SYARIAH INDEX AND PORTFOLIO INDEX: EVIDENCE FROM COINTEGRATION

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ABSTRACT

The main objective of this study is to identify the nature of the relationship between the *Syariah* index and portfolio investment. Using the cointegration procedure, a long run steady state relationship between the *Syariah* index and portfolio investment is established. We found a unilateral Granger causality where the inward of portfolio investment Granger causes *Syariah* index, but *Syariah* index does not Granger cause portfolio investment. Additionally, the results from the impulse response function show that the impact of shock in *Syariah* index to portfolio investment is dominant, while the reverse causality is considered negligible or minimal.

Keywords: Syariah index, portfolio index, cointegration

INTRODUCTION

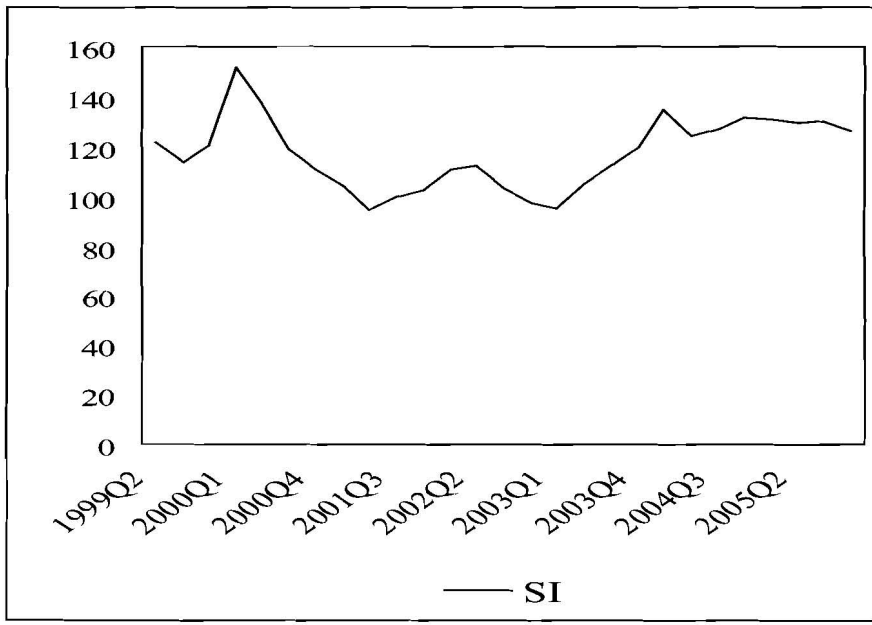
We start our discussion by briefly highlighting the history of the Malaysian capital market. Despite the 1997 Asian financial crisis, Malaysia's capital market remains one of the biggest and most developed in the region and among emerging markets globally. The Kuala Lumpur Stock Exchange (KLSE) has 807 listed companies with a total market capitalization of RM411 billion or USD108 billion (Yackop, 2006). The unique feature of Malaysia's financial system is that the conventional banking, insurance and capital market system is strongly complemented by Islamic banking, Islamic insurance, as well as the Islamic capital market (Yakcop, 2001).

The Islamic banking and *Takaful* in Malaysia are currently well established as is testified by the breadth of products that exist on the market. According to Yackop (2001) and Ahmad and Albaity (2006), out of the total listed securities on KLSE and the Malaysian Exchange of Securities Dealing and Automated Quotation Ltd (MESDAQ) in 2001, 78 per cent were *Syariah*-compatible securities and formed 63 per cent of the market capitalization of the KLSE, compared to only 279 companies as at April 1999. Subsequently, it grew to 826 companies by April 2005, comprising 84 percent of the total listed companies on the KLSE. There are also Islamic unit trust schemes, which are managed by professional portfolio managers, and there are currently 18 unit trust funds with a net asset value in excess of RM2 billion that exist in the market. This forms about 13 per cent of the 139 unit trust funds in the country (Yakcop, 2001). In other areas of finance, Malaysia has also successfully developed Islamic private debt securities in parallel with the equities market. Currently, 37 per cent (or RM6.5 billion) of the total value of private debt securities issued in 2001 are structured as Islamic (Yakcop, 2001).

