RETURN, VOLATILITY AND FUND FLOWS LINKAGES: MALAYSIAN EVIDENCE

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Abstract:
This study examines the relationship between market return and market volatility; and fund flows of equity and vice versa. Using daily aggregate data of equity fund flows, institutional and retail both local and foreign, this study finds that market return has a negative correlation with net equity flows except that of net equity flows of foreign institutions. Market volatility, on the other hand, has a positive correlation with net equity flows of local investors both institutional and retail whilst a negative correlation with net equity flows of foreign investors, also both institutional and retail. Additionally, there is a unidirectional relationship running from both market return and market volatility to net equity flows. This is especially evident for trades of foreign institutional investors. Equity fund flows are neither affect market return nor market volatility.

Keywords: Market return; market volatility; equity fund flows; institutional and retail investors

1. Introduction and literature review

With the increasing need to invest smartly and handle risk wisely, equity funds have risen to become a major investment instrument. Following this, researchers have carried out many studies on the research area related to equity fund flows, of which among others are on market return, market volatility and fund flows relationships and vice versa by using data of either on daily, weekly, monthly or quarterly basis. Past studies document a positive relationship between market return and equity fund flows. Among others is a study by Thenmozhi and Kumar (2009), which use daily aggregate data in a vector autoregression (VAR) approach to examine the associations between market return and market volatility, and mutual fund flows in India. The findings of their study show that market return has a positive relationship with mutual fund flows. Caporale, Philippas et al. (2004) employ a daily data in the Greek context demonstrate that shock to security returns has a significant positive impact on mutual fund flows. Oh and Parwada (2007) use aggregate daily data of equity along with a VAR approach for their study finds that market return has an impact on mutual fund flows in Korea. Beaumont, Daele et al. (2008) use daily aggregate data in the U.S. to find a strong positive relationship between market return and mutual fund flows. Using an aggregate daily data and a bivariate VAR model, Ben-Rephael, Kandel et al. (2011) demonstrate that market return has a

positive association with subsequent mutual fund flows in Israel. French (2011), on the other hand, uses aggregate weekly data as well as a VAR approach in his study. He finds a strong positive relationship running from equity returns to net foreign equity flows in South Africa. Cha and Kim (2010) use U.S. monthly aggregate data confirm the positive relationship between stock returns and mutual fund flows. Similarly, a study by Mishra (2011) based on a monthly data demonstrates a positive unidirectional causality running from market return to mutual fund flows. Apart from that, a study by Watson and Wickramanayake (2012) use an aggregate monthly data in Australia finds that excess market return has an impact on managed fund flows. In addition, Kim and Kim (2016) study which use aggregate monthly data in Korea reveals a positive contemporaneous impact from stock returns to net mutual fund flows. In summary, the findings of previous studies support the positive association between market return and fund flows of equity. Even though most of past studies demonstrate a positive relationship between market return and fund flows, a study by Warther (1995) documents an opposite finding. By using a monthly aggregate data, the author finds that there is a negative correlation between security returns and subsequent fund flows.

Literatures also document an association both positive and negative between lagged fund flows and market return. Using weekly data, Warther (1995) study demonstrates a positive correlation between fund flows and subsequent security returns. Similarly, a study by Edelen and Warner (2001) shows that U.S. equity fund flows positively affect market return. A study by Boyer and Zheng (2009), which uses an aggregate quarterly data together with a VAR and generalized method of moments (GMM) approach finds that shock in cash flows causes market return to increase. Similarly, Ben-Rephael, Kandel et al. (2011) show that shock to mutual fund flows has a positive contemporaneous effect on market return. On the other hand, Caporale, Philippas et al. (2004) study demonstrates that shock to mutual fund flows have a negative relationship with security returns.

Previous studies also document a positive relationship between market volatility and equity fund flows. A study by Bhargava and Konku (2004) uses a monthly aggregate data along with a VAR approach investigates the relationship between U.S. market return volatility and equity fund flows. Their study finds that market volatility affects net fund flows positively. On the contrary, Luo (2003) employs the simple linear regression estimation (OLS) to examine the relation between market volatility and monthly mutual fund flows. He finds that market volatility has a negative impact on subsequent stock fund flows. Past studies also report that there is a positive relationship running from equity fund flows to market volatility such as Luo (2003) who documents that fund flows have a positive effect on subsequent market volatility. Besides that, Bhargava and Konku (2004) find that an increase in net fund flows causes market volatility to increase after two months and decrease after another month. Meanwhile, Ahmed (2016) reveals that the sell trades of foreign institutions and individuals have a positive impact on market volatility. Furthermore, Thenmozhi and Kumar (2009) demonstrate that shock to mutual fund flows causes market volatility to increase. A study by Umutlu, Akdeniz et al. (2013) also demonstrate similar findings. On the other hand, Cao, Chang et al. (2008) study shows that shock in mutual fund flows is negatively related to market volatility.

