

## CHAPTER 2

### LITERATURE REVIEW

The previous chapter highlighted the need for a relevant valuation model to calculate the cost of equity for the Malaysian firms. Based on the studies on practitioners' preference for various techniques to calculate cost of equity, it has come to our attention that the CAPM is the most popular model among practitioners in developed as well as in emerging markets. Therefore, the current chapter is devoted to review past studies on the CAPM, starting with the introduction of the CAPM in the 1960s, the critics on the model, the variations of the CAPM resulting from attempts to overcome the original model's weaknesses and the adoptions on the CAPM for the emerging markets. In the last section, we dwell into studies related to cost of equity determinants.

#### **2.1 CAPM and Cost of Equity Calculation**

A firm's cost of equity represents the compensation that investor demands in substitute for bearing the risks that come with owning the firm's common stocks. Being risk adverse, it is assumed that investors require a risk premium for additional risk on top of a risk-free return. It is easy to understand why the CAPM is popular among practitioner, as the CAPM is the basic theory that conveniently links risks and returns for all risky assets.

CAPM was the work of William Sharpe, a Nobel laureate in economics, that was set out in his book entitled "Portfolio Theory and Capital Markets" in 1970. The main idea behind his model is that not all risks should affect asset prices. Therefore, individual investment contains two types of risk, systematic risk and unsystematic risk. Systematic risk is market risk that cannot be diversified away and this risk affects almost all stocks.

Examples are changes in interest rates, economy recessions and wars. On the other hand, unsystematic risk is risk specific to individual firms or stocks that can be eliminated as investors increase the number of stocks in their portfolios. Some examples include product defects or an announcement on a merger of firms. Modern portfolio theory shows that unsystematic risk can be eliminated through diversification. Nevertheless, diversification does not solve the problem of systematic risk, that is, it cannot eliminate systematic risk. Therefore, when calculating expected return, systematic risk is what troubles investors most. The CAPM, hence, is created as a model that allows estimation of this systematic risk.

An important component of the CAPM is the risk-free rate. To this, a premium is added for additional risk that investors have to bear. The premium consists of a market risk premium multiplied by a coefficient called beta. Beta, when compared to the market risk premium, indicates the amount of compensation needed for investors to take on additional risks. Therefore, there are basically three inputs to the CAPM framework that need to be estimated – risk-free rate, firm's beta and market risk premium. Among the trio, the risk-free rate is the least controversial estimate one has to make. There are nevertheless, two issues to be considered. First, what constitute a good risk-free rate, and second, which maturity should be used for the risk-free rate? Since there are no assets that are really risk-free, it is a norm to use Treasury securities to represent the risk-free asset. As a general rule of thumb, the maturity chosen for the risk-free rate should match the maturity of the project under valuation. Nevertheless, most finance textbooks suggest using short-term rates since they are consistent with simplest version of the CAPM (Titman *et al.*, 2008, p. 138).

The second estimate in the CAPM is firm's beta or simply known as beta, which measures the sensitivity of stock returns relative to market returns. The basic concept of beta arises because stock returns tend to move in tandem with the movement of the overall market returns to a certain extent. Some may move more than others or could move in the same or opposite direction to the movement of the overall market. Therefore, their sensitivity to the overall market movements is an important measure. As market itself has a beta of 1.0, a firm whose stock returns that vary more than the market will have an absolute value of greater than 1.0. On the other hand, a firm whose stock returns vary less than the market will have an absolute beta value of less than 1.0. Since beta takes into account direction and magnitude, a beta of say 1.5 indicates that if the market returns go up ten percent, the stock returns will go up 15 percent. However, if the beta value is negative, then stock returns will move in the opposite direction of the market returns. A beta can be estimated through the market model regression whereby stock returns are regressed against market returns.

The last input for the CAPM is the equity risk premium for the market. To obtain the estimate, the difference between long-run historical rates of return of the market and the rates of return from a risk-free investment is conventionally used. The assumption is that historical data can be used to forecast equity risk premiums in the future. To obtain cost of equity estimates for firms, the estimation of the equity risk premium is the most controversial and difficult. There have been arguments of whether equity risk premium observed in practice is compatible with theory. In their seminar paper, Mehra and Prescott (1985) argued that the observed historical equity risk premiums in the U.S. are much higher than could be justified by standard theory and it would take implausibly high risk-aversion investors to demand these premiums. They termed it as the "equity premium puzzle". Since then, numerous studies have attempted to provide plausible

explanations to the puzzle but no consensus has been reached yet. This has led some researchers to believe that the logical explanations to the puzzle are either the standard models are wrong or historical risk premium is misleading (Dimson *et al.*, 2008). Indeed, Damodaran (2010) concluded that it is not clear what to make of the equity premium puzzle. He added that the puzzle highlighted more on the danger of using historical data and the failure of classic utility models than of the equity risk premium itself.

Standard procedure for estimating equity risk premium is to use the historical risk premium approach, whereby the historical returns earned by stocks above the risk-free rate over a long period are employed. However, Damodaran (2008) argued that while the approach may yield reasonable estimates for countries with a large and diversified stock market which has a long history and a well developed government bond market like the U.S., the approach yield meaningless estimates for the emerging markets where the equity market represents a small proportion of the overall economy and historical data tend to be limited and noisy.<sup>3</sup> He suggested the use of a base premium for a mature equity market such as the U.S. and a country risk premium to estimate equity risk premium.

To measure country risk premium, Damodaran (2008) suggested using the rating assigned to a country's debt by a rating agency like the S&P and Moody's. The advantage of these ratings is that although they measure default risk rather than equity risk, they are affected by many of the factors which drive equity risk as well. Some of the factors include political stability, currency fluctuation and trade balances. Indeed, Pereiro (2001) found that very short time series in volatile settings has caused some

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<sup>3</sup> The paper has gone through a few revisions. It seems that an early draft of the paper has been available since as early as year 2000, as quoted in Pereiro (2001).

Latin American countries such as Chile, Colombia and Peru to have negative market risk premiums. He mentioned that a solution for the problem may be to apply the sovereign bond premium introduced by Damodaran.

After linking the CAPM to the calculation of cost of equity, the following two subsections contain further discussion of the CAPM. In particular, the assumptions of and critics on the model, as well as extensions of the model aimed to modify or relax its simplified assumptions are discussed.

### **2.1.1 Assumptions and Critics of the CAPM**

A massive amount of research had been devoted to the empirical testing of the CAPM over the several past decades. Nevertheless, the empirical evidence supporting the model was poor. Fama and French (2004) attributed the lack of empirical support to the simplifying assumptions underlying the model. Adapted from Elton *et al.* (2007, p. 285), the CAPM is based on the framework of an efficient market with the following assumptions:

- i) No transaction costs. There is no cost involved in buying or selling any asset. The inclusion of transaction cost adds a great deal of complexity to the model.
- ii) Assets are infinitely divisible. Investors are able to take any position in an investment.
- iii) No personal income tax. Investors are indifferent whether to receive the return on their investment in the form of dividends or capital gains.
- iv) Perfect competition. Individual cannot affect the stock price by his/her buying or selling action, that is, all investors are price takers.

