Market Revelations

Lessons learned, unlearned and relearned from a crisis

Aswath Damodaran

www.damodaran.com

So, this is risk?



The fundamentals

DCF Choices: Equity versus Firm



Equity valuation: Value just the equity claim in the business by discounting cash flows to equity at the cost of equity

The Value of a business rests on..





The way we were: Pre-September 12, 2008

Treasuries were riskless... and rates were stable



Risk premiums did not change over short periods...



And only gradually over longer periods...



Last year's earnings and cash flows were a good staring point..

- <u>Base year fixation</u>: When valuing companies, the current year's financial statements represented the foundation on which most estimates were built.
- Let the good times roll: For many companies, especially in the commodities business and in emerging markets, earnings and cash flows had been trending up for so long that it seemed natural to assume that they would continue to do so.
- <u>Trust the accountants</u>: The convergence of accounting standards globally and the assumption that accountants were more sophisticated about dealing with risk led us to trust accounting statements more than we should have.

Macro variables only mattered at the margin...

- While we accepted the reality of recessions, we viewed them as bumps in the road to a bigger and better economy. In other words, recessions caused minor blips in real economic growth that would be reversed in future recoveries. And there was always China and India...
- We were even more optimistic about earnings growth. Companies could use financial leverage, stock buybacks and financial engineering tools to keep earnings growing faster than the overall economy.
- Inflation was a minor problem, because central banks had learned their lessons from the 1970s and would figure out ways to keep inflation in check.

And capital markets were open and accessible...

The assumption that capital markets are open and accessible underlies much of what we did in corporate finance and valuation. For instance, it is key to:

- <u>The costs we attach to debt and equity</u>: When we estimate the costs of debt and equity, based upon risk measures, we are assuming that firms will be able to raise funding at those costs. Thus, even if a firm does not issue bonds, we assume that banks will lend money at roughly the same rate at which the firm's bonds would have been trading.
- <u>The debt equity trade off</u>: In assessing the trade off between debt and equity, we assume that firms (at least larger ones, in developed markets) can raise capital from markets, if they need it. Consequently, we push for firms to borrow more and hold less cash.
- <u>The going concern assumption:</u> In every discounted cash flow valuation, the bulk of the value comes from the terminal value. However, to get there, firms have to survive the growth period. With young firms, this growth period often has negative cash flows which we assume will be covered by external financing.



And then came the "troubles"

Five weeks that changed the world: 9/12-10/16

We discovered stocks are risky.. And the reason for demanding an equity risk premium..



Not just the S&P 500...



Going Global with the crisis...



While treasuries started behaving in odd ways...



Treasuries: Panic and Consequence?

Short term corporate borrowing markets froze..



And corporate bond default spreads widened...



Commodities were no safe haven...



Currencies moved... with a flight to low interest rate currencies!!



Lessons for Valuation and Corporate Finance

I. The Riskfree Rate

You are valuing Embraer in US dollars. Which of the following would you use as your riskfree rate in your valuation?

- a) The rate on the 10-year US Treasury Bond (3.5%)
- b) The rate on the 10-year Nominal \$R Brazilian Government Bond (9.5%)
- c) The rate on the 10-year US dollar denominated Brazilian Government Bond (6%)
- d) The rate on the 10-year Inflation Indexed US treasury bond (1.5%)
- e) None of the above

Would your answer be different if you were valuing Embraer in nominal \$R? How about if you were valuing Embraer in real terms?

Lesson 1: Nothing is risk free?



Response 1: Getting to a Riskfree Rate



The Brazilian government had 10-year nominal \$R bonds outstanding, with a yield to maturity of about 10.25% on January 1, 2009. In January 2009, the Brazilian government had a <u>local</u> <u>currency</u> sovereign rating of Ba1. The typical default spread (over a default free rate) for Ba1 rated country bonds in early 2009 was 3%. The risk free rate in nominal \$R is

- a) The yield to maturity on the 10-year bond (10.25%)
- b) The yield to maturity on the 10-year bond + Default spread (13.25%)
- c) The yield to maturity on the 10-year bond Default spread (7.25%)
- d) None of the above

Why do riskfree rates vary in the first place?... and why does it matter?



A framework for picking the right riskfree rate...



II. The Equity Risk Premium

	Arithmetic Average		Geometric Average	
	Stocks –	Stocks –	Stocks –	Stocks –
	T. Bills	T. Bonds	T. Bills	T. Bonds
1928-2008	7.30%	5.65%	5.32%	3.88%
	(2.29%)	(2.40%)		
1959-2008	5.14%	3.33%	3.77%	2.29%
	(2.39%)	(2.63%)		
1999-2008	-2.53%	-6.26%	-4.53%	-7.96%
	(6.36%)	(8.85%)		

Historical premium

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

Analysts expect earnings to grow 4% a year for the next 5 years. We will assume that dividends & buybacks will keep pace.. Last year's cashflow (52.58) growing at 4% a year After year 5, we will assume that earnings on the index will grow at 2.21%, the same rate as the entire economy (= riskfree rate).



Lesson 2: ERPs can change even in mature markets 9/12/2008 – 12/31/2008



And even more so in emerging markets...

Country	ERP (1/1/08)	ERP (1/1/09)	
United States	4.37%	6.43%	
UK	4.20%	6.51%	
Germany	4.22%	6.49%	
Japan	3.91%	6.25%	
India	4.88%	9.21%	
China	3.98%	7.86%	
Brazil	5.45%	9.76%	

Response 2A: Update your numbers Equity Risk Premiums

For the US, in July 2009

- S&P 500 was at 884
- Dividends and Buybacks had dropped to 46.5 (about 5.26% of the index)
- Expected growth in earnings for next 5 years was at 4.5%
- The treasury bond rate was at 3.5%
- Implied equity risk premium on July 8,2009 = 6.06%
- For Brazil, in July 2009
 - Bovespa was at 50,500
 - FCFE was at about 8% of the index
 - Expected growth in earnings for next 5 years was at 7%
 - The treasury bond rate was at 3.5%
 - Implied equity risk premium on July 8,2009 = 9.69%

Response 2B: Check risk premiums for consistency...



Consequences for Cost of Capital:

Beta =1, Rating of BBB, tax rate of 40% and a 30% debt ratio

On September 12, 2008

• Riskfree rate = 4.5%

 $\blacksquare ERP = 4\%$

- Default spread (BBB)= 1.5%
- Cost of Equity = 4.5% + 4% = 8.5%
- Cost of Debt = 4% + 1.5% = 5.5%
- Cost of Capital = 8.5%(.7)+ 5.5% (1-.
 4) (.3) = 6.94%

On June 15, 2009

- **Riskfree rate = 3.5\%**
- $\blacksquare \quad \text{ERP} = 6\%$
- Default spread (BBB)= 3%
- Cost of Equity = 3.5% + 6% = 9.5%
- Cost of Debt = 3.5% + 3% = 6.5%
- Cost of Capital = 9.5% (.7) + 6.5% (1-.4) (.3) = 7.82%

The composition of the cost of capital has changed: On Sept 12, 2008: Riskfree rate was 4.5%; Risk premium was 2.44% On June 15, 2009: Riskfree rate was 3.5%; Risk premium was 4.32% What are the implications?

