EQUITY RISK PREMIUMS: LOOKING BACKWARDS AND FORWARDS...

Aswath Damodaran

Risk Premiums and Asset Prices

- ☐ 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).

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General Propositions about Risk Premiums

- 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.

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The Equity Risk Premium

□ 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

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The macro determinants of equity risk..

- <u>Economic risk:</u> As the underlying economy becomes more uncertain, equity risk will rise. Higher volatility in GDP -> Higher equity risk.

- <u>Political risk:</u> As the uncertainty about fiscal and government policy increases, equity risk will rise.

- <u>Information opacity:</u> As the information provides by companies becomes more opaque and difficult to assess, equity risk premiums will rise.

- <u>Liquidity:</u> As liquidity of equities decreases, equity risk increases.

- <u>Catastrophic risk</u>: There is always the potential for catastrophic risk in investing in equities. As that perceived likelihood increases, equity risk will rise.

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How equity risk premiums are estimated in practice…

- 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	Notes
Individual Investors	Securities Industries Association	8.3% (2004)	One year premium
Institutional Investors	Merrill Lynch	4.8% (2013)	Monrthly updates
CFOs	Campbell Harvey & Graham	4.48% (2012)	5-8% response rate
Analysts	Pablo Fernandez	5.0% (2011)	Lowest standard deviation
Academics	Pablo Fernandez	5.7% (2011)	Higher for emerging markets

- 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 backward looking
  - they tend to be short term; even the longest surveys do not go beyond one year.

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Equity Risk Premiums
The ubiquitous historical risk premium

- The historical premium is the premium that stocks have historically earned over riskless securities.

- While the users of historical risk premiums act as if it is a fact (rather than an estimate), 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:

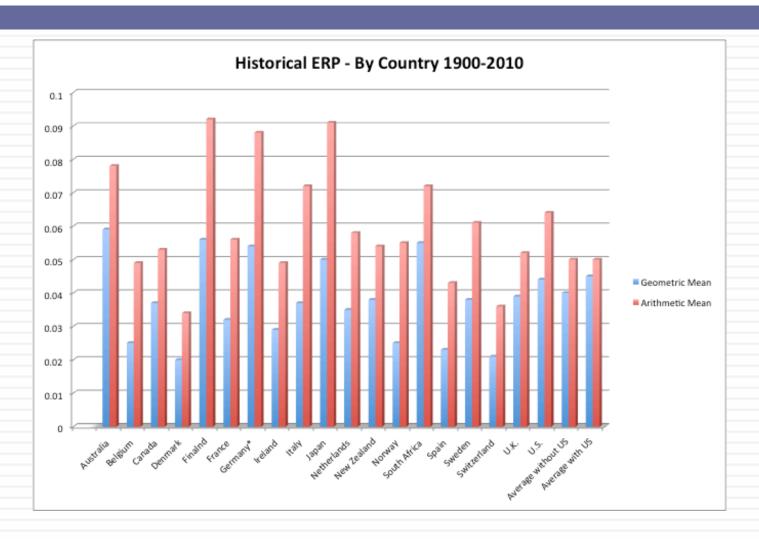|	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2012	7.65%	5.88%	5.74%	4.20%
	2.20%	2.33%		
1962-2012	5.93%	3.91%	4.60%	2.93%
	2.38%	2.66%		
2002-2012	7.06%	3.08%	5.38%	1.71%
	5.82%	8.11%		

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The perils of trusting the past…….

- <u>Noisy estimates</u>: Even with long time periods of history, the risk premium that you derive will have substantial standard error. For instance, if you go back to 1928 (about 80 years of history) and you assume a standard deviation of 20% in annual stock returns, you arrive at a standard error of greater than 2%:

$$\text{Standard Error in Premium} = 20\%/\sqrt{80} = 2.26\%$$

(An aside: The implied standard deviation in equities rose to almost 50% during the last quarter of 2008. Think about the consequences for using historical risk premiums, if this volatility persisted)

- <u>Survivorship Bias</u>: 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.

