



**The
CORPORATE
LIFECYCLE**

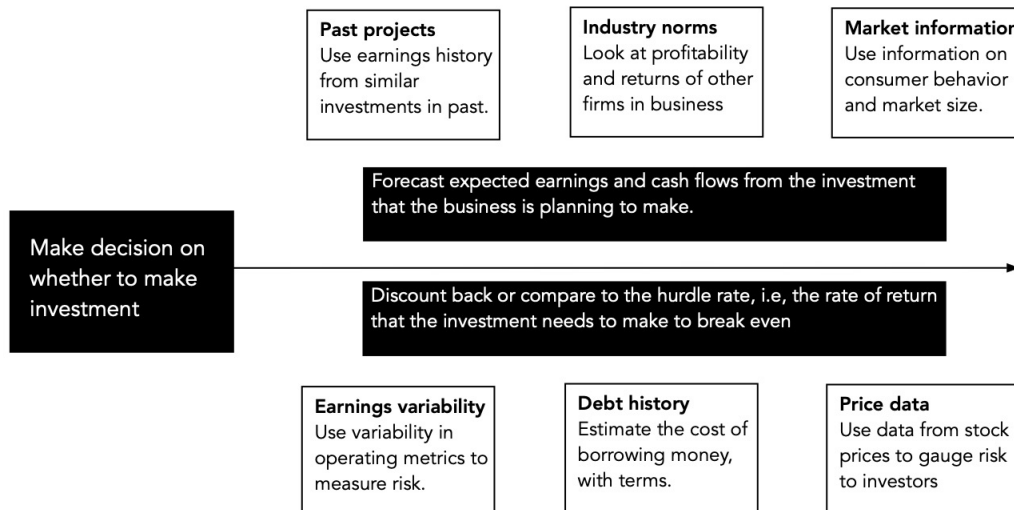
**BUSINESS,
INVESTMENT, AND
MANAGEMENT
IMPLICATIONS**

**ASWATH
DAMODARAN**

**THE INVESTING
DECISION ACROSS
THE LIFE CYCLE**

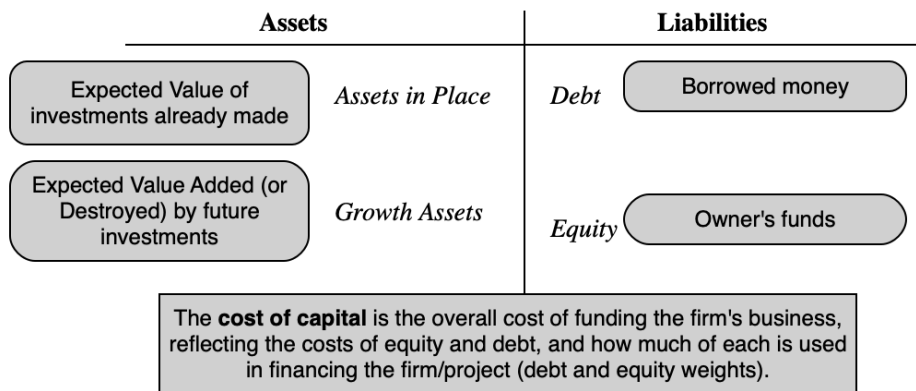
Aswath Damodaran





THE INVESTMENT PROCESS





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.

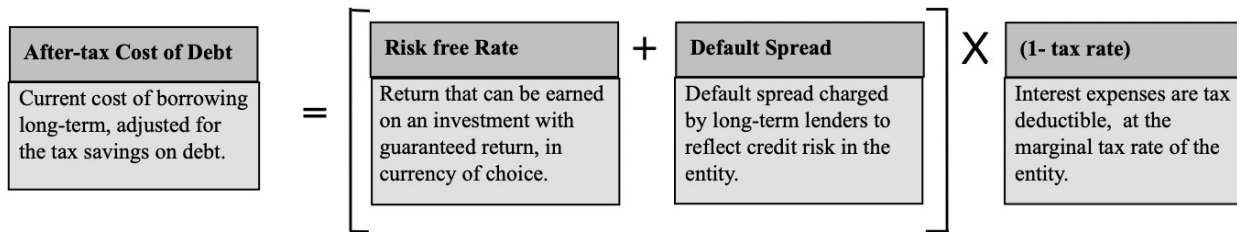
The **cost of equity** is the rate of return that equity investors demand on their investments, given their perception of the risk in the equity.

