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+ (Mature ERP) + (CRP)

Mature ERP = Mature market Equity Risk Premium

CRP = Additional country risk premium

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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

☐ <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 "λ" measures the relative exposure of a firm to country risk. One simplistic solution would be to do the following:

  λ = % 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

  λ_{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.

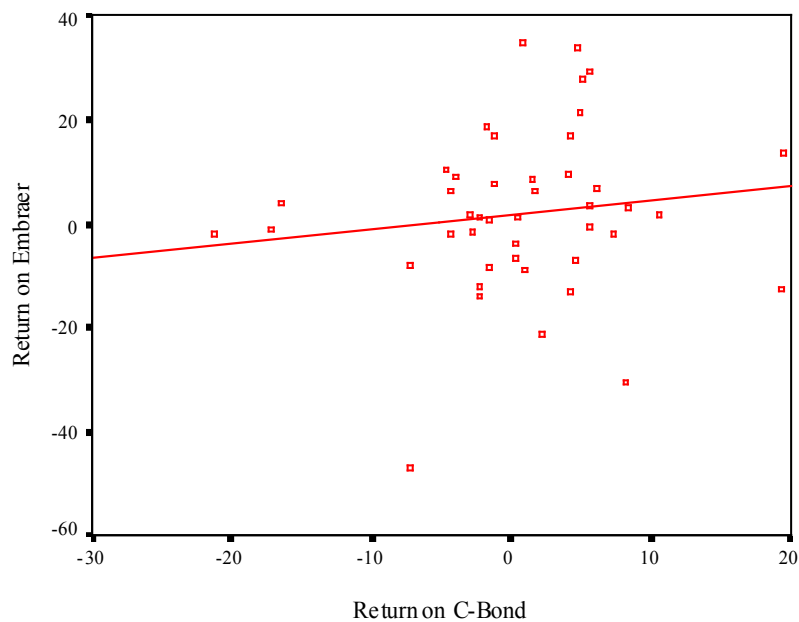 - Firms might be able to actively manage their country risk exposures
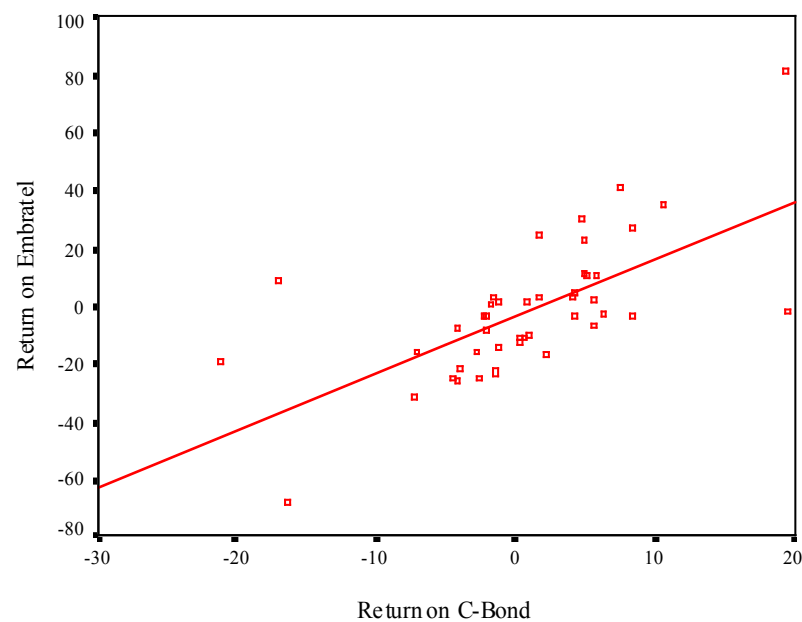
A Price/Return based Lambda

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

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

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%

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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 equity research analysts.

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

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

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Implied Equity Premiums

☐ <u>For a start</u>: The price that investors pay for risky 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).

☐ <u>Stock Price & Risk</u>: 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.

☐ <u>Implied ERP</u>: 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).
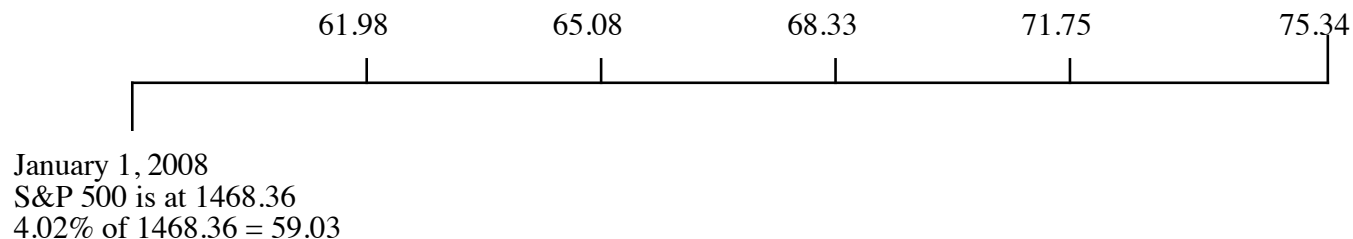
Implied Equity Premiums: January 2008

