

# Risk Premiums: Looking backwards and forwards...

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# Risk Premiums and Asset Prices

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- If investors are risk averse, they need inducement to invest in risky assets. That inducement takes the form of a risk premium, a premium you would demand over and above the riskfree asset to invest in a risky asset.
- Every risky asset market has a “risk” premium that determines how individual assets in that market are priced.
  - In an equity market, that risk premium for dealing with the volatility of equities and bearing the residual risk is the equity risk premium.
  - In the bond market, the risk premium for being exposed to default risk is the default spread.
  - In real asset markets, there are equivalent (though less widely publicized markets).

# General Propositions about Risk Premiums

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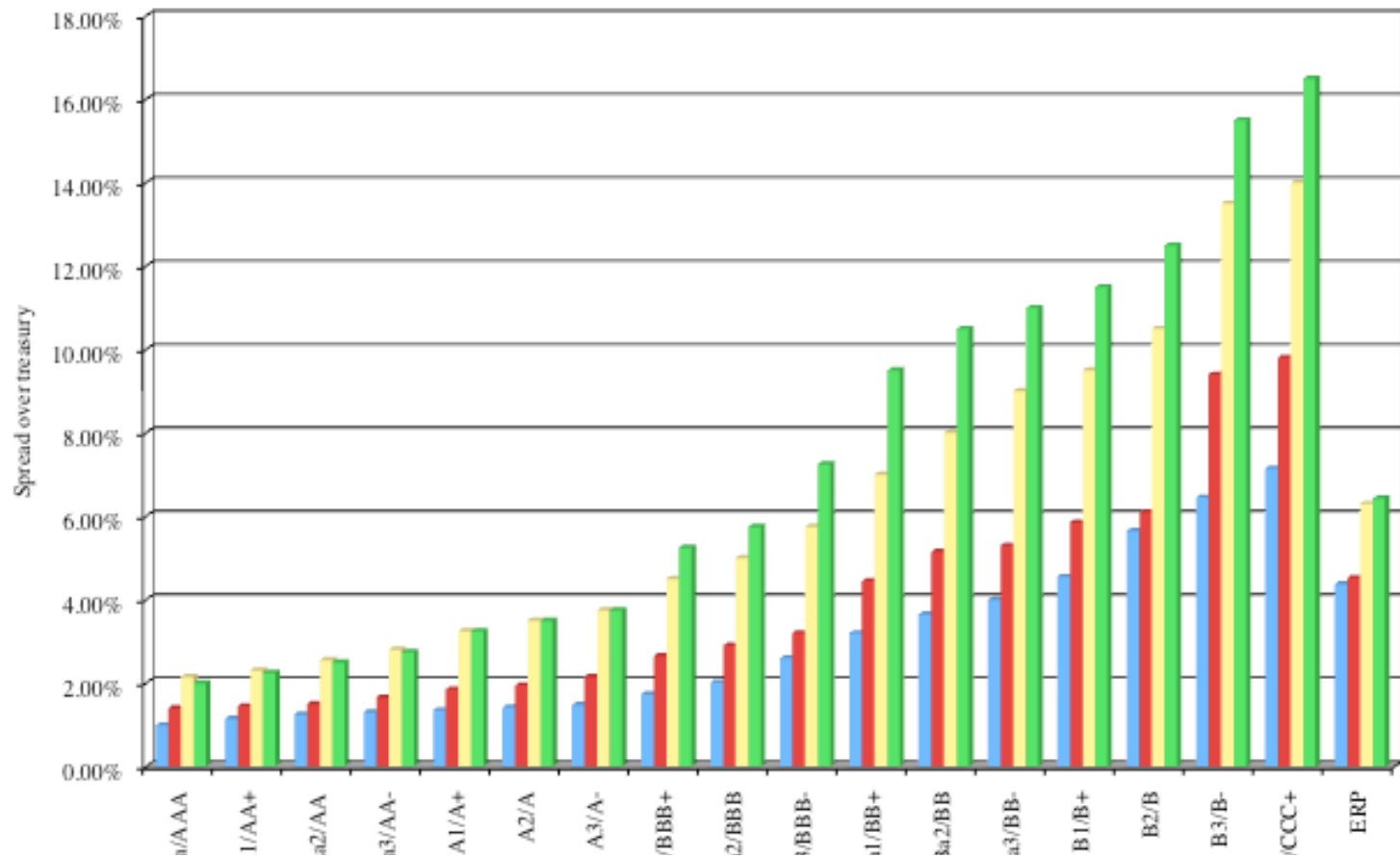
- Proposition 1: Risk premiums and prices for risky assets are inversely related. When risk premiums go up, risky asset prices go down.
- Proposition 2: Any statement about the magnitude of expected risk premiums is really a statement about the level of asset prices. Thus, if you argue that expected risk premium for a risky asset is too low, you are arguing that its priced too high.
- Proposition 3: Asset allocation and market timing decisions are really judgment calls on the future direction of risk premiums in different asset markets.

# I. Bond Default Spreads

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- The most straightforward of all risk premiums is in the bond market (or on a bank loan). Investors in a bond build in the “risk premium” into the interest rate on a bond and that interest rate is observable.
- The default spread, i.e., the difference between the current interest rate or YTM of the bond and the risk free rate, is the risk premium for the bond.
  - Proposition 1: The default spread on a bond should widen as the perceived default risk on the bond increases.
  - Proposition 2: Given a fixed level of default risk, the default spreads demanded by investors can change over time.

