

# **The Discount Rate in Emerging Markets: A Guide**

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Received: December, 2003

## Abstract

The paper deals with investments in real assets in developing countries. The traditional practitioners' approach of incorporating a country risk premium is put into perspective, and an account is given of a selected group of models for discount rate determination in both segmented and integrated markets. On this basis, the most promising models for real asset valuation in emerging markets are selected and a sort of guide as to the course of action when performing valuations in emerging markets is proposed.

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## Introduction

In this paper attention is given to investments in real assets, as opposed to financial assets, in developing countries. That is, the focus is on the main considerations behind the appropriate determination of the discount rate when performing valuations of investments in real assets in emerging markets.

The topic is particularly relevant given, firstly, the growing need to evaluate privatizations, direct private acquisitions<sup>1</sup>, and greenfield investments in new productive facilities throughout the developing world, and secondly, the current controversy as to the correct discount (or “hurdle”) rate for these investments. For the sake of simplicity, the impact of the tax shield will be sidestepped and the focus will be on the unlevered discount rate (i.e. the discount rate on operating cash flows after taxes).

A selection of the most relevant models that have been proposed will be placed into perspective and their salient characteristics discussed for the purpose of devising a sort of user’s guide.<sup>2</sup> These models originate from two well-differentiated groups.

One is the group of “practitioners” (mostly investment bankers) who favor hands-on ways to come up with a discount rate. The models coming from this group will be called “practical models”. The “academicians” make up the other group. Unlike the practitioners, most academicians tend to opt for theoretically and conceptually correct approaches. Their models will be called “academic models”.

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<sup>1</sup> For the purpose of this paper we define real asset investments as all those that involve managerial control. Hence, privatizations and direct private acquisitions are included.

<sup>2</sup> The work done by my students in the Seminar on Corporate Finance in Emerging Markets which took place at IESA in the winter of 2001 was particularly useful for the preparation of this paper. My thanks to them and especially to Angelo Lombardo and Victor Pausin, who did their MBA thesis on this subject. I am also indebted to Carlos Molina, Eduardo Pablo, Maximiliano González, Cándido Pérez and Henrique Ghersi for their interesting comments.

## Practical Models

Most practitioners are convinced that emerging countries are inherently riskier. Hence a higher return must be expected from investments in these regions to account for “country risk”. This is materialized in most valuations by the addition of a rate differential called the “country risk premium” to the corresponding rate for an equivalent investment in a developed market.

The majority of practical models are based on the CAPM (Capital Asset Pricing Model).<sup>3</sup> The most popular one is probably the following adapted CAPM:

$$E(R_{i,x}) = R_f + \beta_i \cdot [E(R_M) - R_f] + CR_x \quad (1)$$

where

$E(R_{i,x})$  is the expected return (discount rate) of project  $i$  in country  $x$

$R_f$  is the risk free rate (usually the yield of a long-term US T-Bond)

$\beta_i$  is the beta of a similar investment in a developed country (usually the US)

$E(R_M)$  is the expected return on the market portfolio (usually the S & P 500 or a worldwide stock market index such as the Morgan Stanley Composite Index or MSCI)

$CR_x$  is a country  $x$  risk premium (usually the spread of a long-term T-Bond issued by country  $x$  in US\$ over a long-term US T-Bond)<sup>4</sup>

It can be said that there are almost as many variants of this model as analysts. What all these variants have in common is that the discount

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<sup>3</sup> Hence, they accept this model's assumptions. See footnote 10.

<sup>4</sup> Occasionally it is made equal to the return of corporate bonds with the same risk classification.

rate is estimated using the CAPM as the base model and then the resulting expected return is increased with a measure of country risk by some means. A sample of some of the more popular adjustments follow:

- An additional risk premium is added to the discount rate depending on the nation in which the project takes place, or
- The relative volatility of the stock market index of the country concerned is somehow factored in, or
- The country risk premium is added instead of the market risk premium, or
- The country risk is associated with the percentage of exports in the firm's or project's sales.<sup>5</sup>

Besides adding a country risk premium to the discount rate, analysts also modify the cash flow projections with country uncertainties. That is, country risk is taken into account twice: in the discount rate and in the cash flows. As will be seen below, this may be incorrect.

Let us now discuss why the practitioners' approaches, although intuitively attractive, appear to be flawed.

