JANUARY 2019 DATA UPDATE 5: THE HURDLE RATE

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Cost of Capital: A Financial Balance Sheet Perspective

Cost of Capital: A Balance Sheet Perspective

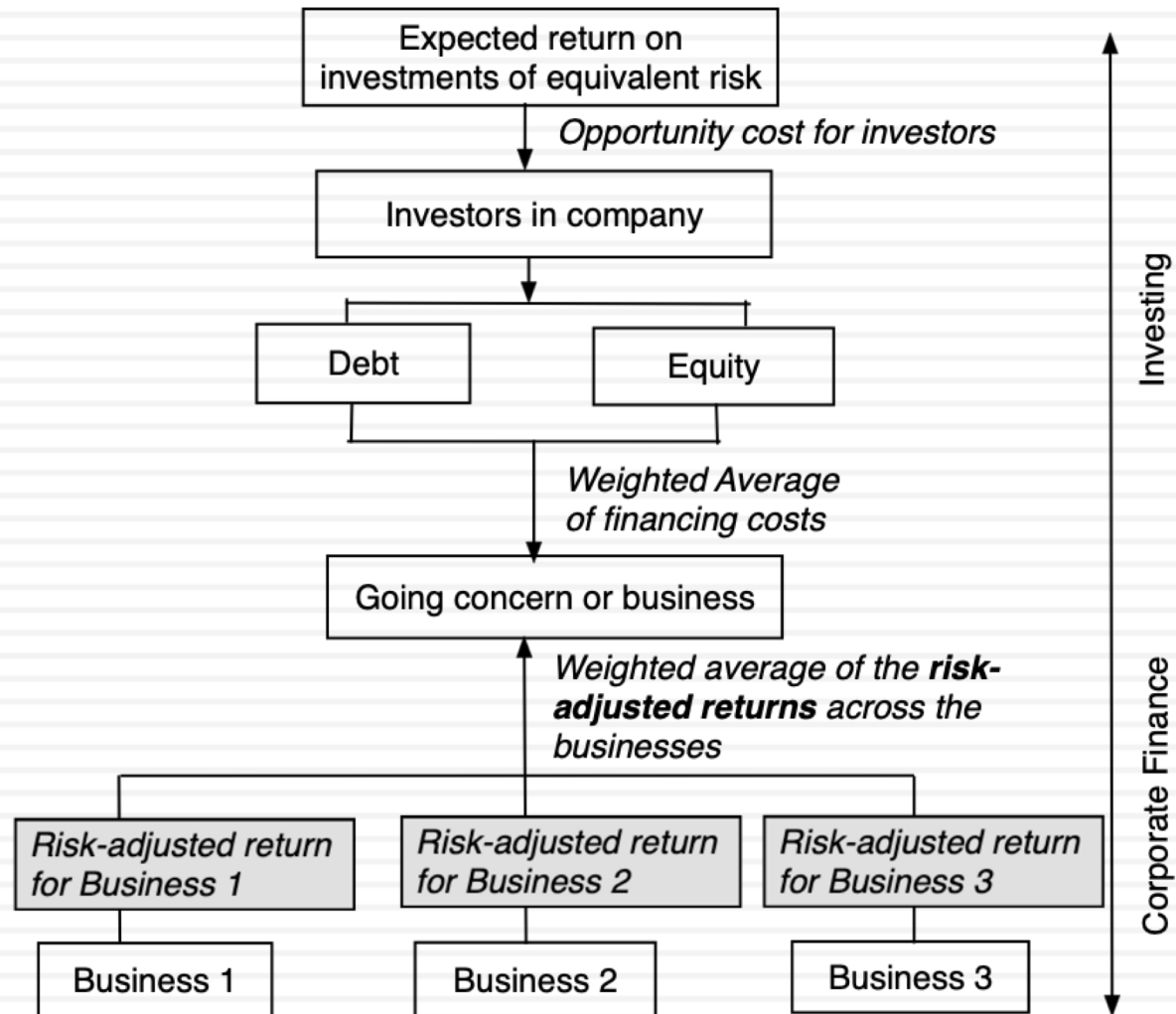|	Assets		Liabilities	
Expected Value of investments already made	Assets in Place	Debt	Borrowed money	The **cost of debt** is the interest rate that those lending long term to the firm will demand today, given their perception of the default risk in the debt, adjusted for any tax benefits from interest expenses.
Expected Value Added (or Destroyed) by future investments	Growth Assets	Equity	Owner's funds	The **cost of equity** is the rate of return that equity investors demand on their investments, given their perception of the risk in the equity.

