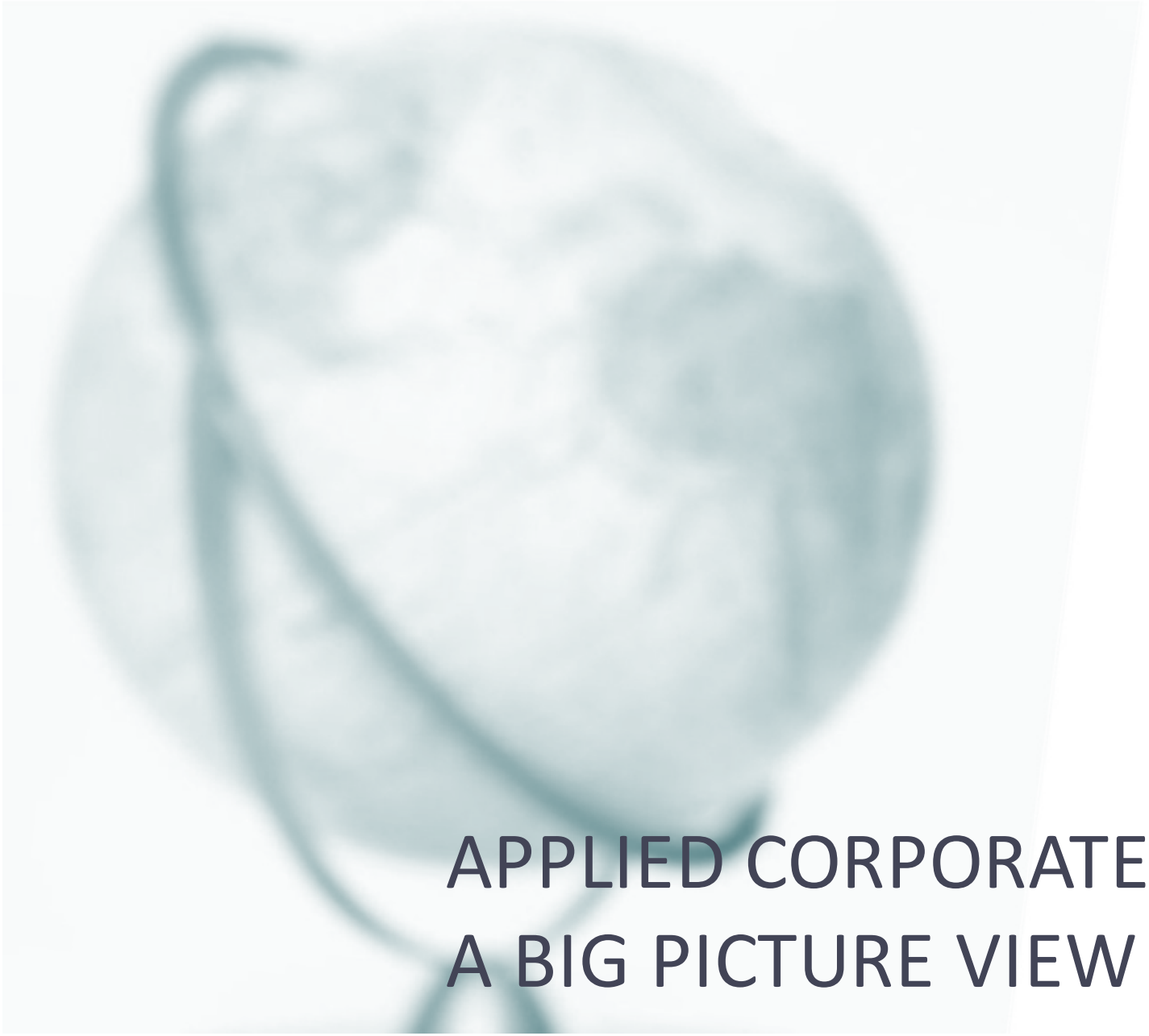
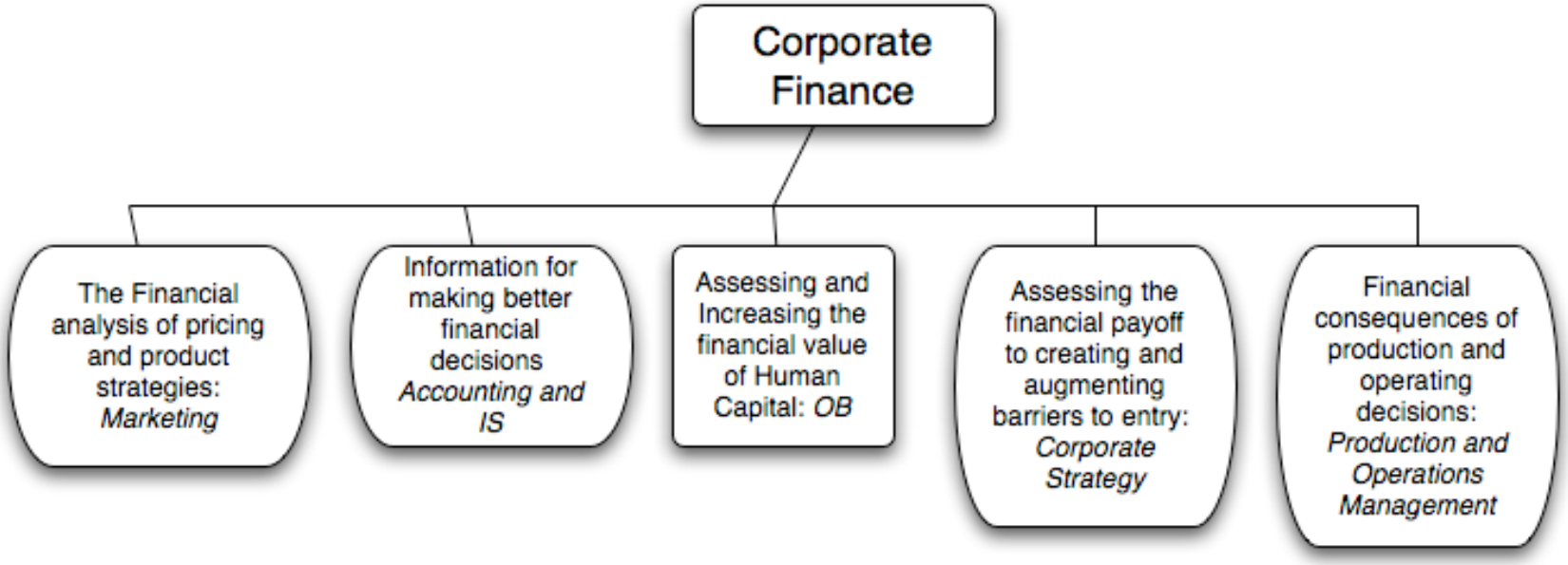


APPLIED CORPORATE FINANCE: A BIG PICTURE VIEW

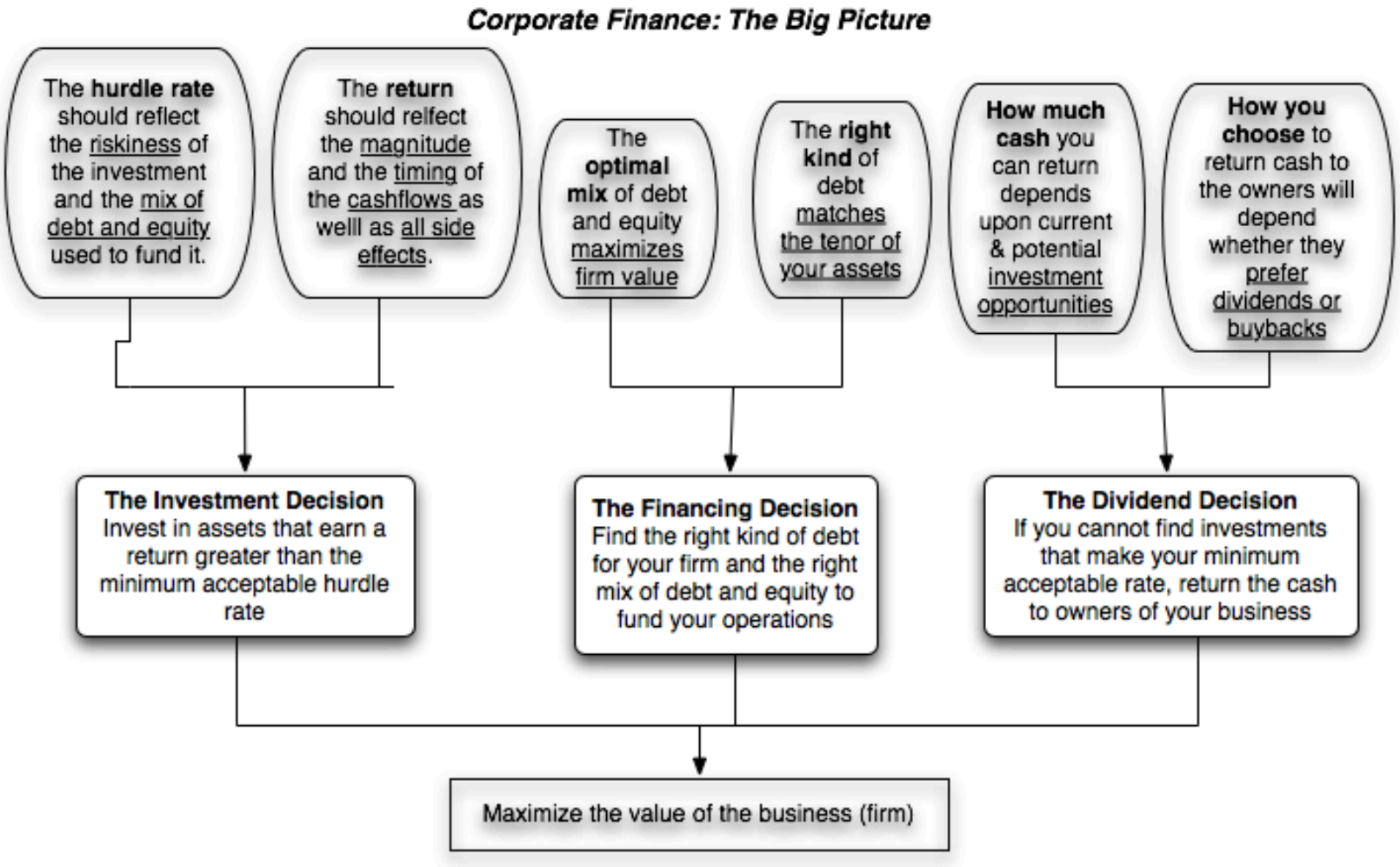
Aswath Damodaran
www.damodaran.com

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.

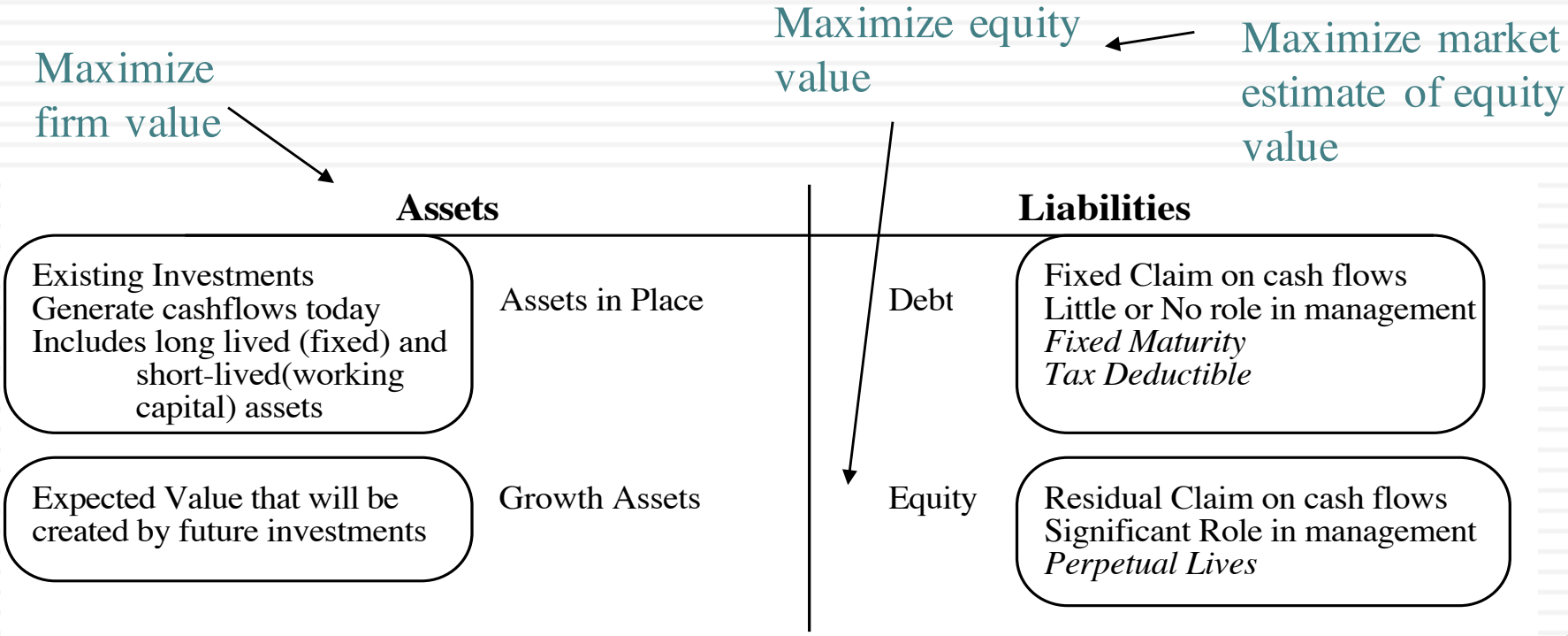


First Principles

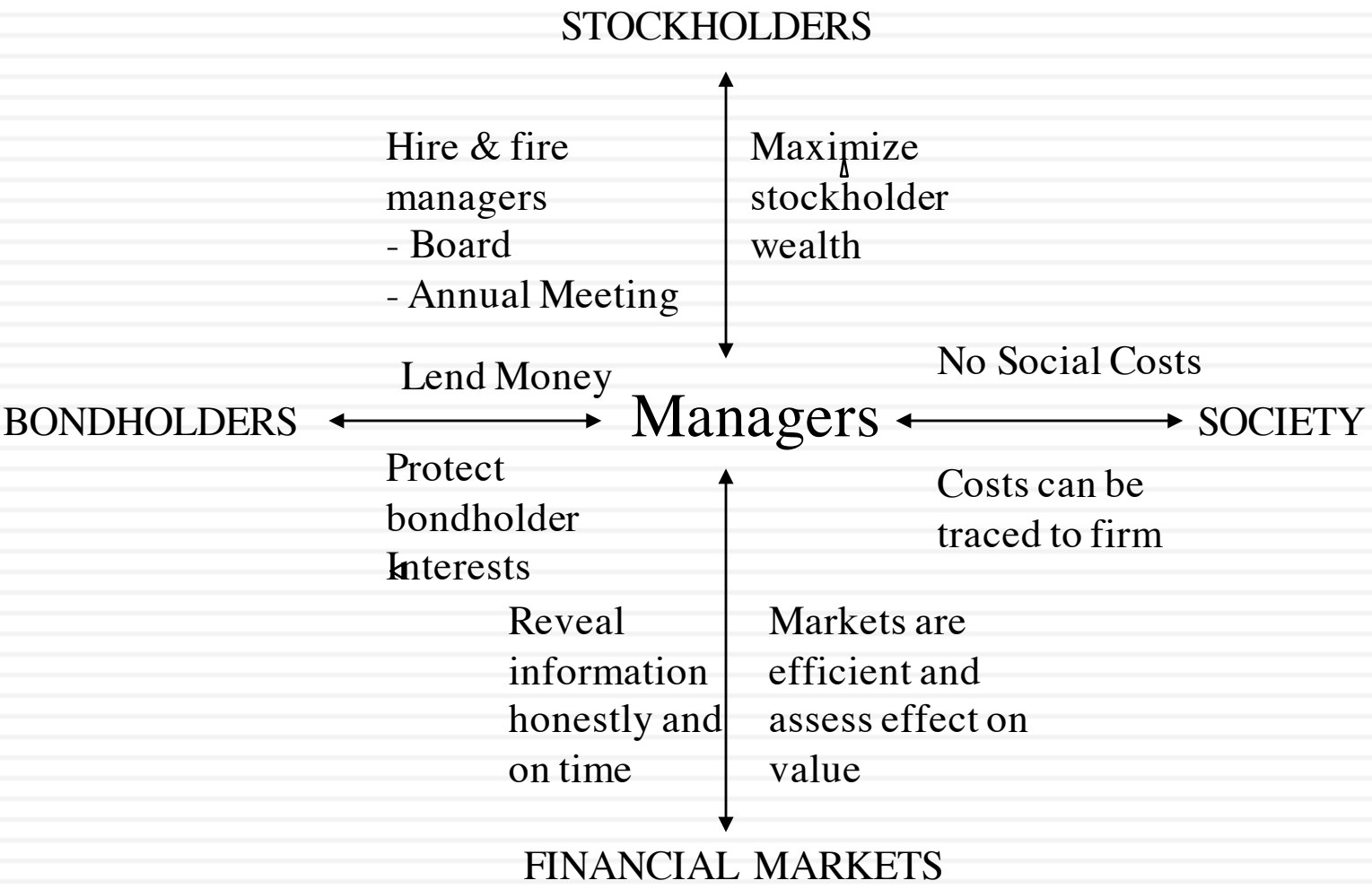


The Objective in Decision Making

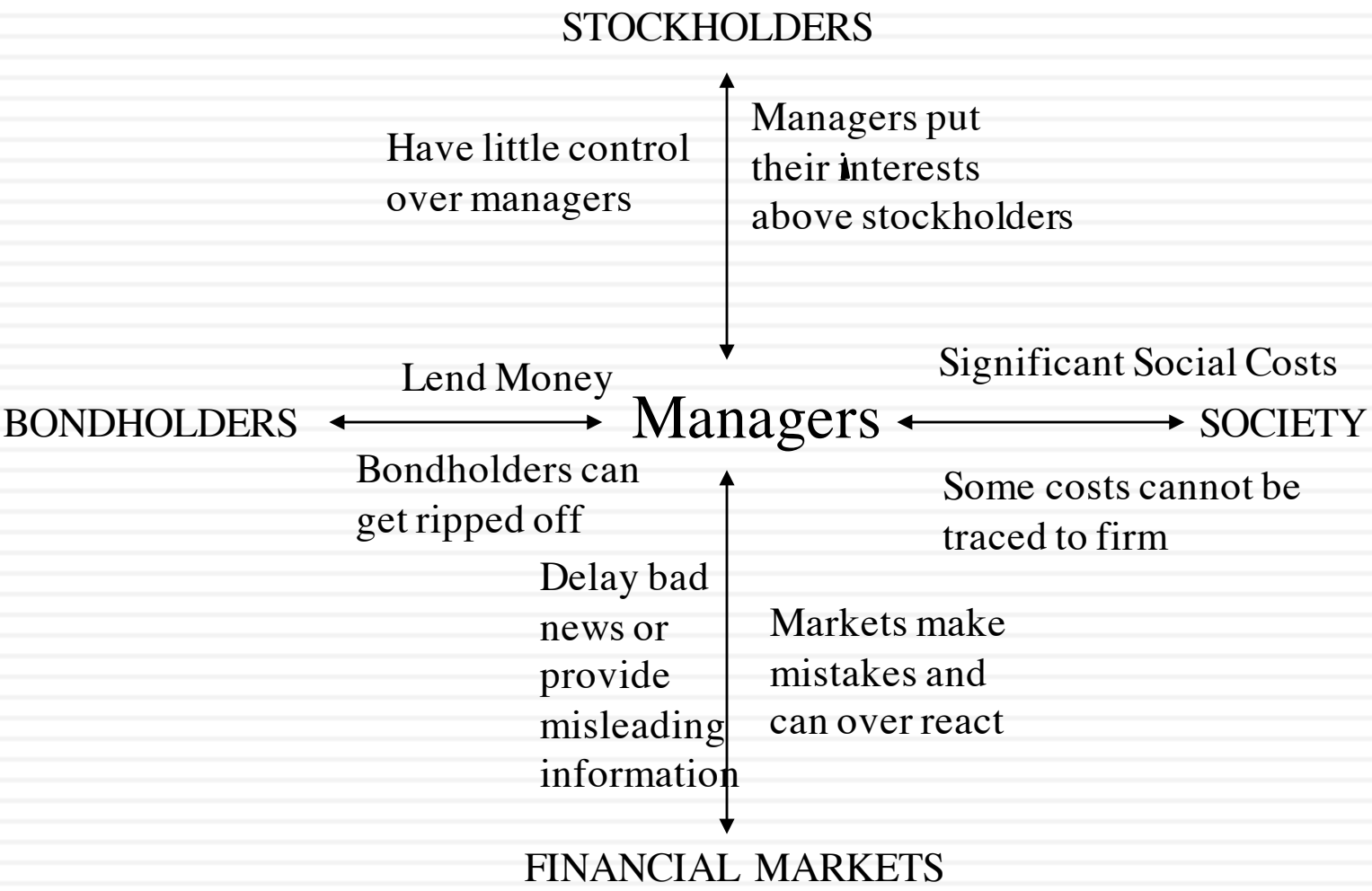
- In traditional corporate finance, the objective in decision making is to maximize the value of the firm.
- A narrower objective is to maximize stockholder wealth. When the stock is traded and markets are viewed to be efficient, the objective is to maximize the stock price.



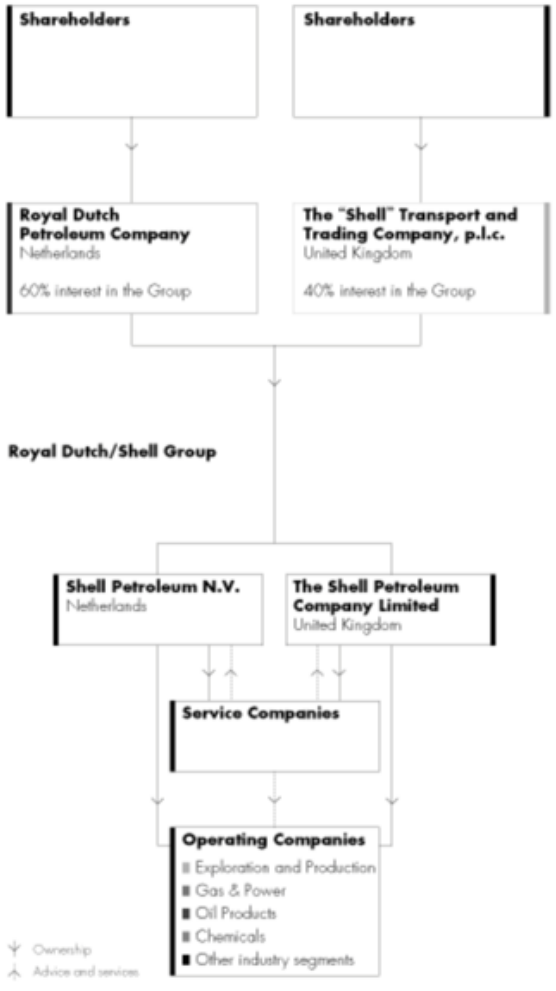
The Classical Objective Function



What can go wrong?



The Old Royal Dutch Shell



RDS: The Corporate Governance History

- Until 1995, RDS was organized geographically, with each regional head wielding substantial power over operating decisions in that geography. That year, it was reorganized around businesses (and the notion of jobs-for-life was removed.)
- In 2004, there were 1500 shares held by the Dutch board that had 800 times the voting rights of the rest of the shares. Those shares gave the board effective control of the company.
- In 2005, after four downgrades of its oil reserves, numerous scandals, stockholder upheaval and a general sense that the company was being left behind, the Dutch board gave up its high voting shares.
- The company is now one company, with two classes of shares, with no differences in voting rights but differences in the tax treatment of dividends, with the Dutch government withholding taxes on the class A shares.

RDS: Who's on board?

Does Shell have an independent board?

a. Yes
b. No

Does Shell have an effective board?

a. Yes
b. No

Name	Age	Since	Current Position
Charles Holliday	67	2015	Non-Executive Chairman of the Board
Ben van Beurden	57	2014	Chief Executive Officer, Director
Hans Wijers	65	2014	Non-Executive Deputy Chairman of the Board, Senior Independent Director
Simon Henry	53	2009	Chief Financial Officer, Director
Ronan Cassidy		2016	Chief Human Resource Corporate Officer
Michiel Brandjes	60	2005	General Counsel, Company Secretary
John Abbott	55	2013	Director - Downstream Division
Andrew Brown	53	2012	Upstream International Director
Donny Ching	51	2014	Legal Director
Marvin Odum	56	2009	Upstream Americas Director
Maarten Wetselaar		2016	Integrated Gas Director
Harry Brekelmans	49	2014	Member of the Executive Committee, Projects & Technology Director
Guy Elliott	59	2010	Non-Executive Director
Euleen Goh	60	2014	Non-Executive Director
Gerard Kleisterlee	68	2010	Non-Executive Director
Nigel Sheinwald	61	2012	Non-Executive Director
Linda Stuntz	61	2011	Non-Executive Director
Patricia Woertz	62	2014	Non-Executive Director
Peter van Driel			Vice President - Investor Relations, Europe

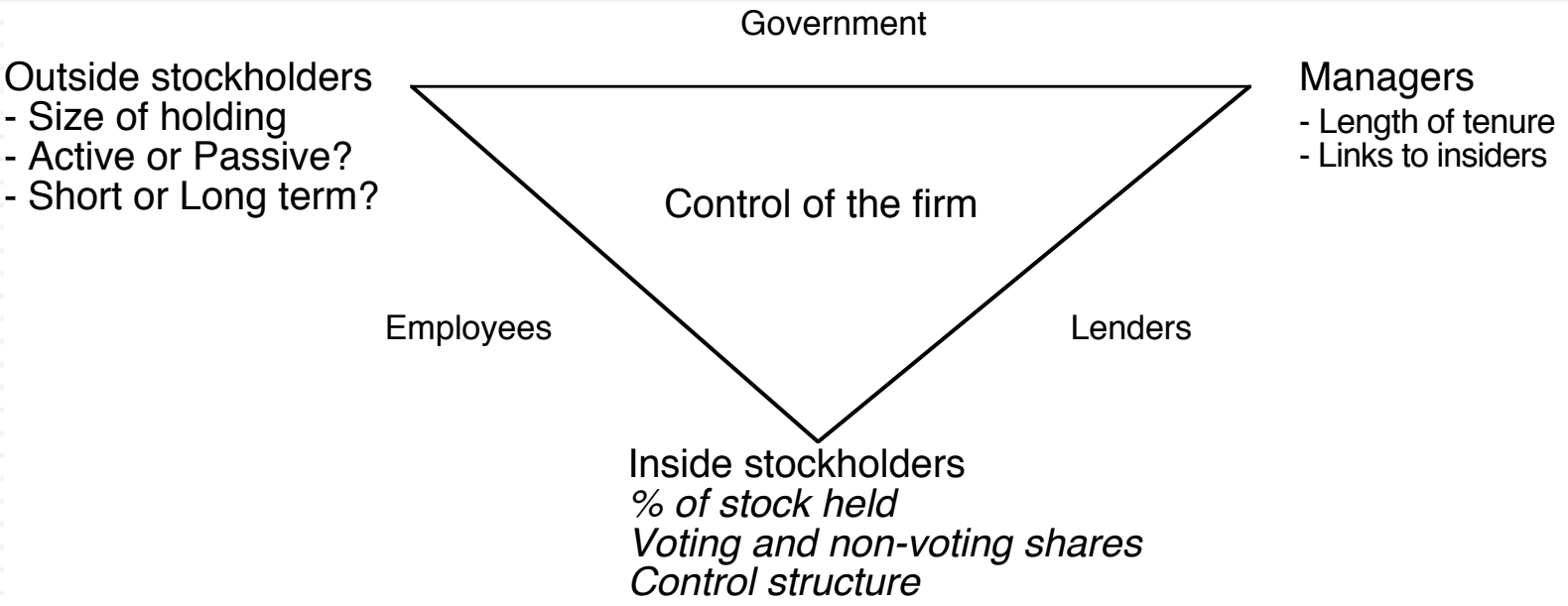
When traditional corporate financial theory breaks down, the solution is:

- 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

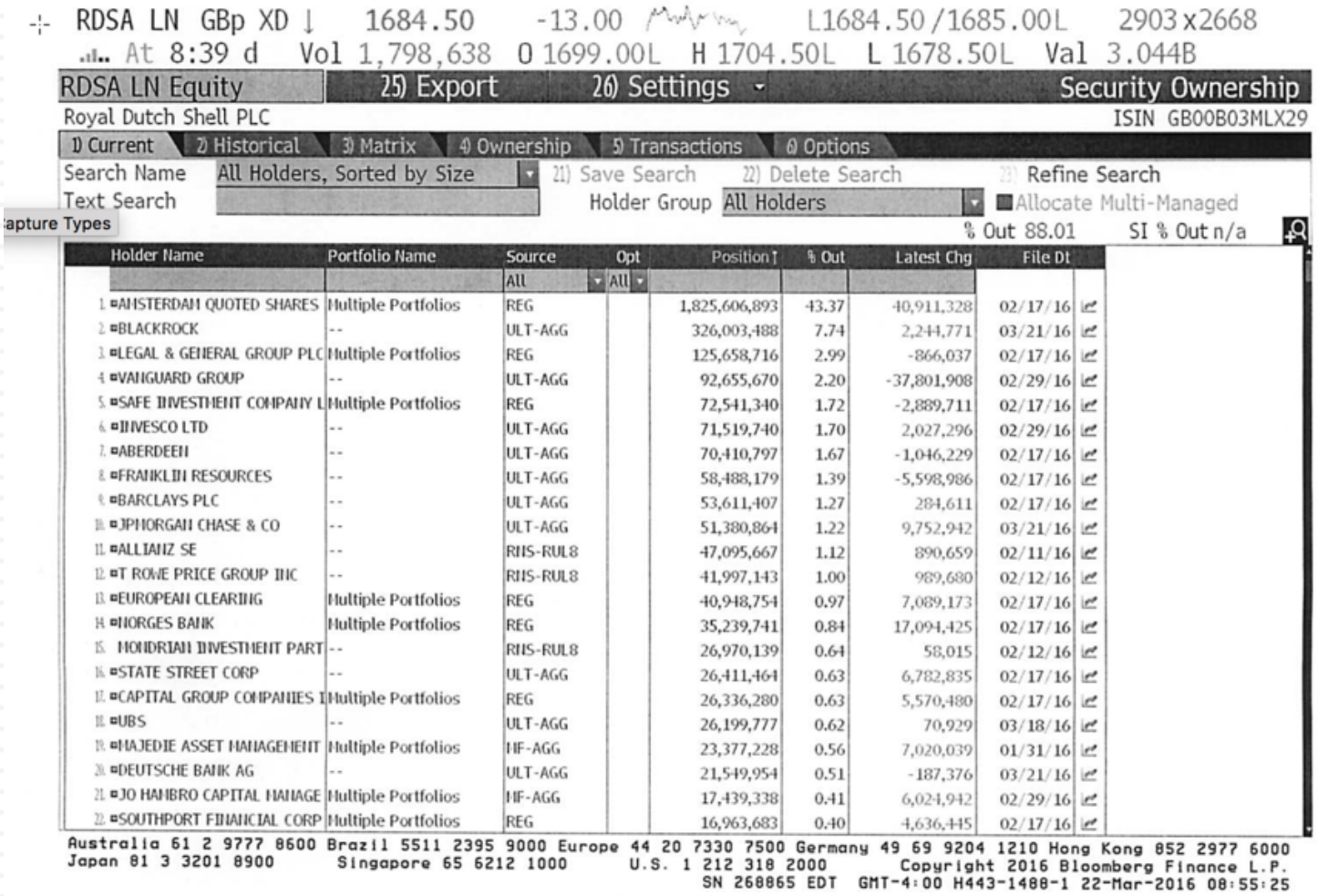
A Market Based Solution

Application Test: Who owns/runs 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?



