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Estimating Cost of Capital for Emerging Market Equity Investments

By

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Executive Summary

In recent years, emerging markets have become very important for investment banks and multinational corporations (MNCs). The attractions to these markets have been to take advantage of diversification opportunities and high growth. Multinationals have an additional benefit from an opportunity to vertically integrate in segments where there are high labour costs. However, emerging markets have also been perceived as risky and uncertain. Investments in these markets are extremely difficult to evaluate. The difficulties arise due to several factors: political, economic and business volatility, among others.

Traditionally, Capital Asset Pricing Models (CAPM) have been used to evaluate the cost of capital for investments. CAPM has been seen to work reasonably well for domestic (U.S.) markets but has failed when a world portfolio (including international markets) has been developed. One of the main difficulties with using CAPM is that many of these emerging markets are segmented. Quantifying factors contributing to the segmentation is not easy and several researchers have developed models to estimate the cost of capital for emerging market investments. Most of these models are a modification to traditional CAPM. They typically include adjustments to CAPM to account for the segmentation and other qualitative features of these markets.

This report addresses some fundamental issues related to emerging markets - what they and their characteristics are. It presents several models available in literature to evaluate cost of capital for investments in these markets - both from portfolio managers' and MNCs points of view. The goal of this report is to present a conceptual framework to look at these topics and does not emphasize quantitative analysis. The state-of-the-art understanding of this topic still lacks a firm basis for quantitative analysis and it would be premature to carry out extensive quantitative analysis.

Estimating Cost of Capital for Equity Investments in Emerging Markets

1. What Are Emerging Markets

Definition of an emerging market depends on one's perspective and purpose. Different sectors of industry define emerging markets differently, even though, they often are referring to similar geographic regions or countries.

Khanna and Palepu [1] propose to classify markets based on how well they facilitate buyers and sellers coming together. Since, every market needs institutions to facilitate its functions, they argue that markets can be classified based on how developed these institutions are. Examples of these institutions are regulations, judicial systems and reliable information transfer mechanisms. They propose that in advanced economies, these institutions are very well developed and therefore minimize the risk of market failure. On the other hand, stagnant economies usually suffer from near complete market failure. Emerging markets, they say are in between, where, some of these institutions are developed, encouraging good commerce (and therefore the prospect of growth) but they also have some institutional voids that can cause market failures. This perspective is a very broad one, perhaps one from a corporate strategist or economist's standpoint.

Mobius [2] describes the term "emerging markets" as first being coined by officers at the World Bank's International Finance Corporation when they were working on the concept of country funds and capital market development in less developed regions of the world. While it is difficult to determine a cut-off between emerging and emerged markets, the World Bank classification of high-, middle- and low-income countries provides a good basis. The low- and middle- income countries are usually considered

these markets are inherently less developed with significant potential for economic growth however with much uncertainty (risk).

2. Characteristics of Emerging Markets

Two characteristics of emerging markets have been mentioned in the previous section: 1) low per capita GNP with higher economic growth rate than developed countries and 2) a higher perceived risk. Both factors are inter-related and a brief discussion on how they are related is presented in this section.

2.1 International Business: Country Risk & Economic Theory

Erb et. al. [4] have presented a comprehensive study of country risk in the context of global financial management. They present a framework to understand risk, expected return and their relation to economic growth. A schematic of this framework is shown in Figure 1.

