Capital Budgeting

Moqi Groen-Xu

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)

• **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
  \[ NPV = \sum_{t=0}^{T} \left[ E(CF_t)/(1 + r)^t \right] \]
  
  Where
  - \( E(CF) \): Expected Cash flows
  - \( r \): Discount rate
  - \( CF_0 = \frac{E(CF_0)}{(1+r)^0} = -I_0 \)
  
  is the initial investment.

If NPV > 0, the project is acceptable.
Note: choose among competing foreign and domestic projects using a common standard.
Cash flows

Useful Terminology

<table>
<thead>
<tr>
<th>Accounting Flows</th>
<th>“Free” Cash Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>FCF = EBIT*((1-\tau_c)) – CAPEX - Δ(NWC) + Depreciation</td>
</tr>
<tr>
<td>- Costs</td>
<td></td>
</tr>
<tr>
<td>= EBITDA</td>
<td></td>
</tr>
<tr>
<td>- Depreciation &amp; Amortization</td>
<td></td>
</tr>
<tr>
<td>= EBIT (Operating Profit)</td>
<td></td>
</tr>
<tr>
<td>- Interest Expenses</td>
<td></td>
</tr>
<tr>
<td>= Pre-tax income</td>
<td></td>
</tr>
<tr>
<td>- Taxes</td>
<td></td>
</tr>
<tr>
<td>= Net Income</td>
<td></td>
</tr>
<tr>
<td>- Dividends</td>
<td></td>
</tr>
<tr>
<td>= Addition to Retained Earnings</td>
<td></td>
</tr>
</tbody>
</table>

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

- \( \Delta NWC \) (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.
Step-by-step: WACC Method

1. Forecast FCFs of the unlevered firm.

2. Forecast the terminal value after the investment horizon.

3. \[ WACC = \frac{D}{D+E} r_p (1-t) + \frac{E}{D+E} r_E \]

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

\[ r_e = r_f + \beta_E \times \text{Market Risk Premium} \]

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:**
  \[ \beta = \frac{\text{cov}(r_i, r_m)}{\text{var}(r_m)} \]
  so higher covariance with the market return \( \Rightarrow \) higher beta = higher risk \( \Rightarrow \) higher return.

The market risk premium

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

- 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 \( r_F = w r_{EW} + (1-w)r_{EL} \)

Weights, \( w \), determined by shareholders.

Extended formula for currency risk

\[ r_c = r_f + \beta_C \times \text{Currency Risk Premium} + \beta_C \times \text{Currency Risk Premium} \]

- **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

\[ r_C = r_F = \frac{\text{Exchange Rate}_{t} - \text{Exchange Rate}_{t-1}}{\text{Exchange Rate}_{t-1}} - r_F \]
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.

<table>
<thead>
<tr>
<th>shareholders are diversified</th>
<th>shareholders are NOT diversified</th>
</tr>
</thead>
<tbody>
<tr>
<td>currency risk is diversified</td>
<td>no premium should be added to account for currency risk</td>
</tr>
<tr>
<td>currency risk is NOT diversified</td>
<td>a premium should be added to account for currency risk</td>
</tr>
</tbody>
</table>

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.
Returns and Beta from 1970

\[ R^2 = 0.013 \]

Returns and Beta from 1990

\[ R^2 = 0.0211 \]
Real or Nominal?

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

<table>
<thead>
<tr>
<th>Hyper-Inflationary Environment</th>
<th>Low to Moderate Inflation Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast &quot;real&quot; cash flows (exclude inflation)</td>
<td>Forecast “nominal” cash flows (include inflation)</td>
</tr>
<tr>
<td>Discount cash flows with the “real” discount rate</td>
<td>Discount cash flows with the “nominal” discount rate</td>
</tr>
</tbody>
</table>

Home or Foreign Currency?

2 Different Approaches:

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

- Discounting foreign cash flows with converted cost of capital
  - Forecast foreign-currency cash flows,
  - Convert cost of capital to foreign-currency cost of capital using forecasted exchange rates,
  - Discount the cash flows using the foreign-currency cost of capital
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?

