

Estimating Risk Premiums in Practice

116

1. Survey Premiums: Survey investors on their desired risk premiums and use the average premium from these surveys.
2. Historical Premiums: Assume that the actual premium delivered over long time periods is equal to the expected premium - i.e., use historical data.
3. Implied Premiums: Estimate a forward-looking premium, based upon today's asset prices.

1. The Survey Approach

117

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

<i>Group Surveyed</i>	<i>Survey done by</i>	<i>Estimated ERP</i>	<i>Notes</i>
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 more reflective of the past than the future.
 - They tend to be short term; even the longest surveys do not go beyond one year.

2. The Historical Premium Approach

118

- This is the default approach used by most to arrive at the premium to use in the model
- In most cases, this approach does the following
 - ▣ Defines a time period for the estimation (1928-Present, last 50 years...)
 - ▣ Calculates average returns on a stock index during the period
 - ▣ Calculates average returns on a riskless security over the period
 - ▣ Calculates the difference between the two averages and uses it as a premium looking forward.
- The limitations of this approach are:
 - ▣ it assumes that the risk aversion of investors has not changed in a systematic way across time. (The risk aversion may change from year to year, but it reverts back to historical averages)
 - ▣ it assumes that the riskiness of the “risky” portfolio (stock index) has not changed in a systematic way across time.

Historical ERP: A Historical Snapshot

	<i>Arithmetic Average</i>		<i>Geometric Average</i>	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2022	8.17%	6.64%	6.34%	5.06%
Std Error	<i>2.05%</i>	<i>2.15%</i>		
1973-2022	7.30%	5.14%	5.87%	4.12%
Std Error	<i>2.51%</i>	<i>2.75%</i>		
2013-2022	12.64%	13.08%	11.50%	12.32%
Std Error	<i>5.50%</i>	<i>4.81%</i>		

Historical
premium for
the US

- If you are going to use a historical risk premium, make it
 - ▣ Long term (because of the standard error)
 - ▣ Consistent with your choice of risk free rate
 - ▣ A “compounded” average
- No matter which estimate you use, recognize that it is backward looking, is noisy and may reflect selection bias.

3. A Forward-Looking ERP

120

- 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.
 - In the bond market, that is exactly what we do when we compute the yield to maturity on a bond.
 - 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.
- 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.

Implied ERP in November 2013: Watch what I pay, not what I say..

- If you can observe what investors are willing to pay for stocks, you can back out an expected return from that price and an implied equity risk premium.

Base year cash flow (last 12 mths)

Dividends (TTM): 33.22
 + Buybacks (TTM): 49.02
 = Cash to investors (TTM): 82.35
 Earnings in TTM:

Expected growth in next 5 years

Top down analyst estimate of earnings growth for S&P 500 with stable payout: 5.59%

Beyond year 5

Expected growth rate =
 Riskfree rate = 2.55%
 Expected CF in year 6 =
 108.1(1.0255)

E(Cash to investors) 86.96 91.82 96.95 102.38 108.10

S&P 500 on 11/1/13= 1756.54

$$1756.54 = \frac{86.96}{(1+r)} + \frac{91.82}{(1+r)^2} + \frac{96.95}{(1+r)^3} + \frac{102.38}{(1+r)^4} + \frac{108.10}{(1+r)^5} + \frac{110.86}{(r - .0255)(1+r)^5}$$

r = Implied Expected Return on Stocks = 8.04%

Minus

Risk free rate = T.Bond rate on 1/1/14=2.55%

Equals

Implied Equity Risk Premium (1/1/14) = 8.04% - 2.55% = 5.49%

What about equity risk premiums for other markets?

122

- Historical data for markets outside the United States is available for much shorter time periods. The problem is even greater in emerging markets.
- The historical premiums that emerge from this data reflects this data problem and there is much greater error associated with the estimates of the premiums.
- You could try to compute implied equity risk premiums but getting the inputs, especially for long term growth are difficult to do.

One solution: Bond default spreads as CRP

– November 2013

- In November 2013, the equity risk premium for the US was 5.50% Using the default spread on the sovereign bond or based upon the sovereign rating and adding that spread to the mature market premium (4.20% for the US) gives you a total ERP for a country.

Country	Rating	Default Spread (Country Risk Premium)	US ERP	Total ERP for country
India	Baa3	2.25%	5.50%	7.75%
China	Aa3	0.80%	5.50%	6.30%
Brazil	Baa2	2.00%	5.50%	7.50%

- If you prefer CDS spreads:

<i>Country</i>	<i>Sovereign CDS Spread</i>	<i>US ERP</i>	<i>Total ERP for country</i>
India	4.20%	5.50%	9.70%
China	1.20%	5.50%	6.70%
Brazil	2.59%	5.50%	8.09%

Beyond the default spread? Equities are riskier than bonds

- While default risk spreads and equity risk premiums are highly correlated, one would expect equity spreads to be higher than debt spreads. One approach to scaling up the premium is to look at the relative volatility of equities to bonds and to scale up the default spread to reflect this:

$$\text{Country Risk Premium} = \text{Country Default Spread} * \left(\frac{\sigma_{\text{Equity}}}{\sigma_{\text{Country Bond}}} \right)$$

- Brazil: The annualized standard deviation in the Brazilian equity index over the previous year is 21 percent, whereas the annualized standard deviation in the Brazilian C-bond is 14 percent.

$$\text{Brazil's Equity Risk Premium} = 5.50\% + 2.00\% (21\%/14\%) = 8.50\%$$

- Using the same approach for China and India:
 - China's Equity Risk Premium = 5.50% + 0.80% (18%/10%) = 6.94%
 - India's Equity Risk Premium = 5.50% + 2.25% (24%/17%) = 9.10%

The bottom line on Equity Risk Premiums in November 2013

- Mature Markets: In November 2013, the number that we chose to use as the equity risk premium for all mature markets was 5.5%. This was set equal to the implied premium at that point in time and it was much higher than the historical risk premium of 4.20% prevailing then (1928-2012 period).