# Volatility of Default Spreads....



## II. The Equity Risk Premium

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- Intuitively, the equity risk premium measures what investors demand over and above the riskfree rate for investing in equities as a class. Think of it as the market price for taking on average equity risk.
- It should depend upon
  - The risk aversion of investors
  - The perceived risk of equity as an investment class

## Why equity risk premiums matter...

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- Every statement about whether equity markets are over or under valued is really a statement about the prevailing equity risk premium.
- Every valuation of an individual stock that you do has embedded in it your implicit or explicit assumptions about the equity risk premium. Getting the premium wrong will lead to misvaluations.
- Fundamental corporate finance decisions depend upon equity risk premium assessments; over (under) estimating the number leads to under (over) investment.
- Many of the most significant financial decisions we make in our personal lives (how much to save... what to put into our pensions.. where to invest our savings) are based upon implicit assumptions on equity risk premiums.

# The macro determinants of equity risk..

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- Economic risk: As the underlying economy becomes more uncertain, equity risk will rise. Higher volatility in GDP -> Higher equity risk.
- Political risk: As the uncertainty about fiscal and government policy increases, equity risk will rise.
- Information opacity: As the information provides by companies becomes more opaque and difficult to assess, equity risk premiums will rise.
- Liquidity: As liquidity of equities decreases, equity risk increases.
- Catastrophic risk: There is always the potential for catastrophic risk in investing in equities. As that perceived likelihood increases, equity risk will rise.



# What is your risk premium?

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- Assume that stocks are the only risky assets and that you are offered two investment options:
  - a riskless investment on which you can make 2%
  - a mutual fund of all stocks, on which the returns are uncertain

How much of an expected return would you demand to shift your money from the riskless asset to the mutual fund?

- Less than 2%
- Between 2- 4%
- Between 4 - 6%
- Between 6- 8%
- Between 8 - 10%
- More than 10%

# How equity risk premiums are estimated in practice...

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- Survey investors on their desired risk premiums and use the average premium from these surveys.
- Assume that the actual premium delivered over long time periods is equal to the expected premium - i.e., use historical data
- Estimate the implied premium in today's asset prices.

# The Survey Approach

- Surveying all investors in a market place is impractical.
- However, you can survey a few individuals and use these results. In practice, this translates into surveys of the following:

Group Surveyed	Survey done by	Estimated ERP
Individual Investors	Securities Industries Assn	8.3% (December 2004)
Institutional Investors	Merrill Lynch	3.8% (2009)
CFOs	Campbell & Harvey	4.7% (2009)
Finance Academics	Fernandez	5.7% (2009)

- The limitations of this approach are:
  - there are no constraints on reasonability (the survey could produce negative risk premiums or risk premiums of 50%)
  - The survey results are extremely volatile
  - they tend to be short term; even the longest surveys do not go beyond one year.

## Everyone uses historical premiums..

- Practitioners never seem to agree on the premium; it is sensitive to
  - How far back you go in history...
  - Whether you use T.bill rates or T.Bond rates
  - Whether you use geometric or arithmetic averages.
- For instance, looking at the US:

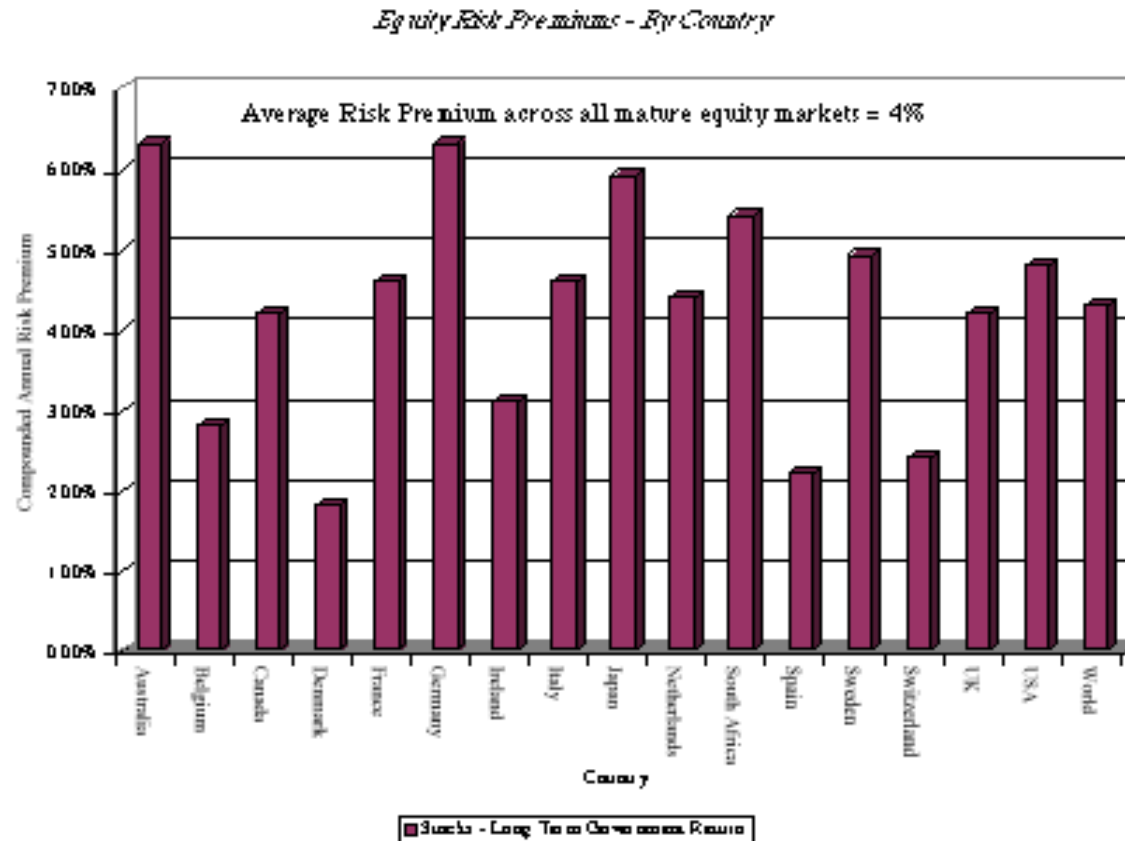
	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2010	7.62%	6.03%	5.67%	4.31%
	2.25%	2.38%		
1961-2010	5.83%	4.13%	4.44%	3.09%
	2.42%	2.69%		
2001-2010	1.37%	-2.26%	-0.79%	-4.11%
	6.73%	9.00%		

