International Journal of Economics, Commerce and Management
United Kingdom Vol. V, Issue 12, December 2017
http://ijecm.co.uk/ ISSN 2348 0386

LIQUID STOCKS: BETA, UPSIDE BETA & DOWNSIDE BETA

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Abstract

The motive of this research is to explore the updated model in exploring whether return of stocks in Indonesia respond differently to liquid stocks with conventional, downside or upside beta and also considering the liquidity as measured by trading volume. The paper uses monthly data of LQ45 stocks listed at the Indonesia Stock Exchange period January 2011 to December 2016. The methodology is using the two-pass regression. We follow Estrada's (2002) suggestions to estimate upside and downside beta. This research finds that only upside beta that has significant effect to the return of stocks. This paper shows that the robustness of the conventional CAPM in explaining the expected return from investors is invalid, since investor more concern about upside beta.

Keywords: Beta, Downside Beta, Return of Stock, Trading Volume, Upside Beta

INTRODUCTION

Capital market plays an important role of economic growthand an integral part of financial system. Portfolio managers has to deal in predicting stock return variations in capital market. There are empirical studies that have investigated the different risk measurement in order to explain stock returns in capital market. Sharpe (1964), Lintner (1965) and Mossin (1966) are the inventor of the capital asset pricing theory. That theory develops the correlation between the market risk, measured as beta to the return expectation. The shifting from market can be explained by this single index factor model. There're so many debates for the robustness of this

theory. So far, there is no definite measurement among researchers and practitioners to identify a proper risk measurement that better captures investors' risk perception.

The CAPM has been popular in developing and emerging markets. Harvey (1995) discovered that betais uncorrelated to expected returns fluctuations. Other researchers did not support the theory of Capital Asset Pricing Model (Fama and French (1992), Morelli (2012)and Shafana, Rimziya and jariya (2013). CAPM is invalid in determining the overall variety of expected returns.The CAPM studies attempted to test for the unconditional expected returns and beta, but unsuccessful to elucidate the effect ofreturnto beta that is consider the downside and upside systematic risk. The previous researchershave proposed CAPM models based on downside risks (Hogan and Warren (1974), Bawa and Lindenberg (1977), Harlow and Rao (1989), Estrada (2000, 2002, 2004), Fraser et al. (2004), Post and Vilet (2004), Ang et al. (2006), Lee, Robinson and Reed (2008), Teplova and Shutova (2011) and Rashid and Hamid (2015).

Besides the condition of the market shifting, investors also consider the speed and the ease of an asset to be sold in capital market. In this part, liquidity refers to how easy or how fast an asset or in this research refers to stocks, is able to be sold among investors in capital market. The stock which the liquid one is a stock that has the high level of selling and buying frequencies, due to the fact that there is a large volume and frequency of shares traded for every single day in capital market. Investors assumed risk avoider and prefer to invest only in liquid stocks. This refers to robust effect of trading volume to return of stock. D'Souza, Ga and Yang (2003) and Christodoulopoulos and Grigoratou (2005) used the volume of trading as the measurement for liquidity.

Substantial researchers examined the relationship of volume and return expectation in different perspectives and methods. Some studies have found a positive effect between trading volume and stock returns (Gervais, Kaniel and Mingelgrin, 2001 and Darwish, 2012). The different results found by Chordia, Subrahmanyam and Anshuman (2001) and Pathirawasam (2011) where they found a negative effect between trading volume and stock returns. Subsequent research conducted by Nowbutsing and Naregadu (2009), where they found the trading volume has no significant effect to stock returns in Mauritius.

This paper investigated the results specific to liquid stocks and proposes the new models in exploring whether return of stocksin Indonesia respond differently to liquid stocks with conventional, downside or upside beta and also considering the liquidity as measured by trading volume.

LITERATURE REVIEW

Sharpe (1964) developed CAPM to measure the market risk of an asset, the name of the measurement is beta coefficient. It stated that there is only one factor that effect the return of an asset, namely beta. An asset is riskier if the asset has a higher level of beta, vice versa. Both the academics and also the practitioners have been debating the robustness of the CAPM.

