

THE DYNAMIC INTERACTION BETWEEN FOREIGN EQUITY FLOWS AND RETURNS: EVIDENCE FROM THE JOHANNESBURG STOCK EXCHANGE

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ABSTRACT

This research examines the dynamic relationship between foreign portfolio equity flows and equity returns on the Johannesburg Stock Exchange (JSE). The primary objective of this research is to uncover how equity market returns influence foreign cross border portfolio equity flows and in turn how those portfolio flows affect equity returns. To understand the linkages between equity flows and market returns, the current research employs vector autoregressive models and presents the results of variance decompositions, impulse response functions and causality tests. The results show that foreign equity flows are 'pulled' into South Africa by high returns on the JSE. This finding is consistent with a broad literature on other emerging markets. This research also finds causal link between net equity flows and returns, indicating that the evolution of the JSE is independent of foreign portfolio activity.

JEL: F21; G15; G11; 014; 016

KEYWORDS: Portfolio flows, International investment, Africa

INTRODUCTION

The broad purpose of this research is to understand the dynamic linkages between foreign portfolio equity flows and equity returns in South Africa. The key questions this research addresses are: 1) Do foreign equity flows affect equity returns on the Johannesburg Stock Exchange (JSE)? 2) Do returns on the JSE forecast changes in foreign equity flows? These questions have been of recurrent interest to investors, economists and policy makers, and are posed with greater urgency during times of financial upheaval or changes in the distribution of capital flows. Frequently, the answers to the above questions have cast international investors in a negative light. It is often argued that foreign equity flows lead to price overreaction, and when withdrawn contagion. An alternative efficient markets view is that equity flows are merely one of the processes by which information is incorporated into asset prices.

While there are numerous strongly held views, there is surprisingly little information on the behavior of international portfolio flows and their relation to equity returns, particularly in South Africa. South Africa's economy has been growing at a very healthy rate since 1999. The average annual GDP growth rate between 2000 and 2006 was in excess of 3.5%, well above the previous decade. Consequently, South Africa has become one of the economic powerhouses of Africa, with a gross domestic product (GDP) four times that of its southern African neighbors and comprising around 25% of the entire continent's GDP (African Competitiveness Report, 2007). The country leads the continent in industrial output, mineral production and generates most of Africa's electricity (African Competitiveness Report, 2007). As a result of South Africa being an economic powerhouse, it also has the most developed equity market in the region, and provides one of the best opportunities on the continent for foreign investors seeking diversification or capital appreciation. South Africa also has a relatively solid financial infrastructure. Its banking sector has ranked consistently among the top ten globally according to the World Economic Forum. Additionally, the Johannesburg Stock Exchange (JSE) is the 18th largest stock exchange in the world in terms of market capitalization. A decade of comprehensive institutional reform and sound economic management has been rewarded with solid credit ratings, implying less risk for investors and

cutting the cost of capital for the country's public and private sector borrowers (Global Competitiveness report, 2007).

South Africa's rapid growth and improving financial infrastructure has led to an increase in foreign portfolio equity flows to the nation. This increase in foreign portfolio capital has emerged as an important policy issue for the country. The danger of a 'Thailand-style' abrupt and sudden withdrawal of equity and the destabilizing effects on equity markets are of concern. While these concerns are justified, comparatively less attention has been paid to analyzing the actual flow data and understanding the key relationships between these flows and equity markets. A proper understanding of the influence of foreign equity flows on equity market returns and equity returns on portfolio flows is essential for a meaningful debate about their effect.

The objective of this research is to first to uncover how equity market returns influence foreign equity flows from and in turn, how these portfolio flows affect equity returns. To this end, we first look at the key features of equity flows and then study the relationship between equity flows and stock markets with the key objective of determining causality or more generally forecast ability. To address these questions, this research uses Vector Autoregressive (VAR) models. The attractive feature of VAR analysis is that since the relationship between flows and returns is not well established and neither variable is known to be exogenous, VAR allows for each variable in the system to be treated symmetrically.

This research finds a strong link between returns on the JSE and foreign equity flows. In particular, this work finds favorable returns on the JSE forecast greater net flows of foreign capital in subsequent periods. This finding is consistent with the work of Bohn and Tesar (1996), Froot, O'Connell and Seasholes (2001) and indicates that foreign investors are relying on past observations of the return sequence of the JSE when making portfolio allocation decisions. These finds are robust to a variety of empirical specifications. On the other hand, no causal link is found running from net flows to returns; this is a positive sign for the development of the JSE, as it demonstrates that the actions of foreign portfolio investors are not unduly influencing the evolution of the Johannesburg Stock Exchange.

The remainder of this research is organized as follows. Section 2 discusses the relevant academic literature, section 3 discusses the empirical methodology, section 4 describes the data, section 5 presents the results and section 6 concludes.