Implications for Corporate Finance

<u>Investment policy</u>: The higher risk premiums for both debt and equity translate into higher costs of capital for all firms. Even if we are optimistic and assume that returns on projects will revert back to what they were pre-2008, this translates into

- Fewer investments by firms, translating into lower real economic growth
- More short term investments, relative to long term investments
- Financing policy: While both the cost of equity and debt have gone up, the latter has gone up more than the former. Unless default spreads decrease, this will tilt firms towards equity.
- Dividend policy: Since firms are reluctant to issue new equity and markets are not receptive to new stock issues, companies will retain more cash and pay out less to stockholders (as dividends and in buybacks).
Implications for Investing

- <u>High Risk versus Low Risk Companies</u>: When equity risk premiums rise, higher risk companies will be affected much more adversely than lower risk companies. That does not mean, however, that investing in high risk companies is a bad strategy now, since the returns for the future will depend upon what you think will happen to equity risk premiums in the future. If you believe that equity risk premiums will decline back to pre-crisis levels, you should shift to higher risk companies.
- Growth versus Mature Companies: When equity risk premiums rise, higher growth companies will be affected more negatively, since their cash flows lie further into the future and higher discount rates will reduce the value of these cash flows much more. Again, whether it is time to switch to growth companies boils down to what you think will happen to equity risk premiums.
- Venture Capital and Private Equity: These investors invest in the riskiest companies (venture capital) or use high financial leverage. Increasing equity risk premiums will hurt them the most and decreasing equity risk premiums will help.

III: Estimating Betas: The perils of regressions...



Playing with regression parameters can change your numbers...



And cannot be trusted even when they look good...



Bottom up Betas as an alternative...

Company	Business	Unlevered beta	D/E Ratio	Weights	Levered Beta
Embraer	Aerospace	1.20	62.00%	100%	1.69
Ambev	Alcoholic beverages	0.75	19.43%	80%	0.85
	Soft Drinks	0.85	19.43%	20%	0.96
	Company	0.77	19.43%		0.87
Vale	Mining	0.98	25.66%	71%	1.15
	Aluminum	0.72	25.66%	9%	0.84
	Steel	0.63	25.66%	14%	0.74
	Transportation	0.73	25.66%	5%	0.85
	Other	0.74	25.66%	1%	0.87
	Company	0.89	25.66%	100%	1.04
Petrobras	Integrated Oil	0.60	49.58%	100%	0.79

Lesson 3A: The limits of diversification..

- Diversification has always been the mantra in investing. If you stay diversified, we have been told, your portfolio will be less risky since the correlation between asset classes is low.
- The crisis of 2008 illustrated some of the limits of diversification. In this particular crisis, all risky assets (equities, bonds, real assets) dropped in value as investors reassessed the price of risk. The correlation across asset classes increased.

Diversification Dilemma



Lesson 3B: Even sector betas can change...

Sector	2009	2008
Financial Servic	ces	
Bank	0.71	0.63
Insurance (Prop/Cas.)	0.91	0.89
Investment Co.(Foreign)	1.31	0.71
Technology		
Biotechnology	1.25	1.51
Computer Software/Svcs	1.22	1.56
Computers/Peripherals	1.29	1.86
Internet	1.41	1.97
Real Estate		
Manuf. Housing/RV	1.32	1.19
R.E.I.T.	1.35	0.90

Betas went up for financial service firms, retailers and real estate related businesses and down for technology and health care.

Lesson 3C: Differences in risk/response widen during crisis...

- The essence of risk and return models is that some stocks are riskier than others and that we have to measure relative risk with a beta or betas and incorporate that risk into expected returns.
- In periods of stability, the relationship between betas and returns is weak. It is only during tumultuous periods (up or down) that the relationship reveals itself.



Response 3: Return to basics for market betas...



Time for creative thinking on risk ...

- <u>Average across firms and across time</u>: Instead of using the sector average betas as bottom up betas, we should consider using the average across time for each sector.
- Check against fundamentals: If the beta of a firm reflects the discretionary nature of its products, the betas we estimate for a sector should be a function of the elasticity of demand for the products/services provided by that sector.
- Adjust for non-diversification: If the marginal investors in the firm are not diversified or only partially diversified, we have to incorporate that portion of the firm specific risk into the beta and cost of equity.
- Check against implied betas: We can estimated implied expected returns for equity by sector, given how the market is pricing stocks in that sector and back out betas from these expected returns. We can compare these betas to the betas that we have estimated.

IV. Macro views

If you believe that interest rates will go up (down), that exchange rates will move adversely (in your favor) and that the economy will weaken (strengthen), should you try to bring them into your individual company valuations?

- Yes
- □ No

If you do, and you conclude that a stock is overvalued (undervalued), how should I read this conclusion?



Lesson 4: Macro variables behave strangely during crisis...

Response 4: Keeping macro views out of your valuation has become more important than ever...

- <u>Selective normalization</u>: Analysts often pick and choose which variables they want to normalize. Thus, they may decide that interest are too low and use higher rates. However, the lower riskfree rate in early 2009 was the result of the market crisis (and the flight to safety), and the crisis also affected equity risk premiums and default spreads (pushing them to new highs) and economic growth (to lows). If you raise the riskfree rate but leave equity risk premiums, default spreads and real growth untouched, you are creating an inconsistent valuation.
- Macro and micro views: When the macro environment becomes unstable, there will be strong disagreements about where the economy, interest rates and exchange rates will go in the near and far future. It is therefore important to separate out your views on the macro economy from your views on a company, when you do valuation. A person looking at your valuation can then decide which of your views is reasonable and which ones are not.

Implications for corporate finance

- <u>Bigger macro effect</u>: Rather than affect performance, earnings and value at the margin, macro variables (economy, exchange rates and interest rates) will be front and center in whether companies, even in developed markets, will be profitable for the near future. Put another way, companies can do everything right (in terms of investing and financing choices) but be hurt badly by one or more macro variables.
- Need for hedging: Since macro variables can alter the dynamics of an investment quickly, making profitable investments into loss-making ones, firms should consider hedging macro risks more both to protect against default risk (especially on big investments) and to provide managers a comfort zone.
- Watch out for speculation: The fact that macro variables will play a bigger role in determining profitability than micro variables will lead some managers (especially over confident managers) to cross the line and speculate on interest rates or exchange rates. We need better risk management tools to restrain this behavior and compensation systems that do not reward bad behavior, even if it is profitable.

Implications for Investing

- <u>The Market timing payoff</u>: Since asset allocation will be a bigger determinant of investment success than stock selection, good market timing will generate huge profits. At the same time, market timing is going to be more difficult and more expensive to do, in this environment.
- <u>The Macro hedge</u>: For those of us who are not confident in our market timing abilities, this new environment increases the need for hedging against macro economic risks. Thus, if you feel that Petrobras is under valued right now, you should buy the stock but also find a hedge against oil prices moving down.

V. A year is not a trend...

Exxon Mobil

In 2009, Exxon and Petrobras reported the following

Revenues EBIT (1-t) Net Cap Ex Chg WC FCFF \$477 billion
\$58 billion
\$3 billion
\$1 billion
\$54 billion

\$R 215 billion
\$R 32 billion
\$R 41 billion
\$R 3 billion
\$R - 12 billion

Petrobras

Exxon's after-tax operating income doubled over the last 5 years

Petrobras has seen a 50% increase in after-tax operating income over the last 5 years and a surge in exploration and reinvestment.

