ut Plan Rejected, Markets Plunge,

ng New Scramble to Solve Crisis

Down 777.68 points The tale of the Dow's largest point loss on record

Market Revelations
Lessons learned, unlearned and relearned from a crisis

Aswath Damodaran

www.damodaran.com

Citi announces takeover of W before trading begins

Central banks credit markets

Voting closes at 1:43 p.m. with 'nays' in the lead

Asian markets open sharply lower after the New York exchanges close

Dow dropped to 10365 after 4 p.m. as traders sorted out last-minute crush of selling

11200
11000
10800
10600
10400
10200

10 a.m.   11 a.m.   Noon   1 p.m.   1:43   2 p.m.   3 p.m.   4 p.m.
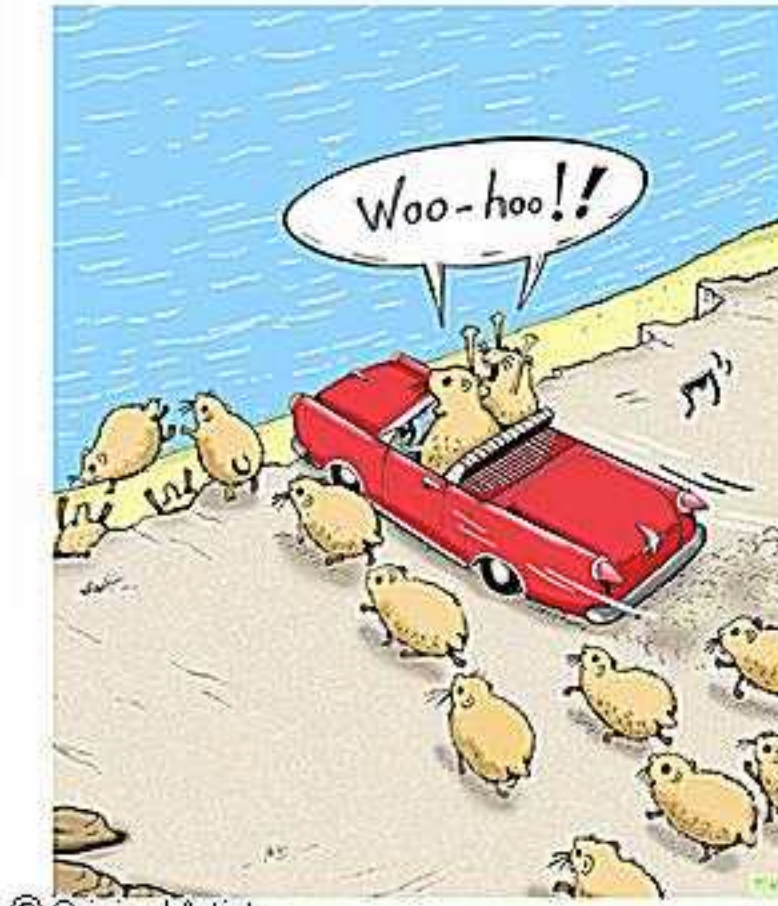
Source: WSJ Market Data Group; Photos: Bloomberg/Landov; Associated Press; UPI/Landov   Note: Dow Jones Industrial Average in one-minute intervals

We learned about risk…
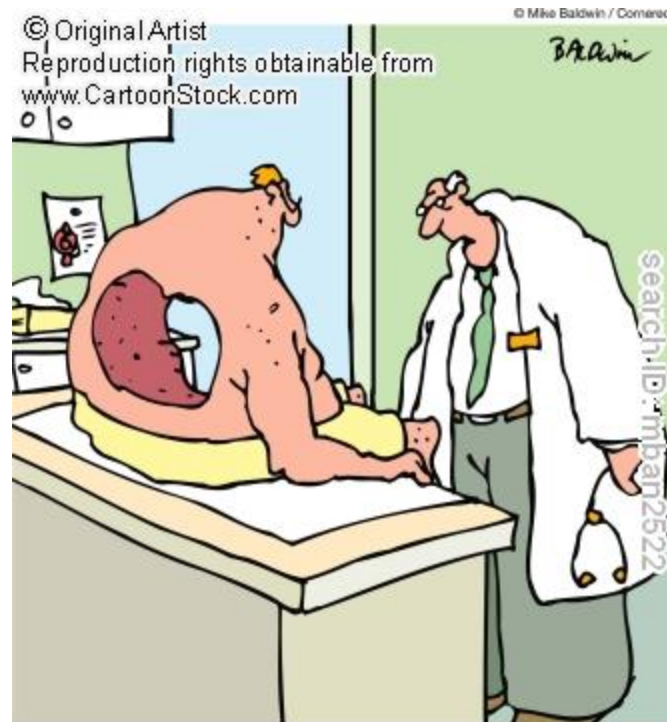
And that a lemming in a fancy car is still a lemming..

The fundamentals

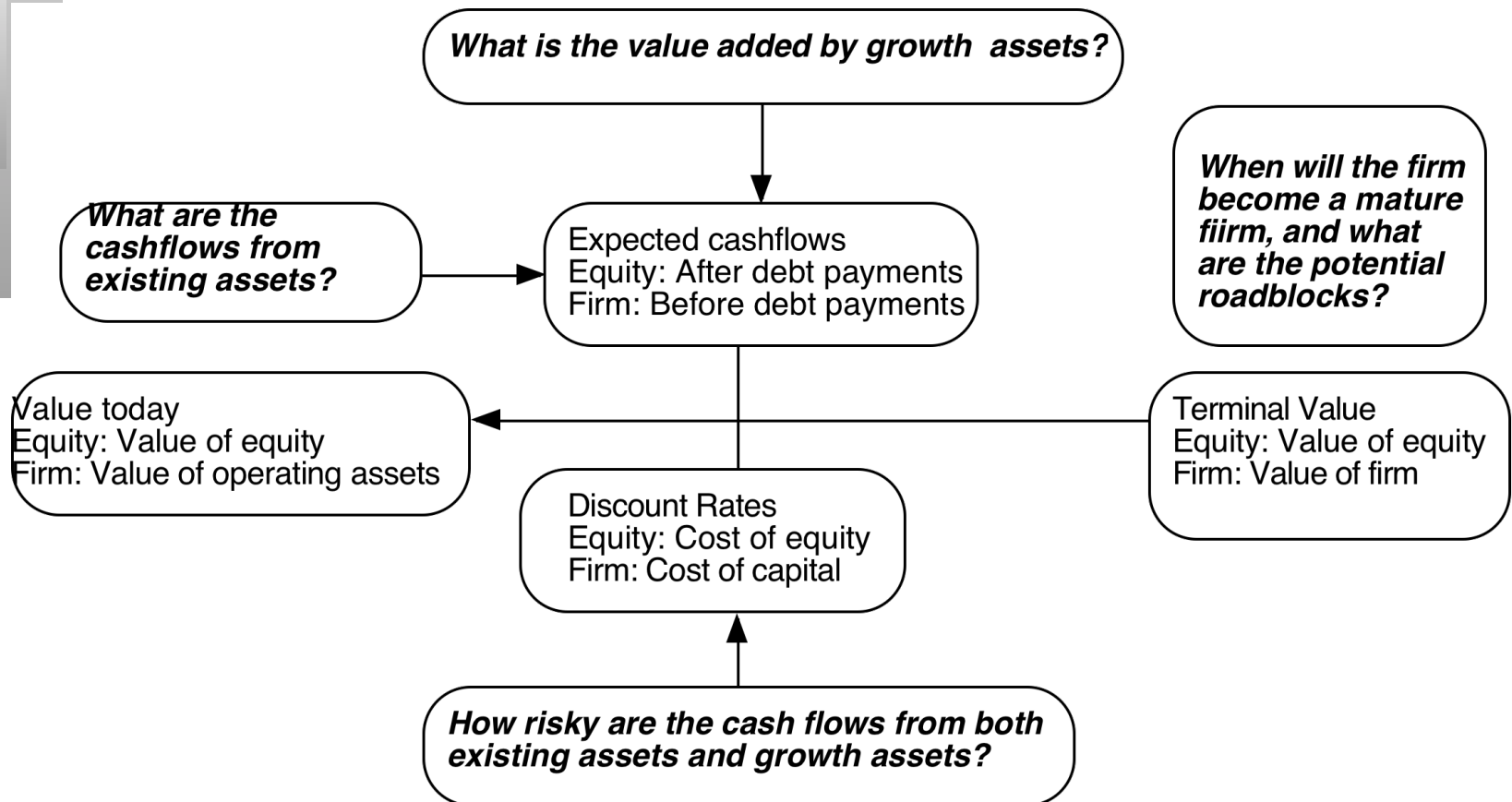The more things change, the more they stay the same…

DCF Choices: Equity versus Firm

Firm Valuation: Value the entire business
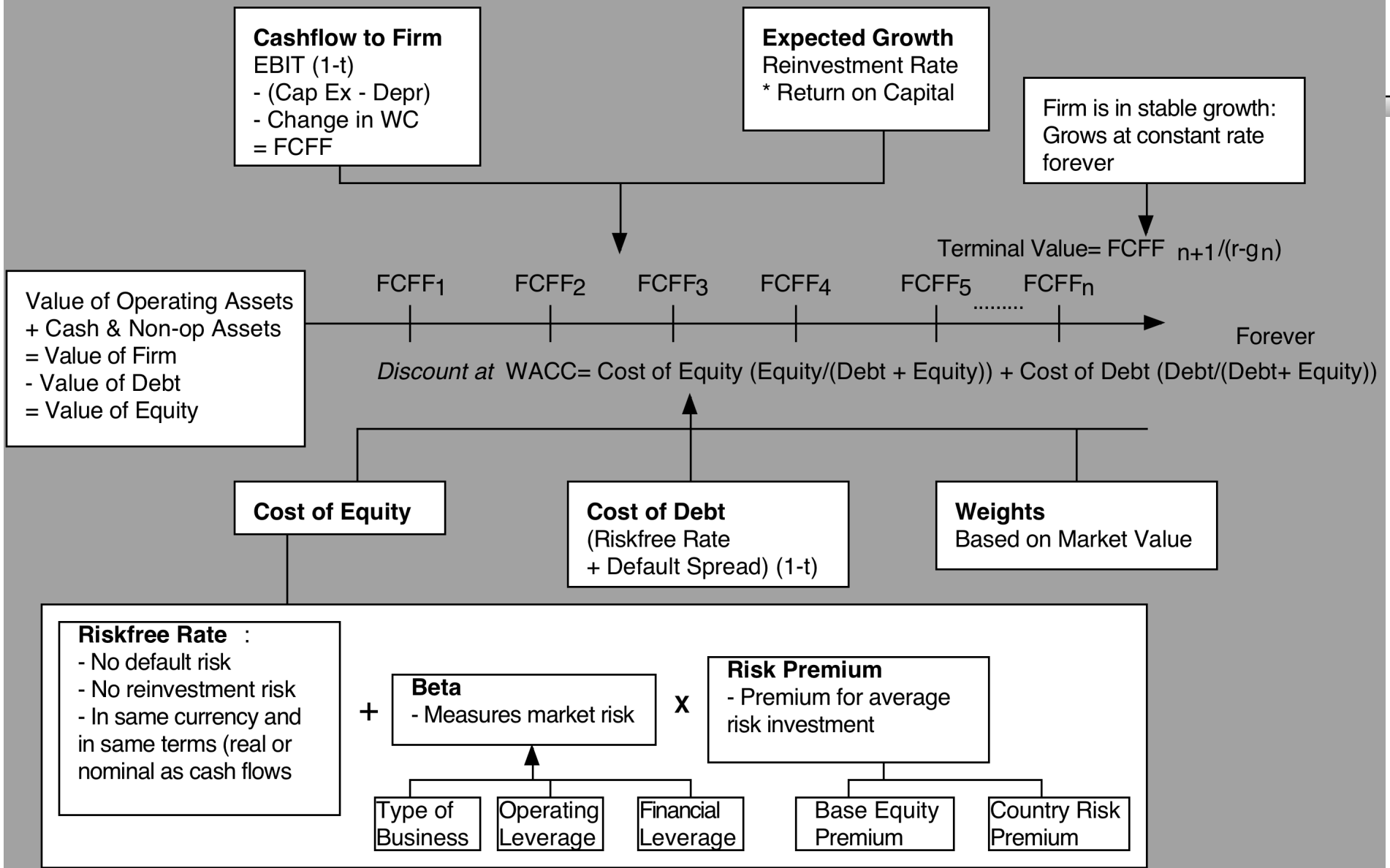by discounting cash flow to the firm at cost
of capital

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

Equity valuation: Value just the
equity claim in the business by
discounting cash flows to equity at
the cost of equity
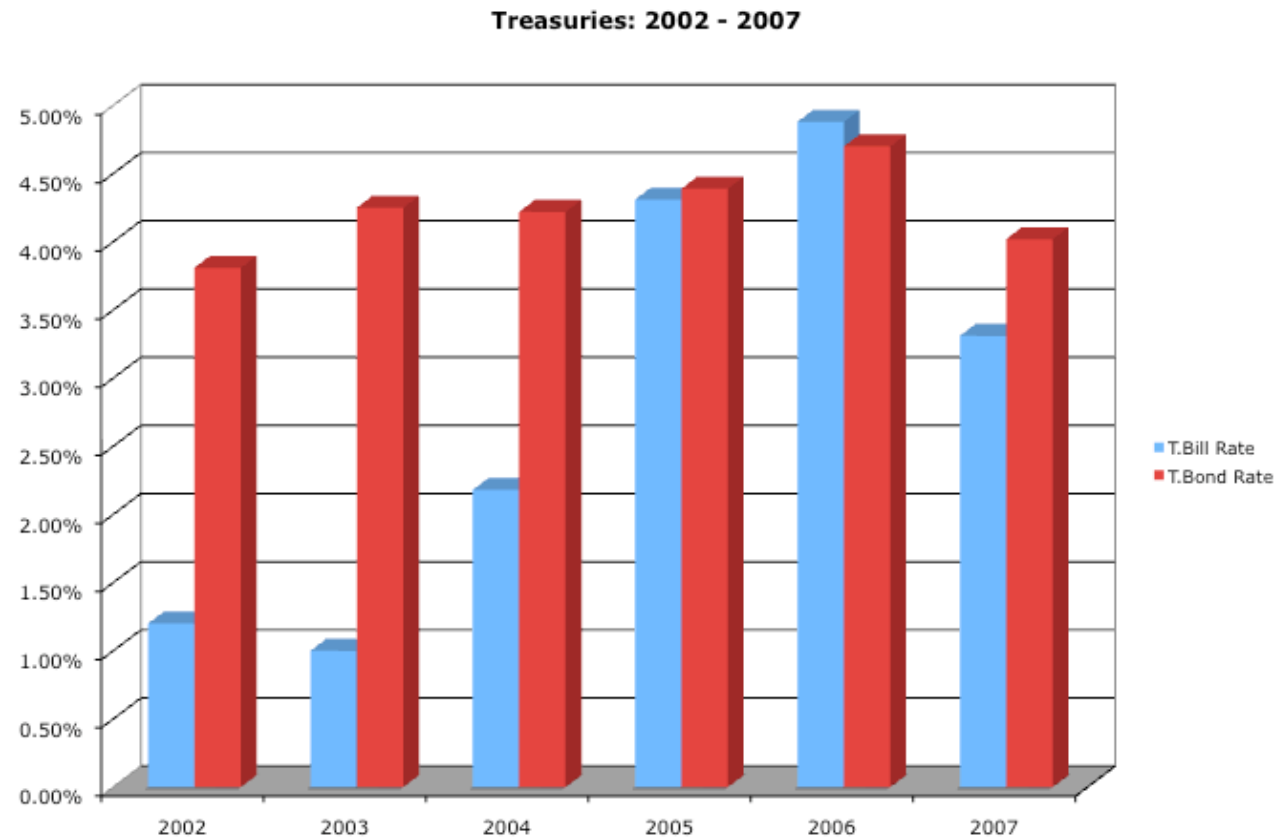
The Value of a business rests on..

What is the value added by growth assets?

What are the cashflows from existing assets?

Expected cashflows
Equity: After debt payments
Firm: Before debt payments

When will the firm become a mature fiirm, and what are the potential roadblocks?

Value today
Equity: Value of equity
Firm: Value of operating assets

Discount Rates
Equity: Cost of equity
Firm: Cost of capital

Terminal Value
Equity: Value of equity
Firm: Value of firm

How risky are the cash flows from both existing assets and growth assets?

DISCOUNTED CASHFLOW VALUATION

Cashflow to Firm
EBIT (1-t)
- (Cap Ex - Depr)
- Change in WC
= FCFF

Expected Growth
Reinvestment Rate
* Return on Capital

Firm is in stable growth:
Grows at constant rate
forever

Terminal Value= $FCFF_{n+1}/(r-g_n)$

Value of Operating Assets
+ Cash & Non-op Assets
= Value of Firm
- Value of Debt
= Value of Equity

$FCFF_1$ $FCFF_2$ $FCFF_3$ $FCFF_4$ $FCFF_5$ $FCFF_n$ ....

Forever

Discount at WACC= Cost of Equity (Equity/(Debt + Equity)) + Cost of Debt (Debt/(Debt+ Equity))

Cost of Equity

Cost of Debt
(Riskfree Rate
+ Default Spread) (1-t)

Weights
Based on Market Value

Riskfree Rate :
- No default risk
- No reinvestment risk
- In same currency and
in same terms (real or
nominal as cash flows

+

Beta
- Measures market risk

X

Risk Premium
- Premium for average
risk investment

Type of Business	Operating Leverage	Financial Leverage	Base Equity Premium	Country Risk Premium

The way we were: Pre-September 12, 2008

Treasuries were riskless… and rates were stable
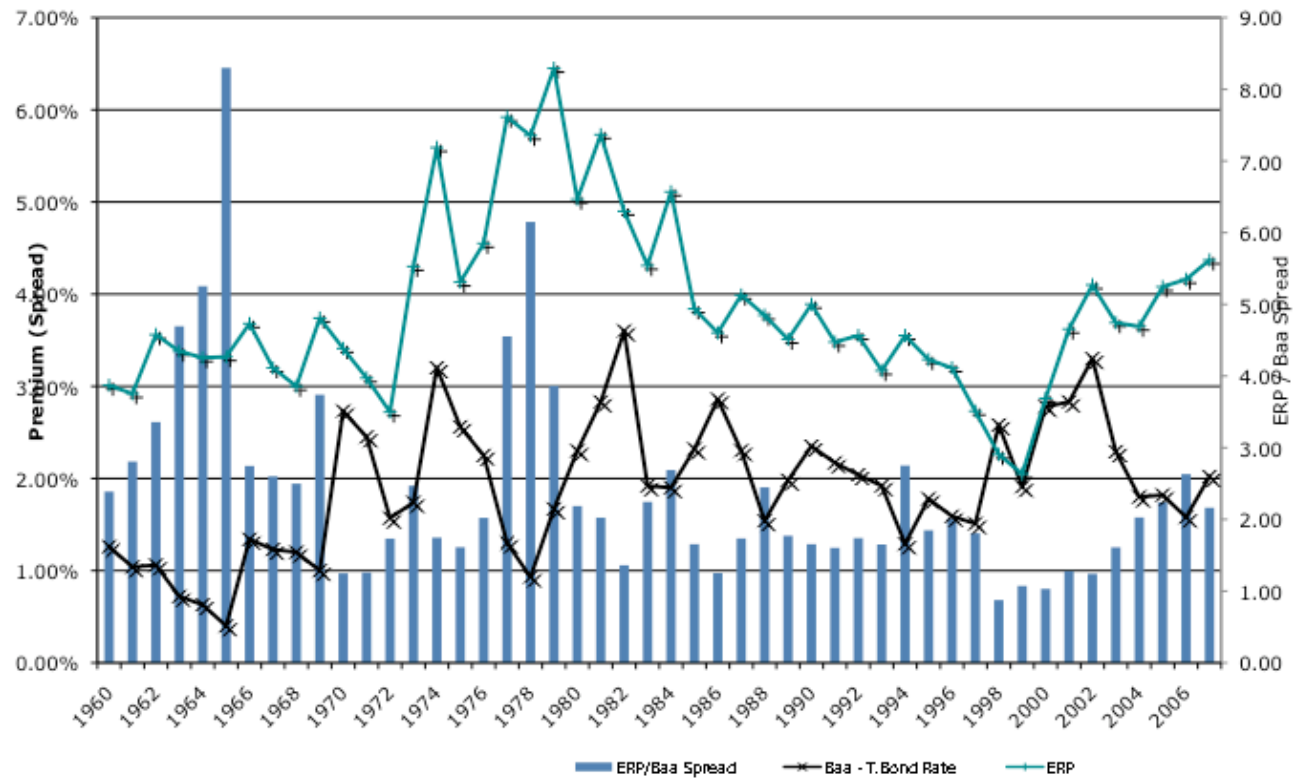

Treasuries: 2002 - 2007

Risk premiums did not change over short periods…
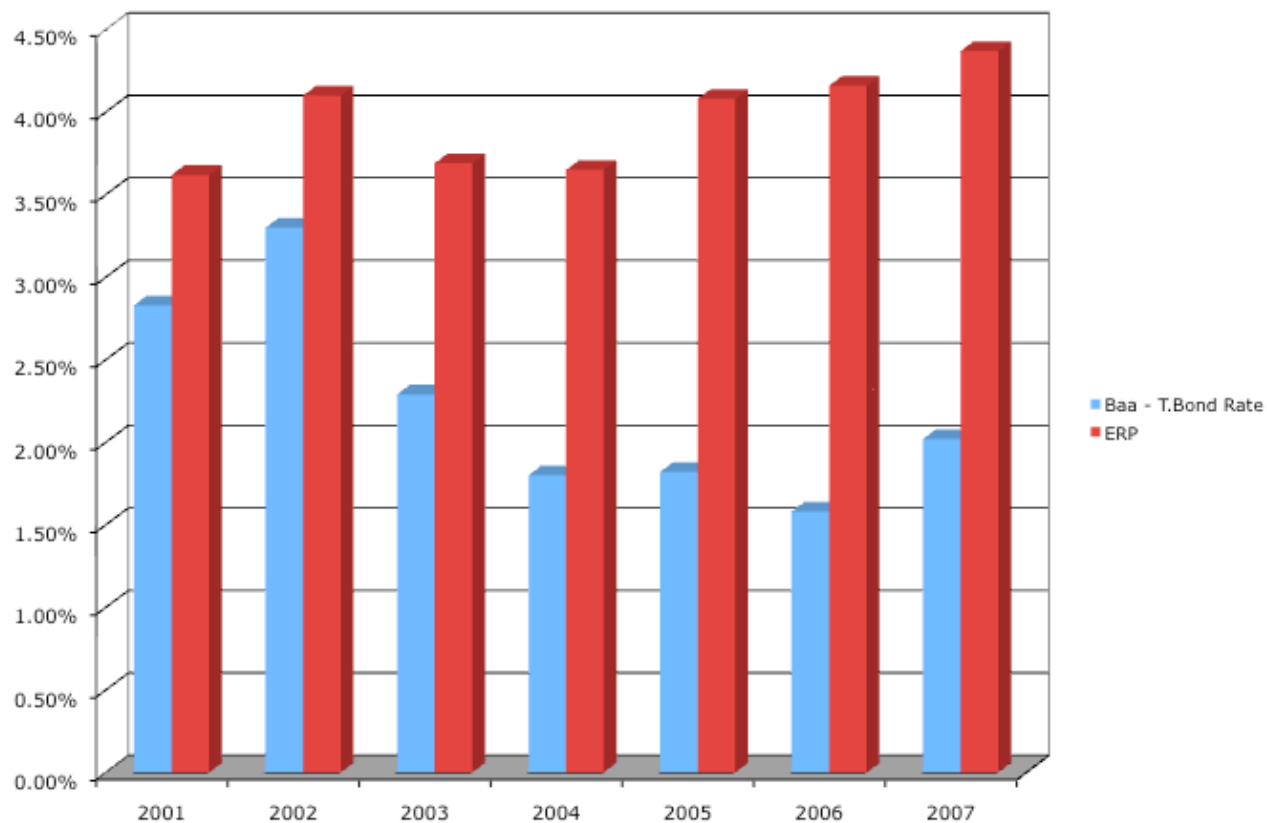
And only gradually over longer periods…

Figure 9: Equity Risk Premiums and Bond Default Spreads

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.

- ■ <u>Let the good times roll</u>: 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:
  - The costs we attach to debt and equity: 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.
  - The debt equity trade off: 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.
  - The going concern assumption: 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.