- v) Investors are expected to make decisions solely in terms of expected values and standard deviations of the returns on their portfolios.
- vi) Unlimited short sales.
- vii) Unlimited lending and borrowing at the riskless rate.
- viii) Investors are assumed to be concerned with the mean and variance of returns (or prices over a single period), and are assumed to define the relevant period for investment in exactly the same manner.
- ix) Investors are assumed to have identical expectations with respect to the necessary inputs for making portfolio decisions, that is, expected returns, variance of returns and the correlation structure between all pairs of stocks.
- x) All assets, including human capital are marketable. It is assumed that the market portfolio consists of all types of assets, including works of art, real estate, human capital and so on.

It is obvious that many of these assumptions do not hold in the real world and one might find the assumptions behind the CAPM unrealistic. There were various critiques on the CAPM but the most famous is none other than Roll's (1977) critique.

Roll's critique is a famous analysis of the validity of the empirical test of CAPM. In his paper, two statements were made regarding the market portfolio. The first statement is the mean-variance tautology. He argued that the validity of the CAPM is equivalent to the market being mean-variance efficient with respect to all investment opportunities. Without observing all investment opportunities, it is not possible to test whether a portfolio is mean-variance efficient. Consequently, it is not possible to test the CAPM. The second statement is made with regards to the unobservable market portfolio. He argued that the market portfolio in practice would necessarily include every single

possible available asset, including real asset, precious metals, stamp collections, jewellery, and anything with any worth. The returns on all possible investment opportunities are unobservable. Roll's critique has received a large number of citations in the financial economics literature but it is the second statement that is mostly cited. Hence, it is not surprising that Roll's critique is interpreted as "the market portfolio is unobservable".

### **2.1.2 Extensions of the CAPM**

Attempts to modify or relax most of the assumptions of the CAPM have resulted in variations of the traditional CAPM model. Some of the prominent extensions include eliminating the possibility of unlimited lending and borrowing at a riskless rate (Brennan, 1971; Black, 1972), allowing some assets to be nonmarketable (Mayers, 1973), having heterogeneous expectations (Lintner, 1969; Gonedes, 1976), presence of personal taxes (Elton and Gruber, 1978) and allowing for multi-period and changing investment opportunities from one period to another (multi-beta model by Merton (1973), consumption CAPM by Breeden (1979); inflation CAPM by Friend *et al.* (1976)). Despite the changes in assumptions, many of the conclusions of the original CAPM remain the same. This shows that the simple form of the CAPM is amazingly robust (Elton *et al.*, 2007, p. 324).

Another strand of the extension to CAPM stems from the findings that variation in average stock returns could not be fully explained by market beta. Basu (1977) found that low price-to-earnings ratios to be associated with higher rates of return than what could be explained by the CAPM, Banz (1981) and Reinganum (1981) showed that this price-to-earnings effect was related to firm size, while Litzenberger and Ramaswamy (1982) found that higher stock returns are associated with high dividend yields. The

ability of other risk factors in explaining stock returns has motivated researchers to examine the performance of alternative models that explain stock returns better. Based on the asset pricing literature, these alternative models take three separate directions, which are (i) multifactor models that add some factors to the market return, (ii) the Arbitrage Pricing Model (APT) of Ross (1976), and (iii) the incorporation of higher moments such as skewness and kurtosis.

The most prominent multifactor model is perhaps the one introduced by Fama and French (1993). Their three-factor (FF3F) CAPM model showed that by adding a 'value' (book-to-market equity) factor and a 'size' (firm size) factor on top of the overall market factor greatly improves the explanatory power of the CAPM on stock returns. In their observation, small firms and stocks with high book-to-market ratio tend to do better than the overall market. Later, Fama and French (1996) found that the FF3F is also able to explain the strong patterns in returns observed when portfolios are formed on earnings-to-price ratio, cash flow-to-price ratio, and sales growth. Despite this, the FF3F was found to leave many other important anomalies unexplained. One of such anomalies is Jegadeesh and Titman's (1993) momentum effect. They found stocks that do well in the past three to 12-month holding periods tend to do well in the next few months and stocks that do not do well will continue to perform poorly. An alternative approach will be to apply Carhart (1997) four-factor model whereby momentum is added as the fourth factor to the FF3F to take into account the persistency in short-term returns. Nonetheless, due to the short-lived nature of the momentum effect, it is irrelevant in cost of equity estimation (Fama and French, 2004).

Recent empirical findings showed that FF3F has limited explanatory power on stock returns. For example, Martinez *et al.* (2005) showed that the FF3F has limited



explanatory power on cross-sectional expected stock returns in the Spanish market. Liu (2006) also shared similar findings for the NYSE, AMEX and NASDAQ markets. In particular, the FF3F is criticised for failing to capture liquidity risk. In Liu's study, it is shown that liquidity risk is priced and is important for asset pricing. The survey by Bruner *et al.* (1998) revealed that only a minority of firms used multi-factor asset pricing models to estimate cost of equity. Ang *et al.* (2006) also demonstrated that only the market factor is consistently priced for 23 developed markets over a sample period of 1980-2003. Interestingly, size, book-to-market, momentum and liquidity are not able to account for the low average returns earned by stocks with high systematic risk.

The APT developed by Ross (1976) serves many of the same functions as the CAPM but has more flexibility because the model does not require the benchmark market portfolio to be the unobservable 'market' portfolio. In addition, the APT suggests that there are factors other than beta which affect systematic risk. Since the APT does not clearly specify the risk factors, the model opens up to many possible sources of risk and uncertainty. Motivated by the APT, Chen *et al.* (1986) managed to identify a set of macroeconomic variables, which in their view, explained expected returns. They are industrial production, risk premium, term structure of interest rates, and inflation. While they do not claim to have found the "true" set of variables for asset pricing, the paper has since motivated a series of research of this sort, see for example, Burmeister and Wall (1986), Burmeister and McElroy (1988), Chen and Jordan (1993), and Shanken and Weinstein (2006).

Although APT seems to be an extremely appealing model, the large macroeconomic data series required become a drawback of the model, especially in emerging markets where the data are usually incomplete, extremely short and very volatile. This may

explain why APT is less popular for applications in less developed markets. As stated in Pereiro (2002, p. 110) “*In Argentina, it has been shown that only eight percent of the corporations and none of the private equity funds or financial advisors surveyed use APT models when computing the cost-of-equity capital...*”. In addition, the lack of agreement among practitioners and academics regarding risk factors has limited the applications of APT (Ameer, 2007).

The third category of studies pays attention to the third- and fourth-order moments of return distribution, that is, skewness and kurtosis, respectively. Arditti (1971) argued that investors do not base their decisions solely on the first two-moments on the return probability distributions, but show a preference for positive skewness. Kraus and Litzenberger (1976) extended the two-moment CAPM to include the effect of positive preference for skewness. They documented that the three-moment CAPM is a better predictor of stock returns than its two-moment counterpart. Employing sample consisting of all stocks listed in the NYSE from 1969 to 1988, Fang and Lai (1997) derived a four-moment CAPM and revealed that conditional skewness and conditional kurtosis contribute to the risk premium of a stock. Dittmar (2002) improved the CAPM model by adding the terms for skewness and kurtosis, and found that multi-factor models lose their significance in explaining cross-sectional of stock returns. Their results propose that forecasting power may improve when skewness and kurtosis are included in a model. Nevertheless, some researchers claim that the opposite might be true (Nagel *et al.*, 2007).