	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%		

- For emerging markets, we will use the melded default spread approach (where default spreads are scaled up to reflect additional equity risk) to come up with the additional risk premium that we will add to the mature market premium. Thus, markets in countries with lower sovereign ratings will have higher risk premiums that 5.5%.

$$\text{Emerging Market ERP} = 5.5\% + \text{Country Default Spread} * \left(\frac{\sigma_{\text{Equity}}}{\sigma_{\text{Country Bond}}} \right)$$

A Composite way of estimating ERP for countries

Step 1: Estimate an equity risk premium for a mature market. If your preference is for a forward looking, updated number, you can estimate an implied equity risk premium for the US (assuming that you buy into the contention that it is a mature market)

- ▣ My estimate: In November 2013, my estimate for the implied premium in the US was 5.5%. That will also be my estimate for a mature market ERP.

Step 2: Come up with a generic and measurable definition of a mature market.

- ▣ My estimate: Any AAA rated country is mature.

Step 3: Estimate the additional risk premium that you will charge for markets that are not mature. You have two choices:

- ▣ The default spread for the country, estimated based either on sovereign ratings or the CDS market.
- ▣ A scaled up default spread, where you adjust the default spread upwards for the additional risk in equity markets.

Andorra	7.45%	1.95%	Liechtenstein	5.50%	0.00%
Austria	5.50%	0.00%	Luxembourg	5.50%	0.00%
Belgium	6.70%	1.20%	Malta	7.45%	1.95%
Cyprus	22.00%	16.50%	Netherlands	5.50%	0.00%
Denmark	5.50%	0.00%	Norway	5.50%	0.00%
Finland	5.50%	0.00%	Portugal	10.90%	5.40%
France	5.95%	0.45%	Spain	8.88%	3.38%
Germany	5.50%	0.00%	Sweden	5.50%	0.00%
Greece	15.63%	10.13%	Switzerland	5.50%	0.00%
Iceland	8.88%	3.38%	Turkey	8.88%	3.38%
Ireland	9.63%	4.13%	United Kingdom	5.95%	0.45%
Italy	8.50%	3.00%	Western Europe	6.72%	1.22%

Canada	5.50%	0.00%
United States of America	5.50%	0.00%
North America	5.50%	0.00%

Country	TRP	CRP
Angola	10.90%	5.40%
Benin	13.75%	8.25%
Botswana	7.15%	1.65%
Burkina Faso	13.75%	8.25%
Cameroon	13.75%	8.25%
Cape Verde	12.25%	6.75%
Egypt	17.50%	12.00%
Gabon	10.90%	5.40%
Ghana	12.25%	6.75%
Kenya	12.25%	6.75%
Morocco	9.63%	4.13%
Mozambique	12.25%	6.75%
Namibia	8.88%	3.38%
Nigeria	10.90%	5.40%
Rwanda	13.75%	8.25%
Senegal	12.25%	6.75%
South Africa	8.05%	2.55%
Tunisia	10.23%	4.73%
Uganda	12.25%	6.75%
Zambia	12.25%	6.75%
Africa	11.22%	5.82%

Albania	12.25%	6.75%
Armenia	10.23%	4.73%
Azerbaijan	8.88%	3.38%
Belarus	15.63%	10.13%
Bosnia	15.63%	10.13%
Bulgaria	8.50%	3.00%
Croatia	9.63%	4.13%
Czech Republic	6.93%	1.43%
Estonia	6.93%	1.43%
Georgia	10.90%	5.40%
Hungary	9.63%	4.13%
Kazakhstan	8.50%	3.00%
Latvia	8.50%	3.00%
Lithuania	8.05%	2.55%
Macedonia	10.90%	5.40%
Moldova	15.63%	10.13%
Montenegro	10.90%	5.40%
Poland	7.15%	1.65%
Romania	8.88%	3.38%
Russia	8.05%	2.55%
Serbia	10.90%	5.40%
Slovakia	7.15%	1.65%
Slovenia	9.63%	4.13%
Ukraine	15.63%	10.13%
E. Europe & Russia	8.60%	3.10%

Bahrain	8.05%	2.55%
Israel	6.93%	1.43%
Jordan	12.25%	6.75%
Kuwait	6.40%	0.90%
Lebanon	12.25%	6.75%
Oman	6.93%	1.43%
Qatar	6.40%	0.90%
Saudi Arabia	6.70%	1.20%
United Arab Emirates	6.40%	0.90%
Middle East	6.88%	1.38%

