Baa2/BBB	2.00%
2.25-2.5	3.5-4	Ba1/BB+	3.00%
2-2.25	3-3.5	Ba2/BB	4.00%
1.75-2.25	2.5-3	B1/B+	5.50%
1.5-1.75	2-2.5	B2/B	6.50%
1.25-1.5	1.5-2	B3/B-	7.25%
0.8-1.25	1.25-1.5	Caa/CCC	8.75%
0.65-0.8	0.8-1.25	Ca2/CC	9.50%
0.2-0.65	0.5-0.8	C2/C	10.50%
<0.2	<0.5	D2/D	12.00%

Disney: Large cap, developed	22.57	→	AAA
Vale: Large cap, emerging	11.67	→	AA
Tata Motors: Large cap, Emerging	4.51	→	A-
Baidu: Small cap, Emerging	23.72	→	AAA
Bookscape: Small cap, private	5.16	→	A-

Synthetic versus Actual Ratings: Rated Firms

- Disney's synthetic rating is AAA, 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 2013 operating income whereas actual rating reflects normalized earnings
- Vale's synthetic rating is AA, but the actual rating for dollar debt is A-. The biggest factor behind the difference is the presence of country risk, since Vale is probably being rated lower for being a Brazil-based corporation.
- 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 = 1.30%
  - Pre-tax cost of debt = Riskfree Rate + Default Spread = 2.75% + 1.30% = 4.05%
  - After-tax cost of debt = Pre-tax cost of debt (1- tax rate) = 4.05% (1-.40) = 2.43%
- 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	2.75% (US $)	1.00%	3.75%	36.1%	2.40%
Deutsche Bank	A	1.75% (Euros)	1.00%	2.75%	29.48%	1.94%
Vale	A-	2.75% (US $)	1.30%	4.05%	34%	2.67%

- For Tata Motors, we have a rating of AA- from CRISIL, an Indian bond-rating firm, that measures only company risk. Using that rating:

$$\text{Cost of debt}_{TMT} = \text{Risk free rate}_{Rupees} + \text{Default spread}_{India} + \text{Default spread}_{TMT}$$
$$= 6.57\% + 2.25\% + 0.70\% = 9.62\%$$

After-tax cost of debt = 9.62% (1-.3245) = 6.50%

Updated Default Spreads – January 2014

Rating	1 year	5 year	10 Year	30 year
Aaa/AAA	0.05%	0.18%	0.42%	0.65%
Aa1/AA+	0.11%	0.37%	0.57%	0.82%
Aa2/AA	0.16%	0.55%	0.71%	0.98%
Aa3/AA-	0.22%	0.60%	0.75%	0.99%
A1/A+	0.26%	0.65%	0.78%	1.00%
A2/A	0.33%	0.67%	0.84%	1.12%
A3/A-	0.46%	0.84%	1.00%	1.26%
Baa1/BBB+	0.58%	1.09%	1.32%	1.67%
Baa2/BBB	0.47%	1.27%	1.52%	1.91%
Baa3/BBB-	0.95%	1.53%	1.78%	2.18%
Ba1/BB+	1.68%	2.29%	2.59%	2.97%
Ba2/BB	2.40%	3.04%	3.39%	3.77%
Ba3/BB-	3.12%	3.80%	4.20%	4.57%
B1/B+	3.84%	4.56%	5.01%	5.36%
B2/B	4.56%	5.31%	5.81%	6.16%
B3/B-	5.28%	6.06%	6.62%	6.96%
Caa/CCC+	6.00%	6.82%	7.43%	7.75%

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

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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 2013 financial statements, the debt due over time was footnoted.

Time due	Amount due	Weight	Weight *Maturity
0.5	$1,452	11.96%	0.06
2	$1,300	10.71%	0.21
3	$1,500	12.36%	0.37
4	$2,650	21.83%	0.87
6	$500	4.12%	0.25
8	$1,362	11.22%	0.9
9	$1,400	11.53%	1.04
19	$500	4.12%	0.78
26	$25	0.21%	0.05
28	$950	7.83%	2.19
29	$500	4.12%	1.19
	$12,139		7.92

- Disney's total debt due, in book value terms, on the balance sheet is $14,288 million and the total interest expense for the year was $349 million. Using 3.75% as the pre-tax cost of debt:
- Estimated MV of Disney Debt = $$349\left[\frac{(1-\frac{1}{(1.0375)^{7.92}}}{.0375}\right]+\frac{14,288}{(1.0375)^{7.92}}=\$13,028 \text{ million}$$

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 3.75%.

Year	Commitment	Present Value @3.75%
1	$507.00	$488.67
2	$422.00	$392.05
3	$342.00	$306.24
4	$272.00	$234.76
5	$217.00	$180.52
6-10	$356.80	$1,330.69
Debt value of leases		$2,932.93

Disney reported $1,784 million in commitments after year 5. Given that their average commitment over the first 5 years, we assumed 5 years @ $356.8 million each.

- Debt outstanding at Disney = $13,028 + $ 2,933= $15,961 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

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Current Cost of Capital: Disney

- Equity
  - Cost of Equity = Riskfree rate + Beta * Risk Premium
    = 2.75% + 1.0013 (5.76%) = 8.52%
  - Market Value of Equity = $121,878 million
  - Equity/(Debt+Equity) = 88.42%
- Debt
  - After-tax Cost of debt =(Riskfree rate + Default Spread) (1-t)
    = (2.75%+1%) (1-.361) = 2.40%
  - Market Value of Debt = $13,028+ $2933 = $ 15,961 million
  - Debt/(Debt +Equity) = 11.58%
- Cost of Capital = 8.52%(.8842)+ 2.40%(.1158) = 7.81%

121,878/ (121,878+15,961)

Divisional Costs of Capital: Disney and Vale

Disney

	Cost of equity	Cost of debt	Marginal tax rate	After-tax cost of debt	Debt ratio	Cost of capital
Media Networks	9.07%	3.75%	36.10%	2.40%	9.12%	8.46%
Parks & Resorts	7.09%	3.75%	36.10%	2.40%	10.24%	6.61%
Studio Entertainment	9.92%	3.75%	36.10%	2.40%	17.16%	8.63%
Consumer Products	9.55%	3.75%	36.10%	2.40%	53.94%	5.69%
Interactive	11.65%	3.75%	36.10%	2.40%	29.11%	8.96%
Disney Operations	8.52%	3.75%	36.10%	2.40%	11.58%	7.81%

Vale

Business	*Cost of equity*	*After-tax cost of debt*	*Debt ratio*	*Cost of capital (in US$)*	*Cost of capital (in $R)*
Metals & Mining	11.35%	2.67%	35.48%	8.27%	15.70%
Iron Ore	11.13%	2.67%	35.48%	8.13%	15.55%
Fertilizers	12.70%	2.67%	35.48%	9.14%	16.63%
Logistics	10.29%	2.67%	35.48%	7.59%	14.97%
Vale Operations	11.23%	2.67%	35.48%	8.20%	15.62%

Costs of Capital: Tata Motors, Baidu and Bookscape

- To estimate the costs of capital for Tata Motors in Indian rupees:

  Cost of capital= 14.49% (1-.2928) + 6.50% (.2928) = 12.15%

- For Baidu, we follow the same path to estimate a cost of equity in Chinese RMB:

  Cost of capital = 12.91% (1-.0523) + 3.45% (.0523) = 12.42%

- For Bookscape, the cost of capital is different depending on whether you look at market or total beta:

	Cost of equity	Pre-tax Cost of debt	After-tax cost of debt	D/(D+E)	Cost of capital
Market Beta	7.46%	4.05%	2.43%	17.63%	6.57%
Total Beta	11.98%	4.05%	2.43%	17.63%	10.30%

⌛ 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.

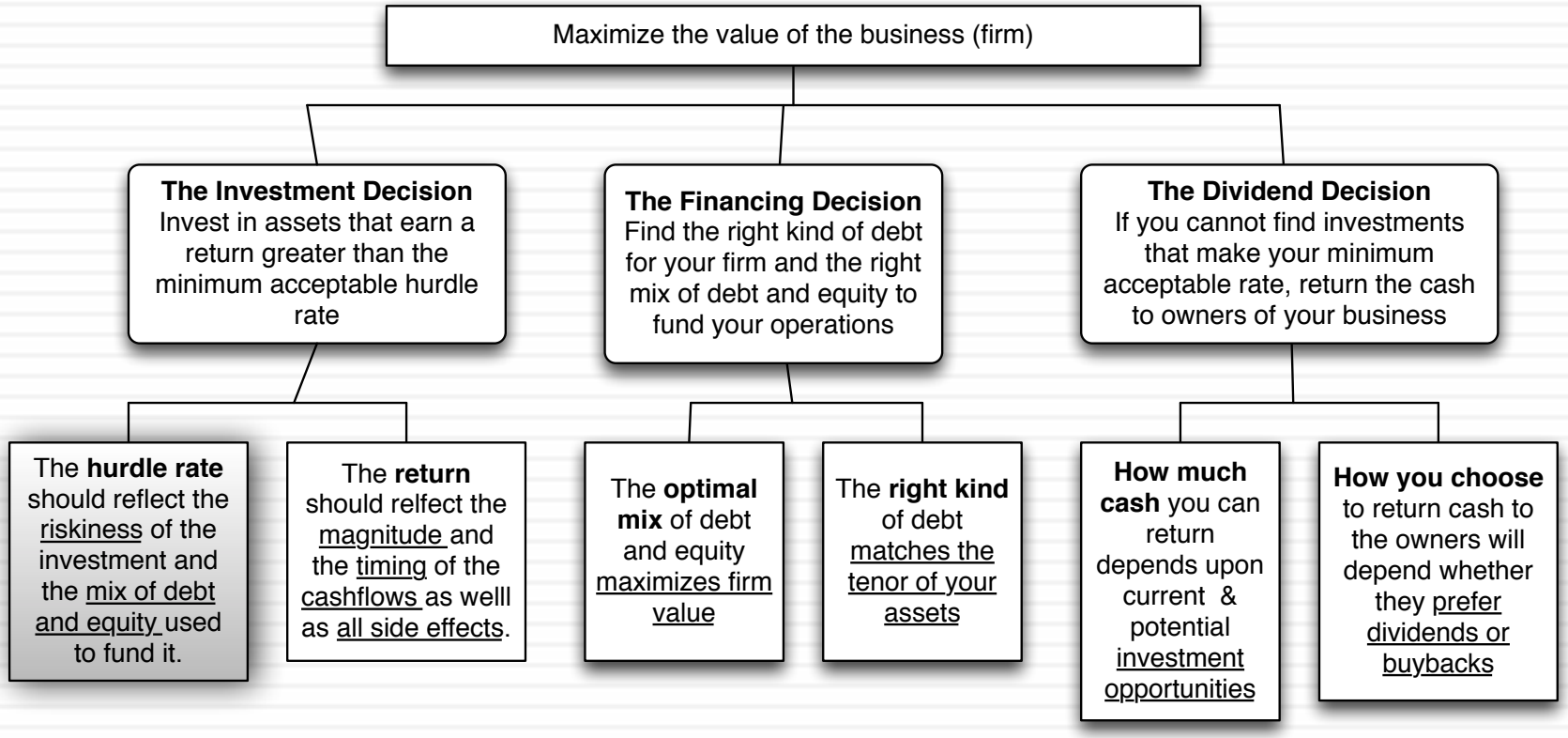
- Based upon the costs of equity and debt that you have estimated, and the weights for each, estimate the cost of capital for your firm.

- 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



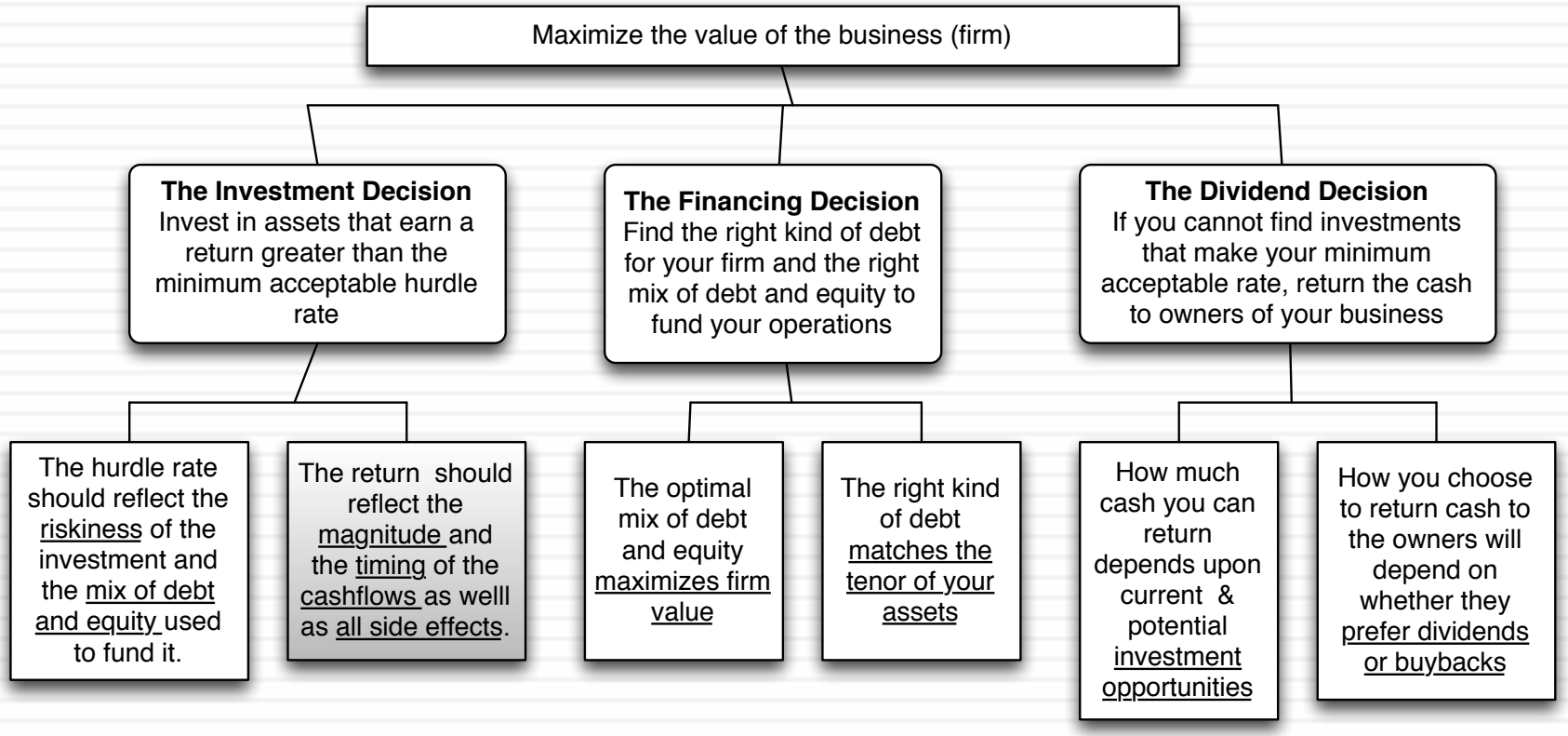
Aswath Damodaran

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		-$18	-$54	-$30	$38	$114	$141	$169	$199	$231	$238
Operating Income after Taxes		-$32	-$96	-$54	$68	$202	$249	$299	$352	$410	$421

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 36.1%

And the Accounting View of Return

Year	After-tax Operating Income	BV of pre-project investment	BV of fixed assets	BV of Working capital	BV of Capital	Average BV of Capital	ROC(a)	ROC(b)
0		500	2000	0	$2,500			
1	-$32	$450	$3,000	$0	$3,450	$2,975	-1.07%	-1.28%
2	-$96	$400	$3,813	$63	$4,275	$3,863	-2.48%	-2.78%
3	-$54	$350	$4,145	$88	$4,582	$4,429	-1.22%	-1.26%
4	$68	$300	$4,027	$125	$4,452	$4,517	1.50%	1.48%
5	$202	$250	$3,962	$156	$4,368	$4,410	4.57%	4.53%
6	$249	$200	$3,931	$172	$4,302	$4,335	5.74%	5.69%
7	$299	$150	$3,931	$189	$4,270	$4,286	6.97%	6.94%
8	$352	$100	$3,946	$208	$4,254	$4,262	8.26%	8.24%
9	$410	$50	$3,978	$229	$4,257	$4,255	9.62%	9.63%
10	$421	$0	$4,010	$233	$4,243	$4,250	9.90%	9.89%
Average							4.18%	4.11%

(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?
  a. The riskfree rate of 2.75% (T. Bond rate)
  b. The cost of equity for Disney as a company (8.52%)
  c. The cost of equity for Disney theme parks (7.09%)
  d. The cost of capital for Disney as a company (7.81%)
  e. The cost of capital for Disney theme parks (6.61%)
  f. 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

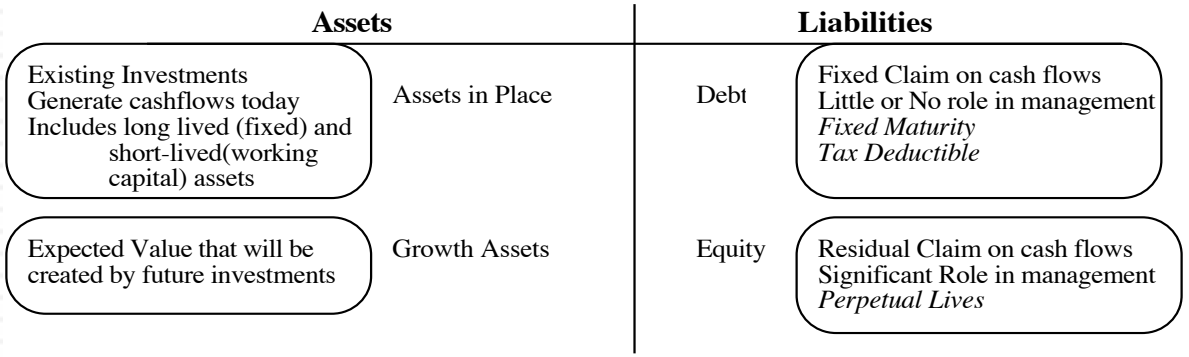
- We did estimate a cost of capital of 6.61% for the Disney theme park business, using a bottom-up levered beta of 0.7537 for the business.
- This cost of equity may not adequately reflect the additional risk associated with the theme park being in an emerging market.
- The only concern we would have 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). We first computed the Brazil country risk premium (by multiplying the default spread for Brazil by the relative equity market volatility) and then re-estimated the cost of equity:
  - Country risk premium for Brazil = 5.5%+ 3% = 8.5%
  - Cost of Equity in US$= 2.75% + 0.7537 (8.5%) = 9.16%
- Using this estimate of the cost of equity, Disney's theme park debt ratio of 10.24% and its after-tax cost of debt of 2.40% (see chapter 4), we can estimate the cost of capital for the project:
  - Cost of Capital in US$ = 9.16% (0.8976) + 2.40% (0.1024) = 8.46%

Would lead us to conclude that...

- Do not invest in this park. The return on capital of 4.18% is lower than the cost of capital for theme parks of 8.46%; 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?
  - Yes
  - 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	$6,920	$16,328	$41,958	$3,387	$54,899	12.61%	7.81%	4.80%
Vale	$12,432	$49,246	$75,974	$5,818	$119,402	10.41%	8.20%	2.22%
Baidu	¥9,111	¥13,561	¥27,215	¥10,456	¥30,320	30.05%	12.42%	17.63%
Tata Motors	120,905₹	471,489₹	330,056₹	225,562₹	575,983₹	20.99%	11.44%	9.55%
Bookscape	$1,775	$12,136	$8,250	$1,250	$19,136	9.28%	10.30%	-1.02%

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	4.80%	$54,899	$2,632
Vale	2.22%	$119,402	$2,645
Baidu	17.63%	$30,320	$5,347
Deutsche Bank	NMF	NMF	NMF
Tata Motors	9.55%	$575,983	$55,033
Bookscape	-1.02%	$19,136	-$195

⌛ 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)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)previous year

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The cash flow view of this project..

	0	1	2	3	4	5	6	7	8	9	10
After-tax Operating Income		-$32	-$96	-$54	$68	$202	$249	$299	$352	$410	$421
+ Depreciation & Amortization	$0	$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 non-cash Work Capital		$0	$63	$25	$38	$31	$16	$17	$19	$21	$5
Cashflow to firm	($2,500)	($982)	($921)	($361)	$198	$285	$314	$332	$367	$407	$434

To get from income to cash flow, we

I. 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
Tax Bendfits from Depreciation	$18	$153	$169	$160	$134	$132	$132	$132	$132	$133

II. subtracted out the capital expenditures

III. subtracted out the change in non-cash working capital

The incremental cash flows on the project

	0	1	2	3	4	5	6	7	8	9	10
After-tax Operating Income		-$32	-$96	-$54	$68	$202	$249	$299	$352	$410	$421
+ Depreciation & Amortization	$0	$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 non-cash Working Capital		$0	$63	$25	$38	$31	$16	$17	$19	$21	$5
Cashflow to firm	($2,500)	($982)	($921)	($361)	$198	$285	$314	$332	$367	$407	$434
+ Pre-project investment (sunk)	$500										
- Pre-project Depreciation * tax rate		$18	$18	$18	$18	$18	$18	$18	$18	$18	$18
+ Non-incremental Allocated Expense (1-t)		$0	$80	$112	$160	$200	$220	$242	$266	$292	$298
Incremental Cash flow to the firm	($2,000)	($1,000)	($860)	($267)	$340	$467	$516	$555	$615	$681	$715

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

2/3rd of allocated G&A is fixed. Add back this amount (1-t) Tax rate = 36.1%

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 Formula	Discounting Formula	Compounding
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)
    =715 (1.02) /(.0846-.02) = $ 11,275 million

Which yields a NPV of..

