The Indonesian Capital Market Review

Volume 9
Number 1 *January*

Article 4

1-30-2017

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Indonesian Capital Market Review 9 (2017) 39-52

INDONESIAN
CAPITAL MARKET REVIEW

The Dual-Beta Model: Evidence from the Malaysian Stock Market

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(Received: October 2016/ Revised: June 2017 / Accepted: July 2017 / Available Online: August 2017)

The study analyzes the beta-return characteristic, considering the asymmetric beta behavior in the up market versus the down market for the Bursa Malaysia (BM). This study uses a sample period from 2001–2015 with two dual-beta models, the capital asset pricing model (CAPM), and the Fama-French, three-factor (FF3F) model, to examine 60 stocks listed on the bourse. The estimated return and beta indicate that most stocks have experienced an increasing (decreasing) beta in the downtrend (uptrend) period. It is inferred that investors are rewarded with a positive risk premium for holding an asset in the down market, while the upside beta carries a negative premium. If news asymmetry captures a significant part of investors' risk perception in the market, there is evidence that a conditional FF3F model is more useful than a conditional CAPM, which is likened to both the dual-beta FF3F and the CAPM in an unconditional context.

Keywords: *Beta Instability; Dual-beta; Risk Premium; Bursa Malaysia; News Asymmetry; EGARCH*

JEL classification: G12; G15

Introduction

The asset pricing framework is known as an indispensable analysis tool for investors to assign rewards for risk bearing with respect to individual security to ensure a return on investment. Sharpe (1964) designed the single-index model to simplify the model of Markowitz (1952) and further to put an application into practice (Mandal, 2013). Subsequently, the capital asset pricing model (CAPM) is presented by Sharpe (1964), Lintner (1965), and Mossin (1966) as the cornerstone of the asset pricing framework for answering the risk-return relationship.

According to Perold (2004), the CAPM gives us the helpful insight of determinants for asset prices and capital budgeting. In short, the expected return is solely a function of its systematic risk (beta). Theoretically, a high beta investment outperforms a low beta investment in the case of positive market returns. Most practitioners rely on the CAPM beta as a systematic risk measurement to make asset allocation decisions (Graham & Harvey, 2001). However, there are many critiques invalidating its statistical significance because CAPM does not hold perfectly as market conditions change (Fama and French, 1993). Numerous authors argue that the CAPM is dead, but they continue applying it as regulatory practice always needs it (Fernandez, 2015).

On the other hand, the CAPM has the weakness when used with multiple-portfolio-based

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factors, which has further led to the formation of a dual-beta model that consists of a rising and declining beta in response to stock returns. Furthermore, several studies provide evidence that firm characterizations such as the small-firm effect (Chaibi, Alioui, & Xiao, 2014; Rutledge, Zhang, & Karim, 2008), the January effect (Ahsan & Sarkar, 2013; Haug & Hirschey, 2006), the price-earnings ratio and dividend yield (Aras & Yilmaz, 2008), and leverage (Chelley-Steeley & Steeley, 2005; Figlewski & Wang, 2000) are found to have the power to explain the anomalies in asset returns.

Motivated by this evidence that beta is actually flat and is not sufficient to capture the average return, Fama and French (1993) designed the Fama-French three-factor (FF3F) model by introducing two well-known factors (size and price ratio, such as book-to-market) for the average return left undescribed by the CAPM. The findings of Drew, Naughton, and Veeraraghavan (2003) and Shum and Tang (2005) on the Asian emerging markets suggest some support of the FF3F model, as this model is able to explain, to a large extent, the cross-sectional variation. In a recent study, Fama and French (2015) have improved on their earlier work by considering the profitability and investment factors for describing efficiently the pattern in average return.

According to Hofschire, Emsbo-Mattingly, Gold, and Blackwell (2013), loss aversion is increasingly being considered by the financial planners who are interested in capital preservation and loss avoidance, thereby encouraging them to seek superior measures of risk to beta. Recent studies highlight that the downside risk measures are better than the conventional single beta for evaluating the portfolio risk; this includes the findings of Markowitz (1952), which proposes semi-variance as an alternate estimate.

If beta responds differently to the market conditions, investment companies consistently publish isolated alphas and betas in bull and bear market phases to avoid erroneous results from the single beta estimated. Pettengill, Sundaram, and Mathur (1995) follow the conditional test procedure and ascertain there is a positive risk-return relation in up markets, but this relation becomes an inverse relation in down markets.