LITERATURE REVIEW

The motivation for capital flows has long been a subject of research in financial economics. This research began with studies of the degree of capital mobility among countries. Early models of capital flows found it convenient to assume perfect mobility of capital. However in 1980, the Feldstein-Horioka puzzle was identified--the finding of low capital mobility in OECD countries (Obsterfeld and Rogoff, 2001). Today the continued existence of the Feldstein-Horioka puzzle is particularly puzzling, since there are several indications that industrial countries' international capital markets are well integrated (Stulz, 1999). In practice, this puzzle, along with other complications, implies that it has proven difficult to model capital flows in a world in which capital is not perfectly mobile or information is not distributed uniformly (Bekaert, Harvey and Lumsdaine, 2002). This has led researchers to rely on single equation and vector autoregressive models to determine the nature of the relationship between equity flows and returns.

Existing evidence indicates a strong relationship between net flows of foreign capital and market returns. Griffin, Nardari, and Stulz (2004) recently confirmed this result in their study of emerging Asian equity markets. They find that for many emerging Asian markets foreign investors follow past realizations of the flows sequence. French and Ahmad (2011) study foreign equity flows into the United States and confirm the strong dynamics between returns and equity flows in the context of a developed country.

What is unsettled is the interpretation of this relationship and implications for the role of foreign investors in emerging markets. There are several competing hypotheses to explain this relationship. One hypothesis is that the participation of foreign investors in the market brings about a demand shift and hence a permanent price change. This broadening of investor base increases risk sharing opportunities and hence lowers the required rate of return. Merton (1987) provides theoretical arguments for this mechanism, and Bekaert and Harvey (2000) and Henry (2000) report empirical work on the effect of liberalization on emerging markets. Another hypothesis conjectures that foreign equity inflows affect equity returns via a temporary price pressure effect due to market illiquidity in absorbing the extra demand. Support for the price pressure hypothesis has been difficult to uncover.

Empirical work in mutual fund literature by Warther (1995) and in equity flows by Clark and Berko (1997) fail to find support for this notion. As the above discussion illustrates, the role of foreign investors in emerging market is also much debated, as they are alternately described as trend chasers (Cho, Kho, and Stulz, 1999, Bohn and Tesar, 1996), informed traders (Seasholes, 2004, Grinblatt and Keloharju, 2000), or investors with information disadvantage (Brennan and Cao 1997, Brennan, Cao, Stong, and Xu, 2005).

Several theoretical arguments made for the dynamic relationship between equity flows and returns in other countries may be relevant in South Africa. The first compelling theory is commonly called, 'portfolio rebalancing', which implies, investors sell equities from countries that are the best performers in their portfolio since they become overweighed in these securities. The portfolio-rebalancing channel predicts that high U.S. returns would generate flows toward foreign (non-U.S.) markets. Hau and Rey (2006) model this relationship with an intuitive (though rigorous) model called the 'uncovered equity parity' condition, assuming incomplete risk trading. One of the implications of Hau and Rey's model is a negative relationship between net equity flows and returns of the South African market.

A second compelling theory that may explain the relationship between returns and net flows is often termed 'return chasing', or 'positive feedback trading'. Bohn and Tesar (1996) document that when the returns are expected to be high in a market, U.S. investors' move into that market and retreat from that market when predicted returns are low. Dahlquist and Robertsson (2004) document this feedback trading behavior in the Swedish market. However, the return chasing hypothesis is not without challenge, for example, Portes and Rey (2005) in a large panel study fail to find evidence of return chasing.

Information asymmetry has also been used to describe the dynamics of equity flows from the U.S to emerging and developed markets (see Brennan and Cao, 1997 and Brennan et al., 2005). Asymmetric information theory proposes that when foreign investors are less well informed about returns on foreign investment, they tend to be more sensitive to new public information than the domestic investors are. Following news in a given national market, foreign investors revise their assessments of expected returns and change their allocations in a more rapid or non-symmetric manner compared to that of domestic investors. Consistent with the asymmetric information theory, Brennan and Cao (1997) and Tesar and Werner (1995) find evidence of positive, contemporaneous correlation between expected returns and international portfolio flows. Brennan et al. (2005) analyze how international investors adjust their expectations of asset returns in a given country in response to information. They find that relative to the domestic investors, foreign investors become more bullish about the stock market of a country as the returns of that country's market portfolio increase. The findings Griffin et al. (2004), Bohn and Tesar (1996) and Brennan and Cao (1997) also evidence this 'trend-chasing' behavior of foreign investors' results in a positive correlation between lagged domestic market returns and contemporaneous and lagged expected returns.

