# Risk Premium for a Mature Market? Broadening the sample to 1900-2017

| Country | Geometric Mean | Standard Error |
|---|---|---|
| Australia | 5.00% | 1.70% |
| Austria | 2.90% | 14.10% |
| Belgium | 2.20% | 1.90% |
| Canada | 3.50% | 1.70% |
| Denmark | 2.20% | 1.70% |
| Finland | 5.20% | 2.70% |
| France | 3.10% | 2.10% |
| Germany | 5.10% | 2.60% |
| Ireland | 2.70% | 1.80% |
| Italy | 3.20% | 2.70% |
| Japan | 5.10% | 3.00% |
| Netherlands | 3.30% | 2.00% |
| New Zealand | 4.00% | 1.60% |
| Norway | 2.40% | 2.50% |
| Portugal | 5.30% | 2.90% |
| South Africa | 5.30% | 1.80% |
| Spain | 1.80% | 1.90% |
| Sweden | 3.10% | 2.00% |
| Switzerland | 2.20% | 1.60% |
| U.K. | 3.70% | 1.60% |
| U.S. | 4.40% | 1.90% |
| Europe | 3.00% | 1.40% |
| World-ex U.S. | 2.80% | 1.30% |
| World | 3.20% | 1.40% |

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

- <u>Default spread for country</u>: 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. (In January 2020, that spread was % for the Brazilian $ bond) was 1.71%.
  - The sovereign CDS spread for the country. In January 2020, the ten-year CDS spread for Brazil, adjusted for the US CDS, was 1.56%.
  - The default spread based on the local currency rating for the country. Brazil's sovereign local currency rating is Ba2 and the default spread for a Ba2 rated sovereign was about 2.51% in January 2020.

- Add the default spread to a "mature" market premium: 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 5.20%.
  - Country Risk Premium for Brazil = 2.51%
  - Total ERP for Brazil = 5.20% + 2.51% = 7.71%

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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:

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

□ 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 5.20%.

  ◻ Assume that the standard deviation in the Bovespa (Brazilian equity) is 30% and that the standard deviation for the S&P 500 (US equity) is 18%.

  ◻ Total Equity Risk Premium for Brazil = 5.20% (30%/18%) = 8.67%

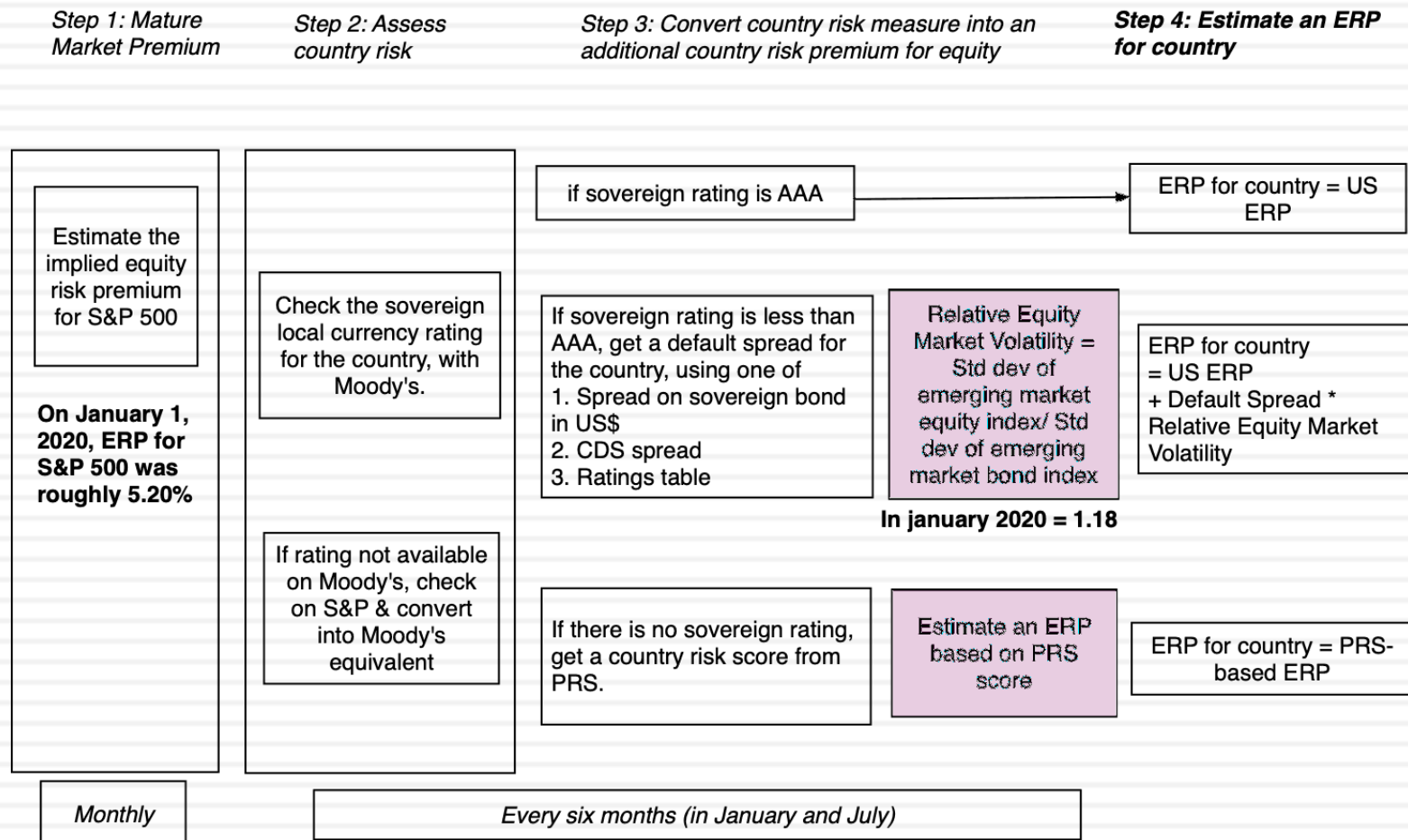  ◻ Country equity risk premium for Brazil = 8.67% - 5.20% = 3.47%

# 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 2020, you would get:

    ▫ Country Equity risk premium = Default spread on country bond* $\sigma_{Country\ Equity}$ / $\sigma_{Country\ Bond}$

        ■ Standard Deviation in Bovespa (Equity) = 30%

        ■ Standard Deviation in Brazil government bond = 20%

        ■ Default spread for Brazil= 2.51%

    ▫ Brazil Country Risk Premium = 2.51% (30%/20%) =  3.77%

    ▫ Brazil Total ERP = Mature Market Premium + CRP = 5.20% + 3.77% = 8.97%

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# A Template for Estimating the ERP

**ERP Estimation Procedure - January 1, 2020**



*Step 1: Mature Market Premium*

*Step 2: Assess country risk*

*Step 3: Convert country risk measure into an additional country risk premium for equity*

**Step 4: Estimate an ERP for country**

Estimate the implied equity risk premium for S&P 500

**On January 1, 2020, ERP for S&P 500 was roughly 5.20%**

Check the sovereign local currency rating for the country, with Moody's.