THE HURDLE RATE: COST OF CAPITAL

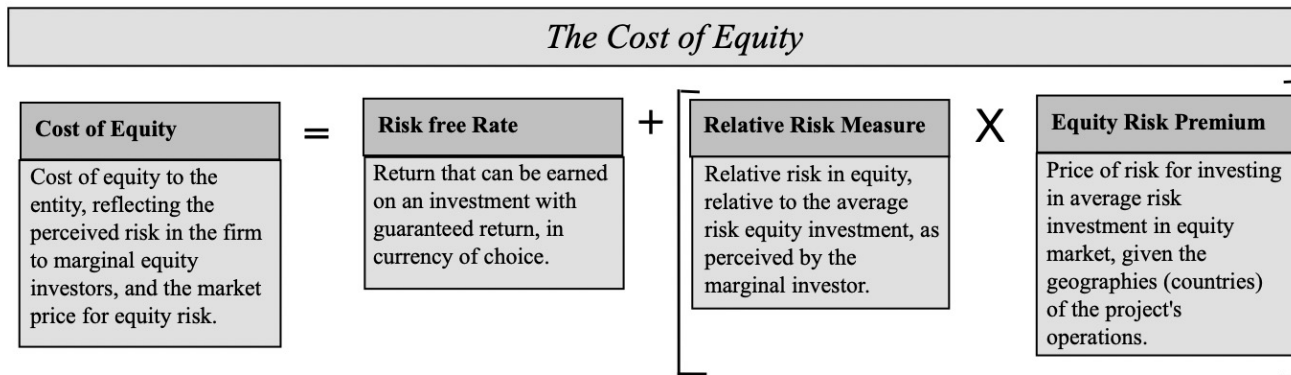


THE COST OF DEBT

The Cost of Borrowing (Debt): Pre and Post Tax



THE COST OF EQUITY



INPUTS TO COST OF CAPITAL: 1. RISKFREE RATE

