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The Executive's Guide to International Capital Budgeting: 1994 Update

INTRODUCTION AND SUMMARY

This report is a guide for financial professionals who analyze and evaluate international planning and capital-budgeting projects. The concepts used in this report form the building blocks of valuation in international mergers and acquisitions. The theoretical discussion and empirical evidence that we present in this report suggest a number of guidelines that will aid the analyst and the executive in intelligently formulating international capital-budgeting analyses.

Most financial managers are reasonably familiar with the basic analytical tools of capital budgeting when their focus is on **domestic** investment alternatives. The **net present value** (NPV) criterion is used commonly to value and rank prospective investments. Typically, managers are familiar with projecting economically sensible cash flows and estimating discount rates when the projects being considered are domiciled in their home country.

When investment opportunities are **international**, managers are faced with an additional set of questions:

- Which currency should be used for the cash flows?
- How do inflation and exchange rates enter the picture?
- Does political risk affect the cash flows or the discount rates?
- Does diversification reduce the discount rate?
- How should other factors such as tax regimes, unfamiliarity with the foreign country and special financing alternatives be treated?

For many financial professionals, these questions cover new ground. This report provides guidance to those who must answer them when evaluating cross-border projects.

The basic premise behind capital budgeting is that decisions can be made by measuring the NPV of any prospective investment. NPV calculations require specification of sensible cash flows and discount rates. In the context of international capital budgeting, a logical sequence applies to this process.

First, management projects **economically sensible cash flows.** The construction of these cash flows should use the same basic principles that are used to construct domestic cash flows. In principle, cash flows are modeled to reflect expectations under each future scenario weighted by the probability of that scenario. In practice, however, cash flow estimates used are frequently the most likely or the most optimistic. This ambiguity can create large misvaluations in evaluating offshore projects that involve substantial downside risk. Analysts should pay attention to the following possible complications when assembling cash flows.

- **The currency of denomination** of the forecast cash flows should depend upon whether the project being considered is domiciled in a developed or developing country. In **developed countries, local currencies** should be used to model cash flows. In **developing countries**, conversely, the **U.S. dollar or another stable currency** such as the Deutschemark or the Japanese yen should be used to model cash flows.

- Because international projects have significant cross-border cash flows, which are subject to inflation and exchange rate risk, these cash flows should be modeled assuming **purchasing power parity (PPP)**. That is, the analyst should assume that exchange rates move to offset inflation differentials among countries. However, PPP may not hold all of the time, especially in the short term, and adjustments can be made to account for possible expected deviations from it.

- Additional adjustments may have to be made for **political risk**, particularly when analyzing projects in **developing** countries. We assume that such risk includes currency inconvertibility, expropriation, civil unrest, and institutional instability. In contrast, political risk does not pose a major concern for developed countries, unless projects in such countries have significant import or export exposures to developing countries.

- **Other considerations** such as **taxes** and **concessional financing arrangements** should be carefully modeled in the cash flows. In some cases, the analyst must pay special attention as to how the target project's cash flows interact with the firm's other activities. For example, the international project's marginal contribution to the overall tax profile of the parent rather than the local tax rate determines the appropriate tax rate to be applied to a project's cash flows. In a competitive bidding situation, however, various market participants may have varying taxation levels. Because of such taxation differences, bidders (particularly from different countries) may tend to value projects differently. In such situations, the analyst and the executive should remember that the ultimate price will be determined by the highest bidders — regardless of internal valuation differences.

Second, the analyst gathers the data used to calculate the **weighted average cost of capital (WACC)**, which, in turn, is used to discount the appropriately determined unlevered after-tax asset cash flows (the investment's cash flows assuming that no interest payments are made). Three of the four inputs that determine a WACC are readily observable — **debt financing rates**, **marginal tax rates** and **target debt-to-equity ratios**. The fourth input, the **expected equity cost of capital**, involves more complexity than the first three.

Third, the analyst determines the **expected equity cost of capital** that is used as the final input in a WACC calculation. The equity cost of capital can be directly used in valuation if the investment is a pure equity investment. To estimate the expected equity cost of capital, we hypothesize and empirically demonstrate that world capital markets largely behave as if they were perfectly integrated. This is especially true when local projects compete globally for funds. As such, the equity market risk premiums that have been observed in the U.S. equity market — the world's most efficient and mature (with the longest uninterrupted and most reliable historical record) — should apply.

Fourth, to refine the cost of equity estimates, the analyst should carefully consider and adjust for differences in **debt-to-equity ratios**, expected overall **macroeconomic growth rates** that may substantially differ from long-term averages (for example, approximately 3% per year in real terms for most developed countries), and other risk factors that may be country-specific.

With this report, we summarize the basic concepts, methods and calculations used in capital budgeting from a domestic perspective. We then address international complexities such as the proper currency of choice, the treatment of inflation and exchange rate variability, the effects of political risk, and the roles of other factors such as tax regimes and financial incentives.

Subsequently, we analyze the empirical evidence on the worldwide costs of debt and equity financing. We find that world debt and equity markets have accelerated toward integration, especially in the past decade. At present, they seem virtually integrated, implying that international capital costs are approximately in equilibrium. As with most conclusions in financial economics, these finding may be debated. Our interpretation of the evidence, however, suggests that cost of capital differences, excluding political risk premiums, do not exceed 3% per year in real terms.

Finally, we present several international capital-budgeting applications and summarize our conclusions.

PRINCIPLES OF DOMESTIC CAPITAL BUDGETING[1]

The Concept

Hurdle Rates

The **hurdle rate** is defined as the appropriate discount rate used to calculate the NPV of an investment. The hurdle rate directly affects the capital-budgeting decision. Assuming no other capital constraints, all positive NPV projects should be undertaken and all negative NPV projects should be rejected.

The hurdle rate, when applied to a risky investment, should equal the cost of capital associated with that investment. The cost of capital is the return expected by investors as compensation for bearing the risk of a particular investment. For each project examined, a hurdle rate must be developed that is commensurate with the project's risk profile.

We note that the hurdle rate for any project is not necessarily the one that will be used for the firm as a whole. The hurdle rate should reflect only the uncertainties inherent in that project.

The risk of an investment relevant to the cost of equity capital is twofold. The first part captures the uncertainty and volatility of the underlying assets and cash flows involved in the investment **(business risk)**. The second part captures the additional risk associated with any steady-state debt financing that the firm will employ with the investment **(financial risk)**. Actual financing at the time of the investment is irrelevant.

When analyzing project cash flows, the hurdle rate that correctly accounts for the relevant risks is the investment's after-tax **WACC**. NPV is then calculated by discounting the investment's cash flows (after-tax, but before financing costs) by the WACC. Alternatively, the practitioner may discount the investment's pure equity cash flows by an equity discount rate.

[1] See *The Financial Executive's Guide to the Cost of Capital*, Peter B. Blanton, Eric B. Lindenberg and Kevin L. Thatcher. Salomon Brothers Inc. June 1990.

Methods

Two ways exist to obtain hurdle rates for nonpublicly traded companies. In the most commonly used **pure-play method**, we suggest the following steps:

- Evaluating each investment as though it were being made by a publicly traded company;
- Reflecting synergies, closely held ownership incentives, and other considerations in the investment's cash flows;
- Identifying a group of pure-play comparable companies whose business risk is similar to the project or investment being evaluated;
- Determining a cost of equity for each **pure play**. To determine an **asset cost of capital**, delever the cost of equity;
- Using the average or median of the pure-play asset costs of capital as a proxy for the investment's unlevered cost of capital. Then, relever using the target capital structure for that investment. We note that the median value captures central tendencies more accurately when outliers are present; and
- Determining (in theory) an investment's borrowing costs by its own characteristics. In practice, we typically suggest using the sponsoring company's cost of debt and the investment's target capital structure in calculating a WACC. This WACC will serve as the investment's hurdle rate. If, however, the borrowing rate for the investment can be clearly distinguished, then it can be used as an alternative.

The less commonly used **fundamental beta approach** develops a statistical relationship between the betas of publicly traded companies and a set of historical and projected key accounting ratios for these companies. This relationship is used to predict betas of other nontraded companies or investments. In its application, we suggest the following steps:

- For the private company, developing the same accounting ratios to predict what its beta would be if the company were public;
- For a division or distinct line of business within the private company, generating similar accounting data;
- With the beta predicted by the statistical relationship, estimating the cost of equity using the **capital asset pricing model (CAPM)**; and
- As in the pure-play method, using the investment's target capital structure to calculate the WACC that will serve as the investment's hurdle rate.

