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Interdependent Trading Behavior of Foreign and Local Investors: Evidence from the Colombo Stock Exchange

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ABSTRACT

This study examines the interdependent trading behaviour of investors in foreign and local contexts with a particular reference to the Colombo Stock Exchange (CSE) of Sri Lanka to fill up the gap in the local literature regarding behavioural aspects and independence among foreign and local investors within their investment policies, procedures, and actions. Based on secondary data collected from a statistical sample drawn from daily trading statistics of CSE, covering both buying and selling actions of local and foreign investors for the period from 2007 to 2019, this study has examined the nature of four main investor groups namely foreign institutions, foreign individuals, domestic institutions, and domestic individuals in terms of daily purchases turnover, sales turnover, share volume traded purchases, and share volume traded sales data. The results showed that the local investors are quite irrational concerning the foreign investors. Hence, foreign investors' interdependence on local investors' behavioural information is weak. Local investors also highly rely on their trading behavior instead of being vigilant about the trading behaviour of foreign investors.

Keywords: Investors' Trading Behaviour, Granger Causality Test, Sales Turnover, Vector Error Correction Model, Colombo Stock Exchange

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INTRODUCTION

Within a state's financial system, the capital markets are extremely important. Businesses can efficiently raise funds through the stock market. When they have free cash flow, it creates a setting for investments with high returns for both individual and institutional investors. 2017 (Nguyen). It generally believes that the development of the economy determines the smooth functioning of the capital market. In Sri Lanka, the CSE acts as the sole licensed Stock Exchange of the country, making a more significant contribution in developing the capital market activities. It also cooperates with the Security Exchange Commission (SEC), which acts as a regulator of the capital market to build a vibrant and robust capital market. Sri Lanka is currently categorized by Morgan Stanley Capital International as a frontier market (MSCI). The CSE is collaborating with the SEC and the stock brokerage industry to push for Sri Lanka to be reclassified as an emerging market, increasing its visibility as a desirable destination for portfolio investments (CSE, 2017). CSE of Sri Lanka is recognized as one of the most dynamic stock exchanges within the region. It was also named as South Asia's best-emerging stock market in October 2009. (Pushpakumara & Anthony, 2009)

The Sri Lankan stock market offers a unique opportunity for foreign and local investors to participate in a rapidly growing economy through listed companies. Market liquidity rises as a result of increased investor interest in more efficient markets (Osei, 1998). Investors are concerned about market efficiency because fluctuations in stock prices affect their wealth. Generally speaking, stock market inefficiency may have an impact on consumer and investment expenditure as well as the health of the economy as a whole.

Many studies have been highly focused on the investors' behaviour of the capital market in the economic development. Examinations on the impact of individual investor behaviour and foreign investor behaviour on the stock market or share price are very common in the economic literature. But there is a gap in the previous studies regarding the interdependency of the local and foreign investors in making investment decisions within the emerging stock exchanges.

As a developing country, Sri Lanka needs more investors to make huge investments that pave the way to reach a developed country state. During

recent years, the Sri Lanka capital market showed a weak form and semi-strong forms of investment as a sign of the market inefficiency (Samarakoon, 2010). It may imply irrational investors of the market. The key reason may be the behaviour patterns of investors affected by several factors and interrelations. Sometimes it may occur following a foreign investor by a local investor or a local investor followed by a foreign investor. The fluctuations of the investments made by the local and foreign investors show a similar pattern, including ups and downs at identical time intervals. Even though this results from several impacts, the significant impact is on the investors' interdependency. When paying attention to Securities' value held on Central Depository System Accounts of both parties, this interdependent behaviour has been further confirmed. It can be seen that domestic investors have increased year by year, and also, the behaviour of foreign investors showed a similar nature of behaviour. It seems that there may be investment patterns where foreigner follows local and local follows foreigners. Hence, there is a need to carry out a study on "The Interdependent Trading Behavior of Foreign versus Local Investors" to address this matter. Further, the literature review conveys that very few studies were carried out in the Sri Lankan context regarding individual investor behaviours. Hence, the current study's findings would provide vital information to understand foreign versus local investors' trading behaviour. The objective of this study to investigate whether the pattern of buying and selling behaviour of foreign and local investors is interdependent when making investment decisions. This study is significant because it helps the individuals and companies' investors looking for investing in clarifying the impact of trading pattern investment decision on the performance of the capital market. It helps them to avoid mistakes that could lead to losses in investments. It will also help the investor in identifying capital market investment theories and awareness. The study is vital for academic purposes as well as investing purposes. In addition, this research is significant as there are very few studies and other studies with the same bearing, which addresses this research gap.