A similar result is presented in Fletcher's (2000) study on international stocks. As observed by Hodoshima, Garza-Gómez, and Kunimura (2000), the dual-beta model provides an advantage by allowing the intercept to differ depending on the excess market return. The article by Chong, Pfeiffer, and Phillips (2011) advocates using a dual-beta model for more efficient stock selection, as more reasonable performance is presented by the dual-beta model with its capabilities for downside protection and upside participation.

As an emerging market, the Malaysia bourse or Bursa Malaysia has many high-potential firms; for example, the world's largest glove producer Top Glove and Asia's most popular low-cost airline Air Asia are listed on the Bursa Malaysia. In addition, the Malaysian capital market has grown significantly in terms of market size, a range of financial products, and level of market efficiency. Comparably, in Asia, the Bursa Malaysia is ranked eleventh when looking at the total market capitalization of $0.4 trillion at the end of 2015. Even with the existing volatility, and bull and bear market swings within it, Bursa Malaysia has been remarkably resilient and has survived a series of market scares, such as domestic political shocks, Eurozone sovereign debt crises, a collapse in the oil price, and various Chinese shocks.

The main focus of this study is to investigate empirically how well the dual-beta CAPM and dual-beta FF3F model can contribute to the description of the risk-return relation in Malaysia. This study extends the standard CAPM and FF3F model by allowing the total systematic risk to be segmented into variations, because of up and down markets, in line with Javid and Ahmad's (2011) dual-beta framework to examine whether the stock return responds differently to bullish and bearish markets.

This study allows for news asymmetry by incorporating conditional information. The dual-beta CAPM has not been applied to the Bursa Malaysia. This study adds to existing research primarily by analyzing the static and dynamic dual-beta CAPM and FF3F model using daily

https://scholarhub.ui.ac.id/icmr/vol9/iss1/4
DOI: 10.21002/icmr.v9i1.6367

and monthly data. Second, for more details, an analysis for different time intervals is done because different sentiments are presented by the market in different periods.

The remainder of the study is organized as follows. Section two briefly elaborates on the previous findings related to the area of asset pricing. Section three introduces the datasets and empirical modeling used. The result and discussion are provided in the next section, and the last section provides the concluding remarks and directions for further research.

Literature Reviews

In this section, we first review previous studies pertaining to the risk factor (beta) pricing theory, which provides guidance for investment decisions. The CAPM is the dominant framework of modern financial economics. In spite of its popularity and wide use as a good estimator of expected returns on risky assets when markets are in equilibrium, the CAPM is subject to much criticism from Berk (1995) and Fama and French (1996) who are skeptical of the CAPM because the CAPM is notorious for its inadequate explanation of the size and book-to-market ratio effects on stock returns. Their results are further reinforced by Fama and French (2004) and Theriou, Maditinos, Chadzoglou, and Anggelidis (2005). In addition, there is considerable proof that advocates beta and the CAPM, such as the findings of Lean and Parsva (2012) and Lee, Cheng, and Chong (2016) in Malaysian capital market.

The standard CAPM provides a poor empirical response because of plenty of apparently undefined patterns in asset returns, which have led to the construction of a factor portfolio of stock-sorting attributes in a multifactor model. The existence of these puzzling anomalies, including the size, book-to-market ratio, momentum, leverage, and January effect, has been inferred predominantly due to the absence of any widely sufficient explanation and the persistence of these features. In this regard, the most persuasive finding is the FF3F model of Fama and French (1993), which incorporates two variables for small minus big (SMB) and high minus low (HML) besides the market return.

There is practically no connection with cross-sectional beta average returns. Betas for the two latter factors are able to explain the change in mean returns of the attribute-sorted portfolio. Most of the anomalies based on the CAPM average returns are allied and can be explained by the FF3F model. However, there is an argument from Chang, Johnson, and Schill (2006) that the SMB and HML coefficients become insignificant when the higher-order systematic co-moments are added into the cross-sectional equation. Another significant discovery is from Ferson and Harvey (1999), who proclaim that many multi factor model specifications fail due to their neglecting the condition information and conclude that cross-sectional variation in portfolio returns can be captured by the established, pre-arranged conditional variables.

Asset pricing behavior in bull and bear markets has received some attention in recent years. Fabozzi and Francis (1977) are the forerunners for investigating time variation in systematic risk across different market states. The years following the publishing of the Fabozzi and Francis (1977) proposal are characterized by a rapid growth in the number of studies that advocate the use of beta and the CAPM using a dual-beta method. Most of the earlier studies were normally conducted in the US (for example, Howton & Peterson, 1998; Maheu & McCurdy, 2000; Pettengill et al., 2002) and the UK (Fletcher, 1997). Later studies discuss this theme, but focus on Asian markets; for example, Shum and Tang (2004), Woodward and Anderson (2009), and, later, Khalid, Sultana, and Zaidi (2013). Fabozzi and Francis (1977) investigate the stability of betas, separating the bull and bear markets, but they find no corroborating evidence for beta instability. The dual-beta framework of Kim and Zumwalt (1979), through the analysis of risk premiums related to the variation of returns in up and down markets, provides evidence that a risk premium seems to be received by an investor for downside risk and a premium is paid for upside variation of returns.

