Capital Budgeting

Moqi Groen-Xu

Capital budgeting

- A key task of managers is to undertake valuation exercises in order to allocate capital between mutually exclusive projects:

  →Is project A better than doing nothing?
  →Is project A better than project B?

- The process of valuation and ultimately of capital budgeting generally involves many factors, some formal, some not.
- We will focus on financial tools for valuation.
- These tools provide managers with numerical techniques to "keep score" and assist in the decision-making process.

Capital budgeting

- **Purpose**
  - Determine the acceptability of or priority ranking of potential projects (project selection)

Capital budgeting

- **Basic steps**
  - Identify the initial capital invested or put at risk
  - Estimate the cash flows to be derived from the project over time, including an estimate of the terminal or salvage value of the investment
  - Identify the appropriate discount rates for determining the present value of the expected cash flows
  - Apply traditional capital budgeting decision criteria such as net present value (NPV) and internal rate of return (IRR) to determine the acceptability of or priority ranking of potential projects

Capital budgeting

- Net present value (NPV) analysis

$$NPV = \sum_{t=0}^{T} [E(CF_t)/(1+r)^t]$$

Where

$E(CF)$: Expected Cash flows

r: Discount rate

and $CF_0 = \frac{E(CF_0)}{(1+r)^0} = -I_0$

is the initial investment.

Capital budgeting

- Net present value (NPV) analysis

$$NPV = \sum_{t=0}^{T} [E(CF_t)/(1+r)^t]$$

If NPV > 0, the project is acceptable.

Note: choose among competing foreign and domestic projects using a common standard

Cash flows

Useful Terminology

	Accounting Flows
	Revenues
-	Costs
=	EBITDA
-	Depreciation & Amortization
=	EBIT (Operating Profit)
-	Interest Expenses
=	Pre-tax income
-	Taxes
=	Net Income
-	Dividends
=	Addition to Retained Earnings

"Free" Cash Flows

$$FCF = EBIT^{*}(1-\tau_C) - CAPEX - \Delta(NWC) + Depreciation$$

- **Goal**: Use accounting information to extract actual flows.
- FCF is total amount of money available to all stakeholders.

FCF Components

- **ΔNWC (** Net Working Capital = Inventory + A/R - A/P **)**
  - Many projects need some capital to be tied up (working capital) which constitutes an opportunity cost.
  - We need the Change in Working Capital implied by the project.
- **What about cash ?**
  - Cash should only be considered as part of working capital if in the safe or in checking accounts receiving no interest, or if for some reason a project requires holding a certain amount of cash.
  - Otherwise it's "negative debt" ("excess cash") and part of the firm's financial and payout policies.

Incremental cash flows

- Sunk cost should **not** be included in the analysis.
- Sunk costs: Costs that have been incurred and cannot be reversed. Brealey & Myers, 2000, P. 1072.
- Sunk costs are like spilled milk: They are past and irreversible outflows. Because sunk costs are bygones, they cannot be affected by the decision to accept or reject the project, and so they should be ignored. Brealey & Myers, 2000, P. 123.

Opportunity costs

Cannibalization should be included: If building a manufacturing plant in Malaysia reduces sales from your Indonesian plant, then the reduction in sales from the Indonesian plant should be incorporated into the decision to invest in Malaysia. Lost sales from the Indonesian plant are an opportunity cost of opening the Malaysian plant.

Estimation Horizon & Terminal Value

- Cash-flows can only be reasonably estimated for a few periods (no more than 5-10 years).
- After T periods, we need to compute terminal value TV_T.
- Usual assumption is that it is based on a multiple or a perpetuity:

$$TV_T = \frac{(1+g)CF_T}{r-g}$$

  - CF_T: Final period cash-flow.
  - g: Terminal growth rate after period T
  - r: Discount rate depending on type of CF. (R_E, WACC or R_A)
- Firms usually go through a fast-growth stage and then become more stable.
- g for stable phase. Usually set to expected economic growth.

WACC

Step-by-step: WACC Method

1. Forecast FCFs of the unlevered firm.
2. Forecast the terminal value after the investment horizon.
3. $$WACC = r_D(1-t)\frac{D}{D+E} + r_E\frac{E}{D+E}$$
4. Discount CFs and terminal value using WACC.
   - Gives an estimate of the firm's total value.
   - Equity value = Total Value - MV(Debt).

Return on Debt: R_d

- Interest rate that lenders would charge to finance the stand-alone project with the chosen capital structure.
- Compute potential credit rating to derive interest rate
  - leverage
  - interest coverage
  - cash-flow risk
- Different layers of debt: use average interest rate
- Very risky debt: estimate expected cash flows with different probabilities (lenders charge an average rate across scenarios)

Cost of Equity Capital: r_E

- Cannot look it up directly.
- Need to estimate r_E from comparables to the project.
- Need an asset pricing model to get r_E.