Figure 6.4: Riskfree Rates, by Currency, in July 2022

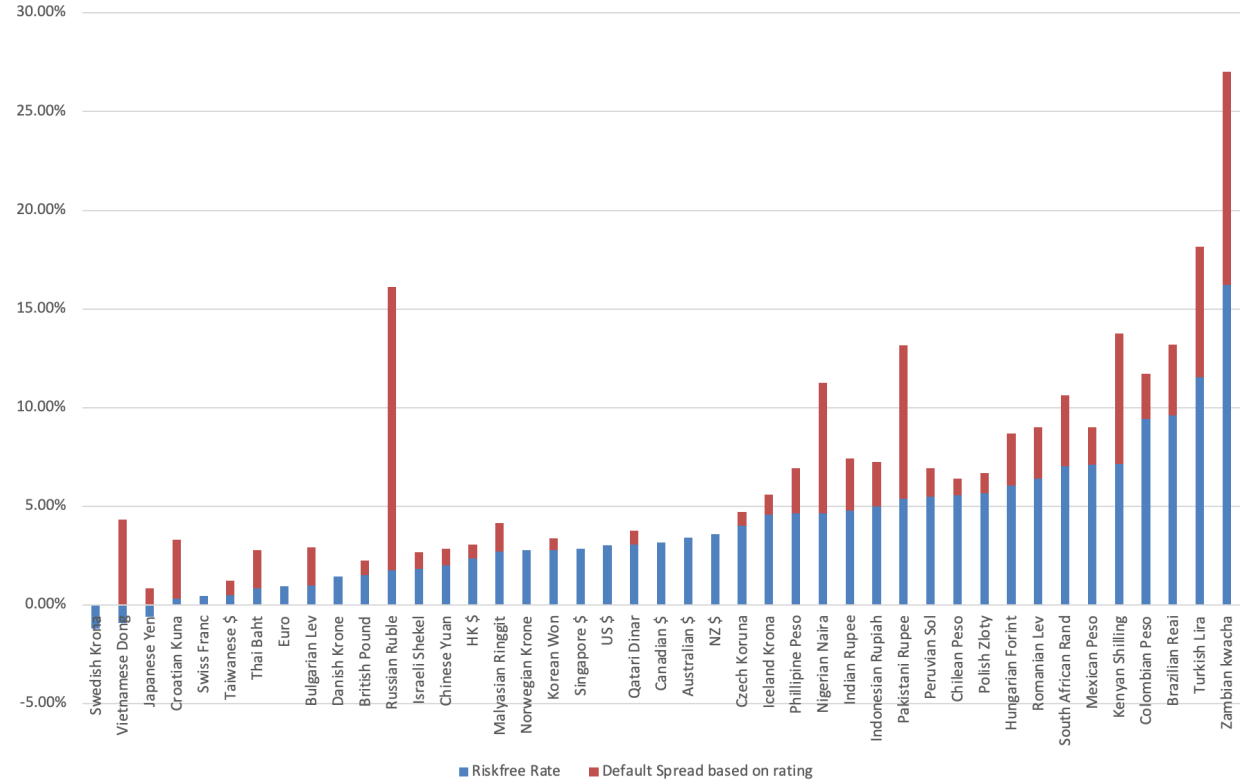
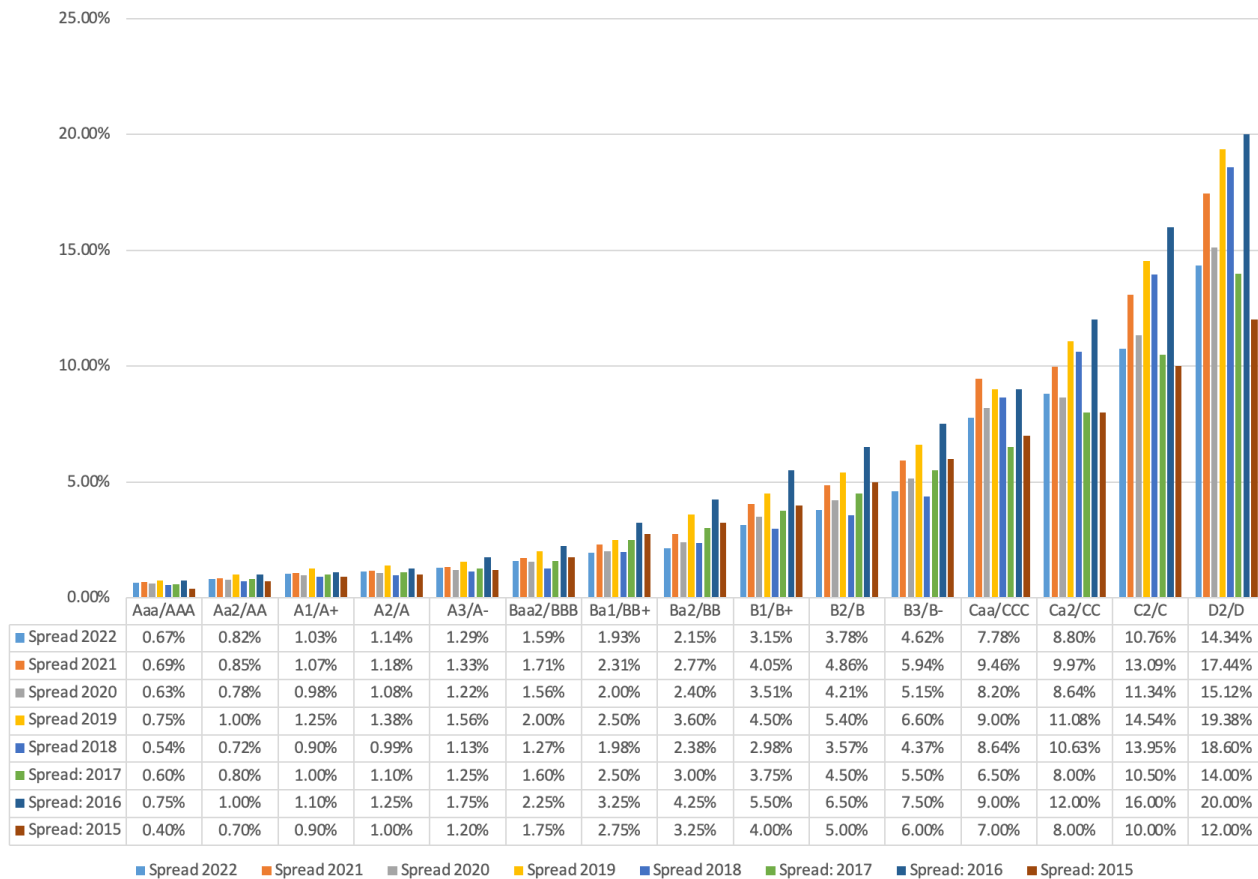
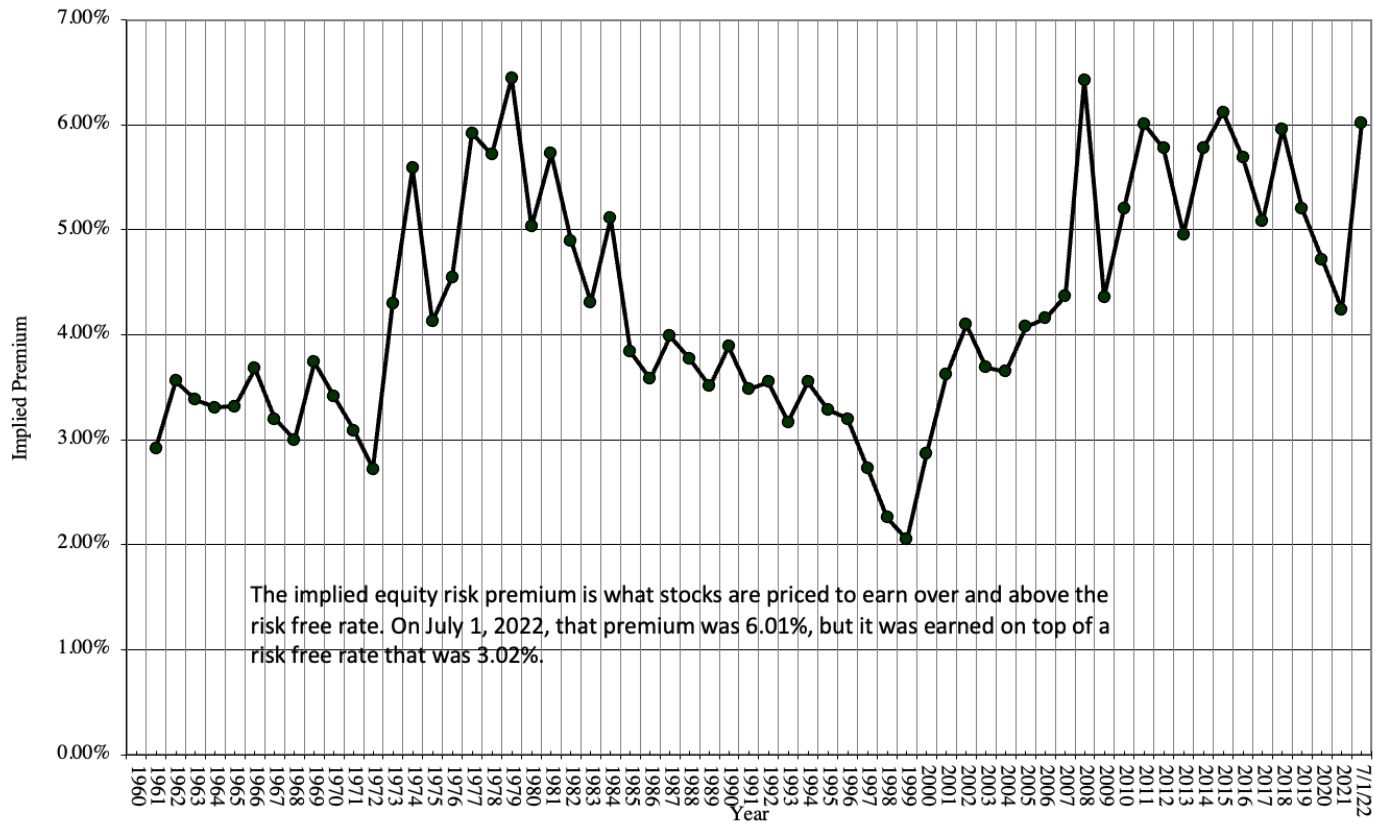