- 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

Average Implied ERP: 1960-2007 = 4.00%

S&P 500 — Implied Premium

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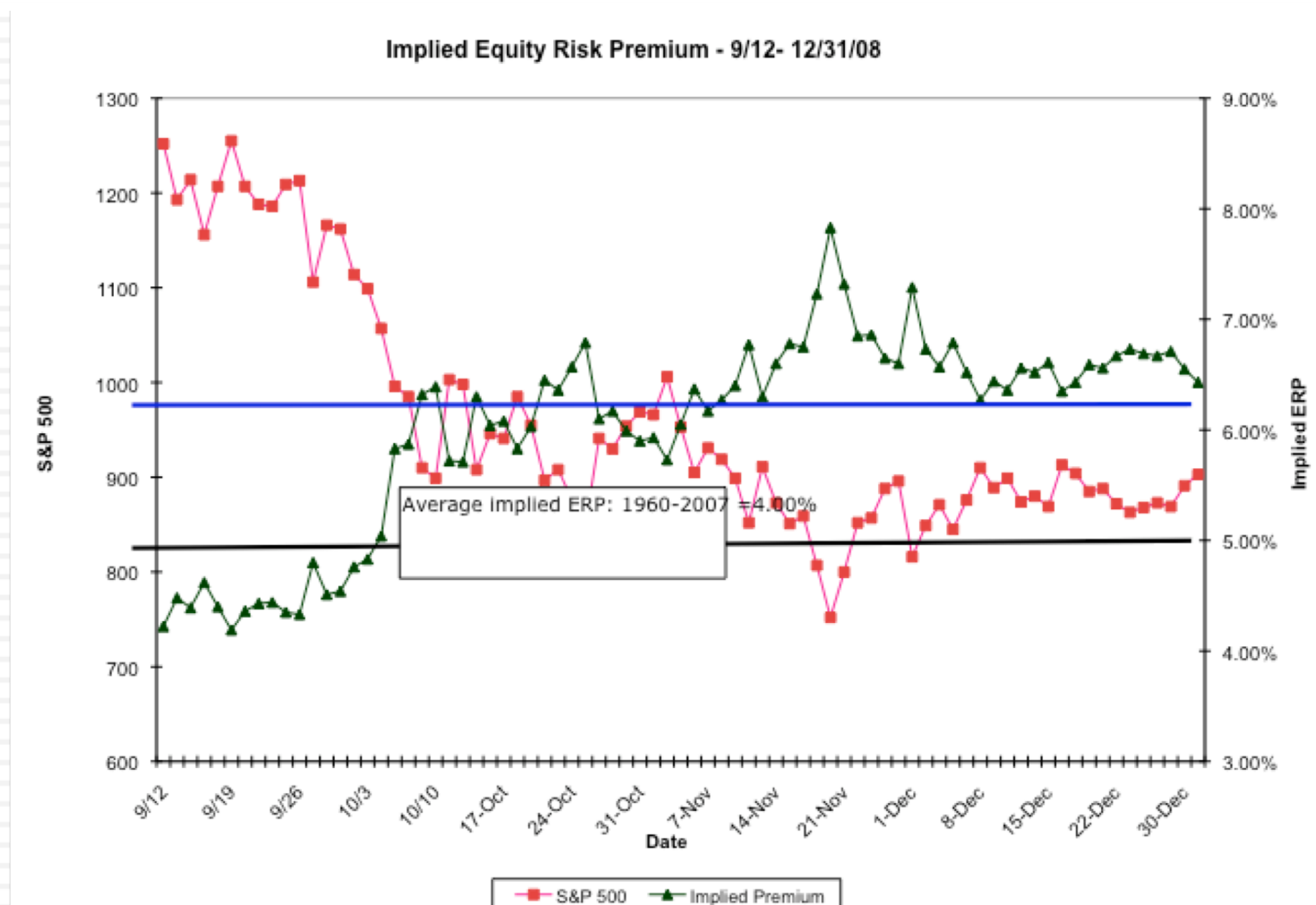
An Updated Equity Risk Premium: January 2019

Base year cash flow (last 12 mths)
Dividends (TTM): 52.25
+ Buybacks (TTM): 84.40
= Cash to investors (TTM): **136.65**