Calculations

The first input in calculating a hurdle rate is the marginal cost of debt, $\mathbf{k_d}$. This market variable is readily observable, as it equals the incremental cost of borrowing required to finance the target project. Typically, this should be the yield on a bond with a maturity equal to the target project's horizon.

The expected cost of equity, $\mathbf{k_e}$, conversely, is not readily observable. It can be estimated for a private company or a division of a public or private company either by the pure-play method or the fundamental beta approach.

In either case, the CAPM can be directly employed:[2]

$$k_e = R_f + \beta(EMRP),$$

where R_f is the risk-free rate, β is the beta of the investment, and EMRP is the **equity market risk premium**. Intuitively, β captures an equity's comovements with the stock market and, hence, the undiversifiable, systematic risk embedded in the equity.

The WACC is calculated as follows:

$$WACC = k_d(1\text{-}t)\ D/(D+E) + k_e\ E/(D+E)\ ,$$

where t is the company's marginal tax rate and E/(D + E) and D/(D + E) are the market value-weighted equity-to-capital and debt-to-capital ratios, respectively.

Possible Adjustments

Several factors such as start-up business risk and closely held company structures may add to, or subtract from, hurdle rates. For instance, start-up companies are riskier than mature companies and should command higher risk premiums. Indeed, over the 1926-93 period, a portfolio of small-capitalization companies that may be used as a proxy for start-up companies outperformed the overall market by 3.5%, as calculated from data provided by Ibbotson Associates.

A closely held ownership structure arguably may reduce the market risk of an investment, because in a closely held ownership structure (unlike in a publicly held company) managers and owners have similar interests and a greater ability to centralize and focus managerial effort.[3]

THE USE OF LOCAL CURRENCY VERSUS THE U.S. DOLLAR

In developed, nonhyperinflationary countries such as those in Western Europe and Japan, using the local currency to model cash flows seems to be the best choice. However, in developing countries whose currencies may not be readily convertible, cash flows should be modeled using the U.S. dollar or another stable currency such as the Deutschemark or the Japanese yen.

The benefits of modeling in local currency include the following:

- Local managers think in local currency terms and prefer to be evaluated against competitors in their home countries; and
- Some components of cash flows (such as depreciation tax shields) are fixed in nominal local currency terms and, therefore, are most appropriately modeled in those terms.

[2] The CAPM is the primary technique used by practitioners to estimate k_e. This model holds that investors require compensation for bearing only systematic risk, because they can fully eliminate nonsystematic or firm-specific risk by diversification. However, for some investments, full diversification may not be possible because of market illiquidity, especially when the investment is part of a private company and cannot be diversified because of market constraints. Therefore, adjustments may be needed. Under such circumstances, a framework different than the CAPM such as the **arbitrage pricing theory** (APT) may help the practitioner in pricing factors unique to an investment (for example, small size and sensitivity to inflation), which can produce alternative estimates for k_e. APT can be thought of as a generalized CAPM that incorporates risk factors in addition to overall stock market risk. See E.J. Elton and M.J. Gruber, *Modern Portfolio Theory and Investment Analysis*, John Wiley and Sons, New York, 1984.

[3] According to this argument, it may be appropriate to look to the Japanese equity market, which is characterized by a more closely held structure than its U.S. counterpart. In certain periods, the Japanese equity market risk premium has been 1.5%-3.0% lower than in the United States. See *The Cost of Capital in Japan and the United States: A Tale of Two Markets*, Salomon Brothers Inc, July 1990.

Conversely, the costs of modeling in local currency include the following:

- Local currency cash flow projections may lack intuitive appeal beyond planning horizons of a few years, especially when analyzing hyperinflationary countries in which the sheer magnitude of the numbers tend to blow up if inflation rates approach or exceed 100% annually; and

- Assumptions have to be made about exchange rate developments — especially when developed forward markets do not exist — for local flows to be converted into the U.S. dollar or another freely convertible currency.

Because developed countries do not suffer from currency inconvertibility or hyperinflation, the costs and benefits that we have outlined suggest that cash flows domiciled in these countries should be modeled using local currencies. Foreign exchange markets in these currencies are usually well developed; thus, they offer hedging products such as forwards, options and swaps with maturities up to five and ten years. As a result, cash flows in these currencies can be readily (and relatively inexpensively) hedged. As such, we recommend local currency modeling for developed countries — particularly given that U.S. dollar conversion can be calculated from observable market benchmarks.

Hyperinflationary currencies usually depreciate in accordance with PPP,[4] assuring stability of cash flows when viewed from a U.S. dollar perspective. This is true, despite the virtual infancy of the hedging markets in these currencies. For example, Figure 1 plots the spot Mexican peso/U.S. dollar exchange rate and the exchange rate implied by PPP. As Figure 1 demonstrates, PPP has approximately held for a country such as Mexico that would have been considered hyperinflationary until a few years ago. Consequently, we recommend the U.S. dollar or another developed country's currency modeling for developing countries whose currencies may be inconvertible for numerous reasons including high inflation.

THE IMPACT OF INFLATION AND EXCHANGE RATE RISK

As a first level of approximation, cash flows should be estimated as conditional on PPP price levels and exchange rates. At a finer level, adjustments should be made to account for possible deviations from PPP. In a nutshell, **absolute** PPP indicates that identical goods must sell at identical prices in different countries when denominated in a common currency. Otherwise, competitive forces will move relative prices or exchange rates.

In reality, imperfections — for example, transportation and distribution costs, taxes and subsidies — may not permit perfect equalization. Thus, only **relative** PPP may hold, in which changes in relative price levels (inflation rates) are reflected in exchange rate changes. For example, an increase in country A's price level relative to that of country B should cause country A's currency to depreciate against country B's.

Figure 2 summarizes inflation and exchange rate statistics for major countries. If PPP holds, then the entries in the last two columns of Figure 2 should be approximately equal. As Figure 2 indicates, PPP holds, within a 10% tolerance, for countries that suffer (or have suffered)

[4] See *Purchasing Power Parity — Relevant for the 1990s?*. Anita Lauria and Niso Abuaf. Salomon Brothers Inc. March 1991; and *The Executive's Guide to Foreign Exchange Exposure Management*, Niso Abuaf et al.. Salomon Brothers Inc. September 1993.

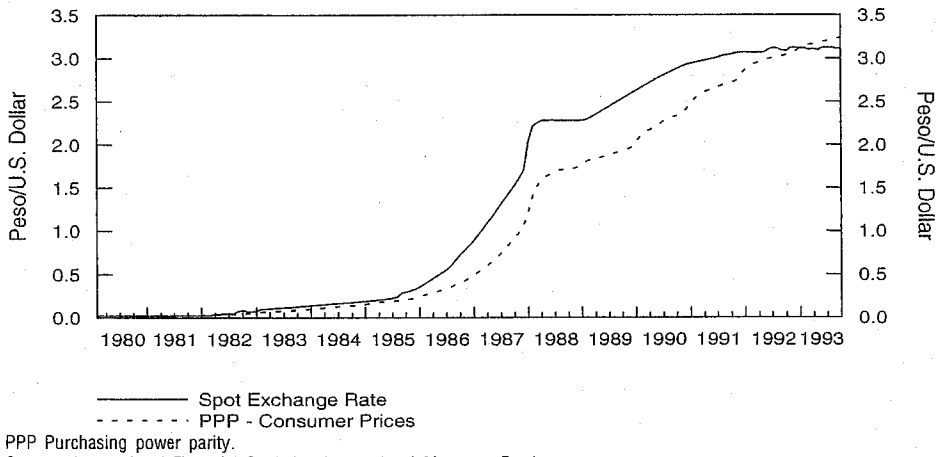
hyperinflationary episodes — measurement problems notwithstanding. In addition, PPP holds for countries that are in close economic cooperation and near monetary union. This is illustrated in Figure 3, which plots the actual and PPP-implied exchange rates of the French franc versus the Deutschemark.

Every April, *The Economist* applies the PPP theory by comparing the relative prices of a McDonald's Big Mac around the world. For example, the magazine found recently that a Big Mac cost $2.69 in Germany and $2.30 in the United States, implying 17% overvaluation of the Deutschemark with respect to the U.S. dollar. A year ago, the Deutschemark had been 30% overvalued with respect to the U.S. dollar. We recommend that analysts valuing international projects should use this Big Mac PPP estimate at least as a benchmark, if not as a predictor.