### ***Country Risk and Country Risk Premium***

Country risk is generally associated with political risk. Political risk stems from the discretionary powers of governmental authorities. The less structured and trustworthy the institutional framework the more significant these powers are. Political risk takes on particular relevance in emerging markets given the weakness of their institutions.

In the case of investments, political risk materializes mainly in obstacles to the repatriation of invested capital or profits in the

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<sup>5</sup> See Díaz & Freites (2000), and Damodaran (1999a & 1999b).

originally expected conditions, including the risk of expropriation. Political risk can also manifest itself in unexpected changes in laws, regulations or governmental administrative practices.

However, there are a number of reasons to believe that adding some kind of country risk premium to the CAPM is not the best way to account for country (i.e. political) risk.<sup>6</sup>

### *Country Risk is not the Same for All Projects*

The same country risk premium should not apply to all investments in a particular country. Some countries have a better reputation in some business sectors than in others. Hence, the country premium for the more reputable sectors should be lower. This could be the case of investments in the banking sector in Panama, or in oil in an OPEC country. Relatively more stable and consistent government policies should be expected in these sectors given the fact that they are critical to these countries' economies.

Likewise, there could be some activities with a higher country risk. A possible example is agriculture, which many nations consider a matter of national security. In consequence, governments usually interfere through subsidies, price controls, import quotas, etc.

Lastly, through contracting arrangements it is feasible to reduce country risk for certain types of investments, for example, a joint venture with the local government in a state controlled sector (e.g. mining). It is reasonable to expect that this would result in less unfavorable interference since such measures would hurt not only the investor but also the government as a partner.

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<sup>6</sup> By permission of the publisher. Extracted from *Financial Decisions in Emerging Markets*, by Jaime Sabal (2002), Oxford University Press (publication forthcoming). All rights reserved.

### *Country Risk is not Totally Systematic*

Adding the country risk premium to the risk free rate, and hence to the discount rate by means of the CAPM, implicitly assumes that country risk is fully systematic or non-diversifiable. However, evidence suggests that public stock returns in developing and developed countries are not highly correlated. To the extent that these returns are truly representative of the local economies it seems that at least a good portion of country risk is diversifiable.

Country uncertainties should always be accounted for in the cash flow projections but this is not necessarily true for the discount rate. It is right to add the country risk premium to the discount rate only if country risk is fully systematic. If country risk is partly systematic just a portion of it should be added to the discount rate. If country risk is fully non-systematic none of it should be added to the discount rate.

### *Credit Risk is not Equivalent to Country Risk*

Government bond prices (in hard currency) in developing countries depend on investors' expectations of compliance with the promised payment schedule. Adding the country risk premium to the discount rate assumes that the risk of non-compliance by the government is the right proxy for whatever country risk is affecting the project under analysis. In most cases this is likely to be a very rough approximation, if not a totally inaccurate one.

In short, the main problems of adding a country risk premium are that:

- Country risk is isolated from the other business risks.
- It is assumed that the effect of country risk is uniform for all projects or families of projects.

- The impact of country risk is considered both in the discount rate and in the projected cash flows without knowledge of the degree of diversifiability at the investor level.

The bottom line is that adding a country risk premium to the discount rate is merely an intuitive approach without any theoretical justification.

### **Academic Models**

Academic models come from two different types of sources: conceptual and empirical. Conceptual models are based on a logical reasoning as to how the discount rate should be estimated given a set of assumptions. Empirical models seek to identify those factors that have the greatest impact on historical returns in the emerging market without paying too much attention to theoretical fundamentals.<sup>7</sup>

To a certain extent, empirical models represent an intermediate step between practical and conceptual models since they attempt to determine the relevant factors from a rigorous empirical perspective but often lack a theoretical foundation.

Another major differentiating issue between all these models is the degree to which the emerging financial market concerned is integrated with the rest of the world, and particularly with industrialized countries.

As a result of all this, academic models can be classified into four groups depending on whether they are conceptual or empirical, or whether they were designed for (fully or partially) segmented or integrated markets.

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<sup>7</sup> This is a simplification, since some empirical models have a theoretical base.

In this paper a number of models will be studied but before describing them it is necessary to briefly discuss the concept of market segmentation.

### ***Market Segmentation***

A market is segmented when it poses significant barriers to international capital flows. When barriers are negligible we are before an integrated market. The most common barriers are restrictions to outward or inward portfolio investments and limitations on foreign ownership of domestic shares (Sercu & Uppal 1995).