In contrast, Chen (1982) argues that the Kim-Zumwalt model has the inherent problems of multicollinearity and heteroscedasticity, and proposes a new rectification method of a Bayesian, time-varying, beta coefficient model as developed by Chen and Lee (1982) to eliminate the weaknesses of the Kim-Zumwalt model. The findings of the size-based portfolio by Wiggins (1992) and Bhardwaj and Brooks (1993) using the dual-beta model, provide supportive evidence that the beta responds indifferently to the changing market conditions. Pettengill et al. (1995) and Howton and Peterson (1998) also find that the beta and return should have direct a relation when the excess market return is positive, using US data. Isakov (1999) extended the design of Pettengill et al. (1995) to examine the Swiss stock market for the period from 1983 to 1991 and rejected the fact that beta is dead because there is a statistically significant relationship between beta and realized return with expected positive and negative signs in the up and down markets, respectively.

However, the firm-specific risk does not contribute to explaining the realized returns. Furthermore, the leverage effect, which refers to the effects of good and bad news, also became the main subject of investigations by Braun, Nelson, and Sunier (1996) and Cho and Engle (1999). The study of Braun et al. (1996) permit market volatility, portfolio-specific volatility, and beta to act asymmetrically in responding to rising and falling markets and portfolio returns, but they do not uncover this link. Inversely, Cho and Engle (1999) claim that betas are influenced asymmetrically by the news.

Market volatility regimes have recently attracted support and concern among researchers for explaining the market movement. The efficiency of a conditional three-beta model in the low, flat, and high volatility regimes is the main purpose of Galagedera and Faff's (2005) research. They find that the beta risk premium is positively priced, but they are not significantly different in the three regimes. Cognizant of this fact, Huang (2000) uses the Markov regime switching model to examine the instability of beta and supports the proof of the stability of the CAPM in a low-risk state, but shows the reverse result in a high-risk state.

In a similar vein, the outcomes of Abdymomunov and Morley (2011) from observing time variation in betas for the book-to-market ratio and momentum show that the ability of a time-varying beta to help to capture portfolio return is much higher than for the unconditional CAPM, especially in the case of high market volatility. Whereas McQueen and Thorley (1993) and Hamilton and Lin (1996) support the existence of conditional volatility in stock returns, which is counter-cyclical, and this pattern is performed better in the contractionary period compared to the expansionary period of the business activities.

In a more recent study, Javid and Ahmad (2011) utilized the dual-beta CAPM and dual-beta FF3F model on 50 stocks traded on the Karachi Stock Exchange over the period from 1993–2007. Their test result supports the evidence that betas increase (decrease) in the rising (falling) market. They also suggest that the conditional FF3F model results in a better model specification than the conditional CAPM when news asymmetry is captured for comparing the unconditional FF3F model and unconditional dual-beta CAPM.

Furthermore, this finding is strengthened by Khalid et al. (2013) in their study on the relation between average abnormal returns and systematic risk across the up and down markets using 15 listed companies on the Karachi Stock Exchange, which reveals that 9 out of 15 stocks has statistically significant differences between up-market and down-market betas. Paramita (2015) applies the Treynor-Mazuy conditional model in bull and bear markets and examines the variation in portfolio returns in a sample of 30 mutual funds that were actively traded between January 2008 and December 2012 on the Indonesian stock market. They document evidence that the market-risk factors, Sertifikat Bank Indonesia (SBI) interest rate, money supply, exchange rate, and market timing have significant power to explain the variation in portfolio returns.

Research Methods

The data sample covers the period from January 2001 to December 2015. The 15-year period is split into two sub-periods, which corresponds approximately to the changes in the external environment for the period prior to the Asian financial crisis (2001–2008) and the post-crisis period (2009–2015).

As initially planned, the data for the constituent companies of the Financial Times Stock Exchange (FTSE) Kuala Lumpur Composite Index (KLCI) Top 100 is collected. When the Top-100-Index listed companies were last updated on December 3, 2015, they were ranked by total market capitalization, free-float market capitalization, and turnovers. However, only 60 companies are chosen as the others do not meet the criteria suggested by the prior work of Javid and Ahmad (2011) for selecting the firms; that is, 1) firms that are continuously listed on the exchange during the whole period of study, 2) data that covers almost all the important sectors, and 3) firms that are characterized by high average turnover.