Bangladesh	10.90%	5.40%
Cambodia	13.75%	8.25%
China	6.94%	1.44%
Fiji	12.25%	6.75%
Hong Kong	5.95%	0.45%
India	9.10%	3.60%
Indonesia	8.88%	3.38%
Japan	6.70%	1.20%
Korea	6.70%	1.20%
Macao	6.70%	1.20%
Malaysia	7.45%	1.95%
Mauritius	8.05%	2.55%
Mongolia	12.25%	6.75%
Pakistan	17.50%	12.00%
Papua NG	12.25%	6.75%
Philippines	9.63%	4.13%
Singapore	5.50%	0.00%
Sri Lanka	12.25%	6.75%
Taiwan	6.70%	1.20%
Thailand	8.05%	2.55%
Vietnam	13.75%	8.25%
Asia	7.27%	1.77%

Australia	5.50%	0.00%
Cook Islands	12.25%	6.75%
New Zealand	5.50%	0.00%
Australia & NZ	5.50%	0.00%

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

Estimating ERP for Disney: November 2013

- Incorporation: The conventional practice on equity risk premiums is to estimate an ERP based upon where a company is incorporated. Thus, the cost of equity for Disney would be computed based on the US equity risk premium, because it is a US company, and the Brazilian ERP would be used for Vale, because it is a Brazilian company.
- Operations: The more sensible practice on equity risk premium is to estimate an ERP based upon where a company operates. For Disney in 2013:

<i>Region/ Country</i>	<i>Proportion of Disney's Revenues</i>	<i>ERP</i>
US& Canada	82.01%	5.50%
Europe	11.64%	6.72%
Asia-Pacific	6.02%	7.27%
Latin America	0.33%	9.44%
Disney	100.00%	5.76%