Looking at the fast development of the Islamic financial market in Malaysia, the KLSE was prompted to develop the Kuala Lumpur *Syariah* Index (KLSI), which is a board based price capitalization-weighted average index constructed from the list of *Syariah* approved compliant securities (Bursa Malaysia, 2007). The components of the Kuala Lumpur *Syariah* Index are all Bursa Malaysia main board companies approved by the *Syariah* Advisory Council as a *Syariah* approved company. The index consists of 518 companies as at 5 February 2007 (Bloomberg, 2007). The index is calculated by Bursa Malaysia with 31 December 1998 as the base year. The index begins began to trade on 19 April 1999 (Rahim *et al,* 2007).

In brief, the Malaysian Islamic capital market[3] has grown tremendously and thus the study on what has driven this growth has also become very important. Although there are a few studies on KLSI such as Ahmad and Ibrahim (2002), who study the relative performance of the *Syariah* Index and the composite index (CI) as well as Yusof and Majid (2007), who attempt to establish the link between the monetary policy volatilities with the volatility of stock returns in both conventional and Islamic stock markets in Malaysia, to date no study has been done that attempts to identify a link between the conventional portfolio investment and the behavior of the *Syariah* index[4]. This research is particularly important as although the Islamic capital market has grown significantly the behavior of the *Syariah* index is not smooth. More precisely, it can be considered as volatile. Therefore, it is the purpose of this study to investigate the dynamic relationship between the behavior of the *Syariah* index and portfolio investment in Malaysia.

Figure 1: Syariah Index



Source: Bloomberg (2007)

3 The Islamic Capital Market was introduced in the Malaysian economy in 1992 with the main feature that its activities are guided by *Syariah* regulations. The main regulations concentrated on the effort to ensure that the market should be free from the elements such as usury, gambling and uncertainties.

4 Besides KLSI, there is another Islamic Index which was introduced by RHB bank, called RHB Islamic Index. This index was introduced in 1992, prior to the introduction of KLSE.

The organization of this study is as follows. The next section offers the framework that could link the behavior of the *Syariah* index and portfolio investment. Section III establishes the empirical specification as well as the research methodology underlying the analysis. The results and discussion of the finding will be provided in section IV and section V concludes the study.

Behavior of Syariah Index and Portfolio Investment

There are several issues relating to the relationships between the *Syariah* index and portfolio investment. For example, if portfolio investments affect returns, the impact may be temporary or it may be permanent. Another issue is that the effect may result from current or past flows. In addition, variability of flows may affect returns and variability of returns may affect flows. Academic literature provides three possible theoretical explanations for the correlation between net portfolio flows and equity returns: information revelation, price pressure and investor sentiment. Based on information revelation explanation (Froot *et al, 2001*), portfolio inflows that contain good information cause share prices to increase while portfolio outflows, which reveal bad information cause share prices to decrease. For example, Scholes (1972), Kraus and Stoll (1972) document that a rapid price decrease usually follows large portfolio outflows and positive information about portfolio inflows push share prices up. As portfolio flows incorporate new information about fundamentals it suggests that the impact of portfolio flows on equity returns is permanent.

Under price pressures, Froot *et al* (2001), provide another possible explanation of why returns are associated with flows. The price pressure argument assumes that cross-border portfolio investors act to provide liquidity to the market. They explain that current portfolio inflows by international investors predict additional future inflows. The behavior pushes market returns up, but not necessarily an improvement in market fundamentals. Harris and Gurel (1986) document that individual stock prices rise immediately after the stocks are added to the S and P 500 index because fund managers copy the index return and buy the composition of the index. Their findings show that since the firm's future prospects do not change, the immediate price increase should result from demand changes for the firm's equity rather than from new information about future prospects. These demand pressures drive equity prices to change regardless of fundamental changes in the firm's future earnings. This implies that because the law of demand and supply continues to determine firms' prices, shifts in the demand curve may result from changes in price pressures as well