Valuing Exxon: An experiment

- The cost of capital for Exxon is 8% and you use a very conservative stable growth rate of 2% to value the firm. The market cap for the firm is \$373 billion and it has \$10 billion in debt outstanding.
 - a. How under or over valued is the equity in the firm?

b. Would you buy the stock based on this valuation? Why or why not?

Normalization... not easy to do... but you don't have a choice...



Here is a tougher challenge: Normalize earnings for a bank... Bradesco & Itau

Consider the five-year history of Itau & Bradesco from 2004 to 2008.

	Itau			Bradesco		
		1144				
	Dividends	Net Income	Book Equity	Dividends	Net Income	Book Equity
2004	R\$ 1,380	R\$ 3,776	R\$ 12,969	R\$ 1,081	R\$ 3,060	R\$ 13,660
2005	R\$ 1,753	R\$ 5,251	R\$ 15,165	R\$ 1,943	R\$ 5,514	R\$ 15,285
2006	R\$ 1,923	R\$ 4,309	R\$ 16,683	R\$ 1,930	R\$ 5,054	R\$ 19,467
2007	R\$ 2,990	R\$ 8,474	R\$ 24,851	R\$ 2,732	R\$ 8,010	R\$ 24,694
2008	R\$ 2,836	R\$ 7,803	R\$ 31,090	R\$ 3,299	R\$ 7,620	R\$ 30,513

- 1. If you were valuing these banks today, what would you use as your base year earnings? Dividends? Return on equity?
- Historically banks have had a beta close to one, which would have given both banks a US\$ cost of equity of about 14% in 2009 (T.Bond rate =3.5%; ERP =6%; CRP=4.5%). Would you continue to use this beta in the valuation?

When uncertainty looms, keep it simple: The key valuation inputs for Bradesco & Itau

Focus on the key inputs into valuation: the ROE and the payout ratio

	Itau		Bradesco		
	ROE	Payout ratio	ROE	Payout ratio	
2004	29.12%	36.55%	22.40%	35.33%	
2005	34.63%	33.39%	36.07%	35.24%	
2006	25.83%	44.63%	25.96%	38.18%	
2007	34.10%	35.29%	32.44%	34.11%	
2008	25.10%	36.34%	24.97%	43.30%	
Average	29.39%	36.75%	28.24%	37.55%	

■ Expected growth in net income = ROE (1- Payout ratio)

Value of Equity as a function of ROE and Cost of Equity

Itau's Value of Equity

		Cost of Equity								
		14%	16%	18%	20%					
lity	12%	R\$ 37,537	R\$ 30,426	R\$ 25,375	R\$ 21,618					
eturn on Equ	16%	R\$ 60,158	R\$ 48,498	R\$ 40,221	R\$ 34,079					
	20%	R\$ 87,348	R\$ 70,157	R\$ 57,970	R\$ 48,941					
	24%	R\$ 119,697	R\$ 95,873	R\$ 78,999	R\$ 66,511					
	28%	R\$ 157,859	R\$ 126,156	R\$ 103,718	R\$ 87,124					
R	32%	R\$ 202,544	R\$ 161,560	R\$ 132,571	R\$ 111,147					

Actual Market cap=R\$126,839

Bradesco's Value of Equity

		Cost of Equity								
eturn on Equity		14%	16%	18%	20%					
	12%	R\$ 28,098	R\$ 22,862	R\$ 18,998	R\$ 16,186					
	16%	R\$ 45,043	R\$ 36,312	R\$ 30,115	R\$ 25,517					
	20%	R\$ 65,400	R\$ 52,529	R\$ 43,404	R\$ 36,644					
	24%	R\$ 89,621	R\$ 71,784	R\$ 59,149	R\$ 49,799					
	28%	R\$ 118,195	R\$ 94,457	R\$ 77,657	R\$ 65,233					
R	32%	R\$ 151,652	R\$ 120,966	R\$ 99,260	R\$ 83,219					

Actual Market cap=R\$83,577

Lesson 5: Sometimes, there is no normal..

When normalizing earnings, we have generally looked at

- Historical values: Especially as we get deeper and richer data bases, we can look at historical averages for almost every input in valuation.
- Industry averages: At the same time, as more firms get listed globally, we have industry averages for margins, returns and every other input in valuation.
- Implicit in both approaches is the assumption of me<u>an reversion</u>, i..e, that there is a historic norm for most values that we converge back to. This assumption is backed up empirically.
- Mean reversion can fail in spectacular fashion, if there is a <u>structural break</u> with the past. Holding on to the past, when the world has changed around you, is a recipe for disaster.

Pre-crisis: I was a firm believer in mean reversion in mature markets.

Post-crisis: I still believe in mean reversion, but I am more willing to consider the possibility of structural breaks.

Implications for corporate finance: Probabilistic analysis

When analyzing new investments and projects, we generally estimate expected earnings and cash flows over the project life and adjust for risk in the discount rate. While there is no reason to abandon this approach, as uncertainty increases, the need for probabilistic analysis also increases. There are three choices:

- Scenario Analysis: Examine how an investment/project will do under different scenarios. In its simplest form, this can be a best/worst case. In its more complete forms, the value of an investment can be examined under likely scenarios.
- Decision trees: For investments that unfold through a sequence of risks, decision trees list out the possibilities at each branch and the probabilities/outcomes.
- Simulations: Probability distributions are attached to inputs and expected value is computed.

Discrete/Continuous	Correlated/Independent	Sequential/Concurrent	Risk
			Approach
Discrete	Independent	Sequential	Decision
			Tree
Discrete	Correlated	Concurrent	Scenario
			Analysis
Continuous	Either	Either	Simulations

Implications for investing: Use more information...



Step 3: Run simulation



Step 2: Look for relationship Regression of Exxon income against oil price Op Inc = -6,934 + 911 (Price per barrel of oil) R squared = 94%

VI. With globalization of revenues... globalization of risk

- <u>Risk comes from your operations, not your country of incorporation</u>: A firm that is headquartered and traded on a developed market can be exposed to significant amounts of emerging market risk. When estimating its cost of capital, we should be adjusting for this additional risk. Conversely, a firm that is headquartered in an emerging market may get the bulk of its revenues in developed markets, and be less exposed to that country's risk.
- To get the cost of capital right, we should
 - Estimate additional risk premiums for each region of the world that a company has operations in (country risk premium)
 - Estimate how exposed the company to risk in each region (lambda)

Three measures of country risk...

Default spread: On January 1, 2009, Brazil's rating was Ba1 but the interest rate on the Brazilian \$ denominated bond was 5.2%, 3% higher than the US treasury bond rate of 2.2% on that day.

