

Implied Equity Premiums

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- Let's start with a general proposition. If you know the price paid for an asset and have estimates of the expected cash flows on the asset, you can estimate the IRR of these cash flows. If you paid the price, this is what you have priced the asset to earn (as an expected return).
- If you assume that stocks are correctly priced in the aggregate and you can estimate the expected cashflows from buying stocks, you can estimate the expected rate of return on stocks by finding that discount rate that makes the present value equal to the price paid. Subtracting out the riskfree rate should yield an implied equity risk premium.
- This implied equity premium is a forward looking number and can be updated as often as you want (every minute of every day, if you are so inclined).

Implied Equity Premiums: January 2008

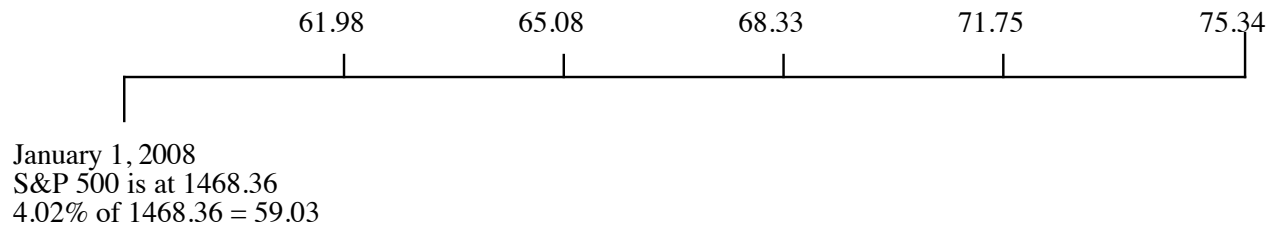
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- We can use the information in stock prices to back out how risk averse the market is and how much of a risk premium it is demanding.

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).



- If you pay the current level of the index, you can expect to make a return of 8.39% on stocks (which is obtained by solving for r in the following equation)

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

- Implied Equity risk premium = Expected return on stocks - Treasury bond rate = 8.39% - 4.02% = 4.37%

Implied Risk Premium Dynamics

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- Assume that the index jumps 10% on January 2 and that nothing else changes. What will happen to the implied equity risk premium?
 - a. Implied equity risk premium will increase
 - b. Implied equity risk premium will decrease
- Assume that the earnings jump 10% on January 2 and that nothing else changes. What will happen to the implied equity risk premium?
 - a. Implied equity risk premium will increase
 - b. Implied equity risk premium will decrease
- Assume that the riskfree rate increases to 5% on January 2 and that nothing else changes. What will happen to the implied equity risk premium?
 - a. Implied equity risk premium will increase
 - b. Implied equity risk premium will decrease

A year that made a difference.. The implied premium in January 2009

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

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

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

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

54.69 56.87 59.15 61.52 63.98

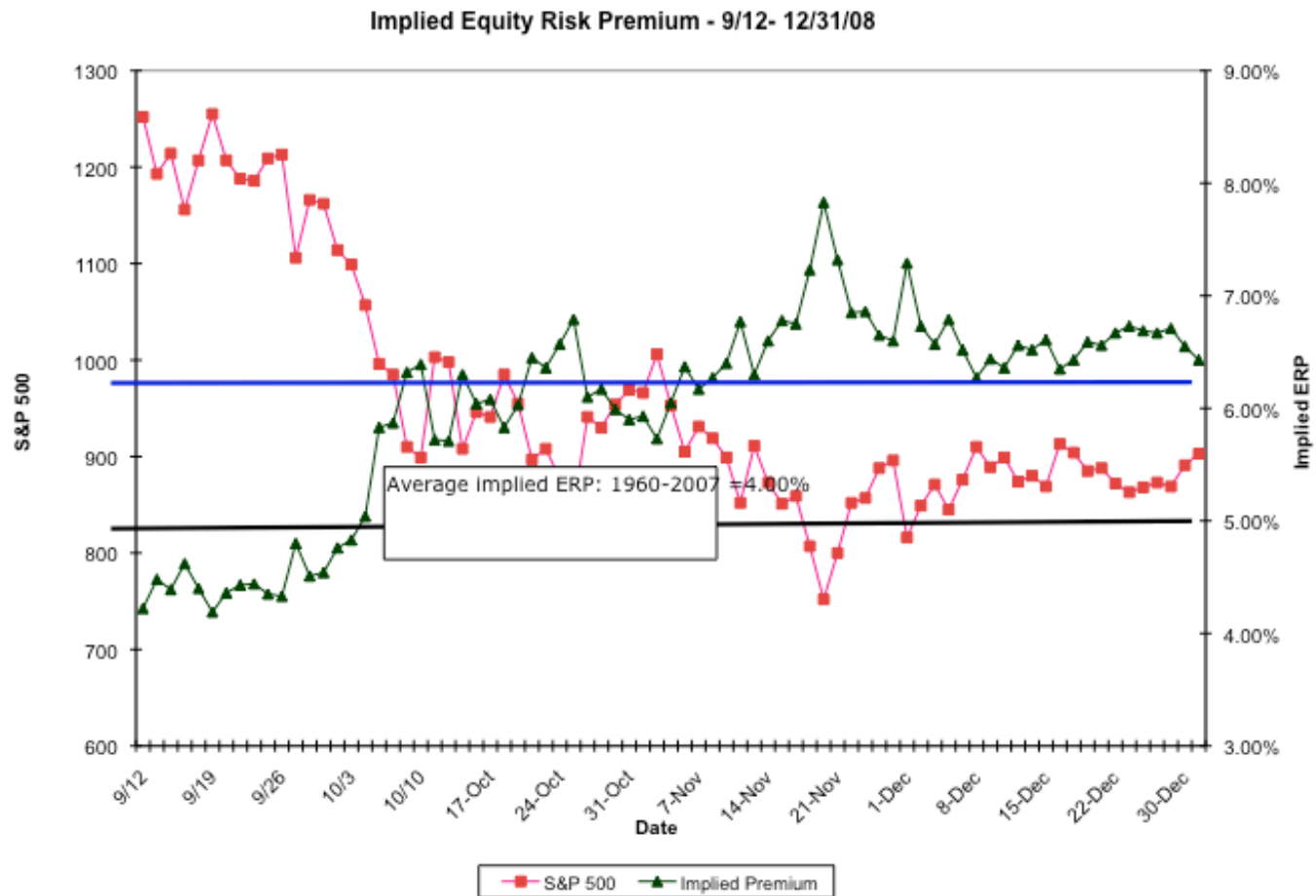
January 1, 2009
S&P 500 is at 903.25
Adjusted Dividends &
Buybacks for 2008 = 52.58