The data to be used comprises daily and monthly closing stock prices that are adjusted for stock splits, stock dividends, and rights issues. All the required accounting information for calculating book values and prices, dividends, capitalization changes, and market capitalization information is extracted from the annual reports for the selected firms. The three-month Treasury bill, used as the risk-free rate, and the KLCI, used as the rate of the market portfolio for Malaysia, are sourced from Thomson Reuters DataStream. Operationalizing this data, the daily and monthly stock returns for the selected firms are computed. Finally, an examination is conducted of the CAPM and FF3F model, which has been proven satisfactorily and are on individual stocks. The CAPM is tested on both a daily and monthly frequency, while the FF3F model was only on a monthly basis.

Empirical Modeling

The methodology used to ascertain the risk-return relationship under different market status, the CAPM (based on the beta) and Fama-French model (based on combined information on the beta, size, and value), as described in this section. A two-pass regression, a modified version of Fama and MacBeth's (1973) model, is used to estimate the CAPM and FF3F model. This technique is similar to the application of Brailsford, Gaunt, and O'Brien (2012), Stocker (2016), and Vo (2015). As the first stage for a time-series regression, the CAPM is written as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

where R_{it} is the excess return on asset i at time t, R_{mt} is the excess return on market portfolio over the risk-free rate; α_i is the intercept, which is the estimate of abnormal profits on asset i; β_i is the slope coefficient, which indicates the market sensitivity of asset i to market returns; and ε_{it} is the error term.

The cross-section regression model is expressed in the following form, which estimates the risk premium joined with beta risk by using the generalized least square (GLS) in the second stage:

$$\overline{R_i} = \lambda_0 + \lambda_1 \widehat{\beta_i} + \varepsilon_i \quad (2)$$

$\overline{R_i}$ is the average excess return on each asset. The coefficient λ_{rm} is the risk premium joined with the beta risk. If λ_0=0 and λ_{rm}>0, this implies that the CAPM is sufficient to explain the portfolio returns.

However, the weak empirical performance of traditional CAPMs has sparked a considerable debate. Subsequently, Fama and French (1993) have come up with an FF3F model, which augments the CAPM, with two more risk factors: the book-to-market value and firm size, which are not taken into account by the CAPM. The time-series regression FF3F model was used in the first stage as shown below:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \varepsilon_{it} \quad (3)$$

where the SMB and HML are mimicking portfolios for size and value factors, respectively; βs refers to the sensitivity of each asset joined to these variables.

The cross-section regression is estimated as follows:

$$\overline{R_i} = \lambda_0 + \lambda_1 \widehat{\beta_i} + \lambda_{\mathrm{SMB}} \widehat{\beta_{SMB}} + \lambda_{\mathrm{HML}} \widehat{\beta_{HML}} + \varepsilon_i \quad (4)$$

The λs are the cross-section regression coefficients that capture the degree of cross-sectional returns of these variables each year.

It is apparent that the financial market is characterized by cycles, such as up, down, and normal market conditions, and the beta has different values depending on these different market conditions (Fabozzi & Francis, 1977). Two betas are estimated for each stock, representing the rising and falling market conditions of which is done by adding two dummy variables, D_H and D_L, into equations (1) and (3) to explain the asymmetric beta effects on different market conditions. Dummy variable D_H takes the value of 1 if market return is greater than 0 and 0 otherwise, and D_L takes the value of 1 if market return is negative and 0 otherwise.

$$R_{it}=\alpha_i+\beta_H D_H R_{mt}+\beta_L D_L R+\varepsilon_{it} \quad (5)$$

$$R_{it} = \alpha_i+\beta_H D_H R_{mt}+\beta_L D_L R_{mt} +\beta_{SMB} SMB_t+\beta_{HML} HML_t+\varepsilon_{it} \quad (6)$$

Equations (5) and (6) represent the dual-beta CAPM and FF3F model where two betas, β_H and β_L are estimated for each stock, representing the rising and falling market status. The Wald test is applied to examine the equality of the bull and bear market betas on a pairwise basis. The cross-sectional, beta-return relation is estimated by the following equation:

$$\overline{R_i} = \lambda_0+\lambda_H\widehat{\beta_H}+\lambda_L\widehat{\beta_L}+\varepsilon_i \quad (7)$$

$$\overline{R_i} = \lambda_0+\lambda_H\widehat{\beta_H}+\lambda_L\widehat{\beta_L}+\lambda_{\text{SMB}}\widehat{\beta_{SMB}}+\lambda_{\text{HML}}\widehat{\beta_{HML}}+\varepsilon_i \quad (8)$$

The λ_L and λ_H represent risk premium, representing the rising and falling market status. If $\lambda_L>0$, an investor expects to gain a positive premium for bearing downside risk, while an investor is willing to pay a positive premium in the up market in the case where $\lambda_H<0$. The equations (7) and (8) are the dual-beta CAPM and FF3F model in which the asymmetric effect on expected return is investigated in an unconditional form.

