The Cost of Equity in Emerging Markets: The Case of Latin America

Abstract

We applied ten methods to calculate the cost of equity in a set of companies included in the MSCI emerging markets list from five countries in Latin America. The methods modify the discount rate obtained using the standard Capital Asset Pricing Model (CAPM) by adjusting for country risk premiums. We found that country effects are more important than industry effects in Latin America. This work also contributes to a better understanding of how different ways of calculating country risk can affect a firm's cost of equity. Furthermore, it gives empirical evidence for specific country and industry determinants of the cost of equity that are not explicitly treated in the extant literature.

BALAS 2014 Annual Conference

Track: Financial Markets, Investment and Risk Management

Keywords: Cost of equity, Latin America, Market integration

The Cost of Equity in Emerging Markets: The Case of Latin America

1. Introduction

Investment in emerging markets has become an increasingly important alternative for globally diversified investors. A model commonly employed to value a firms' cost of capital in emerging markets is simply to add a country risk premium to the discount rate obtained from the Capital Asset Pricing Model, CAPM (Mishra & O'Brien, 2001). Throughout this paper we will refer to this approach as the "investment-banking" model (CAPM-IB).

There are two main approaches to valuation in emerging markets. The first centers on the analysis and inclusion of specific risk factors into a firm's cash flows. The second focuses on the use of a risk-adjusted discount rate (Pereiro, 2006). According to Godfrey & Espinosa (1996), a risk-adjusted discount rate does not solve the problem of incorporating country risk into the valuation analysis. However, country risk premium has been incorporated into a firms' cost of equity by using different methods proposed in the literature and which are currently available to practitioners. Our work centers on this second approach, in which the equity discount rate is estimated using some of those methods. In particular, we empirically assess the effects of these methods on the cost of equity for the firms constituting the MSCI indexes in five Latin American emerging markets[1] during the period 2011-2012. Since "true" discount rates are unobservable variables, it is almost impossible to assess which method gives the best results. Our main objective is not to evaluate the potential effectiveness of each of these different methods but to provide empirical evidence regarding the factors (weather country or industry factors) causing changes in equity discount rates in Latin America depending on the method employed.

Our main findings indicate that the cost of equity obtained with these methods depends heavily on the country where the firm is located and, to a lesser extent, on the industry sector to which the firm belongs. For example, an investor interested in the Basic Materials industry in Chile could expect a similar rate of return when using either the CAPM-IB or the Local CAPM. However, the same investor would have trouble deciding which expected return to use for the same project in Mexico, where the Local CAPM shows a cost of equity, which is considerably greater than that of the CAPM-IB.

[1] These countries are included in the MSCI emerging markets list.

Using the CAPM-IB as a benchmark, we found that, on average, methods that modify the Beta underestimate the cost of equity, while methods that modify the country risk premium show results that are similar to the CAPM-IB. Our results also do not show consistent under- or overestimation of any of the methods when compared to the CAPM-IB.

Our results give a better understanding of the effects of country risk adjustments on firms' cost of equity in Latin America. Our findings are important in two dimensions. First, they alert practitioners (i.e., investors) using only the CAPM-IB about the impact on the estimated cost of equity of using other methods. Furthermore, they can observe that each method will yield different results, depending on the country and, to a lesser extent on the industry where they are applied. Second, our work gives empirical evidence on how country and industry factors are determinants of the cost of equity, which current methods do not consider. From this perspective, we present the baseline for future research on the more reliable country and industry risk determinants.

The rest of the paper is organized as follow. In section 2 we review the current literature on how to incorporate country risk into the cost of equity and summarize the different methods available. In section 3 we describe our database, the sources of information and the methodology employed. In section 4 we present and analyze our main results; finally, in section 5, we conclude.

2. Literature Review and Valuation Models for Emerging Markets

According to Bodnar, Dumas & Marston (2003), the determination of an appropriate discount rate for valuing projects has become an important research problem in finance because it is a challenge to incorporate the various dimensions of risk in the cost of capital; and firms increasingly are more multinational in their operations. Some methods simply add a country risk premium to the original CAPM. This premium is considered an extra return required by investors for their risk exposure in emerging markets (Damodaran, 2009). However, this arbitrary adjustment to firm valuation is considered a mistake by Estrada (2007) since it is not based on available objective information for the particular emerging market. According to Lessard (1996), the result is usually an overestimation of the cost of equity.

Another set of methods adjust the Beta factor before calculating the CAPM discount rate (Godfrey & Espinosa, 1996; Lessard, 1996; and Sabal, 2008). This adjusted Beta tries to include some country risk corrections to the theoretical definition of systematic risk. However, some authors consider that this adjustment lacks a theoretical foundation (Bekaert & Harvey, 2002) and relies on insufficient empirical evidence (Andrade, 2009).

Some attempts to evaluate the cost of equity through different methods include Fuenzalida & Mongrut (2010), who used seven methods to compare the valuation outcomes for a set of Latin American firms. They concluded that no method is better than the others in their sample since they just pretended to observe the behavior of the cost of equity for this region at the beginning of the 21st century. In other work, Mongrut et al. (2010) evaluated results from the Baltic region using four different methods and showed how the cost of equity increased in an particular time framework. They found that the Downside CAPM, which we also test in our work, better fits the cost of equity calculation for this region in their specific time framework (Estrada, 1999 and 2006). A case study by Molina & Santos (2010) compared seven methods used to value an acquisition target, but they make no conclusions about the reliability of any of the methods. Harvey (2005) used as many as twelve different forms to calculate the discount rate for valuation. It is clear that, to date, there are no definitive conclusions regarding how to incorporate country risk into the cost of equity. This paper seeks to claim the importance of this concept showing the differences obtained when applying different methods in Latin American countries. We briefly explain each of the methods employed in the empirical analysis.

