Vol. 76 | No. 3/1 | Mar 2020
DOI: 10.21506/j.ponte.2020.3.5
PONTE Florence, Italy
International Journal of Sciences and Research

FOREIGN INSTITUTIONAL INVESTORS AND THE STOCK MARKET: EVIDENCE FROM ARDL BOUND TESTING APPROACH IN THE CONTEXT OF SAUDI ARABIA

Hanan Mohammed Alhussayen
King Saud University, halhussayen@ksu.edu.sa
Lakshmi Kalyanaraman (Corresponding)
King Saud University, kaylakshmi@gmail.com

Abstract: The stock market of Saudi Arabia was opened up recently to Foreign Institutional Investors. (FIIs). This research tests the relationship between FIIs investment and Saudi stock market over the period 2015-2019 using weekly data. The auto-regressive distributed lag bounds test is applied to check for the presence of integration between FIIs investment and stock market. ARDL (2,1) model shows a positive long-run and short-run relationship between FIIs investment and Saudi stock market. The Granger causality test confirms a bidirectional relationship between FIIs investment and stock market. The positive power FIIs have over the Saudi stock market should facilitate the stabilization of the market and the reduction of its volatility, which is the goal market regulator's attempt to achieve.

Keywords: Foreign Institutional Investors (FIIs), Saudi stock market, Auto-regressive Distributed Lag model (ARDL), Granger causality, Market stability

1. Introduction

Saudi stock market, Tadawul as it is officially called, is the largest market in the Middle East and North Africa (MENA) region with the highest market capitalization (Market capitalization stands at USD 487,711 million as at the market close of October 30, 2019). (www.tadawul.com.sa) It is also the most liquid equity market in the region with around 200 listed companies. In view of its national initiative to move away from being an oil-based economy, the country opened its stock market to the foreign institutional investors (FIIs) on July 15, 2015. The Saudi stock market regulator, Capital Market Authority (CMA), has spelt out the goal of this policy initiative to open the stock market to FIIs. The objective is to attract FIIs with long-term investment goals who can contribute to the stability of the market and reduce its volatility. The focus is on improving the market efficiency by sharing the expertise and knowledge. The empirical works that test the impact of FIIs in emerging markets have come up with mixed findings. Some works support the view that FIIs are rational investors with long-term investment goals that reduce speculative trading (Walter and Howie, 2006), while others produce evidence to show that they have the potential to destabilize the emerging markets. (Chen et al., 2008)

This research is to test the long-run and short-run relationship between FIIs investment and stock market in Saudi Arabia, a country which opened its stock market to FIIs very recently. This research contributes to the vast existing literature that analyzes the relationship between FIIs

investment and stock market significantly. First, institutional investors are the dominant players in the Saudi stock market. Around 87 per cent of the total market, on an average, was held by the institutional investors during our period of analysis. Of this, on an average, around 74% is held by domestic financial institutions. This study analyses if FIIs can impact an emerging market dominated by domestic institutional investors. FIIs had been a marginal investor in the market till 2018. Their investment stood at around a meagre 0.75% as of December 27, 2018. After the commencement of the Saudi stock exchange inclusion tranches in the emerging market indicators, the market has been witnessing increased participation from FIIs. The number of foreign institutional investors registered with the market regulator increased from 118 as at the end of 2017 to 453 at the beginning of the current year to 1,195 as on June 20, 2019. (www.cma.org.sa) The holding of FIIs stands at around 7% of the market at present. As of now, 31 Saudi stock market listed companies are included in the MSCI Emerging Markets Index. The first seven months of this year witnessed an intense trading activity by foreign investors including FIIs which is around 21% of the total market activities. (www.tadawul.com.sa) The upgrade of Saudi stock market, in short, has made it an attractive destination for FIIs. This increased presence of FIIs warrants study on its impact on the stock market. Third, Saudi Arabia follows a currency management system of fixed peg with US dollar. This will completely remove the currency risk of the investments by FIIs from USA and from countries whose currencies have a high correlation with US dollar. Study of FIIs relationship in an emerging market that eliminates some or all of the currency risk of their investment adds to the importance of the study. Fourth, there has been no study that analyses the relationship between investment by FIIs and Saudi stock market other than the study by Sharif (2019) who study the impact of foreign institutional investors on the liquidity and volatility of the market based on data relating to 3 years before their entry and 3 years after their entry for 186 stocks. This study focuses on the long-run and short-run relationship between FIIs investment and the aggregate market index. This is the first study of its kind on Saudi stock market. ARDL bounds test applied to check the cointegration between FIIs investment and stock market index. Since the F-statistic confirms the existence of the cointegration between the two variables. Hence, the long-run and short-run coefficients with ARDL (2, 1) model are estimated. A positive relationship between the two variables is found in both in the long-run and short-run. Granger causality test finds a bidirectional relationship between FIIs investment and stock market. This has important implications for the Saudi stock market. The results show that FIIs have the power to impact the stability and volatility of the market.

The rest of the article is organized as follows. Section 2 reviews the related literature. Section 3 outlines the objectives for allowing FIIs in Saudi stock market and also shows the trends in FIIs investment. Section 4 presents the data and the definitions of the study variables. Section 5 describes the methodology applied by the study. Section 6 summarizes the results of the analysis carried out. The final section concludes the study and describes the main results of the study, its implications, limitations and possibilities for future research.

