Malaysian Firms Cost of Equity: Systematic versus Downside Risk

Foong Swee Sim[ψ] and Goh Kim Leng

Faculty of Economics & Administration, University of Malaya

Abstract

Of late, concerns are raised against the application of the classical one-factor CAPM in emerging markets. Adopting some of the emerging market models reviewed in Pereiro (2001), together with the two-factor CAPM models proposed in this study, we make comparison between systematic and downside risk measures to estimate the cost of equity of Malaysian firms over 2000-2007. Overall, our results are consistent with Estrada (2000, 2001)'s findings which support downside risk measures over standard risk measures. Based on standard model selection criteria we find that two-factor downside betas have the highest explanatory power on actual stock returns, compared to single-factor models that consider only either local or global risk factor. The cost of equity for Malaysian firms calculated based on the two-factor downside betas have an average value of 11.42%. The Adjusted Local CAPM (ALCAPM) gives an average cost of equity value of 10.34%. If Malaysian investors have used the ALCAPM, they would have underestimated the firm's cost of equity by an average of 108 basis points.

Keywords: *(CAPM; Cost of equity; Downside risk; Firm)*

1.0 Introduction

Estimation of cost of equity in an emerging market like Malaysia poses to be a great challenge because unlike developed markets, there is no clear single 'best practice' to follow. A number of empirical studies show that practitioners in the U.S. (Bruner et al., 1998) and U.K. (McLaney et al., 2004) favour the Capital Asset Pricing Model (CAPM) to estimate cost of equity. However, this does not necessary means that investors could use the classical one-factor CAPM for the Malaysian market without caution as unlike the U.S. and U.K. which are developed markets, Malaysia is an emerging market. It is worthwhile to note that the use of inappropriate valuation model may lead to overestimating the cost of equity which in turn may cause an otherwise promising investment opportunities to be rejected. Likewise, when the cost of equity is underestimated, it may lead investors to accept a value-destructive investment. Whichever the case maybe, the effect of using a less appropriate model to estimate cost of equity is detrimental as it leads to misallocation of funds and biased performance measures.

A few models proposed to estimate cost of equity in emerging markets are reviewed in Pereiro (2001). Among them, Estrada (2000, 2001) proposes the use of downside risks as alternative risk measures to market beta. Downside risk is not a new concept. It was first suggested by Roy

[ψ]Corresponding author: Foong Swee Sim, Department of Applied Statistics, Faculty of Economics and Administration, University of Malaya, 50603 Kuala Lumpur. Email: foongss@perdana.um.edu.my.

(1952) who believes investors will prefer safety of principal first and will set some minimum acceptable return that will preserve the principal. Roy’s concept becomes influential in the development of downside risk measures. Earlier studies such as that of Hogan and Warren (1974), Bawa and Lindenberg (1977) and Harlow and Rao (1989) have also proposed CAPM-like models based on downside risks. More recently, Estrada (2002, 2007) show evidence which support the downside risk measures over standard risk measures. He documented evidence that about one third of emerging markets have a difference in cost of equity generated by beta and downside beta that is larger than 250 basis points a year, a differential that is simply too large for practitioners to be taken lightly.

The aim of this study is to find the most relevant model to calculate firm’s cost of equity. This is done by regressing different risk measures against actual firm’s stock returns. Risk measures that have good explanatory power are also better measures for the calculation of cost of equity. In general, previous studies, for example, Estrada (2000, 2001, 2002) and Barnes and Lopez (2006) have used the popular R^2 to compare the performance of several models. In this study, five standard model selection criteria are used, namely, Akaike’s Information Criterion (AIC), Schwarz Criterion (SC), R^2, Adjusted R^2, and Log Likelihood. On top of that, realizing all the models are one-factor model which either perceive the market as exposed to local factor or global factor only, this study proposed a two-factor model so that the model captures the sensitivity of stock returns not only to the local market movements, but also to the global factor. Another contribution of the study is that the study is done from the perspective of local investors. There are ample studies in the literature which provide empirical evidence from the perspective of the U.S. or U.K. investors, for example, but rarely from the perspective of local investors. In a time where the Malaysian economy is affected by world economy declines, the forces of domestic demand may help to cushion the effect. In this regard, better valuation practices may enhance the flow of local investment capital.