Embraer: Status Quo ($)

Avg Reinvestment rate =40%

Return on Capital 18.1%

Current Cashflow to Firm
EBIT(1-t) : $ 434
- Nt CpX   - 11
- Chg WC   178
= FCFF $ 267
Reinvestment Rate = 167/289= 56%
Effective tax rate = 19.5%

Reinvestment Rate 40%

Expected Growth in EBIT (1-t)
.40*.181=.072
7.2%

Stable Growth
g = 3.8%; Beta = 1.00;
Country Premium= 1.5%
Cost of capital = 7.38%
ROC= 7.38%; Tax rate=34%
Reinvestment Rate=g/ROC
=3.8/7.38 = 51.47%

$ Cashflows

Terminal Value$_5$= 254(.0738-.038) = 8,371

Op. Assets $ 6,239
+ Cash: 3,068
- Debt   2,070
- Minor. Int.   177
=Equity   7,059
-Options   4
Value/Share $9.53
        R$ 15.72

Year	1	2	3	4	5	Term Yr
EBIT (1-t)	$465	$499	$535	$574	$615	524
- Reinvestment	$186	$200	$214	$229	$246	270
FCFF	$279	$299	$321	$344	$369	= 254

Discount at $ Cost of Capital (WACC) = 8.31% (.788) + 4.36% (0.212) = 7.47%
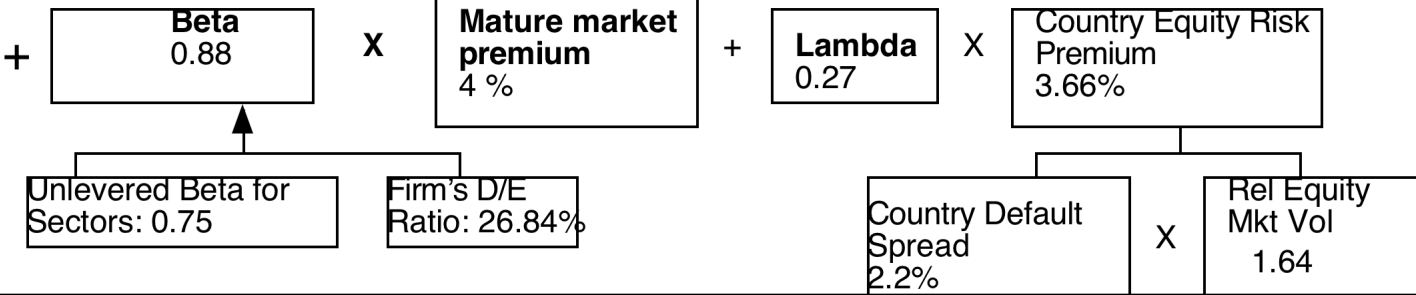
On May 22, 2008
Embraer Price = R$ 17.2

Cost of Equity 8.31%

Cost of Debt
(3.8%+1.7%+1.1%)(1-.34)
= 4.36%

Weights
E = 78.8% D = 21.2%

Riskfree Rate:
US$ Riskfree Rate=
3.8%

+

Beta 0.88

X

Mature market premium
4 %

+

Lambda 0.27

X

Country Equity Risk Premium
3.66%

Unlevered Beta for Sectors: 0.75

Firm's D/E Ratio: 26.84%

Country Default Spread 2.2%

X

Rel Equity Mkt Vol
1.64

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Lehman Fate Spurs Emergency Session

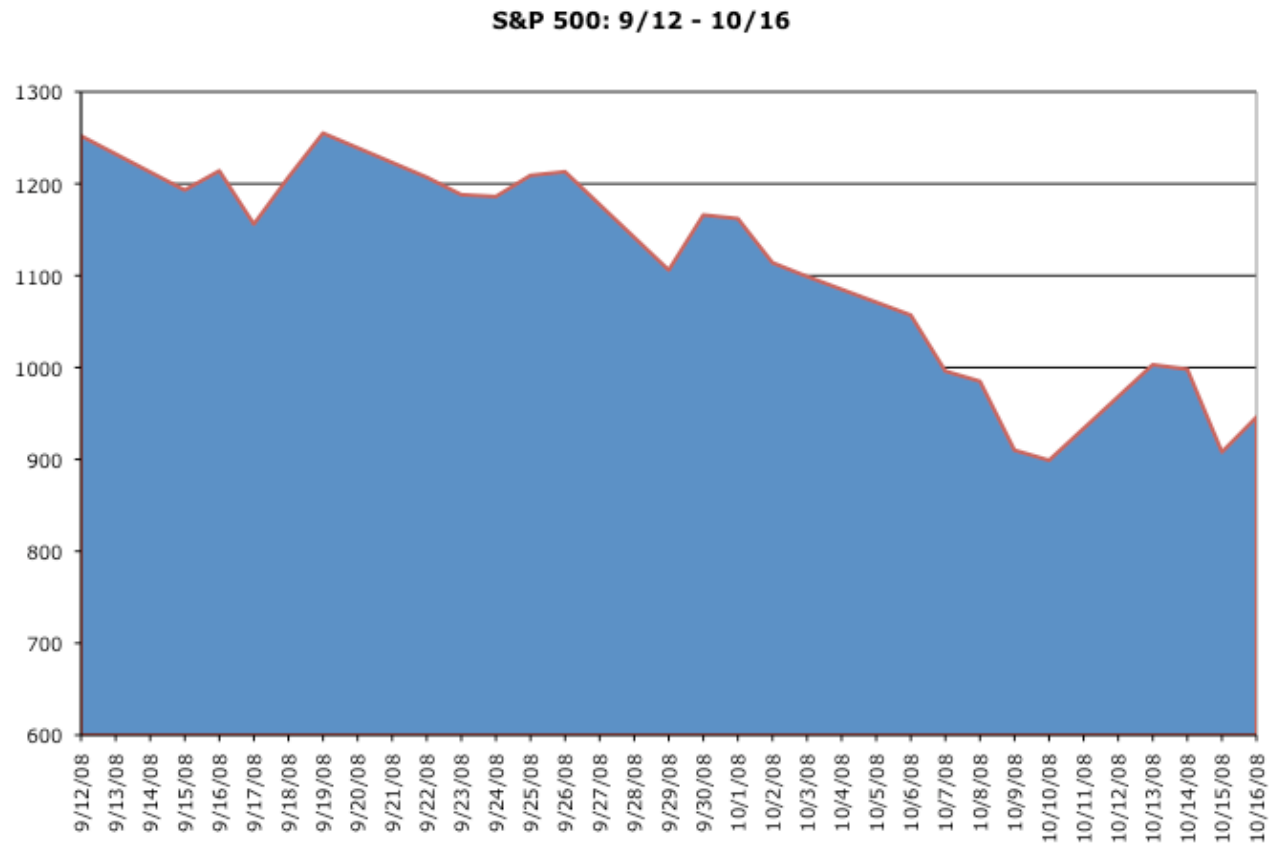### Wall Street Titans Seek Ways to Stem Widening Crisis

The Federal Reserve Bank of New York held an emergency meeting Friday night with top Wall Street executives to discuss the future of venerable firm Lehman Brothers Holdings Inc. and the perilous state of U.S. financial markets.

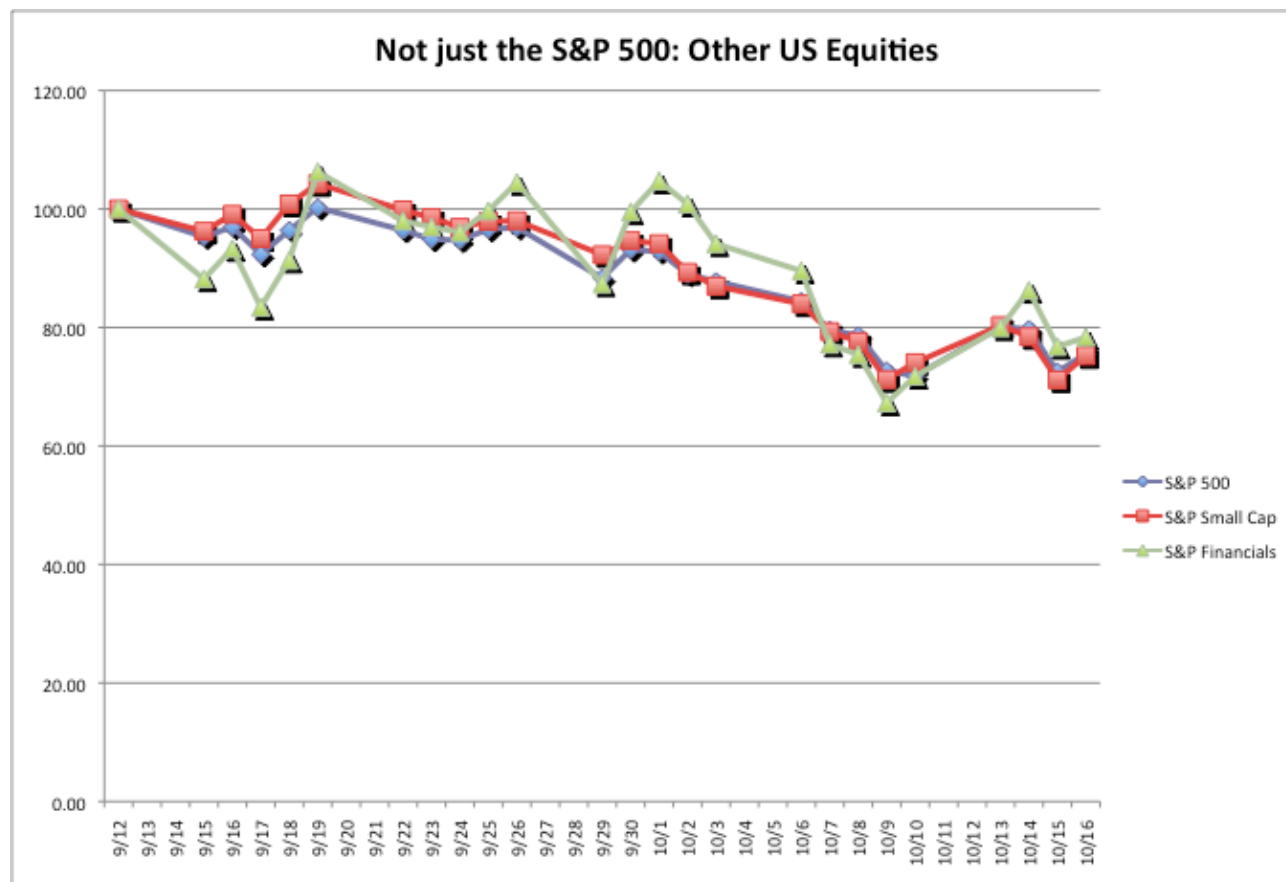In attendance were Treasury Secretary Henry Paulson, Securities and Exchange Commission Chairman Christopher Cox, Morgan Stanley Chief Executive John Mack and Merrill Lynch & Co. chief Executive John Thain, among others.

Talks about a sale of Lehman or many of its parts were taking place in other forums and were likely to continue through the

By Damian Paletta, Susanne Craig, Deborah Solomon, Carrick Mollenkamp and Matthew Karnitschnig

weekend. The meeting began at 6 p.m., but precise details about what was discussed couldn't be learned. The meeting appeared similar to one a decade ago when the New York Fed pulled to-

gether top Wall Street executives to prevent the collapse of hedge fund Long-Term Capital Management. One big issue: Most of the firms at the meeting have themselves been hit with big losses and may not have the excess capital to step in.

"Senior representatives of major financial institutions met at the Federal Reserve Bank of New York Friday evening to discuss recent market conditions," a spokesman for the New York Fed said.

The future of Lehman could open a new chapter in the government's handling of the financial crisis, which is sweeping up an increasing number of firms, includ-

ing American International Group Inc. and Washington Mutual Inc. If the meeting helps engineer a rescue for the firm that doesn't involve government funding, it would represent a new approach for the Bush administration and Mr. Paulson, who has in the past six months helped intervene to break up Bear Stearns Cos. and organize a government takeover of mortgage giants Fannie Mae and Freddie Mac.

As of late Friday, Mr. Paulson appeared unwilling to support a government-led bailout of Lehman, people familiar with the situation say. Mr. Paulson and Fed-

World-Wide

■ Hurricane Ike began to batter the Texas coast. But even as a wave face crashing over Galveston island's 17-foot seawall, as many as 20,000 residents shunned orders to evacuate. Authorities in Houston, fearing traffic gridlock, told residents to remain and "hunker down." Forecasters warned Ike could grow into a Category 3 hurricane, with peak winds of up to 120 mph. A3

Insurers are girding for losses that may exceed Rita's $2 billion toll in 2005 and might

"

Five weeks that changed the world: 9/12-10/6

And then came the ``troubles''

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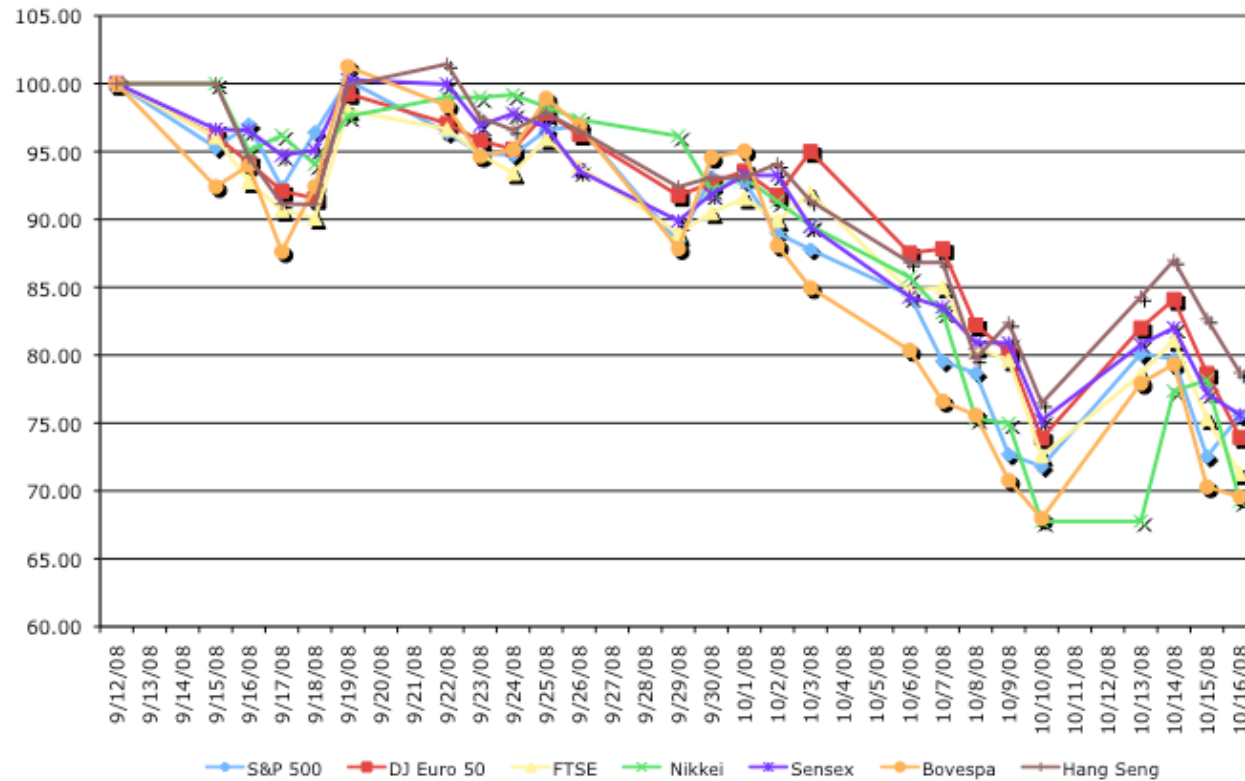

S&P 500: 9/12 - 10/16

Not just the S&P 500…

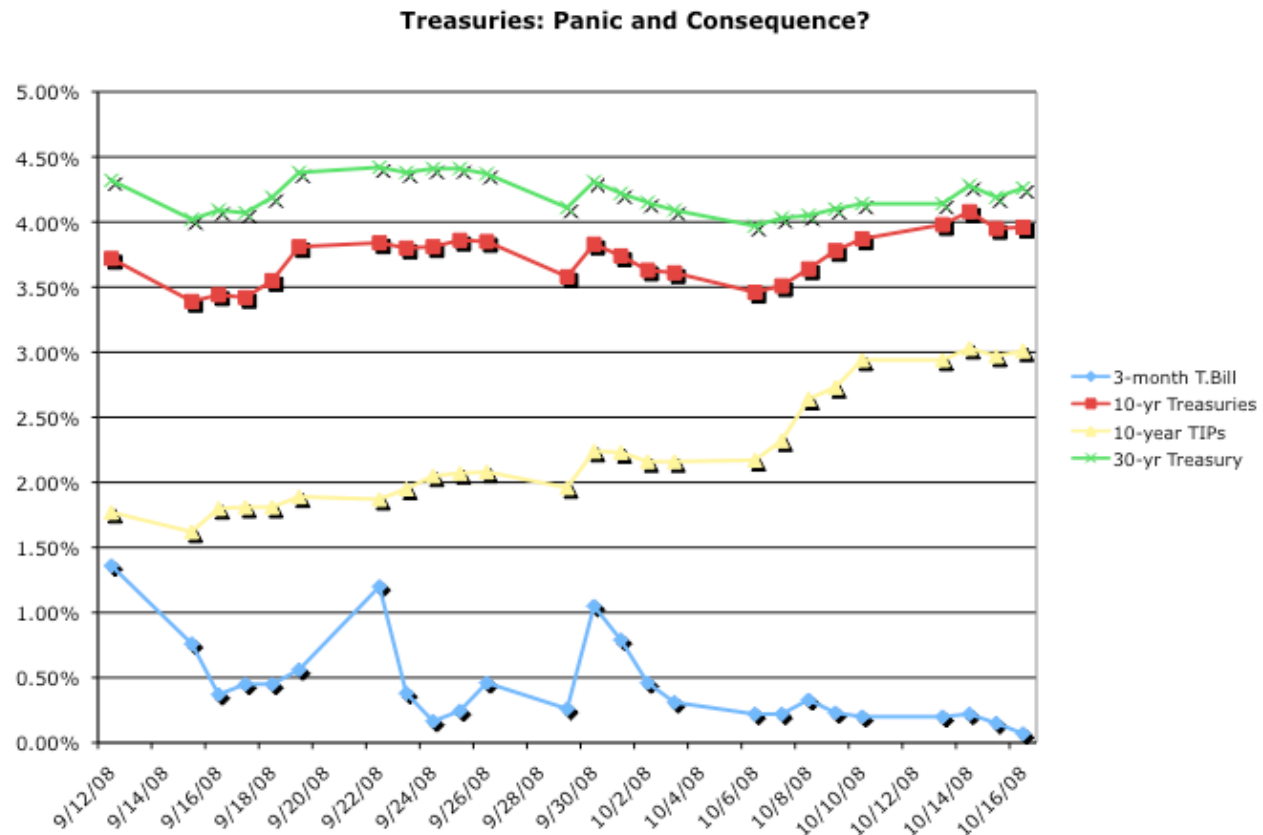# Going Global with the crisis…

The flip side of globalzation!!

While treasuries started behaving in odd ways…

Treasuries: Panic and Consequence?

Short term corporate borrowing markets froze..

The flight to what?
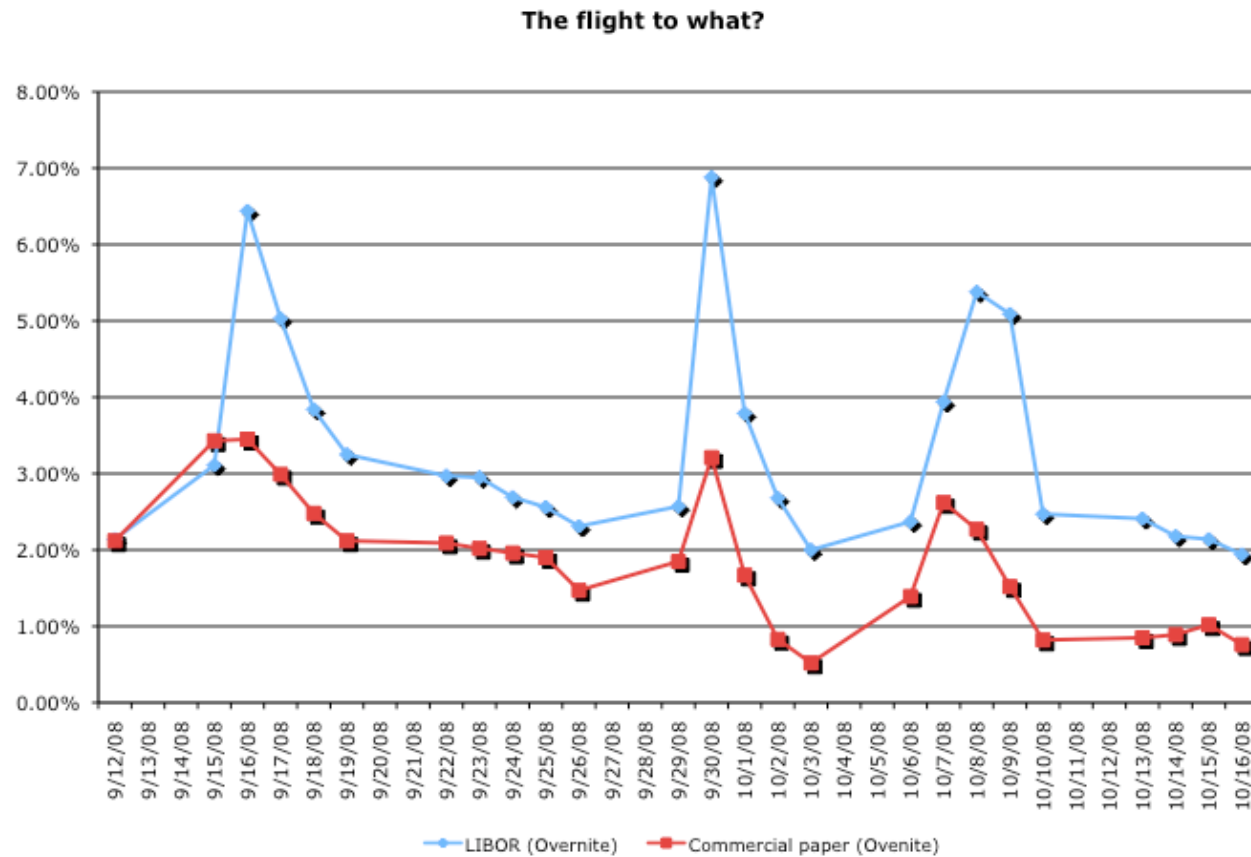
And corporate bond default spreads widened…

Corporate Default Spreads
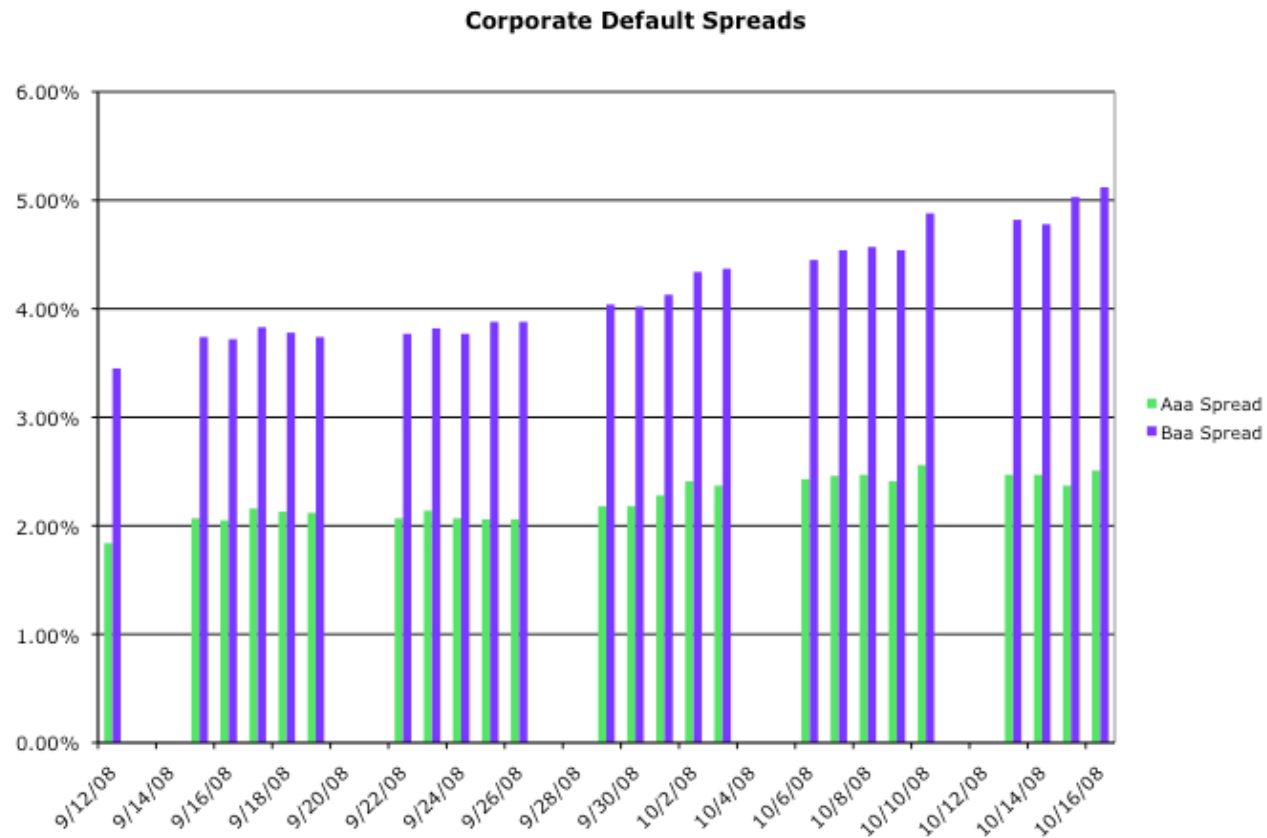
Commodities were no safe haven…

