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. (In January 2022, that spread was % for the Brazilian $ bond) was 2.19%.
  - The sovereign CDS spread for the country. In January 2022, the ten-year CDS spread for Brazil, adjusted for the US CDS, was 2.72%.
  - 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 2.56% in January 2022.
- 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 4.24%.
  - Country Risk Premium for Brazil = 2.56%
  - Total ERP for Brazil = 4.24% + 2.56% = 7.80%

Aswath Damodaran

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 4.72%.
  - 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 = 4.24% (30%/18%) = 7.07%
  - Country equity risk premium for Brazil = 7.07% - 4.24% = 2.83%

Aswath Damodaran

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 2022, 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= 2.56%

  - ▫ Brazil Country Risk Premium = 2.56% (30%/20%) = 3.84%

  - ▫ Brazil Total ERP = Mature Market Premium + CRP = 4.24% + 3.84% = 8.08%

Aswath Damodaran
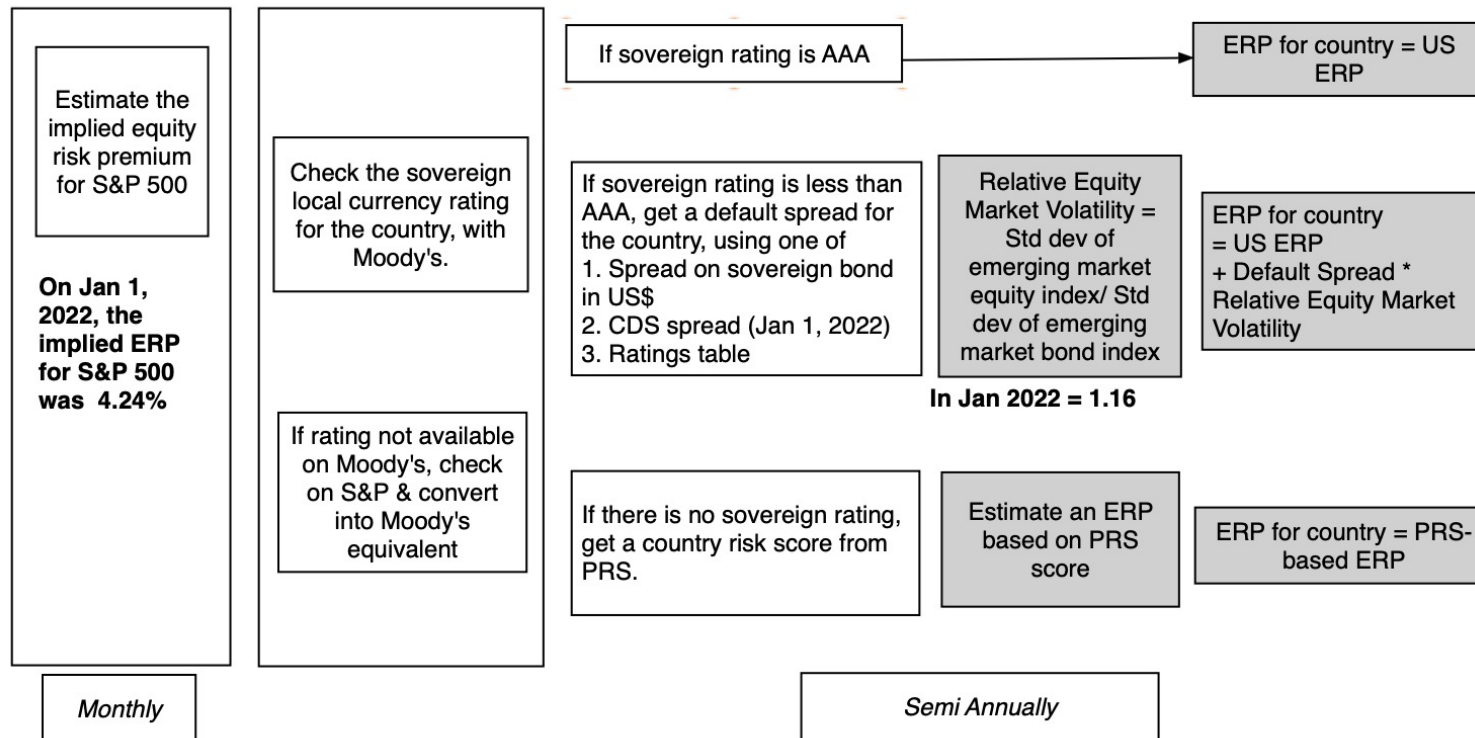
A Template for Estimating the ERP

