CHAPTER 1

The Cost Of Capital

The weighted average cost of capital (WACC) is a critical input for evaluating investment decisions: It is typically the discount rate for net present value (NPV) calculations. And it serves as the benchmark for operating performance, relative to the opportunity cost of capital employed to create value.

Though the Capital Asset Pricing Model (CAPM) has been challenged, it remains the most practical approach to determine a cost of equity. In fact, many perceived limitations arise from challenges in applying the model. We will provide suggestions to deal with the primary difficulties in applying the CAPM: (1) estimating the market risk premium (MRP) for equities; (2) measuring the systematic risk, or beta, of a company; (3) normalizing the riskless rate; (4) estimating an appropriate cost of debt; and (5) estimating global capital costs. Finally, we will also address the related issue of corporate hurdle rates for investment.

The cost of capital is an estimation that should be applied with care to avoid any illusions of false precision. Despite its many degrees of freedom, financial planning time and resources are often better allocated to other areas, such as value creation and risk management. Ultimately, it is the business case, quality of cash flow forecasts, sensitivity analysis, and strategic risk management that will have the greatest impact on value creation.

CALCULATION PITFALLS

WACC is a market-weighted average, at target leverage, of the cost of after-tax debt and equity. We estimate the cost of equity as Rf + beta × MRP, where Rf is the riskless return, market risk premium (MRP) is the expected return premium for bearing equity market risk over the riskless rate, and beta is the systematic risk of the business relative to the market. Estimation of these key inputs (riskless rate, the market risk premium and beta), or degrees of freedom, can lead to a wide range of outcomes.

We normalize the riskless rate with a forward view of the capital markets. We continue to believe that 5 percent is a reliable estimate of the MRP, based on historical data and forward-looking market data.[1] We will provide tools for deriving more reliable estimates of beta in the most problematic areas. This will be especially helpful for business units, unlisted companies, and illiquid stocks with unreliable betas. Direct regression is the most commonly used approach but we also employ alternative methodologies such as constructed betas, portfolio betas, segment regression betas, and multi-variable regression betas.

Beyond these key inputs, the most common pitfalls regard the weightings of debt and equity.

- Financing events per se may not reflect changes in financial policy and may not be permanent changes to the capital structure. Temporary fluctuations in the mix should not affect WACC.
- The WACC for financial institutions is (generally) the cost of equity, as most debt is funding debt (not financing debt) and should be expensed (not capitalized) where the cost of funds is a cost of goods sold (COGS).

Our approach to global corporate capital costs quantifies and captures both sovereign risk and inflation risk. But we recommend that the cash flows be adjusted for the *costs and unsystematic risks* of global investing, coupled with a more rigorous risk analysis. Given the many opportunities for profitable growth abroad, more reliable estimates of global capital costs can help ensure companies will choose to undertake investments that show promise to add value.

The key points of our conceptual rationale and approach are as follows:

- Most companies adjust for sovereign risk. Approaches vary widely between made-up risk premiums and qualitative adjustments to a wide range of quantitative methods, largely based on questionable methods, but most companies do something. Many large-capitalization companies (large caps) approach their five favorite banks each year, with a long list of countries in hand, and compare the responses.
- Most adjustments are too large. Much of the international risk is not systematic risk but is execution risk (poor sourcing and logistics, using too much high-cost expatriate labor, misunderstanding of local market execution) that should be accommodated in the cash flows and not in the discount rate. This parochial view leads to lower growth prospects and lower stock valuations.
- A sovereign risk adjustment for the systematic risk should be made to the cost of debt and the cost of equity. Actual financing choices need

not complicate the picture unless the value of economic subsidies is to be included.

- Sovereign risk premiums may be "triangulated" from country ratings, sovereign yields, stripped Brady yields, and Euros.
- The volatility of a yield is as important as the yield itself. A point estimate of sovereign risk premium may represent false precision. In some cases, a range, derived from the volatility, offers a more practical perspective.
- Avoid quoting a local currency WACC in any market that does not have long-dated local currency borrowings. Though a local currency WACC may be theoretically derived from long-term inflation estimates, the market does not exist for a reason.
- Theoretically, the economic benefit of global diversification can be quantified from country betas and correlations; however, in practice, the numbers are too unstable to be used for financial planning and policy purposes.

MARKET RISK PREMIUM (MRP)

The return premium afforded by stocks over long government bonds (i.e., MRP) is generally believed to be anywhere from 3 to 8 percent. The widely cited Ibbotson and Sinquefeld study (now down from 8 percent, to about 6 to 7 percent) is based on the U.S. arithmetic mean from 1926. It is not that 1926 was an important year in econometric history; this is just when the market tapes started to be archived.

If the study started one year earlier or later, the risk premium would have changed by a full percentage point. Other U.S. studies (employing manual data retrieval) do go back much further (to when the market was largely railroad stocks) and provide estimates closer to the low end of the range.[2] Some studies rely on more recent history and this, again, leads to the lower end of the range.

Provided the data represent a "random walk" and there are no discernible trends up or down, more observations will lead to greater predictive accuracy. However, structural economic changes over the past century make the early data less relevant for estimating expected returns today. Macroeconomic factors have conspired such that, in our opinion, a shorter history is more appropriate.

Based on the arithmetic average of annualized monthly return premiums and on forward looking multiples, stock market investors today are likely to expect about a 5 percent premium for bearing the market risk of equities. The risk of holding equities has generally declined; at the same time, the

risk of investing in government bonds has increased, reducing the premium between these two security classes. Though this is based on monthly returns on the S&P 500 index (which included only 90 stocks before 1957) and on U.S. Treasury long bonds, results are similar using a value-weighted index of all NYSE, AMEX, and NASDAQ stocks as a market proxy.