## But they stink...

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- Noisy estimates: Even with long time periods of history, the risk premium that you derive will have substantial standard error.
- Survivorship Bias: Using historical data from the U.S. equity markets over the twentieth century does create a sampling bias. After all, the US economy and equity markets were among the most successful of the global economies that you could have invested in early in the century.
- Markets with no history: Even if you buy into a “historical” risk premium, most markets in the world do not have enough history to even compute a reliable historical risk premium.

# Risk Premium for a Mature Market? Broadening the sample



# Implied Equity Premiums

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- If we assume that stocks are correctly priced in the aggregate and we can estimate the expected cashflows from buying stocks, we can estimate the expected rate of return on stocks by computing an internal rate of return. 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).

# Equity Risk Premium: A January 2011 update

- By January 1, 2011, the worst of the crisis seemed to be behind us. Fears of a depression had receded and banks looked like they were struggling back to a more stable setting. Default spreads started to drop and risk was no longer front and center in pricing.

*In 2010, the actual cash returned to stockholders was 53.96. That was up about 30% from 2009 levels.*

Analysts expect earnings to grow 13% in 2011, 8% in 2012, 6% in 2013 and 4% thereafter, resulting in a compounded annual growth rate of 6.95% over the next 5 years. We will assume that dividends & buybacks will grow 6.95% a year for the next 5 years.

After year 5, we will assume that earnings on the index will grow at 3.29%, the same rate as the entire economy (= riskfree rate).

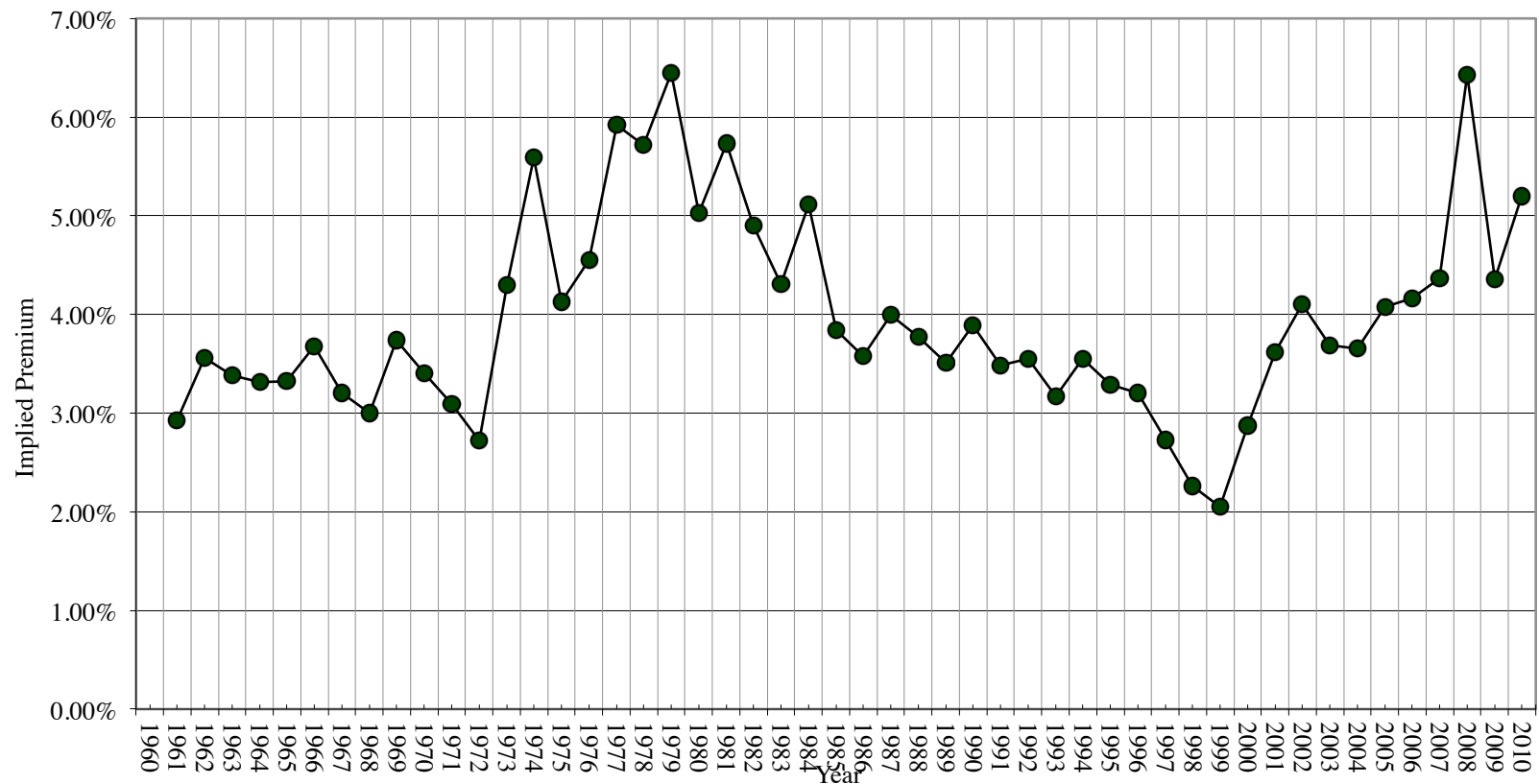
	57.72	61.73	66.02	70.60	75.51
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January 1, 2011 S&P 500 is at 1257.64 Adjusted Dividends & Buybacks for 2010 = 53.96	$1257.64 = \frac{57.72}{(1+r)} + \frac{61.73}{(1+r)^2} + \frac{66.02}{(1+r)^3} + \frac{70.60}{(1+r)^4} + \frac{75.51}{(1+r)^5} + \frac{75.51(1.0329)}{(r-.0329)(1+r)^5}$				
	Expected Return on Stocks (1/1/11)		= 8.49%		
	T.Bond rate on 1/1/11		= 3.29%		
	Equity Risk Premium = 8.03% - 3.29%		= 5.20%		