Relative equity market volatility:

- Standard Deviation in Bovespa (Equity) = 40%
- Standard Deviation in S&P 500= 25%
- ERP for S&P 500 = 6%
- ERP for Brazil = 6% (40/25) = 9.6%
- Country risk premium for Brazil = 9.6% 6% = 3.6%

Equity to bond market volatility:

- Standard Deviation in Bovespa (Equity) = 40%
- Standard Deviation in Brazil \$-Bond = 26.67%
- Default spread on Brazil -Bond = 3%
- Country Risk Premium for Brazil = 3% (40/26.67) = 4.50%

		Austria	0.00%	Albania	9.75%		
		Belgium	1.05%	Armenia	6.00%		
		Cyprus	1.80%	Azerbaijan	4.50%		
		Denmark	0.00%	Belarus	9.75%		
		Finland	, 0.00%	Bosnia and Herzegovina	11.25%	Cambodia	11.25%
		France	0.00%	Bulgaria	3.90%	China	2.10%
		Germany	0.00%	Croatia	3.38%	Fiji Islands	6.00%
		Greece	2.10%	Czech Republic	2.10%	Hong Kong	1.50%
~~~		Iceland	3.00%	Estonia	2.10%	India	6.00%
2	2	Ireland 💋	0.00%	Hungary	2.63%	Indonesia	7.88%
)	5 M	Italy	1.50%	Kazakhstan	3.00%	Japan	1.80%
M	$\langle \rangle$	Malta	2.10%	Latvia	2.63%	Korea	2.40%
	T	Netherlands	0.00%	Lithuania	2.40%	Macao	1.80%
	•	Norway	0.00%	Moldova	18.00%	Malaysia	2.63%
	-	Portugal	1.50%	Montenegro	6.00%	Mongolia	9.75%
Mexico	3.00%	Spain	0.00%	Poland	2.40%	Pakistan	13.50%
Canada	0.00%	Sweden	0.00%	Romania 💊 🔶	3.90%	Papua New Guinea	9.75%
United States of Ame	erica 0.00%	Switzerland	0.00%	Russia	3.00%	Philippines	9.75%
1)		United Kingdom	0.00%	Slovakia	2.10%	Singapore	0.00%
	Ch	2		Slovenia [1]	1.50%	Taiwan	1.80%
Argentina	13.50%	Botewana	2 10%	Turkmenistan	11.25%	Thailand	3.00%
Belize	18.00%	Dotswalla	4.500	Ukraine	9.75%	lurkey	7.88%
Bolivia	13.50%	Egypt	4.50%		43	Vietnam	7.88%
Brazil	4.50%	Mauritius	3.38%	D-1		500	
Chile	2.10%	Morocco	4.50%	Banrain 2.40%		~ ~(	
Colombia	3.90%	South Africa	2.40%	Israel 2.10%	~		
Costa Rica	4.50%	Tunisia	3.38%	Jordan 3.90%	(	)	
Ecuador	3.90%			Kuwait 1.50%	Aust	ratia 🔨 🍨 🖉 0.04	0%
El Salvador	3.38%	•		Lebanon 13.50%	New	Zealand 0.0	<b>9</b> %
Guatemala	4.50%	2		Oman 240%		0	
Honduras	11.25%	1 2		$\begin{array}{c c} \text{Ontail} & 2.40\% \\ \text{Octor} & 1.50\% \\ \end{array}$			
Nicaragua	13.50%	12		Qatar 1.50%			
Panama	4.50%	4		Saudi Arabia 2.10%			
Paraguay	13.50%			United Arab			
Peru	3.90%			Emirates 1.50%			
Uruguay	9.75%						_
Venezuela	9.75%			$C_{c}$	nintrv	' Risk Pror	niımc

Aswath Damodaran

Country Risk Premiums January 2009 63

### Lesson 6A: Country risk can change in a hurry...



#### Response 6: Think about country risk seriously...

- <u>Source of revenues</u>: Other things remaining equal, a company should be more exposed to risk in a country if it generates more of its revenues from that country. A Brazilian firm that generates the bulk of its revenues in Brazil should be more exposed to country risk than one that generates a smaller percent of its business within Brazil.
- Manufacturing facilities: Other things remaining equal, a firm that has all of its production facilities in Brazil should be more exposed to country risk than one which has production facilities spread over multiple countries. The problem will be accented for companies that cannot move their production facilities (mining and petroleum companies, for instance).
- Use of risk management products: Companies can use both options/futures markets and insurance to hedge some or a significant portion of country risk.

## A simplistic measure of country risk exposure...

- The easiest and most accessible data is on revenues. Most companies break their revenues down by region. One simplistic solution would be to do the following:
  - $\lambda = \%$  of revenues domestically_{firm}/ % of revenues domestically_{avg firm}
- Consider, for instance, Embraer and Embratel, both of which are incorporated and traded in Brazil. Embraer gets 3% of its revenues from Brazil whereas Embratel gets almost all of its revenues in Brazil. The average Brazilian company gets about 77% of its revenues in Brazil:
  - Lambda_{Embraer} = 3%/77% = .04
  - Lambda_{Embratel} = 100%/77% = 1.30
- There are two implications
  - A company's risk exposure is determined by where it does business and not by where it is located
  - Firms might be able to actively manage their country risk exposures

#### And a slightly more sophisticated one...

Return_{Embraer} = 0.0195 + 0.2681 Return_{C Bond} Return_{Embratel} = -0.0308 + 2.0030 Return_{C Bond} Return_{Ambev} = 0.0290+ 0.4136 Return_{C Bond} Return_{Vale} = 0.02169 + 0.3760.Return_{C Bond}

Return_{Petrobras}= -0.0308 + **0.6600** Return_{C Bond}



### Implications for corporate finance..

- <u>Incorporate country risk into cost of capital</u>: Adjust the cost of capital of an investment (project) to reflect the exposure to country risk in that project; this can exposure can come both from revenues in other countries and having manufacturing facilities in those countries.
- <u>Financing choices</u>: Use your financing choices to reduce your exposure to country risk, by matching up financing to projects.

#### Implications for investing...

- The conventional practice in valuation is to add the country equity risk premium on to the cost of equity for every emerging market company, notwithstanding its exposure to emerging market risk. Thus, Embraer would have been given a high cost of equity, because it is a Brazilian company, and Coca Cola would have a low cost of equity, because it is a US company. If the argument that a company's risk should be based on its operations and not on incorporation is correct, the former will be be under valued and the latter over valued.
- During market crises, investors often do not discriminate. Consequently, companies like Embraer in Brazil and Infosys in India will be punished too much, when these markets decline. One long term strategy would be to
  - Buy emerging market companies with significant developed market exposure
  - Sell developed market companies with significant emerging market exposure



#### VII. Growth and Value

	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5
Reinvestment Rate	20.00%	100.00%	200.00%	20.00%	0.00%
ROIC on new investment	50.00%	10.00%	5.00%	10.00%	10.00%
ROIC on existing investments before	10.00%	10.00%	10.00%	10.00%	10.00%
ROIC on existing investments after	10.00%	10.00%	10.00%	10.80%	11.00%
Expected growth rate	10.00%	10.00%	10.00%	10.00%	10.00%

Expected growth = Growth from new investments + Efficiency growth

= Reinv Rate * ROC +  $(ROC_t - ROC_{t-1})/ROC_{t-1}$ 

Assume that your cost of capital is 10%. As an investor, rank these firms in the order of most value growth to least value growth.

#### Lesson 7: Growth destroys value more often than we think..

- For growth to create value, the new investments that generate that growth have to earn a return on capital > cost of capital. While this is easy to show, it is tough to measure in practice, since