An obvious financial effect of market segmentation is the presence of significant differences between the prices of local and foreign assets adjusted for risk. In an integrated market these differences do not last long due to arbitrage. Hence, adjustments in the risk-return relationship occur almost simultaneously at local and international level.

Empirically, the usual way to detect the extent to which a market is segmented is by measuring the correlation of returns between local and international assets. The higher this correlation, the more integrated the markets.

The local stock market indices are generally used as a proxy for local assets, and these indices are regressed against a global market portfolio such as the MSCI. However, the results of these regressions are rarely trustworthy given that local stock markets tend to be illiquid, their historical series are short, and local indices are generally biased toward a few stocks (i.e. they are not good proxies for the local economies). Hence, it turns out that in practice it is quite difficult to determine to what extent a local economy is or is not integrated with the rest of the world.



### *The Investor's Perspective*

This paper deals mainly with diversified investors, be they locally or globally diversified.<sup>8</sup> Both globally and locally diversified investors can coexist in a segmented market. For instance, well-diversified foreign investors who are allowed to invest in certain sectors of a closed economy will remain globally diversified whereas this would not be the case for the locals.

In a case such as this it is possible to find two different prices for the same stock. Foreign owned stocks are valued as part of globally diversified portfolios and have a higher price, whereas locally held shares belonging to locally diversified portfolios will trade at a lower price.<sup>9</sup>

Notice that, as regards discount rate determination, what is relevant is not the segmentation of the market but whether the investor is locally or globally diversified. Globally diversified investors will demand lower discount rates.

This is particularly important when dealing with investments in real assets. By definition their markets are not efficient, they have barriers to entry and are expected to yield positive net present values (i.e. extraordinary returns). The lower the barriers to entry the more abundant the interested investors.

The final price of the real asset or project will depend both on the number of potential investors and on how diversified they are. The more numerous and the more diversified the investors, the higher the final price is expected to be. However, since real asset markets remain inefficient, it is likely that in the end the real asset will be bought (or

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<sup>8</sup> Further on, Professor A. Damodaran's proposal for discount rate adjustment in the case of less diversified investors will be introduced.

<sup>9</sup> Of course, this depends on how significant the barriers to arbitrage are.

the project undertaken) by a relatively less diversified investor at a low price (and high expected return).<sup>10</sup>

Investors are often globally diversified, in which case it is immaterial whether the local market is segmented or not, and projects should always be evaluated as part of a globally diversified portfolio.

## Conceptual Models

Within this category we find segmented and integrated market models. Segmented market models apply to investors with well-diversified portfolios that are restricted to the local market. The Local CAPM is the universal model for discount rate determination in segmented markets. The model and its corresponding variables stand as follows:

$$E(R_{ix}) = R_{fx} + \beta_{ix} \cdot [E(R_{Mx}) - R_{fx}] \quad (2)$$

where

$E(R_{ix})$  is the expected return (discount rate) of investment  $i$  in country  $x$

$R_{fx}$  is the risk free rate in country  $x$

$\beta_{ix}$  is the beta of investment  $i$  with respect to the market portfolio in country  $x$

$E(R_{Mx})$  is the expected return of the market portfolio in country  $x$

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<sup>10</sup> Another important consideration is the added value perceived by each potential investor. The higher the perceived added value the higher the price the investor will be willing to pay for the real asset.

The weakness of this model resides not only in its general assumptions<sup>11</sup> but also, in this particular case, in the fact that every parameter is related to the local market. Let us explain why.

Publicly traded securities are the natural information source to estimate beta for a real investment. This is a straightforward process in developed countries: first, select one or more publicly traded companies in the same (or similar) line of business as the company being analyzed. Then, obtain their corresponding betas from an information service. The project beta should be within the range of these company betas.

However, usually this is not so easily done in developing countries, for several reasons:

- The high volatility of their stock markets makes it very difficult to estimate average returns with acceptable confidence levels.
- Emerging stock markets tend to be illiquid and, for most securities, long time intervals are usual between one transaction and the next. Thus, information on prices is infrequent and irregular and many prices (for the periods the securities were not traded) are unknown. Trying to compute returns with this kind of information is imprecise, and hence observed returns do not accurately reflect real historical returns.<sup>12</sup>
- It is difficult to find companies in many lines of business since usually only a limited number of firms are traded in the stock markets. Additionally, as mentioned earlier, the stock indices are strongly biased towards a few stocks, which are weighted heavily in the market. Therefore, betas do not mirror risk with respect to the market but with respect to a biased basket of securities.