2. Review of Literature

Previous research show mixed results regarding the impact of FIIs on stock market. Some works show that FIIs have a negative impact on the stock market. (Bae, Chan and Ng, 2004; Karmakar, 2006; Dadhich, Chotia and Chaudhry, 2015; Dhingra, Gandhi and Bulsara, 2016). They argue that the short-term FII capital inflows may lead to the deviation of stock prices from its fundamentals. The findings of Bae et al., (2004) reveal that opening the stock market to foreign investments attract international inflows that increase the exposure of stock returns to global market risk. Dadhich et al., (2015) reveal in their research the persistence of volatility and confirm the significant impact of gross purchase of FIIs on the volatility of Indian stock market. Similarly, Dhingra et al., (2016) show in their research a destabilizing effect of foreign institutional investments on market returns, and this effect tends to increase with selling activities. This perspective is in line with the feedback trading hypothesis, proposed by Delong, Shleifer, and Waldmann (1990a). In their following research, 1990b, the researchers reveal that feedback trading deviates stock prices from its fundamentals and affects the market negatively. This happens when rational speculators follow positive feedback trader's buying activities. The later buy securities when their prices increase and the former tend to follow them without recognizing the irrationality of price movements, which destabilizes the market and pushes prices away from its fundamentals. The findings of Belhoula and Naoui (2011) are consistent with Delong et al., (1990b), and reveal the existence of positive feedback trading in the US market increases its volatility.

Previous works also produce results to show that FIIs have a positive impact on the stock market (Suresh Babu and Prabheesh, 2008; James and Karoglou, 2010; Li et al., 2011; Joo and Mir, 2014, Vo, 2015, Vo, 2017). FIIs tend to be highly qualified, therefore, their investment decisions are considered long-termed, well researched and don't harm the market. This perspective is in line with the base-broadening hypothesis, proposed by Metron (1987), which state that widening the investor's base generates higher diversification that leads to lower risk through risk sharing and, thus, lower required risk premium. The findings of James and Karoglou (2010), Li et al., (2011) and Joo and Mir (2014) support the base-broadening hypothesis and reveal a positive impact of foreign investments on the stock market. Similarly, Vo (2015) prove the persistent of the positive impact of foreign investments through lower stock price volatility in Vietnam stock market. Whereas, Suresh Babu and Prabheesh (2008) find a bidirectional relationship between FIIs investments and stock returns. The high volume of investments by foreign investors allow them to play the role of market makers and stabilize the market.

Beside the high qualifications of foreign investors that affect positively on the market and lead to risk sharing, FIIs can have positive influence on the market through their monitoring role, as proved by Li et al., (2011), and Sharif (2019). Li et al., (2011) prove in their research a significant positive impact on stock's returns with the presence of large foreign shareholders in the firm. The large foreign shareholders require higher transparency and managerial accountability to protect their investment. This should strengthen the corporate governance regulations of the hosting country and lower its market volatility. Whereas, Sharif (2019) show that the presence of FIIs in the Saudi

market reduces both of securities' overvaluation and market liquidity. This could result from the reluctance of domestic investors to trade against the sophisticated foreign investors who are more informed about the market.

Since Saudi stock market is already dominated by domestic institutional investors and also investors from the GCC countries, the FIIs may be expected to impact the stock market positively because of the dominance of these informed professional traders. This study is to fill the gap in literature that analyses the relationship between FIIs investment and the aggregate market index. This is the first study to fill this gap.

3. Foreign institutional investors in Saudi stock market

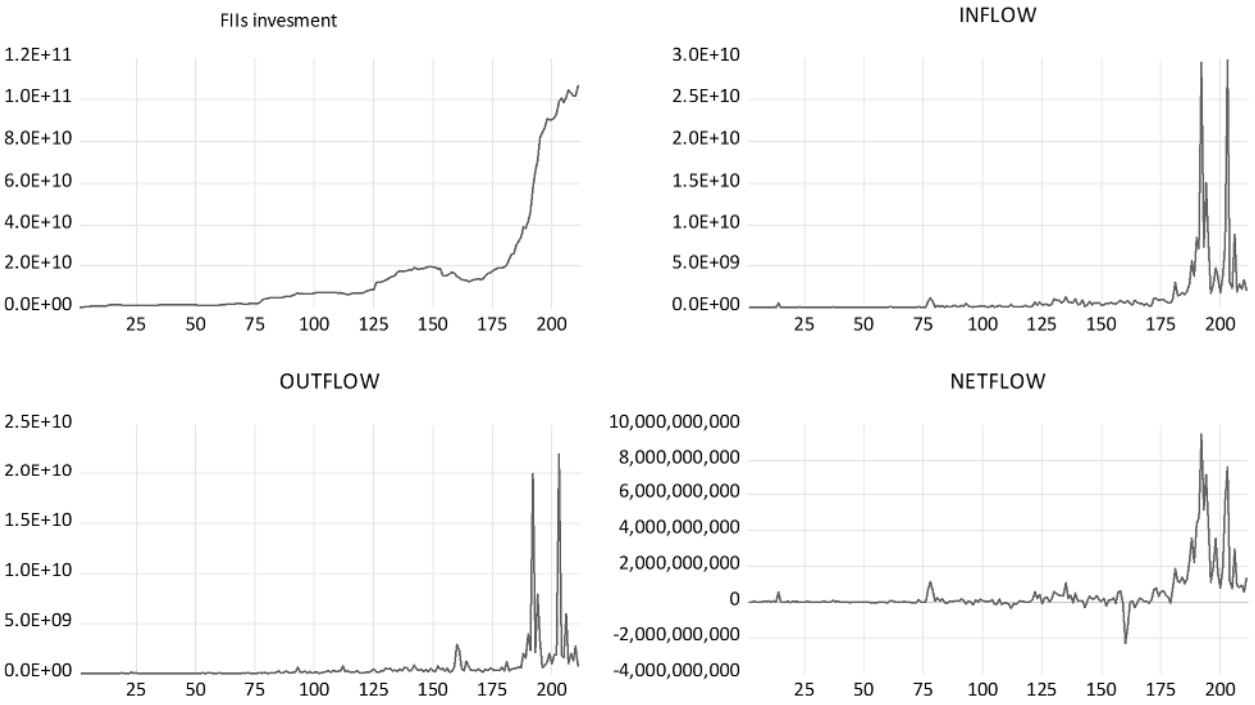
Opening up of the stock market for the FIIs is in line with the country's policy initiative to broad base the economy from being dependent on oil. CMA has clearly stated that the reason for inviting FIIs to Tadawul is not to attract capital or liquidity. The regulator has outlined a few objectives which are both short-term and long-term in nature.