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

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

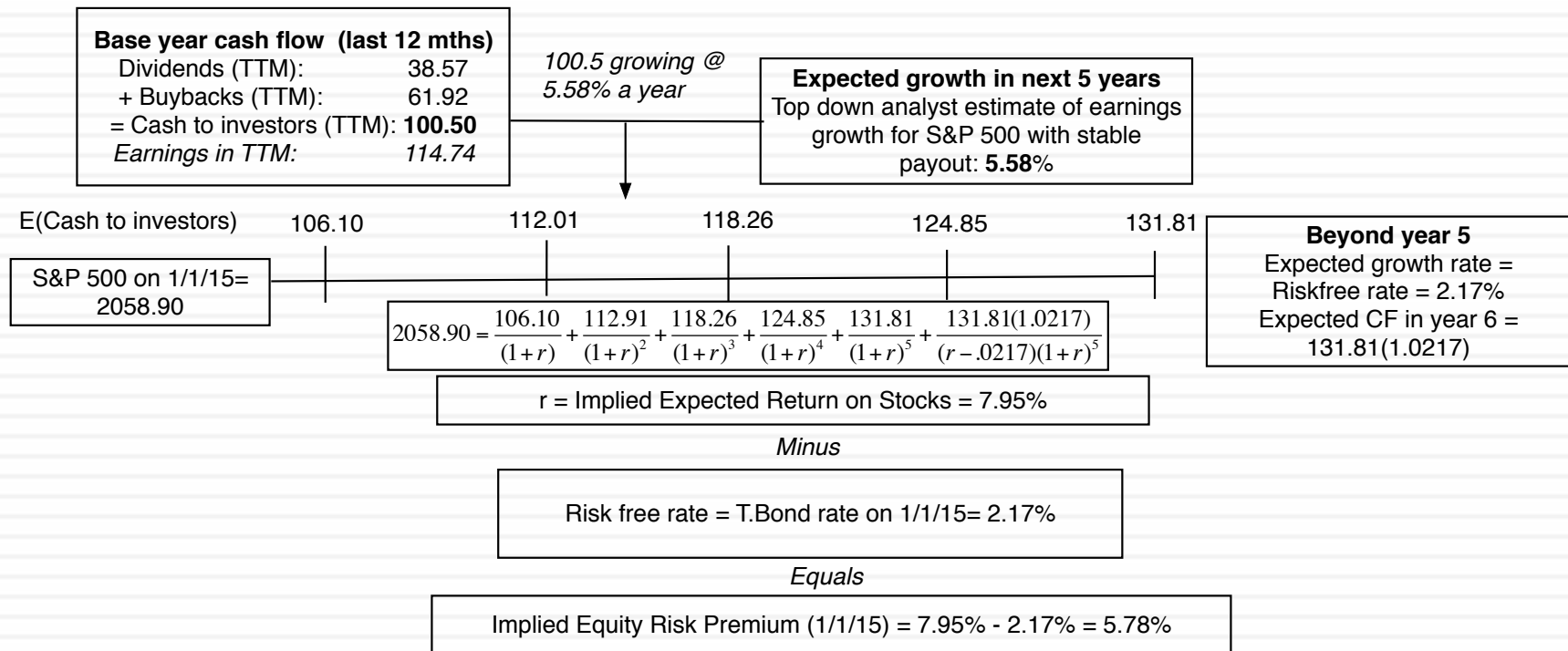
Aswath Damodaran

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