2.1. Local and global CAPM

The standard CAPM (Sharpe, 1964; Lintner, 1965; Mossin, 1966) assumes that markets are completely integrated. The CAPM has been adapted for the differences between segmented and integrated markets. Several authors consider that the issue of market integration is a central factor in firms' equity return in emerging markets (Bekaert & Harvey, 2003; Bodnar et al., 2003). However, most observed returns in emerging markets are not sufficiently explained by the theory that assumes complete integration of financial markets (Harvey, 1995). The study by Garret, Hyde & Varas (2004) found a strong influence of the U.S. stock market on the Latin American market. Their sample included the five countries in this study, in a time frame from a previous decade.

2.1.1. Local CAPM

According to Stulz (1995) the local CAPM is an adaptation by practitioners which mimics the CAPM in the U.S. market. A local market index is used as the proxy for the market portfolio. This model must be used by firms listed in segmented markets (Stulz, 1995; Mishra & O'Brien, 2001). It is defined as:

$$R_E = r_{fL} + \beta_{LL}(R_{ML} - r_{fL}) \tag{1}$$

where R_{ML} is the local market return, r_{fL} is the local risk-free rate and β_{LL} is the local company Beta, calculated against the local market (in local currency).

2.1.2. Global CAPM

The incremental integration of emerging markets leads to more sensitivity to global factors (Thapa, 2007). This method estimates the returns of the firm against a worldwide portfolio. The model is:

$$\mathrm{R_E} = \mathrm{r_{fG}} + \beta_{\mathrm{LG}}(\mathrm{R_{MG}} - \mathrm{r_{fG}}) \tag{2}$$

where R_{MG} is a global portfolio (Stulz, 1995); r_{fG} is the global risk free rate; β_{LG} is the local company Beta against the global market. Harvey (1995) argues that it is difficult to find a relationship between the expected returns and global Betas in emerging markets.

2.2. Multifactor models

Bodnar, Dumas & Marston (2003) propose two multifactor methods. The first applies two Beta factors to explain the effect of global and local markets on the cost of equity. This method is defined as:

$$\mathrm{E}[\mathrm{R_i} - \mathrm{r_f}] = \mathrm{E}[\mathrm{R_w} - \mathrm{r_f}]\beta_{\mathrm{i/w}} + \mathrm{E}\left[\mathrm{R_c} - \mathrm{r_{f_l}}\right]\beta_{\mathrm{i/c}} \tag{3}$$

where R_w is the global market return and R_C is the local market return. Here the factor $\beta_{i/w}$ represents *i* asset's sensitivity to the global market; and the factor $\beta_{i/c}$, its sensitivity to the local market. Thus, the expected excess return for asset *i* depends on the excess return of both global and local markets, each averaged by the corresponding Beta factor. They refer to this method as the Hybrid CAPM (Bodnar et al., 2003) and assume that markets are not completely integrated or completely segmented. The second method proposed by Bodnar et al. (2003) is the International CAPM, which we discuss next.

2.2.1. International CAPM

This second method proposed by Bodnar et al. (2003) considers the problem investors face when trading in different currencies and dealing with currency conversion. They define the model as:

$$\mathrm{E}[\mathrm{R_i} - \mathrm{r_f}] = \mathrm{E}[\mathrm{R_w} - \mathrm{r_f}]\beta_{\mathrm{i/w}} + \mathrm{E}[\mathrm{R_S} - \mathrm{r_f}]\beta_{\mathrm{i/S}} \tag{4}$$

where the factor $\beta_{i/S}$ represents the sensitivity of the returns of asset *i* to the rates of return of non-measurement currency deposits, all measured in some measurement currency; R_w= the global market return; R_S= the rate of return of non-measurement currency deposits

2.3. Sabal model

Sabal (2008) uses a weighted Beta (β_w), which is calculated as the share of income provided by the markets where the firm operates,

$$\beta_w = \sum_{i=1}^{N} \alpha_i \, \beta_{Bi} \tag{5}$$

where β_{Bi} is the Beta of a similar benchmark investment and where $\beta_{Bi} = \beta_{BM} \, \beta_{iM}$.

Here β_{BM} is the Beta of a similar project in a developed market and β_{iM} is the Beta of the local index related to the global index. This method weighs the risk of similar projects according to the volatility of each market with respect to a benchmark market. Thus the model is:

$$r_j = r_f + (r_M - r_f)\beta_w \tag{6}$$

To apply this method adequately one should have specific information about the foreign income from exports for each firm. In our case, this information is not available in the database and so it must be obtained directly from annual reports. This is why we assume that each firm sells locally only. Then $\alpha = 1$ and $\beta_w = \beta_{Bi}$.