1. FIIs are expected to enhance the market stability and diminish its volatility by attracting FIIs with long-term investment goals.
2. FIIs are to share their expertise and knowledge with the other market participants and help improve their level of professionalism.
3. FIIs are to improve the market efficiency by improving the level of disclosure and transparency.
4. FIIs are to help Saudi capital market to become a prominent emerging market and obtain a better rating in the global indices led by Morgan Stanley Capital International (MSCI) Index.
5. FIIs are to contribute to the level of research and analysis on the market and the companies listed in the market to get more fair valuations.

The FIIs seeking registration as qualified financial institution with CMA should be a financial institution incorporated in one of the seventy countries approved by the regulator as a bank, brokerage and securities firm, insurance company, government and government related entities and an investment fund. All applicants other than government entities should have a minimum of USD 1 billion assets under management either under it or its group. Other than government and investment funds, other FIIs should possess an experience of minimum five years in securities investment activities to qualify. There are caps on individual FII's investment in a company and the total investment of all FIIs in a company. The individual cap on an FII's ownership in the shares or convertible debt instruments of a listed issuer stands at 10%, while the ownership of all FIIs is capped at 49%. All the regulations indicate that CMA is interested in inviting FIIs of considerable assets under management, with sound experience in the market, having a long-term investment goal with a vision to stabilize the market. Figure 1 shows the FIIs' investment, inflow, outflow and the netflow. Inflow refers to their buying, outflow is their selling and the netflow is the difference between their buying and selling. These data are represented for the 211 weeks of

our study. FIIs investment remained at less than 1% of the market till March 7, 2019. They were marginal operators in the market and were not active in the market in a significant way. As a response to the CMA's reforms on the regulations for QFIs and upgrade of the Saudi stock market to an emerging market status, FII inflows started growing in leaps and bounds. From USD 5,172.20 million dollars as of March 7, 2015 the FIIs investment increased many folds and stood at USD 28,433.00 million as of October 24, 2019. The FIIs hold around 6% of the market as of October 24, 2019. Their trading activity also showed a similar trend. The addition of Tadawul-listed shares in the MSCI and FTSE emerging market indexes has resulted in higher FIIs flows this year. During this year, the net flows have remained positive during all the weeks. Since the FIIs have become more active and their investments have increased substantially this year, this research that evaluates the dynamic interaction between FIIs investment and stock market becomes important.

Figure 1 Trends in FIIs investment, inflow, outflow and netflow



4. Data and variables

In order to examine the relationship between Saudi stock market and the foreign institutional investment in the market, data is extracted from the weekly stock market ownership and trading activity report published by the Saudi stock market on its website. (www.tadawul.com.sa) Tadawul All Share Index (TASI) is an all-share index based on free float methodology. This index is used to represent Saudi stock market. Foreign institutional investment variable relates to the value of the net investment held by the qualified foreign investors as at the close of the market on the last trading day of the week, Thursday expressed in Saudi Riyals. The choice of period of study for

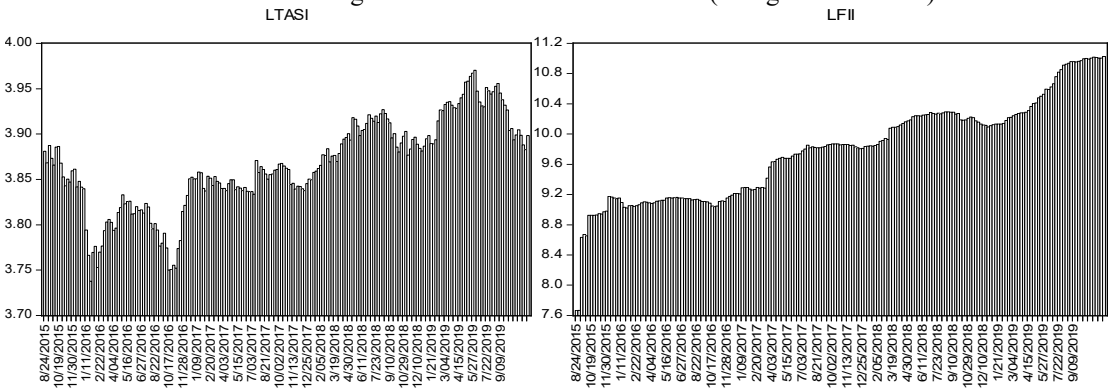
this study is constrained by data availability on the study variables. Data relating to all the variables is weekly for 211 weeks from August 27, 2015 to October 24, 2019. QFIs are allowed for trading in Saudi stock market since June 2015. The weekly data relating to trading and value of the investment held by different types of shareholders were published only from August 27, 2015. This study covers all the available data from the first weekly report made available till the date of analysis.

The functional relationship between Saudi stock market and foreign institutional investment is given below.

LTASI = f (LFII)

LTASI is the Tadawul All Share Index. LFII is the net investment held by the qualified foreign institutional investors. Both the variables are represented in their logarithmic form.