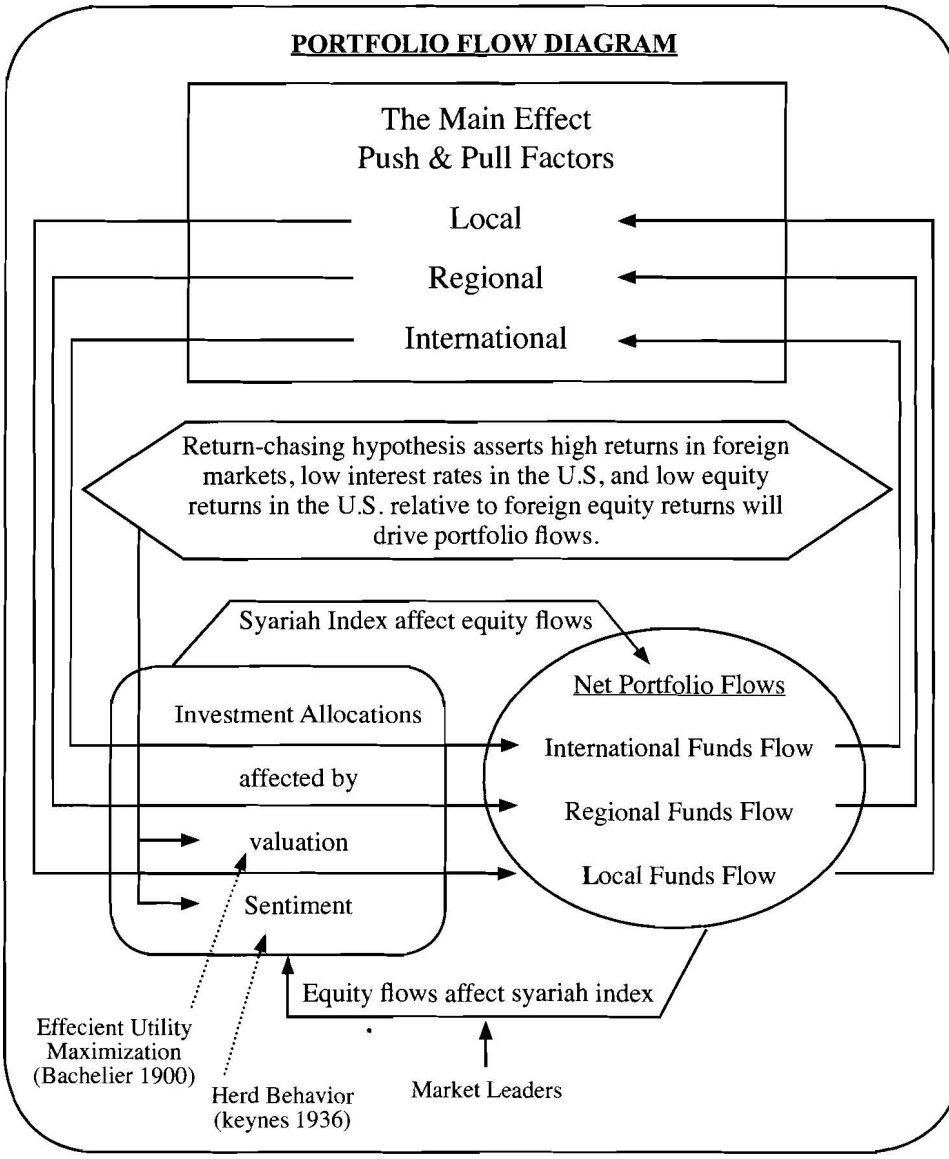
as from changes from fundamental prospects. Similar to the expectation of information revelation, price pressures predict that market returns and portfolio inflows should move in the same direction. However, since firms' fundamental prospects do not change, the impact of portfolio flows on equity returns should be temporary.

