Behaviour of the Islamic Stock Market in a Prolonged Downturn in the Global Market: Empirical Evidence from Malaysia

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Abstract

By focusing on Malaysian data, this study investigates the response of the Islamic stock market to changes in major macroeconomic variables such as industrial output, money supply, unemployment rate, exchange rate and foreign interest rate. It focuses on the period from January 2010 to December 2014 to capture the period of a prolonged downturn in the global financial market due to the U.S. financial crisis which started in 2007. The study adopts the co-integration approach of the Auto Regressive Distributed Lag (ARDL) model in order to capture the long-run relationship between the variables. The results show that the Islamic stock price reacts positively to the domestic factors, namely industrial activities, money supply, unemployment rate and real effective exchange rate disturbances. Interestingly, it reacts negatively to the foreign interest rate, suggesting investors' "flight to quality" behaviour during a downturn in the global equity market.

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Keywords: Macroeconomic variables, Islamic stock market, ARDL, Malaysia

1. Introduction

The stock market is considered as a "barometer" of economic performance and contains important information about the present and future macro-economic situation of a country. Bernanke (2003) suggests that stock prices are totally fragile towards economic circumstances. Trahan and Krantz (2011) show that more than 70% of stock returns are explained by macro trends. In fact, both theoretical conjectures and empirical works have long acknowledged the existence of a strong connection between the stock market and macroeconomic variables.

Theoretical models such as the discounted cash-flow model, arbitrage-pricing model and aggregate demand and aggregate supply (AD-AS) framework all highlight the importance of macroeconomic variables in the investment process. For instance, analysts admit the extensive usage of the discounted cash-flow model to recognize that economic forces have indirect effects on stock prices through the discount factor (k) and expected cashflows (see, for example, Kuworno and Nantwi, 2011; Yusof and Majid, 2007; Ibrahim, 2001; Maysami and Koh, 2000; Liljeblom and Stenius, 1997). Based on this model, any macro-economic variations bring about by changes in interest rates, prices of goods and services, money stock or currency performance that affect k and firm's cashflows will in turn have an effect on stock prices as well. The arbitrage-pricing model on the other hand, allows for multiple risk factors, thus contributing to different ways of defining systematic investment risk with multiple risk factors to anticipate the affect on stock returns. Examples of these factors include inflation, changes in interest rate, growth in GDP or serious political instability (Reilly and Brown, 2011). The extent of the impact of the shocks varies across assets, for instance, interest-sensitive stocks might experience a more significant impact due to interest rate changes, compared to interest-insensitive stocks.

Such connections also can be best understood by referring to the AD-AS framework, particularly to describe the close relationship between money demand and the equity market, as well issues relating to the transmission channel of monetary policy. In this context, Ibrahim and Aziz (2003) documented that Tobin-

Q, wealth, balance sheet and liquidity effects are possible channels that can best explain the transmission impact of monetary policy to the economy. Expansionary monetary policy through increased money supply lowers interest rates, and since the public often views the stock market as the best place to hedge against inflation, this triggers the desire to purchase stocks. The greater demand for stocks in marketplace would in turn, push their prices higher.

There have been extensive studies investigating the relationship between macroeconomic variables and the stock market. Earlier studies mainly focused on the developed market such as Hamao (1989) and Mukherjee and Naka (1995) for the Japanese market, Poon and Taylor (1992) for the UK market, Chen et al. (1986) and Bulmash and Trivoli (1991) for the United States (US) market, and Asprem (1989) for ten European markets. More recently in the post-2000 period, research focus has largely shifted towards the emerging markets. Among the studies are Hosseini et al. (2014) which focused on China and India, Kuwornu and Nantwi (2011) on Ghana, Gay (2008) on four emerging countries, namely India, China, Russia and Brazil, Wongbangpo and Sharma (2002) on five ASEAN countries, namely Malaysia, Thailand, Indonesia, Singapore and Philippines, Maysami and Koh (2000) and Bilson et al. (2001) on 20 emerging countries, and Kwon and Sin (1998) on South Korea. More specifically in the context of Malaysia, several studies have been done such as Yusof and Majid (2007), Ibrahim (2003), Ibrahim and Aziz (2003), and Habibullah and Baharumshah (1996).