Risk Premium for a Mature Market? Broadening the sample

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The simplest way of estimating an additional country risk premium: The country default spread

□ Default spread for country: In this approach, the country equity risk premium is set equal to the default spread for the country, estimated in one of three ways:

- ❑ The default spread on a dollar denominated bond issued by the country. Brazil's 10 year $ denominated bond at the start of 2013 was trading at an interest rate of 2.60%, a default spread of 0.84% over the US treasury bond rate of 1.76%.
- ❑ The ten year CDS spread for Brazil of 1.42%
- ❑ Brazil's sovereign local currency rating is Baa2. The default spread for a Baa2 rated sovereign is about 1.75%.

□ This default spread is added on to the mature market premium to arrive at the total equity risk premium for Brazil, assuming a mature market premium of 5.80%.

- ❑ Country Risk Premium for Brazil = 1.75%
- ❑ Total ERP for Brazil = 5.80% + 1.75% = 7.55%

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An equity volatility based approach to estimating the country total ERP

□ This approach draws on the standard deviation of two equity markets, the emerging market in question and a base market (usually the US). The total equity risk premium for the emerging market is then written as:

$$\text{Total equity risk premium} = \text{Risk Premium}_{US} * \sigma_{\text{Country Equity}} / \sigma_{US \text{ Equity}}$$

□ The country equity risk premium is based upon the volatility of the market in question relative to U.S market.

  ▫ Assume that the equity risk premium for the US is 5.80%.

  ▫ Assume that the standard deviation in the Bovespa (Brazilian equity) is 21% and that the standard deviation for the S&P 500 (US equity) is 18%.

   ▪ Total Equity Risk Premium for Brazil = 5.80% (21%/ 18%) = 6.77%

   ▪ Country equity risk premium for Brazil = 6.77% - 5.80% = 0.97%

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A melded approach to estimating the additional country risk premium

- Country ratings measure default risk. While default risk premiums and equity risk premiums are highly correlated, one would expect equity spreads to be higher than debt spreads.
- Another is to multiply the bond default spread by the relative volatility of stock and bond prices in that market. Using this approach for Brazil in January 2013, you would get:
  - Country Equity risk premium = Default spread on country bond* $\sigma_{Country\ Equity} / \sigma_{Country\ Bond}$
    - Standard Deviation in Bovespa (Equity) = 21%
    - Standard Deviation in Brazil government bond = 14%
    - Default spread on C-Bond = 1.75%
  - Brazil Country Risk Premium = 1.75% (21%/14%) = 2.63%
  - Brazil Total ERP = Mature Market Premium + CRP = 5.80% + 2.63% = 8.43%

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Country Risk Premiums
July 2013

North America		
Canada	0.00%	5.75%
United States	0.00%	5.75%
North America	**0.00%**	**5.75%**

Latin America		
Argentina	10.13%	15.88%
Belize	14.25%	20.00%
Bolivia	5.40%	11.15%
Brazil	3.00%	8.75%
Chile	1.20%	6.95%
Colombia	3.38%	9.13%
Costa Rica	3.38%	9.13%
Ecuador	12.00%	17.75%
El Salvador	5.40%	11.15%
Guatemala	4.13%	9.88%
Honduras	8.25%	14.00%
Mexico	2.55%	8.30%
Nicaragua	10.13%	15.88%
Panama	3.00%	8.75%
Paraguay	5.40%	11.15%
Peru	3.00%	8.75%
Suriname	5.40%	11.15%
Uruguay	3.38%	9.13%
Venezuela	6.75%	12.50%
Latin America	**3.94%**	**9.69%**

W. Europe		
Andorra	1.95%	7.70%
Austria	0.00%	5.75%
Belgium	1.20%	6.95%
Cyprus	16.50%	22.25%
Denmark	0.00%	5.75%
Finland	0.00%	5.75%
France	0.45%	6.20%
Germany	0.00%	5.75%
Greece	10.13%	15.88%
Iceland	3.38%	9.13%
Ireland	4.13%	9.88%
Isle of Man	0.00%	5.75%
Italy	3.00%	8.75%
Liechtenstein	0.00%	5.75%
Luxembourg	0.00%	5.75%
Malta	1.95%	7.70%
Netherlands	0.00%	5.75%
Norway	0.00%	5.75%
Portugal	5.40%	11.15%
Spain	3.38%	9.13%
Sweden	0.00%	5.75%
Switzerland	0.00%	5.75%
Turkey	3.38%	9.13%
UK	0.45%	6.20%
W. Europe	**1,.22%**	**6.97%**