Figure 6.5: Corporate Bond Default Spreads from 2015- 2022



2. DEFAULT SPREADS





3. EQUITY RISK PREMIUM



AND BY COUNTRY, IN 2022

ERP : July 2022

Andorra (Principality of)	Baa2	2.66%	8.67%	Italy	Baa3	3.07%	9.08%
Austria	Aa1	0.56%	6.57%	Jersey (States of)	Aaa	0.00%	6.01%
Belgium	Aa3	0.84%	6.85%	Liechtenstein	Aaa	0.00%	6.01%
Cyprus	Ba1	3.50%	9.51%	Luxembourg	Aaa	0.00%	6.01%
Denmark	Aaa	0.00%	6.01%	Malta	A2	1.18%	7.19%
Finland	Aa1	0.56%	6.57%	Netherlands	Aaa	0.00%	6.01%
France	Aa2	0.69%	6.70%	Norway	Aaa	0.00%	6.01%
Germany	Aaa	0.00%	6.01%	Portugal	Baa2	2.66%	8.67%
Greece	Ba3	5.03%	11.04%	Spain	Baa1	2.23%	8.24%
Guernsey (States of)	Aaa	0.00%	6.01%	Sweden	Aaa	0.00%	6.01%
Iceland	A2	1.18%	7.19%	Switzerland	Aaa	0.00%	6.01%
Ireland	A1	0.99%	7.00%	Turkey	B2	7.69%	13.70%
Isle of Man	Aa3	0.84%	6.85%	United Kingdom	Aa3	0.84%	6.85%
				W. Europe		1.16%	7.17%

EU		1.06%	7.07%
Euro Zone		1.07%	7.08%

Canada	Aaa	0.00%	6.01%
United States	Aaa	0.00%	6.01%
US & Canada		0.00%	6.01%

Caribbean		9.06%	15.07%
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Argentina	Ca	16.78%	22.79%
Belize	Caa3	13.98%	19.99%
Bolivia	B2	7.69%	13.70%
Brazil	Ba2	4.21%	10.22%
Chile	A1	0.99%	7.00%
Colombia	Baa2	2.66%	8.67%
Costa Rica	B2	7.69%	13.70%
Ecuador	Caa3	13.98%	19.99%
El Salvador	Caa3	13.98%	19.99%
Guatemala	Ba1	3.50%	9.51%
Honduras	B1	6.29%	12.30%
Mexico	Baa1	2.23%	8.24%
Nicaragua	B3	9.09%	15.10%
Panama	Baa2	2.66%	8.67%
Paraguay	Ba1	3.50%	9.51%
Peru	Baa1	2.23%	8.24%
Suriname	Caa3	13.98%	19.99%
Uruguay	Baa2	2.66%	8.67%
Venezuela	C	20.40%	26.41%
Latin America		5.20%	11.21%

Country	Rating	CRP	ERP
Angola	B3	9.09%	15.10%
Benin	B1	6.29%	12.30%
Botswana	A3	1.68%	7.69%
Burkina Faso	Caa1	10.48%	16.49%
Cameroon	B2	7.69%	13.70%
Cape Verde	B3	9.09%	15.10%
Congo (DR)	Caa1	10.48%	16.49%
Congo (Republic of)	Caa2	12.59%	18.60%
Côte d'Ivoire	Ba3	5.03%	11.04%
Egypt	B2	7.69%	13.70%
Ethiopia	Caa2	12.59%	18.60%
Gabon	Caa1	10.48%	16.49%
Ghana	Caa1	10.48%	16.49%
Kenya	B2	7.69%	13.70%
Mali	Caa2	12.59%	18.60%
Mauritius	Baa2	2.66%	8.67%
Morocco	Ba1	3.50%	9.51%
Mozambique	Caa2	12.59%	18.60%
Namibia	B1	6.29%	12.30%
Niger	B3	9.09%	15.10%
Nigeria	B2	7.69%	13.70%
Rwanda	B2	7.69%	13.70%
Senegal	Ba3	5.03%	11.04%
South Africa	Ba2	4.21%	10.22%
Swaziland	B3	9.09%	15.10%
Tanzania	B2	7.69%	13.70%
Togo	B3	9.09%	15.10%
Tunisia	Caa1	10.48%	16.49%
Uganda	B2	7.69%	13.70%
Zambia	Ca	16.78%	22.79%
Africa		7.36%	13.37%