Expected cashflow growth in next 5 years
Cash flow growth = Top down analyst estimate of earnings growth for S&P 500 = 4.12%

	Last 12 months	1	2	3	4	5	Terminal Year
Expected Earnings	148.34	154.46	160.83	167.46	174.37	181.56	186.43
Expected Dividends + Buybacks =	136.65	$142.28	$148.15	$154.26	$160.62	$167.25	171.73

Earnings and Cash flows grow @2.68% (set equal to risk free rate) a year forever.
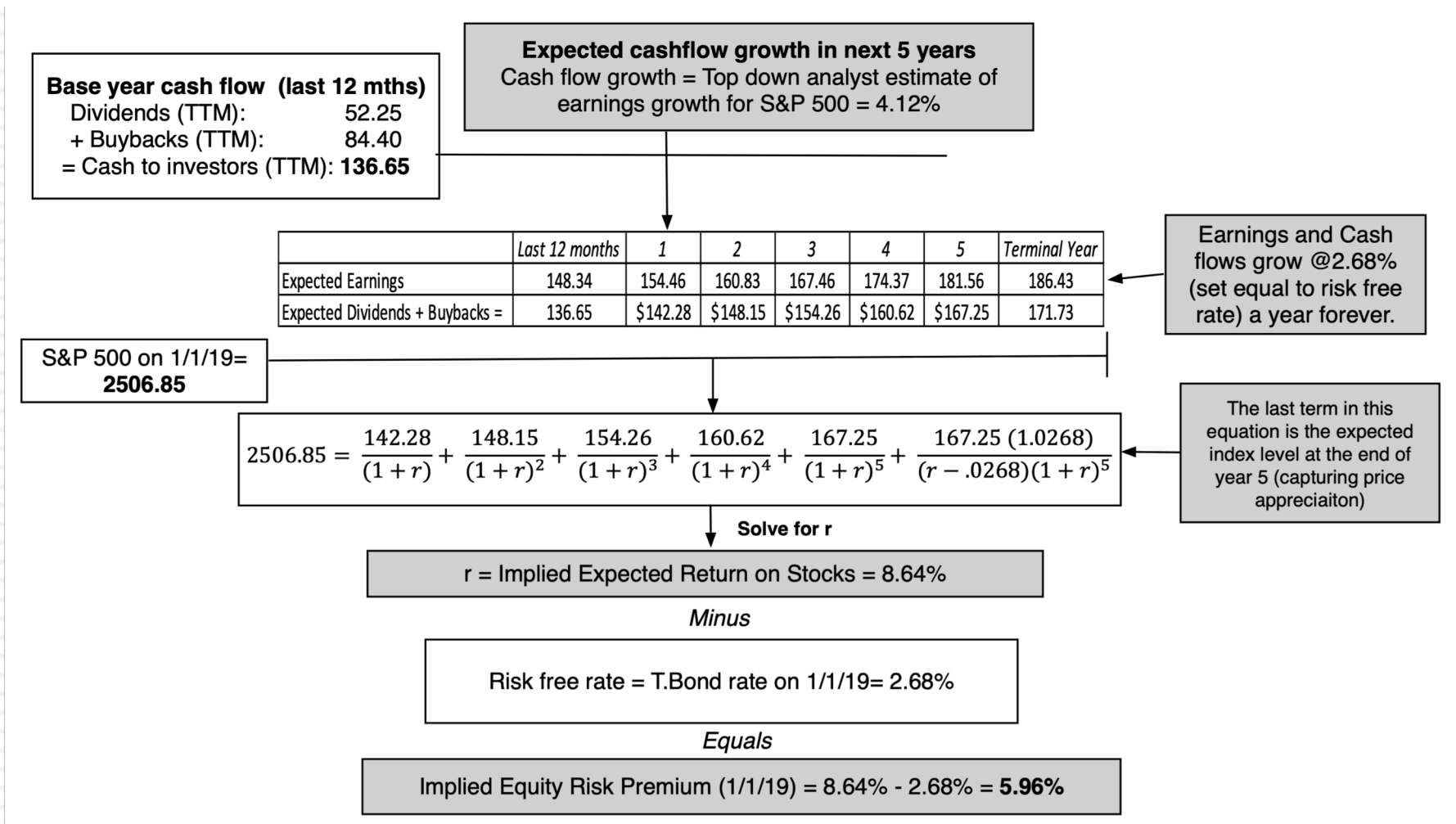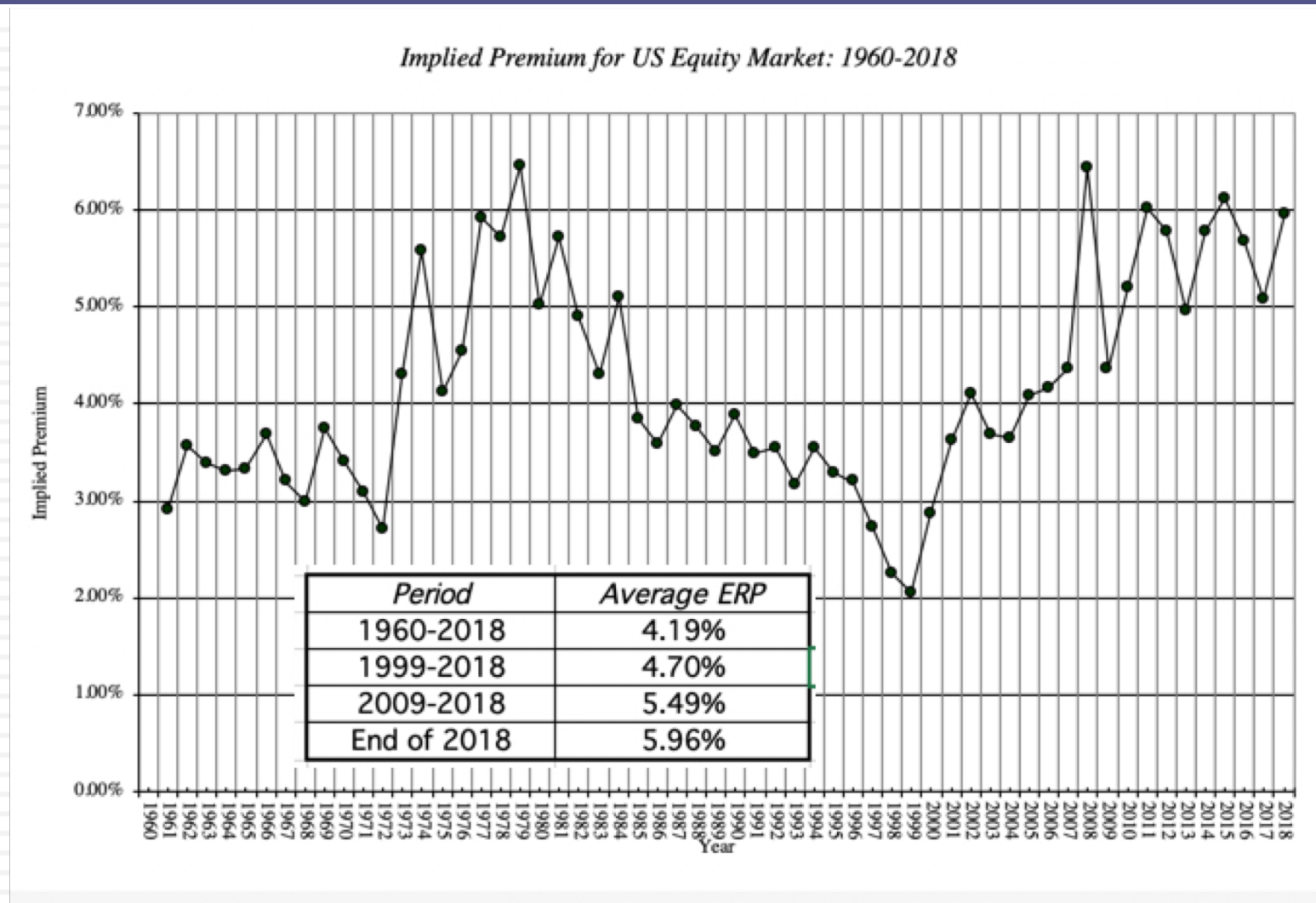
S&P 500 on 1/1/19= **2506.85**