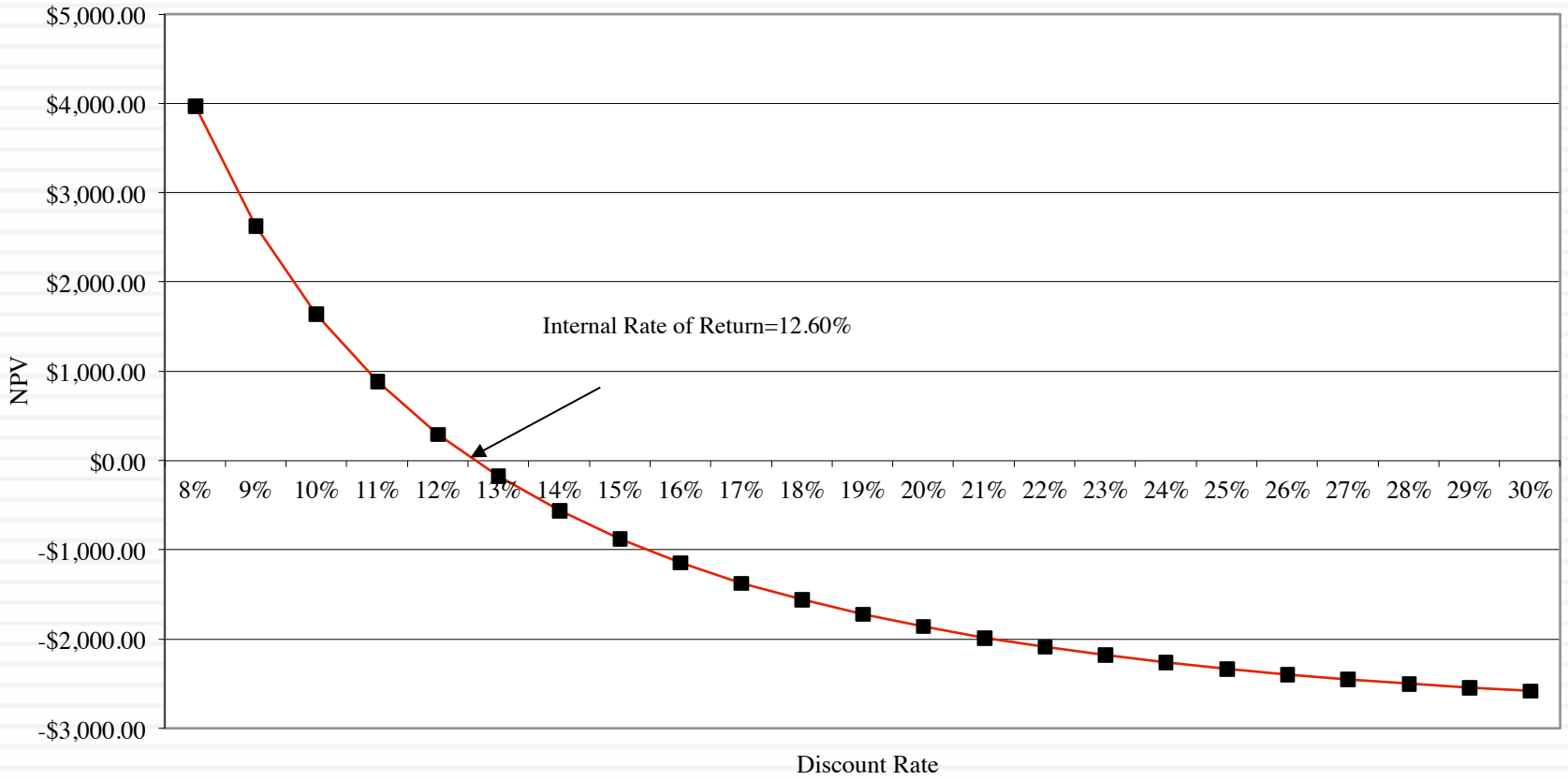
Year	Annual Cashflo	Terminal Value	Present Value
0	-$2,000		-$2,000
1	-$1,000		-$922
2	-$859		-$730
3	-$267		-$210
4	$340		$246
5	$466		$311
6	$516		$317
7	$555		$314
8	$615		$321
9	$681		$328
10	$715	$11,275	$5,321
			$3,296

Discounted at Rio Disney cost of capital of 8.46%

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 $3,296 million.

The IRR of this project



The IRR suggests..

- The project is a good one. Using time-weighted, incremental cash flows, this project provides a return of 12.60%. This is greater than the cost of capital of 8.46%.
- 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 * $(1.09/1.02)^t$

Discount at $R cost of capital
= (1.0846) (1.09/1.02) – 1 = 15.91%

Year	Cashflow ($)	$R/$	Cashflow (Bt)	Present Value
0	-R$ 2,000	R$ 2.35	-R$ 4,700	-R$ 4,700
1	-R$ 1,000	R$ 2.51	-R$ 2,511	-R$ 2,167
2	-R$ 859	R$ 2.68	-R$ 2,305	-R$ 1,716
3	-R$ 267	R$ 2.87	-R$ 767	-R$ 492
4	R$ 340	R$ 3.06	R$ 1,043	R$ 578
5	R$ 466	R$ 3.27	R$ 1,527	R$ 730
6	R$ 516	R$ 3.50	R$ 1,807	R$ 745
7	R$ 555	R$ 3.74	R$ 2,076	R$ 739
8	R$ 615	R$ 4.00	R$ 2,458	R$ 754
9	R$ 681	R$ 4.27	R$ 2,910	R$ 771
10	R$ 11,990	R$ 4.56	R$ 54,720	R$ 12,504
				R$ 7,745

NPV = R$ 7,745/2.35= $ 3,296 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 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	-$922	-$2,922
2	-$859	-$3,859	-$730	-$3,652
3	-$267	-$4,126	-$210	-$3,862
4	$340	-$3,786	$246	-$3,616
5	$466	-$3,320	$311	-$3,305
6	$516	-$2,803	$317	-$2,988
7	$555	-$2,248	$314	-$2,674
8	$615	-$1,633	$321	-$2,353
9	$681	-$952	$328	-$2,025
10	$715	-$237	$317	-$1,708
11	$729	$491	$298	-$1,409
12	$743	$1,235	$280	-$1,129
13	$758	$1,993	$264	-$865
14	$773	$2,766	$248	-$617
15	$789	$3,555	$233	-$384
16	$805	$4,360	$219	-$165
17	$821	$5,181	$206	$41

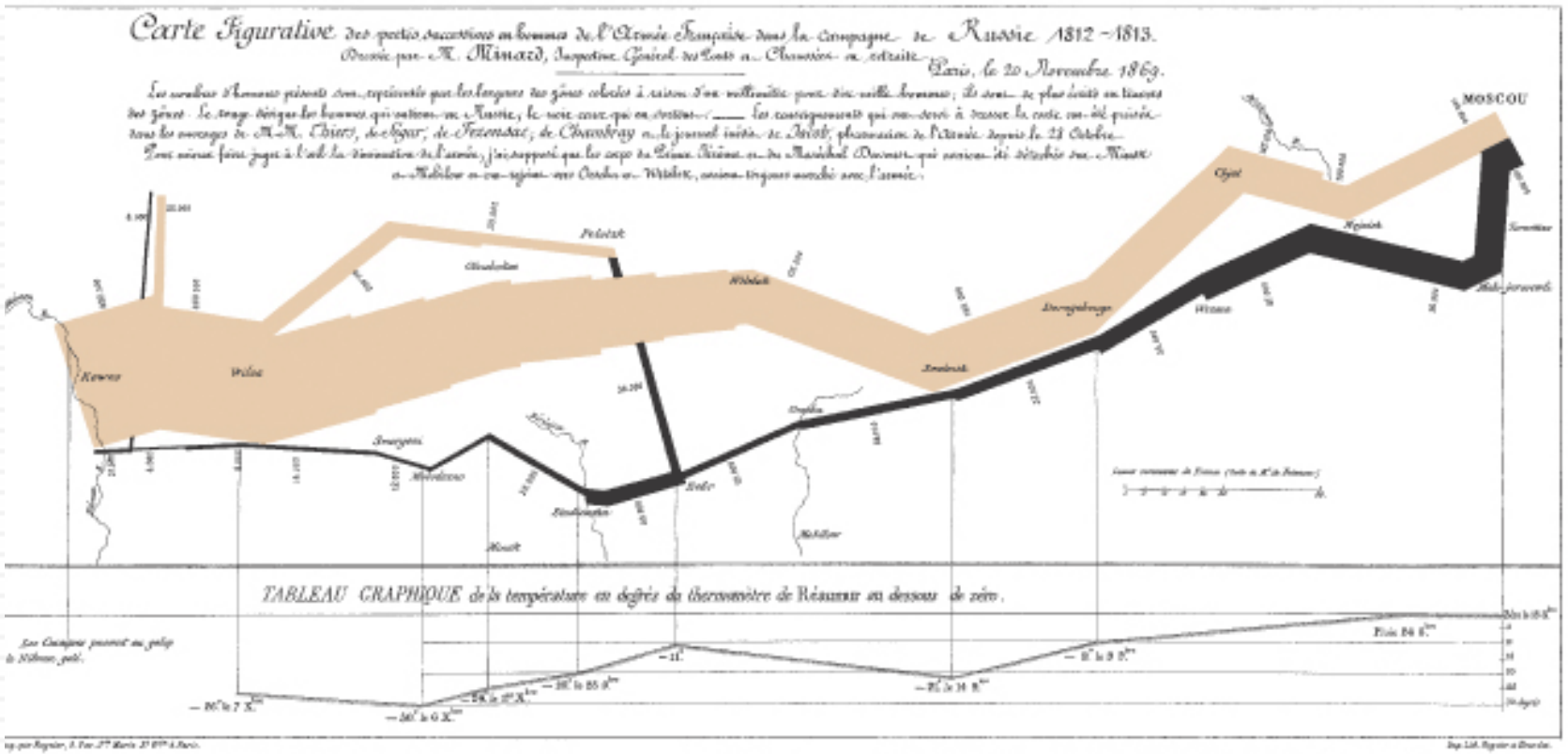
Payback = 10.3 years →

Discounted Payback = 16.8 years

A slightly more sophisticated approach: Sensitivity Analysis & 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).

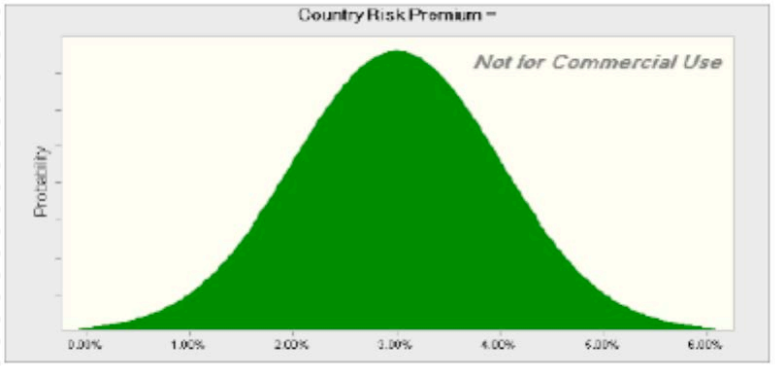
And here is a really good picture…



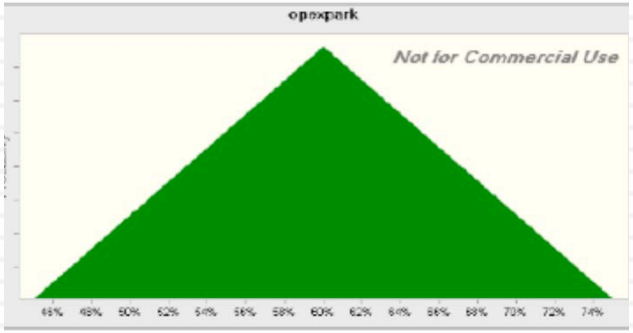
The final step up: Incorporate probabilistic estimates.. Rather than expected values..

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

Country Risk Premium (Base Case = 3% (Brazil))

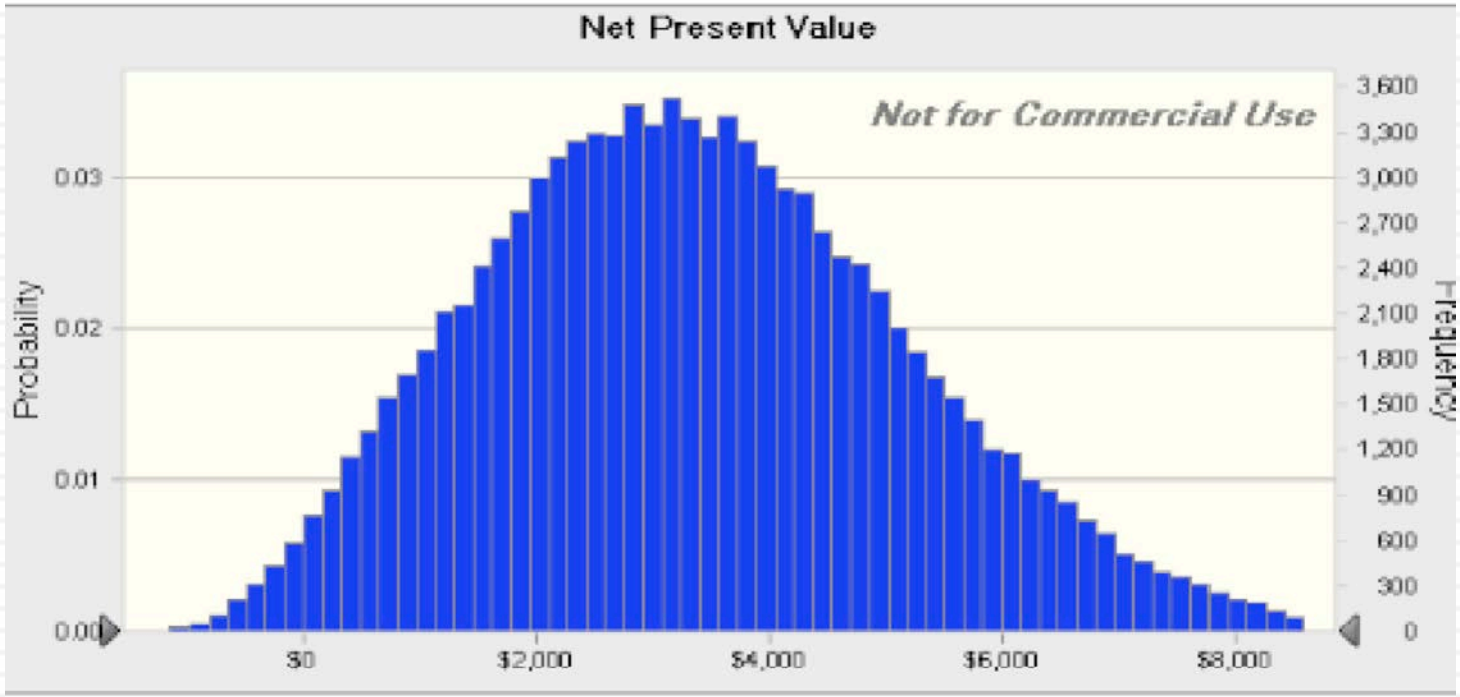


Operating Expenses at Parks as % of Revenues (Base Case = 60%)



The resulting simulation…

Average = $3.40 billion
Median = $3.28 billion

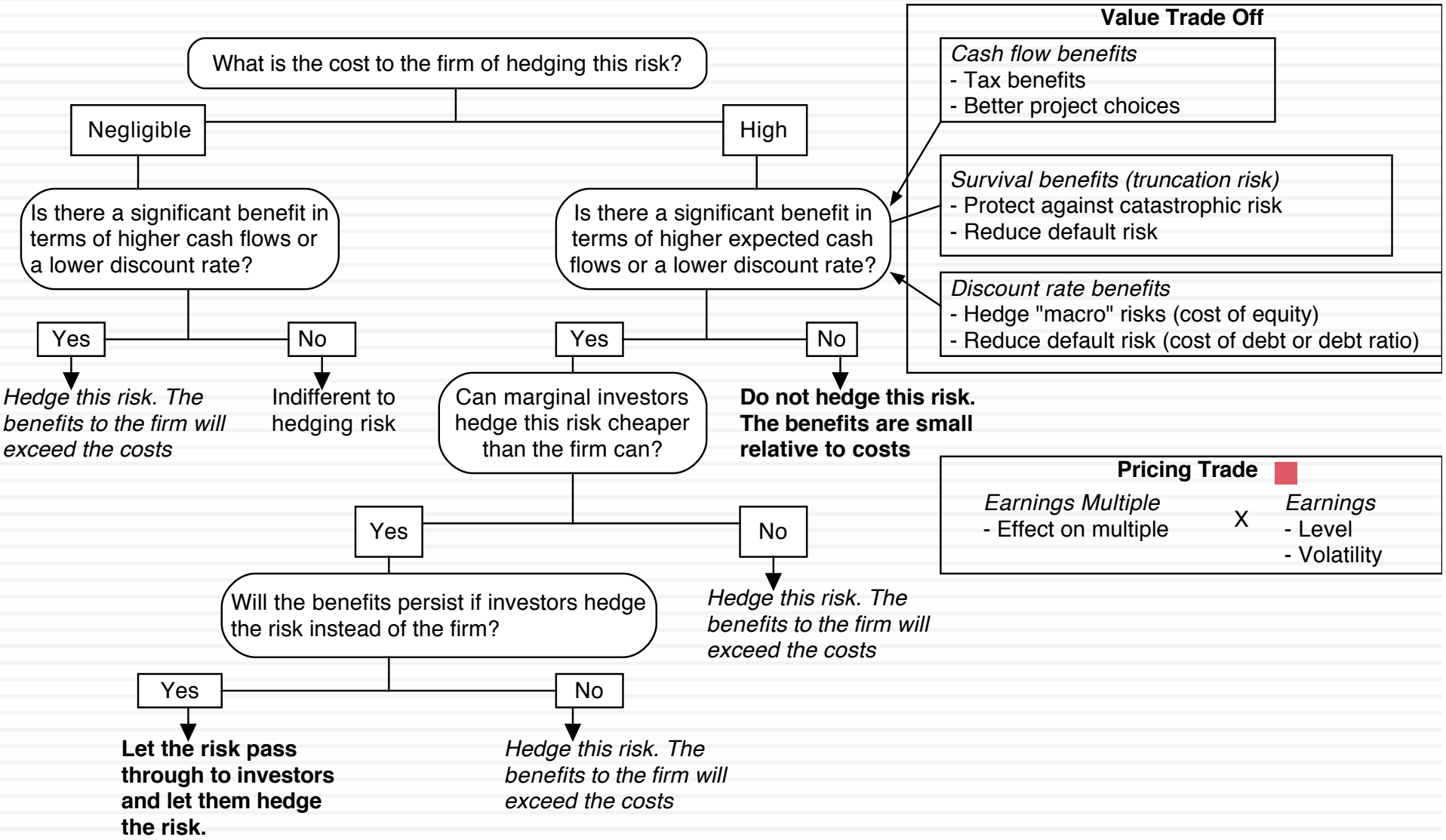


NPV ranges from -$1 billion to +$8.5 billion. NPV is negative 12% of the time.

A side bar: Should you hedge risks?

- Disney can reduce the risk in this project by hedging against exchange rate risk. Should it?