The previous research have proposed CAPM models based on downside risks (Hogan and Warren (1974), Bawa and Lindenberg (1977), Harlow and Rao (1989), Estrada (2000, 2002, 2004), Fraser et al. (2004), Post and Vilet (2004), Ang et al. (2006), Lee, Robinson and Reed (2008), Teplova and Shutova (2011) and Rashid and Hamid (2015)).To investigate whether the investor concerns for downside risks and to do the asymmetric treatment of risks, Hogan and Warren (1974) developed the first downside CAPM and they used semi-variance and co-semivariance.Different approach from them, Bawa and Lindenberg (1977) and Harlow and Rao (1989)measured downside beta byusing mean lower partial moment and conditional bythe movements from market downside. Hogan and Warren (1974) and Bawa and Lindenberg (1977) presented the expected return of a security as an exact linear function of its downside beta computed with respect to the market portfolio. Harlow and Rao (1989) supported the use of the Generalised Lower Partial Moment-CAPM model. But unfortunately, Harlow and Rao (1989)did not support theconventional CAPM in this research. In addition, the downside beta from Bawa and Lindenberg (1977) and Harlow and Rao (1989) considers only the downside movement of market returns as risk.

Estrada (2000, 2002, 2004) proposed the alternative risk measures to market beta. Moreover, Estrada (2000, 2002, 2004) has argued for the superiority of downside beta over traditional beta. Estrada (2002) also extended further by exploring the downside market risk of both asset and market rate of returns. Different from Bawa and Lindenberg (1977) and Harlow and Rao (1989), the downside beta from Estrada's (2002) research considers the downside co-movement of asset returns and market returns in co-semi-variance.

Fraser et al. (2004), Post and Vilet (2004), Ang et al. (2006) and Rashid and Hamid (2015) empirically tested the downsiderisk-CAPM.Post and Vilet (2004) also discovered downside risk-CAPM outperformed the traditional CAPM for the cross-section of US stock returns. Ang et al. (2006) also supported the downside risk for US stock, where Fraser et al. (2004) also provided indirect empirical evidence from the UK stock market to support the use of that downside risk-CAPM.

Furthermore, Lee, Robinson and Reed (2008) investigated the validation for CAPM by using a downside and higher-moment framework of CAPM. The unconditional CAPM in crisis period have low explanatory power and unfortunately not significant statistically. Downside risk

has the highest explanatory power for the return variations. Teplova and Shutova (2011) examined the importance of downside beta to the variation of returns. Downside beta gave higher explanatory effect to the cross sectional return variations. Investors only require a premium for downside risk instead of conventional CAPM.

Nonetheless, Rashid and Hamid (2015) found that there is a negative systematic risk-return relationship. For the risk avoiders, investors prefer to invest in liquid stocks. The volume of trading can be used as a measurement for liquidity (D'Souza, Ga and Yang (2003) and Christodoulopoulos and Grigoratou (2005). Some studies have found a positive effect between volume of trading and returns (Gervais, Kaniel and Mingelgrin, 2001andDarwish, 2012). Gervais, Kaniel and Mingelgrin (2001) found that stocks which have unusually high (low) trading volume over a day or a week tend to appreciate (depreciate) over the course of the following month.

Darwish (2012) investigated the effect of volume of trading on stock returns using weekly data Palestine Exchange (PE). By using GARCH, they found a positive effect between volume of trading on returns. The study also examined the causal relationship between trading volume and stock returns. By using a bivariate model of Vector Auto Regressive (VAR), they found if the trading volume may effect stock returns and stock returns also can affect the volume of trade.

The different results found by Chordia, Subrahmanyam and Anshuman (2001) and Pathirawasam (2011) where they found a negative effect between sizeof trading and stock returns. Subsequent research conducted in Mauritius by Nowbutsing and Naregadu (2009), where they found the trading volume had no significant effect on stock returns.Chordia, Subrahmanyam and Anshuman (2001) also examined the correlation of liquidity on the expected return of the stock. Measuring instruments used in measuring liquidity is the trading volume and share turnover. They found a significant negative effect between liquidity and expected return share for NYSE and AMEX during the period January 1966 - December 1995. The same effect also occurred in the NASDAQ stock over the period 1984 - 1995. The shares have low trading volumes have expected returns high.