Converging Volatilities and Returns

The volatility of stock returns versus bond returns has decreased. The trailing average standard deviation of annualized monthly stock returns fell from 25 percent in the 1950s to about 16 percent in 2004. During that period, the standard deviation of bond returns increased from 4 percent to almost 12 percent. Similar trends emerge when using 10-year and 20-year averaging periods as 30 years.

Consistent with changes in relative volatility over the past century, the premium that investors received for stocks relative to bonds fell from over 10 percent to about 5 percent. This drop in the risk premium was attributable to a reduction in the level of stock market risk and to an increase in real required returns on bonds.

Why Is The Market Risk Premium Lower?

Several factors contribute to support the notion that earlier history may be less relevant to the *ex post* derivation of expected equity returns. We speak to the possible causes below:

Regulation and Public Policy Prudent monetary policies of the Federal Reserve and its foreign counterparts, as well as the general liberalization of regulatory policies, appear to have reduced the volatility of business cycles.[3] Liberalization of developing economies, establishment of trading blocks, and the increase of international trade have all contributed to global economic growth and stability, despite tremendous political change and upheaval.

Growth and Globalization Growth in worldwide market capitalization affords more liquidity, less net volatility, and less *net risk*. The growth of emerging markets helps to buffer the down cycles of developed economies. Emerging markets help drive developed economies to invest further in human and technical capital. Emerging market volatility is often, in turn, buttressed by the developed markets. Although claims of a borderless global economy are overstated, there is a reduced sensitivity to the economics of any single nation, which reduces systematic risk.

Risk Liquidity Despite claims to the contrary, the proliferation of risk management products (insurance, credit, interest rate, f/x, and commodity) has increased risk *liquidity*, allowing it to be isolated, traded, syndicated, and managed. Most individuals invest in the market through funds and institutions leading to an increased sophistication and change in the nature of our equity markets.

Information and Technology Despite recent accounting scandals, disclosure is more immediate and comprehensive, reducing uncertainty and required returns. Notwithstanding Regulation FD, segment data, reporting requirements, and analyst coverage are all more extensive and of higher quality today than 50 years ago. And technology has reduced the price and raised the quality of information processing.

Labor Mobility The nature of employment has changed. Tremendous growth in the service sector allows service and manufacturing cycles to be somewhat offsetting. Service economies have fewer fixed costs and are, thus, less susceptible to pricing pressures in times of overcapacity. The trend toward mobile, marketable knowledge workers helps reduce fixed costs and improve resource allocation.

Agency Costs Hedge funds and large institutional investors today are much more active in influencing companies to maximize shareholder value, which reduces the risk of common stock. This force is supported by the success of LBOs and the widespread adoption of value-based management. The importance of agency costs and ownership concentration in improving corporate performance are well documented.

How Much History?

Consistent with changes over the past century, the premium investors received for stocks relative to bonds fell from over 10 percent to about 5 percent.[4] With such a clear trend in the data toward lower equity premiums, it would be a mistake to go too far back in time when estimating the MRP.

The estimate of the MRP depends on how much history is used. Indeed, one could almost justify any premium. Starting from as recently as 2004 implies a negative premium, −5 percent, while adding all 78 years of available history increases the premium to about 7 percent.

Structural changes in the economy and markets suggest that more recent data provide a better basis for predicting the future. Provided you choose a period that goes back at least as far as the early 1980s, the MRP has drifted

down. The questions that one must answer are these: How far will the MRP go down, and can we expect it to cycle back up? We have chosen to use the second part of the past century (instead of 3/4), a sufficiently long period to achieve statistical reliability, while avoiding the potentially less relevant early market returns. Consequently, we estimate the MRP over the long bond to be about 5 percent.

Market-Implied Risk Premium

A market risk premium may be estimated from the market's total capitalization, level of earnings and re-investment, and future earnings growth. For example, the dividend discount model (Gordon growth model) provides a simple one-stage valuation framework that may be re-written for this purpose. The constant growth rate assumption of a simple one-stage model, though problematic for a single company, may be more useful for a broad market.

Solving for cost of equity, the Gordon growth model can be expressed as Ke = [(Div0/P0)*(1 + g)] + g, where Div0 is the annual market dividend payments; P0 is the total market capitalization; and g is the estimated dividend growth rate (Table 1.1). Using a distributed yield rather than a reinvestment rate allows us to cancel both market earnings and capitalization. It is also important to note that increasingly, distributed yield may come in the form of share repurchases rather than dividends—both tactics have similar balance sheet impact in reducing capital employed (cash and equity).

Long-term sustainable growth rates may be estimated as the *product* (return on equity * retention ratio) of returns on equity and re-investment rates (i.e., one-payout ratio). This is an ex-ante approach to estimating future growth rates.[5] Retention growth assumes historical returns on book equity (i.e., net income/book equity) and earnings retention are a proxy for

TABLE 1.1 Market-Implied Cost of Equity

Market-Implied Cost of Equity		Perpetual Growth Rate				
		4%	5%	6%	7%	8%
Div Yield	1.0%	5.0%	6.1%	7.1%	8.1%	9.1%
	1.5%	5.6%	6.6%	7.6%	8.6%	9.6%
	2.0%	6.1%	7.1%	8.1%	9.1%	10.2%
	2.5%	6.6%	7.6%	8.7%	9.7%	10.7%
	3.0%	7.1%	8.2%	9.2%	10.2%	11.2%
	4.0%	8.2%	9.2%	10.2%	11.3%	12.3%

future growth. For example, a 10 percent return on equity and sixty percent re-investment rate implies a 6 percent growth rate.