Using data from 39 closed-end country funds, Froot and Ramodorai (2001) investigate the relationship between portfolio inflows and local equity market returns, and test the price pressure hypothesis that foreign investors have an information advantage over local investors. They find that cross-border fund flows follow a positive autocorrelation process and that cross-border fund flows are able to aid in predicting future returns of local equity markets. Their findings show that cross-border flows' predictability for equity returns in foreign markets mostly results from information rather than price pressure, suggesting that flows reflect new information about the market's fundamental prospects. However, they also find some evidence to support the price pressure hypothesis in foreign markets over a very short horizon. This implies that international investors generally trade with fundamental analysis in mind over long periods, but are also affected by price pressures or market sentiment over short periods.

Goetzmann *et al (2000) used* a sample of daily net flows from 1,000 U.S. mutual funds between Jan, 1998 and July 1999. They observed a significant relationship of net portfolio inflows and market return. They also noticed that fund managers demonstrated their investment decision based on positive feedback trading. Edward and Zhang (1998) applied the Granger-causality test to investigate the relationship of portfolio flows and stock returns. They found that stock market returns cause the inward of portfolio flows, but portfolio flows do not cause stock returns. Choe (1999) used monthly data to investigate the relationship between net portfolio flows and U.S. stock returns. He found a one way causal relation from stock market returns to equity fund flows. Additionally, the results from impulse response function showed that the impact of shock in U.S. stock returns to portfolio flows is significant. But, the shock in portfolio flows to stock return is minimal. Lastly, based on the empirical evidence, many believe that investor sentiment plays an important role in equity markets. See, for example, Keynes (1936), Griffin (2004), and Shiller (2003). Positive feedback trading is closely associated with under-reaction, since the positive autocorrelations of returns over reflect slow incorporation of new information into equity prices, thus, investor sentiment theory predicts that foreign portfolio inflows and local market returns move together.

However, current literature focusing on Malaysia's portfolio investment based on positive feedback strategy employed by foreign investors is still limited. Soo (2005), Tamirisa (2006) and Simon *et al* (2006) investigate Malaysia's experience with capital controls. Yoke and Habibullah (2006) look at capital mobility based on saving-investment relationship. Latifah (2002) and Mahani (2000) explain the role of Malaysia's regulation of capital flows and in the early 1990's, Ghazali and Low (2002), Ibrahim and Jusoh (2001) and Majid *et al* (2001) analyzed the causal relations between macroeconomic variables and stock prices. Bacha and Ruzila (2001) and Jomo (2001) illustrate the events prior to exchange rate devaluation, stock market crash and capital outflows during the period of currency crisis. Lastly, there are also a number of literatures focusing on the political-economy issues associated with capital flows (Ramasamy 2001, Haggard and Low 2001; Johnson and Milton (2001). All in all, information on portfolio investment is still fragmented. Based on the few studies mentioned above, we simplify the theoretical relationship between the *Syariah* index and portfolio investment as in Figure 2.

Figure 2: Diagram of Net Portfolio Investment and Syariah Index



Sources: Authors' own illustration, based on Bikhchandani (1992), Richard (2002), Shiller (2003) and Griffin (2005) to name a few.

More specifically, there are at least two studies that directly utilized the KLSI, namely, Ahmad and Ibrahim (2002) as well as Yusof and Majid (2007). Ahmad and Ibrahim (2002) studied the relative performance of the *Syariah* Index (SI) and the composite index (CI) of the KLSE during the period of April 1999 to January 2002 and found that *Syariah*-approved stocks were not more favorable than the other stocks on the KLSE. Furthermore, Yusof and Majid (2007) attempt to establish the link between the monetary policy volatilities with the volatility of stock returns on both conventional and Islamic stock markets in Malaysia during the period January 1992 to December 2000. Among others, the study suggests that the predictive power of monetary policy variables volatility appears to explain the volatility in the Islamic stock market better.