The rest of this paper is as follows. The next section discusses the methods and data used in this study. Section 3 presents the results. Section 4 concludes and discusses possible implications of the results.

2.0 Methodology

This section explains the methods we apply in estimating various risk measures, the models used for calculating the cost of equity and the data used for this study.

2.1 The Measures for Cost of Equity

In finance, cost of equity is defined as the discount rate that equates all future dividends in perpetuity to the current market price of a firm’s stock. It can also be seen as the minimum rate of return a firm must offer to compensate stockholders for delaying their consumption and for bearing some risk. There are various ways to calculate a firm’s cost of equity. In general, the cost of equity can be summarized as follows:

$$\text{Cost of Equity} = \text{Risk-Free Rates} + \text{Risk Measure} \times \text{Risk Premium} \qquad (1)$$

What equation (1) suggests is a firm must compensate the equity holders by delivering a rate of returns that is high enough to cover the risk-free rates plus a risk premium that commensurate the underlying risk factor. The above equation is based on modern finance where we assume the main concern of a typical investor is risk and returns. The question here is how are we going to get the risk measure of a firm? Based on the existing literature, we have several alternatives, which will be discussed in the following sections.

2.1.1 The CAPM Cost of Equity

The classical way of obtaining the cost of equity is using risk measure estimated via a CAPM model which was developed in the 1960s by Sharpe (1964), Lintner (1965) and Mossin (1966). What this CAPM suggests is the cost of equity of a firm can be estimated by referring to the risk free rates and its systematic risk. An annual CAPM cost of equity is given by:

Cost of Equity = Risk-Free Rates + Premium for Systematic Risk

$$CE_i = R_f + \beta_i \left(R_M - R_f \right) \quad (2)$$

where CE_i represents the cost of equity for firm *i*, R_f is the annualized return on the risk-free asset, R_M is the annualized return on the benchmark market index and β_i is the systematic risk measure for firm *i*.

Before we can calculate the cost of equity suggested in equation (2) we follow a 2-step procedure to estimate the risk measure β_i from the following CAPM using weekly data:

$$r_{it} = \alpha_i + \beta_i \left(r_{Mt} - r_{ft} \right) + \varepsilon_t \quad (2a)$$

where r_{it} is the weekly compounding return series for firm *i* at week *t*, r_{Mt} is the weekly compounding returns for the market portfolio and r_{ft} is the weekly compounding risk-free return series. The parameter α_i represents the intercept, and $\beta_i = \frac{\operatorname{cov}(r_i, r_M)}{\sigma_M^2}$ the regression coefficient capturing the sensitivity of firm *i* to the market risk.

Equation (2) basically states that the cost of equity of a firm comprises of a risk-free rate and the firm's market risk sensitivity multiplied by the market risk premium. The contribution of the CAPM is the idea of benchmarking the firm to the overall market or so-called the systematic risk – the comovement of firm with the market. This is powerful in practise as it has avoided tedious calculation in modern portfolio theory to obtain the extremely large portfolio covariance/correlation matrix in establishing an efficient portfolio. By benchmarking to the market, the calculation is reduced from $\left(n^2 - n\right)/2$ to n, where in the case of 100 firms, instead of $\left(100^2 - 100\right)/2$ =4,950, we only need to calculate the risk for 100 firms.

CAPM-based models for emerging markets are basically extensions and modifications from the classical one-factor U.S. CAPM. When investors believe the emerging market is segmented, the cost of equity can be estimated via equation (2) where all the parameters are acquired from the emerging market itself. Equation (2), in this sense, is known as Local CAPM (LCAPM). In this kind of setting, according to Pereiro (2006), the risk-free rate in the local CAPM is the sum of the global (U.S.) risk-free rate and a country risk premium. The country risk premium can be seen as a complex composite of different country-related risks such as political turmoil, sovereign default probability, currency fluctuation and so on. It is usually computed as the spread of sovereign bonds over global bonds of similar denomination, yield and term. Thus, the risk-free rates for emerging market can be written as:

$$R_f = R_F + R_C \qquad (3)$$

where R_F is the global (U.S.) risk-free rate and R_C is the country risk premium.[1] For this study, the U.S. market is chosen as representative of the world market. Therefore, the U.S. one-year government bond rate is used as proxy for the global risk-free rate.