If rating not available on Moody's, check on S&P & convert into Moody's equivalent

if sovereign rating is AAA → ERP for country = US ERP

If sovereign rating is less than AAA, get a default spread for the country, using one of
1. Spread on sovereign bond in US$
2. CDS spread
3. Ratings table

Relative Equity Market Volatility = Std dev of emerging market equity index/ Std dev of emerging market bond index

**In january 2020 = 1.18**

ERP for country = US ERP + Default Spread * Relative Equity Market Volatility

If there is no sovereign rating, get a country risk score from PRS.

Estimate an ERP based on PRS score

ERP for country = PRS-based ERP

*Monthly*

*Every six months (in January and July)*

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| Country | ERP | CRP | Country | ERP | CRP |
|---|---|---|---|---|---|
| Andorra (Principality of) | 7.08% | 1.88% | Italy | 7.37% | 2.17% |
| Austria | 5.59% | 0.39% | Jersey (States of) | 5.89% | 0.69% |
| Belgium | 5.80% | 0.60% | Liechtenstein | 5.20% | 0.00% |
| Cyprus | 8.16% | 2.96% | Luxembourg | 5.20% | 0.00% |
| Denmark | 5.20% | 0.00% | Malta | 6.04% | 0.84% |
| Finland | 5.59% | 0.39% | Netherlands | 5.20% | 0.00% |
| France | 5.69% | 0.49% | Norway | 5.20% | 0.00% |
| Germany | 5.20% | 0.00% | Portugal | 7.37% | 2.17% |
| Greece | 9.64% | 4.44% | Spain | 6.77% | 1.57% |
| Guernsey (States of) | 6.77% | 1.57% | Sweden | 5.20% | 0.00% |
| Iceland | 6.04% | 0.84% | Switzerland | 5.20% | 0.00% |
| Ireland | 6.04% | 0.84% | Turkey | 9.64% | 4.44% |
| Isle of Man | 5.69% | 0.49% | United Kingdom | 5.69% | 0.49% |
| | | | **Western Europe** | **6.01%** | **0.81%** |

| Country | PRS Composite Risk Score | ERP | CRP |
|---|---|---|---|
| Algeria | 63 | 11.62% | 6.42% |
| Brunei | 82.75 | 5.59% | 0.39% |
| Gambia | 63.75 | 11.62% | 6.42% |
| Guinea | 57 | 15.06% | 9.86% |
| Guinea-Bissau | 63.25 | 11.62% | 6.42% |
| Guyana | 63.75 | 11.62% | 6.42% |
| Haiti | 57.5 | 14.08% | 8.88% |
| Iran | 62.5 | 11.62% | 6.42% |
| Korea, D.P.R. | 50.5 | 17.03% | 11.83% |
| Liberia | 49.5 | 21.71% | 16.51% |
| Libya | 69.5 | 8.16% | 2.96% |
| Madagascar | 65.5 | 10.63% | 5.43% |
| Malawi | 63.5 | 11.62% | 6.42% |
| Myanmar | 64 | 11.62% | 6.42% |
| Sierra Leone | 57 | 15.06% | 9.86% |
| Somalia | 53 | 17.03% | 11.83% |
| Sudan | 39.75 | 21.71% | 16.51% |
| Syria | 53 | 17.03% | 11.83% |
| Yemen, Republic | 54.5 | 17.03% | 11.83% |
| Zimbabwe | 50.5 | 17.03% | 11.83% |

| Country | ERP | CRP |
|---|---|---|
| Albania | 9.64% | 4.44% |
| Armenia | 8.75% | 3.55% |
| Azerbaijan | 8.16% | 2.96% |
| Belarus | 11.62% | 6.42% |
| Bosnia and Herzegovina | 11.62% | 6.42% |
| Bulgaria | 7.08% | 1.88% |
| Croatia | 8.16% | 2.96% |
| Czech Republic | 5.80% | 0.60% |
| Estonia | 5.89% | 0.69% |
| Georgia | 8.16% | 2.96% |
| Hungary | 7.37% | 2.17% |
| Kazakhstan | 7.37% | 2.17% |
| Kyrgyzstan | 10.63% | 5.43% |
| Latvia | 6.38% | 1.18% |
| Lithuania | 6.38% | 1.18% |
| Macedonia | 8.75% | 3.55% |
| Moldova | 11.62% | 6.42% |
| Montenegro | 9.64% | 4.44% |
| Poland | 6.04% | 0.84% |
| Romania | 7.37% | 2.17% |
| Russia | 7.37% | 2.17% |
| Serbia | 8.75% | 3.55% |
| Slovakia | 6.04% | 0.84% |
| Slovenia | 6.77% | 1.57% |
| Tajikistan | 11.62% | 6.42% |
| Ukraine | 12.59% | 7.39% |
| Uzbekistan | 7.08% | 1.88% |
| **Eastern Europe & Russia** | **7.34%** | **2.14%** |

| Country | ERP | CRP |
|---|---|---|
| Canada | 5.20% | 0.00% |
| United States | 5.20% | 0.00% |
| **North America** | **5.20%** | **0.00%** |

| | | |
|---|---|---|
| **Caribbean** | **10.62%** | **5.42%** |

| Country | ERP | CRP |
|---|---|---|
| Argentina | 14.08% | 8.88% |
| Belize | 11.62% | 6.42% |
| Bolivia | 8.75% | 3.55% |
| Brazil | 8.16% | 2.96% |
| Chile | 5.89% | 0.69% |
| Colombia | 7.08% | 1.88% |
| Costa Rica | 9.64% | 4.44% |
| Ecuador | 11.62% | 6.42% |
| El Salvador | 14.08% | 8.88% |
| Guatemala | 7.66% | 2.46% |
| Honduras | 9.64% | 4.44% |
| Mexico | 6.38% | 1.18% |
| Nicaragua | 10.63% | 5.43% |
| Panama | 6.77% | 1.57% |
| Paraguay | 7.66% | 2.46% |
| Peru | 6.38% | 1.18% |
| Suriname | 10.63% | 5.43% |
| Uruguay | 9.64% | 4.44% |
| Venezuela | 22.89% | 17.69% |
| **Central and South America** | **8.48%** | **3.28%** |