To calculate β_{iM}, we use the data on the considered markets against the benchmark, computed as:

$$\beta_{iM} = \frac{\sigma_{i,M}}{\sigma_M^2} = \rho_{i,M}\left(\frac{\sigma_i}{\sigma_M}\right) \tag{7}$$

2.3.1. Country risk modulator

Sabal also proposes a model called a systematic country risk modulator (CRM), which introduces a coefficient for country risk. This is multiplied by the spread of sovereign debt (λCR) in which λ weighs country risk by the volatility of the local market. Thus, the method is defined as:

$$R_j = r_f + (R_M - r_f)\beta_{BM} + \lambda CR \tag{8}$$

where $\lambda = (\beta_{iM})^2 \, (\sigma_M/\sigma_i)^2$. When this modulator is developed, it is equal to:

$$\beta_{iM} = \frac{\sigma_{i,M}}{\sigma_M^2} = \rho_{i,M} \left(\frac{\sigma_i}{\sigma_M}\right) \tag{9}$$

By replacing (9) in λ one obtains:

$$\lambda = \left\{\left[\rho_{i,M} \left(\frac{\sigma_i}{\sigma_M}\right)\right]^2 \left(\frac{\sigma_M}{\sigma_i}\right)\right\}^2 = \left(\rho_{i,M}\right)^2 \tag{10}$$

The resulting non-linear relation is different to the linear relation of the original CAPM. Sabal's proposal is that the relation (particularly the correlation) between country risk and the expected return of a project is quadratic.

2.4. Downside CAPM

Estrada (1999 and 2006) proposes a new method to calculate Beta by using a standard semi-deviation of historical returns. He suggests that the risk should be measured by the standard semi-deviation of historical returns because what really matters to investors when calculating the cost of equity is the occurrence of lower than expected returns. His method is referred to as the Downside CAPM (D-CAPM).

The D-CAPM considers three situations to calculate the standard semi-deviation of returns. The first is when returns are less than zero, i.e., when there are losses. The second is when returns are less than they would be at a risk-free rate, i.e., only returns below a risk-free rate are considered. And the third is when only returns below the average rate are considered. The author recommends the third approach, given by:

$$\Sigma_{\mu i} = \sqrt{\frac{\Sigma(R_t - B)^2}{T}}, \forall R_t < B \tag{11}$$

From here, Estrada's method is defined as:

$$r_{DR} = r_f + (r_M - r_f)\left(\frac{\Sigma_{\mu i}}{\Sigma_{\mu M}}\right) \tag{12}$$

where $\Sigma_{\mu i}$ is the standard semi-deviation of the return on asset i, and $\Sigma_{\mu M}$ is the standard semi-deviation of the benchmark market return, both calculated with respect to zero returns.

2.5. Godfrey & Espinosa

Godfrey & Espinosa (1996) make an adjustment to Beta based on the following definition:

$$\beta_j = \frac{\sigma_{j,M}}{\sigma_M^2} = \rho_{j,M}\,\sigma_j \frac{\sigma_M}{\sigma_M^2} = \rho_{j,M}\left(\frac{\sigma_j}{\sigma_M}\right) \tag{13}$$

By assuming that $\rho_{j,M}$ is an arbitrary value equal to 0.6 for all markets, the authors argue that a way to avoid double counting the risk pertaining to credit quality and volatility in emerging markets is to contend that 40 percent of the total risk is explained by credit quality (Erb, Harvey, & Viskanta, 1995). They refer to this Beta as "adjusted Beta". Their model is:

$$r_j = r_{f_{US}} + CS + \left[0.6 \times \left(\frac{\sigma_j}{\sigma_m}\right) \times (MRP_{US})\right] \tag{14}$$

Where CS is the credit spread attributable to the sovereign debt, and MRP_{US} is the U.S. market risk premium. However, Harvey (2005) admits that this kind of adjustment to Beta does not have a solid theoretical foundation.

2.6. Lessard

Lessard (1996) proposes a modified Beta calculated by multiplying a project's Beta (β_P, calculated as the industry Beta) by the country Beta (β_C, calculated as the sensitivity of the local stock market performance compared to the global market proxy),

$$(\beta = \beta_P \times \beta_C) \tag{15}$$

According to this author, two basic dimensions of risk determine this "country Beta" (as Lessard has labeled it): (1) the market volatility (macroeconomics of the country) compared with the U.S. market, and (2) the correlation with benchmark portfolios in the U.S. market.

To facilitate an understanding of the different methods, Table 1 shows a summary of all the methods described.

We do not consider other CAPM-based methods such as Goldman Sachs (Mariscal & Hargis, 1999) or Salomon Smith Barney (Zenner & Akaydin, 2002) because they require the use of firm-specific inputs which are very difficult to obtain. Finally, we do not use other methods such as Erb, Harvey & Viskanta (1995), multiples or real options, because they are not CAPM-based.

Refer to Table 1 for a summary of the methods employed.

Insert Table 1 here

3. The Data and the Methodology

Data sources

We use the closing price data[2] of publicly firms traded from five Latin American stock markets included in the MSCI emerging markets list: Brazil, Chile, Colombia, Mexico, and Peru. We selected the stocks that compose the local MSCI index in order to avoid selection bias problems (See Table 2 for the number of firms from each country.) We selected the

[2] All prices were obtained in U.S. dollars, in order to make the results comparable. In the case of the Local CAPM, data were downloaded in local currency, but results were corrected by local/benchmark inflation rates by using:

$$r_E^* = \left[\frac{1 + r_E}{1 + I_{US}}\right](1 + I_{LCL}) - 1$$

where I_{US} is the yearly U.S. inflation for the current year and I_{LCL} is the yearly local inflation for the current year.

period 2011-2012 to minimize the noise caused by the global financial crisis of 2007-2008. The information was retrieved from the Bloomberg database. Returns were calculated by using multi-period returns and were arithmetically annualized, as in Damodaran (2009).