Who owns your equity?
Shell's top stockholders in 2016 – Class A



RDSA LN GBp XD ↓ 1684.50 -13.00 L1684.50/1685.00L 2903x2668
At 8:39 d Vol 1,798,638 O 1699.00L H 1704.50L L 1678.50L Val 3.044B

RDSA LN Equity | 25) Export | 26) Settings | Security Ownership

Royal Dutch Shell PLC — ISIN GB00B03MLX29

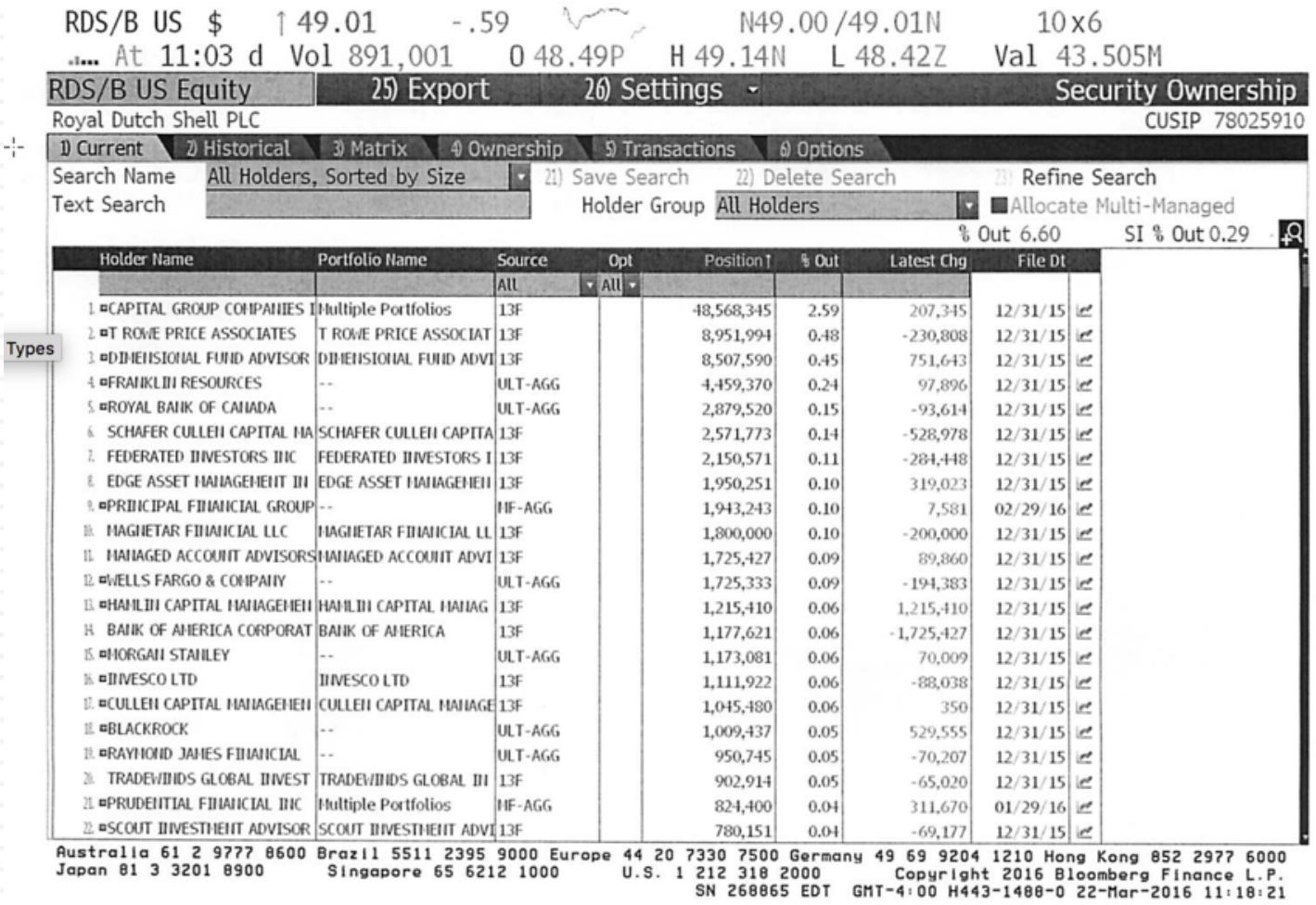
1) Current | 2) Historical | 3) Matrix | 4) Ownership | 5) Transactions | 6) Options

Search Name: All Holders, Sorted by Size | 21) Save Search | 22) Delete Search | 23) Refine Search
Text Search: | Holder Group: All Holders | Allocate Multi-Managed
apture Types | % Out 88.01 | SI % Out n/a

	Holder Name	Portfolio Name	Source	Opt	Position↑	% Out	Latest Chg	File Dt
			All	All				
1.	AMSTERDAM QUOTED SHARES	Multiple Portfolios	REG		1,825,606,893	43.37	40,911,328	02/17/16
2.	BLACKROCK	--	ULT-AGG		326,003,488	7.74	2,244,771	03/21/16
3.	LEGAL & GENERAL GROUP PLC	Multiple Portfolios	REG		125,658,716	2.99	-866,037	02/17/16
4.	VANGUARD GROUP	--	ULT-AGG		92,655,670	2.20	-37,801,908	02/29/16
5.	SAFE INVESTMENT COMPANY L	Multiple Portfolios	REG		72,541,340	1.72	-2,889,711	02/17/16
6.	INVESCO LTD	--	ULT-AGG		71,519,740	1.70	2,027,296	02/29/16
7.	ABERDEEN	--	ULT-AGG		70,410,797	1.67	-1,046,229	02/17/16
8.	FRANKLIN RESOURCES	--	ULT-AGG		58,488,179	1.39	-5,598,986	02/17/16
9.	BARCLAYS PLC	--	ULT-AGG		53,611,407	1.27	284,611	02/17/16
10.	JPMORGAN CHASE & CO	--	ULT-AGG		51,380,864	1.22	9,752,942	03/21/16
11.	ALLIANZ SE	--	RNS-RUL8		47,095,667	1.12	890,659	02/11/16
12.	T ROWE PRICE GROUP INC	--	RNS-RUL8		41,997,143	1.00	989,680	02/12/16
13.	EUROPEAN CLEARING	Multiple Portfolios	REG		40,948,754	0.97	7,089,173	02/17/16
14.	NORGES BANK	Multiple Portfolios	REG		35,239,741	0.84	17,094,425	02/17/16
15.	MONDRIAN INVESTMENT PART	--	RNS-RUL8		26,970,139	0.64	58,015	02/12/16
16.	STATE STREET CORP	--	ULT-AGG		26,411,464	0.63	6,782,835	02/17/16
17.	CAPITAL GROUP COMPANIES I	Multiple Portfolios	REG		26,336,280	0.63	5,570,480	02/17/16
18.	UBS	--	ULT-AGG		26,199,777	0.62	70,929	03/18/16
19.	HAJEDIE ASSET MANAGEMENT	Multiple Portfolios	NF-AGG		23,377,228	0.56	7,020,039	01/31/16
20.	DEUTSCHE BANK AG	--	ULT-AGG		21,549,954	0.51	-187,376	03/21/16
21.	JO HAMBRO CAPITAL MANAGE	Multiple Portfolios	NF-AGG		17,439,338	0.41	6,024,942	02/29/16
22.	SOUTHPORT FINANCIAL CORP	Multiple Portfolios	REG		16,963,683	0.40	4,636,445	02/17/16

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2016 Bloomberg Finance L.P.
SN 268865 EDT GMT-4:00 H443-1488-1 22-Mar-2016 08:55:25

And Class B..



RDS/B US $ ↑ 49.01 -.59 N49.00/49.01N 10x6
At 11:03 d Vol 891,001 O 48.49P H 49.14N L 48.42Z Val 43.505M

RDS/B US Equity | 25) Export | 26) Settings | Security Ownership

Royal Dutch Shell PLC — CUSIP 78025910

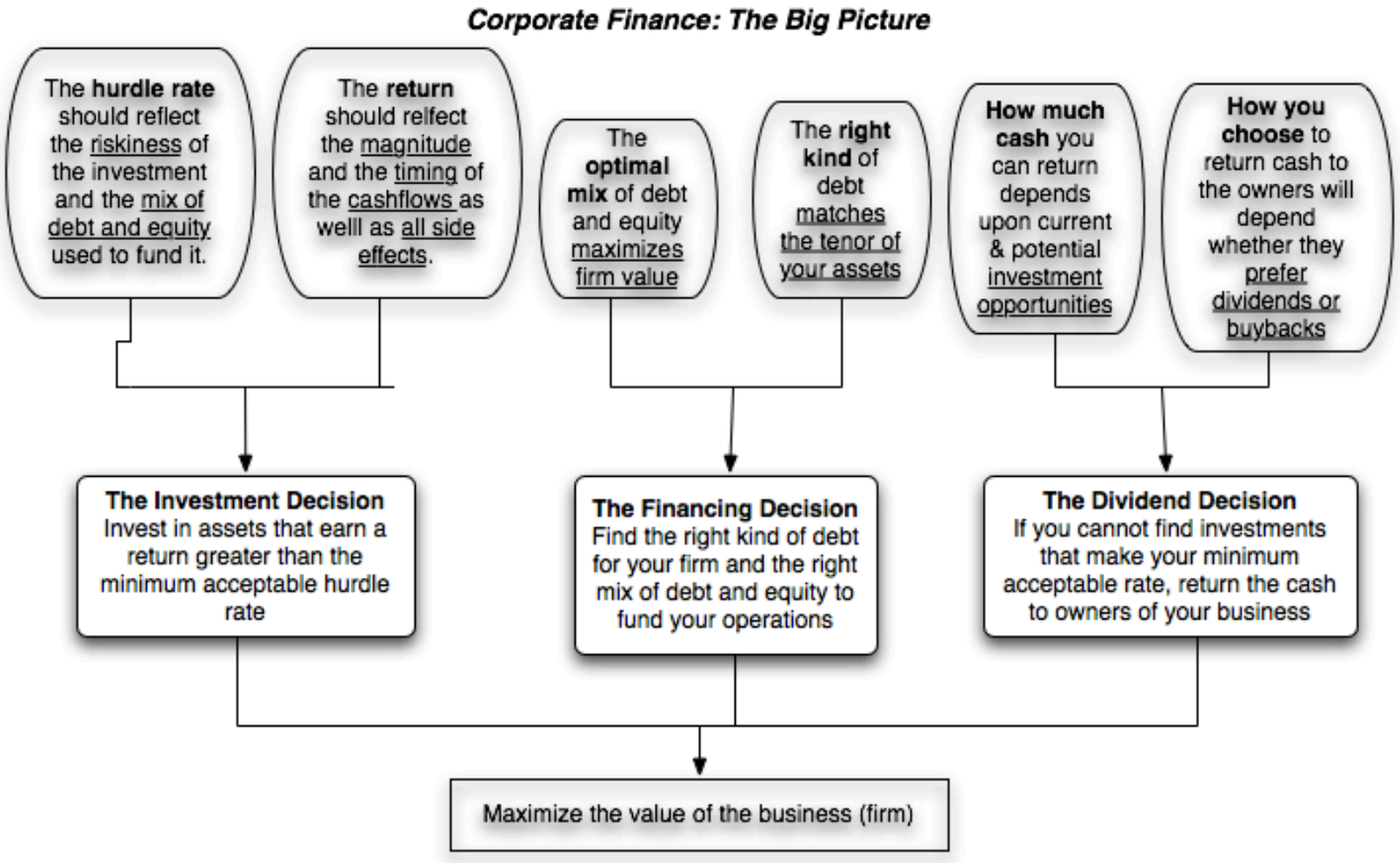
1) Current | 2) Historical | 3) Matrix | 4) Ownership | 5) Transactions | 6) Options

Search Name: All Holders, Sorted by Size | 21) Save Search | 22) Delete Search | 23) Refine Search
Text Search: | Holder Group: All Holders | Allocate Multi-Managed
% Out 6.60 SI % Out 0.29

Types

	Holder Name	Portfolio Name	Source	Opt	Position↑	% Out	Latest Chg	File Dt
			All	All				
1.	CAPITAL GROUP COMPANIES I	Multiple Portfolios	13F		48,568,345	2.59	207,345	12/31/15
2.	T ROWE PRICE ASSOCIATES	T ROWE PRICE ASSOCIAT	13F		8,951,994	0.48	-230,808	12/31/15
3.	DIMENSIONAL FUND ADVISOR	DIMENSIONAL FUND ADVI	13F		8,507,590	0.45	751,643	12/31/15
4.	FRANKLIN RESOURCES	--	ULT-AGG		4,459,370	0.24	97,896	12/31/15
5.	ROYAL BANK OF CANADA	--	ULT-AGG		2,879,520	0.15	-93,614	12/31/15
6.	SCHAFER CULLEN CAPITAL MA	SCHAFER CULLEN CAPITA	13F		2,571,773	0.14	-528,978	12/31/15
7.	FEDERATED INVESTORS INC	FEDERATED INVESTORS I	13F		2,150,571	0.11	-284,448	12/31/15
8.	EDGE ASSET MANAGEMENT IN	EDGE ASSET MANAGEMEN	13F		1,950,251	0.10	319,023	12/31/15
9.	PRINCIPAL FINANCIAL GROUP	--	HF-AGG		1,943,243	0.10	7,581	02/29/16
10.	MAGNETAR FINANCIAL LLC	MAGNETAR FINANCIAL LL	13F		1,800,000	0.10	-200,000	12/31/15
11.	MANAGED ACCOUNT ADVISORS	MANAGED ACCOUNT ADVI	13F		1,725,427	0.09	89,860	12/31/15
12.	WELLS FARGO & COMPANY	--	ULT-AGG		1,725,333	0.09	-194,383	12/31/15
13.	HANLIN CAPITAL MANAGEMEN	HANLIN CAPITAL MANAG	13F		1,215,410	0.06	1,215,410	12/31/15
14.	BANK OF AMERICA CORPORAT	BANK OF AMERICA	13F		1,177,621	0.06	-1,725,427	12/31/15
15.	MORGAN STANLEY	--	ULT-AGG		1,173,081	0.06	70,009	12/31/15
16.	INVESCO LTD	INVESCO LTD	13F		1,111,922	0.06	-88,038	12/31/15
17.	CULLEN CAPITAL MANAGEMEN	CULLEN CAPITAL MANAGE	13F		1,045,480	0.06	350	12/31/15
18.	BLACKROCK	--	ULT-AGG		1,009,437	0.05	529,555	12/31/15
19.	RAYMOND JAMES FINANCIAL	--	ULT-AGG		950,745	0.05	-70,207	12/31/15
20.	TRADEWINDS GLOBAL INVEST	TRADEWINDS GLOBAL IN	13F		902,914	0.05	-65,020	12/31/15
21.	PRUDENTIAL FINANCIAL INC	Multiple Portfolios	HF-AGG		824,400	0.04	311,670	01/29/16
22.	SCOUT INVESTMENT ADVISOR	SCOUT INVESTMENT ADVI	13F		780,151	0.04	-69,177	12/31/15

First Principles



What is Risk?

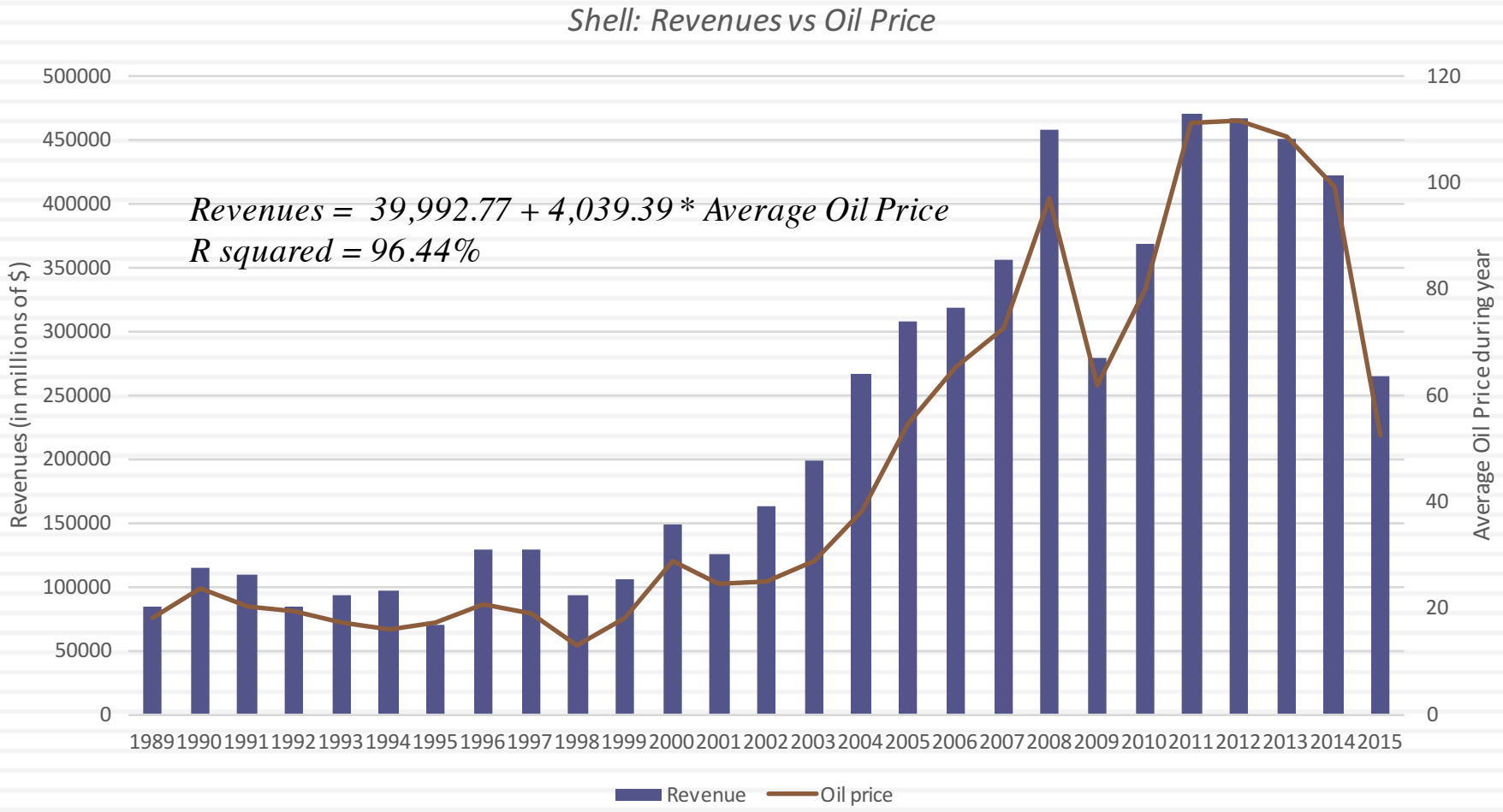
- Risk, in traditional terms, is viewed as a ‘negative’. Webster’s dictionary, for instance, defines risk as “exposing to danger or hazard”. The Chinese symbols for risk, reproduced below, give a much better description of risk:

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

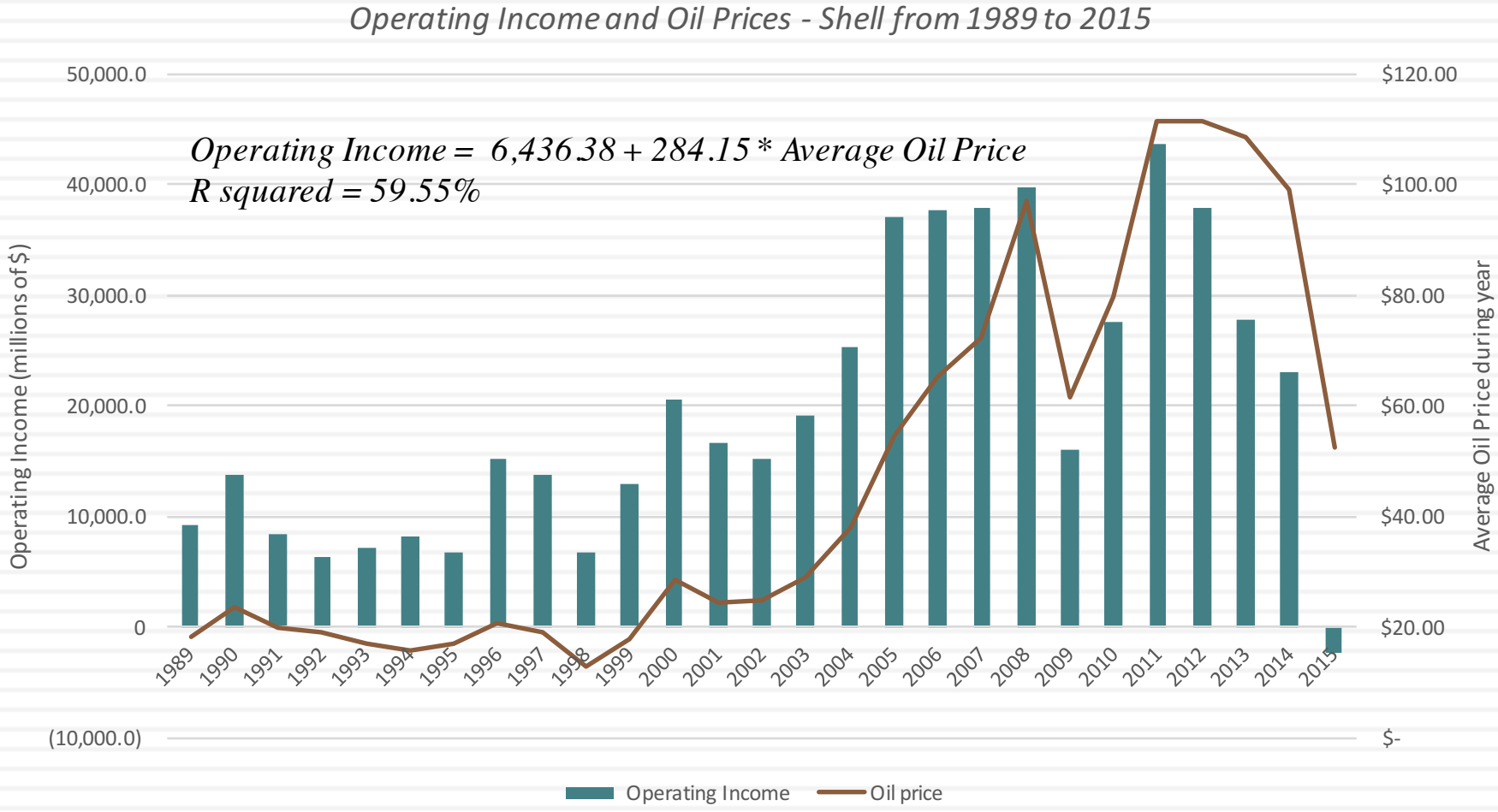
Risk, from many places..

- Estimation versus Economic uncertainty
  - Estimation uncertainty reflects the possibility that you could have the "wrong model" or estimated inputs incorrectly within this model.
  - Economic uncertainty comes the fact that markets and economies can change over time and that even the best medals will fail to capture these unexpected changes.
- Micro uncertainty versus Macro uncertainty
  - Micro uncertainty refers to uncertainty about the potential market for a firm's products, the competition it will face and the quality of its management team.
  - Macro uncertainty reflects the reality that your firm's fortunes can be affected by changes in the macro economic environment.
- Discrete versus continuous uncertainty
  - Discrete risk: Risks that lie dormant for periods but show up at points in time. (Examples: A drug working its way through the FDA pipeline may fail at some stage of the approval process or a company in Venezuela may be nationalized)
  - Continuous risk: Risks changes in interest rates or economic growth occur continuously and affect value as they happen.

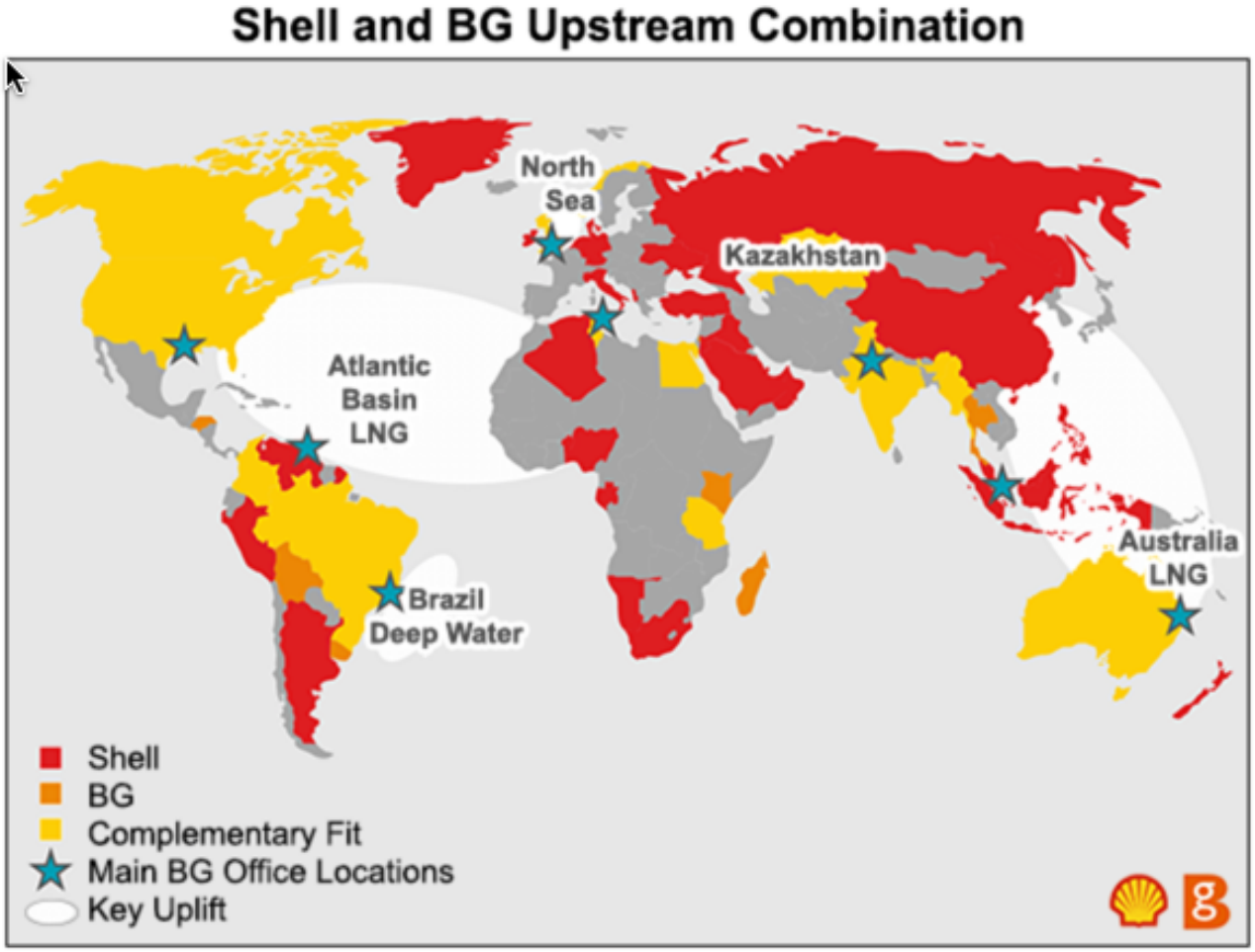
Your biggest driver (and no surprise) is..



Though you do have some power to alter your income..

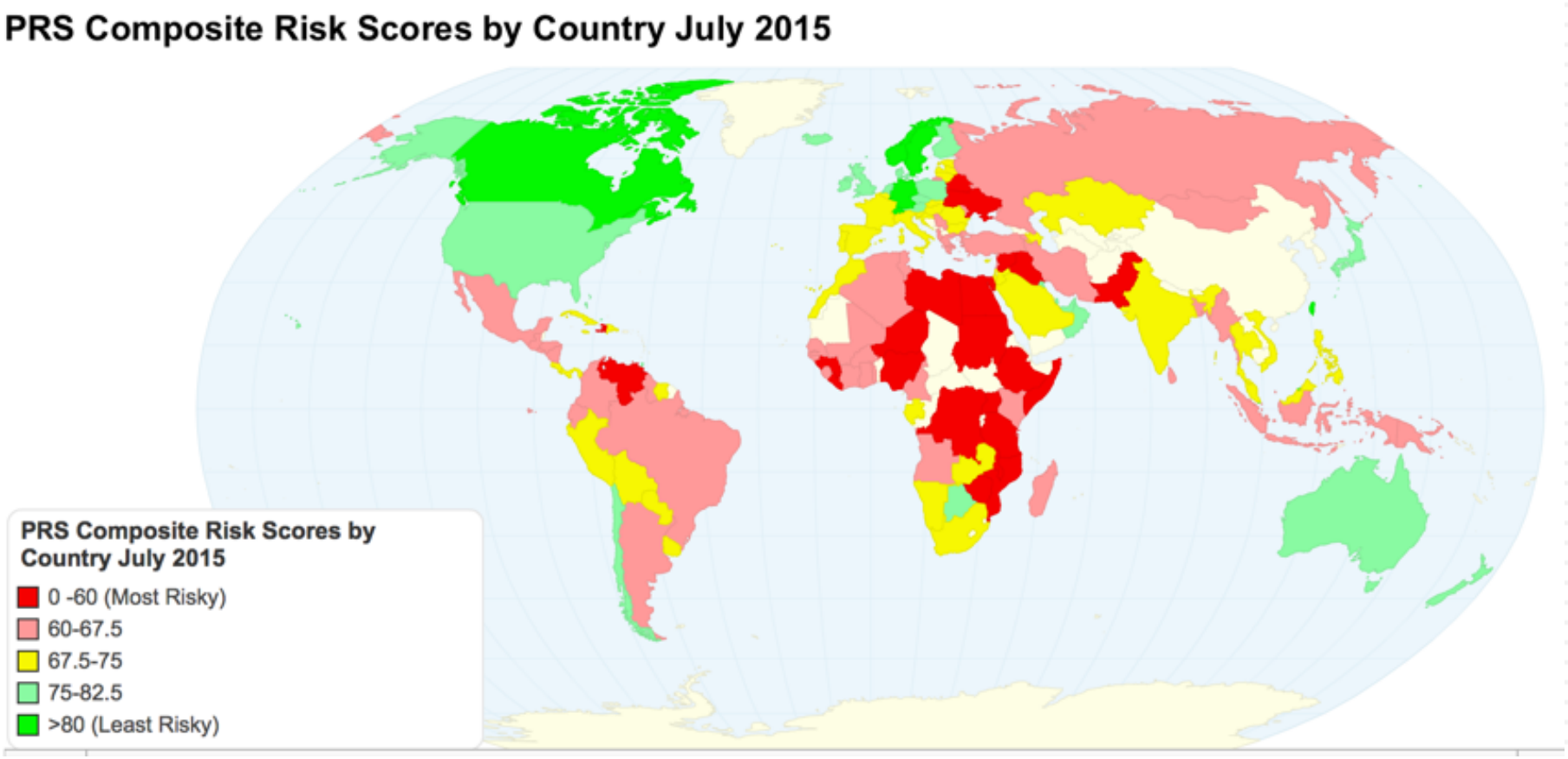


The geography of your reserves..