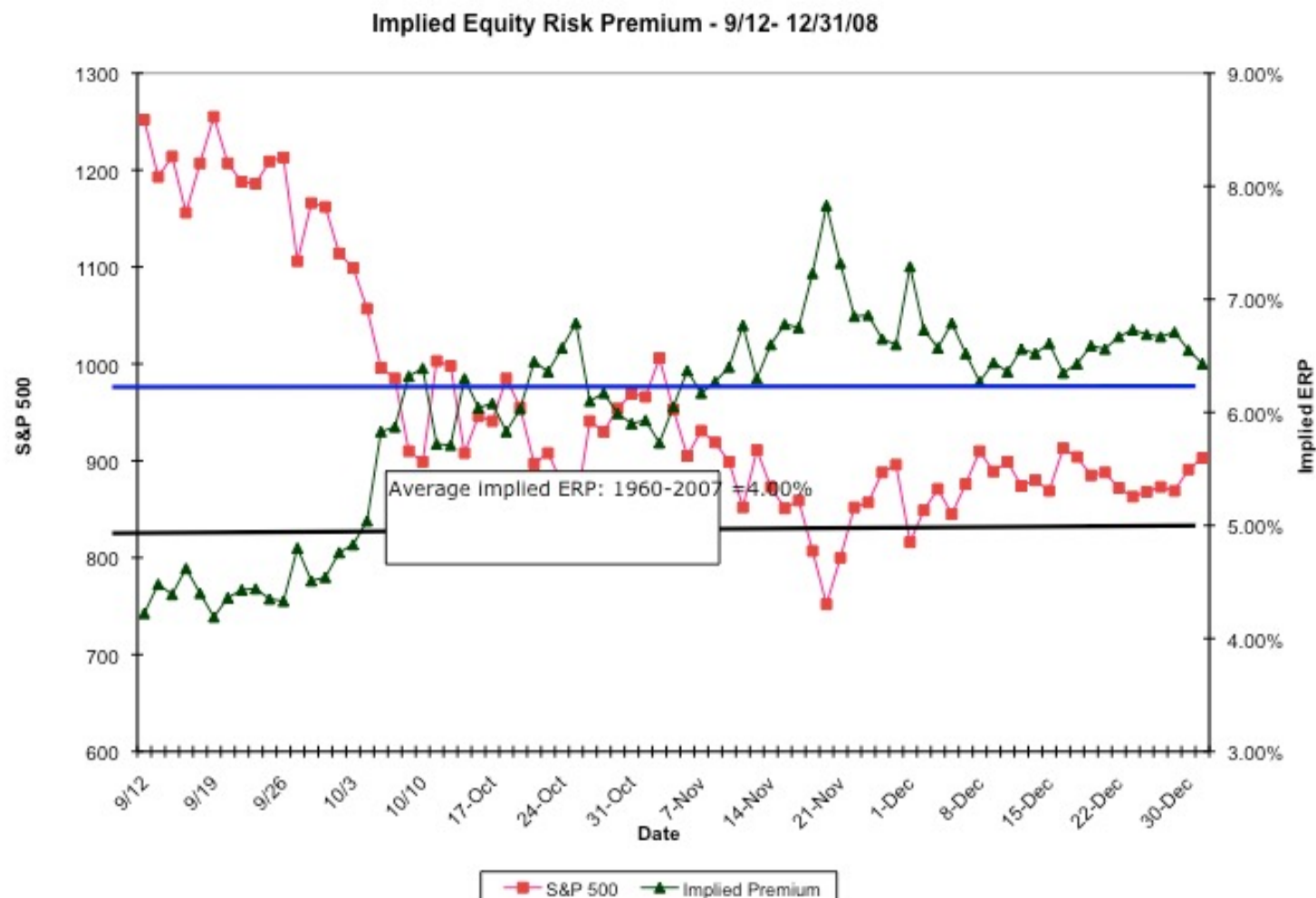
ERP for Companies: November 2013

In November 2013,
the mature market
premium used was
5.5%

<i>Company</i>	<i>Region/ Country</i>	<i>Weight</i>	<i>ERP</i>
Bookscape	United States	100%	5.50%
Vale	US & Canada	4.90%	5.50%
	Brazil	16.90%	8.50%
	Rest of Latin America	1.70%	10.09%
	China	37.00%	6.94%
	Japan	10.30%	6.70%
	Rest of Asia	8.50%	8.61%
	Europe	17.20%	6.72%
	Rest of World	3.50%	10.06%
	Company	100.00%	7.38%
Tata Motors	India	23.90%	9.10%
	China	23.60%	6.94%
	UK	11.90%	5.95%
	United States	10.00%	5.50%
	Mainland Europe	11.70%	6.85%
	Rest of World	18.90%	6.98%
	Company	100.00%	7.19%
Baidu	China	100%	6.94%
Deutsche Bank	Germany	35.93%	5.50%
	North America	24.72%	5.50%
	Rest of Europe	28.67%	7.02%
	Asia-Pacific	10.68%	7.27%
	South America	0.00%	9.44%
	Company	100.00%	6.12%

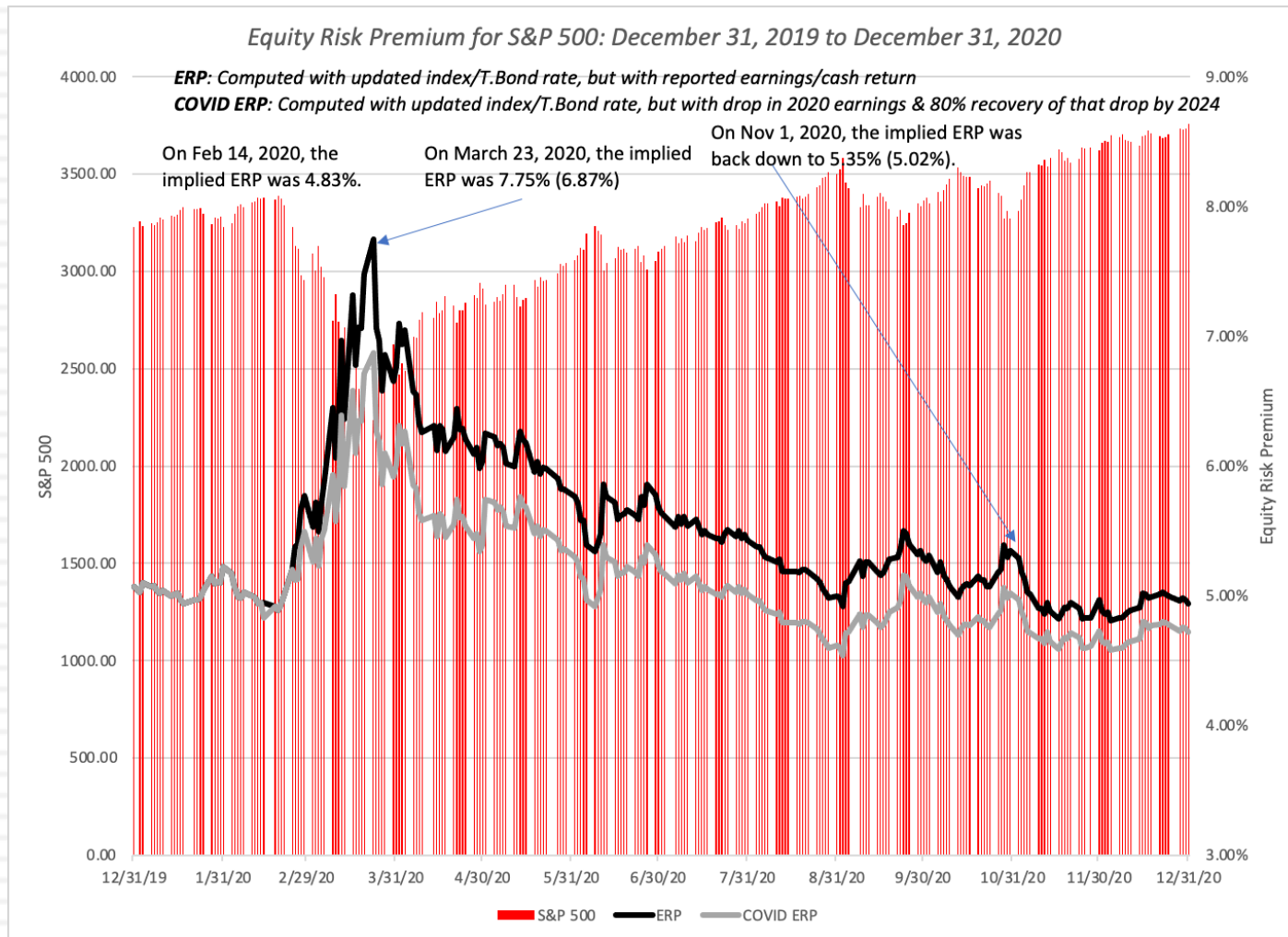
The Anatomy of a Crisis: Implied ERP from September 12, 2008 to January 1, 2009

130



And in 2020.. COVID effects

131



An Updated Implied ERP

In the trailing 12 months, across all companies in the index.