No safe haven in commodities?
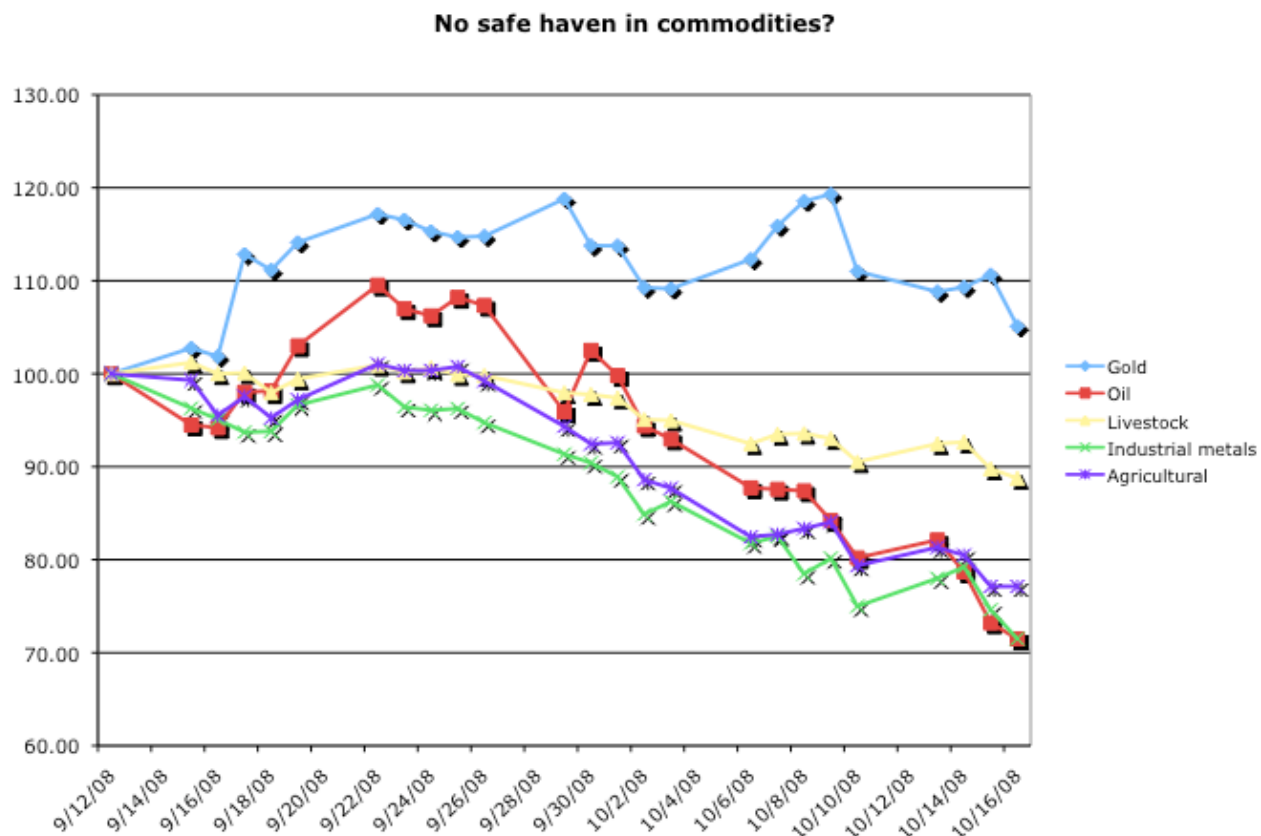
Currencies moved… with a flight to low interest rate currencies!!
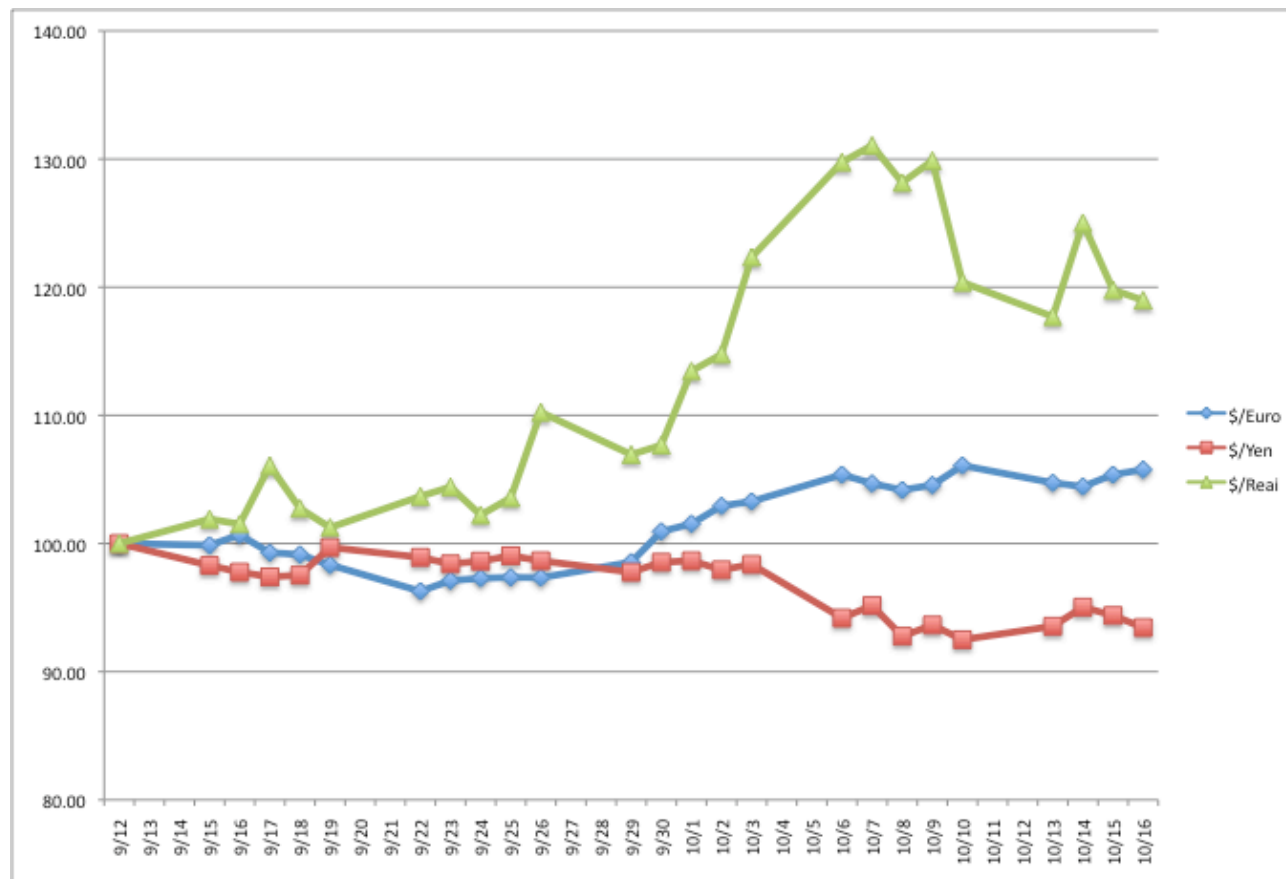
Lessons for Valuation and Corporate Finance

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? The market view of US treasuries…
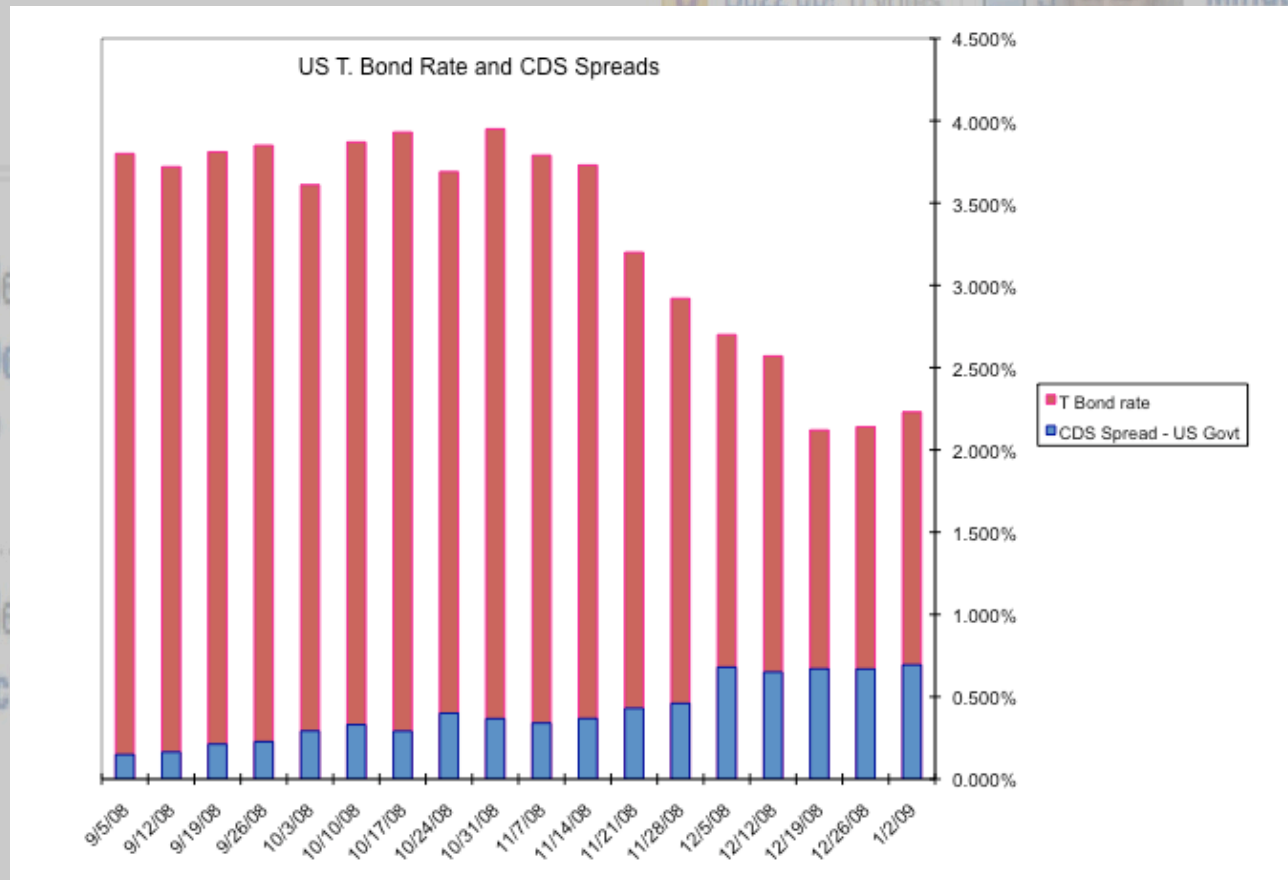
And the consequences..

- Reserve Fund "breaks the buck" On Wednesday, September 17, the Reserve Primary Fund had $62.6 billion in assets, making it one of the largest money-market funds.. At least a dozen large investors pulled out almost $40 billion of their money Monday and Tuesday, two-thirds of Primary Fund's formidable asset base. That pushed the fund's per-share price down to $0.97, a bracing signal to investors and a jolt to money-market investors world-wide. The withdrawals meant the Primary Fund had to "break the buck." That is, its net asset value sunk below the time-honored standard of $1 a share.

- Treasury bill rates drop to zero on Sept 17

Shortfall

Yields on Treasurys of shorter maturities fell dramatically Wednesday

One year ago

Sept. 2

Wednesday

1   3   6   2   5   10   30
in month(s)   in years
Treasury maturity

Source: Ryan ALM
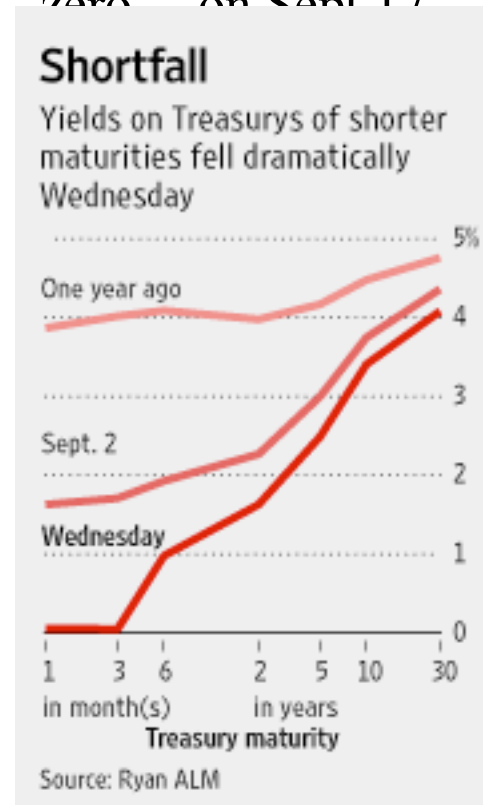
Response 1: From government bond rates to riskfree rates…

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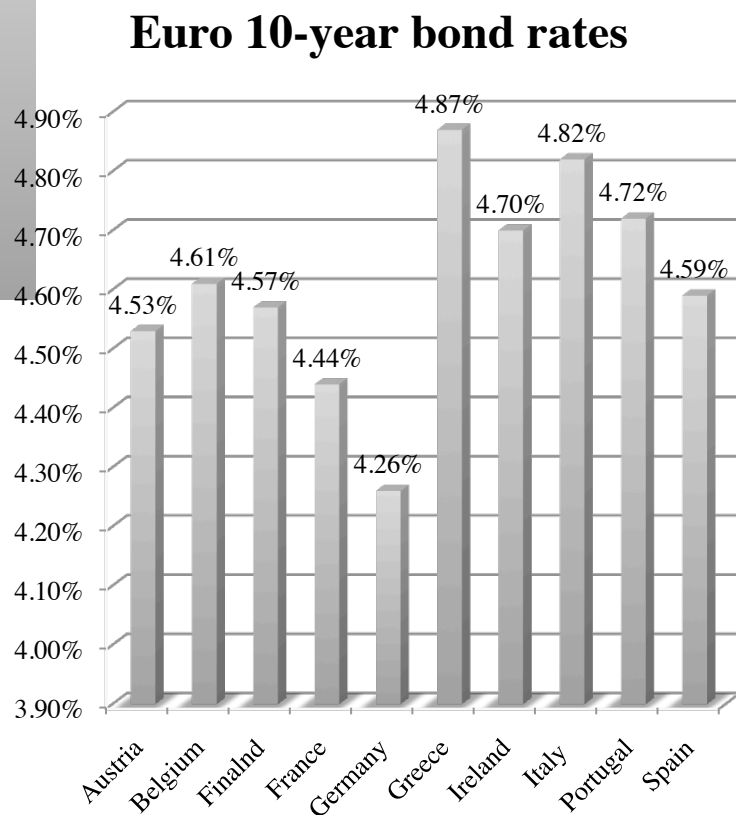
- The Brazilian government had 10-year nominal $R bonds outstanding, with a yield to maturity of about 10.25% on January 1, 2009. In January 2009, the Brazilian government had a <u>local currency</u> sovereign rating of Ba1. The typical default spread (over a default free rate) for Ba1 rated country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

Figure 3: Riskfree Rates by Currency
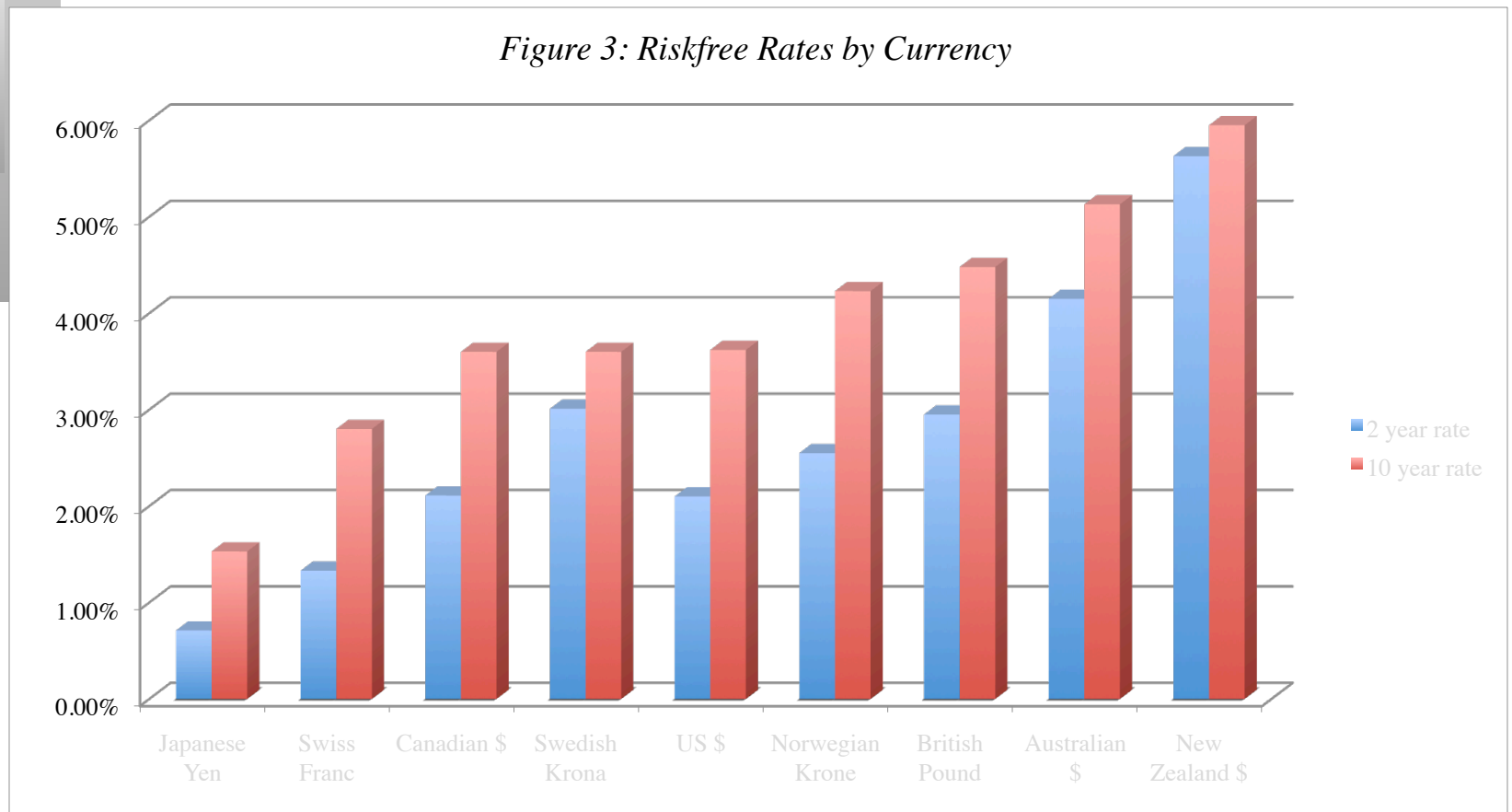
Response 2: A framework for picking the right riskfree rate…

Will you be doing your valuation in real or nominal terms?

Nominal

Real

Pick a currency to do your valuation in

Riskfree rate = Long term rate on inflation-indexed bonds issued by default-free entity (TIPs)

Switch currencies or do analysis in real terms

Is there a long term government bond denominated in that currency?

No

No

Yes

Is the government default free?

No

Does the country have a local currency rating?

Yes

Yes

Riskfree rate = Long term government bond rate

Riskfree rate = Long term government bond rate - Default spread

Implications for corporate finance…

- <u>Cash may not be a neutral asset</u>: In the United States and much of the developed world, we have generally assumed that holding treasury bills or even commercial paper is both liquid and riskfree. This has allowed us to treat cash as a neutral asset – a dollar in cash balance is valued at a dollar. To the extent that there is liquidity and default risk in even these investments, that assumption may no longer hold.

- <u>Hurdle rates</u>: In computing cost of equity and capital, companies have generally used government bond rates in the currency as riskfree rates. That practice may no longer be automatic.

Implications for investors…

- <u>No risk free investment</u>: It is conceivable, in some environments, that there is no investment that is riskfree (in terms of liquidity and default risk).
- <u>Negative interest rates</u>: In extreme scenarios, it is conceivable that the nominal interest rates may become negative. (To those who may wonder why you would even invest the money in the first place, it may not be feasible (or safe) to have hundreds of millions of dollars in cash under your mattress.

II. The Equity Risk Premium: Trusting history?

	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2007	7.78%	6.42%	5.94%	4.79%
1967-2007	5.94%	4.33%	4.75%	3.50%
1997-2007	5.26%	2.68%	3.86%	1.51%

Historical premium in January 2008

←

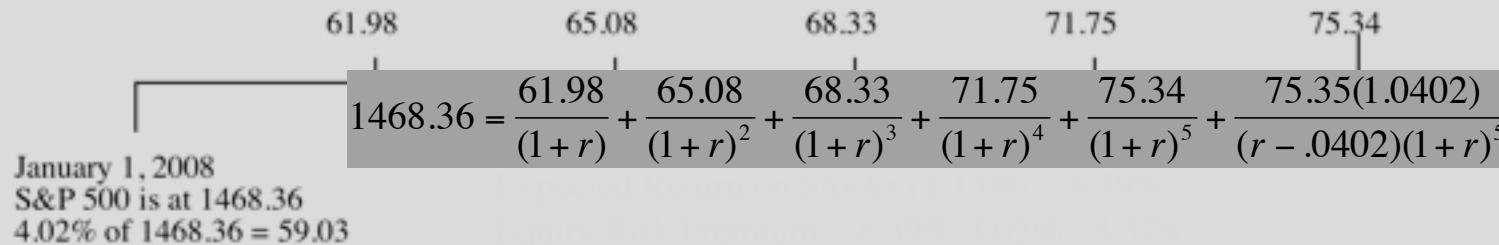|	Arithmetic Average		Geometric Average	
	Stocks – T. Bills	Stocks – T. Bonds	Stocks – T. Bills	Stocks – T. Bonds
1928-2008	7.30%	5.65%	5.32%	3.88%
	(2.29%)	(2.40%)		
1959-2008	5.14%	3.33%	3.77%	2.29%
	(2.39%)	(2.63%)		
1999-2008	-2.53%	-6.26%	-4.53%	-7.96%
	(6.36%)	(8.85%)		

Historical premium in January 2009

Or the market?: Implied equity risk premiums in 2008 vs 2009

Between 2001 and 2007 dividends and stock buybacks averaged 4.02% of the index each year.

Analysts expect earnings to grow 5% a year for the next 5 years. We will assume that dividends & buybacks will keep pace.. Last year's cashflow (59.03) growing at 5% a year

After year 5, we will assume that earnings on the index will grow at 4.02%, the same rate as the entire economy (= riskfree rate).