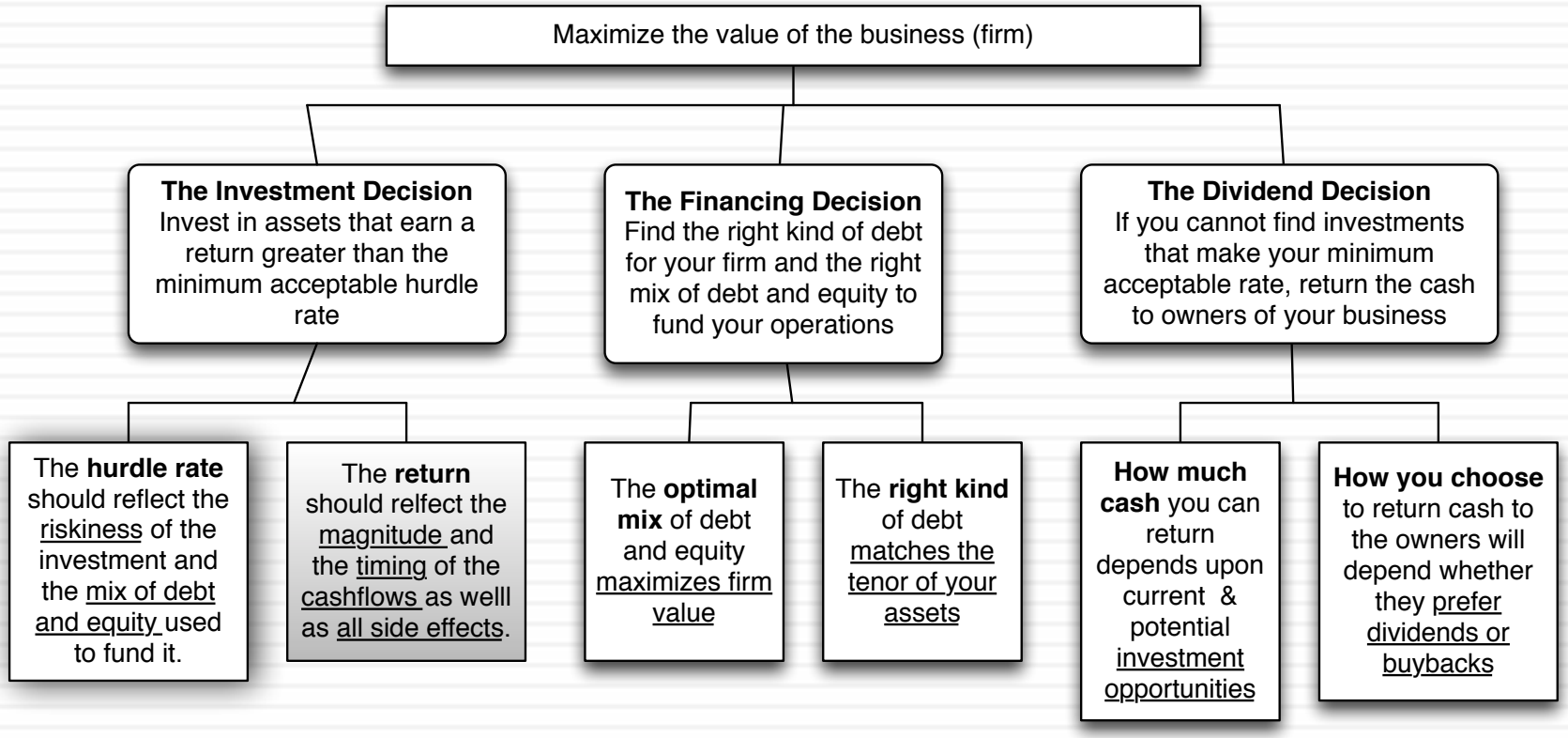
a. Yes
b. No
c. Maybe


What is the cost to the firm of hedging this risk?
Negligible
High
Is there a significant benefit in terms of higher cash flows or a lower discount rate?
Is there a significant benefit in terms of higher expected cash flows or a lower discount rate?
Yes
No
Yes
No
Hedge this risk. The benefits to the firm will exceed the costs
Indifferent to hedging risk
Can marginal investors hedge this risk cheaper than the firm can?
Do not hedge this risk. The benefits are small relative to costs
Yes
No
Will the benefits persist if investors hedge the risk instead of the firm?
Hedge this risk. The benefits to the firm will exceed the costs
Yes
No
Let the risk pass through to investors and let them hedge the risk.
Hedge this risk. The benefits to the firm will exceed the costs
Value Trade Off
Cash flow benefits
- Tax benefits
- Better project choices
Survival benefits (truncation risk)
- Protect against catastrophic risk
- Reduce default risk
Discount rate benefits
- Hedge "macro" risks (cost of equity)
- Reduce default risk (cost of debt or debt ratio)
Pricing Trade
Earnings Multiple
- Effect on multiple
X
Earnings
- Level
- Volatility

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



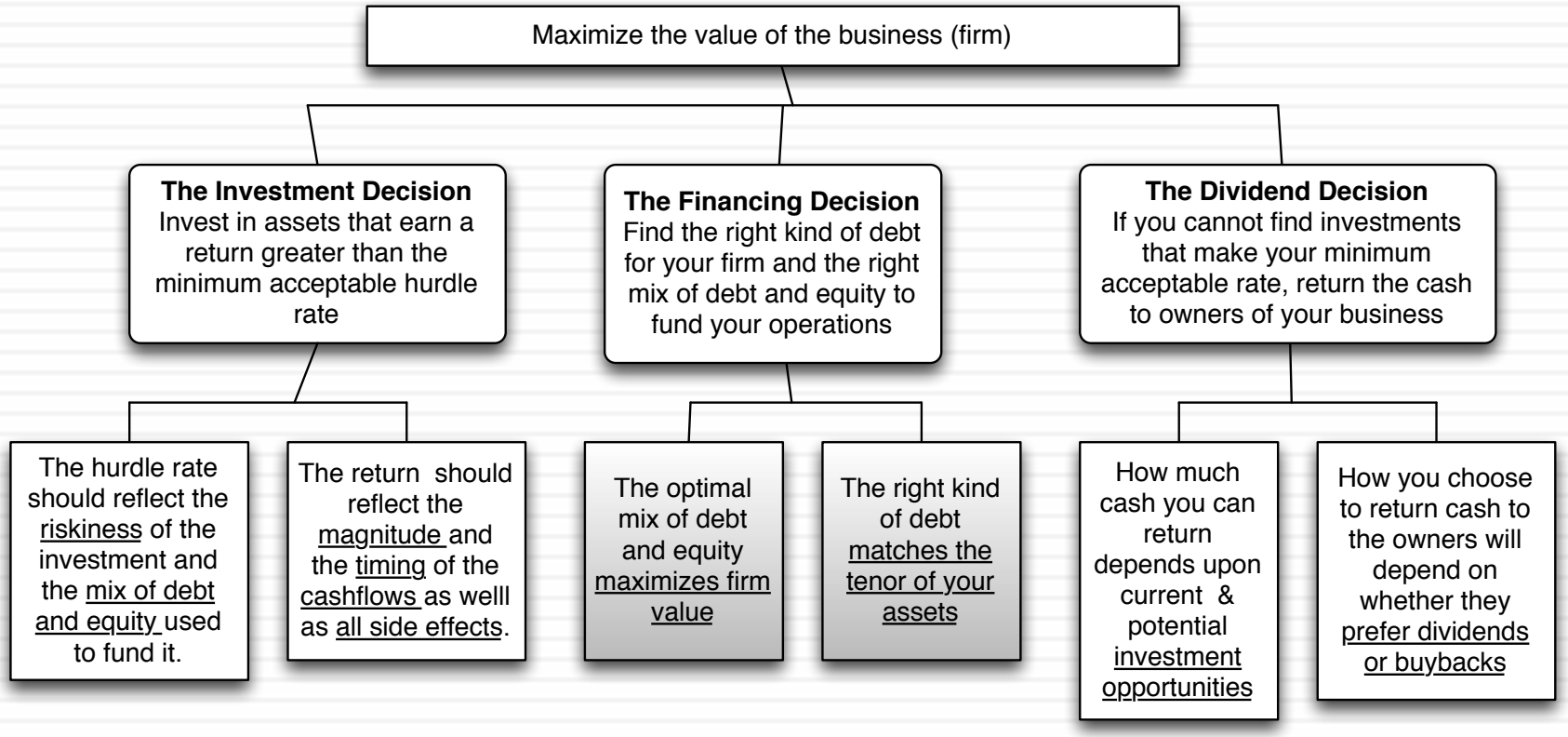
Aswath Damodaran

CAPITAL STRUCTURE: THE CHOICES AND THE TRADE OFF

"Neither a borrower nor a lender be"

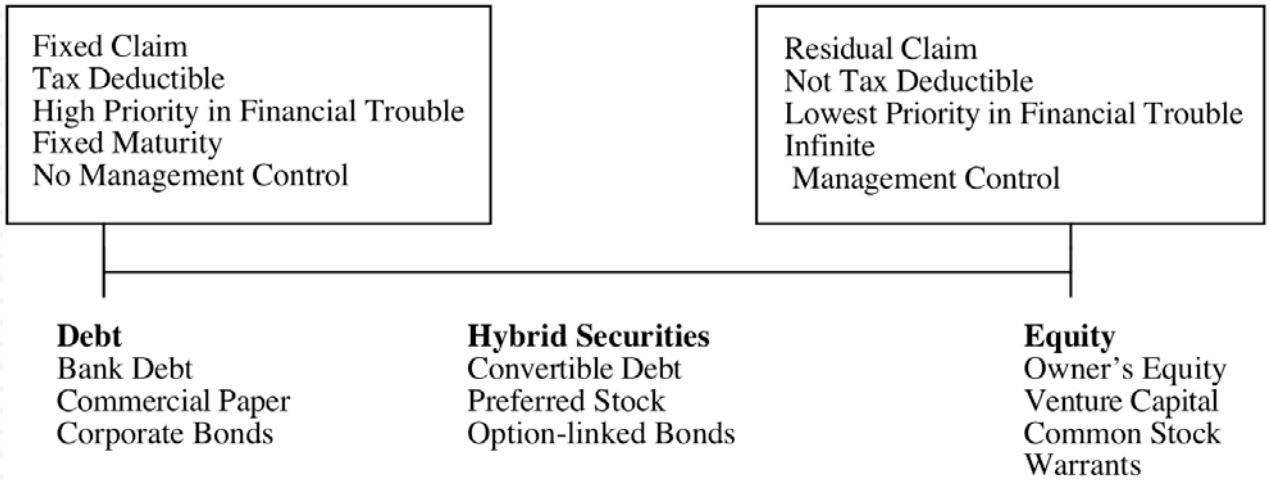
Someone who obviously hated this part of corporate finance

First Principles



Debt or Equity: The Continuum

Figure 7.1: Debt versus Equity

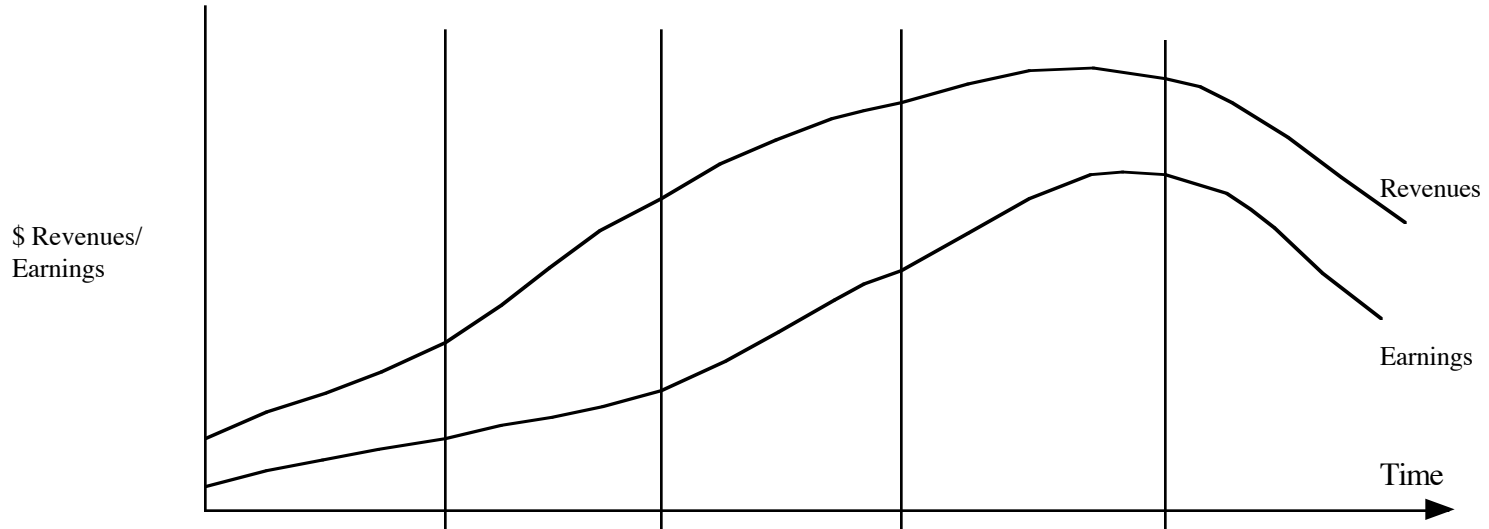


- The simplest measure of how much debt and equity a firm is using currently is to look at the proportion of debt in the total financing. This ratio is called the debt to capital ratio:
- Debt to Capital Ratio = Debt / (Debt + Equity)
- In general, this ratio should be computed using market values for both debt and equity, and include all debt.

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

	Disney	*Vale*	*Tata Motors*	*Baidu*
BV of Interest bearing Debt	$14,288	$48,469	535,914₹	¥17,844
MV of Interest bearing Debt	$13,028	$41,143	477,268₹	¥15,403
Lease Debt	$2,933	$1,248	0.00₹	¥3,051
Type of Debt				
Bank Debt	7.93%	59.97%	62.26%	100.00%
Bonds/Notes	92.07%	40.03%	37.74%	0.00%
Debt Maturity				
<1 year	13.04%	6.08%	0.78%	1.98%
1- 5 years	48.93%	23.12%	30.24%	68.62%
5-10 years	20.31%	29.44%	57.90%	29.41%
10-20 years	4.49%	3.00%	10.18%	0.00%
> 20 years	13.24%	38.37%	0.90%	0.00%
Currency for debt				
Debt in domestic currency	94.51%	34.52%	70.56%	17.90%
Debt in foreign currency	5.49%	65.48%	29.44%	82.10%
Fixed versus Floating rate debt				
Fixed rate debt	94.33%	100.00%	100.00%	94.63%
Floating rate debt	5.67%	0.00%	0.00%	5.37%

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.*

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

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

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

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

A Hypothetical Scenario

Assume that you live in a world where

(a) There are no taxes

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

(c) No firm ever goes bankrupt

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

(e) Firms know their future financing needs with certainty

Benefits of debt	Costs of debt
Tax benefits	Expected Bankruptcy Cost
Added Discipline	Agency Costs
	Need for financial flexibility

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

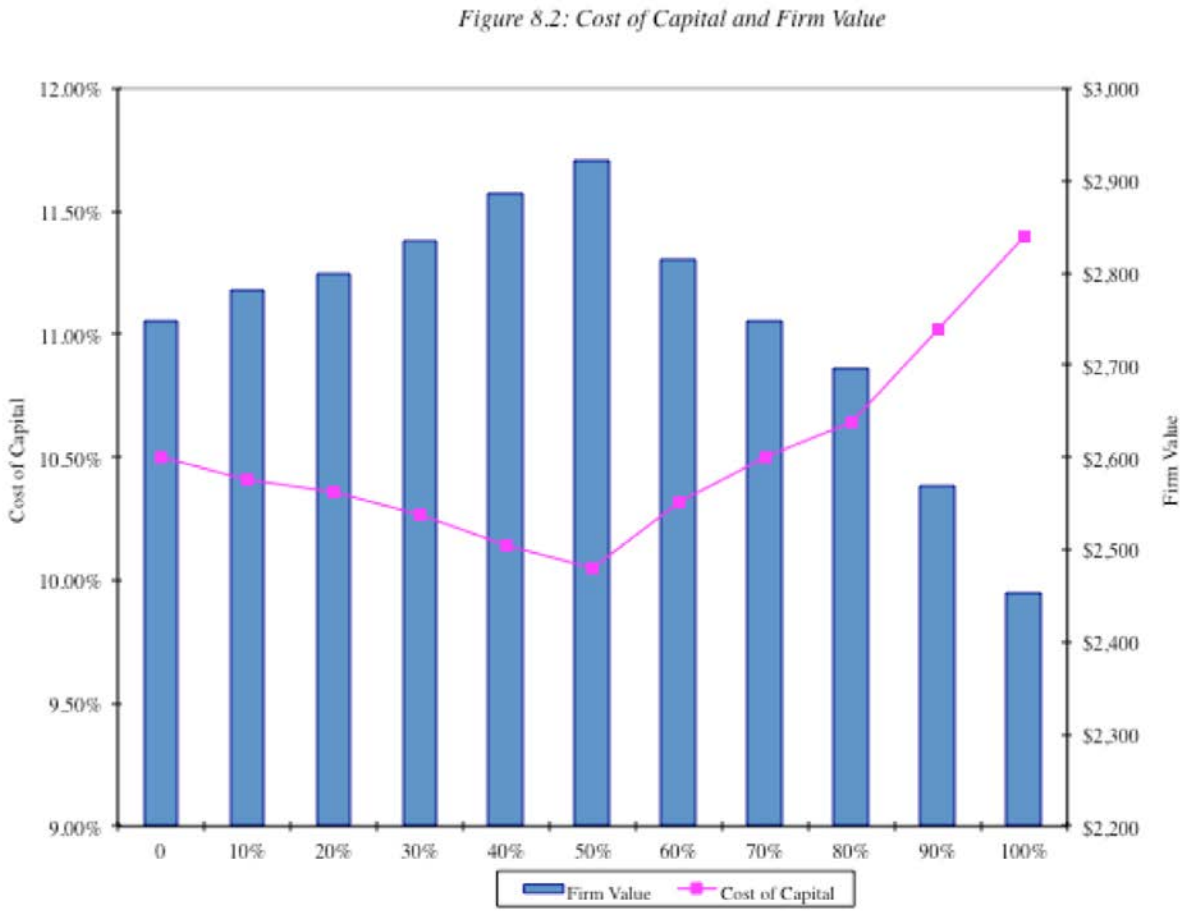
- Value of a Firm = Present Value of Cash Flows to the Firm, discounted back at the cost of capital.
- If the cash flows to the firm are held constant, and the cost of capital is minimized, the value of the firm will be maximized.

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…



Current Cost of Capital: Disney

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

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

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

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

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

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

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

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

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

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

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

2. Get Disney's current financials…

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

I. Cost of Equity

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

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

Estimating Cost of Debt

Start with the market value of the firm = = 121,878 + $15,961 = $137,839 million

D/(D+E)	0.00%	10.00%	Debt to capital
D/E	0.00%	11.11%	D/E = 10/90 = .1111
$ Debt	$0	$13,784	10% of $137,839
EBITDA	$12,517	$12,517	Same as 0% debt
Depreciation	$ 2,485	$ 2,485	Same as 0% debt
EBIT	$10,032	$10,032	Same as 0% debt
Interest	$0	$434	Pre-tax cost of debt * $ Debt
Pre-tax Int. cov	∞	23.10	EBIT/ Interest Expenses
Likely Rating	AAA	AAA	From Ratings table
Pre-tax cost of debt	3.15%	3.15%	Riskless Rate + Spread

The Ratings Table

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

T.Bond rate =2.75%

A Test: Can you do the 30% level?

		Iteration 1 (Debt @AAA rate)	*Iteration 2 (Debt @AA rate)*
D/(D + E)	*20.00%*	*30.00%*	*30.00%*
D/E	25.00%		
$ Debt	$27,568		
EBITDA	$12,517		
Depreciation	$2,485		
EBIT	$10,032		
Interest expense	$868		
Interest coverage ratio	11.55		
Likely rating	AAA		
Pretax cost of debt	3.15%		