Albania	B1	6.29%	12.30%
Armenia	Ba3	5.03%	11.04%
Azerbaijan	Ba2	4.21%	10.22%
Belarus	Ca	16.78%	22.79%
Bosnia and Herzegovina	B3	9.09%	15.10%
Bulgaria	Baa1	2.23%	8.24%
Croatia	Ba1	3.50%	9.51%
Czech Republic	Aa3	0.84%	6.85%
Estonia	A1	0.99%	7.00%
Georgia	Ba2	4.21%	10.22%
Hungary	Baa2	2.66%	8.67%
Kazakhstan	Baa2	2.66%	8.67%
Kyrgyzstan	B3	9.09%	15.10%
Latvia	A3	1.68%	7.69%
Lithuania	A2	1.18%	7.19%
Macedonia	Ba3	5.03%	11.04%
Moldova	B3	9.09%	15.10%
Montenegro	B1	6.29%	12.30%
Poland	A2	1.18%	7.19%
Romania	Baa3	3.07%	9.08%
Russia	Ca	16.78%	22.79%
Serbia	Ba2	4.21%	10.22%
Slovakia	A2	1.18%	7.19%
Slovenia	A3	1.68%	7.69%
Tajikistan	B3	9.09%	15.10%
Ukraine	Caa3	13.98%	19.99%
Uzbekistan	B1	6.29%	12.30%
E. Europe & Russia		8.85%	14.86%

Abu Dhabi	Aa2	0.69%	6.70%
Bahrain	B2	7.69%	13.70%
Iraq	Caa1	10.48%	16.49%
Israel	A1	0.99%	7.00%
Jordan	B1	6.29%	12.30%
Kuwait	A1	0.99%	7.00%
Lebanon	C	20.40%	26.41%
Oman	Ba3	5.03%	11.04%
Qatar	Aa3	0.84%	6.85%
Ras Al Khaimah (Emirate of)	A1	0.99%	7.00%
Saudi Arabia	A1	0.99%	7.00%
Sharjah	Baa3	3.07%	9.08%
United Arab Emirates	Aa2	0.69%	6.70%
Middle East		2.02%	8.03%

Country	PRS	CRP	ERP
Algeria	66.75	6.29%	12.30%
Brunei	79.25	1.18%	7.19%
Gambia	66.25	6.29%	12.30%
Guinea	58	12.59%	18.60%
Guinea-Bissau	63.5	9.09%	15.10%
Guyana	75.75	2.23%	8.24%
Haiti	56	13.98%	19.99%
Iran	66.25	6.29%	12.30%
Korea, D.P.R.	51.25	16.78%	22.79%
Liberia	58.25	12.59%	18.60%
Libya	71	4.21%	10.22%
Madagascar	63.25	9.09%	15.10%
Malawi	56.75	13.98%	19.99%
Myanmar	57.75	12.59%	18.60%
Sierra Leone	54.75	16.78%	22.79%
Somalia	52	16.78%	22.79%
Sudan	47	20.40%	26.41%
Syria	45.25	20.40%	26.41%
Yemen, Republic	48.25	20.40%	26.41%
Zimbabwe	60.75	10.48%	16.49%

Bangladesh	Ba3	5.03%	11.04%
Cambodia	B2	7.69%	13.70%
China	A1	0.99%	7.00%
Fiji	B1	6.29%	12.30%
Hong Kong	Aa3	0.84%	6.85%
India	Baa3	3.07%	9.08%
Indonesia	Baa2	2.66%	8.67%
Japan	A1	0.99%	7.00%
Korea	Aa2	0.69%	6.70%
Laos	Caa3	13.98%	19.99%
Macao	Aa3	0.84%	6.85%
Malaysia	A3	1.68%	7.69%
Maldives	Caa1	10.48%	16.49%
Mongolia	B3	9.09%	15.10%
Pakistan	B3	9.09%	15.10%
Papua New Guinea	B2	7.69%	13.70%
Philippines	Baa2	2.66%	8.67%
Singapore	Aaa	0.00%	6.01%
Solomon Islands	Caa1	10.48%	16.49%
Sri Lanka	Ca	16.78%	22.79%
Taiwan	Aa3	0.84%	6.85%
Thailand	Baa1	2.23%	8.24%
Vietnam	Ba3	5.03%	11.04%
Asia		1.56%	7.57%