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<sup>11</sup> The less realistic assumptions of the CAPM are that all investors have the same information set, investment horizon and expectations, absence of transaction costs and normally distributed asset returns. Surprisingly, despite these limitations many empirical studies have given practical validity to this model.

<sup>12</sup> See Scholes & Williams (1977) and Fowler & Harvey (1983) for techniques to alleviate this problem.

Fortunately, in today's globalized world it is rare to find major investors whose portfolios are restricted to local markets. Therefore, the practical relevance of the Local CAPM may be weakening.

Having covered the conceptual/segmented case, let us now concentrate on the more interesting case of conceptual/integrated models. Four models will be covered within this category: the International CAPM, the Modified International CAPM, the Godfrey & Espinosa (1996) model and the APT.

### *The International CAPM*

The International CAPM is the central model for well-diversified international investors. In addition to the standard assumptions behind the CAPM, this model presumes investors with hard currency consumption baskets. Therefore, it needs to incorporate the risk arising from purchase parity deviations. This is done by adding a term measuring the exchange rate risk between the local currency and a base currency from a developed economy (such as the US dollar).

The International CAPM stands as follows (Sercu & Uppal, 1995):

$$E(R_{ix}) = R_f + \beta_i \cdot [E(R_M) - R_f] + \gamma_{ix} \cdot E(s_x + r_x - R_f) \quad (3)$$

where

$E(R_{ix})$  is the expected return (discount rate) in base currency of investment  $i$  in country  $x$

$R_f$  is the risk free rate of the base currency (e.g. the US dollar)

$\beta_i$  is the beta of investment  $i$  with respect to a proxy for the world market portfolio such as the MSCI

$E(R_M)$  is the expected return of the proxy for the world market portfolio

$\gamma_{ix}$  is the beta of the risk free rate of the base currency (e.g. the US dollar) with respect to the local currency exchange rate change (to the base currency)

$s_x$  is the percentage exchange rate change of the base currency with respect to the local currency

$r_x$  is the risk free rate in local currency

However, luckily it is safe to assume that purchase parity holds in the long run for real asset investments. Thus, the exchange risk term drops out and the model simply becomes:

$$E(R_{ix}) = R_f + \beta_i \cdot [E(R_M) - R_f] \quad (4)$$

This simplifies the computation considerably. The risk free rate and the market portfolio are easily available for a base currency such as the US dollar, and beta can be estimated by regressing the unlevered local industry stock returns against the selected reference index (e.g. S & P 500 or MSCI Emerging Markets index).

Nevertheless, for beta to be reliable this approach requires the local industry stock to be very liquid and to have a history of public trading. Regrettably, these conditions are rarely met in emerging markets.

### *The Modified International CAPM*

The Modified International CAPM (MICAPM)<sup>13</sup> is simply a variant of the International CAPM that seeks to improve upon the computation

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<sup>13</sup> The MICAPM also assumes that purchase parity holds in the long run, so the exchange rate risk terms drop out. See Sabal (2002) for an extended explanation of the MICAPM.

of beta. Like the International CAPM, it rests on the same assumptions as the CAPM and takes for granted investors with hard currency consumption baskets.

The MICAPM is expressed as:

$$E(R_i) = R_f + \beta_p [E(R_M) - R_f] \quad (5)$$

where

$E(R_i)$  is the expected return of investment  $i$

$R_f$  is the risk free rate of the base currency (e.g. the US dollar)

$\beta_p$  is a “weighted” beta (more on this below)

$E(R_M)$  is the expected return of the proxy for the market portfolio (e.g. the S & P 500 or MSCI)

When compared with the International CAPM, the main advantages of the MICAPM are that:

- The computation of beta is more reliable because it is based on information from countries with well-developed equity markets.
- It is recognized that a project’s results can be significantly related to two or more countries.

Let us illustrate this with an example.<sup>14</sup>

Imagine a textile concern trading in three markets, one of them the US market. The weighted beta is computed as follows:<sup>15</sup>

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<sup>14</sup> This adjustment to the CAPM is inspired by ideas taken from Damodaran (1999a) and Shapiro (1996).

<sup>15</sup> For the sake of simplicity we will use the US\$ as the relevant hard currency in this example. In other words, we are thinking of investors with consumption baskets that are dependent on the US\$. Likewise, we adopt the US stock market as our proxy for the “market portfolio”.