| Country | ERP | CRP |
|---|---|---|
| Angola | 11.62% | 6.42% |
| Benin | 10.63% | 5.43% |
| Botswana | 6.04% | 0.84% |
| Burkina Faso | 10.63% | 5.43% |
| Cameroon | 10.63% | 5.43% |
| Cape Verde | 10.63% | 5.43% |
| Congo (Democratic Republic of) | 12.59% | 7.39% |
| Congo (Republic of) | 14.08% | 8.88% |
| Côte d'Ivoire | 8.75% | 3.55% |
| Egypt | 10.63% | 5.43% |
| Ethiopia | 9.64% | 4.44% |
| Gabon | 12.59% | 7.39% |
| Ghana | 11.62% | 6.42% |
| Kenya | 10.63% | 5.43% |
| Mali | 11.62% | 6.42% |
| Morocco | 7.66% | 2.46% |
| Mozambique | 14.08% | 8.88% |
| Namibia | 8.16% | 2.96% |
| Niger | 11.62% | 6.42% |
| Nigeria | 10.63% | 5.43% |
| Rwanda | 10.63% | 5.43% |
| Senegal | 8.75% | 3.55% |
| South Africa | 7.37% | 2.17% |
| Swaziland | 10.63% | 5.43% |
| Tanzania | 9.64% | 4.44% |
| Togo | 11.62% | 6.42% |
| Tunisia | 10.63% | 5.43% |
| Uganda | 10.63% | 5.43% |
| Zambia | 14.08% | 8.88% |
| **Africa** | **9.89%** | **4.69%** |

| Country | ERP | CRP |
|---|---|---|
| Abu Dhabi | 5.69% | 0.49% |
| Bahrain | 10.63% | 5.43% |
| Iraq | 12.59% | 7.39% |
| Israel | 5.89% | 0.69% |
| Jordan | 9.64% | 4.44% |
| Kuwait | 5.69% | 0.49% |
| Lebanon | 14.08% | 8.88% |
| Oman | 7.66% | 2.46% |
| Qatar | 5.80% | 0.60% |
| Ras Al Khaimah | 12.59% | 7.39% |
| Saudi Arabia | 5.89% | 0.69% |
| Sharjah | 6.38% | 1.18% |
| United Arab Emirates | 5.69% | 0.49% |
| **Middle East** | **6.77%** | **1.57%** |

| Country | ERP | CRP |
|---|---|---|
| Bangladesh | 8.75% | 3.55% |
| Cambodia | 10.63% | 5.43% |
| China | 5.89% | 0.69% |
| Fiji | 8.75% | 3.55% |
| Hong Kong | 5.69% | 0.49% |
| India | 7.08% | 1.88% |
| Indonesia | 7.08% | 1.88% |
| Japan | 5.89% | 0.69% |
| Korea | 5.69% | 0.49% |
| Macao | 5.80% | 0.60% |
| Malaysia | 6.38% | 1.18% |
| Maldives | 10.63% | 5.43% |
| Mauritius | 6.77% | 1.57% |
| Mongolia | 11.62% | 6.42% |
| Pakistan | 11.62% | 6.42% |
| Papua New Guinea | 10.63% | 5.43% |
| Philippines | 7.08% | 1.88% |
| Singapore | 5.20% | 0.00% |
| Solomon Islands | 11.62% | 6.42% |
| Sri Lanka | 10.63% | 5.43% |
| Taiwan | 5.80% | 0.60% |
| Thailand | 6.77% | 1.57% |
| Vietnam | 8.75% | 3.55% |
| **Asia** | **6.21%** | **1.01%** |

| | | |
|---|---|---|
| Australia | 5.20% | |
| Cook Islands | 9.64% | |
| New Zealand | 5.20% | |
| **Australia & New Zealand** | **5.20%** | |

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*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)
- 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+ (Mature ERP) + $\lambda$ (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.

# Operation based CRP: Single versus Multiple Emerging Markets

☐ <u>Single emerging market</u>: 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%** |

☐ <u>Multiple emerging markets</u>: 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 Asia
2. Obscure aggregations including Eurasia and Oceania

# 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.

# A Production-based ERP: Royal Dutch Shell in 2015

| Country | Oil & Gas Production | % of Total | ERP |
|---|---|---|---|
| Denmark | 17396 | 3.83% | 6.20% |
| Italy | 11179 | 2.46% | 9.14% |
| Norway | 14337 | 3.16% | 6.20% |
| UK | 20762 | 4.57% | 6.81% |
| *Rest of Europe* | *874* | *0.19%* | *7.40%* |
| Brunei | 823 | 0.18% | 9.04% |
| Iraq | 20009 | 4.40% | 11.37% |
| Malaysia | 22980 | 5.06% | 8.05% |
| Oman | 78404 | 17.26% | 7.29% |
| Russia | 22016 | 4.85% | 10.06% |
| *Rest of Asia & ME* | *24480* | *5.39%* | *7.74%* |
| *Oceania* | *7858* | *1.73%* | *6.20%* |
| Gabon | 12472 | 2.75% | 11.76% |
| Nigeria | 67832 | 14.93% | 11.76% |
| Rest of Africa | 6159 | 1.36% | 12.17% |
| USA | 104263 | 22.95% | 6.20% |
| Canada | 8599 | 1.89% | 6.20% |
| Brazil | 13307 | 2.93% | 9.60% |
| *Rest of Latin America* | *576* | *0.13%* | *10.78%* |
| **Royal Dutch Shell** | **454326** | **100.00%** | **8.26%** |

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# Approach 3: Estimate a lambda for country risk

- □ Country risk exposure is affected by where you get your revenues and where your production happens, but there are a host of other variables that also affect this exposure, including:

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

  - ▫ Government "national" interests: There are sectors that are viewed as vital to the national interests, and governments often play a key role in these companies, either officially or unofficially. These sectors are more exposed to country risk.

- □ It is conceivable that there is a richer measure of country risk that incorporates all of the variables that drive country risk in one measure. That way my rationale when I devised "lambda" as my measure of country risk exposure.