61.98   65.08   68.33   71.75   75.34

$$1468.36 = \frac{61.98}{(1+r)} + \frac{65.08}{(1+r)^2} + \frac{68.33}{(1+r)^3} + \frac{71.75}{(1+r)^4} + \frac{75.34}{(1+r)^5} + \frac{75.35(1.0402)}{(r - .0402)(1+r)^5}$$

January 1, 2008
S&P 500 is at 1468.36
4.02% of 1468.36 = 59.03

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

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

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

54.69   56.87   59.15   61.52   63.98

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

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

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

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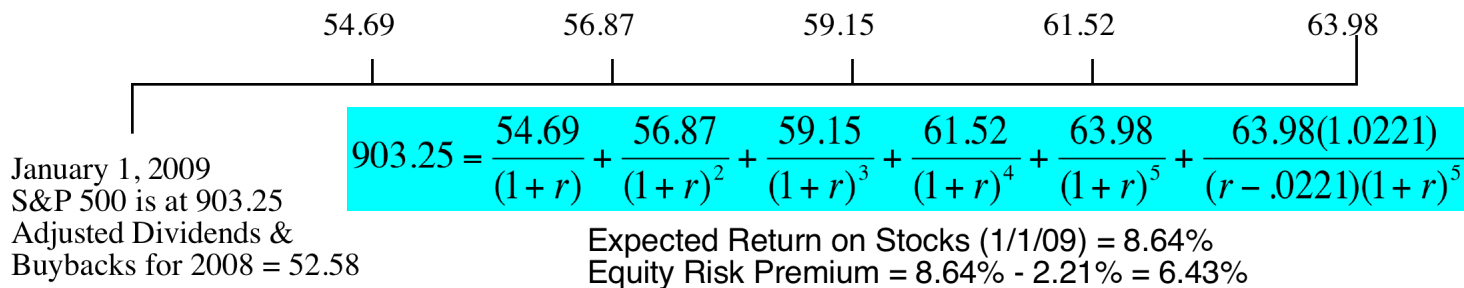
Lesson 2A: ERPs can change even in mature markets: 9/12/2008 – 12/31/2008

Implied Equity Risk Premium - 9/12- 12/31/08

Average implied ERP: 1960-2007 = 4.00%
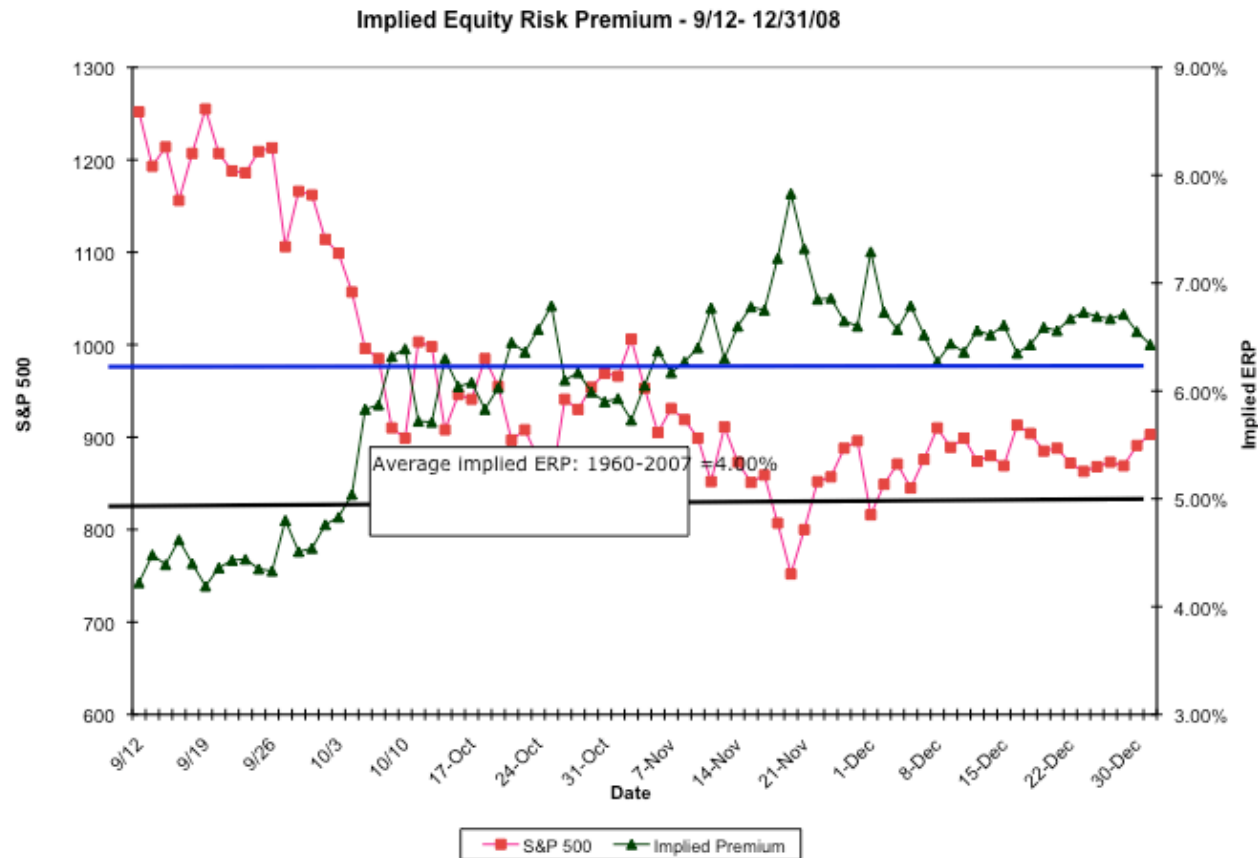
As expected volatility increased…

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%

The markets that saw the biggest changes in equity risk premiums were the emerging markets that had also benefited the most from the pre-crash drop in premiums…

Response 2A: Update your numbers: Implied 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%

Lesson 2B: Default spreads can also change dramatically…

Rating	Default spread over treasury			
	1-Jan-08	12-Sep-08	12-Nov-08	1-Jan-09
Aaa/AAA	0.99%	1.40%	2.15%	2.00%
Aa1/AA+	1.15%	1.45%	2.30%	2.25%
Aa2/AA	1.25%	1.50%	2.55%	2.50%
Aa3/AA-	1.30%	1.65%	2.80%	2.75%
A1/A+	1.35%	1.85%	3.25%	3.25%
A2/A	1.42%	1.95%	3.50%	3.50%
A3/A-	1.48%	2.15%	3.75%	3.75%
Baa1/BBB+	1.73%	2.65%	4.50%	5.25%
Baa2/BBB	2.02%	2.90%	5.00%	5.75%
Baa3/BBB-	2.60%	3.20%	5.75%	7.25%
Ba1/BB+	3.20%	4.45%	7.00%	9.50%
Ba2/BB	3.65%	5.15%	8.00%	10.50%
Ba3/BB-	4.00%	5.30%	9.00%	11.00%
B1/B+	4.55%	5.85%	9.50%	11.50%
B2/B	5.65%	6.10%	10.50%	12.50%
B3/B-	6.45%	9.40%	13.50%	15.50%
Caa/CCC+	7.15%	9.80%	14.00%	16.50%

Response 2B: Don't trust (or use) book costs of debt… even for unrated companies..

■ Many practitioners use the book cost of debt, computed by dividing the interest expenses by the book value of debt, to estimate the cost of capital. Implicit in this practice are two assumptions:

- The cost of debt for most companies (at least mature ones) does not change much over time.
- The book cost of debt is the actual cost that the company has to pay
- If a company has no bonds or rating, there is no choice

■ While this practice has always been sloppy, its inadequacy has been laid bare by the crisis.

- Even if a company's rating did not change over 2008, its cost of borrowing new funds would have changed significantly
- If you are valuing a firm, you have to consider the current cost of borrowing, not a historical cost.

Lesson 2C: Equities, Bonds and Real Estate
All Risky Investments!
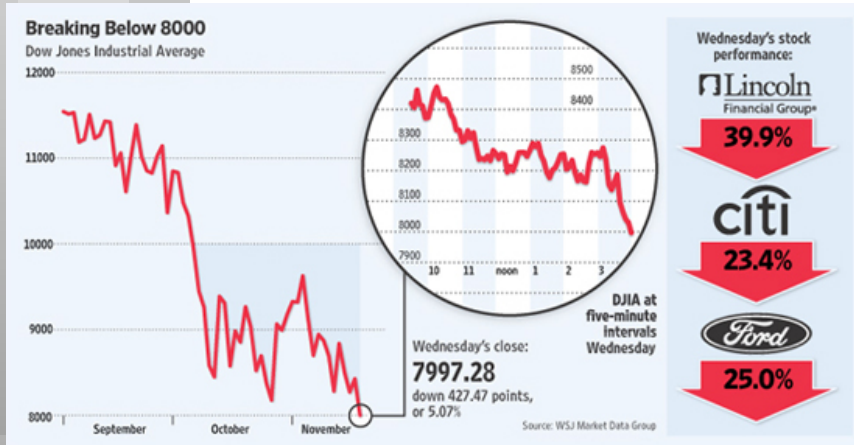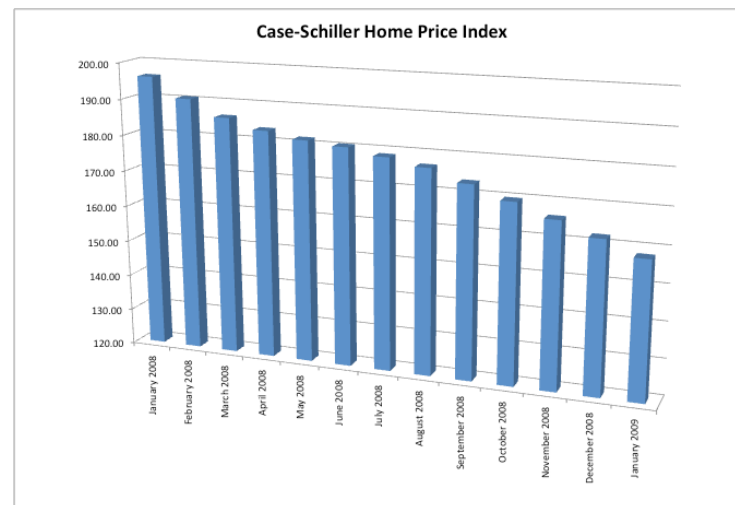
Response 2C: Check risk premiums for consistency…

Figure 10: Equity Risk Premiums, Cap Rates and Bond Spreads
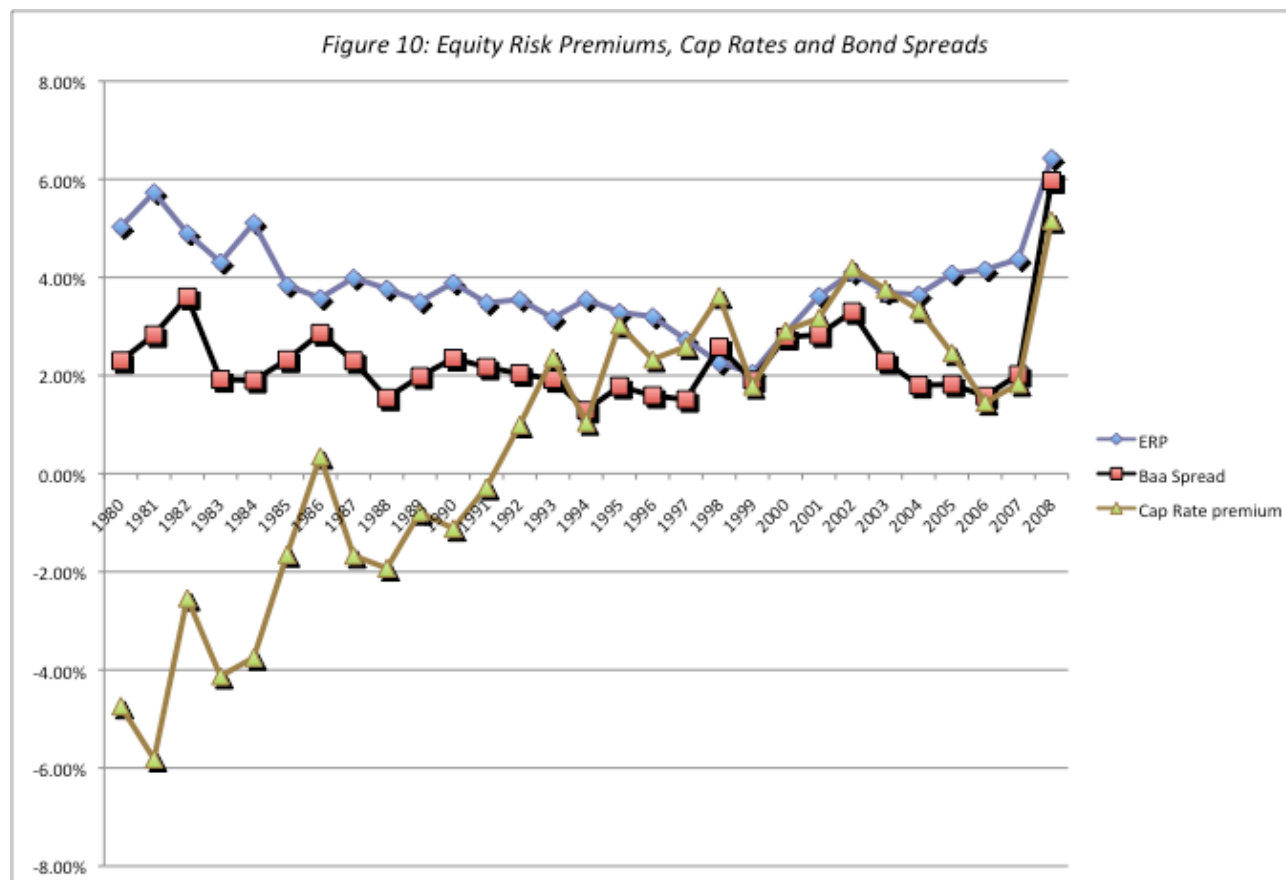
Consequences for Cost of Capital:
Beta =1, Rating of BBB, tax rate of 40% and a 30% debt ratio

On September 12, 2008

- Riskfree rate = 4.5%
- 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%
- 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

- **Investment policy**: 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.

- <u>Growth versus Mature Companies</u>: 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.

- <u>Venture Capital and Private Equity</u>: 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…
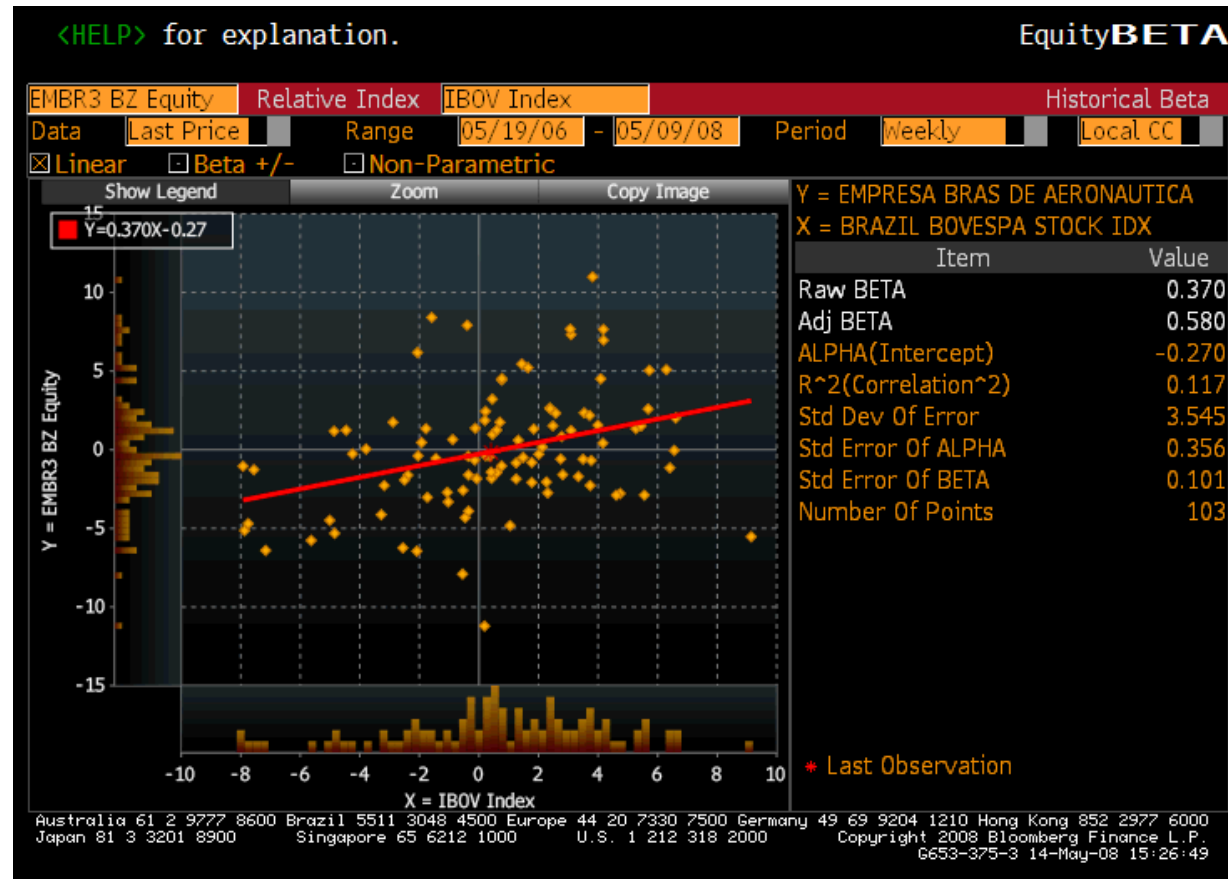
Playing with regression parameters can change your numbers…
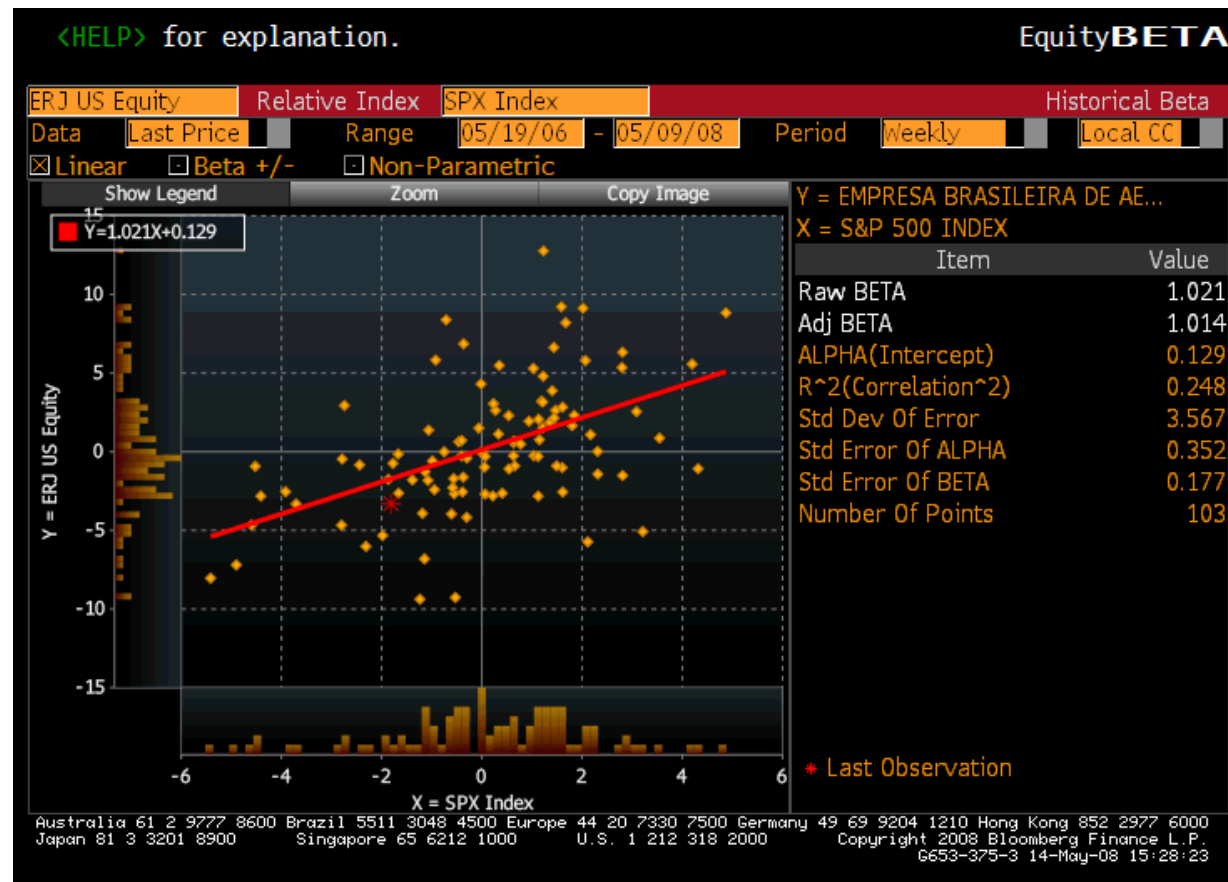
And cannot be trusted even when they look good…
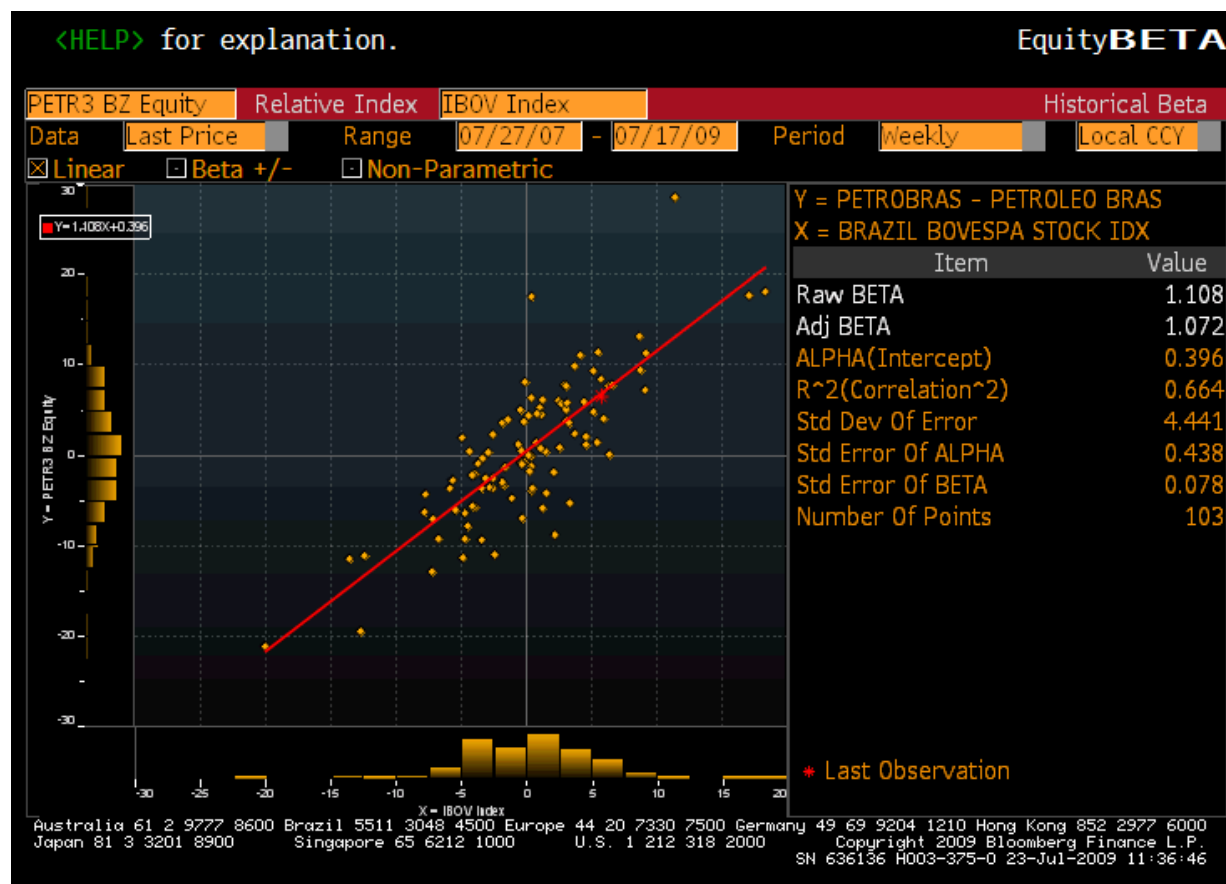
Bottom up Betas as an alternative…

Step 1: Find the business or businesses that your firm operates in.

Possible Refinements

Step 2: Find publicly traded firms in each of these businesses and obtain their regression betas. Compute the simple average across these regression betas to arrive at an average beta for these publicly traded firms. Unlever this average beta using the average debt to equity ratio across the publicly traded firms in the sample.
Unlevered beta for business = Average beta across publicly traded firms/ (1 + (1- t) (Average D/E ratio across firms))

If you can, adjust this beta for differences between your firm and the comparable firms on operating leverage and product characteristics.

Step 3: Estimate how much value your firm derives from each of the different businesses it is in.

While revenues or operating income are often used as weights, it is better to try to estimate the value of each business.

Step 4: Compute a weighted average of the unlevered betas of the different businesses (from step 2) using the weights from step 3.
Bottom-up Unlevered beta for your firm = Weighted average of the unlevered betas of the individual business

If you expect the business mix of your firm to change over time, you can change the weights on a year-to-year basis.

Step 5: Compute a levered beta (equity beta) for your firm, using the market debt to equity ratio for your firm.
Levered bottom-up beta = Unlevered beta (1+ (1-t) (Debt/Equity))

If you expect your debt to equity ratio to change over time, the levered beta will change over time.

Lesson 3A: The line between firm specific and market risk can be murky..

Figure 3.5: A Break Down of Risk
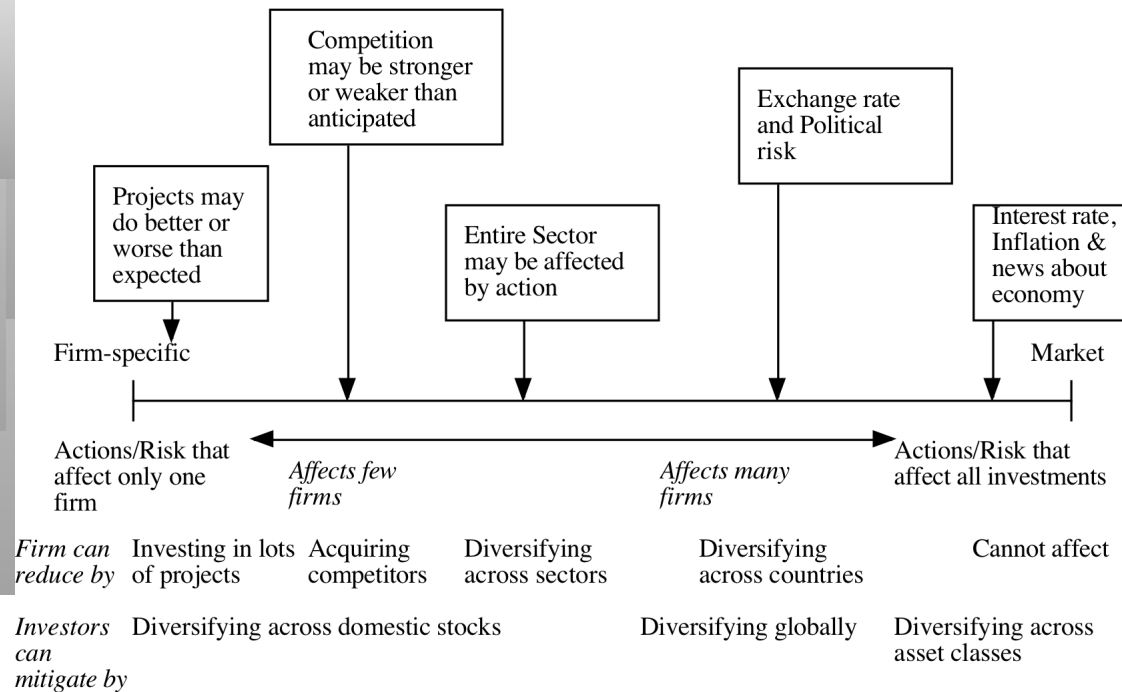
The classic point of view: Market risks come from macro variables and what firms do to enhance their profits/value falls under firm specific risk.