$$2506.85 = \frac{142.28}{(1+r)} + \frac{148.15}{(1+r)^2} + \frac{154.26}{(1+r)^3} + \frac{160.62}{(1+r)^4} + \frac{167.25}{(1+r)^5} + \frac{167.25\,(1.0268)}{(r-.0268)(1+r)^5}$$

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

Solve for r

r = Implied Expected Return on Stocks = 8.64%

Minus

Risk free rate = T.Bond rate on 1/1/19= 2.68%

Equals

Implied Equity Risk Premium (1/1/19) = 8.64% - 2.68% = **5.96%**

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Implied Premiums in the US: 1960-2018

Implied Premium for US Equity Market: 1960-2018

Period	Average ERP
1960-2018	4.19%
1999-2018	4.70%
2009-2018	5.49%
End of 2018	5.96%

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Implied Premium versus Risk Free Rate
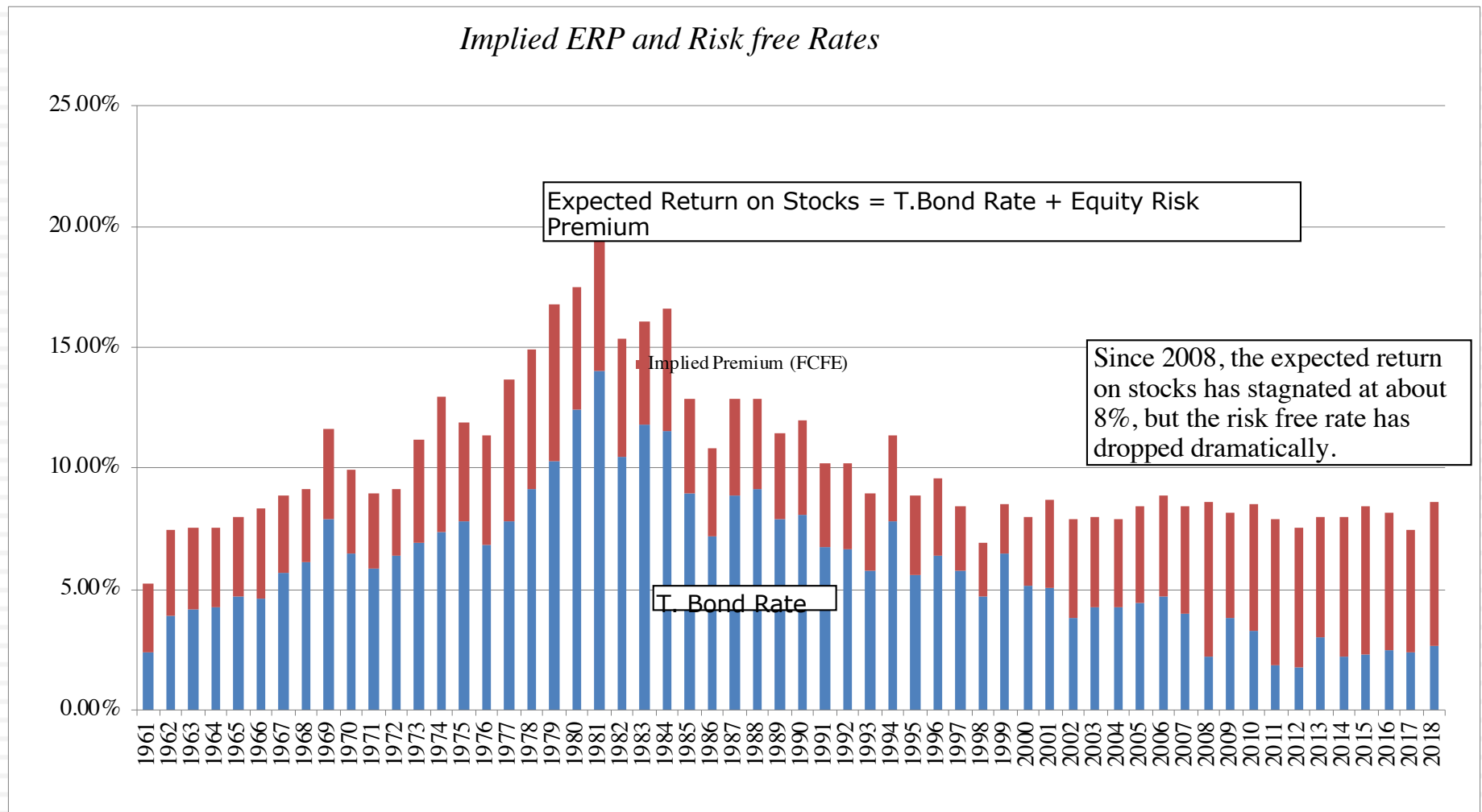
Implied ERP and Risk free Rates

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

Implied Premium (FCFE)

Since 2008, the expected return on stocks has stagnated at about 8%, but the risk free rate has dropped dramatically.