Figure 2 TASI and FIIs investment (in logarithmic form)



5. Methodology

Any time series analysis requires an understanding of the nature of data. (Ewing et al., 2007) Augmented Dickey-Fuller (1979) and Phillips-Perron (1988) tests are applied to analyze the stationary condition of the study variables. The dependent variable, TASI, is I(1) and the independent variable FII is I(0). Hence, the study proceeds to apply the autoregressive distributed lag model (ARDL) suggested by Pesaran et al., (2001) for testing the co-integration among the study variables and the error correction analysis. ARDL model of co-integration offers many advantages over the traditional tests of co-integration. ARDL test of co-integration is ideal in cases where the analysis involves the test of integration of variables of different order. It is the best suited technique for testing co-integration in a small sample or finite sample. (Pesaran et al., 2001) The estimates and t-statistics produced ARDL methodology are not affected by the presence of autocorrelation and endogeneity problems. (Harris and Sollis, 2003) ARDL procedure estimates both long-run and short- run relationship of the study variables simultaneously. ARDL is a least squares regression model with lags of dependent and independent variables. The model produces an asymptotic test statistic and is not affected by the different orders of lag for the study variables. An ARDL regression of order (p,q) can be expressed as follows.

$$y_t + \beta_1 y_{t-1} + \cdots + \beta_p y_{t-p} = \lambda + \alpha_0 x_t + \alpha_1 x_{t-1} + \cdots + \alpha_q x_{t-q} + \varepsilon_t \quad (1)$$

The model is autoregressive as the model includes the lagged values of the dependent variable. The model also includes distributed lag component of the independent variables. The model is estimated as OLS.

Our study ARDL model included dynamic regressors and is given below.

$$\Delta LTASI_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta LTASI_{t-i} + \sum_{i=0}^{q} \beta_{2i} \Delta LFII_{t-i} + \delta_{11} LTASI_{t-1} + \delta_{21} LFII_{t-1} + \upsilon_{1t} \quad (2)$$

Where Δ is the first difference operator and $\upsilon_{1t}$is the white noise error term. Lag length is selected as per Akaike Information Criterion (AIC).

LM test is to check if the errors are serially independent. The errors of the estimated model should be free from serial correlation. According to Pesaran et al., (2001), this will influence the choice of lags for our study variables in the model. The next step is applying bound testing. The first step in ARDL co-integration approach is to test for the existence of a long-run relationship between our study variables by carrying out the bound test for co-integration. This requires computation of the F-statistic. The F-statistic tests the absence of long-run equilibrium relationship between the study variables. The F-statistic tests the joint null hypothesis that the coefficients of the lagged variables are zero. The null hypothesis for no co-integration among variables in equation (2) is $H_0: \delta_{11} = \delta_{21} = 0$and the alternative hypothesis is $H_1: \delta_{11} \neq \delta_{21} \neq 0$. The distribution of this F-statistic is non-standard, irrespective of whether the variables in the system are I(0) or I(1). F-statistic is evaluated against the two sets of critical values in Pesaran et al., (2001) The lower critical bound assumes all variables are I(0) concluding that there exists no co-integration among the study variables. The upper critical bound assumes all variables are I(1) suggesting that there is co-integration among the study variables. When the computed F-statistic is greater than the upper bound critical value it may be concluded that there exists co-integration among the variables. If the F-statistic is less than the lower bound critical value, it may be concluded that there is no co-integration among the study variables. If the F-statistic falls between the upper and lower bound critical values, the results are inconclusive. Additionally, a bound t-test of H_0: $\delta_{11} = 0$ against H_1: $\delta_{11} < 0$ is carried out to cross-check our result. If the t-statistic for the lagged dependent variables is above the I(1) bound found in Pesaran et al., (2001), it may be concluded that there is a long-run relationship between the variables. If the t-statistic is lower than the I(0) bound, the conclusion is that the data is stationary. If the variables are found to be co-integrated based on the bounds test, the long-run relationship between the variables is estimated by the following equation.

$$LTASI_t = \alpha_{01} + \sum_{i=1}^{p} \beta_{1i} LTASI_{t-i} + \sum_{i=0}^{q} \beta_{2i} LFII_{t-i} + \varepsilon_{1t} \quad (3)$$

The short-run dynamics can be captured by specifying the following error correction model.

$$\Delta LTASI_t = \alpha_{01} + \sum_{i=1}^{p} \beta_{1i} LTASI_{t-i} + \sum_{i=0}^{q} \beta_{2i} \Delta LFII_{t-i} + \lambda_1 ECM_{t-1} + \varepsilon_{1t} \quad (4)$$

ECM_{t-1} is the error correction term and λ is the speed of adjustment. The coefficient of the error correction term denotes the speed of adjustment to the long-run equilibrium after a state of disequilibrium from short-run shocks. λ has to be negative and statistically significant. (Shahbaz et al., 2013)

Diagnostic tests to ensure ARDL assumptions like errors are free from serial correlation and normally distributed are carried out. Breusch-Godfrey serial correlation LM test is to check serial correlation and Jarque-Bera test is for normality testing. Breusch-Pagan/Cook-Weisberg test for heteroskedasticity is done to check the presence of the issue of heteroskedasticity in the model specification. Ramsey Reset test is done to check if the model suffers from misspecification. Recursive CUSUM and CUSUM of squares (Brown et al., 1975) is to check the structure stability of the model.

Upon the confirmation of the long-run relationship between stock market index and investments held by foreign institutional investors by application of ARDL bounds test and establishing co-integration, Granger causality test to investigate the direction of causality between the variables is conducted. Error correction model based Granger causality test is applied.

6. Results

Pretesting for the unit roots is not a pre requisite for ARDL co-integration technique as it can handle integration of variables of different order.

However, the technique will crash in the presence of variables that are integrated of order I(2). The test for unit roots is to ensure that none of the time series variables is I(2).

As suggested by Enders(1995), both Augmented Dickey-Fuller (1981) and Phillips-Perron(1988) tests are applied.

Table 1 Results of unit root tests

	Augmented Dickey-Fuller test statistic		Phillips-Perron test statistic	
Variables	Level	First difference	Level	First difference
LTASI	-1.4960	-13.3040***	-1.6158	-13.2917***
LFII	-3.1065**	-13.7709***	-2.8216**	-13.9475***

*** Significant at 1% level
** Significant at 5% level

Both the tests confirm that that the study variables are stationary at level or at first difference. The unit root tests' results show that none of the study variables is I(2). Data is fit for the application of ARDL test procedure.