  - Our estimates of cost of capital are backward-looking, and even if done right, reflect the past risk profile of the company. If a firm grows by sequentially entering riskier and riskier businesses, we will give it higher values as it grows, but the risk will eventually catch up.
  - Our estimates of return on capital are based upon the operating income reported in a specific year and the accounting capital invested. Both numbers reflect both accounting choices and short term profitability, rather than long term returns.
- In effect, we may be rewarding many companies for growth when we should be punishing them.
### Backed up by some evidence...



### Response 7: Spend some time getting return on capital right!!



## Implication for corporate finance: Not all growth is created equal...



### Implication for investing

- <u>Control for growth quality</u>: Rather than assume that higher growth is always a positive, we need to be more questioning about the quality of growth and ask the following questions:
  - How much is being reinvested to create the growth?
  - What is the return on investment on new investments?
  - Where are the new investments being made?
- Watch out for deteriorating returns on capital: Rather than just focus on overall returns on capital, we should be focusing on marginal returns on new or additional investments.
- Check the qualitative variables: A good company is one that not only generates good numbers (high earnings and returns on capital) but has strong and sustainable competitive advantages and a management team dedicated to augmenting these advantages.

## 8: The Debt Equity Trade off

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

### The cost of capital trade off



### The conventional cost of capital approach: Disney in May 2009

Debt Patio	Beta	Cost of Equity	Bond Dating	Interact rate on debt	Tox Doto	Cost of Debt (ofter tox)	Cost of capital	Firm Value (G)
Debt Katlo	Deta	Cost of Equity	Dolid Katilig	interest fate on debt	Tax Kate	Cost of Debt (after-tax)	Cost of Capital	
0%	0.73	7.90%	AAA	4.75%	38.00%	2.95%	7.90%	\$58,499.82
10%	0.78	8.20%	AAA	4.75%	38.00%	2.95%	7.68%	\$60,373.92
20%	0.85	8.58%	AAA	4.75%	38.00%	2.95%	7.45%	\$62,371.16
30%	0.93	9.07%	AA	5.25%	38.00%	3.26%	7.32%	\$63,595.96
40%	1.04	9.72%	А	6.00%	38.00%	3.72%	7.32%	\$63,650.81
50%	1.19	10.63%	A-	6.50%	38.00%	4.03%	7.33%	\$63,556.35
60%	1.42	11.99%	BBB	7.00%	38.00%	4.34%	7.40%	\$62,873.20
70%	1.79	14.26%	B-	12.00%	38.00%	7.44%	9.49%	\$47,883.80
80%	2.55	18.81%	CCC	13.50%	38.00%	8.37%	10.46%	\$43,090.17
90%	5.05	33.83%	CCC	13.50%	34.52%	8.84%	11.34%	\$39,497.05

Disney's actual debt ratio was 27% and its firm value was about \$ 60 billion. The optimal debt ratio, based upon minimizing the cost of capital, is 40%.

### Applied to Vale in July 2009

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	0.81	8.35%	AAA	7.75%	34.00%	5.12%	8.35%	R\$ 149,857
10%	0.87	8.71%	AAA	7.75%	34.00%	5.12%	8.35%	R\$ 149,969
20%	0.94	9.15%	AAA	7.75%	34.00%	5.12%	8.35%	R\$ 150,082
30%	1.04	9.73%	А	9.00%	34.00%	5.94%	8.59%	R\$ 142,638
40%	1.16	10.49%	A-	9.50%	34.00%	6.27%	8.80%	R\$ 136,753
50%	1.34	11.56%	BBB	10.00%	34.00%	6.60%	9.08%	R\$ 129,702
60%	1.61	13.16%	B+	12.50%	34.00%	8.25%	10.21%	R\$ 106,886
70%	2.05	15.83%	B-	15.00%	34.00%	9.90%	11.68%	R\$ 86,799
80%	2.94	21.17%	CCC	16.50%	34.00%	10.89%	12.95%	R\$ 74,451
90%	5.62	37.20%	CCC	16.50%	33.98%	10.89%	13.52%	R\$ 69,849

At it's existing debt ratio of 30%, Vale is slightly over levered, since it does have an optimal debt ratio of 20%.

# Lesson 8A: Debt ratios and costs of capital can shift, even if dollar debt does not...

		Jan	-08	Jan	-09
	Change in debt				
Industry Name	ratio	MV Debt Ratio	BV Debt Ratio	MV Debt Ratio	BV Debt Ratio
Market	12.72%	20.07%	47.62%	32.80%	48.31%
Coal	20.07%	12.37%	50.23%	32.44%	51.26%
Manuf. Housing/RV	20.92%	12.47%	24.53%	33.39%	25.44%
Trucking	23.12%	32.79%	47.75%	55.91%	61.76%
Steel (Integrated)	23.48%	15.90%	32.67%	39.38%	32.34%
Paper/Forest Products	25.15%	29.00%	44.26%	54.15%	44.17%
Advertising	26.84%	28.97%	55.45%	55.81%	56.97%
Securities Brokerage	27.03%	55.19%	85.64%	82.22%	88.14%
Property Management	27.31%	46.57%	74.55%	73.88%	74.90%
Building Materials	28.00%	22.77%	43.70%	50.76%	46.57%
Maritime	31.36%	33.64%	55.32%	65.00%	60.90%
Publishing	32.32%	25.51%	84.10%	57.83%	98.13%
Hotel/Gaming	32.57%	26.21%	60.84%	58.78%	62.52%
Utility (Foreign)	35.58%	3.00%	18.93%	38.58%	36.70%
Power	41.22%	10.68%	76.06%	51.90%	69.10%

## Lesson 8B: The costs of distress can be higher than we thought!!

- Difficulty in accessing capital markets: By assuming that capital markets are always open and always accessible, we under estimate the cost of distress. In effect, we assume that if a firm (especially a large one in a developed market) has a cash flow problem, it can access the equity and bond markets and raise fresh funding to keep going. The crisis of 2008 illustrated that capital markets can shut down even for large companies in developed markets.
- Bank crises: We assume that banking authorities and regulatory capital ratios have made bank runs a thing of the past. While banks may become tighter in granting credit in bad times, they are assumed to be willing to lend to companies with good credit standing. The huge losses incurred on sub-prime mortgages and other securities devastated the capital at banks and imperiled this assumption as well.

### Response 8A: Build in the costs of distress into the trade off... Disney modified..

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	0.73	7.90%	AAA	4.75%	38.00%	2.95%	7.90%	\$58,522
10%	0.78	8.20%	AAA	4.75%	38.00%	2.95%	7.68%	\$60,384
20%	0.85	8.58%	AAA	4.75%	38.00%	2.95%	7.45%	\$62,368
30%	0.93	9.07%	A+	5.75%	38.00%	3.57%	7.42%	\$62,707
40%	1.04	9.72%	CCC	13.50%	38.00%	8.37%	9.18%	\$24,987
50%	1.30	11.29%	С	18.50%	22.97%	14.25%	12.77%	\$17,569
60%	1.62	13.24%	С	18.50%	19.15%	14.96%	14.27%	\$15,630
70%	2.16	16.48%	С	18.50%	16.41%	15.46%	15.77%	\$14,077
80%	3.25	22.97%	С	18.50%	14.36%	15.84%	17.27%	\$12,804
90%	6.49	42.44%	С	18.50%	12.76%	16.14%	18.77%	\$11,743

### Operating income is a function of rating

Rating	Coverage gt	and lt	Spread	Drop in EBITDA
AAA	8.5	100000	1.25%	0.00%
AA	6.5	8.499999	1.75%	0.00%
A+	5.5	6.499999	2.25%	0.00%
А	4.25	5.499999	2.50%	0.00%
A-	3	4.249999	3.00%	-2.00%
BBB	2.5	2.999999	3.50%	-10.00%
BB	2	2.2499999	5.00%	-20.00%
B+	1.75	1.999999	6.00%	-20.00%
В	1.5	1.749999	7.25%	-20.00%
B-	1.25	1.499999	8.50%	-25.00%
CCC	0.8	1.249999	10.00%	-40.00%
CC	0.65	0.799999	12.00%	-40.00%
С	0.2	0.649999	15.00%	-40.00%
D	-100000	0.199999	20.00%	-50.00%

### Response 8B: Allow costs of capital to change over time... An Example with Las Vegas Sands

-					
Year	Beta	Cost of equity	Pre-tax Cost of debt	Debt Ratio	Cost of capital