Typical asset pricing model: CAPM

$$r_e = r_f + \beta_E * Market\ Risk\ Premium$$

Implications

- **Only market risk is "priced":**
  Expected returns are only earned as compensation for bearing market risk. All other idiosyncratic risk can be diversified away

- **Covariance (with the market) is everything:**
  $$\beta = \frac{cov(r_i, r_m)}{var(r_m)}$$
  so higher covariance with the market return ⇒ higher beta = higher risk ⇒ higher return.

The market risk premium

$$\left[E(r_{market}) - r_f\right]$$

- This is meant to be the expected return of the market portfolio (You just cannot use last year's market return).

- How do you get the **market risk premium**?
  - Historical averages
  - Past may not be representative of the future
  - Time-variation in the market premium
  - Numbers between 5%-6% are more commonly used these days.

The market portfolio

- If shareholders are globally diversified: use world market portfolio
- If shareholders are only locally diversified: use domestic portfolio
- In general an average of the two holds:

Steps of a practical approach:

1. Estimate world beta and expected return : $r_{EW} = r_f + b_w(r_w - r_f)$
2. Estimate local beta and expected return : $r_{EL} = r_f + b_l(r_l - r_f)$
3. Put everything in common currency terms
4. Add up the two components ➔

$$r_E = w\, r_{EW} + (1-w) r_{EL}$$

Weights, w, determined by shareholders.

Extended formula for currency risk

$$r_e = r_f + \beta_E * Market\ Risk\ Premium + \beta_C * Currency\ risk\ premium$$

– **Currency beta**
constructed using the covariance of the project with the currency net return

– **Currency risk premium**
Required to compensate investors for the additional risk associated with currency fluctuations

$$r_C - r_F = \frac{\text{Exchange Rate}_{\frac{\$}{C},t} - \text{Exchange Rate}_{\frac{\$}{C},t-1}}{\text{Exchange Rate}_{\frac{\$}{C},t-1}} - r_F$$

Benefits of Diversification

In case of segmented markets/investors, the cost of equity depends on the global portfolio composition of the company and its shareholders and on the relevance of the currency risk.

	shareholders are diversified	shareholders are NOT diversified
currency risk is diversified	no premium should be added to account for currency risk	the net benefit of diversifying abroad should reduce the required return
currency risk is NOT diversified	a premium should be added to account for currency risk	the effect is indeterminate, as the benefits coming from diversification abroad should be weighted against the additional exchange rate risk.

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Project Beta

Direct Approach: covariance between the past returns of the company in which you invest and the market portfolio.

Indirect Approach: product between:

- » the beta of a project comparable in the home country
- » the beta of the country you invest (i.e., the covariance between the market of your home country and the market of the local country, standardized by the variance of the market of the home country).

- Alternatively, you can use betas disaggregated by country/sector/industry.

➔ ***Rule of thumb: Availability of data.***

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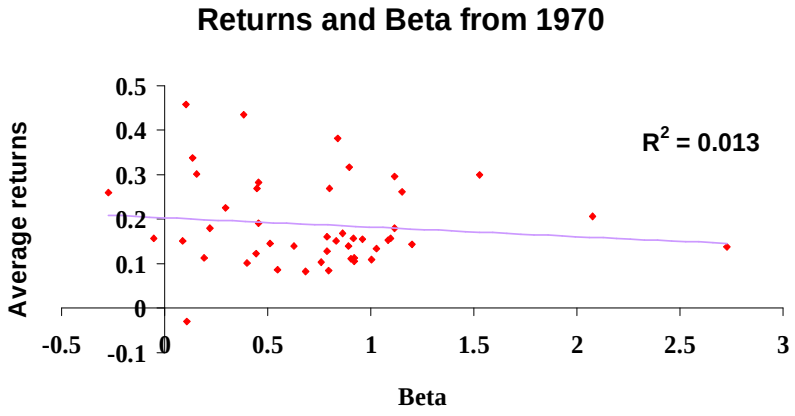
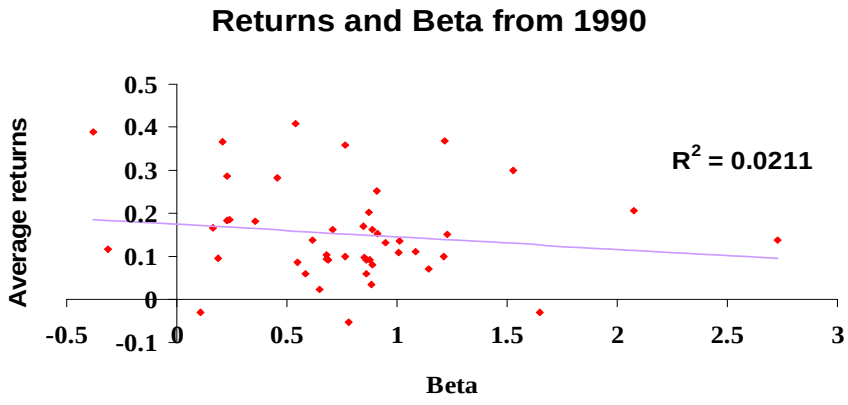
Beta


Returns and Beta from 1970
Average returns
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.5
0
0.5
1
1.5
2
2.5
3
Beta
R2 = 0.013

Beta


Returns and Beta from 1990
Average returns
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.5
0
0.5
1
1.5
2
2.5
3
Beta
R2 = 0.0211

Real or Nominal ?