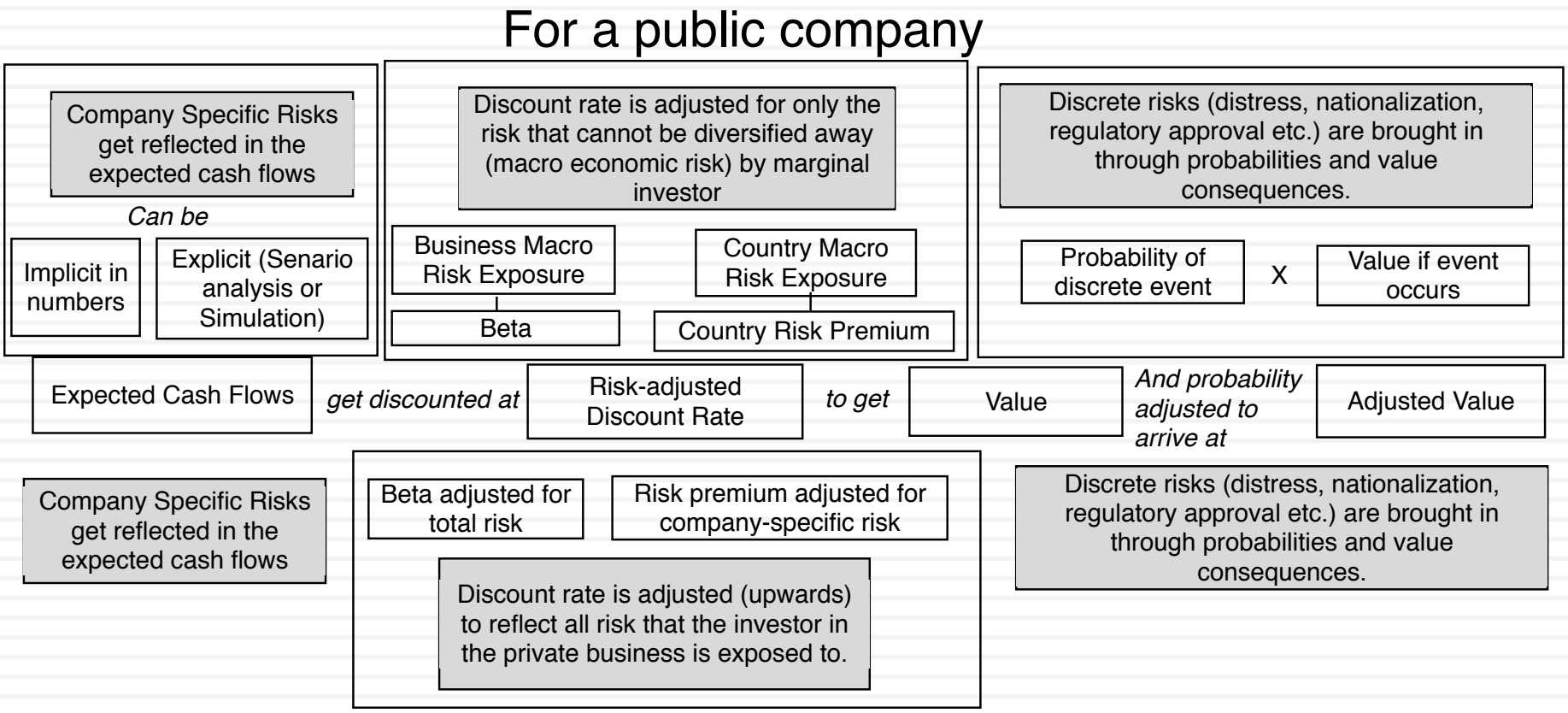


Source: Royal Dutch Shell plc

Your secondary driver..



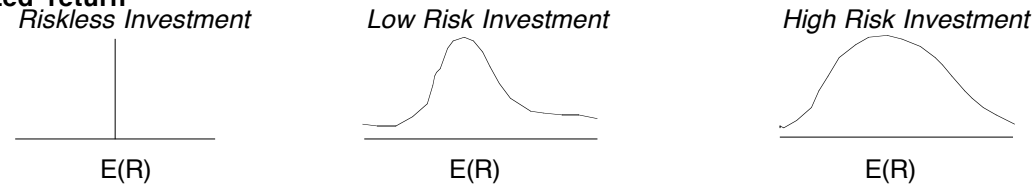
A Risk Template



Risk and Discount Rates: The Models

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 thismarket portfolio **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)

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.

I. A Riskfree Rate

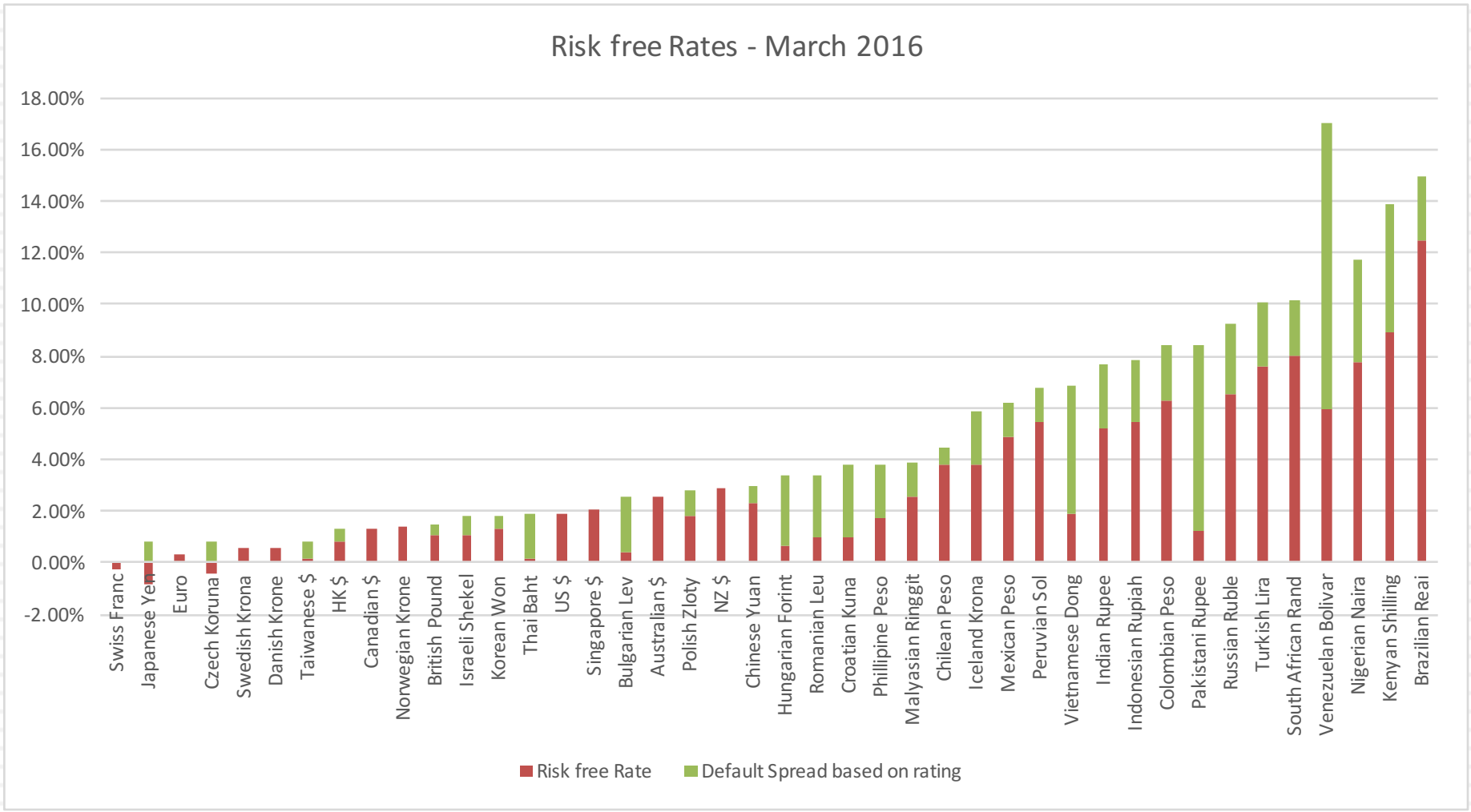
- On a riskfree asset, the actual return is equal to the expected return. Therefore, there is no variance around the expected return.
- For an investment to be riskfree, then, it has to have
  - No default risk
  - No reinvestment risk

1. Time horizon matters: Thus, the riskfree rates in valuation will depend upon when the cash flow is expected to occur and will vary across time.
2. Not all government securities are riskfree: Some governments face default risk and the rates on bonds issued by them will not be riskfree.

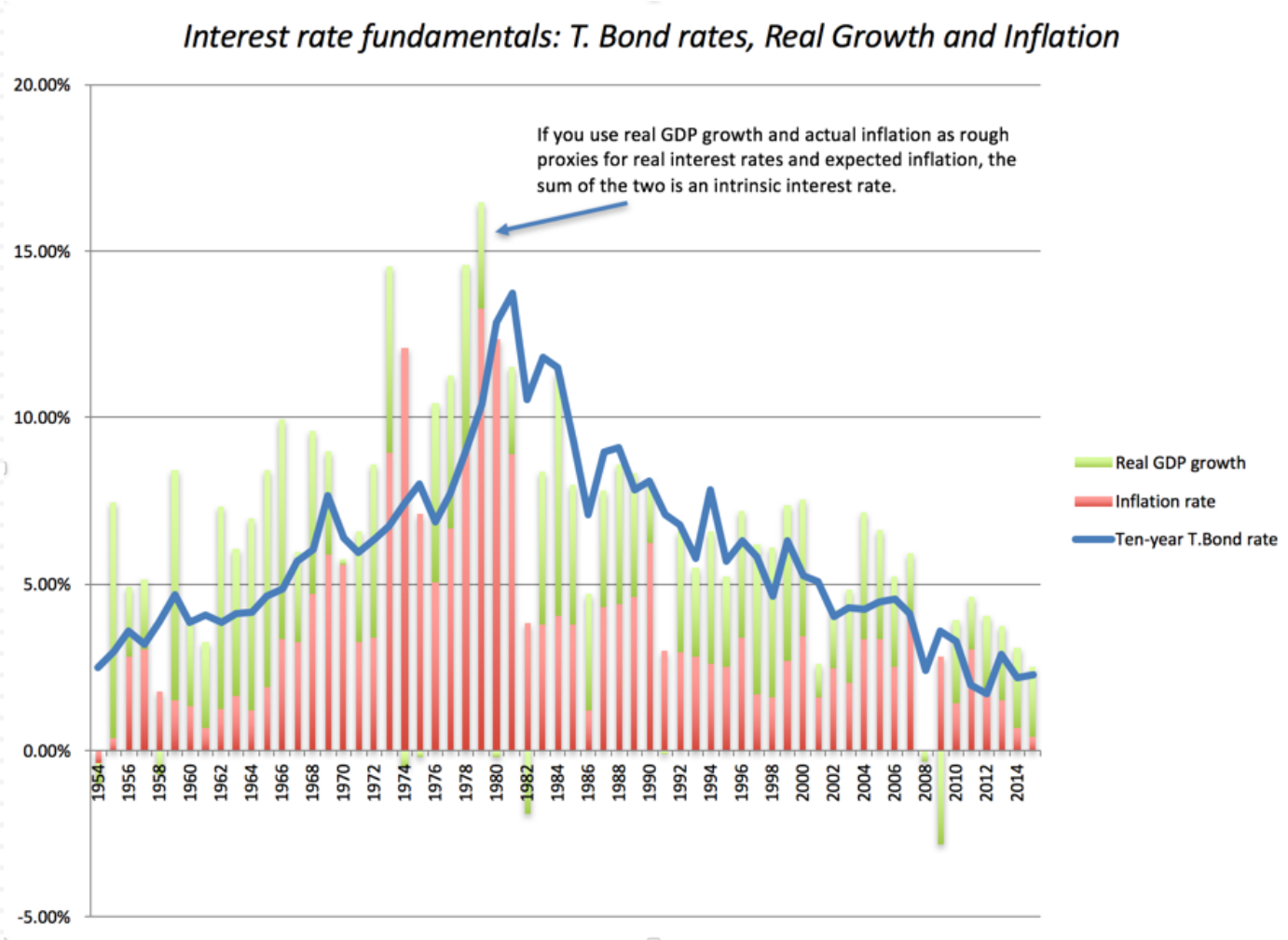
Getting to a Risk free Rate

- If you can find a default free entity (generally a government) issuing a bond in the currency, use the rate on that bond.
  - With US dollars, you can use the US 10-year T.Bond rate as risk free, if you are willing to consider the US treasury as default free.
  - With Euros, you can use the German 10-year Euro bond rate as the risk free rate.
- If you can find a government bond rate in that currency, but that government is not viewed as default free, you have to adjust that rate to get to a risk free rate.
  - The Nigerian Government has a 10-year Naira denominated bond with an interest rate of 11.75%.
  - The Nigerian Government has a local currency sovereign rating of Ba3 and the default spread on that rating is 3.99%.
  - Nigerian Naira Risk free rate = 11.75% - 3.99% = 7.76%
- If you cannot find long term bonds denominated in the currency, you can use a synthetic risk free rate = expected inflation in that currency + expected real interest rate, with the US TIPs rate standing in for the latter.

Risk free rates by currency: March 2016



But the risk free rate is ”too low”



II. The Equity Risk Premium

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2015	7.92%	6.18%	6.05%	4.54%
Std Error	2.15%	2.29%		
1966-2015	6.05%	3.89%	4.69%	2.90%
Std Error	2.42%	2.74%		
2006-2015	7.87%	3.88%	6.11%	2.53%
Std Error	6.06%	8.66%		

Historical premium for the US

Base year cash flow (last 12 mths)
Dividends (TTM): 42.66
+ Buybacks (TTM): 63.43
= Cash to investors (TTM): **106.09**

Payout ratio assumed to stay stable. 106.09 growing @ 5.55% a year

Expected growth in next 5 years
Top down analyst estimate of earnings growth for S&P 500: **5.55**%

	Last 12 mths	1	2	3	4	5	Terminal Year
Dividends + Buybacks	106.09	$111.99	$118.21	$124.77	$131.70	$139.02	142.17

Earnings and Cash flows grow @2.27% (set equal to risk free rate) a year forever.

S&P 500 on 1/1/16= 2043.94

$$2043.94 = \frac{111.99}{(1+r)} + \frac{118.21}{(1+r)^2} + \frac{124.77}{(1+r)^3} + \frac{131.70}{(1+r)^4} + \frac{139.02}{(1+r)^5} + \frac{142.17}{(r-.0227)(1+r)^5}$$

You have to solve for the discount rate (r). I used the solver or Goal seek function in Excel

r = Implied Expected Return on Stocks = 8.39%

Minus

Risk free rate = T.Bond rate on 1/1/16= 2.27%

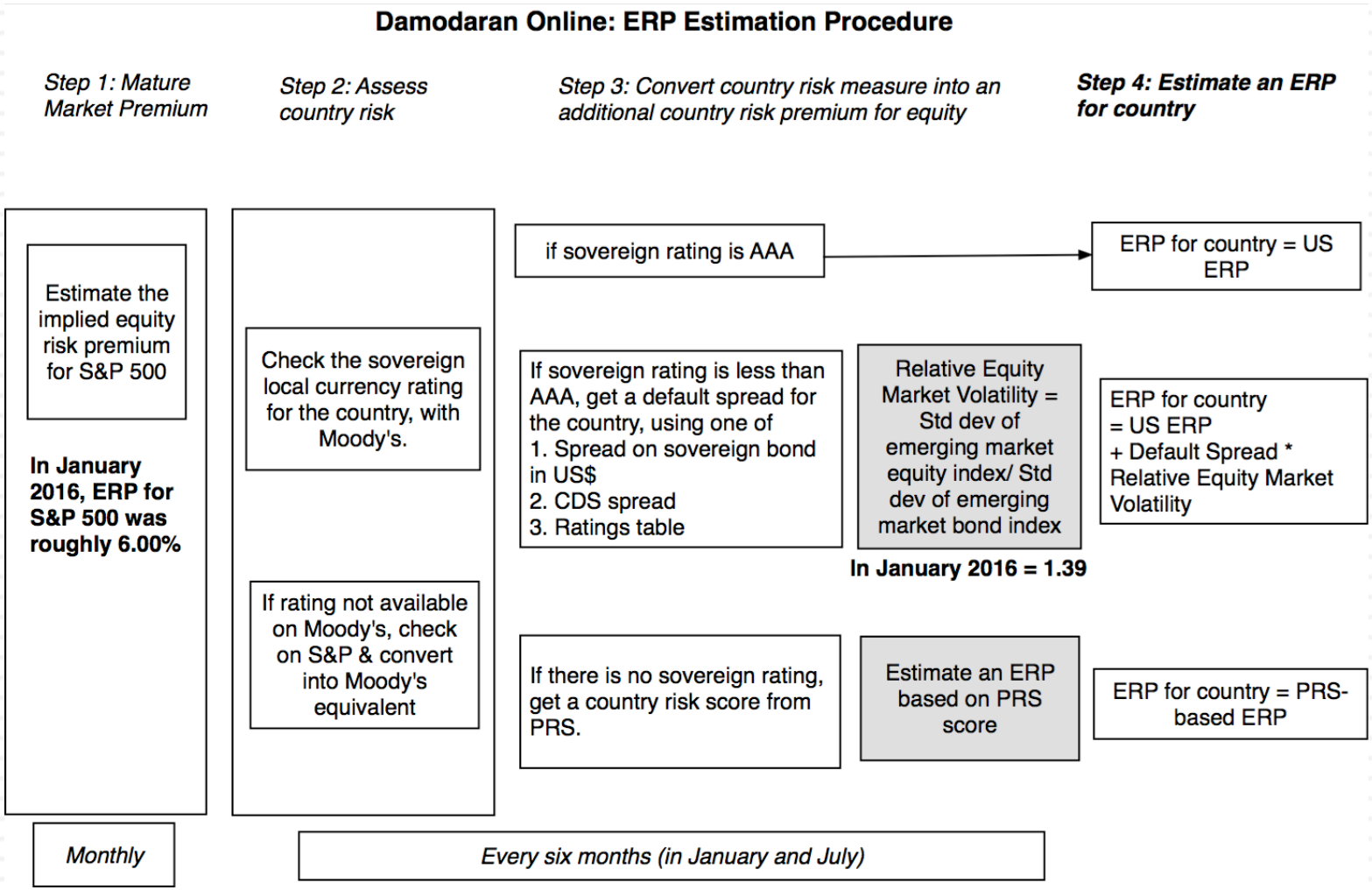
Equals

Implied Equity Risk Premium (1/1/16) = 8.39% - 2.27% = 6.12%

Country Risk: Look at a country's bond rating and default spreads as a start

- In this approach, the country equity risk premium is set equal to the default spread for the country, estimated in one of three ways:
  - The default spread on a dollar denominated bond issued by the country. (In January 2016, that spread was 5.08% for the Brazilian $ bond)
  - The sovereign CDS spread for the country. In January 2016, the ten year CDS spread for Brazil was 5.19%.
  - The default spread based on the local currency rating for the country. Brazil's sovereign local currency rating is Baa3 and the default spread for a Baa2 rated sovereign was about 2.44% in January 2016.
- Many analysts add this default spread to the US risk premium to come up with a risk premium for a country. This would yield a risk premium of 8.44% for Brazil, if we use 6.40% as the US risk premium and the default spread based on the rating.

Beyond the default spread



ERP : Jan 2016

Andorra	9.28%	3.28%	Jersey (States of)	6.59%	0.59%
Austria	6.00%	0.00%	Liechtenstein	6.00%	0.00%
Belgium	6.90%	0.90%	Luxembourg	6.00%	0.00%
Cyprus	12.71%	6.71%	Malta	7.79%	1.79%
Denmark	6.00%	0.00%	Netherlands	6.00%	0.00%
Finland	6.00%	0.00%	Norway	6.00%	0.00%
France	6.74%	0.74%	Portugal	9.72%	3.72%
Germany	6.00%	0.00%	Spain	8.84%	2.84%
Greece	20.90%	14.90%	Sweden	6.00%	0.00%
Guernsey	6.59%	0.59%	Switzerland	6.00%	0.00%
Iceland	8.84%	2.84%	Turkey	9.28%	3.28%
Ireland	8.38%	2.38%	United Kingdom	6.59%	0.59%
Isle of Man	6.59%	0.59%	**Western Europe**	**7.16%**	**1.16%**
Italy	8.84%	2.84%			

Canada	6.00%	0.00%
US	6.00%	0.00%
North America	**6.00%**	**0.00%**

Caribbean	**14.61%**	**8.61%**

Argentina	17.17%	11.17%
Belize	19.42%	13.42%
Bolivia	11.37%	5.37%
Brazil	9.28%	3.28%
Chile	6.90%	0.90%
Colombia	8.84%	2.84%
Costa Rica	9.72%	3.72%
Ecuador	15.70%	9.70%
El Salvador	11.37%	5.37%
Guatemala	9.72%	3.72%
Honduras	15.70%	9.70%
Mexico	7.79%	1.79%
Nicaragua	14.20%	8.20%
Panama	8.84%	2.84%
Paraguay	9.72%	3.72%
Peru	7.79%	1.79%
Suriname	11.37%	5.37%
Uruguay	8.84%	2.84%
Venezuela	20.90%	14.90%
Latin America	**10.42%**	**4.42%**

Country	*ERP*	*CRP*
Angola	10.48%	4.48%
Botswana	7.26%	1.26%
Burkina Faso	15.70%	9.70%
Cameroon	14.20%	8.20%
Cape Verde	14.20%	8.20%
Congo (DR	15.70%	9.70%
Congo (Republic)	11.37%	5.37%
Côte d'Ivoire	11.37%	5.37%
Egypt	15.70%	9.70%
Ethiopia	12.71%	6.71%
Gabon	11.37%	5.37%
Ghana	15.70%	9.70%
Kenya	12.71%	6.71%
Morocco	9.72%	3.72%
Mozambique	14.20%	8.20%
Namibia	9.28%	3.28%
Nigeria	11.37%	5.37%
Rwanda	12.71%	6.71%
Senegal	12.71%	6.71%
South Africa	8.84%	2.84%
Tunisia	11.37%	5.37%
Uganda	12.71%	6.71%
Zambia	14.20%	8.20%
Africa	**11.76%**	**5.76%**

Albania	12.71%	6.71%
Armenia	11.37%	5.37%
Azerbaijan	9.28%	3.28%
Belarus	17.17%	11.17%
Bosnia	15.70%	9.70%
Bulgaria	8.84%	2.84%
Croatia	9.72%	3.72%
Czech Republic	7.05%	1.05%
Estonia	7.05%	1.05%
Georgia	11.37%	5.37%
Hungary	9.72%	3.72%
Kazakhstan	8.84%	2.84%
Latvia	7.79%	1.79%
Lithuania	7.79%	1.79%
Macedonia	11.37%	5.37%
Moldova	15.70%	9.70%
Montenegro	11.37%	5.37%
Poland	7.26%	1.26%
Romania	9.28%	3.28%
Russia	9.72%	3.72%
Serbia	12.71%	6.71%
Slovakia	7.26%	1.26%
Slovenia	9.28%	3.28%
Ukraine	20.90%	14.90%
Eastern Europe & Russia	**9.65%**	**3.65%**

Abu Dhabi	6.74%	0.74%
Bahrain	9.28%	3.28%
Israel	7.05%	1.05%
Jordan	12.71%	6.71%
Kuwait	6.74%	0.74%
Lebanon	14.20%	8.20%
Oman	7.05%	1.05%
Qatar	6.74%	0.74%
Ras Al Khaimah	7.26%	1.26%
Saudi Arabia	6.90%	0.90%
Sharjah	7.79%	1.79%
United Arab Emirates	6.74%	0.74%
Middle East	**7.11%**	**1.11%**

Frontier Markets (not rated)

Algeria	63.0	12.71%	6.71%	Malawi	57.0	17.17%	11.17%
Brunei	72.8	8.84%	2.84%	Mali	62.5	12.71%	6.71%
Gambia	62.0	14.20%	8.20%	Myanmar	63.3	12.71%	6.71%
Guinea	53.8	17.17%	11.17%	Niger	51.0	17.17%	11.17%
Guinea-Bissau	62.3	12.71%	6.71%	Sierra Leone	56.5	17.17%	11.17%
Guyana	63.5	12.71%	6.71%	Somalia	42.5	20.90%	14.90%
Haiti	57.0	17.17%	11.17%	Sudan	48.3	20.90%	14.90%
Iran	67.8	10.48%	4.48%	Syria	35.8	25.00%	19.00%
Iraq	56.0	17.17%	11.17%	Tanzania	63.0	12.71%	6.71%
Korea, D.P.R.	56.0	17.17%	11.17%	Togo	63.8	12.71%	6.71%
Liberia	50.5	17.17%	11.17%	Yemen, Republic	50.3	17.17%	11.17%
Libya	52.8	17.17%	11.17%	Zimbabwe	54.5	17.17%	11.17%
Madagascar	61.3	14.20%	8.20%				

Bangladesh	11.37%	5.37%
Cambodia	14.20%	8.20%
China	6.90%	0.90%
Fiji	12.71%	6.71%
Hong Kong	6.59%	0.59%
India	9.28%	3.28%
Indonesia	9.28%	3.28%
Japan	7.05%	1.05%
Korea	6.74%	0.74%
Macao	6.74%	0.74%
Malaysia	7.79%	1.79%
Mauritius	8.38%	2.38%
Mongolia	14.20%	8.20%
Pakistan	15.70%	9.70%
Papua New Guine	12.71%	6.71%
Philippines	8.84%	2.84%
Singapore	6.00%	0.00%
Sri Lanka	12.71%	6.71%
Taiwan	6.90%	0.90%
Thailand	8.38%	2.38%
Vietnam	12.71%	6.71%
Asia	**7.49%**	**1.49%**

Australia	6.00%	0.00%
Cook Islands	12.71%	6.71%
New Zealand	6.00%	0.00%
Australia & NZ	**6.00%**	**0.00%**

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

Shell: Equity Risk Premium- March 2016

Country	*Oil & Gas Production*	*% of Total*	*ERP*
Denmark	17396	3.83%	6.20%
Italy	11179	2.46%	9.14%
Norway	14337	3.16%	6.20%
UK	20762	4.57%	6.81%
Rest of Europe	*874*	*0.19%*	*7.40%*
Brunei	823	0.18%	9.04%
Iraq	20009	4.40%	11.37%
Malaysia	22980	5.06%	8.05%
Oman	78404	17.26%	7.29%
Russia	22016	4.85%	10.06%
Rest of Asia & ME	*24480*	*5.39%*	*7.74%*
Oceania	*7858*	*1.73%*	*6.20%*
Gabon	12472	2.75%	11.76%
Nigeria	67832	14.93%	11.76%
Rest of Africa	6159	1.36%	12.17%
USA	104263	22.95%	6.20%
Canada	8599	1.89%	6.20%
Brazil	13307	2.93%	9.60%
Rest of Latin America	*576*	*0.13%*	*10.78%*
Royal Dutch Shell	**454326**	**100.00%**	**8.26%**

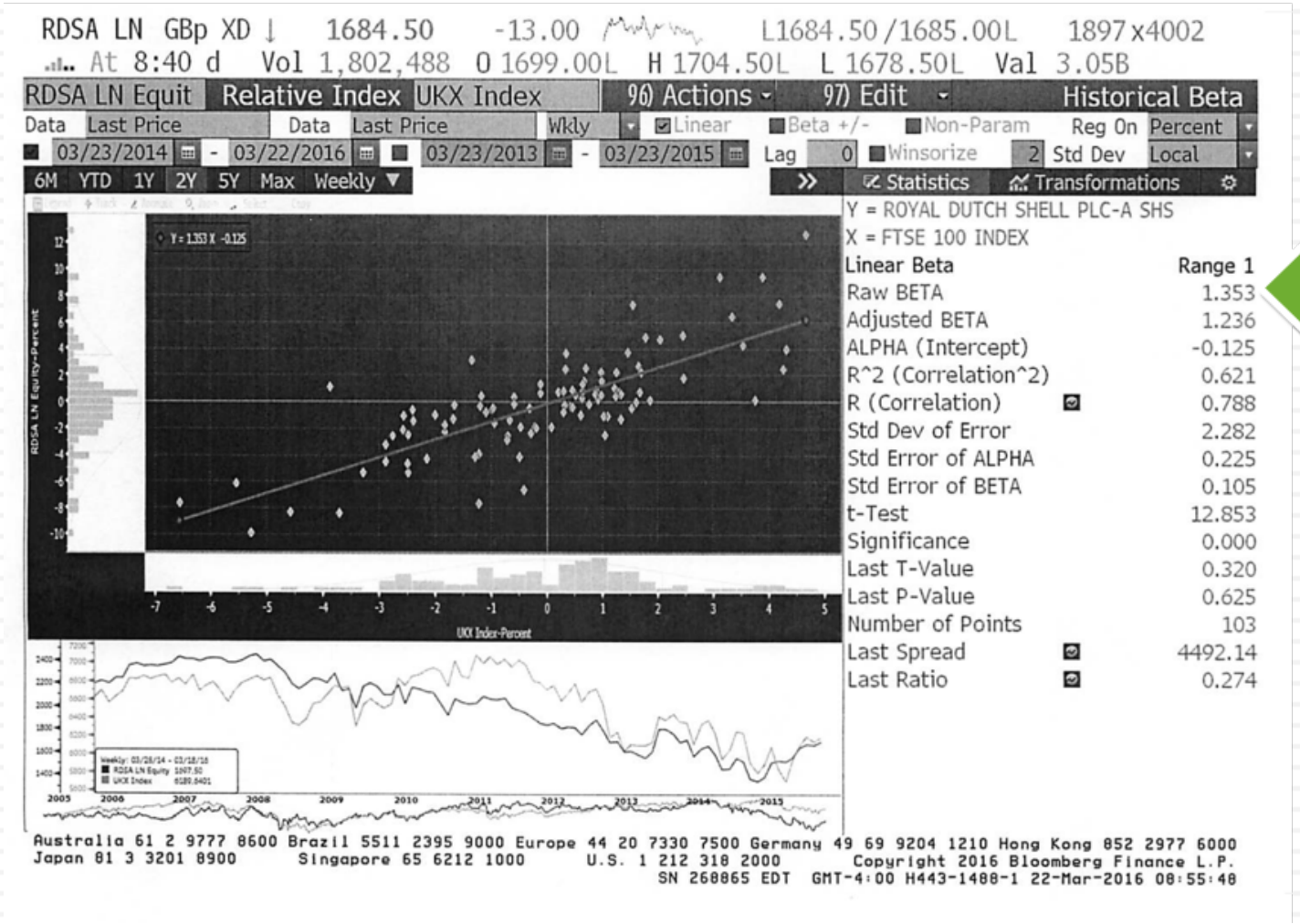
Implications for Investing

Implication 1: A Shell investment in Canada, in any given business or currency, will require a lower cost of equity than an equivalent investment in Nigeria or Brazil.