The **cost of capital** is the overall cost of funding the firm's business, reflecting the costs of equity and debt, and how much of each is used in financing the firm (debt and equity weights).
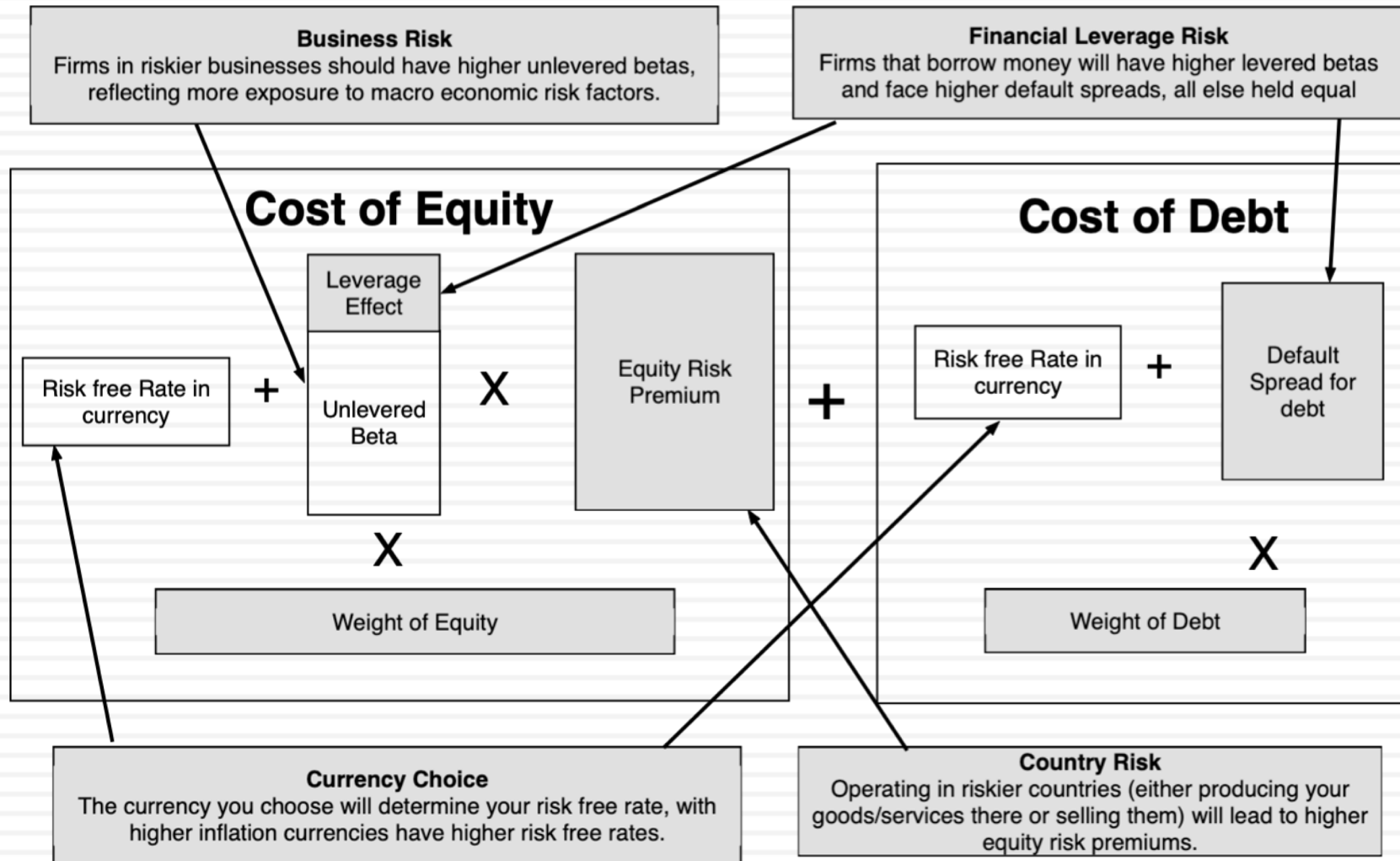
The Swiss Army Knife