LITERATURE REVIEW

The question of how to explain the investor behaviour in terms of their rationality/ irrationality has never been clearly addressed. Despite the fact that financial investors' ability in assessing market data, settling on a reliable choice, controlling voracity and lament elements of human brain science, and so forth, turns out to be more basic in the trial of financial investors soundness

or unreasonableness under the state of vulnerability. Elton et al. (2004) claim that the stock market index is typically the best indicator because erratic and irrational market fluctuations can be the strongest predictor of an investor's irrationality. According to Rozeff and Kinney (1976), January stock returns in U.S. markets were higher than those in any other month that disregarded the efficient market hypothesis' (EMH) ordinariness presumption. Haugen and Baker (1996) presumed that the January impact is maybe the most popular illustration of peculiar conduct in security markets all through the world, including the U.K., Australia, Germany, French, and so forth, not use Dec. 31 as the duty year-end. Gibbons and Hess (1981) found the "Monday impact." It appears to be that the market has fostered a long example of silliness with no monetary thinking behind that. Both of those discoveries were conflicting with a powerless kind of market effectiveness. In June 1978, an extraordinary issue of the Journal of Financial Economics distributed a few unique papers of "market inconsistencies" noticed up until now. Those oddities show the markets opposite financial backer's silliness.

Moreover, the most startling hit to EMH came from monetary financial experts, when Grossman and Stiglitz (1980) assaulted the essential supposition of a normal market. They contended that if applicable data were reflected in market costs, market specialists would have no motivation to gain dependent on the stock cost. This thinking comes to be known as the Grossman-Stiglitz conundrum. Stiglitz proceeded with the contention in his resulting works and at last procured Nobel Prize in 2001. The request, obviously, didn't stop there. In their examination, De Bondt et al.(1985) showed that the financial exchange will in general overcompensate to awful news than uplifting news. What's more, Kahnemen et al. (1979) tracked down that as opposed to Expected Utility (E.U.) hypothesis, an individual will in general place various loads on gains and misfortunes and spots various scopes of likelihood on those ideal results.

Hirshleifer and Shumway (2003) broke down 26 nations' information from 1982-1997. They reasoned that enough daylight in each country in the example is a solitary most indicator of a positive stock return in each market. Subsequent to controlling daylight, it has been discovered that downpour and snowfall are uncorrelated with the return. In his investigation, Hui-Chu (2010) has likewise reported that financial investors mind-set decidedly associates with security costs, particularly value and bill costs, contending that financial investors mind-set is a crucial factor in harmony resources costs and return.

Bailey et al. (2011), working with U.S. rebate financier financial investors, have proposed conduct predisposition in a common asset. The examination presumes that pattern pursuing among the financial investors seems identified with conduct inclinations instead of objectively deriving administrative expertise from past execution. The correlational examination proposes that these financial investors adjust to generalizations described as Gambler, Smart, Overconfident, Narrow Framer, and Mature. Adam and Marcet (2011) expressed that market specialists are 'inside judicious,' i.e., amplify limited expected utility under vulnerability given progressively steady abstract convictions about what's to come. Yet, specialists probably won't be 'remotely sane,' i.e., probably won't have the foggiest idea about the extraordinary model for result pertinent factors.