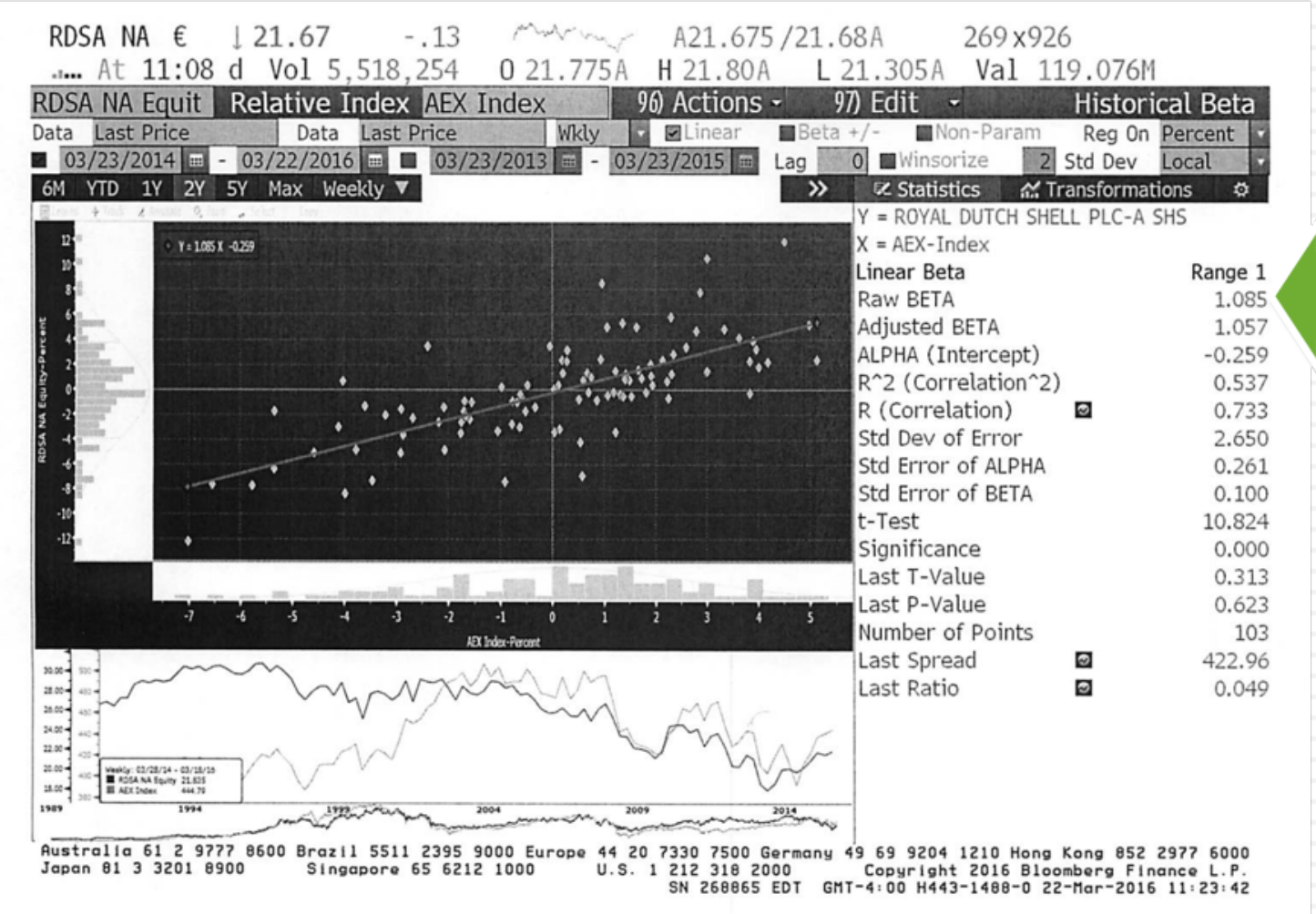
Implication 2: Given the divergence of ERP within the Middle East and Asia, an investment in Oman is safer than an investment in Brunei or Iraq.

Implication 3: The ERP in some parts of the world that Shell operates in can change dramatically overnight.

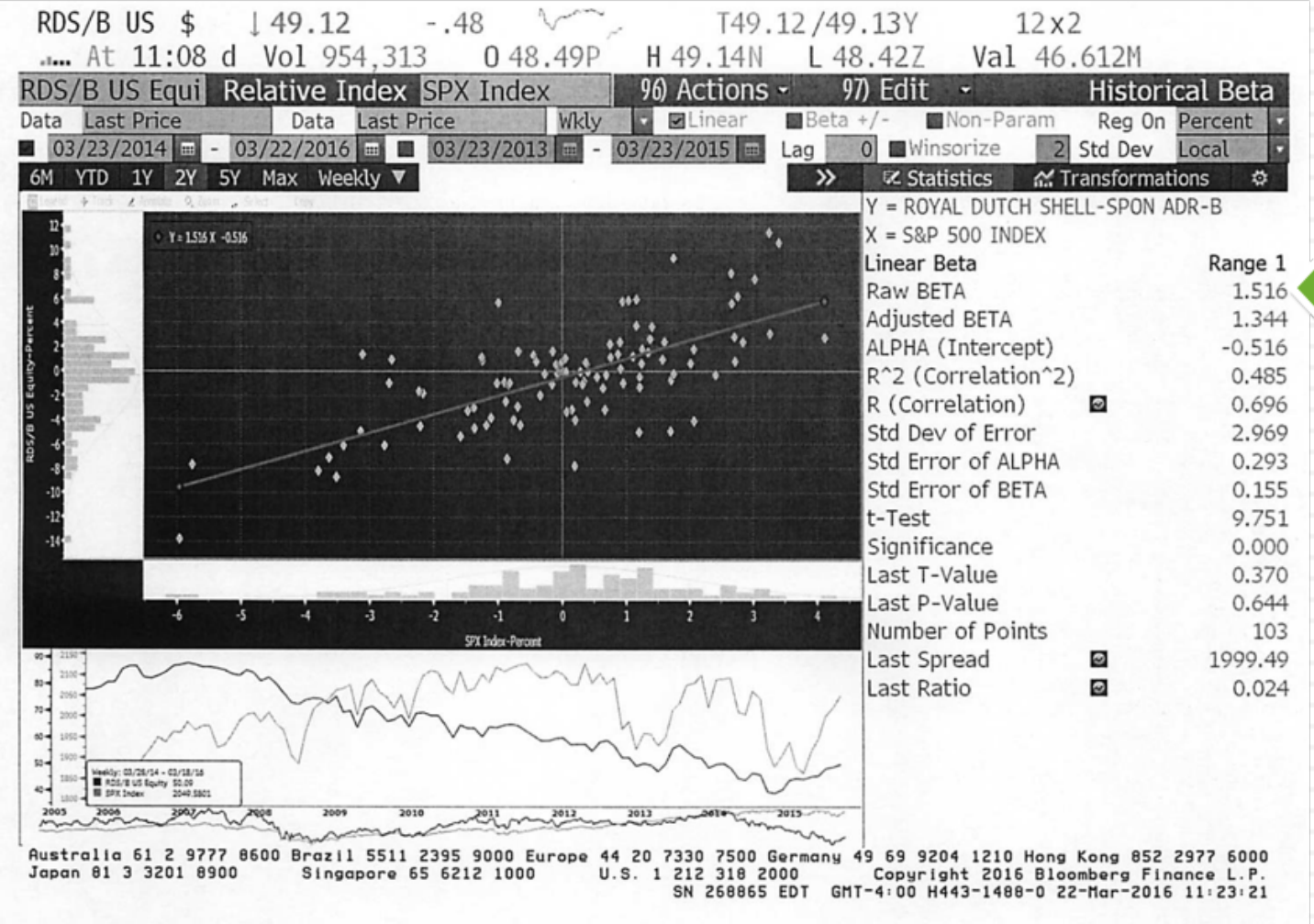
Estimating Beta: The Regression Approach



And another regression…

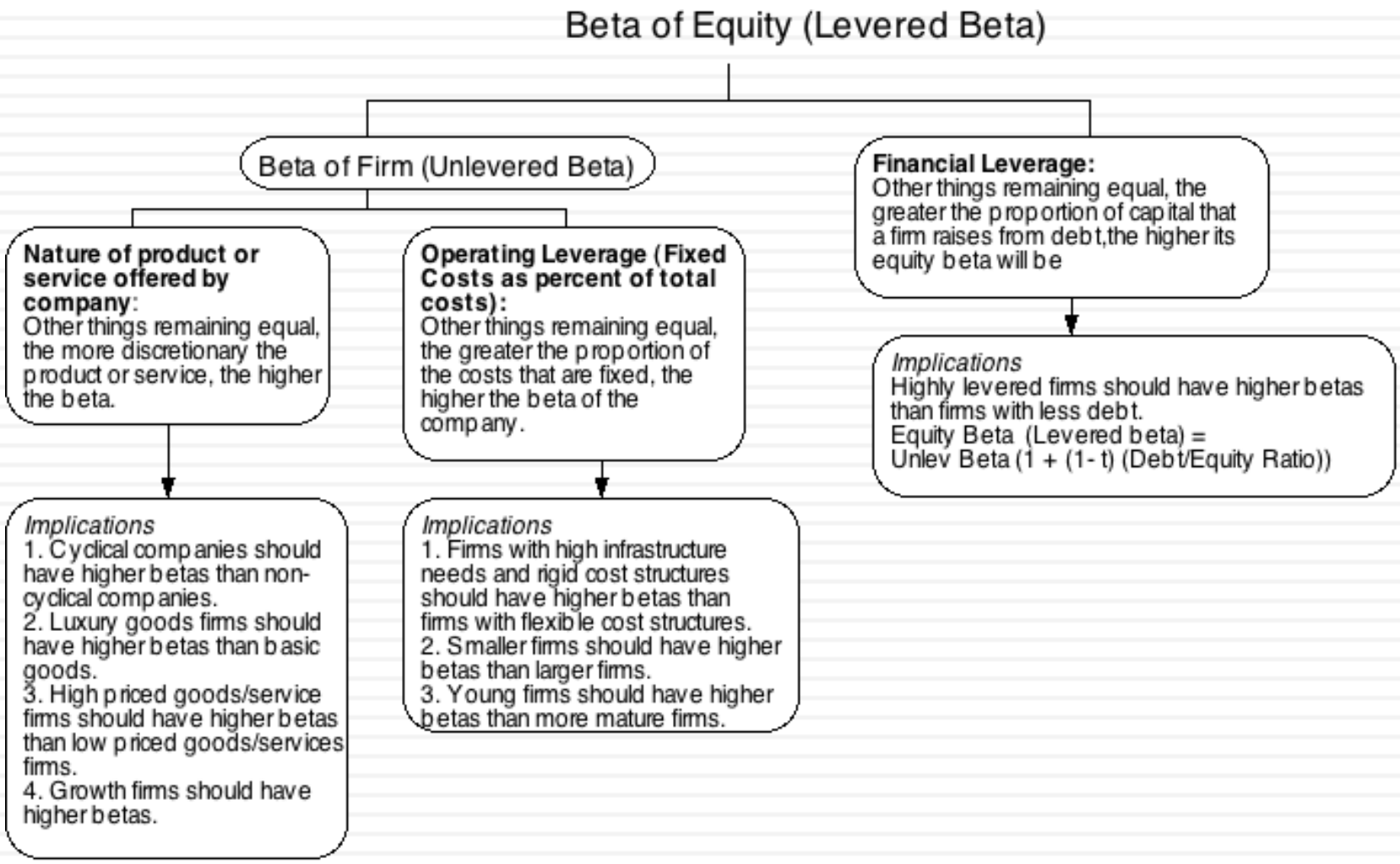


And yet another one..

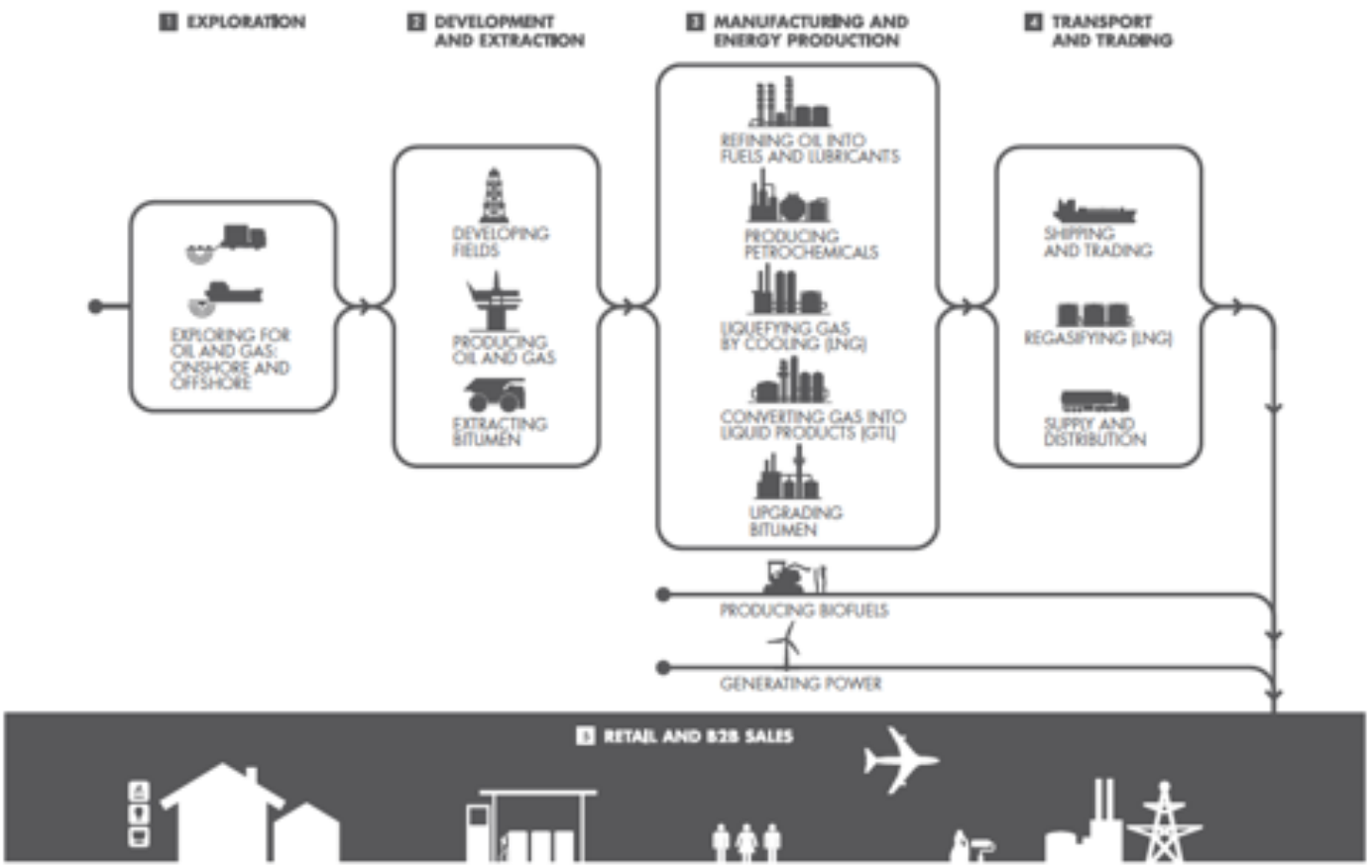


Regression Beta

Determinants of Betas



Breaking down the Oil Business



Bottom up beta for Shell..

Shell classifies its business into upstream (exploration and development) and downstream.

	Revenues (2015)	*Earnings (2015)*	*Revenues (2013-15)*	*Earnings (2013-15)*	*% of firm*	*Unlevered Beta*
Upstream	$53,927	$(5,663)	$239,125	$22,816	56.56%	1.13
Downstream	$237,746	$10,243	$1,020,219	$17,523	43.44%	0.85
Corporate	$96	$(425)	$362	$(209)		
Shell	$291,769	$4,155	$1,259,706	$40,130	100.00%	1.01

- The proportion of Shell's value that comes from upstream and downstream is very different, depending on whether you look at revenues (which weight downstream a lot more) than at earnings. *I used the earnings because the margins are very different across the businesses.*
- When the numbers are volatile, as is evidenced in the 2015 values, *the averages across time are better indicators*.

Shell's Cost of Equity

Business	*% of Company*	*Unlevered Beta*	*D/E Ratio*	*Beta*	*Cost of Equity (in US$)*
Upstream	56.56%	1.13	30.63%	1.39	13.47%
Downstream	43.44%	0.85	30.63%	1.05	10.63%
Shell	**100.00%**	**1.01**	**30.63%**	**1.24**	**12.24%**

Risk free rate in US $ = 2.00%
Equity Risk Premium for Shell = 8.26%

I have allocated debt proportionately to the two businesses. Is this a fair assumption? If not, how would you allocate debt across the businesses?

Discussion Issue

- Shell is considering investing in a new refinery in Nigeria. An analysis of the earnings suggests that it will generate a return on equity of 15% (in **Naira**). Would you fund it?
  a. Yes.
  b. No.

  What return on equity would this investment need to make to be justified? Why?

Estimating the Cost of Debt

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

Estimating Synthetic Ratings

- The rating for a firm can be estimated using the financial characteristics of the firm. In its simplest form, we can use just the interest coverage ratio:
- Interest Coverage Ratio = EBIT / Interest Expenses
- For Shell, we obtain the following:
  - For 2015: Operating Income/ Interest Expense = -3261/1832 = -1.78
  - For 2014: Operating Income/ Interest Expense = 19879/1517 = 13.1
  - For 2014-15: (19879-3261)/ (1832+1517)= 4.96

Interest Coverage Ratios, Ratings and Default Spreads

Interest coverage ratio	*Rating is*	*Spread is*
> 8.5	Aaa/AAA	0.40%
6.5-8.5	Aa2/AA	0.70%
5.5-6.5	A1/A+	0.90%
4.25-5.5	A2/A	1.00%
3-4.25	A3/A-	1.20%
2.5-3	Baa2/BBB	1.75%
2.25-2.5	Ba1/BB+	2.75%
2-2.25	Ba2/BB	3.25%
1.75-2	B1/B+	4.00%
1.5-1.75	B2/B	5.00%
1.25-1.5	B3/B-	6.00%
0.8-1.25	C2/C	7.00%
0.65-0.85	Ca2/CC	8.00%
0.2-0.65	Caa/CCC	10.00%
<0.25	D2/D	12.00%

Shell's actual rating is A+

Shell, Market Cap > $ 5 billion: 4.96 → Synthetic rating = A2/A

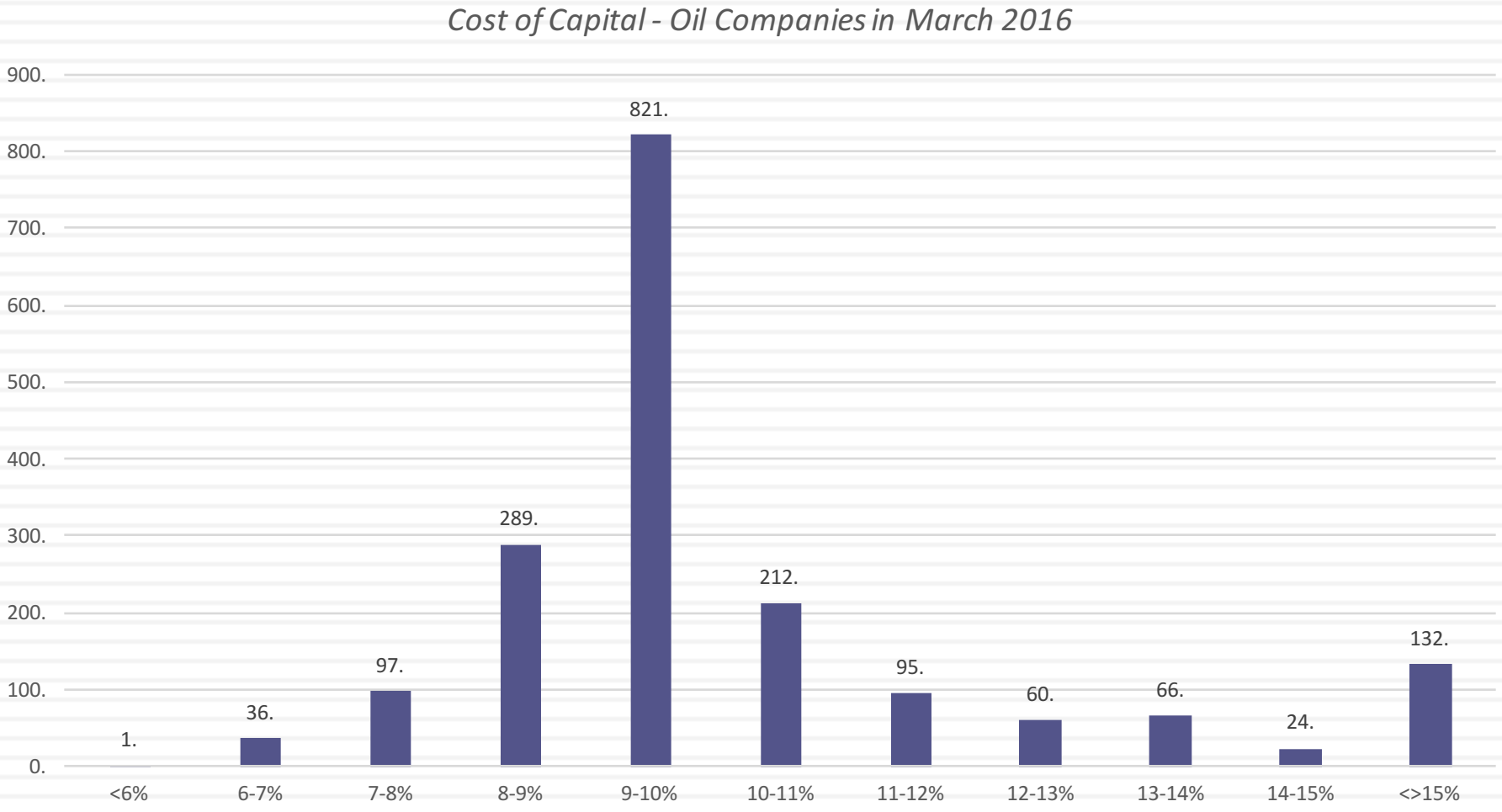
Shell's cost of debt

- Based on the actual rating, the default spread is 1.10%, which can be added to the risk free rate of 2.00% to arrive at a pre-tax cost of debt of 3.10% (in US$).
  - Pre-tax cost of debt = Risk free Rate + Default Spread
    = 2.00% + 1.10% = 3.10%
- Shell is a global company and does have the freedom to put its interest expenses where it can get the maximum tax benefit. Given its conservative nature, I will use the Dutch marginal tax rate of 25%.
  - After-tax cost of debt = 3.10% (1-.25) = 2.33%

Current Cost of Capital: Shell

Business	*Cost of Equity*	*E/(D+E)*	*Pre-tax Cost of Debt*	*After-tax Cost of debt*	*D/(D+E)*	*Cost of Capital*
Upstream	13.47%	76.55%	3.10%	2.33%	23.45%	10.86%
Downstream	10.63%	76.55%	3.10%	2.33%	23.45%	8.68%
Shell	**12.24%**	**76.55%**	**3.10%**	**2.33%**	**23.45%**	**9.91%**

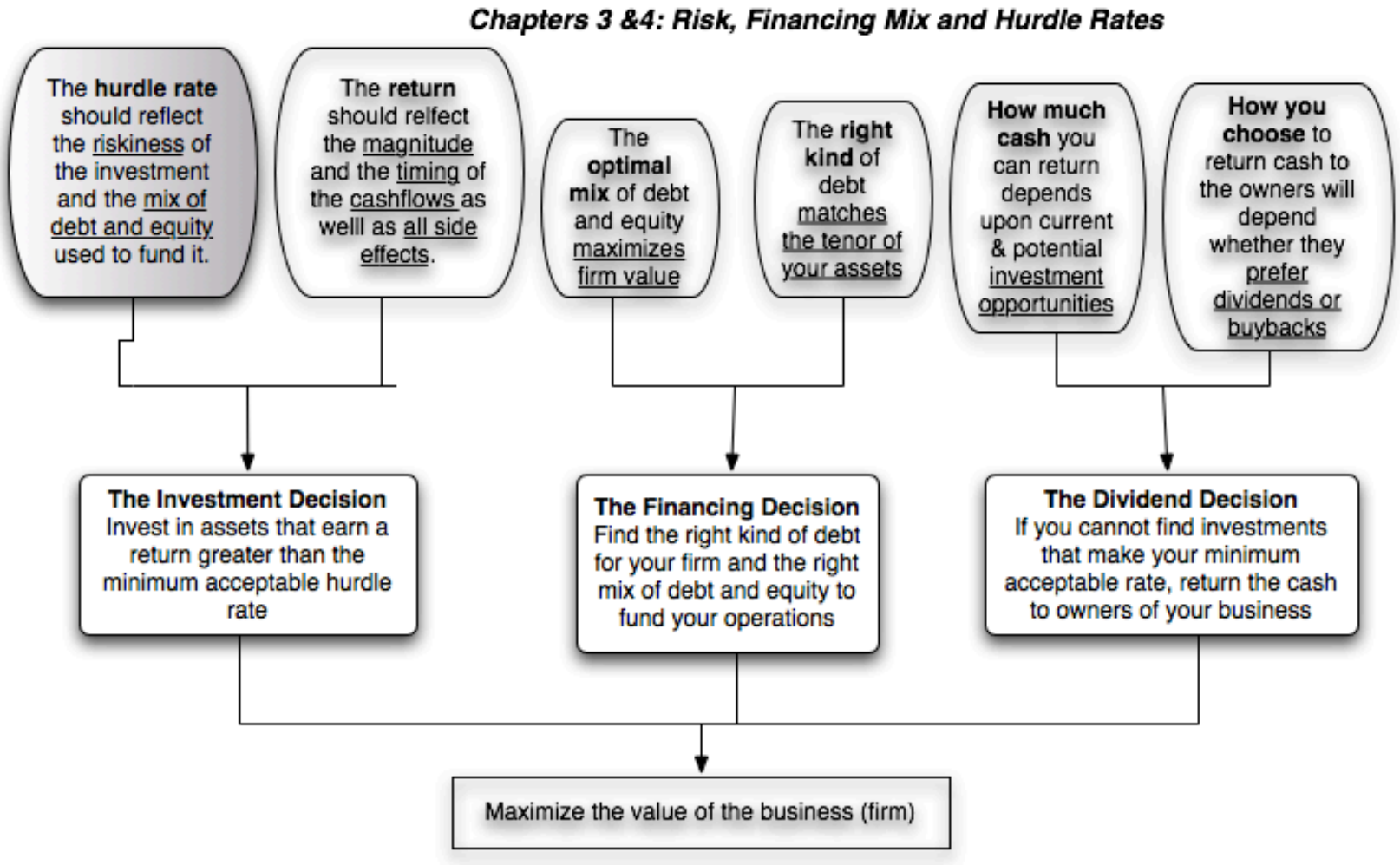
The Oil Business: Cost of Capital



Relative to your peer group..