The literatures mentioned use different geographical context (country-specific or international) and different methodological approach where findings on the

relationship are inconsistent. Hence, this study contributes to the literature on the relationship between market return and market volatility; and fund flows of equity and vice versa in the Malaysian context. This study finds that market return has a negative correlation with net equity flows except that net equity flows of foreign institutions. Market return volatility, on the other hand, has a positive correlation with net equity flows of local institutions and retailers whilst a negative correlation with net equity flows of foreign institutions and retailers. Besides that, there is a unidirectional relationship running from both market return and market volatility to net equity flows. This is especially evident for foreign institutional net equity flows. This study finds that local institutions, local and foreign retailers are contrarian traders whereas foreign institutions are momentum traders. The remaining sections are as follows: Section 2 discusses the methodology. Section 3 presents the results and Section 4 concludes the study.

2. Methodology

2.1 Data

This study employs equity fund flows data which comprises of buy and sell trades, and net equity flows of institutions and retailers, both local and foreign on Bursa Malaysia, the official stock exchange of Malaysia. This study also utilizes stock market return and volatility to explore the relationship between market return and market volatility; and equity fund flows and vice versa. The data of this study is obtained from Bursa Malaysia which covers a period from October 2009 to December 2015. Daily aggregate data from Bursa Malaysia spans from October 2009 to December 2015 as this is the only data available. The daily trading data is in terms of value of trades. In total, there are 1,540 observations for each time series data.

2.2 Methods

This study employs equations (1), (2) and (3) to calculate daily net equity flows, market return and market volatility respectively.

$$F_t = \frac{\text{Buy trade} - \text{Sell trade}}{\text{Buy trade} + \text{Sell trade}} \quad (1)$$

where F_t = net equity flows. This method is consistent with Umutlu, Akdeniz et al. (2013).

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \quad (2)$$

where R_t = market return, P_t = market index's end-of-day price on day t, and P_{t-1} = market index's end-of-day price on day t – 1.

$$V_t = \sqrt{\frac{\sum(R_t - R)^2}{N}} \quad (3)$$

where V_t = market volatility, R_t = market return, R = mean of all market return data, and N = total number of data.

This study employs VAR Granger causality test and impulse response functions to examine the linkages between market return and market volatility; and fund flows of equity and vice versa. The Granger causality test is to check if a variable will have an impact on another variable. Variable A affects variable B if the past values of variable A help in forecasting the value of variable B. The impulse response functions, on the other hand, is to estimate the dynamic effect of a shock to net equity flows on market return and market volatility, and vice versa.

3. Research findings

3.1 Descriptive statistics

Table 1 reports the descriptive statistics of market return, market volatility and equity fund flows. The Jarque-Bera test for bell curve determines if the data is normal. The Augmented Dickey-Fuller (ADF) test, on the other hand, examines if the data has a unit root. Having a unit root means the time series data is stationary. This study can continue with Granger causality test and impulse response functions if only the time series data is stationary. This study employs Akaike information criterion (AIC) to determine the optimal lag length to be used in the analysis.