Africa		
Angola	5.40%	11.15%
Benin	8.25%	14.00%
Botswana	1.65%	7.40%
Burkina Faso	8.25%	14.00%
Cameroon	8.25%	14.00%
Cape Verde	6.75%	12.50%
Egypt	12.00%	17.75%
Gabon	5.40%	11.15%
Ghana	6.75%	12.50%
Kenya	6.75%	12.50%
Morocco	4.13%	9.88%
Mozambique	6.75%	12.50%
Namibia	3.38%	9.13%
Nigeria	5.40%	11.15%
Rwanda	8.25%	14.00%
Senegal	6.75%	12.50%
South Africa	2.55%	8.30%
Tunisia	4.73%	10.48%
Zambia	6.75%	12.50%
Africa	**5.90%**	**11.65%**

E. Europe/Russia		
Albania	6.75%	12.50%
Armenia	4.73%	10.48%
Azerbaijan	3.38%	9.13%
Belarus	10.13%	15.88%
Bosnia	10.13%	15.88%
Bulgaria	3.00%	8.75%
Croatia	4.13%	9.88%
Czech Republic	1.43%	7.18%
Estonia	1.43%	7.18%
Georgia	5.40%	11.15%
Hungary	4.13%	9.88%
Kazakhstan	3.00%	8.75%
Latvia	3.00%	8.75%
Lithuania	2.55%	8.30%
Macedonia	5.40%	11.15%
Moldova	10.13%	15.88%
Montenegro	5.40%	11.15%
Poland	1.65%	7.40%
Romania	3.38%	9.13%
Russia	2.55%	8.30%
Serbia	5.40%	11.15%
Slovakia	1.65%	7.40%
Slovenia	4.13%	9.88%
Uganda	6.75%	12.50%
Ukraine	10.13%	15.88%
E. Europe/Russia	**3.13%**	**8.88%**

Middle East		
Bahrain	2.55%	8.30%
Israel	1.43%	7.18%
Jordan	6.75%	12.50%
Kuwait	0.90%	6.65%
Lebanon	6.75%	12.50%
Oman	1.43%	7.18%
Qatar	0.90%	6.65%
Saudi Arabia	1.20%	6.95%
UAE	0.90%	6.65%
Middle East	**1.38%**	**7.13%**

Asia		
Bangladesh	5.40%	11.15%
Cambodia	8.25%	14.00%
China	1.20%	6.95%
Fiji	6.75%	12.50%
Hong Kong	0.45%	6.20%
India	3.38%	9.13%
Indonesia	3.38%	9.13%
Japan	1.20%	6.95%
Korea	1.20%	6.95%
Macao	1.20%	6.95%
Malaysia	1.95%	7.70%
Mauritius	2.55%	8.30%
Mongolia	6.75%	12.50%
Pakistan	12.00%	17.75%
Papua NG	6.75%	12.50%
Philippines	4.13%	9.88%
Singapore	0.00%	5.75%
Sri Lanka	6.75%	12.50%
Taiwan	1.20%	6.95%
Thailand	2.55%	8.30%
Vietnam	8.25%	14.00%
Asia	**1.77%**	**7.52%**

Australia & NZ		
Australia	0.00%	5.75%
Cook Islands	6.75%	12.50%
New Zealand	0.00%	5.75%
Australia & NZ	**0.00%**	**5.75%**

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

From Country Equity Risk Premiums to Corporate Equity Risk premiums

- Approach 1: Assume that every company in the country is equally exposed to country risk. In this case,

  E(Return) = Riskfree Rate + CRP + Beta (Mature ERP)

  Implicitly, this is what you are assuming when you use the local Government's dollar borrowing rate as your riskfree rate.