EMPIRICAL MODEL AND METHODOLOGY

Figure 2 offers a hypothetical relationship between the *Syariah* index and portfolio investment. Since our focal point is to investigate the role of portfolio investment in explaining the behavior of the *Syariah* index, we specify our empirical model as follows:

$$SI_t = \beta_0 + \beta_1 PI_t + \varepsilon \qquad (1)$$

Where *SI* stands for *Syariah* index and *PI* denotes portfolio investment. The *Syariah* index can be calculated by using the following equation[5]:

$$\mathbf{S} = \frac{AMV_1}{AMV_0} \square 100 \qquad (2)$$

Where:

AMV_1 = $\sum P_1 Q_1$ = Current aggregate market value

AMV_0 = $\sum P_0 Q_0$ = Base aggregate market value

5 Taken from Ahmad and Ibrahim (2002) and the index is calculated electronically every minute like the other KLSE indices.

P_0 = Current closing price of share

P_1 = Base market price

Q_1 = Current number of ordinary shares

Q_0 = base number of ordinary shares

For portfolio flow, the data is taken from the data stream, which is defined as all transactions with non-residents in financial securities of any maturity other than those included in direct investment with the exception of financing and reserve assets. In the financial literature, it has been widely recognized that an inter-relationship exists among various financial instruments. The primary aim of this study is to examine the short- and long-term dynamic causal linkages that possibly exist between the *Syariah* index and portfolio investment in Malaysia. The results from this analysis will offer the direction of the interaction between the two as well as the degree of interdependence between these two variables. In the current econometrics literature there now exists a menu of alternative estimation procedures, which allows valid testing of causal inferences in theoretically postulated models that are known to be cointegrated.

Thus the normal procedure of time series analysis will be followed. Starting by testing for the existence of the unit root problem in each series by using the Augmented Dickey-Fuller (ADF) test, we will then proceed with the cointegration test by following the Johansen and Juselius (1990) trace and maximum eigenvalue tests. If it is found that all variables are cointegrated, then we will proceed with determining the error correction model as cointegrated series have an error correction representation (Engle and Granger, 1987). Engle and Granger (1987) reveal that if the series are cointegrated, then the possibility of the estimated regression being spurious is ruled out due to tribulations such as omitted variable bias, autocorrelation, and endogeneity. Since our series are cointegrated, we can further proceed to determine the direction of causality, in Granger's sense, among the variables. For this purpose various vector error correction models can be specified. Observing the short-run properties of the series, by utilizing such models, may provide very useful insights, especially for policy makers. Relying on the presence of a cointegrating vector, the subsequent vector error correction model (VECM) can be written as follows:

$$\Delta \ln SI_t = \alpha_0 + \alpha_1 ECT_{t-1} + \sum_{i=1} \alpha_{3i} \Delta \ln SI_{t-i} + \sum_{i=1} \alpha_{4i} \Delta \ln PI_{t-i} + \varepsilon_{1t} \quad (3)$$

$$\Delta \ln PI_t = \beta_0 + \beta_1 ECT_{t-1} + \sum_{i=1} \beta_{3i} \Delta \ln SI_{t-i} + \sum_{i=1} \beta_{4i} \Delta \ln PI_{t-i} + \varepsilon_{2t} \quad (4)$$

The term ECT is an error correction term, representing the adjustment process from short-run disequilibrium to long-run equilibrium. The α_1 and β_1 denote the speed of adjustment. This study is utilizing data derived from Bloomberg (2007), International Financial Statistics (IMF) and Key Economic Indicators (ADB, 2006), which covers from 1999Q2 to 2005Q4.

RESULTS AND DISCUSSIONS

The results of the unit root test, based on the Augmented Dickey-Fuller (ADF) test, are presented in Table 1. The Akaike Information Criterion (AIC) is used to choose the optimal lag specification. The null hypothesis of unit root in the *Syariah* Index (SI) cannot be rejected at level, whereas rejected in the first difference. A similar conclusion can be drawn for PI. In the nutsell, the unit root test shows that all the series are integrated of same order and is I(1). As all series are non-stationary, cointegration analysis is appropriate.

Table 1: Unit root test - ADF test

	Level		1st Difference	
	C	C & T	C	C & T
ln*SI*	- 2.9378	- 2.7463	- 6.5169**	- 6.5896**
ln*PI*	- 1.8143	- 1.9092	- 4.4002**	-4.2870**

Note: Asterisk ** denotes significant at 1 % significant level.