In a recent study, Nagel *et al.* (2007) compared six commonly used methods in cost of equity estimation, namely, the CAPM, the FF3F model, the Carhart (1997) four-factor model, a co-skewness model, a co-kurtosis model and the stock’s own historical mean

return. The model in Lee *et al.* (1999) is used as the base model. Following the base model, the cost of equity is calculated as the sum of the risk-free rate and a risk premium averaged over many years. The six mainstream models were built upon the base model. Using firm sample of all non-financial stock returns available in the Center for Research in Security Prices (CRSP) from 1953 to 1996, Nagel *et al.* (2007) found that the more sophisticated models do not offer forecasting ability more superior than the base model. They concluded that forecast error from estimating factor loadings and expected risk premium in the more sophisticated models exceeds the precision gained by including those risk factors.

In sum, multifactor models emerged as a result of the failure of market beta to explain cross-sectional variations in stock returns. These models incorporate fundamental factors such as size and price-to-earnings ratio in addition to the market beta. The non-normality of stock returns especially in high-frequency data as shown by several studies resulted in the alternative of CAPM with higher order co-moments. Over the years, the simple form of the CAPM model has gone through various modifications in adjacent to new empirical findings. Not only that, as the world globalizes and investors gain access to foreign investments, other issues emerge and research continues to find a model that will better grasp the conditions of these markets. With the rapid pace of globalization, some believe that the world has become more integrated than before and thus one only need a single asset pricing model to estimate cost of equity. This is discussed in Section 2.2. Section 2.3 will focus on another issue, which is cost of equity estimation for emerging markets.

## 2.2 Global Cost of Equity

Towards the end of War World II, capital markets around the world were very much segmented due to the numerous barriers to free flow of capital. The reformation and liberalization in the developed markets in the 1970s and emerging markets in the 1980s led to the removal of many of these barriers. Parallel with globalization, the world capital markets have become more integrated and perhaps a single model is all that one needs to estimate cost of equity.

In the classic CAPM, investors are assumed to care about only one risk factor – the overall market risk. How risky is a stock compared to the overall market is captured by the covariance of the stock returns with the overall market returns, in other words, the beta for the stock. The discount rate is based on the multiplication of this beta with the equity risk premium, given as the excess return of the overall market portfolio over the risk-free rate. Investors evaluating a stock in their own country will probably use the excess return of the local market portfolio over the local risk-free rate to estimate cost of equity. However, in today's globalized market, investors are faced with the question of whether a global market risk premium should be used instead.

Stehle (1977) and Stulz (1995) argued that the use of a local market index is only appropriate for closed, national markets. Their reports provide empirical support for the global CAPM over the local CAPM. On the other hand, Solnik (1974) raised his doubts that a single global index would give a realistic description of the international context because national factors are important too. Stulz (1981b) constructed an international asset pricing model with investment barriers and found that these barriers reduce trade in assets which do not provide expected returns large enough to offset the cost of barriers. Accordingly, he concluded that, when there are international investment

barriers, the world portfolio of stocks cannot be efficient for any investor. The empirical evidence seems to suggest the use of a local asset pricing model for segmented markets while a global asset pricing model for integrated markets.

Perhaps, the more important question here is whether local and global pricing models will lead to different cost of equity estimates. Empirical evidence on the issue is mixed. Among the first to address the problem is Stulz (1995). Using the case of the Swiss multinational Nestlé, he replaced the local market index in the traditional CAPM with a global market index and showed the difference in cost of equity estimates is about 150 basis points. Mishra and O'Brien (2001) took it a step further by including a third model, a global CAPM with one additional factor for exchange rate risk, and compared it to the local CAPM and the global CAPM proposed by Stulz (1995). Unlike Stulz who examined a single firm, their study included a large sample of equities which is inclusive of 2989 U.S. stocks and 118 American Depository Receipts (ADRs). They found the models, on average, do not produce substantial difference in cost of equity estimates. Koedijk *et al.* (2002), Harris *et al.* (2003), and Koedijk and van Dijk (2004) also shared the view that the local CAPM does not lead to significantly different cost of equity estimates than those of the global CAPM.

A recent test on the effectiveness of global models in pricing the cross-sectional emerging market stock returns was done by Barclay *et al.* (2010). Focusing on monthly return data for 20 emerging markets (Malaysia inclusive) covering the period of 1995-2008, eight asset pricing models were tested in the study. The first four models were unconditional models consisting of (i) simple CAPM with developed world index, (ii) simple CAPM with emerging world index, (iii) currency model with developed world index and three currency factors (German Deutsche Mark, Japanese Yen and U.K.

Pound Sterling) and (iv) currency model with emerging world index and three currency factors. The remaining models were conditional models, estimated by adding a global information variable as a separate factor to each model. They found a wide spread performance across the eight models in terms of  $R^2$ , but in general, the conditional models performed better than the unconditional models. Models factoring in currency risk have better performance than the single factor models. Nevertheless, when model misspecification was allowed, the difference in  $R^2$  became not significant. An important implication from the findings is that when controlling for model misspecification, none of the models outperform the global CAPM.

A drawback of the global CAPM is the assumption that every investor trades using the same currency. In reality, the investor population around the world are heterogeneous, coming from different countries and holding different currencies. If the heterogeneity is taken into account, the model should include additional terms. One of such terms is exchange rate risk. Some of the earlier studies to incorporate this risk in international asset pricing are Solnik (1974), Stulz (1981a), and Adler and Dumas (1983). Nonetheless, currency exchange risk premiums are often much smaller than world market risk premium (Bodnar *et al.*, 2003) and there is overwhelming evidence that shows that the covariance between stock returns and exchange rate movements is quite small (Solnik, 1999, p. 227 as quoted in Pereiro 2001). Other studies, for example, Hamao (1988) and Jorion (1991), found no evidence that exchange risk is priced in the Japanese and the U.S. stock market, respectively. However, Pereiro (2001) indicated that the global CAPM may be plausible for developed markets but certainly not for emerging markets where country risk is present.

## **2.3 Cost of Equity Estimation in Emerging Market**

Despite considerable history of research on emerging markets, much of the current work was initiated as a result of the World Bank Conference on Portfolio Investment in Developing Countries, held in Washington in late 1993. Some of the ideas presented at the conference motivated much of the research on emerging markets over the next five years. Among the goal of the conference was to think about ‘best practice’ in the issue of assets valuation in emerging markets and to explore new research and practical methodologies. One of the most pressing problems professional firm appraisers face in cost of equity valuation in emerging market is the availability of accurate reliable information. Empirical evidence shows that emerging equity market information tends to be scarce and unreliable. Not only that, financial efficiency of emerging markets is also highly debatable. These are relevant problems, because traditional valuation techniques including DCF work best when applied to the valuation of stocks of large public firms, which operate within highly efficient markets in developed economies.

### **2.3.1 Challenges of Using CAPM in Emerging Market**

The first challenge faced by researchers is associated with emerging markets’ imperfect, incomplete, or short-lived data. Most empirical research on emerging markets relies on the International Finance Corporation (IFC) indices which represent portfolios of securities that comprise at least 60 percent of the market capitalization in each emerging market. For some countries, there are only a few stocks in the IFC index portfolio. For example in December 1997, emerging countries like Hungary and Venezuela have less than 20 securities in the IFC global index. India had more than 5,000 equity securities listed in the country but only 133 securities are included in IFC index. The small number of securities in these indices means that the country portfolio may contain some variance that is usually diversified away with larger portfolios. Not only that, empirical

evidence shows that the existence of financial efficiency in most emerging markets is highly debatable. This is because transitional economies normally have small and concentrated national markets, which are prone to manipulation (Pereiro, 2001).