Cost of capital as opportunity cost to investors

Cost of capital as cost of financing to a company

Cost of capital as hurdle rate for investment analysis

Expected return on investments of equivalent risk

Opportunity cost for investors

Investors in company

Debt | Equity

Weighted Average of financing costs

Going concern or business

Weighted average of the **risk-adjusted returns** across the businesses

Risk-adjusted return for Business 1 | Risk-adjusted return for Business 2 | Risk-adjusted return for Business 3

Business 1 | Business 2 | Business 3

Investing

Corporate Finance

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Every Risk has a place

Business Risk
Firms in riskier businesses should have higher unlevered betas, reflecting more exposure to macro economic risk factors.

Financial Leverage Risk
Firms that borrow money will have higher levered betas and face higher default spreads, all else held equal

Cost of Equity

Risk free Rate in currency
+
Leverage Effect
Unlevered Beta
X
Equity Risk Premium

X

Weight of Equity

Cost of Debt

Risk free Rate in currency
+
Default Spread for debt

X

Weight of Debt

Currency Choice
The currency you choose will determine your risk free rate, with higher inflation currencies have higher risk free rates.

Country Risk
Operating in riskier countries (either producing your goods/services there or selling them) will lead to higher equity risk premiums.

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1. Business Risk

□ If you are diversified, I argued that you would measure the risk in an investment with the covariance of that investment with the market, or in its standardized form, its beta.

□ To get the beta for a company, then, you can adopt one of two approaches.

  ❑ The first, and the one that is taught in every finance class, is to run a regression of returns on the stock against a market index and to use the regression beta.

  ❑ The second, and my preferred approach, is to estimate a beta by looking at the business or businesses a company operates in, and taking a weighted average of the betas of companies in that business.

Estimation Process

- Each year, I estimate these numbers by averaging the betas of publicly traded companies in each business. These betas, in addition to reflecting the risk of the business, also reflect the financial leverage of companies in that business (with more debt pushing up betas) and their holdings in cash and marketable securities (which, being close to risk less, push down betas).

- I adjust the average beta for both variables to estimate what is called a pure play or a business beta for each business.

Beta for a company

- To get from these business betas to the beta of a company, you need to first identify what businesses the company operates in, and then how much value it derives from each of the businesses.
  - The first part is usually simple to do, though you may face the challenge of finding the right bucket to put a business into
  - The second part is usually difficult, because the individual businesses do not trade. You can use revenues or operating income by business as approximations to estimate weights or apply multiples to each of these variables (by looking at what other companies in the business trade at) to arrive at value weights.

2. Financial Leverage

- Debt Ratio: Th mix of debt and equity that you use represents the weights in your cost of capital.
- Beta Effect: As you borrow money, your equity will become riskier, because it is a residual claim, and having more interest expenses will make that claim more volatile.