Despite the abundant empirical studies on the interaction between the economic forces and stock prices, studies in the context of the Islamic stock market, while increasing, is still considered relatively few. Focusing on the Islamic stock market is highly relevant and timely, particularly in the case of Malaysia due to the dominance of the *shari'ah*-compliant stocks in the Malaysian stock market. According to the Securities Commission, Malaysia (2014), currently more than 80% of the public-listed firms in the Malaysian stock market are *shari'ah*-compliant. In 2013, the bourse witnessed a gain of 9.5% of the Islamic stock index compared to a gain of 7.2% of its conventional counterpart, indicating the demand for Islamic stock is growing faster than its conventional counterpart. More importantly, at the global front, the focus of the international investors in Islamic finance has now expanded to capital market-based instruments from the earlier bank-based instruments (Dewandaru et al., 2014). Amid the uncertainties in the conventional financial market globally, investors are demanding more of the Islamic investment products as a viable investment alternative (Al-Khazali, 2014).

Against the backdrop of these issues, the objective of this paper is to examine how variations in major macroeconomic variables, namely industrial activities, money supply, unemployment rate, exchange rate and foreign interest rate affect the behaviour of Islamic stock price in the long run using the co-integration approach of the Auto Regressive Distributed Lag (ARDL) model. The aforementioned variables reflect the inter-relation of four markets; security market (stock market), goods market (industrial index), money market (money supply), labour market (unemployment rate) and two international factors (exchange rate and foreign interest rate).

Wongbangpo and Sharma (2002) proposed a model covering these four markets on finding the dynamic interactions of conventional stock market and macroeconomic fundamentals in five ASEAN countries. However, considering the Walras' law that allows for omission of any of the markets in the analysis, variable from labour market is dropped from the analysis due to explicit consideration, which is not clearly mentioned. A novel aspect of this study is that it incorporates all four markets in our analysis including labour market. Labour news might not receive particular attention in the literature as other variables,[*] but we intend to demonstrate the market dependence on macroeconomic news in which unemployment rate is one of the components.

On industrial output, it is expected that market participants are concerned about real output since according to the standard valuation theory, production of output has direct relationship with firm's profit growth. For money supply and stock price, money stock is considered as a relevant trigger indicator to effectively influence the vibrancy of stock market, since it deals directly with monetary policy decision making. Thus, the pattern of interaction may indicate the effectiveness of direct intervention the

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[*] Few studies incorporating unemployment rate in their set of independent variables such as Orphanides (1992), McQueen and Roley (1993) and Boyd et Al. (2005).

policymakers played in the Islamic financial system and whether their ongoing efforts towards designing appropriate actions are translated effectively in the marketplace. If stock price responded to these two variables, they might be a suitable target for the policymakers to focus on in order to spurring the performance of equity market. Third, since Malaysia is a small and opened economy, incorporating factors affecting trade balance position and global competitiveness is inevitable. Last but not least, other related studies such as Majid and Yusof (2009) and Hussin et al. (2012) did not satisfactorily address the current specific issues such as the recent financial crisis where the US Federal Reserve lowered the fed funds rate to its' lowest level since 2007. Given that the conduct of our monetary policy is influenced by the foreign shocks (Kassim and Manap, 2008), we incorporate the effect of fed funds rate on the Islamic stock price in our analysis.

2. Methodology

2.1 Data and Data Sources

The estimating model considers the interrelation of four different markets. The Islamic stock price represents the security market and is proxied by the Bursa Malaysia Emas Shariah Index (henceforth denoted as *FBMESI*).[†] On the determinants of the Islamic stock price behaviour, it covers another three different markets, namely the goods market, money market and labour market. The industrial production index (IPI), money supply (M3), and unemployment rate are used to represent these markets, respectively. Due to high influence of foreign shocks on the conduct of monetary policy, as highlighted by Kassim and Manap (2008), two foreign factors are included, namely the real effective exchange rate (REER) and Federal funds rate (FFR).

Monthly data covering the period from January 2010 to December 2014 are gathered from various sources. Macroeconomic data is taken from Bank Negara Malaysia's *Monthly Statistical Bulletin*, International Monetary Fund's *International Financial Statistics*, Federal Reserve website, while the stock index data is retrieved from *Bloomberg* database. The selection of January 2010 as the starting point of the research is due to data limitation issue since monthly unemployment rate data for Malaysia is only available from 2010.