- Approach 2: Assume that a company's exposure to country risk is similar to its exposure to other market risk.

  E(Return) = Riskfree Rate + Beta (Mature ERP+ CRP)

- Approach 3: Treat country risk as a separate risk factor and allow firms to have different exposures to country risk (perhaps based upon the proportion of their revenues come from non-domestic sales)

  E(Return)=Riskfree Rate+ β (Mature ERP) + λ (CRP)

Mature ERP = Mature market Equity Risk Premium

CRP = Additional country risk premium

Approaches 1 & 2: Estimating country risk premium exposure

- Location based CRP: The standard approach in valuation is to attach a country risk premium to a company based upon its country of incorporation. Thus, if you are an Indian company, you are assumed to be exposed to the Indian country risk premium. A developed market company is assumed to be unexposed to emerging market risk.

- Operation-based CRP: There is a more reasonable modified version. The country risk premium for a company can be computed as a weighted average of the country risk premiums of the countries that it does business in, with the weights based upon revenues or operating income. If a company is exposed to risk in dozens of countries, you can take a weighted average of the risk premiums by region.

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Operation based CRP: Single versus Multiple Emerging Markets

Single emerging market: Embraer, in 2004, reported that it derived 3% of its revenues in Brazil and the balance from mature markets. The mature market ERP in 2004 was 5% and Brazil's CRP was 7.89%.

	Revenues	Total ERP	CRP
US and other mature markets	97%	5.00%	0.00%
Brazil	3%	12.89%	8%
Embraer		**5.24%**	**0.24%**

Multiple emerging markets: Ambev, the Brazilian-based beverage company, reported revenues from the following countries during 2011.

	Revenues	%	Total ERP	CRP
Argentina	19	9.31%	15.00%	9.00%
Bolivia	4	1.96%	10.88%	4.88%
Brazil	130	63.73%	8.63%	2.63%
Canada	23	11.27%	6.00%	0.00%
Chile	7	3.43%	7.05%	1.05%
Ecuador	6	2.94%	12.75%	6.75%
Paraguay	3	1.47%	12.00%	6.00%
Peru	12	5.88%	9.00%	3.00%
Ambev	**204**		**9.11%**	**3.11%**

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Extending to a multinational: Regional breakdown Coca Cola's revenue breakdown and ERP in 2012

Region	Revenues	Total ERP	CRP
Western Europe	19%	6.67%	0.67%
Eastern Europe & Russia	5%	8.60%	2.60%
Asia	15%	7.63%	1.63%
Latin America	15%	9.42%	3.42%
Australia	4%	6.00%	0.00%
Africa	4%	9.82%	3.82%
North America	40%	6.00%	0.00%
Coca Cola	100%	7.14%	1.14%

Things to watch out for

1. Aggregation across regions. For instance, the Pacific region often includes Australia & NZ with Asi
2. Obscure aggregations including Eurasia and Oceania

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Two problems with these approaches..

- <u>Focus just on revenues:</u> To the extent that revenues are the only variable that you consider, when weighting risk exposure across markets, you may be missing other exposures to country risk. For instance, an emerging market company that gets the bulk of its revenues outside the country (in a developed market) may still have all of its production facilities in the emerging market.

- <u>Exposure not adjusted or based upon beta:</u> To the extent that the country risk premium is multiplied by a beta, we are assuming that beta in addition to measuring exposure to all other macro economic risk also measures exposure to country risk.

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Approach 3: Estimate a lambda for country risk

- <u>Source of revenues</u>: Other things remaining equal, a company should be more exposed to risk in a country if it generates more of its revenues from that country.

- <u>Manufacturing facilities</u>: Other things remaining equal, a firm that has all of its production facilities in a "risky country" 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).

- <u>Use of risk management products</u>: Companies can use both options/futures markets and insurance to hedge some or a significant portion of country risk.

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Estimating Lambdas: The Revenue Approach

- The easiest and most accessible data is on revenues. Most companies break their revenues down by region.