The implications of this principle are that long-term international investments in hyperinflationary countries or countries that are in close economic and monetary cooperation can be evaluated in a single currency such as the U.S. dollar. For example, investments in most Latin American countries can be modeled in U.S. dollars. Similarly, an investment in a high-inflation country such as Turkey could be modeled in the Deutschemark because we would expect the Turkish lira to follow PPP with respect to the Deutschemark — particularly given Turkey's close economic ties to Germany. PPP may not hold among countries such as Germany, Japan and the United States, particularly in the short run — intervals up to five years (see Figures 4-5).[5]

Because there are deviations from PPP in the short run, especially among developed countries, some theorists and practitioners argue that an exchange rate risk should be reflected in the discount rates. Recent empirical evidence, however, suggests that the market charges a small, unstable and unpredictable risk premium to foreign exchange rate exposures. Moreover, these forward premiums are significantly smaller than the approximately ±2-percentage-point differences associated with estimating the cost of capital. Consequently, our analysis assumes a zero risk premium for exchange rate risk.

Figure 1. Purchasing Power Parity in High-Inflation Countries — Mexico versus the United States, 1980-93 (Base Year, 1980)



PPP Purchasing power parity.
Source: *International Financial Statistics*, International Monetary Fund.

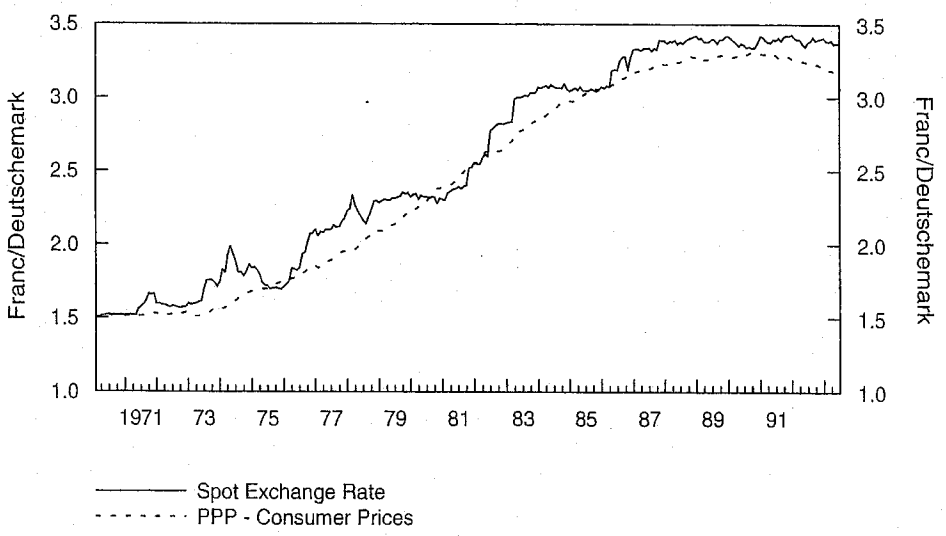
[5] See Niso Abuaf and Philippe Jorion, "Purchasing Power Parity in the Long Run," *The Journal of Finance*, March 1990. In this article, econometric tests find evidence that PPP may hold in the long run and estimates that it takes about three years to reduce deviations from PPP in half.

Figure 2. Does Purchasing Power Parity Hold? 1974-93[a]

	Country	Inflation Rate	Actual Currency Appreciation (Depreciation) vs. the U.S. Dollar	Currency Appreciation (Depreciation) vs. the U.S. Dollar Implied by PPP
North America	United States	5.96%		
	Canada	6.53	(1.53)%	(0.54)%
Europe	Austria	4.37	1.77	1.50
	Belgium	5.44	0.00	0.49
	Denmark	6.81	(0.96)	(0.80)
	Finland	7.84	(2.58)	(1.77)
	France	7.25	(1.52)	(1.22)
	Germany	3.45	1.70	2.37
	Greece (1975-93)	17.60	(11.41)	(11.32)
	Iceland (1985-92)	17.70	(7.12)	(11.98)
	Ireland	9.11	(2.67)	(2.97)
	Italy	11.64	(5.24)	(5.36)
	Luxembourg (1985-93)	2.48	3.97	1.17
	Netherlands	4.10	1.35	1.76
	Norway	7.26	(1.96)	(1.23)
	Portugal (1975-93)	15.80	(10.89)	(9.62)
	Spain	11.41	(5.04)	(5.14)
	Sweden	8.09	(3.83)	(2.01)
	Switzerland	3.51	2.77	2.31
	United Kingdom	9.25	(2.44)	(3.10)
Latin America	Argentina (1977-93)	260.33	(216.03)	(241.22)
	Brazil (1975-93)	263.10	(283.12)	(243.71)
	Chile (1975-93)	36.75	(24.12)	(29.45)
	Colombia (1980-93)	24.52	(18.33)	(18.90)
	Mexico	39.74	(33.68)	(31.88)
	Venezuela (1975-93)	21.28	(19.41)	(14.80)
Australasia	Australia	8.11	(3.59)	(2.03)
	China (1985-90)	10.26	(10.23)	(5.94)
	Hong Kong	8.50	(2.41)	(2.40)
	India (1975-93)	7.77	(7.18)	(2.02)
	Indonesia (1986-93)	7.84	(3.88)	(4.01)
	Japan	4.32	5.09	1.55
	Korea (1975-93)	10.28	(2.89)	(4.39)
	Malaysia	4.10	(0.80)	1.76
	New Zealand	9.98	(4.60)	(3.79)
	Philippines (1975-93)	12.79	(7.38)	(6.77)
	Singapore	3.16	1.91	2.64
	Thailand (1975-93)	6.45	(1.24)	(0.77)
Middle East	Israel (1977-92)	67.59	(61.82)	(58.43)
	Jordan (1975-92)	8.60	(4.16)	(2.80)
	Turkey (1975-93)	48.14	(46.46)	(40.23)

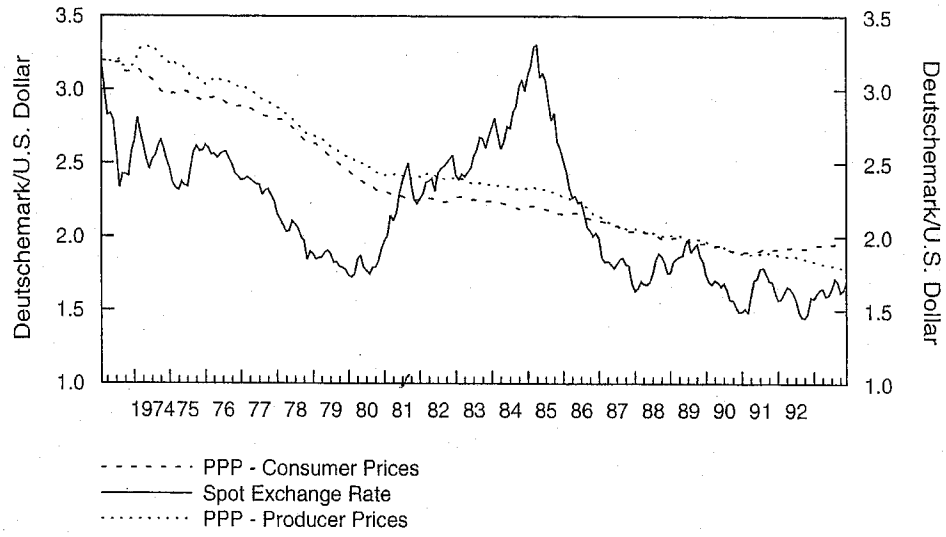
[a] Except where indicated.
Sources: *International Financial Statistics*, International Monetary Fund and Ibbotson Associates, Inc.

Figure 3. Purchasing Power Parity Within the European Monetary System — France versus Germany, 1970-93 (Base Period, 1970)



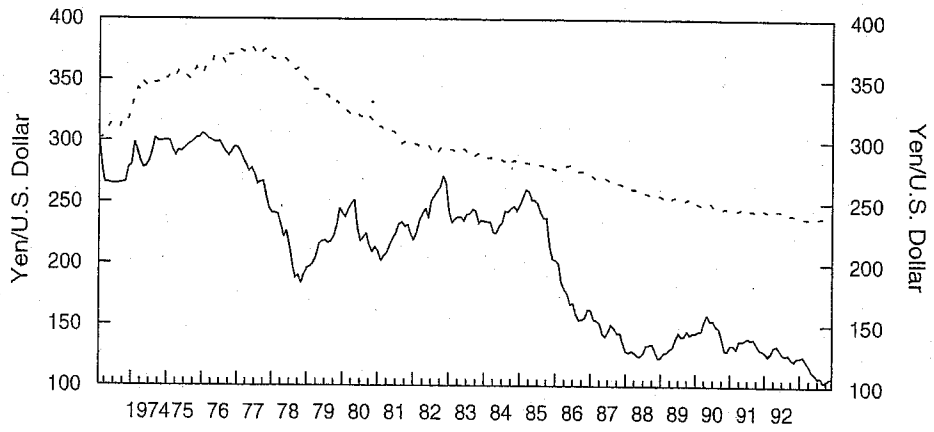
PPP Purchasing power parity.
Source: *International Financial Statistics*, International Monetary Fund.