One final branch of literature in this area worth noting is the study of equity flows surrounding financial crises. Choe et al. (1999) who study the nature of capital flows and their relationship with stock returns in

Korea before and during the Asian financial crisis (November 30, 1996 to the end of 1997). The authors find that before the Korean crisis foreign investors purchased more Korean stocks on days following an increase in the market and bought Korean shares that outperformed the market over the previous day. This finding evidences positive feedback trading by the foreign investors. However, the evidence of positive feedback trading was found to be much weaker during the crisis period. Froot et al. (2001) find that during the Asian financial crisis, emerging markets and Asian markets experienced inflows of foreign capital. They report that daily inflows during the crisis period (July 1997-July 1998) averaged 40% into all emerging markets and 30% into Asian markets of their pre-crisis levels.

METHODOLOGY

In order to understand the dynamic relationship between flows and returns we estimate several vector autoregressive models. A vector autoregression (VAR) model is useful for forecasting systems of interrelated time-series variables and testing causality among these endogenous variables. Let a VAR be expressed as:

$$Z_t = \mu + \Gamma_1 Z_{t-1} + \dots + \Gamma_p Z_{t-p} + \varepsilon_t, \quad (1)$$

where $Z_t = [R_{it}, f_{it}]'$ and R_{it} and f_{it} are returns of market i and net flows (inflows-outflows) to South Africa, μ is a parameter vector and Γ 's are the matrices of the parameters estimated, and ε_t is the residual vector. The lag length is determined by the Akaike information criterion (AIC).

It has become standard in VAR to restrict parameters assuming that one variable has no contemporaneous effect on the other; this is known as Choleski decomposition. For example, if one assumes that returns respond to flow innovations with a one-period lag or that net flows respond to innovations in returns with a one period lag, identification is achieved. This sort of identification mechanism can sometimes lead to sensitivity of the results to the ordering of variables. However, the major results of a VAR of flows and returns in South Africa are not influenced by the ordering of the variables, which is consistent with Bekarert et al (2002), and Dahlquist and Robertsson (2004).

To further understand the dynamic relationships between net flows and returns, we use the fact that equity flows are highly autocorrelated, and decompose flows into an expected and unexpected sequence. Tests for autocorrelation of the residuals are performed using the generalized LaGrange multiplier test to check for autocorrelation. We then estimate an autoregressive (AR2) model using the full sample and use the coefficients to predict one-step-ahead values of net flows (i.e. anticipated or expected net flows) and term the residual from this AR(2) regression unanticipated or unexpected net flows. This decomposition gives both an expected and an unexpected net flow series, this methodology was adopted from Warther (1995). We then estimate VAR models using these decomposed net equity flow series and returns on the JSE.

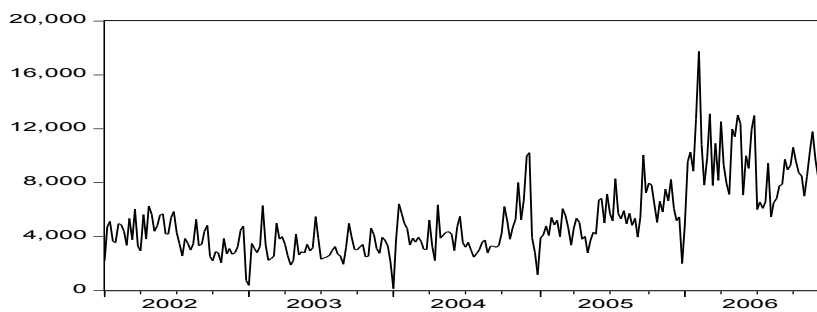
Data and Summary Statistics

Portfolio flows are distinguished from other international capital flows by the degree that they are reversible. Some clarification and definitions may be useful at this point. Capital flows are generally broken into three components: Direct Foreign Investment (FDI), bond flows and equity flows. FDI flows are distinguished from other international capital flows by the degree to which the investor owns or controls the firms. FDI is typically defined as the direct or indirect ownership or control by a single domestic entity of at least ten percent of the voting securities of an incorporated foreign business firm or the equivalent in an unincorporated enterprise. Bond flows represent flows from abroad to South African bond markets for portfolio reasons. Similarly, the equity flows used in this study represent flows from foreign investors (non-South African) to the Johannesburg equity markets for portfolio reasons

(representing less than 10% ownership stakes). The source for the equity flows used in this study is directly from the Johannesburg Stock Exchange. The equity flow data is weekly for the period of January 4, 2002 to December 29, 2006. This equity flow data is paired with weekly index levels and returns on the Johannesburg Stock Exchange, which are obtained from Bloomberg data services.