Based on today's market capitalization, depending on assumed future growth rates and dividend yields, the dividend discount model implies a market cost of equity of 7 to 9 percent and an MRP of about 4 percent, using a riskless rate of about 5 percent (Table 1.1). Estimates of long-term sustainable nominal growth rates now range from 5 to 7 percent, consistent with expected inflation of 2 to 3 percent and real GDP growth of 3 to 4 percent.

The Global Market Risk Premium

A global MRP is most appropriate, given the forces of globalism and capital market convergence. However, practically, the U.S. data will still dominate any market-weighted mean. Furthermore, as markets integrate, develop, and season, the U.S. market may serve as the best proxy for a future global MRP.[6] The United States has the largest economy and the most liquid capital markets. Consequently, the 5 percent risk premium seems appropriate for other markets, after adjusting for differences in tax rates, and so forth.

Recent international studies have provided similar results, yielding MRP estimates in the vicinity of 5 percent. In one 103-year history of risk premiums in 16 countries, the U.S. risk premium relative to Treasury bills was 5.3 percent, as compared to 4.2 percent for the United Kingdom and 4.5 percent for a world index.[7] Again, the historical record may still overstate expectations of the *future* risk premium partly because market volatility in the future may be lower than in the past and partly because of a general decline in risk resulting from new technological advances and increased diversification opportunities for investors. After adjusting for the expected impact of these factors, these same authors calculate forward-looking equity risk premiums of 4.3 percent for the United States, 3.9 percent for the United Kingdom, and 3.5 percent for the world index. At the same time, however, they caution that the risk premium can fluctuate over time and that managers should make appropriate adjustments when there are compelling economic reasons to think that expected premiums are unusually high or low.

Most market studies from other countries also tend to draw on shorter histories: Their earlier data are often unavailable, unreliable, or irrelevant due to significant changes in exchange controls and monetary policy. Foreign market derivations of MRPs are often undermined by unreliable historical information, local tax complications, irrelevant history, and liquidity issues making the analysis and its conclusions suspect for many major and emerging markets. Yet, current and future differences in taxes, treatment of dividends, and so on, may make a global risk premium somewhat premature.

TOWARD A BETTER BETA

The determination of a robust proxy for systematic risk (beta) is often a problematic part of a WACC calculation, especially for business units, private companies, illiquid stocks and public companies with little meaningful historical data. Beta is typically the regression coefficient that describes the slope of a line of "best fit" through a history of dividend-adjusted stock and market returns. Though betas can be reasonable and statistically meaningful, they can be difficult to determine, so do not throw out the baby with the bathwater. We will provide some alternative methods to apply the CAPM with a reliable measure of systematic risk.

Direct Regression

Most typically calculated using the most recent 60 monthly returns, other sampling periods and frequencies can be more appropriate. For example, for sectors affected by the tech bubble or 9/11 a three-year sampling of weekly data may be more appropriate. How much history is relevant to your company or industry? Beyond a qualitative assessment for fundamental changes in risk, check the data.

Potential questions might probe the interpretation and sensibility of the regression coefficients, summary statistics, and residuals. Sorting the residuals will help you to flag and understand suspect data, as well as to guide your choices regarding the amount of history and length of the return periods to be used. If no discernible trend is evident and the data represent a random walk, longer periods can be employed to provide more data and improve reliability. If a trend is evident or sufficient history is unavailable, more data can be derived from the shorter history with weekly or daily returns to provide enough data for a meaningful regression. Analyze the residuals of a regression by plotting or sorting, that is, what is not explained by the regression. Re-regressing the interquartile or interdecile range of data should provide a similar slope (i.e., beta) but can give a much better "fit" (i.e., a more statistically significant coefficient of determination). However, if the slope changes, it begs which slope is correct?

Industry Betas

Many stocks or markets are less liquid or have too little history, potentially leading to spurious results if the beta is determined overly mechanically. A simple solution in such cases, as well as for private companies and business units, is to determine a proxy for systematic risk by calculating an industry beta. The underlying assumption is that the systematic risk is similar for all

businesses in that industry. However, these approaches can be sensitive to the selection of peers.

Simple Mean or Median of Unlevered Beta A simple mean or median of pure-play comparable unlevered betas (i.e., asset betas) may serve as a representative proxy for the company unlevered beta. The unlevered beta is then relevered based on a target capital structure. Asset beta, or unlevered beta, is adjusted to exclude financial risk from the market beta:

Unlevered beta = D/EV*debt beta(1 − tax rate) + (1 − D/EV)*levered beta

D is debt, EV is enterprise value, and debt beta is estimated from credit spreads or direct regression of market data. The beta for a conglomerate can be a weighted average of division betas, based on each division's contribution to the firm's intrinsic value (capitalized operating cash flow may serve as a proxy).

Portfolio Beta Where leverage ratios are similar across an entire industry, a portfolio beta may serve as a proxy for a company beta. The portfolio beta is derived from a single regression of cross-sectional returns for all company market return points. Include as much data as possible to minimize bias from any point. Avoid grouping, aggregating, or averaging your data.

Secondary Regression by Segment

In cases of highly vertically integrated industries (financial services and resource industries), where there are often only a few pure-play peer companies, a secondary regression by segment can be employed to determine a pure-play beta. This is especially helpful for estimating segment, or line-of-business, costs of capital within integrated industries. The dependent variable is each company's unlevered beta, and the independent variables are the percentage exposures to different business segment (e.g., by revenue, assets, or operating income).