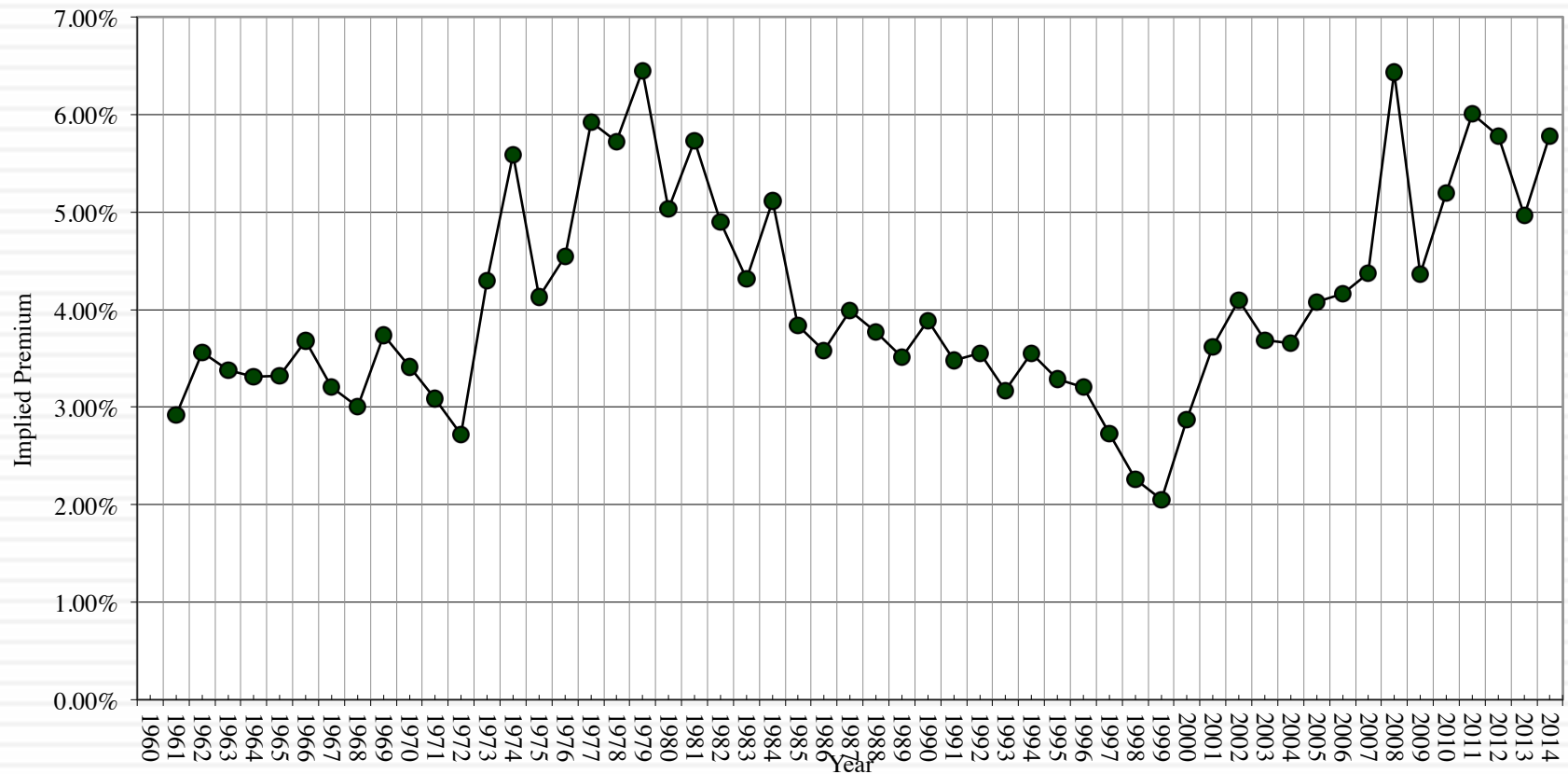
An Updated Equity Risk Premium: January 2015

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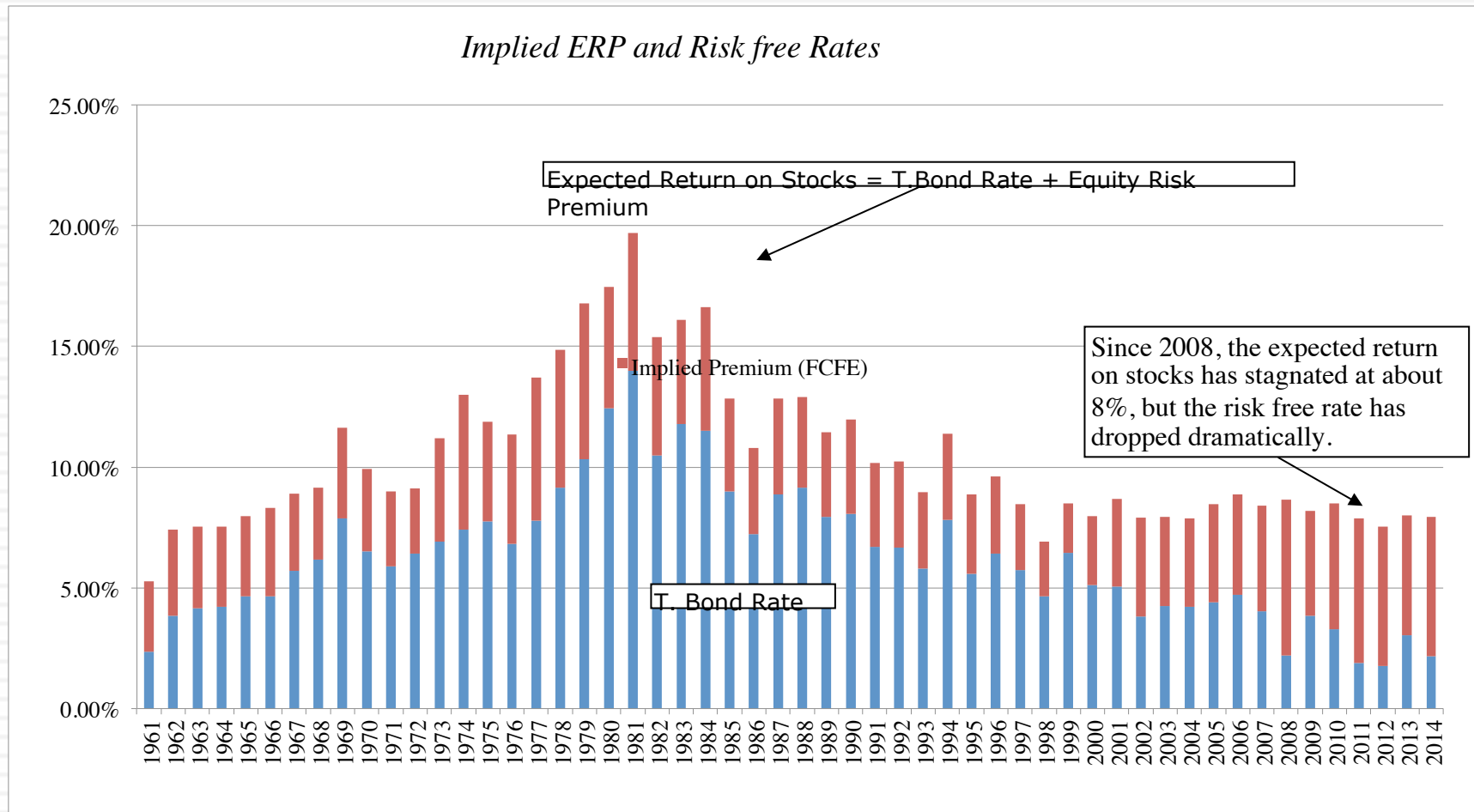