ERP Estimation Procedure - January 1, 2022

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 Jan 1, 2022, the implied ERP for S&P 500 was 4.24%

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 (Jan 1, 2022)
3. Ratings table

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

In Jan 2022 = 1.16

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

Semi Annually

Aswath Damodaran

56

ERP : Jan 2022

Western Europe

Country	Rating	CRP	ERP	Country	Rating	CRP	ERP
Andorra	Baa2	1.88%	6.12%	Italy	Baa3	2.18%	6.42%
Austria	Aa1	0.39%	4.63%	Jersey	Aaa	0.00%	4.24%
Belgium	Aa3	0.60%	4.84%	Liechtenstein	Aaa	0.00%	4.24%
Cyprus	Ba1	2.47%	6.71%	Luxembourg	Aaa	0.00%	4.24%
Denmark	Aaa	0.00%	4.24%	Malta	A2	0.84%	5.08%
Finland	Aa1	0.39%	4.63%	Netherlands	Aaa	0.00%	4.24%
France	Aa2	0.49%	4.73%	Norway	Aaa	0.00%	4.24%
Germany	Aaa	0.00%	4.24%	Portugal	Baa2	1.88%	6.12%
Greece	Ba3	3.56%	7.80%	Spain	Baa1	1.58%	5.82%
Guernsey	Aa3	0.60%	4.84%	Sweden	Aaa	0.00%	4.24%
Iceland	A2	0.84%	5.08%	Switzerland	Aaa	0.00%	4.24%
Ireland	A2	0.84%	5.08%	Turkey	B2	5.44%	9.68%
Isle of Man	Aa3	0.60%	4.84%	UK	Aa3	0.60%	4.84%
				W. Europe		**0.83%**	**5.07%**

North America

Canada	Aaa	0.00%	4.24%
United States	Aaa	0.00%	4.24%
North America		**0.00%**	**4.24%**

Caribbean	NA	6.83%	11.07%

Latin America

Argentina	Ca	11.87%	16.11%
Belize	Caa3	9.89%	14.13%
Bolivia	B2	5.44%	9.68%
Brazil	Ba2	2.97%	7.21%
Chile	A1	0.70%	4.94%
Colombia	Baa2	1.88%	6.12%
Costa Rica	B2	5.44%	9.68%
Ecuador	Caa3	9.89%	14.13%
El Salvador	Caa1	7.41%	11.65%
Guatemala	Ba1	2.47%	6.71%
Honduras	B1	4.45%	8.69%
Mexico	Baa1	1.58%	5.82%
Nicaragua	B3	6.43%	10.67%
Panama	Baa2	1.88%	6.12%
Paraguay	Ba1	2.47%	6.71%
Peru	Baa1	1.58%	5.82%
Suriname	Caa3	9.89%	14.13%
Uruguay	Baa2	1.88%	6.12%
Venezuela	C	20.34%	24.58%
Latin America		**3.79%**	**8.03%**

Africa

Country	Rating	CRP	ERP
Angola	B3	5.53%	10.67%
Benin	B1	3.83%	8.69%
Botswana	A3	1.02%	5.43%
Burkina Faso	B2	4.68%	9.68%
Cameroon	B2	4.68%	9.68%
Cape Verde	B3	5.53%	10.67%
Congo (Democratic Republic of)	Caa1	6.38%	11.65%
Congo (Republic of)	Caa2	7.66%	13.14%
Côte d'Ivoire	Ba3	3.06%	7.80%
Egypt	B2	4.68%	9.68%
Ethiopia	Caa2	7.66%	13.14%
Gabon	Caa1	6.38%	11.65%
Ghana	B3	5.53%	10.67%
Kenya	B2	4.68%	9.68%
Mali	Caa1	6.38%	11.65%
Mauritius	Baa2	1.62%	6.12%
Morocco	Ba1	2.13%	6.71%
Mozambique	Caa2	7.66%	13.14%
Namibia	Ba3	3.06%	7.80%
Niger	B3	5.53%	10.67%
Nigeria	B2	4.68%	9.68%
Rwanda	B2	4.68%	9.68%
Senegal	Ba3	3.06%	7.80%
South Africa	Ba2	2.56%	7.21%
Swaziland	B3	5.53%	10.67%
Tanzania	B2	4.68%	9.68%
Togo	B3	5.53%	10.67%
Tunisia	Caa1	6.38%	11.65%
Uganda	B2	4.68%	9.68%
Zambia	Ca	10.21%	16.11%
Africa		**5.25%**	**9.49%**