For example, Table 1.2 illustrates the development of an unlevered timber beta of 0.4, versus a higher 0.7 for pulp and paper, within the integrated forest products industry. Though the t-statistics are generally all highly significant, the "other" beta will clearly not be meaningful due to the wide mix of other segments within which it will represent.

Constructed Beta

A constructed beta is especially helpful for illiquid stocks where the beta is artificially depressed by a low correlation to the market due to extremely

TABLE 1.2 Segment Beta Regression Illustration

Company	Market Beta	Debt/ EV (%)	Asset Beta	Products (%)	Pulp and Paper (%)	Timber (%)	Other (%)
Company A	1.00	40%	0.68	15%	40%	40%	5%
Company B	1.90	60%	0.88	40%	50%	0%	10%
Company C	1.30	55%	0.69	40%	35%	20%	5%
:							
Company Z	1.20	30%	0.90	60%	10%	10%	20%
Industry				0.95	0.70	0.40	nmf

low stock liquidity. Betas can be constructed as the product of an industry portfolio correlation coefficient and a company-specific relative volatility coefficient:

$$\text{Beta} = \text{industry correlation coefficient} \times (\text{company volatility}/\text{market volatility})$$

Volatility of market returns may be measured directly from market data, as can a correlation coefficient for the industry. If the business is not traded, relative volatility may be estimated from the standard deviation of changes in capitalized net operating profit after tax (NOPAT), or earnings before interest and taxes (EBIT), as a proxy for return volatility. If operating results, which are generally available on monthly basis, exhibit seasonality, we suggest regressing the percentage change in capitalized NOPAT or EBIT over the same period last year against respective annual market returns.

Multi-Variable Regression Beta

We have employed a novel approach for hybrid businesses that share the characteristics of multiple sectors. For example, a privately owned industrial biotechnology company shared specialty chemicals, pharmaceuticals and biotechnology characteristics. Our multivariable regression incorporated these characteristics (Table 1.3).

Our illustration predicts an asset beta based on these key characteristics, or value drivers (size, growth, R&D intensity, margins, and capex intensity) relative to those of publicly traded pharmaceutical, biotechnology, and specialty chemicals companies. We found significant and intuitively appealing coefficients with this model.

TABLE 1.3 Multivariate Regression Beta Illustration

Company	Market Beta	Debt/ EV (%)	Asset Beta	Size (ln)	Growth (%)	R&D Intensity	Margins (%)	Capex (%)
Company A	1.50	20%	1.24	8.00	20%	18%	30%	8%
Company B	1.00	0%	1.00	14.00	0%	2%	15%	10%
Company C	1.30	10%	1.19	11.00	5%	6%	12%	12%
:								
Company Z	1.20	15%	1.05	12.00	3%	4%	15%	5%
Hybrid Co.				8.00	15%	12%	18%	3%

THE "RISKLESS RATE"

With the 10-year Treasury at abnormally low levels, we typically normalize the riskless rate. Ten-year Treasuries are near historic lows below 5 percent (and 30-year Treasuries near 5 percent); the 10-year historical average is closer about 5.5 percent. Though many companies use a trailing average to normalize the riskless rate for policy purposes, this will have the perverse effect of continuing lower even as spot rates climb and the forward curve steepens.

The forward curve for 10-year Treasuries is a market-derived estimate for the riskless rate. It tends to asymptote in the 5 percent range. The forward curve is less sensitive to the choice of historical averaging period and provides a stable and objective benchmark for a normalized riskless rate.

In practice, investors use any number of government bond rates as a proxy for the risk-free rate, each with its own strengths and weaknesses.[8] Those who use T-bill rates argue that the shorter duration and lower correlation of the T-bill with the stock market make it truly riskless. However, because T-bill rates are more susceptible to supply/demand swings, central bank intervention, and yield curve inversions, T-bills provide a less reliable estimate of long-term inflation expectations and do not reflect the return required for holding a long-term asset.

For valuation, long-term forecasts, and capital budgeting decisions, the most appropriate risk-free rate is derived from longer-term government bonds. They capture long-term inflation expectations, are less volatile and subject to market movements, and are priced in a liquid market. However, the long end is more susceptible to systematic risk, leading some practitioners to propose adjustments to unlever the risk-free rate with a Treasury beta, leading to a truly riskless rate.

THE COST OF DEBT

WACC is calculated using the marginal cost of corporate debt, that is, the yield the company would incur for borrowing an additional dollar. Interest expense is an inaccurate reflection of a corporation's true cost of debt. Nor is it a marginal cost. The average coupon currently paid by a corporation is the result of yields and credit rating at the times of issuance and may not reflect the market environment or corporate credit quality.

Credit quality and corporate bond ratings are the primary determinants of the cost of debt, and they are influenced by factors such as size, industry, leverage, cash flow and coverage, profitability, and numerous qualitative factors.

WACC is based on an after-tax cost of debt. Higher degrees of financial leverage and cash flow volatility will lead to lower expected values for each dollar of tax shield. There will be fewer profits to shield, a loss in time value from loss carry forwards, and an increased risk of financial distress. Company-specific stochastic solutions are perhaps the best approach to estimating this effect. However, as a short-cut method, this effect can be approximated by analyzing risk-laden corporate debt as risk-free debt less a put option on the assets of the firm, with a strike price equal to the face value of the debt.