Implied Premiums in the US: 1960-2014

Implied Premium for US Equity Market: 1960-2014

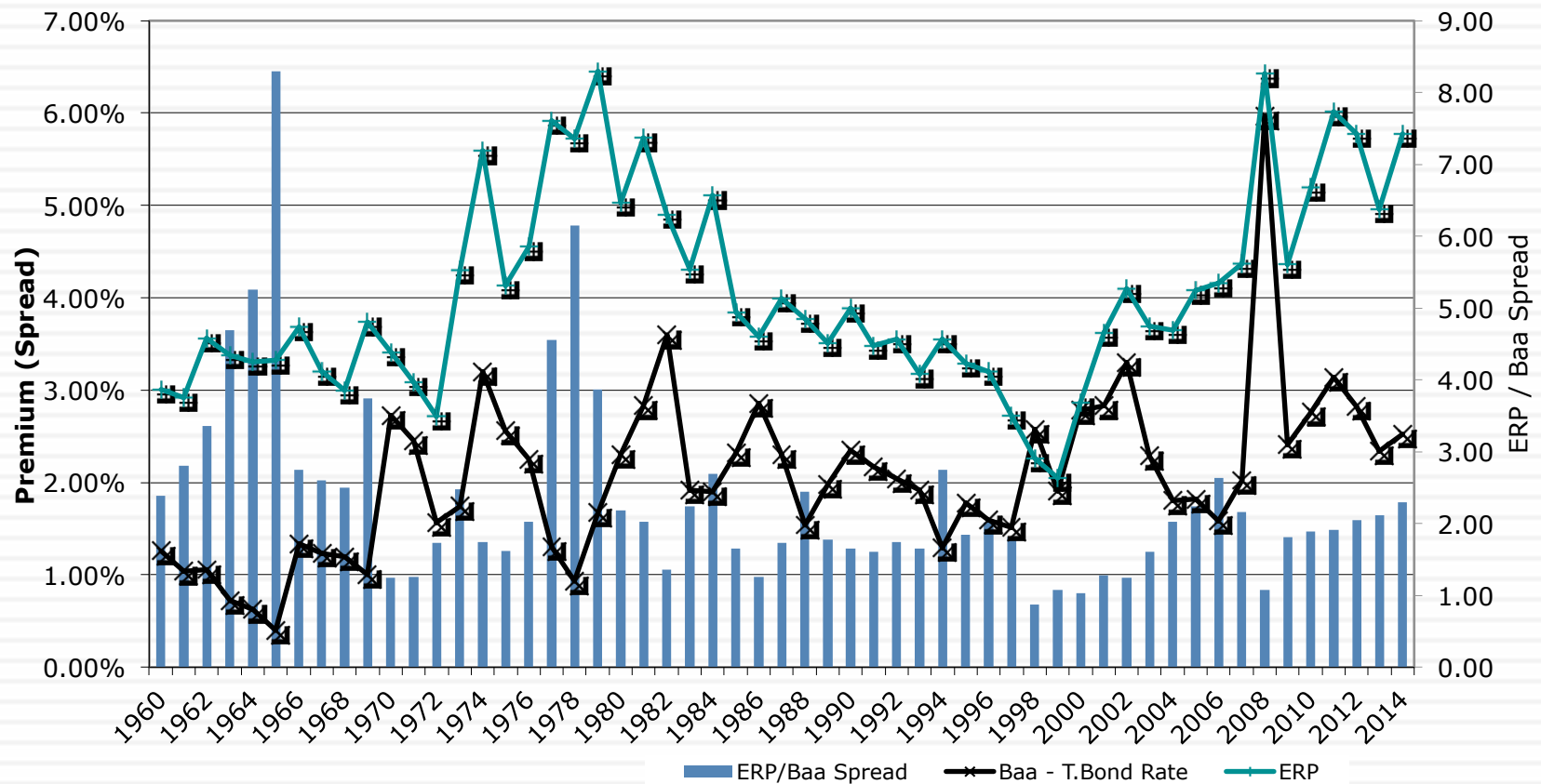


Implied Premium versus Risk Free Rate



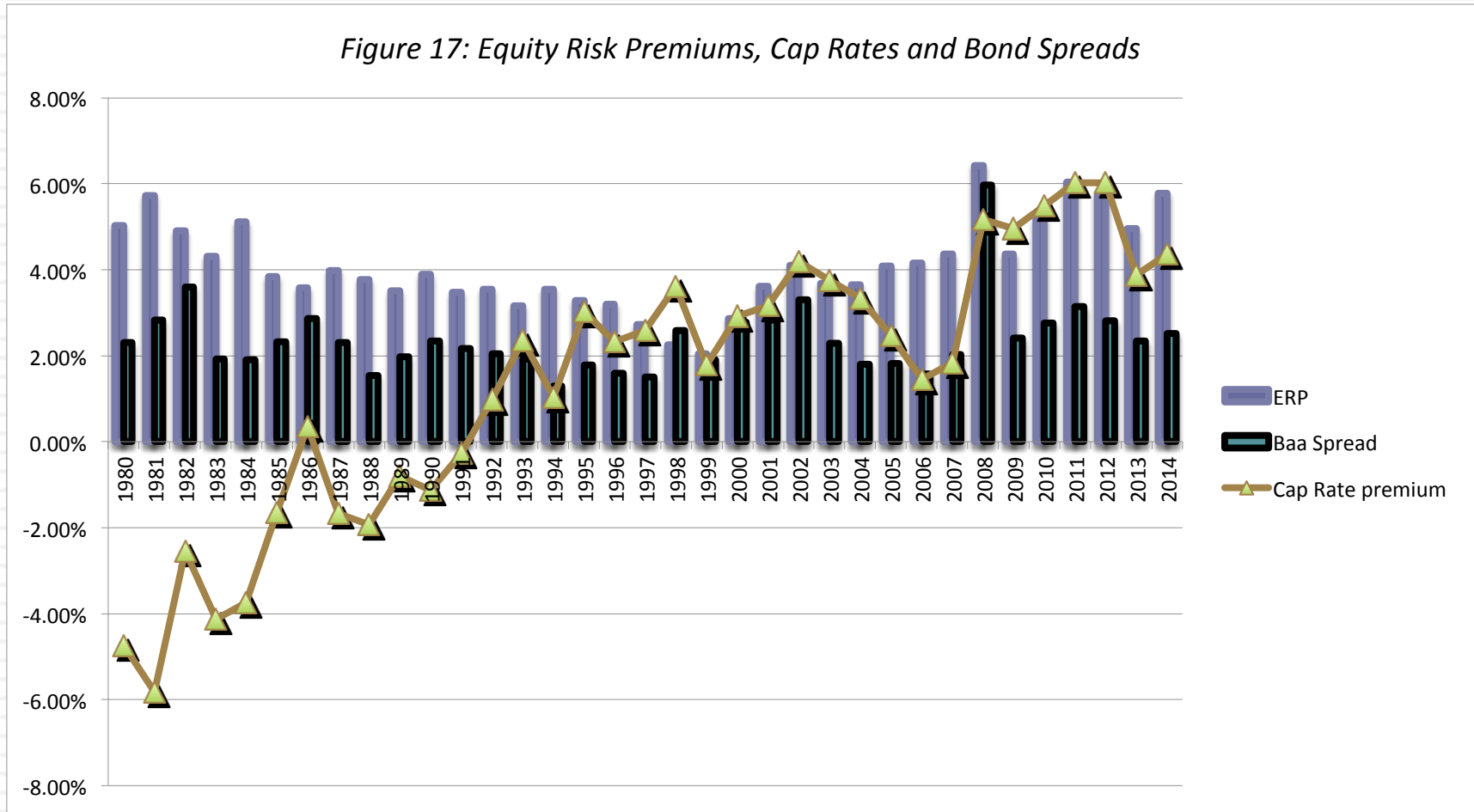
Equity Risk Premiums and Bond Default Spreads

Figure 16: Equity Risk Premiums and Bond Default Spreads



Equity Risk Premiums and Cap Rates (Real Estate)

Figure 17: Equity Risk Premiums, Cap Rates and Bond Spreads



Why implied premiums matter?

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- In many investment banks, it is common practice (especially in corporate finance departments) to use historical risk premiums (and arithmetic averages at that) as risk premiums to compute cost of equity. If all analysts in the department used the arithmetic average premium (for stocks over T.Bills) for 1928-2014 of 8% to value stocks in January 2014, given the implied premium of 5.75%, what are they likely to find?
 - a. The values they obtain will be too low (most stocks will look overvalued)
 - b. The values they obtain will be too high (most stocks will look under valued)
 - c. There should be no systematic bias as long as they use the same premium to value all stocks.

