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Country Risk – Cost of Equity Measurement: Methodologies and Implications

Table A3: Case Study Parameters and Results

		BRAZIL			RUSSIA			INDIA			CHINA		
		Itau Uni-banco	Petróleo Brasi-leiro	Vale	Gaz-prom	Sber-bank	Norilsk Nickel	HDFC Bank	Reliance Indus-tries	Coal India	Petro-China	Ind. & Comm. Bank of China	China Shen-hua Energy
(1)	**International CAPM**												
	Global risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. global index	1.21	1.88	1.79	0.98	1.30	0.83	0.97	0.85	0.89	1.43	1.07	1.26
	Global market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Cost of equity	10.31%	14.49%	13.92%	8.84%	10.85%	7.94%	8.81%	8.09%	8.30%	11.68%	9.44%	10.61%
(2)	**International CAPM (US proxy)**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. U.S. index	1.08	1.67	1.56	0.93	1.23	0.71	0.88	0.81	0.83	1.32	0.92	1.14
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Cost of equity	9.51%	13.21%	12.53%	8.54%	10.44%	7.21%	8.23%	7.78%	7.93%	10.98%	8.48%	9.88%
(3)	**International CAPM (Ibbotson)**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Country beta vs. global index	1.13	1.13	1.13	0.90	0.90	0.90	0.84	0.84	0.84	0.79	0.79	0.79
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	U.S. country beta vs. global index	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
	Cost of equity	9.93%	9.93%	9.93%	8.47%	8.47%	8.47%	8.09%	8.09%	8.09%	7.80%	7.80%	7.80%
(4)	**Modified International CAPM (Sabal)**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Weighted project beta	0.77	1.46	1.58	1.21	0.64	1.31	0.59	1.10	1.19	1.09	0.58	1.18
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Cost of equity	7.59%	11.86%	12.62%	10.31%	6.77%	10.95%	6.41%	9.63%	10.21%	9.57%	6.37%	10.14%
(5)	**Local CAPM**												
	Local risk free rate	12.80%	12.80%	12.80%	8.83%	8.83%	8.83%	7.75%	7.75%	7.75%	3.67%	3.67%	3.67%
	Beta vs. local index	1.20	1.68	1.29	1.05	1.16	1.06	1.17	0.98	0.84	1.23	1.16	1.22
	Local market risk premium	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	8.00%	8.00%	8.00%	7.00%	7.00%	7.00%
	Cost of equity	21.19%	24.57%	21.85%	16.16%	16.94%	16.22%	17.12%	15.61%	14.44%	12.28%	11.81%	12.22%
(6)	**Bekaert and Harvey Mixture Model**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Level of integration	0.46	0.46	0.46	0.33	0.33	0.33	0.57	0.57	0.57	0.28	0.28	0.28
	Beta vs. local index	1.20	1.68	1.29	1.05	1.16	1.06	1.17	0.98	0.84	1.23	1.16	1.22
	Local market risk premium	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	8.00%	8.00%	8.00%	7.00%	7.00%	7.00%
	Beta vs. global index	1.21	1.88	1.79	0.98	1.30	0.83	0.97	0.85	0.89	1.43	1.07	1.26
	Global market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Cost of equity	10.75%	14.50%	12.78%	9.67%	10.85%	9.42%	10.23%	9.17%	8.79%	11.45%	10.48%	11.10%
(7)	**Erb-Harvey-Viskanta**												
	Cost of equity	15.81%	15.81%	15.81%	16.34%	16.34%	16.34%	17.88%	17.88%	17.88%	13.36%	13.36%	13.36%

		BRAZIL			RUSSIA			INDIA			CHINA		
		Itau Uni-banco	Petróleo Brasi-leiro	Vale	Gaz-prom	Sber-bank	Norilsk Nickel	HDFC Bank	Reliance Indus-tries	Coal India	Petro-China	Ind. & Comm. Bank of China	China Shen-hua Energy
(8)	**Globally nested CAPM**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Country beta vs. global index	1.13	1.13	1.13	0.90	0.90	0.90	0.84	0.84	0.84	0.79	0.79	0.79