Figure 4. The U.S. Dollar — Purchasing Power Parity Exchange Rates versus the Deutschemark, 1973-93 (Base Period, 1973)



PPP Purchasing power parity.
Source: *International Financial Statistics*, International Monetary Fund.

Figure 5. The U.S. Dollar — Purchasing Power Parity Exchange Rates versus the Japanese Yen, 1973-93 (Base Period, 1973)



PPP Purchasing power parity.
Source: *International Financial Statistics*, International Monetary Fund.

THE IMPACT OF POLITICAL RISK

Hurdle rates used for investments in developing countries may reflect political risk such as expropriation, inconvertibility of receivables, civil unrest, institutional instability, and other acts that would reduce the present value of a project. Conversely, political risk does not pose a major concern for developed countries unless a project has export- or import-type exposures to developing countries.

In principle, political risk may affect either discount rates or cash flows. Theoretically, the following hold true:

- If political risk is a function of world macroeconomic conditions, then it should be reflected in the discount rate; and[6]
- If political risk is independent of world macroeconomic conditions, then the relevant cash flows should be appropriately altered.

Usually, political risk is more closely correlated with local conditions than with world macroeconomic conditions. As such, theory suggests that expected cash flows should be penalized because of political risk. However, adjusting expected cash flows because of political risk can be as *ad hoc* as adjusting the discount rate. Indeed, in practice, most adjustments for political risk are made to the cost of capital used in discounting cash flows.[7] Guidelines in applying and estimating the political risk premium are as follows:

[6] According to the capital asset pricing model, the discount rate captures undiversifiable risk. As such, if political risk is a function of world macroeconomic conditions, then, almost by definition, it cannot be diversified away. Hence, under such conditions, political risk should be reflected in the discount rate. If, however, political risk is independent of world macroeconomic conditions, then it can be diversified away. Therefore, such political risk is captured by the expected cash flows rather than the discount rate.

[7] See Wicks, Kelly, M.E., Philippatos, G.C., "Comparative Analysis of Foreign Investment Evaluation Practices Used by U.S. Based Manufacturing Multinational Companies," *Journal of International Business Studies*, Winter 1982, pp. 19-42.

• **Apply the political risk premium to most likely, not expected, cash flows.** In principal, cash flows should be modeled as expected cash flows — that is, as cash flows under each possible future scenario weighted by the probability of that scenario. A political risk premium applied to these cash flows would amount to double counting. In practice, however, cash flow estimates used are those that are expected under the most likely set of future circumstances. A political risk premium should be applied to such cash flows.

• **In applying a political risk premium, pay attention to the time pattern of uncertainties.** An investor's unfamiliarity with a country decreases over time. Consequently, when modeling unfamiliarity is part of the discount rate, such a discount rate should decrease over time. Similarly, regulatory uncertainty also may decline or remain stable over time.

• **Estimate the political risk premium.** Despite various caveats, a decision maker is frequently asked to assess a country's political risk premium and a country's cost of capital. To assess the impact of political risk, an analyst can rely on three data sources:

(1) **fixed-income risk premiums** on a given country's convertible currency (for example, U.S. dollar, Deutschemark or Japanese yen), public debt or bank loans;

(2) **insurance premiums** charged by government agencies such as the Overseas Private Investor Corporation; and

(3) **country and political risk ratings** published by *Institutional Investor*, *The Economist* Intelligence Unit or U.S. bond rating agencies.

• **Bond risk premiums.** Frequently, an upper bound on the size of the political risk premium that is added to the developing country hurdle rate can be estimated by calculating the dollar-denominated yields of the specific country's sovereign bonds versus U.S. Treasuries. This spread would be considered an upper bound, because the probability of expropriation of a local project typically is lower than the default risk of a developing country's Government bond. In addition, investing in a foreign country and holding a foreign bond are not identical. A bondholder can, at best, get his principal back and, at worst, lose his principal. Conversely, a foreign investor may have significant upside potential and an ability to significantly manage downside outcomes. In fact, some commentators have likened bonds to straight preferred stock, and direct investment to cumulative participating preferred. To obtain a range estimate of expropriation risk, one must analyze spreads on U.S. dollar-denominated local corporate bonds versus U.S. Treasuries. Figure 6 summarizes indicative yields on various Latin American country bonds.

Estimating a certain country's political risk premium is not as straightforward as it appears, because even sovereigns or close-sovereigns may have various types of debt that trade at different yields in different markets. As such, an analyst has to rely on various spreads to estimate a country's true political risk premium. To estimate this premium, we typically analyze three types of bonds: (1) Yankee bonds; (2) Brady bonds; and (3) Eurobonds.

The Yankee market is the one through which high-quality sovereigns and foreign corporations raise funds in the United States (see Figure 7). This market is liquid and deep, imposing significant disclosure requirements on its borrowers. A sovereign or a foreign corporation that issues in the Yankee market is regarded as being able to withstand Securities and Exchange Commission (SEC) or U.S. institutional investor scrutiny.

Consequently, ability to issue in the Yankee market signals a level of financial quality not afforded to everyone. Partially as a result, Yankee spreads are the lowest. In some cases, Yankee issues do not go beyond fiv to ten years — a reality that causes difficulty in estimating long-term political risk premiums.

Brady bonds are obligations of a developing-country government issued after lengthy negotiations involving the sovereign, major commercial bank lenders and international agencies. These bonds alleviate a sovereign's deb burden, placing it back on the well-functioning international financial map

Typically, a Brady bond has its principal collateralized by zero-coupon U.S. Treasuries and two or three semiannual coupon payments backed by at least double-A-rated securities. The remaining coupons reflect the sovereign's country and credit risk. The blended yield of the Brady bond i a weighted average of U.S. government rates and the pure sovereign rate, known as the stripped yield.

The Eurobond market is not as institutionalized as the Yankee or Brady bond market. Historically, the Eurobond market has been dominated by private individuals. Most issues are in bearer form and this market does nc impose as onerous disclosure requirements as the U.S. market. These institutional reasons — the market's size, investor base, and tax considerations — explain why spreads in the Euromarket may differ from those in the Yankee and Brady bond markets.

Certain developing countries may not have meaningful sovereign debt instruments that trade. (For example, some countries have nonperforming loans that trade.) Unfortunately, the spreads of these nonperforming loans are difficult to calculate. Consequently, one must analyze spreads of comparable-country loans to estimate the correct political risk premium.

- **Simulation analysis**, which incorporates the risks of expropriation, also may provide insight regarding the appropriate political risk premium. In a simulation analysis, one assigns various expropriation probabilities along the target project's horizon. When calculating the expected NPV of such a stream, the implied discount rate is computed and, hence, the penalty for expropriation risk.

- **Additional factors** may affect the political risk penalty applied to the discount rate. For instance, whether the investment is in a politically sensitive industry sector or geographic area may be a factor. Sometimes investments in developing countries might be considered to reduce risk if they result in diversifying the project portfolio of the parent firm. For example, Greece and Turkey have **stock market betas** with respect to the U.S. stock market that almost equal zero, suggesting that these countries provide **diversification** for a U.S.-based investor. Conversely, Mexico's beta is about 0.77, suggesting that this country's risk more closely follows that of the U.S. stock market. As such, political risk premiums may be approximately reduced to account for diversification.

- If cash flows are modeled in **local currency** terms, the local risk-free rate should be used as the first building block. The EMRP, the beta and the political risk premium used for U.S. dollar modeling are identically used for local currency modeling, because the local risk-free rate embodies local market conditions (such as the local real rate and local inflationary expectations). As such, additional factors such as equity market risk and political risk are viewed as add-ons that are independent of the currency o denomination. Stated differently, if these risk factors were functions of the currency of denomination, then we would be double counting.

• Any remaining risk specific to the locale should be handled by adjustments to expected cash flows.