Method I:
\[
\text{Present value} = -\text{C$} 590 = -\text{Yen} (590 \times 83.86) = -\text{Yen49,230}
\]

Method II:
\[
\text{Cash flows} (\text{C$}) = -15.502 2.520 2.664 2.815 2.975 3.144 3.323 3.512
\]
\[
\text{Discount factor} (\text{C$}) = 1.000 0.920 0.846 0.778 0.715 0.657 0.605 0.556
\]
\[
\text{PV(C$)} = -15.502 2.318 2.252 2.189 2.127 2.067 2.009 1.952
\]

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!
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

Expected Value = 1.58bn

Best Outcome
100 m, g = 6%,
Value = 100/(0.1022-0.06) = 2,370

Average Outcome
90 m, g = 4%,
Value = 90/(0.1022-0.04) = 1,447

Worst Outcome
80 m, g = 2.5%,
Value = 80/(0.1022-0.025) = 1,036

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

**Simple Sensitivity Analysis**

**Probability of Occurrence**

<table>
<thead>
<tr>
<th>Political Intervention</th>
<th>Worst Outcome</th>
<th>Average Outcome</th>
<th>Best Outcome</th>
<th>Implied Political Risk Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>25.00%</td>
<td>50.00%</td>
<td>25.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>2</td>
<td>24.50</td>
<td>49.00</td>
<td>24.50</td>
<td>0.11</td>
</tr>
<tr>
<td>4</td>
<td>24.00</td>
<td>48.00</td>
<td>24.00</td>
<td>0.22</td>
</tr>
<tr>
<td>5</td>
<td>23.50</td>
<td>47.00</td>
<td>23.50</td>
<td>0.33</td>
</tr>
<tr>
<td>8</td>
<td>23.00</td>
<td>46.00</td>
<td>23.00</td>
<td>0.45</td>
</tr>
<tr>
<td>10</td>
<td>22.50</td>
<td>45.00</td>
<td>22.50</td>
<td>0.58</td>
</tr>
<tr>
<td>20</td>
<td>20.00</td>
<td>40.00</td>
<td>20.00</td>
<td>1.31</td>
</tr>
<tr>
<td>30</td>
<td>17.50</td>
<td>35.00</td>
<td>17.50</td>
<td>2.26</td>
</tr>
<tr>
<td>40</td>
<td>15.00</td>
<td>30.00</td>
<td>15.00</td>
<td>3.53</td>
</tr>
<tr>
<td>50</td>
<td>12.50</td>
<td>25.00</td>
<td>12.50</td>
<td>5.33</td>
</tr>
</tbody>
</table>

Source: Salomon Smith Barney/Citigroup

---

### Example

**EXHIBIT 2**

**Three scenarios for Pão de Açúcar**

**Macroeconomic assumptions, 1999**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Foreign-exchange rate between Brazilian real and US dollar, ′% Change &amp; 減</th>
<th>Average interest rates, percent</th>
<th>Real growth in GDP, percent</th>
<th>Inflation, percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base case</td>
<td>20.00</td>
<td>10</td>
<td>0.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Austerity</td>
<td>20.00</td>
<td>0.6</td>
<td>-3.0</td>
<td>0</td>
</tr>
<tr>
<td>Devaluation</td>
<td>30.00</td>
<td>-5.0</td>
<td>0.4</td>
<td>0</td>
</tr>
</tbody>
</table>

**Pão de Açúcar’s assumptions, 1999**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Nominal sales growth, percent</th>
<th>Nominal same-store sales growth, percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base case</td>
<td>17.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Austerity</td>
<td>1.7</td>
<td>-8.2</td>
</tr>
<tr>
<td>Devaluation</td>
<td>42.6</td>
<td>35.3</td>
</tr>
</tbody>
</table>