Based on option valuation framework, the probability of being able to utilize the interest tax shield decays under increased leverage, volatility, and duration. At the debt's maturity equity-holders can "put" the firm assets to debt-holders in exchange for the face value of debt (in bankruptcy, the debt is effectively forgiven when debt-holders take possession of the assets). If the company's assets' value declines below the face value of its debt, the bondholders suffer a loss. Key inputs in the option valuation are time to maturity and volatility of returns of the underlying asset, in this case the enterprise value.

Specifically, from put-call parity, the probability that a firm will be unable to make a payment on its debt obligations and, thus, will not realize a tax shield is (G). S-call (S) = PV (strike price @ Rf)−Put (S). S is the firm's assets, Call (S) is the value of equity, PV (strike price @ Rf) is the value of riskless debt (Df), and PV (strike price @ Rf)−Put (S) is the value of risky debt (Dr). Hence, assets−equity = risky debt. Dr/Df = (PV (strike price @ Rf)−put (S))/PV (strike price. @ Rf) = 1−put (S)/PV (strike price @ Rf) = G.

Hybrid Instruments

Convertibles can offer issuers significant tax advantages while minimizing cash servicing costs via amortization of the warrant value. WACC estimations are complicated by the introduction of hybrids into the capital

TABLE 1.4 Anatomy of a Convertible

Equity Portion	Stock Price	$28.00
	Conversion Price	$40.00
	Effective Term	5
	Stock Volatility	35%
	Risk-Free Rate	5%
	Value of Warrant	7.45
	Warrants per Bond	18
	Total Warrant Value	134.12
Debt Portion	Par Value	1,000
	Coupon	2.5%
	Discount Rate	5.5%
	Straight Debt Value	871.89
CVT	Intrinsic Value	1,006.01

structure. This is most easily resolved through an effective bifurcation of the instrument's value into debt and equity to reflect the true target debt-equity mix (Table 1.4).

However, the equity content for ratings treatment may not represent the true economic content, and therefore its true economic cost. For example, for ratings agency purposes, cash-pay converts are typically treated as debt until conversion. This is true regardless of how in-the-money they become. Some hybrids, such as the newer long-dated junior unsecured notes receive considerable equity credit from the agencies despite representing no economic dilution to the common shareholders. Mandatory convertibles and trust preferred, receive some equity credit for ratings purposes.[9]

Table 1.5 illustrates the effective WACC of this convertible security as a weighted average of cost of the debt and equity portions. The cost of the debt is the grossed up yield (coupon + accretion); grossed up yield = convertible yield/debt portion of total value; straight debt portion of total value = 1 − warrant value/value of the convertible bond; discount rate (%) based on comparable 10-year corporate bond yields.

The cost of the equity is the cost of warrant equity.[10] The warrant value is estimated using the Black-Scholes or other option pricing formula: exercise price premium = (strike price/share price)−1; risk-free rate = Treasury rate with a tenor matching the option term in years; warrant beta = equity beta*warrant delta*share price/warrant premium.

In the case of the more recent hybrid securities with equity-like features that enable them to be accorded a degree of equity content (typically, C or D bucket treatment by Moody's) for ratings purposes, there is no underlying dilution (or conversion) to the fundamental equity interest either at issue, or

TABLE 1.5 Weighted Average Cost of a Convertible

Cost of Equity	Warrant Beta	3.00
	Market Risk Premium	5%
	Cost of Warrant	15%
	Equity Content	13%
Cost of Debt	Effective Yield	2.5%
	Debt Content	87%
	Grossed Up Yield	2.9%
	Adjusted Tax Rate	20%
	A/T Cost of Debt	2.3%
CVT	WACCvt	4.0%

any point in the future. For WACC purposes in such cases, these instruments (long-dated, junior, subordinated notes) are treated as debt.

GLOBAL CAPITAL COSTS

Under the pressure of a prolonged weakness and uncertainty in the equity market, many companies face unprecedented demand for profitable, long-term sustainable growth. Corporate expansion through foreign direct investment continues to offer investors the prospect of valuable growth opportunities.

Global growth remains an essential part of the strategy of most large companies today. Companies pursuing global growth accomplish something their investors appear unwilling or unable to do themselves.[11] Global diversification is a strategy to cope with economic exposures that market integration and risk management were supposed to eliminate but did not. Despite the development and integration of world financial markets, investors continue to behave as if there are substantial costs to foreign portfolio investment.

But today's corporate financial management practices are decidedly at odds with the strategic benefits of foreign direct investment. There may be no other area where corporate practice diverges so far from finance theory. Many still cling to standard practices and ad hoc rules of thumb where excessive hurdle rates for overseas operations and investments often impede value-enhancing growth.

Though the investment returns in emerging economies are often more volatile than the returns on domestic operations, emerging market investments do *not* contribute as significantly as one might expect to the *net risk*

of a multinational corporation's (MNC) portfolio.[12] One of the key issues behind the wide range of approaches, in practice, is the extent to which capital markets are now integrated.

A Segmented Markets Perspective

A local country perspective assumes that country managers operate and invest within the isolation of their own respective local markets. This perspective treats each country operation as a stand-alone investment and uses a "local" version of the CAPM with local equity risk indices, local market risk premiums, debt costs, and country risk premiums. Though this approach reflects managers' intuition that international markets exhibit higher risk, it ignores the more global view of shareholders and the beneficial effects of a diverse MNC portfolio and often leads to numerous practical challenges in obtaining reliable and intuitive results. From a corporate financial policy perspective, this approach introduces considerable complexity, communications challenges, and administrative burden.

An Integrated Markets Perspective

An integrated markets perspective views investments as components of a global portfolio. This approach calls for uniformly allocating the corporate portfolio's net sovereign risk, inflation risk, and diversification effects to each and every country-business unit or investment: one source of capital and one cost of capital for all.