In addition, higher volatility and large price changes in emerging markets are an established fact (for examples, see Harvey, 1995; Bekaert and Harvey, 1995, 1997; De Santis and Imrohoroglu, 1997; Jorion and Goetzmann, 1999; Rouwenhorst, 1999; Harvey *et al.*, 2000; Salomons and Grootveld, 2003). Also, distributions of emerging market equity returns are highly non-normal. Harvey (1995) rejected the null hypothesis of normality for 14 of the 20 emerging markets but normality cannot be rejected for any of the three developed markets (namely U.S., U.K. and Japan) in his test. Bekaert and Harvey (1997) also rejected the normality of stock returns in 15 out of 20 emerging markets included in their study while De Santis and Imrohoroglu (1997) detected a considerably larger kurtosis for emerging markets than developed markets. The observation that emerging stock returns are not normally distributed and the existence of significant skewness and kurtosis in returns have important implication not only for the financial models popularly applied in developed markets such as the CAPM and Markowitz's (1952) portfolio theory but also for the relevance of commonly used measure of risk, that is, the beta.

Theory may suggest that in an integrated capital market, the expected return is determined by the beta with respect to the world market portfolio multiplied by the world risk premium. On the contrary, in a segmented market, the expected return is the product of the local beta and the local market risk premium. However, with the onset of capital market liberalization in the 1990s, some emerging markets have become partially integrated into world capital markets (see Bekaert and Harvey, 1995 and



Bekaert *et al.* 2005). When considering the risk exposure in a market, it is important to consider the level of market integration. In fully integrated markets, the common factor with which risk is priced is the covariance of market returns with the world market portfolio returns. The other extreme is the perfectly segmented market, where market returns move independently of the world market. In this scenario, the relevant factor will be the assets' exposure to factors specific to the segmented market. As emerging markets lie within the continuum of full integration on one end and full segmentation on the other end, one would need to consider appropriate risk measures that can capture the dynamic risk-return relationship in transitional economies.

To sum up, many of the critical assumptions behind traditional asset pricing models are violated where emerging markets are concerned. As opposed to developed markets, stocks of emerging markets have prices that are more volatile, and returns that are non-normal with excessive skewness, or fat tails, or both. As a result, challenges are raised against direct applications of traditional asset pricing models to emerging markets.

### **2.3.2 Valuation Models for Emerging Market**

When appraisers need to value securities in emerging markets, it is convenient to use the established or popular asset pricing models designed for the developed markets, for example, the FF3F and APT, among others. Nevertheless, recent empirical evidence, for example, Grandes *et al.* (2010) concluded that both size and value premia were not generally statistically significant risk factors for the seven Latin American stock markets. With the exception of Brazil for some years, the FF3F also did not provide additional informational content to the local market portfolio in explaining stock returns. In addition, incomplete and extremely short time series with volatile movements dampened the attractiveness of the APT application for emerging markets since the

model requires large macroeconomic data series. Not only that, consensus has not been reached among practitioners and academics regarding the risk factors to be used in the APT. This has limited the use of the model for emerging markets.

The application of the traditional one-factor CAPM to emerging markets is a controversial venture. Despite that, Pereiro (2002) felt that chances were, the model will continue to be used for many years to come and he listed three reasons. First, the availability of data for easy application of the CAPM model may entice analysts to continue using it for cost-benefit reason. Second, the popularity of the CAPM has made it a standard benchmark. In a buy-sell negotiation for example, an analyst may be at a disadvantage if he/she ignores the model since the other party is most likely to be using the CAPM. Third, some flaws of the CAPM can be, to some extent, lessen through specific modifications.

In the basic CAPM model, the cost of equity is acquired by plugging in local information, that is, local risk-free rate, beta (obtained by regressing firm returns against local market index returns) and local market returns into the model if the analyst believes that the market is segmented. On the other hand, for analysts who believe that the market is fully integrated, global risk-free rate, global beta (obtained by regressing firm returns against global market index returns) and global market returns would be used instead. In an emerging market setting, specific modifications are made to the standard one-factor CAPM, particularly, to account for country risk. Hence, it is not surprising to find majority of the models suitable for estimating cost of equity in emerging markets are CAPM-based variants although there are also a few which are non-CAPM based variants. These models are summarized in Table 2.1.

Table 2.1: CAPM and non-CAPM variants for Emerging Markets

Model	Description	Highlight of the Study
<p><b>CAPM-based models</b></p> <p>1. Lessard's model Lessard (1996)</p>	$CE = R_F^{US} + R_C + \beta_{L,US} \beta_{US} \left( R_M^{US} - R_F^{US} \right)$ <p>where <math>CE</math> is the cost of equity, <math>R_F^{US}</math> is the U.S. risk-free rate, <math>R_C</math> is the target country risk premium which may include chance of expropriation, war, inconvertibility and other risks, <math>\beta_{L,US}</math> is the country beta which measures the sensitivity of local market return to the U.S. market return, <math>\beta_{US}</math> is the beta of a comparable U.S.-based firm and <math>R_M^{US}</math> is the U.S. market return.</p>	<p>The paper highlighted three approaches to compute country risk premium:</p> <ul style="list-style-type: none"> <li>i) the spread of sovereign bond yield over the U.S. treasuries.</li> <li>ii) insurance premiums charged by various government export credit agencies such as OPIC in the U.S.</li> <li>iii) indirectly derived figures from political risk ratings.</li> </ul>
<p>2. Godfrey-Espinosa model Godfrey and Espinosa (1996)</p>	$CE = R_F^{US} + R_C + \left( \frac{\sigma_L}{\sigma_{US}} \right) \left( R_M^{US} - R_F^{US} \right) 0.60$ <p>where <math>\sigma_L</math> is the standard deviation of local market return and <math>\sigma_{US}</math> is the standard deviation of U.S. market return.</p>	<p>In this model, a 0.60 factor is used to depress the equity risk premium so as to avoid double counting risk. This factor is an average of the risk reflected in the stock markets across emerging countries but is not reflected in the bond market.</p>

Table 2.1, continued.

<p>3. Mariscal-Hargis model Mariscal and Hargis (1999)</p>	$CE = R_F^{US} + R_C + \beta_L \left( \frac{\sigma_L}{\sigma_{US}} \right) \left( R_M^{US} - R_F^{US} \right) (1 - R)$ <p>where <math>\beta_L</math> measures the sensitivity of local firm returns to the local market returns, <math>R</math> is the correlation between the local stock market and the bond market returns.</p>	<p>The inclusion of <math>(1 - R)</math> to replace the fixed adjustment of 0.60 can be thought of as a better adjustment for double counting risk.</p>
<p>4. Adjusted Local CAPM Pereiro (2001)</p>	$CE = R_F^L + R_C + \beta_L \left( R_M^L - R_F^L \right) (1 - R^2)$ <p>where <math>R_F^L</math> is the local risk-free rate and <math>R_M^L</math> is the local market returns and <math>R^2</math> is the coefficient of determination of the regression between the volatility of local market returns and the variation of country risk.</p>	<p>The inclusion of <math>(1 - R^2)</math> factor depresses the equity risk premium to somewhat alleviate the problem of double-counting risk.</p>
<p>5. Adjusted Hybrid CAPM Pereiro (2001)</p>	$CE = R_F^G + R_C + \beta_{L,G} \left[ \beta_{GG} \left( R_M^G - R_F^G \right) \right] (1 - R^2)$ <p>where <math>R_F^G</math> is the global risk-free rate, <math>R_M^G</math> is the global market return, <math>\beta_{L,G}</math> is the country beta which measures the sensitivity of local market return to the global market return and <math>\beta_{GG}</math> is the average unlevered beta of comparable firms quoted in the global market.</p>	<p>The use of <math>\beta_{GG}</math> assumes cross-border stability of betas. If this is a dubious assumption, a local beta may be used instead.</p>

Table 2.1, continued.