Which equity risk premium should you use?

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If you assume this

Premiums revert back to historical norms and your time period yields these norms

Market is correct in the aggregate or that your valuation should be market neutral

Market makes mistakes even in the aggregate but is correct over time

Premium to use

Historical risk premium

Current implied equity risk premium

Average implied equity risk premium over time.

<i>Predictor</i>	<i>Correlation with implied premium next year</i>	<i>Correlation with actual risk premium – next 10 years</i>
Current implied premium	0.712	0.424
Average implied premium: Last 5 years	0.646	0.360
Historical Premium	-0.394	-0.486
Default Spread based premium	0.059	0.174

And the approach can be extended to emerging markets Implied premium for the Sensex (September 2007)

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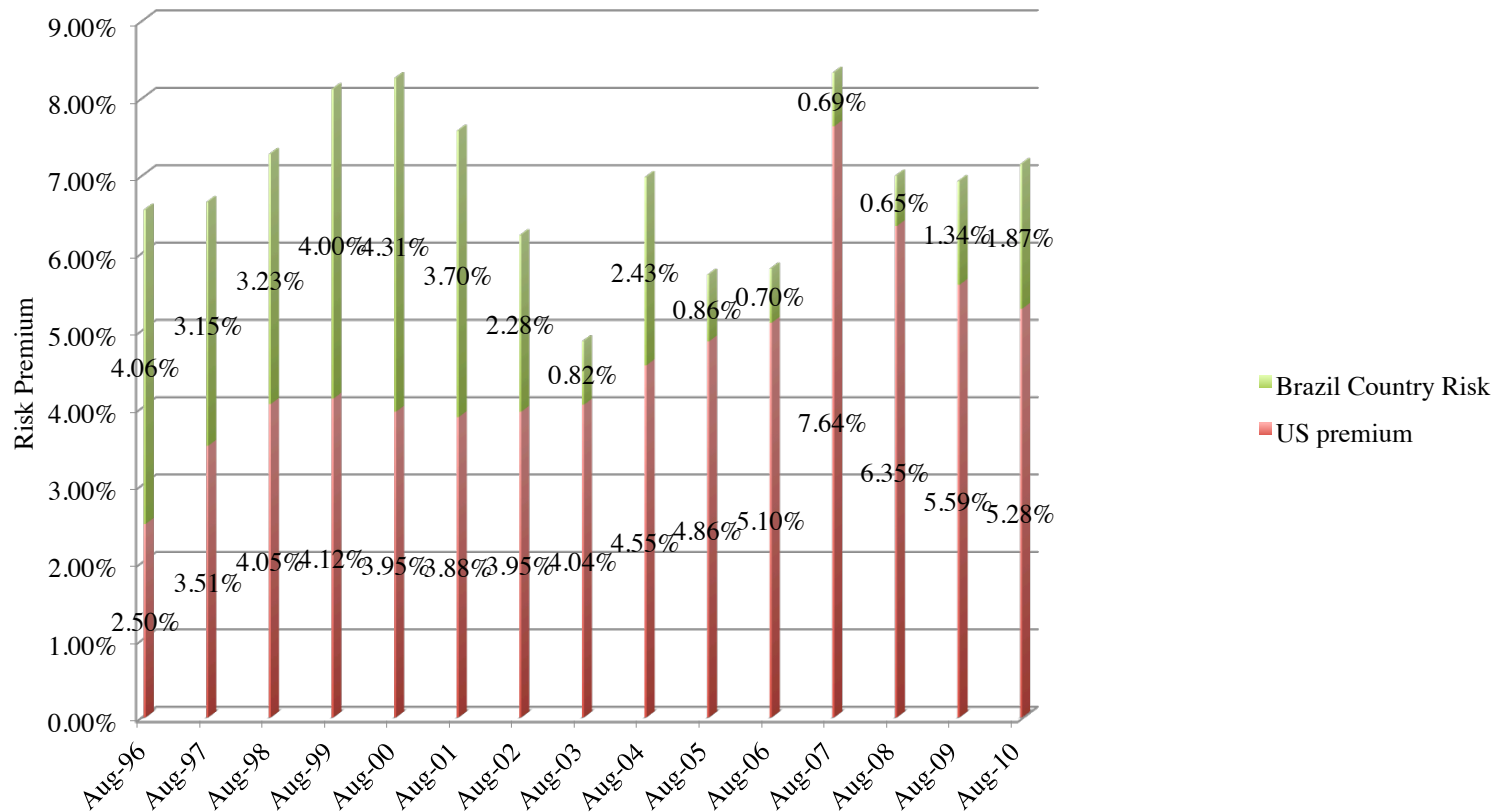
- Inputs for the computation
 - Sensex on 9/5/07 = 15446
 - Dividend yield on index = 3.05%
 - Expected growth rate - next 5 years = 14%
 - Growth rate beyond year 5 = 6.76% (set equal to riskfree rate)
- Solving for the expected return:

$$15446 = \frac{537.06}{(1+r)} + \frac{612.25}{(1+r)^2} + \frac{697.86}{(1+r)^3} + \frac{795.67}{(1+r)^4} + \frac{907.07}{(1+r)^5} + \frac{907.07(1.0676)}{(r - .0676)(1+r)^5}$$

- Expected return on stocks = 11.18%
- Implied equity risk premium for India = 11.18% - 6.76% = 4.42%

Can country risk premiums change? Brazil CRP & Total ERP from 2000 to 2013

Figure 15: Implied Equity Risk Premium - Brazil

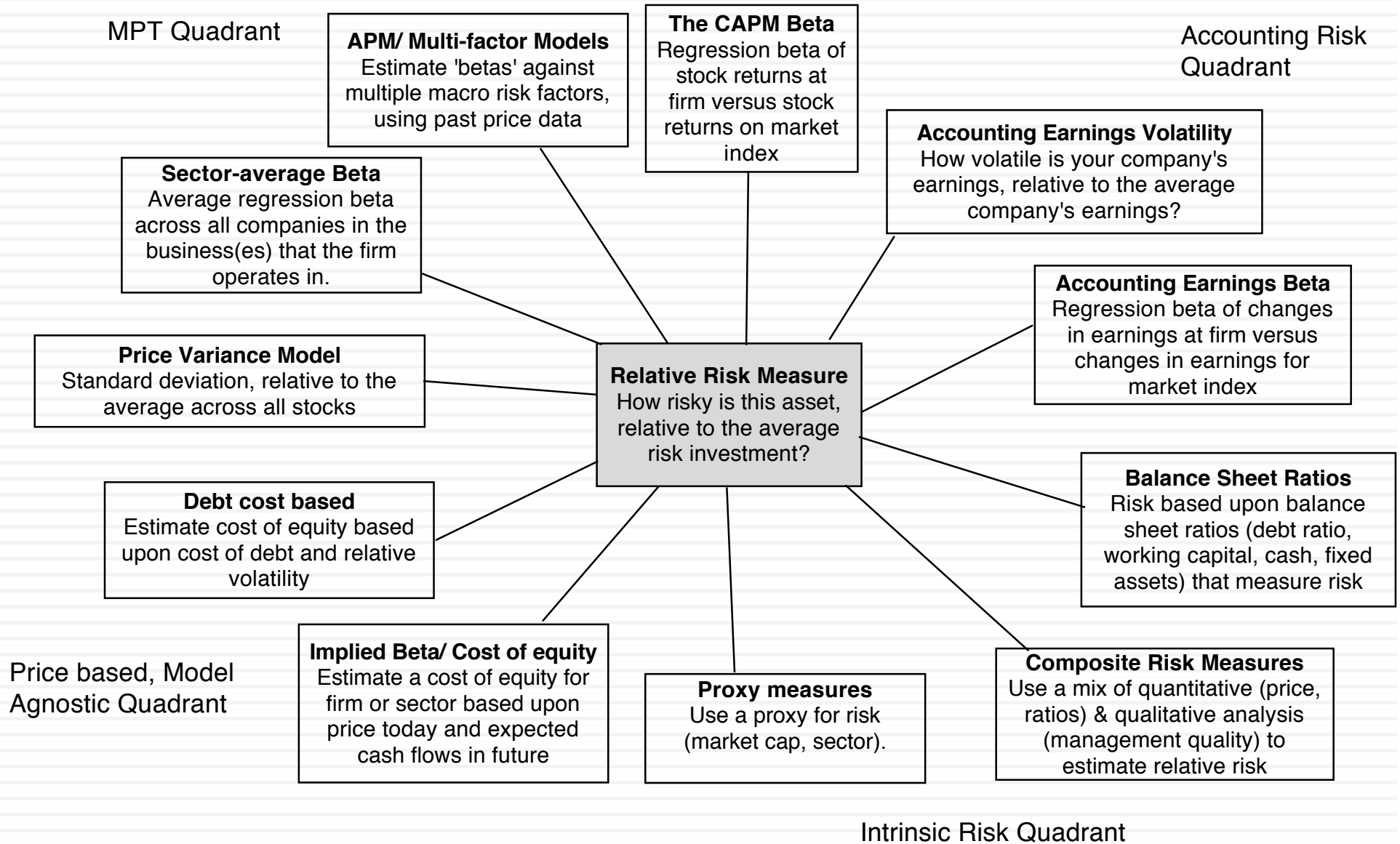


The evolution of Emerging Market Risk

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	<i>PBV Developed</i>	<i>PBV Emerging</i>	<i>ROE Developed</i>	<i>ROE Emerging</i>	<i>US T.Bond rate</i>	<i>Growth rate Developed</i>	<i>Growth rate Emerging</i>	<i>Cost of equity (Developed)</i>	<i>Cost of equity (Emerging)</i>	<i>Differential ERP</i>
2004	2.00	1.19	10.81%	11.65%	4.22%	3.72%	5.22%	7.27%	10.62%	3.36%
2005	2.09	1.27	11.12%	11.93%	4.39%	3.89%	5.39%	7.35%	10.54%	3.19%
2006	2.03	1.44	11.32%	12.18%	4.70%	4.20%	5.70%	7.71%	10.20%	2.49%
2007	1.67	1.67	10.87%	12.88%	4.02%	3.52%	5.02%	7.92%	9.73%	1.81%