  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

Note that if the proportion of revenues of the average company gets in the market is assumed to be 100%, this approach collapses into the first one.,

- 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 exposure

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Estimating a US Dollar Cost of Equity for Embraer - September 2004

- Assume that the beta for Embraer is 1.07, and that the US $ riskfree rate used is 4%. Also assume that the risk premium for the US is 5% and the country risk premium for Brazil is 7.89%. Finally, assume that Embraer gets 3% of its revenues in Brazil & the rest in the US.

- There <u>are five estimates</u> of $ cost of equity for Embraer:
  - Approach 1: Constant exposure to CRP, Location CRP
    E(Return) = 4% + 1.07 (5%) + 7.89% = 17.24%
  - Approach 2: Constant exposure to CRP, Operation CRP
    E(Return) = 4% + 1.07 (5%) + (0.03*7.89% +0.97*0%)= 9.59%
  - Approach 3: Beta exposure to CRP, Location CRP
    E(Return) = 4% + 1.07 (5% + 7.89%)= 17.79%
  - Approach 4: Beta exposure to CRP, Operation CRP
    E(Return) = 4% + 1.07 (5% +(0.03*7.89%+0.97*0%)) = 9.60%
  - Approach 5: Lambda exposure to CRP
    E(Return) = 4% + 1.07 (5%) + 0.27(7.89%) = 11.48%%

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Implied Equity Premiums

- 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).
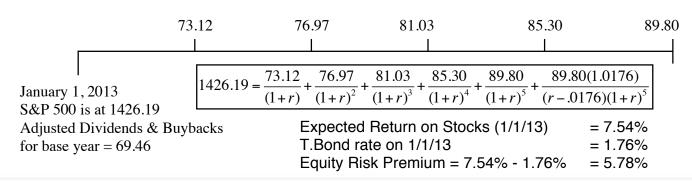
An Updated Equity Risk Premium:

□ On January 1, 2013, the S&P 500 was at 1426.19, essentially unchanged for the year. And it was a year of macro shocks – political upheaval in the Middle East and sovereign debt problems in Europe. The treasury bond rate dropped below 2% and buybacks/dividends surged.

In 2012, the actual cash returned to stockholders was 72.25. Using the average total yield for the last decade yields 69.46

Analysts expect earnings to grow 7.67% in 2013, 7.28% in 2014, scaling down to 1.76% in 2017, resulting in a compounded annual growth rate of 5.27% over the next 5 years. We will assume that dividends & buybacks will tgrow 5.27% a year for the next 5 years.

After year 5, we will assume that earnings on the index will grow at 1.76%, the same rate as the entire economy (= riskfree rate).
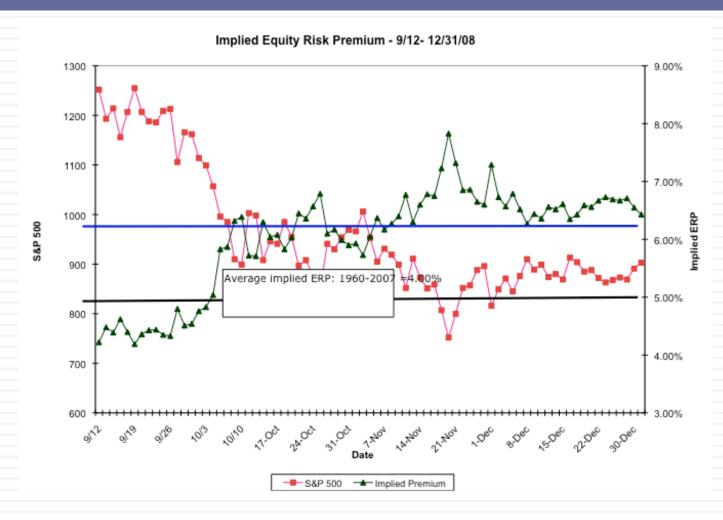
	73.12	76.97	81.03	85.30	89.80