Figure 6. Indicative Yields for Selected Developing Country Credits, Aug 94

Bonds	Stripped Yield Spread[a]	Average Life	Final Maturity
Argentina Bonex, 1989	446bp	2.90Yrs.	12/99
Brazil Investment Bonds	971	11.86	09/13
Brazil New Money Bonds	851	2.69	10/99
Mexico Aztec	487	13.66	03/08
Mexico Par Bonds	432	25.41	12/19
Mexico Discount Bonds	452	25.41	12/19
Venezuela Conversion Bonds	2108	8.37	12/07
Venezuela Discount Bonds	1923	25.66	03/20
Venezuela Par Bonds	1649	25.66	03/20

[a] Defined as the internal rate of return of the pure country risk component of the bond — excluding non-local country (for example, U.S. Treasury) guarantees. bp Basis points.
Note: A description of these various bonds is beyond the scope of this report. We suggest that the reader focus on the yield difference of the various country bonds with respect to U.S. Treasuries. For detailed explanations of these various bonds, please consult the numerous Salomon Brothers Inc publications prepared by the Emerging Markets Debt Trading Desk and the Bond Portfolio Analysis Group.
Source: Salomon Brothers Inc.

Figure 7. Indicative Yield for Selected Yankee Bonds, Aug 94

Issuer	Maturity	Terms	Spread, 8/14/94
Kingdom of Thailand	03/02	10NC-L	+78 bp vs 10 Yr.
Republic of Turkey	06/99	7NC-L	+660 bp vs ACT
United Mexican States	09/02	10NC-L	+228 bp vs 10 Yr.
Korea Electric Power Co.	04/13	20NC-L	+155 bp vs 30 Yr.
Export-Import Bank of Korea	05/00	7NC-L	+110 bp vs 7 Yr.
Petronas (144A)	07/03	10NC-L	+76 bp vs 10 Yr.
Pohang Iron & Steel Co.	07/03	10NC-L	+120 bp vs 10 Yr.
China Int'l Trust & Investment	08/03	10NC-L	+105 bp vs 10 Yr.
National Bank of Hungary	11/03	10NC-L	+330 bp vs 10 Yr.
National Bank of Hungary	11/13	20NC-L	+350 bp vs 30 Yr.
Korea Electric Power Co. (Global)	12/03	10NC-L	+112 bp vs 10 Yr.
Pemex (144A)	12/23	30NC-L	+277 bp vs 30 Yr.
Korea Development Bank	12/98	5NC-L	+82 bp vs ACT
Korea Development Bank	12/05	12NC-L	+125 bp vs 10 Yr.
Republic of Argentina (Global)	12/03	10NC-L	+385 bp vs 10 Yr.
Bancomext (Global)	02/04	10NC-L	+271 bp vs 10 Yr.
People's Republic of China (Global)	02/04	10NC-L	+100 bp vs 10 Yr.
Republic of Colombia	02/04	10NC-L	+180 bp vs 10 Yr.
Bank of China	03/99	5NC-L	+90 bp vs 5 Yr.
Bank of China	03/14	20NC-L	+155 bp vs 30 Yr.

ACT Actual. bp Basis points. NC-L Noncall-life.
Source: Salomon Brothers Inc.

OTHER FACTORS: TAXES AND FINANCIAL INCENTIVES

Several other factors such as tax regime differences, customs issues and financial incentives may complicate international capital-budgeting analysis. All of these factors should be reflected in the cash flows.

For instance, for a U.S. parent, the taxes due on any foreign project should reflect the interaction of local and U.S. taxes. (The interaction of these taxes is a complex matter that is beyond the scope of this report.) In particular, managers should address the following tax implications: repatriating income to the United States; structuring the foreign operation as a subsidiary or a branch, which, in turn, may affect local taxation; and the effects of these actions on foreign tax credits.

Similarly, concessional financing arrangements can be reduced to an NPV that should be added to the overall project value. In analyzing a loan at below-market rate, its present value should be computed by discounting promised payments on the loan by an "arm's-length" rate in the same currency and with the same degree of credit risk, and then subtracting the resulting amount from the face value of the loan.

The presence of other factors such as taxes and financial incentives may imply that a target project's cash flow streams must be broken down into various building blocks with varying risk-reward profiles that should not be lumped into one aggregate category. Naturally, appropriate (but different) hurdle rates should be applied to cash flows with separate risk characteristics to obtain separate NPVs. These NPVs can then be added together to capture the total NPV of the project. This approach is sometimes characterized as the **adjusted present value approach (APV)**.

THE EMPIRICAL EVIDENCE: THE COST OF DEBT FINANCING

In the following two sections, we analyze the historical record on the worldwide costs of debt and equity financing. The data fail to suggest in any significant way the existence of important and persistent cost of capital differences especially among developed countries. Nevertheless, episodic advantages exist that one country may enjoy with respect to another.

The cost of debt financing can be readily observed by examining historical yields on Government and corporate bonds. Figures 8-9 present historical averages of nominal and inflation-adjusted (real) costs of Government and corporate borrowing.

The cost of Government borrowing represents one of the most important building blocks for measuring all other types of borrowing, including equity costs within an economy. Consequently, a particular country's cost advantage in public-sector financing likely is replicated in its private sector. The averages in Figures 8-9 support this view.

To place the yields in Figures 8-9 in the proper perspective, Figure 10 summarizes historical averages of inflation and economic growth rates for a wide variety of countries.

In addition, Figure 11 presents expected corporate yields, inflation rates and real rates for a select group of countries. As Figures 8-11 indicate, the inflation-adjusted (real) cost of debt differences, excluding political risk, among countries has not been as significant as nominal cost of debt differences.

Figure 8. Average Long-Term Government Bond Yields, 1970-93[a]

	Country	Government Bond Yields	
		Nominal	Real[b]
North America	United States	8.72%	2.87%
	Canada	9.97	3.66
Europe	Austria (1971-93)	8.28	3.59
	Belgium	9.31	3.84
	Denmark (1989-93)	8.90	6.54
	Finland (1977-92)[c]	9.88	1.78
	France	10.74	3.57
	Germany	7.77	3.91
	Greece (1970-92)[c]	17.60	0.77
	Iceland (1978-92)[c]	29.89	(1.82)
	Ireland (1982-93)	11.26	2.15
	Italy	12.42	1.46
	Luxembourg (1970-92)	7.96	2.79
	Netherlands (1984-93)	7.42	6.39
	Norway (1973-93)	10.17	2.88
	Portugal (1970-73, 1976-91)	13.81	(1.86)
	Spain (1988-93)[c]	12.48	6.69
	Sweden (1980-93)	11.64	4.35
	Switzerland (1980-93)	11.64	8.01
	United Kingdom	11.22	2.05
Latin America	Argentina (1984-92)[c]	356.74	(12.40)
	Brazil (1970-89)[d]	85.00	(10.66)
	Chile (1977-92)[c]	48.00	17.06
	Colombia (1980-92)[c]	31.28	5.32
	Mexico (1978-85, 1987-92)[d]	39.57	(3.52)
	Venezuela (1984-92)[c]	17.22	(9.81)
Australasia	Australia (1977-93)	11.76	4.61
	India (1978-92)[c]	16.41	6.87
	Indonesia (1986-90, 1992)[c]	21.93	13.51
	Japan	6.68	1.54
	Korea (1980-92)[c]	11.43	1.13
	Malaysia (1976-91)[c]	8.67	4.75
	New Zealand (1970-92)	10.66	0.54
	Philippines (1976-92)[c]	17.90	3.92
	Singapore (1978-92)[c]	8.21	3.98
	Thailand (1976-92)	10.57	3.95
Middle East	Israel (1979-89, 1991-92)[c]	125.85	21.09
	Jordan (1970-91)[e]	6.15	(2.79)
	Turkey (1978-87)[c]	36.83	(6.63)

[a] Except where indicated otherwise. [b] Defined as average yield minus average inflation rate when the average nominal interest rate is 15% or below. Otherwise, defined as the geometric difference of the series. [c] Lending rate. [d] Treasury bill rate. [e] Discount rate.
Sources: *International Financial Statistics*, International Monetary Fund and Ibbotson Associates, Inc.

Figure 9. Average Corporate Bond Yields, 1970-92[a]

	Country	Corporate Bond Yields[b]	
		Nominal	Real
North America	United States (1973-92)	10.04%	3.74%
	Canada	10.95	4.44
Europe	Austria	8.32	3.59
	Belgium (1970-82)	10.60	3.23
	France	11.36	3.96
	Germany	8.20	4.35
	Italy	13.08	1.56
	Netherlands	8.34	3.61
	Spain (1970-83)	12.76	(1.61)
	United Kingdom	12.61	3.11
Asia	Japan	7.40	2.10

[a] Except were indicated otherwise. [b] Based on an index of investment-grade, medium-term corporate bonds.
Sources: *International Financial Statistics*, International Monetary Fund and Ibbotson Associates, Inc.