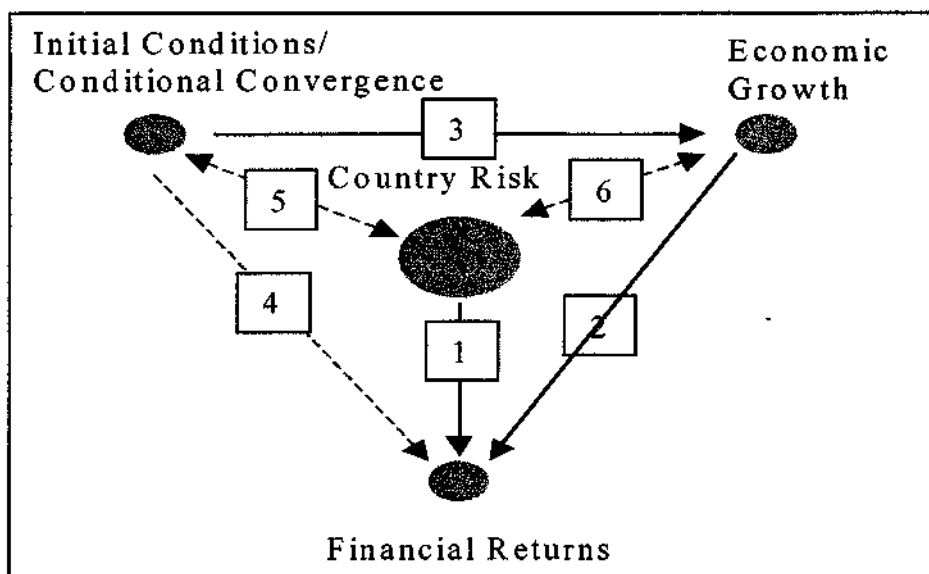


Figure 1: Growth, Return & Risk: A Macroeconomic Framework (by Erb et. al. [4])

of the economy. However, inefficiencies do exist and countries are usually not at the optimal level of capital utilization. The important point here is that growth and expected returns (related to return of capital) are positively correlated.

3. *Conditional Convergence & Economic Growth:* The principle of convergence implies that economies with lower per capita GDP will grow, on average, faster than countries with higher per capita GDP. Conditional convergence implies the same principle but includes the assumption of all other factors being equal. Barro [6], in his neoclassical model of growth theory implies that if all economies were similar in all countries, except for the stage of development (or initial conditions), there would be a convergence to a steady-state level of GDP. This is an important assumption when considering emerging markets, because all things are not equal in these markets leading to an uncertainty on the rate of growth and therefore leading to convergence only in a conditional sense. Conditional growth also changes the level of risk in various countries. These differences arise from various government policies, growth rate of population, savings rate, education levels and fertility rates. We will revisit some of these issues in later sections. Another aspect of Barro's work relates technological change (or R&D) and economic growth. He implies that long term R&D helps to maintain a positive long term economic growth. This aspect of growth theory has an important implication for emerging markets whose long term R&D investment is miniscule compared to the advanced countries. Conditional convergence would still hold in this case because developing countries can "piggyback" on the research of leading countries. While the developed countries can

differences in these factors between countries lead to differences in risk. We will revisit these factors in greater detail in later sections.

4. ***Initial Conditions/Conditional Convergence and Financial Returns:*** This is inferred from the conditional convergence-economic growth-expected returns relationships outlined in items 1, 2 and 3. It can also be viewed as a conclusion from the principle of diminishing returns of capital, *i.e.* economies with a lower capital per worker tend to earn higher returns and higher growth. As indicated by the dashed line, this relationship is basically an inferred relationship.
5. ***Economic Growth & Country Risk:*** Erb *et. al.* [4] concluded this relationship by regressing real per capita economic growth on: real GDP per capita, the natural log of *the Institutional Investor's Country Credit Rating* (a measure of country risk) and the realized change in the rating for 61 countries between 1980 and 1992. The regression explained 60% of the cross-sectional variation with a positive correlation between risk and economic growth and a negative coefficient for initial GDP per capita (diminishing growth with a high initial level of per capita GDP).
6. ***Initial Conditions/Conditional Convergence and Country Risk:*** Similar to analysis in item 5, Erb *et. al.* regressed equity market returns in these countries with: the initial conditions represented by real per capital GDP and the Institutional Investor's Country Credit Ratings. The regression produced statistically significant coefficients for both the independent variables (real per capital GDP and credit ratings), thus linking the initial conditions and financial returns.

The above discussion provides a general framework to understand how current states of various countries (say, in terms of per capita GDP), their economic growth

2.3 Investing in International Markets

Just as there were large capital flows in a period spanning 30 years prior to the first world war, significant integration of international markets is taking place again today. However, there are some major differences [10]:

- Today, a large number of countries are involved in trade, unlike the 19th century.
- Globalization in the latter half of 19th century was heavily motivated by falling transportation costs whereas, today it is being driven by falling communication costs.
- Although, the net capital flows are smaller today than in the past, gross capital flows are much bigger.

While, there are several indicators of increased integration around the world, markets are still quite segmented. For example, trade between two Canadian provinces is 20 times higher than trade between an American and Canadian province. This is a telling statistic, considering that trading borders between Canada and the United States is one of the least restricted in the world.

Segmentation in world markets provides unique opportunities and risks for investors. Many factors that segment markets, also provide basis for country risk. They form the basis for international investing and global financial management.