	Global market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Country beta vs. regional risk	0.93	0.93	0.93	0.70	0.70	0.70	0.80	0.80	0.80	0.84	0.84	0.84
	Regional risk	3.29%	3.29%	3.29%	2.71%	2.71%	2.71%	1.11%	1.11%	1.11%	1.11%	1.11%	1.11%
	Cost of equity	12.85%	12.85%	12.85%	10.27%	10.27%	10.27%	8.89%	8.89%	8.89%	8.64%	8.64%	8.64%
(9a)	**Damodaran No. 1 (Default Spread)**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. U.S. index	1.08	1.67	1.56	0.93	1.23	0.71	0.88	0.81	0.83	1.32	0.92	1.14
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Yield Spread (Rating Induced)	5.19%	5.19%	5.19%	3.09%	3.09%	3.09%	1.72%	1.72%	1.72%	1.23%	1.23%	1.23%
	Cost of equity	14.70%	18.40%	17.72%	11.63%	13.53%	10.30%	9.95%	9.50%	9.65%	12.21%	9.71%	11.11%
(9b)	**Damodaran No. 2 (Relative Equity Volatility)**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. U.S. index	1.08	1.67	1.56	0.93	1.23	0.71	0.88	0.81	0.83	1.32	0.92	1.14
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Yield Spread (Rating Induced)	5.19%	5.19%	5.19%	3.09%	3.09%	3.09%	1.72%	1.72%	1.72%	1.23%	1.23%	1.23%
	Rel Volatility factor (EQ vs. Bond)	1.86	1.86	1.86	0.52	0.52	0.52	4.04	4.04	4.04	1.59	1.59	1.59
	Cost of equity	19.16%	22.86%	22.17%	10.16%	12.06%	8.83%	15.17%	14.73%	14.87%	12.94%	10.43%	11.83%
(9c)	**Damodaran No. 3 (Relative Country Volatility)**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. U.S. index	1.08	1.67	1.56	0.93	1.23	0.71	0.88	0.81	0.83	1.32	0.92	1.14
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Rel Volatility factor (local vs. U.S.)	1.45	1.45	1.45	1.37	1.37	1.37	0.92	0.92	0.92	1.16	1.16	1.16
	Cost of equity	12.57%	17.95%	16.95%	10.69%	13.30%	8.86%	7.79%	7.38%	7.51%	12.32%	9.41%	11.04%
(10)	**Adjusted Local CAPM (Pereiro)**												
	Global risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Sov. bond yield local (USD)	6.75%	6.75%	6.75%	4.85%	4.85%	4.85%	2.28%	2.28%	2.28%	2.78%	2.78%	2.78%
	Sov. bond yield U.S. (USD)	2.57%	2.57%	2.57%	1.74%	1.74%	1.74%	0.00%	0.00%	0.00%	1.74%	1.74%	1.74%
	Beta vs. local index	1.20	1.68	1.29	1.05	1.16	1.06	1.17	0.98	0.84	1.23	1.16	1.22
	Local market risk premium	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	8.00%	8.00%	8.00%	7.00%	7.00%	7.00%
	R2x (local)	0.3417	0.4599	0.6355	0.0650	0.4861	0.2464	0.0000	0.0000	0.0000	0.0442	0.0635	0.2136
	Cost of equity	12.45%	13.28%	10.23%	12.71%	10.02%	11.43%	n/a	n/a	n/a	12.02%	11.40%	10.51%
(11)	**Horn Approach**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. U.S. index	1.08	1.67	1.56	0.93	1.23	0.71	0.88	0.81	0.83	1.32	0.92	1.14
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Yield Spread (Rating Induced)	2.46%	2.46%	2.46%	1.95%	1.95%	1.95%	1.54%	1.54%	1.54%	0.25%	0.25%	0.25%
	Cost of equity	11.97%	15.67%	14.99%	10.49%	12.39%	9.16%	9.77%	9.32%	9.47%	11.23%	8.73%	10.13%
(12)	**Salomon-Smith-Barney Approach**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. global index	1.21	1.88	1.79	0.98	1.30	0.83	0.97	0.85	0.89	1.43	1.07	1.26
	Global market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Sov. bond yield local (USD)	6.75%	6.75%	6.75%	4.85%	4.85%	4.85%	2.28%	2.28%	2.28%	2.78%	2.78%	2.78%
	Sov. bond yield U.S. (USD)	2.57%	2.57%	2.57%	1.74%	1.74%	1.74%	0.00%	0.00%	0.00%	1.74%	1.74%	1.74%