Lehman's woes can be traced to large bets <u>made by the firm</u> in the CDS and deriviatives market. If we stayed with classical finance, this seems to clearly fall under firm specific risk but… Too big to fail? Systemic risks? All of these are really debates about when firm specific risk becomes market risk.

Lesson 3B: 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

Prices of various assets are more likely to track U.S. stocks in down markets than in up markets.

Below, the correlation between asset returns and S&P 500 in months from 1973 through June 2009 that the U.S. stock market was:

■ Up 5% or more   ■ Down 5% or more

Long-Term U.S. Treasurys
Treasury Inflation Protected Securities
High-Yield Bonds
MSCI Europe stock index
MSCI Japan stock index
Gold

−20%   0   20   40   60   80%
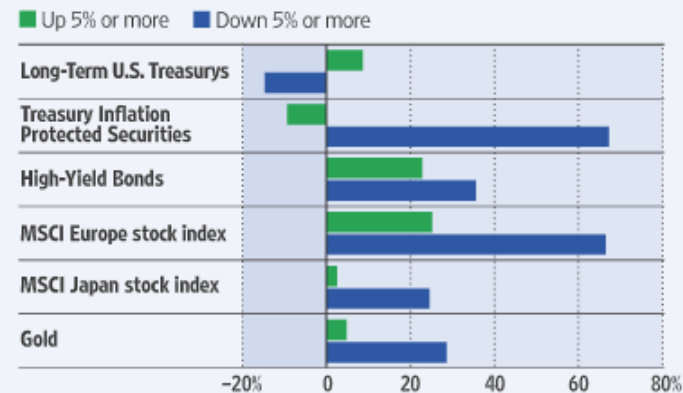
Source: Ibbotson Associates

Lesson 3C: Even sector betas can change…

■ Estimates of sector betas at the start of 2008 and 2009:

Sector	2009	2008
Financial Services		
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 3D: 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.
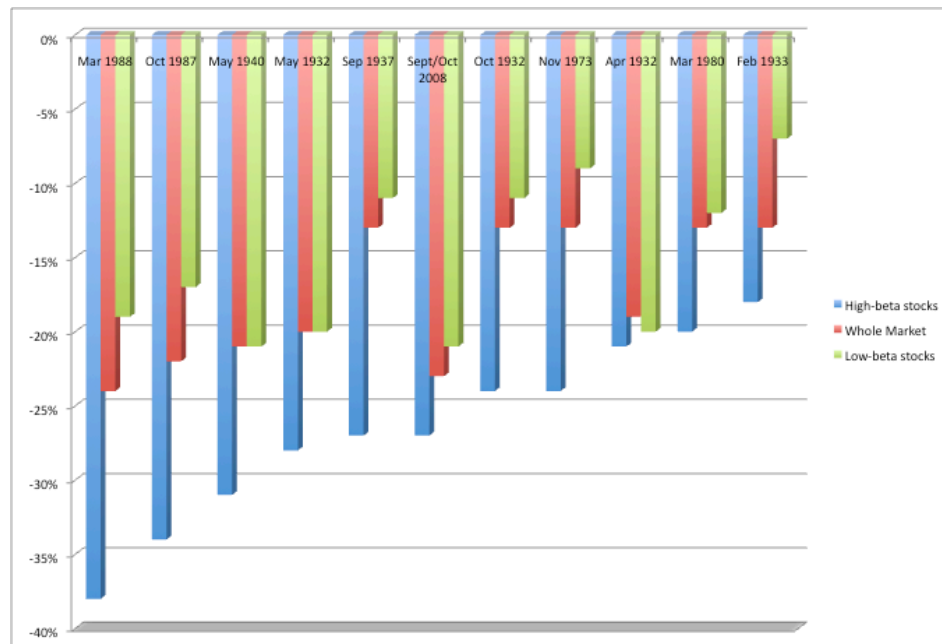
Betas actually work better at explaining return differences during market crises.

Response 3: Return to basics for market betas…

Beta of Equity (Levered Beta)

Beta of Firm (Unlevered Beta)

Nature of product or service offered by company:
Other things remaining equal, the more discretionary the product or service, the higher the beta.

Operating Leverage (Fixed Costs as percent of total costs):
Other things remaining equal the greater the proportion of the costs that are fixed, the higher the beta of the company.

Financial Leverage:
Other things remaining equal, the greater the proportion of capital that a firm raises from debt,the higher its equity beta will be

Implciations
Highly levered firms should have highe betas than firms with less debt.
Equity Beta (Levered beta) =
Unlev Beta $(1 + (1 - t) (Debt/Equity Ratio))$

Implications
1. Cyclical companies should have higher betas than non-cyclical companies.
2. Luxury goods firms should have higher betas than basic goods.
3. High priced goods/service firms should have higher betas than low prices goods/services firms.
4. Growth firms should have higher betas.

Implications
1. Firms with high infrastructure needs and rigid cost structures should have higher betas than firms with flexible cost structures.
2. Smaller firms should have higher betas than larger firms.
3. Young firms should have higher betas than more mature firms.

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.

- <u>Check against fundamentals</u>: 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.

- <u>Adjust for non-diversification</u>: 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.

- <u>Check against implied betas</u>: 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…

Figure 6.6: US $ Riskfree Rates - 1928 -2008

Average T.Bond Rate: 1958-2007: 6.61%

Average T.Bond rate: 1928-2007: 5.19%

On 1/1/09: 2.21%
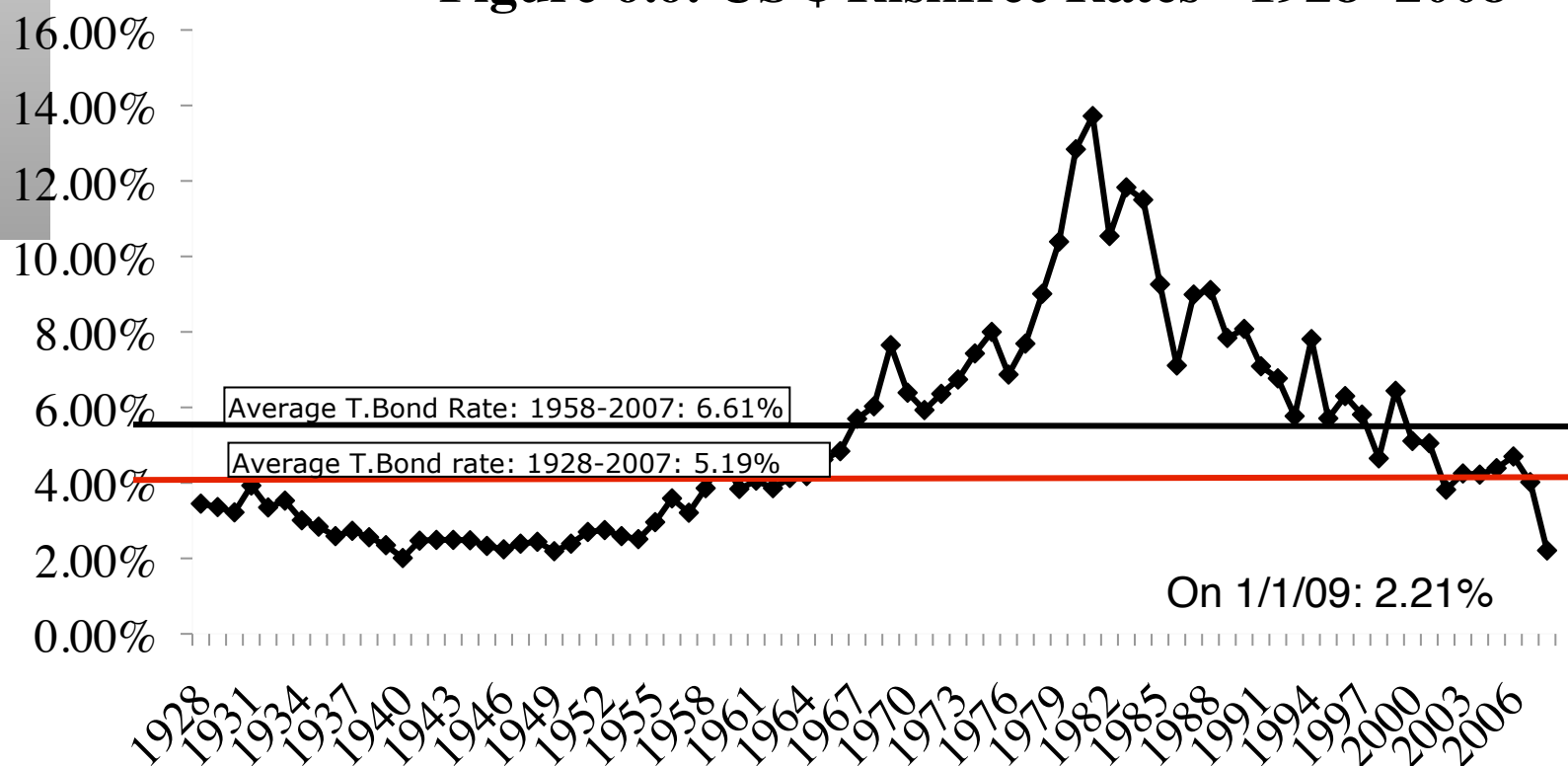
Response 4: Keeping macro views out of your valuation has become more important than ever…

- **Selective normalization**: 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.

■ <u>Need for hedging</u>: 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.

■ <u>Watch out for speculation</u>: 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

■ The Market timing payoff: 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.

■ The Macro hedge: 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. Liquidity (or the lack thereof..): The conventional wisdom..

■ The notion that investors care about liquidity is neither new nor revolutionary. The lack of liquidity of assets has been used to explain why these assets trade at a lower price or yield higher returns.

■ The literature has generally linked illiquidity to trading volume, arguing that it is markets (assets) where volume is low that we have to worry about illiquidity the most. Following through on this proposition:

- Illiquidity is more of a problem with real asset markets (real estate, fine art) than for financial asset markets.
- Illiquidity will affect value more in emerging markets than in developed markets.
- Illiquidity should be greater factor for small cap companies than with large cap companies.

Dealing with illiquidity..

■ With publicly traded firms, the conventional practice for dealing with liquidity can be best described as benign neglect. We generally have ignored liquidity, when estimating discount rates and cash flows, and thus in estimating value. We consider liquidity primarily in the execution phase, when assessing whether to buy a company that we have found to be under valued.

■ With private firms, appraisers have been more cognizant of the need for considering illiquidity but have used bludgeon approaches where:

  • Discounts are applied to value based upon small sample studies of strange companies (restricted stocks, IPOs…)

  • Illiquidity is often double counted, by augmenting discount rates (for size?) and applying a discount to value.

  • There is little discrimination across private businesses.

Lesson 5A: Even large cap stocks in developed markets can become illiquid..

- Panic selling

Reaching Down

Morgan Stanley's share price dropped 24% on Wednesday

Source: WSJ Market Data Group

- And buying

SHARE PRICE IN GERMANY

Volkswagen

Tuesday: €945 ($1,200), up 82%
October change: up 244%
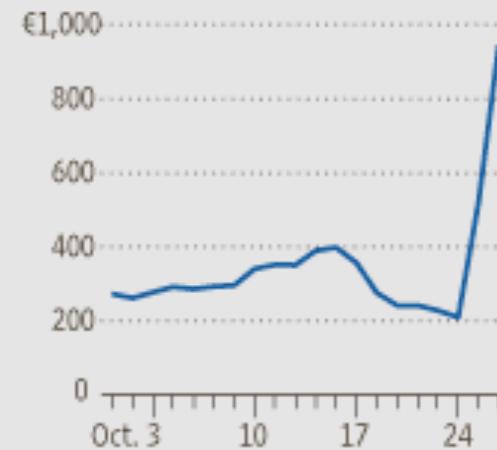
Source: Thomson Reuters

Lesson 5B: With the concurrent increase in costs…
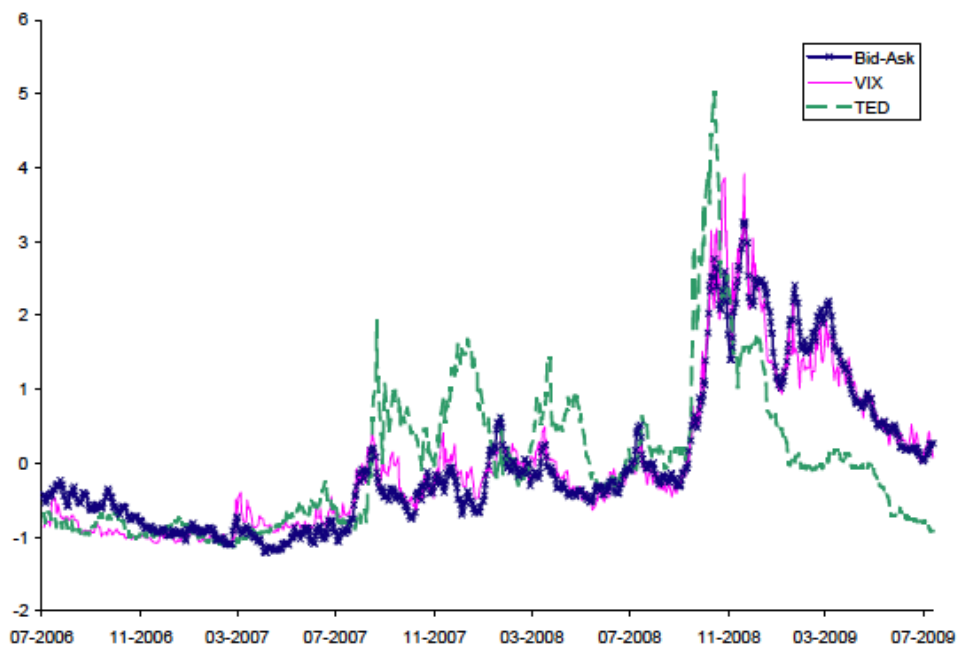
Figure 2: **Bid-Ask Spreads During the Global Liquidity Crisis.** The chart shows average bid-ask spread for large cap U.S. stocks, the equity volatility index VIX, and the interest-rate spread between LIBOR and Treasury bills (TED) from July 2006 to July 2009. Each of the series has been scaled to have a zero mean and a unit standard deviation.

And even more so for stocks with short sales restrictions…

Short Spreads
The difference between bid and asked prices on stocks subject to the short-selling ban compared with the Dow Jones Industrial Average, in hundredths of a percentage point.
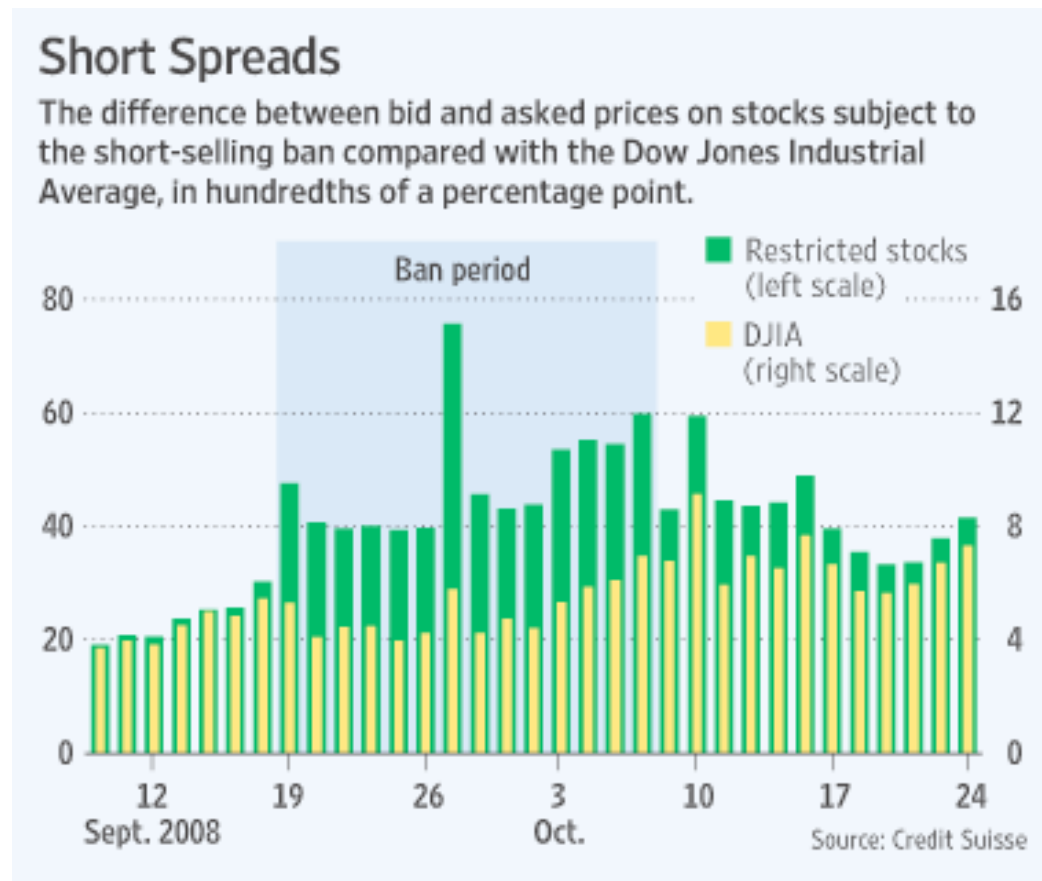
Lesson 5C: With wildly divergent effects for different investors..
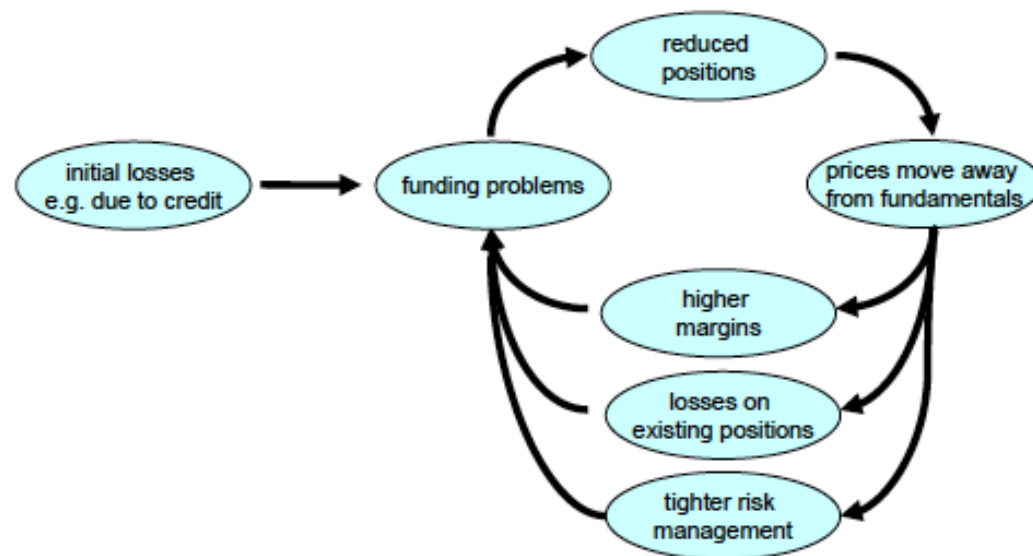
Figure 4: **Liquidity Spirals.** The chart shows how an initial shock to financial institutions' funding is amplified by increasing margins (margin spirals), losses on existing positions (loss spiral), and tightened risk management (risk management spiral).

See Pedersen (2009)

Response 5A: Illiquidity has to be considered explicitly in valuation… for all companies..

■ If we accept the premise that illiquidity can be a significant problem, even with large market cap companies, we have to consider ways in which we can explicitly incorporate the illiquidity risk into value. In general, we have two choices:

- Adjust discount rates: As a general proposition, we could argue that illiquidity is a risk and that discount rates should be higher for illiquid companies. Holding cash flows constant, we will arrive at lower values for illiquid assets.

- Reduce estimated value for illiquidity: Alternatively, we can ignore illiquidity while estimating value but discount the expected value for illiquidity (like private company practitioners have.

Response 5B: And vary across assets (companies)…

- **Liquidity as a source of market risk**: We can extend traditional risk and return models (such as the CAPM) to consider illiquidity as a source of market risk. In practice, this would require us to estimate
  - An illiquidity beta for every asset, reflecting not only how illiquid an asset is but how that illkquidity correlates with market illiquidity
  - An illiquidity risk premium which will vary across time
- **Historical data**: We can look at how the market has priced assets historically and try to back out how much of a discount it has attached to illiquid assets and how that discount varies across asssts.
- **Market based approach**: Using observed stock prices, we can back out the implied illiquidity discount on estimated value for firms in different sectors (illiquidity classes).

Implications for corporate finance…

■ Investment Policy: As illiquidity becomes more of an issue (illiquidity risk premiums increase), we should expect to see
- Less real investment in the aggregate (since the cost of capital of firms will increase)
- A greater drop off in firms that are more exposed to illiquidity risk (smaller firms, more distressed firms…)

■ Capital Structure: The effect of illiquidity can be different across equity and bond markets. If the illiquidity increases proportionately in both markets, there will be no effect. However, if one market becomes more illiquid, relative to the other, there will be a shirt towards the more liquid market.

■ Dividend Policy: Since illiquidity affects external financing more than internal financing, firms will tend to retain more cash.

Implications for Investors…

- <u>Short time horizon investors</u>: When allocating assets, investor have to explicitly factor in illiquidity, in addition to risk and return, in making their decisions. In effect, when illiquidity is a significant concern, investors may have to settle for lower returns and perhaps even higher other risk in return for lower illiquidity.

- <u>Long time horizon investors</u>: A long time horizon can be a key competitive advantage when markets become illiquid. Thus, a portfolio of relatively illiquid investments (small companies, distressed companies…) can have very high expected returns and low other risks.

Buffett's bets…

GE Turns to Buffett for a $3 Billion Show of Confidence

Finance Arm Hit by Credit Worries; 'Rainy-Day Fund'

Article   **Comments (28)**

✉ Email   🖨 Printer Friendly   Share: 🅱 Yahoo Buzz ▼   – Text Size +

By PAUL GLADER and LIZ RAPPAPORT

In the latest unexpected deal stemming from the financial crisis, General Electric Co. turned to Warren Buffett to inject at least $3 billion in the company -- and, GE hopes, provide a much-needed boost in investor confidence.

BUSINESS | SEPTEMBER 25, 2008

Buffett Drove Hard Bargain With Goldman

Article   **Comments**

✉ Email   🖨 Printer Friendly   Share: 🅱 Yahoo Buzz ▼   – Text Size +

By SUSAN PULLIAM, KATE KELLY and MATTHEW KARNITSCHNIG

For six months, as the credit crisis deepened, billionaire investor Warren Buffett turned away a string of Wall Street firms that came hat in hand looking for help.

On Tuesday, Mr. Buffett says, he was sitting with his feet on his desk in Omaha, drinking a Cherry Coke and munching on mixed nuts, when he got an unusually candid call from a Goldman Sachs Group Inc. investment banker. Tell us what kind of investment you'd consider making in Goldman, the banker urged him, and the firm would try to hammer out a deal.

Aswath Damodaran   *72*

VI. A year is not a trend…

■ In early 2009, Exxon and Petrobras reported the following (for the 2008 fiscal year)

	Exxon Mobil	Petrobras
Revenues	$477 billion	$R 215 billion
EBIT (1-t)	$ 58 billion	$R 32 billion
Net Cap Ex	$ 3 billion	$R 41 billion
Chg WC	$ 1 billion	$R 3 billion
FCFF	$ 54 billion	$R – 12 billion

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?

The conventional response: Normalize..

- 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 mean reversion, 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 structural break with the past. Holding on to the past, when the world has changed around you, is a recipe for disaster.