Base year cash flow (last 12 mths)

Dividends (TTM): 65.54
+ Buybacks (TTM): 116.46
= Cash to investors (TTM): **181.99**

Expected earnings/cashflow growth in next 5 years

Earnings growth rate of 6.41% based upon analyst estimates for 2023 and 2024 and growth dropping to 3.88% over the following years.

Modified Payout

This computation assumes that the payout ratio changes over time to reflect a sustainable payout ratio = g/ROE , in the stable growth. The resulting ERP is 5.11%.

Actual

numbers

Forecasted numbers

	Last 12 months	1	2	3	4	5	Term Year
Earnings	219.49	233.55	248.52	264.44	281.38	299.41	311.03
Expected growth	89.78%	89.78%	89.78%	89.78%	89.78%	89.78%	89.78%
Dividends + Buybacks =	181.99	209.68	223.12	237.41	252.62	268.81	279.24

Earnings and Cash flows grow @3.88% (set equal to risk free rate) a year forever.

S&P 500 on 1/1/23=
3839.50

$$3839.50 = \frac{209.68}{(1+r)} + \frac{223.12}{(1+r)^2} + \frac{237.41}{(1+r)^3} + \frac{252.62}{(1+r)^4} + \frac{268.81}{(1+r)^5} + \frac{279.24}{(r - .0388)(1+r)^5}$$