The supposition of the sane market neither fits on account of the securities exchange of Bangladesh. In this way, a few tests have been performed to discover whether the offer market responds fittingly with the declaration of significant data. Ahsan et al. (2003) has directed one such examination on recorded protections in Dhaka Stock Exchange by fostering the accompanying invalid theory that "there is no huge distinction in share cost increment and decline previously, then after the fact the declaration of procuring." The test has been led at a 5% importance level. Their discovering closed a connection between the offer costs and income declarations, despite the fact that the greatness of progress in share cost is exceptionally ridiculous.

Ciner and Karagozoglu (2008) examined the effect of unfamiliar exchanging action on the hypothesis of private financial investors. Their principle finding is that arrival of individual theorists is impacted emphatically by unfamiliar merchants. With scholarly experience, unfamiliar financial investors give unrivaled data, decrease the uneven issue and cause the effect on entire market developments. With respect to stream, Thailand market saw the specific relationship between net buy and stock vacillation, which further develops market liquidity since the monetary emergency occurred. Wang (2007) likewise gives two monetary translations for the connection between unfamiliar speculation and market instability. Initially, in a developing business sector, outsiders' buy upgrades market data effectiveness and diminishes instability, which is the financial backer base-expanding impact distinguished by Merton (1987). Thusly, when enlarging the financial backer base, the danger is shared, and the necessary pace of return is decreased.

Thus, market instability will be diminished. Also, this is the ramifications of the notable influence impact hypothesis. It is characterized that unfamiliar financial investors' selling adversely influences returns and causes more critical variance on stock cost than their buys. Additionally, Dahlquist and Robertsson (2004) likewise brought up that the super durable stock cost was related decidedly with the net acquisition of unfamiliar financial investors. The clarification is that more broad responsibility for investor diminishes the capital expense of the firm. Thus, they will in general put resources into stocks that are preferable educated over others. The creators additionally affirm that hazard sharing prompts different capital expenses in many firms in monetary advancement. Griffin et al. (2004) introduced the straightforward model of balance value streams to analyze the effect of unfamiliar financial investors on returning homegrown ones and market execution. Utilizing a bivariate underlying VAR, this investigation gave solid proof to demonstrate that the unfamiliar financial investors follow the positive market execution. In the U.S market, unfamiliar money inflow expands the value market's exhibition.

Chan et al. (2007) researched the connection between two market sections: homegrown financial investors and foreign financial investors in China. They cited the A-share for the formers and the B-share for the last mentioned. They likewise analyzed the effect of the financial arrangement of the Chinese government, which permits homegrown financial investors to exchange A-share from Feb. 19 2001. Utilizing Vector Autoregressive Model (VAR) and Vector Error Correction Model (VECM), this examination brings up the exchanging volume makes significant impact stock returns in similar exchanging meeting and the future stock returns. In more subtleties, before Feb. 19, 2001, A-share return and B-share return can be anticipated unequivocally by A-share volume, while B-share volume has a minor affect on A-share return. Then, at that point, after Feb. 19 2001, B-share influences essentially. A-share in term of volume and statement modification. As a clarification, the creators firmly accept that homegrown financial investors' exchanging contains more data than unfamiliar financial investors. Since the quantity of exchanging movement the B-share market is lower than that in the A-share market, the impact of the B-share market in general market is more fragile. Nonetheless, it doesn't mean unfamiliar financial investors would get a larger number of weaknesses than homegrown others and return relies upon

technique venture.

Hong and Lee (2011) tracked down that because of U.S. market returns, outsiders and institutional financial investors will in general follow an energy system though singular financial investors will in general follow an antagonist procedure. Richards (2005) likewise explored six Asian developing business sectors about the net acquisition of unfamiliar financial investors. This paper gave generous proof to demonstrate that outsiders react rapidly to value change. In addition, the exchanging movement of the unfamiliar area impacts emphatically to cost and clearly, it prompts an increment in the entire market. Fundamentally, this impact is more critical in the developing business sector than in the created market.