E. Europe & Russia

Albania	B1	4.45%	8.69%
Armenia	Ba3	3.56%	7.80%
Azerbaijan	Ba2	2.97%	7.21%
Belarus	B3	6.43%	10.67%
Bosnia and Herzegovina	B3	6.43%	10.67%
Bulgaria	Baa1	1.58%	5.82%
Croatia	Ba1	2.47%	6.71%
Czech Republic	Aa3	0.60%	4.84%
Estonia	A1	0.70%	4.94%
Georgia	Ba2	2.97%	7.21%
Hungary	Baa2	1.88%	6.12%
Kazakhstan	Baa2	1.88%	6.12%
Kyrgyzstan	B2	5.44%	9.68%
Latvia	A3	1.19%	5.43%
Lithuania	A2	0.84%	5.08%
Macedonia	Ba3	3.56%	7.80%
Moldova	B3	6.43%	10.67%
Montenegro	B1	4.45%	8.69%
Poland	A2	0.84%	5.08%
Romania	Baa3	2.18%	6.42%
Russia	Baa3	2.18%	6.42%
Serbia	Ba2	2.97%	7.21%
Slovakia	A2	0.84%	5.08%
Slovenia	A3	1.19%	5.43%
Tajikistan	B3	6.43%	10.67%
Ukraine	B3	6.43%	10.67%
Uzbekistan	B1	4.45%	8.69%
E. Europe & Russia		**2.11%**	**6.35%**

Country	PRS	CRP	ERP
Algeria	62.25	6.43%	10.67%
Brunei	79	0.84%	5.08%
Gambia	65.75	5.44%	9.68%
Guinea	57.5	8.90%	13.14%
Guinea-Bissau	62.75	6.43%	10.67%
Guyana	66.25	4.45%	8.69%
Haiti	56.25	9.89%	14.13%
Iran	63.75	6.43%	10.67%
Korea, D.P.R.	51.5	11.87%	16.11%
Liberia	59	8.90%	13.14%
Libya	66.25	4.45%	8.69%
Madagascar	63.5	6.43%	10.67%
Malawi	59.75	8.90%	13.14%
Myanmar	53	11.87%	16.11%
Sierra Leone	57	9.89%	14.13%
Somalia	51.5	11.87%	16.11%
Sudan	36.25	20.34%	24.58%
Syria	45.5	20.34%	24.58%
Yemen	52.75	11.87%	16.11%
Zimbabwe	61	7.41%	11.65%

Middle East

Abu Dhabi	Aa2	0.49%	4.73%
Bahrain	B2	5.44%	9.68%
Iraq	Caa1	7.41%	11.65%
Israel	A1	0.70%	4.94%
Jordan	B1	4.45%	8.69%
Kuwait	A1	0.70%	4.94%
Lebanon	C	20.34%	24.58%
Oman	Ba3	3.56%	7.80%
Qatar	Aa3	0.60%	4.84%
Ras Al Khaimah	A3	1.19%	5.43%
Saudi Arabia	A1	0.70%	4.94%
Sharjah	Baa3	2.18%	6.42%
United Arab Emirates	Aa2	0.49%	4.73%
Middle East		**1.60%**	**5.84%**

Asia

Bangladesh	Ba3	3.56%	7.80%
Cambodia	B2	5.44%	9.68%
China	A1	0.70%	4.94%
Fiji	B1	4.45%	8.69%
Hong Kong	Aa3	0.60%	4.84%
India	Baa3	2.18%	6.42%
Indonesia	Baa2	1.88%	6.12%
Japan	A1	0.70%	4.94%
Korea	Aa2	0.49%	4.73%
Laos	Caa2	8.90%	13.14%
Macao	Aa3	0.60%	4.84%
Malaysia	A3	1.19%	5.43%
Maldives	Caa1	7.41%	11.65%
Mongolia	B3	6.43%	10.67%
Pakistan	B3	6.43%	10.67%
Papua New Guinea	B2	5.44%	9.68%
Philippines	Baa2	1.88%	6.12%
Singapore	Aaa	0.00%	4.24%
Solomon Islands	Caa1	7.41%	11.65%
Sri Lanka	Caa2	8.90%	13.14%
Taiwan	Aa3	0.60%	4.84%
Thailand	Baa1	1.58%	5.82%
Vietnam	Ba3	3.56%	7.80%
Asia		**1.04%**	**5.28%**

Australia & NZ

Australia	Aaa	0.00%	4.24%
Cook Islands	B1	4.45%	8.69%
New Zealand	Aaa	0.00%	4.24%
Australia & NZ		**0.00%**	**4.24%**

Blue: Moody's Rating
Red: Added Country Risk
Green #: Total ERP

Aswath Damodaran

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) + 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.