Bond Ratings, Cost of Debt and Debt Ratios

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

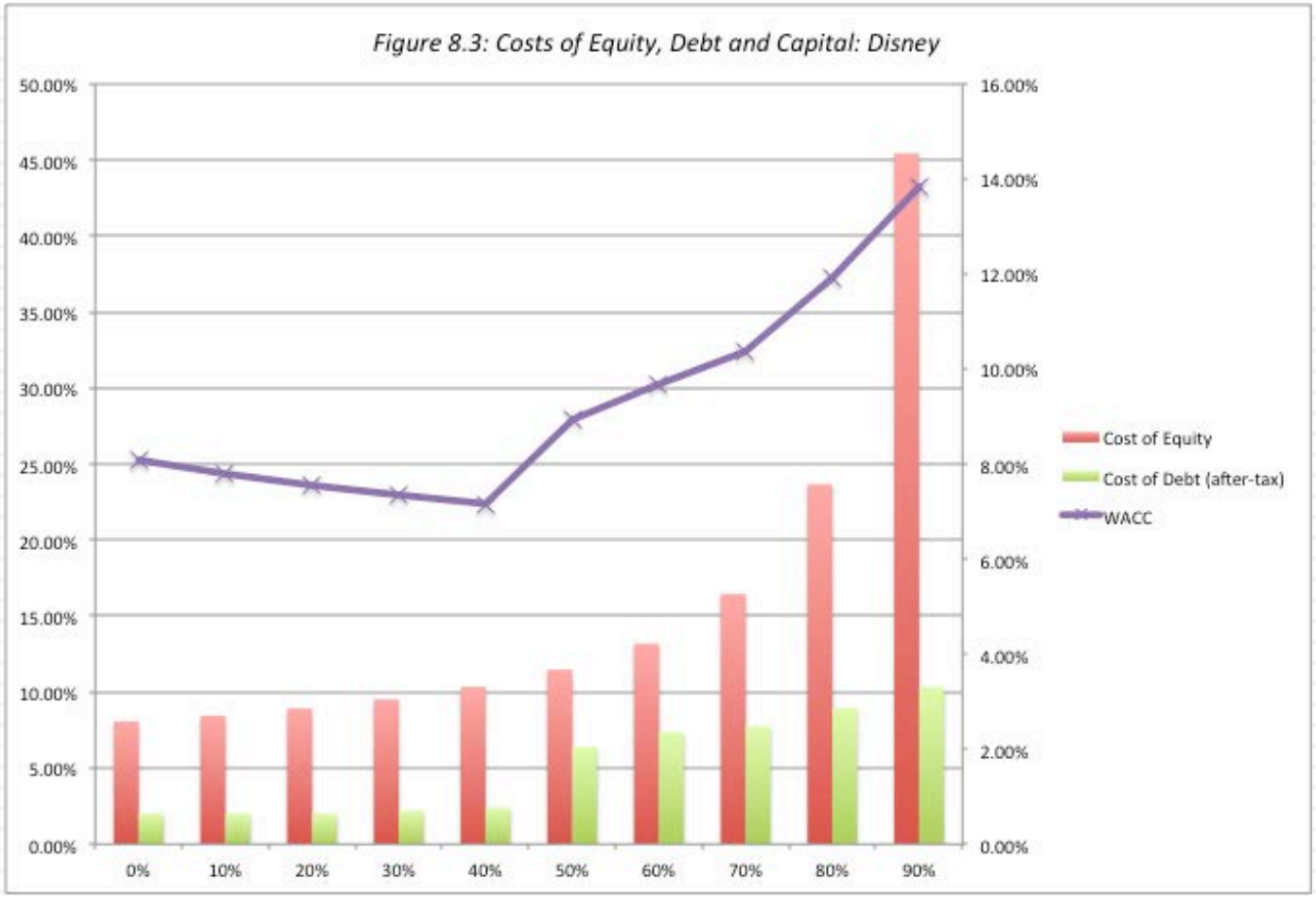
Stated versus Effective Tax Rates

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

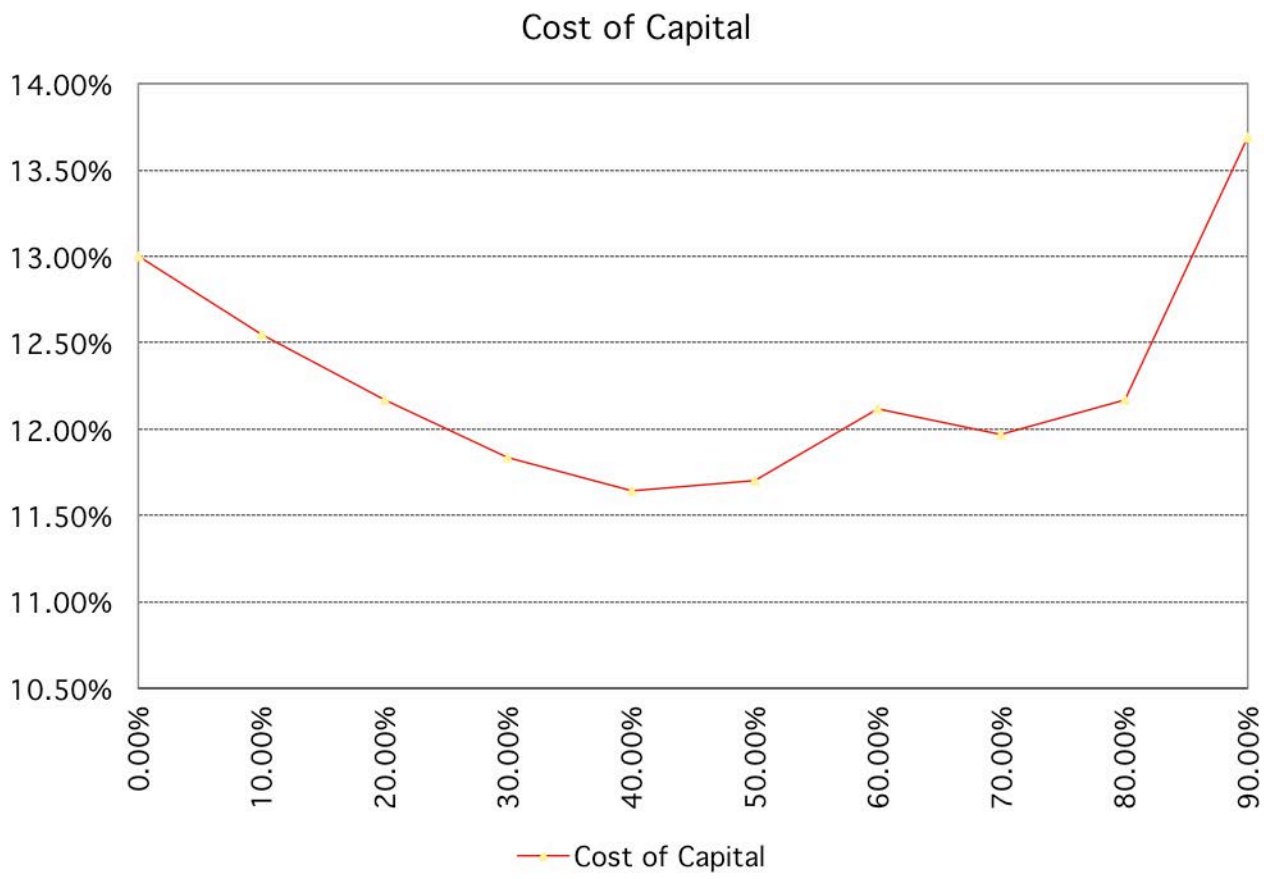
Disney's cost of capital schedule…

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

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 $15.96 billion in debt. The optimal dollar debt (at 40%) is roughly $55.1 billion. Disney has excess debt capacity of 39.14 billion.
- To move to its optimal and gain the increase in value, Disney should borrow $ 39.14 billion and buy back stock.
- Given the magnitude of this decision, you should expect to answer three questions:
  - Why should we do it?
  - What if something goes wrong?
  - What if we don't want (or cannot) buy back stock and want to make investments with the additional debt capacity?

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

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

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

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

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

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

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

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

- Step 3: Revalue the firm with the new cost of capital
  - Firm value = $\frac{FCFF_0(1+g)}{(\text{Cost of Capital} - g)} = \frac{3,657(1.0494)}{(.0716 - 0.0484)} = \$172,935 \text{ million}$
  - The firm value increases by $39,028 million = $172,935 - $133,908

Effect on Value: Incremental approach

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

Enterprise Value before the change = $133,908 million

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

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

Annual savings in cost of financing = $10,458 million – $9,592 million = $866 million

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

Enterprise value after recapitalization

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

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

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

The more general solution, given a buyback price

- Start with the buyback price and compute the number of shares outstanding after the buyback:
  - Increase in Debt = Debt at optimal – Current Debt
  - # Shares after buyback = # Shares before – $\frac{\text{Increase in Debt}}{\text{Share Price}}$
- Then compute the equity value after the recapitalization, starting with the enterprise value at the optimal, adding back cash and subtracting out the debt at the optimal:
  - Equity value after buyback = Optimal Enterprise value + Cash – Debt
- Divide the equity value after the buyback by the post-buyback number of shares.
  - Value per share after buyback = Equity value after buyback/ Number of shares after buyback

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

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

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

- Start with the buyback price and compute the number of shares outstanding after the buyback
  - # Shares after buyback = 1800 - $39,175/$78.61 = 1301.65 m
- Then compute the equity value after the recapitalization, starting with the enterprise value at the optimal, adding back cash and subtracting out the debt at the optimal:
  - Optimal Enterprise Value = $153,531
  - Equity value after buyback = $153,531 + $3,931– $55,136 = $102,326
- Divide the equity value after the buyback by the post-buyback number of shares.
  - Value per share after buyback = $102,326/1301.65 = $78.61

2. What if something goes wrong? The Downside Risk

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

Standard deviation in % change in EBIT = 19.17%

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

Disney: Safety Buffers?

EBIT drops by	EBIT	Optimal Debt ratio
0%	$10,032	40%
10%	$9,029	40%
20%	$8,025	40%
30%	$7,022	40%
40%	$6,019	30%
50%	$5,016	30%
60%	$4,013	20%

Constraints on Ratings

- Management often specifies a 'desired rating' below which they do not want to fall.
- The rating constraint is driven by three factors
  - it is one way of protecting against downside risk in operating income (so do not do both)
  - a drop in ratings might affect operating income
  - there is an ego factor associated with high ratings
- Caveat: Every rating constraint has a cost.
  - The cost of a rating constraint is the difference between the unconstrained value and the value of the firm with the constraint.
  - Managers need to be made aware of the costs of the constraints they impose.

Ratings Constraints for Disney

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

  Cost of AA Rating Constraint = Value at 40% Debt – Value at 30% Debt = $153,531 m – $147,835 m = $ 5,696 million
- If managers insisted on a AAA rating, the optimal debt ratio would drop to 20% and the cost of the ratings constraint would rise:

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

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

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

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

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

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

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

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

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

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

Optimal Debt Ratio for a young, growth firm: Baidu

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

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

Extension to a private business
Optimal Debt Ratio for Bookscape

Debt value of leases = $12,136 million (only debt)
Estimated market value of equity = Net Income * Average PE for Publicly Traded Book Retailers = 1.575 * 20 = $31.5 million
Debt ratio = 12,136/(12,136+31,500) = 27.81%

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

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

Capital Structure for a bank: An Alternative Approach

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

Loans outstanding after Expansion		= $ 150 million
Equity after expansion	= 7% of $150	= $10.5 million
Existing Equity		= $ 6.0 million
New Equity needed		= $ 4.5 million

- Your need for "external" equity as a bank/financial service company will depend upon
  a. Your growth rate: Higher growth -> More external equity
  b. Existing capitalization vs Target capitalization: Under capitalized -> More external equity
  c. Current earnings: Less earnings -> More external equity
  d. Current dividends: More dividends -> More external equity

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

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

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

2. Pre-tax Cash flow Return

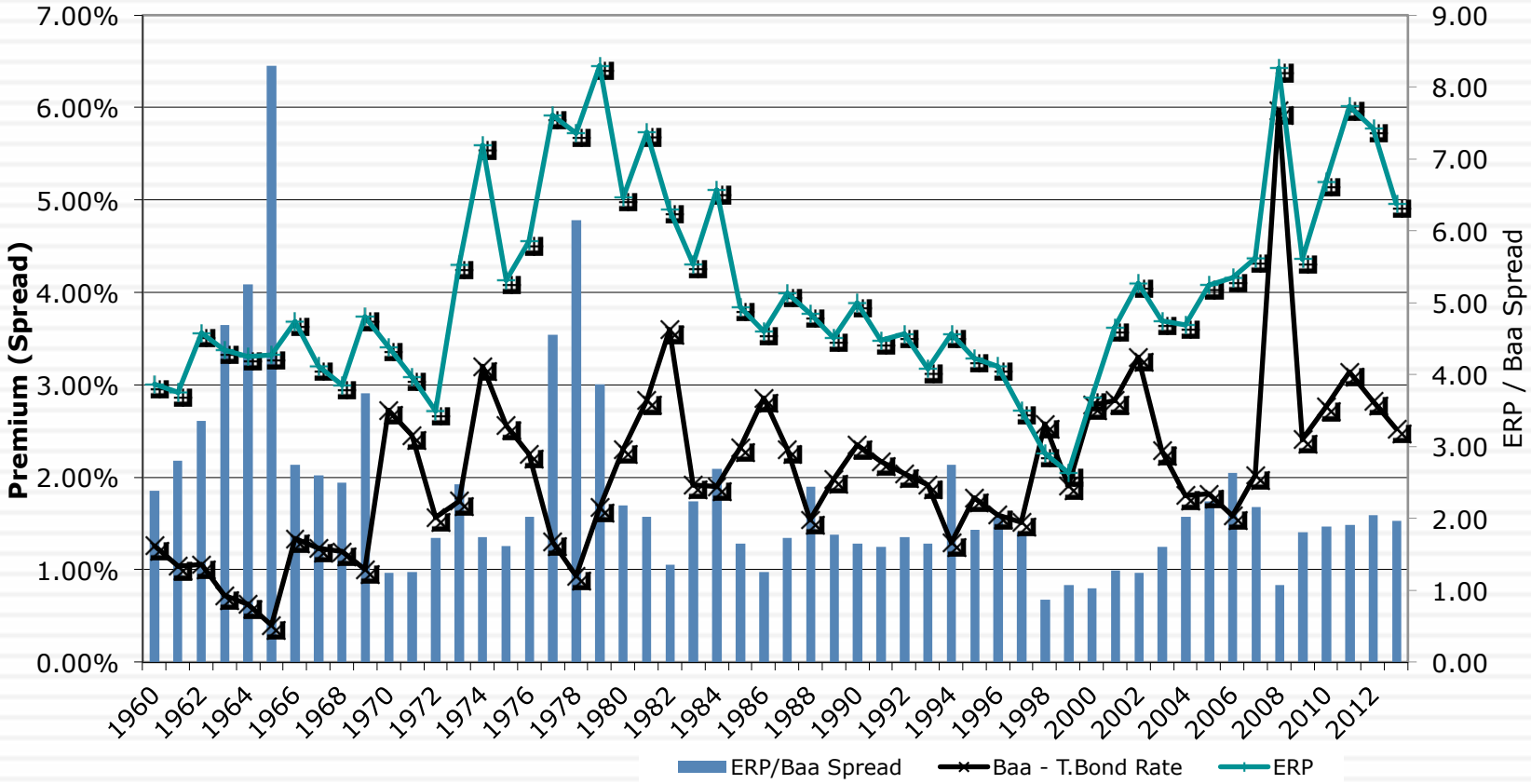
Company	*EBITDA*	*EBIT*	*Enterprise Value*	*EBITDA/ EV*	*EBIT/EV*	*Optimal Debt*	*Optimal Debt Ratio*
Disney	$12,517	$10,032	$133,908	9.35%	7.49%	$55,136	40.00%
Vale	$20,167	$15,667	$112,352	17.95%	13.94%	$35,845	30.00%
Tata Motors	250,116₹	166,605₹	1,427,478₹	17.52%	11.67%	325,986₹	20.00%
Baidu	¥13,073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

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 16: 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?

Bloomberg FA page
Capstru.xls

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)

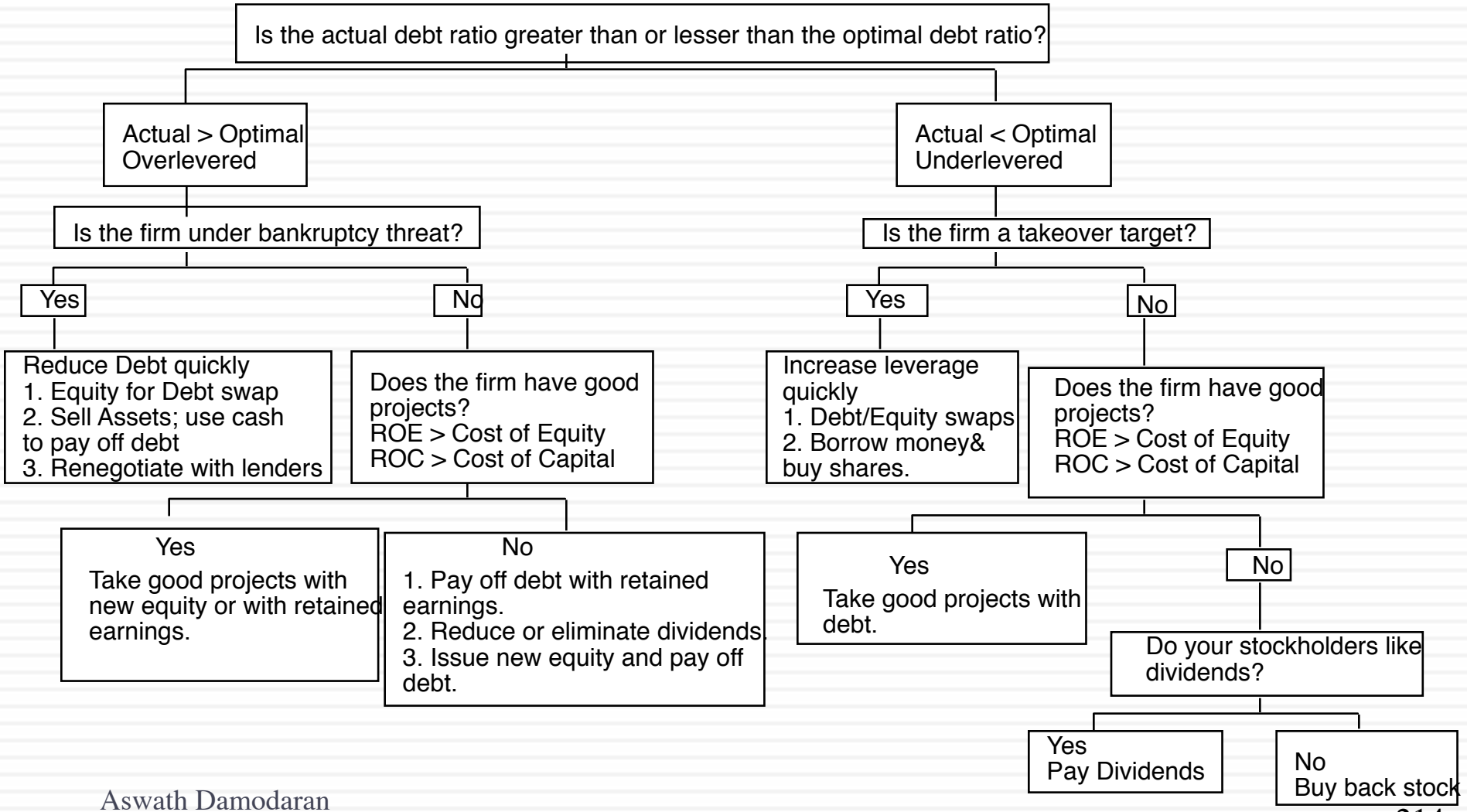
Comparing to industry averages

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

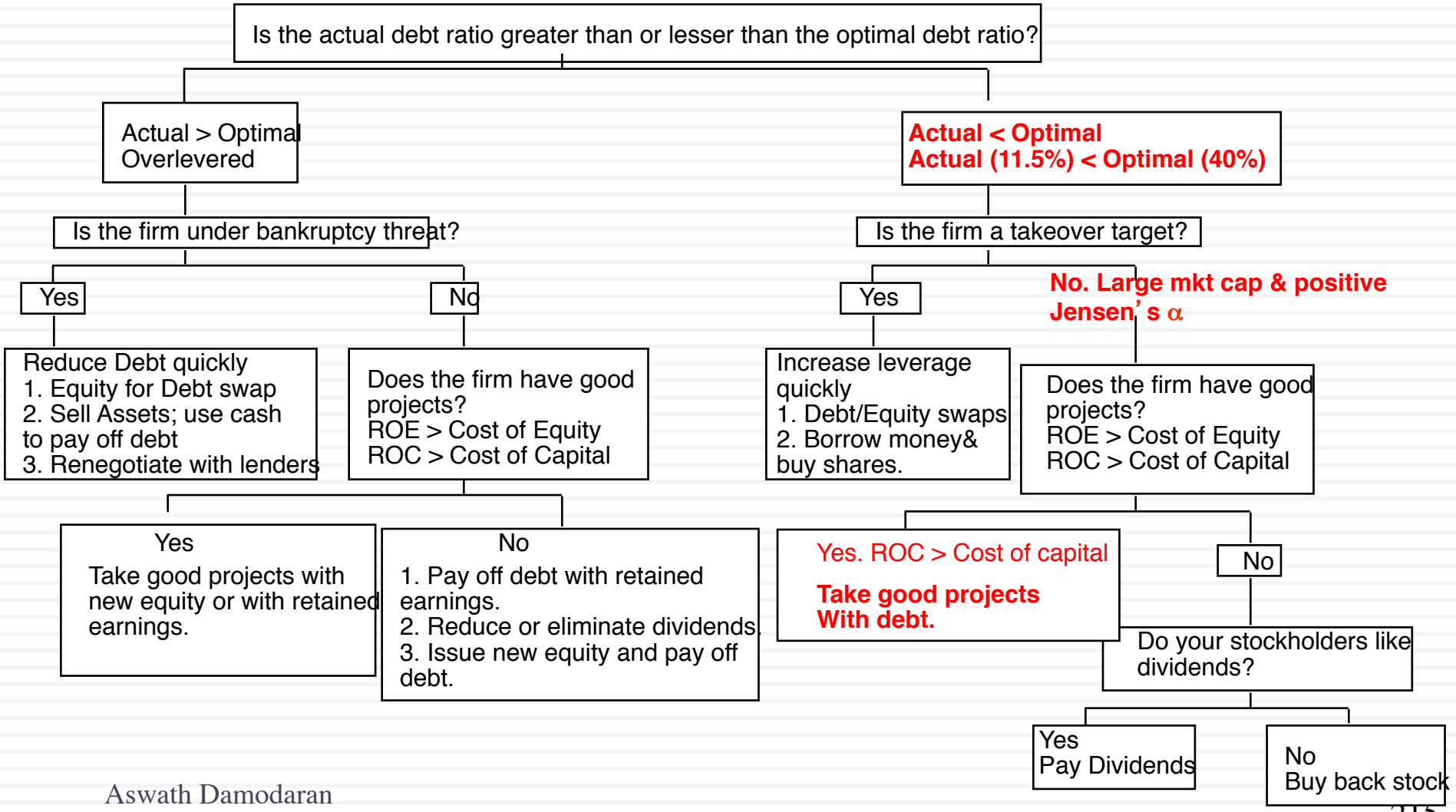
Now that we have an optimal.. And an actual.. What next?