January 1, 2013
S&P 500 is at 1426.19
Adjusted Dividends & Buybacks
for base year = 69.46

$$1426.19 = \frac{73.12}{(1+r)} + \frac{76.97}{(1+r)^2} + \frac{81.03}{(1+r)^3} + \frac{85.30}{(1+r)^4} + \frac{89.80}{(1+r)^5} + \frac{89.80(1.0176)}{(r-.0176)(1+r)^5}$$

Expected Return on Stocks (1/1/13) = 7.54%
T.Bond rate on 1/1/13 = 1.76%
Equity Risk Premium = 7.54% - 1.76% = 5.78%

Data Sources:
Dividends and Buybacks last year: S&P
Expected growth rate: S&P, Media reports, Factset, Thomson-Reuters
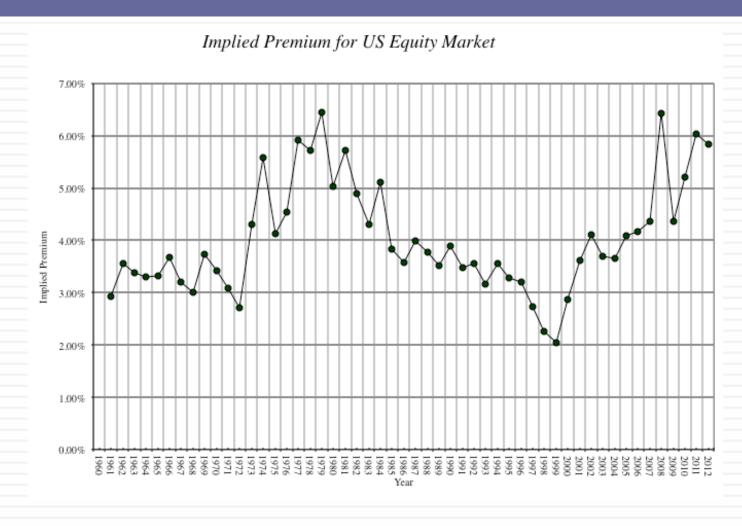
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Stress testing the implied ERP

- Base year cash flow: There are three choices for equity cash flows – dividends, dividends plus buybacks and free cash flow to equity. You can also use either last year's number or an average over a period.
  - My choice: Ten-year average of dividends plus buybacks as percent of stock prices.
  - Sensitivity: Using just dividends lowers the ERP dramatically, but using the FCFE or the current cash flow has little impact.

- Expected growth rate: Here again, there are three choices:
  - (a) Historical growth rate in earnings on index over last 5 years
  - (b) Analyst estimate of expected growth in earnings, with two subchoices
    - i. Bottom-up estimate: Average of analyst estimates of growth for individual companies (10.57%)
    - ii. Top down estimate: Average of analyst estimates of growth in aggregate earnings for the index (5.27%)
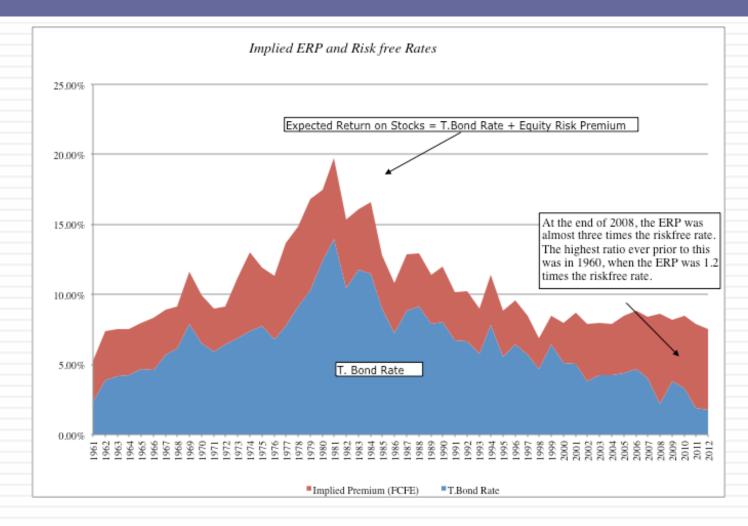 - (c) Fundamental growth rate = ROE * Retention ratio for index (5.38%)