2.3.1 Why invest in international markets ?

Up until the 1970's, the U.S. capitalization of the world market was over 50% [11]. In fact, in the 50's and 60's the U.S. market capitalization was over 75%. For this reason, the U.S. market was considered proxy for the world market. However, today, the U.S. market represents less than 40% of the world market. Therefore, the question is,

Therefore, the variance of the portfolio has been reduced by 50%. Even though, the two stocks exhibit identical expected performance, a portfolio containing the two stocks **exhibits lower volatility because of the low correlation** (0 in this case). A low correlation thus provides an investor with the ability to hedge his portfolio. While identifying a market with 0 correlation is nearly impossible, all 20 developed countries exhibit a correlation less than 1.0 (*i.e.* less than perfect correlation) with the U.S. equity markets. It has also been shown, that on average, when the U.S. market returns are negative, there can be gains exceeding U.S. losses to be had in international markets, but, not all the time. However, a diversified international portfolio exhibits a higher expected return for a lower risk when compared to a portfolio of only U.S. assets. This benefit from international investment has led to an aggressive move by U.S. investors into international markets. By investing in international markets, one invests in both the local market and in the foreign exchange rate (vs. the U.S. dollar). Some recent data shows that in the last decade, daily currency trading turnover in New York, London and Tokyo has gone up from \$190 billion to almost \$1.2 trillion [13]. While, the basic ideas are sound, practically, portfolio strategies cannot be formulated on the basis of averages. There are several factors that influence international market portfolios:

- Foreign exchange risk
- Distribution of returns are different in bull and bear markets
- Volatility is not symmetric because of the leverage effect
- Correlation between U.S. and international market returns are higher when U.S. returns are negative

² %X, %Y = proportion of each stock in the portfolio, σ_X, σ_Y = Standard deviations of stock price

2.4 Investing in Emerging Markets

2.4.1 Motivation To Invest & Recent Trends in Emerging Markets

Some basic information comparing developed and emerging economies is presented in Figure 2.

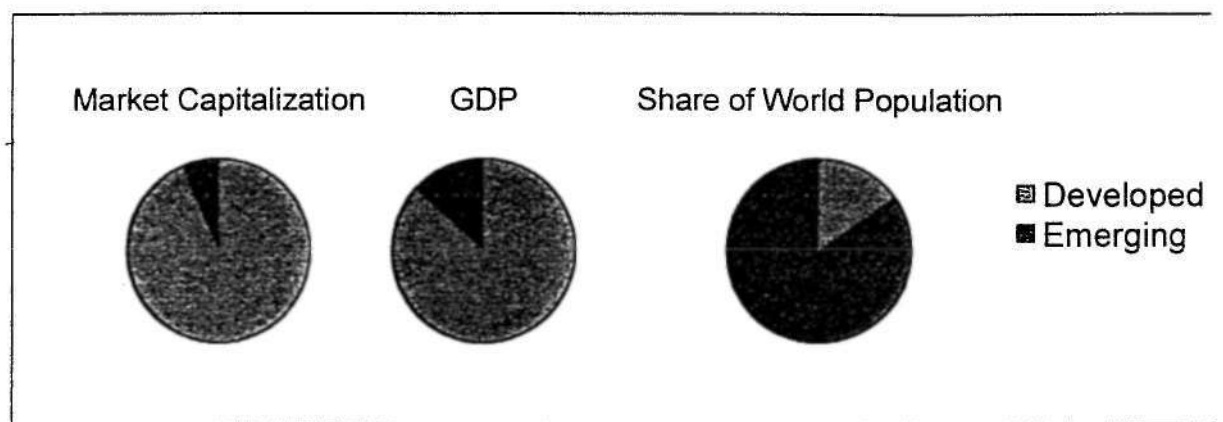


Figure 2 Emerging Markets vs. Developed Markets - Share of the World

Figure 2 shows that the emerging markets are a small fraction of the global economy even though they have the majority of the world's population. Starting in the 1980's, however, developing economies began opening up and international capital flows into these markets accelerated. Figure 3, taken from *The Economist* [13], demonstrates