- 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



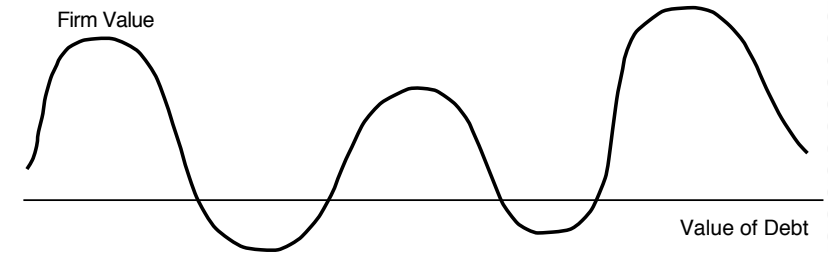
Application Test: Getting to the Optimal

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

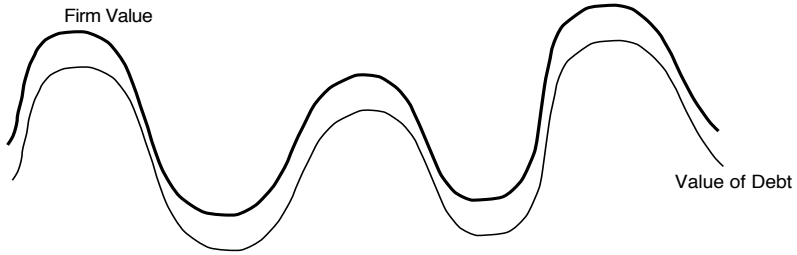
Designing Debt: The Fundamental Principle

- 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

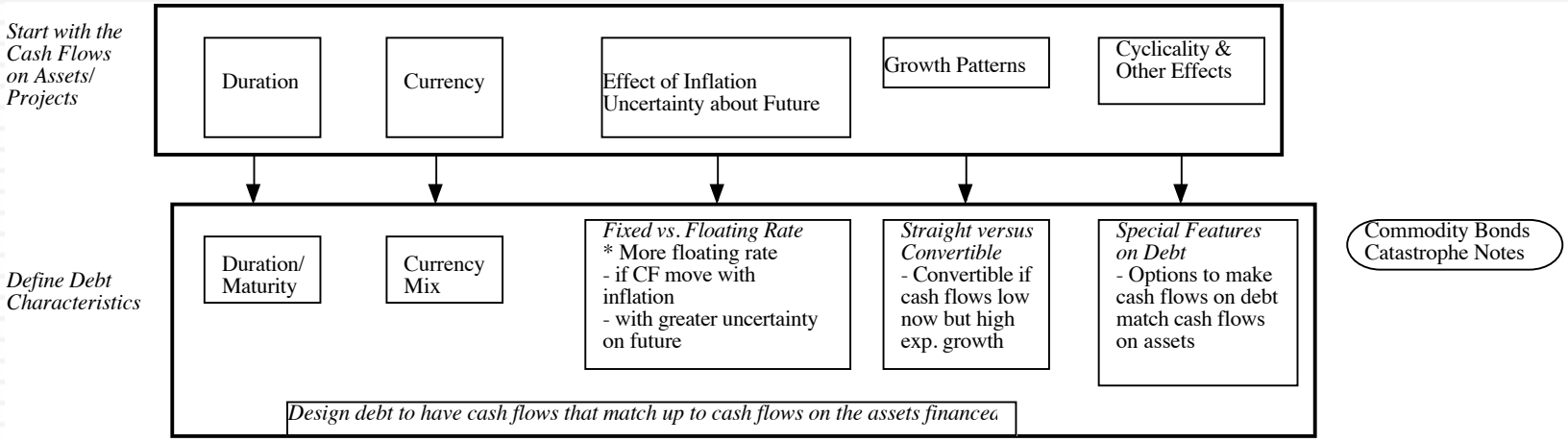


Matched Debt



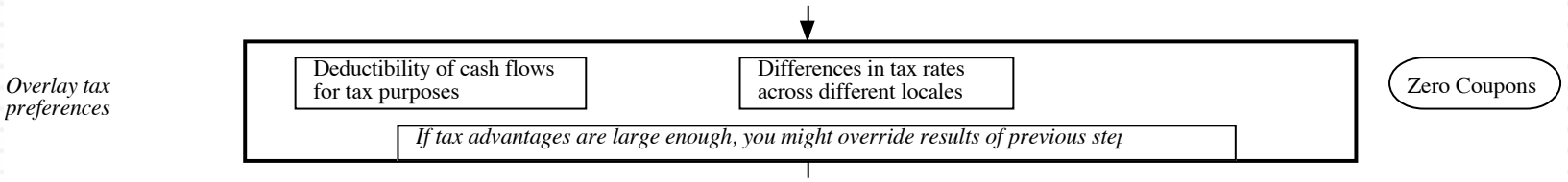
Design the perfect financing instrument

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



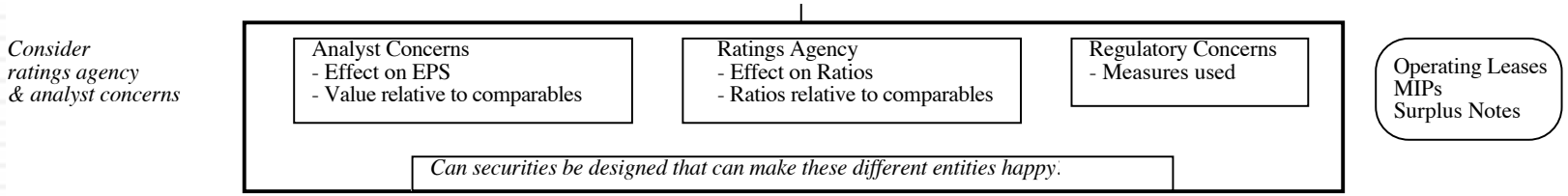
Ensuring that you have not crossed the line drawn by the tax code

- 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.

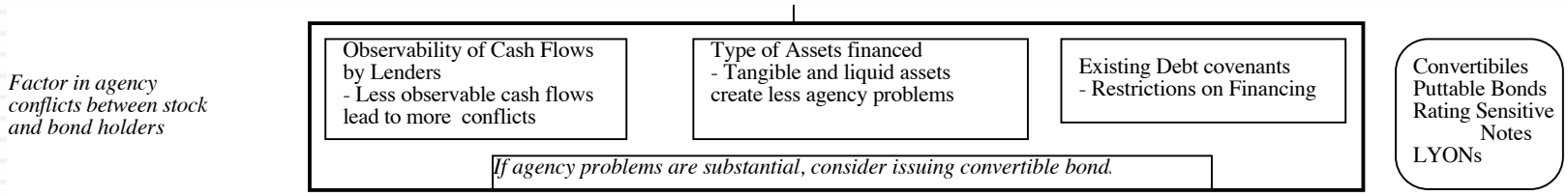


Debt or Equity: The Strange Case of Trust Preferred

- 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. A firm that is under levered, but has a rating constraint that would be violated if it moved to its optimal
  b. A firm that is over levered that is unable to issue debt because of the rating agency concerns.

Soothe bondholder fears

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



And do not lock in market mistakes that work against you

- Ratings agencies can sometimes under rate a firm, and markets can underprice 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 • Be short-term • Have cash outflows primarily in dollars (because Disney makes most of its movies in the U.S.), but cash inflows could have a substantial foreign currency component (because of overseas revenues) • Have net cash flows that are heavily driven by whether the movie is a hit, which is often difficult to predict	Debt should be 1. Short-term 2. Primarily dollar debt.Mixed currency debt, reflecting audience make-up. 3. If possible, tied to the success of movies.
Media networks	Projects are likely to be 1. Short-term 2. Primarily in dollars, though foreign component is growing, especially for ESPN. 3. Driven by advertising revenues and show success (Nielsen ratings)	Debt should be 1. Short-term 2. Primarily dollar debt 3. If possible, linked to network ratings
Park resorts	Projects are likely to be 1. Very long-term 2. Currency will be a function of the region (rather than country) where park is located. 3. Affected by success of studio entertainment and media networks divisions	Debt should be 1. Long-term 2. Mix of currencies, based on tourist makeup at the park.
Consumer products	Projects are likely to be short- to medium-term and linked to the success of the movie division; most of Disney's product offerings and licensing revenues are derived from their movie productions	Debt should be 1. Medium-term 2. Dollar debt
Interactive	Projects are likely to be short-term, with high growth potential and significant risk. While cash flows will initially be primarily in US dollars, the mix of currencies will shift as the business ages.	Debt should be short-term, convertible US dollar debt.

Recommendations for Disney

- The debt issued should be long term and should have duration of about 4.3 years.
- A significant portion of the debt should be floating rate debt, reflecting Disney's capacity to pass inflation through to its customers and the fact that operating income tends to increase as interest rates go up.
- Given Disney's sensitivity to a stronger dollar, a portion of the debt should be in foreign currencies. The specific currency used and the magnitude of the foreign currency debt should reflect where Disney makes its revenues. Based upon 2013 numbers at least, this would indicate that about 18% of its debt should be foreign currency debt. 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 $14.3 billion in interest-bearing debt with a face-value weighted average maturity of 7.92 years. Allowing for the fact that the maturity of debt is higher than the duration, this would indicate that Disney's debt may be a little longer than would be optimal, but not by much.
- Of the debt, about 5.49% of the debt is in non-US dollar currencies (Indian rupees and Hong Kong dollars), but the rest is in US dollars and the company has no Euro debt. Based on our analysis, we would suggest that Disney increase its proportion of Euro debt to about 12% and tie the choice of currency on future debt issues to its expansion plans.
- Disney has no convertible debt and about 5.67% of its debt is floating rate debt, which looks low, given the company's pricing power. While the mix of debt in 2013 may be reflective of a desire to lock in low long-term interest rates on debt, as rates rise, the company should consider expanding its use of foreign currency debt.

Adjusting Debt at Disney

- It can 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

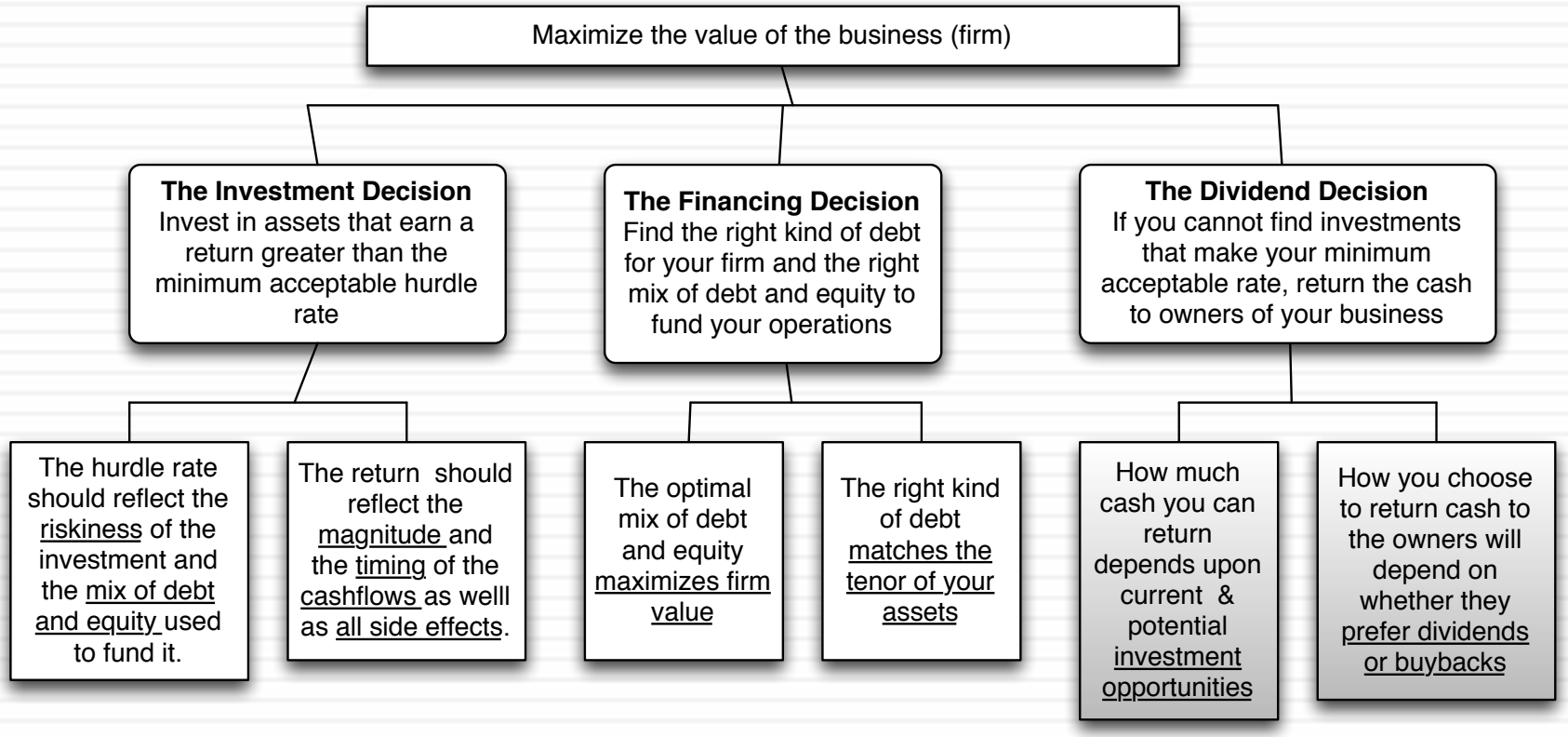
- Based upon the business that your firm is in, and the typical investments that it makes, what kind of financing would you expect your firm to use in terms of
  a. Duration (long term or short term)
  b. Currency
  c. Fixed or Floating rate
  d. Straight or Convertible

Aswath Damodaran

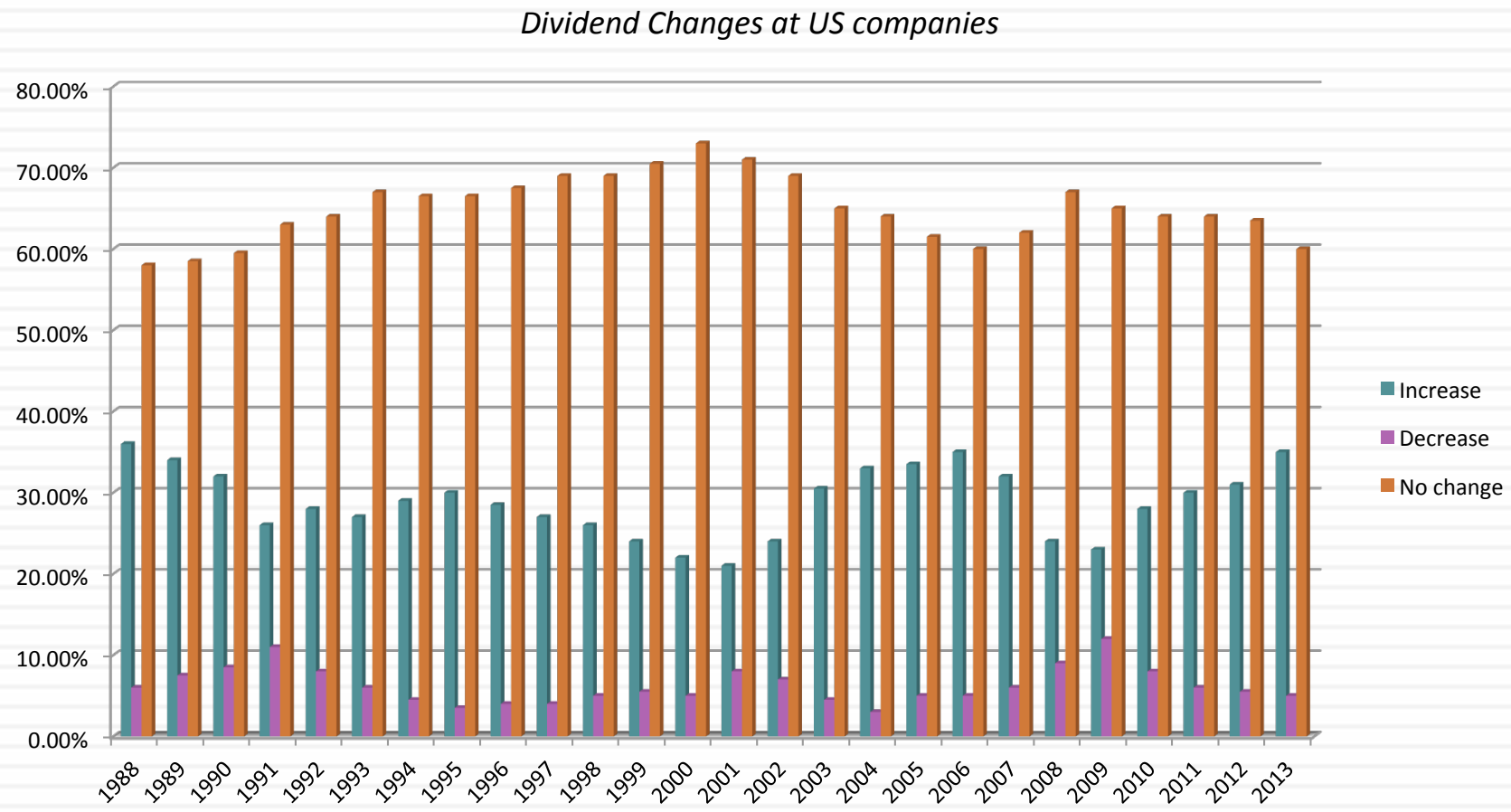
RETURNING CASH TO THE OWNERS: DIVIDEND POLICY