Company Name	Country	Bottom up levered beta	Cost of equity in US$	Pre-tax cost of debt in US $	After-tax cost of debt in US $	Cost of capital in US$
Exxon Mobil Corporation (NYSE:XOM)	United States	1.4456	10.94%	3.02%	1.81%	9.94%
PetroChina Co. Ltd. (SEHK:857)	China	1.8570	15.08%	4.19%	3.14%	11.07%
Chevron Corporation (NYSE:CVX)	United States	1.5322	11.46%	3.27%	1.96%	9.69%
Royal Dutch Shell plc (ENXTAM:RDSA)	Netherlands	1.9203	12.24%	3.10%	2.33%	9.91%
TOTAL S.A. (ENXTPA:FP)	France	1.8731	14.89%	3.82%	3.06%	10.52%
BP p.l.c. (LSE:BP.)	UK	2.1810	16.64%	3.96%	2.77%	10.59%
China Petroleum & Chemical Corp. (SEHK:386)	China	2.3158	18.25%	3.94%	2.96%	10.76%
Eni SpA (BIT:ENI)	Italy	1.9516	19.52%	6.13%	4.90%	13.73%
Occidental Petroleum Corporation (NYSE:OXY)	United States	1.4964	11.25%	3.52%	2.11%	9.82%
BG Group plc (LSE:BG.)	UK	1.8541	14.49%	4.46%	3.12%	10.85%
Statoil ASA (OB:STL)	Norway	2.0664	14.67%	3.27%	2.62%	9.57%
Public Joint Stock Company Gazprom (MICEX:GAZP)	Russia	2.4838	26.41%	8.29%	6.05%	15.95%
Suncor Energy Inc. (TSX:SU)	Canada	1.7175	12.58%	4.02%	2.95%	9.95%
Imperial Oil Ltd. (TSX:IMO)	Canada	1.5874	11.79%	3.02%	2.22%	9.92%
Public Joint Stock Company Oil Company LUKOIL	Russia	1.9614	21.34%	7.29%	5.32%	15.51%
PTT Public Company Limited (SET:PTT)	Thailand	2.4166	22.52%	6.29%	5.22%	13.90%
Sasol Ltd. (JSE:SOL)	South Africa	1.5679	16.13%	6.63%	2.98%	13.68%
Open Joint Stock Company Surgutneftegas (	Russia	1.3463	15.36%	6.29%	4.59%	15.36%
Repsol, S.A. (CATS:REP)	Spain	2.9094	27.99%	6.63%	5.30%	13.99%
Ecopetrol SA (BVC:ECOPETROL)	Colombia	2.5277	24.62%	6.63%	4.85%	13.96%

Back to First Principles



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"

Shell's bid for BG Group

- In August 2015, Shell bid almost £47 billion ($70 billion) for BG Group (BRGYY), a UK-based firm with oil reserves in Brazil and East Africa and natural gas holdings in Australia. The price paid represented a 50% premium on BG's market price at the time.
- If completed, the purchase will add 25% to Shell's oil and gas reserves and 20% to production. Shell also expects "synergies" of around $2.5 billion, raising the possibility of job cuts.
- Shell expects to pay for the merger with a combination of cash and stock. BG shareholders will end up with approximately 19% of the shares in Shell after the merger.
- Many analysts praised the logic in the deal, praising Shell for making a "bold mover". Shares in BG soared 38% in London, while Shell slipped nearly 6%.

What are you buying?

- Business: In 2014, the company reported that about 60% of its profits came from upstream and about 40% from LNG Shipping and Marketing.
- Operations: BG reported operating income of about $6.2 billion on revenues of $19.2 billion in 2014. However, they also reported more than $8.6 billion in losses from disposals, re-measurement and impairment, leading to an overall loss of -$2.33 billion.

UPSTREAM

PRODUCTION BY COUNTRY (kboed)

	2013	2014
UK	100	105
Kazakhstan	92	85
Brazil	39	78
Trinidad and Tobago	70	65
Egypt	112	62
Bolivia	36	48
USA	58	39
Thailand	41	39
Australia	25	34
Tunisia	38	32
India	20	18
Norway	2	1

The sought after reserves..

ESTIMATED NET PROVED DEVELOPED RESERVES OF NATURAL GAS

	Australia bcf	Africa bcf	Asia bcf	North America and the Caribbean bcf	South America bcf	Europe bcf	Total bcf
As at 31 December 2011 (SEC)	575	1 254	1 851	1 349	392	728	6 149
As at 31 December 2012 (SEC)	503	1 181	1 858	1 387	709	684	6 322
As at 31 December 2013 (SPE-PRMS)	509	758	1 791	993	850	573	5 474
As at 31 December 2014 (SPE-PRMS)	**1 539**	**476**	**1 719**	**724**	**849**	**503**	**5 810**

ESTIMATED NET PROBABLE RESERVES OF NATURAL GAS

re Types

	Australia bcf	Africa bcf	Asia bcf	North America and the Caribbean bcf	South America bcf	Europe bcf	Total bcf
As at 31 December 2011 (SEC)	6 565	1 425	920	1 342	1 157	355	11 764
As at 31 December 2012 (SEC)	5 788	1 170	1 137	1 416	1 550	452	11 513
As at 31 December 2013 (SPE-PRMS)	2 930	3 894	636	1 350	1 435	394	10 639
As at 31 December 2014 (SPE-PRMS)[a]	**2 145**	**3 412**	**759**	**1 385**	**1 142**	**411**	**9 254**

ESTIMATED NET PROVED DEVELOPED RESERVES OF OIL

	Australia mmbbl	Africa mmbbl	Asia mmbbl	North America and the Caribbean mmbbl	South America mmbbl	Europe mmbbl	Total mmbbl
As at 31 December 2011 (SEC)	–	21.0	238.1	1.9	43.8	136.7	441.5
As at 31 December 2012 (SEC)	–	18.8	230.5	3.6	78.5	126.4	457.8
As at 31 December 2013 (SPE-PRMS)	–	14.0	221.4	2.8	120.4	119.2	477.8
As at 31 December 2014 (SPE-PRMS)	**–**	**15.5**	**221.1**	**1.9**	**196.1**	**101.9**	**536.5**

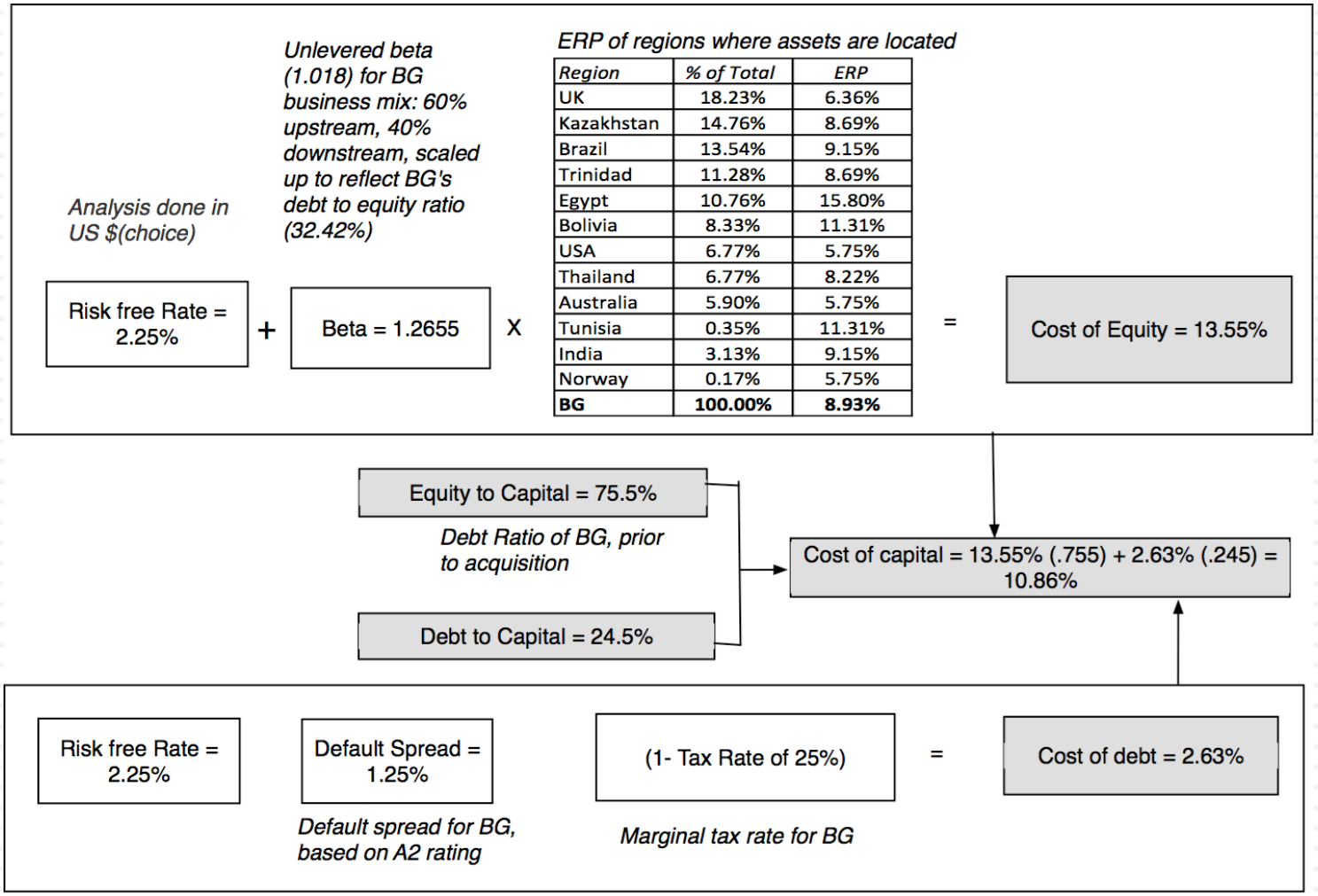
ESTIMATED NET PROBABLE RESERVES OF OIL

	Australia mmbbl	Africa mmbbl	Asia mmbbl	North America and the Caribbean mmbbl	South America mmbbl	Europe mmbbl	Total mmbbl
As at 31 December 2011 (SEC)	–	9.0	137.2	2.3	1 737.4	92.4	1 978.3
As at 31 December 2012 (SEC)	–	15.6	77.6	2.1	1 652.5	91.9	1 839.7
As at 31 December 2013 (SPE-PRMS)	–	10.6	121.2	1.9	1 479.0	66.4	1 679.1
As at 31 December 2014 (SPE-PRMS)	**–**	**7.6**	**149.4**	**1.5**	**1 161.3**	**50.2**	**1 370.0**

Estimating a cost of capital for this asset acquisition

- In estimating a 'hurdle rate' to use in assessing this acquisition, what should you use as
  - The risk free rate?
  - The beta for the investment (risk)?
  - The equity risk premium?
  - The debt mix?

Cost of capital for the BG acquisition

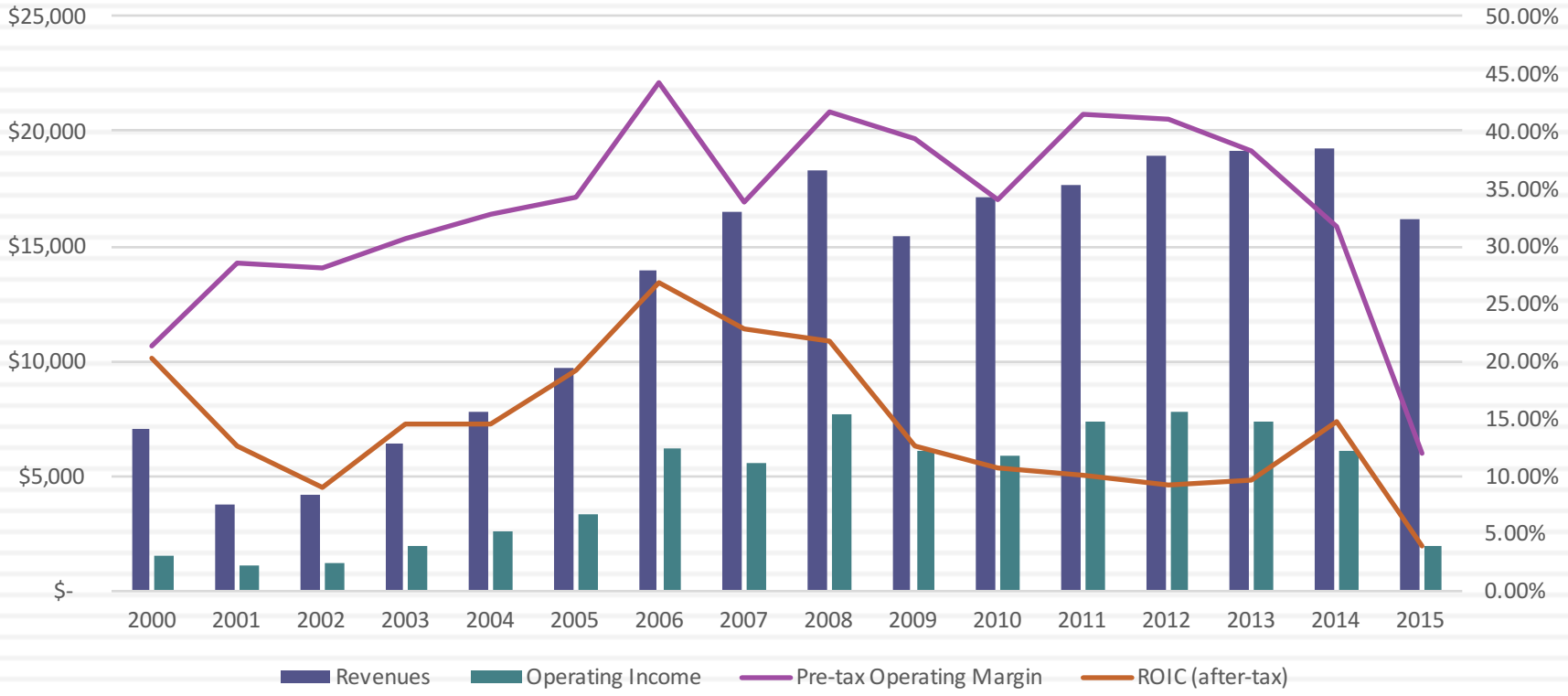


Expected Cashflows at BG

- A press release for the company reported that the company generated operating $1,921 million (down from $6.155 million in 2014) on revenues of $16,148 million (down from $19.2 billion in 2014).

Revenue Growth (CAGR)	5.70%
Operating Income Growth (CAGR)	1.65%
Median Operating Margin	33.98%
Median ROIC	13.54%

BG: Operating History from 2000 to 2015



Valuing BG

BG revenues will grow at 5.70% a year for next 5 years, before settling into stable growth of 2% a year.

	Base Year	1	2	3	4	5	Terminal Year
Revenues	$ 16,148	$ 17,069	$ 18,042	$ 19,071	$ 20,159	$ 21,309	$ 21,735
Operating Margin	11.90%	22.94%	28.46%	31.22%	32.60%	33.98%	33.98%
Operating Income	1921	$ 3,914.96	$ 5,134.17	$ 5,953.36	$ 6,571.09	$ 7,239.92	$ 7,384.72
Effective tax rate	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
AT Operating Income	$ 1,440.75	$ 2,936.22	$ 3,850.63	$ 4,465.02	$ 4,928.32	$ 5,429.94	$ 5,538.54
+ Depreciation	$ 2,799.00	$ 2,959	$ 3,127	$ 3,306	$ 3,494	$ 3,694	
- Cap Ex	$ 2,922.50	$ 3,089	$ 3,265	$ 3,452	$ 3,648	$ 3,857	
- Chg in WC		$ 46.05	$ 48.67	$ 51.45	$ 54.38	$ 57.49	
FCFF		$ 2,759.63	$ 3,663.97	$ 4,267.71	$ 4,719.75	$ 5,209.48	$ 4,720.15
Terminal Value						$ 67,430.71	
Return on capital							13.54%
Cost of Capital		10.86%	10.86%	10.86%	10.86%	10.86%	9.00%
Cumulated Discount Factor		1.1086	1.2290	1.3625	1.5104	1.6745	
Present Value		$ 2,489.29	$ 2,981.27	$ 3,132.35	$ 3,124.78	$ 43,381.30	
Value of Operating Assets	$ 55,109.00						
+ Cash	$ 5,295.00						
+ Cross Holdings	$ 4,308.00						
- Debt	$ 17,507.00						
- Minority Interets	$ -						
Value of Equity	$ 47,205.00						
Number of shares	3415.19						
Value per share	$ 13.82						

BG's market cap was at about $44 billion at the start of the summer of 2015. By September, it had increased as Shell's interest in acquiring it became public. It was eventually acquired at $70 billion

Over time, operating margin will revert back to median of 33.98%.

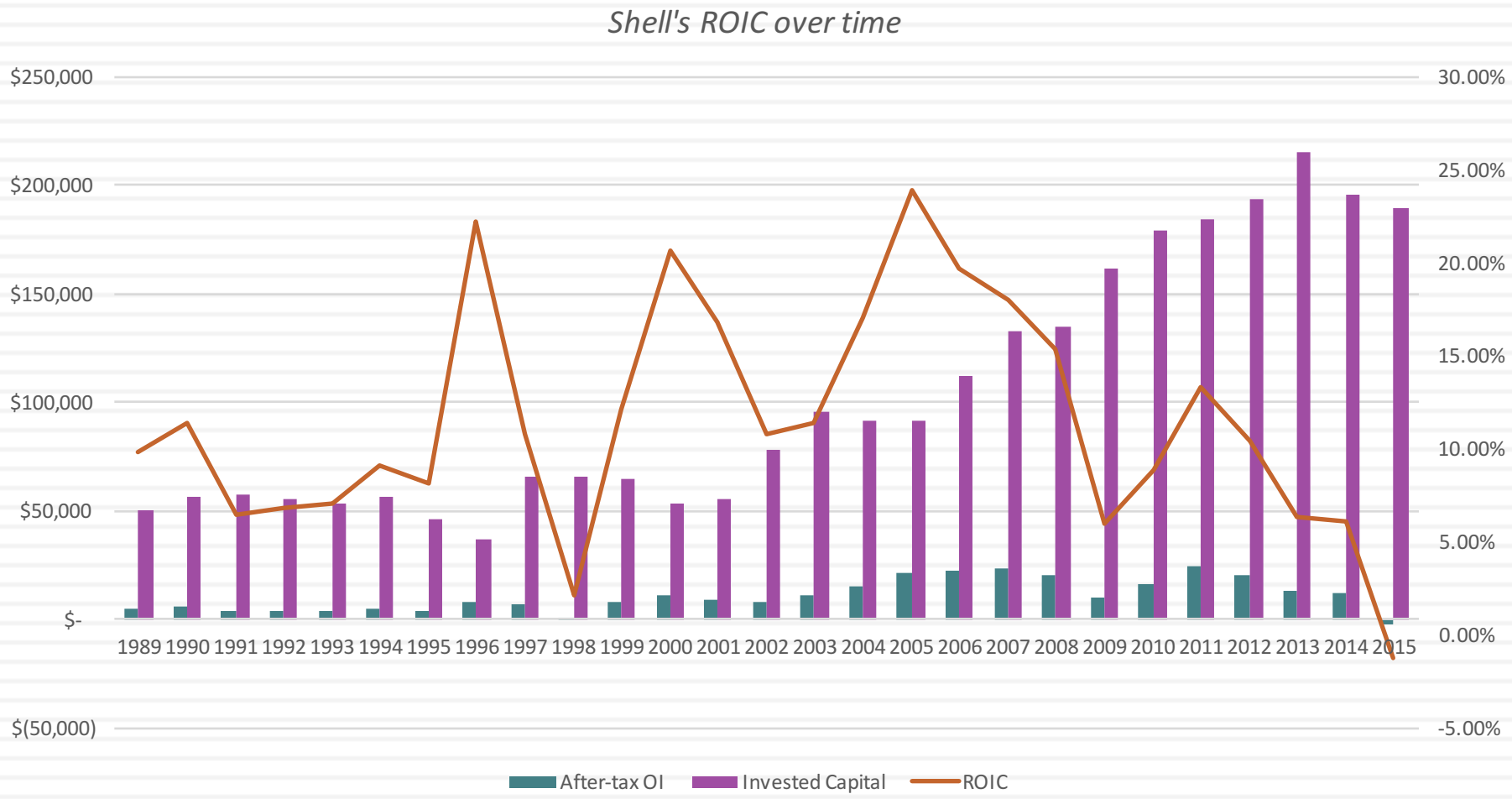
ROIC will settle in at median of 13.54% in stable growth.

Cost of capital will stay at 10.86% until year 5.

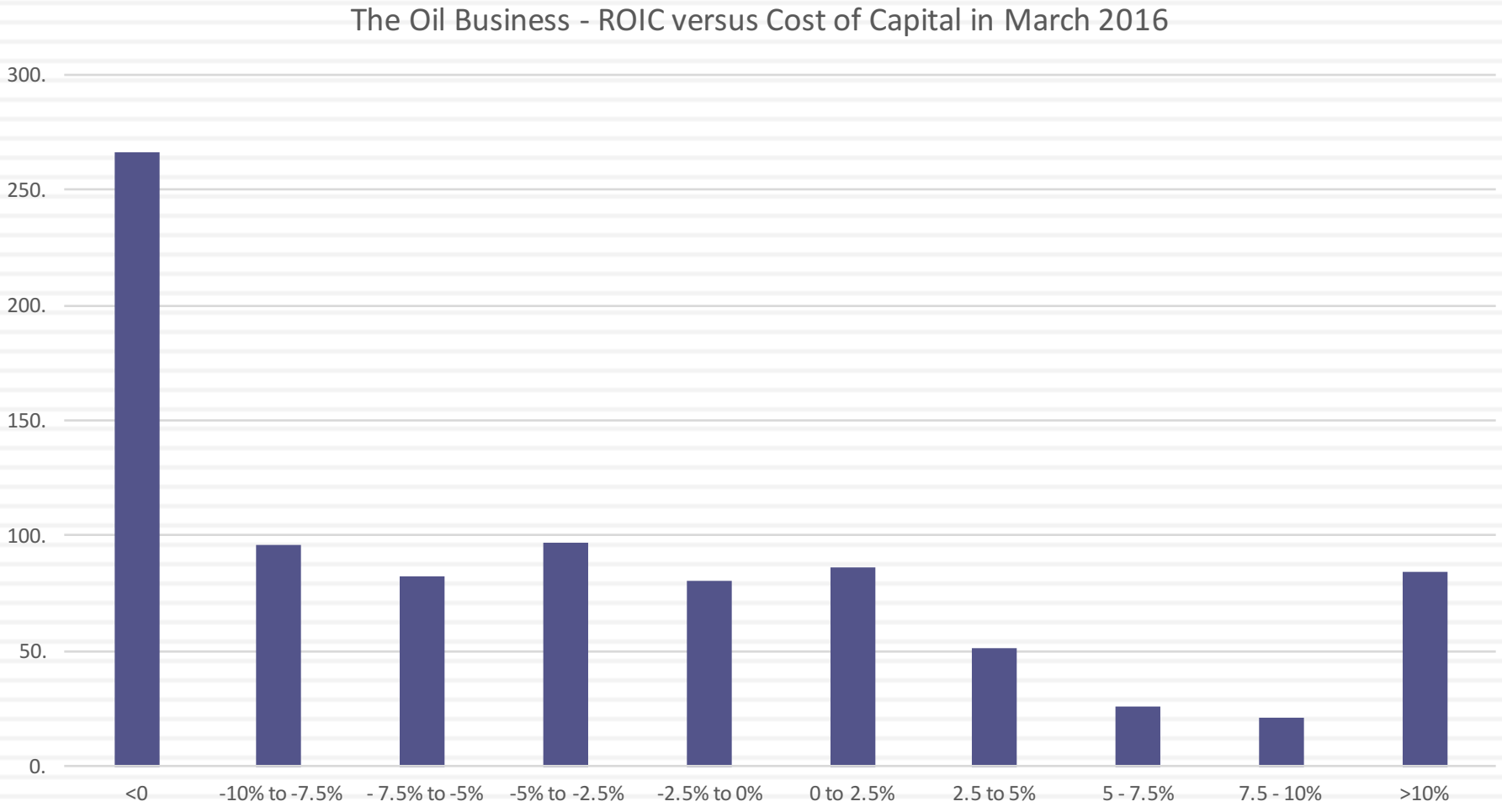
Valuing Synergy

- Assume that $47 billion is a fair stand-alone value for BG. The premium paid on the acquisition was approximately $23 billion and one reason provided was synergy.
- What is the synergy that you see in this deal and where would you expect it to show up on the consolidated entity's financials?
  a) Higher cash flows today (cost cutting)
  b) Higher growth in the future (from reserves)
  c) Lower risk (from ?)
  d) Something else
- How would you value this synergy?

A tangent: How do Shell's existing investments measure up?



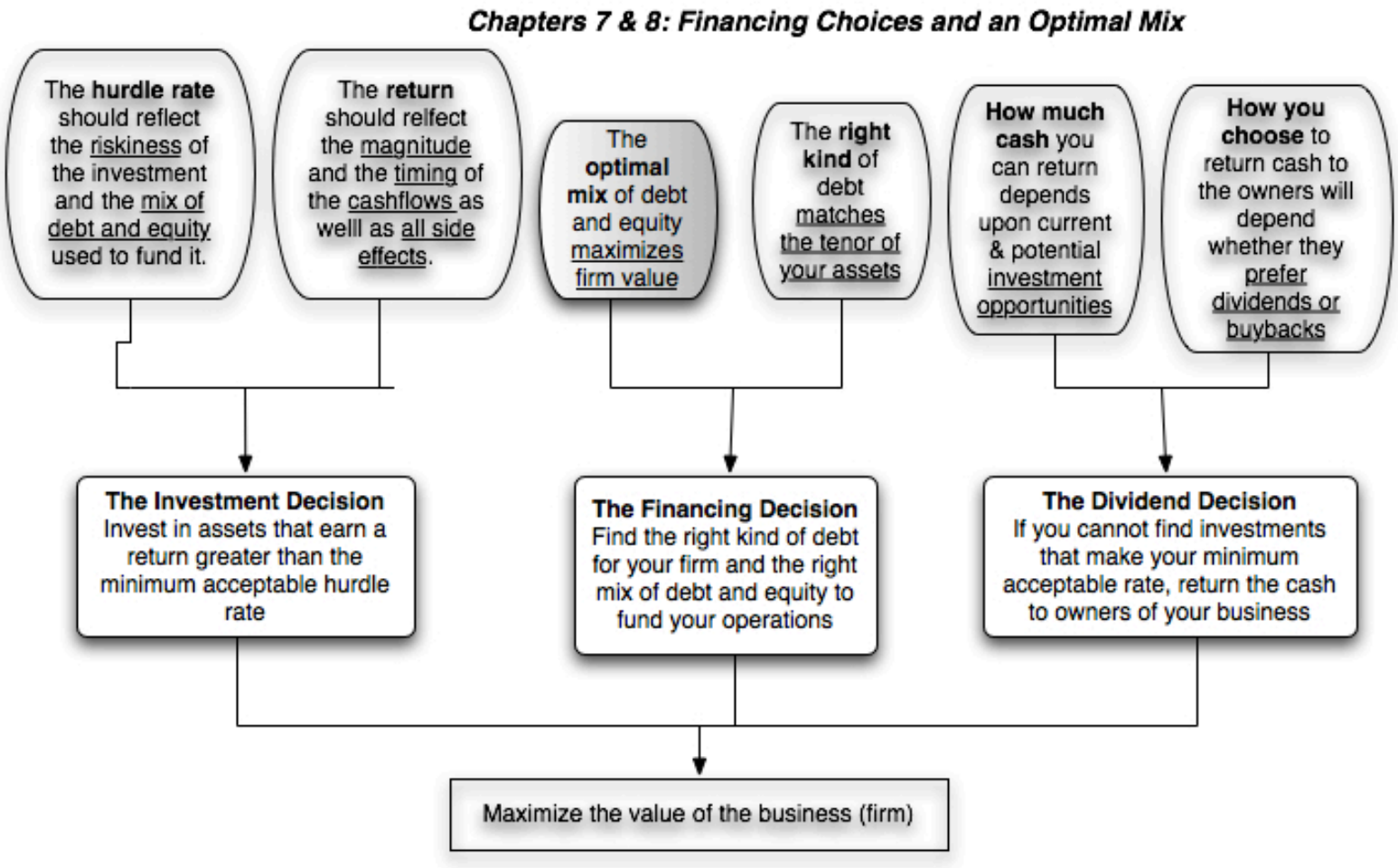
The Oil Sector: ROIC vs Cost of Capital



Relative to your peer group..