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 = 9.82%

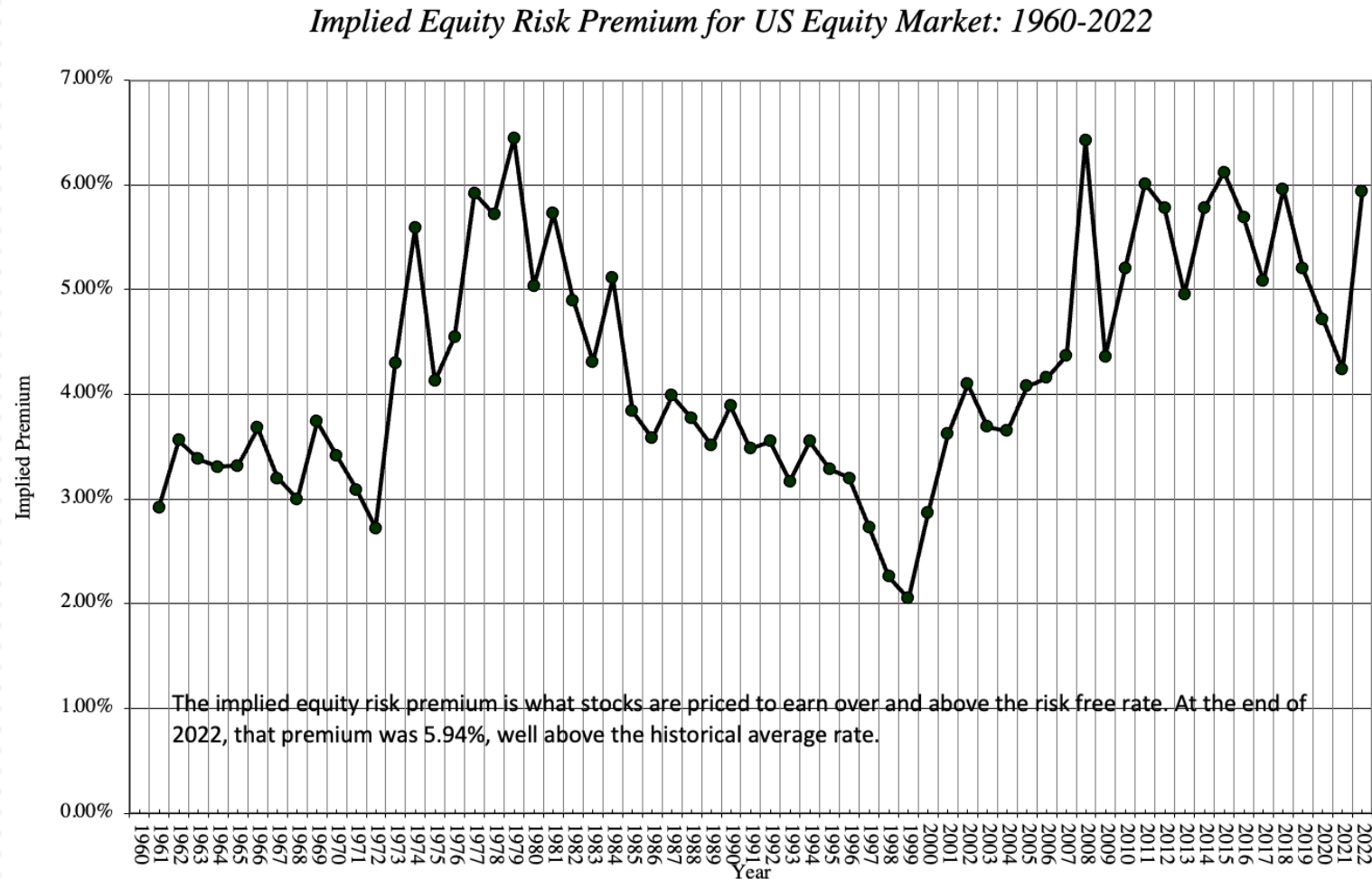
Minus

Risk free rate = T.Bond rate on 1/1/23= 3.88%

Equals

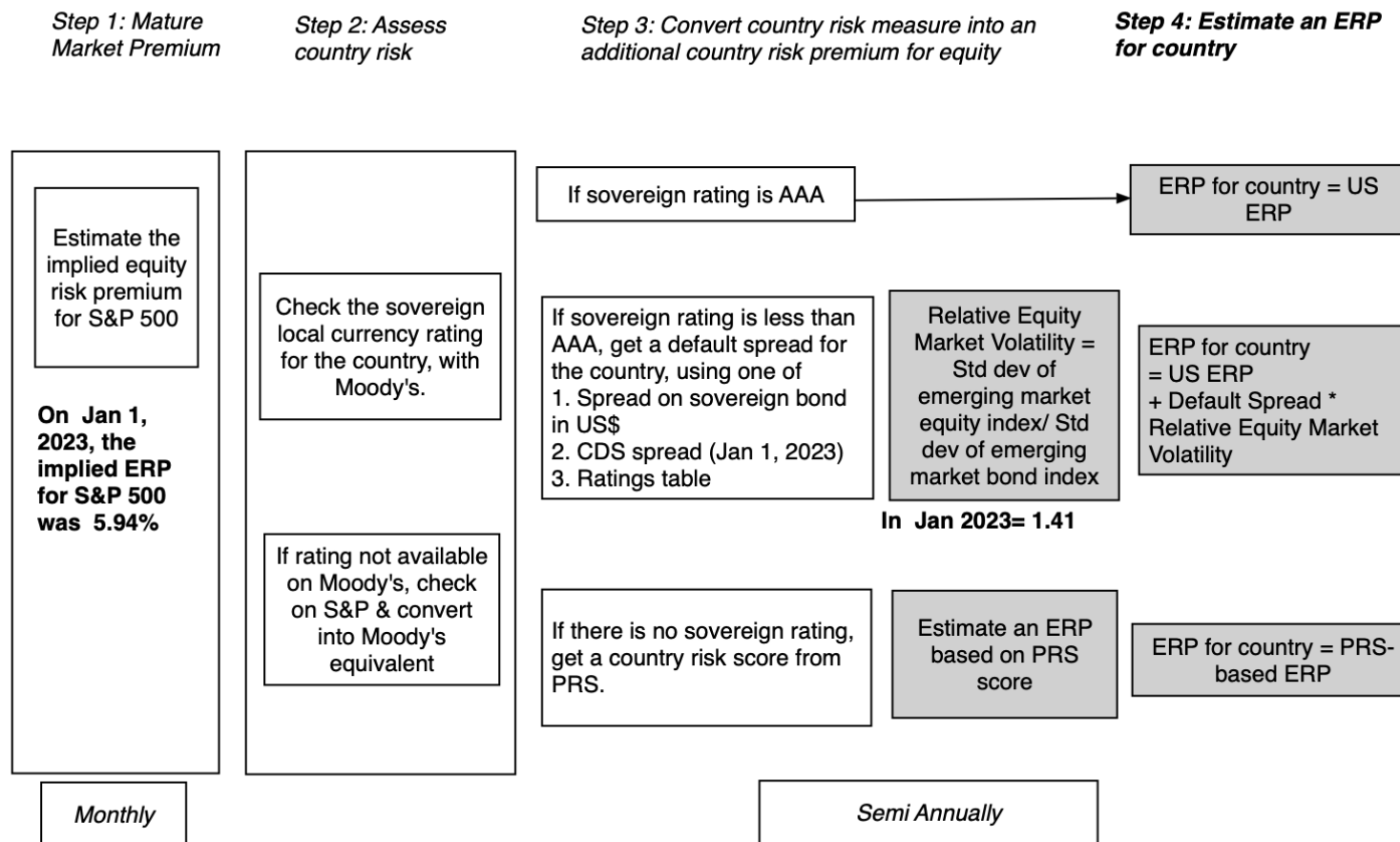
Implied Equity Risk Premium (1/1/23) = 9.82% - 3.88% = 5.94%