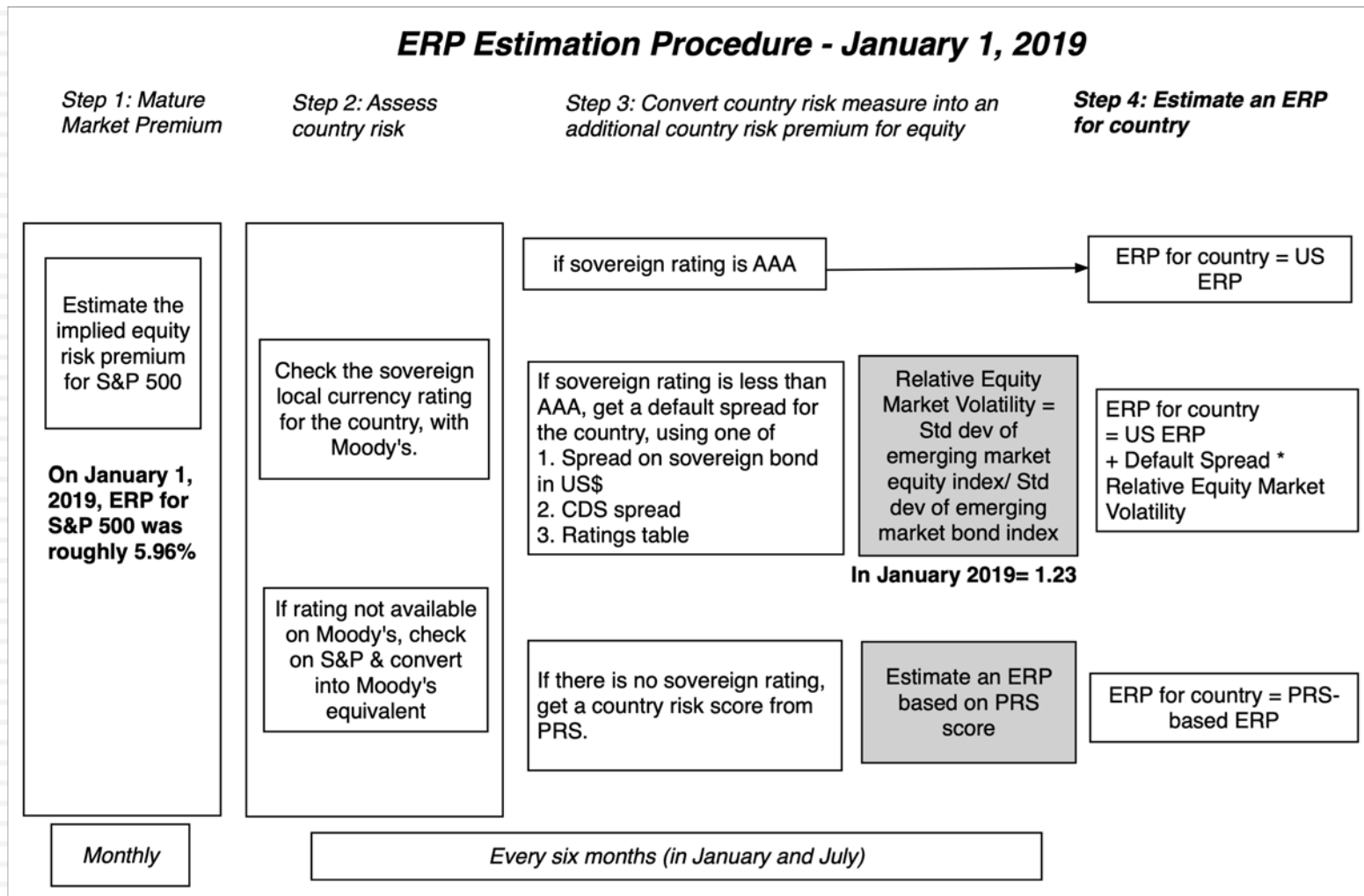Levered Beta = Unlevered Beta (1 + (1- Tax Rate) (Debt/Equity))

- Cost of Debt: The cost of debt, which is set by lenders based upon how much default risk that they see in a company. To the extent that the tax law is tilted towards debt, the after-tax cost of borrowing will reflect that tax benefit.

Cost of Debt = (Risk free Rate + Default Spread) (1 – Tax Rate)

3. Country Risk

- <u>Sovereign Ratings and Default Spreads</u>: The vast majority of countries have sovereign ratings, measuring their default risk.

- <u>Sovereign CDS spreads</u>: The Credit Default Swap (CDS) market is one where you can buy insurance against sovereign default, and it offers a market-based estimate of sovereign risk.

- <u>Country Risk Premiums</u>: I start with the default spreads, but I add a scaling factor to reflect the reality that equities are riskier than government bonds to come up with country risk premiums. The scaling factor that I use is obtained by dividing the volatility of an emerging market equity index by the volatility of emerging market bonds.