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# A Revenue-based Lambda

- The factor "$\lambda$" measures the relative exposure of a firm to country risk. One simplistic solution would be to do the following:

  $\lambda$ = % of revenues domestically$_{firm}$/ % of revenues domestically$_{average\ firm}$

- Consider two firms – Tata Motors and Tata Consulting Services, both Indian companies. In 2008-09, Tata Motors got about 91.37% of its revenues in India and TCS got 7.62%. The average Indian firm gets about 80% of its revenues in India:

  $\lambda_{Tata\ Motors}$= 91%/80% = 1.14

  $\lambda_{TCS}$= 7.62%/80% = 0.09

- There are two implications

  - A company's risk exposure is determined by where it does business and not by where it is incorporated.

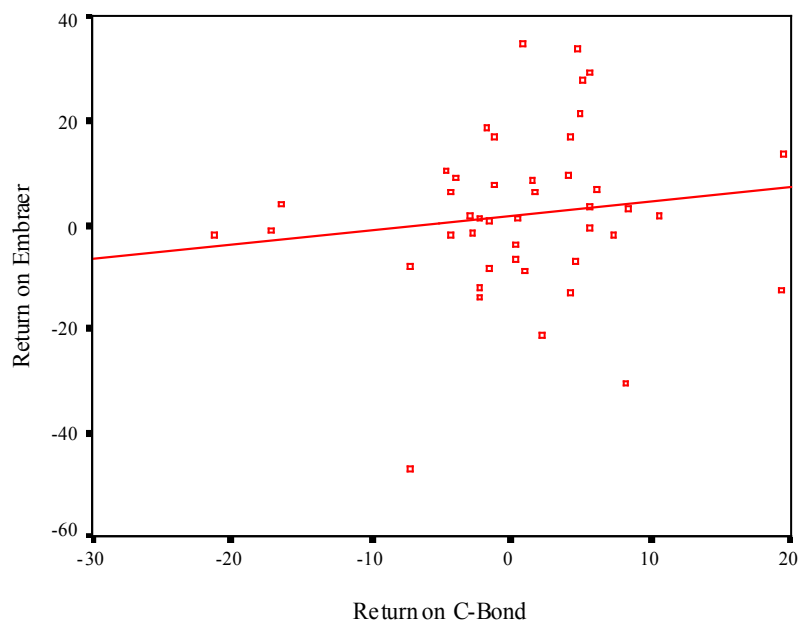  - Firms might be able to actively manage their country risk exposures
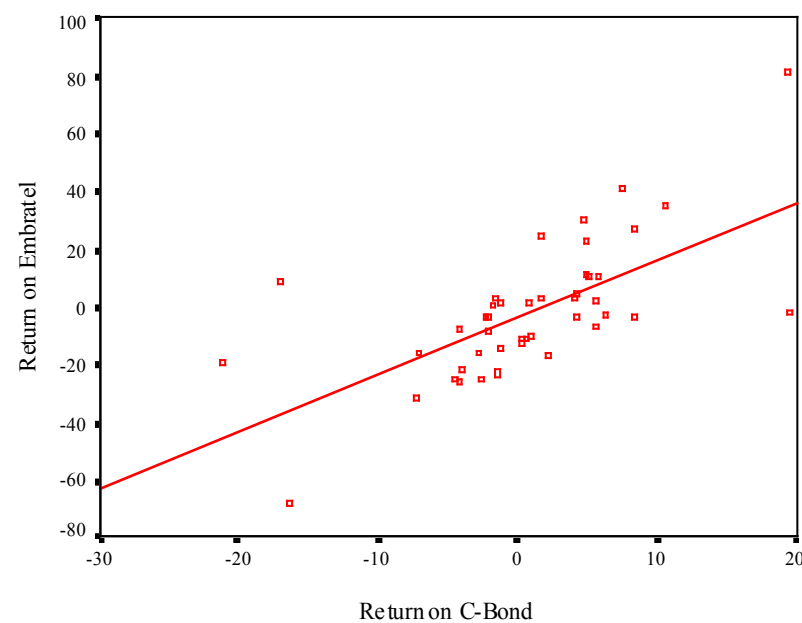
# A Price/Return based Lambda

$$\text{Return}_{\text{Embraer}} = 0.0195 + \mathbf{0.2681} \; \text{Return}_{\text{C Bond}}$$

$$\text{Return}_{\text{Embratel}} = -0.0308 + \mathbf{2.0030} \; \text{Return}_{\text{C Bond}}$$

Embraer versus C Bond: 2000-2003

Embratel versus C Bond: 2000-2003

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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 are five estimates 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%

# Valuing Emerging Market Companies with significant exposure in developed markets

☐ The conventional practice in investment banking 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, in 2004, Embraer would have been valued with a cost of equity of 17-18% even though it gets only 3% of its revenues in Brazil. As an investor, which of the following consequences do you see from this approach?

     a. Emerging market companies with substantial exposure in developed markets will be significantly over valued by analysts

     b. Emerging market companies with substantial exposure in developed markets will be significantly under valued by analysts

Can you construct an investment strategy to take advantage of the mis-valuation?  What would need to happen for you to make money of this strategy?

# Implied Equity Premiums

- For a start: 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 your expected return.

- Stock Price & Risk: 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.

- Implied ERP: 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).
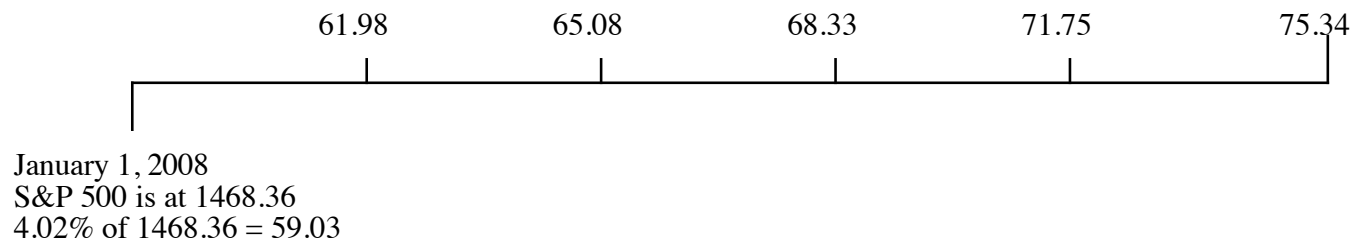
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# Implied Equity Premiums: January 2008

- 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).