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

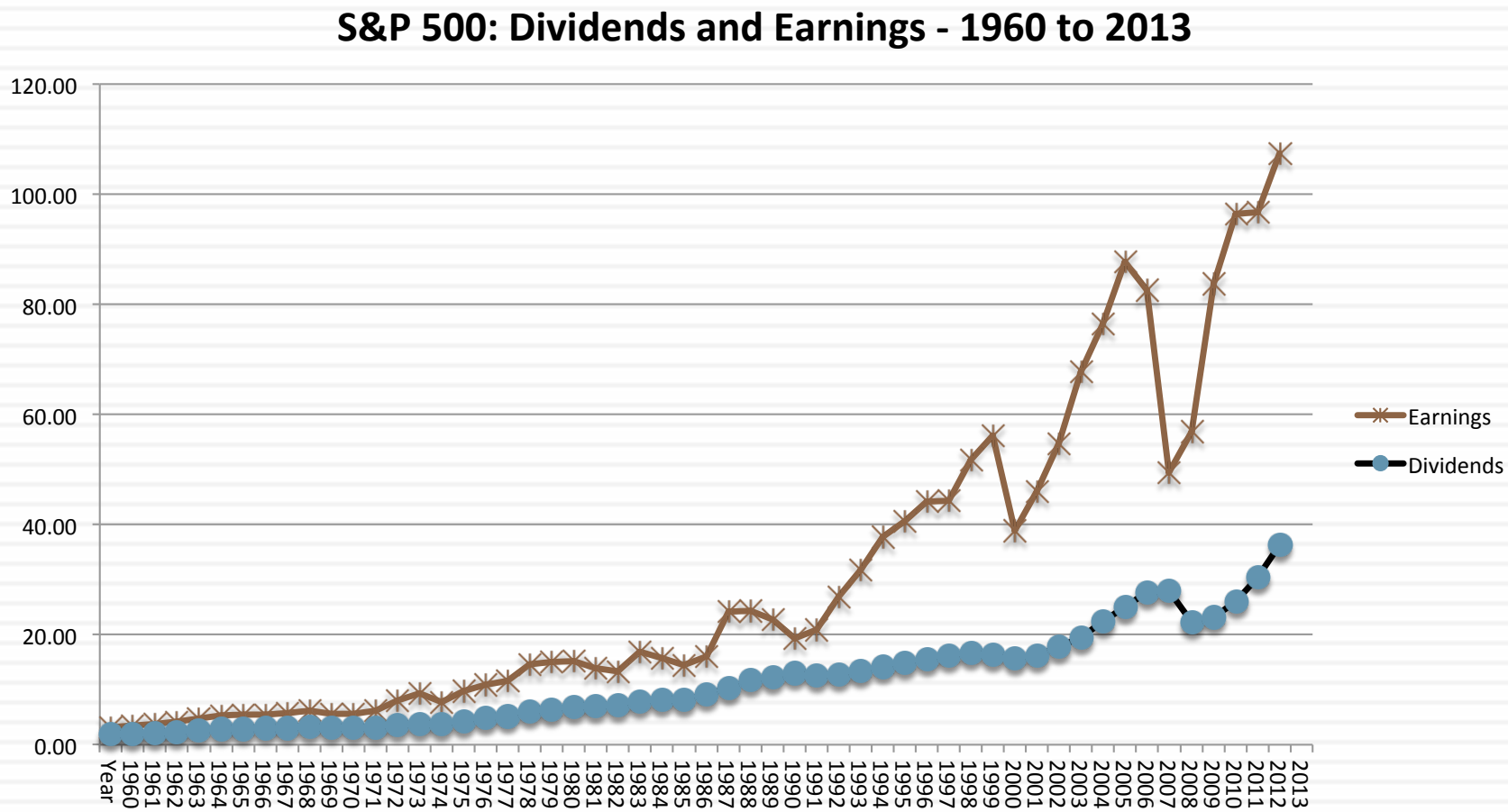
First Principles



I. Dividends are sticky

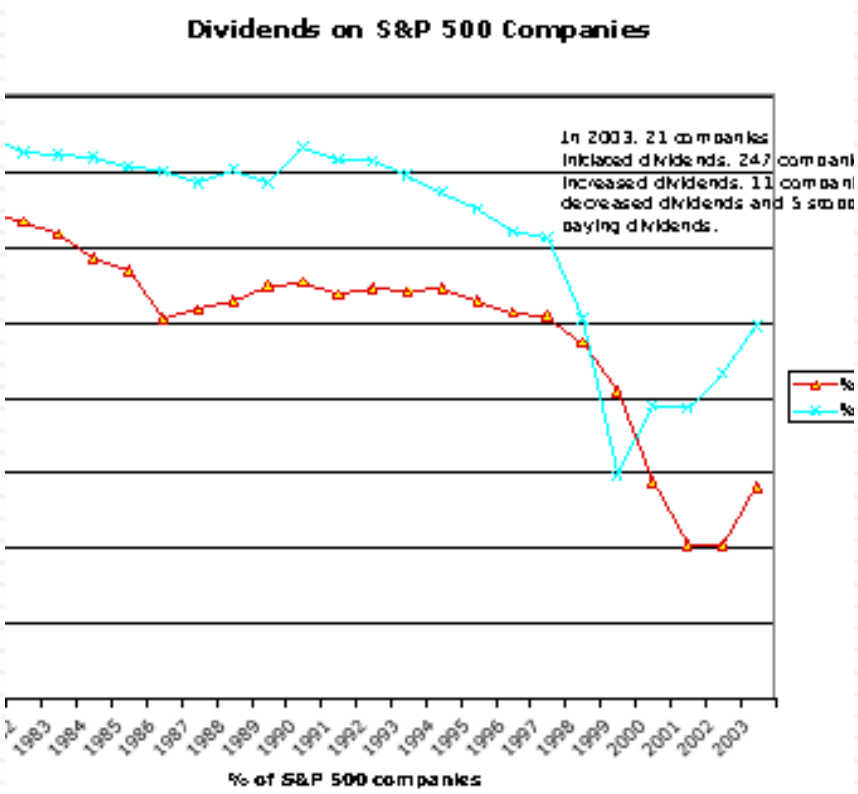


II. Dividends tend to follow earnings



II. Are affected by tax laws…

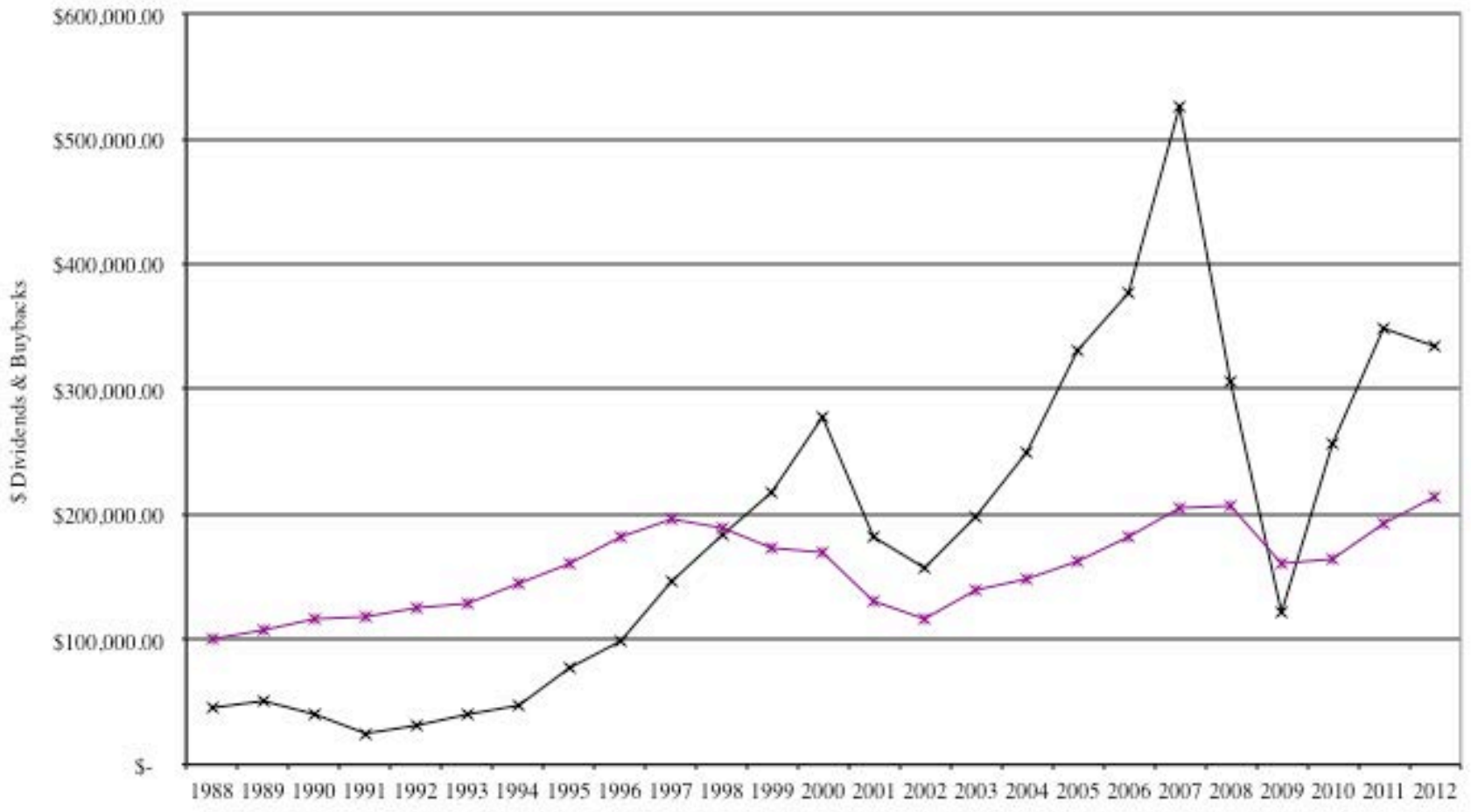
In 2003



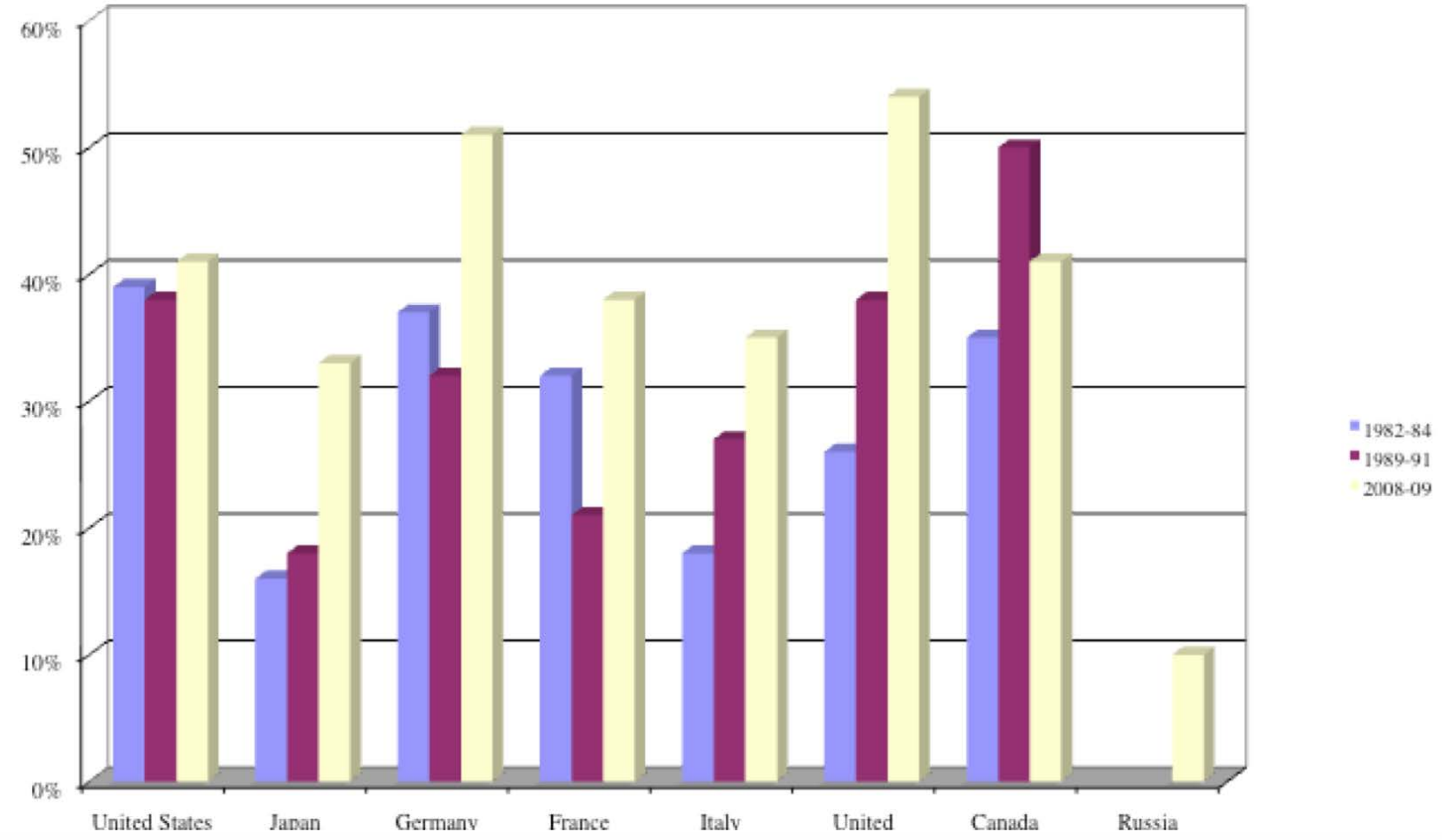
In the last quarter of 2012

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

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



V. And there are differences across countries…



Measures of Dividend Policy

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

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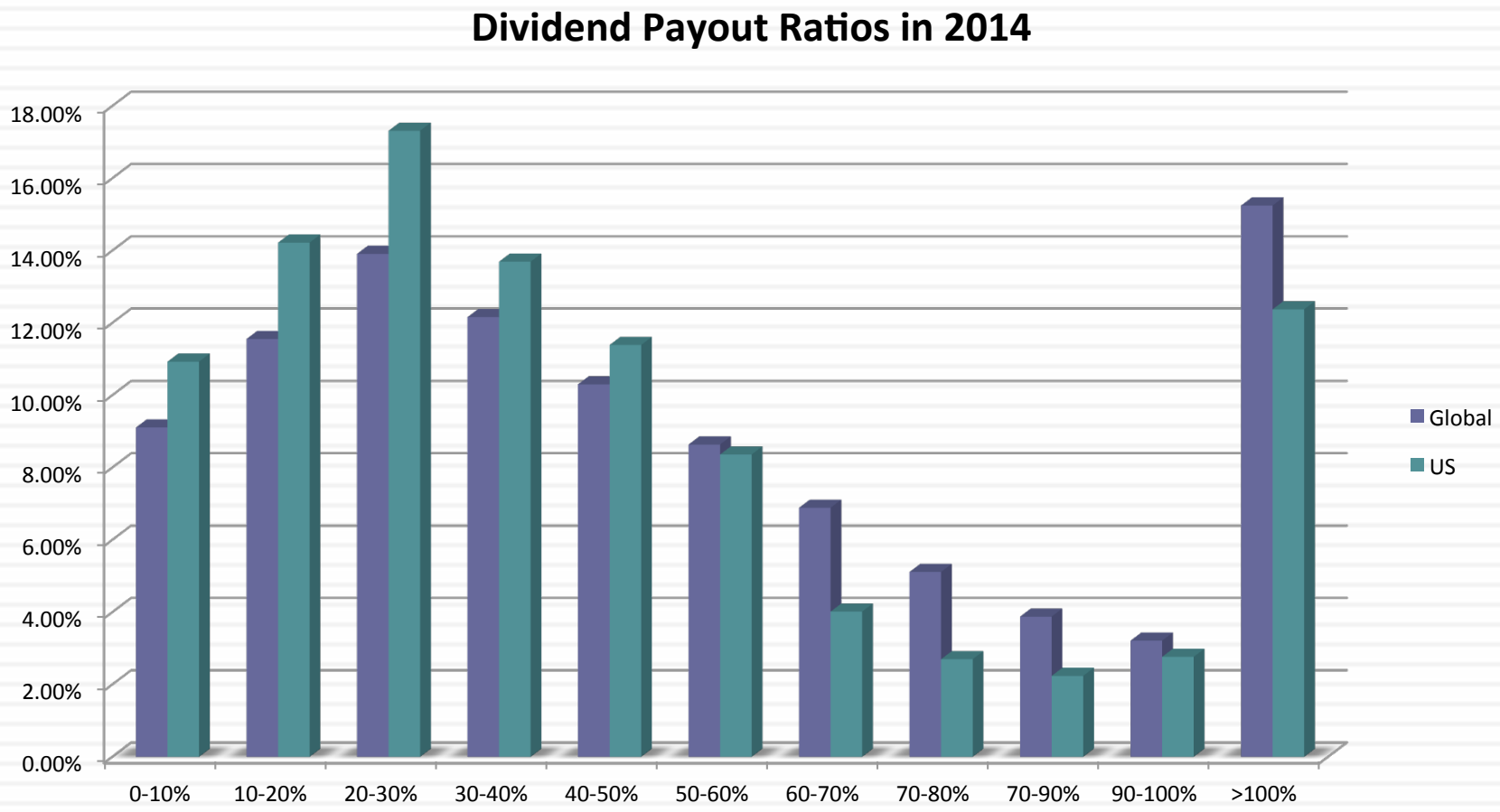
Dividend Payout Ratios



Dividend Yields

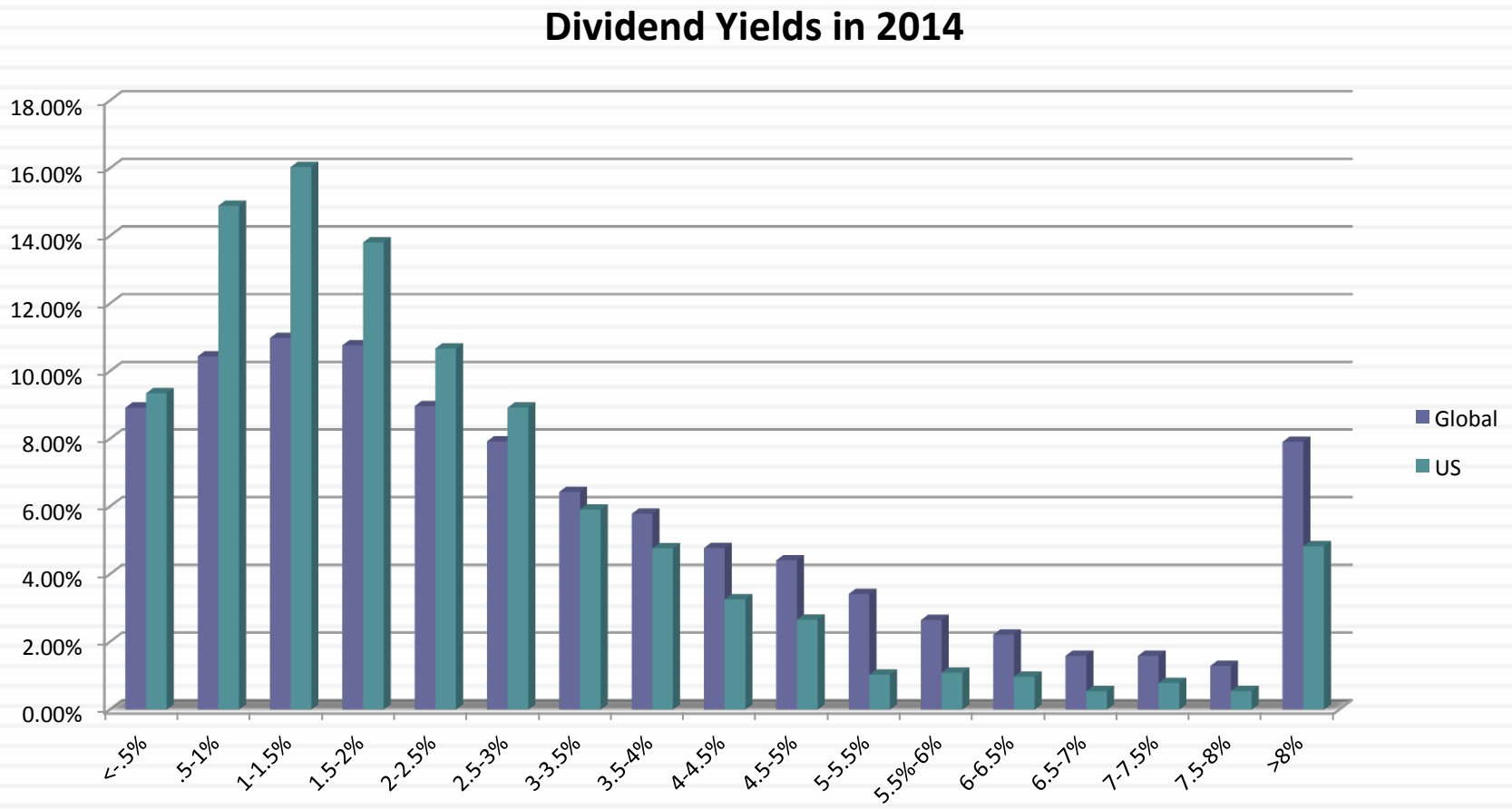
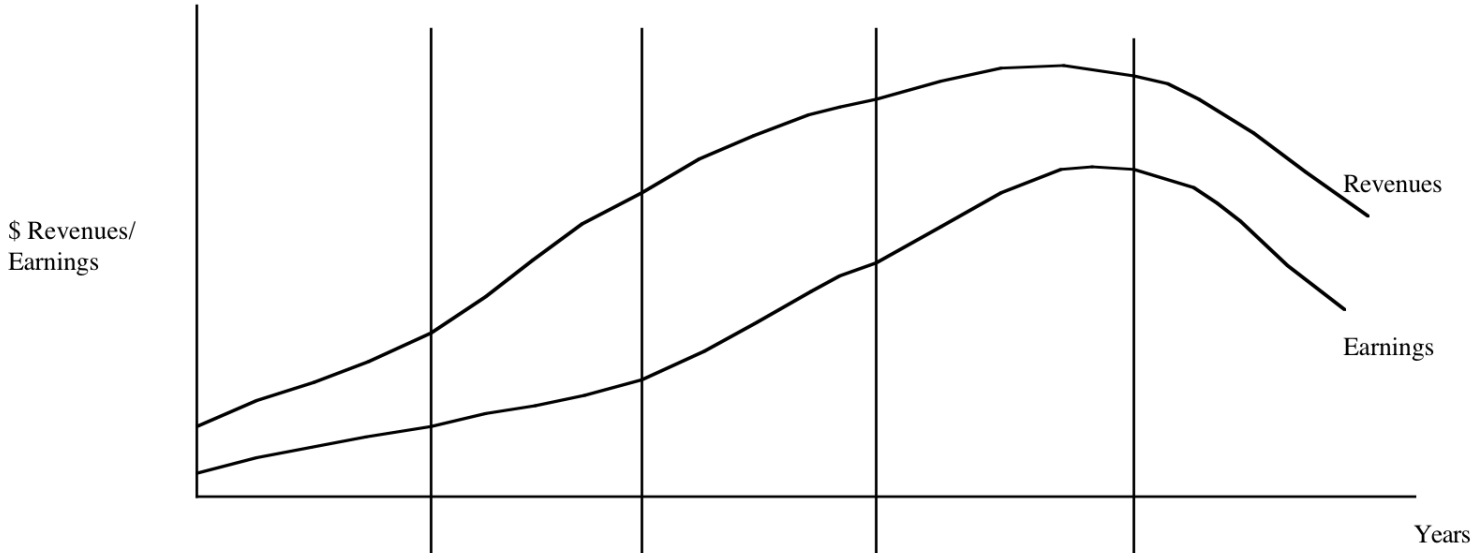


Figure 10.7: Life Cycle Analysis of Dividend Policy



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 et al.

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

Three Schools Of Thought On Dividends

1. If there are no tax disadvantages associated with dividends & companies can issue stock, at no issuance cost, to raise equity, whenever needed

   Dividends do not matter, and dividend policy does not affect value.

2. If dividends create a tax disadvantage for investors (relative to capital gains)

   Dividends are bad, and increasing dividends will reduce value

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

   Dividends are good, and increasing dividends will increase value

The balanced viewpoint

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

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 companies we are analyzing the cash returned looked as follows.

	Disney		*Vale*		*Tata Motors*		*Baidu*		*Deutsche Bank*	
Year	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks	Dividends	Buybacks
2008	$648	$648	$2,993	$741	7,595₹	0₹	¥0	¥0	2,274 €	0 €
2009	$653	$2,669	$2,771	$9	3,496₹	0₹	¥0	¥0	309 €	0 €
2010	$756	$4,993	$3,037	$1,930	10,195₹	0₹	¥0	¥0	465 €	0 €
2011	$1,076	$3,015	$9,062	$3,051	15,031₹	0₹	¥0	¥0	691 €	0 €
2012	$1,324	$4,087	$6,006	$0	15,088₹	970₹	¥0	¥0	689 €	0 €
2008-12	**$4,457**	**$15,412**	**$23,869**	**$5,731**	**51,405₹**	**970₹**	**¥0**	**¥0**	**¥4,428**	**¥0**

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: 2008 – 2012

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

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

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 + d (Capital Expenditures - Depreciation + Working Capital Needs)
  - Thus, whatever debt has to be repaid gets paid off with new debt and additional debt is taken on to fund growth in the firm.