Insert Table 2 here

To standardize the data for the purpose of comparisons, all the indexes employed here were taken from the Morgan Stanley indexes available at Bloomberg. This helps to avoid any problem derived from the construction of local indexes, since their baskets are commonly value-weighted.[3]

The U.S. risk-free rate used as a benchmark was obtained from reports of the U.S. Federal Reserve.[4] These rates are calculated as the simple annual average of the observed return rates from T-Bonds in a time window of ten years. A constant maturity guarantees their comparability. For local risk-free rates the data were retrieved from Bloomberg by using the yield curves of each country's sovereign debt in local currency.[5] Provided that this data is calculated for different maturities, we used the ten-year returns.

To add a country risk premium, we employed the J. P. Morgan Emerging Markets Bond Index Plus (EMBI+). This index is a benchmark and provides information on the spread of the sovereign debt in foreign currency for the countries in the database versus the comparable U.S. Treasury Bond.

To obtain the particular Beta of each company, we built the unlevered Betas by industry with the U.S. market data. We found the observed Betas of the different sectors, with the averaged tax rates and debt-to-equity relationship. Then we recalculated each particular Beta by applying Hamada's formula to the single data of effective tax rate and debt-to-equity ratio for each firm. All the remaining Betas of each particular method were calculated with historical data from Bloomberg. The regressions were run for periods of two years with weekly frequency.

4. Results

[3] However, each market has its own procedure for index formation (market capitalization, liquidity, etc.).
[4] http://www.federalreserve.gov/releases/h15/data.htm
[5] The tickers for Brazil, Chile, Colombia, México and Peru were: I393, I351, I217, I251 and I361, respectively.

We calculated the expected returns for each firm using the ten methods explained above. The results for each one are summarized in Table 3.

Insert Table 3 here

As stated previously, the CAPM-IB is one of the most popular methods for estimating the cost of equity (Mishra & O'Brien, 2001). Therefore, we arbitrarily select the CAPM-IB as a reference benchmark to make the results comparable between the different methods employed, without arguing about the conceptual validity of this method.

To make the comparison of the contemporaneous results statistically reliable, we applied a *t* test for the mean differences[6] for all firms. We found statistically significant mean differences among eight of the nine methods employed with the CAPM-IB,[7] as shown in Table 4.

Insert Table 4 here

As Table 4 shows, the Local CAPM method and the Hybrid method produced a higher cost of equity than the CAPM-IB. Conversely, the remaining methods were lower than the CAPM-IB. All the results were statistically significant at the 1 percent level except the I-CAPM. The major differences are Sabal, with a value of 4.4 percentage points lower than the CAPM-IB, and the Local CAPM with an estimated cost of capital that was 6.1 percentage points higher than the CAPM-IB. When analyzed by country, results have a homogeneous pattern, as shown in Table 5, where the sign of the differences remains.

Insert Table 5 here

The ICAPM result for Peru is the only sign that change sand that difference is considerable higher than the average shown in table 4. Countries show important discrepancies in the magnitude of the mean differences for each method. Local, Hybrid and ICAPM are the methods with more variability in terms of differences by country. An investor who uses CAPM-IB to calculate the capital discount rate in Peru or Chile and then tries to compare this results with those yielded by Local CAMP,

[6] Different variances were assumed. F tests for similar variances were run for a random sample and showed that the variances were statistically different at 1 percent of statistical significance.
[7] Information on the differences for the rest of the methods is available upon request.

will find substantial differences. Meanwhile, Godfrey & Espinosa has a homogenous behavior in the results for all the countries.

The volatility of the local markets with respect to the benchmark market (USA) is very different between the countries in our sample. It is important to notice how the local indexes are explained by the benchmark index. It is possible that during our time span some markets were more volatile than others with respect to the benchmark market[8]. We remark that the country risk premium between countries have been historically different, however, there is a convergence behavior (see Figure 1). Additionally, it is necessary in this case to assess the impact caused by stocks' liquidity. In the studies we reviewed, liquidity is an important variable, even more than those related to market integration in emerging markets; for example Bekaert, Harvey, & Lundblad (2007) found that it is an important driver of expected returns.

Insert Figure 1 here

On the other hand, results from Peru are mostly not statistically significant; actually five of the nine methods compared with CAPM-IB. In the case of Brazil, three methods have differences that are not statistically significant.

D-CAPM results are statistically significant and are always below of CAPM-IB. Since this method is biased towards negative returns, one can expect to observe this behavior for these countries due to shared regional features. In contrast, a study of Bekaert & Harvey (2003) for several emerging markets, which includes the countries in this study, found scarce integration of these markets. It probably would be expected that such homogeneity would not appear.

The methods of Sabal's CRM (2008) and Lessard (1996) produce homogeneous results between countries, always below those for CAPM-IB. Sabal and Lessard adjust the Beta by the volatility of the local markets. Meanwhile, CRM applies this adjustment to the added country risk premium.