<p>6. Damodaran's model Damodaran (2003)</p>	$CE = R_F^{US} + R_C \cdot \lambda + \beta_L \left( R_M^{US} - R_F^{US} \right)$ <p>where <math>\lambda</math> is a measure of firm's exposure to country risk.</p>	<p>The exposure factor, <math>\lambda</math>, is scaled around one where a <math>\lambda</math> of one indicates a firm with average exposure to country risk while a <math>\lambda</math> above or below one indicating above or below average exposure to country risk.</p>
<p><b>Non-CAPM-based models</b></p>		
<p>7. Erb-Harvey-Viskanta model  Erb <i>et al.</i> (1996)</p>	$CS_{i,t+1} = \gamma_0 + \gamma_1 \ln(CCR_{it}) + \varepsilon_{i,t+1}$ <p>where <math>CS</math> is the semi-annual return in U.S. dollars for country <math>i</math>, <math>CCR</math> is the country credit rating, <math>t</math> is measured in half years and <math>\varepsilon</math> is the regression residual.</p>	<p>This model relates expected returns to credit rating where the "reward for risk" is measured by <math>\gamma_1</math>.</p>
<p>8. Downside Risk model Estrada (2000; 2001)</p>	$CE = R_F^{US} + RM \left( R_M^{US} - R_F^{US} \right)$ <p>where <math>RM</math> is a risk measure.</p>	<p>The <math>RM</math> is a downside risk measure, taken as the ratio between the semi-standard deviation of returns with respect to the mean in the local market and the semi-standard deviation of returns with respect to the mean in the world market.</p>

The aim of Lessard's (1996) study was to help U.S. companies in the evaluation of their offshore projects, especially those in emerging markets. According to Lessard (1996), the cost of equity is given as the summation of a default risk-free rate and the risk premium for market covariance risk. This risk premium, in turn, is defined as beta (covariability of the project with the benchmark U.S. market portfolio) multiplied by the risk premium on the benchmark market portfolio. Assuming that the relation between the risk of a project with the local economy risk is same as that of a comparable project in the home country, the project beta can then be estimated as the beta of the comparable home country project multiplied by the country beta (the beta of the local market portfolio relative to the home-market portfolio). The highlight of Lessard's (1996) study is the incorporation of a country risk premium<sup>4</sup> in the risk-free rates where the country risk premium can be computed using (i) the spread of sovereign bond yield over the U.S. treasuries, (ii) insurance premiums charged by various government export credit agencies, such as OPIC in the U.S. and EFIC in Australia to insure against expropriation, war, etc. and (iii) country and political risk ratings published by organizations like Euromoney and the Economist Intelligence Unit.

Nevertheless, one drawback of Lessard's (1996) model is that it tends to overestimate cost of equity. Godfrey and Espinosa (1996) argued that country risk may already be present in the market risk premium and thus, including a country risk premium into the risk-free rate will lead to double-counting. Analyzing returns from portfolios built based on lagged country credit risk ratings for 40 national equity indices where 21 were for developed markets and 19 for emerging markets, Erb *et al.* (1995) found that on average, country risk explained about 40 percent of the cross-sectional variation in market return variations. This means that the remaining 60 percent is explained by pure stock market

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<sup>4</sup> Several papers such as Herston and Rouwenhorst (1994) and Griffin and Karolyi (1998) documented that the effect of country risk on stock returns is often more sizeable than the sectoral effect.

risk. Hence, to tackle the double-counting problem, Godfrey and Espinosa (1996) applied a corrector factor of  $(1 - 0.40) = 0.60$ , where, as per Erb *et al.*'s (1995) findings, 0.40 is the average coefficient of determination of the regressions of volatility of market returns against the country credit rating.

Mariscal and Hargis (1999) felt that changes in the risk of an underlying economy are likely to be reflected similarly in sovereign spread movements and equity market volatility. In order to adjust for the double-counting problem as well as to acquire a more reasonable measurement of the true discount rate, they suggested adjusting the equity risk premium by  $(1 - R)$  where  $R$  is the correlation between the local stock market and the bond market returns. On the other hand, Pereiro (2001) proposed to tackle the double-counting problem by correcting the systematic risk premium by  $(1 - R^2)$ , where  $R^2$  is the coefficient of determination of the regression of the volatility of local market returns on the variation of country risk. Hence, the inclusion of the factor  $(1 - R^2)$  into the equation depresses the equity risk premium to partially counter the overestimation problem.

In the same paper, Pereiro (2001) acknowledged the problem of the computation of long-term market premiums and firm betas which can be highly unstable over time. In addition, their historical averages tend to be unreliable or unavailable. Therefore, a hybrid CAPM-based model is created. Lessard's (1996) model alleviated the local data quality problem by calibrating the global market premium through the use of a country beta, where the beta is a measure of the sensitivity of stock returns in the local market to global market returns. To address the problem of double-counting risk in Lessard's (1996) model, Pereiro (2001) also suggested to add the  $(1 - R^2)$  factor to the hybrid model.

Damodaran (2003) believed firms in a market should have exposure to country risk that differs from their exposure to other market risks. He introduced an exposure factor, lambda, to measure a firm's exposure to country risk. The lambda could be measured using one of three variables. The first and simplest method is to measure lambda based totally on where a firm generates its revenues. Using this method, the lambda is obtained by dividing the percentage of revenues generated in the country for the firm of interest by the average percentage for the firms in the country. The second method is based upon the most recent accounting earnings and their variation over time. Theoretically, a firm's earnings that are more exposed to country risk should increase (decrease) as country risk decreases (increases). The third measure is to use stock prices to estimate firm risk exposure. This method is similar to the conventional beta estimates except that stock returns were regressed against bond returns instead of the equity market returns. While each of the three methods has its own drawback, the key to measure exposure to country risk should be based on where a firm operates and not where it is incorporated.

The existence of empirical evidence, for example, Harvey (1995) who found betas of emerging markets to be largely uncorrelated to variation in expected returns in a single-factor model framework, has motivated the development of non-CAPM-based models. In fact, in developing their model, Erb *et al.* (1996) also found no significant relation between beta and expected returns when using a broader cross-sectional sample of countries than that used by Harvey (1995). An alternative solution provided by Bekaert and Harvey (1995) is to use a time-varying approach where the cost of equity is allowed to change over time. However, the method is criticized for its complexity in the estimation procedure which makes it unattractive to practitioners who typically seek



more straightforward methods (Estrada, 2000; Chen and Chen, 2004; Collins and Abrahamson, 2006).

The model of Erb *et al.* (1996) is categorized as “non-CAPM-based” asset pricing model as it does not use the standard beta or market risk premium to arrive at a discount rate. The model uses *Institutional Investors’* country credit ratings to establish forward-looking rates that represent expected returns on investments of average risk within each country. A regression was estimated by combining all market returns for 47 countries and credit ratings into one large model. A log-linear model was used following the argument that as credit rating falls to a low level, expected returns may increase faster than predicted by a linear model. The slope coefficient was found to be significantly negative, suggesting that higher credit ratings are associated with lower average returns. Nevertheless, the model of Erb *et al.* (1996) can only be applied for estimating cost of equity at a country-wide level but not at the firm-level.