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

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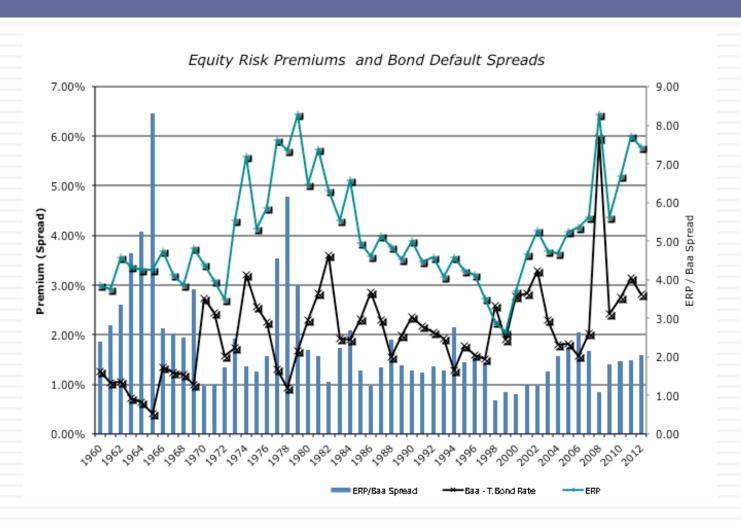
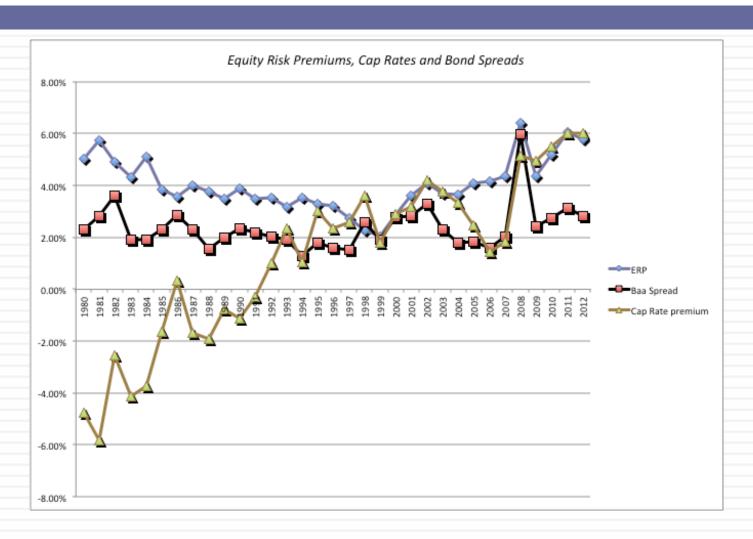# Implied Premiums in the US: 1960-2012

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Implied Premium versus Risk Free Rate

Equity Risk Premiums and Bond Default Spreads

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Equity Risk Premiums and Cap Rates (Real Estate)

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

- 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%

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Can country risk premiums change? Brazil CRP & Total ERP from 2000 to 2012

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Other uses for implied ERP

- <u>Small cap premium</u>: For decades, analysts have added a small cap premium to the cost of equity for small companies, with the small cap premium coming from historical data. You can compute an implied small cap premium by computing the ERP on a small cap stock index (say the Russell) and comparing to the ERP on the S&P 500

- <u>Illiquidity discounts</u>: You could categorize stocks by liquidity (float, trading volume) and compute ERP for each decile to get an estimate of the illiquidity premium that you should add to discount rates.

- <u>Implied beta</u>: You could compute implied ERP for sector indices or ETFs to estimate the expected return (or cost of equity) for each sector. That sector return can then be used to back out implied betas.

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Which equity risk premium should you use?

If you assume this   **Premium to use**

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

Market is correct in the aggregate or that   Current implied equity risk premium
your valuation should be market neutral

Marker makes mistakes even in the   Average implied equity risk premium
aggregate but is correct over time   over time.

Predictor	Correlation with implied premium next year	Correlation with actual risk premium – next 10 years
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

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The bottom line…

☐ 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.

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