- You may end up operating in countries with very big differences in inflation:

Hyper-Inflationary Environment	**Low to Moderate Inflation Environment**
Forecast "real" cash flows (exclude inflation)	Forecast "nominal" cash flows (include inflation)
Discount cash flows with the "real" discount rate	Discount cash flows with the "nominal" discount rate

Home or Foreign Currency?

2 Different Approaches:

Discounting foreign cash flows converted to home currency	**Discounting foreign cash flows with converted cost of capital**
Forecast **foreign-currency** cash flows,	Forecast **foreign-currency** cash flows
Convert cash flows to **home-currency** cash flows using **forecasted exchange rates**	Convert cost of capital to **foreign-currency** cost of capital using **forecasted exchange rates**
Discount them using the **home-currency** cost of capital	Discount the cash flows using the **foreign-currency** cost of capital
	Convert everything to the **home-currency** at the **spot exchange rate**

Home or Foreign Currency? Example

- Maple, a Canadian firm, wants to build a plant in Japan.
  - The plant costs Yen1.3m to build
  - The plant will produce cash flows of Yen200,000 for the next 7 years.
  - The Yen interest rate is 2.9%
  - The Canadian interest rate is 8.75%
  - The Spot rate (Yen/C$) is 83.86
  - The investment is risk free
- How should you calculate the NPV?

Home or Foreign Currency? Example

Year	1996	1997	1998	1999	2000	2001	2002	2003
Forward rate	83.86	79.35	75.08	71.04	67.22	63.61	60.18	56.95
Method I								
Cash flows (Yen)	-1300	200	200	200	200	200	200	200
Discount factor (Yen)	1.000	0.972	0.944	0.918	0.892	0.867	0.842	0.819
PV(Yen)	-1300.000	194.363	188.886	183.562	178.389	173.362	168.476	163.728
Method II								
Cash flows (C$)	-15.502	2.520	2.664	2.815	2.975	3.144	3.323	3.512
Discount factor (C$)	1.000	0.920	0.846	0.778	0.715	0.657	0.605	0.556
PV(C$)	-15.502	2.318	2.252	2.189	2.127	2.067	2.009	1.952

Method I: Present value = -C$ 590 = -Yen (590*83.86) = -Yen49,230

Method II: Present value = -Yen 49,230

Both methods yield the same result!

Risk

Risks for Foreign Investment

- Political risk
  - Firm-specific (micro risk):
    - Different foreign firms operating within the same country may have very different degrees of vulnerability to changes in host-country policy or regulations.
  - Country-specific risk (macro risks):
    - Transfer risk (blocked funds)
    - Cultural and institutional risks (corruption, protectionism)
  - Global-specific risk
    - Terrorism, environmental concerns
- Economic risk
  - Exchange rate risk
  - Financial risk

Country Risk Adjustment

How do we account for it? Either:

- **in the cash flows with scenario analysis**
- **in the discount factor**

Example:

- A project has $100 in perpetual cash flows
- If domestic, the discount rate would be 10% and Value= $100/0.10= $1,000.
- If the project is located abroad we can:
  - reflect the country risk in the discount rate, the rate rises to 20%
    Value = $100/0.20 = $500
  - reflect the country risk in the cash flows, the value is:
    Value = p*$0/0.10 + (1-p)*$100/0.10 = $500
    where p = probability of project being confiscated = 0.5.

Foreign complexities

- Use of host-government **subsidized loans** complicates both capital structure and the ability to determine an appropriate WACC for discounting purposes.
- **Political risk** must be evaluated.
- **Terminal value** is more difficult to estimate because potential purchasers from the host, parent, or third countries may have widely divergent perspectives on the value to them of acquiring the project. (Valuation problem in FDI: how to value used machinery and equipment in equity participation?)

Sensitivity analysis

- Almost everything in the NPV analysis is based on estimates ("most likely" assumptions)
- "What if" scenarios:
  - Political risk
  - Exchange rate risk
  - Other unexpected changes: change in assumed terminal value, capacity utilization, initial project cost, local financing, etc.