2.1.1.1 Adjusted Local CAPM

One drawback of the local CAPM is the model tends to overestimate cost of equity. Godfrey and Espinosa (1996) argued that country risk may already present in the market risk premium and thus, including a country risk premium into the CAPM will double-counts risk. Indeed, using credit risk ratings for over 40 developed and emerging economies, Erb et al. (1995) find that on average, country risk explained about 40% of the variation in market returns while the remaining 60% is explained by pure stock market risk.

Pereiro (2001) tries to tackle the double-counting problem by proposing an adjusted model of the local CAPM that corrects the systematic risk premium. The model is called the Adjusted Local CAPM (ALCAPM):

Cost of Equity = Risk-Free Rates + Premium for Adjusted Systematic Risk

$$CE_i = R_f + \beta_i \left(R_M - R_f\right)\left(1 - R_i^2\right) \qquad (4)$$

where R_i^2 is the coefficient of determination of the regression between the volatility of the firm and the volatility of the market. Hence, the inclusion of $\left(1 - R_i^2\right)$ factor into the equation depresses the equity risk premium to partially counter the overestimation problem. The risk measure in equation (4), i.e. β_i is the one obtained from regression (2a).

2.1.1.2 Global CAPM

The local CAPM is basically in a domestic setting, where firm returns are regressed against local market returns to obtain the risk measure, i.e. systematic risk. Another school of thought stresses that in today's globalization world, with capital mobilization, the benchmarking market index should be the world portfolio. This is because in a highly integrated world capital market, the return premium to any investments is the same for all investors regardless of the currency unit. Extending equation (2) to a global setting, the GCAPM is given by:

Cost of Equity = Global Risk-Free Rates + Premium for Global Systematic Risk

$$CE_i = R_F + \beta_i^G \left(R_G - R_F\right) \qquad (5)$$

where R_F is the annualized global risk-free rates, R_G the annualized global portfolio returns, and β_i^G is the coefficient that measure the firm's global systematic risk.

[1] Herston and Rouwenhorst (1994) and Griffin and Karolyi (1998) found that the effect of country risk is often more sizable than the industry effect.

GCAPM assume complete integration of the world market and there is no unsystematic risk in the model as it assumes geographic diversification makes unsystematic risk disappears. A firm's global beta is obtained by regressing firm's returns on the world market returns:

$$r_{it} = \alpha_i^G + \beta_i^G \left(r_{Gt} - r_{Ft} \right) + \varepsilon_t \qquad (5a)$$

where r_{Gt} is the weekly compounding returns for global market portfolio and r_{ft} is the weekly compounding global risk-free rates. The parameter α_i^G and β_i^G are the intercept and coefficient, respectively.

2.1.1.3 Two-factor CAPM

In order to capture both local and global factors that are relevant especially to partially integrated markets, such as that of Malaysia, this study proposes a two-factor model which introduces a global market factor into the CAPM.[2] In this case, the model captures the sensitivity of a firm's returns not only to the local market movements, but also to the global factor. This proposed model is denoted as 2F-CAPM. The cost of equity can then be obtained by:

Cost of Equity = Risk-Free Rates + Premium for Local Systematic Risk
+ Premium for Global Systematic Risk

$$CE_i = R_f + \beta_{Li} \left(R_M - R_f \right) + \beta_{Gi} \left(R_G - R_F \right) \qquad (6)$$

where R_F is the global risk-free rate, R_G represents the returns on the world portfolio while both β_{Li} and β_{Gi} are the firm's sensitivities to the local and global risk factors, respectively. Again, the betas are estimated from a 2-factor CAPM regression as below:

$$r_{it} = \alpha_i + \beta_{Li} \left(r_{Mt} - r_{ft} \right) + \beta_{Gi} \left(r_{Gt} - r_{Ft} \right) + \varepsilon_t \qquad (6a)$$

2.1.2 The CAPM Cost of Equity: The Downside Version

This section discusses the downside version of ALCAPM, GCAPM and 2F-CAPM where the standard risk measure in the respective equation is replaced with downside risk measure.