Such empirical evidence at least partially supports the theory that nominal interest rates move in step with inflationary expectations.[8]

Figure 10. Average Inflation and Real Economic Growth Rates, 1970-93[a]

	Country	Consumer Price Inflation[b]	Economic Growth[c]
North America	United States	5.85%	2.31%
	Canada	6.31	3.22
Europe	Austria	4.68	3.46
	Belgium (1970-91)[d]	5.47	2.73
	Denmark[d]	7.01	2.29
	Finland[d]	7.84	3.56
	France	7.17	3.19
	Germany	3.86	3.08
	Greece (1970-91)[d]	16.60	2.33
	Iceland[d]	29.22	4.05
	Ireland (1970-91)	9.11	3.03
	Italy	10.96	4.02
	Luxembourg (1970-90)[d]	5.10	4.33
	Netherlands[d]	4.64	3.42
	Norway[d]	7.45	3.17
	Portugal (1970-90)	15.27	2.96
	Spain (1970-91)[d]	11.08	4.63
	Sweden[d]	7.96	2.36
	Switzerland	4.21	2.21
	United Kingdom (1970-89)	9.17	2.68
Latin America	Argentina (1976-88)	196.68	1.10[f]
	Brazil (1974-88)	188.19	1.90[e]
	Chile	36.75	10.30
	Colombia (1970-91)	22.91	4.79
	Mexico	34.19	1.40[e]
	Venezuela	18.20	4.24
Australasia	Australia	7.96	3.73
	China (1979-90)	6.66	6.63
	Hong Kong	8.66	6.30[e]
	India (1970-91)	8.73	4.34
	Indonesia (1970-91)	12.16	8.12
	Japan	5.14	3.94
	Korea	10.11	9.84
	Malaysia (1970-91)[d]	4.47	7.36
	New Zealand (1970-91)[d]	9.73	2.86
	Philippines	13.98	2.52
	Singapore (1970-91)	4.15	8.52
	Thailand (1970-90)	6.47	6.30
Middle East	Israel (1977-92)	51.64	8.85
	Jordan (1970-91)	8.80	3.69
	Turkey (1971-92)	41.69	5.54

[a] Except were indicated otherwise. [b] Consumer price inflation for 1970-93, except Chile which is for 1975-93. [c] Real gross domestic product growth for 1970-92, unless otherwise noted. [d] Real gross national product growth. [e] 1980-93. [f] 1983-92.

Sources: *International Financial Statistics*, International Monetary Fund and Ibbotson Associates, Inc., and the *Economist*.

[8] International interest rate differentials embody expectations about future exchange rate changes. Thus, an exhaustive study of international cost of capital differences should incorporate foreign exchange market developments. Unfortunately, over our sample period, long-dated foreign exchange markets were not fully developed, rendering an exchange rate-adjusted cost-of-capital comparison nearly impossible. Consequently, this study relies primarily on inflation-adjusted cost-of-capital comparisons.

Figure 11. Government Yields and Expected Inflation Rates for Selected Countries, Jul 94

Country	Three-Year Government Yields	Expected Inflation[a]	Expected Real Rate[a]
United States	6.46%	3.2%	3.26%
Canada	8.54	2.0	6.54
Germany	6.08	2.0	4.08
Japan	3.06	0.6	2.46
United Kingdom	7.82	2.8	5.02
France	6.54	1.5	5.04
Australia	8.44	2.5	5.94

[a] Based on Salomon Brothers Inc's 1994 estimates.
Source: Salomon Brothers Inc.

THE EMPIRICAL EVIDENCE: THE COST OF EQUITY FINANCING

Conventional Methodologies

Unlike expected debt yields, expected total equity returns are not readily observable. Even though this presents a variety of measurement problems, methodologies have been developed to estimate expected equity returns. In this section, we first discuss conventional methodologies based on observed accounting and financial measures. Subsequently, we review the modern finance approach to equity cost-of-capital estimation.

Theoretically, the cost of equity equals expected economic profits per unit of equity investment plus the expected profit growth rate. Conventional methodologies develop proxies for economic profits per unit of equity investment by using observed equity market prices, reported accounting data and realized dividend yields. The most common measures are the inverse of the price/earnings (P/E) ratio — that is, the earnings/price (E/P) ratio — and the dividend yield (defined here as current dividends divided by share price).[9] To be theoretically correct, growth rates have to be added to these measures.

Because of differences in accounting and business practices in various countries, accounting earnings do not always reflect true economic earnings.[10] Moreover, accounting measures such as E/P ratios do not incorporate profit growth rates, which are essential to calculate current equity cost-of-capital measures. Consequently, P/E ratios and their inverses may be misleading in estimating cost-of-capital differences across countries.

These caveats notwithstanding, Figure 12 presents international P/E averages. Assuming a zero-profit growth rate, a P/E ratio of ten implies a 10% equity cost of capital, while a P/E ratio of 12 implies an 8.3% equity cost of capital.

Another conventional measure for estimating the equity cost of capital is the dividend yield. Similar to E/P ratios, dividend yields also have to be adjusted to incorporate expected growth rates. Figure 13 presents international dividend yield averages.

[9] The cost of equity capital $k_e = (p \times E/P) + g$, where p is the expected dividend payout ratio out of earnings, E/P is the earning/price ratio, and g is the expected constant growth rate of earnings or dividends. This formulation assumes that p is constant and that k_e is greater than g. Alternatively, p E/P can be interpreted as the dividend yield.

[10] This is especially true for Japan and has been extensively documented in academic and professional literature. See *Cost of Capital in Japan and the United States: A Tale of Two Markets*, Salomon Brothers Inc, July 1990.

Figure 12. Price/Earnings Profiles, Jan 73-Dec 93

	Country	Sample Average	Jun 90-Dec 93	Dec 93
North America	United States	12.40	19.88	19.60
	Canada (Jan 74-Jun 91)	13.54	21.92	25.50
Europe	Belgium (Jan 80-Jun 91)	12.22	13.11	16.90
	France	11.37	12.05	12.60
	Germany	12.24	16.22	19.60
	Ireland (Jan 75-Jun 91)	9.78	12.90	13.80
	Italy (Jan 89-Jun 91)	17.00	15.29	18.80
	Netherlands	9.20	12.13	13.20
	Switzerland	11.52	12.76	13.70
	United Kingdom	11.91	16.98	18.00
Asia	Hong Kong	14.56	13.51	14.50
	Japan	32.27	40.96	56.20
	Thailand (Jan 77-Jun 91)	14.28	13.50	13.70

Source: Interactive Data.

Figure 13. Annualized Dividend Yields, 1970-93

	Country	Sample Average	Jan 93-Dec 93
North America	United States	4.24%	2.93%
	Canada	3.82	3.09
Europe	Austria	2.94	1.63
	Belgium	6.62	5.14
	Denmark	4.00	1.47
	Finland (1988-92)	2.38	1.52
	France	4.39	2.38
	Germany	3.23	2.35
	Greece (1976-93)	5.86	4.85
	Italy	3.03	2.79
	Netherlands	5.95	4.44
	Norway	3.50	2.04
	Portugal (1986-93)	2.36	2.95
	Spain	6.99	5.46
	Sweden	4.01	1.86
	Switzerland	2.69	2.12
	United Kingdom	5.16	3.37
Latin America	Argentina (1976-93)	1.31	2.28
	Brazil (1976-93)	5.58	0.40
	Chile (1976-93)	5.37	2.74
	Colombia (1985-93)	6.02	1.88
	Mexico (1976-93)	5.22	1.65
	Venezuela (1985-93)	1.51	2.35
Australasia	Australia	4.65	3.84
	India (1976-93)	2.96	1.00
	Indonesia (1990-93)	0.96	1.25
	Japan	1.91	5.89
	Korea (1976-93)	3.97	0.63
	Malaysia (1985-93)	2.09	1.05
	New Zealand (1988-93)	5.89	5.32
	Phillipines (1985-93)	2.34	0.35
	Thailand (1976-93)	6.22	1.51
Middle East	Jordan (1978-93)	3.76	2.71
	Turkey (1987-93)	5.46	2.39

Source: Ibbotson Associates, Inc.

Modern Finance Theory

Modern finance theory states that the cost of equity equals the equilibrium expected return to equity holders. Unlike the conventional approach, however, modern finance theory focuses on observed and expected returns in the securities markets and ignores accounting-based measurements.

The most prominent modern theory is the CAPM, which states the following for a given security:

Expected Return = Risk-Free Rate + "beta" x EMRP.