Lesson 6A: There may be no normal…
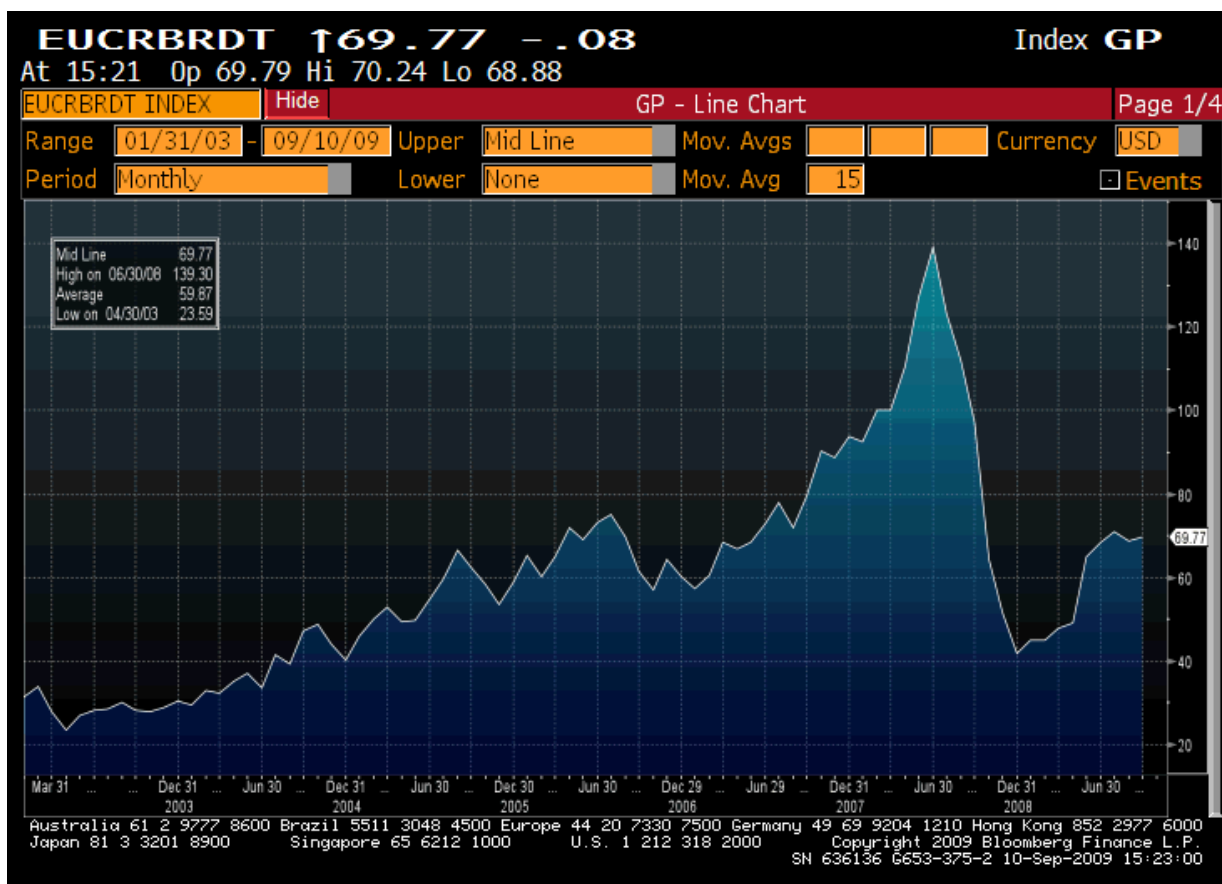
And value will be a function of the expected price…

Exxon Mobil: Equity Value and Oil Price
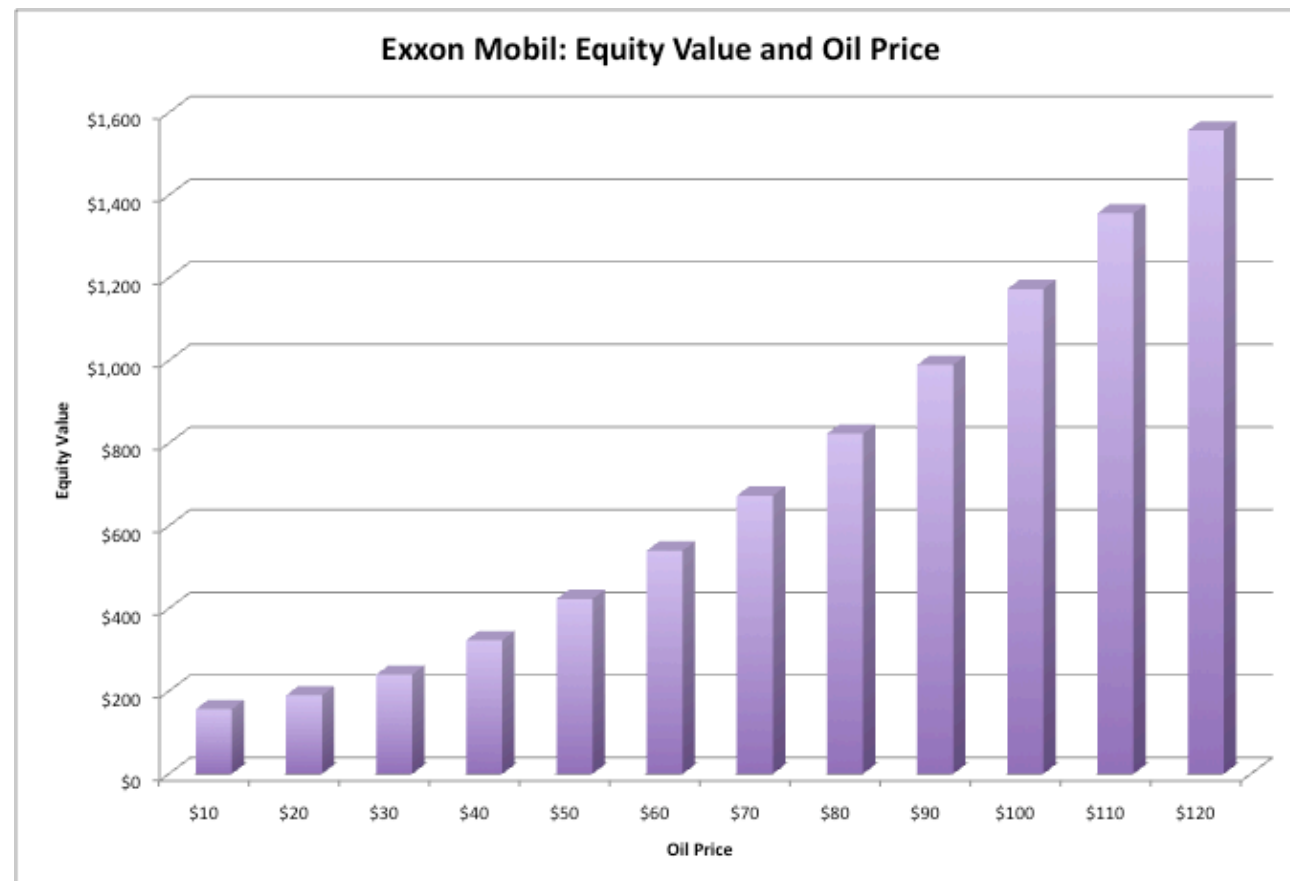
Lesson 6B: And stability can be fleeting… Valuing a Bank in 2009 – Wells Fargo..

Year	2008	2007	2006	2005	2004	2003	2002	2001	Average: 01-07
Dividends	$5,751	$3,955	$3,641	$3,375	$3,150	$2,527	$1,873	$1,710	
Net Income	$2,842	$8,057	$8,482	$7,671	$7,014	$6,202	$5,434	$3,423	
Book Equity	$47,628	$45,876	$40,660	$37,866	$34,469	$30,319	$27,214	$26,488	
Growth Rate	-64.73%	-5.01%	10.57%	9.37%	13.09%	14.13%	58.75%	-14.98%	12.28%
Payout ratio	202.36%	49.09%	42.93%	44.00%	44.91%	40.74%	34.47%	49.96%	43.73%
ROE	5.97%	17.56%	20.86%	20.26%	20.35%	20.46%	19.97%	12.92%	18.91%

1. If you were valuing Wells Fargo today, what would you use as your base year earnings? Dividends? Return on equity?

2. 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?

Response 6A: When uncertain, keep it simple:
The key valuation inputs for Wells Fargo..

■ Focus on the key inputs into valuation: the ROE and the cost of equity

		Cost of Equity			
		9%	11%	13%	15%
Return on Equity	10%	$56,900	$42,971	$34,542	$28,910
	12%	$73,581	$55,185	$44,148	$36,790
	14%	$90,883	$67,909	$54,144	$44,982
	16%	$109,917	$81,157	$64,541	$53,694
	18%	$122,703	$94,942	$75,349	$62,333
	20%	$147,261	$109,279	$86,578	$71,509

■ Or define value as a function of key scenarios:
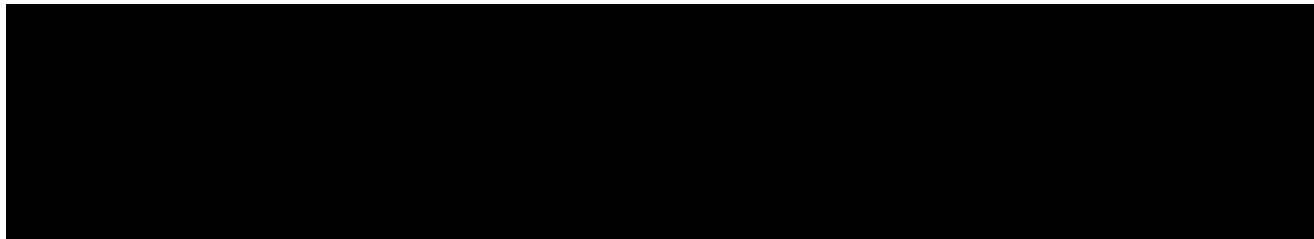
Implications for corporate finance: Probabilistic analysis

■ 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 1: Look at history
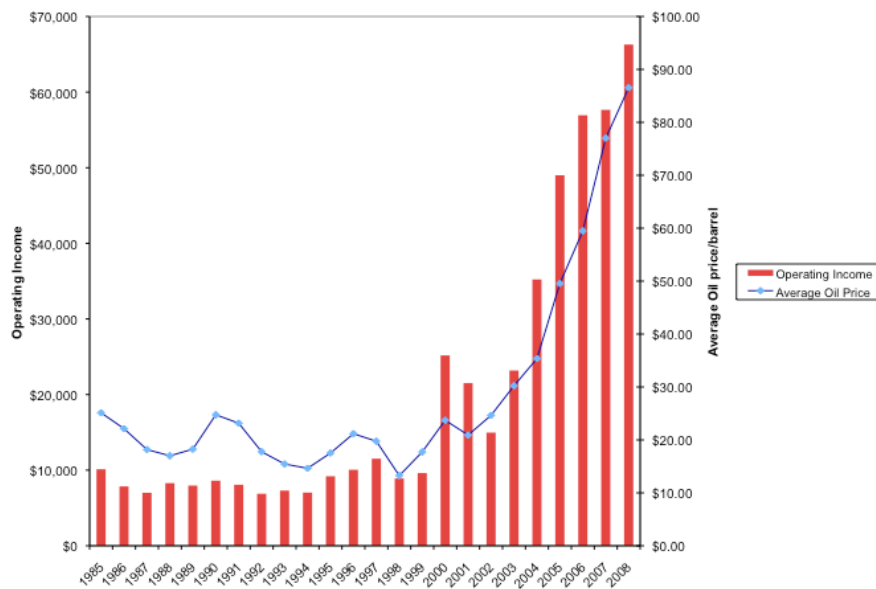
Step 3: Run simulation
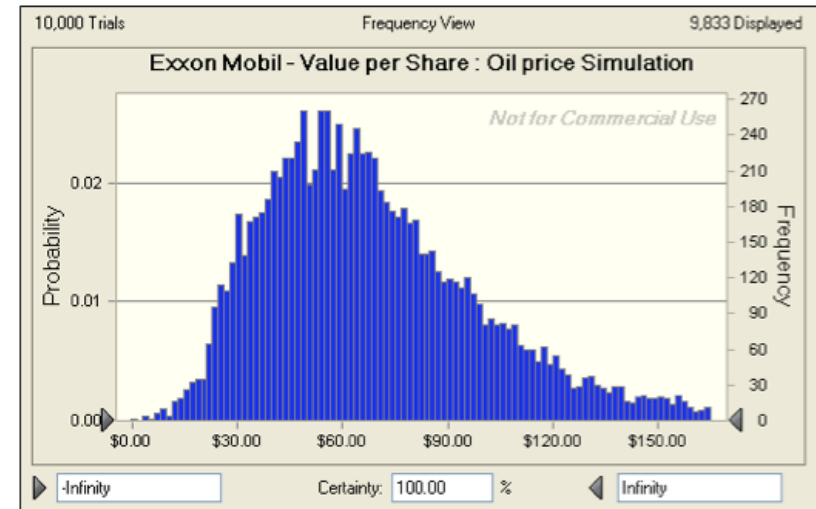
Step 2: Look for relationship
Regression of Exxon income against oil price
Op Inc = -6,934 + 911 (Price per barrel of oil)
R squared = 94%

VII. 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%

Europe (West)		Europe (East)	
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%
France	0.00%	Bulgaria	3.90%
Germany	0.00%	Croatia	3.38%
Greece	2.10%	Czech Republic	2.10%
Iceland	3.00%	Estonia	2.10%
Ireland	0.00%	Hungary	2.63%
Italy	1.50%	Kazakhstan	3.00%
Malta	2.10%	Latvia	2.63%
Netherlands	0.00%	Lithuania	2.40%
Norway	0.00%	Moldova	18.00%
Portugal	1.50%	Montenegro	6.00%
Spain	0.00%	Poland	2.40%
Sweden	0.00%	Romania	3.90%
Switzerland	0.00%	Russia	3.00%
United Kingdom	0.00%	Slovakia	2.10%
		Slovenia [1]	1.50%
		Turkmenistan	11.25%
		Ukraine	9.75%

Asia	
Cambodia	11.25%
China	2.10%
Fiji Islands	6.00%
Hong Kong	1.50%
India	6.00%
Indonesia	7.88%
Japan	1.80%
Korea	2.40%
Macao	1.80%
Malaysia	2.63%
Mongolia	9.75%
Pakistan	13.50%
Papua New Guinea	9.75%
Philippines	9.75%
Singapore	0.00%
Taiwan	1.80%
Thailand	3.00%
Turkey	7.88%
Vietnam	7.88%

North America	
Mexico	3.00%
Canada	0.00%
United States of America	0.00%

Latin America	
Argentina	13.50%
Belize	18.00%
Bolivia	13.50%
Brazil	4.50%
Chile	2.10%
Colombia	3.90%
Costa Rica	4.50%
Ecuador	3.90%
El Salvador	3.38%
Guatemala	4.50%
Honduras	11.25%
Nicaragua	13.50%
Panama	4.50%
Paraguay	13.50%
Peru	3.90%
Uruguay	9.75%
Venezuela	9.75%

Africa	
Botswana	2.10%
Egypt	4.50%
Mauritius	3.38%
Morocco	4.50%
South Africa	2.40%
Tunisia	3.38%

Middle East	
Bahrain	2.40%
Israel	2.10%
Jordan	3.90%
Kuwait	1.50%
Lebanon	13.50%
Oman	2.40%
Qatar	1.50%
Saudi Arabia	2.10%
United Arab Emirates	1.50%

Oceania	
Australia	0.00%
New Zealand	0.00%

Aswath Damodaran

Country Risk Premiums
January 2009

Lesson 7A: Country risk can change in a hurry…

Brazil: Implied ERP and Country ERP
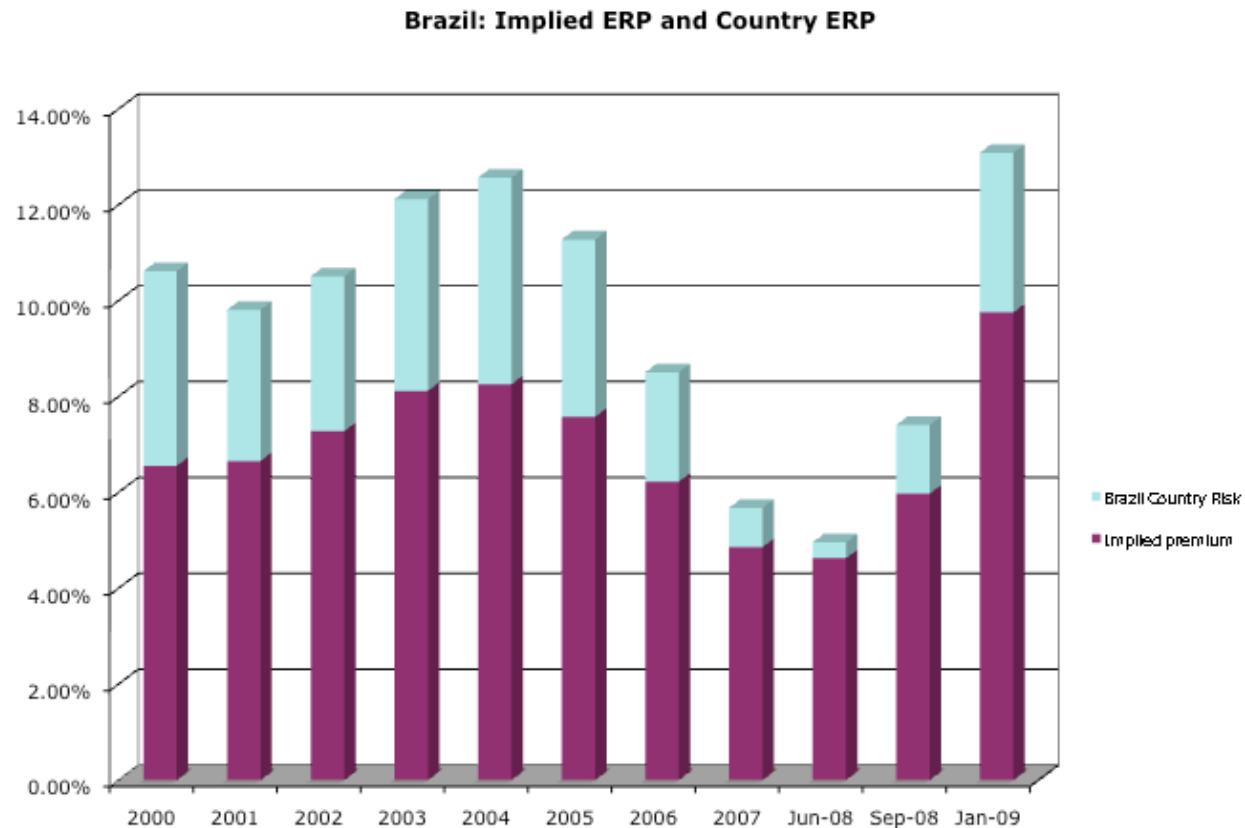
Response 7A: A more dynamic measure of country risk..
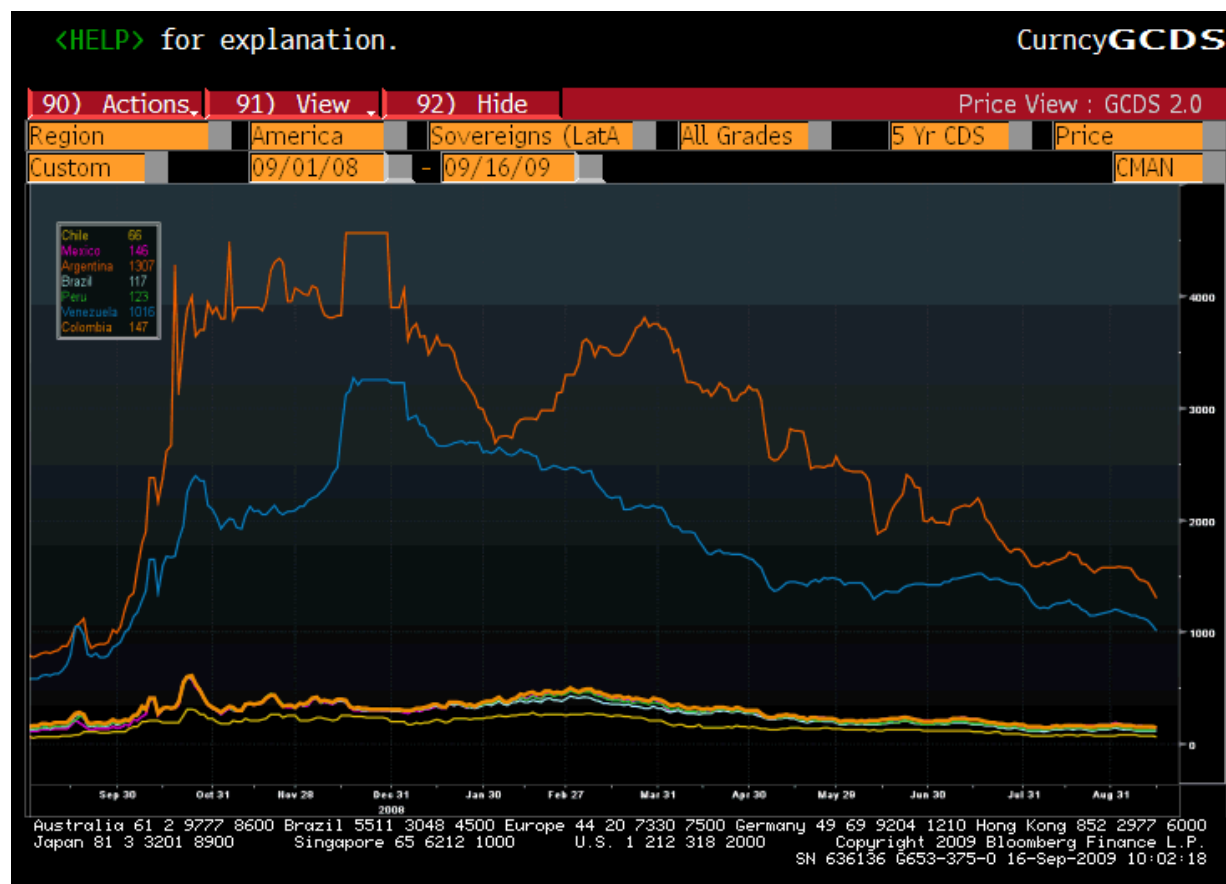
Lesson 7B: And affect developed market companies…

■ Results of The Economist's Survey of developed market companies

In the past three years, how has the extent of your organisation's investments in emerging markets changed?
(% respondents)

Increased significantly **40**
Increased slightly **39**
Stayed the same **14**
Decreased slightly **6**
Decreased significantly **1**
Don't know **1**
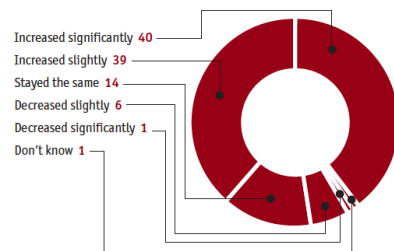
How significant do you consider the following risks to be in the context of your organisation's emerging markets investments?
(% of respondents)

■ 1 ■ 2 ■ 3 ■ 4 ■ 5 ■ Don't know/Not applicable

Risk	1	2	3	4	5	Don't know/NA
Economic problems in host countries	23	34	28	11	3	2
Stability of political regime in host countries	24	36	28	6	5	2
Terrorism	16	27	18	26	11	1
War/major social unrest	16	26	26	21	10	2
Abrupt change in policy/ruling party	21	36	26	12	4	2
Bribery and corruption	24	34	25	10	6	1
Failure to honour contracts	21	34	24	15	4	1
Theft of intellectual property	17	21	27	23	9	3
Strikes/major labour disruptions	10	14	38	26	11	1
Nationalisation of assets	16	20	24	23	16	1
Trade embargo or sanctions	9	18	18	28	24	3
Creeping expropriation	11	21	22	22	19	5
Lack of judicial independence	18	26	31	14	9	2
Lack of commitment to international treaties	18	20	23	25	13	3

Response 7: Country risk derives from operations, not where you are incorporated..

- **Source of revenues**: 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:

λ = % 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…

$Return_{Embraer} = 0.0195 + \textbf{0.2681}\ Return_{C\ Bond}$ $Return_{Embratel} = -0.0308 + \textbf{2.0030}\ Return_{C\ Bond}$
$Return_{Ambev} = 0.0290 + \textbf{0.4136}\ Return_{C\ Bond}$ $Return_{Petrobras} = -0.0308 + \textbf{0.6600}\ Return_{C\ Bond}$
$Return_{Vale} = 0.02169 + \textbf{0.3760}.Return_{C\ Bond}$

Embraer versus C Bond: 2000-2003

Embratel versus C Bond: 2000-2003
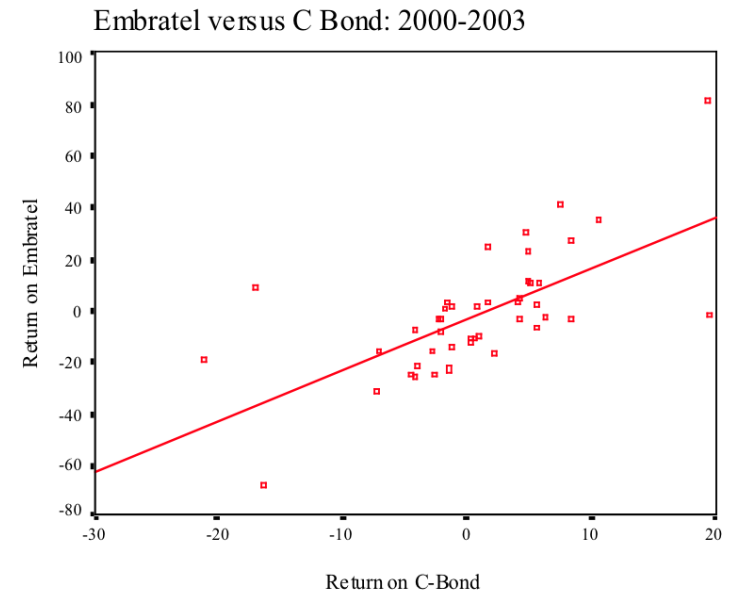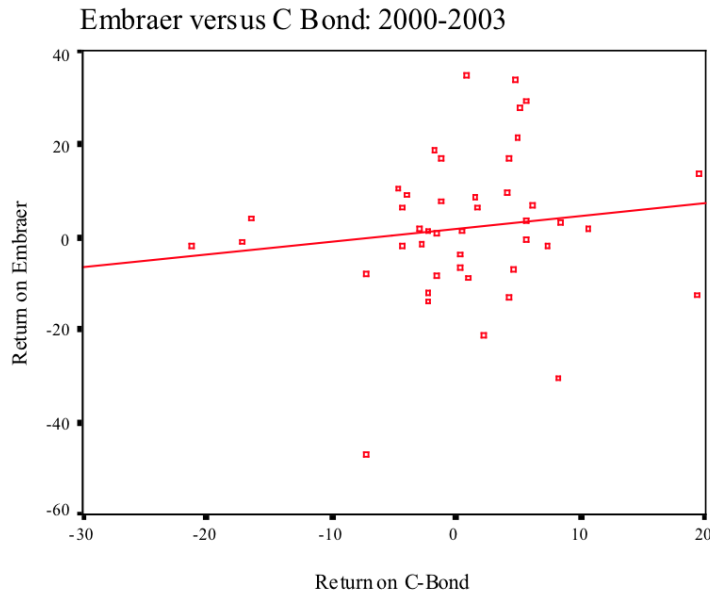
Implications for corporate finance..