	Gamma 1	0	0	0	0	0	0	0	0	0	0	0	0
	Gamma 2	8	6	6	6	8	6	8	6	6	6	8	6
	Gamma 3	5	5	5	5	5	5	5	5	5	5	5	5
	Cost of equity	12.12%	16.02%	15.45%	9.98%	12.20%	9.08%	9.79%	8.92%	9.14%	12.05%	9.89%	10.99%
	Cost of equity (low): Gammas = 0	10.31%	14.49%	13.92%	8.84%	10.85%	7.94%	8.81%	8.09%	8.30%	11.68%	9.44%	10.61%
	Cost of equity (high): Gammas = 10	14.49%	18.67%	18.10%	11.95%	13.96%	11.05%	11.09%	10.37%	10.58%	12.71%	10.48%	11.64%

		BRAZIL			RUSSIA			INDIA			CHINA		
		Itau Unibanco	Petróleo Brasileiro	Vale	Gazprom	Sberbank	Norilsk Nickel	HDFC Bank	Reliance Industries	Coal India	PetroChina	Ind. & Comm. Bank of China	China Shenhua Energy
(13)	**Lessard Approach**												
	U.S. risk fre rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Beta vs. U.S. index	1.08	1.67	1.56	0.93	1.23	0.71	0.88	0.81	0.83	1.32	0.92	1.14
	Country beta vs. U.S. index	1.02	1.02	1.02	0.85	0.85	0.85	0.77	0.77	0.77	0.76	0.76	0.76
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Cost of equity	9.64%	13.41%	12.71%	7.65%	9.25%	6.52%	6.97%	6.62%	6.73%	9.03%	7.12%	8.19%
(14)	**Adjusted Hybrid CAPM (Pereiro)**												
	Global risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Sov. bond yield local (USD)	6.75%	6.75%	6.75%	4.85%	4.85%	4.85%	2.28%	2.28%	2.28%	2.78%	2.78%	2.78%
	Sov. bond yield U.S. (USD)	2.57%	2.57%	2.57%	1.74%	1.74%	1.74%	0.00%	0.00%	0.00%	1.74%	1.74%	1.74%
	Country beta vs. global index	1.13	1.13	1.13	0.90	0.90	0.90	0.84	0.84	0.84	0.79	0.79	0.79
	Beta vs. global index	1.21	1.88	1.79	0.98	1.30	0.83	0.97	0.85	0.89	1.43	1.07	1.26
	Global market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	R2x (hybrid)	0.2669	0.2669	0.2669	0.4545	0.4545	0.4545	0.0000	0.0000	0.0000	0.1258	0.1258	0.1258
	Cost of equity	13.18%	16.64%	16.17%	8.85%	9.83%	8.40%	n/a	n/a	n/a	9.98%	8.43%	9.24%
(15)	**Relative Standard Deviation Model (Ibbotson)**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Rel Volatility factor (local vs. U.S.)	1.89	1.89	1.89	1.30	1.30	1.30	1.04	1.04	1.04	2.29	2.29	2.29
	Cost of equity	14.59%	14.59%	14.59%	10.90%	10.90%	10.90%	9.22%	9.22%	9.22%	17.03%	17.03%	17.03%
(16)	**Downside CAPM**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Downside beta vs. global index	1.31	2.32	1.88	0.89	1.31	0.78	0.96	0.95	0.89	1.37	1.11	1.31
	Global market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Cost of equity	10.94%	17.25%	14.50%	8.31%	10.94%	7.63%	8.75%	8.69%	8.31%	11.29%	9.67%	10.97%
(17)	**CSFB Approach**												
	Stripped yield of a Brady bond	6.75%	6.75%	6.75%	4.85%	4.85%	4.85%	2.28%	2.28%	2.28%	2.78%	2.78%	2.78%
	Beta vs. local index	1.20	1.68	1.29	1.05	1.16	1.06	1.17	0.98	0.84	1.23	1.16	1.22
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Volatility of local EQ market	28.13%	28.13%	28.13%	19.34%	19.34%	19.34%	15.37%	15.37%	15.37%	33.92%	33.92%	33.92%
	Volatility of U.S. EQ market	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%
	Mean of local EQ market	0.03%	0.03%	0.03%	0.28%	0.28%	0.28%	0.09%	0.09%	0.09%	0.46%	0.46%	0.46%
	Mean of U.S. EQ market	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
	Local coef. of variation*	888.69	888.69	888.69	70.02	70.02	70.02	164.23	164.23	164.23	73.61	73.61	73.61
	U.S. coef. of variation	194.87	194.87	194.87	194.87	194.87	194.87	194.87	194.87	194.87	194.87	194.87	194.87