The upgrading of Saudi stock market as an emerging market has made it an attractive destination for FIIs. Section 3 that relates to foreign institutional investors in Saudi stock market shows that the FIIs investment in the market increased significantly since March 14, 2019.

Both the foreign investment flows and number of FIIs registered with the regulator showed a tremendous rise. Besides, the regulator has also carried out a number of amendments to the QFIs regulation as the initial response to the policy initiative to open the stock market to FIIs investment was not encouraging.

FIIs investment flows responded positively to both of these market happenings. Hence, if there is any structural break in FIIs investment data is checked. The upgrade of the Saudi stock market as emerging market can be expected to impact the market sentiment positively and affect the stock market performance.

Hence, both the study variables are tested for any structural break. Zivot-Andrew(1992) test of structural break analyses is FIIs investment time series data and Saudi stock market time series data have any structural break. The results of the test are presented in table 2.

The results of the test shows absence of a structural break in both the time series data.

Table 2 Zivot-Andrews Unit Root Test results

	Null Hypothesis: LFII has a unit root with a structural break in the intercept	Null Hypothesis: LTASI has a unit root with a structural break in the intercept	Null Hypothesis: LFII has a unit root with a structural break in the trend	Null Hypothesis: LTASI has a unit root with a structural break in the trend	Null Hypothesis: LFII has a unit root with a structural break in both the intercept and trend	Null Hypothesis: LTASI has a unit root with a structural break in both the intercept and trend
Zivot-Andrews test statistic	-2.9310	-3.5463	-2.8363	-3.3462	-3.6775	-4.1017
1% critical value:	-5.3400	-5.3400	-4.8000	-4.8000	-5.5700	-5.5700
5% critical value:	-4.9300	-4.9300	-4.4200	-4.4200	-5.0800	-5.0800
10% critical value:	-4.5800	-4.5800	-4.1100	-4.1100	-4.8200	-4.8200

To test if co-integration is present between FIIs investment and Saudi stock market, bound test approach is applied. The result of the test is presented in table 3, which shows that the computed F-statistic (9.22) is higher than the F-critical value at 1%, 5% and 10%. The result supports the rejection of null hypothesis, which indicates the presence of a long-run relationship between the study variables. A co-integration between FIIs investment and stock market can be inferred. Since existence of co-integration is confirmed, the long-run and short-run relationship between FIIs investment and stock market is analyzed.

Table 3 ARDL bounds test result for co-integration

H_0: No cointegration	Value	10% critical bounds		5% critical bounds		2.5% critical bounds		1% critical bounds	
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F-statistic	9.22***	4.04	4.78	4.94	5.73	5.77	6.68	6.84	7.84

*** Significant at 1% level

ARDL (2,1) is found to be the most appropriate model for our study variables as suggested by Akaike Information Criterion. The Breusch-Godfrey serial correlation LM test is conducted to check if our results suffer from serial correlation problem. Table 4 presents the result of the serial correlation test. The result confirms absence of serial correlation problem.

Table 4 Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.2770	Prob. F(2,202)	0.7583
Obs*R-squared	0.5717	Prob. Chi-Square(2)	0.7514

The diagnostic test for heteroscedasticity rules out the presence of this problem. The result of the Breusch-Pagan-Godfrey heteroscedasticity test is presented in table 5. The test result confirms absence of this problem in our model estimation. It may now be concluded that the model is good enough to study the cointegration between FIIs investment and stock market.

Table 5 Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.4297	Prob. F(4,204)	0.2254
Obs*R-squared	5.6992	Prob. Chi-Square(4)	0.2228
Scaled explained SS	5.6631	Prob. Chi-Square(4)	0.2258

Since ARDL (2,1) is found to be a good fit, the long-run and short-run estimates of this model are presented in table 6 and table 7 respectively.

Table 6 Long-run estimates

Variable	Coefficient	Standard Error	t-statistic	Prob.
LFII	0.0727	0.0107	6.7794	0.0000

Dependent variable: LTASI

Estimated long-run coefficient presented in table 6 show that FIIs investment emerges significant at 1% level. It indicates that 1% change in the investments held by qualified foreign institutional investors (in logarithmic form) will result in 0.0727% change in the stock market index. (in logarithmic form) The relationship between the two variables is positive. It may be inferred that the opening up of the Saudi stock market to the qualified foreign institutional investors will have the desired result of impacting the market positively. When the long-run relationship between the variables is found to be present, it may be concluded that there is at least one-way Granger-causality as determined by the F-statistic and the lagged error-correction term. As the long-run relationship is confirmed, the short-run dynamic estimates from error correction model associated with the long-run estimates as recommended Narayan and Smyth (2008) are estimated. The short-term dynamic coefficients associated with the long-run estimates is presented in table 7.

Table 7 Short-run estimates

Variables	Coefficient	Standard Error	t-statistic	Prob.
ΔLTASI(-1)	0.1457	0.0654	2.2281	0.0270
ΔLFII	0.0591	0.0101	5.8308	0.0000
CointEq(-1)*	-0.1054	0.0245	-4.3053	0.0000

Dependent variable: ΔLTASI

From the short-run coefficients presented in table 7, it can inferred that the investments held by qualified foreign institutional investors that was found to be significant in the long-run analysis is found to be significant in the short-run estimation also. The association is significant at 1% level. The variable has a positive relationship with stock market index. In the short-run, the responsiveness of stock market to a 1% increase in FIIs investment is at 0.0591%. The coefficient of the error correction term is found to be negative and statistically significant. The system corrects the disequilibrium at a speed of 10.54%.

A few more diagnostic tests are carried out. Ramsey RESET test result shows that there is no model misspecification problem. Jarque-Bera test statistic confirms normal distribution of the residuals. To ascertain the robustness of the model, the structural stability test of the parameter on the axis cumulative sum of recursive residuals (CUSUM) and cumulative sum of recursive

residuals square (CUSUMSQ) are recommended by Pesaran and Pesaran (1997). Both the test results show that the null hypothesis of stable coefficients is upheld.