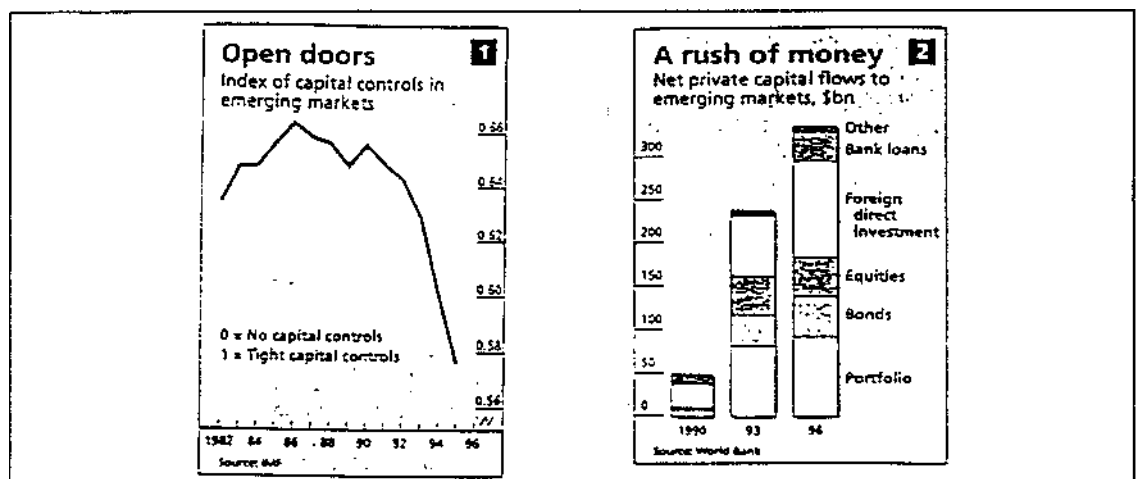


Figure 3 (a) Opening up of emerging economies (b) Capital flows into emerging markets

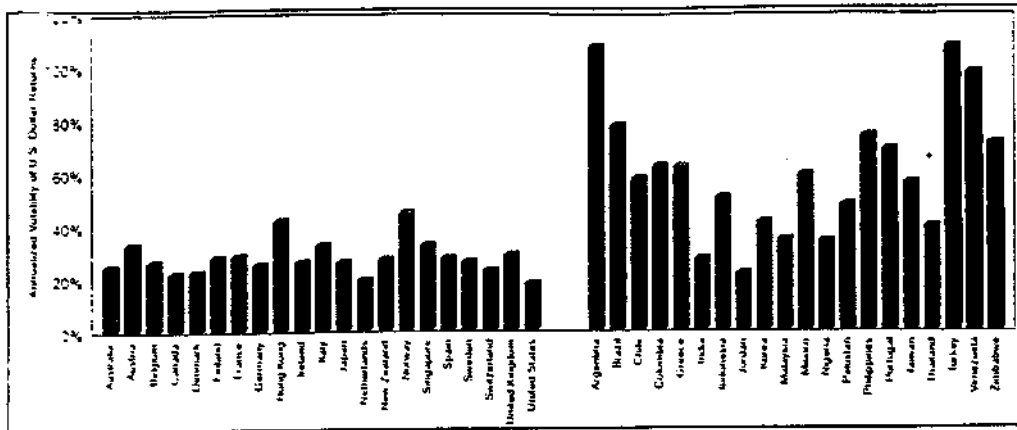


Figure 4 Average volatility of developed and emerging financial markets [12]

- Emerging financial markets can provide higher returns than developed markets

(Figure 5)

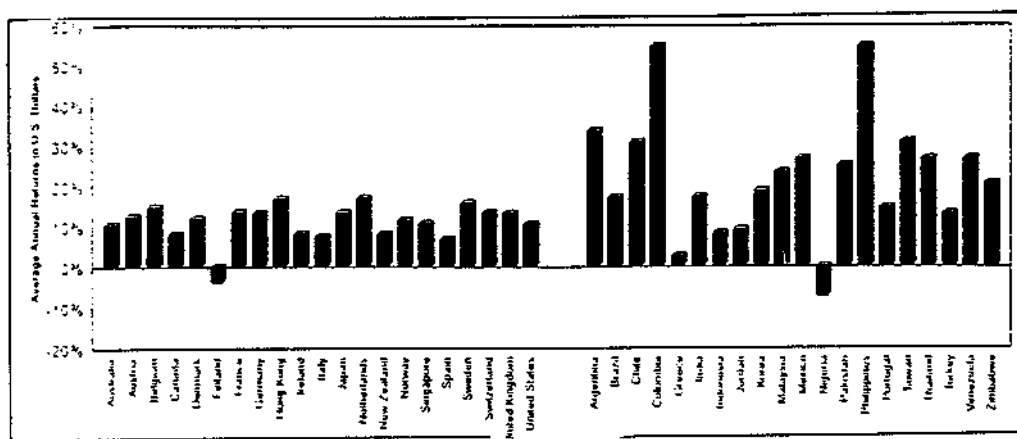


Figure 5 Average annual returns of developed and emerging markets [12]

- Many emerging markets are larger than some smaller developed countries' markets

While there is sufficient empirical evidence that suggests and encourages investments in emerging markets, there is very little fundamental understanding of these markets to enable complete and consistent analyses of investments in these countries. The next

vary across securities and investors. Sometimes, there are restrictions on which investors can buy too, further limiting this model.