Each element of the corporate portfolio fully bears the risks and benefits of the portfolio, irrespective of its contribution to the systematic risk of the corporate portfolio. Though this works well for the consolidated cost of capital, for country operations and investments, we employ a hybrid perspective that captures each investment's *marginal impact* to the systematic risk of the corporate portfolio.

The Hybrid Perspective

Although world financial markets have become more integrated than they were 25 years ago, several factors continue to contribute to a significant degree of market segmentation. Perhaps most important, investors in all nations are still most comfortable investing in companies in their home markets, leading to the well-documented "home bias" in investor portfolios. But legal, tax, accounting, and regulatory barriers are also at work.

As a result of these impediments to well-functioning markets, many of the world's capital markets, particularly emerging markets, have continued to exhibit signs of illiquidity—or, depending on your interpretation,

market inefficiencies—associated with market segmentation. But, far from discouraging foreign direct investment by corporations, these barriers make the *benefits* of foreign direct investment *even greater* than if markets were completely integrated.

In a world that remains at least partly segmented, foreign direct investment is still capable of providing the firm's shareholders with investment opportunities and diversification benefits they cannot obtain on their own. Moreover, as global economies and financial markets continue the process of integration, this diversification benefit of foreign direct investment will gradually disappear; other benefits, notably the reduction in risks (sovereign and inflation) that come with global integration, will take its place.

Our hybrid perspective assumes that a company maintains a dynamic portfolio of foreign and domestic investments that is continuously evaluated for possible expansion, curtailment, or even sale; as a result, the proportionate weightings of each real portfolio element are constantly changing.

To extend the CAPM to the evaluation of operations and investments overseas, we adjust the framework for systematic and unsystematic risk as follows:

- Adjust operating cash flows for project-specific risks and costs. Though simple rules of thumb are easier to use, they obscure fundamental issues, undermine strategic risk discussion, and become inapplicable as conditions change.
- Perform comprehensive risk analysis, such as sensitivity analysis and Monte Carlo simulations, of risk drivers to enhance active risk management for value.
- Adjust the cost of capital for sovereign risk and expected inflation—our proposed methodology follows.

As a practical matter, the risk profiles and volatilities of each market, as well as their correlations between each other, are changing. Therefore, we *do not* employ a country beta relative to the home country as our proxy for the incremental systematic risk to the portfolio for each operation or prospective investment; rather, we assume sovereign spreads best capture the incremental systematic risk. Similarly, we *do not* attempt to quantify the diversification benefit that accrues to the portfolio with each marginal investment. This is constantly changing. Variation within the estimation of any one correlation coefficient is often greater than the difference between any two correlation coefficients.

The instability of sovereign ratings and sovereign risk makes any *point estimate* of WACC an oversimplification in many markets. Historical

distribution and standard deviation data can support the development of a range estimate to help quantify the risk of a value-dilutive investment via simulation. For example, the probability that an investment produces a negative NPV due to the true WACC turning out to be higher than the hurdle rate.

The Risks and Returns of Foreign Direct Investment

Beyond profitable growth, there are strategic benefits to global investing. Today's global companies are often more attractive than their domestic peers who missed their chances to go global in part because of inflated international hurdle rates. For many years, Bestfoods was an attractive acquisition target to packaged food companies, ultimately trading at a large premium, in part, due to its highly diversified global portfolio with exposure to faster growing consumer markets.

Consider the case of Japanese foreign direct investment in the United States in the 1980s. These "transplants" enjoyed relief with low-cost manufacturing resulting from an unexpected strengthening of the yen against the dollar. Had production remained in Japan, supply to the large U.S. market would have been uncompetitive. European transplants similarly benefited in this more recent era of Euro strength.

But the returns of global investment cannot be realized without significant risk since global investing entails risks and costs incremental to those domestic investing. We distinguish between unsystematic and systematic risks and propose approaches to the treatment of each. Systematic risk, or market risk, stems from economy-wide perils that affect all businesses; by definition, this would include the currency and sovereign risks of the economy itself. What matters to the well-diversified corporation, and ultimately the well-diversified investor, is any incremental contribution to risk.[13]

Unsystematic Risks and Costs

Foreign direct investment brings new and significant incremental costs (foreign legal and tax, currency repatriation and hedging, and insurance and other transaction costs) that reduce the intrinsic value of the investment or operation. Numerous risks (heightened project uncertainty such as market success, labor strife or other operational challenges) are specific to the investment or operation. Typically, these costs and risks are noncompounding and are best evaluated in cash flow scenario, sensitivity, and simulation analyses. But despite the heroic coaching of finance professors around the world, our experience has shown that these costs and risks are still frequently omitted from the cash flow projections of international investment

decisions. Furthermore, they are often "below the line" in the evaluation of any international operations. This creates a need for higher hurdle rates.

Project uncertainty, and the recognition that many international risks and costs are neglected, is the often unspoken rationale to inflate the hurdle rates for these investments. But managers typically have the best information about the potential impact of these risks on the expected stream of operating cash flows. Managers do not have any way to quantify the effect (if there is any) on shareholders' required rate of return, and these risks are diversifiable by investors or companies with global portfolios.

Systematic Risks

We identify the systematic risks to discrete foreign direct investments that can be quantified and treated within the cost of capital framework to manage the MNC portfolio better. However, these risks do not need to be incorporated with arbitrary and excessive risk premiums; rather, they can be addressed more rigorously in a fairly straightforward manner.