- Obtain the beta of textile companies in the US market  $\beta_{t,M}$  from a financial information service.
- Estimate the betas of each local market with respect to the US market. If we call these markets  $m$  and  $n$ , their corresponding betas will be  $\beta_{m,M}$  and  $\beta_{n,M}$ . These betas can be estimated by regressing the historical returns of (representative) local stock indices against the US stock market returns.
- Compute the project beta in each market with respect to the US market,  $\beta_{tm,M}$  and  $\beta_{tn,M}$ , as:

$$\begin{aligned}\beta_{tm,M} &= \beta_{t,M} \beta_{m,M} \\ \beta_{tn,M} &= \beta_{t,M} \beta_{n,M}\end{aligned}\tag{6}$$

where  $\beta_{t,M}$  is the beta corresponding to the textile business in the US market.

- Find the weighted beta  $\beta_p$  with the following formula:

$$\begin{aligned}\beta_p &= \alpha_M \beta_{t,M} + \alpha_m \beta_{tm,M} + \alpha_n \beta_{tn,M} \\ \alpha_M + \alpha_m + \alpha_n &= 1\end{aligned}\tag{7}$$

originating in each market.

### *The Godfrey & Espinosa Model*

Godfrey & Espinosa identify three types of risks affecting investments in emerging markets: political risk, business risk and currency risk. As in the previous models, currency risk is accounted for by selecting a base hard currency (e.g. the US dollar) whereas the other two types of risks are incorporated into the discount rate by altering the basic CAPM.

The model is expressed as follows:

$$E(R_{ix}) = R_f + \beta_{adj} \cdot [E(R_M) - R_f] + CR_x \quad (8)$$

where

$E(R_{ix})$  is the expected return of investment  $i$  in country  $x$

$R_f$  is the risk free rate in the base hard currency

$\beta_{adj}$  is an “adjusted beta”

$E(R_M)$  is the expected return of the base currency stock market

$CR_x$  is a credit (or “country risk”) spread for country  $x$  (e.g. the spread of a long-term T-Bond issued by country  $x$  in US\$ over a long-term US T-Bond)

The adjusted beta is defined as:

$$\beta_{adj} = \frac{\sigma_x}{\sigma_M} \quad (9)$$

where

$\sigma_x$  is the standard deviation of returns for a proxy of the local stock market (e.g. the local stock market index)

$\sigma_M$  is the standard deviation of returns for the hard currency stock market (e.g. the S & P 500 index)

Observe that the CAPM’s beta is defined as:

$$\beta_i = \frac{\sigma_{iM}}{\sigma_M^2} \quad (10)$$



and this expression is equivalent to

$$\beta_i = \frac{\sigma_{iM}}{\sigma_i \cdot \sigma_M} \cdot \frac{\sigma_i}{\sigma_M} = \rho_{iM} \cdot \frac{\sigma_i}{\sigma_M} \quad (11)$$

Therefore,  $\beta_{adj}$  can be interpreted as the CAPM's beta when the correlation coefficient between the base market and the local market returns equals +1.

Godfrey & Espinosa recognize that the adjusted beta and the credit spread might be related. In their own words:

*In reality, however, fundamental economic and political developments are likely to affect both, a country's credit quality and the volatility of the local stock market. To the extent these two measures of risk derive from the same source of risk, our method of combining both measures of risk will result in some "double counting".*

They go on to refer to Erb, Harvey & Viskanta (1995b). In this paper it was found that 40% of the variation in equity volatility can be explained by variation in credit quality. Hence, the double counting is corrected by reducing the adjusted beta by this percentage. The final model stands as:

$$E(R_{ix}) = R_f + (0.60 \cdot \beta_{adj}) \cdot [E(R_M) - R_f] + CR_x \quad (12)$$

Godfrey & Espinosa's model can be criticized on several grounds:

First, like the practitioners, they add a country risk premium (credit spread) to the discount rate. The flaws of this procedure were explained earlier.

Second, the adjusted beta relies on historical information on local stock market returns. It was shown earlier how this approach might be unreliable (see "Conceptual Models").

And third, the adjusted beta embodies average local equity risk, and it remains unclear how this risk should be adjusted to reflect the particular risk of the project being analyzed.