A detailed discussion of these issues is presented in Stulz [14]. More evidence of the difficulty in understanding international market returns is provided by Cho *et al.* [15]. Based on an empirical investigation, they reject the hypothesis that the international capital market is integrated and that the arbitrage pricing theory is valid internationally. However, they do not specifically determine if this rejection implies a segmentation of capital markets or the failure of international arbitrage pricing theory.

Relationships between inflation and asset returns are well-understood for developed markets, however; they are less clear for emerging markets. Figure 6 shows average inflation data for developed and emerging markets. Furthermore, regressing country credit ratings with inflation, stock market returns, (in local and US currency) or volatility (in local or US currency) does not demonstrate any correlation for emerging markets [12].

In summary, while developed international markets are understood to some extent, parameters influencing emerging market returns are less understood.

2.4.3 Cost of Capital In Emerging Equity Markets

Emerging markets cannot be considered as one market. Each country is different and should be dealt with separately. Investment risks are country specific. The important sources of country risk are:

proxy to world returns. While they show some changes in the beta values for some periods, their analysis is not conclusive.

- Most world market portfolios are heavily weighted by the industrial countries. Based on market capitalization of these countries, it is difficult to determine how close these portfolios are in representing world market behavior.

CAPM assumes that investors have access to all stocks and these stocks are traded freely. However, in reality, regulations, costs and logistics of trading in these markets can be costly and complicated, or in other words, the markets are not completely integrated into the world. Harvey [19] has compiled a table (Table 1) listing the regulatory environment for investors in several emerging markets. Obviously, the CAPM model does not take into account these difficulties.

The betas estimated by typical single-factor models are assumed to be constants over time. A constant beta implies constant risk over the period considered. Most emerging markets are changing rapidly on all fronts of risk and this assumption is a limitation of most world CAPM models.

The above discussion implies that there are several qualitative factors that prevent a conclusive rigorous statistical analysis of these markets. Several researchers have included these factors in a somewhat ad hoc manner as discussed here.

The Country Spread Model (McKinsey, Goldman Sachs [20]): The country spread model to determine the cost of capital (or hurdle rate) for a particular stock can be described as follows:

$$\text{Hurdle Rate} = \text{Risk Free Rate} + \beta [E(\text{U.S. Market Risk Premium})] + \Delta[\text{Country's U.S. bond yield, U.S. Treasury Bond Yield}]$$

where Δ a difference operator. Some difficulties with this model are[11]:

- The country spread (the last term in the equation) is considered too low by many investors – since it is based on bond yields.
- Only those countries which have publicly traded bonds in the U.S. can be considered. Even if World Bank Bonds are used, it still limits the countries that can be considered by this model.
- The additional premium using bond yields are the same for all securities. This assumption is difficult to accept.

The Ibbotson Model: The Ibbotson model is a modification of the world CAPM. A regression is carried out using the following model:

$$(R_{\text{security}} - R_{\text{risk Free}}) = \beta(E(\text{U.S. Market Risk Premium})) + I$$

where R stands for an expected return for a particular security. When computing the security's risk premium, an additional factor, $I = 50\%$ (Intercept) is added to the required premium of the security. This fractional value of the intercept plays the same role as the

The Bekaert-Harvey Model[23]: Bekaert and Harvey extend the Erb-Harvey-Viskanta model to explicitly include effects of the degree of market integration. Three factors included in the model to represent the integration process are: the number of country funds (NFunds), exports plus imports divided by GDP (Trade/GDP) and equity market capitalization (Mcap/GDP). The beta terms are firm specific but the tangent terms are country wide coefficients. The model is described by the following expression:

$$r_{ijt} = \alpha_{ijt} + \beta^{w_{it}} r_{wt} + \beta^j r_{jt} + \varepsilon_{ijt}$$

Where,

$$\begin{aligned} \beta_{ij}^w &= b_{0i} + b_1 NFunds_{j,t-1} + b_2 [Trade / GDP]_{j,t-1} + b_3 [MCap / GDP]_{j,t-1} \\ \beta_{ij}^j &= c_{0i} + c_1 NFunds_{j,t-1} + c_2 [Trade / GDP]_{j,t-1} + c_3 [MCap / GDP]_{j,t-1} \\ \alpha_{ijt} &= a_{0i} + a_j \log(CCR_{j,t-1}) \end{aligned}$$

Once the coefficients have been obtained by regression, the cost of capital is obtained by using the equation given above.