Nonetheless, there is a growing body of work on the asymmetric effect on time-varying beta, including the work of Cho and Engle (1999), which reveal stock market volatility increases with bad news and decreases with good news.

In this study, we utilized the exponential generalized autoregressive conditional heteroscedasticity (EGARCH) approach advocated by Nelson (1991) to investigate the asymmetric effect on the conditional context, in which the parameters are not restricted to being non-negative.

To examine the asymmetric effect of rising and falling market status on the average and volatility of returns in the dual-beta CAPM-with-EGARCH(1,1) model and dual-beta FF3F-with-EGARCH(1,1) model, the extended equations (5) and (6), and new equation (9) are estimated to be as follows:

$$R_{it}=\alpha_i+\beta_H D_H R_{mt}+\beta_L D_L R+\varepsilon_{it} \quad (5)$$

$$R_{it} = \alpha_i+\beta_H D_H R_{mt}+\beta_L D_L R_{mt} +\beta_{SMB} SMB_t+\beta_{HML} HML_t+\varepsilon_{it} \quad (6)$$

$$\log(h_t) = \varphi_0+\log h_{t\text{-}1}+\left|\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}\right|+\varphi_1\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} +\theta_{Ht\text{-}1}D_{Ht\text{-}1}r^2_{mt\text{-}1}+\theta_{Lt\text{-}1}D_{Lt\text{-}1}r^2_{mt\text{-}1} \quad (9)$$

The news effect is asymmetric if $\varphi_1\neq 0$ for at least one i in equation (9). Moreover, if $\varphi_1< 0$, it shows the presence of an asymmetric effect.

Result and Discussion

Daily and monthly data, consisting of 60 individual stocks listed on the main board of the Bursa Malaysia, is employed to probe the predictability of unconditional and conditional dual-beta CAPMs, spanning the period from January 2001 to December 2015. The examination has been extended to unconditional and conditional dual-beta FF3F models utilizing monthly data. These examinations are conducted in the "excess return" mode by subtracting the risk-free rate from both the return on picked stock and market returns. The whole sample period (2001–2015) and two sub-periods (2001–2008 and 2009–2015) are attested in this study.

This study implements the Fama-MacBeth approach, which involves two steps to measure

Table 1. Average Risk Premium for the Unconditional CAPM for an Up/Down Market

CAPM	Daily Data				Monthly Data			
	λ_U	λ_D	H_0: λ_U=λ_D	R^2	λ_U	λ_D	H_0: λ_U=λ_D	R^2
2001–2008	0.0001	-0.0002	0.6892	0.0322	-0.0011	-0.0003	0.0310	0.0060
	(-0.4246)	(-1.1154)			(-0.4801)	(-0.1268)		
2009–2015	-0.0009***	0.0009***	25.1092***	0.3086	-0.0021	0.0076***	7.0943***	0.1251
	(-4.7138)	(4.3624)			(-1.1003)	(2.8097)		
2001–2015	-0.0004**	0.0001	2.3824	0.1494	-0.0045***	0.0042**	7.4779***	0.1283
	(-2.2844)	(0.7491)			(-2.8049)	(2.0472)		

Note: The t-values are reported in the parentheses. *** shows it is significant at 1%, ** is significant at 5%, and * is significant at 10%.

stock sensitivities (beta) and risk premiums in the respective model (Fama & MacBeth, 1973). First, the stocks' beta in up and down market regimes are calculated using daily and monthly data in the excess-return model above the risk-free rate, for the period spanning January 2001 to December 2015. Second, the up and down beta estimates from the first step are used to evaluate the risk premium. The finding of the first step implies that the up- and down-market betas are significantly different, as presented by the Wald test for 25 stocks on daily data and 9 stocks on monthly data. Using daily data for 42 stocks, the smaller beta coefficients are acquired during bullish periods, whereas the reverse holds for the remaining stocks. The full finding of the first step is available upon request.