2.1.2.1 Downside CAPM

The calculation of downside beta involves isolating instances when both the firm and the local market index returns are less than the risk-free rate. From here, two new 'downside' series are generated and beta is calculated for these series, using simple linear regression. This beta is called "downside beta", denoted β_i^D for firm *i*:

Cost of Equity = Risk-Free Rates + Premium for Downside Systematic Risk

$$CE_i = R_f + \beta_i^D \left(R_M - R_f \right) \qquad (7)$$

where $$\beta_i^D = \frac{E\left[\min\left\{ \left(r_i - r_f \right), 0 \right\} \min\left\{ \left(r_m - r_f \right), 0 \right\} \right]}{E\left\{ \left[\min\left(r_m - r_f \right), 0 \right]^2 \right\}} \qquad (7a)$$

is estimated from the regression of the two newly generated downside series.

---

[2] A two-factor setting is common in the literature of asset pricing for partially integrated markets. However, there are a few different approaches to deal with partially integrated pricing, see for example, Errunza and Losq (1985), Errunza *et al*. (1992), Kearney (2000) and Gérard *et al*. (2003).

2.1.2.2 Downside GCAPM

Following Estrada, the downside risk model can be extended to GCAPM. The rationale is that even if the market is globally integrated, investors might still have a preference for asymmetric risk. We thus include the downside version of the GCAPM where we term as DGCAPM, as shown below:

Cost of Equity = Risk-Free Rates + Premium for Global Downside Systematic Risk

DGCAPM: $$CE_i = R_F + \beta_i^{DG}\left(R_G - R_F\right) \tag{8}$$

where $$\beta_i^{DG} = \frac{E\left[\min\{(r_{it} - r_{Ft}),0\}\min\{(r_{Gt} - r_{Ft}),0\}\right]}{E\left\{\left[\min(r_{Gt} - r_{Ft}),0\right]^2\right\}} \tag{8a}$$

is estimated from the regression of the newly generated firm and global downside return series.

2.1.2.3 Downside Two-factor CAPM

Downside betas for the two-factor CAPM are first estimated from the followings:

Cost of Equity = Risk-Free Rates + Premium for Local Downside Systematic Risk + Premium for Global Downside Systematic Risk

$$CE_i = R_f + \beta_{Li}^{D}\left(R_M - R_f\right) + \beta_{Gi}^{D}\left(R_G - R_F\right) \tag{9}$$

$$\beta_{Li}^{D} = \frac{E\left[\min\{(r_{it} - r_{ft}),0\}\min\{(r_{Mt} - r_{ft}),0\}\right]}{E\left\{\left[\min(r_{Mt} - r_{ft}),0\right]^2\right\}} \tag{9a}$$

$$\beta_{Gi}^{D} = \frac{E\left[\min\{(r_{it} - r_{Ft}),0\}\min\{(r_{Gt} - r_{Ft}),0\}\right]}{E\left\{\left[\min(r_{Gt} - r_{Ft}),0\right]^2\right\}} \tag{9b}$$

where β_{Li}^{D} is the downside local beta and β_{Gi}^{D} the downside global beta (with respect to the U.S. market).

2.2 Data Description

Weekly data are used in the estimation of all the risk measures. The sample period for this study covers 5 January 2000 until 26 December 2007. The risk measures are estimated for every year of the sample period based on the weekly observations of the relevant year. All the data are collected from DataStream, which include the weekly prices of stocks listed on the Main Board of Bursa Malaysia, bond prices, as well as the market indices of the U.S. Weekly frequency is preferable because daily series has more noise that may affect the quality of the cost of equity estimates.[3] The annual averages of the monthly 3-month Treasury bill rates of Malaysia and U.S. are used for the local and global risk-free rate, respectively.