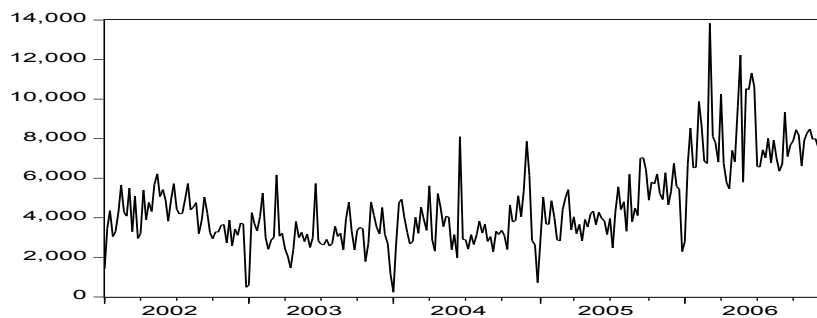
Figure 1 presents the breakdown of weekly portfolio equity flows to/from South Africa. As Figure 1, Panel A clearly illustrates, inflows to South Africa from abroad have increased substantially over our sample period and all indications are that equity flows to the region should continue to grow. Figure 1, panel C plots the evolution of net flows foreign equity flows into South Africa. Net flows represent inflows of foreign capital minus foreign outflows of capital. Panel C shows that for most weeks during the sample period net flows have been positive, indicating that on average more foreign equity capital is entering the South African equity market than is leaving.

Figure 1 Panel A: Weekly Equity Flows from the Abroad to South Africa: 01/04/02-12/29/06



This figure shows the trend in weekly foreign equity flows from foreign investors into South Africa for the period of January 2002 to December 2006. These flows are commonly called equity inflows; the vertical axis is in millions of South African Rand.

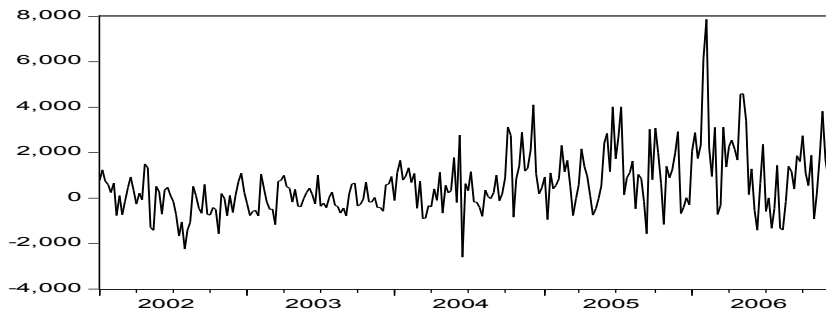
Figure 1, Panel B: Weekly Equity Flows from the South Africa to Abroad: 01/04/02-12/29/06



This figure shows the trend in weekly foreign equity flows from foreign investors out of South Africa for the period of January 2002 to December 2006. These flows are commonly called equity outflows; the vertical axis is in millions of South African Rand.

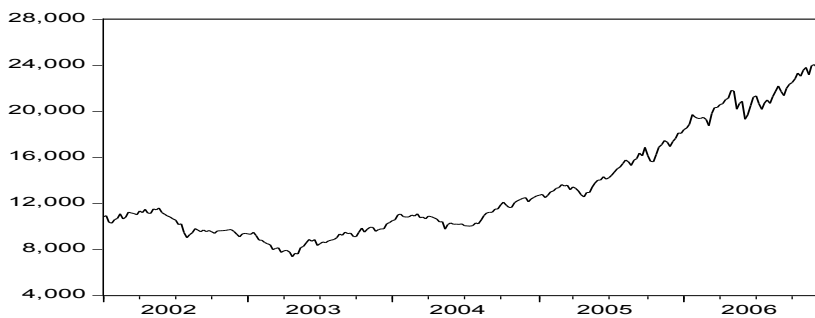
Figure 2, plots the evolution of the Johannesburg Stock Exchange (JSE) over our sample period. It is evident that the JSE has been consistently trending upward. This could provide one potential explanation for the increase in portfolio equity flows to South Africa; foreign investors are funneling their monies to South Africa to take advantage of the rapid growth opportunities. However, this could also indicate an alternative hypothesis that foreign investors are pressuring returns up via excess demand and illiquidity in the South African equity market. If foreign investors' are pressuring returns upward, then any sign of weakness in the JSE could send lead to a rapid withdraw of capital by foreign investors, and have negative consequences for the JSE. In the next section of this paper, we will address these issues in a dynamic VAR model.

Figure 1: Panel C: Weekly Net Equity Flows: 01/04/02-12/29/06



This figure shows the trend in weekly net equity flows foreign equity flows (inflows minus outflows) into South Africa for the period of January 2002 to December 2006; the vertical axis is in millions of South African Rand.

Figure 2: Johannesburg Stock Exchange Index: 01/04/02-12/29/06



This figure shows the weekly trend in the Johannesburg Stock Exchange Index for the period of January 2002 to December 2006.