Table 8 Diagnostic tests

Ramsey RESET Test Ho: Functional form is correctly specified		Do not reject H_0
F-statistic	0.3354 (0.5631)	
Jarque-Bera normality test H_0: Data is normally distributed		
Jarque-Bera test statistic	1.6164 (0.4456)	

Figure 3 Cumulative sum (CUSUM)

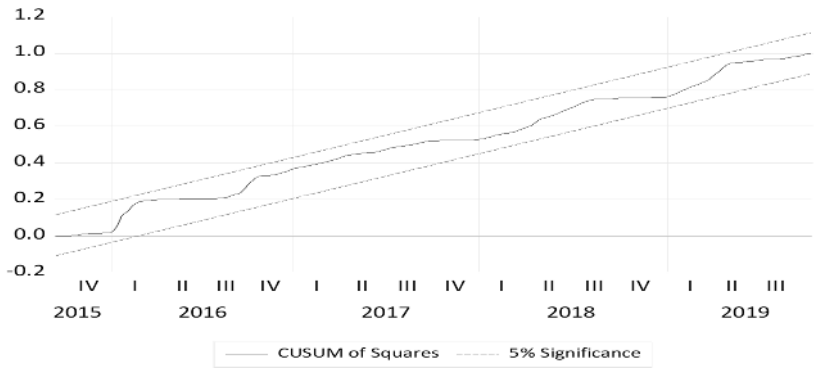


Figure 4 Cumulative sum of squares (CUSUMQ).

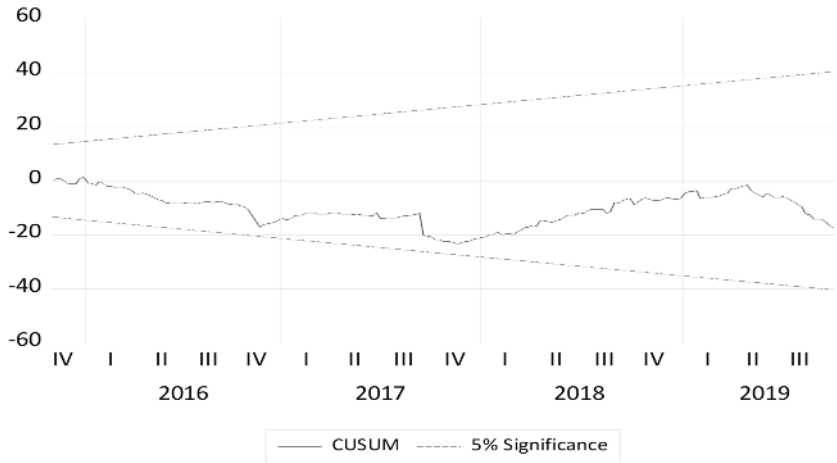
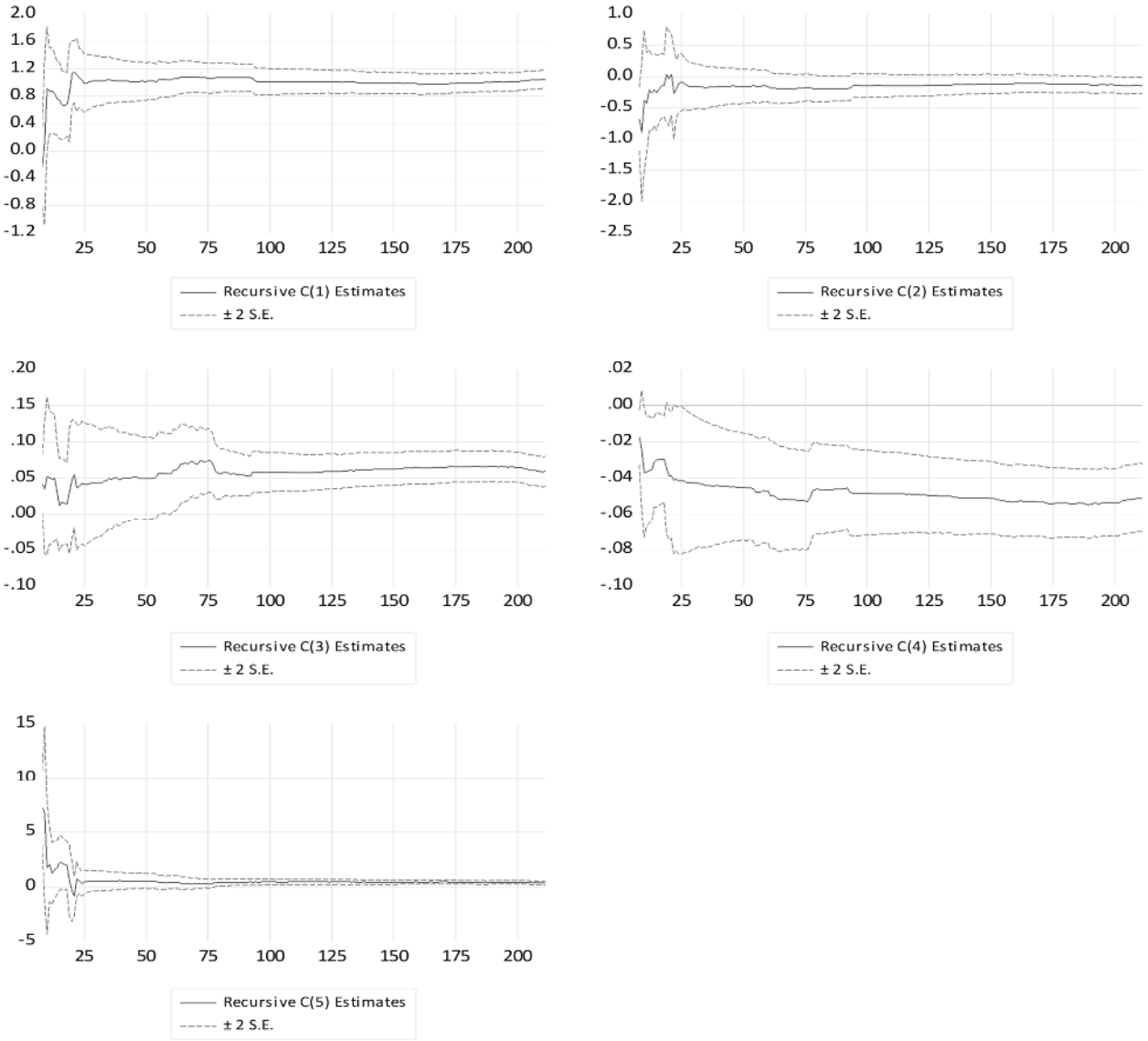