Company Name	ROIC	Cost of capital in US$	ROIC - Cost of Capital
Exxon Mobil Corporation (NYSE:XOM)	7.38%	9.94%	-2.56%
PetroChina Co. Ltd. (SEHK:857)	2.74%	11.07%	-8.33%
Chevron Corporation (NYSE:CVX)	0.55%	9.69%	-9.14%
Royal Dutch Shell plc (ENXTAM:RDSA)	0.67%	9.91%	-9.24%
TOTAL S.A. (ENXTPA:FP)	3.40%	10.52%	-7.11%
BP p.l.c. (LSE:BP.)	-4.85%	10.59%	-15.44%
China Petroleum & Chemical Corp. (SEHK:386)	0.35%	10.76%	-10.41%
Eni SpA (BIT:ENI)	1.63%	13.73%	-12.10%
Occidental Petroleum Corporation (NYSE:OXY)	-16.29%	9.82%	-26.11%
BG Group plc (LSE:BG.)	3.58%	10.85%	-7.27%
Statoil ASA (OB:STL)	3.93%	9.57%	-5.64%
Public Joint Stock Company Gazprom (MICEX:GAZP)	4.73%	15.95%	-11.23%
Suncor Energy Inc. (TSX:SU)	2.74%	9.95%	-7.22%
Imperial Oil Ltd. (TSX:IMO)	4.86%	9.92%	-5.06%
Public Joint Stock Company Oil Company LUKOIL (MICEX:LKOH)	2.19%	15.51%	-13.32%
PTT Public Company Limited (SET:PTT)	3.31%	13.90%	-10.59%
Sasol Ltd. (JSE:SOL)	17.16%	13.68%	3.48%
Open Joint Stock Company Surgutneftegas (MICEX:SNGS)	4.92%	15.36%	-10.43%
Repsol, S.A. (CATS:REP)	1.79%	13.99%	-12.20%
Ecopetrol SA (BVC:ECOPETROL)	3.39%	13.96%	-10.57%

First Principles



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.*

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)

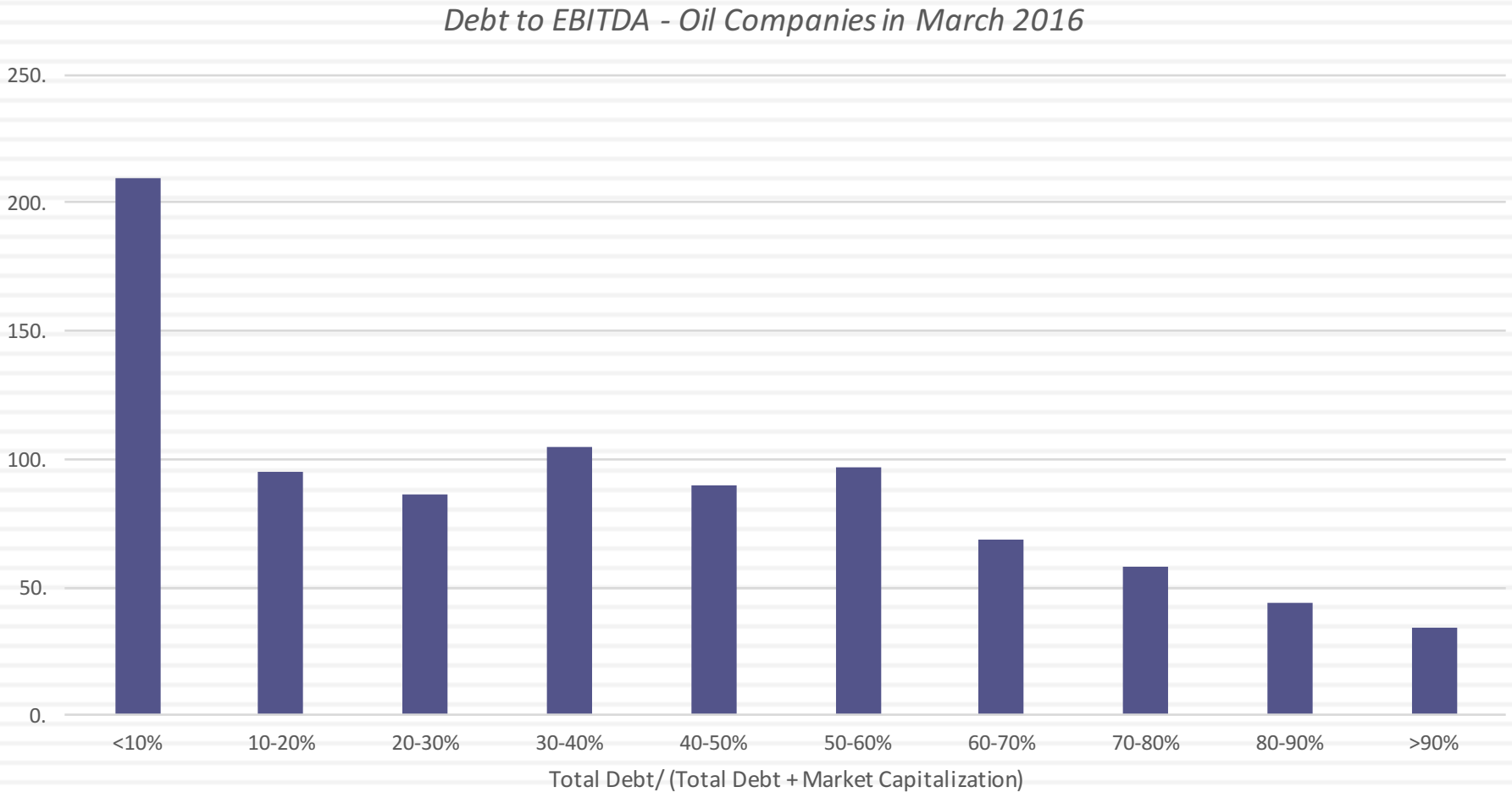
3. Estimate the Cost of Capital at different levels of debt

4. Calculate the effect on Firm Value and Stock Price.

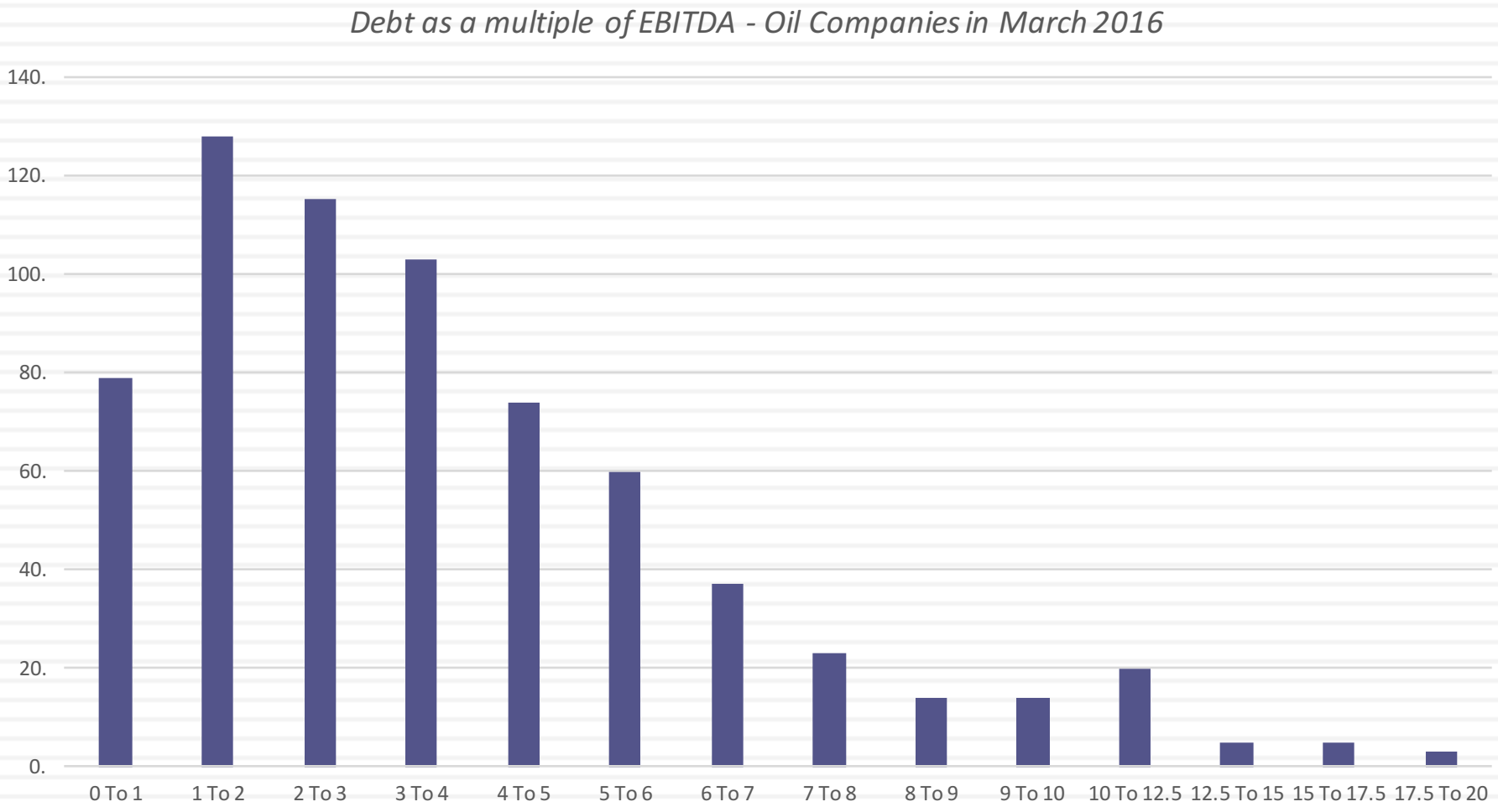
Finding an optimal mix: Shell's cost of capital schedule…

Debt Ratio	*Beta*	*Cost of Equity*	*Bond Rating*	*Interest rate on debt*	*Tax Rate*	*Cost of Debt (after-tax)*	*WACC*
0%	0.9987	10.25%	Aaa/AAA	2.75%	25.00%	2.06%	10.25%
10%	1.0819	10.94%	Aaa/AAA	2.75%	25.00%	2.06%	10.05%
20%	1.1859	11.80%	Aaa/AAA	2.75%	25.00%	2.06%	9.85%
30%	**1.3197**	**12.90%**	**Aa2/AA**	**3.00%**	**25.00%**	**2.25%**	**9.71%**
40%	1.4980	14.37%	A3/A-	3.75%	25.00%	2.81%	9.75%
50%	1.7477	16.44%	Caa/CCC	11.00%	25.00%	8.25%	12.34%
60%	2.2768	20.81%	C2/C	18.00%	14.68%	15.36%	17.54%
70%	3.0358	27.08%	C2/C	18.00%	12.58%	15.74%	19.14%
80%	4.5537	39.61%	C2/C	18.00%	11.01%	16.02%	20.74%
90%	9.1073	77.23%	C2/C	18.00%	9.79%	16.24%	22.34%

Debt Ratios across the Sector



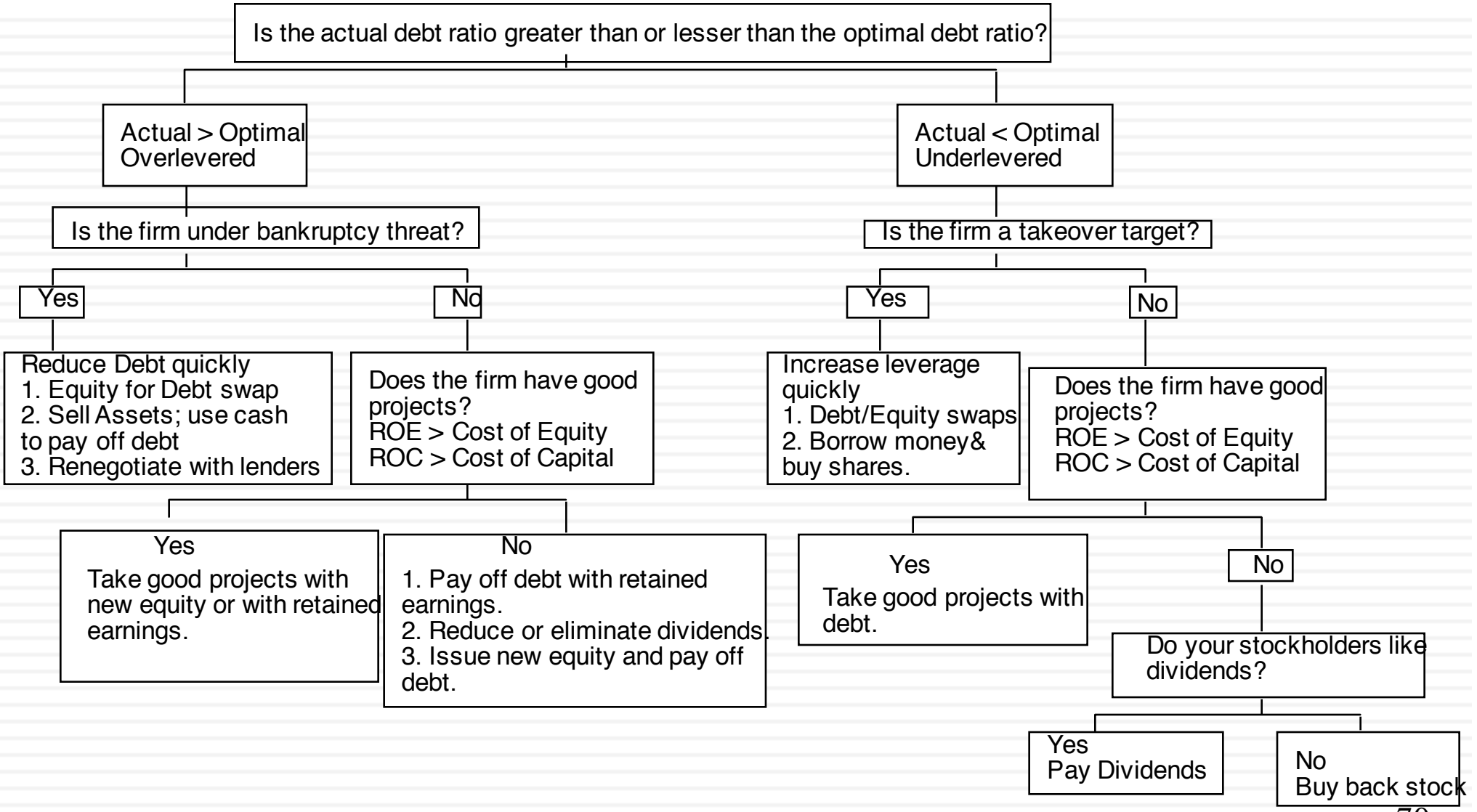
And a more immediate measure of the danger from debt



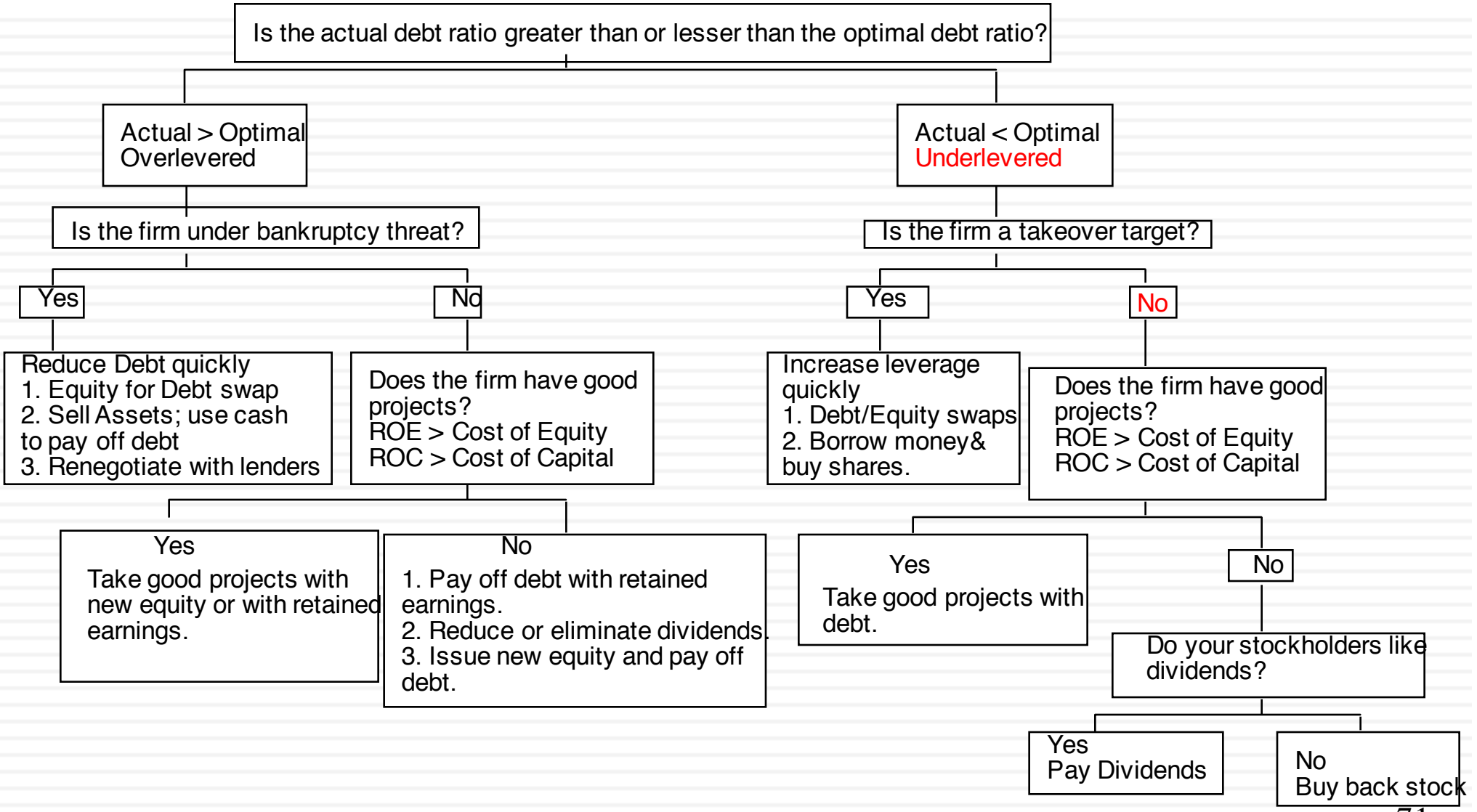
Debt Ratios with your peer groups..

Company Name	Market Cap (in US $)	Total Debt incl leases (in US $)	Book Debt to capital ratio	Market Debt to capital ratio	Book Debt to Equity Ratio	Market Debt to Equity ratio	Debt/EBITDA
Exxon Mobil Corporation (NYSE:XOM)	$325,167.20	$39,970.38	18.44%	10.95%	22.60%	12.29%	1.01
PetroChina Co. Ltd. (SEHK:857)	$222,078.10	$112,310.63	35.26%	33.59%	54.45%	50.57%	2.43
Chevron Corporation (NYSE:CVX)	$169,552.70	$39,003.07	20.01%	18.70%	25.01%	23.00%	1.74
Royal Dutch Shell plc (ENXTAM:RDSA)	$145,239.30	$82,559.95	33.69%	36.24%	50.81%	56.84%	2.60
TOTAL S.A. (ENXTPA:FP)	$104,216.90	$61,159.32	38.15%	36.98%	61.68%	58.68%	2.68
BP p.l.c. (LSE:BP.)	$95,507.80	$74,008.64	41.91%	43.66%	72.13%	77.49%	5.42
China Petroleum & Chemical Corp.	$88,409.00	$84,883.14	40.76%	48.98%	68.82%	96.01%	3.39
Eni SpA (BIT:ENI)	$54,220.40	$35,533.60	34.23%	39.59%	52.05%	65.54%	2.18
Occidental Petroleum Corporation	$51,185.60	$9,510.78	24.14%	15.67%	31.83%	18.58%	1.55
BG Group plc (LSE:BG.)	$49,648.10	$23,406.25	44.25%	32.04%	79.38%	47.14%	3.57
Statoil ASA (OB:STL)	$44,530.00	$32,624.90	43.77%	42.28%	77.85%	73.26%	1.74
Public Joint Stock Company Gazprom	$43,529.90	$45,970.70	19.54%	51.36%	24.28%	105.61%	1.60
Suncor Energy Inc. (TSX:SU)	$37,236.30	$13,968.43	31.26%	27.28%	45.47%	37.51%	2.06
Imperial Oil Ltd. (TSX:IMO)	$27,445.80	$6,686.75	27.89%	19.59%	38.67%	24.36%	2.21
Public Joint Stock Company Oil Company	$23,259.00	$13,282.70	13.88%	36.35%	16.12%	57.11%	1.08
PTT Public Company Limited (SET:PTT)	$19,335.10	$19,212.56	39.12%	49.84%	64.26%	99.37%	3.04
Sasol Ltd. (JSE:SOL)	$17,700.90	$4,046.36	20.01%	18.61%	25.02%	22.86%	0.79
Open Joint Stock Company Surgutneftegas	$16,879.90	$0.00	0.00%	0.00%	0.00%	0.00%	0.00
Repsol, S.A. (CATS:REP)	$15,201.70	$24,512.35	41.67%	61.72%	71.44%	161.25%	6.93
Ecopetrol SA (BVC:ECOPETROL)	$14,650.30	$17,140.40	50.87%	53.92%	103.52%	117.00%	3.16

A Framework for Getting to the Optimal



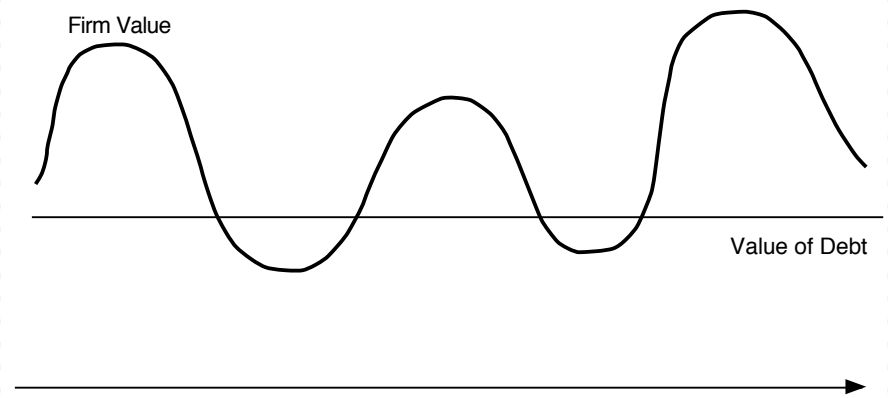
Shell's Pathways to the Optimal



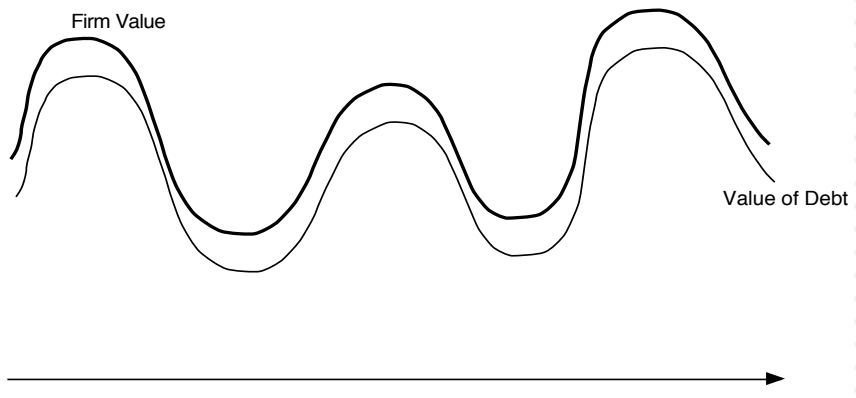
Designing Debt: The Fundamental Principle

- 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.

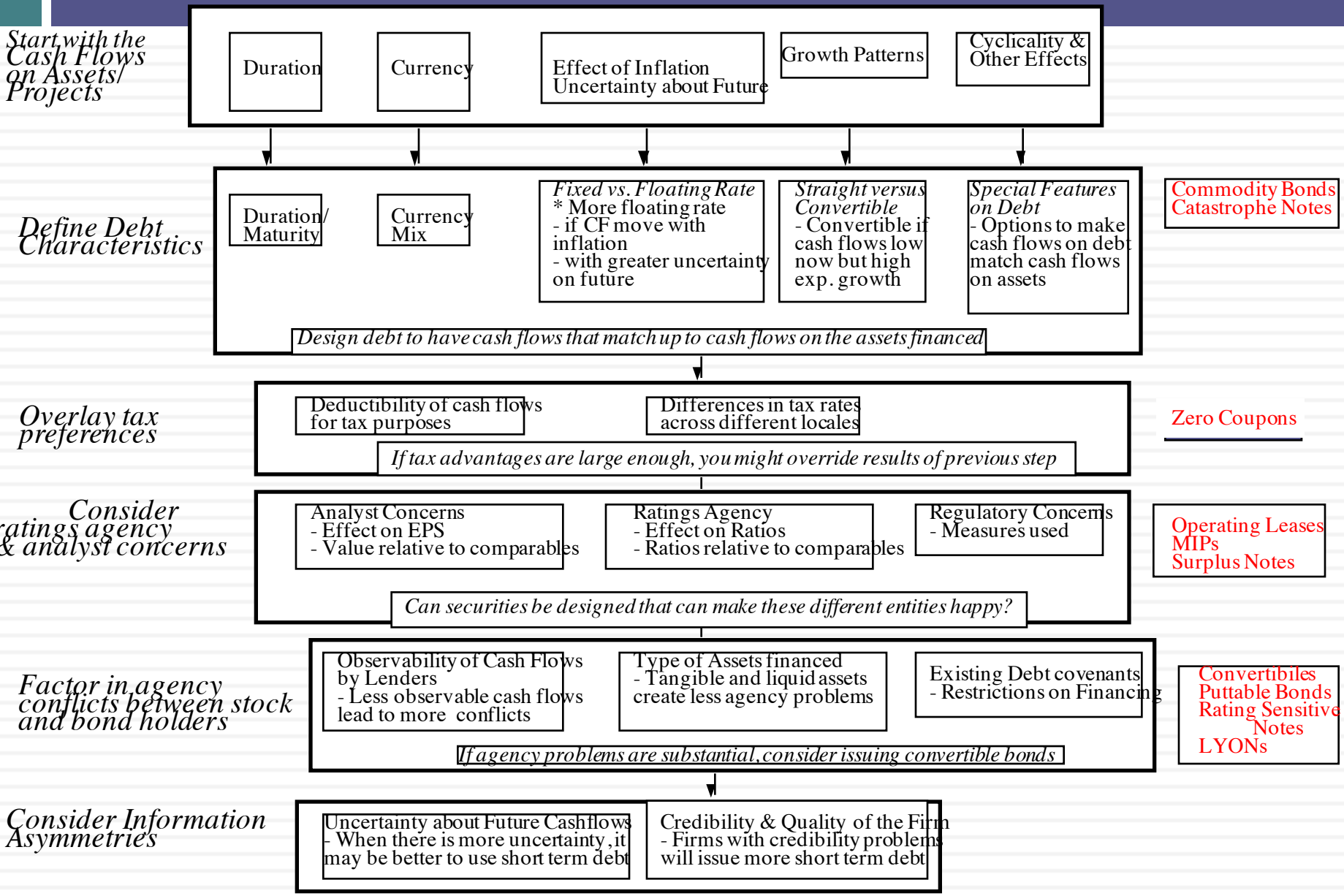
Unmatched Debt



Matched Debt



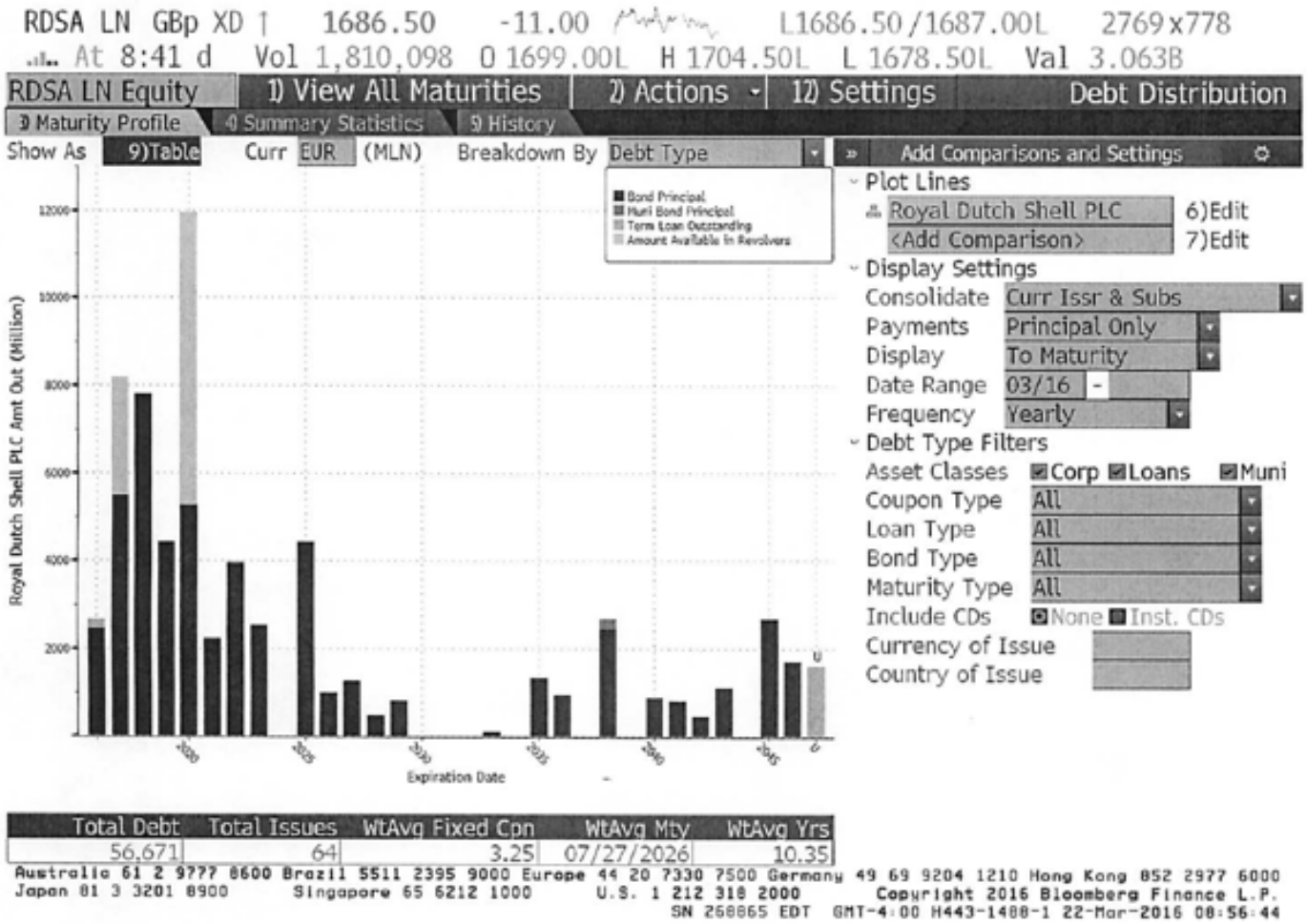
Designing Debt: Bringing it all together



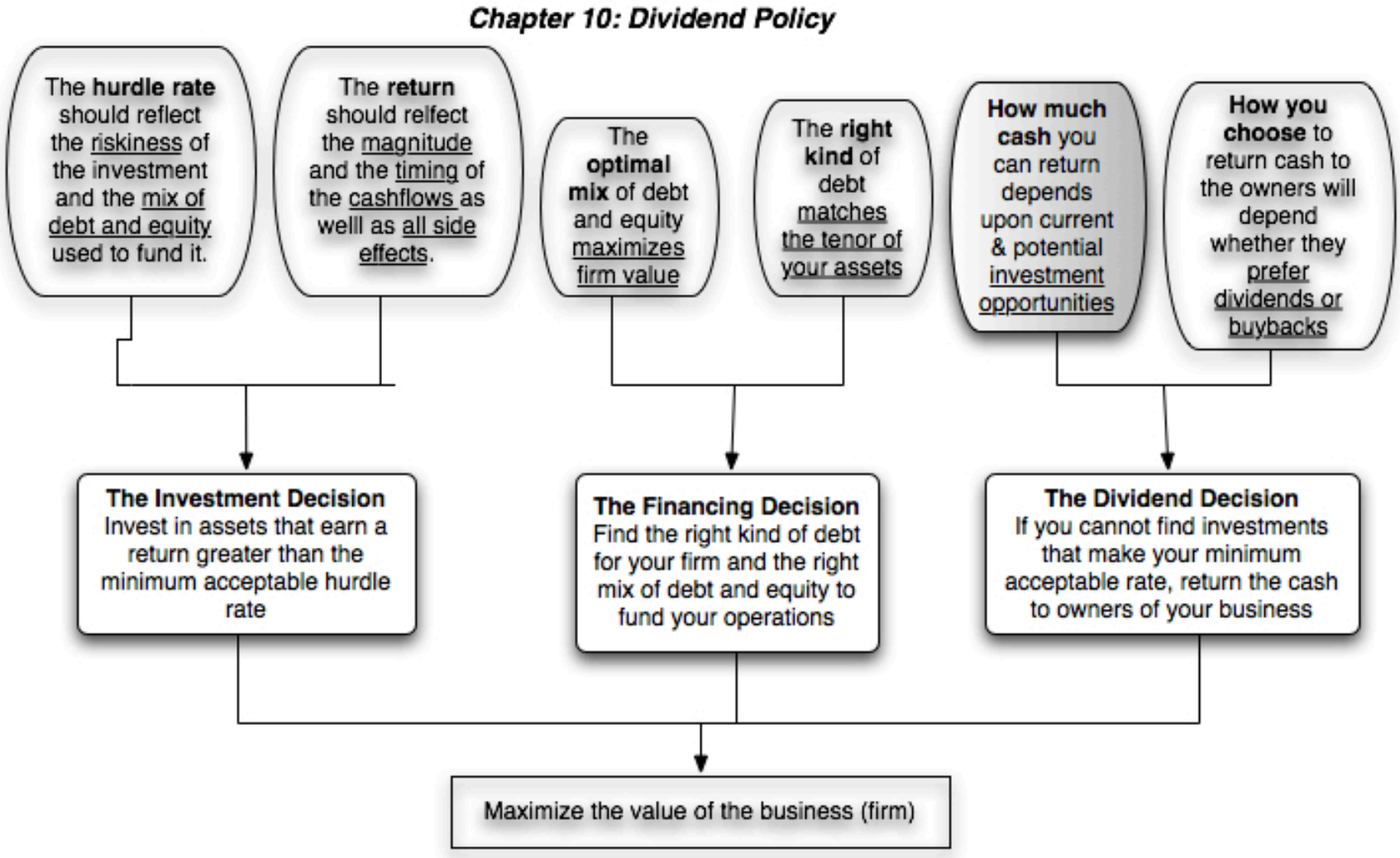
Designing Shell's debt

- What is the duration of a typical project for Shell?
  - Very short term (< 1 year)
  - Short term (1-3 years)
  - Medium term (3-5 years)
  - Long term
- What currency are your cash flows in?
- How much pricing power do you have (to deal with changes in inflation)?
  - None. We are price takers
  - Some.
  - A great deal.
- What macro-economic variables most affect your cash flows?