| 61.98 | 65.08 | 68.33 | 71.75 | 75.34 |

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

- 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%

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

| 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

$$903.25 = \frac{54.69}{(1+r)} + \frac{56.87}{(1+r)^2} + \frac{59.15}{(1+r)^3} + \frac{61.52}{(1+r)^4} + \frac{63.98}{(1+r)^5} + \frac{63.98(1.0221)}{(r-.0221)(1+r)^5}$$
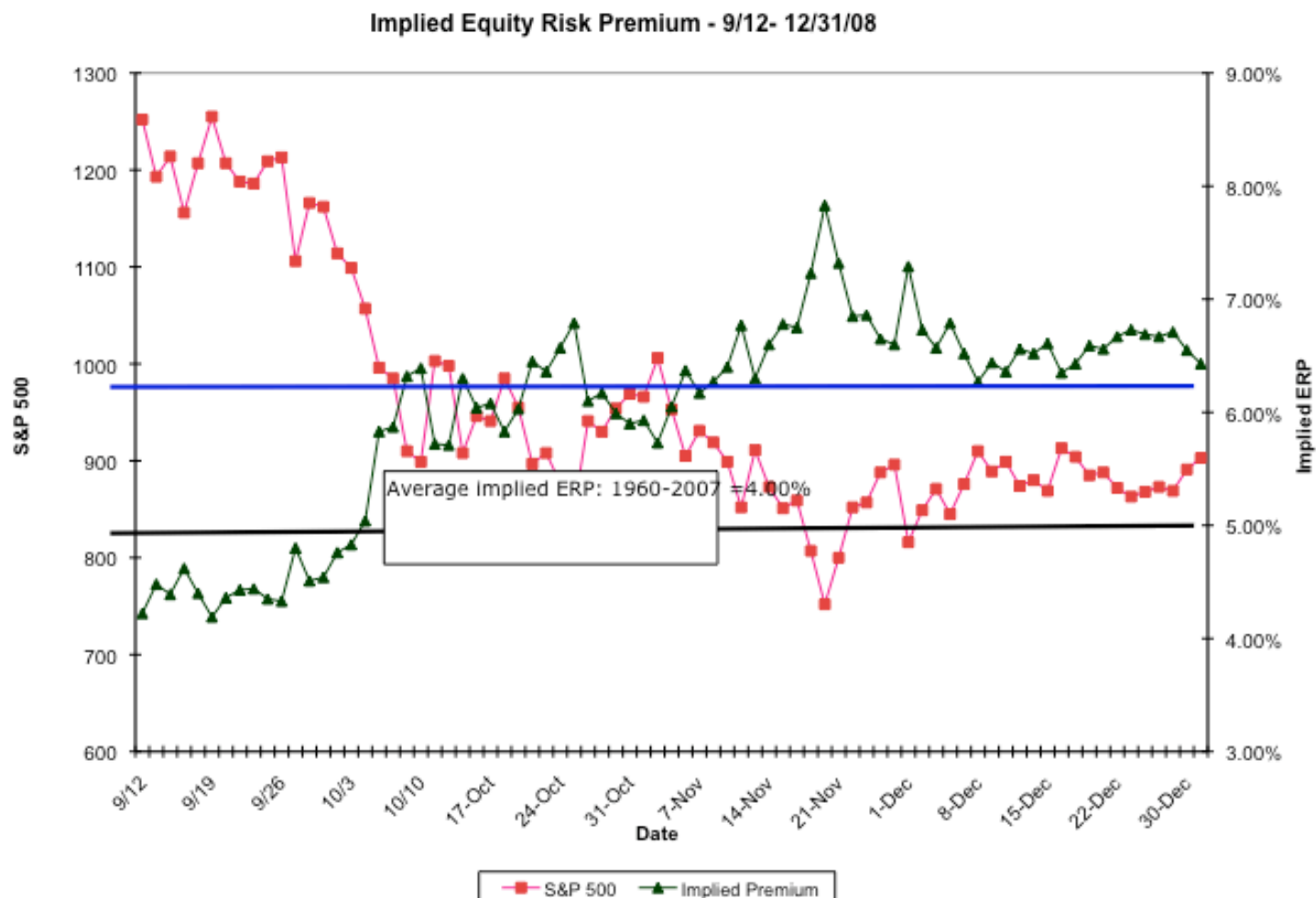
Expected Return on Stocks (1/1/09) = 8.64%
Riskfree rate                = 2.21%
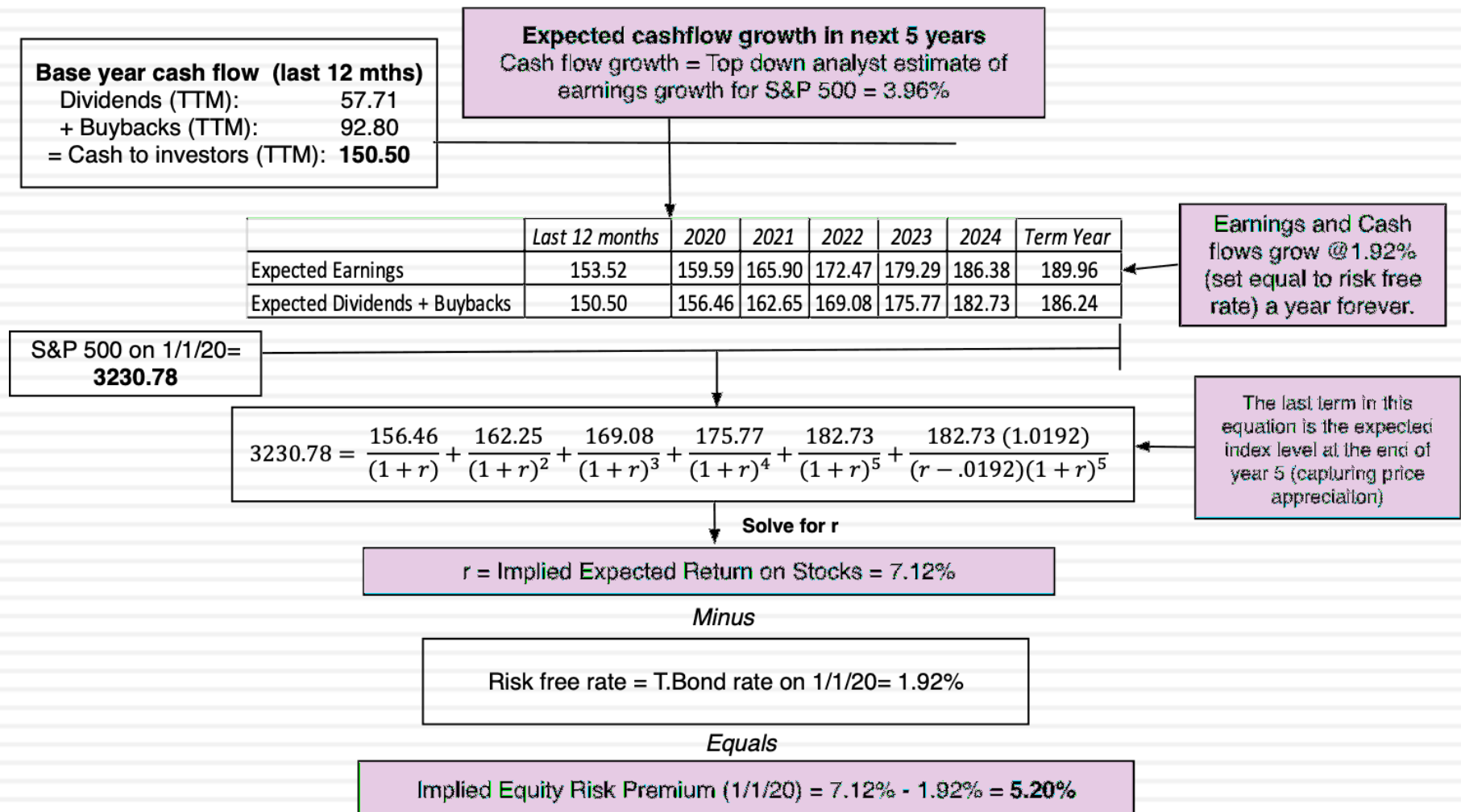Equity Risk Premium      = 6.43%