2.2 ARDL Bound Testing Approach

This study employs the cointegration technique of the Auto Regressive Distributed Lag (ARDL) approach in efforts to capture the long-run cointegration between selected macroeconomic variables and the Islamic stock price. The ARDL approach, which was initially developed by Pesaran et al. (1996), is chosen due to its several advantages compared to the most commonly used cointegration techniques - Engle-Granger (EG) and Johansen and Juselius (JJ). First, the EG and JJ methods require the variables used to be cointegrated in the same order to avoid pre-testing problem, thus introduces the degree of uncertainty into the analysis of level relationship. Second, the EG technique is inappropriate to be employed in a multi-variate model because it is based on the assumption that there exist only one cointegrating vector that connect all the variables (Saibu and Nwosa, 2011; Pesaran et al., 2001).

Consequently, the ARDL test is a suitable alternative, where this technique can be applied despite of stationary properties of the variables, or in other words, it can be applied even if the variables are I(0), I(1) or mutually cointegrated. Although this pre-testing is not a prerequisite for subsequent procedures under ARDL framework, Duasa (2007) notes that unit root test may convince us whether the ARDL model should be used or not. This test would be most appropriate in situation where the underlying regressors show a mixture of I(0) and I(1). Furthermore, the ARDL model is not sensitive to sample size unlike the other approaches, even for small sample size (as in the case of the models in this study), this test is still suitable. The ARDL model also takes sufficient number of lags to capture data generating process in a

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[†] Bursa Malaysia has replaced Kuala Lumpur Shariah Index with Bursa Malaysia Emas Shariah Index starting November 1, 2007.

general to specific modelling framework (Kassim, 2013; Laurenceson and Chai, 2003). The estimation of the baseline models in this study are as follows:

$$FBMESI_t = \alpha_0 + \alpha_1 IPI_t + \alpha_2 M3_t + \alpha_3 UNEMP_t + \alpha_4 REER_t + \alpha_5 FFR_t + \epsilon_t \qquad (1)$$

The error correction version of the ARDL framework pertaining to equation (1) can be expressed as follows:

$$\Delta FBMESI_t = \delta_0 + \Sigma\,\theta_i \Delta FBMESI_{t-1} + \Sigma\,\varphi_i\,IPI_{t-1} + \Sigma\,\phi_i \Delta M3_{t-1} + \Sigma\,\gamma_i \Delta UNEMP_{t-1} + \Sigma\,\mu_i \Delta REER_{t-1} + \Sigma$$
$$v_i \Delta FFR_{t-1} + \lambda_1 FBMESI_{t-1} + \lambda_2\,IPI_{t-1} + \lambda_3\,M3_{t-1} + \lambda_4 UNEMP_{t-1} + \lambda_5 REER_{t-1} + \lambda_6 FFR_{t-1} + \mu_{1t}\,(2)$$

Equation (2) contained of two parts. The first part indicates the short run error-correction dynamics (shown by the coefficients with the summation signs Σ_n), while the second part represents long run estimates (reflected by the terms with λ_s). The null hypothesis is defined by H_0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = 0$, if not rejected means there is no cointegration exists in the long run. This hypothesis will be tested against the alternative hypothesis of H_a: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda6 \neq 0$, by the means of the F-test. Prior to the cointegration testing, all variables will be converted into logarithm form to obtain a constant elasticity in the models and then, a stationary test will be conducted to give us confirmation that if there is a mixture of stationary properties at level relationship (Duasa, 2007). In view of this, to determine the order of integration of variables, common unit root tests of Augmented Dicker Fuller and Phillip-Perron will be applied to the each variable. When the stationary properties of all variables are confirmed, a cointegration test will be conducted to know whether the long run relationship exists or not.