The calculation of costs of equity involves the local and global market risk premiums. Following Damodaran (2003), the sovereign bond premium approach is used to solve the problem associated with the estimation of market risk premium for emerging markets. Accordingly, the

[3] For the weekly series, Wednesday closing prices are collected to avoid Monday and Friday effects.

Malaysian equity risk premium is computed as the sum of the premium of a developed market (i.e., the U.S. for this study) and Malaysian country risk premium, which is available from Damodaran's website on annual basis from year 2000 to 2007. Similarly, the data on global market risk premium are extracted from this website. Given that only annual risk premiums are available, the costs of equity are calculated on annual basis in this study.

We include firms from eight sectors of the Main Board in Bursa Malaysia. After filtering out new firms which were listed after 2000 because they do not have a complete series of data for the full sample period, we have a total of 557 firms available for analysis. They are from Construction (62 firms), Consumer Products (38 firms), Industrial (196 firms), Finance (33 firms), Plantations (29 firms), Properties (70 firms), Trade & Services (117 firms) and Technology (12 firms). We exclude three sectors, i.e. Hotel, Infrastructure Company, and Tin & Mining as the number of firms listed under these sectors are limited.

3.0 Results and Discussion

Table 1 shows the annual returns of Malaysian firms by sector, both local and global risk-free rates and market risk premiums (extracted from Damodaran's website) for local as well as global market. Overall, there are large fluctuations in the firm annual returns. Negative returns were recorded in 2000 but in 2001, huge improvement can be seen for all firms, with the Consumer Products, Technology and Plantations sector recorded positive returns. The annual returns deteriorated in the following year but improved in 2003. Nevertheless, all sectors show positive annual returns in 2007, a major improvement from year 2000. Declines have also been observed in local and global risk-free rates from 2000 till 2007. Similar trend is also observed for local and global market risk premium.

Estimated risk measures from equations (2a), (5a), (6a), (7a), (8a), (9a) and (9b) are presented in Table 2. In line with Estrada's (2000, 2001) findings, the estimated downside betas are greater than the standard betas for both one-factor and two-factor models. Estimated betas for ALCAPM is much higher than GCAPM, suggesting firm's stock returns are more responsive to the variations in the local market than to the world market movements. The estimated betas for six out of eight sectors have average figures of greater than one. This means the six sectors are riskier than the market. On the contrary, the estimated betas for GCAPM have figures of less than 0.5, signalling a weak relationship between firm's stock returns with global market returns. The gap between estimated betas figures for ALCAPM and GCAPM is far less apparent for their respective downside version. The estimated downside betas have consistently been above one for both models. When jointly estimating beta for local and global factor in the two-factor model, local betas end up with average values greater than global betas. This is also true for its downside version. This finding is consistent with the observation from the one-factor models.

Table 1 Annual Firm Returns by Sector, Risk-Free Rates and the Market Risk Premiums (in percent)

Year	2000	2001	2002	2003	2004	2005	2006	2007	Grand Mean
Firm Returns									
Construction	-27.6077	-2.4755	-20.5857	12.9593	-4.0776	-13.7247	10.4953	7.7504	-4.6583
Consumer Products	-35.5875	3.2078	-24.6256	22.5704	-26.7119	-40.5281	28.5494	45.3471	-3.4723
Industrial	-34.0162	-6.8943	-26.1047	29.5261	-16.4574	-39.4725	17.0534	10.9223	-8.1804
Finance	-38.7156	-2.7675	-17.4704	24.9698	-0.2153	-17.3592	27.9166	26.1049	0.3079
Trade & Service	-37.5208	-4.6373	-24.9129	25.1527	-6.1428	-28.4703	19.9242	20.9808	-4.4533
Technology	-49.2437	2.5080	-9.2931	24.0554	-27.5915	-50.6211	-6.1992	0.8515	-14.4417
Properties	-54.4454	-5.5424	-25.9710	29.0155	-11.9179	-42.3865	25.7583	48.3692	-4.6400
Plantations	-35.1332	6.9375	4.8589	24.3851	6.9034	-13.2623	27.6705	51.3896	9.2187
Market Return	-16.8956	-3.7858	-3.5184	21.3729	15.4865	-0.8617	19.1261	27.9955	7.3649
Risk Free Rates									
Local	7.3285	6.3206	6.6454	5.4360	5.6971	5.6402	6.0679	5.9102	6.1307
Global	6.0285	5.0206	4.6204	4.0110	4.2721	4.2902	4.7929	4.6352	4.7089
Market Risk Premiums									
Local	6.8100	6.8100	6.5350	6.2450	6.2650	6.1500	6.1850	6.0650	6.3831
Global	5.5100	5.5100	4.5100	4.8200	4.8400	4.8000	4.9100	4.7900	4.9613

