Calculating the cost of equity in emerging markets

Emerging markets offer high returns but carry high risk, which influences the cost of equity in these markets. While there are myriad ways to estimate the cost of equity, not all approaches are practicable or theoretically tenable. An analysis of six dominant approaches indicates that the investor's degree of international diversification determines the correct approach. Globally diversified investors should use a Capital Asset Pricing Model (CAPM) based on international inputs, whereas investors who only diversify locally should use a CAPM based on local inputs.

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EMERGING MARKETS allow investors to access high returns and unique investment opportunities. However, these opportunities carry high risks. The cost of equity is an appropriate measure of this risk. This article analyses six dominant models to determine the appropriate approach to estimating the cost of equity in emerging markets.

Home CAPM

The Home CAPM (HCAPM) estimates the CAPM using data from the investor's home country and then adds a risk premium. This risk premium reflects the local market's country risk.

This has some practical support (Sabal 2004). The HCAPM defines the cost of equity, or expected return, as:

$$E[r_{ix}] = r_{fh} + \beta_{ih} (E[r_{mh}] - r_{fh}) + CR_h$$

where $E[r_{ix}]$ is the expected return (cost of equity) of investment i in country x; r_{fh} is the risk-free rate in the home country; $E[r_{mh}]$ is expected return on the market in the home country; β_{ih} is the pure play beta based upon comparable companies in the home market; and CR_x is local market's country risk. A typical proxy is the country's credit rating.

The HCAPM is easy to estimate but theoretically flawed. First, the country risk premium may not be an appropriate measure of equity risk. Credit premiums estimate the probability a government will default on a loan. Equity investors have different risks, such as general market movements.

Second, the HCAPM assumes that country risk is the same for all types of projects in all industries. However, some emerging markets favour investments in particular sectors or of particular types. These investments may have lower country risk.

These flaws indicate that practitioners should use another model even if the HCAPM is easy to estimate.

Local CAPM

The Local Capital Asset Pricing Model (LCAPM) is the most common way to estimate the cost of equity. The LCAPM defines the cost of equity as:

$$E[r_{ix}] = r_{fx} + \beta_{ix}\,(E[r_{mx}] - r_{fx})$$

where r_{fx} is the risk-free rate in country x; $E[r_{mx}]$ is expected return on the market in country x; and β_{ix} is the sensitivity and responsiveness of returns on investment i to returns on the market in country x.

The LCAPM is theoretically sound. It validly assumes that investors cannot diversify away country risk. While the academic literature indicates that global integration has increased (Bekaert et al. 2007), it also indicates that emerging markets remain largely segmented (Bekaert 1995). Subsequently, although integration has reduced the cost of capital, the reduction is small (Bekaert & Harvey 2000; Harvey 2004; de Jong & de Roon 2005).

However, using local inputs induces practical limitations:

- *Genuine risk-free rates may not exist in emerging markets*. While emerging market governments may issue debt, these often have sovereign default risk.
- *Calculating beta is complex for three reasons:* First, finding comparable companies for a pure play beta is problematic. Second, emerging markets exhibit thin trading and illiquidity (see on illiquidity: Bris et al. 2004; Lesmond 2005), which may bias regression results. Third, emerging markets may have short market histories and past returns may not be an accurate predictor of future returns.
- *Calculating market returns is problematic since emerging markets often have limited market histories and structural breaks*. Further, analysts must ensure the market return is free from survivorship bias. Also, past returns may not adequately capture expected future returns.

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International CAPM

The International CAPM (ICAPM) has some academic support (Stulz 1996; Schramm & Wang 1999; Stulz 1999; O'Brien & Dolde 2000). The ICAPM replaces $E[r_{mx}]$, the expected return on the market in country x, with $E[r_{mp}]$, the expected return on an international portfolio of stocks, such as the MSCI world index. The main advantage of the ICAPM is that it is easier to estimate than the LCAPM. However, the disadvantages of the ICAPM outweigh the advantages.

First, the ICAPM does not resolve problems estimating the risk-free rate. Second, international portfolios, such as the MSCI world index, exhibit survivorship bias. While controlling for survival bias is possible (see, for example, Hamelink et al. 2001; Ding et al. 2005), this negates the ICAPM's practical benefits. Third, some world indexes, including the MSCI index, focus on developed markets and are value-weighted, thereby emphasising large companies. Thus, the index may not reflect the riskiness of emerging market investments. Fourth, emerging market returns may have low correlation with the MSCI index; and thus, the index may understate the riskiness of investments. Fifth, this model assumes a significant level of diversification, which may not hold in reality.