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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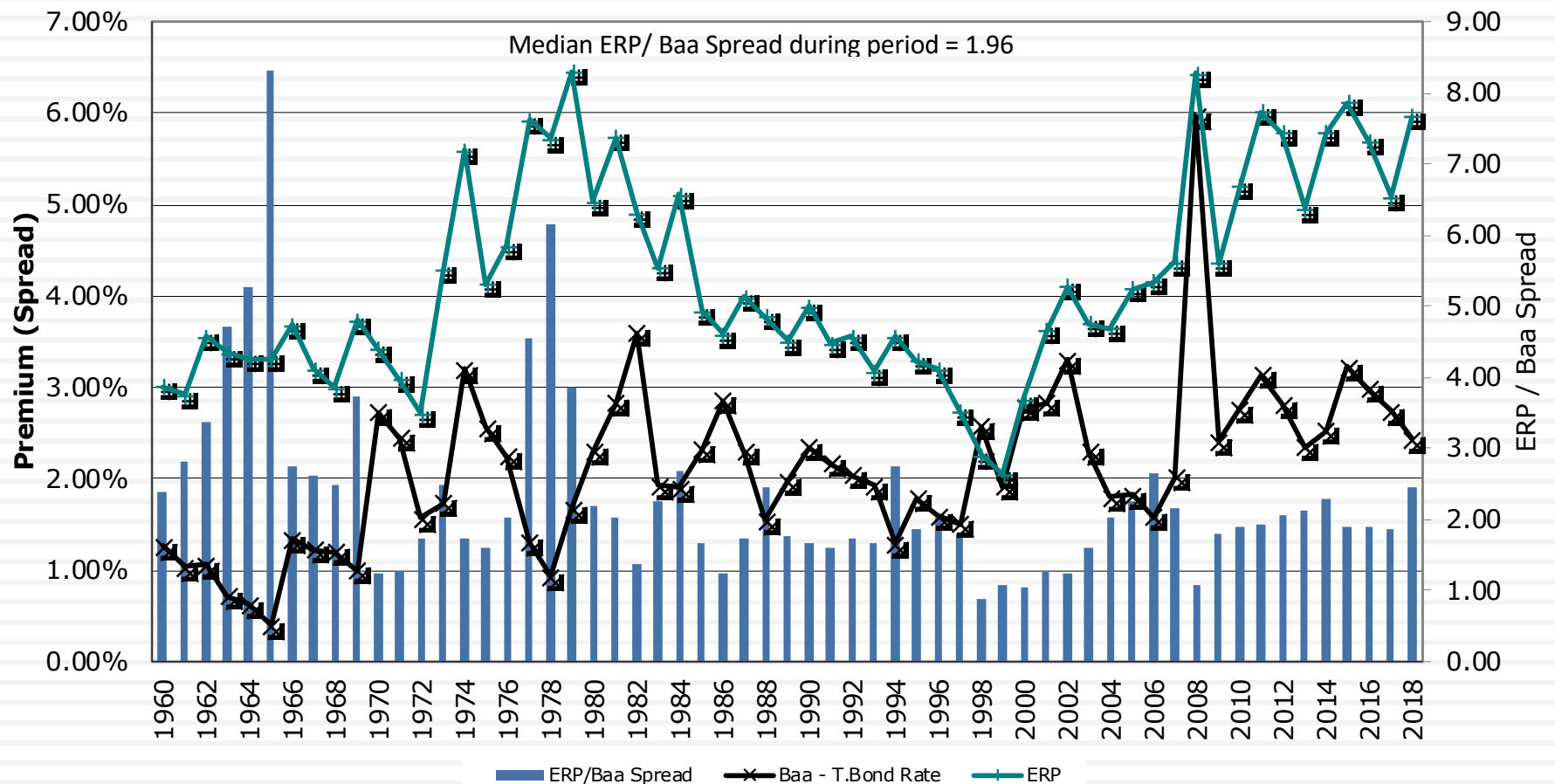
Equity Risk Premiums and Cap Rates (Real Estate)