To compare the explanatory power of the various risk measures, a panel regression analysis is performed where actual returns for all firms are regressed against the different risk measures. The annual risk measures as well as the annual actual returns of all the 557 firms are stacked by year and by firm. The panel regression controls for firm specific effects as well as period effects. Table 3 report the AIC, SC, R^2, adjusted R^2, and Log Likelihood figures for the different risk measures according to sectors. The risk measure with the lowest AIC and SC while having the highest R^2, adjusted R^2, and Log Likelihood value will be considered as the best among six risk measures. The results are displayed in Table 3.

Overall, the results are consistent across five criteria. As the table shows, downside betas from the two-factor model have the lowest AIC and SC values while receiving the highest R^2, adjusted R^2 and Log Likelihood values. Therefore, the two-factor downside betas emerge as the risk measure with highest explanatory power on actual stock returns. Beta from the one-factor model is ranked second. The two-factor betas are ranked third while global beta is ranked fourth. The other two downside version of the one-factor model is ranked fifth and sixth, respectively. This shows that model which considers both local and global risk factors has higher explanatory power than model that considers only either one risk factor.

The averages of firm's annual cost of equity are calculated from different models and the result is presented in Table 4. As expected, global beta recorded the lowest average cost of equity with values ranges from 7.14% (Construction) to 8.33% (Technology). CAPM in a global setting should results in lower estimate of cost of equity as it postulates that the world market portfolio is the only priced risk factor to be considered in the estimation. The world equity market portfolio is considered the optimum market portfolio where the risk is at its lowest possible value without compromising return. Therefore, the calculated cost of equity should end up lower to justify for lower risk. Given that the two-factor downside betas have the highest explanatory power in explaining actual stock returns based on the five criteria, the cost of equity for Malaysian firms is estimated to have an average value of 11.42%. The ALCAPM gives an average cost of equity value of 10.34%. If investors have used the ALCAPM, they would have underestimated the cost of equity by an average of 108 basis points.

Table 2 Averages of the Estimated Risk Measures

Statistics	Construction	Consumer Products	Industrial	Finance	Trade & Service	Technology	Properties	Plantations	Grand Mean
Single Factor Model									
β_i^G	0.1986	0.3896	0.2942	0.3687	0.3223	0.4369	0.4060	0.2184	0.3293
β_i	0.8906	1.1251	1.0793	1.2051	1.1690	1.0973	1.3827	0.8810	1.1037
β_i^{DG}	1.1791	1.5349	1.4445	1.1433	1.4094	1.4255	1.5442	1.0758	1.3446
β_i^D	1.5032	1.9063	1.8513	1.5087	1.8107	1.7246	1.9891	1.4265	1.7151
Two-Factor Model									
2F-CAPM									
β_{Li}	0.8983	1.1039	1.0789	1.1990	1.1683	1.0516	1.3806	0.8897	1.0963
β_{Gi}	-0.0292	0.0803	0.0016	0.0229	0.0026	0.1733	0.0078	-0.0333	0.0283
2F-DCAPM									
β_{Li}^D	1.1423	1.4636	1.4404	1.2766	1.4336	1.3370	1.6547	1.1892	1.3672
β_{Gi}^D	0.6168	0.8340	0.7414	0.5071	0.6754	0.8361	0.7444	0.4514	0.6758