Now butsing and Naregadu (2009) conducted a study on the effect of trading volume on the return and volatility for 36 stocks traded on the Stock Exchange of Mauritius (SEM) using data from daily stock price and the volume of the trade daily during the period January 3, 2002 until December 31, 2008. The results showed if the volume of trade has no effect on stock returns and volatility. Pathirawasam (2011) examined the relationship between trading volume and stock returns of 266 stocks in Colombo. This study used the conventional methodology by Jagadeesh and Titman (Jagadeesh and Titman, 1993). Returns has the positive effect to the

change in size of trading. Further, it was found that past trading volume change has negative effect to returns.

METHODOLOGY

This paper uses monthly data of closing prices of shares to calculate returns on stocks for the period of January 2011 to December 2016 for 45 companies included in LQ-45 index. The time series data is used to describe the current condition of the stock prices. We carry out the test of the CAPM, the downside CAPM and upside CAPM on individual stock returns following Fama and MacBeth (1973) which includes two phases: to estimate the risk and to test the model. In a first phase, beta is estimated using timeseries regression. In a second phase, assets' returns for each month are regressed on the underlying assets' betas obtained from the first pass, and so on for upside and downside systematic risk. Dependent variable in this paper is return of stock, calculated as:

$$R_{i(t)} = \frac{P_{i(t)} - P_{i(t-1)}}{P_{i(t-1)}}$$

Where:

$R_{i(t)} = \text{return of stock i time t}$; $P_{i(t)} = \text{price of stock i time t}$; $P_{i(t-1)} = \text{price of stock i time t} - 1$

CAPM

CAPM (Capital Asset Pricing Model) was discovered by William F. Sharpe (1964). The CAPM therefore states that only the marketrisk is priced to the return expectation. In order to find the beta coefficients for each security, this paper uses regression analysis as shownbelow:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \varepsilon_{it}$$

Where:

$r_{it} = \text{return of stock i time t}$

$\alpha_{it} = \text{intercept of stock i}$

$\beta_i = \text{beta stock i}$

$r_{mt} = \text{return of market time t}$

$\varepsilon_{it} = \text{error stock i time t}$

Upside and Downside CAPM

The estimation of downside and upside beta is quite different from the estimation ofthe conventional beta. Estrada (2002) splits the negative asset returns and negative marketreturns for downside systematic risk and on the contrary, the positive asset returns and positive market returns for upside systematic risk. Herefore, Estrada (2002) suggested that to estimate correct downside risk beta, is estimated using the equation below:

$$r_{it}^{-} = \beta_i^D r_{mt}^{-} + \varepsilon_{it}$$

where

$\beta_i^D = E[r_{it}^{-}, r_{mt}^{-}]/E[(r_{mt}^{-})]\hat{2}$, $r_{mt}^{-} = \min(R_{mt} - \mu_m, 0)$, $r_{it}^{-} = \min(R_{it} - \mu_i, 0)$

$\mu_i$is average of R_i, and μ_m is average of R_m. Similarly, the upside beta of Estrada (2002) is estimated using the equation below:

$$r_{it}^{+} = \beta_i^U r_{mt}^{+} + \varepsilon_{it}$$

where

$\beta_i^U = E[r_{it}^{+}, r_{mt}^{+}]/E[(r_{mt}^{+})]\hat{2}$, $r_{mt}^{+} = \max(R_{mt} - \mu_m, 0)$, $r_{it}^{+} = \max(R_{it} - \mu_i, 0)$

Finally, to test the hypothesis of the systematic risk and liquidity-return relationship, this research has the following cross-section models are estimated:

$r_{it} = \lambda_0 + \lambda_1\beta_1 + \mathcal{E}_{it}$ (1)

$r_{it} = \lambda_0 + \lambda_1\beta_1 + \lambda_2 TV + \mathcal{E}_{it}$ (2)

$r_{it} = \lambda_0 + \lambda_1\beta_i^D + \mathcal{E}_{it}$ (3)