*As of December 1999.*

Source: Salomon Smith Barney/Citigroup.
Example

**Exhibit 3**

**Probability-weighted scenarios approximate market value**

<table>
<thead>
<tr>
<th>Discounted-cash-flow value, $ million</th>
<th>Probability, percent</th>
<th>Probability-weighted value, $ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base case</td>
<td>1,340</td>
<td>33–50</td>
</tr>
<tr>
<td>Austerity</td>
<td>766</td>
<td>30–33</td>
</tr>
<tr>
<td>Devaluation</td>
<td>973</td>
<td>20–33</td>
</tr>
</tbody>
</table>

Range of probability-weighted values

Pão de Açúcar's market value as of September 1998

$1.026 billion—$1.094 billion

$0.995 billion

Another Example

Incorporating political, familiarity and liquidity risks

**Risk Characteristics**

<table>
<thead>
<tr>
<th>Risks</th>
<th>Estimated Probability</th>
<th>Estimated Cash Flow Impact</th>
<th>Probability Adjustment</th>
<th>Estimated Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political Risk</td>
<td>100%</td>
<td>-10%</td>
<td>10%</td>
<td>Immediate</td>
</tr>
<tr>
<td>Familiarity Risk</td>
<td>20%</td>
<td>+5%</td>
<td>1%</td>
<td>2 years</td>
</tr>
<tr>
<td>Liquidity</td>
<td>5%</td>
<td>-100%</td>
<td>-5%</td>
<td>3 years</td>
</tr>
</tbody>
</table>

**Sample Cash Flow Adjustment**

<table>
<thead>
<tr>
<th>Year</th>
<th>Base Case Cash Flows ($M)</th>
<th>Political Risk</th>
<th>Familiarity</th>
<th>Liquidity</th>
<th>Total Adjustments</th>
<th>Adjusted Cash Flows ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$37</td>
<td>-10%</td>
<td>0%</td>
<td>0%</td>
<td>-10%</td>
<td>$33</td>
</tr>
<tr>
<td>Year 2</td>
<td>$50</td>
<td>-10%</td>
<td>1%</td>
<td>0%</td>
<td>-10%</td>
<td>$46</td>
</tr>
<tr>
<td>Year 3</td>
<td>$68</td>
<td></td>
<td>1%</td>
<td>-5%</td>
<td>-1%</td>
<td>$58</td>
</tr>
<tr>
<td>Year 4</td>
<td>$83</td>
<td></td>
<td></td>
<td></td>
<td>-14%</td>
<td>$72</td>
</tr>
</tbody>
</table>

FN 209 – Mopli Groen-Xu
Discount rate adjustment

Alternatively, we can modify the discount factor

\[ K_u = r_F + b_f(r_M - r_F) + \sum b_c(r_c - r_F) + \mu \text{CRP} \]

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

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 \( \mu = 1 \).

- **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 is 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:

\[ Ku = r_F + \beta(t_M - r_F) + \sum \beta_c(t_c - r_F) + \text{Spread Difference} \]

---

Modifying the Discount Factor: Goldman Model

<table>
<thead>
<tr>
<th>Country</th>
<th>Spread (basis points)</th>
<th>Country</th>
<th>Spread (basis points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>138</td>
<td>Mexico</td>
<td>441</td>
</tr>
<tr>
<td>Russia</td>
<td>188</td>
<td>Indonesia</td>
<td>539</td>
</tr>
<tr>
<td>Philippines</td>
<td>226</td>
<td>Brazil</td>
<td>1151</td>
</tr>
<tr>
<td>South Africa</td>
<td>254</td>
<td>Venezuela</td>
<td>1201</td>
</tr>
<tr>
<td>Poland</td>
<td>258</td>
<td>Argentina</td>
<td>1581</td>
</tr>
<tr>
<td>Uruguay</td>
<td>341</td>
<td>Nigeria</td>
<td>1973</td>
</tr>
</tbody>
</table>

Source: Bloomberg, August 30, 2001
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**

Real Yields and Institutional Investor Country Credit Ratings from 1990 through 1998:03

\[ R^2 = 0.8784 \]
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 $\mu_{CRP}$

3. More sophisticated models based on regressions can be used.


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

Political risk rating

The value of 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 (discussed below). Overall, a political risk rating of 60% to 99% indicates a Very High Risk; 50% to 59% a High Risk; 40% to 49% a Moderate Risk; 30% to 39% a Low Risk; and 0% to 39% a Very Low Risk. The data are available for samples II, III, and IV from 1984 through 1997. For each country, we backfill the 1994 value as 1990.