When sorting the data for industry, we find heterogeneous results among the methods, as shown in Table 6. We found that none of the results in the Energy sector are statistically significant. However, it is important to notice that this sector has a little number of firms in the region (just four) and it is possible that not reach consistent estimators for some statistics.

[8] We ran a simple regression between the local indexes against the benchmark (USA). Results for each R-squared do not allow us to find any dependence relationship between the benchmark index and local indexes. These results are available upon request.

Insert Table 6 here

On the other hand, SABAL-CRM is statistically significant in just one (Financial) of the seven sectors studied. In general, the differences are less than 2 percentage points. This is similar for ICAPM, differences just statistically significant for two sectors (Utilities and Consumer), and Hybrid for three (Financial, Consumer and Basic Materials).

Some methods show a heterogeneous pattern. Lessard result is greater than CAPM-IB in Consumer sector and lower in the rest, as in the average. Also Hybrid is lower in Utilities sector, contrary to the average. And finally, ICAPM is greater in Industry and Basic Materials sectors.

This analysis shows the importance of country and industry-specific factors when choosing a method to calculate cost of equity in emerging markets. It is also interesting to note that, beyond the CAPM-IB, practitioners do employ some methods that correct for country or industry risk. The main objective of this work is not to rate any of the current models but to compare each of them against the CAPM-IB as a benchmark. Our results shed light on the need to incorporate country and industry-specific factors in further theoretical development of models.

5. Complementary analysis

We use different time periods to calculate the cost of equity for all the firms in the sample in order to identify changes over time. In particular, we divided our results from before, during and after the 2007-08 crisis, 2010-2012 and 2006-2008. Table 7 shows the average returns with the different methods and time frames for the entire sample. For the last two time periods, results are very similar. However, they are noticeably different before and during the crisis. The required return of equity increases slightly after the crisis under most methods, as expected.

Insert Table 7 here

We observe that during the crisis and in the current next period, some discount rates are negative. When we analyzed the individual data found that several firms had an apparent over-debt pattern which makes the relationship debt to capital negative, and therefore, the leveraged beta too. This phenomenon is similar for Sabal method, which modifies the beta by the correlation between the local and the benchmark market. The same phenomena occur with D-CAPM, perhaps due to its bias towards negative returns, something to be expected during the global financial crisis.

Finally, we examine the results by separating countries and sectors at the same time, in order to identify regularities. Local CAPM yielded greater values than those of the CAPM-IB; however, this difference is considerably lower for the Financial sector in Brazil, and much more lower in Chile for Basic Materials (results available upon request).

Conclusions

Our analyses of the mean differences in the cost of equity obtained for the evaluated methods compared to the CAPM-IB show that the majority of the methods underestimate the discount rate related to this benchmark. An interesting case in the analysis of results was the Local CAPM. In particular, this method does not show any obvious regularity when separated by country and by industry at the same time. The same conclusion is applicable to the hybrid methods employed here.

In spite of the D-CAPM's strength in the Baltic region, as argued by Mongrut et. Al (2010), this result is not clear for Latin America. The results produced by using this method were contradictory, not only by country or industry but also separated by country and industry.

We analyzed three methods that modify the Beta in different forms: Sabal, G&E and Lessard. Their results always tend to underestimate the cost of equity compared with the CAPM-IB, and this result is homogeneous when we split the sample by country or sector. The multifactor methods lack a definitive pattern. In the case of the Hybrid model, results are contradictory by country and sector. And regarding the ICAPM model, we consider the results unreliable because of revaluation episodes in the region that make outcomes questionable.

When data is separated by sector and country at the same time, several differences between industries and countries arose across the methods. In practice, the heterogeneous results among the methods shown here challenge practitioners making equity cost calculations. Depending on the country or the sector that is being evaluated, important differences will be found among the available methods. However, we found that country effects are more important than industry effects in Latin America. Although we cannot claim our research favors of any of the methods studied, we do show the danger of considering just one and ignoring the impact of the others.

References

Andrade, S. C. (2009). A model of asset pricing under country risk. *Journal of International Money and Finance*, *28*(4), 671–695.

Bekaert, G., & Harvey, C. R. (2002). Research in emerging markets finance: looking to the future. *Emerging Markets Review*, *3*(4), 429–448.

Bekaert, G., & Harvey, C. R. (2003). Emerging markets finance. *Journal of Empirical Finance*, *10*(1), 3–55.

Bekaert, G., Harvey, C. R., & Lundblad, C. (2007). Liquidity and expected returns: Lessons from emerging markets. *Review of Financial Studies*, *20*(6), 1783–1831.

Bodnar, G. M., Dumas, B., & Marston, R. D. (2003). *Cross-border valuation: The international cost of equity capital*. National Bureau of Economic Research.

Damodaran, A. (2009). Equity Risk Premiums (ERP): Determinants, Estimation and Implications – A Post-Crisis Update. *Financial Markets, Institutions & Instruments*, *18*(5), 289–370. doi:10.1111/j.1468-0416.2009.00151.x

Erb, C. B., Harvey, C. R., & Viskanta, T. E. (1995). Country risk and global equity selection. *The Journal of Portfolio Management*, *21*(2), 74–83.

Estrada, J. (1999). The cost of equity in emerging markets: a downside risk approach. Recuperado a partir de http://papers.ssrn.com/sol3/papers.cfm?abstract_id=170748

Estrada, J. (2006). Downside risk in practice. *Journal of Applied Corporate Finance*, *18*(1), 117–125.