The first step of the ARDL approach is to select the optimal number of lags since the lag length criteria are important as it may influence the ultimate findings of this study. To determine the lag length of time series variables, there are several selection criteria being proposed, but we only reported Akaike information criterion (AIC) and final prediction error (FPE), since they are better choices for smaller sample (Liew, 2004). The second step involves conducting bounds F-statistics to each models to check if there is long run cointegration exists. To reach the results, the F-statistics value generated from the test will be compared against to those critical values of bounds statistics provided in Pesaran et al. (2001). They have tabulated two sets of critical values to be compared with the F-statistic value, one assumes they are all purely $I(0)$ and the other one assumes a purely $I(1)$. The results might fall into three situations, first, if F-statistics is lower than its critical value, it means variables tested has no long run association or purely not cointegrated, $I(0)$. Second, if F-statistics is greater than its critical value, the variables have long run relationship or purely cointegrated, $I(1)$. Third, if F-statistics fall within the critical value, the relationship of the variables is inconclusive or mutually cointegrated, which means we cannot decide whether particular variables tested are related or not in the long run.

3. Empirical Findings

3.1 Unit Root Test

The results of the unit root tests based on the ADF and PP are presented in Tables 1 and 2. The results show that all the variables had unit root at levels, but became stationary after first differencing I(1), except for lnIPI and lnUNEMP where they are stationary at both levels and first difference under ADF and PP test. Since the results appear mixed with the lnIPI and lnUNEMP being integrated at $I(0)$, this confirm that the estimating model can be further analysed to the next level of testing.

Table 1. Stationary test of variables on level and first difference - ADF

	Level		First difference	
Variable	Constant	Trend	Constant	Trend
ln FBMESI	-1.864726	-2.32251	-7.81611*	-7.95366*
ln IPI	-2.543963	-6.99223	-15.7599*	-15.6118*
ln M3	-0.820495	-1.09325	-8.406041*	-8.46339*
ln UNEMP	-4.968642*	-5.58302*	-9.607310*	-9.54230*
ln REER	-4.421479	-4.87291	-5.844863*	-5.90857*
ln FFR	-1.666507	-2.03361	-6.908704*	-6.81879*

Notes: * denotes 1 percent level of significance. The critical values given in the test report is -3.514426 at the 99% significance level.

Table 2. Stationary test of variables on level and first difference - PP

	Level		First difference	
Variable	Constant	Trend	Constant	Trend
ln FBMESI	-1.8792	-2.3225	-7.8167*	-7.9671*
ln IPI	-4.7208*	-7.0853*	-20.86*	-20.6479*
ln M3	-0.8434	-1.1155	-8.3818*	-8.4439*
ln UNEMP	-5.0216*	-5.6897*	-12.422*	-12.3313*
ln REER	-3.4564	-3.4596	-5.5302*	-5.6345*
ln FFR	-1.9733	-2.4307	-6.9641*	-6.8746*

Notes: * denotes 1 percent level of significance. The critical values given in the test report is -3.5144 at the 99% significance level.

3.2 ARDL Analysis

Before proceeding to the ARDL estimation, it is necessary to determine the lag length criteria. Here we use the appropriate lag length as suggested by Akaike Information Criterion (AIC) and Final Prediction Error (FPE) of lag 7. The model was subsequently tested using "General to Specific Approach" to get the parsimonious specification. The insignificant variables were removed, except for the level variables and intercept that must be retained. The computed F-statistics for the model suggests that the equilibrium relationship exists between the selected macroeconomic variables and Islamic stock price in the long run.

The analysis on the significance of respective variables towards Islamic stock price behaviour, individually, is reported in the fourth column in Table 3. In terms of multivariate cointegration, our results are in line with the wide agreement upon existing literatures on similar market data where the selected macroeconomic variables, namely money supply, industrial production, unemployment rate, exchange rate and Federal funds rate do indeed have important influence on the Islamic stock price behaviour in Malaysia. However, the channels of effect, as denoted by the sign of coefficients from individual variables, appeared to be mixed.

Table 3.
Lag Length, F-statistic of Cointegration Relationship (in Parsimonious Specification)
and Long Run ARDL Model Estimates for Each Variable

Lag length	F-test statistic	Dependent variable	Coefficient and *t*-test statistic
7	7.1853	C	-14.2117
			(-5.0112)
		*ln*IPI	0.9203**
			(2.7712)
		*ln*IPI	0.2003**
			(1.7957)
		*ln*UNEMP	1.3842*
			(4.6486)
		*ln*REER	8.1777*
			(5.0195)
		*ln*FFR	-0.1007*
			(-3.5970)
			Adj-R^2 = 0.4648
			D-W = 2.0040

Notes:
1. The relevant critical value bounds for the model are given in Table C1.iii (with unrestricted intercept and no trend; the number of regressors = 6). They are 3.15 – 4.43 at the 99% significance level; 2.45 – 3.61 at the 95% significance level; and 2.12 – 3.23 at the 90% significance level (see Table C1.iii, Pesaran *et al*., 2001). * denotes that F-statistic falls above the 99% upper bound.
2. *, ** and *** denote significantly at 1%, 5% and 10% level of significance, respectively. *t-statistic* in ( ). D-W denotes Durbin-Watson test for autocorrelation.