Figure 5 Recursive least squares graphs for the long-run model.



If there is co-integration between two variables, Y and X, there may be three different kinds of relationships between the variables: (1) X influences Y, (2) Y influences X and (3) X and Y influence each other. The first scenarios are instances of unidirectional relationship while the last scenario describes a bidirectional relationship. If the analysis fails to find a co-integration relationship between the two variables, the two variables are independent and do not affect each other. Since the analysis finds that the FIIs investment and Saudi stock market are integrated, Granger (1969) causality test to applied determine the pattern of relationship. If the current and lagged values of X help to predict the future value of Y, it may be concluded that X 'Granger causes' Y. The following model is estimated.

$$\Delta LTASI_t = \sum_{i=1}^{n} \alpha_i \Delta LTASI_{t-1} + \sum_{j=1}^{n} \beta_j \Delta LFII_{t-j} + u_{1t} \quad (5)$$

$$\Delta LFII_t = \sum_{i=1}^{n} \lambda_i \Delta LFII_{t-1} + \sum_{j=1}^{n} \delta_j \Delta LTASI_{t-j} + u_{1t} \quad (6)$$

Equation (5) suggests the current value of $\Delta LTASI_t$ is related to the past value of itself and the past values of ΔLFII. Likewise, equation (6) shows the current value of $\Delta LFII_t$ is related to its past values and that of ΔLTASI. The null hypothesis tested in equation (5) is $\beta_j = 0$ which suggests 'ΔLFII does not Granger cause ΔLTASI'. The null hypothesis tested by equation (6) is $\delta_j = 0$ which shows 'ΔLTASI does not cause ΔLFII'. The acceptance or rejection of the null hypothesis is based on F-statistics.

Table 9 Results of short-run Granger causality

Dependent variable	F-statistic
ΔLTASI	33.0268***
ΔLFII	37.0612***

*** Significant at 1% level

Table 6 presents the results of short-run Granger causality by applying the Wald test to all the lag terms of the independent variable using the joint F-test. A bidirectional short-run causality relationship is present between FIIs investment and stock market. This means FIIs investment affects stock market and stock market affects FII investment. The long-run relationship between the two variables is confirmed by the significance of the error correction term. A long-term causality from foreign institutional investments to stock market can be inferred. This finding is in line with some of the earlier works. (Naik and Padhi, 2015, Singh, Singh and Kaur, 2016)

7. Conclusion

Saudi Arabia has embarked on an ambitious plan called Saudi Vision 2030 that states the long-term goals of the country with an aim to build on the country's strengths and capabilities. One of the three pillars of this vision is to become a global investment powerhouse. The vision plans to reduce the economy's dependence on oil and make it broad based. The country has initiated lots of policy changes and introduced new regulations that are in alignment with the Saudi Vision 2030. One of such major policy initiatives is opening up the Saudi stock market to qualified foreign institutions registered with the country's regulator, CMA. This initiative was also followed up by subsequent amendments when the initial response was lukewarm. The opening up of the market to the foreign institutional investors can be seen as a major move to integrate the market with the global markets and capturing its place firmly as an emerging market as a destination for the global institutional investors. This is bound to impact the market in a big way.

This work analyzes the relationship between FIIs investment and Saudi stock market. The analysis is based on weekly data on FIIs investment and Saudi stock market index for 211 weeks from August 27, 2015 till October 24, 2019. The results of the unit root tests (Augmented Dickey Fuller and Phillip Perron) show that the study variables, FIIs investment and Saudi stock market, both expressed in logarithmic form are a mix of I(0) and I(1). LTASI, the Saudi stock market index expressed in logarithmic form, is I(1), while LFII, (FIIs investment expressed in logarithmic form)

is I(0). This makes it logical to turn to ARDL bounds testing approach of co-integration. When the presence of co-integration between FIIs investment and Saudi stock market is found, an ARDL (2,1) model to test the long-run and short-run relationship between the two variables is applied. The study finds a positive long-run and short-run relationship between FIIs investment and Saudi stock market. The Granger causality test done in the framework of vector error correction model confirmed bidirectional relationship between FIIs investment to stock market. This finding assumes importance in view of the fact that the Saudi stock market is open to foreign institutional investment only since June 2015. The market regulator, CMA, has categorically stated that the goal of opening up the Saudi stock market to foreign institutional investors is not to attract capital or liquidity to the market rather to contribute to the market stability and reduce the high volatility in prices. Their objective is to attract foreign investors with long-term investment goals. The finding of a long-run and short-run positive relationship between FIIs investment and stock market index shows FIIs have the power to affect the Saudi stock market positively. As of now, FIIs are marginal operators in the market. The rate of growth of FIIs investment was slow close to being near static in the previous four years, but it is gaining momentum this year since the second week of March. FIIs investment had been less than 1% of the market capitalization till March 7, 2019. Over the recent 31 weeks starting March 14, 2019 till October 24, 2019 they have been steadily increasing their investment and hold around 5.74% of the market as of October 24, 2019. We observe that during 63 weeks out of our study of 211 weeks, FIIs sold more than what they bought during the week resulting in a negative net flow. Though FIIs investment has been on the rise in this year, these negative net flows will affect the market at least in the short-run. The bidirectional causality between FIIs investment and Saudi stock market shows that FIIs may also indulge in feedback trading. However, the finding of a positive long-run relationship between FIIs investment and stock market is encouraging in view of the growing investments from FIIs.