1	3.14	21.82%	9.00%	73.50%	9.88%
2	3.14	21.82%	9.00%	73.50%	9.88%
3	3.14	21.82%	9.00%	73.50%	9.88%
4	3.14	21.82%	9.00%	73.50%	9.88%
5	3.14	21.82%	9.00%	73.50%	9.88%
6	2.75	19.50%	8.70%	68.80%	9.79%
7	2.36	17.17%	8.40%	64.10%	9.50%
8	1.97	14.85%	8.10%	59.40%	9.01%
9	1.59	12.52%	7.80%	54.70%	8.32%
10	1.20	10.20%	7.50%	50.00%	7.43%

### Implications for corporate finance

- <u>Less debt in the optimal financing mix</u>: If we hold all else constant and increase bankruptcy costs (to reflect higher distress costs) and agency costs (as lenders worry about oversight), debt becomes a less attractive option, relative to equity. That should reduce optimal debt ratios across the board.
- <u>Dynamic (as opposed to static) optimization</u>: The dramatic changes in equity risk premiums, default spreads and bankruptcy costs over a few months illustrates the dangers of the static target ratio approach, where firms set a target debt ratio (whether rationally or not) and stick with it for decades.
- The herd can be wrong: Staying close to the industry average or the leader of the sector can be dangerous.

### Implications for investing

<u>Control for financial leverage</u>: When comparing companies, adjust for differences in debt ratios across companies. In effect, a company that looks cheap on a PE ratio or EV/EBITDA basis may be over levered.

### XI: The Terminal Value

- The best way to compute terminal value is to
- Use a stable growth model and assume cash flows grow at a fixed rate forever
- Use a multiple of EBITDA or revenues in the terminal year
- Use the estimated liquidation value of the assets

You have been asked to value a business. The business expects to \$ 120 million in after-tax earnings (and cash flow) next year and to continue generating these earnings in perpetuity. The firm is all equity funded and the cost of equity is 10%; the riskfree rate is 3% and the ERP is 7%. What is the value of the business?

### 9.1: Limits to stable growth..

Assume now that you were told that the firm can grow <u>earnings</u> at 2% a year forever. Estimate the value of the business.

Now what if you were told that the firm can grow its earnings at 4% a year forever?

■ What if the growth rate were 6% a year forever?

### 9.2: And reinvestment to go with growth...

- To grow, a company has to reinvest. How much it will have to reinvest depends in large part on how fast it wants to grow and what type of return it expects to earn on the reinvestment.
  - Reinvestment rate = Growth Rate/ Return on Capital

Assume in the previous example that you were told that the return on capital was 10%. Estimate the reinvestment rate and the value of the business (with a 2% growth rate).

What about with a 3% growth rate?

### 9.3: And you make it to Nirvana...

- Traditional valuation techniques are built on the assumption of a going concern, I.e., a firm that has continuing operations and there is no significant threat to these operations.
  - In discounted cashflow valuation, this going concern assumption finds its place most prominently in the terminal value calculation, which usually is based upon an infinite life and ever-growing cashflows.
  - In relative valuation, this going concern assumption often shows up implicitly because a firm is valued based upon how other firms most of which are healthy are priced by the market today.
- When there is a significant likelihood that a firm will not survive the immediate future (next few years), traditional valuation models may yield an over-optimistic estimate of value.

### Lesson 9: We under estimate truncation risk..

- Our assumptions of perpetual life and terminal value are based upon two premises:
  - The consequences of getting into financial trouble are short term and easily reversed.
  - Capital markets are always open and accessible. A company that needs to raise equity to cover negative cash flows or repay debt can always do so, albeit at a higher cost.
- Lesson 1: Indirect bankruptcy costs are much higher than we thought. In other words, the perception that you are in trouble can be almost as damaging as being in trouble, especially in businesses that are dependent upon intangible assets.
- Lesson 2: Capital markets can shut down, even in developed markets and even for the largest companies.



### Response 9: Adjust value for truncation risk

In February 2009, LVS was rated B+ by S&P. Historically, <u>28.25% of B+</u> <u>rated bonds default</u> within 10 years. LVS has a 6.375% bond, maturing in February 2015 (7 years), trading at \$529. If we discount the expected cash flows on the bond at the riskfree rate, we can back out the probability of distress from the bond price:

$$529 = \sum_{t=1}^{t=7} \frac{63.75(1 - p_{\text{Distress}})^{t}}{(1.03)^{t}} + \frac{1000(1 - p_{\text{Distress}})^{7}}{(1.03)^{7}}$$

Solving for the probability of bankruptcy, we get:

 $\pi_{\text{Distress}}$  = Annual probability of default = 13.54%

- Cumulative probability of surviving 10 years =  $(1 .1354)^{10} = 23.34\%$
- Cumulative probability of distress over 10 years = 1 .2334 = .7666 or 76.66%
- If LVS is becomes distressed:
  - Expected distress sale proceeds = \$2,769 million < Face value of debt
  - Expected equity value/share = \$0.00
- Expected value per share = \$8.12(1 .7666) + \$0.00(.7666) = \$1.92

### X. What is your share worth?

Assume that you are valuing Gazprom, the Russian oil company and have estimated a value of US \$180 billion for the operating assets. The firm has \$30 billion in debt outstanding. What is the value of equity in the firm?

- Now assume that the firm has 15 billion shares outstanding. Estimate the value of equity per share.
- The Russian government owns 42% of the outstanding shares. Would that change your estimate of value of equity per share?

### Lesson 10: Governments and regulators can affect value..

- In most developed market valuations, there is little explicit consideration for how governments and politics affect value. In fact, the only effect on value that governments have on value is through tax policy, primarily through tax rates.
- In this crisis, we have been reminded that governments can influence equity value in many ways...
  - <u>Bailouts</u>: By determining who is "too large to fail" and who is not, governments can determine the destiniex of even large enterprises.
  - <u>Nationalizations</u>: We used to think of the fear of nationalization as restricted to tinpot dictatorships in small emerging markets. No more!
  - <u>Regulations and rules</u>: We think of rules and regulations as clearly defined boundaries and constraints. We forget that rules are written and enforced by human beings, and they can be changed by those same humans.