**Data Sources:**  
*Dividends and Buybacks last year. S&P*  
*Expected growth rate: News stories, Yahoo! Finance, Zacks*

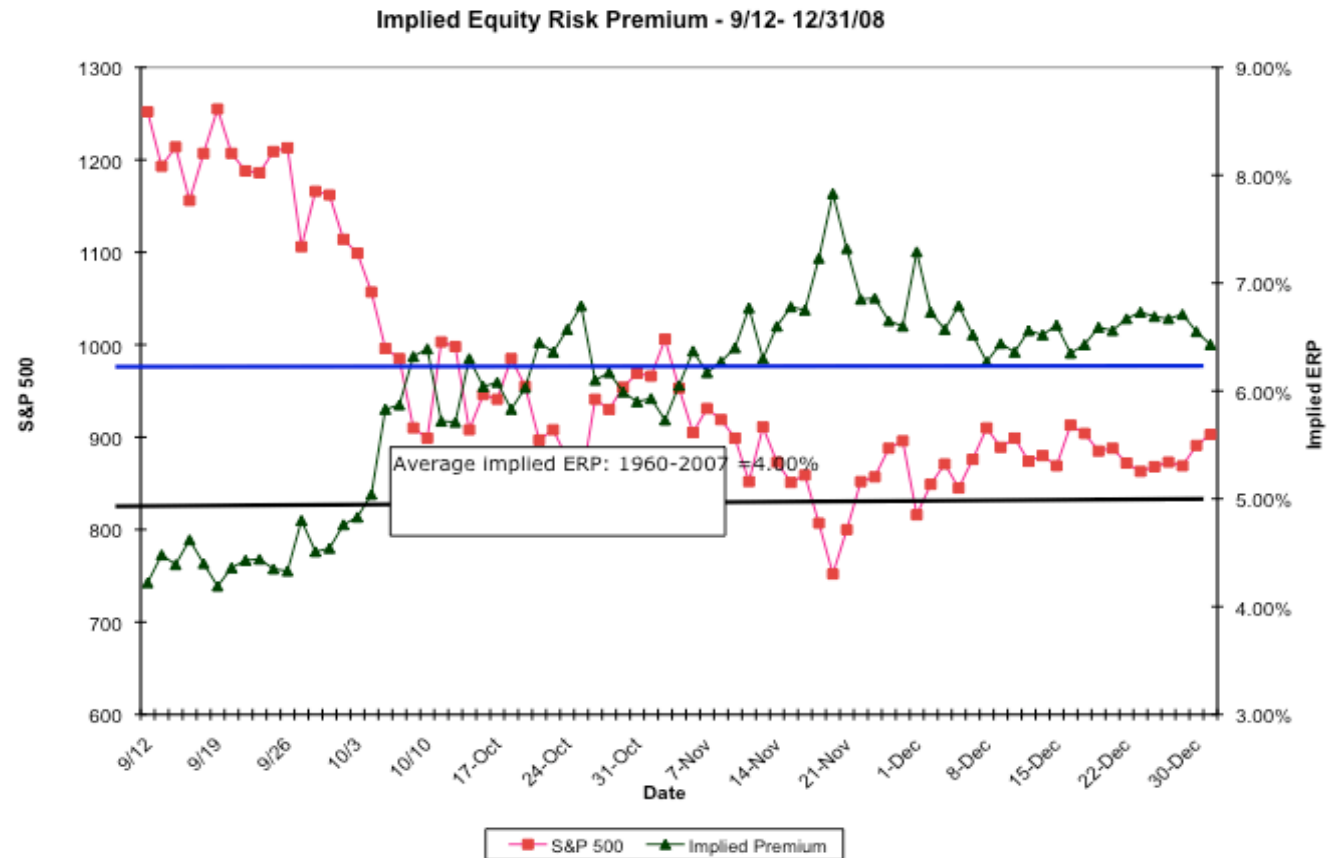


# Implied Premiums in the US: 1960-2010

*Implied Premium for US Equity Market*

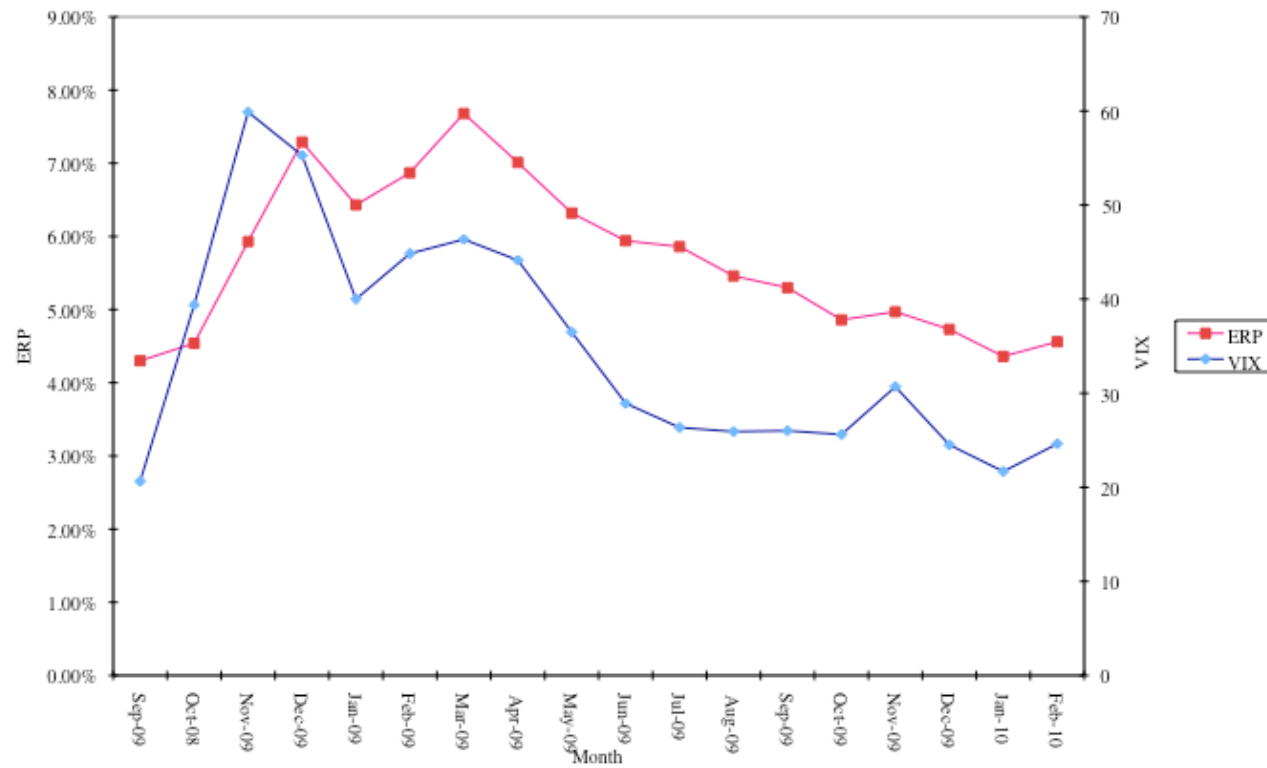