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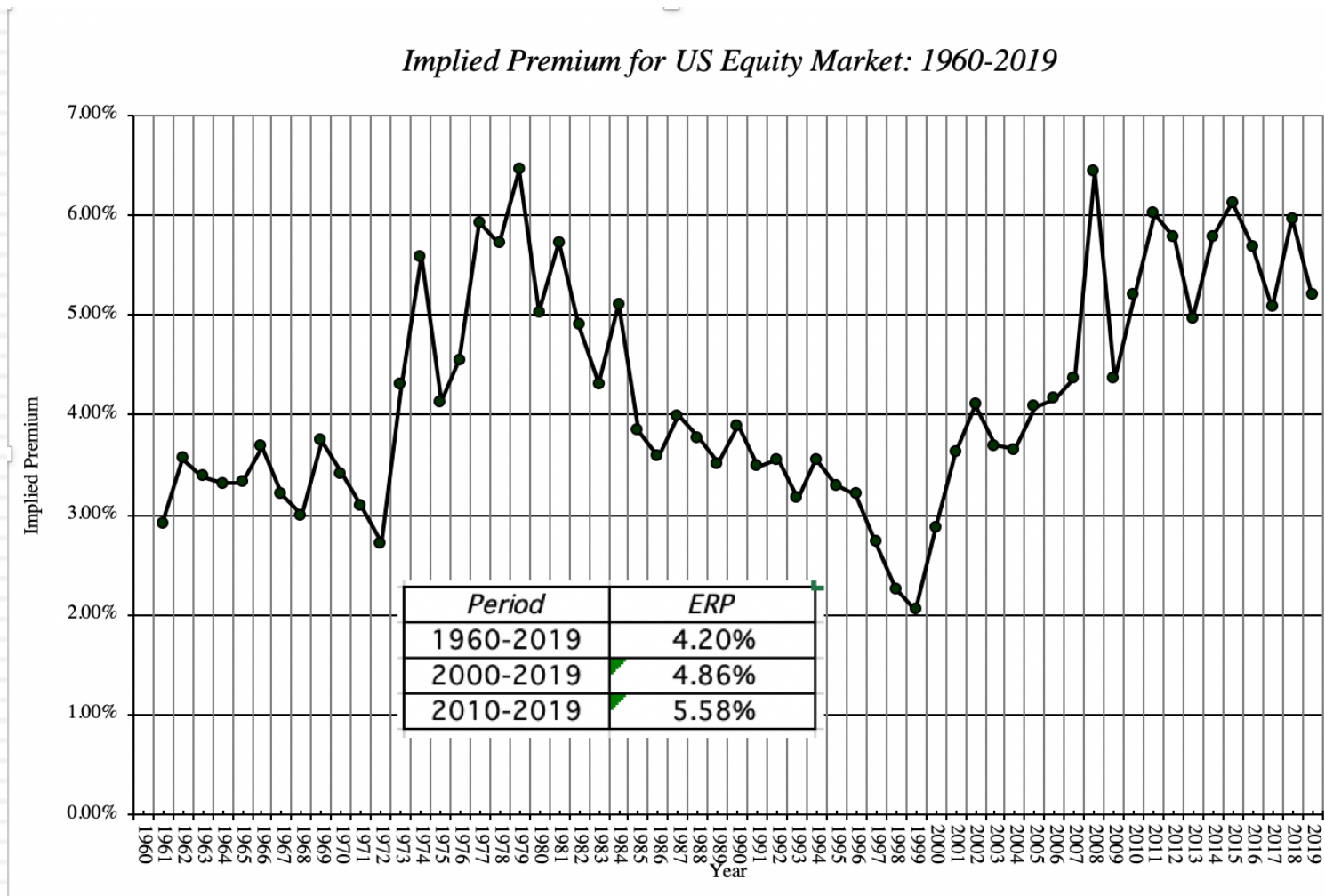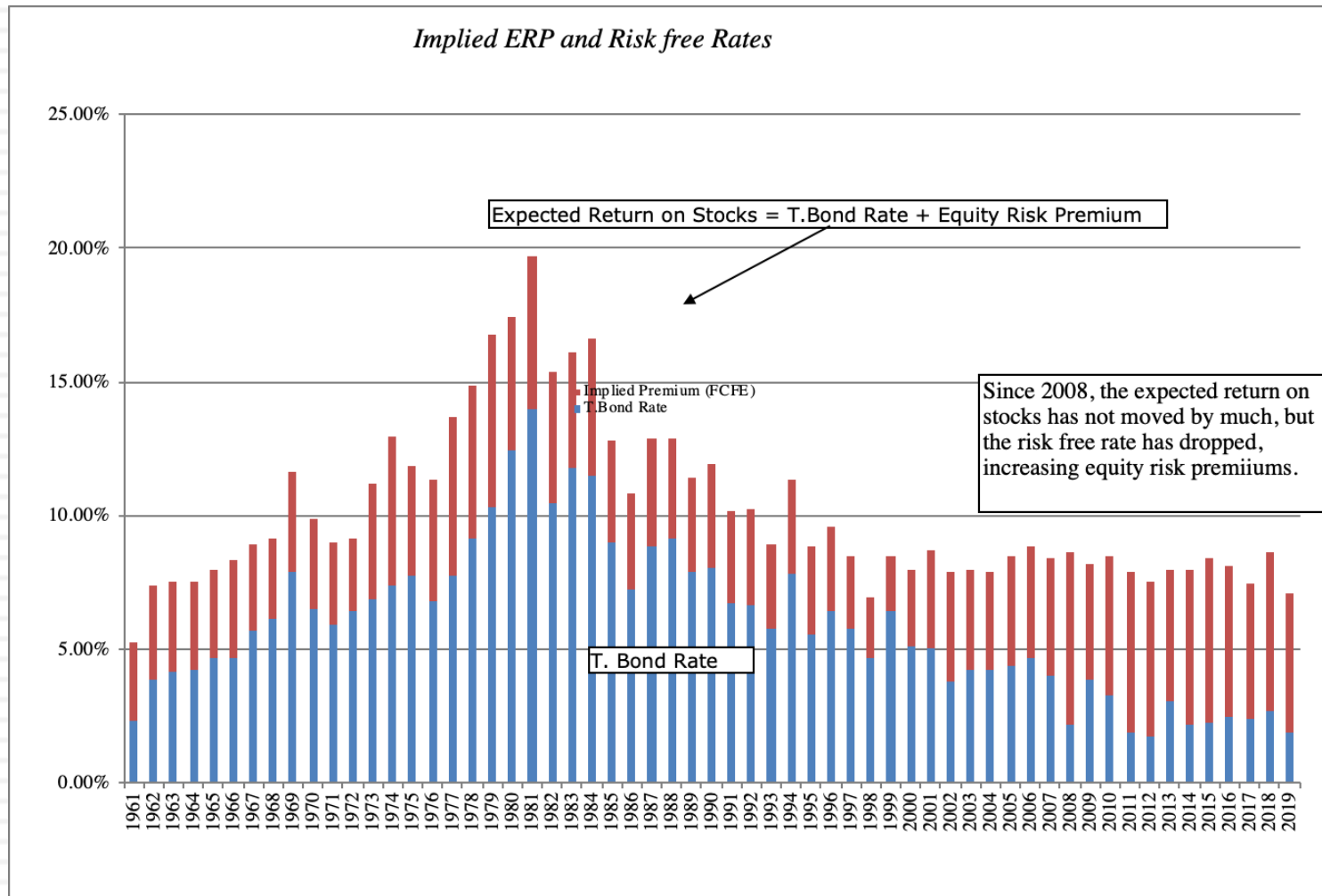