Fuenzalida, D., & Mongrut, S. (2010). Estimación de los ratios de descuento en Latinoamérica: Evidencia empírica y retos. *Journal of Economics, Finance and Administrative Science, 15*(28), 7–43.

Garrett, I., Hyde, S., & Varas, J. (2004). The Interaction Between Latin American Stock Markets and the US. *University of Manchester, mimeo*. Recuperado a partir de http://www.efmaefm.org/efma2006/papers/347724_full.pdf

Godfrey, S., & Espinosa, R. (1996). A practical approach to calculating costs of equity for investments in emerging markets. *Journal of Applied Corporate Finance*, *9*(3), 80–90. doi:10.1111/j.1745-6622.1996.tb00300.x

Harvey, C. (1995). Predictable Risk and Returns in Emerging Markets. *Review of Financial Studies*, *8*(3), 773-816.

Lessard, D. R. (1996). Incorporating country risk in the valuation of offshore projects. *Journal of Applied Corporate Finance*, *9*(3), 52–63.

Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The review of economics and statistics*, *47*(1), 13–37.

Mariscal, J., & Hargis, K. (1999). A long-term perspective on short-term risk. *Goldman Sachs Investment Research*.

Mishra, D. R., & O'Brien, T. J. (2001). A comparison of cost of equity estimates of local and global CAPMs. *Financial Review*, *36*(4), 27–48.

Molina, C. A., & Santos, M. A. (2010). Case study TELMEX and CANTV: Which is the appropriate discount rate? *Academia Revista Latinoamericana de Administración*, (44), 137–154.

Mongrut, S., Paškevičius, A., Dubinskas, P., Kovalevskaja, R., & Fuenzalida, D. (2010). Estimatating the Cost of Equity in the Baltic Region. *Ekonomika*, *89*(3), 40-54.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica: Journal of the Econometric Society*, 768–783.

Pereiro, L. E. (2006). The practice of investment valuation in emerging markets: Evidence from Argentina. *Journal of Multinational Financial Management*, *16*(2), 160–183.

Sabal, J. (2008). A Practical Approach for Quantifying Country Risk. *Revista Globalización, Competitividad y Gobernabilidad*, *2*(3).

Sharpe, W. F. (1964). Capital asset prices: a theory of market equilibrium under conditions of risk. *The journal of finance*, *19*(3), 425–442.

Stulz, R. M. (1995). The cost of capital in internationally integrated markets: The case of Nestlé. *European Financial Management*, *1*(1), 11–22.

Thapa, C. (2007). *Integration of emerging equity markets. A systematic review* (Master of Research). Cranfield University, Bedford, UK.

Zenner, M., & Akaydin, E. (2002). A practical approach to the international valuation and capital allocation puzzle. *Global Corporate Finance Report. SalomonSmithBarney, July, 26*.

Table 1
Summary of the Cost of Equity Estimation Methods

This summary of the methods employed for the equity cost calculation includes the main reference, the model and a short description of the variables used.

Method	Model	Description
Local CAPM (Stulz, 1995; Mishra & O'Brien, 2001)	$R_E = r_{fL} + \beta_{LL}(R_{ML} - r_{fL})$	Where: R_{ML} = the global market return, r_{fL} = the local risk-free rate; β_{LL} is the local company Beta against the local market
Global CAPM (Stulz, 1995)	$R_E = r_{fG} + \beta_{LG}(R_{MG} - r_{fG})$	Where: R_{MG} global portfolio, r_{fG} = global risk-free rate; β_{LG} local firm Beta against the global market
Hybrid CAPM (Bodnar et al., 2003)	$E[R_i - r_f] = E[R_w - r_f]\beta_{i/w}$ $+E[R_c - r_{f_l}]\beta_{i/c}$	Where: R_w = the global market return; R_C = the local market return; $\beta_{i/w}$ = the *i* asset's sensitivity to the global market; $\beta_{i/c}$ = the *i* asset's sensitivity to the local market
International CAPM (Bodnar et al., 2003)	$E[R_i - r_f] = E[R_w - r_f]\beta_{i/w}$ $+E[R_S - r_f]\beta_{i/S}$	Where: R_w = the global market return; R_S = the rate of return of non-measurement currency deposits; $\beta_{i/w}$ = the *i* asset's sensitivity to the global market; $\beta_{i/S}$ = the *i* asset's sensitivity to the rates of return of non-measurement currency deposits, all measured in some measurement currency
Sabal (2008)	$r_j = r_f + (r_M - r_f)\beta_w$ $\beta_w = \sum_{i=1}^{N} \alpha_i \beta_{Bi}$ $\beta_{Bi} = \beta_{BM}\,\beta_{iM}$	Where: β_{BM} = Beta for similar project in a developed market; β_{iM} Beta of the local index related to a global index. β_w = weighted Beta by the share of income from markets where it operates
Country Risk Modulator (Sabal, 2008)	$R_j = r_f + (R_M - r_f)\beta_{BM} + \lambda CR$	Where: $\lambda = \beta_{iM}{}^2\,(\sigma_M/\sigma_i)^2$. And: $\beta_{iM} = \sigma_{i,M}/\sigma_M^2 = \rho_{i,M}\,(\sigma_i/\sigma_M)$. *CR* is the country risk spread
Downside CAPM (Estrada, 1999, 2006)	$r_{DR} = r_f + (r_M - r_f)\left(\frac{\Sigma_{\mu i}}{\Sigma_{\mu M}}\right)$	Where: $\Sigma_{\mu i}$ is the standard semi-deviation of the return of asset *i*, and $\Sigma_{\mu M}$ is the standard semi-deviation of the return of benchmark market $\Sigma_{\mu i} = \sqrt{\frac{\sum(R_t - B)^2}{T}}, \forall R_t < B$
Godfrey & Espinosa (1996)	$r_j = r_{f_{US}} + CS$ $+\left[0{,}6 \times \left(\frac{\sigma_j}{\sigma_m}\right) \times (MRP_{US})\right]$	Where: CS is the credit spread due to the sovereign debt, and MRP_{US} is the U.S. market risk premium
Lessard (1996)	$R_E = r_f + \beta_{Country}(R_M - r_f)$	Where: $\beta_{Country} = \beta_P \times \beta_C$. Where: β_P =Industry Beta; β_C =Country Beta