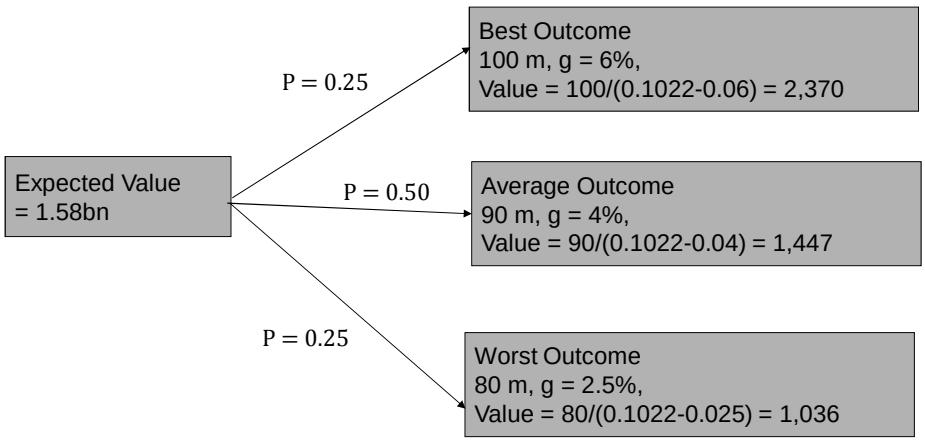
Techniques

- **Decision tree analysis** (graphical representations of sequential decisions that allow managers to ask questions such as the following: " What if exchange rates appreciate and we follow this course of action?"
- **Reducing cash flows** to certainty equivalents
- **Adjusting the discount rate** to reflect the degree of riskiness of the project
- **Monte Carlo simulation**: similar to scenario analysis, but it uses the entire distribution of exchange rates rather than just a few representative scenarios.
- **Measuring the statistical dispersion** of expected returns

Step by step

- Identify risks and estimate their probabilities of occurrence (use ERI)
- Estimate when they are most likely to occur
- Identify the impact of each risk on expected cash flows
- Calculate expected value of cash flows by weighting the cash flows in each scenario by the probability the scenario occurs

Example



WACC = 10%. A 0.22% Country Risk is Factored in.
What Probability does it correspond to?

Example

Simple Sensitivity Analysis				
Probability of Occurence				
Political Intervention	*Worst Outcome*	*Average Outcome*	*Best Outcome*	*Implied Political Risk Premium*
0%	25.00%	50.00%	25.00%	0.00%
2	24.50	49.00	24.50	0.11
4	24.00	48.00	24.00	0.22
5	23.50	47.00	23.50	0.33
8	23.00	46.00	23.00	0.45
10	22.50	45.00	22.50	0.58
20	20.00	40.00	20.00	1.31
30	17.50	35.00	17.50	2.26
40	15.00	30.00	15.00	3.53
50	12.50	25.00	12.50	5.33
Source: Salomon Smith Barney/Citigroup				

Example

EXHIBIT 2

Three scenarios for Pão de Açúcar

Macroeconomic assumptions, 1999

	Foreign-exchange rate between Brazilian real and US dollar,[1] $	Average interest rates, percent	Real growth in GDP, percent	Inflation, percent
Base case Brazil enacts fiscal reforms, enjoys international support	0.77	18	0.4	2.2
Austerity Brazil remains in recession for 2 years	0.77	20	–3.0	0
Devaluation Inflation rises; economy shrinks by 5%	0.44	30	–5.0	30.0

Pão de Açúcar's assumptions, 1999

	Base case	Austerity	Devaluation
Nominal sales growth, percent	17.2	1.7	42.6
Nominal same-store sales growth, percent	1.2	–8.2	33.3

[1]As of December 1999.
Source: Merrill Lynch; McKinsey analysis

Example

EXHIBIT 3

Probability-weighted scenarios approximate market value

	Discounted-cash-flow value, $ million	×	Probability, percent	=	Probability-weighted value, $ million
Base case	1,340		33–50		446–670
Austerity	766		30–33		229–255
Devaluation	973		20–33		195–324

Range of probability-weighted values: $1.026 billion–$1.094 billion

Pão de Açúcar's market value as of September 1998: $0.995 billion

Another Example

Incorporating political, familiarity and liquidity risks

Risk Characteristics

Risks	Estimated Probability	Estimated Cash Flow Impact	Probability Adjustment	Estimated Timing
Political Risk	100%	-10%	10%	Immediate
Familiarity Risk	20%	+5%	1%	2 years
Liquidity	5%	-100%	-5%	3 years

Sample Cash Flow Adjustment

	Year 1	Year 2	Year 3	Year 4
Base Case Cash Flows $ Millions	$ 37	$ 50	$ 68	$ 83
Political Risk *Familiarity* *Liquidity*	-10% 0% 0%	-10% 1% 0%	-10% 1% -5%	-10% 1% -5%
Total Adjustments	-10%	-9%	-14%	-14%
Adjusted Cash Flows ($M)	$ 33	$ 46	$ 58	$ 72

LSE

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Discount rate adjustment

Alternatively, we can modify the discount factor

$$K_u = r_F + b_e(r_M - r_F) + \Sigma_c b_c(r_c - r_F) + \mu\, CRP$$

Company's exposure to country risk

Country Risk Premium

Exposure to country risk is a function of:
1) Access to capital markets
2) Susceptibility of investment to country risk
3) Importance of Investment for the company

Country Risk Premium can be estimated by:
1) Bond Spread
2) Sovereign Spreads
3) Country Ratings

Discount rate adjustment

This model is widely used by McKinsey, Salomon and others.