2008	0.87	0.83	9.42%	11.12%	2.21%	1.71%	3.21%	10.57%	12.74%	2.17%
2009	1.20	1.34	8.48%	11.02%	3.84%	3.34%	4.84%	7.62%	9.45%	1.83%
2010	1.39	1.43	9.14%	11.22%	3.29%	2.79%	4.29%	7.36%	9.14%	1.78%
2011	1.12	1.08	9.21%	10.04%	1.88%	1.38%	2.88%	8.37%	9.51%	1.14%
2012	1.17	1.18	9.10%	9.33%	1.76%	1.26%	2.76%	7.96%	8.33%	0.37%
Jun-13	1.17	1.17	8.79%	9.37%	2.55%	2.05%	3.55%	7.81%	8.52%	0.71%

Measuring Relative Risk



The CAPM Beta

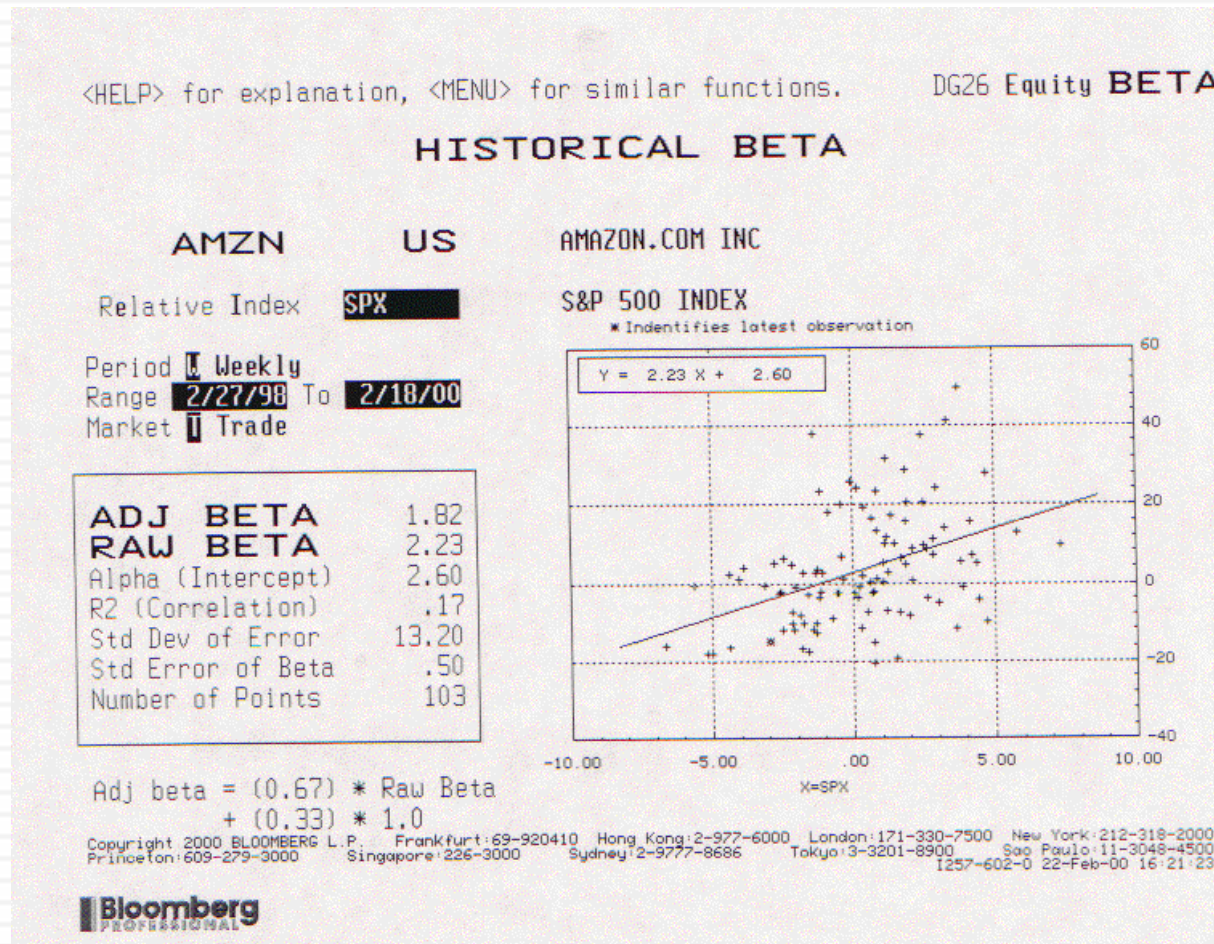
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- The standard procedure for estimating betas is to regress stock returns (R_j) against market returns (R_m) -
$$R_j = a + b R_m$$

where a is the intercept and b is the slope of the regression.
- The slope of the regression corresponds to the beta of the stock, and measures the riskiness of the stock.
- This beta has three problems:
 - It has high standard error
 - It reflects the firm's business mix over the period of the regression, not the current mix
 - It reflects the firm's average financial leverage over the period rather than the current leverage.