Analyzing Shell's Current Debt



First Principles



Assessing Dividend Policy

- 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 Shell, we obtain the following:

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2006-2015
Dividends	$8,142	$9,001	$9,516	$10,526	$9,584	$6,877	$7,390	$7,198	$9,444	$9,370	$87,048
Stock Buybacks	$8,047	$4,387	$3,573	$-	$-	$2,035	$1,526	$5,565	$3,328	$448	$28,909
Cash Returned	$16,189	$13,388	$13,089	$10,526	$9,584	$8,912	$8,916	$12,763	$12,772	$9,818	$115,957

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

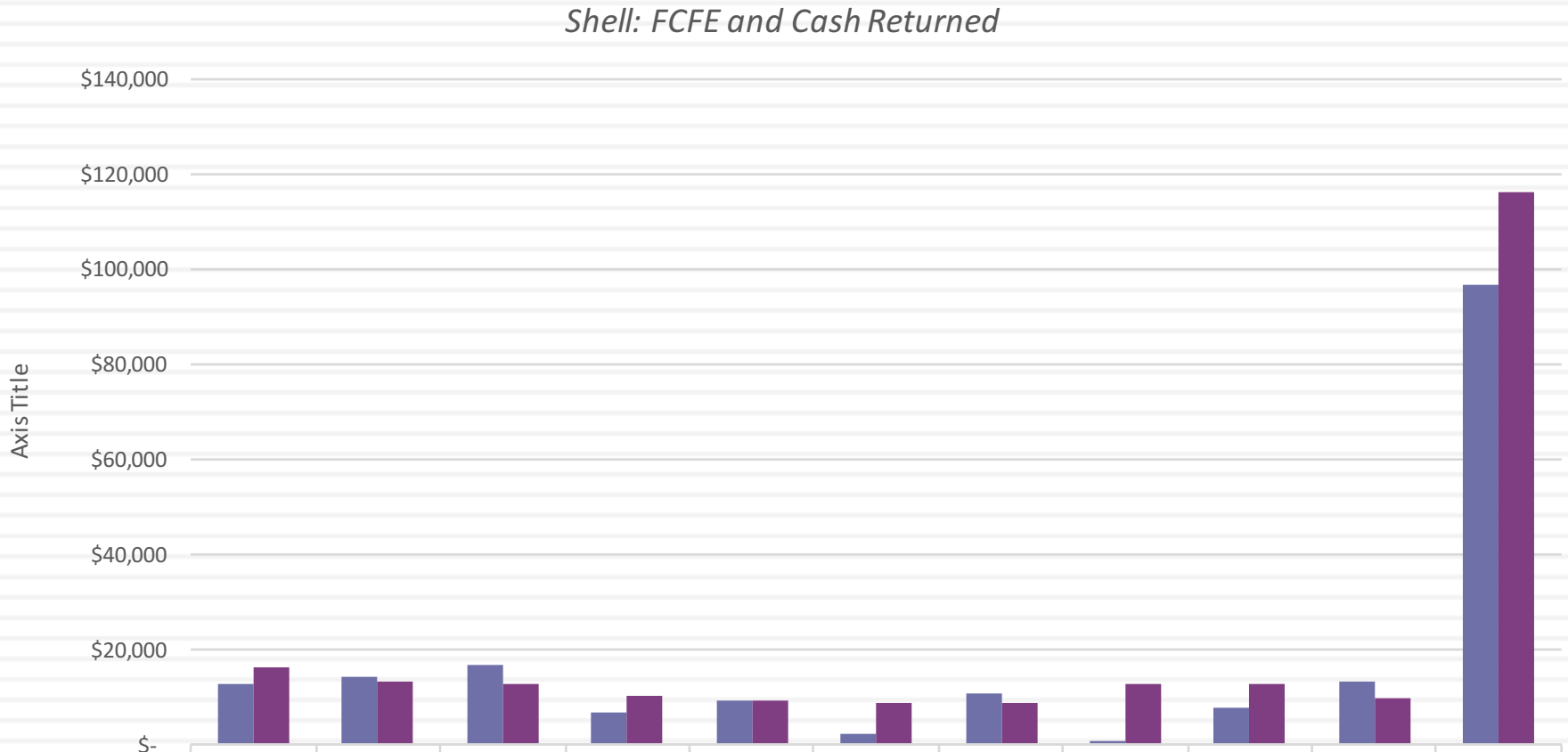
  + Proceeds from New Debt Issues

  = Free Cash flow to Equity

Shell's FCFE

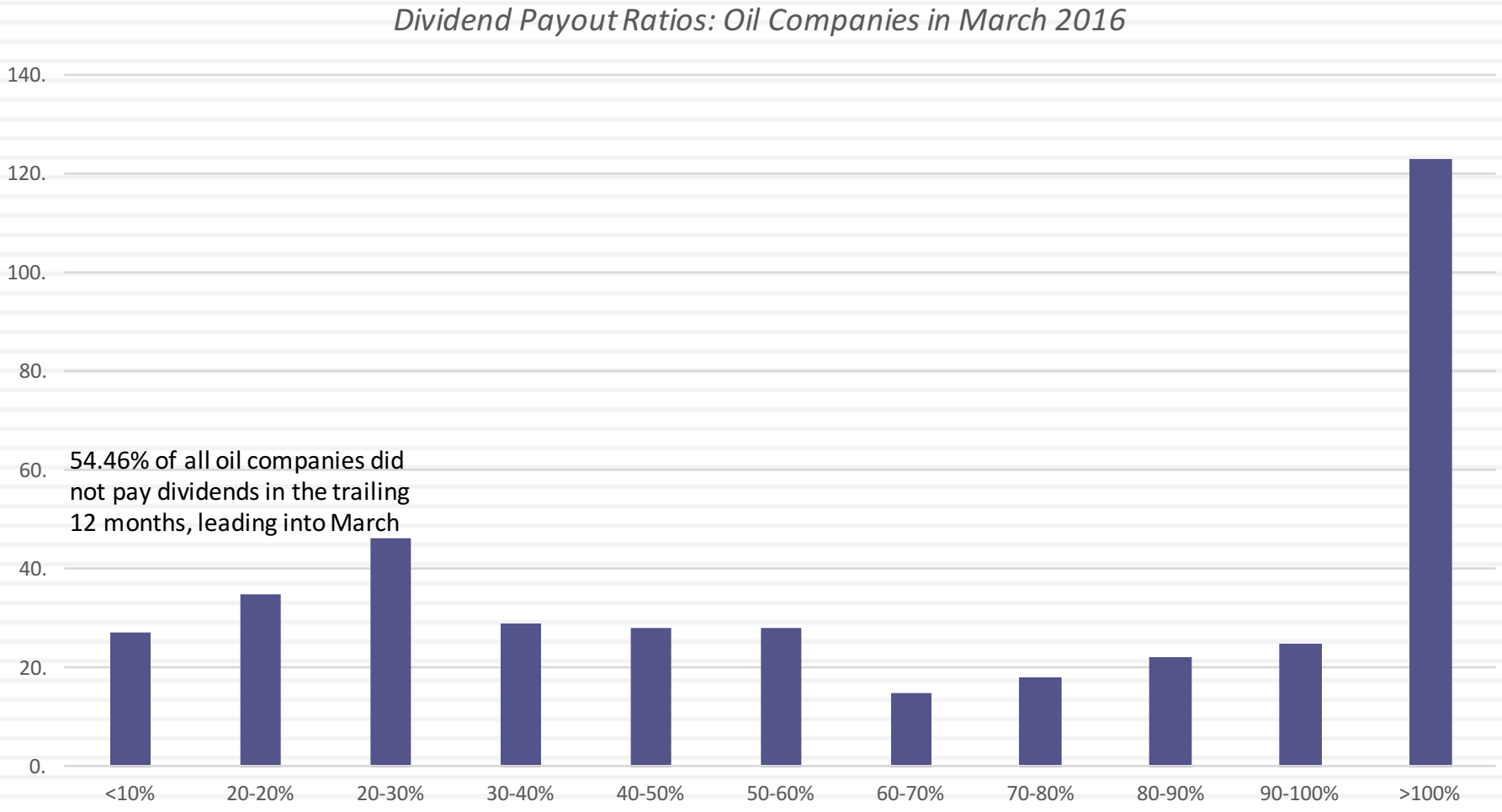
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net Income	$25,442	$31,331	$26,277	$12,518	$20,127	$30,826	$26,712	$16,371	$14,874	$1,939
Depreciation & Amort.	$12,411	$12,563	$13,082	$12,623	$12,688	$11,713	$13,518	$16,099	$17,196	$16,779
Goodwill Amortized									$671	$609
Capital Expenditure	$(22,922)	$(24,576)	$(35,065)	$(26,516)	$(26,940)	$(26,301)	$(32,576)	$(39,975)	$(31,676)	$(26,131)
- Change in WC	$4,052	$6,206	$(7,935)	$2,331	$5,929	$6,471	$(3,391)	$(2,988)	$(6,405)	$(5,521)
- *(Debt repaid - Debt issued)	$(2,106)	$(1,314)	$(4,826)	$(10,701)	$(9,256)	$7,124	$17	$(5,395)	$(357)	$(14,891)
FCFE	$12,985	$14,426	$17,055	$6,995	$9,202	$2,643	$11,028	$878	$7,827	$13,608

Shell: Cash Returned vs FCFE



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2006-2015
FCFE	$12,985	$14,426	$17,055	$6,995	$9,202	$2,643	$11,028	$878	$7,827	$13,608	$96,647
Cash Returned	$16,189	$13,388	$13,089	$10,526	$9,584	$8,912	$8,916	$12,763	$12,772	$9,818	$115,957

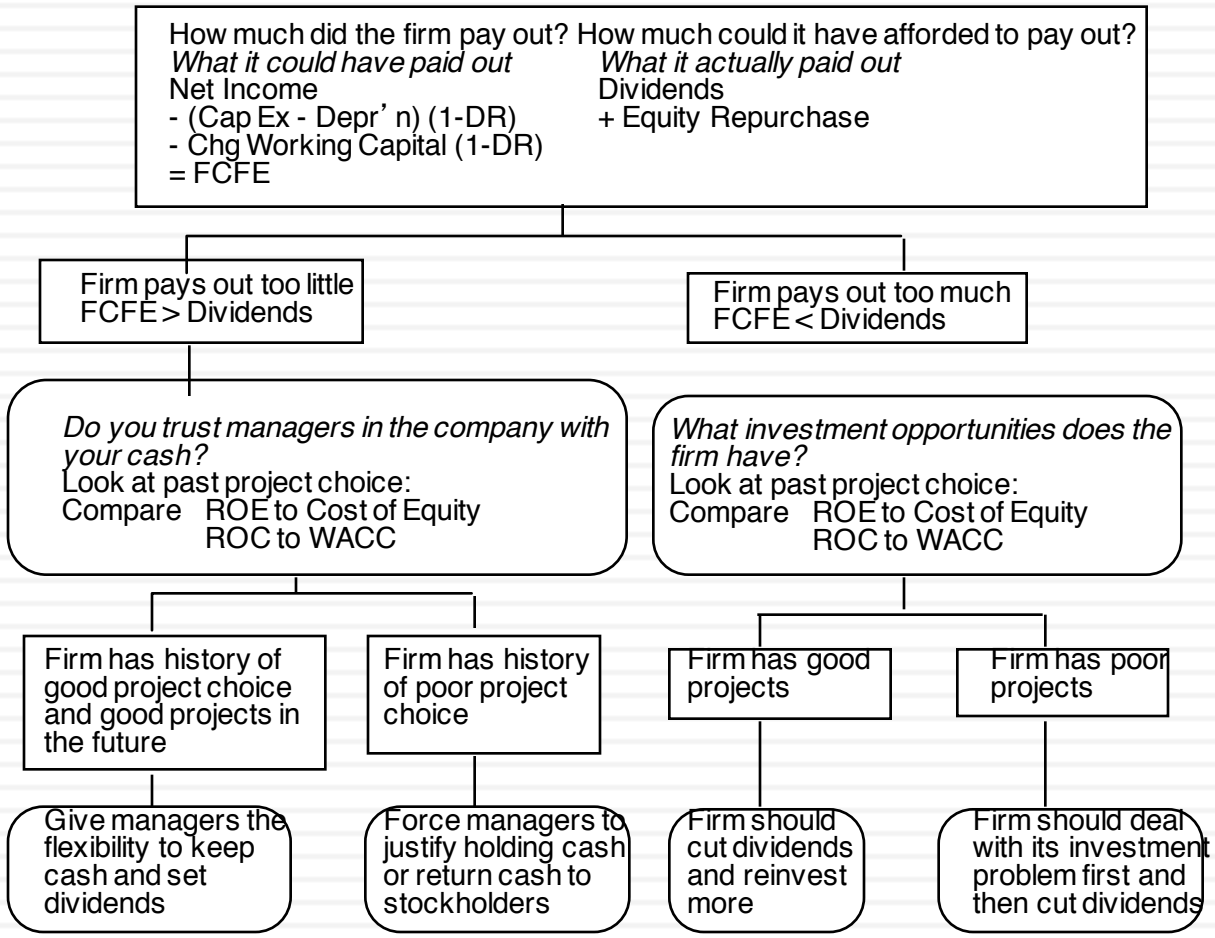
The Oil Sector: Dividend Payout Ratios



Dividends across the peer group..

Company Name	Payout ratio	Dividend Yield	Trailing Net Income	Dividends	FCFE	Dividends + Buybacks
Exxon Mobil Corporation (NYSE:XOM)	59.98%	3.68%	$19,940.00	$11,960.00	$3,589.00	$18,563.00
PetroChina Co. Ltd. (SEHK:857)	65.86%	1.95%	$6,564.00	$4,323.20	-$1,785.75	$4,323.20
Chevron Corporation (NYSE:CVX)	92.47%	4.72%	$8,646.00	$7,995.00	-$2,825.00	$9,233.00
Royal Dutch Shell plc (ENXTAM:RDSA)	663.01%	7.28%	$1,595.00	$10,575.00	$3,436.00	$12,030.00
TOTAL S.A. (ENXTPA:FP)	378.01%	3.83%	$1,055.00	$3,988.00	-$7,778.00	$4,225.00
BP p.l.c. (LSE:BP.)	NA	6.12%	-$7,582.00	$5,848.00	-$3,302.00	$6,641.00
China Petroleum & Chemical Corp. (SEHK:386)	111.59%	4.31%	$3,413.40	$3,809.10	$3,479.30	$3,809.10
Eni SpA (BIT:ENI)	NA	7.14%	-$3,063.40	$3,871.40	$1,684.10	$3,969.60
Occidental Petroleum Corporation (NYSE:OXY)	NA	4.40%	-$6,064.00	$2,251.00	$229.00	$3,254.00
BG Group plc (LSE:BG.)	NA	1.97%	-$2,667.00	$980.00	-$5,784.00	$980.00
Statoil ASA (OB:STL)	NA	6.03%	-$4,359.40	$2,683.60	-$6,726.60	$2,683.60
Public Joint Stock Company Gazprom (MICEX:GAZP)	43.34%	6.89%	$6,917.30	$2,998.30	-$16,544.70	$2,998.30
Suncor Energy Inc. (TSX:SU)	1701.26%	3.28%	$71.70	$1,219.80	-$1,267.60	$1,617.70
Imperial Oil Ltd. (TSX:IMO)	26.02%	1.20%	$1,262.30	$328.50	-$1,236.20	$328.50
Public Joint Stock Company Oil Company LUKOIL (MICEX:LKOH)	146.75%	8.34%	$1,322.00	$1,940.00	$2,021.00	$1,940.00
PTT Public Company Limited (SET:PTT)	NA	5.63%	-$245.80	$1,089.10	-$2,596.16	$1,089.10
Sasol Ltd. (JSE:SOL)	42.87%	5.92%	$2,446.10	$1,048.60	$243.70	$1,048.60
Open Joint Stock Company Surgutneftegas (MICEX:SNGS)	2.69%	2.54%	$15,939.90	$428.70	$14,263.50	$428.70
Repsol, S.A. (CATS:REP)	61.27%	3.59%	$890.60	$545.70	-$9,348.80	$1,024.50
Ecopetrol SA (BVC:ECOPETROL)	364.05%	13.00%	$523.20	$1,904.70	-$3,847.00	$1,904.70

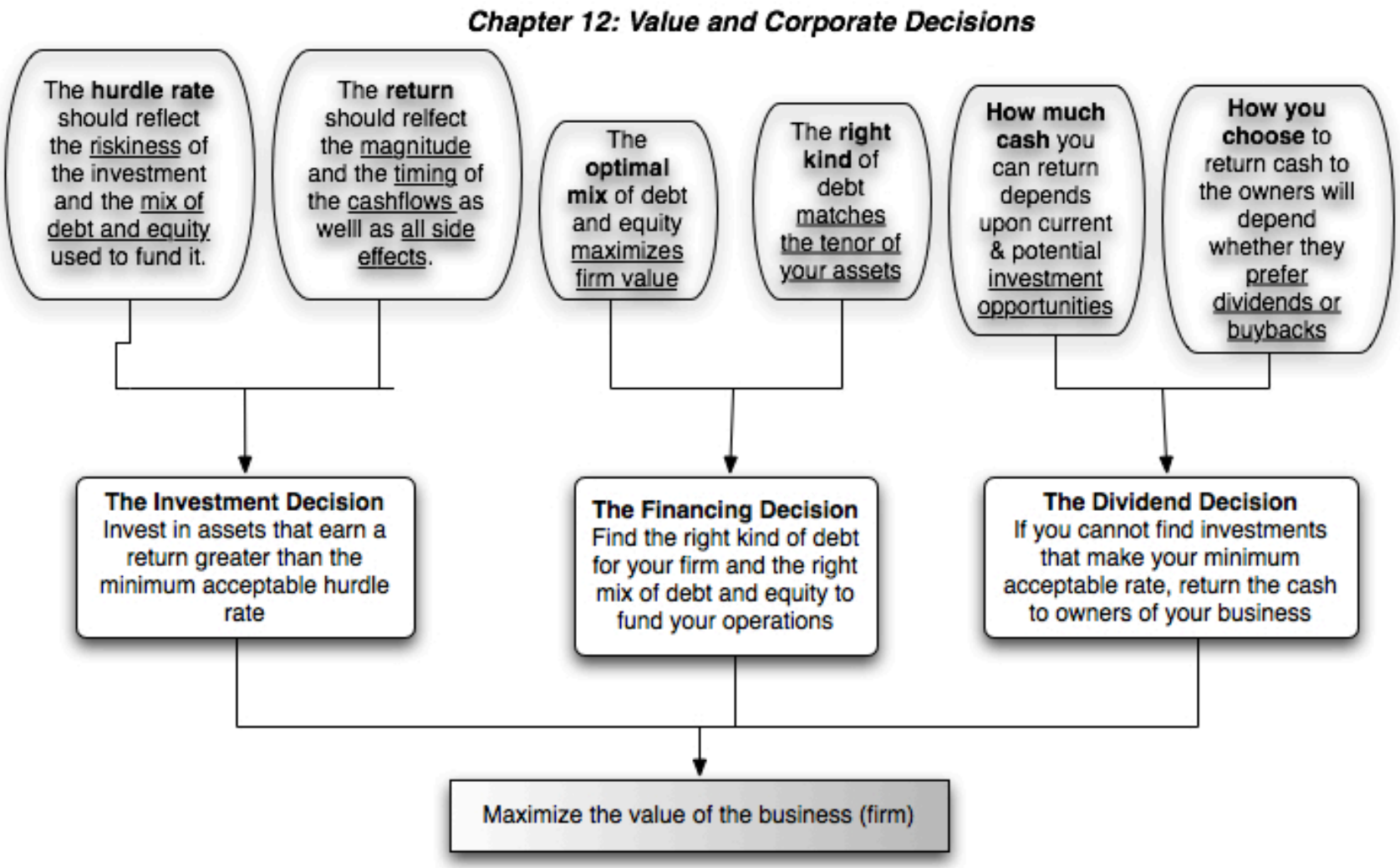
A Practical Framework for Analyzing Dividend Policy



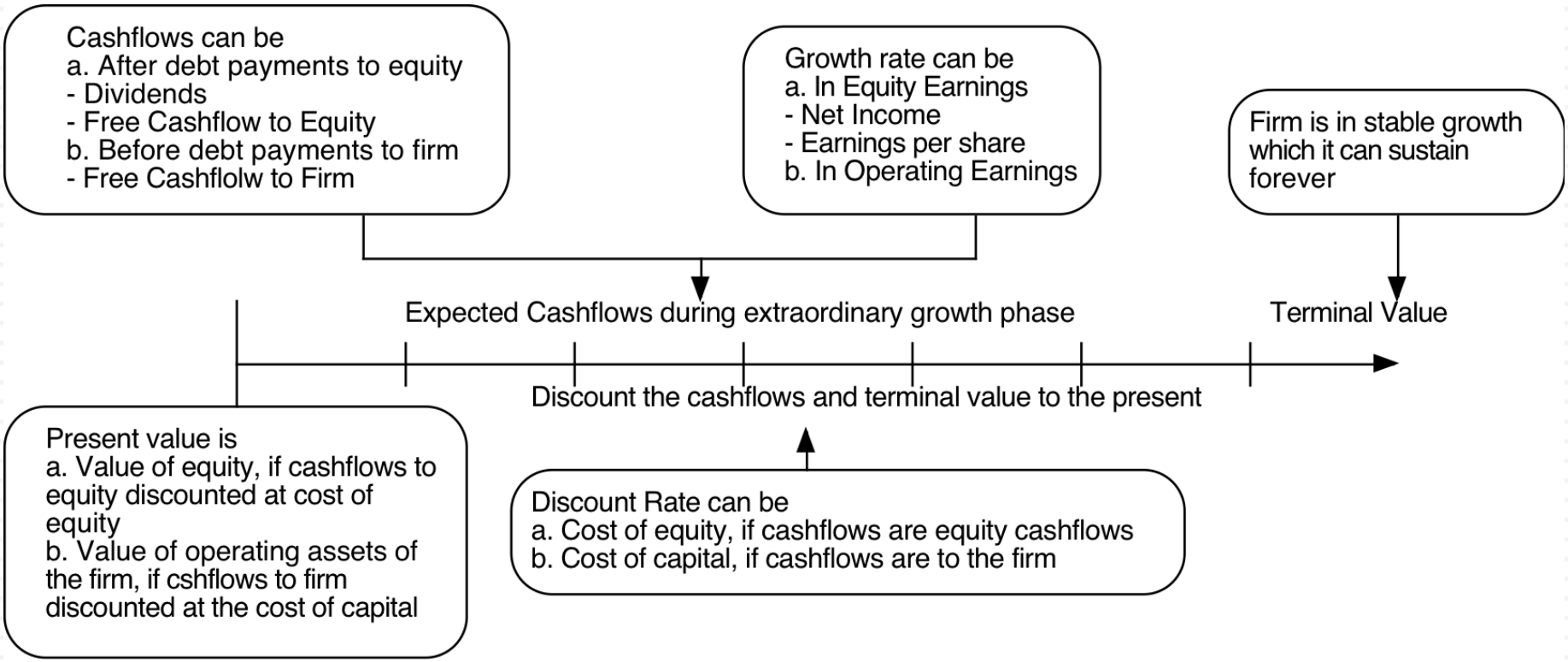
Do investors trust Shell's management?

- Given Shell's track record, if you were a Shell stockholder, would you be comfortable with Shell's dividend policy?
  - Yes
  - No
- As managers at Shell, are you comfortable with Shell's dividend policy?
  - Yes
  - No

First Principles



The Ingredients that determine value.



Valuing Shell at today's oil price ($40)

Revenue calculated from prevailing oil price of $40/barrel in March 2016
Revenue = 39992.77+4039.40*$40
= $201,569

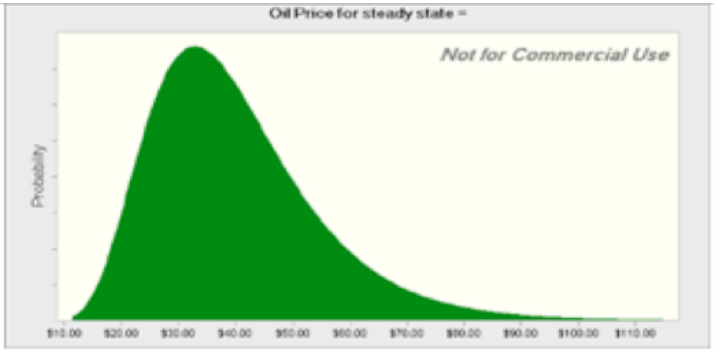
Compounded revenue growth of 3.91% a year, based on Shell's historical revenue growth rate from 2000 to 2015

	Base Year	*1*	*2*	*3*	*4*	*5*	*Terminal Year*
Revenues	$ 201,569	$ 209,450	$ 217,639	$ 226,149	$ 234,991	$ 244,180	$ 249,063
Operating Margin	3.01%	6.18%	7.76%	8.56%	8.95%	9.35%	9.35%
Operating Income	$ 6,065.00	$ 12,942.85	$ 16,899.10	$ 19,352.39	$ 21,040.39	$ 22,830.80	$ 23,287.41
Effective tax rate	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
AT Operating Income	$ 4,245.50	$ 9,060.00	$ 11,829.37	$ 13,546.68	$ 14,728.27	$ 15,981.56	$ 16,301.19
+ Depreciation	$ 26,714.00	$ 27,759	$ 28,844	$ 29,972	$ 31,144	$ 32,361	
- Cap Ex	$ 31,854.00	$ 33,099	$ 34,394	$ 35,738	$ 37,136	$ 38,588	
- Chg in WC		$ 472.88	$ 491.37	$ 510.58	$ 530.55	$ 551.29	
FCFF		$ 3,246.14	$ 5,788.19	$ 7,269.29	$ 8,205.44	$ 9,203.68	$ 13,011.34
Terminal Value						$ 216,855.71	
Return on capital							12.37%
Cost of Capital		9.91%	9.91%	9.91%	9.91%	9.91%	8.00%
Cumulated Discount Factor		1.0991	1.2080	1.3277	1.4593	1.6039	
Present Value		$ 2,953.45	$ 4,791.47	$ 5,474.95	$ 5,622.81	$ 140,940.73	
Value of Operating Assets	$ 159,783.41						
+ Cash	$ 31,752.00						
+ Cross Holdings	$ 33,566.00						
- Debt	$ 58,379.00						
- Minority Interets	$ 1,245.00						
Value of Equity	$ 165,477.41						
Number of shares	4209.7						
Value per share	$ 39.31						

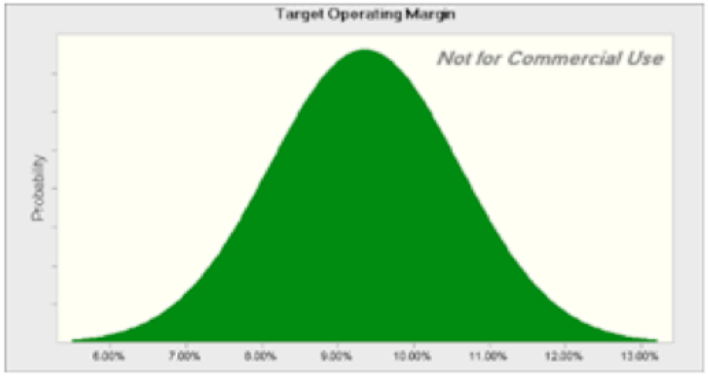
Operating margin converges on Shell's historical average margin of 9.35% from 200-2015

Return on capital reverts and stays at Shell's historic average of 12.37% from 200-2015

Added long term investments in joint ventures and subtracted out minority interest in consolidated holdings.