Estrada (2000) commented that beta values seem to be too small to accommodate the figures for the cost of equity that most investors deem as reasonable, implying that beta does not accurately measure risk in emerging markets. If beta is maintained as a measure of risk, many emerging markets would have low investment risks. Recognizing the problem of beta especially when applied to emerging markets, Estrada (2000) proposed the downside risk measure, that is, semi-deviation or semi-variance, which he felt can perform better than beta in capturing expected returns of emerging markets. He argued that the downside risk models are preferable since they produce estimates of cost of equity that are halfway between the ‘rather low’ figures produced by the systematic risk (beta) approach and the higher figures generated by the total risk method.

Besides providing more reasonable cost of equity estimates for emerging markets, the downside risk method has several attractive features (Estrada, 2000). Among the features are easy implementation of the method, ability to be applied to both market level and firm level analysis, it is not based on subjective measures of risk, it can be adjusted to any desired benchmark return and most importantly, downside risk captures the portion of risk that investors want to avoid. Further support for downside risk measure is provided by Harvey (2000) who documented that semi-deviation explains a substantial part of the variations in the stock returns of emerging markets. Estrada (2001) extended his test across industries in emerging markets and the results supported the semi-deviation as an appropriate measure of risk in emerging markets.

Downside risk, also referred to as lower partial moments, was first introduced by Roy (1952). He believed investors will prefer safety of principal first and will set some minimum acceptable return that will preserve the principal. Roy's concept became influential in the development of downside risk measures. Earlier studies such as those of Hogan and Warren (1974), Bawa and Lindenberg (1977) and Harlow and Rao (1989) have also proposed CAPM-like models based on downside risks. In their paper, Hogan and Warren (1974) suggested that given the strong support found for semi-variance (downside risk) as a more appropriate risk measure than variance, a CAPM based on semi-variance might provide superior explanation on capital market behaviour. However, compared to the standard risk measure, beta, downside risk has been tested less extensively.

Recent research interest attempted to compare the performance of standard risk measure to downside risk measure. In a sample of 27 emerging markets, Estrada (2002, 2007) documented evidence that about one third of the emerging markets showed a difference

in required returns generated by beta and downside beta that is larger than 300 basis points a year, a differential that is simply too large for practitioners to ignore. Chen and Chen (2004) also found the downside risk to have a strong explanatory power on stock returns. Nevertheless, using equity data from the U.K., Pedersen and Hwang (2007) found although downside beta explained stock returns better than the traditional CAPM, the proportion of equities benefitting from using the former is not large enough to improve asset pricing models significantly.

In sum, asset pricing models modified specifically for use in emerging markets are relatively new in view that most of them have only been introduced in the 1990s or after the new millennium. These models have yet to be studied or used extensively in the literature. Much work needs to be done in order to establish the strength of these models so that investors are more confident in using them to obtain cost of equity estimates.

#### **2.4 Measuring Cost of Equity on a Sectoral Basis**

An early paper by Lessard (1974) documented that a sectoral factor significantly explains the proportion of individual stock returns that were unexplained by a world market factor. An important implication from his results is that the sectoral factor plays a significant role in explaining the variation of market returns. Based on equity price indices for 24 countries including Malaysia, Roll (1992) reported that the sectoral factor is more important than the exchange rate in explaining stock price behaviour for most countries. The argument is that different sectors have differing impacts on the stock exchange, for example, mining is important for producer countries like South Africa but relatively unimportant for raw material importer countries like Hong Kong. Therefore,

countries with similar sectors tend to have similar market behaviour than countries with different sectors.

Bekaert and Harvey (1995) noted that returns of a market may be weakly or negatively correlated to the world market returns even though the market could be perfectly integrated into the world market, due to its sectoral mix that is grossly different from the average world mix. Hardouvelis *et al.* (2007) examined the behaviour of industrial sectors across the Economic and Monetary Union (EMU) countries. They believe that there is no reason to assume all sectors in a country will benefit from higher stock market integration just because the country does. The issue of whether the EMU led to a convergence in cost of equity within a sector across the member countries or across different sectors within a given country has important investment implications with regards to whether asset allocation should be optimized across countries or across sectors. Their study revealed strong convergence in the cost of equity across the EMU countries within a given industrial sector, but little convergence across the different sectors of a given country. The implication for portfolio managers is that sectoral effects are becoming more important.

Realizing the increasing importance of the sectoral factor, Collins and Abrahamson (2006) examined the cost of equity in a sample of African equity markets on a sectoral basis. Using the FTSE Global Classification System, they measured cost of equity for ten sectors, namely, Financials, Resources, Basic Industries, Non-Cyclical Goods, Cyclical Services, General Industrials, Cyclical Goods, Non-Cyclical Services, Utilities, and Information Technology, across six African markets (Egypt, Kenya, Morocco, Namibia, South Africa, and Zimbabwe), covering the time period of 1999-2002. Concurring with the findings of Estrada (2000) who emphasized the importance of

downside risk measures for emerging markets, Collins and Abrahamson (2006) took averages from four cost of equity measures based on standard deviation, beta, semi-deviation with respect to mean and downside beta. They found that Non-Cyclical Goods, Financials and Basic Industries had the lowest cost of equity estimates while Resources, Utilities, Non-Cyclical Services and Information Technology were the sectors with the highest cost of equity estimates.

In a recent study, Hearn and Piesse (2009) found considerable dispersion of cost of equity between various industrial sectors in a sample consisting of eight African markets (Morocco, Tunisia, Egypt, Kenya, Nigeria, Zambia, Botswana and South Africa). For all countries, the Financial sector recorded the highest cost of equity while lowest cost of equity was found for blue chip stocks in Tunisia, Morocco, Namibia and South Africa. For the individual countries, the dispersion of cost of equity in the Moroccan market ranges from 15.43 percent and 17.26 percent for the industrial and diversified sectors to 25.37 percent for the consumer-cyclical sector, while the Tunisian market exhibited the greatest dispersion between sectors with values that ranged from 1.70 percent for the consumer non-cyclical sector to 11.19 percent for the finance sector.

The implication of these studies is that although equity markets may have converged following the globalization waves, there could be little convergence across industries within a market itself. The wide dispersion in cost of equity estimates that is still observed warrants an analysis to be done on a sectoral basis.

## **2.5 The Determinants of Cost of Equity**

Given the importance of cost of equity for making financial decisions and the amount of work that has been dedicated to find appropriate asset pricing models for its estimation,

the subsequent quest will be to determine the factors that affect cost of equity. As there could be many factors that might influence cost of equity, the scope of this review is narrowed to prominent issues or events in the 1990s that have triggered research on the effect of these phenomena on cost of equity. This section is also dedicated to review the influence of the fundamentals, specifically the firm-related accounting variables and market-related variables on cost of equity.