Summary statistics for the variables used in this study are reported in Table 1. The mean net flow per week to the JSE from all overseas investors was 576.48 million Rand, with much larger inflows and outflows, demonstrating that investors are constantly rebalancing or adjusting their portfolios, within South Africa to changing economic conditions. Returns on the JSE also had a positive mean over the sample period returning about 0.35% per week. The JSE is a volatile market with an average return standard deviation of 2.4% per week with a maximum return over our sample period of 7.4% and a minimum return of -7.42%.

Table 1: Summary Statistics: 01/04/02-12/29/06

	Obs	Mean	S.D	Min	Max
INFLOW	260	5219.66	2745.65	134.83	17746.49
OUTFLOW	260	4643.18	2167.54	237.49	13832.16
NETFLOW	260	576.48	1378.38	-2913.30	7869.26
INDEX	260	13264.51	4632.81	7361.15	24915.20
RETURN	260	0.0035	0.024	-0.0742	0.0744

Means, standard deviations and extreme values for data on foreign equity flows and returns are reported in the table above. INFLOW represents inflows from the foreign portfolio investors to South Africa, OUTFLOW represents outflows from South Africa to the foreign investors, NETFLOW represents INFLOW minus OUTFLOW, the raw flow data are in millions of South African RAND. INDEX is the Johannesburg Stock Exchange index level, RETURN is the return on the Johannesburg Stock Exchange. All flow data is on a weekly basis and was provided by the Johannesburg Stock Exchange. Equity market information was obtained from Bloomberg.

EMPIRICAL RESULTS

Before estimating VAR models several diagnostic tests are performed. First, index and net flows are tested for a unit root using standard Augmented Dickey Fuller (ADF) procedures. VAR models are misspecified in the presence of nonstationary variables. The results ADF test are not reported, but as

expected index in the level is integrated of order one, but returns and net flows are stationary. The next step in our empirical methodology is to decompose the net flow series into an expected (or anticipated) and an unexpected (or unanticipated) series. Net flows are decomposed using a simple autoregressive model of order two. Two lags were selected to eliminate serial correlation in the residuals. This is the appropriate method to decompose the net flow sequence since net flows are found to be autocorrelated. It is common in literature to find that net flows are autocorrelated. For example, French and Naka (2008) report that net flows in both China and India are similarly auto correlated. The next step in our empirical analysis is to address the dynamic interactions between equity flows and returns on the JSE. In order to garner a full understanding of the nature of the linkages between net flows and returns we estimate three separate VAR models based on equation one in our methodology section.

Our baseline model is a bivariate VAR between returns and net flows; lag length of two is selected based on the AIC criteria for all VAR models estimated. Table 2 summarizes the granger causality results for all three VAR equations estimated. The granger causality results for our base VAR model of net flows and returns are reported in the first column of the table below. We note unidirectional causality running from returns to flows, but fail to find a statistically significant causal relationship running from net flows to returns. Column one of table two reports the Chi-Squared statistic along with the level of significance. We find a very highly significant (at the 1% level) causal relationship between returns on JSE and net equity flows.

Table 2: Summary of Granger Causality Tests

Model	VAR [RETURN, NETFLOW]	VAR [RETURN, EXPECTED]	VAR [RETURN, UNEXPECTED]
Flows Causing Returns	0.68	0.13	0.61
Returns Causing Flows	21.16***	19.09***	21.26***

*The table below presents a summary of two Granger causality tests: Granger 1: Flows do not Granger cause returns. Granger 2: returns do not Granger cause flows. Causality results are based on the model outlined in equation one of the text. Chi-square statistics are reported. Results are summarized for three VAR models under three different specifications. RETURN is equal to the weekly return of the Johannesburg stock exchange, NETFLOW is inflows minus outflow, EXPECTED are expected net flows as predicted from an AR(2) model. UNEXPECTED are the residuals of an AR(2) model of net flows. *** Significance at 1%, ** significance at 5% and *significance at 10%*

This finding is consistent with the ‘Return Chasing’ hypothesis developed by Bohn and Tesar in 1996 and supported in subsequent research (see French and Naka, 2008 for a recent example). Our baseline model indicates that foreign investors increase their allocation to South Africa following a positive return realization. We also note the important finding that net foreign equity flows do not appear to granger cause returns; this finding is consistent with Clark and Berko’s (1997) finding in Mexico.

The failure to find a causal relationship between net flows and returns indicated that foreign equity investment does not appear to be artificially pressuring prices in South Africa upward. We now turn to the results of our variance decompositions stemming from our baseline VAR of returns and net flows. These results are reported in Table 3 and support the general findings of the granger causality results, showing that the return sequence is exogenous (in a statistical sense). The first three columns report the variance decomposition of returns from an unexpected shock to the return sequence and from an unexpected shock to the net flow sequence. We note that almost all of the variance in the return sequence is attributable to a shock in returns, indicating that the sequence is statistically exogenous. Turning the variance decomposition in the final three columns of table 3 we note that almost 10% of the variance in the net flow sequence is attributable to a shock in the return sequence. This finding indicates that a significant portion of the variance in the net flow sequence is attributable to shocks in returns on the JSE.