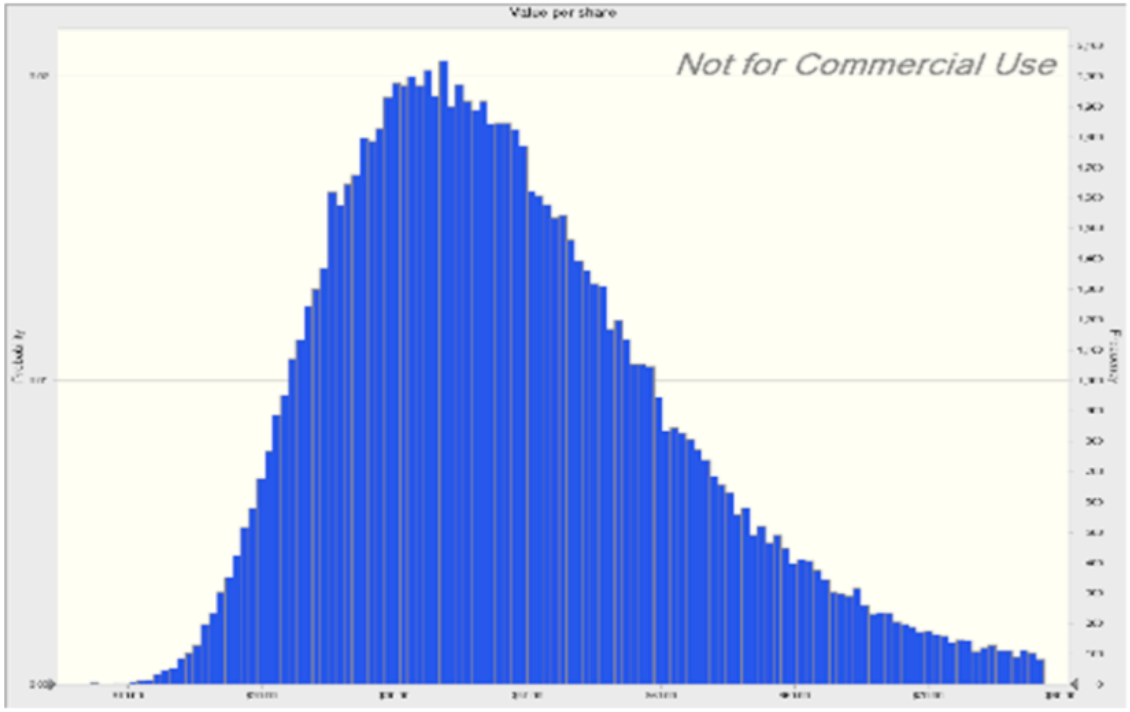
Revenue calculated from the oil price drawn from distribution
Revenue = 39992.77+4039.40*Oil Price/Barrel



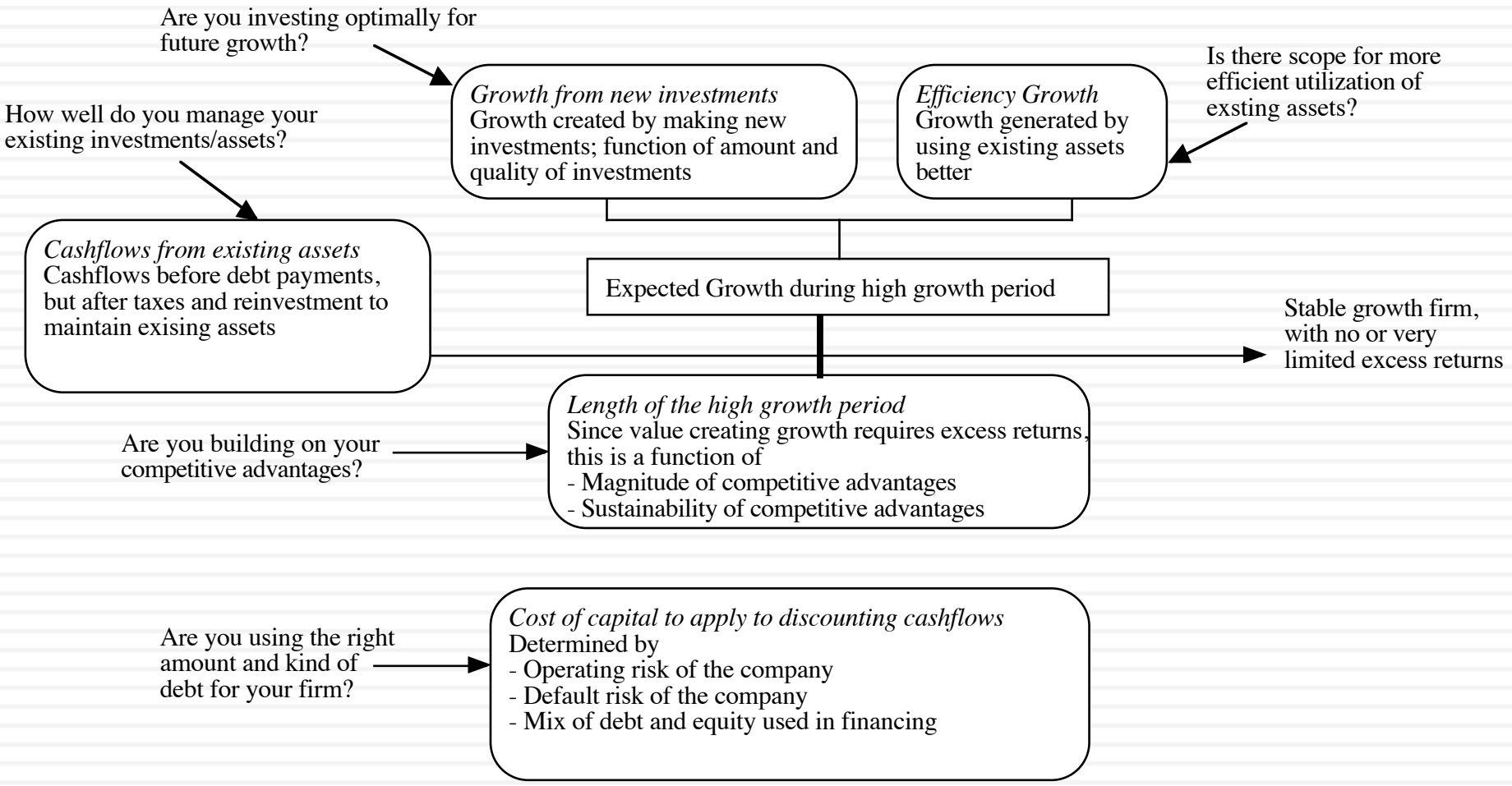
Pre-tax Operating Income based on revenue & selected margin
Pre-tax Operating Income = Revenues * Operating Margin

Value Shell based on operating income, assuming other assumptions (tax rate, revenue growth, cost of capital

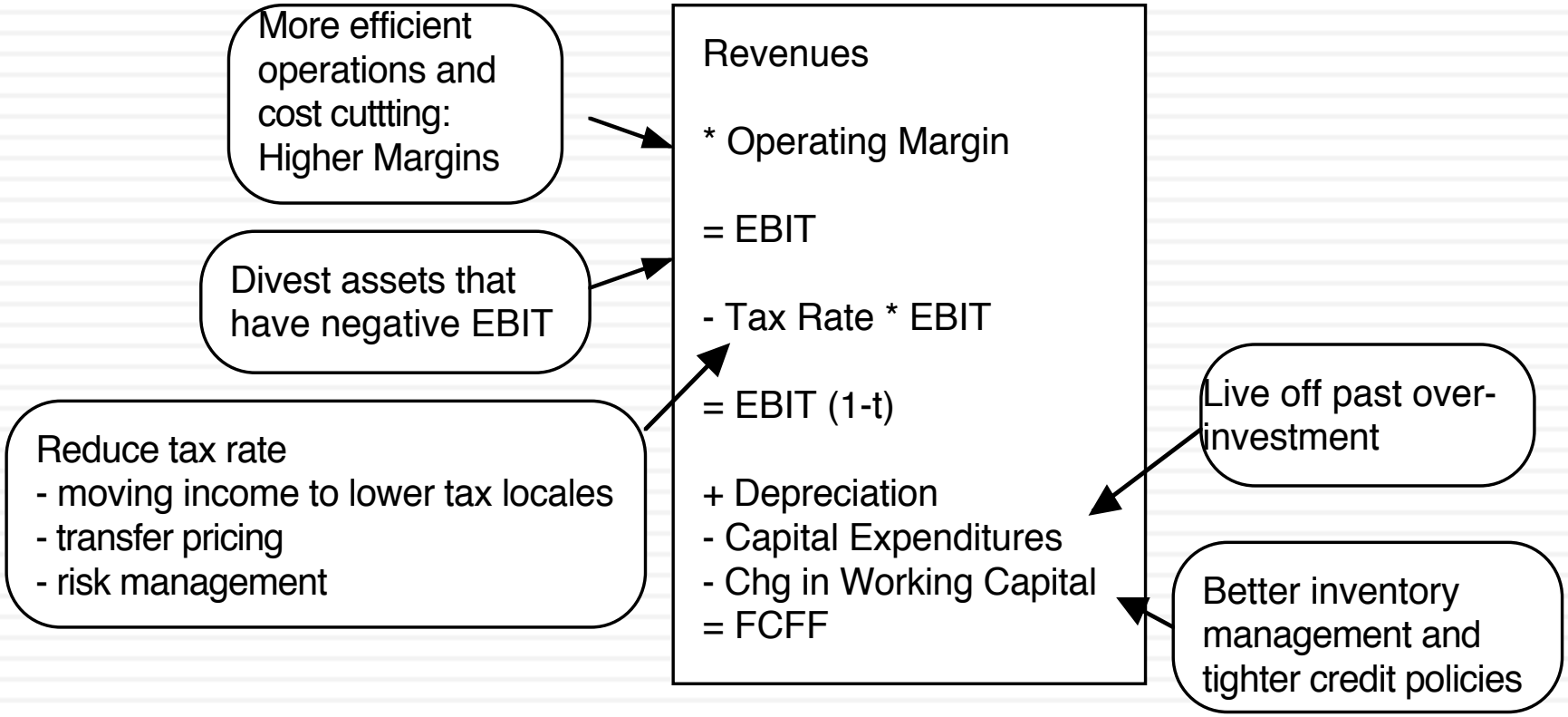
Percentiles:	Forecast values
0%	$6.55
10%	$23.90
20%	$27.73
30%	$30.89
40%	$33.88
50%	$36.99
60%	$40.28
70%	$44.22
80%	$49.24
90%	$57.49
100%	$197.11



Ways of changing value…

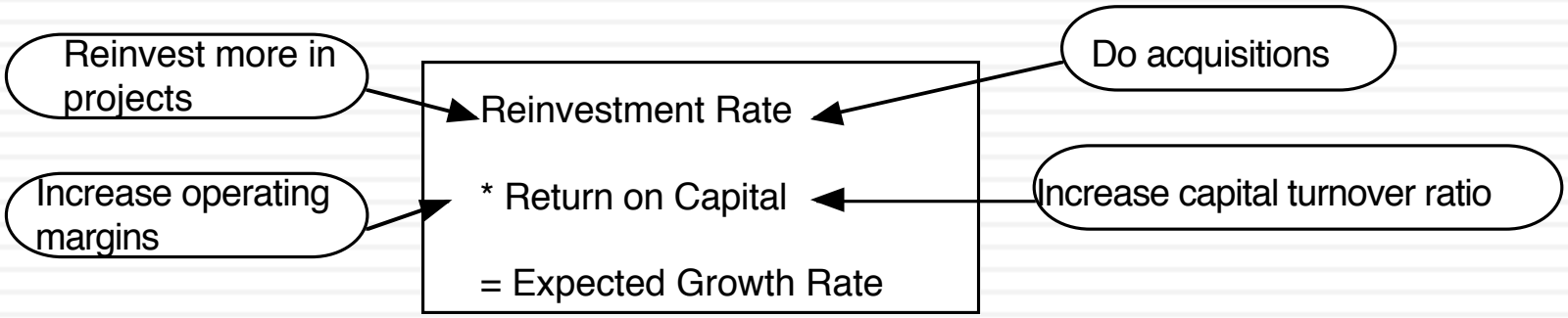


Value Creation 1: Increase Cash Flows from Assets in Place

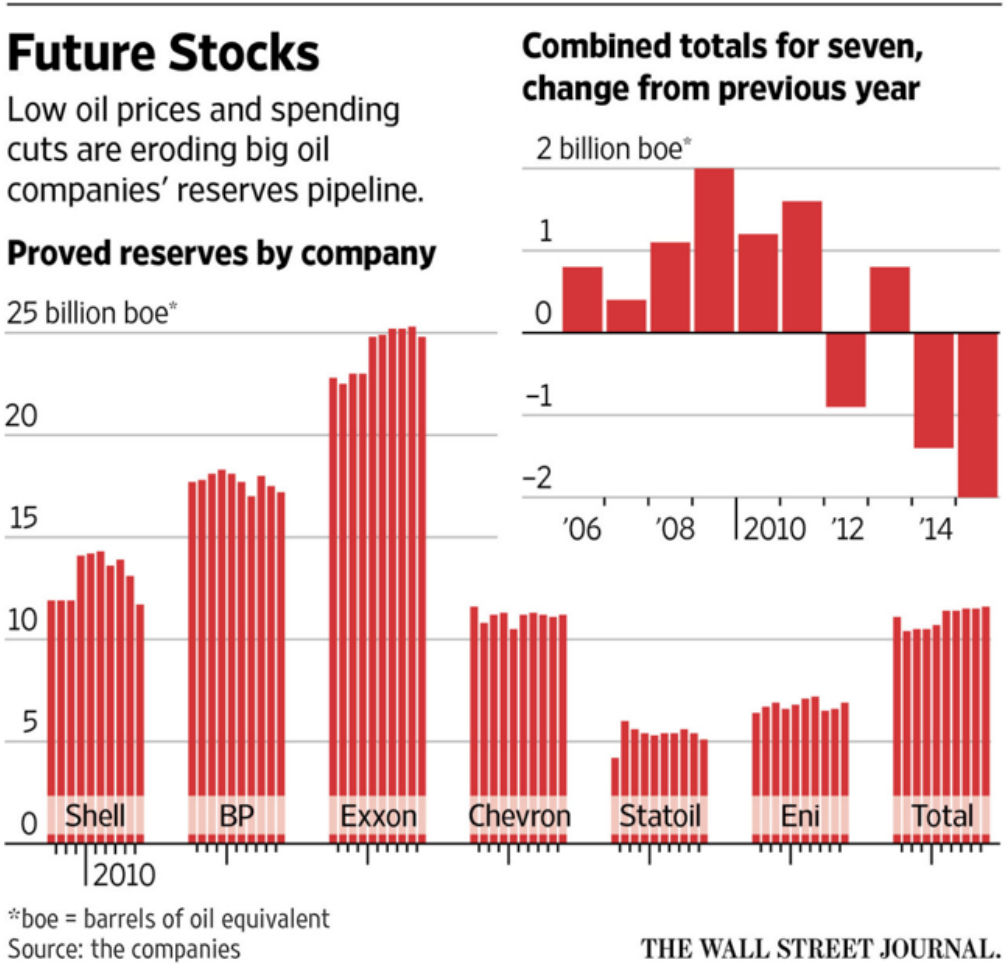


Value Creation 2: Increase Expected Growth

- Keeping all else constant, increasing the expected growth in earnings will increase the value of a firm, but only if the firm earns a return on capital that exceeds the cost of capital:



The Effect of Oil Prices on the Value of Growth

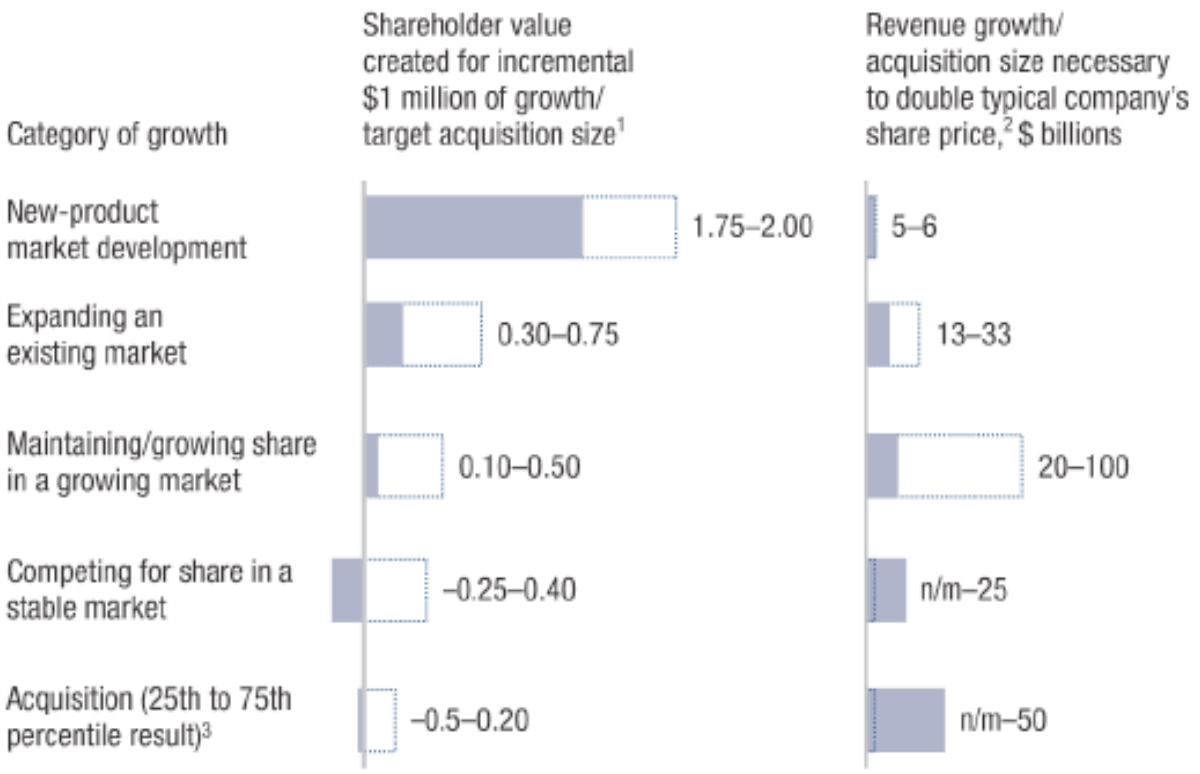


A postscript on creating growth: The Role of Acquisitions and Divestitures

- An acquisition is just a large-scale project. All of the rules that apply to individual investments apply to acquisitions, as well. For an acquisition to create value, it has to
  - Generate a higher return on capital, after allowing for synergy and control factors, than the cost of capital.
  - Put another way, an acquisition will create value only if the present value of the cash flows on the acquired firm, inclusive of synergy and control benefits, exceeds the cost of the acquisitons
- A divestiture is the reverse of an acquisition, with a cash inflow now (from divesting the assets) followed by cash outflows (i.e., cash flows foregone on the divested asset) in the future. If the present value of the future cash outflows is less than the cash inflow today, the divestiture will increase value.
- A fair-price acquisition or divestiture is value neutral.

Value Creating Growth… Evaluating the Alternatives..

Modes of organic growth vary in value creation intensity—consumer goods industry



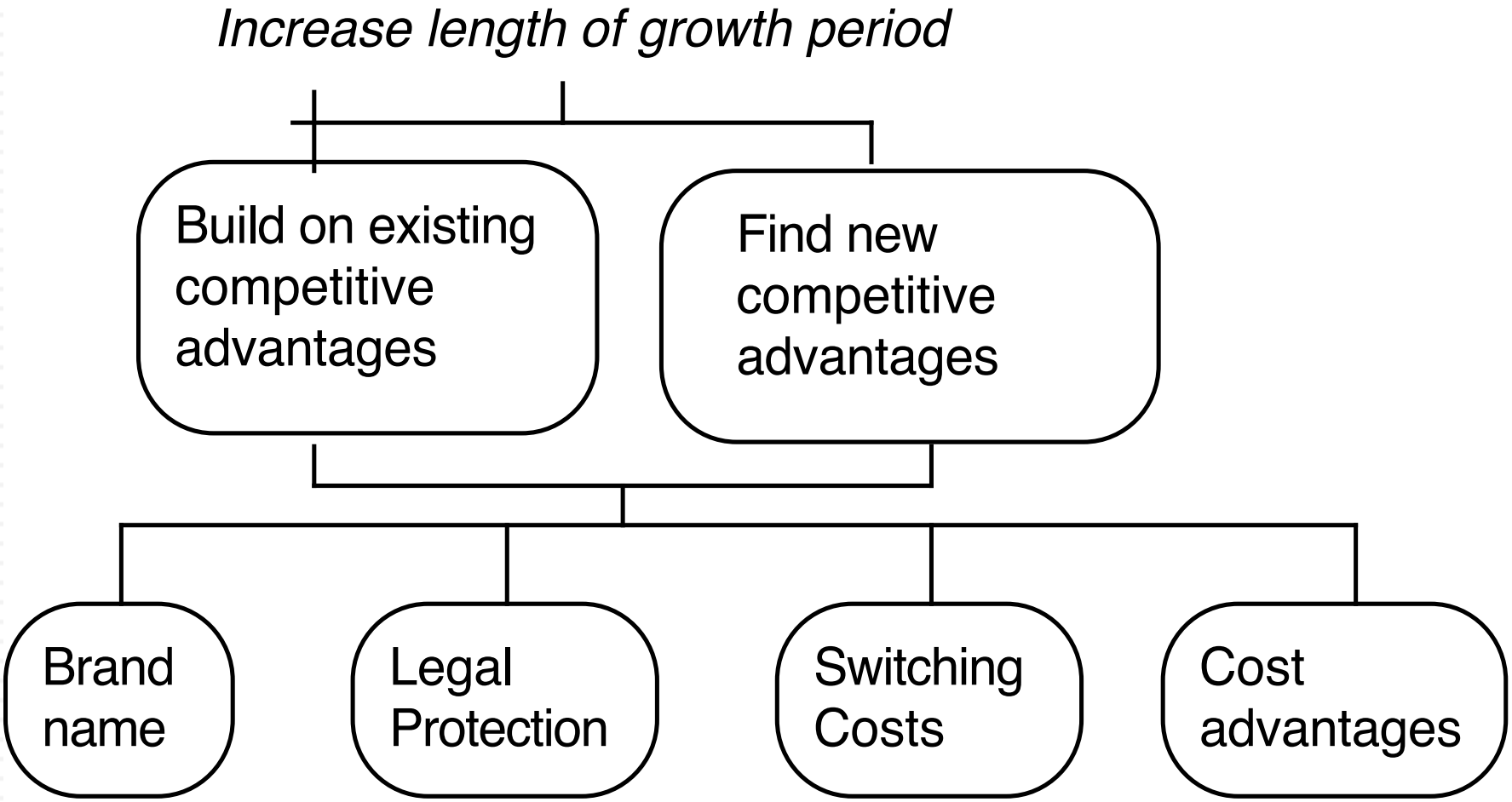
A more general problem… Growing through acquisitions has never been easy…

- Firms that grow through acquisitions have generally had far more trouble creating value than firms that grow through internal investments.
- In general, acquiring firms tend to
  - Pay too much for target firms
  - Over estimate the value of "synergy" and "control"
  - Have a difficult time delivering the promised benefits
- Worse still, there seems to be very little learning built into the process. The same mistakes are made over and over again, often by the same firms with the same advisors.
- Conclusion: There is something structurally wrong with the process for acquisitions which is feeding into the mistakes.

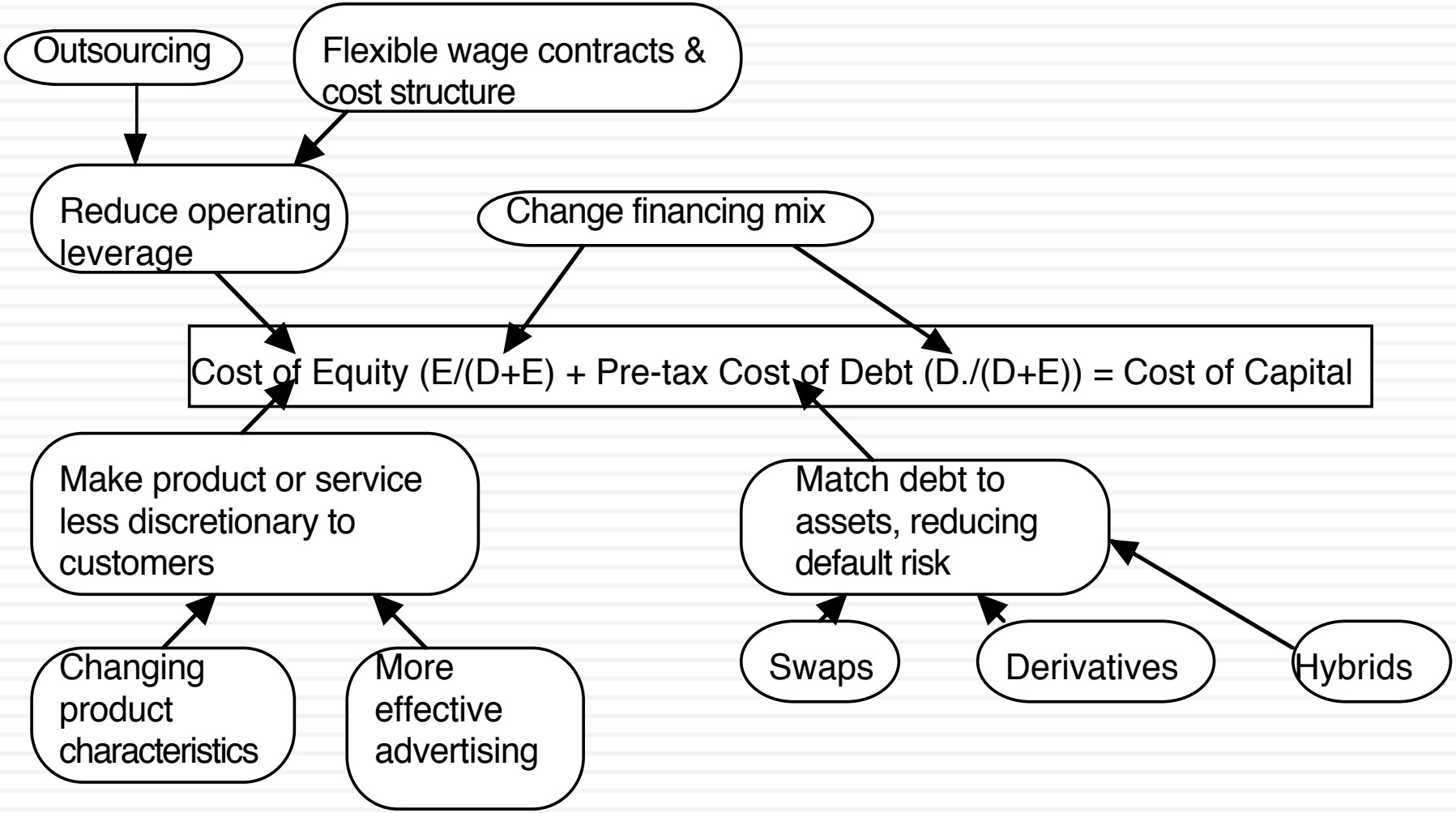
Seven reasons why acquisitions fail…

1. Risk Transference: Attributing acquiring company risk characteristics to the target firm. Just because you are a safe firm and operate in a secure market, does not mean that you can transfer these characteristics to a target firm.
2. Debt subsidies: Subsiding target firm stockholders for the strengths of the acquiring firm is providing them with a benefit they did not earn.
3. Auto-pilot Control: Adding 20% or some arbitrary number to the market price just because other people do it is a recipe for overpayment. Using silly rules such as EPS accretion just makes the problem worse.
4. Elusive Synergy: While there is much talk about synergy in mergers, it is seldom valued realistically or appropriately.
5. Its all relative: The use of transaction multiples (multiples paid by other acquirers in acquisitions) perpetuates over payment.
6. Verdict first, trial afterwards: Deciding you want to do an acquisition first and then looking for justification for the price paid does not make sense.
7. It's not my fault: Holding no one responsible for delivering results is a sure-fire way not to get results…

III. Building Competitive Advantages: Increase length of the growth period



Value Creation 4: Reduce Cost of Capital

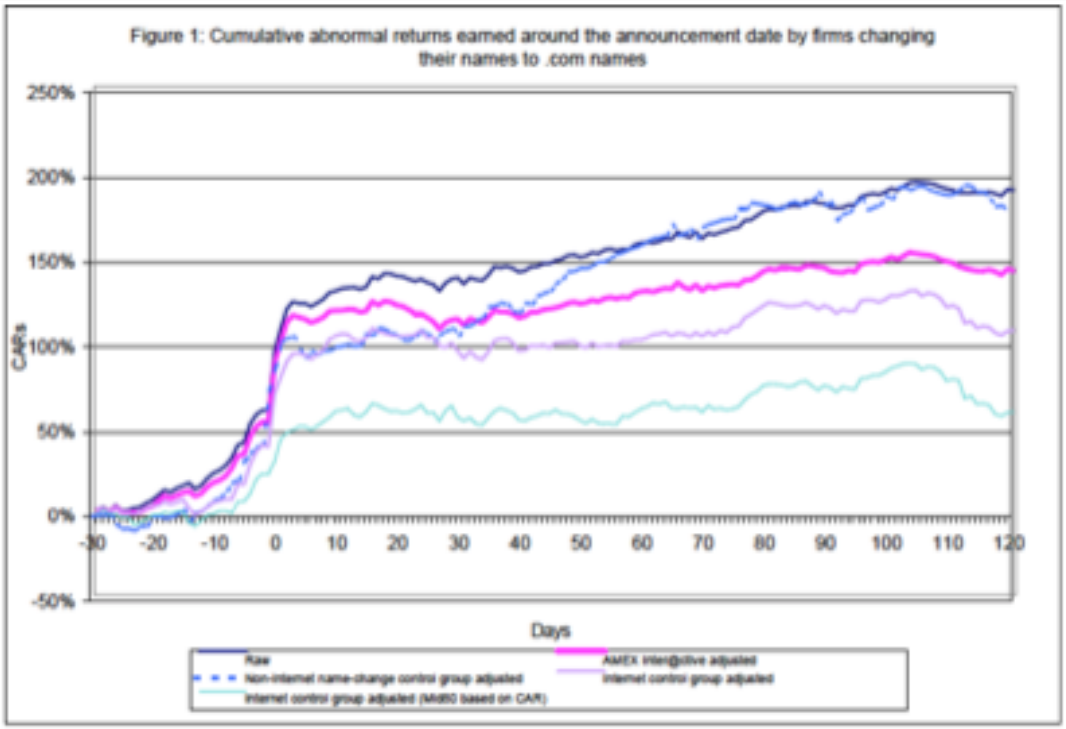


Shell: Where's the value?

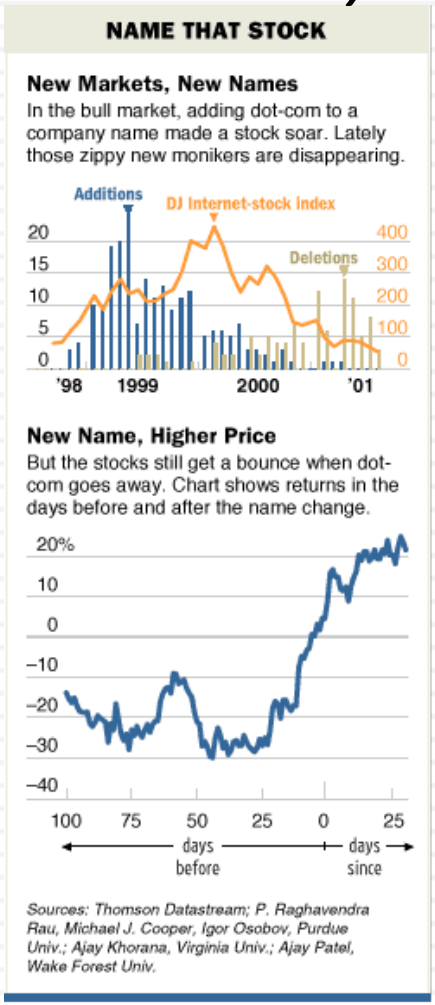
- Of the options available to increase Shell's value per share, which of the following offers the most promise?
  a) Improve efficiency, cut costs and go for higher margins.
  b) Acquire other companies (to get growth)
  c) Invest in reserves (exploration & acquisition)
  d) Financial engineering (change debt mix and type)
  e) Cash return (Dividends and stock buybacks)

You can always play the pricing game..

The market gives…



And takes away….



First Principles