# The Anatomy of a Crisis: Implied ERP from September 12, 2008 to January 1, 2009

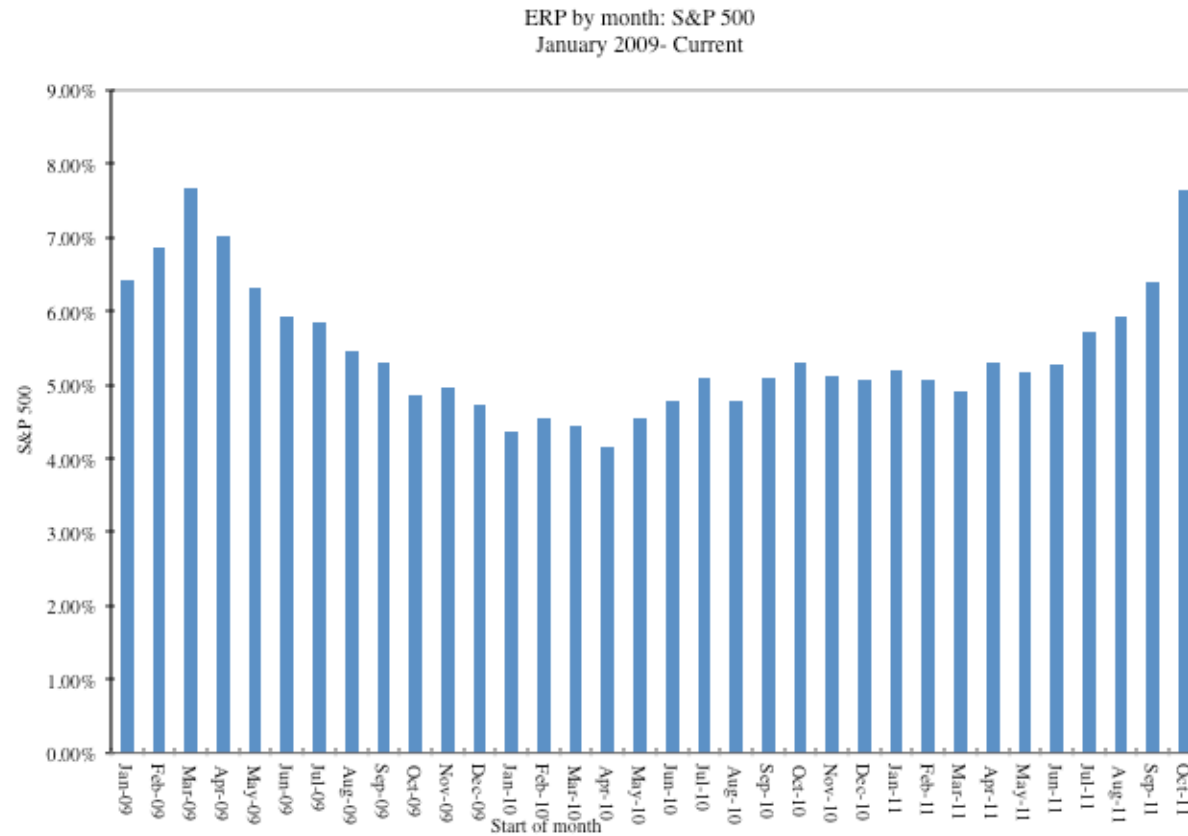


# Connected to stock market volatility...

Figure 18: ERP versus VIX



# Updated numbers...

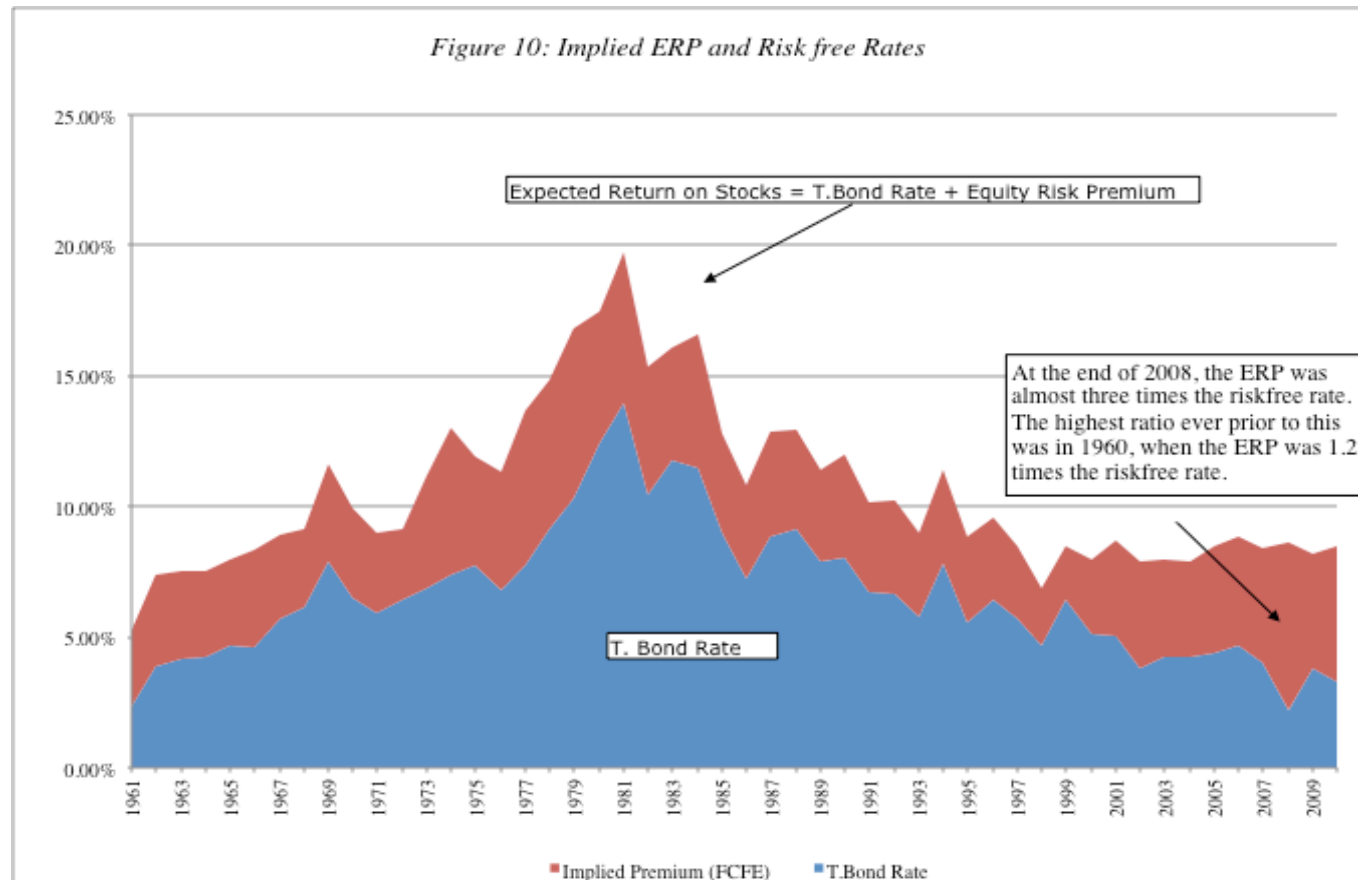