Table 1

Summary statistics of market return, market volatility and equity fund flows

Variables	Mean	Std dev	Skew-ness	Kurtosis	Jarque-Bera	ADF t-statistic
Foreign Institution:						
Buy Trades	450.33	231.99	4.34	45.40	120231**	-12.37**
Sell Trades	445.27	225.10	3.20	27.97	42678**	-9.41**
Net Flows	0.009	0.17	-0.07	2.83	3.12	-9.04**
Foreign Retail:						
Buy Trades	7.08	2.86	1.55	8.04	2250**	-11.22**
Sell Trades	8.12	3.62	2.16	13.89	8809**	-12.05**
Net Flows	-0.06	0.18	0.19	3.00	9**	-21.43**
Local Institution:						
Buy Trades	699.55	257.11	0.29	4.46	160**	-7.73**
Sell Trades	673.09	240.22	0.53	7.56	1414**	-8.34**
Net Flows	0.01	0.10	0.09	3.30	8*	-9.46**
Local Retail:						
Buy Trades	345.83	129.97	0.80	4.16	252**	-7.18**
Sell Trades	358.27	127.16	0.93	4.82	439**	-7.53**
Net Flows	-0.02	0.05	-1.42	10.26	3912**	-10.61**
Market Return	0.0002	0.005	-0.23	5.54	429**	-18.91**
Market Volatility	0.006	0.0009	3.44	23.01	28735**	10.50**

**Statistically significant at 1% level.

*Statistically significant at 5% level.

Referring to the mean value for each buy and sell trade category, local institutional investors have the highest share value of equity transaction on local stock market. The local institutions also record the highest value of volatility according to standard deviation figure. Foreign institutions, local and foreign retailers are behind local institutions for both mean and standard deviation values of both buy and sell trades. Foreign and local retailers have negative net equity flows as the values of sell trades are higher than the buy trades. On the contrary, foreign and local institutions have positive net equity flows as the value of sell trades is lower than the buy trades.

The market return is approximately symmetric although its skewness is negative. However, market return volatility's skewness is highly positive. All of the categories are leptokurtic. The Jarque-Bera test identifies the net equity flows of foreign institutions as the only data that is normal. However, due to a large number of observations (1,540), the non-normality of other data series is acceptable (David de Vaus. 2002). As for the ADF test, since the t-statistic of all categories except for market return volatility are lesser than their corresponding critical values, it implies that all of those categories are stationary. Although the t-statistic of market return volatility is higher than its critical value, the test proves that it has a unit root. Hence, it is stationary. Thus, this study can proceed with Granger causality test and impulse response functions for the analysis.

3.2 Correlation coefficients

Table 2 presents the results of Spearman correlation test between market return and market volatility; and net equity flows. Spearman correlation test measures the strength of the relationship between two variables. This study employs the Spearman correlation test due to the non-normality in most of the data series.

Table 2

Correlations between market return and market volatility; and net equity flows

Variables	Market return	Market volatility	Foreign institution net flow	Foreign retail net flow	Local institution net flow	Local retail net flow
Market Return	-					
Market Volatility	-0.08**	-				
Foreign Institution Net Flow	0.41**	-0.29**	-			
Foreign Retail Net Flow	-0.28**	-0.02	-0.26**	-		
Local Institution Net Flow	-0.34**	0.268**	-0.92**	0.17**	-	
Local Retail Net Flow	-0.35**	0.12**	-0.44**	0.34**	0.20**	-

**Statistically significant at 1% level.

This study finds that the strongest positive correlation is between market return and net equity flows of foreign institution with a p-value of 0.41. Net equity flows of local institution, local and foreign retailer show a negative correlation with market return.

Market volatility, on the other hand, has a positive correlation with net equity flows of local institutions and retailers whilst a negative correlation with net equity flows of foreign institutions and retailers. All of the categories show a significant correlation with one another at the 1% level except for the correlation between market return volatility and net equity flows of foreign retailers.

3.3 Granger causality test

Table 3 reports the causal relationship between market return and market volatility; and fund flows of equity. Granger causality test is to check if a variable will have an impact on another variable. Variable A is said to have an impact on variable B if the past values of variable A help in predicting variable B's future value. The findings in Table 3 demonstrate that market return significantly affects the buy trades of foreign retailer at 1 percent level and of local institutions and local retailer at 5 percent level. On the other hand, market return has an impact on sell trades of retail investors, both foreign and local at 5 percent and 1 percent level respectively.

Table 3

Causal relationship between market return, market volatility and equity fund flows

Equity fund flows	Market return does not granger-cause equity flows	Equity flows does not granger-cause market return	Market volatility does not granger-cause equity flows	Equity flows does not granger-cause market volatility
Buy Trades:				
Foreign Institution	1.37	3.61	2.43	0.26
Foreign Retail	19.98**	0.65	10.24**	3.70
Local Institution	8.34*	1.16	16.02**	0.14
Local Retail	6.13*	5.55	1.25	0.50
Sell Trades:				
Foreign Institution	0.77	3.84	16.55**	1.15
Foreign Retail	7.29*	1.60	3.89	0.35
Local Institution	4.59	1.06	2.72	0.34
Local Retail	10.95**	3.86	1.41	1.12
Net Flows:				
Foreign Institution	9.39**	0.42	26.03**	3.99
Foreign Retail	42.10**	0.59	2.18	0.39
Local Institution	1.09	1.77	20.80**	0.36
Local Retail	21.14**	1.07	2.30	2.35

**Statistically significant at 1% level.

*Statistically significant at 5% level.