Hsu (2013) analyzed what unfamiliar ventures mean for the homegrown financial exchange by contrasting the exhibition of supported and un-supported supplies of unfamiliar financial investors. They observationally tried whether financial investors crowded into each gathering and regardless of whether the most loved gathering performs better compared to the un-supported gathering during both downturn and development periods. Their discoveries show that market member's crowd the exchanging conduct of the unfamiliar financial backer supported stock gathering. However, they crowded in the un-supported gathering just in bear markets. The unfamiliar financial backer supported gathering performs better just during a monetary development. During a downturn, the unfamiliar financial backer disfavored bunch outflanks the supported gathering.

Bohn and Tesar (1996) tracked down that month to month unfamiliar acquisition of U.S. financial investors are decidedly connected with contemporary and anticipated nearby returns. Brennan and Cao (1997) detailed a positive connection between U.S. quarterly buys in created unfamiliar business sectors and simultaneous nearby returns and a positive relationship between slacked U.S. buys in developing business sectors and nearby returns. In an investigation of the every day streams in the Korean market, Choe et al. (1999) tracked down that unfamiliar financial investors purchase following a positive market return and sell following a negative market return before the Korean monetary emergency. They discover comparative proof of positive criticism exchanging by Korean individual financial investors too.

Froot et al. (2001) showed that simultaneous and slacked returns emphatically impact the portfolio streams of global financial investors. Batra (2003) showed that unfamiliar institutional financial investors go about as hopeful input brokers every day in India. Utilizing Swedish information, Dahlquist and Robertsson (2004) found that outsiders increment their net possessions in firms that have as of late performed well. Griffin et al. (2007) showed a solid connection among turnover and past returns in many securities exchanges. Utilizing Korean information, Bae et al. (2011) showed that unfamiliar financial investors will in general purchase stocks that have outflanked beforehand and sell stocks failed to meet expectations, proposing that outsiders will in general be energy merchants. Unfamiliar financial investors' crowding is the inclination for financial investors of a specific gathering to copy each other's exchanging. As indicated by Banerjee (1992), instructive unevenness might make clueless yet normal examiners decide to exchange the same way as educated financial investors. Since instructive issues might be more genuine when putting resources into an unfamiliar value market than the homegrown market. So that crowding might be correspondingly more serious in an unfamiliar market. These discoveries suggest that unfamiliar financial investors might pull out their speculation from the host country during a downturn period, making stock costs drop enormously. Accordingly, during a downturn period, homegrown financial investors can procure a superior return by putting resources into unfamiliar unfavoured stocks because of the low unsettling influence from unfamiliar financial investors.

Ramli et al. (2016), using the Indonesian Capital Market day by day exchange information during the years 2009-2011, analyzed the grouping conduct of homegrown financial investors, which followed that of unfamiliar financial investors by apply the Lakonishok models. They tracked down that the grouping conduct in the Indonesian Capital Market happened in both purchase exchanges and sell exchanges during 2008 and 2009. Then, at that point purchase crowding proceeded after the emergency with a lower power. Be that as it may, there was no sell grouping conduct saw after the emergency. In this manner homegrown financial investors will in general follow antagonist procedure; sell when unfamiliar financial investors watched to purchase. They additionally look at that crowding conduct happened because of the effect of data unevenness among homegrown and unfamiliar financial investors. There is an alternate clarification for crowding among institutional

financial investors. In contrast to singular financial investors, store chiefs survey their assets consistently (for example quarterly for shared assets and yearly for annuity assets) on their exhibition comparative with a benchmark and one another. It might convince them to copy each other are exchanging undeniably (Scharfstein & Stein, 1990).

Shyu and Sun (2010) analyze the crowding conduct of institutional financial investors in Taiwan's securities exchange from 1999 to 2004. They isolated the institutional financial investors into unfamiliar institutional financial investors, homegrown common supports financial investors, and homegrown protections sellers. Their discoveries show that institutional crowding exists in Taiwan's securities exchange. Just as, they researched that the unfamiliar institutional financial investors have an unmistakable inclination to crowd. In any case, they tracked down that homegrown common finances financial investors have the most grounded propensity to crowd. Yet, their investigation results show that there has an exceptionally low inclination to draw in homegrown protections sellers in crowding.