The results of this study have to be viewed both as critical and with caution as the study covers only 211 weeks' data. Though this covers all the weeks for which the data is available from the stock market, the FIIs flows are still meagre and gaining importance only since the middle of the current calendar year. There is a further scope for carrying out the impact of FIIs trading on the market liquidity and volatility.

Acknowledgement

This research project was supported by a grant from the Research Center for the Humanities, Deanship of Scientific Research, King Saud University.

References

Bae, K., Chan, K., & Ng, A. (2004). Invisibility and Return Volatility. *Journal of Financial Economics , 71*(2), 239-263. https://doi.org/10.1016/S0304-405X(03)00166-1

Belhoula, M., & Naoui, K. (2011). Herding and Positive Feedback Trading in American Stock Market: A Two Co-directional Behavior of Investors. *International Journal of Business and Management, 6*(9), 244. DOI:10.5539/ijbm.v6n9p244.

Chen, Y.-F., Wang, C.-Y., & Lin, F.-L. (2008). Do qualified foreign institutional investors herd in Taiwan's securities market? *Emerging Markets Finance & Trade, 44*(4), 62–74.
Dadhich, G., Chotia, V., & Chaudhry, O. (2015). Impact of Foreign Institutional Investments on Stock Market Volatility in India. *Indian Journal of Finance, 9*(10), 22. DOI: 10.17010//2015/v9i10/79561
DeLong, B. J., Shleifer, A., Summers, L., & Waldmann, R. J. (1990a). Noise trader risk in finance markets. *Journal of Political Economy, 98*, 703-38. DOI:10.1086/261703.
DeLong, B. J., Shleifer, A., Summers, L., & Waldmann, R. J. (1990b). Positive Feedback Investment Strategies and Destabilizing Rational Speculation. *Journal of Finance, 45*, 379-395. DOI:10.2307/2328662.
Dhingra, V., Gandhi, S., & Bulsara, H. (2016). Foreign institutional investments in India: An empirical analysis of dynamic interactions with stock market return and volatility. *IIMB Management Review, 28*, 212–224.
Dickey, D., & Fuller, W. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association, 74*(366a), 427431. DOI: 10.1080/01621459.1979.10482531.
Enders, W. (1995) Applied Econometric Time Series. John Wiley & Son, Inc. USA.
Ewing, B. T., Sari, R., & Soytas, U. (2007). Disaggregate energy consumption and industrial output in the United States. *Energy Policy, 35*(2), 1274–1281.
Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica, 37*(3), 424-438.
Harris, R. I. D., & Sollis, R. (2003). Applied time series modeling and forecasting. Chichester, West Sussex, England: J. Wiley.
James, G., & Karoglou, M. (2010). Financial Liberalization and Stock Market Volatility: The Case of Indonesia. *Applied Financial Economics, 20*(6), 477-486.
Joo, B., & Mir, Z. (2014). Impact of FIIs Investment on Volatility of Indian Stock Market: An Empirical Investigation. *Journal of Business & Economic Policy, 1*(2), 2375-0766.
Karmakar, M. (2006). Stock Market Volatility in the Long Run, 1965-2005. *Economic and Political Weekly*, *41*(18), 1796-1802.
Li, D., Nguyen, Q., Pham, P., & Wei, S. (2011). Large Foreign Ownership and Firm-Level Stock Return Volatility in Emerging Markets. *Journal of Finance and Quantitative Analysis, 46(*4), 1127-1155
Merton, R. (1987). A Simple Model of Capital Market Equilibrium with Incomplete Information. *The Journal of Finance, 42*(3), 483-510.
Naik, P. K., & Padhi, P. (2015). An empirical evidence of dynamic interaction between institutional fund flows and stock market returns in India. *Indian Journal of Finance, 11*(3), 219–229. doi:10.17010//2015/v9i4/71455.
Narayan, P. K., & Smyth, R. (2008). Energy Consumption and Real GDP in G7 Countries: New evidence from Panel Co-integration with Structural Breaks. *Energy Economics, 30*, 2331-2341.
Pesaran, M. H., Shin, Y., & Smith, R. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*, 289-326.
Phillips, Peter, C. B., & Perron, P. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika, 75*(2), 335-346.
Sharif, S. (2019). How Foreign Investors Influence Stock Markets? The Saudi Arabian Experience. *Middle East Development Journal (MEDJ), 11* (1), 105-123.
Singh, R., Singh, K., & Kaur, P. (2016). Dynamics of foreign institutional investments and equity returns in India. *International Journal of Research –Granthaalayah, 4*(6), 1–7.
Suresh Babu, M., & Prabheesh, K. (2008). Causal relationships between Foreign Institutional Investments and stock returns in India. *International Journal of Trade and Global Markets, 1*(3), 259-265.
Vo, X. V. (2015), Foreign Ownership and Stock Return Volatility—Evidence From Vietnam, *Journal of Multinational Financial Management, 30*, 101– 109.
Vo, X. V. (2017), ' Do Foreign Investors Promote Stock Price Efficiency in Emerging Markets?', *International Review of Finance, 19*(1), 223– 235.
Walter, C., & Howie, F. (2006). Privatizing China: Inside China's Stock Markets. 2nd Edition, John Wiley & Sons. DOI:10.1002/9781119207764
Zivot, E., & Andrews, Donald W. K. (1992). Further Evidence on the Great Crash, the Oil-Price Shock, and the Unit-Root Hypothesis. *Journal of Business & Economic Statistics, 10*(3), 251–270.