Business and Financial Risks The inherent business and financial risk need not change for foreign direct investments because a company's core business and target capital structure does not typically depend on any particular international operations; we would typically expect these to be applicable worldwide. For example, in industries where operating profit tends to be more volatile and correlated to the market (e.g., semiconductor industry), business risk is high. These risks, measured by the company beta, have been captured in the corporate cost of capital.

Expected Inflation The rate at which prices are expected to increase, inflation risk, measures the relative strength of a currency in relation to domestic expected inflation and is typically reflected in forward foreign exchange rates. In effect, it represents the risk arising from expected currency devaluation (longer term) due to differentials in long-run inflation expectations (assumes interest rate parity holds over the longer run). These risks implied by the relative risk-free rates between countries, or from inflation-linked government bonds, are incorporated into the cost of debt and cost of capital calculations. This risk should be distinguished from the short-run cases where parity breaks down, and unexpected currency devaluation is a possibility subsumed by sovereign risk.

Sovereign Risk Sovereign risk is most commonly associated with the risk that a foreign government will default on its loans or fail to honor other business commitments due to change in government or policy. However,

sovereign risk is a broad category of risks unique to a country's political and economic environments that include the impact of currency controls, changes in tax or local content laws, quotas and tariffs, and the sudden imposition of labor or environmental regulation:

- **Unexpected devaluation/inflation:** Sharp movements in the relative valuations of currencies, as in Mexico in 1994 and in Russia and much of Asia in 1998, go beyond the weakness implied by expected inflation differentials and are frequently the result of unrealistic currency pegs. Sudden runaway inflation has been "employed" to help satisfy debt obligations (e.g., Bolivia in the 1980s).
- **Policy risk:** A host government, due to leadership or policy changes, may renege on contracts, agreements, or approvals, may prevent currency conversion, or may impede repatriation. Other examples include sudden large changes in tax laws, local content laws, quotas and tariffs, and environmental restrictions. For example, witness the unexpected difficulties faced by MNC loggers and miners in the Pacific Northwest in the 1990s as a result of environmental lobbying.
- **Expropriation:** Host government policy may reduce or eliminate ownership of, control over, or rights to an investment by an overseas firm. This has happened in Russia, Cuba, South America, Israel, and many other countries.
- **War/civil disturbance:** This includes acts of sabotage or terrorism, damage to tangible assets, or interference with the ability of the enterprise to operate. This has been particularly acute in sub-Saharan Africa and the Middle East.

Sovereign risks add a premium to the required rate of return for foreign direct investment. One way of estimating the possible size of this premium is to look at the "insurance premiums" charged by organizations such as the Overseas Private Investment Corporation (OPIC) and the Multilateral Investment Guarantee Agency (MIGA), which guarantee foreign investments against some of the risks cited above. Other market-based methods may be more reliable.

We generally employ multiple sources of information to "triangulate" sovereign risk premiums, such as USD-denominated (Global Euro and stripped Brady) sovereign debt yields. Where bond yields are unavailable or appear unreliable, we use the premiums implied by a basket of similarly rated (S&P country ratings) countries. For the countries that make long-term borrowings predominantly in U.S. dollars (USD) and not in the local currency, we may use Eurobond yields or the stripped yield of their International/Brady bonds as a basis for USD-based risk-free rates. The

stripped yield is the yield on the noncollateralized portion of the bond. We do not employ a local currency WACC for currencies that have no long-dated market. Where capital markets are unwilling or unable to quote and make long-dated bets on a currency, neither should corporates. In these cases, we keep WACC in a "hard" currency and recommend that great care be taken in projecting and discounting cash flows to mitigate against uncertain future inflation estimates. The local cost of capital in local currency provides local managers with a reference frame when forecasts are based on local currency with local inflation expectations embedded. But, for purposes of evaluating a contemplated investment in Turkey (or, say, a major expansion of its current operations), a Turkish cost of capital in USD (with no significant revenue inflation) provides a better basis.

For developed countries (and those others who are able and tend to borrow long-term in the local currency), we may estimate USD-based sovereign yields based on S&P sovereign credit rating of such countries and corporate credit spread matrix. We begin by estimating a domestic cost of capital and then add sovereign and expected inflation risk premiums.

This process is a somewhat iterative process, as the *domestic* cost of capital should not reflect the net incremental risk of the *global assets* already reflected in the company beta. We skip this step where the impact is deemed to be immaterial at the corporate level.

Our sovereign risk premiums reflect the country risk; larger markets such as the G7 and other AAA and AA countries have low risk premiums, often less than 50 basis points (bps). Emerging market sovereign risk premiums range from 50 to 100 bps for investment grade credits such as Chile and Poland, to hundreds or even thousands of bps for noninvestment grade credits like Argentina, Indonesia, Peru, and the Ukraine.

For example, Chile USD sovereign debt yields 4.9 percent, and incorporates an incremental required rate of return to compensate U.S. (or globally diversified) investors for bearing Chilean sovereign risk. To determine what portion of that 4.9 percent represents Chilean sovereign risk, we effectively subtract the U.S. sovereign yield from the local country sovereign yield (excluding the effect of compounding) to estimate a 70 bps sovereign risk premium, which is consistent with their country USD rating.

Global Corporate Capital Costs

A helpful way of looking at the cost of capital for foreign countries is in terms of the marginal impact of the two systematic risk components: sovereign and currency risk. Calculating foreign WACC in USD involves adding a sovereign risk premium to the domestic WACC. To calculate foreign WACC in local currency, we also add the expected inflation premium.