All models described here aim at estimating cost of capital for emerging market investments by making assumptions to include the lack of integration in world markets. The next section addresses the issues relating to estimating cost of capital for emerging market investments by multinational corporations.

3.1 Risks for MNC Investments in Emerging Markets

There are three primary sources of risks for MNC investments in emerging markets [26]:

1. Political or "sovereign" risk
2. Commercial or "business" risk
3. Currency risk

Political or "sovereign" risks can be observed in the yield spreads on the sovereign bonds denominated in US dollars. Business risk can be observed in the volatility of local equity markets. Currency risk can be accounted for by carrying out all financial analyses by converting cash flows from local currency to US dollars. The exchange rate used for this conversion can typically include an upper and lower bound to estimate the bounds on cash flows.

3.2 Discount Rates for Evaluating Investment Opportunities

Discount rates are useful for comparing various investment opportunities when performing an NPV analysis. In practice, for corporations, discount rates are computed as a weighted average of relevant debt and equity costs. Estimations of costs of equity are typically done based on the Capital Asset Pricing Model (CAPM).

In principle, risks such as sovereign risks would be considered unsystematic risks because investors could diversify away these risks by personally investing in these markets. However, as we have seen from the discussions in earlier sections, emerging markets are not easily accessible to investors. For instance, consider Ford Motor

2. **Business Risk:** Business volatility is incorporated by using an additional risk premium - analogous to the market risk premium in a CAPM framework. However, instead of using a beta which reflects the covariance of the local stock market return with respect to the world or home country market returns, they suggest using a measure that reflects the volatility of the local stock market relative to the volatility of the domestic (US) market.

Therefore, the cost of equity for evaluating emerging market discount rate can be expressed by the following equation:

$$R = [RF_{US} + \textit{Credit Spread}] + \beta(\textit{US Equity Premium})$$

The above equation provides the cost of equity for an investment of average risk in a given country. It does not account for any specific project risks. To arrive at a project specific risk, an additional adjustment to capture any differences between the project's risk and that of an average investment in the economy.

The following steps are used in estimating the variables in the above equation to estimate the cost of equity.

- **Step 1 - Estimating Credit Spread:** Credit spread in the equation can be estimated by observing the yield differential between sovereign bonds denominated in USD and the US treasury bonds for the same time period. For example, the credit spread for Philippines can be estimated by observing the yield differential between Philippines' Brady bonds and US Treasuries. Publicly traded debt take into account the expected rates of inflation, economic policies and therefore the uncertainty associated changes