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

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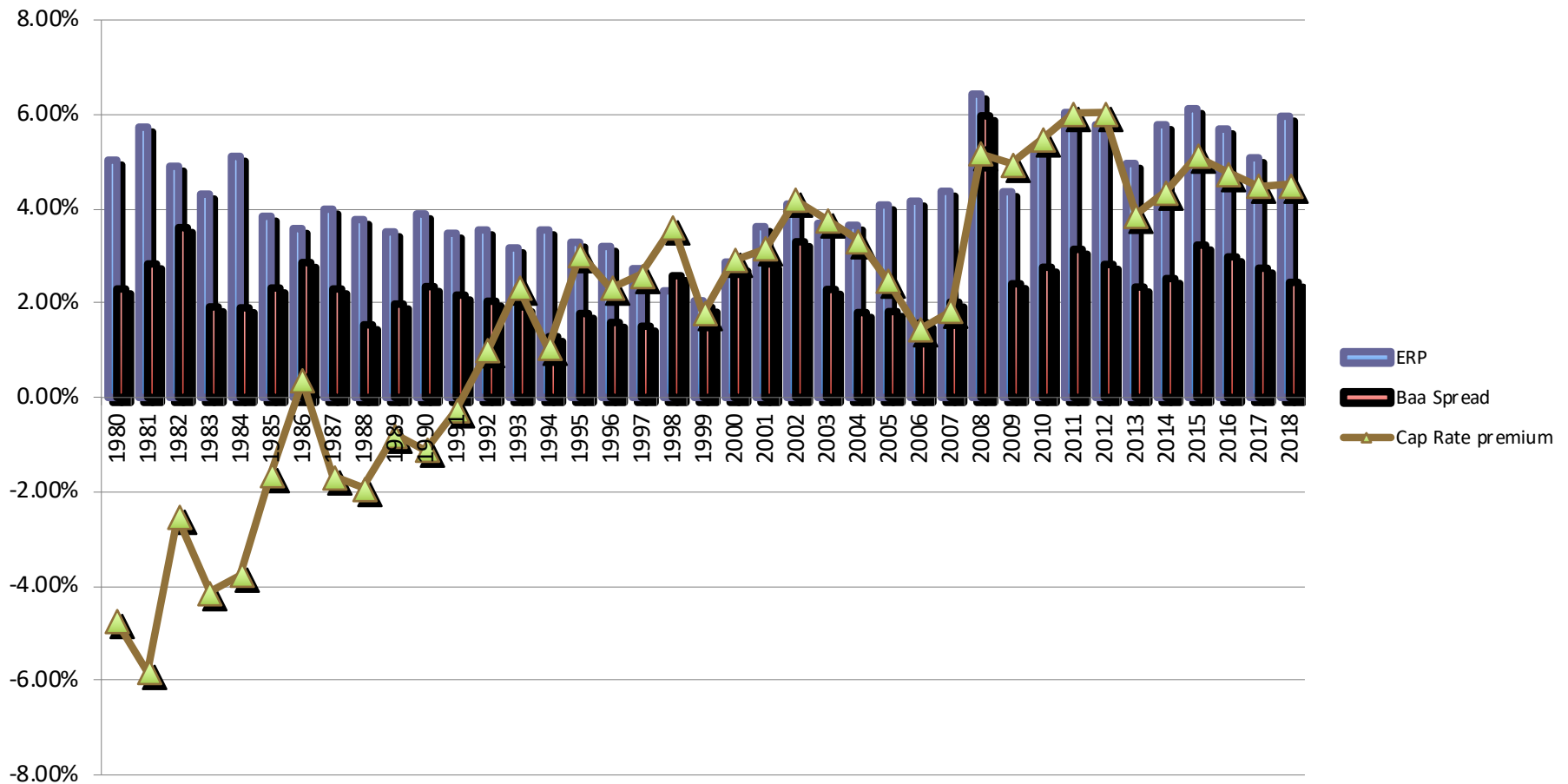
Why implied premiums matter?

- 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 1928-2018 of 7.93% to value stocks in January 2019, given the implied premium of 5.96%, 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 4.66% from 1928 to 2018 as their ERP?

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Which equity risk premium should you use?

If you assume this	**Premium to use**
Premiums revert back to historical norms and your time period yields these norms	Historical risk premium
Market is correct in the aggregate or that your valuation should be market neutral	Current implied equity risk premium
Marker makes mistakes even in the aggregate but is correct over time	Average implied equity risk premium over time.

Predictor	Correlation with implied premium next year	Correlation with actual return- next 5 years	Correlation with actual return – next 10 years
Current implied premium	0.763	0.427	0.500
Average implied premium: Last 5 years	0.718	0.326	0.450
Historical Premium	-0.497	-0.437	-0.454
Default Spread based premium	0.047	0.143	0.160