A given security's beta measures the degree to which the security's price movements follow the overall equity market's price movements.[11] The EMRP measures the return that equity investors require above the return on riskless investments. The beta and the EMRP are often estimated using historical data. As is the case with all historical estimates, the user should be aware that history may not necessarily repeat itself.

Indeed, even the choice of the estimation period is somewhat arbitrary, although some guidelines exist. Over long periods of time, the financial markets likely will absorb most of the types of economic shocks that cause equity premiums to fluctuate. Therefore, a long-term average of historical risk premiums arguably would appear to best forecast investor expectations and future realized returns. Conversely, some analysts would argue that the immediate future more likely resembles the immediate past. Such analysts would be inclined to use recent and shorter averaging periods rather than longer ones.

In addition, rolling 30-year stock market standard deviations declined from about 25% in 1955 to about 15% in 1993 — suggesting a downward trend for equity market risk premiums. EMRPs also may be a function of the underlying level of interest rates. That is, EMRP may tend to rise in high interest rate environments and to decline in low interest rate environments. Alternatively, one also can use forecast or forward-looking equity market risk premiums or implied equity market risk premiums based on earnings estimates.

[11] See *The Financial Executive's Guide to the Cost of Capital*, Peter B. Blanton, Eric B. Lindenberg and Kevin L. Thatcher. Salomon Brothers Inc, June 1990.

For example, the arithmetic average risk premiums for the overall U.S. equity market (with respect to long-term Government bonds) over various time periods are illustrated in Figure 14.

Figure 14. Arithmetic Average Risk Premiums for U.S. Equity Market, 1926-93

Period	Risk Premium
1926-93	7.2%
1946-93	6.9
1964-93	3.7
1974-93	4.9
1984-93	6.7
1989-93	7.4

Source: Ibbotson Associates, Inc.

Ultimately, the choice of the averaging time period is best left to the final decision maker's judgment.

Many analysts use the 7.2% long-term average rate because of its robustness and the diversity of economic events occurring during this extended time period. Other analysts may use equity market risk premiums as low as 5%. Given such uncertainty, analysts should value projects using equity market risk premiums ranging from 5%-7.2%. Such an exercise helps decision makers appreciate the sensitivity of their valuations to the underlying assumptions.

As Figure 15 illustrates, the European EMRPs generally exceeded those in the United States over the 1970-92 period. However, the large size of the standard deviations of the estimates suggest that, statistically speaking, various countries' EMRPs are indistinguishable.

Figure 15. Selected Average Equity Market Risk Premiums, 1970-92[a]

	Country	Equity Market Total Return — Long-Term Govt Bond Yield	Standard Deviation
North America	United States	3.21%	16.33%
	Canada	1.39	17.27
Europe	Austria (1971-92)	3.49	32.78
	Belgium	5.83	23.70
	Denmark	5.65	35.95
	Finland (1988-92)	(14.75)	23.04
	France	5.40	28.36
	Germany	2.17	26.76
	Greece (1976-92)	(0.42)	38.21
	Ireland (1980-92)	8.23	41.53
	Italy	1.19	38.01
	Netherlands	5.46	22.67
	Norway	9.31	50.11
	Portugal (1987-91)	17.76	78.46
	Spain (1978-92)	(2.29)	29.78
	Sweden	8.66	28.40
	Switzerland	4.39	23.82
	United Kingdom	8.04	36.01
Latin America	Argentina (1984-92)	285.18	827.00
	Brazil (1976-89)	63.73	25.18
	Chile (1977-92)	16.93	48.35
	Colombia (1985-92)	45.88	66.22
	Mexico (1978-92)	23.43	44.38
	Venezuela (1985-92)	88.59	185.97
Australasia	Australia (1981-92)	2.52	27.68
	India (1978-92)	12.43	25.40
	Japan	8.22	31.95
	Korea (1980-92)	9.72	31.06
	Malaysia (1985-92)	3.65	22.31
	New Zealand (1981-92)	5.00	42.06
	Philippines (1985-92)	51.66	121.36
	Singapore (1978-92)	12.47	27.21
	Thailand (1976-92)	16.68	40.84
Middle East	Jordan (1979-91)	10.10	20.88
	Turkey (1987)	224.15	NA

[a] Except where otherwise noted. NA Not available.
Sources: *International Financial Statistics*, International Monetary Fund and Ibbotson Associates, Inc.

To properly compare EMRPs, the different markets must be placed on an equal footing, particularly concerning the relative real economic growth rates, and the relative debt-to-equity ratios.

The cost of equity capital can be thought of as consisting of two parts: the current return to capital plus the expected growth rate of the future returns to capital. This implies that observed EMRPs have to be adjusted for real economic growth rates, because different expected and realized economic growth rates would suggest different EMRPs.

Similarly, observed EMRPs have to be adjusted for relative debt-to-equity ratios (see Figure 16), because these affect equity returns as a result of leverage. That is, even if foreign and U.S. markets consisted of identical assets, because of their higher leverage, the foreign markets would outperform the U.S. market in bull markets and underperform it in bear markets. Thus, in the worldwide bull market during the 1980s, observed foreign equity risk premiums probably overstated the longer-term premiums.

As Figure 10 shows, developed country real economic growth rates historically have been closely bunched together. Specifically, most developed countries' real economic growth rates are 2.5%-3.5% annually. This suggests that differences in relative stock market performances within the developed countries cannot be attributed to real economic growth differences.

However, selected European companies have had higher, albeit declining, debt-to-capital ratios relative to their comparable U.S. counterparts (see Figure 16). Properly adjusting for this difference may tend to eliminate or reduce the gap between European and U.S. EMRPs.

Figure 16. Debt-to-Capital Ratios of Selected European Companies and Their Comparable U.S. Counterparts, 1979-92[a]

	Sample Average	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979
Netherlands															
Royal Dutch Petroleum	28%	14%	14%	14%	11%	16%	17%	19%	28%	36%	40%	50%	49%	40%	42%
Exxon Corp.	17	15	15	17	20	15	13	14	16	15	15	22	23	15	20
Unilever	29	15	17	21	19	19	15	46	29	30	30	32	41	45	42
Campbell Soup	14	9	9	13	11	14	12	11	11	13	14	17	23	21	8
Philips	66	73	64	74	56	63	68	59	52	58	60	70	76	80	73
Zenith Electronics	39	47	41	45	36	45	53	42	29	30	13	40	49	31	42
Italy															
Fiat S.P.A.	69%	81%	79%	73%	55%	—	—	—	—	—	—	—	—	—	—
General Motors	44	74	82	80%	77	77%	52%	37%	20%	19%	17%	23%	33%	22%	12%
Montedison S.P.A.	72	—	81	75	61	66	78	—	—	—	—	—	—	—	—
Du Pont (E.I.) De Nemours	25	26	21	28	22	20	18	20	19	25	29	41	44	19	18
France															
Rhone-Poulenc SA	62%	61%	64%	72%	50%	—	—	—	—	—	—	—	—	—	—
Dow Chemical	33	32	34	34	24	19%	19%	25%	32%	38%	35%	43%	47%	42%	39%
Thomson CSF	29	25	26	32	18	62	23	19	—	—	—	—	—	—	—
Raytheon Co.	9	10	17	24	21	18	10	2	3	3	4	3	4	3	6

[a] Capital defined as book value of debt plus market value of common plus preferred stock. Debt is defined as book value.
Source: Standard & Poor's Compustat Services Inc.

In this section, we demonstrate, using specific examples, how a manager would estimate the cost of capital in various industries worldwide. We also address how additional complications such as start-up companies should be analyzed. These examples, though hypothetical in nature, draw upon our advisory work in a variety of cross-border capital-budgeting and acquisition assignments.

Example 1:

What Discount Rate Should Be Applied to the Equity Cash Flows of a Petrochemical Company (PCC) in Mexico?

Because Mexico has been a hyperinflationary, developing country with a recently stabilized modest inflation rate, these cash flows should be modeled in the U.S. dollar. Once this decision is made, we calculate a discount rate for an investment in a PCC in Mexico using four **building blocks**:

- The U.S. risk-free rate;
- An equity market risk premium reflecting the risk inherent in investment in equity securities;
- A beta reflecting the business risk of a PCC (that is, the systematic risks of doing business) based on a review of equity returns of comparable U.S. companies; and
- A country/political risk premium reflecting the political risk that a PCC faces by operating in Mexico (that is, unsystematic risks such as expropriation).

Step 1: Risk-Free Rate

The risk-free rate reflects the opportunity cost of U.S. dollars based on expected U.S. inflation and real rates of return. Because equity investments likely are longer term, an appropriate proxy for the risk-free rate is the yield on the long-term U.S. Treasury bond. We assume that the yield on the ten-year U.S. bond is 7.28%.