Furthermore, 32 stocks are estimated to have a lower beta for the up market than for the down market, and the remaining 28 stocks show the opposite pattern, based on monthly data. Even using the Fama and French variables, the same results are found. These findings support the conventional wisdom that a stock has the greater beta in the down market than in the up market. However, the assumption of the pairwise equality of bull-and bear-market betas has been proven false for a little stock only. This study also confirms the positive beta-return linkages, indicating that greater beta stocks are linked to higher returns no matter what the market condition is.

The findings for the dual-beta CAPM are exhibited in Table 1, based on the daily and monthly data. The findings imply that, except for the sub-period 2001–2008, the risk premiums achieve the expected sign in the sub-period 2009–2015 and the whole period of 2001–2015, negative for the up market and positive for the down market, with most estimates being "significantly" different from zero. These practical results strengthen and confirm the theoretical argument that the risk premium with respect to a bull market is negative and for a bear market it is positive. The assumption of the pairwise equality of risk premiums in up and down markets proven false for sub-period 2009–2015 using daily and monthly data, and for the overall period 2001–2015 using monthly data. These findings seem to validate previous studies, such as Javid and Ahmad's (2011) research, which indicates a positive premium will be paid for bearing downside risk, while a negative premium is related to an up-market beta.

The dual beta FF3F model is examined in unconditional form and the findings are exhibited in Table 2. When Fama and French's (1993) size and book-to-market value are added into the dual-beta cross-section regression, the premium over bull-and-bear market betas remains correctly and significantly signed for the overall sample period, and has the expected sign in all sub-periods, but some estimates are insignificantly different from zero. The premiums for the firm's size and book-to-market ratio are mixed results, with 50% being sequels, which is consistent with standard practice, as the premiums for the size and book-to-market ratio variables are significantly positive.

However, the FF3F model provides a better explanation of the risk-return characteristics in Malaysia than the CAPM as it provides a higher value for R^2 in the overall sample period and all sub-periods. This indicates that the risk factors for up- and down-market returns, firm size and book-to-market ratio are considerably rewarded in the Malaysian market. The constant terms differ significantly from zero. These findings are in accordance with the research outcome observed for the Australian market by Nguyen,

Table 2. Average Risk Premiums for the Unconditional FF3F Model for an Up/Down Market

FF3F	λ_0	λ_{smb}	λ_{hml}	λ_U	λ_D	H_0: $\lambda_U=\lambda_D$	R^2
2001–2008	0.0039	-0.0027	0.0004	-0.0013	0.0009	0.2815	0.0462
	(1.1749)	(-1.3275)	(0.1265)	(-0.5484)	(0.3066)		
2009–2015	0.0060*	0.0120***	-0.0055	-0.0041**	0.0039	5.5547**	0.3287
	(1.7480)	(4.6084)	(-1.6268)	(-2.2806)	(1.4063)		
2001–2015	0.0043*	0.0041***	-0.0087***	-0.0028*	0.0051**	5.9637**	0.2477
	(1.9816)	(3.0068)	(-3.6753)	(-1.6773)	(2.2904)		

Note: The t-values are reported in the parentheses. *** shows it is significant at 1%, ** is significant at 5%, and * is significant at 10%.

Table 3. Average Risk Premium for the Conditional CAPM for an Up/Down Market

Conditional	Daily Data				Monthly Data			
CAPM	λ_U	λ_D	H_0: $\lambda_U=\lambda_D$	R^2	λ_U	λ_D	H_0: $\lambda_U=\lambda_D$	R^2
2001–2008	0.0001	-0.0003*	1.4868	0.0701	-0.0018	0.0016	0.9807	0.0188
	(0.4843)	(-1.6722)			(-0.9441)	(0.6402)		
2009–2015	-0.0010***	0.0009***	16.8366***	0.2334	-0.0003	0.0041*	2.0625	0.0539
	(-4.0558)	(3.5534)			(-0.1658)	(1.8010)		
2001–2015	-0.0004***	0.0001	3.1798*	0.1892	-0.0026*	0.0034*	4.7781**	0.0810
	(-2.7997)	(0.7515)			(-1.9563)	(1.7145)		

Note: The t-values are reported in the parentheses. *** shows it is significant at 1%, ** is significant at 5%, and * is significant at 10%.

Faff, and Gharghori (2007), and for the Bourse Régionale des Valeurs Mobilières (BRVM) stock market by Soumaré, Aménounvé, Diop, Méité, and N'sougan (2013).