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.

$$FCFE_{Bank} = \text{Net Income} - \text{Increase in Regulatory Capital (Book Equity)}$$

- 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:

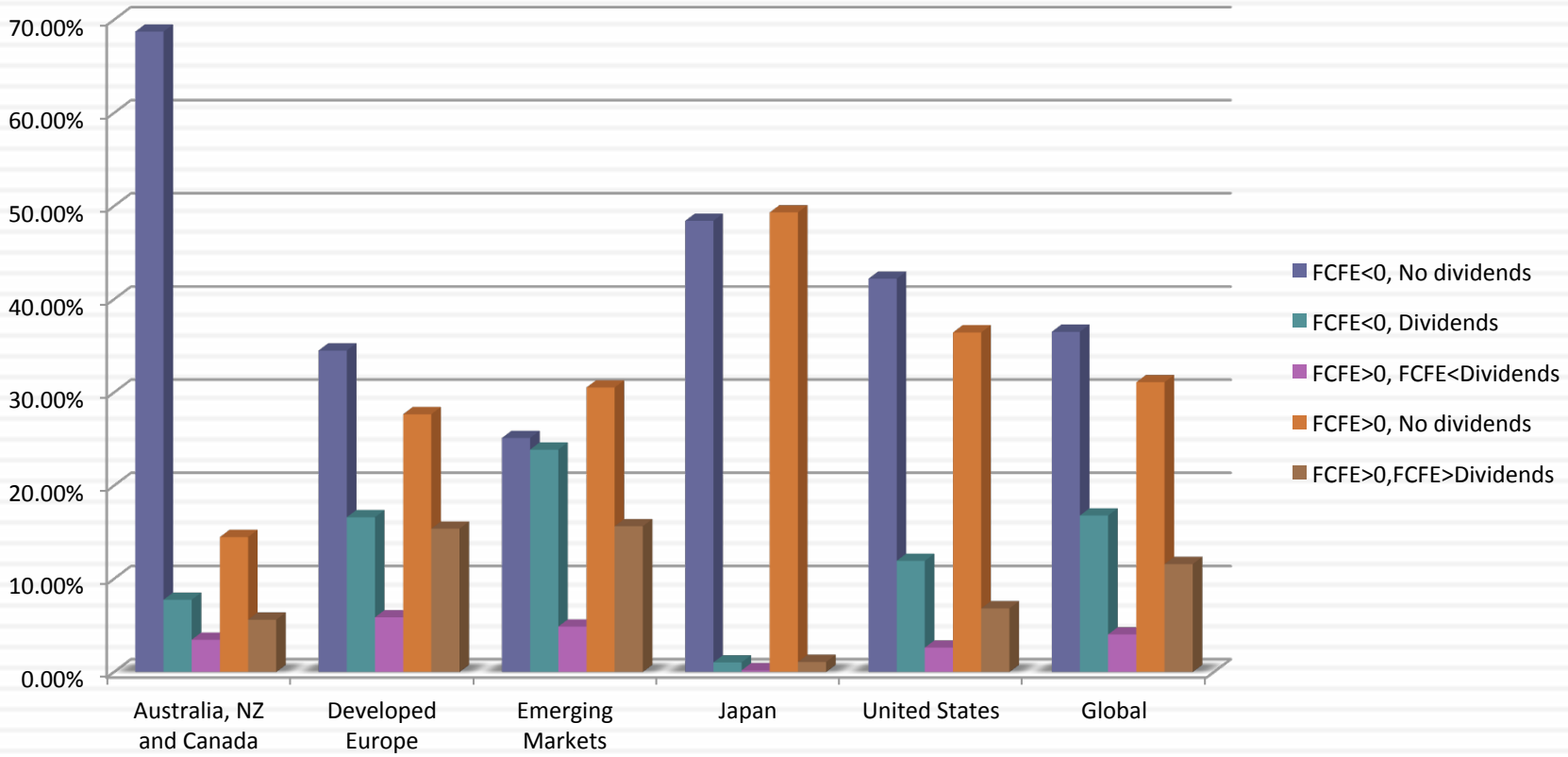
$$FCFE = \$150 \text{ million} - (11{,}000\text{-}10{,}000)^* (.075) = \$75 \text{ million}$$

Deutsche Bank: FCFE estimates (November 2013)

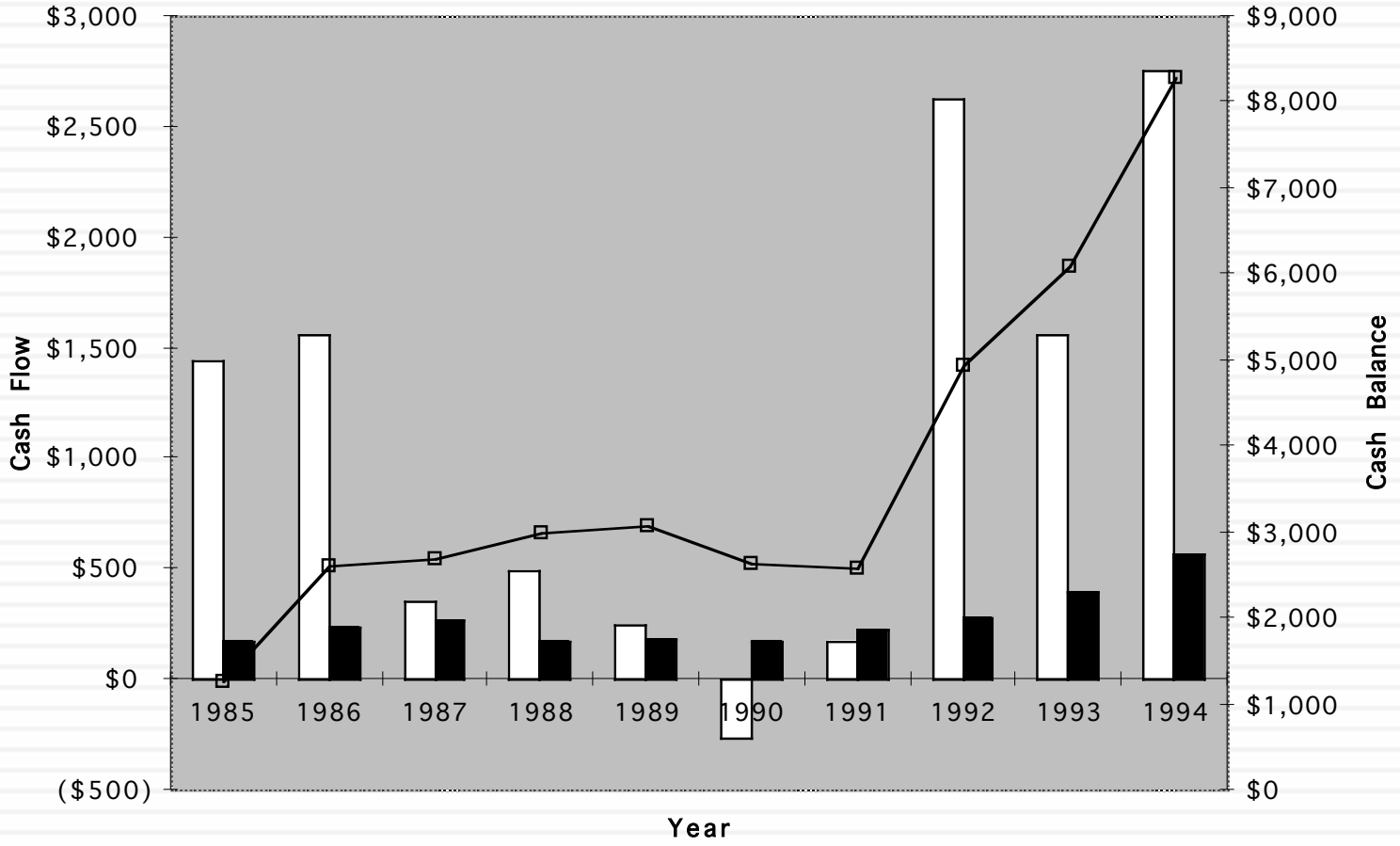
	Current	1	2	3	4	5
Asset Base	439,851 €	453,047 €	466,638 €	480,637 €	495,056 €	509,908 €
Capital ratio	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%
Tier 1 Capital	70,376 €	72,487 €	74,662 €	76,902 €	79,209 €	81,585 €
Change in regulatory capital		2,111 €	2,175 €	2,240 €	2,307 €	2,376 €
Book Equity	76,829 €	78,940 €	81,115 €	83,355 €	85,662 €	88,038 €
ROE	-1.08%	0.74%	2.55%	4.37%	6.18%	8.00%
Net Income	-757 €	584 €	2,072 €	3,642 €	5,298 €	7,043 €
- Investment in Regulatory Capital		2,111 €	2,175 €	2,240 €	2,307 €	2,376 €
FCFE		-1,528 €	-102 €	1,403 €	2,991 €	4,667 €

Dividends versus FCFE: Across the globe

Figure 11.2: Dividends versus FCFE in 2014



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

If cash flow statement used

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

- Compare to

  Dividends (Common)
  + Stock Buybacks

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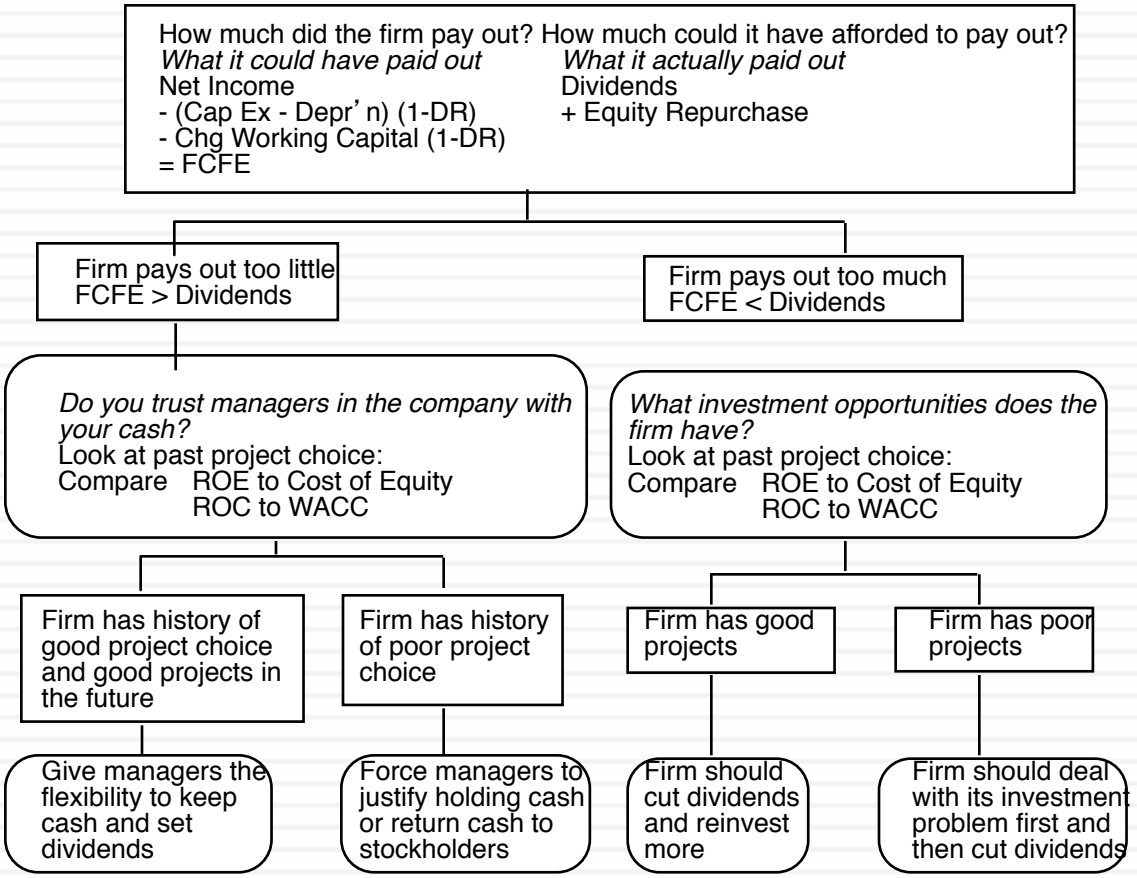
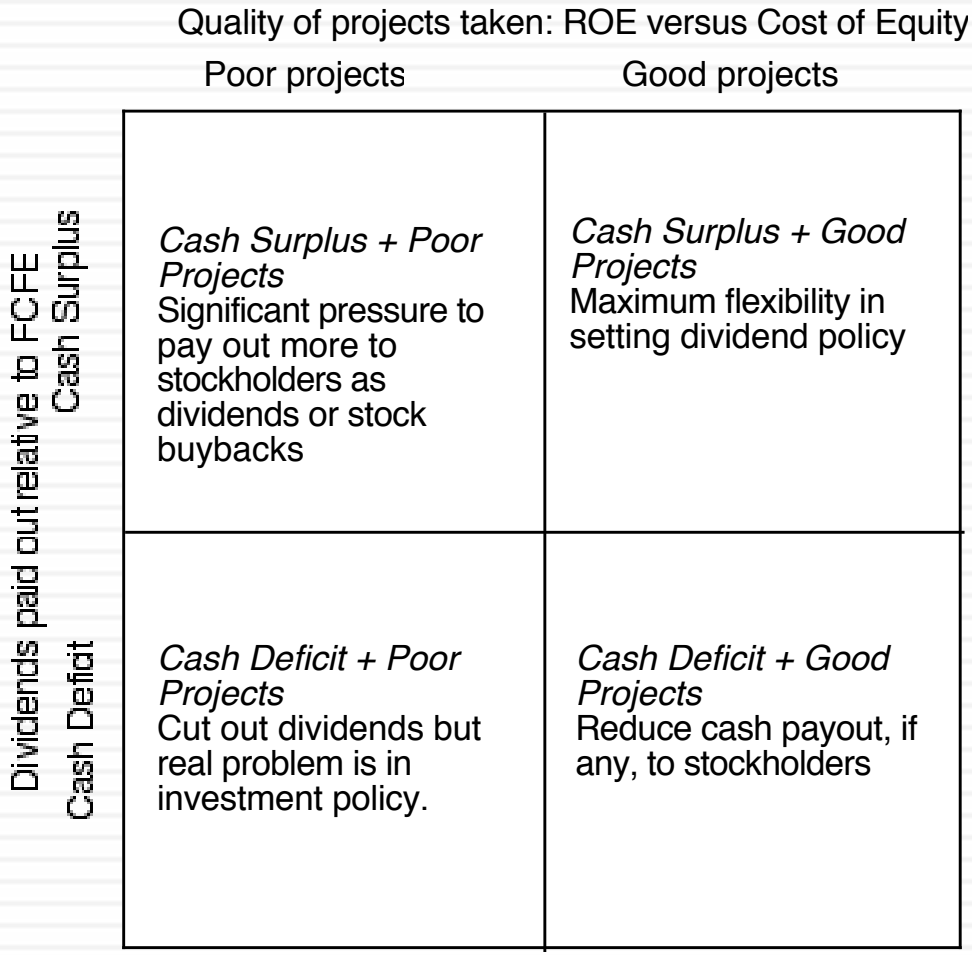
A Practical Framework for Analyzing Dividend Policy



A Dividend Matrix



Case 1: Disney in 2003

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

Can you trust Disney's management?

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

a. Yes

b. No

- Does the fact that the company is run by Michael Eisner, the CEO for the last 10 years and the initiator of the Cap Cities acquisition have an effect on your decision.

a. Yes

b. No

Following up: Disney in 2009

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

Final twist: Disney in 2013

- Disney did return to holding cash between 2008 and 2013, with dividends and buybacks amounting TO $2.6 billion less than the FCFE (with a target debt ratio) over this period.
- Disney continues to earn a return on capital well in excess of the cost of capital and its stock has doubled over the last two years.
- Now, assume that Bob Iger asks you for permission to withhold even more cash to cover future investment needs. Are you likely to go along?

a. Yes
b. No

Case 2: Vale – Dividends versus FCFE

	Aggregate	Average
Net Income	$57,404	$5,740
Dividends	$36,766	$3,677
Dividend Payout Ratio	$1	$1
Stock Buybacks	$6,032	$603
Dividends + Buybacks	$42,798	$4,280
Cash Payout Ratio	$1	
Free CF to Equity (pre-debt)	($1,903)	($190)
Free CF to Equity (actual debt)	$1,036	$104
Free CF to Equity (target debt ratio)	$19,138	$1,914
Cash payout as % of pre-debt FCFE	FCFE negative	
Cash payout as % of actual FCFE	4131.08%	
Cash payout as % of target FCFE	223.63%	

Vale: Its your call..

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

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!

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

Europe, recovery will depend upon seasonal heating oil de[illegible]nd," Mr. Simon said.

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

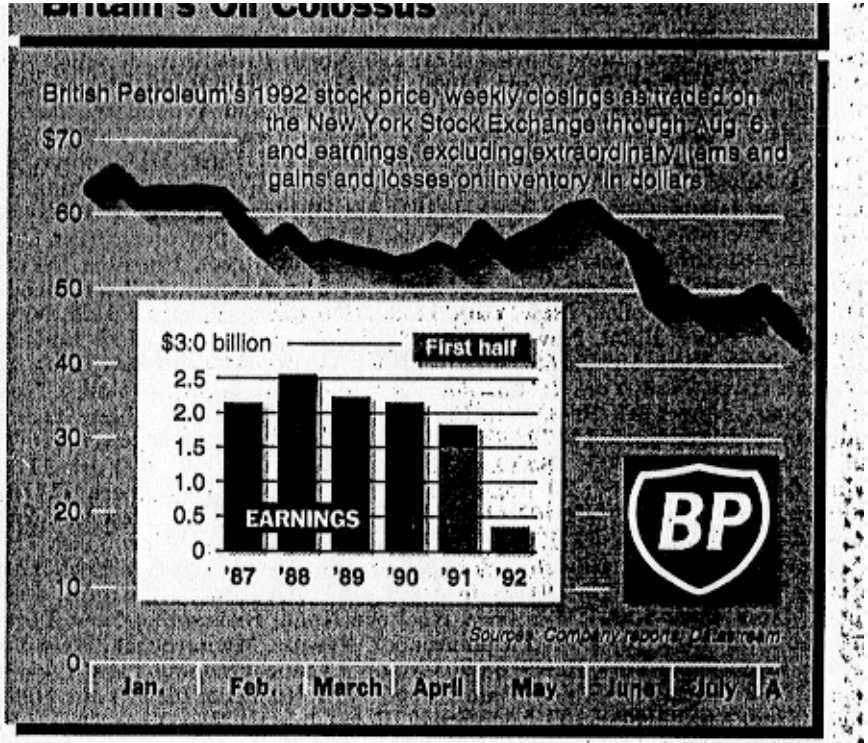
The giant British oil company bet on rising oil prices.

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

The market for petrochemicals in Europe remains weak.

B.P.'s second quarter profits, before one-time transactions, declined to $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.



The New York Times

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

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

Managing changes in dividend policy

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?
  a. Yes
  b. No
- Why?

5. Tata Motors

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

Negative FCFE, largely because of acquisitions.

⌛ 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

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

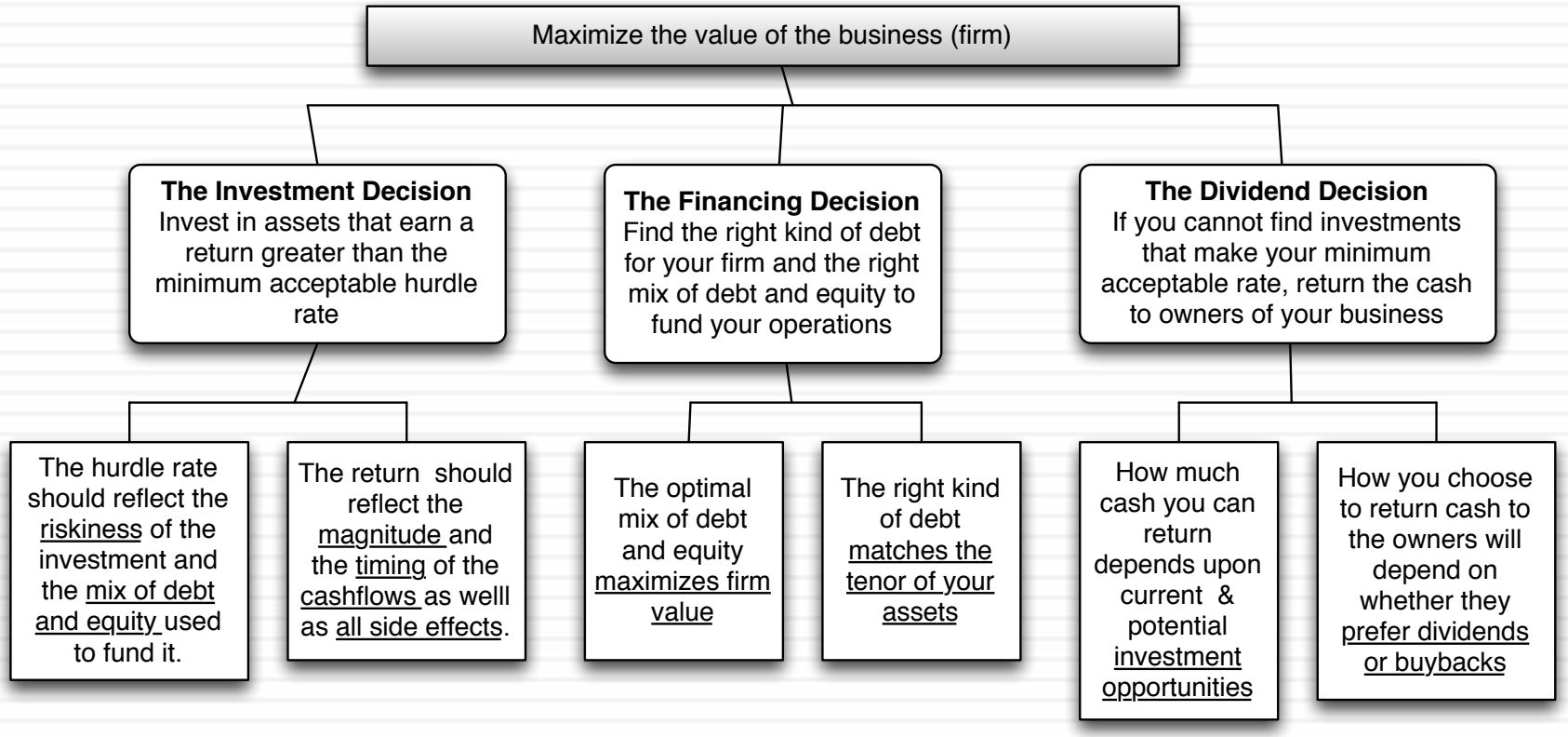
	Dividend Yield		*Dividend Payout*				
Company	*2013*	*Average 2008-12*	*2013*	*Average 2008-12*	*Comparable Group*	*Dividend Yield*	*Dividend Payout*
Disney	1.09%	1.17%	21.58%	17.11%	US Entertainment	0.96%	22.51%
Vale	6.56%	4.01%	113.45%	37.69%	Global Diversified Mining & Iron Ore (Market cap> $1 b)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

VALUATION

Aswath Damodaran

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

First Principles



Three approaches to valuation

1. 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.
2. 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.
3. 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.