It uses the sovereign yield spread to proxy for the country risk premium.

- The sovereign yield spread is the yield on a *U.S. dollar-denominated* bond that a country offers versus a U.S. Treasury bond of the same maturity
- The spread is said to reflect "country risk"
- In the simplest version μ = 1.

- *Problem:*
  Even adding this yield spread delivers a cost of capital that is unreasonably low in many countries
  Does the sovereign spread proxy for the country risk you care about?
  It may mess up with expected inflation.

Modifying the Discount Factor: Goldman Model

Example:

Assume:	The yield on 10-year US Treasury zero-coupon notes is 6.25%;
	The yield on Philippine 10-year peso-denominated zero-coupon govt. notes is 15.25%;
	The yield on Philippine 10-year zero-coupon dollar-denominated notes 8.8%.
Conclusions:	The 9% difference between US government notes and peso notes represents both country risk and anticipated peso devaluation of the peso relative to the dollar.
	The 2.55% spread on dollar denominated Philippine debt represents country risk.
	The 6.45% spread between the peso and dollar denominated Philippine notes represents anticipated peso devaluation.

In this case country risk is considered constant and we have:

$$Ku = r_F + \beta(r_M - r_F) + \Sigma_c \beta_c (r_c - r_F) + \text{Spread Difference}$$

Modifying the Discount Factor: Goldman Model

Sovereign Debt Spread over U.S. Treasury Securities			
Country	**Spread (basis points)**	**Country**	**Spread (basis points)**
China	138	Mexico	441
Russia	188	Indonesia	539
Philippines	226	Brazil	1151
South Africa	254	Venezuela	1201
Poland	258	Argentina	1581
Uruguay	341	Nigeria	1973

Source : Bloomberg, August 30, 2001

Ratings

The country risk ratings and sovereign risk ratings are a good ex ante measure of risk and have an impressive fit to data.

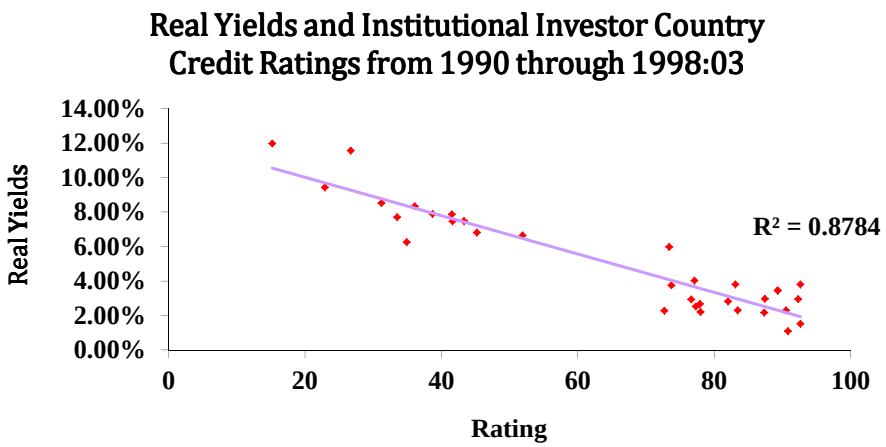
Types of ratings

- Political Risk,
- Economic Risk,
- Financial Risk
- Country Credit Ratings

Sources

- Political Risk Services' International Country Risk Guide
- Institutional Investor's Country Credit Rating
- Euromoney's Country Credit Rating
- Moody's
- S&P

Ratings



Ratings

How do you use them?

1. Use them to determine the fraction of country risk you are concerned with (e.g., fraction of overall rating-spread vis-à-vis US).
2. Then, use in the calculation this fraction to determine the fraction of yield you use as proxy for ***μ CRP***
3. More sophisticated models based on regressions can be used.

Country risk. *International Country Risk Guide*

Country	S&P	Moody's	II CCR	ICRGC	ICRGP	ICRGF	ICRGE
Argentina	BB-	B1	38.8	70.0	74.0	34.0	31.5
Australia	AA	Aa2	71.2	82.5	83.0	44.0	37.5
Belgium	AA+	Aa1	79.2	83.0	79.0	46.0	41.0
Brazil	B+	B1	34.9	62.5	64.0	33.0	28.0
Canada	AA+	Aa2	80.3	83.0	81.0	46.0	39.0
France	AAA	Aaa	89.1	82.0	80.0	44.0	40.0
Germany	AAA	Aaa	90.9	84.5	83.0	47.0	39.0
Hong Kong	A	A3	67.0	81.0	72.0	46.0	43.5
India	BB+	Baa3	46.3	69.0	63.0	37.0	37.5
Italy	AA	A1	72.3	77.0	75.0	41.0	38.0
Japan	AAA	Aaa	91.6	86.0	80.0	48.0	44.0
Pakistan	B+	B1	30.7	59.5	54.0	33.0	31.5
Singapore	AAA	Aa2	84.0	86.0	80.0	48.0	44.0
South Africa	BB+	Baa3	45.2	76.5	75.0	41.0	36.5
Switzerland	AAA	Aaa	92.2	89.0	85.0	50.0	43.0
United Kingdom	AAA	Aaa	87.8	79.5	78.0	46.0	35.0
United States	AAA	Aaa	90.7	83.0	80.0	48.0	38.0