Table 2: Cointegration test

H_0	Max-stat	99%	Trace-stat	99%
r = 0	18.7000**	18.63	22.0177**	20.04
r ≤ 1	5.3176	6.65	5.3176	6.65

Note: Asterisk ** denotes significant at 5% significant level.

Table 2 shows the cointegration test between SI and PI in the Malaysian case. As shown, both the trace and maximum eigenvalues test produce similar results. Briefly, the results show evidence of cointegration between the two variables. Evidence from both trace and maximal eigenvalue tests also suggest that there is at most a single cointegrating vector or analogously two independent common stochastic trends within this two-variable system. Therefore, we conclude that there is long run equilibrium between the two variables.

Table 3: ECM and its diagnostic tests

$\Delta lnSI = -0.6348ECT(-1)^{***} + 0.3390\Delta lnSI(-1) + 0.2302\Delta lnSI(-2)^{**} + 0.1436\Delta lnSI(-3) - 0.0049\Delta lnPI(-1)^{**} - 0.0035\Delta lnPI(-2)^{*} - 0.0016\Delta lnPI(-3) - 1.1104$			
R^2	0.5209	S.E. of Regression	7.0131
Autocorrelation (2)	0.1047 [0.9014]	Normality	0.2284 [0.8921]
Heterogeneity (2)	2.4697 [0.1128]		

Note: Asterisks *, ** and *** denote significant at 10 %, 5 % and 1 % critical value, respectively. Figure in ( ) refers to *no of lag* while figure in [ ] stand for *p-value*.

Engel and Granger (1987) show that in the presence of cointegration there always exists a corresponding error correction representation. This implies that changes in the dependent variable are a function of the level of disequiblirium in the cointegrating relationship (captured by the error correction term, ECT), as well as changes in other explanatory variables (Masih and Masih, 1999). Through the ECT, the error correction model (ECM) opens up an additional channel for Granger causality to emerge, which can be tested through (i) the significance of lagged ECT, (ii) the significance of a joint test of lagged explanatory variables, or (iii) a joint test of both (i) and (ii). The significance of all indicates econometric endogeneity of the dependent variable. Moving to our empirical results of ECM, as shown in Table 3, we found evidence that SI is relatively endogenous in the system since the coefficient of ECT is significant at 1 percent critical value. This evidence is further supported by the results from test (ii), which is presented in Table 4, demonstrating that there is a significant result of Granger causality running from PI to SI, while the reverse causation is not valid. In other words, we found a one way causal relation from PI to the SI, but SI does not cause portfolio investment.

Table 4: Granger causality based on VECM

	ΔSI [χ^2-stat]	ΔPI [χ^2-stat]	ECM t-stat
ΔSI	-	7.0824 [0.0693]*	-0.6348 {- 3.8286}*
ΔPI	2.1310 [0.5457]	-	-34.2060 {- 0.8146}

Note: Value in [] refers to *p-value* and { } denotes *t-value*. Asterisks * denotes significant at least at 10% critical value.

Referring back to Table 3, the significance of ECT's coefficient implies that there is long run relationship since the lagged error correction term contained long-run information. The magnitude of the coefficient also highlights the existence of the adjustment process of short-run disequilibrium to long-run equilibrium with relatively fast, given high coefficient of 0.6348. Moving on to the result of the long-run equation, based on the normalized equation, which is presented in Table 5, we found that SI is positively responsive to any change in the PI. Although the impact of PI on SI is highly significant the magnitude of the impact is not that high. This may reflect the nature of the under-developed level of the Malaysian Islamic capital market.

Table 5: Long run equation

$$SI = -11.5918 + 0.0108PI^{**}$$
$$[3.8555]$$

Note: Figure in [ ] denotes *t-value*. Asterisk ** stand for significant at 5 % critical value.

Additionally, in complementing the above mentioned results, which may be interpreted as within-sample causality test, we offer out-sample forecasting procedure, called impulse response function (IRF) and variance decomposition (VDC). We choose to utilize generalized IRFs which circumvent the ordering issue[6]. This allows us to gauge the relative strength of the Granger-causal chain or strength of causality between the two variables beyond the sample period. The results from the impulse response function show that consistent with the result in Table 5, *SI* positively responds to the shock in *PI* (see Figure 3). A similar finding can be observed in the case of response of *PI* to shock in *SI* (see Figure 4).