### *The Arbitrage Pricing Model (APT)*

All the practical and academic models described so far are variants of the CAPM. Although the CAPM is widely known and remains the most popular among practitioners it is based on a set of assumptions that are somewhat removed from practical realities. The CAPM results from a state of general equilibrium under the following assumptions:

- All investors are risk averse and maximize their expected utility.
- There is a risk free asset.
- There is a market portfolio.
- There are no transaction costs.
- All investors have the same information set.
- All investors have the same investment horizon and homogeneous expectations about asset returns.
- Asset returns are normally distributed.

Out of this group only the first two seem reasonably realistic.

The APT proposed by Ross (1976) offers a different approach for asset pricing. It derives asset prices by banning profit opportunities through arbitrage (i.e. taking advantage of possible price disequilibria between assets).

According to the model, asset returns are linearly related to a set of factors, as follows:

$$E(R_i) = R_f + \beta_{i1} \cdot f_1 + \beta_{i2} \cdot f_2 + \dots + \beta_{in} \cdot f_n \quad (13)$$

where

$E(R_i)$  is the expected return on investment  $i$

$R_f$  is the risk free rate

$f_{\#}$  are factors affecting expected return

$\beta_{i,\#}$  is the sensitivity of  $i$  returns to factor  $\#$

In equilibrium all portfolios built with the set of assets under consideration using no wealth and having no risk must on average earn no return. In order to form a portfolio with no wealth it is necessary to combine short positions with long positions so that the net amount invested is zero. If the weighted average of the beta components for each factor is likewise zero, the portfolio will have no risk and hence no expected return.

The APT shows the following main advantages when compared to the CAPM:

- It is not restricted to any particular return distribution.
- General equilibrium is not required, only a partial equilibrium between asset returns.
- There is no need for a market portfolio.

Identifying the right factors has proved to be the main disadvantage of the APT, since they must be completely uncorrelated to each other. Fortunately, recent statistical advances are solving most of these shortcomings and the way is open for the practical application of this model.<sup>16</sup> Nevertheless, so far the APT has not taken hold among investment analysts, who remain ever faithful to the CAPM and its variants.

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<sup>16</sup> See Campbell, Lo & MacKinlay (1997) for the statistical handling of the APT and other possibilities. Chen, Roll & Ross (1983) identified four macroeconomic variables that provide valuable insight on the APT factors for the US economy.

## **Empirical Models**

As mentioned above, empirical models seek to identify the most significant factors affecting returns in a particular market. Not having to cope with the assumptions of the CAPM (and its variants) or the APT is their greatest advantage. Nonetheless, this generally comes at the price of a lack of theoretical basis.

Empirical models are multifactor models along much the same lines as the APT. However, they address the “unidentifiable factor problem” by selecting the factors a priori from available data. But as can be expected, the factors tend to be correlated to each other, causing statistical problems and affecting the reliability of the estimates. As with the APT, most of these problems are gradually being solved and the results obtained from multifactor models are becoming more robust.

It is important to take into account that the significant factors that are finally identified will determine whether the asset returns are more or less integrated into the global markets. A model encompassing mostly local parameters will point to locally diversified investors, whereas if global parameters are more important, asset returns will be more integrated with the rest of the world, suggesting globally diversified investors.

In general, the multifactor approach requires experimental determination of the causal factors for historical returns, an analysis that should be updated periodically to adjust for changes in the composition and weight of the factors over time.

Three interesting empirical proposals merit our attention: an older one by Erb, Harvey & Viskanta (1995a & 1995b), and two more recent ones by Harvey (2000) and Estrada (2000).

### *Erb, Harvey & Viskanta's Model*

This model is conceived for segmented markets (locally diversified investors in our case) and uses institutional investors' country risk ratings to estimate expected returns for projects of average risk within each country. By relying on credit ratings rather than historical series the discount rates turn out to be forward-looking.

The model is as follows:<sup>17</sup>

$$E(R_{ix}) = \gamma_0 + \gamma_1 \cdot CR_x \quad (14)$$

where

$E(R_{ix})$  is the expected return (or discount rate)

$\gamma_0$  and  $\gamma_1$  are (regression estimated) parameters

$CR_x$  is the credit rating of country  $x$

Unfortunately, the paper leaves to the user the adjustment for risk for particular projects.

On his web page <<http://www.duke.edu/~charvey/camlinks.htm>> Professor Harvey offers a subscription service based on this model providing updated discount rates for 136 countries.

### *Harvey's Proposal*

In his latest proposal, Harvey suggests a hybrid between segmented and integrated markets, incorporating the degree of integration/segmentation in the computation.