Intrinsic Value: Four Basic Propositions

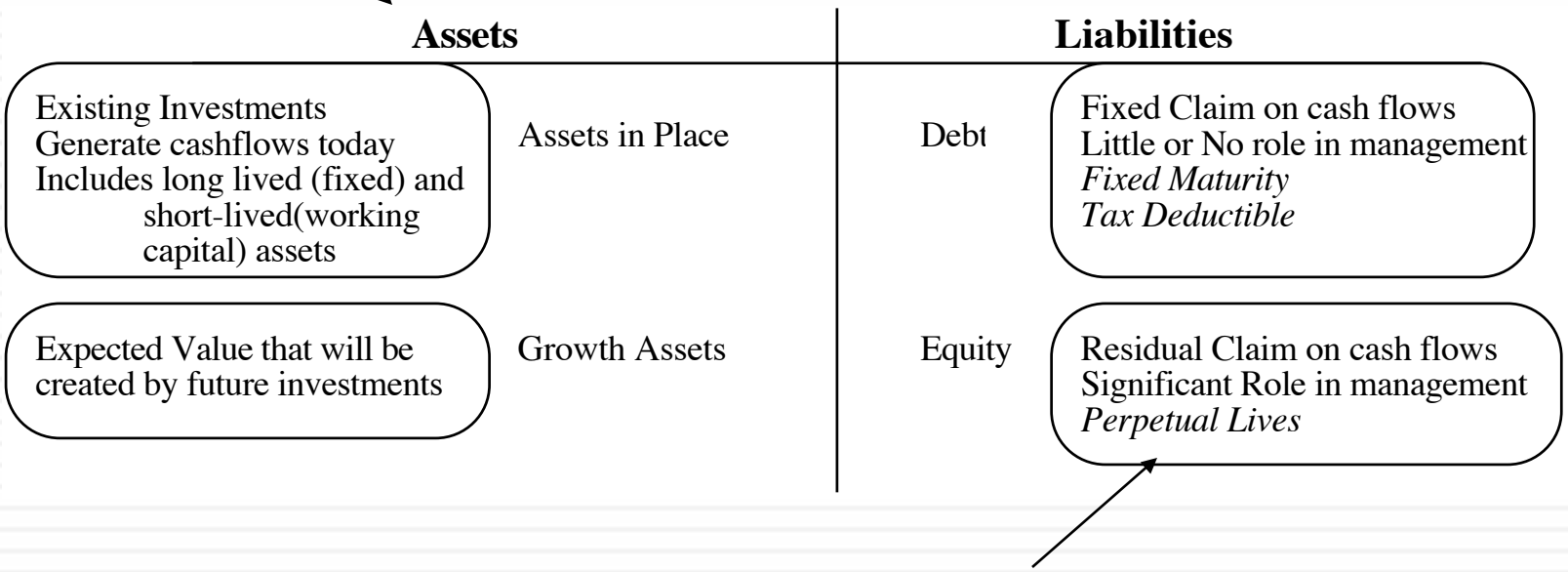
The value of an asset is the present value of the expected cash flows on that asset, over its expected life:

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

1. *The IT Proposition*: If "it" does not affect the cash flows or alter risk (thus changing discount rates), "it" cannot affect value.
2. *The DUH Proposition*: For an asset to have value, the expected cash flows have to be positive some time over the life of the asset.
3. *The DON'T FREAK OUT Proposition*: Assets that generate cash flows early in their life will be worth more than assets that generate cash flows later; the latter may however have greater growth and higher cash flows to compensate.
4. *The VALUE IS NOT PRICE Proposition*: The value of an asset may be very different from its price.

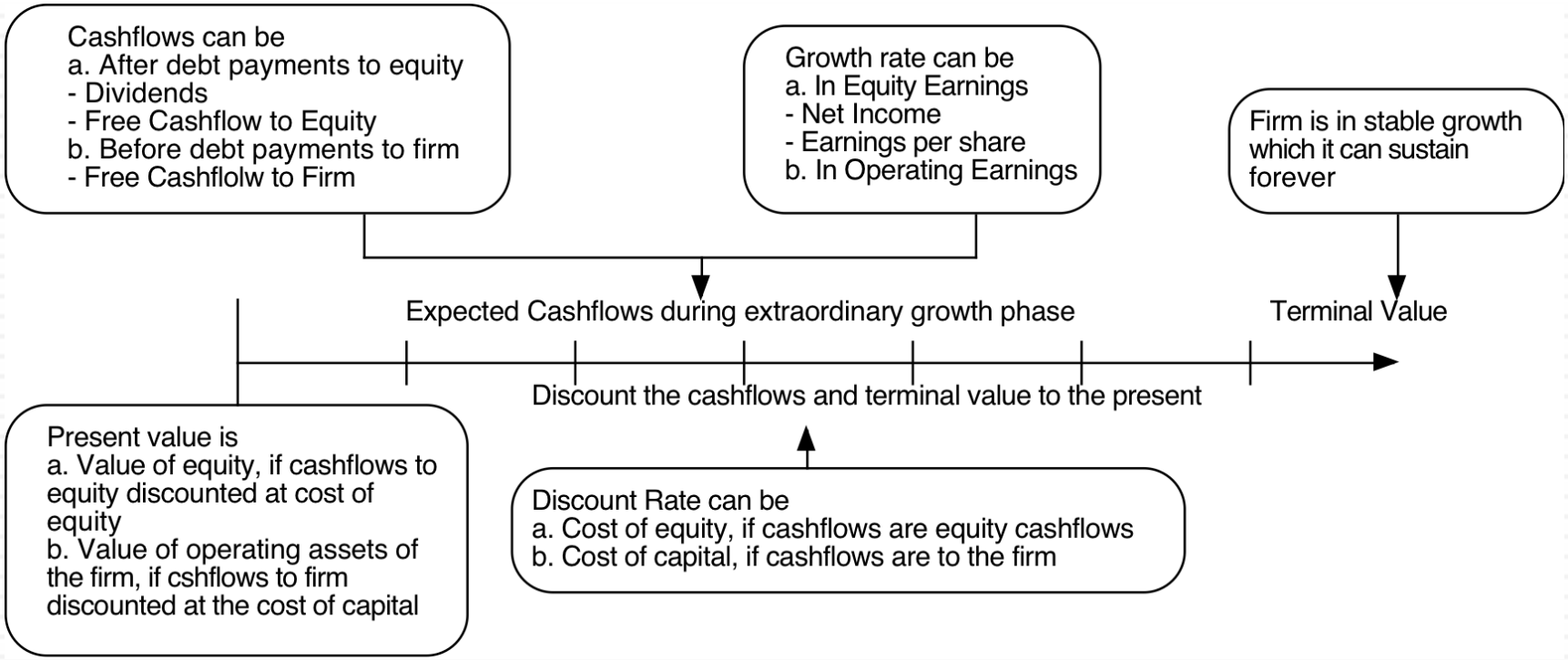
DCF Choices: Equity Valuation versus Firm Valuation

Firm Valuation: Value the entire business

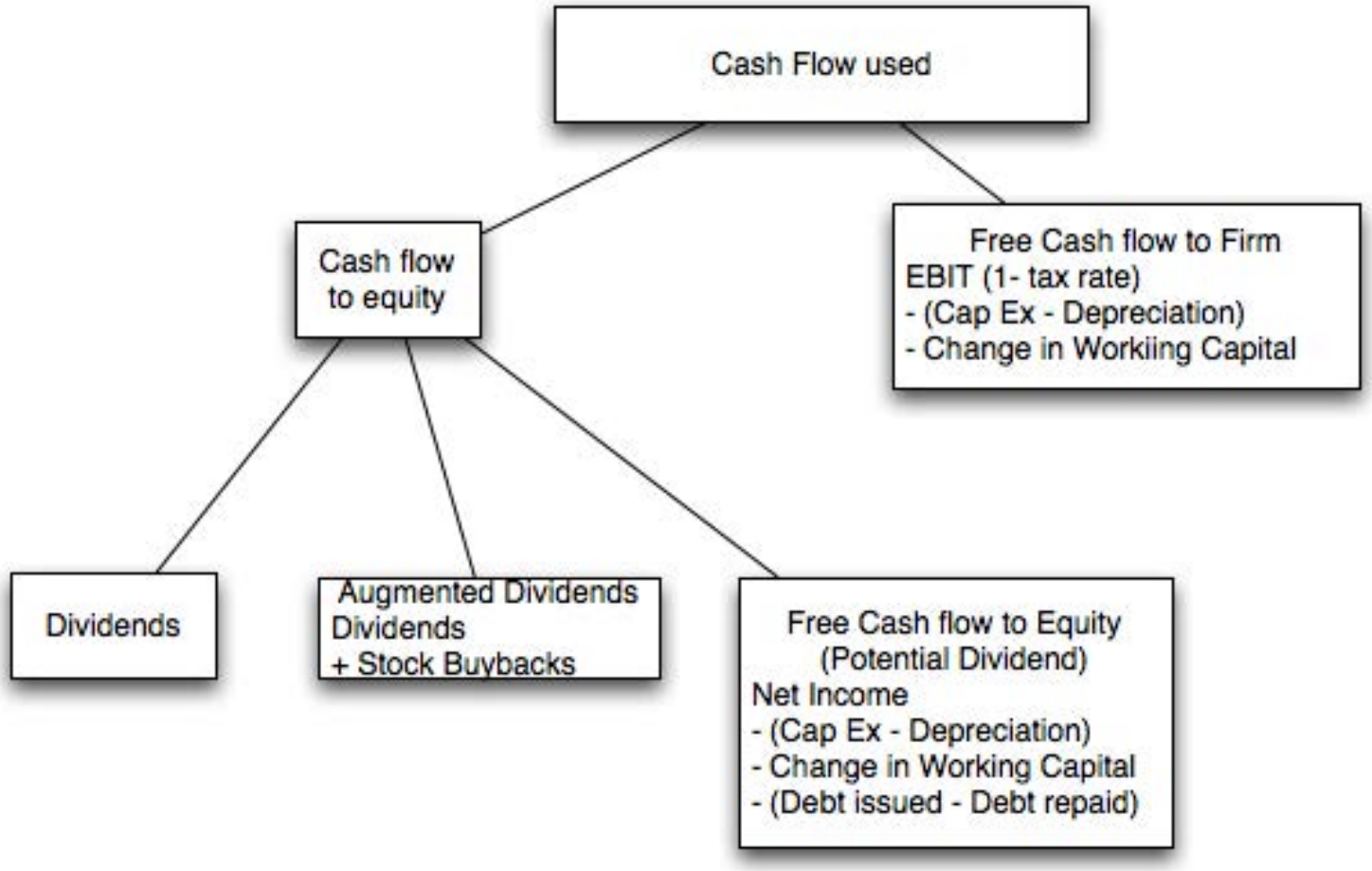


Equity valuation: Value just the equity claim in the business

The Ingredients that determine value.



I. Estimating Cash Flows



Estimating FCFF: Disney

- In the fiscal year ended September 2013, Disney reported the following:
  - Operating income (adjusted for leases) = $10,032 million
  - Effective tax rate = 31.02%
  - Capital Expenditures (including acquisitions) = $5,239 million
  - Depreciation & Amortization = $2.192 million
  - Change in non-cash working capital = $103 million
- The free cash flow to the firm can be computed as follows:

After-tax Operating Income	= 10,032 (1 -.3102)	= $6,920
- Net Cap Expenditures	= $5,239 - $2,192	= $3,629
- Change in Working Capital	=	=$103
= Free Cashflow to Firm (FCFF)	=	= $3,188

- The reinvestment and reinvestment rate are as follows:
  - Reinvestment = $3,629 + $103 = $3,732 million
  - Reinvestment Rate = $3,732/ $6,920 = 53.93%

II. Discount Rates

- Keep it current: When doing a valuation, you need a discount rate that reflects today's conditions. Not only does this require you to update the base risk free rate, but also your risk premiums (equity risk premium and default spread) and perhaps even your measures of risk (betas, default risk measures)
- Keep it consistent: At an intuitive level, the discount rate used should be consistent with both the riskiness and the type of cash flow 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.
- Keep it in perspective: The discount rate obviously matters in a discounted cash flow valuation, but not as much as your other inputs. In fact, as uncertainty about the future increases, the more you should focus on estimating cash flows and the less your should focus on discount rates.

Current Cost of Capital: Disney

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

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

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

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

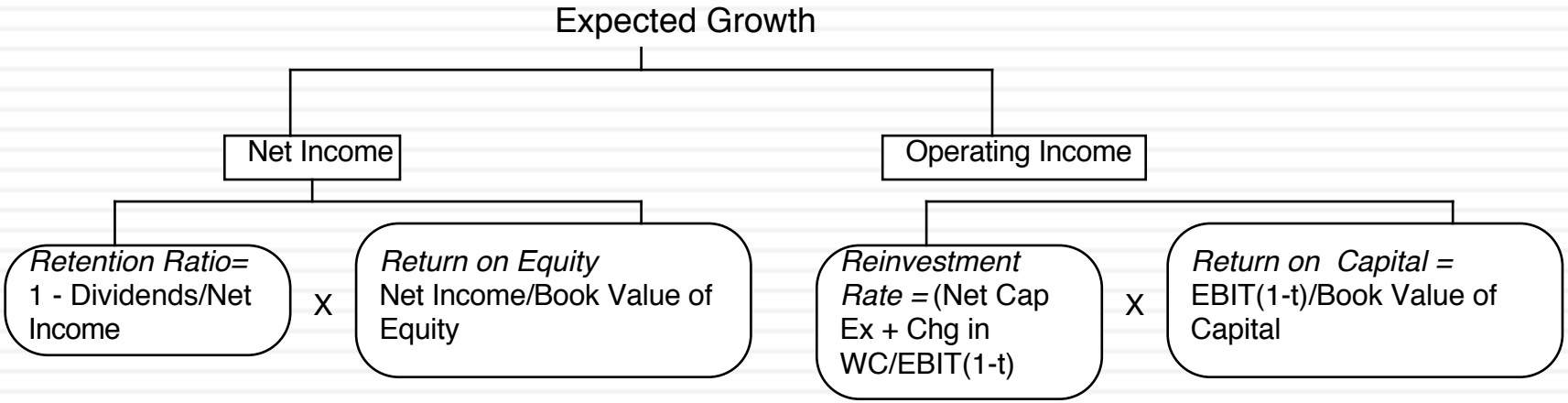
- The cost of capital was calculated using these costs and the weights based on market values of equity (121,878) and debt (15.961):

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

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

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

III. Expected Growth



Estimating Growth in EBIT: Disney

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

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

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

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

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

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

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

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

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 2.5. This is set lower than the riskfree rate (2.75%).
- Stable period excess returns: The return on capital for Disney will drop from its high growth period level of 12.61% to a stable growth return of 10%. This is still higher than the cost of capital of 7.29% but the competitive advantages that Disney has are unlikely to dissipate completely by the end of the 10th year.
- Reinvest to grow: Based on the expected growth rate in perpetuity (2.5%) and expected return on capital forever after year 10 of 10%, we compute s a stable period reinvestment rate of 25%:
  - Reinvestment Rate = Growth Rate / Return on Capital = 2.5% /10% = 25%
- 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 = 2.75% + 5.76% = 8.51%
  - The debt ratio for Disney will rise to 20%. Since we assume that the cost of debt remains unchanged at 3.75%, this will result in a cost of capital of 7.29%
  - Cost of capital = 8.51% (.80) + 3.75% (1-.361) (.20) = 7.29%

V. From firm value to equity value per share

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

Disney: Inputs to Valuation

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

Disney - November 2013

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

Reinvestment Rate 53.93%

Return on Capital 12.61%

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

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

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

Term Yr
10,639
2,660
7,980

First 5 years

Growth declines gradually to 2.75%

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

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

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

Cost of capital declines gradually to 7.29%

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

Cost of Equity
8.52%

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

Weights
E = 88.5% D = 11.5%

Riskfree Rate:
Riskfree rate = 2.75%

+

Beta
1.0013

Unlevered Beta for Sectors: 0.9239

D/E=13.10%

X

ERP for operations
5.76%

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

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

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

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

Strategic investments determine length of growth period

Existing Investments ROC = 12.61%

New Investments Return on Capital 12.61%

Reinvestment Rate 53.93%

Financing Mix D=11.5%; E=88.5%

Financing Choices Mostly US $ debt with duration of 6 years

Current EBIT (1-t) $ 6,920

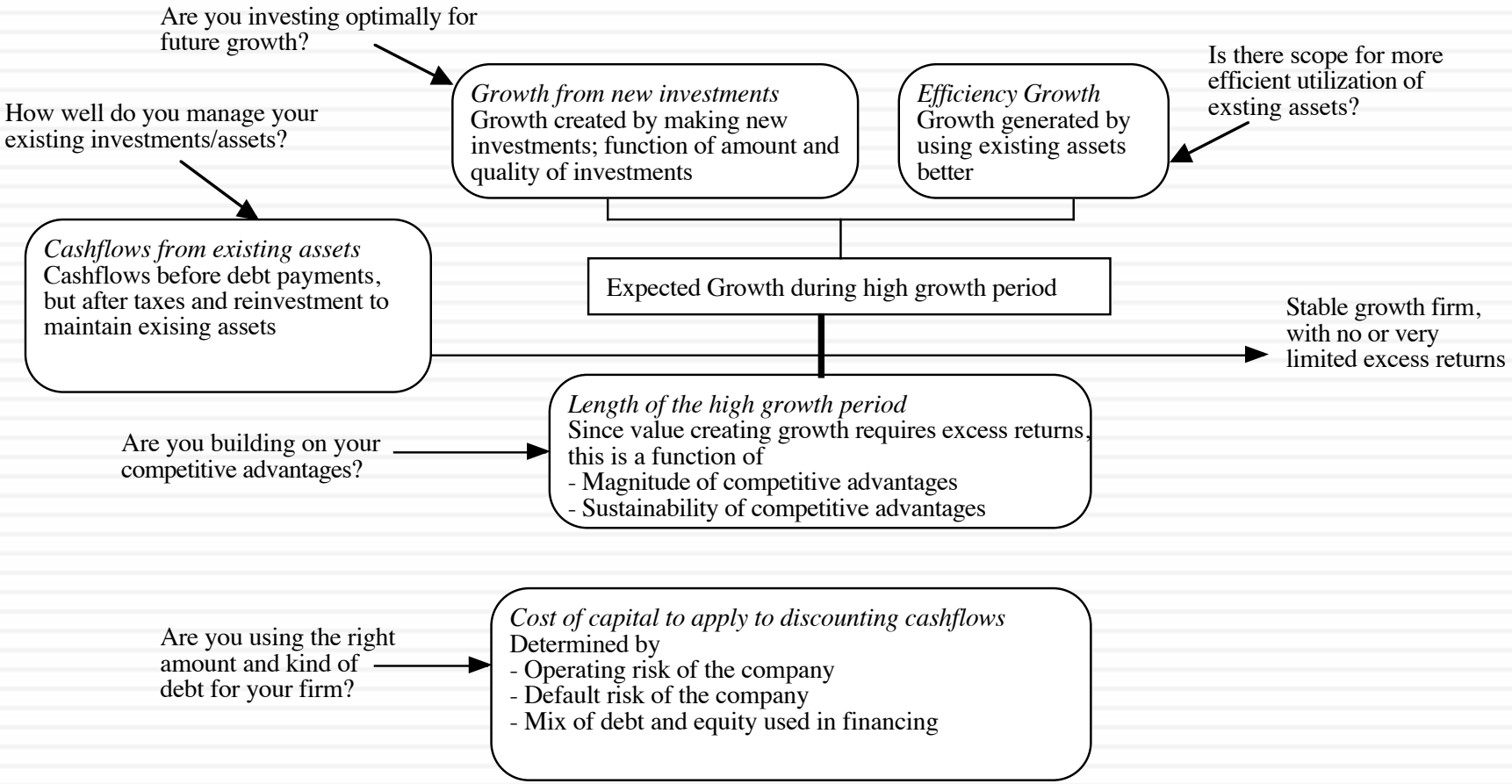
Expected Growth Rate = 12.61% * 53.93%= 6.8%

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

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

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

Ways of changing value…



Disney (Restructured)- November 2013

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

Reinvestment Rate 50.00%

More selective acquisitions & payoff from gaming

Return on Capital 14.00%

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

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

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

Term Yr
12,275
3,069
9,206

First 5 years

Growth declines gradually to 2.75%

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

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

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

Cost of capital declines gradually to 6.76%

Cost of Equity
10.34%

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

Weights
E = 60% D = 40%

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

Move to optimal debt ratio, with higher beta.

Riskfree Rate:
Riskfree rate = 2.75%

+

Beta
1.3175

Unlevered Beta for Sectors: 0.9239

D/E=66.67%

x

ERP for operations
5.76%

First Principles