ERP Estimation in January 2019

ERP Estimation Procedure - January 1, 2019

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, 2019, ERP for S&P 500 was roughly 5.96%

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 2019= 1.23

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)

Western Europe

Country	ERP	CRP	Country	ERP	CRP
Andorra	8.60%	2.64%	Italy	9.02%	3.06%
Austria	6.51%	0.55%	Jersey (States of)	6.80%	0.84%
Belgium	6.80%	0.84%	Liechtenstein	5.96%	0.00%
Cyprus	10.13%	4.17%	Luxembourg	5.96%	0.00%
Denmark	5.96%	0.00%	Malta	7.63%	1.67%
Finland	6.51%	0.55%	Netherlands	5.96%	0.00%
France	6.65%	0.69%	Norway	5.96%	0.00%
Germany	5.96%	0.00%	Portugal	9.02%	3.06%
Greece	14.99%	9.03%	Spain	8.18%	2.22%
Guernsey (States of)	6.80%	0.84%	Sweden	5.96%	0.00%
Iceland	7.63%	1.67%	Switzerland	5.96%	0.00%
Ireland	7.14%	1.18%	Turkey	10.96%	5.00%
Isle of Man	6.65%	0.69%	United Kingdom	6.65%	0.69%
			Western Europe	**7.11%**	**1.15%**

North America

	ERP	CRP
Canada	5.96%	0.00%
United States	5.96%	0.00%
North America	**5.96%**	**0.00%**

	ERP	CRP
Caribbean	**13.61%**	**7.65%**

Central and South America

Country	ERP	CRP
Argentina	13.60%	7.64%
Belize	14.99%	9.03%
Bolivia	10.96%	5.00%
Brazil	10.13%	4.17%
Chile	6.94%	0.98%
Colombia	8.60%	2.64%
Costa Rica	12.21%	6.25%
Ecuador	14.99%	9.03%
El Salvador	16.37%	10.41%
Guatemala	9.43%	3.47%
Honduras	12.21%	6.25%
Mexico	7.63%	1.67%
Nicaragua	13.60%	7.64%
Panama	8.60%	2.64%
Paraguay	9.43%	3.47%
Peru	7.63%	1.67%
Suriname	13.60%	7.64%
Uruguay	8.60%	2.64%
Venezuela	28.10%	22.14%
Central and South America	**10.61%**	**4.65%**

Africa

Country	ERP	CRP
Angola	14.99%	9.03%
Benin	12.21%	6.25%
Botswana	7.14%	1.18%
Burkina Faso	13.60%	7.64%
Cameroon	13.60%	7.64%
Cape Verde	13.60%	7.64%
Congo (DR)	14.99%	9.03%
Congo (Rep)	18.46%	12.50%
Côte d'Ivoire	10.96%	5.00%
Egypt	14.99%	9.03%
Ethiopia	12.21%	6.25%
Gabon	16.37%	10.41%
Ghana	14.99%	9.03%
Kenya	13.60%	7.64%
Morocco	9.43%	3.47%
Mozambique	19.83%	13.87%
Namibia	9.43%	3.47%
Nigeria	13.60%	7.64%
Rwanda	13.60%	7.64%
Senegal	10.96%	5.00%
South Africa	9.02%	3.06%
Swaziland	13.60%	7.64%
Tanzania	12.21%	6.25%
Tunisia	13.60%	7.64%
Uganda	13.60%	7.64%
Zambia	16.37%	10.41%
Africa	**12.63%**	**6.67%**

Eastern Europe & Russia

Country	ERP	CRP
Albania	12.21%	6.25%
Armenia	12.21%	6.25%
Azerbaijan	10.13%	4.17%
Belarus	14.99%	9.03%
Bosnia and Herzegovina	14.99%	9.03%
Bulgaria	8.60%	2.64%
Croatia	10.13%	4.17%
Czech Republic	6.94%	0.98%
Estonia	6.94%	0.98%
Georgia	10.13%	4.17%
Hungary	9.02%	3.06%
Kazakhstan	9.02%	3.06%
Kyrgyzstan	13.60%	7.64%
Latvia	7.63%	1.67%
Lithuania	7.63%	1.67%
Macedonia	10.96%	5.00%
Moldova	14.99%	9.03%
Montenegro	12.21%	6.25%
Poland	7.14%	1.18%
Romania	9.02%	3.06%
Russia	9.43%	3.47%
Serbia	10.96%	5.00%
Slovakia	7.14%	1.18%
Slovenia	8.18%	2.22%
Tajikistan	9.43%	3.47%
Ukraine	18.46%	12.50%
Eastern Europe & Russia	**9.24%**	**3.28%**