Appendix on Risk Ratings
(from Harvey, "Risk analysis and project evaluation")

Political risk rating	The value of the the Political Risk Service (PRS) Group's political risk indicator (which ranges between 0 and 100). The risk rating is a combination of 12 subcomponents (documented below). Overall, a political risk rating of 0.0% to 49.9% indicates a Very High Risk; 50.0% to 59.9% High Risk; 60.0% to 69.9% Moderate Risk; 70.0% to 79.9% Low Risk; and 80.0% or more Very Low Risk. The data are available for samples II, III and IV from 1984 through 1997. For each country, we backfill the 1984 value to 1980. Source: Various issues of the *International Country Risk Guide.*
Government stability	ICRG political risk sub-component (12% weight). This is a measure both of the government's ability to carry out its declared program(s), and its ability to stay in office. This will depend on the type of governance, the cohesion of the government and governing party or parties, the closeness of the next election, the government's command of the legislature, and popular approval of government policies.
Socioeconomic Conditions	ICRG political risk sub-component (12% weight). This is an attempt to measure general public satisfaction, or dissatisfaction, with the government's economic policies. In general terms, the greater the popular dissatisfaction with a government's policies, the greater the chances that the government will be forced to change direction, possibly to the detriment of business, or will fall. Socioeconomic conditions cover a broad spectrum of factors ranging from infant mortality and medical provision to housing and interest rates. Within this range different factors will have different weight in different societies. PRS attempts to identify those factors that are important for the society in question, i.e. those with the greatest political impact, and assess the country on that basis.
Investment Profile	ICRG political risk sub-component (12% weight). This is a measure of the government's attitude to inward investment. The investment profile is determined by PRS's assessment of four sub-components: (i) risk of expropriation or contract viability (scored from zero [very high risk] to four [very low]); (ii) taxation (scored from zero to three, corresponding to very high, high, medium, and low risk; (iii) repatriation (scored from zero to three); and (iv) and labor costs (scored from zero to two, corresponding to high, medium and low).
Internal Conflict	ICRG political risk sub-component (12% weight). This is an assessment of political violence in the country and its actual or potential impact on governance. The highest rating is given to those countries where there is no armed opposition to the government and the government does not indulge in arbitrary violence, direct or indirect, against its own people. The lowest rating is given to a country embroiled in an on-going civil war. The intermediate ratings are awarded on the basis of whether the threat posed is to government and business or only business (e.g. kidnapping for ransom); whether acts of violence are carried out for a political objective (i.e. terrorist operations); whether such groups are composed of a few individuals with little support, or are well-organized movements operating with the tacit support of the people they purport to represent; whether acts of violence are sporadic or sustained; and whether they are restricted to a particular locality or region, or are carried out nationwide.

Appendix on Risk Ratings
(from Harvey, "Risk analysis and project evaluation")

External Conflict	ICRG political risk sub-component (12% weight). The external conflict measure is an assessment of the risk to both the incumbent government and inward investment. It ranges from trade restrictions and embargoes, whether imposed by a single country, a group of countries, or the whole international community, through geopolitical disputes, armed threats, exchanges of fire on borders, border incursions, foreign-supported insurgency, and full-scale warfare.
Corruption	ICRG political risk sub-component (6% weight). This is a measure of corruption within the political system. Such corruption: distorts the economic and financial environment, reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introduces an inherent instability into the political process. The most common form of corruption met directly by business is financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. Although the PRS measure takes such corruption into account, it is more concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, "favor-for-favors," secret party funding, and suspiciously close ties between politics and business. In PRS's view these sorts of corruption pose risk to foreign business, potentially leading to popular discontent, unrealistic and inefficient controls on the state economy, and encourage the development of the black market.
Military in Politics	ICRG political risk sub-component (6% weight). The military is not elected by anyone. Therefore, its involvement in politics, even at a peripheral level, is a diminution of democratic accountability. However, it also has other significant implications. The military might, for example, become involved in government because of an actual or created internal or external threat. Such a situation would imply the distortion of government policy in order to meet this threat, for example by increasing the defense budget at the expense of other budget allocations. In some countries, the threat of military take-over can force an elected government to change policy or cause its replacement by another government more amenable to the military's wishes. A military takeover or threat of a takeover may also represent a high risk if it is an indication that the government is unable to function effectively and that the country therefore has an uneasy environment for foreign businesses. A full-scale military regime poses the greatest risk.
Religion in Politics	ICRG political risk sub-component (6% weight). Religious tensions may stem from the domination of society and/or governance by a single religious group that seeks to replace civil law by religious law and to exclude other religions from the political and/or social process; the desire of a single religious group to dominate governance; the suppression of religious freedom; the desire of a religious group to express its own identity, separate from the country as a whole. The risk involved in these situations range from inexperienced people imposing inappropriate policies through civil dissent to civil war.