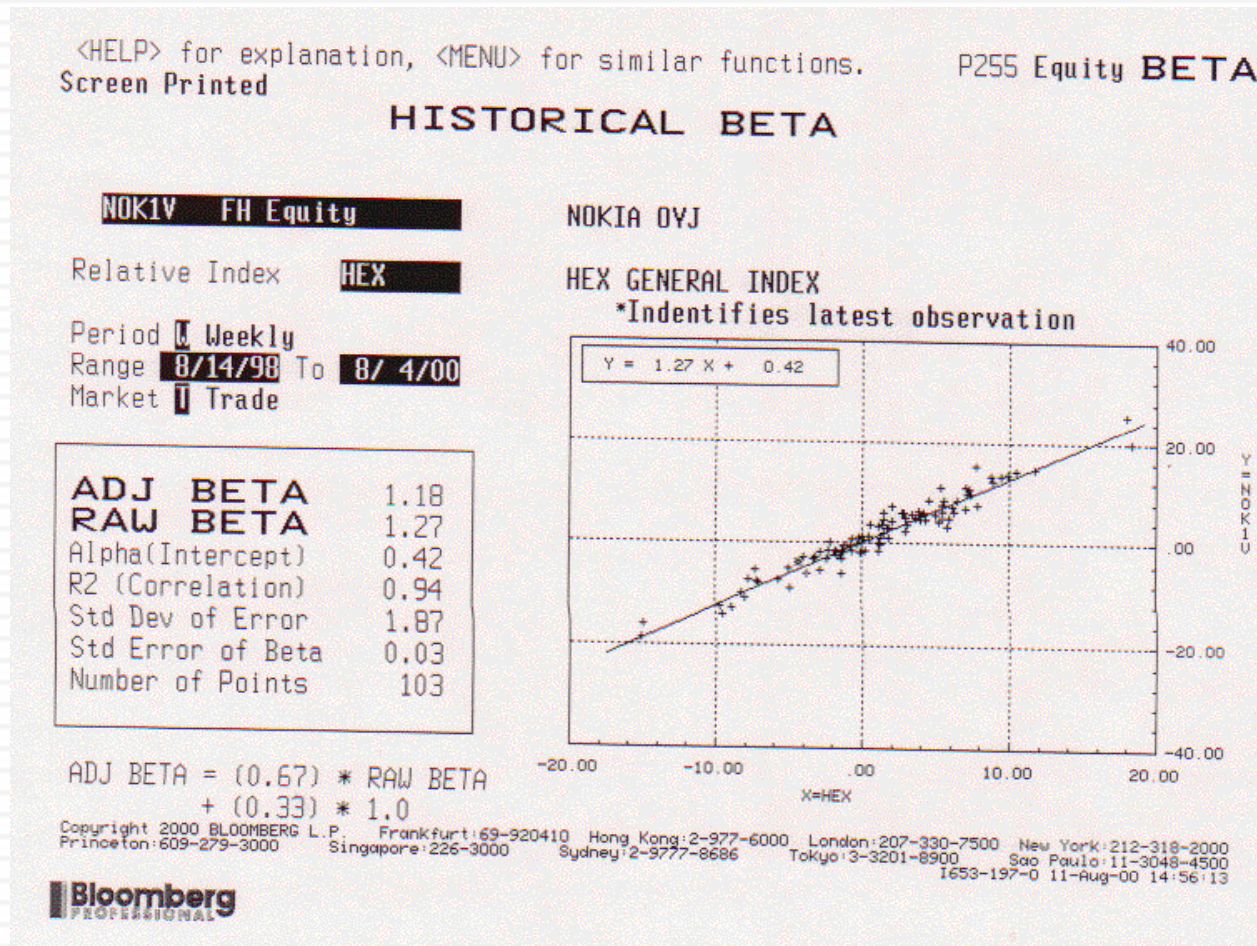
Beta Estimation: The Noise Problem

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Beta Estimation: The Index Effect

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Stock-priced based solutions to the Regression Beta Problem

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- Modify the regression beta by
 - changing the index used to estimate the beta
 - adjusting the regression beta estimate, by bringing in information about the fundamentals of the company
- Estimate the beta for the firm using
 - the standard deviation in stock prices instead of a regression against an index
 - $\text{Relative risk} = \frac{\text{Standard deviation in stock prices for investment}}{\text{Average standard deviation across all stocks}}$
- Estimate the beta for the firm from the bottom up without employing the regression technique. This will require
 - understanding the business mix of the firm
 - estimating the financial leverage of the firm
- Imputed or implied beta (cost of equity) for the sector.

Alternative measures of relative risk for equity

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- Accounting risk measures: To the extent that you don't trust market-priced based measures of risk, you could compute relative risk measures based on
 - ▣ Accounting earnings volatility: Compute an accounting beta or relative volatility
 - ▣ Balance sheet ratios: You could compute a risk score based upon accounting ratios like debt ratios or cash holdings (akin to default risk scores like the Z score)
- Proxies: In a simpler version of proxy models, you can categorize firms into risk classes based upon size, sectors or other characteristics.
- Qualitative Risk Models: In these models, risk assessments are based at least partially on qualitative factors (quality of management).
- Debt based measures: You can estimate a cost of equity, based upon an observable costs of debt for the company.
 - ▣ Cost of equity = Cost of debt * Scaling factor

Determinants of Betas & Relative Risk

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