As predicted, the Islamic stock price responds positively to industrial production, supporting the common notion that an increase in real economic activities, leads to higher firm profits both current and expected, thus adjusts demand curves for stocks to shift rightward and hence, results stock prices to rise. It is apparent that current firms' cashflows do reflect the relation between industrial activities and Islamic stock prices. This result concurs with the previous studies such as Shanken (2006), Binswanger (2004), Wongbangpo and Sharma (2002), Kwon and Shin (1999), Fama (1992), and Chen et al. (1986). Money supply also shows positive impact on the Islamic stock price. Two possible explanations for such interactions are; first, there is a direct positive effect from changes in money supply, where greater (lesser) liquidity buoys the desire of investors to holding more (or less) stocks in their portfolio thus affecting the price of particular stocks selected. Second, it presumably due to the indirect effect via it influences on firms' cashflows, where an increase in the availability of money appeals public to spend more on goods and services, hence results in more vibrant economic activities. This will affect the cashflows of firms to respond positively and when this happens, the value of stocks will rise as well. The finding is in line with Dhakal (1993), Mukherjee and Naka (1995), Ibrahim (2003), and Hosseini et al. (2014).

The results also show that Islamic stock price reacts significantly to the labour market as proxied by the unemployment rate. Since it is shown that the relationship is positive, it can be understood that the result suggests that rising unemployment rate means an increase in the Islamic stock market. This puzzling finding is rather difficult to explain, since logically good news from the labour market indicates that an economy is expanding, thus investors tend to have optimistic expectations regarding future business cycle of the firm, which in turn will increase the stock price. However, according to Boyd et al. (2005), there are at least two factors that might be the primary sources of this interaction; first, growth expectations. Often slower growth appears as a result of a rising unemployment rate, so equity investors will expect a revision in growth expectations. Thus, stock prices may decline. Second, they obtained explicit evidence that the unemployment rate has a positive correlation with equity risk premiums. In other words, rising unemployment rate (bad news concerning the labour market), leads to an increase in equity risk premiums.

The real effective exchange rate is found to be positively and significantly related with the Islamic stock price. Theoretical discussion usually relates the linkage between trade balance position and global competitiveness and the Malaysian economy is no doubt, highly dependent on international trade. Since the current account balance depicts that our economy is export-oriented with the domestic firms heavily exporting their output, our result advocates the common view that when a currency is depreciating, it encourages exports since the volume of sales will increase. So, a firm's cashflow will increase, hence pushing its stock price higher. Indeed, the findings of Aggarwal (1981), Roll (1992), Chiang and Yang (2003), and Phylaktis and Ravazzolo (2005) are all consistent with the finding of this study.

Lastly, the federal funds rate (FFR) shows a significant negative relationship with the stock price. Since 2007 until present, the FFR has been at the lowest level because of subprime mortgage crisis, thus the international investors no longer consider the US as a safe haven for their portfolio diversification. Consequently, funds are shifted to the emerging Islamic market and thereby escalating the stock prices higher. This implies that the Malaysian Islamic stock market is highly sensitive to the events happening in the US. In times of crisis such as the U.S. sub-prime crisis of 2007-2008, emerging stock markets such as Malaysia experienced a significant in-flow of funds.