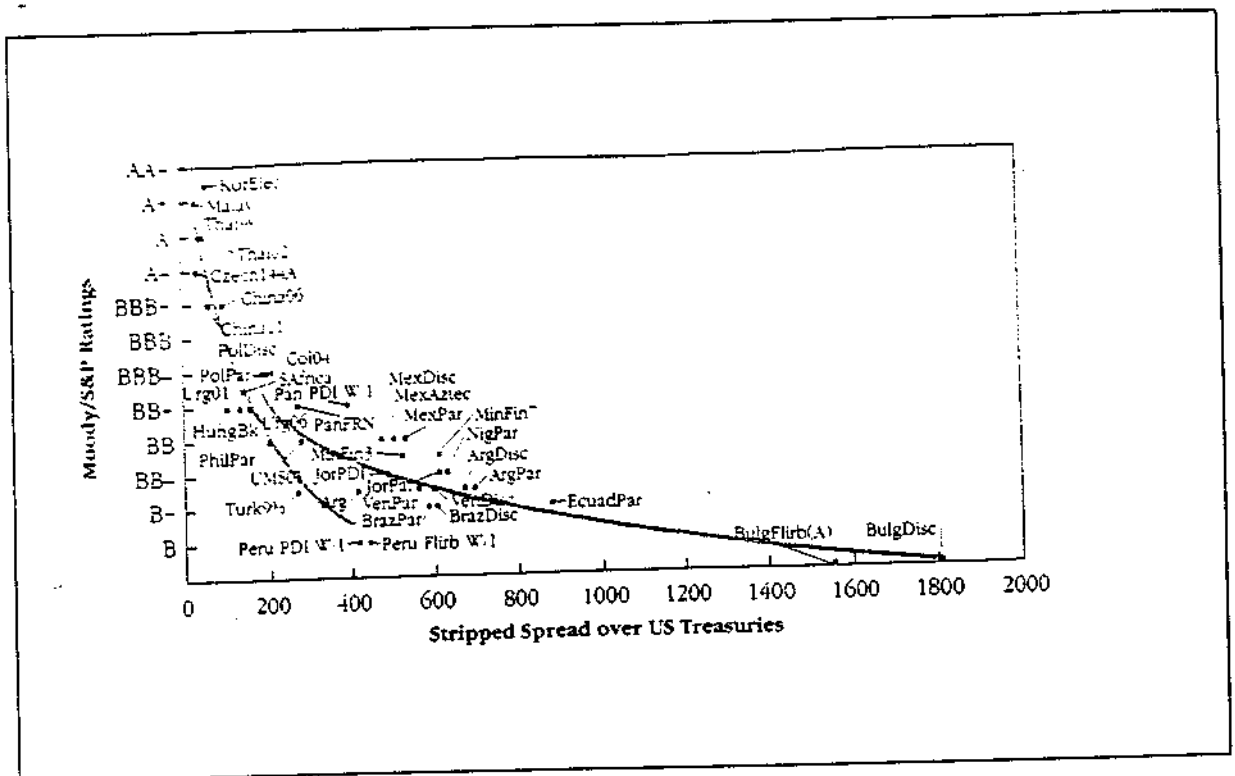


Figure 7 Emerging market yield spreads [26]

- Step 2 – Calculating the Premium for Business Volatility:** Traditional CAPM is based on beta, which uses an asset's covariance with the market to estimate the asset's risk. Godfrey & Espinosa, like Harvey, have shown that the covariance of emerging market investments with a world market portfolio is very low resulting in very low values for beta for emerging market investments. In some cases, beta has a value of zero implying no risk which is unrealistic. Therefore, they suggest using a simplified formulation for beta which measures the relative standard deviation of an emerging market asset with respect to the US market portfolio:

$$\beta = \sigma_{country} / \sigma_{US}$$

- Step 3 – Accounting for the Interdependence Between Credit Risk and Business/Equity Volatility:** The two dimensions of emerging market equity risk used

4 Extension of Godfrey and Espinosa Model for Project Specific Investments

Godfrey and Espinosa developed an approach to evaluate cost of capital for an average investment in emerging markets. In reality, however, most investments are probably not average and require independent evaluation. To carry out this evaluation, one requires the cost of capital for an investment in that particular industry. For example, an automotive investment would have to be evaluated based on a cost of capital for automotive investments in that country.

An enhancement to the model described in Section 3.2 is suggested here to adjust for project specific risk:

$$R = [RF_{US} + \textit{Credit Spread}] + \beta_{\textit{country}}(\textit{US Equity Premium}) \\ + \beta_{\textit{project}}(\textit{Local Market Equity Premium})$$

where, $\beta_{\textit{country}}$ is the same as β described in Section 3.2. The new term (last in the above equation) is used to adjust for the risk level of a particular project in the local market.

$\beta_{\textit{project}}$ is given by,

$$\beta_{\textit{project}} = (\rho_{\textit{industry.country}}) [\sigma_{\textit{industry}} / \sigma_{\textit{country}}]$$

This new model has the following features:

- $\beta_{\textit{project}}$ allows for the adjustment of $\beta_{\textit{country}}$ for a level of risk appropriate for the project in the local market
- The multiplier (local market equity premium) will allow for the adjustment of the premium appropriate for the project relative to the market. For example, if the

is a great deal of uncertainty associated with cash flows for investments in emerging markets. In fact, I believe, having a handle on cash flows is harder because it requires accurate estimates of economic growth and income distributions in these markets.