Next, we analyze the impulse response functions (IRF) as reported in Figure 3. The graph in the top left corner shows the response of the return sequence to a shock in returns. We find that a one standard deviation shock to returns leads to a contemporaneous increase in returns in the next period, but this effect

is quickly eroded. The top right graph shows the response of returns to a one standard deviation shock to net flows. We note that consistent with the previous findings there is not statistically significant response on returns from a one standard deviation shock in net flows.

Table 3: Variance Decomposition

	Std. error	RETURN Shock	NETFLOW Shock	Std error	RETURN Shock	NETFLOW Shock
<i>Period</i>	<i>Variance Decomposition RETURN</i>			<i>Variance Decomposition NETFLOW</i>		
1	0.02	100.00	0.00	1190.13	0.02	99.98
2	0.02	99.76	0.24	1306.03	6.51	93.49
3	0.02	99.72	0.27	1363.94	8.57	91.43
4	0.02	99.72	0.27	1381.76	9.13	90.87
5	0.02	99.72	0.28	1389.07	9.34	90.66
6	0.02	99.72	0.28	1391.80	9.42	90.58
7	0.02	99.72	0.28	1392.85	9.45	90.55
8	0.02	99.72	0.28	1393.26	9.46	90.54
9	0.02	99.72	0.28	1393.42	9.47	90.53
10	0.02	99.72	0.28	1393.48	9.47	90.53

Table 3 presents the variance decomposition from the VAR of RETURN and NETFLOW described in equation one in the text. Shocks are identified using the Cholesky decomposition. Standard errors and the percent of variation in each variable explained by shocks to itself and other variables in the system are reported.

Turning to the main findings of our IRF analysis in the bottom left graph in figure 3, which shows the response of net flows to a one standard deviation shock to returns. We find a statistically significant increase in net flows over the next 1-4 weeks following an unexpected return shock. Additionally a shock to net flow tends to lead to higher levels of net flows for about the next 6 weeks, demonstrating that net flows tend to follow net flows (this supports the autocorrelation finding).

To summarize our main findings in our base model of returns and net flows. We find a highly significant relationship between net flows and returns. In particular unexpected shocks to returns forecast greater net foreign equity flows into South Africa beyond what could be predicted from lagged net flows. This results is consistent with broad literature that has found that foreign equity investors are ‘return chasers’. We also fail to find a significant relationship running from net flows to returns, this finding indicates that foreign equity investment does not appear to pressure prices upward in South Africa.

To better understand the joint dynamics between returns and net flows in South Africa we take advantage of the fact that net flows are autocorrelated. We follow the seminal work of Warther (1995) and decompose the flow sequence into an anticipated and an unanticipated series, where the unanticipated series is the residual of an AR(2) model and the anticipated is the fitted values. The current paper then estimates VAR using these decomposed sequences. The VAR between anticipated net flows and returns is estimated and column two of table 2 summaries the granger causality results. Similar to the baseline model it is found that anticipated flows do not forecast returns, this would be expected, since net flows are positively autocorrelated higher levels of net flows lead to higher levels of net flows in the future, markets appear to anticipate this reaction and are not influenced by anticipated or expected net flows. On the other hand, returns do strongly forecast future expected net flows this can be seen by the high Chi-squared statistic and the significance level of 1%.

To get a better idea of the joint dynamics between anticipated net flows and returns we estimate IRF in a similar fashion to our base models. The IRF for our second model are reported in figure 4. Focusing on the graph in the lower left corner of figure 4 we find that a one standard deviation shock to returns produces an increase in the permanent (or expected) component of net flows over the next 6 weeks.

Figure 3: Impulse Response Functions: Var [Returns, Netflows]