The dual-beta CAPM in conditional form is examined using EGARCH regression and the findings are exhibited in Table 3. This study manipulates the beta obtained from the dual-beta CAPM-EGARCH specification to investigate the conditional beta-return ties. The time-series CAPM-EGARCH results based on daily data indicates that all selected stocks exhibit a positive market beta, β, which means that they follow the market.

The γ_t parameter indicates the asymmetric or the leverage effect; i.e., diverse responses to positive and negative shocks. The γ_t coefficient, which is not equivalent to zero and is significant, suggests an asymmetric model. A total of 44 stocks have the significant coefficient of $\gamma_t$with daily data, but only 25 stocks have γ_t as significant for the monthly data. This substantiates our analysis that good and bad news impacts the volatility of the Malaysian equity market, and it is still asymmetric. Out of 44 significant coefficients, 36 are positive (for monthly data, out of 25 parameters, 15 are positive). This suggests that good news generates more volatility than negative news of equal magnitude. The coefficient for the rest of the stocks is negative, suggesting that, for these firms, bad news produces a stronger effect than good news. Our evidence provides additional insights into the news effect and the full finding is available upon request.

We analyze the influences of bull-and-bear market conditions on the conditional mean and variance of market return via dual beta CAPM and dual beta FF3F model with EGARCH specification. The estimated results can be interpreted as follows. We find a statistically significant difference in beta between the up- and down-market states for the number of stocks, indicating that up- and down-market states have a significant influence on the stability of betas. γ_t measures the increased impact of a positive effect on variance, which is likened to the negative effect in the variance equation.

The findings demonstrate that this coefficient is significant for 47 stocks based on the CAPM and 20 stocks based on the FF3F model. Out of 47 significant coefficients, 38 are positive, and out of 20 stocks, 13 are positive, which indicates that volatility tends to rise in more stocks when the return is positive. The coefficient for the rest of the stocks is negative, implying that negative shocks for these firms increase their volatility by more than positive shocks.

Nonetheless, the asymmetry occurrence rate, albeit significant, is not very high, as evi-

Table 4. Average Risk Premium for the Conditional FF3F Model for the Up/Down Market

Conditional FF3F	λ_0	λ_{smb}	λ_{hml}	λ_U	λ_D	H_0: λ_U=λ_D	R^2
2001–2008	0.0017	-0.0018	-0.0017	-0.0010	0.0031	1.1242	0.0479
	(0.5374)	(-0.9081)	(-0.6430)	(-0.4190)	(1.0903)		
2009–2015	0.0097***	0.0099***	-0.0042	-0.0028	-0.0003	1.0729	0.2733
	(3.3019)	(3.9763)	(-1.2873)	(-1.6214)	(-0.1515)		
2001–2015	0.0029	0.0050***	-0.0109***	-0.0013	0.0052**	5.4030**	0.2995
	(1.4493)	(3.4984)	(-4.5674)	(-0.8897)	(2.6079)		

Note: The t-values are reported in the parentheses. *** shows it is significant at 1%, ** is significant at 5%, and * is significant at 10%.

denced by the extent of the parameters. These findings confirm the theoretical argument that good news increases the stock return volatility more than bad news. The finding from the dual beta FF3F model with EGARCH specification indicates that β_{SMB} and β_{HML} exhibit mixed results. The size's and book-to-market's effects on stock returns are irreconcilable with the theoretic counterparts of β_{SMB} and β_{HML}, but for 75% of the examined firms it is positive and for the remaining 25% it registers as negative. The full finding is available upon request.

Subsequent to the estimation of the up- and down-market conditional betas for each stock, applying the dual-beta CAPM with EGARCH specification, the risk premium is estimated with these betas using cross-section regression. The findings for the risk premiums for the conditional CAPM with EGARCH(1,1) are displayed in Table 3. The findings reveal that investors receive a positive and significant compensation corresponding to the conditional downside risk, and risk premiums in the up-market beta are negative over the full sample period of 2001–2015. However, the risk premiums for conditional up- and down-market risk are mixed across all sub-periods; i.e., some risk premiums have the expected sign and they are significant, but some risk premiums are insignificant or have the wrong sign. The findings for the conditional FF3F cross-sectional regression with two betas are displayed in Table 4.

The risk premiums for the up market have the correct sign, negative, although is statistically insignificant in sub-periods 2001–2008 and 2009–2015, and the overall period of 2001–2015. For the down market, only the overall period of 2001–2015 registers a positive and significant risk premium, while for the other sub-periods these variables are insignificant or of the wrong sign. In the Malaysian equity market, for most periods, the risk premium is found to be negative for the up market, and for the down market, it is positive, which strengthens the theoretical argument. These findings are similar to those in the study by Rashid and Hamid (2015), which provides evidence of a positive risk premium for the downside beta.