■ <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

Embraer: $ Value in 2009

Current Cashflow to Firm
EBIT(1-t) :   R$ 735
- Nt CpX   R$ 596
- Chg WC   R$ 297
= FCFF   - R$ 158
R$/ US $ 2.252
Reinvestment Rate = 893/735=122%

Average from 2004-2008

Reinvestment Rate
23.54%

Return on Capital
15.58%

Expected Growth in EBIT (1-t)
..2354*.1558=0.0367
3.67%

Stable Growth
g = 3%; Beta = 1.20
Country Premium= 3%
Cost of capital = 8.81%
ROC= 8.81%;
Reinvestment Rate=g/ROC
=3/ 78.81= 34.03%

Terminal Value$_5$= 230/(.0881-.03) = $ 3840

$ Cashflows

Year	1	2	3	4	5	
EBIT (1-t)	R$ 762	R$ 789	R$ 818	R$ 848	R$ 879	R$ 906
- Reinvestment	R$ 179	R$ 186	R$ 193	R$ 200	R$ 207	R$ 308
FCFF (in R$)	R$ 582	R$ 604	R$ 626	R$ 649	R$ 672	R$ 598
Exchange rate	2.32	2.39	2.46	2.53	2.60	2.68
FCFF (In US $)	$251	$253	$255	$257	$258	$ 230

Op. Assets $ 3,197
+ Cash: 2,274
+ Non-op   608
- Debt   1,597
- Minor. Int.   117
=Equity   4,366
Value/Share $ 5.90
            R$ 13.28

Discount at $ Cost of Capital (WACC) = 14.42% (.62) + 5.94% (0.38) = 11.17%

Expected inflation
US = 2%
Brazil = 5%

Cost of Equity 14.42%

Cost of Debt
(3%+ 3%+ 3%)(1-.34)
= 5.94%

Weights
E = 62% D = 38%

On June 1, 2009
Embraer Price = R$ 7.2

Riskfree Rate:
$ Riskfree Rate= 3%

+

Beta
1.69

X

Mature market premium
6%

+

Lambda
0.27

X

Country Equity Risk Premium
4.75%

Unlevered Beta for
Sectors: 1.20

Firm's D/E
Ratio: 62%

Country Default
Spread
3%

X

Rel Equity
Mkt Vol
1.5833
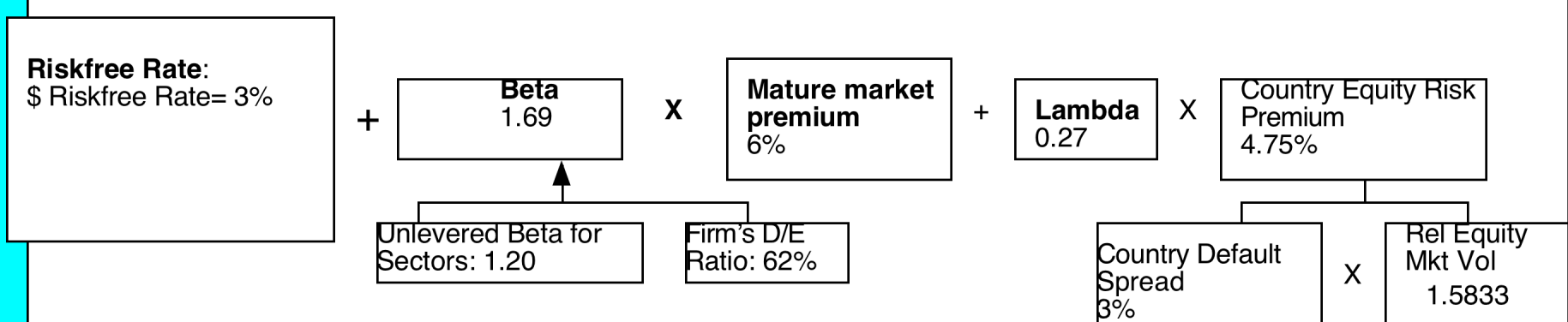
VIII. Growth and Value

	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

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

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 8A: Growth can be illusory…

Earnings growth at technology companies
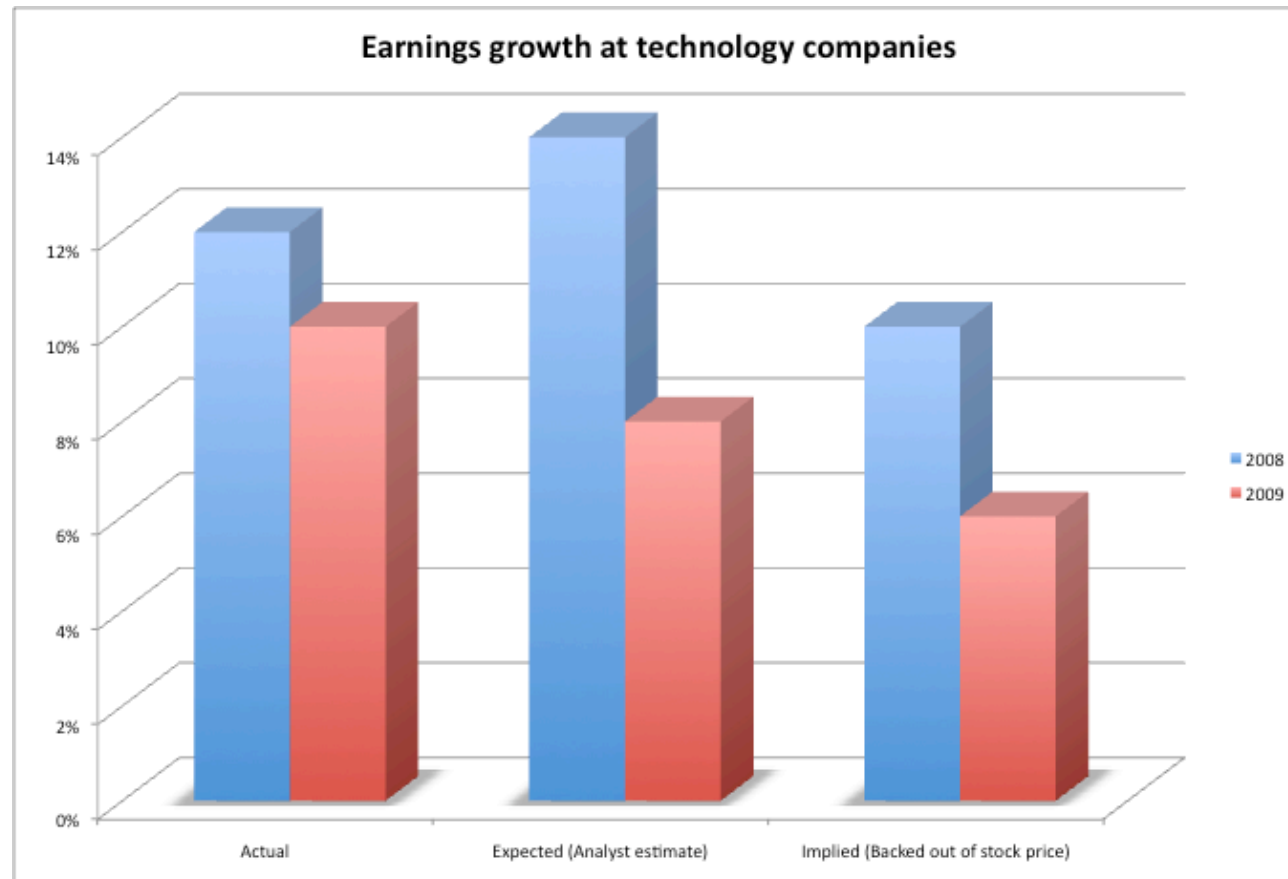
Lesson 8B: And destroy value..

■ 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…
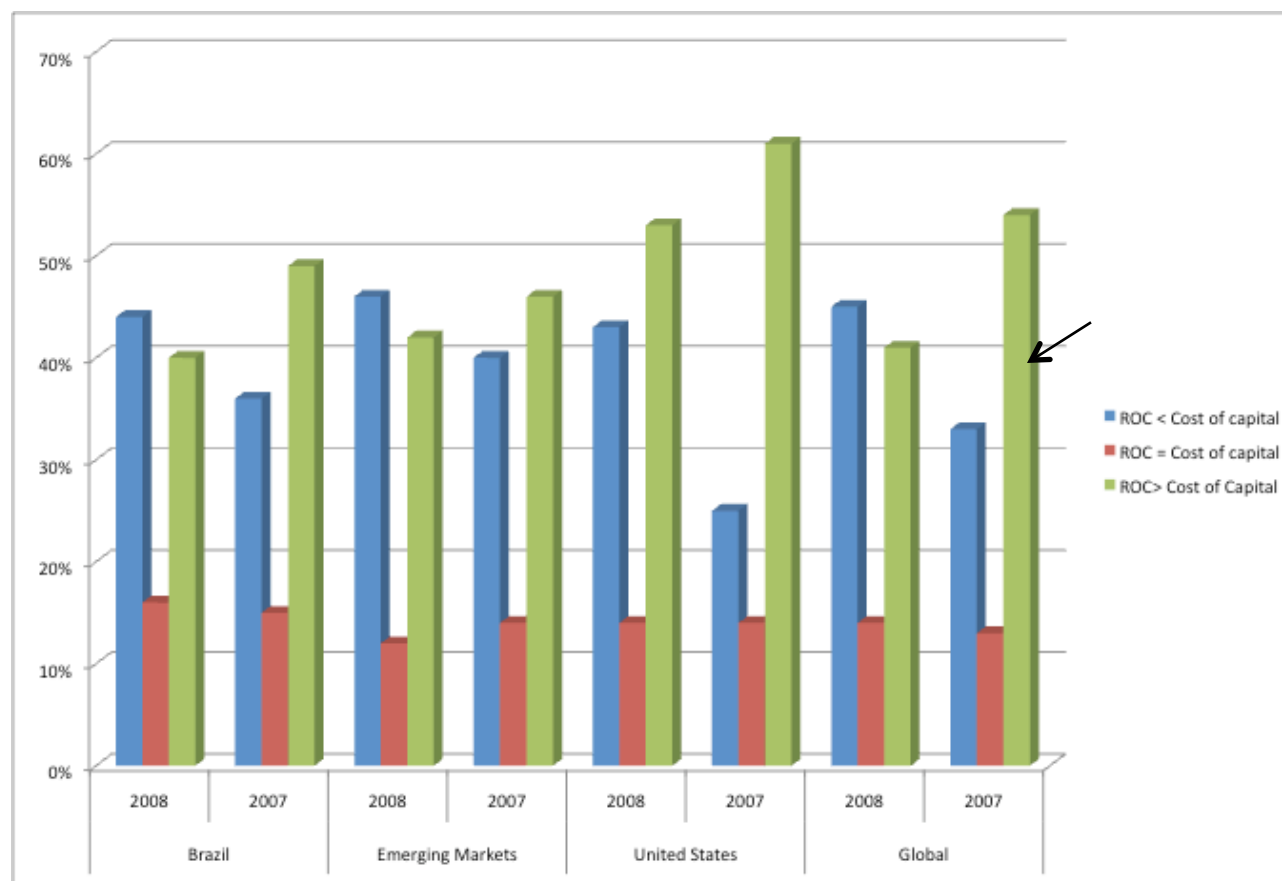
Response 8A: Don't trust historical growth rates..

		Next 5 years					
	Growth Class	Lowest	2	3	4	5	Highest
First 5 years	Lowest	13.73%	7.19%	7.52%	9.80%	13.07%	48.69%
	2	27.27%	6.74%	12.61%	15.84%	17.01%	20.53%
	3	15.23%	14.09%	27.27%	20.45%	11.14%	11.82%
	4	10.03%	14.09%	34.15%	21.14%	11.38%	9.21%
	5	9.09%	12.63%	24.24%	28.79%	12.12%	13.13%
	Highest	16.32%	10.88%	19.67%	22.18%	13.81%	17.15%

Typically, the revenue growth rate of a newly public company outpaces its industry average for only about five years.

Margin by which revenue growth rate exceeds industry average

Post-I.P.O. growth
Median of new issues from 1965 to 2005

Number of years after coming to market
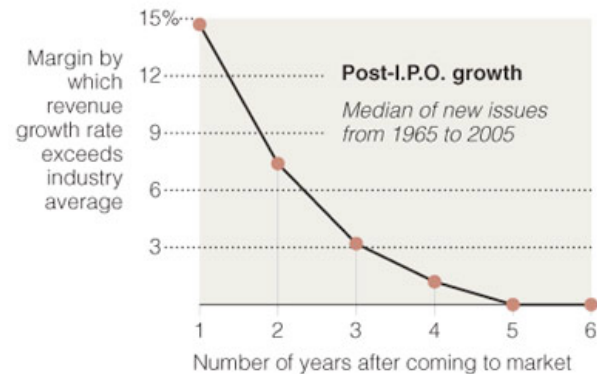
Source: Andrew Metrick   The New York Times

Response 8B: Or analyst estimates and management forecasts…

S&P 500 2Q09 earnings estimates
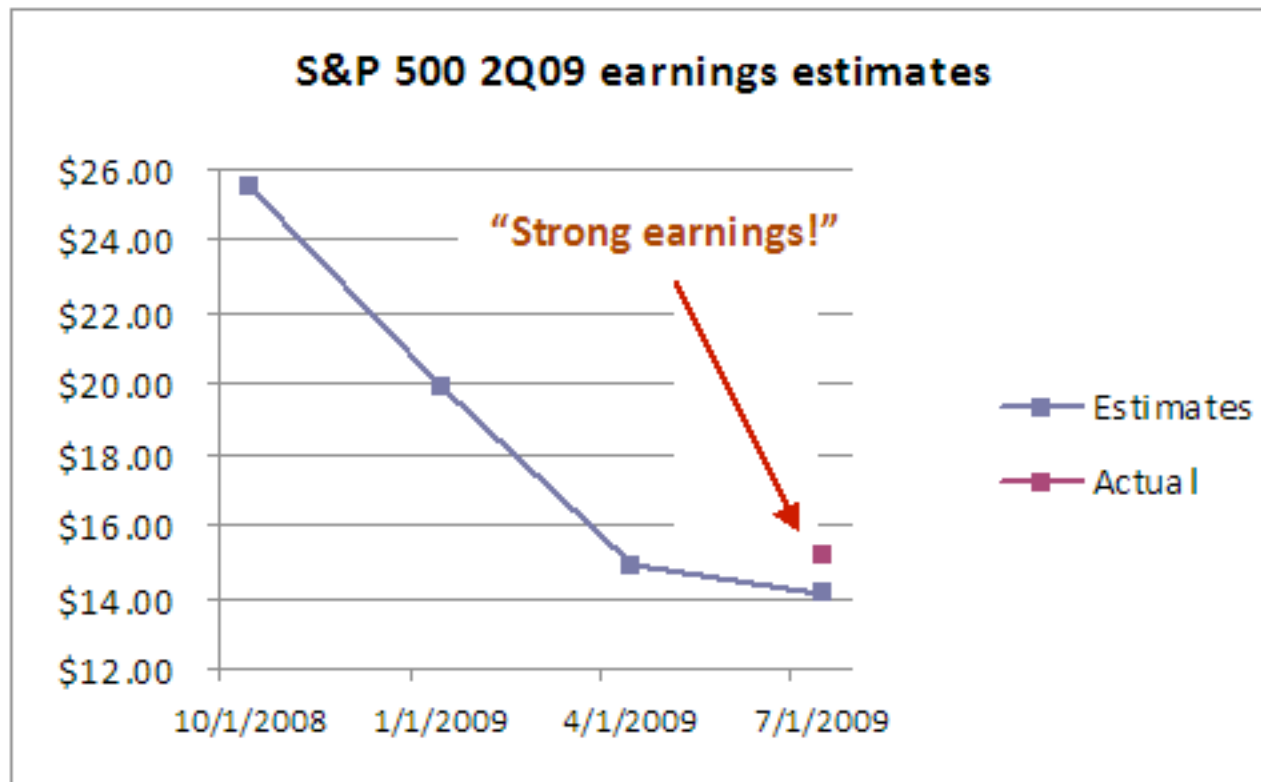
Response 8C: Spend some time getting return on capital right!!

Adjust EBIT for
a. Extraordinary or one-time expenses or income
b. Operating leases and R&D
c. Cyclicality in earnings (Normalize)
d. Acquisition Debris (Goodwill amortization etc.)

Use a marginal tax rate to be safe. A high ROC created by paying low effective taxes is not sustainable

$$ROC = \frac{EBIT \ (1 - tax \ rate)}{Book \ Value \ of \ Equity + Book \ value \ of \ debt - Cash}$$

Adjust book equity for
1. Capitalized R&D
2. Acquisition Debris (Goodwill)

Adjust book value of debt for
a. Capitalized operating leases

Use end of prior year numbers or average over the year but be consistent in your application

Implication for corporate finance: Not all growth is created equal…

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

Category of growth	Shareholder value created for incremental $1 million of growth/ target acquisition size[1]	Revenue growth/ acquisition size necessary to double typical company's share price,[2] $ billions
New-product market development	1.75–2.00	5–6
Expanding an existing market	0.30–0.75	13–33
Maintaining/growing share in a growing market	0.10–0.50	20–100
Competing for share in a stable market	–0.25–0.40	n/m–25
Acquisition (25th to 75th percentile result)[3]	–0.5–0.20	n/m–50

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?

■ <u>Watch out for deteriorating returns on capital</u>: Rather than just focus on overall returns on capital, we should be focusing on marginal returns on new or additional investments.

■ <u>Check the qualitative variables</u>: 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.

IX: The Debt Equity Trade off

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

	3. Loss of flexibility: Using up available debt capacity today will mean that you cannot draw on it in the future. This loss of flexibility can be disastrous if funds are needed and access to capital is shut off.
	Implication:
	    1. Firms that can forecast future funding needs better should be able to borrow more.
	    2. Firms with better access to capital markets should be more willing to borrow more today.

The cost of capital trade off

Bankruptcy costs are built into both the
cost of equity the pre-tax
cost of debt

Tax benefit is
here

Cost of capital = Cost of Equity (Equity/ (Debt + Equity)) + Pre-tax cost of debt (1- tax rate) (Debt/ (Debt + Equity)

As you borrow more, he
equity in the firm will
become more risky as
financial leverage magnifies
business risk. The cost of
equity will increase

As you borrow more,
your default risk as a
firm will increase
pushing up your cost
of debt.

At some level of
borrowing, your tax
benefits may be put
at risk, leading to a
lower tax rate.

The conventional cost of capital approach:
Disney in May 2009

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	Cost of capital	Firm Value (G)
0%	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%	A	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%	A	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 9A: Debt ratios and costs of capital can shift, even if dollar debt does not…

		Jan-08		Jan-09	
Industry Name	Change in debt 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 9B: 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 9A: 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%	C	18.50%	22.97%	14.25%	12.77%	$17,569
60%	1.62	13.24%	C	18.50%	19.15%	14.96%	14.27%	$15,630
70%	2.16	16.48%	C	18.50%	16.41%	15.46%	15.77%	$14,077
80%	3.25	22.97%	C	18.50%	14.36%	15.84%	17.27%	$12,804
90%	6.49	42.44%	C	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%
A	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%
B	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%
C	0.2	0.649999	15.00%	-40.00%
D	-100000	0.199999	20.00%	-50.00%

Response 9B: 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.

- <u>The herd can be wrong</u>: 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.

X: 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?

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?

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?

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 10: We under estimate truncation risk.. With distressed firms..

■ 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 10.1: 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 10.2: Capital markets can shut down*, even in developed markets and even for the largest companies.

Current Revenue $ 4,390	Current Margin: 4.76%	**Reinvestment:** Capital expenditures include cost of new casinos and working capital			*Stable Growth*		

Reinvestment: Capital expenditures include cost of new casinos and working capital

Stable Growth

Current Revenue $ 4,390

Current Margin: 4.76%

Stable Revenue Growth: 3%

Stable Operating Margin: 17%

Stable ROC=10% Reinvest 30% of EBIT(1-t)

EBIT $ 209m

Extended reinvestment break, due ot investment in past

Industry average

Expected Margin: -> 17%

Terminal Value= 758(.0743-.03) =$ 17,129

Term. Year

	$4,434	$4,523	$5,427	$6,513	$7,815	$8,206	$8,616	$9,047	$9,499	$9,974	$10,273
Revenues	$4,434	$4,523	$5,427	$6,513	$7,815	$8,206	$8,616	$9,047	$9,499	$9,974	$10,273
Oper margin	5.81%	6.86%	7.90%	8.95%	10%	11.40%	12.80%	14.20%	15.60%	17%	17%
EBIT	$258	$310	$429	$583	$782	$935	$1,103	$1,285	$1,482	$1,696	$ 1,746
Tax rate	26.0%	26.0%	26.0%	26.0%	26.0%	28.4%	30.8%	33.2%	35.6%	38.00%	38%
EBIT * (1 - t)	$191	$229	$317	$431	$578	$670	$763	$858	$954	$1,051	$1,083
- Reinvestment	-$19	-$11	$0	$22	$58	$67	$153	$215	$286	$350	$ 325
FCFF	$210	$241	$317	$410	$520	$603	$611	$644	$668	$701	$758
	1	2	3	4	5	6	7	8	9	10	Forever

Value of Op Assets	$ 9,793
+ Cash & Non-op	$ 3,040
= Value of Firm	$12,833
- Value of Debt	$ 7,565
= Value of Equity	$ 5,268
Value per share	$ 8.12

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

Cost of Equity 21.82%

Cost of Debt 3%+6%= 9% 9% (1-.38)=5.58%

Weights Debt= 73.5% ->50%

Riskfree Rate: T. Bond rate = 3%

Beta 3.14-> 1.20

x

Risk Premium 6%

+

Casino 1.15

Current D/E: 277%

Base Equity Premium

Country Risk Premium
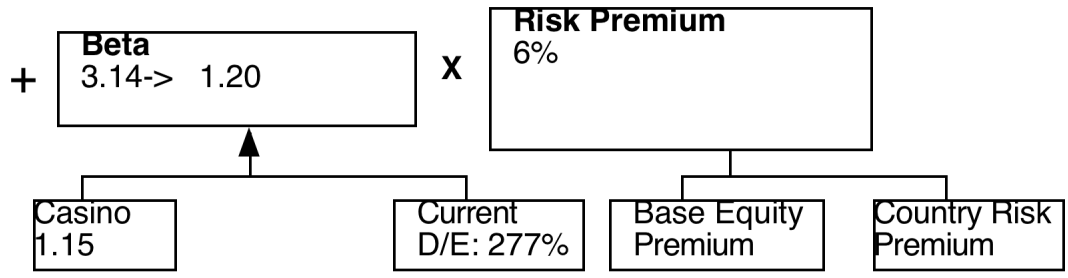
Las Vegas Sands Feburary 2009 Trading @ $4.25

Response 10: Adjust value for truncation risk

- In February 2009, LVS was rated B+ by S&P. Historically, <u>28.25% of B+ 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 (3%), we can back out the probability of distress from the bond price:

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

- Solving for the probability of bankruptcy, we get:

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

  - 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

And at the other end of the spectrum… Survival rates for young private businesses…

	Starting	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Natural resources	100.00%	82.33%	69.54%	59.41%	49.56%	43.43%	39.96%	36.68%
Construction	100.00%	80.69%	65.73%	53.56%	42.59%	36.96%	33.36%	29.96%
Manufacturing	100.00%	84.19%	68.67%	56.98%	47.41%	40.88%	37.03%	33.91%
Transportation	100.00%	82.58%	66.82%	54.70%	44.68%	38.21%	34.12%	31.02%
Information	100.00%	80.75%	62.85%	49.49%	37.70%	31.24%	28.29%	24.78%
Financial activities	100.00%	84.09%	69.57%	58.56%	49.24%	43.93%	40.34%	36.90%
Business services	100.00%	82.32%	66.82%	55.13%	44.28%	38.11%	34.46%	31.08%
Health services	100.00%	85.59%	72.83%	63.73%	55.37%	50.09%	46.47%	43.71%
Leisure	100.00%	81.15%	64.99%	53.61%	43.76%	38.11%	34.54%	31.40%
Other services	100.00%	80.72%	64.81%	53.32%	43.88%	37.05%	32.33%	28.77%
All firms	100.00%	81.24%	65.77%	54.29%	44.36%	38.29%	34.44%	31.18%

■ In valuing young companies, we should explicitly adjust value for the likelihood of survival, especially since the assets will be worth little if the firm does not.

■ The traditional venture capital route – using a target rate that is much higher than a conventional risk-adjusted discount rate – is a sloppy way of adjusting for survival.