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An ERP for the Sensex

- □ 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)
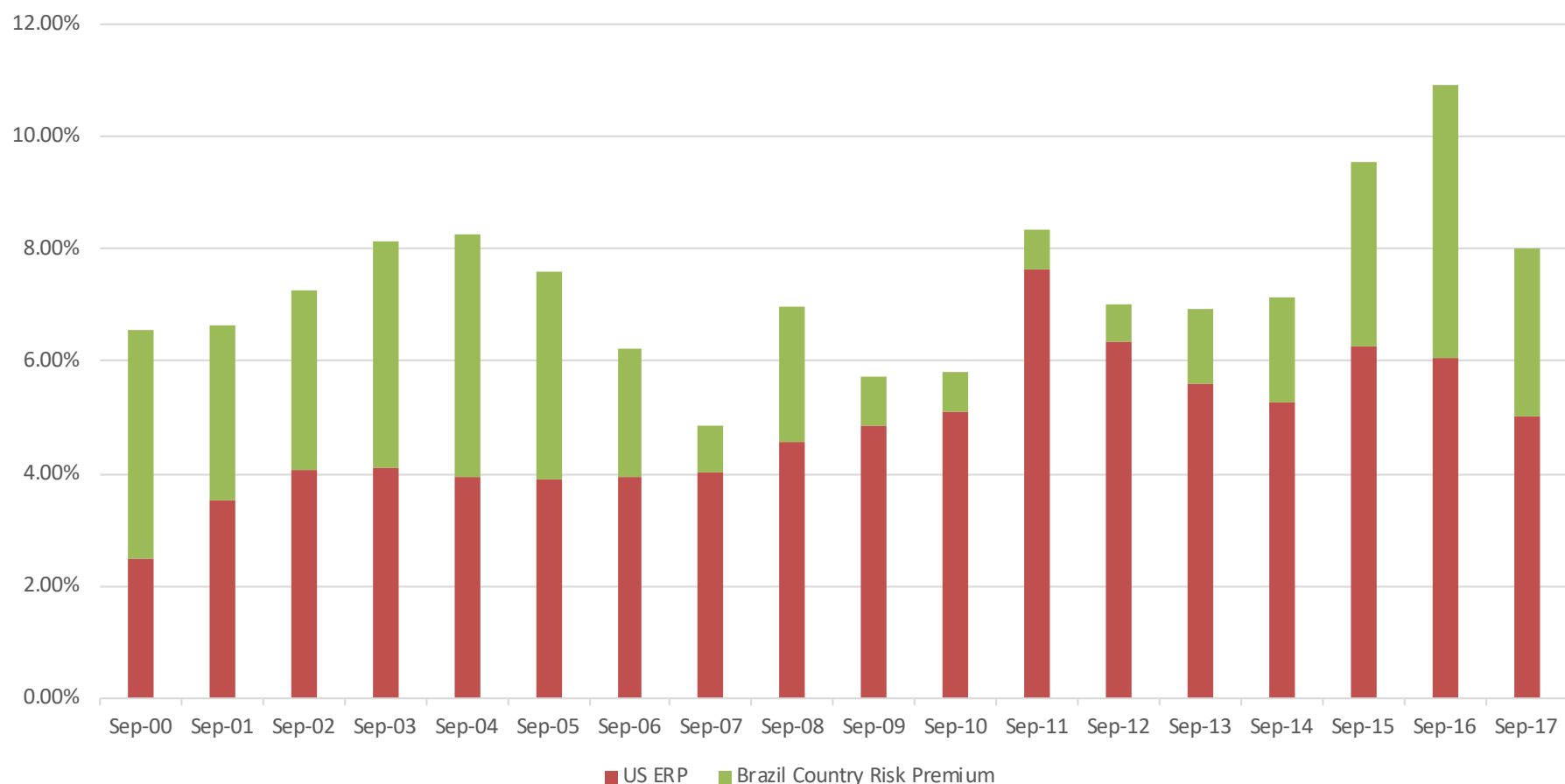- □ Solving for the expected return:

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

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

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Changing Country Risk: Brazil CRP & Total ERP from 2000 to 2016

Figure 15: US ERP and Brazil Implied CRP

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The evolution of Emerging Market Risk

Start of year	PBV Developed	PBV Emerging	ROE Developed	ROE Emerging	US T.Bond rate	Growth Rate Developed	Growth Rate Emerging	Cost of Equity (Developed)	Cost of Equity (Emerging)	Differential ERP
2004	2.00	1.19	10.81%	11.65%	4.25%	3.75%	5.25%	7.28%	10.63%	3.35%
2005	2.09	1.27	11.12%	11.93%	4.22%	3.72%	5.22%	7.26%	10.50%	3.24%
2006	2.03	1.44	11.32%	12.18%	4.39%	3.89%	5.39%	7.55%	10.11%	2.56%
2007	1.67	1.67	10.87%	12.88%	4.70%	4.20%	5.70%	8.19%	10.00%	1.81%
2008	0.87	0.83	9.42%	11.12%	4.02%	3.52%	5.02%	10.30%	12.37%	2.07%
2009	1.20	1.34	8.48%	11.02%	2.21%	1.71%	3.21%	7.35%	9.04%	1.69%
2010	1.39	1.43	9.14%	11.22%	3.84%	3.34%	4.84%	7.51%	9.30%	1.79%
2011	1.12	1.08	9.21%	10.04%	3.29%	2.79%	4.29%	8.52%	9.61%	1.09%
2012	1.17	1.18	9.10%	9.33%	1.88%	1.38%	2.88%	7.98%	8.35%	0.37%
2013	1.56	1.63	8.67%	10.48%	1.76%	1.26%	2.76%	6.02%	7.50%	1.48%
2014	1.95	1.50	9.27%	9.64%	3.04%	2.54%	4.04%	6.00%	7.77%	1.77%
2015	1.88	1.56	9.69%	9.75%	2.17%	1.67%	3.17%	5.94%	7.39%	1.45%
2016	1.89	1.59	9.24%	10.16%	2.27%	1.77%	3.27%	5.72%	7.60%	1.88%

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