- Implication: When valuing companies, especially regulated businesses, we have to consider the effects of not only existing regulations, but changes in those regulations.

## Response 10: Incorporate the "Heavy Hand" into Equity Value per Share



anything about it as a stockholder?

<u>The Government put</u>: The government will not let a company that it owns go under, offering bailouts and other measures to save the firm. This will increase the value of the firm.

<u>The Government call</u>: If the firm becomes too valuable, the government may decide to expropriate the firm at favorable prices (nationalization).

### Adjusting the value of equity for nationalization risk...

- Assume that you have valued equity in a Venezuelan company at \$ 100 million and that there are 10 million shares outstanding. What is the value of equity per share?
- Now assume that there is a 20% chance that the company will be nationalized and that you will receive the book value per share (which is approximately \$ 2 per share) if this happens. Estimate the value of equity per share.

### XI. From firm value to equity value: The Garnishing Effect...

For a firm with consolidated financial statements, you have discounted free cashflows to the firm at the cost of capital to arrive at a firm value of \$ 100 million. The firm has

- A cash balance of \$ 15 million
- Debt outstanding of \$ 20 million
- A 5% holding in another company: the book value of this holding is \$ 5 million. (Market value of equity in this company is \$ 200 million)
- Minority interests of \$ 10 million on the balance sheet
- What is the value of equity in this firm?
- How would your answer change if you knew that the firm was the target of a lawsuit it is likely to win but where the potential payout could be \$ 100 million if it loses?

### 11.1: Dealing with cash

- The cash is invested in treasury bills, earning 3% a year. The cost of capital for the firm is 8% and its return on capital is 10%. An argument has been made that cash is a sub-optimal investment for the firm and should be discounted. Do you agree?
- Yes
- □ No

- If yes, what are the logical implications of firms paying dividends or buying back stock?
- If no, are there circumstances under which you would discount cash?
- Are there circumstances under which you would attach a premium to cash?

### 11.2: Valuing Cross Holdings

- In a perfect world, we would strip the parent company from its subsidiaries and value each one separately. The value of the combined firm will be
  - Value of parent company + Proportion of value of each subsidiary
- To do this right, you will need to be provided detailed information on each subsidiary to estimated cash flows and discount rates.
- With limited on unreliable information, you can try one of these approximations:
  - <u>The market value solution</u>: When the subsidiaries are publicly traded, you could use their traded market capitalizations to estimate the values of the cross holdings. You do risk carrying into your valuation any mistakes that the market may be making in valuation.
  - <u>The relative value solution</u>: When there are too many cross holdings to value separately or when there is insufficient information provided on cross holdings, you can convert the book values of holdings that you have on the balance sheet (for both minority holdings and minority interests in majority holdings) by using the average price to book value ratio of the sector in which the subsidiaries operate.

### 11.3: The missed liabilities

- When going from the value of the firm to the value of equity, we usually subtract out the debt of the firm. Since equity investors have a residual claim on the firm, after all other claim holders have been paid, this is our last chance to deal with claims on the firm.
- While almost all analysts bring in long-term interest bearing debt into their analysis, the claims that get missed most often include:
  - Short term interest bearing debt (often shown in current liabilities)
  - Lease and rental commitments
  - Underfunded pension obligations
  - Potential claims from lawsuits

### Lesson 11A: Cash (Liquidity)



### Lesson 11B: It is what you don't see that trips you up..

- When valuing companies, we base our forecasts and estimates on information provided by the company. To the extent that this information is held back, skewed or misleading, our estimates of value will be wrong as well.
- *Implication 1: Trust, but verify*: While there is no perfect fraud detection system, we can look for internal inconsistencies in the reporting:
  - Accrual earnings that consistently runs ahead of cash earnings
  - Volatile effective tax rates
  - Frequent "one time" charges and income
  - Income that is not compatible with the asset base
- Implication 2: When there is no information, do not give management the benefit of the doubt: If we make assumptions, when faced with missing information, that increase value, we encourage firms to hold back more.
- *Implication 3: Punish complexity*. We should be consider these firms to be riskier (and therefore less valuable) than simpler firms.

### Measuring Complexity: Volume of Data in Financial Statements

Company	Number of pages in last $10Q$	Number of pages in last 10K
General Electric	65	410
Microsoft	63	218
Wal-mart	38	244
Exxon Mobil	86	332
Pfizer	171	460
Citigroup	252	1026
Intel	69	215
AIG	164	720
Johnson & Johnson	63	218
IBM	85	353

### Measuring Complexity: A Complexity Score

Item	Factors	Follow-up Question	Answer	Weighting factor	Gerdau Score	GE Score
Operating Income	1. Multiple Businesses	Number of businesses (with more than 10% of revenues) =	1	2.00	2	30
	2. One-time income and expenses	Percent of operating income =	10%	10.00	1	0.8
	3. Income from unspecified sources	Percent of operating income =	0%	10.00	0	1.2
	4. Items in income statement that are	· · · · · · · · · · · · · · · · ·				
	volatile	Percent of operating income =	15%	5.00	0.75	1
Tax Rate	1. Income from multiple locales	Percent of revenues from non-domestic locales =	70%	3.00	2.1	1.8
	2. Different tax and reporting books	Yes or No	No	Yes=3	0	3
	3. Headquarters in tax havens	Yes or No	No	Yes=3	0	0
	4. Volatile effective tax rate	Yes or No	Yes	Yes=2	2	0
Capital	1. Volatile capital expenditures	Yes or No	Yes	Yes=2	2	2
Expenditures	2. Frequent and large acquisitions	Yes or No	Yes	Yes=4	4	4
	3. Stock payment for acquisitions and					
	investments	Yes or No	No	Yes=4	0	4
Working capital	1. Unspecified current assets and					
	current liabilities	Yes or No	No	Yes=3	0	0
	2. Volatile working capital items	Yes or No	Yes	Yes=2	2	2
Expected Growth	1. Off-balance sheet assets and					
rate	liabilities (operating leases and R&D)	Yes or No	No	Yes=3	0	3
	2. Substantial stock buybacks	Yes or No	No	Yes=3	0	3
	3. Changing return on capital over time	Is your return on capital volatile?	Yes	Yes=5	5	5