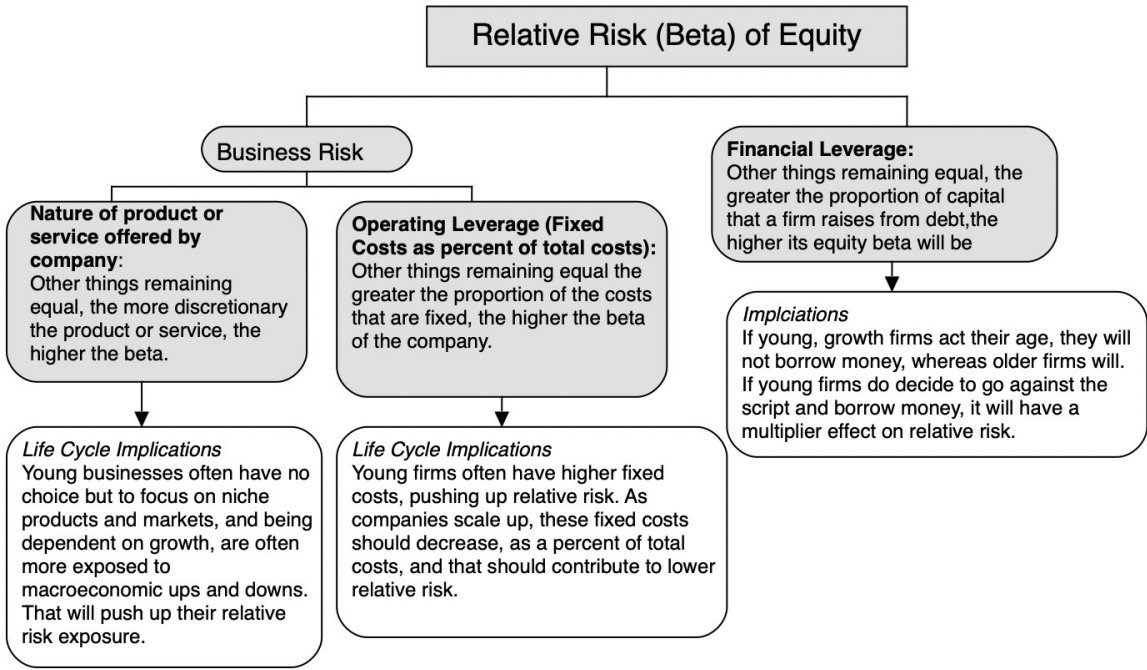
Australia	Aaa	0.00%	6.01%
Cook Islands	Caa1	10.48%	16.49%
New Zealand	Aaa	0.00%	6.01%
Aus & NZ		0.00%	6.01%

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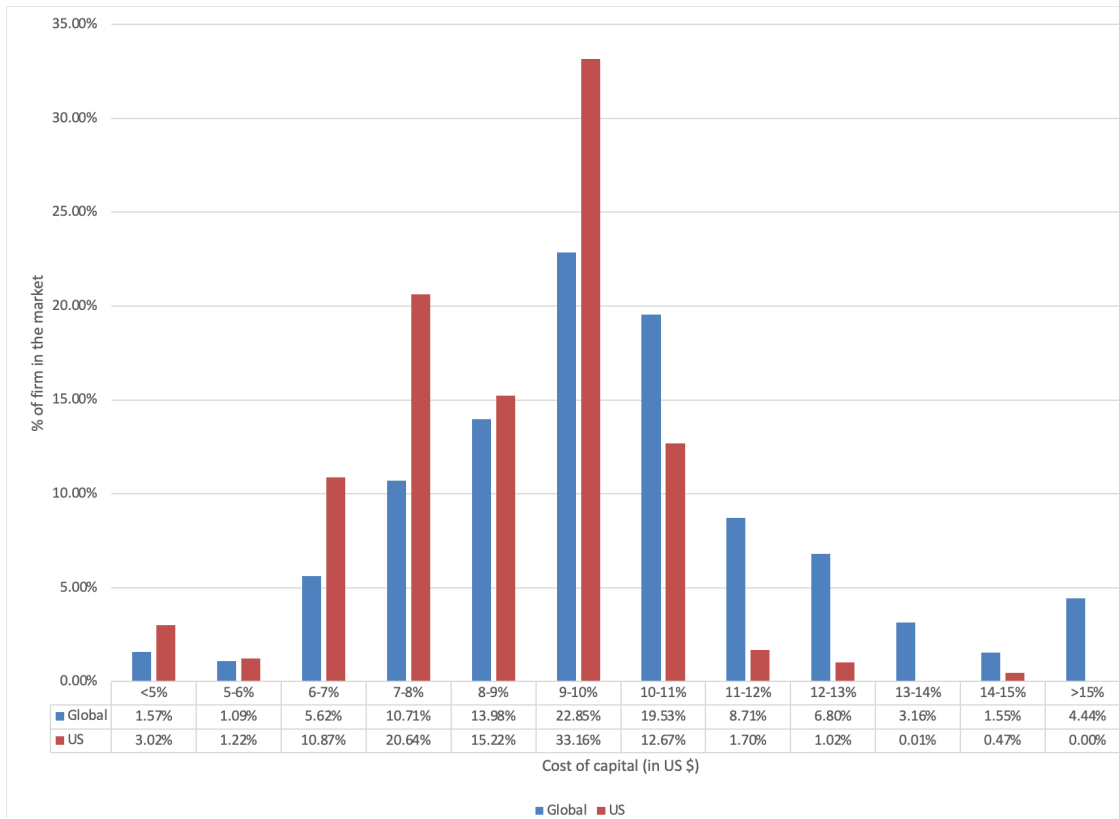
Blue: Moody's Rating
Red: Added Country Risk
Green #: Total ERP