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<sup>17</sup> Erb, Harvey & Viskanta (1995a & 1995b) also propose non-linear variations of this model to achieve a better fit for low credit ratings.

The salient points of his proposal are:

- Asset risk is a function of its covariance with global markets if the country is fully integrated and a function of its variance if it is fully segmented.
- The weight of each factor depends on the level of integration of the local economy with the rest of the world.
- The weights can vary over time.
- Regrettably in his paper it is not clear how the level of integration should be measured.

### *Estrada's Model*

This model assumes expected return to be a function of the negative side of the variance of local returns. In other words, investors are not averse to total volatility but just to its unfavorable part.

The model is expressed as:

$$E(R_{ix}) = R_f + RP_M \cdot RM_{ix} \quad (15)$$

where

$E(R_{ix})$  is the expected return (discount rate) of asset  $i$  in market  $x$

$R_f$  is the risk free rate (e.g. yield of US T-Bonds)

$RP_M$  is the global market risk premium

$RM_{ix}$  is the risk measure of negative volatility, expressed as:

$$RM_{ix} = \frac{\sqrt{\frac{1}{N} \cdot \sum_{n=1}^N (R_{in} - \bar{R}_{ix})^2}}{\sqrt{\frac{1}{N} \cdot \sum_{n=1}^N (R_{in} - \bar{R}_{iM})^2}} \quad (16)$$

for

$$R_{in} < \bar{R}_{ix}$$

$$R_{in} < \bar{R}_{iM}$$

where

$N$  is the number of observations

$R_{in}$  are the returns of asset  $i$  in market  $x$

$\bar{R}_{ix}$  is the mean return of asset  $i$  in market  $x$

$\bar{R}_{iM}$  is the mean return of asset  $i$  in the global market

Because its point of reference is the global market, Estrada's model is conceived for integrated markets.

### **The Gap Between Practitioners and Academicians**

The country risk premium approach does not have any theoretical justification. However, it remains the most popular one among practitioners. Why is this so? It may be that this behavior is rooted in an inclination to keep complications to a minimum combined with a conservative attitude from most analysts when recommending investments in emerging markets.

### *Ease of Application*

The CAPM is an appealing model. To the less well-informed analyst it appears as a simple equation whose parameters (the betas, the risk free rate, and the expected return on the market portfolio) are easily obtainable through financial information services. Hence, it offers a straightforward way to come up with a discount rate.

Furthermore, being designed for developed economies, it “makes sense” to add a “country risk premium” to account for the additional risk of doing business in the developing world. This sounds quite a practical approach, but as we discussed above it is also a flawed one.

Even when the analyst is aware of the existence of other better-grounded models these are usually rejected, probably because they tend to be more difficult to understand and apply. In addition, the more complex the models the harder it is to explain them to corporate decision makers who often lack training in modern corporate finance.

Another possibility is that, as most assumptions behind the conceptual models are so divorced from day-to-day realities in emerging markets, analysts prefer to discard them in favor of more practical approaches.

The temptation to embrace the friendly CAPM is even more pronounced in the many instances in which valuation results are needed quickly and there is not enough time for additional complications.

### *Conservatism*

The personal incentives of analysts and decision makers in relation to the project under consideration are another factor. First, they are rarely given credit for any diversification effects on the company’s investors. Moreover, an asymmetric incentive structure could be present in most



situations. Managers might expect to be strongly penalized when a particular emerging market investment turns sour but not specially rewarded if the project is successful. Hence, only emerging market investments offering extraordinarily high returns will be recommended and undertaken.

Notice that this kind of behavior is sustainable only when there are significant entry barriers to the projects in question, which indeed would appear to be feasible in an emerging markets context.

## **Adjustments**

It is worth mentioning a couple of adjustments to the discount rate that might be advisable for some investments in emerging countries. One has to do with investor diversification and the other with stock market liquidity.

### *Investor Diversification*

The CAPM and related models all assume that investors are fully diversified either locally or globally. However, such an assumption might not apply for those local emerging market investors who keep a large portion of their assets in family or closely held businesses. These less diversified investors should demand a larger return on their real asset investments to compensate for their lack of diversification.<sup>18</sup>

For such situations, Damodaran <[http://www.stern.nyu.edu/~adamodar /New\\_Home\\_Page/home.htm](http://www.stern.nyu.edu/~adamodar/New_Home_Page/home.htm)> proposes adjusting the expected return by dividing beta by the correlation coefficient between the returns of the industry and the reference market (for instance, the S

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<sup>18</sup> Of course, these investors will be at a competitive disadvantage vis-à-vis more diversified investors.