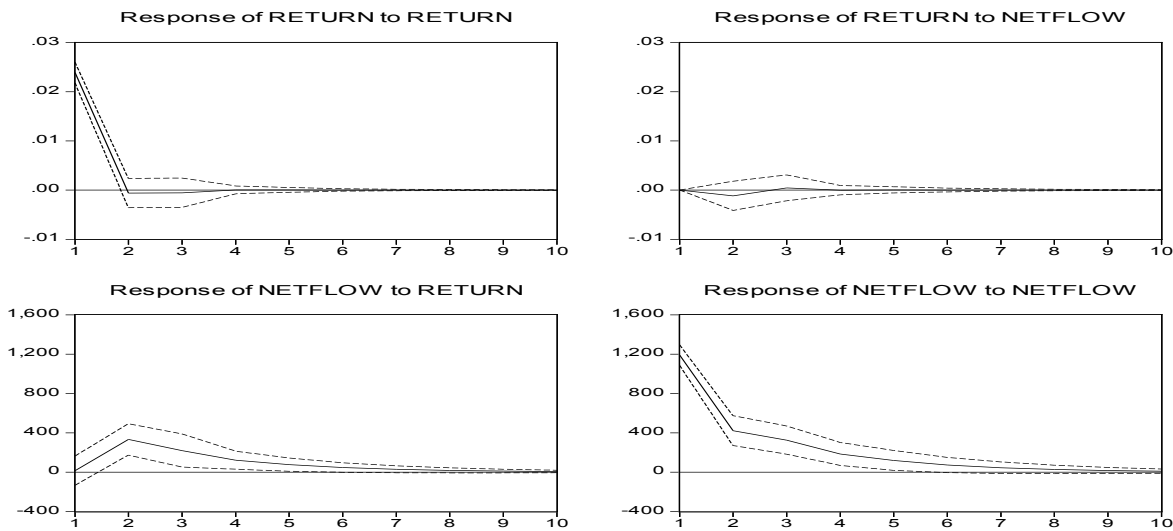


Figure 3 presents the standard impulse response functions for a VAR of RETURNS and net flows, where net flows are foreign equity inflows into South Africa minus foreign equity outflows from South Africa. Dotted lines are 90%-confidence bounds, which were generated by a Monte-Carlo simulation with 1000 draws from the posterior distribution.

Figure 4: Impulse Response Functions: Var [Returns, Expected]

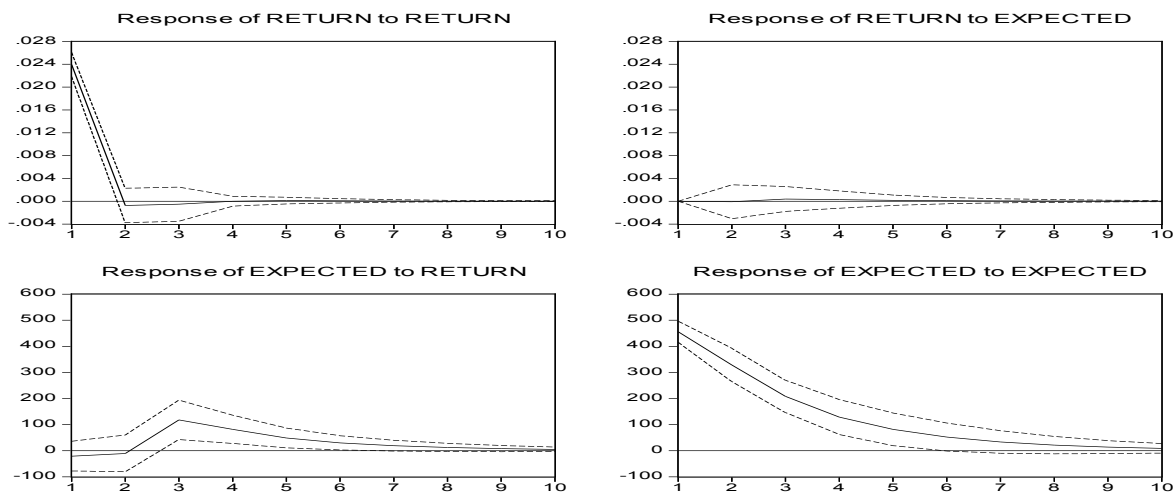


Figure 4 presents the standard impulse response functions for a VAR of RETURNS and EXPECTED, where EXPECTED, are the forecasted net flows using an AR(2) model. Dotted lines are 90%-confidence bounds, which were generated by a Monte-Carlo simulation with 1000 draws from the posterior distribution.

This again provides evidence that foreign investors are relying on past realizations of the return sequence to make their portfolio allocation decisions. With higher returns in South Africa leading to higher expected allocation of foreign capital to the JSE.

As a final step to understand the dynamic linkages between returns and net equity flows to South Africa we estimate a third VAR model between returns and unexpected equities flows (or those flows that could not be predicted using the autocorrelated structure of the net flow sequence).

Consistent with the previous two models we find a unidirectional relationship between unexpected net flows and returns. Column three of table 2 reports the granger causality results. As far as forecast ability,

unexpected net flows do not have forecasting power on returns. This finding provides evidence against the notion the foreign investors or pressuring prices higher on the JSE. Warther (1995) found a similar result for mutual fund flows and Clark and Berko (1997) did not find evidence of foreign equity flows pressuring the Mexico equity market upward. However, returns do appear to forecast future unanticipated equity flows strongly and quickly within a week or two unanticipated foreign equity flows jump by about 360 million Rand. This finding demonstrates that in South Africa foreign investors are very responsive to changes in the price of the JSE and adjust their portfolio to reflect these changes, but do not appear to significantly influence the evolution of the return sequence. The results of the granger causality test are supported by the IRF's reported in Figure 5 below. It is notes that an unexpected shock to return illicit a statistically significant response from unexpected net equity flows, whereas returns evolve independently of shocks to unexpected net equity flows.