6 Since this study only has two variables the ordering problem may not be that severe.

Figure 3: IRF of SI to shock in PI

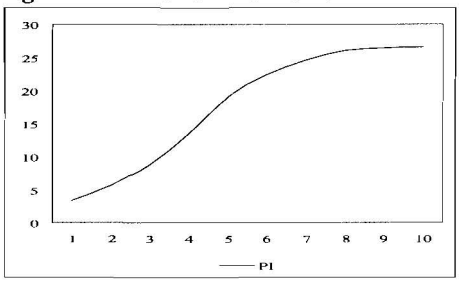
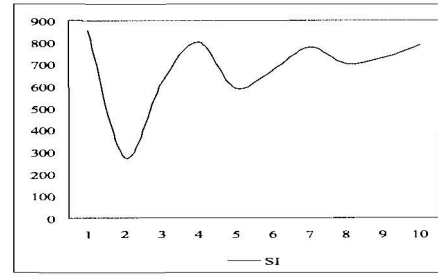


Figure 4: IRF of PI to shock in SI



As IRF only provides information regarding the direction of the response, we conduct generalized variance decomposition (VDC) to gauge to what extent shocks to certain variables are explained by other variables considered in the system. The results are tabulated in Table 6. Interestingly, the results are also relatively supportive of previous findings. As far as the endogeneity of the *SI* is concerned, the results demonstrated that *SI* behavior tends to be explained by the behavior of *PI*. Most *SI* behavior is explained by *PI*. For example, at the end of the 6th period, more than 80 percent of the behavior of *SI* is explained by *PI*. In contrast, the bulk of the variance in *PI* is explained by its own shock.

Table 6: Variance decomposition

	VDC of SI		VDC of PI	
Period	SI	PI	SI	PI
1	100.00	0.00	22.93	77.07
3	68.43	31.57	15.54	84.46
6	18.36	81.64	12.53	87.47

At this stage, we confirm that the behavior of PI is considered the main determinant of SI behavior. One possible explanation of why portfolio investment is associated with *SI* can be referred to the market leaders or price pressure arguments. The price pressure argument (Maeck, 2006), assumes that cross-border portfolio investors act to provide liquidity to the market. They explain that current portfolio investment by international investors predicts additional future inflows. The behavior pushes market returns up because of extrapolative expectation, but not necessarily an improvement in market fundamentals. The price pressure arguments can also be attributed to the approach put forward by Keynes (1936) in Chapter 12 of the General Theory. Writing in 1936, Keynes noted, "Speculators may do no harm as bubbles on the steady stream of enterprise. But the position is serious when enterprise becomes the bubbles

on a whirlpool of speculation". Thus, in Keynesian analysis, which has been formalized in recent theoretical literatures, price formation in the *Syariah* index may often be dominated by investor sentiment and herding behavior. The price pressure arguments are supported by some experimental evidence in the field of psychology. For example the study by Andereassen and Kraus (1988) found that when people are shown real historical stock prices and invited to trade in a simulated market, they tended to behave as if they estimate based on the trend on previous price performance. The biased self-attribution is a pattern of human behavior that claims successful events to one's own high-ability and attributes unsuccessful events to bad luck. The findings also mirror the argument put forward by Keynes (1936) who defined market herding behavior as "the activity of forecasting the psychology of the market."

CONCLUSION

The main objective of this study is to identify the dynamic relationship between the *Syariah* index and portfolio investment. Using the cointegration procedure, a long run steady state relationship between the *Syariah* index and portfolio investment is detected. Further investigation allows us to infer that there is a uni-directional causality that can be observed running from portfolio investment to the *Syariah* Index. The reverse causality from *Syariah* index to portfolio investment, however, cannot be observed. These findings are also relatively supported by the results from impulse response function and variance decomposition analyses.

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