The outbreak of international diversifications and cross-listing activities in the 1990s led to research interest in exploring the effect of these activities on cost of equity (see for example, Foerster and Karolyi, 1993,1999; Karolyi, 1998; Doukas and Switzer, 2000; Singh and Nejadmalayeri, 2004). The extensive survey of studies on cross-listings provided by Karolyi (1998), for instance, concluded that the effect of listing decisions can result in a net reduction of approximately 126 basis points in cost of equity. This is due to a significant decrease in domestic market risk while only a slight increase in global market risk and foreign exchange risk. Higher degree of international diversification also resulted in lower cost of capital as evident in the study of Singh and Nejadmalayeri (2004). Using a sample of 90 French firms from 1996 to 1999, the effect is observable even after controlling for other variables such as debt, equity risk, firm size and asset structure.

Another closely related area to international diversifications and cross-listings is the effect of capital market liberalization on cost of equity. The intuition is that in a segmented capital market, cost of equity is related to variability in the local market returns. On the other hand, in an integrated capital market, cost of equity is related to covariance with the world market returns. Since local market returns are normally more volatile, as capital markets open up or liberalize and the covariance with the world

capital market increases, their cost of equity should decrease. A number of studies documented evidence that capital market liberalization reduces cost of equity (see for example, Bekaert and Harvey, 2000; Henry, 2000; Chari and Henry 2004). Taking a step further, Ameer (2007) tested the effect of stock market liberalization at the firm-level and found that there was significant difference in the decline of cost of equity among firms once firm heterogeneous characteristics were taken into account. In a recent study, Li (2010), using sector-level data for 19 emerging markets and 18 developed countries from 1980 to 2000, provided evidence that sectors that were highly dependent on external funding seemed to grow faster after liberalization. This supports the hypothesis that capital market liberalization results in lower cost of equity.

A series of financial scandal outbreaks in the 1990s might have motivated studies on the effect of legal institutions and securities regulation (Daouk *et al.*, 2006; Hail and Leuz, 2006), as well as disclosures and corporate governance (Botosan, 1997; Bhattacharya and Daouk, 2002; Eaton *et al.*, 2007; Chen *et al.*, 2009; Guedhami and Mishra, 2009) on cost of equity. It was argued that a well-functioning legal system reduces monitoring and enforcement costs to investors, which may result in investors demanding a lower return on their capital. Testing on a sample consisting of 35,118 firm-year observations from 40 countries spanning from 1992 to 2001, Hail and Leuz (2006) found that firms in countries with effective legal institutions had lower cost of equity than they do in countries with weak legal systems. Based on four different models of implied cost of equity used by Hail and Leuz (2006), Guedhami and Mishra (2009) reported that excess control negatively affects firm value, and this is reflected in the firm's discount rate. In addition, consistent with the findings of Hail and Leuz (2006), they found that legal institutions have significant influence on cost of equity too.

The discussion so far involves studies on events related to international investment, capital market liberalization and financial scandals. On the other hand, there are also studies which focus on the fundamentals, especially financial statements of firms. Data from financial statements were found to be value-relevant to public listed firms (see for example, Barth *et al.* 2001; Kothari, 2001). The importance of financial statement increases as a firm matures and its financial position become increasingly associated with its equity value (Hand, 2005). Nevertheless, in most studies, exploring financial statement data as potential determinants of cost of equity is not the core objective, but a peripheral product of the analysis on the impact of other factors such as legal institutions and securities regulation (Hail and Leuz, 2006), financial liberalization (Ameer, 2007), and corporate governance (Chen *et al.*, 2009, Guedhami and Mishra, 2009) on cost of equity.

A summary of studies on the relationship between various variables and cost of equity is provided in Table 2.2. The table is divided into two parts. The first part summarizes studies with emphasis on accounting-based variables and (or) market-based variables. The accounting-based variables are those measured using accounting information only while the market-based variables are constructed from the relation between accounting data and market data. Part two of Table 2.2 includes studies that focus on other variables such as international diversification and corporate governance but also includes accounting-based variables or market-based variables in the study.

Gebhardt *et al.* (2001) and Gode and Monhanram (2003) indirectly explored the determinants for cost of equity through implied risk premium. Gebhardt *et al.* (2001) examined the relationship of implied risk premium with various risk categories which can be grouped into market volatility, leverage, liquidity and information environment,



variability and predictability of earnings, and other pricing anomalies. Controlling for industry effect, they found three variables to consistently assign a higher risk premium to firms with higher book-to-market ratio, higher forecasted growth rate and lower dispersion in analysts' forecasts. Surprisingly, beta had a weak relationship with risk premium and therefore, they concluded that beta has limited importance in the market assessments of a firm's systematic risk. Applying variables similar to those of Gebhardt *et al.* (2001), Gode and Monhanram (2003) reported that the association of risk premium with the variables is as expected and thus conforming to the results documented in Gebhardt *et al.* (2001).

Francis *et al.* (2004) examined the relation between cost of equity and seven attributes of earnings, namely, accrual quality, earnings persistence, predictability, smoothness, value relevance, timeliness and conservatism. They categorized the first four as accounting-based attributes while the last three as market-based attributes. Their research is based on a relation between cost of equity with firm-specific information and earnings are a primary source of these information. It is assumed that investors will use earnings information as a reflection of a firm's current situation or probably as a projection of the firm's future direction. Since there is a positive association between information quality and cost of equity, their results showed that firms with the least favourable values of each attribute experienced higher cost of equity than firms with the most favourable values. Larger effects on cost of equity were observed for accounting-based attributes.

Investors were shown to assign higher risk premium for certain sectors (see for example, Gebhardt *et al.*, 2001; Gode and Monhanram, 2003), resulting in higher cost of equity for those sectors. Nevertheless, studies exploring the effect of financial statement data

on cost of equity are very rare. The only one is the study by Omran and Pointon (2004) where they explored determinants for cost of equity at the sectoral level for 119 Egyptian firms. Using two different models, the inverse of the price-earnings ratio and a modified Gordon growth model for estimating cost of equity, a similar set of determinants were found. Both models showed, for the whole sample of the study, reserves, earnings growth, firm size and active trading were significant determinants except that reserves were not reflected in the modified Gordon growth model. When breaking down the analysis to individual sectors, both models showed that liquidity is an important determinant for the food sector. In the heavy industries, the first model showed that variations in cost of equity were determined by income gearing (times interest earned), capital gearing (long-term debt/total investment) and firm size. As for the contracting and real estate sector, the most important factors were fixed asset backing, income gearing, earnings growth and firm size. Only one key variable was found for the services sector, which was the tax ratio. Clearly, it is evident in their study that determinants of cost of equity differ across sectors.

In a more recent study, Sung *et al.* (2008) examined the relation of implied cost of equity from earnings-based valuation models with a set of frequently-cited risk proxies. Seven risk proxies were chosen. They were market beta (beta), market value of equity (size), book-to-market ratio, debt-to-market ratio, idiosyncratic risk (measured as the variance of residuals from the regressions of market beta estimation), operating income volatility (measured as the standard deviation of operating income in past two up to five years scaled by average total assets) and dispersion of analysts' earning forecasts (measured as the standard deviation of one-year-ahead analysts' earning forecasts scaled by the absolute mean of these forecasts). A sample consisting of 415 firms listed in Korean Securities Dealers Automated Quotations or KOSDAQ from 2001 to 2006

was used in the study. They found that the average implied cost of equity was positively associated with beta, debt-to-market ratio and operating income volatility, while negatively related to size.