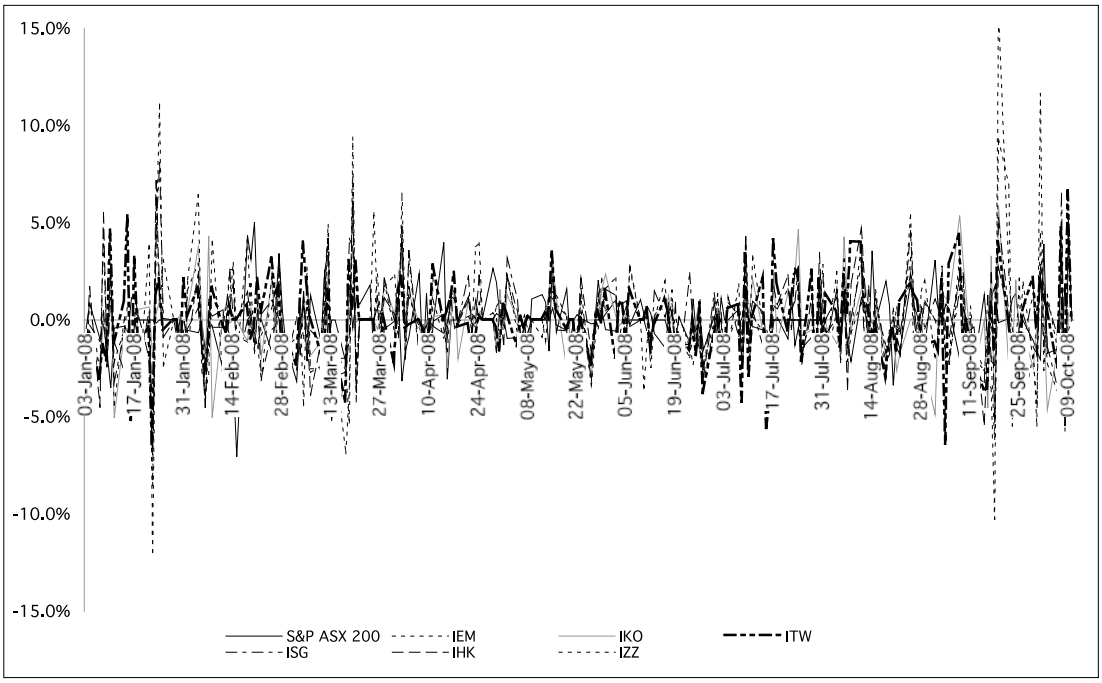
Further, even if it is appropriate to use an international index, the trends in many emerging market indexes have strong correlations with the developed markets from which they originate. Thus, the international index may reflect returns in the home market more than returns on an

TABLE 1: Pairwise correlation between returns on the S&P ASX 200 index and exchange traded funds on the ASX

Region	Ticker	S&P ASX 200	EM	IKO	ITW	ISG	IHK
Emerging Markets	IEM	0.696 *0.000*[a]					
South Korea	IKO	0.410 *0.000*[a]	0.491 *0.000*[a]				
Taiwan	ITW	0.418 *0.000*[a]	0.429 *0.000*[a]	0.474 *0.000*[a]			
Singapore	ISG	0.551 *0.000*[a]	0.583 *0.000*[a]	0.487 *0.000*[a]	0.544 *0.000*[a]		
Hong Kong	IHK	0.560 *0.000*[a]	0.680 *0.000*[a]	0.526 *0.000*[a]	0.522 *0.000*[a]	0.651 *0.000*[a]	
China	IZZ	0.617 *0.000*[a]	0.734 *0.000*[a]	0.499 *0.000*[a]	0.466 *0.000*[a]	0.629 *0.000*[a]	0.681 *0.000*[a]

Notes: Significance values are in italics. The superscript a denotes significance at 1%.

FIGURE 1: **Returns on S&P ASX 200 index and emerging market based exchange traded funds, January–October 2008**



international portfolio (see Table 1). Table 1 contains the correlation between the returns on the S&P ASX 200 and various emerging market-based exchange trade funds. The results indicate statistically significant correlation between the emerging market funds and returns on the ASX 200. Figure 1 illustrates this graphically. Thus, international indices may reflect returns on the home market as much as they reflect returns on an international portfolio.

Country Risk CAPM

The country-risk-adjusted CAPM (CRCAPM) adjusts the traditional CAPM equation for risks associated with investing in emerging markets. It has some support in the literature (Lessard 1996). CRCAPM defines the cost of equity as follows:

$$E[r_{ix}] = r_{fh} + \beta_{ih} \times \beta_{xh} (E[r_{mh}] - r_{fh})$$

where r_{fh} is the risk-free rate in the home market; β_{ih} is a pure play beta based upon comparable companies in the home market; and β_{xh} is the beta of the local market with respect to the home market. Mathematically, β_{xh} is:

$$\beta_{xh} = \rho_{xh} \times \frac{\sigma_x}{\sigma_h}$$

where ρ_{xh} is the correlation between the local market and the home market; σ_x is the standard deviation of returns in the local market, and σ_x is the standard deviation of returns in the home market.