4. RELATIVE RISK (BETA)



COST OF CAPITAL — DISTRIBUTION (ALL FIRMS)



		<i>Cost of Capital in US \$</i>		
<i>Age Decile</i>	<i>Average Age</i>	<i>Lowest Quartile</i>	<i>Median</i>	<i>Highest Quartile</i>
Youngest	5.04	8.73%	9.27%	9.64%
2nd decile	9.43	8.58%	9.20%	9.64%
3rd decile	13.58	8.19%	9.19%	9.77%
4th decile	18.12	8.13%	9.15%	9.78%
5th decile	23.49	7.64%	9.12%	9.81%
6th decile	29.49	8.10%	9.15%	9.70%
7th decile	38.19	7.81%	9.05%	9.68%
8th decile	52.48	7.53%	8.94%	9.67%
9th decile	86.88	6.91%	8.59%	9.24%
Top decile	140.22	6.66%	7.03%	8.88%

**AND BY AGE
DECILE...**

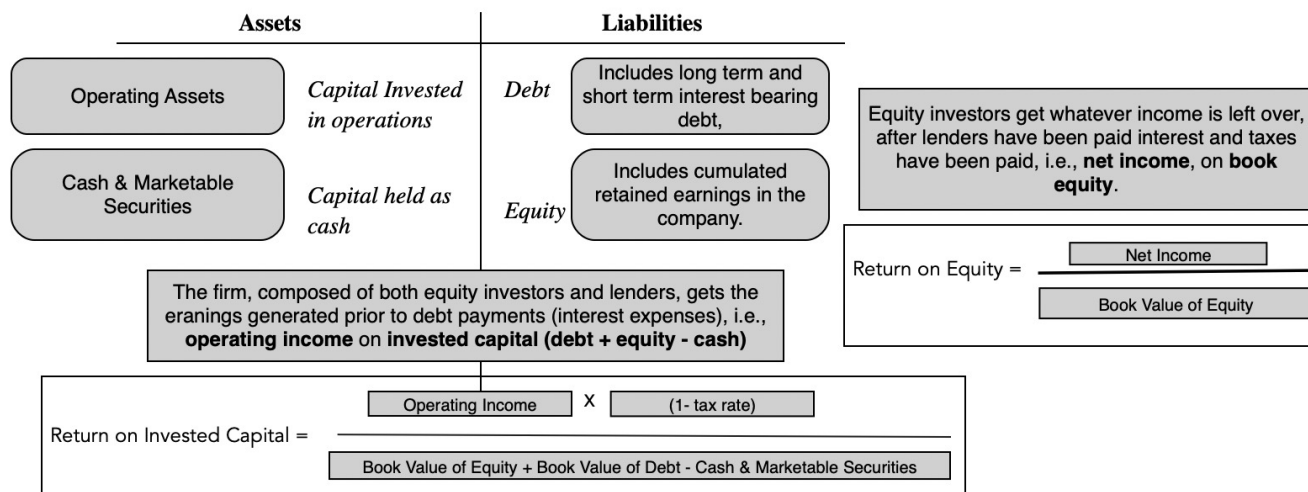


EXTENDING TO PRIVATE BUSINESSES (TOTAL RISK)

<i>Age Decile</i>	<i>Number of firms</i>	<i>Correlation with market</i>	<i>Total Cost of Capital</i>		
			<i>First Quartile</i>	<i>Median</i>	<i>Third Quartile</i>
Youngest	483	28.31%	20.86%	25.31%	28.73%
2nd decile	674	28.61%	20.64%	25.25%	27.96%
3rd decile	442	29.11%	19.52%	24.15%	27.75%
4th decile	731	29.11%	19.39%	24.01%	27.59%
5th decile	611	29.11%	17.85%	23.92%	27.45%
6th decile	560	29.28%	18.02%	23.33%	26.93%
7th decile	592	29.60%	17.84%	22.25%	26.36%
8th decile	621	30.97%	16.89%	20.63%	24.43%
9th decile	584	31.77%	12.70%	20.08%	23.01%
Oldest	595	33.52%	12.02%	12.70%	21.10%



INVESTMENT DECISION RULES: 1. ACCOUNTING RETURNS



ACCOUNTING RETURNS – BY AGE DECILE

<i>Age Decile</i>	<i>Average Age</i>	<i>Return on Capital</i>			<i>Return on Equity</i>		
		<i>Median</i>	<i>Aggregate</i>	<i>% Negative</i>	<i>Median</i>	<i>Aggregate</i>	<i>% Negative</i>
Youngest	5.04	-74.99%	7.28%	47.41%	-15.50%	0.43%	73.91%
2nd decile	9.43	-57.06%	4.14%	43.92%	-15.96%	-4.21%	67.66%
3rd decile	13.58	-27.77%	-5.18%	42.08%	-9.40%	-8.74%	57.01%
4th decile	18.12	-7.40%	11.84%	36.94%	-4.84%	12.42%	51.03%
5th decile	23.49	0.10%	13.64%	28.81%	5.79%	18.23%	37.48%
6th decile	29.49	4.65%	11.38%	27.14%	6.83%	22.74%	34.11%
7th decile	38.19	6.26%	17.81%	24.32%	9.90%	18.64%	28.72%
8th decile	52.48	9.30%	10.24%	19.32%	12.65%	31.45%	19.16%
9th decile	86.88	10.22%	4.72%	18.15%	12.66%	22.04%	16.95%
Top decile	140.22	5.18%	7.83%	22.69%	11.84%	15.10%	8.57%