Aswath Damodaran

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%**

Aswath Damodaran

60

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%**

Aswath Damodaran

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.

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.

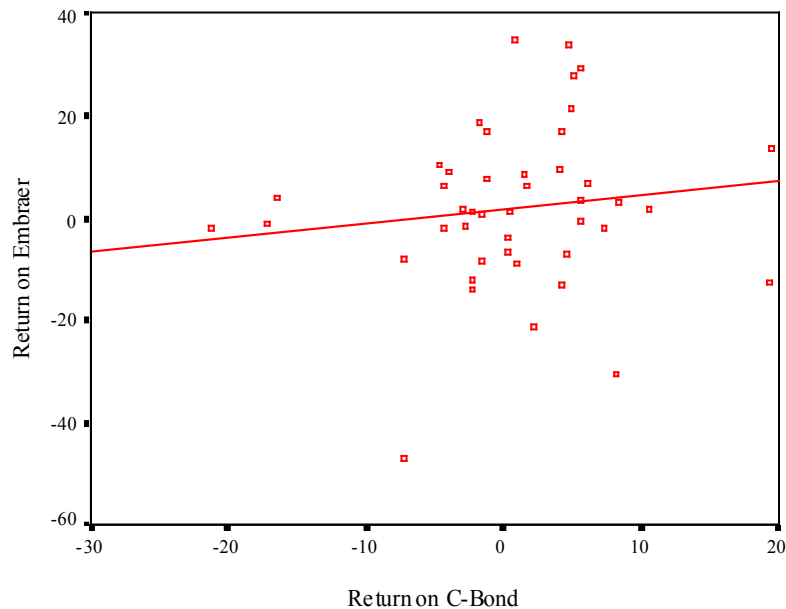◻ Firms might be able to actively manage their country risk exposures
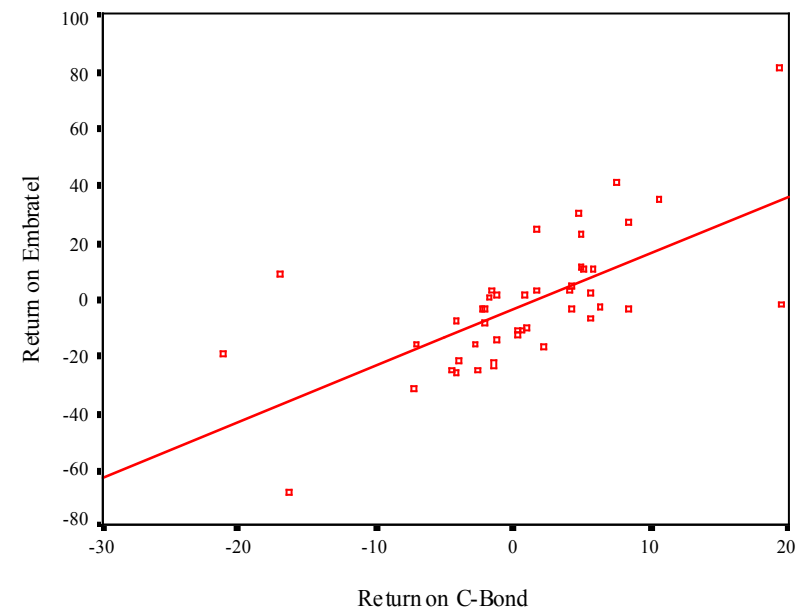
A Price/Return based Lambda

$$\text{Return}_{\text{Embraer}} = 0.0195 + \mathbf{0.2681} \ \text{Return}_{\text{C Bond}}$$
$$\text{Return}_{\text{Embratel}} = -0.0308 + \mathbf{2.0030} \ \text{Return}_{\text{C Bond}}$$

Embraer versus C Bond: 2000-2003

Embratel versus C Bond: 2000-2003

Aswath Damodaran

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%

Aswath Damodaran

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?

Aswath Damodaran

Implied Equity Premiums

- <u>For a start</u>: 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.

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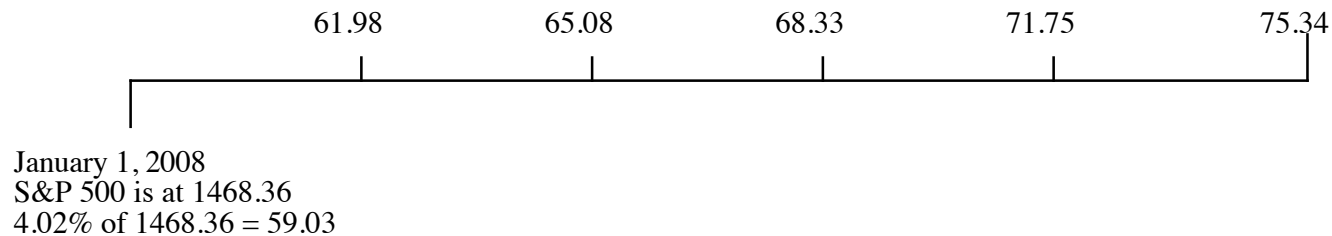
□ If you pay the current level of the index, you can expect to make a return of 8.39% on stocks (which is obtained by solving for r in the following equation)