Samarakoon (2010) presumed that the conduct of financial investors differs according to points of view to the purchase side and sells thoughts of the financial investors. As indicated by the discoveries, homegrown financial investors and institutional financial investors are more educated than singular financial investors. The profits going before deals by more-educated financial investors are probably going to be bigger than returns going before deals by less-educated. Positive simultaneous strange returns, with the exception of when unfamiliar institutional financial investors sell.

Hardly any monetary markers advance the grouping conduct of financial investors. One of them is unfamiliar incomes. Unfamiliar incomes bring generous speculation assets to many arising nations yet make them out of nowhere powerless against unfamiliar money outpourings. Homegrown financial investors in developing business sectors as a rule take unfamiliar financial investors exchanging as a main market pointer. However, this didn't generally occur in created nations. In the event that homegrown financial investors follow unfamiliar financial investors' exchanging, nearby business sectors may overcompensate to unfamiliar incomes during a time of speculative assaults. This wonder will clarify why homegrown financial investors may have developed the Asian monetary emergency (Chen, 2002).

Garg and Chawla (2015) analyzed the pattern examination and connection between unfamiliar institutional financial investors and homegrown institutional financial investors information on the Indian securities exchange. The examination is completed on the month to month information from 2007 to 2015 utilizing 96 perceptions for institutional financial investors' net ventures. They utilized Microsoft Excel and logarithmic Trend Lines for their investigation. Their examination planned to break down the pattern a lot of institutional financial backer interests in the Indian Stock Market. Subsequently, they tracked down a solid negative relationship between the speculations made by unfamiliar institutional financial investors and homegrown institutional financial investors.

Bae et al. (2008) inspect the relationships of net purchase volume among various financial backer sorts in Japan's Tokyo Stock Exchange. They found that there was a negative connection between the net purchases of unfamiliar and homegrown brokers. Their outcomes suggest that homegrown financial investors will in general purchase more than they sell when the market is falling, and unfamiliar financial investors will in general purchase more than they sell when the interest is rising. Nonetheless, they likewise tracked down that unfamiliar financial investors' net purchases are decidedly corresponded with future returns essentially. So it may suggest that unfamiliar financial investors have a decent market anticipating capacity.

Samarkoon (2009) examined the previous streams influence returns, with utilizing 13 years of every day value stream information in the Sri Lankan financial exchange. The value stream information are remarkable in that they are arranged by the purchasing and selling financial backer class as homegrown institutional financial investors, homegrown individual financial investors, unfamiliar institutional financial investors, and unfamiliar person. In that examination it is inferred that they are decidedly interrelated and effect of streams on future returns isn't diverse among emergency and non-emergency periods.

Nonsensical venture example of value streams in developing business sectors makes market failure of the developing business sector. Just as worried about the exact outlines, there is no sufficient explores which has tended to this matter inside the neighborhood setting. Indeed, even the current writing has given just restricted proof to look at financial backer conduct and securities exchange execution between nearby versus unfamiliar financial

investors. Thus an examination hole has been recognized and the scientist has directed this exploration to top off this distinguished hole.

METHODOLOGY

This study used the quantitative methodology based on the comparative nature of the research problem (Dewasiri et al., 2017; Dewasiri et al., 2018) obtaining daily equity flow data for each investor class, which are figured from transactions data obtained from CSE. The equity flow for an investor group represents the total value of trades and the shares traded of that particular investor group on a given day. The daily turnover, which is the value of shares traded, and the shares traded of each stock is classified by the buy-side and the sell-side investor class. The data cover 12 years from 2007 to 2019 and contain trades on 272 companies' stocks with 3121 observations. The data set enables the identification of the buyer and the seller of each company trade as Foreign Companies (FC), Foreign Individual (FI), Domestic Companies (DC) and Domestic Individual (DI). This paper examined the purchases and sales of each of the four investor classes.