Step 2: Equity Market Risk Premium

In this step, we add an equity market risk premium for the extra risk associated with investment in equity securities. We recommend the use of an equity risk premium of 7.2% based on 1926-93 data.

Step 3: Determination of Beta

We adapt the equity market risk premium to a PCC's business operations and capital structure by multiplying the premium by an appropriate beta, calculated by the following method, and reflecting its correlation with the equity market.

Figure 17 provides a set of companies that are comparable with PCC's operations. We first unlever their equity betas to obtain asset betas, which are the betas of each firm assuming that each were totally financed with equity. Essentially, an asset beta measures the underlying business risk of the company — excluding the risk caused by financial leverage. This allows us to examine the comparables' betas on an apples-to-apples basis.

Figure 17. Analysis of Comparable Company Capital Structures, Fiscal Year-End 1993

Company	Equity Beta	Debt/Cap. Ratio[a]	Asset Beta[b]
Geon Co.	1.05	11.9%	0.97
Georgia Gulf Corp.	1.91	24.2	1.59
Lyondell Petrochemical	0.92	26.5	0.75
Union Carbide	1.13	18.7	0.95
Median	**1.09**	**21.5**	**0.96**

[a] Market value basis, fiscal year-end 1993. [b] Asset (Unlevered) Beta = Equity Beta/[(1 + (Debt/Equity) x (1 - Marginal Tax Rate)].
Sources: Standard & Poor's Compustat Services Inc. and Salomon Brothers Inc estimates.

Figure 18. Petrochemical Company Asset Beta = 0.96

Target Debt/Cap Ratio[a]	Equity Beta[b]
0.0%	0.96
20.0	1.11
25.0	1.16
30.0	1.22

[a] Market value basis, fiscal year-end 1993. [b] Relevered Equity Beta = Total Group Asset Beta x [(1 + (Debt/Equity) x (1 - Marginal Tax Rate)].
Source: Salomon Brothers Inc.

We then choose the median asset beta from the comparable group and assume that it represents the asset beta of a PCC. To reflect PCC's equity risk, this asset beta is relevered at a PCC's target debt-to-equity ratio, which gives us an equity beta that can be used in the CAPM. If a PCC is fully equity financed, then Figure 17 implies that its beta equals 0.96.

Step 4: Political Risk Premium

The fourth building block in the discount rate calculation takes into account the country/political risks that a PCC faces in Mexico.

Yields on U.S. and Mexican Government obligations can be compared to determine the **spread** between the two as a proxy for Mexican risk. The spread between the two ranges from about 300 basis points (Yankees) to more than 450 basis points (Brady bonds).

Alternatively, the size of the political risk premium can be approximated by evaluating the rate at which high-grade comparable Mexican firms currently borrow in the Euromarkets using U.S. dollars. This rate can then be compared with that of a similar U.S. firm.

Such a difference between the two firms' borrowing rates may reflect the different political risks facing each firm. Illustrative short- to medium-term Mexican Eurodollar placements carry yields of roughly 325 basis points above comparable U.S. yields.

The longer-term yield differential for Mexican Government obligations should be considered as an upper bound, because this reflects default risk rather than generalized country/political risk. Conversely, the short-term yield differential for corporate obligations likely understates longer-term business risk, because events such as political uprisings that may take place over a longer time horizon are not priced into short-term credit risk.

In sum, a midpoint of about 300 basis points reflects appropriately the country/political risk elements inherent in an investment in a Mexican PCC.

Figure 19. Summary Calculation of a 100%-Equity-Financed Investment in a Mexican Petrochemical Company (Applied to U.S. Dollar Cash Flows; Ten-Year Horizon)

1. U.S. Risk-Free Rate	7.28%
2. Equity Market Risk Premium	7.2
3. Multiply by Beta (= 0.96)	6.9
4. Country/Political Risks	3.0
Total	**17.2%**

Source: Salomon Brothers Inc.

Example 2:

What Discount Rate Should Be Applied to the Equity Cash Flows of a Start-Up Paper and Forest Products Company (PAP) in France?

Because France is a developed country, these cash flows should be modeled in the French franc. Once we make this decision, we calculate a discount rate for an investment in a PAP in France using five building blocks:

Step 1: The Risk-Free Rate

Assuming that our project horizon is ten years, we obtain the ten-year French franc Government bond yield, which we assume to be 7.28%.

Step 2: Equity Market Risk Premium

The longer-term equity market risk premium is 7.2%. This assumes that world capital markets are perfectly integrated and that the U.S. long-term equity market risk premium also applies to France. This argument implicitly assumes that the French equity market, on average, has a similar debt-to-equity ratio as that of the United States.

Step 3: Determination of Beta

Figure 20 presents equity and asset betas for a set of companies that well represent paper and forest product companies. As discussed in Example 1, we assign the median asset beta of 0.79 to a PAP.

Figure 20. Paper and Forest Product Company Betas, 1993

Company	Debt/Cap. Ratio	Equity Beta	Asset Beta
Boise Cascade Corp.	71.0%	1.10	0.44
Champion International Corp.	55.3	0.86	0.49
Georgia-Pacific Corp.	45.1	1.35	0.89
International Paper Co.	41.5	1.13	0.79
Weyerhaeuser Corp.	40.1	1.31	0.93
P.H. Glatfelter Co.	15.4	0.86	0.77
Westvaco Corp.	35.5	1.09	0.81
Union Camp Corp.	35.7	0.99	0.74
Scott Paper Co.	46.2	1.21	0.79
Median	**41.5%**	**1.10**	**0.79**

Sources: Standard & Poor's Compustat Services Inc. and Salomon Brothers Inc estimates.

Step 4: Political Risk Premium

France is a developed country that we believe poses little or no country/political risk. Consequently, we assign zero political risk premium to a PAP in France.

Step 5: Start-Up Premium

Some analysts argue that companies in their developing stages have a greater amount of business or asset risk than companies in more mature stages. This suggests that while the traditional pure-play approach provides reasonable approximations to estimating the cost of equity for a mature company, techniques that adjust for their newness and small size may be needed.

For this, we look to the equity market risk premium for small-capitalization companies. These risk premiums over 1926-93 are presented in Figure 21.

Figure 21. Small-Capitalization Companies — Equity Market Risk Premiums, 1926-93

Period	Premium over the S&P 500 Risk Premium
1926-93	3.50%
1949-93	3.30
1964-93	5.50
1974-93	6.40
1984-93	(3.60)
1989-93	0.03

Source: Salomon Brothers Inc.

Of the numbers presented in Figure 21, we prefer the longer-term small-capitalization premium of 3.5% — based on analogous arguments that we made for the overall equity market.

Figure 22. Summary Calculation of a 100%-Equity-Financed Investment in a French Start-Up Paper and Forest Products Company (Applied to French Franc Cash Flows; Ten-Year Horizon)

French Risk-Free Rate	7.28%
Equity Market Risk Premium	7.2
Times Beta (= 0.79)	5.7
Country/Political Risk	0.0
Start-Up Premium	3.5
Total	**16.5%**

Source: Salomon Brothers Inc.

CONCLUSIONS

Based on a review of the academic and professional literature, an analysis of world capital market data and our experience as advisors to various cross-border capital-budgeting as well as mergers and acquisitions projects, we suggest that the following guidelines should be generally used when conducting an international capital-budgeting analysis.

- Model cash flows in local currency for projects domiciled in developed countries;
- Model cash flows in a freely convertible stable currency (the U.S. dollar and the Deutschemark, for example) when modeling cash flows in developing, hyperinflationary countries;
- After choosing the appropriate currency, obtain the same-currency risk-free rate of a maturity corresponding to the project's horizon;

- Assume that world capital markets are virtually integrated and, consequently, apply an equity market risk premium of 7.2% in the context of an international CAPM;
- Calculate an asset beta for a pure-play typical company that is in a virtually identical business to that of the analyzed project;
- Lever the beta to reflect the target project's capitalization ratios;
- Use the cost of equity for equity flows;
- Obtain the appropriate debt rates, tax rates and capitalization ratios to calculate WACCs to be applied to asset cash flows;
- Estimate a country/political risk premium, if applicable;
- Estimate a start-up premium, if applicable; and
- Estimate other additions to or subtractions from risk depending on the specific business situation.

In summary, the process of capital budgeting for international projects demands that the practitioner exercise considerable judgment. The evolution of a decision is as much an art as a science. We expect that the guidelines described in this report will allow the practitioner to proceed in a systematic and rational manner, while also allowing management to make the necessary judgment calls.