& P 500). This is equivalent to dividing the standard deviation of a stock by the standard deviation of the market.<sup>19</sup>

### *Stock Market Liquidity*

Illiquid shares come with higher trading costs. Hence, investors demand higher returns (and lower prices) from these investments. Koeplin, Sarin & Shapiro (2000) show that stock prices tend to be significantly lower for private (non-listed) companies, confirming this assertion. The discount can reach 20-30% in US companies and up to 50% for non-US ones.

The large majority of equity investments in emerging countries are illiquid. Given the considerable inefficiencies of emerging markets this is true not only in the case of private firms but for many companies listed in the local exchanges as well. Therefore, most valuations in emerging markets should be adjusted downwards to account for the lack of liquidity of their corresponding stock.

Only when a stock is expected to be widely traded, whether in the local exchanges or in an international exchange (e.g. in the form of ADRs or GDRs), the illiquidity discount might not apply.

### **How to Proceed in Practice**

The use of the (practitioners') country risk premium approach is justifiable mostly as a point of reference (or simply when the decision maker requests it). It is time for the well-grounded models to occupy pride of place when valuations are performed in emerging markets. The following methodology is proposed:

- Gather information as to the degree of diversification of the investors involved; in other words, to what extent they hold global or

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<sup>19</sup> Quite similar to the adjusted beta proposed by Godfrey & Espinosa. (1996).

local portfolios. If they can be assumed to be globally diversified, an integrated market model with global parameters should be used. In the unlikely event that they are locally diversified a segmented market model with local parameters will apply.

Notice that when dealing with investments in real assets (with expected positive net present values) what is relevant is the degree of diversification at the investor's level and not the integration with the rest of the world of the country in which the investment will take place. In most instances well-diversified investors will be encountered.

- Select at least two relevant models. The most promising among the conceptual ones are the APT, the Local CAPM for locally diversified investors, and the International CAPM and its variant, the MICAPM, for globally diversified investors. Erb, Harvey & Viskanta's (1995a & 1995b), Harvey's (2000) and Estrada's (2000) proposals seem interesting as empirical models.
- Obtain a range of acceptable discount rates by applying the selected models to the project under analysis.
- Make any necessary adjustment that might be appropriate due to low investor diversification or lack of liquidity of the investment's stock.
- Prepare the cash flow projections. They must allow for all uncertainties related to both the country and the project itself. Recall that all risk (including "country risk") must be considered in the cash flows whereas only its systematic portion should be accounted for in the discount rate.
- Perform the valuation using Monte Carlo simulation. First, identify the discount rate and any other uncertain parameters having a significant impact on value. Second, assign a comprehensive and interrelated set of probability distributions to each of these parameters. Then, on the basis of this information, run the simulation. The final outcome of the computation will not be a single value but rather a cumulative distribution function for the present value of the project.
- Finally, it is always advisable to contrast the results with comparables from businesses with similar characteristics (if

available). However, caution is recommended when interpreting these comparables (Damodaran, 2000).

In the end, a yes or no decision will not be forthcoming, and some uncertainty on the ultimate outcome of the project is unavoidable. The final choice will rest on the cumulative distribution function for the present value of the project. The higher the present value the greater the probability of an unfavorable outcome and vice versa. As always, the discretion of the analyst will play a central role.

## **Conclusions**

This paper addresses the issue of investments in real assets, as opposed to financial assets, in developing countries. It is concluded that the traditional practitioners' approach of incorporating a country risk premium is not appropriate, mainly because country risk is neither the same for all projects nor totally systematic, and there is no reason for it to be closely related to the spread on the government bonds of the country concerned.

It is also argued that, as regards discount rate determination, what is important is not the segmentation of the market but the extent to which the investor is locally or globally diversified.

A selected group of models for discount rate determination, for both (fully or partially) segmented and integrated markets, are placed into focus and their salient characteristics discussed. On this basis, the most promising models for real asset valuation in emerging markets are selected and a sort of guide as to the course of action when performing valuations in emerging markets is proposed.

Adjustments to the valuation procedure are also suggested for those instances in which investors are not well-diversified and/or the investment's stock is illiquid.

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