Implied Premiums in the US: 1960-2022



A Composite way of estimating ERP for countries

ERP Estimation Procedure - January 1, 2023



Andorra	Baa2	3.29%	9.23%	Italy	Baa3	3.79%	9.73%
Austria	Aa1	0.69%	6.63%	Jersey (States of)	Aaa	0.00%	5.94%
Belgium	Aa3	1.03%	6.97%	Liechtenstein	Aaa	0.00%	5.94%
Cyprus	Ba1	4.32%	10.26%	Luxembourg	Aaa	0.00%	5.94%
Denmark	Aaa	0.00%	5.94%	Malta	A2	1.46%	7.40%
Finland	Aa1	0.69%	6.63%	Netherlands	Aaa	0.00%	5.94%
France	Aa2	0.85%	6.79%	Norway	Aaa	0.00%	5.94%
Germany	Aaa	0.00%	5.94%	Portugal	Baa2	3.29%	9.23%
Greece	Ba3	6.21%	12.15%	Spain	Baa1	2.76%	8.70%
Guernsey (States of)	Aaa	0.00%	5.94%	Sweden	Aaa	0.00%	5.94%
Iceland	A2	1.46%	7.40%	Switzerland	Aaa	0.00%	5.94%
Ireland	A1	1.22%	7.16%	Turkey	B3	11.22%	17.16%
Isle of Man	Aa3	1.03%	6.97%	United Kingdom	Aa3	1.03%	6.97%
				Western Europe		1.51%	7.45%

Canada	Aaa	0.00%	5.94%
United States	Aaa	0.00%	5.94%
North America		0.00%	5.94%

Caribbean	NA	11.19%	17.13%
-----------	----	--------	--------

Argentina	Ca	20.71%	26.65%
Belize	Caa2	15.54%	21.48%
Bolivia	B2	9.49%	15.43%
Brazil	Ba2	5.19%	11.13%
Chile	A2	1.46%	7.40%
Colombia	Baa2	3.29%	9.23%
Costa Rica	B2	9.49%	15.43%
Ecuador	Caa3	17.26%	23.20%
El Salvador	Caa3	17.26%	23.20%
Guatemala	Ba1	4.32%	10.26%
Honduras	B1	7.77%	13.71%
Mexico	Baa2	3.29%	9.23%
Nicaragua	B3	11.22%	17.16%
Panama	Baa2	3.29%	9.23%
Paraguay	Ba1	4.32%	10.26%
Peru	Baa1	2.76%	8.70%
Suriname	Caa3	17.26%	23.20%
Uruguay	Baa2	3.29%	9.23%
Venezuela	C	24.69%	30.63%
Latin America		6.57%	12.51%

Angola	B3	11.22%	17.16%
Benin	B1	7.77%	13.71%
Botswana	A3	2.07%	8.01%
Burkina Faso	Caa1	12.94%	18.88%
Cameroon	B2	9.49%	15.43%
Cape Verde	B3	11.22%	17.16%
Congo (DR)	B3	11.22%	17.16%
Congo (Rep of)	Caa2	15.54%	21.48%
Côte d'Ivoire	Ba3	6.21%	12.15%
Egypt	B2	9.49%	15.43%
Ethiopia	Caa2	15.54%	21.48%
Gabon	Caa1	12.94%	18.88%
Ghana	Ca	20.71%	26.65%
Kenya	B2	9.49%	15.43%
Mali	Caa2	15.54%	21.48%
Mauritius	Baa3	3.79%	9.73%
Morocco	Ba1	4.32%	10.26%
Mozambique	Caa2	15.54%	21.48%
Namibia	B1	7.77%	13.71%
Niger	B3	11.22%	17.16%
Nigeria	B3	11.22%	17.16%
Rwanda	B2	9.49%	15.43%
Senegal	Ba3	6.21%	12.15%
South Africa	Ba2	5.19%	11.13%
Swaziland	B3	11.22%	17.16%
Tanzania	B2	9.49%	15.43%
Togo	B3	11.22%	17.16%
Tunisia	Caa1	12.94%	18.88%
Uganda	B2	9.49%	15.43%
Zambia	Ca	20.71%	26.65%
Africa		9.64%	15.58%

Albania	B1	7.77%	13.71%
Armenia	Ba3	6.21%	12.15%
Azerbaijan	Ba1	4.32%	10.26%
Belarus	Ca	20.71%	26.65%
Bosnia and Herzegovina	B3	11.22%	17.16%
Bulgaria	Baa1	2.76%	8.70%
Croatia	Baa2	3.29%	9.23%
Czech Republic	Aa3	1.03%	6.97%
Estonia	A1	1.22%	7.16%
Georgia	Ba2	5.19%	11.13%
Hungary	Baa2	3.29%	9.23%
Kazakhstan	Baa2	3.29%	9.23%
Kyrgyzstan	B3	11.22%	17.16%
Latvia	A3	2.07%	8.01%
Lithuania	A2	1.46%	7.40%
Macedonia	Ba3	6.21%	12.15%
Moldova	B3	11.22%	17.16%
Montenegro	B1	7.77%	13.71%
Poland	A2	1.46%	7.40%
Romania	Baa3	3.79%	9.73%
Russia	Caa1	12.94%	18.88%
Serbia	Ba2	5.19%	11.13%
Slovakia	A2	1.46%	7.40%
Slovenia	A3	2.07%	8.01%
Tajikistan	B3	11.22%	17.16%
Ukraine	Caa3	17.26%	23.20%
Uzbekistan	B1	7.77%	13.71%
E. Europe & Russia		7.79%	13.73%