The causal relationship also exists from market return to net equity flows of foreign institutions, foreign and local retailers. On the contrary, for the test on the effect of net equity fund flows on market return, none of the categories is significant. Thus, this signifies a unidirectional relationship running from market return to net equity flows of both foreign and local investors.

As for the test does market volatility Granger-cause equity fund flows, the findings reveal that market volatility has a significant impact on the buy trades of foreign retailers and local institutions. On the contrary, as for the sell trades category, the findings show that market volatility has an impact only on the trades of foreign institutions. The causal relationship also exists from market volatility to net equity flows of foreign and local institutions. On the contrary, for the test does equity fund flows Granger-cause market volatility, none of the categories are significant. Similar to market return and net equity fund flows relationships, the findings of this study demonstrate that there is a unidirectional relationship running from market volatility to equity fund flows of foreign and local investors.

In summary, this study finds a unidirectional relationship running from market return and market volatility to equity fund flows especially for the relationships between market return and market volatility; and net equity flows of foreign institutions. The unidirectional relationship from market return to net equity flows is consistent with studies by Cha and Kim (2010); French (2011); Mishra (2011); Watson and Wickramanayake (2012). The finding of this study is inconsistent with the findings by Alexakis, Dasilas et al. (2013), Aydogan, Vardar et al. (2014), Caporale, Philippas et al. (2004), Oh and Parwada (2007) and Warther (1995) where there is a bi-directional relationship between return and fund flows.

The finding of this study which shows that market volatility has an impact on fund flows is consistent with study of Lee, Paek et al. (2015). However, other studies such as Bae, Yamada et al. (2008), Li & Wang (2010), Lin (2006), Pavabutr and Yan (2007) and Umutlu, Akdeniz et al. (2013) report different findings. These studies demonstrate that fund flows have an impact on market volatility and not vice versa.

3.4 Impulse Response Functions

Figure 1 reports the impulse response functions of a variable to one unit of standard deviation innovation in another variable for a short term period. The focus of the discussions is on the response of net equity flows to market return and market volatility innovations and vice versa. The graph in Figure 1 reveals that one standard deviation shock in market return causes different reactions in the four categories of net equity flows. The findings show that net equity flows of foreign institutions response positively to innovation in market return. The response is relatively small in magnitude and starts to decline on day 2 and reach zero after day 10. On the contrary, net equity flows of foreign retail response negatively to innovation in market return of which over .15 basis points on day 1. The response starts to decline on day 2 and approach zero on day 7. Similar to net equity flows of foreign retail, net equity flows of local institutions and retail also exhibit negative response to shocks in market return. Figure 1 also depicts that contrary to net equity flows of foreign institutions and retail, local institutions and retail net flows response positively to shocks in market volatility. All response effects dissipate after day 10 and signify that there is short term effect of innovations in market return and market volatility on all categories of net equity flows. Consistent with the results of VAR Granger causality in Table 3,

the responses of market return and market volatility to innovations in all categories of net equity flows either positive or negative are less substantial.