XI. 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 11: 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…

- Bailouts: By determining who is "too large to fail" and who is not, governments can determine the destiniex of even large enterprises.
- Nationalizations: We used to think of the fear of nationalization as restricted to tinpot dictatorships in small emerging markets. No more!
- Regulations and rules: 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 11: Incorporate the "Heavy Hand" into Equity Value per Share

	Average for companies where government has large stake	Average for other companies in the same sector
Tax Rate	41%	32%
ROIC	7%	11%
Debt ratio	43%	35%
Dividends/FCFE	135%	78%

The government's interests may diverge from your interests.
-Dividend policy
-Cost cutting
-Taxes

If the company is badly run, can you do anything about it as a stockholder?

The Government put: 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.

The Government call: 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.

# XII. 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?

Lesson 12A: Cash may not be a neutral asset…

	Company A	Company B	Company C
Enterprise Value	$ 1 billion	$ 1 billion	$ 1 billion
Cash	$ 100 mil	$ 100 mil	$ 100 mil
Return on Capital	10%	5%	22%
Cost of Capital	10%	10%	12%
Trades in	US	US	Indonesia

Response 12A: A large cash balance can be "bad" or "good"

Market Value of $ 1 in cash:
Estimates obtained by regressing Enterprise Value against Cash Balances
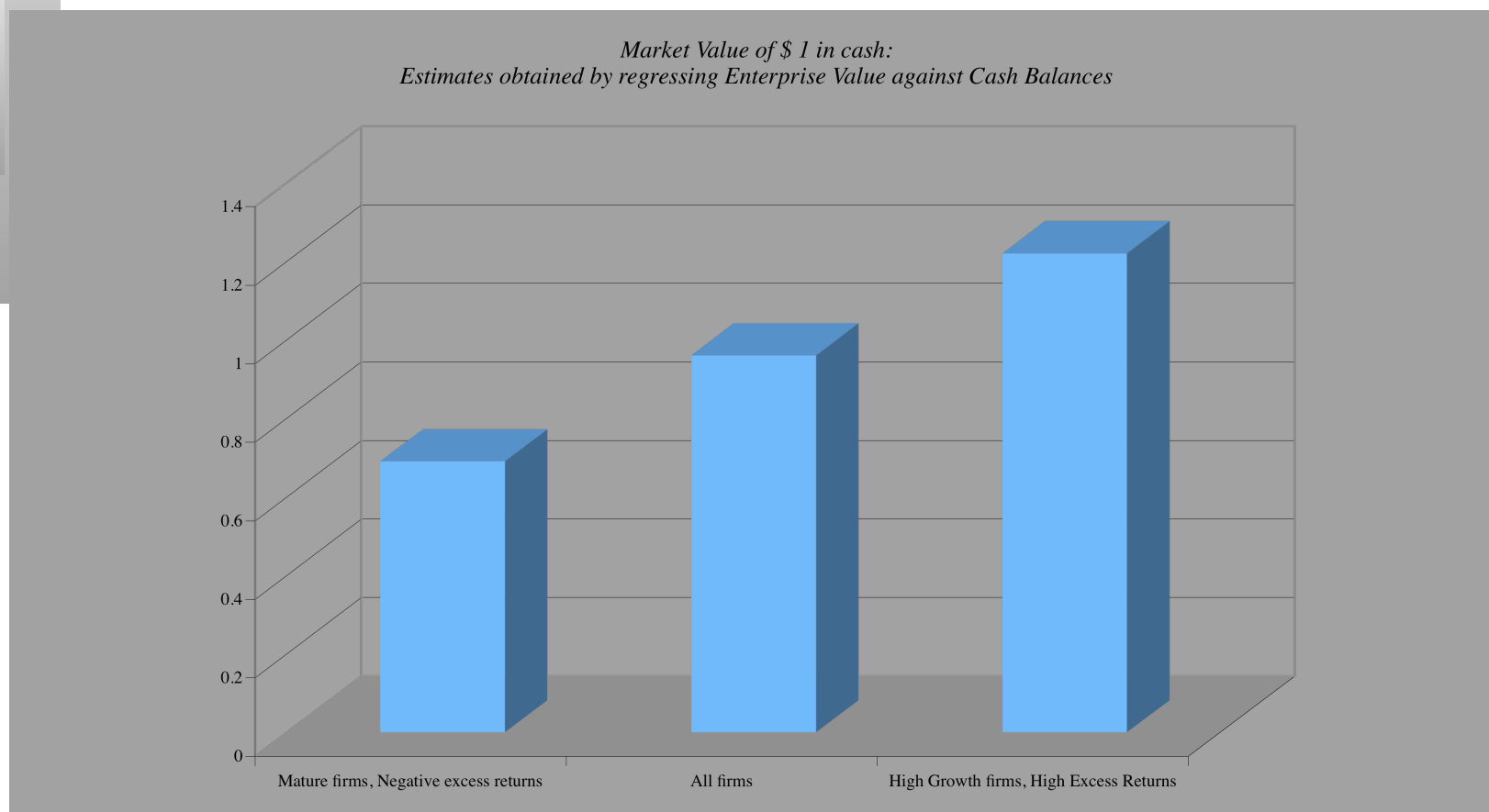
Lesson 12B: It is what you don't see that trips you up..

■ 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.

Response 12B: Measure Complexity
1. 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

2. 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 Expenditures	1. Volatile capital expenditures	Yes or No	Yes	Yes=2	2	2
	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 rate	1. Off-balance sheet assets and 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

And incorporate the complexity into value…

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
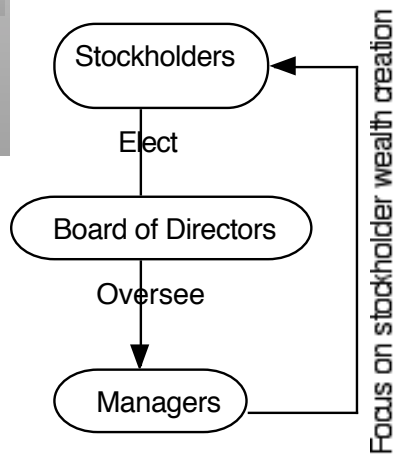 - Value the firm and then discount value for complexity

In relative valuation

In a relative valuation, you may be able to assess the price that the market is charging for complexity:

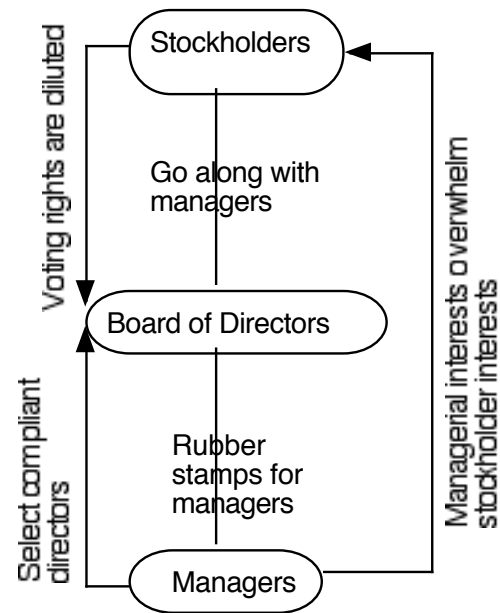With the hundred largest market cap firms, for instance:

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

Classical Theory

```
┌──────────────┐
│ Stockholders │◄───────┐
└──────┬───────┘        │
       │ Elect          │
       ▼                │  Focus on stockholder wealth creation
┌──────────────────┐    │
│ Board of Directors│   │
└──────┬───────────┘    │
       │ Oversee        │
       ▼                │
┌──────────────┐        │
│   Managers   │────────┘
└──────────────┘
```

Agency Theory

```
        ┌──────────────┐
        │ Stockholders │◄────────┐
        └──────┬───────┘         │
 Voting        │ Go along with   │  Managerial interests overwhelm
 rights        │ managers        │  stockholder interests
 are           ▼                 │
 diluted ┌──────────────────┐    │
         │ Board of Directors│   │
         └──────┬───────────┘    │
 Select         │ Rubber         │
 compliant      │ stamps for     │
 directors      │ managers       │
         ▼      ▼                │
        ┌──────────────┐         │
        │   Managers   │─────────┘
        └──────────────┘
```

Corporate Governance Fix

```
        ┌──────────────┐
   ┌───►│ Stockholders │◄────────┐
   │    └──────┬───────┘         │
 Laws/Rules    │ More say in     │  Tie managerial compensation to
 on voting     │ board selection │  equity value.
 rights        ▼                 │
   │    ┌──────────────────┐     │
   └────│ Board of Directors│    │
        └──────┬───────────┘     │
 Laws/Rules    │ Independent     │
 on            │ boards          │
 Boards        ▼                 │
        ┌──────────────┐         │
        │   Managers   │─────────┘
        └──────────────┘
```

Lesson 13A: Independent Board ≠ Effective Board

SEPTEMBER 18, 2008

Where Was Lehman Board?

Firm's External Directors Had Relied on Experiences Of a Bygone Financial Era

By DENNIS K. BERMAN

Article	Comments

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Nine of them are retired. Four are over 75 years old. One is a theater producer, another a former Navy admiral. Only two have direct experience in the financial-services industry.

Meet the Lehman Brothers Holdings external board directors, a group of 10 people who, perhaps unknowingly, carried the health of the world's financial system on their shoulders the past 18 months.

As the world nervously awaits the effects of the unprecedented Lehman Brothers liquidation, one can't help but wonder how and why this board let its longtime chairman and patron, Richard Fuld Jr., cling to both hope and power.
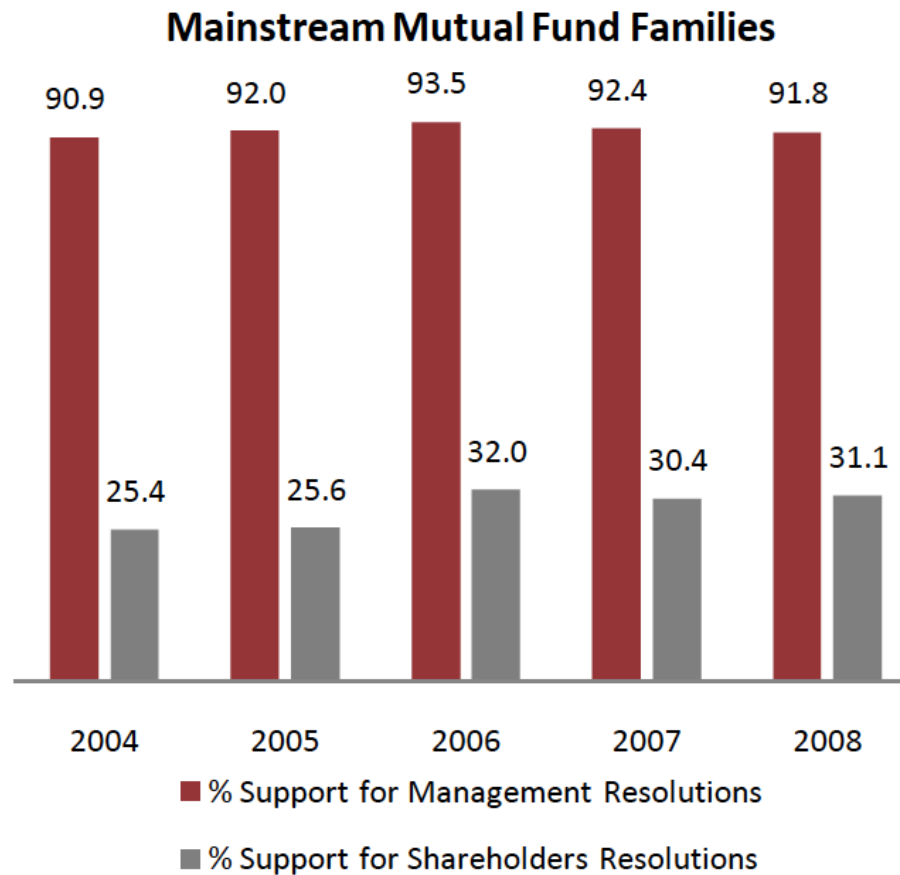
Aswath Damodaran   *133*

Response 13A: Let's think about effective boards…
Directors should..

- <u>Know the business</u>: If we want board members to oversee managers, we have to also accept the proposition that these board members understand the business that the company is in.

- <u>(At least some should) serve the interests of those most opposed to incumbent managers</u>: If one of the problems with boards is that they are unwilling to challenge incumbent managers, we need directors who represent stockholders who most disagree with incumbent managers (proportional voting for directors versus majority voting).

- <u>Have a counter weight to the CEO</u>: If it is human nature to assent to authority, we need to create counters to the power of the CEO. In effect, it may be time to create a "Devil's Advocate" on the Board, with powers (and resources) to match the CEO.

Lesson 13B: Top down corporate governance alone won't work..

■ In the aftermath of accounting and operating scandals at Enron, Tyco and other large companies, Congress responded by writing laws to improve corporate governance. In particular, Sarbanes-Oxley imposed a host of requirements on both board composition and information disclosure on publicly traded corporations in the United States.

■ The failures of boards of large corporations to restrain bad risk taking at corporations suggests that:

- Improving corporate governance requires stockholders to be aware and active
- Information provided to boards on risk taking is either insufficient or ineffective.

# Response 13B: Investors (especially institutional) have to exercise voting rights…

Mainstream Mutual Fund Families

	2004	2005	2006	2007	2008
% Support for Management Resolutions	90.9	92.0	93.5	92.4	91.8
% Support for Shareholders Resolutions	25.4	25.6	32.0	30.4	31.1

Lesson 13C: Equity compensation ≠ Stockholder perspective..

■ <u>Options versus Conventional Equity</u>: While options and common stock both are equity, they have very different payoff outcomes.

Options
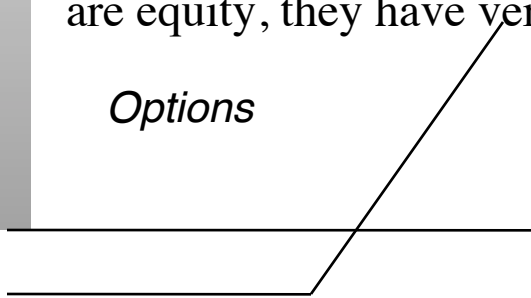
Common stock
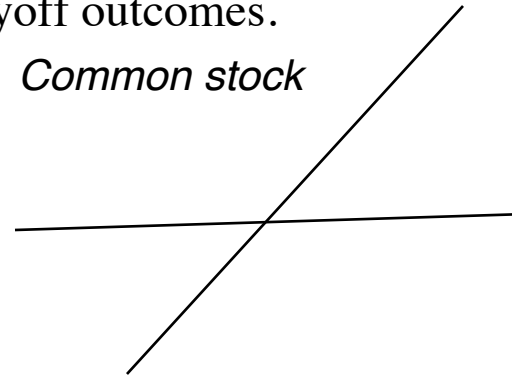
■ <u>Inside equity versus Outside equity</u>: Even when managers are rewarded with stock, their view on risk can be skewed by the fact that they have too much invested in the equity of the company (in terms of both human capital and financial investment), relative to other investors in the firm's common stock.

Response 13C: Executive Compensation
Back to the Drawing Board..

A good compensation system

■ Symmetric payoff: Should provide managers with a share of both the upside of risk taking and the down side.

■ Diversified investor: Should consider risk through the eyes of the marginal investor in the firm (and not through the managers' eyes).

■ Firm versus Equity: Should reward managers for maximizing the value of the firm's businesses rather than expropriating wealth from lenders (bankers, bondholders).

■ Value versus price (Long term versus short term?): should provide a payoff to those managers who increase the long term (intrinsic) value of a firm, even if the stock price moves in the opposite direction.

Exhibit 8

KENNECOTT COPPER CORPORATION

PROJECTED CARBORUNDUM COMPANY FINANCIAL DATA ADJUSTED TO REFLECT THE ACQUISITION OF CARBORUNDUM BY KENNNECOTT
AT A PRICE OF $66 PER SHARE, 1977–1987
($ millions except for per share and ratio data)

	1977 Unadjusted	Adjustments	1977 Adjusted	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Income statement													
Sales	$717.6			$790.1	$885.9	$1,005.2	$1,129.9	$1,265.5	$1,392.1	$1,531.3	$1,684.4	$1,852.8	$2,038.1
Net income (before adjustments)	38.4			43.1	50.7	60.1	70.6	84.7	93.2	102.5	112.7	124.0	136.4
Interest adjustment	0			6.5	7.8	8.5	9.2	9.8	10.7	11.7	12.8	14.0	15.4
Goodwill adjustment	0			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plant write-up adjustment	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
Balance sheet													
Working capital	$198.8	+ 37.0 / + 100.0 / − 140.0	$195.8	$202.9	$223.0	$248.1	$274.2	$302.8	$329.3	$358.6	$390.7	$426.1	$465.0
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	1,394.6	1,500.3
Long-term debt	86.2	+ 100.0	186.2	220.9	238.8	252.9	266.8	280.1	297.7	317.5	339.4	363.9	391.0
Shareholders' equity	309.0	+ 101.0	410.0	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
Capital 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				—	—	—	—	—	—	—	—	—	—
Debt financing (net)				34.7	17.9	14.1	13.9	13.3	17.6	19.8	21.9	24.5	27.1
Total capital added				$34.8	$51.3	$40.3	$39.6	$38.1	$50.4	$56.4	$62.6	$69.9	$77.4
Key financial ratios													
Growth rate in sales (%)	16.9			10.1	12.1	13.5	12.4	12.0	10.0	10.0	10.0	10.0	10.0
Sales/assets	1.23			0.96	1.00	1.06	1.12	1.19	1.23	1.26	1.30	1.33	1.36
Profit/sales	.054			0.040	0.043	0.047	0.050	0.055	0.056	0.056	0.056	0.057	0.057
Assets/net worth	1.89			2.01	2.01	2.02	2.03	2.05	2.05	2.06	2.06	2.06	2.07
Profit/net worth	.124			0.078	0.086	0.100	0.114	0.135	0.141	0.146	0.151	0.156	0.160

Cash flow to Kennecott													
Acquisition of Carborundum			$(550.0)										
Dividends to Kennecott			140.0	$31.7	$ 4.7	$20.6	$30.9	$45.3	$44.9	$49.4	$54.4	$59.8	$ 65.9
Utilization of Kennecott tax loss carryforwards			—	20.0	20.0	—	—	—	—	—	—	—	—
Tax shelter from plant write-up adj.				2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Terminal value at 10 times earnings													1,044.9
Net cash flow			$(410.0)	$54.5	$27.5	$23.4	$33.7	$48.1	$47.7	$52.2	$57.2	$62.6	$1,113.6

Assumptions:
[1] Kennecott would pay $550 million to acquire Carborundum's equity which had a book value of $309 million. The $241 million in excess of purchase price over book value of assets acquired would be allocated as follows: (a) $37.0 million would be added to inventory to reflect the replacement cost of inventories; (b) $11.0 million would be added to land to reflect the market value of land; (c) $113 million would be added to net plant and equipment to reflect the depreciated replacement cost of plant and equipment; and (d) $80 million would be added to goodwill. Immediately following the acquisition of Carborundum, Carborundum borrows $100 million and then pays a $140 million dividend to Kennecott. This dividend is financed with the $100 million plus $40 million of Carborundum's excess cash.
[2] Interest at the rate of 10% (5% after taxes) is paid on the difference between the amount of Carborundum debt outstanding in Exhibit 8 and the amount of debt assumed to be outstanding in Exhibit 5. In Exhibit 8, it is assumed that Carborundum will have 35% debt in its total capital structure after 1977.
[3] The $80 million of goodwill created as a result of the acquisition is amortized over 40 years. This expense is not tax-deductible.
[4] The $113 million write-up of plant and equipment is depreciated over a 20-year life, providing a reduction in profit after taxes and an increase in cash flow equal to ($113/20) x .5. It is assumed that this added cash flow is paid to Kennecott as dividends.
[5] Dividends to Kennecott equal the difference between Carborundum's net profit (after adjustment) and the profit retention requirements needed to support Carborundum's growth.
[6] The utilization of $40 million of tax loss carry-forwards and investment tax credit carryforwards available to Kennecott are assumed to be utilized as a result of the Carborundum acquisition and that these would expire unutilized without the acquisition.
[7] Carborundum is assumed to be sold at the end of ten years at a price equal to ten times earnings. The proceeds from this sale, $1,162 million, are reduced by $117.1 million as a result of taxes on the capital gain of $1,162−$726. Carborundum's net worth at 12/31/87 is assumed to be $726 million.
Sources: Exhibit 5 and casewriter projections.

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

Lesson 14A: Biased 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 14A: If you want good valuations, fix the processes…

■ <u>Require disclosure of bias:</u> All analysts should be required to reveal their biases before they reveal their valuation results.

■ <u>Separate valuation from deal making and selling</u>: Asking deal makers (sales people) to analyze whether a deal (sale) makes sense creates conflicts of interest that lead to biased valuations.

■ <u>Force transparency</u>: It is easy to hide bias, when assumptions are not explicit and valuations are not transparent.

■ <u>Avoid "post-valuation garnishing"</u>: While rules of thumb are often based in fact, they get dated and can lead us to set aside good sense.

Lesson 14B: "Fair value" is in the eye of the beholder..

Expected next year (in millions)

Revenues	$400
- Operating Expenses	$250
- Depreciation	$30
Operating Income	**$120**
- Taxes	$40
Operating Income after taxes	**$80**

1. Operating income is expected to remain the same (zero growth) forever (perpetuity).

2. Capital expenditures offset depreciation and there are no working capital requirements.

3. The firm is all equity funded and has a cost of equity of 10%.

What is the fair value of equity?

■ Assume now that the firm, run by superior (optimal) management, would make the following changes:

- The after-tax operating margin will increase to 25% (from 20%). As a result the after-tax operating income would be $100 million instead of $ 80 million.
- Changing the mix of debt and equity will lower the cost of capital to 8%.

What is the intrinsic value of the firm, with new management?

More on "fair value"

A. <u>Market Value?</u> We have two estimates of fair value - $ 800 million with the status quo and $1,250 million with optimal management. Assume now that there is a 40% probability that the management of this firm will change and a 60% probability that it will not. In an efficient market, what is the "expected" intrinsic value of this firm?

B. <u>Relative Value</u>: Now assume that the firm is a mid-size chemical company and that publicly traded mid-size chemical companies trade at 5 times EBITDA. Given that this firm is expected to have EBITDA of $ 150 million, estimate the value of the firm.

C. <u>Transaction Value</u>: Now as a final estimate, assume that equity markets are fairly illiquid right now and that selling the entire business today can be accomplished only by discounting the value. If the illiquidity discount is 20% on estimated value, estimate the expected proceeds from selling the business today.

So what is the fair value? You be the judge

■ We now have five estimates of fair value for this firm. Which of the following is the "right" fair value?

❑ $ 800 million: Intrinsic value, with status quo.

❑ $ 1250 million: Intrinsic value, with optimal management

❑ $ 980 million: Expected intrinsic value, with probability of change built in

❑ $ 750 million: Relative value, based upon sector multiple

❑ $ 600 million: Relative value, adjusted for illiquidity

Why?

Response 14B: Fair value accounting, buyer beware…

- ■ <u>The ubiquitous "market participant"</u>: Through the entire statement, homage is paid to the ubiquitous market participants and what they think about risk and will be willing to pay for an asset. In effect, accountants are asked to attach values to assets/liabilities that market participants would have been willing to pay/ receive.

- ■ <u>Tilt towards relative value</u>: "The definition focuses on the price that would be received to sell the asset or paid to transfer the liability (an exit price), not the price that would be paid to acquire the asset or received to assume the liability (an entry price)." The hierarchy puts "market prices", if available for an asset, at the top with intrinsic value being accepted only if market prices are not accessible.

- ■ <u>Consideration of illiquidity</u>: Accountants are asked to give consideration to specific restrictions on the sale/use of an asset in valuing it. Presumably, if there are restrictions on selling an asset, the value will have to be discounted for illiquidity.

Lesson 14C: Poorly designed rewards = Bad risk taking

"Upside" skewed systems
- Risk takers share in upside but not in downside
- Too much risk taking

Risk = Danger + Opportunity

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"Downside" skewed systems
- Punish risk takers
- Too little risk taking
- Managers behave like bondholders

Response 14C: Design systems that reward good risk taking

■ <u>Have more symmetry in payoff</u>: If you share in the upside, you have to share in the downside.

■ <u>Tie compensation to process, not outcome</u>: It is entirely possible that we can get good outcomes (make money) from bad choices and bad outcomes (lose money) from good choices. Compensation has to look at both outcome and process.

■ <u>Side costs and benefits</u>: No person is an island and no action is made in a vacuum. We have to look at the impact (positive and negative) that an employee's have on others in the organization, when determining compensation.

■ <u>Consider the law of large numbers</u>: When confronted with success or failure, separating how much can be attributed to luck as opposed to skill remains a difficult task. Consistent success should count for more than an occasional big win….

CLOSING THOUGHTS..

- We all make mistakes. When confronted with them, we can
  - Ignore them and act like nothing has happened
  - Panic (and throw out everything that we have learned out as useless)
  - Learn from them and adapt

- We will make more mistakes in the future. We cannot design systems and models that are always right but we can incorporate "early warning" mechanisms in them to allow us to fix mistakes before it is too late.

- If uncertainty is the name of the game, we have to develop estimation approaches that are flexible, less dependent upon historical data and more grounded in fundamentals.