An obvious flaw in the basic CRCAPM is that inflation expectations may differ between the home market and the local market. This is important if the investor has a long time-horizon and purchasing power parity does not hold (due to exchange rate restrictions). Thus, a more complex model adjusts for differences in inflation expectations by adding the yield spread in the local country (S_x). The CRCAPM becomes:

$$E[r_{ix}] = r_{fh} + s_x + \beta_{ih} \times \beta_{xh} (E[r_{mh}] - r_{fh})$$

The CRCAPM has some advantages. First, it allows the analyst to use a true risk-free rate, r_{fh}, whereas the LCAPM and ICAPM use the local country's rate. Second, adjusting the cost of capital for sovereign risk is intuitively appealing.

The CRCAPM has two theoretical flaws. First, multiplying β_{xh} and β_{ih} is mathematically invalid (Bodnar et al. 2003). Second, political risk influences the expected value of cash flows rather than the cost of capital per se. Therefore, adjusting cash flows is more valid than adjusting the cost of capital. And, if the analyst adjusts both cash flows and the cost of capital, then the analyst double-counts.

Multifactor model (MFM)

The multifactor model (MFM) incorporates several risk-parameters. The MFM has substantial support in the literature (Errunza & Losq 1985, 1987; Diermeir & Solnik 2001; Cavaglia et al. 2002; Bodnar et al. 2003). The MFM computes the cost of equity as the risk-free rate plus the firm's sensitivity to several factors such as global factors, country-specific factors, macroeconomic factors or company-specific factors. The cost of equity becomes:

$$E[r_{ix}] = r_{fh} + \beta_1 f_1 + \beta_k f_k$$

The MFM's advantages are that it allows investors to tailor the model to match their specific risk exposure, and the inclusion of multiple risk factors may improve the model's explanatory power.

Practical and theoretical considerations support the LCAPM and ICAPM. The choice between the LCAPM and the ICAPM depends on whether the investor diversifies internationally. If the investor does not diversify, such as when making an acquisition, then the LCAPM best captures the investor's risk. However, if the investor diversifies, then the ICAPM best captures the investor's required rate of return.

However, the multifactor model does not indicate the appropriate risk factors, may not be economical, and may not significantly improve upon the CAPM's cost of equity. Further, the multifactor model is computationally troublesome and does not resolve existing problems estimating beta, market returns, or risk-free rates of return. Therefore, the multifactor model may not be a significant improvement on the CAPM.

Credit Risk Model

The credit risk model (CRM) bases the cost of capital on the emerging market's credit rating. The rationale is that the credit rating is readily available and correlates with stock returns (Harvey et al. 1995; Diamonte et al. 1996; Erb et al. 1996). This approach attempts to resolve the estimation problems associated with the CAPM. It defines the cost of equity as follows (Harvey et al. 1995; Harvey 2001):

$$E[r_{ix}] = \beta_0 + \beta_1 (CR_x)$$

CRM estimation proceeds as follows. For all countries that have credit ratings, regress the credit rating on the market returns to estimate the coefficients β_0 and β_1. Then apply the local country's credit rating, CR_x, to these coefficients to estimate an expected return. An extended model improves on the basic CRM by allowing for differences in correlation and integration among countries (Bekaert & Harvey 2000).

The CRM's primary advantage is that it avoids problems estimating risk-free rates of return, market returns or beta. Further, since credit ratings are forward-looking, the CRM should yield a forward-looking cost of equity.

The CRM has two key disadvantages. The first disadvantage is that credit ratings are not a direct measure of equity risk. Credit risks capture the probability that a government will default on debt obligations. However, this type of risk is only one part of equity risk, which also includes exposure to local and global stock market movements (Sabal 2004). Thus, the CRM is misleading.

Arguably, the coefficient on credit ratings (β_1) includes this by capturing the sensitivity and responsiveness of equity markets to credit ratings. However, this is true only if β_1 is both econometrically consistent and unbiased. This is unlikely to hold since the CRM equation omits key variables that may explain the relation between market-returns and credit ratings.

The second disadvantage is that the CRM requires further adjustment for company-specific risk, however, it is unclear how to make this adjustment. Therefore, while the CRM is a useful model in countries with severe information restrictions, it may not improve on the CAPM in countries that have acceptable information levels.

How to escape this quagmire

Practitioners have many different options and none appears ideal. Both practical and theoretical considerations are relevant.

Practically, the HCAPM is the easiest model to apply since it only requires readily available data. The LCAPM and ICAPM are also easy to apply, however, they may have estimation problems. The MFM is difficult to estimate due to difficulty finding uncorrelated factors. The CRM is difficult to apply due to difficulties adjusting it for investment-specific risks.

Theoretically, the LCAPM, ICAPM and MFM have the greatest theoretical support. The HCAPM, CRCAPM and CRM have the most theoretical flaws.

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Conclusion

Emerging markets provide exciting investment opportunities but they also carry risk. The cost of equity is an appropriate measure of this risk. However, there is no consensus on how to estimate this risk. This paper has examined six techniques to determine the cost of equity. Two conclusions emerge: if investors diversify internationally, they should use the International CAPM; but, if investors do not diversify internationally, they should use the Local CAPM.

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