Figure 5: Impulse Response Functions: Var [Returns, Unexpected]

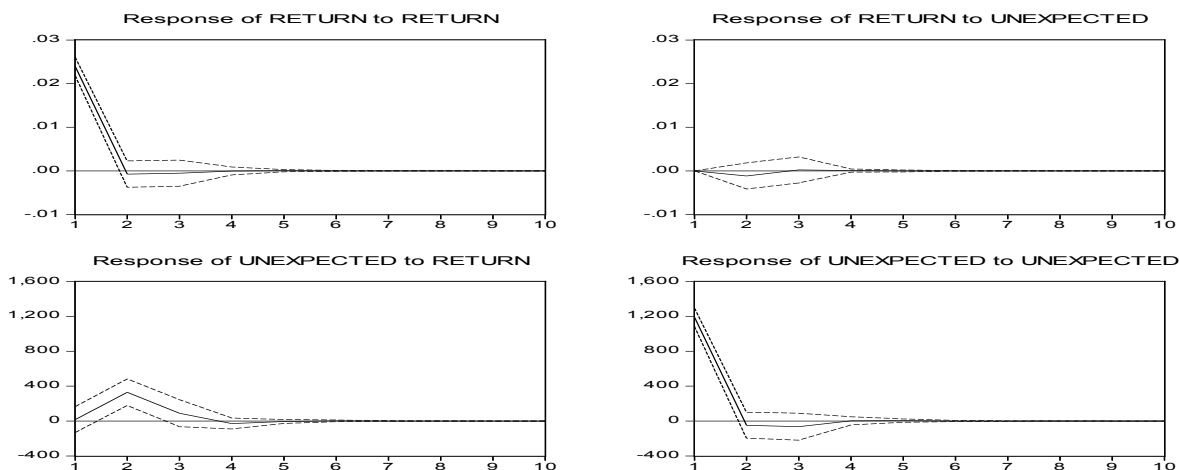


Figure 5 presents the standard impulse response functions for a VAR of RETURNS and UNEXPECTED, where UNEXPECTED, are residuals from an AR(2) model of net flows. Dotted lines are 90%-confidence bounds, which were generated by a Monte-Carlo simulation with 1000 draws from the posterior distribution.

CONCLUSION

This paper has addressed the important issue of the relationship between net foreign equity flows and returns on the JSE. Vector autoregressive techniques are used as a filter to isolate the specific effects that returns have on flows and flows on returns. Additionally the net flows sequence is decomposed into an expected and an unexpected series and VAR models are estimated. This research uncovered the following relationship between foreign portfolio equity flows and returns on the JSE.

In South Africa, returns tend to forecast foreign equity flows; this finding is consistent with the idea that foreign portfolio investors are ‘Chasing’ high returns into the JSE. This finding is robust to all specifications of net flows (i.e. expected and unexpected). The relationship found in South Africa are consistent with the findings of Bohn and Tesar (1996), Froot and Seasholes (2001) and are in contrast to the work of Portes and Rey (2005). The findings of the current paper have several important implications for South Africa. The finding of a strong link running from returns to net foreign equity flows, demonstrates that foreign portfolio investors are relying on past realizations of the return sequence of the JSE to make portfolio investments. Second, the absence of the link running from net foreign equity flows to returns indicates that foreign investors are not exerting undue influence on the returns of the JSE; this is positive sign in the overall development of the JSE.

While the current paper is a first step to understanding the influence of foreign equity flows on the development and evolution of the Johannesburg stock exchange, it does have several limitations and implications for further research. Let us begin with the limitations, the first and most significant limitation of this work is that equity flows are aggregated, so that we cannot determine if investors from different nations have asymmetric influences on equity markets or display different patterns of investment in South Africa with respect to different return sequences. A second limitation of this work is that we only considered the dynamics of returns and net equity flows as a first step to understanding foreign investment behavior in South Africa. The limitations of this study provide several interesting paths for future research. First, obtaining country specific equity flows to South Africa would allow a research to determine if different countries display non-similar investment patterns. A second path forward is to expand the variables included in the analysis to include global push and pull factors into the analysis to see the impact of variables such as exchange rates, interest rates and growth on the dynamics of foreign investment in South Africa. With these limitations and suggestions noted, the current research presents a first effort at understanding the influences that foreign equity flows have on the Johannesburg stock exchange and the influence that returns have at drawing equity investment into Africa's premier financial market.

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