- The **net present value of a project** is the sum of the present values of the expected cash flows on the project, over its lifetime, discounted back at the hurdle rate, i.e., the cost of equity or capital. If the NPV is greater (less) than zero, the project is generating a return that exceeds (trails) its hurdle rate and is a good (bad) project.
- The **internal rate of return** is the discount rate that makes the aggregated present value of all cash flows on the project equal to zero. That internal rate of return can be compared to the hurdle rate for the project, and if it exceeds (falls below) the hurdle rate, the project is a good project

INVESTMENT DECISION RULES: 2. DISCOUNTED CASHFLOW APPROACHES

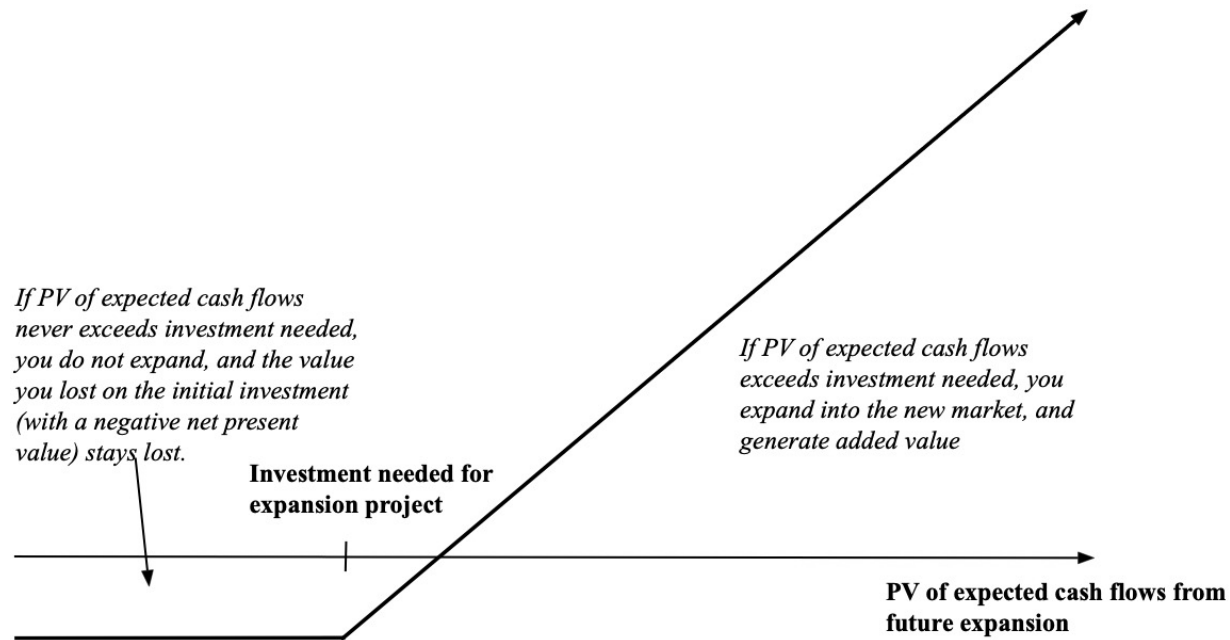


- **Percent versus Absolute Value:** The first difference is that the NPV for a project is an absolute value, i.e., with expected dollar cash flows, the NPV will be a dollar value, biasing it towards investments that require more capital. The internal rate of return, as a percentage value, is likely to skew towards projects that require less capital, yielding rankings that diverge from the NPV rule.
- **Unique versus Multiple Values:** There can be only one net present value for a project, but if a project has cash flows that change sign more than once, going from negative to positive and then back to negative, over time, there can be more than one internal rate of return for the project.
- **Reinvestment of intermediate cash flows:** The NPV rule assumes that these intermediate cash flows are reinvested at the hurdle rate, a safe assumption if these hurdle rates represent what investors can earn in the market right now on investments of equivalent risk. The IRR rule assumes that intermediate cash flows get reinvested at the computed IRR for the project, an implicit assumption that the business will continue to have new projects very similar in quality and returns to the one that is being assessed, in the future.

NPV VS IRR



INVESTMENT DECISION RULES: 3. REAL OPTIONS



- Real options are notoriously difficult to value, since the option pricing models that we use to value listed options do not adapt well to valuing project options, where the underlying asset is not traded, the options are long term and early exercise is more the rule than the exception.
- However, recognizing that there is a real option embedded in a project can yield valuable insights and alter decision making. Thus, even without attaching a value to the option, we know that option to expand have the most value, when the market you plan to expand into is a big one and when you are most uncertain about its size, and whether you will be able to enter it.
- While businesses across the life cycle can and often do make real options arguments for investing in projects that don't pass financial muster (NPV is less than zero or return on capital is less than the cost of capital), you can see the appeal to young firms, especially those entering large markets, since they often face the most uncertainty about the future.

REAL OPTIONS IN PRACTICE



INVESTMENT DECISION RULES ACROSS THE LIFE CYCLE!