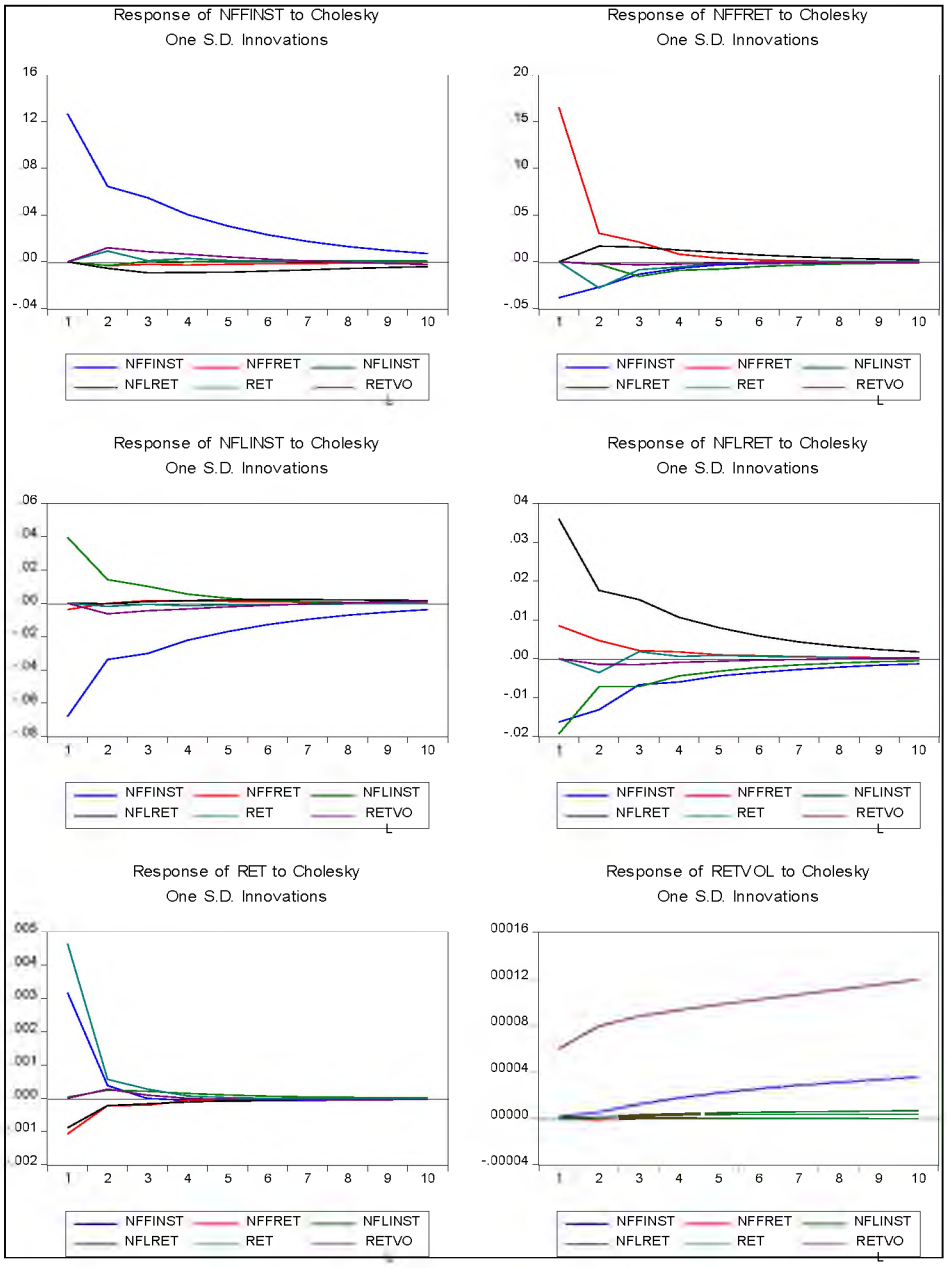

Figure 1. A short term plots of Impulse Response Functions of net equity flow to market return and market volatility shocks, and vice versa

4. Conclusions

The focus of this study is to determine the relationships between market return and market volatility; and equity fund flows and vice versa. The finding of this study demonstrates that market return is negatively correlated with net equity flows except that net equity flows of foreign institutions. Market volatility, on the other hand, has a positive correlation with net equity flows of local institution and retail whilst a negative correlation with net equity flows of foreign institutions and retail. Besides that, there is a unidirectional causal relation running from market return and market volatility to net equity flows. Equity fund flows do not granger-cause market return and market volatility.

The impulse response functions exhibit that there are minimal responses of market return and market volatility to shock in net equity flows. However, there are substantial responses of net equity flows to innovation in market return and market volatility. All of the response of net equity flows to market return and market volatility shocks and vice versa is short and temporary. This study also finds that unlike the other three categories of investors, foreign institutional investors take into account both risk and return factors in their investment decision. They are considered return 'chaser' investors, buy shares when the market is in uptrend and prefer low risk investment. This study contributes by taking the first attempt to identify the relationship between market return and market volatility; and equity fund flows and vice versa in the Malaysian equity market context. Future research can check on the consistency of the findings in this study.

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