Table 3 The Explanatory Power of Risk Measures on Actual Returns Using Panel Regression

Model	R2	AdjR2	LogL	AIC	SC
Panel A: Values					
2-factor Downside Betas	0.3680	0.2763	-22458.09	10.3340	11.1472
Beta	0.3630	0.2706	-22475.97	10.3416	11.1533
2-factor Betas	0.3627	0.2701	-22476.91	10.3424	11.1556
Global Beta	0.3599	0.2672	-22486.47	10.3463	11.1580
Downside Beta	0.3583	0.2653	-22492.14	10.3488	11.1606
Global Downside Beta	0.3582	0.2652	-22492.47	10.3490	11.1607
Panel B: Ranking					
2-factor Downside Betas	1	1	1	1	1
Beta	2	2	2	2	2
2-factor Betas	3	3	3	3	3
Global Beta	4	4	4	4	4
Downside Beta	5	5	5	5	5
Global Downside Beta	6	6	6	6	6

Note: The panel regression has controlled for firm effect and time effects (2-way fixed effects).

Table 4 Averages of Firm Annual Cost of Equity from Different Models (List down by Smallest Values of Grand Mean)

Statistics	Construction	Consumer Products	Industrial	Finance	Trade & Service	Technology	Properties	Plantations	Grand Mean
GCAPM	7.1355	8.0731	7.6091	7.9736	7.7471	8.3292	8.1643	7.2432	7.7844
2F-CAPM	7.2475	8.1106	7.7043	8.9345	8.0002	8.7658	8.3183	7.3786	8.0575
CAPM	7.3908	7.7158	7.6948	8.7874	7.9836	7.9579	8.2591	7.5161	7.9132
DCAPM	7.7727	8.1630	8.1744	9.1505	8.4396	8.3382	8.7247	7.8943	8.3322
2F-DCAPM	10.5870	11.9923	11.5624	11.4349	11.4968	12.1635	12.1543	10.0007	11.4240
DGCAPM	11.9942	13.7410	13.3099	11.7583	13.1278	13.2710	13.7882	11.4841	12.8093

4.0 Conclusion

The CAPM developed by Sharpe (1964), Lintner (1965) and Mossin (1966) is widely used and accepted by practitioners worldwide. Unfortunately, empirical evidence on the ability of beta in explaining stock returns has been weak, particularly where emerging markets are concerned. Estrada's (2000, 2001) proposes the use of downside risks as alternative risk measures to market beta. CAPM-like models based on downside risks have also been proposed in earlier studies, for example, Hogan and Warren (1974), Bawa and Lindenberg (1977) and Harlow and Rao (1989). In more recent studies, Estrada (2002, 2007) shows evidence which suggest downside risk measures as a better risk measure over their standard counterparts. Therefore, the aim of this study is to find the most relevant model for calculating the Malaysian firm's cost of equity, in particular, to make comparison between systematic and downside risk measures. Apart from adopting some of the models reviewed in Pereiro (2001), this study also proposes a two-factor CAPM model and their downside version that capture both local and global risk factor which might be more suitable for partially integrated markets such as that of Malaysia.

Overall, our results are consistent with Estrada's findings which support downside risk measures over standard risk measures. Results base on AIC, SC, R^2, adjusted R^2 and Log Likelihood criteria show that the two-factor downside betas have the highest rank in terms of explanatory power on actual stock returns. In addition, the results also show that models which consider both local and global risk factors have higher explanatory power than models that consider only either one risk factor. Given that the two-factor downside betas have the highest explanatory power in explaining actual stock returns based on the five criteria, the cost of equity for Malaysian firms is estimated to have an average value of 11.42%. The ALCAPM gives an average cost of equity value of 10.34%. If Malaysian investors have used the ALCAPM, they would have underestimated the cost of equity by an average of 108 basis points.

Acknowledgement

The first author is a PhD candidate at the University of Malaya. She is grateful for the sponsorship under the University of Science Malaysia Fellowship Scheme. This research is supported by the University of Malaya PPP Research Grant (PS005/2009A). The usual disclaimer regarding errors and omissions applies.