Implied Equity Risk Premium - 9/12- 12/31/08

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# An Updated Equity Risk Premium: January 2020

**Base year cash flow (last 12 mths)**

| | |
|---|---|
| Dividends (TTM): | 57.71 |
| + Buybacks (TTM): | 92.80 |
| = Cash to investors (TTM): | **150.50** |

**Expected cashflow growth in next 5 years**
Cash flow growth = Top down analyst estimate of earnings growth for S&P 500 = 3.96%

| | Last 12 months | 2020 | 2021 | 2022 | 2023 | 2024 | Term Year |
|---|---|---|---|---|---|---|---|
| Expected Earnings | 153.52 | 159.59 | 165.90 | 172.47 | 179.29 | 186.38 | 189.96 |
| Expected Dividends + Buybacks | 150.50 | 156.46 | 162.65 | 169.08 | 175.77 | 182.73 | 186.24 |

Earnings and Cash flows grow @1.92% (set equal to risk free rate) a year forever.

S&P 500 on 1/1/20=
**3230.78**

$$3230.78 = \frac{156.46}{(1+r)} + \frac{162.25}{(1+r)^2} + \frac{169.08}{(1+r)^3} + \frac{175.77}{(1+r)^4} + \frac{182.73}{(1+r)^5} + \frac{182.73\,(1.0192)}{(r - .0192)(1+r)^5}$$

The last term in this equation is the expected index level at the end of year 5 (capturing price appreciation)

**Solve for r**

r = Implied Expected Return on Stocks = 7.12%

*Minus*

Risk free rate = T.Bond rate on 1/1/20= 1.92%

*Equals*

Implied Equity Risk Premium (1/1/20) = 7.12% - 1.92% = **5.20%**

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# Implied Premiums in the US: 1960-2019



Implied Premium for US Equity Market: 1960-2019

| Period | ERP |
|--------|-------|
| 1960-2019 | 4.20% |
| 2000-2019 | 4.86% |
| 2010-2019 | 5.58% |

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# Implied Premium versus Risk Free Rate

Implied ERP and Risk free Rates

Expected Return on Stocks = T.Bond Rate + Equity Risk Premium

Implied Premium (FCFE)
T.Bond Rate

Since 2008, the expected return on stocks has not moved by much, but the risk free rate has dropped, increasing equity risk premiums.

T. Bond Rate

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# Equity Risk Premiums and Bond Default Spreads