$r_{it} = \lambda_0 + \lambda_1\beta_i^D + \lambda_2 TV + \mathcal{E}_{it}$ (4)

$r_{it} = \lambda_0 + \lambda_1\beta_i^U + \mathcal{E}_{it}$ (5)

$r_{it} = \lambda_0 + \lambda_1\beta_i^U + \lambda_2 TV + \mathcal{E}_{it}$ (6)

$r_{it} = \lambda_0 + \lambda_1\beta_1 + \lambda_2\beta_i^D + \lambda_3\beta_i^U + \lambda_4 TV + \mathcal{E}_{it}$ (7)

RESULTS

Following the two-pass regression analysis of Fama and MacBeth (1973) – first, we estimate systematic risk for conventional beta, downside beta and upside beta. The results indicate that there is inconsistency beta estimation for different approach both from the value and from the coefficient.

Table 1. Beta, Downside Beta, Upside Betafor LQ45 Stocks Period 2011-2016

Beta(β_i)	**Downside Beta**(β_i^D)	**Upside Beta**(β_i^U)
0.596	0.075	0.031
-0.051	-0.046	0.080
0.772	0.090	0.084
0.251	0.005	0.046
-0.124	-0.082	-0.226
0.549	0.202	0.014
0.064	-0.025	0.024
-0.317	0.005	-0.013
-0.024	0.024	-0.017
-0.045	0.027	0.003
0.639	0.030	0.062
0.294	0.018	0.031
-0.151	-0.073	0.003
0.339	0.053	0.045
-0.026	0.014	0.015
-0.204	0.004	-0.045
0.018	-0.001	0.016
-0.116	-0.052	-0.009
-0.042	-0.029	0.000
0.532	0.115	0.092
0.517	0.036	-0.010
-0.099	-0.004	-0.007
0.069	-0.019	0.005
-0.054	-0.028	0.056
-0.138	-0.037	-0.016
0.026	-0.013	-0.016
0.428	0.199	0.040
0.383	0.050	0.056
0.062	0.015	-0.023
-0.230	-0.057	-0.035
0.147	0.000	0.018
0.679	0.096	0.051
-0.002	0.025	0.023
0.341	0.169	0.022
-0.057	-0.050	0.048
0.005	-0.040	-0.038
0.055	-0.003	0.008
-0.149	-0.001	0.007
-0.099	-0.080	-0.041
0.148	-0.015	-0.035
-0.393	-0.009	0.049
0.153	0.051	-0.004
-1.249	-0.035	-0.029
-0.207	-0.020	0.012
-0.594	-0.022	-0.061

In Panel A from the table 2 presents the results of Model 1 when the CAPM includes only conventional beta as an explanatory variable. The coefficient of beta (λ_1) in model 1 is negative. The results indicate that the effect of conventional beta to liquid stock return is significant at the level 1% for period 2011-2016.

In panel B from the table 2, trading volume is added to the model, as an additional regressor, to check for linearity of the systematic risk and liquidity-return relationship. The coefficient of beta (λ_1) in model 2 is negative. The coefficient of trading volume (λ_2) in model 2 is negative. The results indicate that the effect of conventional beta and trading volume to liquid stock return is significant at the level 1% for period 2011-2016 with the value of R^2 is 6.2 percent and adjusted R^2 is 4 percent.

Table 2. Regressions between Conventional Beta, Trading Volume and Return of LQ45 Stocks Period 2011-2016

Panel A: Model 1: $r_{it} = \lambda_0 + \lambda_1 \beta_i + \varepsilon_{it}$	**Values**
λ_0	0.0138
λ_1	-0.0140
R^2	0.0622
Adj R^2	0.0404
$F_{statistics}$	3.6547e-05
Panel B: Model 2: $r_{it} = \lambda_0 + \lambda_1 \beta_i + \lambda_2 TV + \varepsilon_{it}$	
λ_0	0.0142
λ_1	-0.0142
λ_2	-9.88×10^{-12}
R^2	0.0629
Adj R^2	0.0183
$F_{statistics}$	0.000252

In Panel C from the table 3 presents the results of Model 3that includes only downside beta as an explanatory variable. The coefficient of beta (λ_1) in model 3 is negative. The results indicate that the effect of downside beta to liquid stock return is significant at the level 5% for period 2011-2016.