Appendix on Risk Ratings
(from Harvey, "Risk analysis and project evaluation")

Law and Order	ICRG political risk sub-component (6% weight). PRS assesses Law and Order separately, with each sub-component comprising zero to three points. The Law sub-component is an assessment of the strength and impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law. Thus, a country can enjoy a high rating (3.0) in terms of its judicial system, but a low rating (1.0) if the law is ignored for a political aim.
Ethnic Tensions	ICRG political risk sub-component (6% weight). This component measures the degree of tension within a country attributable to racial, nationality, or language divisions. Lower ratings are given to countries where racial and nationality tensions are high because opposing groups are intolerant and unwilling to compromise. Higher ratings are given to countries where tensions are minimal, even though such differences may still exist.
Democratic Accountability	ICRG political risk sub-component (6% weight). This is a measure of how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one. However, assessing democratic accountability is more complex than simply determining whether the country has free and fair elections. Even democratically elected governments, particularly those that are apparently popular, can delude themselves into thinking they know what is good for their people even when the people have made it abundantly clear that they do not approve particular policies. Therefore, it is possible for an accountable democracy to have a lower score, i.e. a higher risk, for this component than a less democratic form of government.
Bureaucratic Quality	ICRG political risk sub-component (4% weight). The institutional strength and quality of the bureaucracy is tends to minimize revisions of policy when governments change. Therefore, high points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In these low-risk countries, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training. Countries that lack the cushioning effect of a strong bureaucracy receive low points because a change in government tends to be traumatic in terms of policy formulation and day-to-day administrative functions.

Appendix on Risk Ratings
(from Harvey, "Risk analysis and project evaluation")

Financial risk rating	The value of the the Political Risk Service (PRS) Group's financial risk indicator (which ranges between 0 and 100). The risk rating is a combination of 5 subcomponents (documented below). PRS assigns risk points to a pre-set group of factors, termed financial risk components. The minimum number of points for each component is zero, while the maximum number of points depends on the fixed weight that component is given in the overall financial risk assessment. Overall, a financial risk rating of 0.0% to 24.5% indicated a Very High Risk; 25.0% to 29.9% High Risk; 30.0% to 34.9% Moderate Risk; 35.0% to 39.9% Low Risk; and 40.0% or more Very Low Risk.
Foreign debt as a % of GDP	ICRG financial risk sub-component (20% weight). The estimated gross foreign debt in a given year, converted into US dollars at the average exchange rate for that year, is expressed as a percentage of the gross domestic product converted into US dollars at the average exchange rate for that year. If the ratio is 0-5%, then the highest rating of 10/10 is assigned. The rating decreases by 0.5 for every 5% increment until a ratio of 50%. After 50%, the rating decreases by 0.5 for every increment of 10% until a ratio of 130%. A rating of 0.5 is assigned for ratios between 150-200% and zero is assigned for higher ratios.
Foreign debt service as a % of exports of goods and services	ICRG financial risk sub-component (20% weight). The estimated foreign debt service, for a given year, converted into US dollars at the average exchange rate for that year, is expressed as a percentage of the sum of the estimated total exports of goods and services for that year, converted into US dollars at the average exchange rate for that year. If the ratio is between 0 and 4.9%, the highest rating of 10/10 is applied. The rating decreases by 0.5 for every 4% increase in the ratio. At a ratio of 85% and above, the rating is zero.
Current account as a % of exports of goods and services	ICRG financial risk sub-component (30% weight). The estimated foreign debt service, for a given year, converted into US dollars at the average exchange rate for that year, is expressed as a percentage of the sum of the estimated total exports of goods and ser-vices for that year, converted into US dollars at the average exchange rate for that year. The highest rating of 10/10 is given to current account ratios of 25% and over. The rating decreases by 0.5 for every 5% decrease in the ratio. If the ratio is -120% or below, the rating is zero.

Appendix on Risk Ratings
(from Harvey, "Risk analysis and project evaluation")