Table 2
Number of constituents of MSCI index per country
Source: MSCI

	2006-2012
MSCI Brazil Index	54
MSCI Chile Index	27
MSCI Colombia Index	6
MSCI Mexico Index	25
MSCI Peru Index	4

Table 3
Descriptive statistics of the discount rates
All data are taken from Datastream. The number of firms differs between methods, given that in some methods a specific variable is either omitted or it is not possible to calculate. The table includes the entire sample for the period 2011-2012.

METHOD	FIRMS	MEAN	STD. DEV.	MIN	MAX
CAPM-IB	116	8.02%	3.65%	-9.73%	23.79%
LOCAL	113	14.13%	4.32%	8.09%	35.17%
GLOBAL	113	4.81%	1.35%	1.22%	10.24%
SABAL	116	3.62%	0.34%	2.75%	3.96%
CRM	116	6.57%	3.56%	-10.58%	22.54%
D-CAPM	113	4.78%	0.96%	2.64%	8.60%
G&E	116	6.36%	1.14%	5.30%	8.37%
LESSARD	116	6.34%	1.22%	4.98%	8.44%
HYBRID	113	11.35%	5.04%	2.24%	35.70%
ICAPM	113	6.64%	4.15%	-8.95%	26.79%

Table 4

Mean differences between the estimated cost of equity using the CAPM-IB and each method for the entire sample

We report the *t*-statistics test for mean differences between the results of the CAPM-IB and each of the different methods, including the entire sample for 2011-2012.
(*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

BENCHMARK	METHOD	MEAN	DIFFERENCE
CAPM-IB = 0.0802			
	LOCAL	0.1413	-0.061 ***
	GLOBAL	0.0481	0.0321 ***
	SABAL	0.0362	0.044 ***
	CRM	0.0657	0.0145 ***
	D-CAPM	0.0478	0.0324 ***
	G&E	0.0636	0.0166 ***
	LESSARD	0.0634	0.0168 ***
	HYBRID	0.1135	-0.0332 ***
	ICAPM	0.0664	0.0138

Table 5
Mean differences between the estimated cost of equity using the CAPM-IB and each method by country

We report the *t*-statistics test for mean differences between the results of the CAPM-IB and each of the different methods by country, including the entire sample, divided by country, for 2011-2012.
(*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

	BRA	CHI	COL	MEX	PER
LOCAL	-0.0573 ***	-0.0337 ***	-0.136 ***	-0.0571 ***	-0.1423 **
GLOBAL	0.028 ***	0.0355 ***	0.0451 ***	0.0372 ***	0.0141
SABAL	0.0378 ***	0.0521 ***	0.0537 ***	0.0535 ***	0.0231 *
CRM	0.0103	0.0175 ***	0.023 ***	0.0204 ***	0.0135
D-CAPM	0.0272 ***	0.0381 ***	0.0439 ***	0.0402 ***	0.016
G&E	0.0162 ***	0.0243 ***	0.0216 ***	0.0098 *	0.0019
LESSARD	0.0132 **	0.0293 ***	0.0314 ***	0.0112 **	0.0046
HYBRID	-0.0076	-0.0323 ***	-0.1231 ***	-0.0686 ***	-0.1532 **
ICAPM	0.0051	0.0205 ***	0.0351 ***	0.0468 ***	-0.1293 *

Table 6
Mean differences between the estimated cost of equity using the CAPM-IB and each method by industry

We report the *t*-statistics test for mean differences between the results of the CAPM-IB and each of the different methods by industry, including the entire sample, divided by industry, for 2011-2012.
(*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%