Abu Dhabi	Aa2	0.85%	6.79%
Bahrain	B2	9.49%	15.43%
Iraq	Caa1	12.94%	18.88%
Israel	A1	1.22%	7.16%
Jordan	B1	7.77%	13.71%
Kuwait	A1	1.22%	7.16%
Lebanon	C	24.69%	30.63%
Oman	Ba3	6.21%	12.15%
Qatar	Aa3	1.03%	6.97%
Ras Al Khaimah	A3	2.07%	8.01%
Saudi Arabia	A1	1.22%	7.16%
Sharjah	Ba1	4.32%	10.26%
United Arab Emirates	Aa2	0.85%	6.79%
Middle East		2.51%	8.45%

Country	PRS	CRP	ERP
Algeria	69.25	5.19%	11.13%
Brunei	79.5	1.46%	7.40%
Gambia	65	9.49%	15.43%
Guinea	57.25	15.54%	21.48%
Guinea-Bissau	64	11.22%	17.16%
Guyana	75.75	2.76%	8.70%
Haiti	54.25	20.71%	26.65%
Iran	66.5	7.77%	13.71%
Korea, D.P.R.	51	20.71%	26.65%
Liberia	58	15.54%	21.48%
Libya	70.75	5.19%	11.13%
Madagascar	62.5	11.22%	17.16%
Malawi	51	20.71%	26.65%
Myanmar	55.75	17.26%	23.20%
Sierra Leone	53.5	20.71%	26.65%
Somalia	52	20.71%	26.65%
Sudan	43	24.69%	30.63%
Syria	43.75	24.69%	30.63%
Yemen, Republic	48.25	24.69%	30.63%
Zimbabwe	61.5	12.94%	18.88%

Bangladesh	Ba3	6.21%	12.15%
Cambodia	B2	9.49%	15.43%
China	A1	1.22%	7.16%
Fiji	B1	7.77%	13.71%
Hong Kong	Aa3	1.03%	6.97%
India	Baa3	3.79%	9.73%
Indonesia	Baa2	3.29%	9.23%
Japan	A1	1.22%	7.16%
Korea	Aa2	0.85%	6.79%
Laos	Caa3	17.26%	23.20%
Macao	Aa3	1.03%	6.97%
Malaysia	A3	2.07%	8.01%
Maldives	Caa1	12.94%	18.88%
Mongolia	B3	11.22%	17.16%
Pakistan	Caa1	12.94%	18.88%
Papua New Guinea	B2	9.49%	15.43%
Philippines	Baa2	3.29%	9.23%
Singapore	Aaa	0.00%	5.94%
Solomon Islands	Caa1	12.94%	18.88%
Sri Lanka	Ca	20.71%	26.65%
Taiwan	Aa3	1.03%	6.97%
Thailand	Baa1	2.76%	8.70%
Vietnam	Ba2	5.19%	11.13%
Asia		1.93%	7.87%

Australia	Aaa	0.00%	5.94%
Cook Islands	B1	7.77%	13.71%
New Zealand	Aaa	0.00%	5.94%
Australia & NZ		0.00%	5.94%

Aswath Damodaran

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

Application Test: Estimating a Market Risk Premium

136

- For your company, get the geographical breakdown of revenues in the most recent year. Based upon this revenue breakdown and the most recent country risk premiums, estimate the equity risk premium that you would use for your company.
- This computation was based entirely on revenues. With your company, what concerns would you have about your estimate being too high or too low?

Estimating Beta

137

- The standard procedure for estimating betas is to regress stock returns (R_j) against market returns (R_m):

$$R_j = a + b R_m$$

where a is the intercept and b is the slope of the regression.

- The slope of the regression corresponds to the beta of the stock and measures the riskiness of the stock.
- The R squared (R^2) of the regression provides an estimate of the proportion of the risk (variance) of a firm that can be attributed to market risk. The balance ($1 - R^2$) can be attributed to firm specific risk.

Estimating Performance

138

- The intercept of the regression provides a simple measure of performance during the period of the regression, relative to the capital asset pricing model.

$$R_j = R_f + b (R_m - R_f)$$

$$= R_f (1-b) + b R_m \quad \text{..... Capital Asset Pricing Model}$$

$$R_j = a + b R_m \quad \text{..... Regression Equation}$$

- If
 - $a > R_f (1-b)$ Stock did better than expected during regression period
 - $a = R_f (1-b)$ Stock did as well as expected during regression period
 - $a < R_f (1-b)$ Stock did worse than expected during regression period
- The difference between the intercept and $R_f (1-b)$ is Jensen's alpha. If it is positive, your stock did perform better than expected during the period of the regression.

Setting up for the Estimation

139

- Decide on an estimation period
 - ▣ Services use periods ranging from 2 to 5 years for the regression
 - ▣ Longer estimation period provides more data, but firms change.
 - ▣ Shorter periods can be affected more easily by significant firm-specific event that occurred during the period
- ▣ Decide on a return interval - daily, weekly, monthly
 - ▣ Shorter intervals yield more observations, but suffer from more noise.
 - ▣ Noise is created by stocks not trading and biases all betas towards one.
- Estimate returns (including dividends) on stock
 - ▣ $\text{Return} = (\text{Price}_{\text{End}} - \text{Price}_{\text{Beginning}} + \text{Dividends}_{\text{Period}}) / \text{Price}_{\text{Beginning}}$
 - ▣ Included dividends only in ex-dividend month
- Choose a market index, and estimate returns (inclusive of dividends) on the index for each interval for the period.