TABLE 1.6 Global Capital Cost Illustration

	USD Rating	Sovereign Risk	Standard Deviation	USD WACC	Inflation Risk	LC WACC
Country A	AAA	20	5	8.0%	(20)	7.8%
Country B	AA	35	10	8.4%	—	8.4%
Country C	A	70	15	8.7%	10	8.8%
Country D	BBB	115	30	9.2%	150	10.7%
Country E	BB	240	60	10.4%	nmf	nmf
Country F	B	350	150	11.5%	nmf	nmf

We estimated currency risk from inflation-linked sovereign bonds or from the difference between using expected changes in Consumer Price Index (CPI), LC sovereign bond yields and the implied LC issuer yields based on S&P Country sovereign yields. Local WACC in USD = global USD WACC + sovereign risk premium. Local WACC in LC = local WACC in USD + inflation risk premium.

For example (Table 1.6), in the case of Chile (Country C), where we estimate a sovereign risk premium of 70 bps and an inflation risk premium of 10 bps, a company with a domestic WACC of 8 percent will have a foreign WACC in USD of roughly 8.7 percent and a WACC in local currency of about 8.8 percent.

But any point estimate of sovereign risk may represent false precision. Sovereign risk premiums vary widely even within country ratings, and are subject to sudden change. For noninvestment grade countries, we estimate and illustrate the range for a sovereign risk premium with a Monte Carlo simulation based on historical sovereign yield data.

WACC AND HURDLE RATES

Many companies use a higher required return for investments than their actual cost of capital, often with artificial decrees to compensate for poor sensitivity or risk analysis, free capital and with an excessive reliance on single-point estimates of an internal rate of return (IRR) or NPV. In many companies, capital is "free" because once investment approval is negotiated, it is a sunk cost to managers. Thus, in most cases, capital must be rationed precisely because it is free. Alternatively, when capital bears its own true cost, it becomes plentiful but expensive.

But hurdle rates destroy value:

- Starve growth by systematically obstructing value-adding investment opportunities

- Lead to inflated projections by the proponents of investment opportunities
- Steer the company away from beneficial activities of more comprehensive risk analysis and creative risk management
- Reduce the company's weighted average return on capital by forfeiting positive NPV investment opportunities

To offset the problems of poor risk analysis and free capital, hurdle rates that exceed the cost of capital are frequently imposed on managers. This attempt to subsume a proper risk analysis and compensate for overly optimistic forecasts typically leads to more optimistic forecasts. The practical corollary to the deceptively simple allure of inflated hurdle rates is a reduced emphasis on even simple risk analysis and more optimistic forecasts.

Increasing a project's rate of return does not allow for adequate consideration of the time pattern and magnitude of risk being evaluated. Using a higher discount rate to reflect additional risk indiscriminately penalizes future cash flows relative to less distant ones and geometrically compounds the cost of any risk. It is simplest to use a single cost of capital (per currency) for discounting and hurdle rates. Risk, on the other hand, is best identified and analyzed discretely through scenario or simulation analysis; capital consumption, is best managed through performance measurement and rewards.

Though some negative NPV projects invariably must be undertaken for environmental, health and safety reasons (defensive capital), inflated hurdle rates do not help, and actually exacerbate, this problem because they limit the amount of capital that earns an offsetting return. However, all investments that earn returns above those of the existing business increase the overall return on capital. An inflated hurdle rate results in foregone opportunity, less growth, a lower return on capital employed (ROCE), and a lower value (Table 1.7). We illustrate mathematically that reducing the hurdle rate down from 20 percent (versus an 8 percent WACC and 10 percent ROCE) leads to increasingly higher weighted average returns, more NPV, and larger enterprise values.

Instead of raising the cost of capital, project and business operating cash flows should be adjusted downward to reflect the incremental risks, costs, and uncertainties. Where capital must be rationed, we recommend a ranking to produce the largest incremental NPV available. However, the limitation to any ranking of investments is that this must be done in a static environment with all investment opportunities available for evaluation at the same time, yet this is rarely realistic.

Capital is rarely in short supply as investors are clamoring for opportunity. The greatest constraint, and one of the greatest strategic challenges

TABLE 1.7 Lower Hurdle Rates Lead To Higher Returns and Values

	Profit	Capital	ROCE	EVA	NPV	EV
Company	120	1200	10.0%	24	300	1,500
Projects						
20%	20	100	10.8%	36	450	1,750
18%	18	100	11.3%	46	575	1,975
15%	15	100	11.5%	53	663	2,163
12%	12	100	11.6%	57	713	2,313
10%	10	100	11.5%	59	738	2,438

facing publicly traded corporations, is the opportunity for growth. Stock prices routinely reflect expectations of tremendous growth. In most years, about one half of the aggregate S&P enterprise value can be justified by the present value of current cash flows capitalized as perpetuity. The other half of the market capitalization is predicated on profitable growth over and above today's level of cash flows.

Today's corporate financial policies and practices are at odds with this growth imperative—excessive hurdle rates impede growth—especially organic growth and smaller investments (the least amount of risk) and, ultimately, necessitate large acquisitions (where risk is greatest) to supplement modest growth.

One of the most basic and fundamental tenets of modern corporate finance, and indeed capitalism, is the obligation to maximize shareholder wealth. A tacit promise to maximize NPV is made with passive investments, such as retaining rather than distributing capital, and with active investments, involving the raising of capital. To meet this obligation to maximize shareholder wealth, all positive NPV are to be undertaken and negative NPV investments rejected, or deferred, where possible. Every positive NPV project adds value. Value is maximized when all positive NPV projects are undertaken.