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

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

Aswath Damodaran

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%

Aswath Damodaran

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

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

Aswath Damodaran

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%**

Aswath Damodaran

And in 2020.. COVID effects

Equity Risk Premium for S&P 500: December 31, 2019 to December 31, 2020

ERP: *Computed with updated index/T.Bond rate, but with reported earnings/cash return*
COVID ERP: *Computed with updated index/T.Bond rate, but with drop in 2020 earnings & 80% recovery of that drop by 2024*

On Feb 14, 2020, the implied ERP was 4.83%.

On March 23, 2020, the implied ERP was 7.75% (6.87%)

On Nov 1, 2020, the implied ERP was back down to 5.35% (5.02%).

Aswath Damodaran

An Updated Estimate: ERP in 2022

In 2021, earnings recovered almost entirely from the 2020 collapse and dividends & buybacks surged as well.

Base year cash flow (last 12 mths)
Dividends (TTM): 59.20
+ Buybacks (TTM): 88.05
= Cash to investors (TTM): **147.24**

Expected earnings/cashflow growth in next 5 years
Analysts were on target in 2021, with estimated earnings of 206.38 for the year. They were projecting compunded annual growth rate of 6.47% a year for next five years.

Modified Payout
This computation assumes that the payout ratio stays constant over time. If you assume that it changes to a sustainable level (given stable growth & ROE), the implied ERP = 4.90%

Actual numbers   Forecasted numbers

	2019	2020	LTM	2021E	1	2	3	4	5
Expected Earnings	157.18	139.76	190.34	206.38	219.74	233.96	249.11	265.23	282.40
Cash payout as % of earnings	146.31	118.66	77.36%	77.36%	77.36%	77.36%	77.36%	77.36%	77.36%
Dividends + Buybacks =	93.08%	84.90%	147.24	159.65	$169.99	$180.99	$192.71	$205.18	$218.46

Earnings and Cash flows grow @1.51% (set equal to risk free rate) a year forever.

S&P 500 on 1/1/22 = 4766.18

$$4766.18 = \frac{169.99}{(1+r)} + \frac{180.99}{(1+r)^2} + \frac{192.71}{(1+r)^3} + \frac{205.18}{(1+r)^4} + \frac{218.46}{(1+r)^5} + \frac{218.46\,(1.0151)}{(r-.0151)(1+r)^5}$$

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

Solve for r

You can solve for this r either iteratively or using the solver function in Excel

r = Implied Expected Return on Stocks = 5.75%

Minus

Risk free rate = T.Bond rate on 1/1/22 = 1.51%

Equals

Implied Equity Risk Premium (1/1/22) = 5.75% - 1.51% = **4.24%**

Aswath Damodaran

Implied Premiums in the US: 1960-2021

Implied Premium for US Equity Market: 1960-2021

Period	ERP
1960-2021	4.21%
2002-2021	4.98%
2012-2021	5.35%
End of 2021	4.24%

Aswath Damodaran

Implied Premium versus Risk Free Rate

Implied ERP and Risk free Rates

Expected Return on Stocks = T.Bond Rate + Equity Risk Premium
Based upon how stocks are priced, this is the expected annual return for the long term on stocks.

ERP of 4.24% at the end of 2021 does not look abnormal, but the expected return on stocks of 5.75% (=1.51%+4.24%) has not been this low in 60 years.

T. Bond Rate

ERP

■ Implied ERP (FCFE)   ■ T.Bond Rate

Aswath Damodaran

Equity Risk Premiums and Bond Default Spreads

Aswath Damodaran

Equity Risk Premiums and Cap Rates (Real Estate)

Figure 18: Equity Risk Premiums, Bond Spreads and Real Estate Risk Premiuums

Aswath Damodaran

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 1928-2021 of 8.49% to value stocks in January 2022, given the implied premium of 4.24%, 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 5.13% from 1928 to 2020 as their ERP?

Aswath Damodaran

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

Aswath Damodaran

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%

Changing Country Risk: Brazil CRP & Total ERP from 2000 to 2020

Figure 15: US ERP and Brazil Implied CRP

Aswath Damodaran