	Ai	4.56	4.56	4.56	0.36	0.36	0.36	0.84	0.84	0.84	0.38	0.38	0.38
	Cost of equity	27.23%	35.49%	28.86%	6.26%	6.41%	6.28%	5.98%	5.39%	4.92%	4.52%	4.43%	4.51%
(18)	**Godfrey-Espinosa Approach**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Sov. bond yield local (USD)	6.75%	6.75%	6.75%	4.85%	4.85%	4.85%	2.28%	2.28%	2.28%	2.78%	2.78%	2.78%
	Sov. bond yield U.S. (USD)	2.57%	2.57%	2.57%	1.74%	1.74%	1.74%	0.00%	0.00%	0.00%	1.74%	1.74%	1.74%
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Rel Volatility factor (local vs. U.S.)	1.89	1.89	1.89	1.30	1.30	1.30	1.04	1.04	1.04	2.29	2.29	2.29
	Cost of equity	14.03%	14.03%	14.03%	10.75%	10.75%	10.75%	8.91%	8.91%	8.91%	12.36%	12.36%	12.36%
(19)	**Goldman-Sachs Approach**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Sov. bond yield local (USD)	6.75%	6.75%	6.75%	4.85%	4.85%	4.85%	2.28%	2.28%	2.28%	2.78%	2.78%	2.78%
	Sov. bond yield U.S. (USD)	2.57%	2.57%	2.57%	1.74%	1.74%	1.74%	0.00%	0.00%	0.00%	1.74%	1.74%	1.74%
	U.S. market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Correlation EQ vs. sov. bond	0.66	0.66	0.66	0.75	0.75	0.75	0.18	0.18	0.18	-0.05	-0.05	-0.05
	Rel Volatility factor (local vs. U.S.)	1.89	1.89	1.89	1.30	1.30	1.30	1.04	1.04	1.04	2.29	2.29	2.29
	Beta vs. local index	1.20	1.68	1.29	1.05	1.16	1.06	1.17	0.98	0.84	1.23	1.16	1.22
	Company specific factor	0	0	0	0	0	0	0	0	0	0	0	0
	Cost of equity	11.79%	13.75%	12.18%	7.98%	8.20%	8.00%	11.28%	10.27%	9.49%	22.24%	21.22%	22.10%

		BRAZIL			RUSSIA			INDIA			CHINA		
		Itau Unibanco	Petróleo Brasileiro	Vale	Gazprom	Sberbank	Norilsk Nickel	HDFC Bank	Reliance Industries	Coal India	PetroChina	Ind. & Comm. Bank of China	China Shenhua Energy
(20)	**J.P. Morgan Approach**												
	U.S. risk free rate	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
	Sov. bond yield local (USD)	6.75%	6.75%	6.75%	4.85%	4.85%	4.85%	2.28%	2.28%	2.28%	2.78%	2.78%	2.78%
	Sov. bond yield U.S. (USD)	2.57%	2.57%	2.57%	1.74%	1.74%	1.74%	0.00%	0.00%	0.00%	1.74%	1.74%	1.74%
	Global market risk premium	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
	Rel Volatility factor (local vs. global)	1.90	1.90	1.90	1.31	1.31	1.31	1.04	1.04	1.04	2.29	2.29	2.29
	Beta vs. local index	1.20	1.68	1.29	1.05	1.16	1.06	1.17	0.98	0.84	1.23	1.16	1.22
	Cost of equity	11.02%	12.67%	11.34%	8.07%	8.30%	8.09%	7.22%	6.87%	6.59%	13.77%	13.22%	13.70%

The table contains the complete table with all case study parameters and results. All estimates are calculated from the perspective of a U.S. investor who has projected the companies' cash flows in USD. For all cost of equity calculations, the cutoff date is June 30, 2016. We select the MSCI World Index as a proxy for the world market. The S&P 500 serves as a proxy for the U.S. market, Bovespa serves as a proxy for the Brazilian market, Micex serves as a proxy for the Russian market, S&P CNX Nifty serves as a proxy for the Indian market, and Shanghai Shenzhen CSI 300 Index serves as a proxy for the Chinese market. All local market risk premiums are based on the Fernandez 2016 survey, the U.S. market risk premium is 6.25% per Damodaran, and the global market risk premium is approximated by the U.S. MRP. To calculate betas, we use two years of weekly returns. All stock market data are from Bloomberg.