Middle East

Country	ERP	CRP
Abu Dhabi	6.65%	0.69%
Bahrain	13.60%	7.64%
Iraq	16.37%	10.41%
Israel	6.94%	0.98%
Jordan	12.21%	6.25%
Kuwait	6.65%	0.69%
Lebanon	14.99%	9.03%
Oman	9.02%	3.06%
Qatar	6.80%	0.84%
Ras Al Khaimah (Emirate of)	7.14%	1.18%
Saudi Arabia	6.94%	0.98%
Sharjah	7.63%	1.67%
United Arab Emirates	6.65%	0.69%
Middle East	**7.96%**	**2.00%**

Country	PRS	ERP	CRP	Country	PRS	ERP	CRP
Algeria	65	13.60%	7.64%	Malawi	61	16.37%	10.41%
Brunei	80.5	6.94%	0.98%	Mali	61.3	16.37%	10.41%
Gambia	63.3	14.99%	9.03%	Myanmar	62	16.37%	10.41%
Guinea	54.3	22.61%	16.65%	Niger	54.5	22.61%	16.65%
Guinea-Bissau	62	16.37%	10.41%	Sierra Leone	54.8	22.61%	16.65%
Guyana	66.5	12.21%	6.25%	Somalia	53.5	22.61%	16.65%
Haiti	60	18.46%	12.50%	Sudan	38.8	28.10%	22.14%
Iran	69.3	10.13%	4.17%	Syria	51.8	22.61%	16.65%
Korea, D.P.R.	53	22.61%	16.65%	Togo	61	16.37%	10.41%
Liberia	53.5	22.61%	16.65%	Yemen, Republic	48	28.10%	22.14%
Libya	66.5	12.21%	6.25%	Zimbabwe	59.3	18.46%	12.50%
Madagascar	64	14.99%	9.03%				

Asia

Country	ERP	CRP
Bangladesh	10.96%	5.00%
Cambodia	13.60%	7.64%
China	6.94%	0.98%
Fiji	10.96%	5.00%
Hong Kong	6.65%	0.69%
India	8.60%	2.64%
Indonesia	8.60%	2.64%
Japan	6.94%	0.98%
Korea	6.65%	0.69%
Macao	6.80%	0.84%
Malaysia	7.63%	1.67%
Maldives	13.60%	7.64%
Mauritius	8.18%	2.22%
Mongolia	14.99%	9.03%
Pakistan	14.99%	9.03%
Papua New Guinea	13.60%	7.64%
Philippines	8.60%	2.64%
Singapore	5.96%	0.00%
Solomon Islands	14.99%	9.03%
Sri Lanka	12.21%	6.25%
Taiwan	8.18%	2.22%
Thailand	8.18%	2.22%
Vietnam	10.96%	5.00%
Asia	**7.43%**	**1.47%**

Australia & New Zealand

Country	ERP	CRP
Australia	5.96%	0.00%
Cook Islands	12.21%	6.25%
New Zealand	5.96%	0.00%
Australia & New Zealand	**5.96%**	**0.00%**

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

4. Currency Risk (or is it Choice)

$$\text{Value of asset} = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} ..... + \frac{E(CF_n)}{(1+r)^n}$$