### III. Exploring interactions...

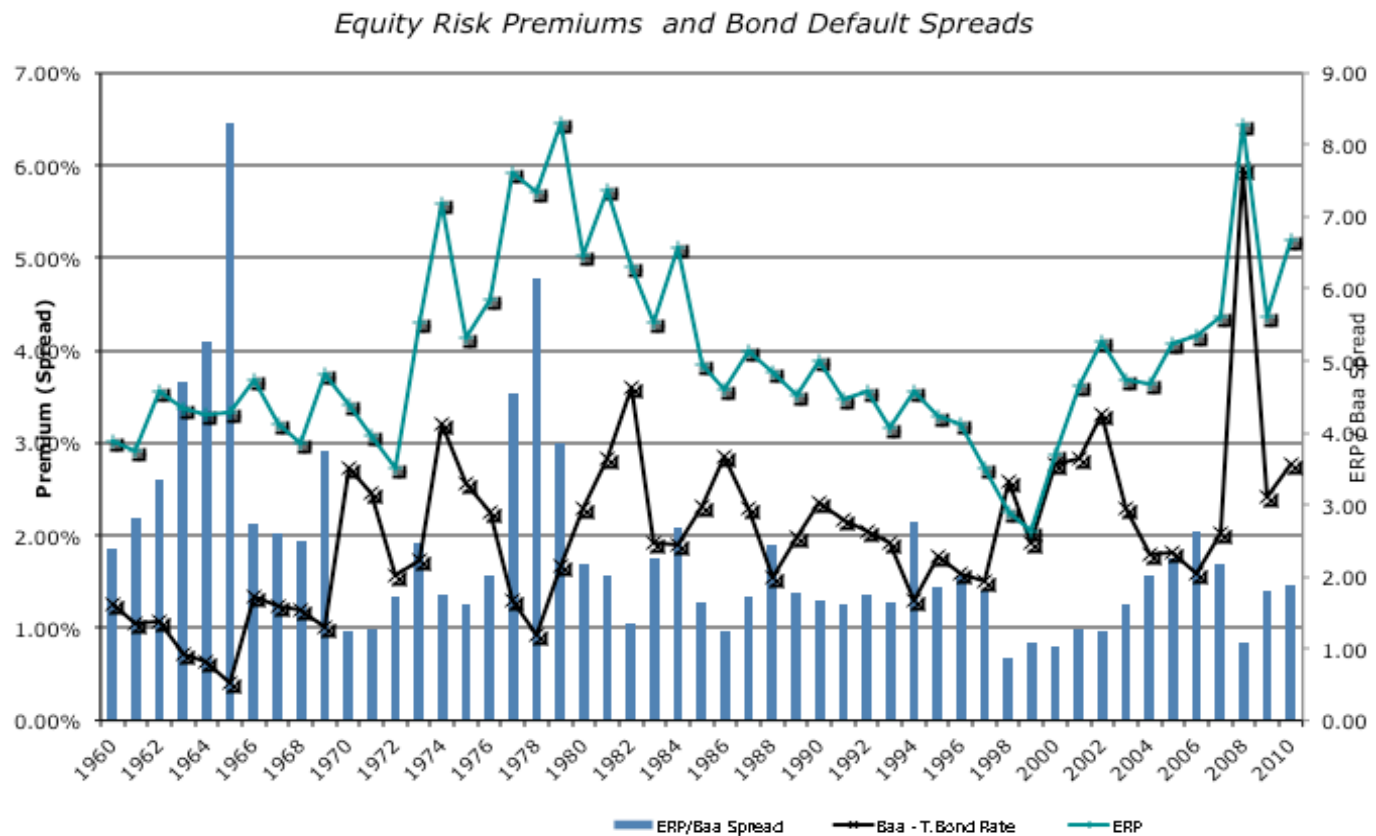
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- No asset market exists in isolation. The same investors often invest across markets, and if they become more risk averse in one market, they should show similar tendencies in others.
  - When returns and risk premiums change significantly in one asset market, you should expect them to change in other markets as well.
  - When risk premiums move in different directions in different markets at the same time, it can reflect changing fundamentals in the markets or market mistakes.