To ascertain the stability of the models, we apply the CUSUM test proposed by Brown et al. (1975). The CUSUM test employs the cumulative sum of recursive residuals based on the first set of observations and is updated recursively and plotted against the break points (Kassim and Manap, 2008; Bahmani-Oskooee and Ng, 2002). As long as the CUSUM statistic is found (see the blue line in the Figure 1) within the critical bound values of 5 percent significance level (see the two red lines in the Figure 1), the model is considered stable and free from serial correlation, thus confirming that null hypothesis of coefficient constancy cannot be rejected at the 5 percent level.
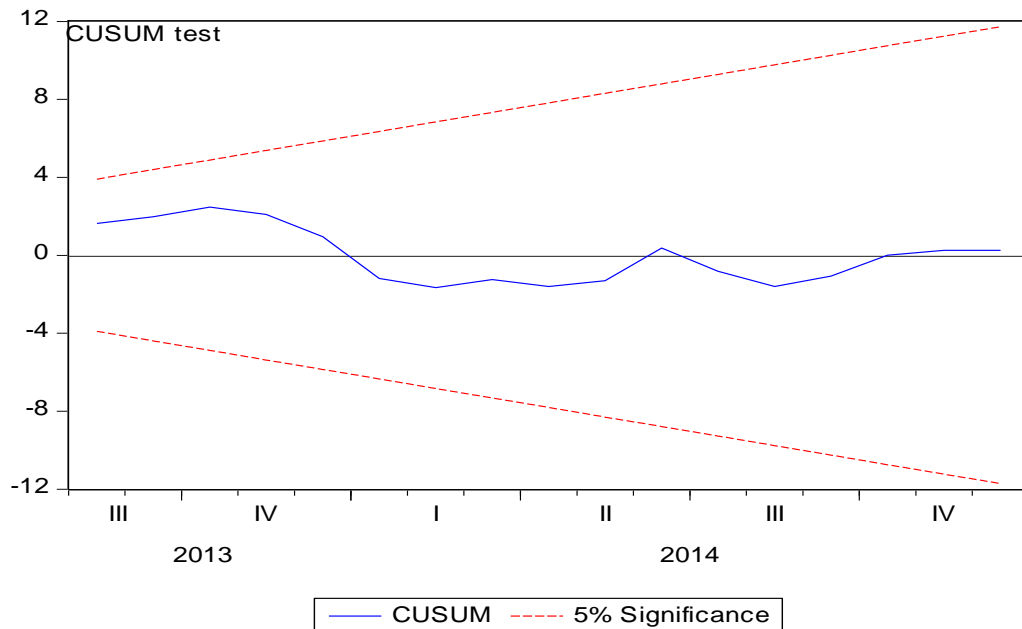

Figure 1. Stability Test of the Goodness of Fit of the ARDL Model

4. Conclusion

While a bulk of literature enthusiastically measured the linkages between macroeconomic forces and stock price within the context of conventional market, empirical studies on the Islamic stock market remain negligible despite the domination of shari'ah-compliant stocks in the Malaysian bourse. This raises the question as to what extent Islamic stock prices are susceptible to macroeconomic conditions. We, therefore, investigated the effect of macroeconomic disturbances on the Malaysian Islamic stock market in

the long run. Domestic macroeconomic fundamental factors such as industrial activities, money supply, unemployment rate, and two international factors, which are real effective exchange rate and federal funds rate, were taken into consideration in our analysis.

Our findings revealed that while the Islamic stock market showed a reaction towards all the variables selected, the pattern of the responses is mixed. Monetary aggregates (M3) had positive relationship with stock price, where direct liquidity effect and indirect effect via real economic activities might be the sources of this positive relation. Industrial activities also affects stock price in a positive manner, supporting the common view that vibrant economic activities usually lead to a higher stock value through the effect of a firm's earnings and cash flow. Unemployment rate and Islamic stock price related positively, which is surprising. Following the Boyd et al. (2005), we reasoned this puzzling result due to the revise on growth expectations by the investors during economic expansion and positive relation that unemployment rate had with equity risk premiums. Next, there is a positive relation between real effective exchange rate and stock price. Given the current account balance is export-oriented, this result is not a surprise. Last but not least, foreign interest rate and the Islamic stock price showed a negative relationship. During periods of instability in major countries, particularly in the U.S., international investors might lose confidence and no longer see the U.S. market as safe haven for their portfolio diversification due to low rates of return. Thus, there is a "flight to quality" to a higher yielding investment option in the emerging Islamic market as investors could earn higher returns than they could domestically. However, there is a possibility that investors withdraw their investments if the Federal Reserve increases rates once the U.S. economy begins to recover, which of course, will have a negative effect on returns in emerging equity markets.

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