Base year cash flow

Expected Inflation | Real growth in economy

Real growth in company

Currency Choice

Company characteristics

Expected Inflation | Real Interest Rate | **+** | Risk Premium
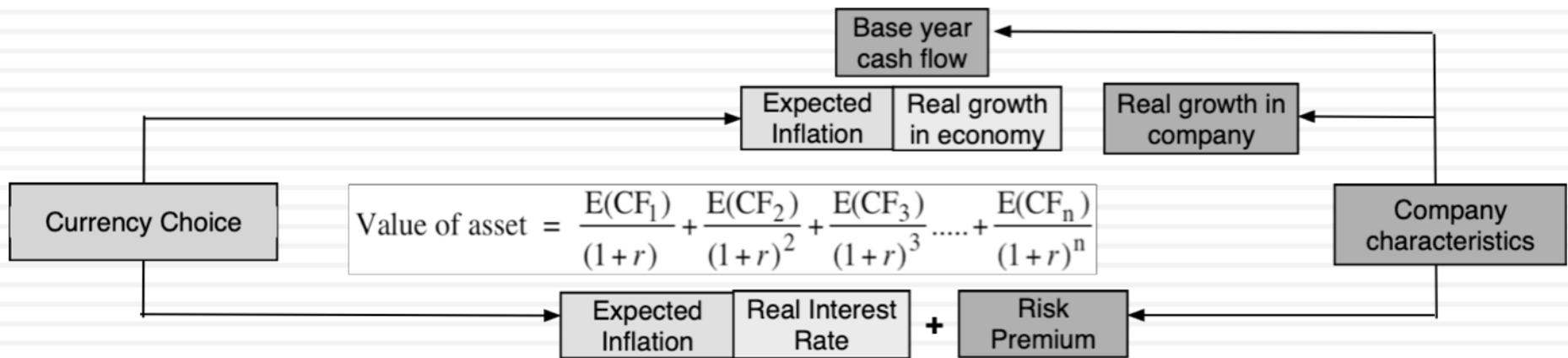
Approach 1: Risk free Rate

Risk Free Rates in Currencies in January 2019: Government Bond Based

Risk free Rate in Currency = Government Bond Rate - Default Spread for Government (based on local currency rating)

■ Risk free Rate   ■ Default Spread based on rating
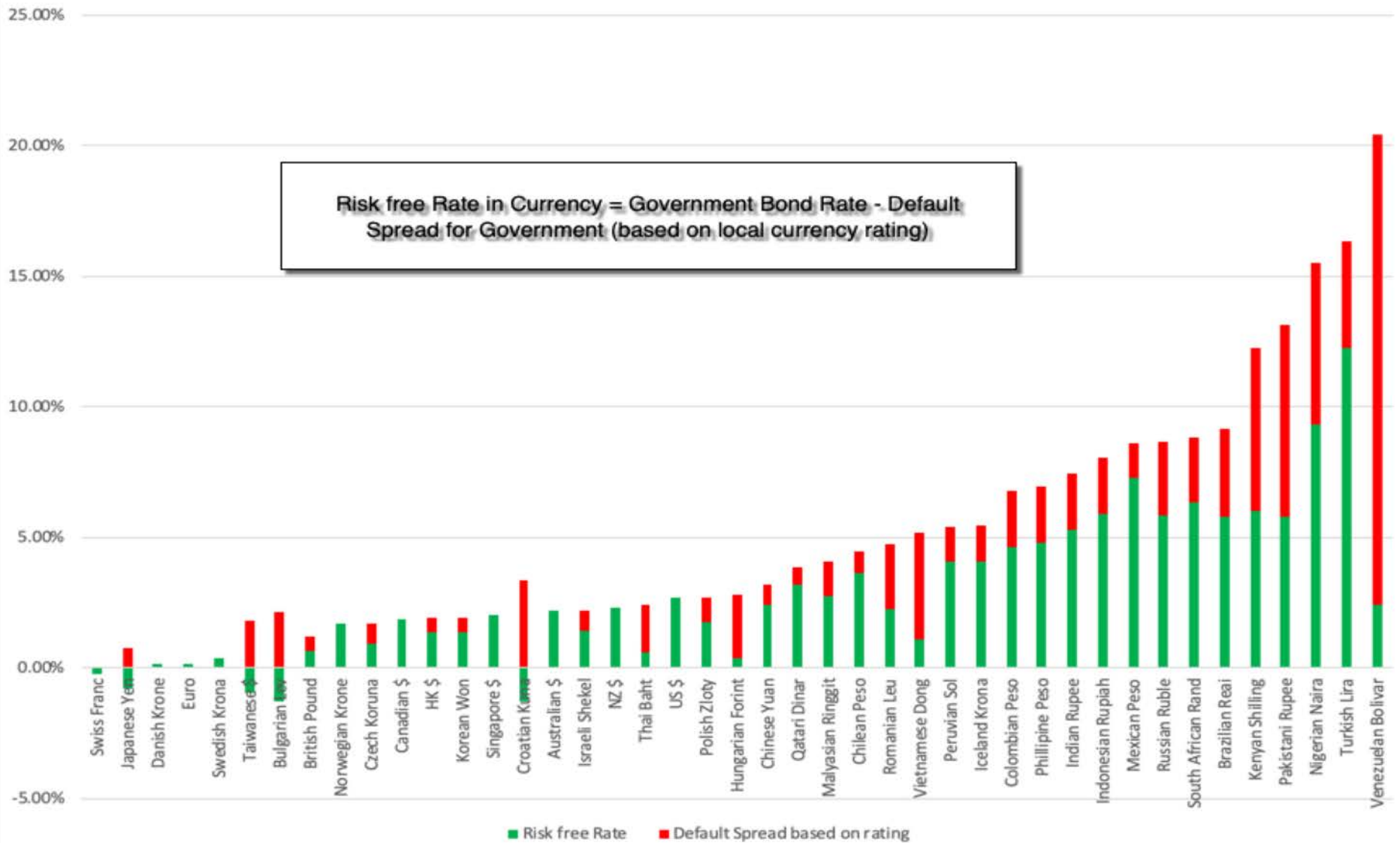
Approach 2: Differential Inflation