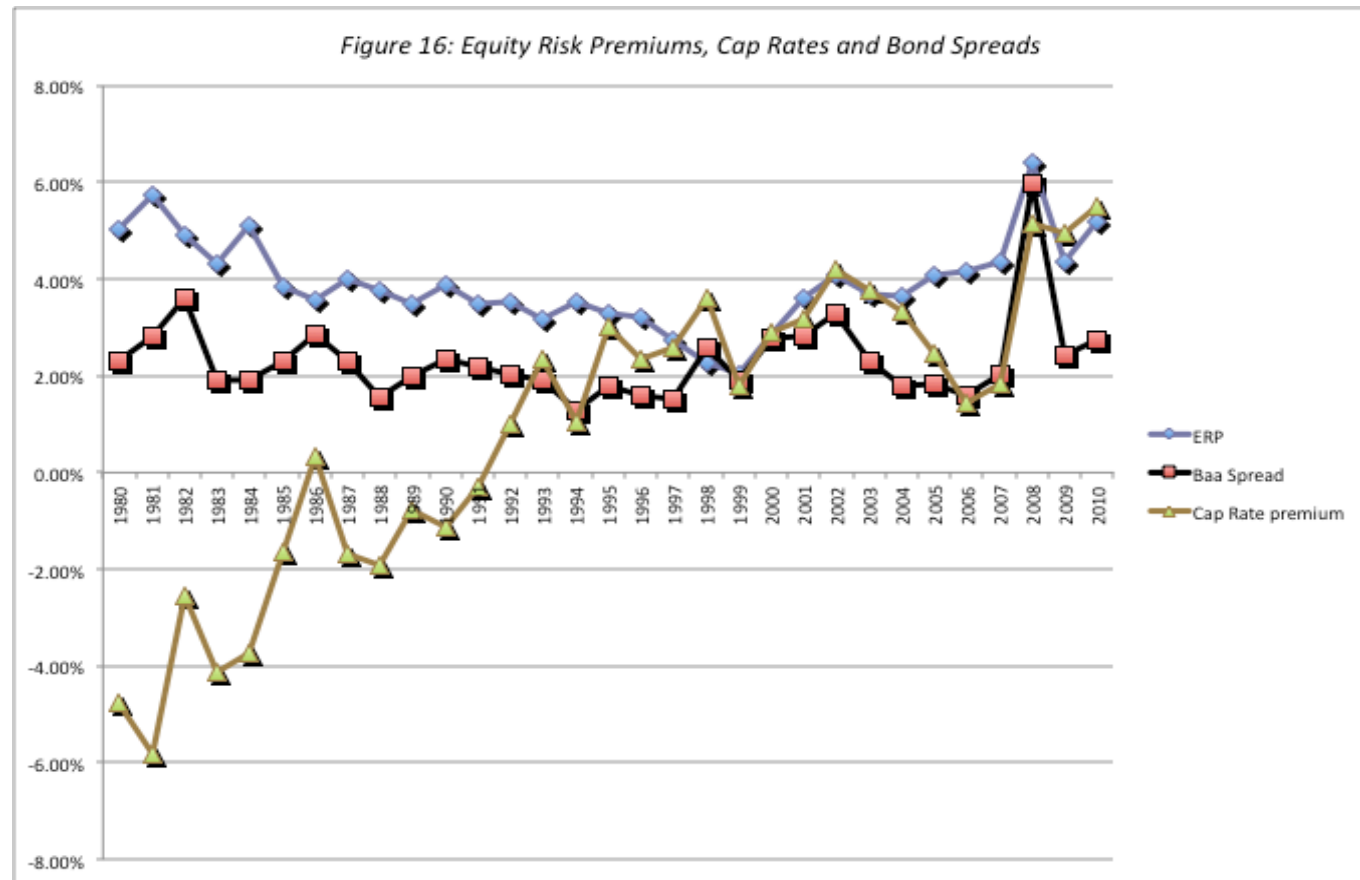
# Implied Premium versus Risk Free Rate



# Equity Risk Premiums and Bond Default Spreads



# Equity Risk Premiums and Cap Rates (Real Estate)





# Equity Risk premium in an emerging market

## 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%

## Implied Equity Risk Premium comparison: January 2008 versus January 2009

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<i>Country</i>	<i>ERP (1/1/08)</i>	<i>ERP (1/1/09)</i>
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%	9.06%

# Estimates of ERP for US in January 2011

<i>Approach Used</i>	<i>ERP</i>	<i>Additional information</i>
Survey: CFOs	3.07%	Campbell and Harvey survey of CFOs (2010); Average estimate. Median was 2.7%.
Survey: Global Fund Managers	3.80%	Merrill Lynch (September 2009) survey of global managers
Historical - US	4.31%	Geometric average - Stocks over T.Bonds: 1928-2010
Historical – Multiple Equity Markets	3.70%	Average premium across 17 markets: Dimson, Marsh and Staunton (2010)
Current Implied premium	5.07%	From S&P 500 – February 1, 2011
Average Implied premium	3.92%	Average of implied equity risk premium: 1960-2009
Implied premium adjusted for T.Bond rate and term structure	3.45%	Using regression of implied premium on T.Bond rate
Default spread based premium	4.87%	Default Spread * (ERP/ Default Spread average)

## Best Estimator?

<i>Predictor</i>	<i>Correlation with implied premium next year</i>	<i>Correlation with actual risk premium – next 10 years</i>
Current implied premium	0.702	0.532
Average implied premium: Last 5 years	0.489	0.338
Historical Premium	-0.326	-0.493
Default Spread based premium	0.076	0.106

## The bottom line...

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- The days of stable equity risk premiums are behind us. We are in a new world order, where all risk premiums will become more volatile.
- Sticking with a fixed risk premium or trusting mean reversion in this market is a recipe for disaster, since fundamentals shift so dramatically over time.
- Here is what we need to do:
  - Have dynamic, constantly recomputed forward looking estimates of risk premiums
  - Relate these risk premiums to real events and fundamentals
  - Compare these risk premiums across different markets to check for consistency and mispricing.