Government stability

ICRG political risk sub-component (12% weight). This is a measure of the government’s ability to carry out its declared programs, and its ability to stay in office. This will depend on the type of government, 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 provisions 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 assign the country or that basin.

Investment Profile

ICRG political risk sub-component (12% weight). This is an attempt to measure 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 violation (scored from zero [very high risk] to four [very low]); (ii) taxation (scored from zero to three, corresponding to very high, medium, and low, risk respectively); (iii) repatriation (scored from zero to three, and (iv) 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 an armed opposition to the government and the government does not indulge in arbitrary violence, direct or indirect, against its own people. 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. terrorism operations); whether such groups act 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.

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 (5% 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 forms of corruption are rent-seeking by business in 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 PRS measures take such corruption into account, it is more concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, “favor-for-favor,“ secret party funding, and suspiciously close ties between politics and business. In PRS’s view these sorts of corruption pose a risk to foreign business, potentially leading to populism, disinterest, and inefficient controls on the state economy, and encouraging the development of the black market.

Military Politics

ICRG political risk sub-component (6% weight). The military is not elected by anyone. Therefore, its involvement in politics, even as 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 potential 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 takeover 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 (5% 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 religious groups 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; and to separate from the country as a whole. The risk is greatest where religious groups are imposed on the country by other outside forces or groups. This can generally result in the suppression of certain religious groups, and the imposition of religious law, and the curtailing of other religious groups by the government, or the repression of certain religious groups by other religious groups and/or individuals.
### 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 (3/3) in terms of its judicial system, but a low rating (1/3) 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 assessed separately, with each sub-component comprising zero to three points. The Law sub-component is an assessment of the impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law and order. Overall, a financial risk rating of 0% to 24.5% indicates 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.

---

### 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 200). The risk rating is a combination of 5 sub-components (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% to 24.5% indicates 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 (30% 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% increase until a ratio of 50%. After 50%, the rating decreases by 0.5 for every increment of 10% until a ratio of 130%. A ratio of 0% is assigned for ratios between 130-200% 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 services 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 15 is given to countries with a ratio of 15 or over. The rating decreases by 0.5 points for decreases in the ratio of 5.0 or less. 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 appreciation, the maximum 10/10 is assigned for 0 to 6.9% appreciations. The rating decreases by 0.5 for increased 5% appreciations. For appreciation of 20% or more, the rating decreases by 0.5 for 2.5% increments. Appreciation or depreciation of 50% or more has a negative effect on the rating, with surpluses that are 10% and greater. The rating decreases by 0.5 points for current account balances between 6 and -9.9% in 1% increments, 10 and -11.9% in 2% increments, 12 and -14.9% in 3% increments, 15 and -29.9% in 5% increments.

Budget Balance as a Percentage of GDP
ICRG economic risk sub-component (30% 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 15/15 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, 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 50% or 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 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 balances between 10 and 2% in 2% increments, between 2 and -9.9% in 5% increments, -1 and -24.9% in 12% increments, -25 and -29.9% in 5% increments, -30 and -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 are -40% or less.

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 in 0% 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 Indexes 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 39.9% in 6% increments, 40 and 50 in 10% increments, 66 and 129.9 in 25% increments. A rating of zero is assigned to countries with inflation rates of 130% or greater.

Real 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. Measured at 250% or greater gets the maximum weight of 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 than 10% of the average GDP, a rating of zero is assigned.

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 maximum number of points for each component is zero, while the maximum number of points depends on the final 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.