	4. Unsustainably high return	Is your firm's ROC much higher than industry average?	No	Yes=5	0	0
Cost of capital	1. Multiple businesses	Number of businesses (more than 10% of revenues) =	1	1.00	1	20
	2. Operations in emerging markets	Percent of revenues=	50%	5.00	2.5	2.5
	3. Is the debt market traded?	Yes or No	No	No=2	2	0
	4. Does the company have a rating?	Yes or No	Yes	No=2	0	0
	5. Does the company have off-balance					
	sheet debt?	Yes or No	No	Yes=5	0	5
No-operating assets	Minority holdings as percent of book					
	assets	Minority holdings as percent of book assets	0%	20.00	0	0.8
Firm to Equity value	Consolidation of subsidiaries	Minority interest as percent of book value of equity	63%	20.00	12.6	1.2
Per share value	Shares with different voting rights	Does the firm have shares with different voting rights?	Yes	Yes = 10	10	0
	Equity options outstanding	Options outstanding as percent of shares	0%	10.00	0	0.25
		Complexity Score =			48.95	90.55

### Response 11: Deal with complexity

#### In Discounted Cashflow Valuation

- The Aggressive Analyst: Trust the firm to tell the truth and value the firm based upon the firm's statements about their value.
- The Conservative Analyst: Don't value what you cannot see.
  - The Compromise: Adjust the value for complexity
    - Adjust cash flows for complexity
    - Adjust the discount rate for complexity
    - Adjust the expected growth rate/ length of growth period
    - Value the firm and then discount value for complexity

#### In relative valuation

In a relative valuation, you may be able to assess the price that the market is charging for complexity: With the hundred largest market cap firms, for instance:

PBV = 0.65 + 15.31 ROE - 0.55 Beta + 3.04 Expected growth rate - 0.003 # Pages in 10K

## XII. Valuation Mistakes... Who makes them and why?

	1077	(\$ m	illions exc	ept for pe	er share a	ind ratio	data)						
	Unadjusted	Adjustments	Adjusted	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
come statement												*1 0#2 0	1 020 24
Sales	\$717.6			\$790.1	\$885.9 \$	1,005.2 \$	70.6	\$1,265.5 i	03.2	102.5	112.7	124.0	136.4
Net income (before adjustments)	38.4			45.1	7.8	8.5	9.2	9.8	10.7	11.7	12.8	14.0	15.4
Goodwill adjustment ^a	0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plant write-up adjustment4	0			2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Net income (after adjustments)	\$38.4			\$31.8	\$38.1	\$ 46.8	\$ 56.6	\$ 70.1	\$ 77.7	\$ 86.0	\$ 95.1	\$ 105.2	\$ 116.2
alance sheet													
wer 11 1 1	0.0015	1 + 37.0	\$105 P	\$202.0	\$223.0	\$248.1	\$274.2	\$302.8	\$329.3	\$358.6	\$390.7	\$426.1	\$465.0
Working capital	\$198.8	+ 100.0	\$193.8	\$202.9	\$223.0	\$240.1	94/4.4	4,02.0	434713	455010			
Property, plant, and equipment	181.8	+ 124.0	305.8	334.2	367.4	384.6	400.1	411.6	437.5	466.6	499.1	535.6	576.1
Goodwill.	0	+ 80.0	80.0	78.0	76.0	74.0	72.0	70.0	68.0	66.0	64.0	62.0	60.0
Total assets	584.3	+ 201.0	785.3	824.0	889.9	948.4	1,007.0	1,065.8	1,135.5	1,213.1	1.299.0	1,394.0	301.0
Long-term debt	86.2	+ 100.0	186.2	410.1	443.5	469.7	495.4	520.2	553.0	589.6	630.3	675.7	726.0
Total capital	395.2	+ 201.0	596.2	631.0	682.3	722.6	762.2	800.3	850.7	907.1	969.7	1,039.6	1,117.0
apiral sources													
Profit retentions				\$ 0.1	\$33.4	\$26.2	\$25.7	\$24.8	\$32.8	\$36.6	\$40.7	\$45.4	\$50.3
Capital contributed by Kennecott							120	12.2	176	10.9	21.0	24.5	27.1
Debt financing (net)				34.7	17.9	14.1	13.9	#20.1	17.0 #50.4	456 4	\$62.6	\$60.0	\$77.6
Total capital added				\$34.8	\$51.3	\$40.3	\$39.6	\$38.1	\$30.4	\$30.4	\$02.0	309.9	\$77.4
Cey financial ratios				10.1	12.1	13.5	12.4	12.0	10.0	10.0	10.0	10.0	10.0
Growth rate in sales (%)	10.9			0.96	1.00	1.06	1.12	1.15	1.23	1.26	1.30	1.33	1.3
Profit/sales		4		- 0.040	0.04	3 0.04	7 0.05	0 0.05	5 0.05	6 0.05	6 0.05	6 0.05	7 0.0
Assets/net worth	1.89			2.01	2.01	2.02	2.03	2.05	2.0	2.06	2.00	2.00	6 01
Pront/net worth													
	Contrast.		-		-								
Cash flow to Kennecote													
Dividends to Kennecorri			\$(550.0)										
Utilization of Kennecott tax loss			140.0	\$31.7	\$ 4.7	\$20.6	\$30.9	\$45.3	\$44.9	\$49.4	\$54.4	\$50.8	* 65.0
carryforwards			_	20.0	20.0							477.0	* 0).;
Tax shelter from plant write-up adj.4	·			2.8	2.8	2.8	20	2.0		-	-	-	-
ierminal value at 10 times earnings?.						2.0	4.0	2.0	2.8	2.8	2.8	2.8	2.1
INET Cash How			\$(410.0)	\$54.5	\$27.5	\$23.4	\$33.7	\$48.1	\$47.7	\$52.2	\$57.7	0121	1,044.9
Assumptions: iKennecott would pay \$550 million to cquired would be allocated as follows: (a) narket value of land; (c) \$113 million would o goodwill. Immediately following the acc ith the \$100 million plus \$40 million of C	acquire Carb \$37.0 million Id be added t quisition of C Arborundum	orundum's equ a would be add o net plant and Carborundum, ( 's excess cash.	ity which hi ed to invent equipment Carborundur	ad a book ory to refle to reflect d m borrows	value of \$ ct the rep he depreci \$100 mill	309 millio lacement o ated replac ion and th	n. The \$2 ost of inw ement cos en pays a	41 million entories; ( st of plant \$140 milli	in excess b) \$11.0 m and equip ion divide	of purchas illion wou ment; and nd to Ken	e price ov ld be adde (d) \$80 m necott. Th	soz.o er book va ed to land uillion wou is dividend	lue of ass to reflect i ld be add

	Cost of Equity	Cost of Capital
Kennecott Corp (Acquirer)	13.0%	10.5%
Carborandum (Target)	16.5%	12.5%

### Lesson 12: Bad processes = Bad valuations!!

- The biggest barrier to sensible valuations is not bad data, poor modeling skills, poorly trained or lack of inflation. It is bias.
- If we enter a valuation with strong preconceptions about what we expect or should find, we will find ways to confirm those preconceptions.
- If we tie rewards, compensation and other incentives to the conclusions of a valuation, the bias will get worse.
## Response 12: If you want good valuations, fix the processes...

- <u>Separate valuation from deal making</u>: Asking deal makers to analyze whether a deal makes sense creates conflicts of interest that lead to biased valuations.
- <u>Don't trust biased sources</u>: Trusting managers in a company on forecasts is asking for trouble. What manager with an ego and in his right mind will give you unbiased estimates?
- <u>Don't be intimidated by the experts</u>: It is human nature to accept expert opinions, even if these opinions make no sense.
- <u>Avoid "rules of thumb</u>": While rules of thumb are often based in fact, they get dated and can lead us to set aside good sense.

## Some closing thoughts on valuation...

- View "paradigm shifts" with skepticism.
  - Focus on the big picture; don't let the details trip you up.
  - Keep your perspective; it is only a valuation.
  - If you have to choose between valuation skills and luck....