In panel D from the table 3, trading volume is added to the model, as an additional regressor, to check for linearity of the systematic risk and liquidity-return relationship. The coefficient of downside beta (λ_1) in model 4 is negative. The coefficient of trading volume (λ_2) in model 4 is negative. The results indicate that the effect of downside beta and trading volume to liquid stock return is significant at the level 5% for period 2011-2016 with the value of R^2 is 14.33 percent and adjusted R^2 is 10.25 percent.

Table 3. Regressions between Downside Beta, Trading Volume and Return of LQ45 Stocks Period 2011-2016

Panel C: Model 3: $r_{it} = \lambda_0 + \lambda_1 \beta_i^D + \varepsilon_{it}$	**Values**
λ_0	0.0144
λ_1	-0.1163
R^2	0.1409
Adj R^2	0.1209
$F_{statistics}$	0.0111
Panel D: Model 4: $r_{it} = \lambda_0 + \lambda_1 \beta_i^D + \lambda_2 TV + \varepsilon_{it}$	
λ_0	0.0150
λ_1	-0.1186
λ_2	-1.80×10^{-11}
R^2	0.1433
Adj R^2	0.1025
$F_{statistics}$	0.0388

In Panel E from the table 4 presents the results of Model 5 that includes only upside beta as an explanatory variable. The coefficient of upside beta (λ_1) in model 5 is negative. The results indicate that the effect of upside beta to liquid stock return is significant at the level 1% for period 2011-2016.

In panel F from the table 4, trading volume is added to the model, as an additional regressor, to check for linearity of the systematic risk and liquidity-return relationship. The coefficient of upside beta (λ_1) in model 6 is negative. The coefficient of trading volume (λ_2) in model 6 is negative. The results indicate that the effect of upside beta and trading volume to liquid stock return is significant at the level 1% for period 2011-2016 with the value of R^2 is 46.95% and adjusted R^2 is 44.42%. Upside beta has the highest R^2 among the conventional beta and downside beta in explaining the variations in return of liquid stock in Indonesia. This means investors in Indonesia more sensitive to the market shifting in upside perspective.

Table 4. Regressions between Upside Beta, Trading Volume and Return of LQ45 Stocks Period 2011-2016

Panel E: Model 5: $r_{it} = \lambda_0 + \lambda_1 \beta_i^U + \varepsilon_{it}$	**Values**
λ_0	0.0149
λ_1	-0.2728
R^2	0.4643
Adj R^2	0.4518
$F_{statistics}$	2.58×10^{-7}
Panel F: Model 6:	

Table 4...

$r_{it} = \lambda_0 + \lambda_1 \beta_i^U + \lambda_2 TV + \mathcal{E}_{it}$	
λ_0	0.0157
λ_1	-0.2761
λ_2	-2.61×10^{-11}
R^2	0.4695
Adj R^2	0.4442
$F_{statistics}$	1.66×10^{-6}

In panel G from the table 5, conventional beta, downside beta, upside beta and trading volume is added to the model, to check for linearity of the systematic risk and liquidity-return relationship. The coefficient of conventional beta (λ_1) in model 7 is positive but statistically insignificant. The coefficient of downside beta (λ_2) in model 7 is negative and but statistically insignificant. The coefficient of upside beta (λ_3) in model 7 is negative and statistically insignificant. The coefficient of trading volume (λ_4) in model 7 is negative but statistically insignificant. The results indicate that simultaneously, the effect of conventional beta, downside beta, upside beta and trading volume to liquid stock return is significant at the level 1% for period 2011-2016 with the value of R^2 is 49.77 percent and adjusted R^2 is 44.74 percent.

Model 7 gives the new perspective for the investor's perception in expected return. They're not sensitive to the conventional shifting market by using conventional beta, but more sensitive to the upside shifting market. Furthermore, when we combine the conventional beta, downside beta, upside beta and trading volume, we found the highest R^2 among other models, 49.77 percent. This means investors in Indonesia more sensitive for market shifting in every perspective either conventional, downside or upside beta and moreover with trading volume consideration.