- You estimate the cost of capital in a currency that you feel comfortable with (in terms of estimating risk free rates and risk premiums) and then add on or incorporate the differential inflation between that currency and the local currency that you want to convert the cost of capital to.

- Thus, to convert the cost of capital in US $ terms to a different currency, you would do the following:

$$Cost\ of\ Capital_{LC} = (1 + Cost\ of\ Capital_{US\$}) * \frac{(1 + Inflation\ Rate_{LC})}{(1 + Inflation\ Rate_{US\$})} - 1$$

Proposition 1: A hurdle rate is an opportunity cost, not a funding cost

- ☐ Most people, when asked what a cost of capital is, will respond with the answer that it is the cost of raising capital. In the context of its usage as a hurdle rate, that is not true.

- ☐ It is an opportunity cost, a rate of return that you (as a company or investor) can earn <u>on other investments in the market of equivalent risk.</u>

- ☐ That is why, when valuing a target firm in an acquisition, you should always use the risk characteristics of the target firm (its beta and debt capacity) to compute a cost of capital, rather than the cost of capital of the acquiring firm.

Proposition 2: A company-wide hurdle rate can be misleading and dangerous

- In corporate finance, the hurdle rate becomes the number to beat, when you do investment analysis. Most companies claim to have a corporate hurdle rate, a number that all projects that are assessed within the company get measured against.

- If your company operates in only one business and one country, this may work, but to the extent that companies operate in many businesses across multiple countries, there can be no one hurdle rate. Even if you use only one currency in analysis, your cost of capital will be a function of which business a project is in, and what country it is aimed at.

- The consequences of not making these differential adjustments will be that your safe businesses will end up subsidizing your risky businesses, and over time, both will be hurt, in what I term the "curse of the lazy conglomerate".

Proposition 3: Currency is a choice, but one that should not change outcomes

- If you follow the consistency rule on currency, incorporating inflation into both cash flows and discount rates, your analyses should be currency neutral.

- In other words, a project that looks like it is a bad project, when the analysis is done in US dollar terms, cannot become a good project, just because you decide to do the analysis in Indian rupees.

- If you do get divergent answers with different currencies, it is because there are inflation inconsistencies in your assessments of discount rates and cash flows.

Proposition 4: Your cost of capital cannot be insulated from the market

- There are many who remain wary of financial markets and their capacity to be irrational and volatile.

- Consequently, they try to generate hurdle rates that are unaffected by market movements, a futile and dangerous exercise, because we have to be price takers on at least some of the inputs into hurdle rates.

- Your cost of capital will change, and should change, as risk free rates and the prices of risk (equity risk premiums and default spreads) change.

Proposition 5: Gain perspective on cost of capital

Cost of Capital Distribution- January 2019

Broad Group	1st Decile	1st Quartile	Median	3rd Quartile	9th Decile
Aus, NZ and Canada	6.11%	8.14%	9.59%	10.06%	10.45%
Developed Europe	6.07%	7.16%	9.01%	10.53%	12.01%
Emerging Markets	6.85%	8.27%	10.23%	12.24%	14.43%
Japan	6.47%	7.20%	8.87%	10.26%	11.31%
United States	5.25%	6.58%	8.84%	9.97%	10.86%
Global	6.23%	7.79%	9.53%	10.93%	13.23%