When the dual-beta CAPM is extended to allow for firm-specific risk factors (firm size and its book-to-market ratio) to play a role in asset pricing, the premiums for the up- and down-market betas remain almost the same in terms of both sign and statistical significance, but the R^2 increases for all examined sub-periods and the whole sample period. The premium for firm size is significantly positive for 2009–2015 and 2001–2015, while the book-to-market value is negatively priced, but significant only in 2001–2015.

Similar to Javid and Ahmad (2011), who reveal a significantly positive reward in the Pakistani stock market for high-risk-bearing stock, and small and valuable stock, the premiums on firm size and book-to-market ratio are stronger than for the up- and down-market beta premiums, and a positive size effect is observed, but the premium on the firm's book-to-market value is negative on the Bursa Malaysia. These findings reveal that the conditional Fama-and-French estimators provide a better fit for the description of the cross-section for expected returns. These findings corroborate Fama and French's (1993; 1995; 1996; 2004; 2015) argument in their seminal papers for the US market, which explains that correlation with Fama-and-French variables is greater than the market return, and their model outperforms CAPM in capturing the cross-section of risky stocks.

Likewise, Rutledge et al. (2008) prove the existence of a statistically significant size effect in the Chinese stock markets, while Morelli (2012) further confirms the predictive power of size and book-to-market equity on Shanghai A-share security returns. The same results are produced in studies by Simlai (2009) for US stock returns. The significance of the dual-beta model has been recognized by many, including Morelli (2012), Pettengill et al. (1995), and Theriou, Anggelidis, Maditinos, and Šević (2010), and all provide support for significant, conditional, beta-return links. The results, which report a positive and negative premium concerning down- and up-market betas, respectively, are consistent with the findings of Rashid and Hamid (2015). The asset pricing model with the EGARCH model, which allows news asymmetry to be taken into account, performs better than the traditional test procedure because it provides an assessment of the conditional variance of returns as the risk estimate, thus permitting volatility to vary following good and bad news (Karmakar, 2007).

To summarize, an overall positive risk-return trade-off exists in the Malaysian equity market and this interaction is found to be stronger in the down market than the up market for most individual stocks. Conditioning the dual-beta FF3F model considerably enhances its performance compared to the dual-beta conditional CAPM. Both models, however, only capture, at most, 30% of the variations in returns for the examined Malaysian stocks, either using the full sample or for a sub-period.

Conclusions

This study focused on the beta-return characteristic by examining the asymmetric beta behavior in the up market versus the down market, via the dual-beta capital asset pricing model (CAPM) and dual-beta Fama-French three-factor (FF3F) model, for 60 stocks listed on the Bursa Malaysia over the period of 2001–2015. The sign for beta instability has been observed for both bullish and bearish periods, along with the incidence of a greater beta in a bearish market than in a bullish market for the majority of examined stocks.

The findings acknowledge the commonly held view that the majority of stocks have experienced an increasing (decreasing) beta in the downtrend (uptrend) period. This indicates a rejection of the Wald test pairwise equality between the bullish and bearish markets for a certain number of examined stocks. The results for the CAPM estimates suggested that the risk premiums corresponding to up- and down-market betas are negative and positive, respectively, in most cases. However, the explanatory power of the CAPM model is limited, as indicated by a low R^2, using either daily or monthly data.

For the FF3F model, which advocates the use of size and book-to-market proxies in unconditional and conditional settings, a more accurate prediction result for the cross-section of stock returns has been obtained, as denoted by a higher R^2. The results also revealed that investors are rewarded with a positive risk premium for holding an asset in down market, while the upside beta carries a negative premium. It is argued that the loading on the small minus big (SMB) and high minus low (HML) are potential explanatory factors for the cross-section of returns. The findings revealed that, in the Malaysian market, if news asymmetry is considered to capture a significant part of investors' risk perception, a conditional FF3F model is more useful than a conditional CAPM, which is likened to both the dual-beta FF3F model and CAPM in unconditional context.

However, this study has its limitations. First, this study encompasses only 60 out of 892 public listed companies on the Bursa Malaysia, which do not provide a complete picture of all Malaysian companies. Second, our analysis is limited to a maximum of 15 years only. Besides, none of these models capture more than two-thirds of the variations, thus leaving room for additional risk factors, including behavioral risk, in light of unexplained variations in the cross-sectional return. Further study is also suggested to test the asymmetric response of beta across industries in Malaysia.

https://scholarhub.ui.ac.id/icmr/vol9/iss1/4
DOI: 10.21002/icmr.v9i1.6367

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