Net international liquidity as months of import cover	ICRG financial risk sub-component (10% weight). The total estimated official reserves for a given year, converted into US dollars at the average exchange rate for that year, including official holdings of gold converted into US dollars at the free market price for the period, but excluding the use of IMF credits and the foreign liabilities of the monetary authorities, is divided by the average monthly merchandise import cost, converted into US dollars at the average exchange rate for the period. This provides a comparative liquidity risk ratio that indicates how many months of imports can be financed with reserves. The maximum rating of 5/5 is given to countries with a ratio of 15 or over. The rating decreases by 0.5 points for decreases in the ratio of 3.0 until a ratio of 5.0 it hit. The points then drop by 0.5 for every decrease of 1.0 in the ratio. 0.5 points are assigned for ratios between 0.6 and 1 and zero points if the ratio is below.
Exchange rate stability	ICRG financial risk sub-component (20% weight). The appreciation or depreciation of a currency against the US dollar (against the German mark or Euro in the case of the US) over a calendar year or the most recent 12-month period is calculated as a percentage change. For appreciations, the maximum of 10/10 is assigned for 0 to 9.9% appreciations. The rating decreases by 0.5 for incremental 5% appreciations. For appreciations of 20% to 30%, the rating decreases by 0.5 for 2.5% increments. For appreications between 30 and 40%, the rating decreases by 0.5 for 5% increments. For appreciations between 40-49.9%, 5.5 rating points are assigned. Appreciations of 50% and above are assigned 5 points. For depreciations, 0.1-4.9 are assigned the maximum 10/10. For 2.5% increments in depreciation, 0.5 are deducted from the rating until 30% is hit. From 30-59.9%, 0.5 is deducted for 5% increments. From 60 to 99.9%, ratings decrease by 0.5 for 10% increments. For 100% or greater depreciations, zero points are assigned.
Budget Balance as a Percentage of GDP	ICRG economic risk sub-component (20% weight). The estimated general government budget balance (excluding grants) for a given year in the national currency is expressed as a percentage of the estimated GDP for that year in the national currency. The maximum rating of 10/10 is assigned to countries with 4% or greater surpluses. The rating decreases by 0.5 points for budget balances between 6 and -9.9% in 1% increments, between 10 and 11.9% in 2% increments, 12 and 14.9% in 3% increments, 15 and 29.9% in 5% increments. A rating of zero is assigned to countries with budget deficit that are 30% and greater.
Current Account as a Percentage of GDP	ICRG economic risk sub-component (30% weight). The estimated balance on the current account of the balance of payments for a given year, converted into US dollars at the average exchange rate for that year, is expressed as a percentage of the estimated GDP of the country concerned, converted into US dollars at the average rate of exchange for the period covered. The maximum rating of 15/15 is assigned to countries with surpluses that are 10% and greater. The rating decreases by 0.5 points for current account balance percentages between 10 and 2% in 2% increments, between 1.9 and -0.9% in 1% increments, -1 and -15.9% in 2% increments, -16 and -24.9% in 1% increments, betweenb -25 and -29.9% in 2% increments, -30 to 3-34.9% in 2.5% increments, and -35 to -39.9% in 5% increments. A rating of zero is assigned to countries with current account percentages that that are -40% or less.

FN 209 – Moqi Groen-Xu

Appendix on Risk Ratings
(from Harvey, "Risk analysis and project evaluation")

Economic risk rating	The value of the the Political Risk Service (PRS) Group's economic risk indicator (which ranges between 0 and 100). The risk rating is a combination of 5 subcomponents (documented below). PRS assigns risk points to a pre-set group of factors, termed financial risk components. The minimum number of points for each component is zero, while the maximum number of points depends on the fixed weight that component is given in the overall financial risk assessment. Overall, a financial risk rating of 0.0% to 24.5% indicated a Very High Risk; 25.0% to 29.9% High Risk; 30.0% to 34.9% Moderate Risk; 35.0% to 39.9% Low Risk; and 40.0% or more Very Low Risk.
GDP Per Head	ICRG economic risk sub-component (10% weight). The estimated GDP per head for a given year, converted into US dollars at the average exchange rate for that year, is expressed as a percentage of the average of the estimated total GDP of all the countries covered by ICRG. Measures of 250% or greater get the maximum weight of 5/5. The rating decreases by 0.5, in 50% increments until a percentage of 100% is attained. The rating decreases by 0.5 in 25% increments until the percentage of the average GDP is 50%. The rating then decreases by 0.5 in 10% increments. For countries with less then 10% of the average GDP, a rating of zero is assigned.
Real GDP Growth	ICRG economic risk sub-component (20% weight). The annual change in the estimated GDP, at constant 1990 prices, of a given country is expressed as a percentage increase or decrease. The maximum rating of 10/10 is assigned to countries with 6% and higher growth. The ratings decrease by 0.5 for every 1% decrease in growth until 3%. The ratings then decrease by 0.5 for 0.5% decreases in real growth. If growth is -6% or less, the rating is zero.
Annual Inflation Rate	ICRG economic risk sub-component (20% weight). The estimated annual inflation rate (the unweighted average of the Consumer Price Index (calculated as a percentage change. If inflation is less than 2%, the maximum 10/10 points are assigned. The points are decreased by 0.5 for every 1% increase in the inflation rate up to 10%. The rating decreases by 0.5 points for inflation rates between 10 and 15.9% in 2% increments, between 16 and 24.9% in 3% increments, 25 and 30.9% in 6% increments, 31 and 50.9% in 10% increments, 66 and 129.9 in 20% increments. A rating of zero is assigned to countries with inflation rates of 130% and greater.

FN 209 – Moqi Groen-Xu