Table 5. Regressions between Beta, Downside Beta, Upside Beta, Trading Volume and Return of LQ45 Stocks Period 2011-2016

Panel G: Model 7: $r_{it} = \lambda_0 + \lambda_1 \beta_1 + \lambda_2 \beta_i^D + \lambda_3 \beta_i^U + \lambda_4 TV + \mathcal{E}_{it}$	**Values**
λ_0	0.0160
λ_1	0.010
λ_2	-0.065
λ_3	-0.274*
λ_4	$-2.81.10^{-11}$
R^2	0.4977
Adj R^2	0.4474
$F_{statistics}$	$1.1467.10^{-5}$

Notes: Value of each coefficient is followed by its t-value.

*,**,***significant at 1, 5, and 10 percent levels, respectively

CONCLUSION

This research found inconsistency beta estimation for different approach both from the value and from the coefficient. First, we want to make conclusion about the investigation of conventional beta. Partially, there is negative relationship but not statistically significant between beta and liquid stocks return, which is inconsistent with the basic assumption in CAPM of a positive relationship for market risk. Furthermore, the results indicate that simultaneously, the effect of conventional beta to liquid stocks return is significant at the level 1% for period 2011-2016. When trading volume is added to the model with conventional beta, there is negative relationship both between beta and trading volume to liquid stocks return but not statistically significant. Nonetheless, the simultaneous effect of conventional beta and trading volume to liquid stock return is significant.

Second, we want to make conclusion about the investigation of downside beta. Partially, there is negative relationship but not statistically significant between downside beta and liquid stocks return, which is inconsistent with the basic assumption in CAPM of a positive relationship for market risk. Furthermore, the results indicate that simultaneously, the effect of downside beta to liquid stocks return is significant at the level 1% for period 2011-2016. When trading volume is added to the model with downside beta, there is negative relationship both between downside beta and trading volume to liquid stocks return but not statistically significant. Nonetheless, the simultaneous effect of downside beta and trading volume to liquid stock return is significant.

Third, we want to make conclusion about the investigation of upside beta. Partially, there is negative relationship but not statistically significant between upside beta and liquid stocks return, which is inconsistent with the basic assumption in CAPM of a positive relationship for market risk. Furthermore, the results indicate that simultaneously, the effect of upside beta to liquid stocks return is significant. When trading volume is added to the model with upside beta, there is negative relationship both between upside beta and trading volume to liquid stocks return but not statistically significant. Nonetheless, the simultaneous effect of upside beta and trading volume to liquid stock return is significant. Upside beta has the highest R^2 among the conventional beta and downside beta in explaining the variations in return of liquid stock in Indonesia. This means investors in Indonesia more sensitive to the market shifting in upside perspective.

Finally, we investigate the relationship between conventional beta, downside beta, upside beta and trading volume to liquid stocks return. Partially, there is positive relationship between conventional beta to liquid stocks return but statistically insignificant. There is negative relationship between downside beta to liquid stocks return but statistically insignificant. There is

negative relationship between upside beta to liquid stocks return and statistically significant. There is negative relationship between trading volume to liquid stocks return but statistically insignificant. The results indicate that simultaneously, the effect of conventional beta, downside beta, upside beta and trading volume to liquid stock return is significant.

The last model gives the new perspective for the investor's perception in expected return. They're not sensitive to the conventional shifting market by using conventional beta, but more sensitive to the upside shifting market. Furthermore, when we combine the conventional beta, downside beta, upside beta and trading volume, we found the highest R^2 among other models, 49.77 percent. This means investors in Indonesia more sensitive for market shifting in every perspective either conventional, downside or upside beta and moreover with trading volume consideration.

Further research should investigate about the robustness of Capital Asset Pricing Model for the non liquid stocks. Since this research found the existence of the market sensitivity by distinguishing the down and up market, the consideration of market movements for upcoming research also needed to be investigated for the systematic risk.

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