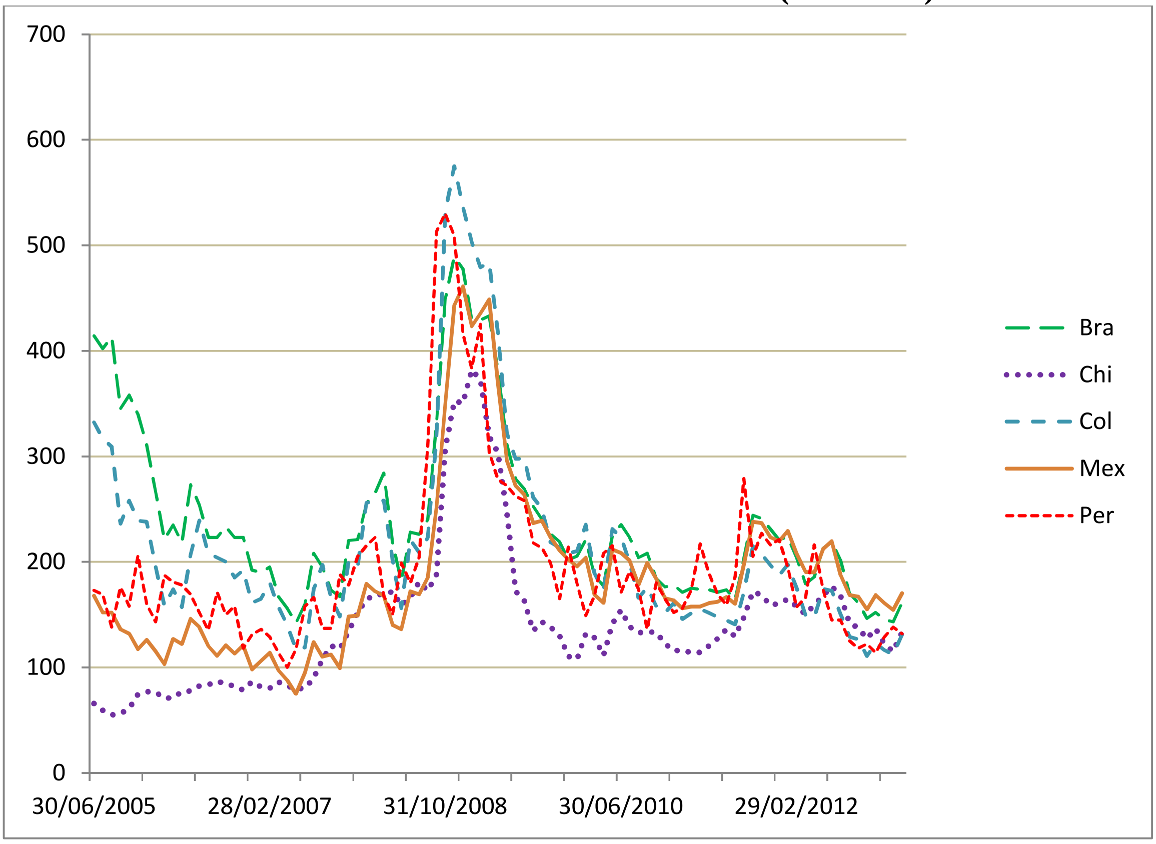
	FIN	IND	UTI	ENE	CONS	C&TECH	BAS_MAT
LOCAL	-0.0679 ***	-0.0825 **	-0.0295 **	-0.0551	-0.0667 ***	-0.0349 **	-0.0778 ***
GLOBAL	0.0371 ***	0.037 **	0.0536 ***	0.0585	0.0186 ***	0.0444 ***	0.0189 **
SABAL	0.0497 ***	0.0496 ***	0.0608 ***	0.0833	0.024 ***	0.0615 ***	0.0452 ***
CRM	0.0168 ***	0.016	0.013	0.0151	0.0128	0.0158	0.0146
D-CAPM	0.0366 ***	0.0368 ***	0.0532 ***	0.067	0.016 **	0.0482 ***	0.0254 ***
G&E	0.0189 ***	0.0183	0.038 ***	0.0571	-0.0017	0.0304 **	0.0175 **
LESSARD	0.0203 ***	0.0189	0.0388 ***	0.059	-0.0028	0.0311 **	0.0185 **
HYBRID	-0.0379 ***	-0.0565	0.0032	-0.0325	-0.0306 ***	-0.0195	-0.0722 ***
ICAPM	0.0005	-0.0403	0.0675 ***	0.0221	0.0143	0.0355 **	-0.0197

Table 7
Average returns obtained under different methods and time periods

The firms in the sample were the same in all periods. However, the number of firms differs between methods, given that a specific variable is omitted in some methods or it is not possible to calculate them.

	2012		2010		2008		2006	
	MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD
CAPM-IB	8.02%	3.65%	2.41%	7.78%	-0.63%	10.12%	9.72%	3.39%
LOCAL	14.13%	4.32%	15.48%	4.89%	13.53%	2.73%	14.29%	4.50%
GLOBAL	4.81%	1.35%	6.42%	3.21%	3.81%	0.94%	4.74%	0.10%
SABAL	3.62%	0.34%	-0.15%	0.77%	4.31%	0.65%	4.65%	0.09%
SABAL-CRM	6.57%	3.56%	1.10%	7.76%	-3.56%	9.75%	6.53%	3.12%
D-CAPM	4.78%	0.96%	-1.53%	1.85%	-0.16%	0.98%	5.37%	0.22%
G&E	6.36%	1.14%	4.08%	1.31%	0.03%	1.61%	8.80%	1.21%
LESSARD	6.34%	1.22%	3.84%	1.55%	6.48%	1.20%	8.10%	1.16%
HYBRID	11.35%	5.04%	12.36%	7.56%	7.49%	2.69%	9.63%	4.00%
ICAPM	6.64%	4.15%	8.08%	5.51%	3.60%	5.84%	3.38%	5.44%

Figure 1
EMBI Plus for Latin American countries (2005-2012)



Source: Global Financial Data.