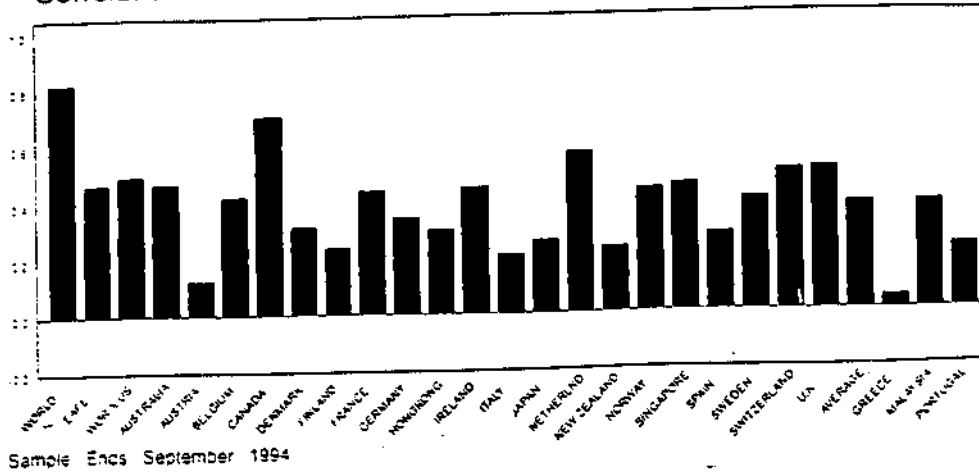
6 Acknowledgements

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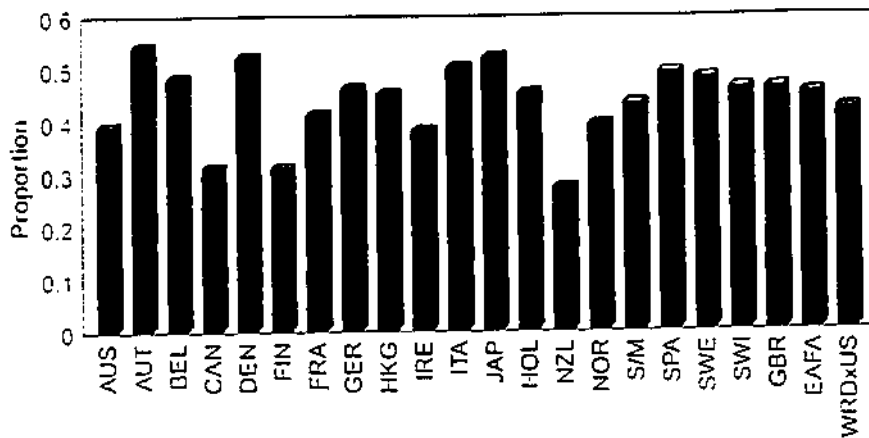
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Appendix 1 - Why Invest Internationally ?

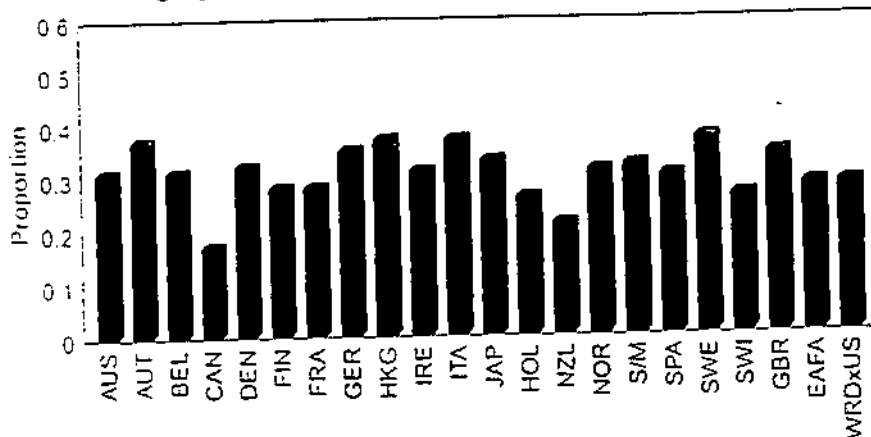
Correlation with MSCI U.S. Equity Returns (Unhedged) MSCI Countries



Hedging Direction: U.S. Market Down/Foreign Market Up



Hedging Coverage: Foreign Gain Exceeds U.S. Loss



Faculty Comments

Here is the evaluation I put on your paper. We need urgently one more clean copy to be put in the Library.

This research paper provides a comprehensive survey of various models used for estimating the cost of capital for investments in emerging markets.

The subject is challenging and the author has done an extensive job researching the literature and compiling the major ideas into a readable and generally well-organized report.

Small problems in exposition and structure notwithstanding, a grade of EXCELLENT is appropriate in view of the scope of work and the difficulty of the topic.


G. Dufey, Prof. of Intl. Bus. & Finance June 12, 1999