In the studies such as Hail and Leuz (2006), Ameer (2007), Chen *et al.* (2009) and Guedhami and Mishra (2009), accounting-based variables and market-based variables were included as control risk variables. Hail and Leuz (2006), for instance, found a significant negative relation between cost of equity with firm size while book-to-market ratio and stock return volatility had significant positive relation with cost of equity. In another study, Ameer (2007) examined the effect of stock market liberalization and securities market development, along with a few other firm-specific risk factors on firm-level cost of equity. The firm-specific risk factors were book-to-market ratio, size, debt-to-equity ratio, price volatility and managerial efficiency. His results showed that in general, the coefficients of firm-specific risk factors had signs which are consistent with the literature. In the investigation on the effect of excess control and legal institutions on cost of equity, Guedhami and Mishra (2009) recorded significant relationship of debt-to-total capital, price volatility and market-to-book ratio with cost of equity and their signs were consistent with prior empirical research.

## **2.6 Concluding Remarks**

The application of the CAPM for the estimation of cost of equity posed to be a challenging task, from identification of the risk-free rate and its maturity to obtaining a usable market risk premium for the case of an emerging market. While some studies questioned the validity of the CAPM, the model is still widely used by practitioners. The valuation models developed specifically for emerging markets do not review both local and global factors simultaneously. This research gap should be addressed because

if an emerging market is partially integrated to the world capital market, then a model which considers both local and global factors might offer better explanatory power on firm stock returns. Hence, better cost of equity estimates could be obtained. Likewise, systematic risks alone may not be sufficient for the estimation of cost of equity. The increasingly relevance of downside risk must be taken into consideration in the estimation of cost of equity for emerging markets. There is also clearly a lack of studies on cost of equity determinants, in particular, on a sectoral basis. Efforts to find such determinants will only be meaningful following the establishment of appropriate measures of cost of equity.

Table 2.2: Association of Various Explanatory Variables with Cost of Equity

Study	Sample	Variables Used in Analysis (Expected Sign)	Significant Variables in Results (Sign)
<p><b>Accounting/Market-Related variables as primary focus</b></p> <p>1. Gebhardt <i>et al.</i> (2001)</p>	<p>All U.S. firms from the NYSE and AMEX obtained from the CRSP and available on I/B/E/S dataset. Number of firms varies by year. Period: 1979-1995</p>	<p><b>Market volatility:</b>            Beta (+)            Standard deviation of stock returns (+)</p> <p><b>Leverage:</b>            Debt-to-book value of equity (+)            Debt-to-market value of equity (+)</p> <p><b>Liquidity and information environment:</b>            Size (-)            Analyst coverage (-)            Average dollar trading volume (-)</p> <p><b>Variability and predictability of earnings:</b>            Mean absolute errors of forecast (+/-)            Earnings variability (+/-)            Dispersion in analysts' forecasts (+/-)</p> <p><b>Market anomaly variables:</b>            Long-term growth in earnings (-)            Book-to-market (+)            Price momentum (+)            Turnover (-)</p>	<p>Book-to-market (+)            Dispersion in analysts' forecasts (-)            Long-term growth in earnings (+)</p>

Table 2.2, continued.

<p>2. Gode and Mohanram (2003)</p>	<p>Firms available in the CRSP and I/B/E/S dataset. Period: 1984-1998</p>	<p>Beta (+) Book-to-market (+) Unsystematic risk (+) Earnings volatility (+) Debt-to-equity (+) Size (-) Long-term growth in expected earnings (+)</p>	<p>In general, all variables are significant and signs are as expected.</p>
<p>3. Francis <i>et al.</i> (2004)</p>	<p>Number of firms varies by year and is sourced from CRSP Period: 1975-2001</p>	<p><b>Accounting-based variables:</b> Accrual quality (+) Earnings persistence (+) Predictability – ability of earnings to predict itself (+) Smoothness – ratio of income variability to cash flow variability (+)</p> <p><b>Market-based variables:</b> Value relevance – ability of earnings to explain return variation (+) Timeliness – explanatory power of a reverse regression of earnings on returns (+) Conservatism – ratio of the slope coefficients on negative returns to the slope coefficients on positive returns in a reverse regression of earnings on returns (+)</p>	<p><b>Accounting-based variables:</b> Accrual quality (+) Earnings persistence (+) Smoothness (+)</p> <p><b>Market-based variables:</b> Value relevance (+) Timeliness (+)</p>
<p>4. Omran and Pointon (2004)</p>	<p>119 Egyptian firms Period: 1994-1998</p>	<p>(Cash and short-term investment)/current liabilities (+?) Fixed assets/total assets (-) Gearing (+) Long term debt/equity (+)</p>	<p><b>Full sample:</b> Net earnings growth (+) Reserves (+) Size (-)</p>

Table 2.2, continued.

		<p>Long term debt/total investment (+)  Net earnings growth (+)  Net fixed asset growth (+)  Q-ratio (+)  Quick ratio (+?)  Reserves (-)  Size (-)  Standard deviation of earnings (+)  Tax/net profit before tax (-)  Times interest earned (-)</p>	<p><b>Food sector:</b>  (Cash and short-term investments)/Current liabilities (-)  Quick ratio (+)  Standard deviation of earnings (+)  Times interest earned (+)</p> <p><b>Heavy industry:</b>  Long term debt/total investment (+)  Size (-)  Times interest earned (-)</p> <p><b>Contracting and Real Estates:</b>  Fixed asset/total assets (+)  Net earnings growth (+)  Net fixed asset growth (+)  Size (-)  Standard deviation of earnings (+)  Times interest earned (-)</p> <p><b>Services:</b>  Tax/net profit before tax (+)</p>
5. Sung <i>et al.</i> (2008)	415 firms listed on KSE/KOSDAQ. Period: 2001-2006	<p>Beta (+)  Book-to-market (+)  Debt-to-market (+)  Dispersion of analysts' earnings forecasts (+)  Idiosyncratic risk (+)  Operating income volatility (+)  Size (-)</p>	<p>Beta (+)  Debt-to-market (+)  Operating income volatility (+)  Size (-)</p>

Table 2.2, continued.

Accounting/Market-Related variables as control risk factors			
6. Hail and Leuz (2006)	35,122 firm-year observations from 40 countries contained in Worldscope. Period: 1992-2001	Beta (+) Book-to-market (+) FBIAS – one-year-ahead analyst forecast error (+) Inflation (+) MVAR – component of four proxies for macroeconomic variability (+) Size (-) Stock return volatility (+)	All are significant and have predicted sign.
7. Ameer (2007)	Listed non-financial firms, number in bracket indicates number of firms [India (50); Indonesia (35); Malaysia (50); Pakistan (20); South Korea (50); Thailand (37)] Period: 1990-2004	Asset turnover ratio (+) Book-to-market (+) Debt-to-equity (+) Size (-) Price volatility (+)	Debt-to-equity (+) Asset turnover ratio (+)
8. Chen <i>et al.</i> (2009)	Firms covered in Credit Lyonnais Securities Asia (CLSA) Emerging Markets published in 2001 and 2002.	Analysts' forecast errors (-) Beta (+) Book-to-market (+) Liquidity (-) Ownership concentration (-) Price momentum (-)	All are significant and have predicted sign except for Liquidity.
9. Guedhami and Mishra (2009)	1207 firms from 9 Asian and 13 Western European countries. Period: 1996-1999	Analyst coverage (-) Debt-to- total capital (+) Dispersion of analyst forecasts (+) Excess control (+) Legal institutions variables (-) Long-term growth rate (+) Market-to-book (-) Price volatility (+)	All are significant and have predicted sign.