Equity Risk Premiums and Bond Default Spreads

Median ERP/ Baa Spread during period = 1.96

Legend: ERP/Baa Spread, Baa - T.Bond Rate, ERP

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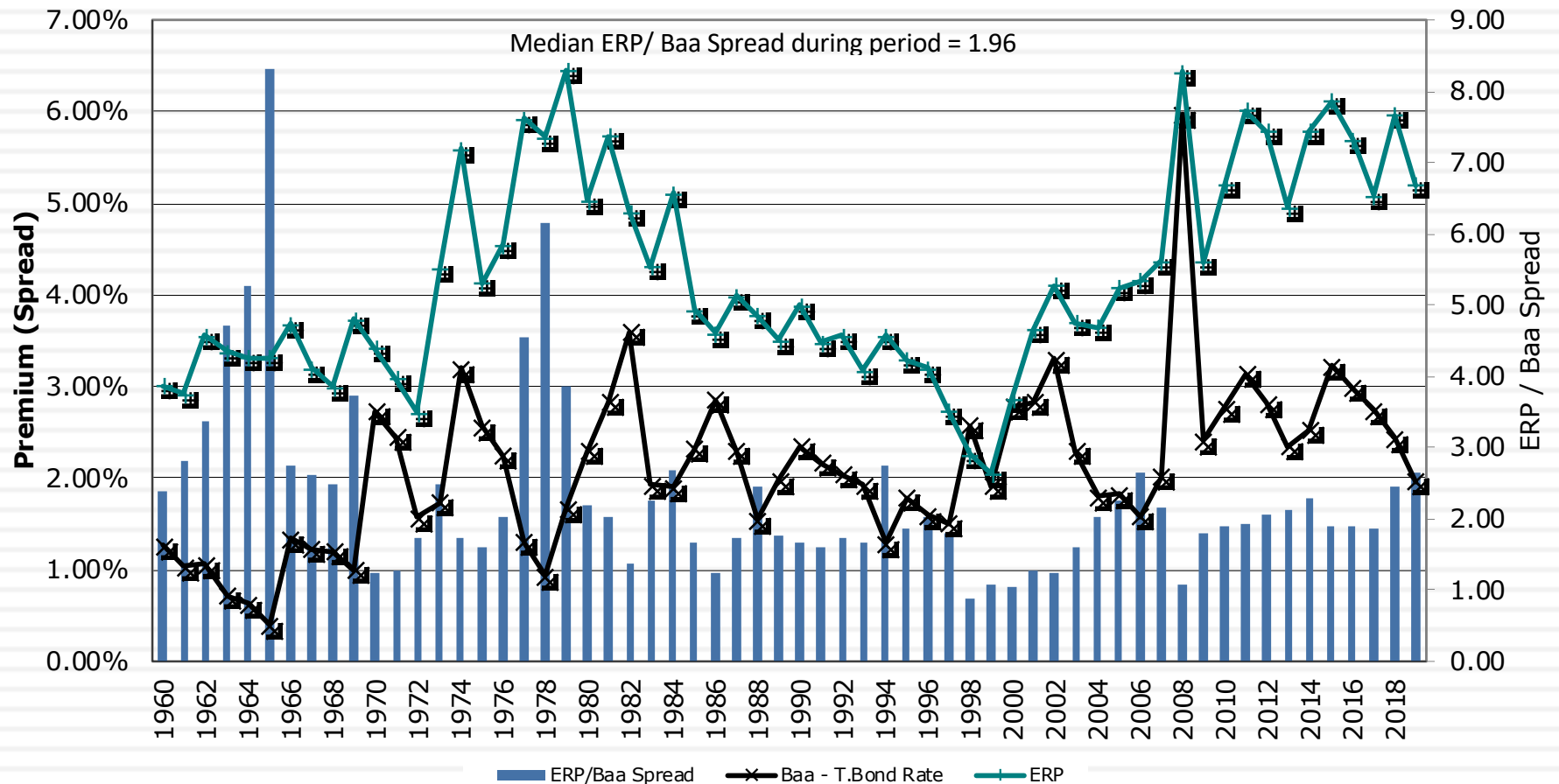
# Equity Risk Premiums and Cap Rates (Real Estate)



Figure 18: Equity Risk Premiums, Cap Rates and Bond Spreads

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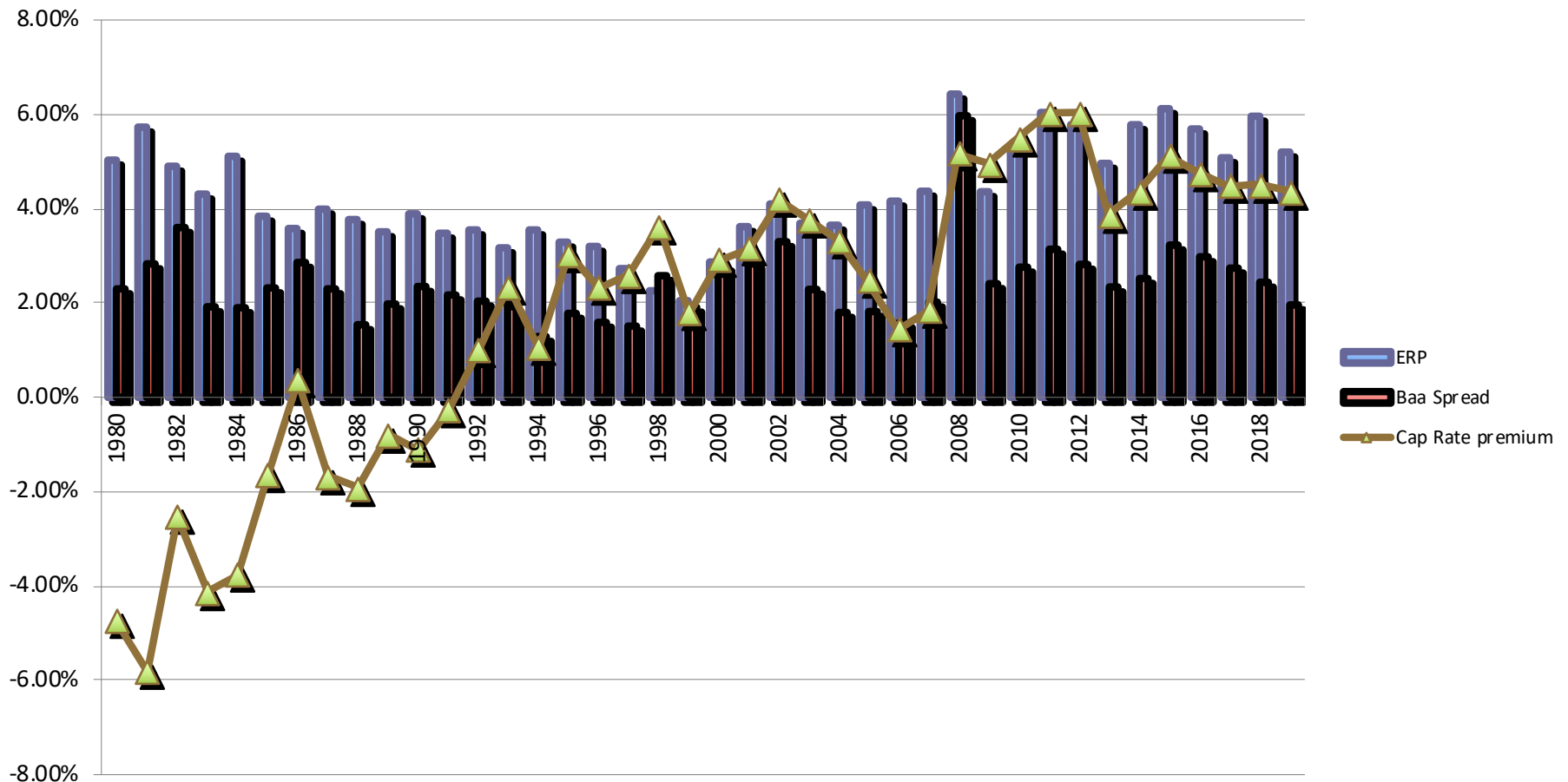
# Why implied premiums matter?

☐ 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 1928-2019 of 8.18% to value stocks in January 2019, given the implied premium of 5.20%, 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.

☐ What if analysts are using the historical geometric average premium of 4.83% from 1928 to 2019 as their ERP?

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