References

Barnes, M.L. and Lopez, J.A. (2006) Alternative Measures of the Federal Reserve Banks' Cost of Equity Capital, *Journal of Banking and Finance*, 30, 1687-1711.

Bawa, V. and Lindenberg, E. (1977) Capital Market Equilibrium in a Mean-Lower Partial Moment Framework, *Journal of Financial Economics*, 5, 189-200.

Bruner, R.F., Eades, K.M., Harris, R.S. and Higgins, R.C. (1998) Best Practices in Estimating the Cost of Capital: Survey and Synthesis, *Financial Practice and Education*, 13-28.

Erb, C.B., Harvey, C.R. and Viskanta, T.E. (1995) Country Risk and Global Equity Selection, *Journal of Portfolio Management*, 74-83.

Errunza, V. and Losq, E. (1985) International Asset Pricing Under Mild Segmentation: Theory and Tests, *Journal of Finance*, 40, 105-124.

Errunza, V.R., Losq, E. and Padmanabhan, P. (1992) Tests of Integration, Mild Segmentation and Segmentation Hypotheses, *Journal of Banking and Finance*, 16, 949-972.

Estrada, J. (2000) The Cost of Equity in Emerging Markets: A Downside Risk Approach, *Emerging Markets Quarterly*, 19-30.

Estrada, J. (2001) The Cost of Equity in Emerging Markets: A Downside Risk Approach (II), *Emerging Markets Quarterly*, 63-72.

Estrada, J. (2002) Systematic Risk in Emerging Markets: The D-CAPM, *Emerging Markets Review*, 3, 365-379.

Estrada, J. (2007) Mean-Semivariance Behavior: Downside Risk and Capital Asset Pricing, *International Review of Economics and Finance*, 16, 169-185.

Gérard, B., Thanyalakpark, K. and Batten, J.A. (2003) Are the East Asian Market Integrated? Evidence from the ICAPM, *Journal of Economics and Business*, 55, 585-607.

Godfrey, S. and Espinosa, R. (1996) A Practical Approach to Calculating Costs of Equity for Investments in Emerging Markets, *Journal of Applied Corporate Finance*, 80-89.

Griffin, J.M. and Karolyi, A. (1998) Another Look at the Role of the Industrial Structure of Markets for International Diversification Strategies, *Journal of Financial Economics*, 50, 351-373.

Harlow, W.V. and Rao, R.K.S. (1989) Asset Pricing in a Generalized Mean-Lower Partial Moment Framework: Theory and Evidence, *Journal of Financial and Quantitative Analysis*, 24(3), 285-312.

Herston, S.l. and Rouwenhorst, K.G. (1994) Does Industrial Structure Explain the Benefits of International Diversification?, *Journal of Financial Economics*, 36, 3-27.

Hogan, W.W. and Warren, J.M. (1974) Toward the Development of an Equilibrium Capital-Market Model based on Semivariance, *Journal of Financial and Quantitative Analysis*, 9(1), 1-11.

Kearney, C. (2000) The Determination and International Transmission of Stock Market Volatility, *Global Finance Journal*, 11, 31-52.

Lintner, J. (1965) The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets, *Review of Economics and Statistics*, 47, 13-37.

McLaney, E., Pointon, J., Thomas, M. and Tucker, J. (2004) Practitioners' Perspectives on the UK Cost of Capital, *The European Journal of Finance*, 10, 123-138.

Mossin, J. (1966) Equilibrium in a Capital Asset Market, *Econometrica*, 34(4), 768-783.

Pereiro, L.E. (2001) The Valuation of Closely-held Companies in Latin America, *Emerging Markets Review*, 2, 330-370.

Pereiro, L.E. (2006) The Practice of Investment Valuation in Emerging Markets: Evidence from Argentina, *Journal of Multinational Financial Management*, 16, 160-183.

Roy, A.D. (1952) Safety First and the Holding of Assets, *Econometrica*, 20(3), 431-449.

Sharpe, W.F. (1964) Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk, *Journal of Finance*, 19, 425-442.