FINDINGS

The output obtained from the e-Views software has been presented through statistical and analytical methods such as Granger Causality Test, Cointegration Test, and Vector Error Correction Model to gain the results based on the research objectives. First, the researchers proceeded with the diagnostic tests such as normality and unit root, the results show that all the variables are normally distributed and in stationary in its levels.

Granger Causality Test

Granger causality test specifies the direction of the causal relationship between the variables, and also Granger-Causality test is used to examine the short-run dynamics. Since the VAR models represent the significant effect, it highlights a short-run causality relationship between variables. The pairwise Granger causality analysis for the turnover (purchases) found that there is a unidirectional Granger Causality from the foreign companies who purchase shares (BFC) to the foreign individuals who buy shares (BFI) at the 5% significance level. Further, BFC shows a bi-directional causality to local companies that buy shares (BLC). It indicates that foreign companies purchase stocks by looking at local institutions. Local companies buy stocks

by looking at foreign companies' previous purchasing behaviour. There is only a unidirectional causality from BLI (local individuals who buy shares) to BFC, meaning that foreign companies follow local individuals' previous purchase value, but local individuals do not follow foreign companies when purchasing shares. Further findings show that there is bi-directional causality between BFI and BLC, which indicates that both parties follow each other's purchasing trades when buying stocks from CSE. Both are significant at the 1% level of the p-value. According to the results, BFI (foreign individuals) also follows BLI trading behaviour and local individual investors follow individual foreign investors purchasing behaviour vice versa. It suggests that there has a high herding behaviour between local domestic and institutional investors.

The results for granger causality among sales (turnover) of different investor types show there is uni-directional causality between foreign companies that sell shares (SFC) and foreign individuals that sell shares (SFI). It shows that, when selling stocks, foreign companies are looking at foreign individuals selling behaviour. The rest of all other variables follow each variable. For example, SFC affects the preceding previous trading behaviour of local companies that sell shares (SLC). In contrast, SLC affects SFC trading behaviour, SLI (local individuals who sell shares) Granger Cause SFC, SFC Granger Cause SLI and SLC affect the SFI trading behaviour, and SFI affects the SLC trading behaviour. Consequently, there has bi-directional causality between each variable except SFI and SFC. In summary, we can't see any relationship between the foreign individual and foreign institutional sales. But other all types of investor's sales had a bi-directional causality among the trading flows.

The granger causality among foreign and domestic investors' share volume traded on the purchase shows there is an unidirectional Granger causality between BTFI (foreign investors' share volume traded on the purchase) with BTFC (foreign companies investors' share volume traded on the purchase), BTFC with BTFI, BTFC with BTLI (local individuals' share volume traded on the purchase), and BTLI with BTFC at a 1% confidence level. The rest of all other variables carried on bi-directional Granger causality. BTFC with BTLI and BTLI with BTFC is one of the bi-directional Granger causalities, and BTFI with BTLC (local companies' share volume traded on the purchase) and BTLC with BTFI is another bi-directional Granger causality. BTFI with BTLI and BTLI with BTFI have bi-directional

granger causality and BTLC with BTLI and BTLI with BTLC have bi-directional Granger causality. That means Foreign institutions and local institutions tend to follow short-run trading behaviour considering the share volume traded of Local individuals. According to the granger causality among foreign and domestic investors' share volume traded on the selling, there has unidirectional Granger causality between STFI (foriegn investors' share volume traded on the selling) and STFC (foriegn companies' share volume traded on the selling) and STFC with STFI and STFC with STLI (local investors' share volume traded on the selling) and STLI with STFC at a 1% confidence level. Bi-directional Granger causality was carried on all other variables. STFC with STLI and STLI with STFC is one of the bi-directional Granger causalities, and STFI with STLC and STLC with STFI is another bi-directional Granger causality. STFI with STLI and STLI with STFI have bi-directional granger causality and STLC (local companies' share volume traded on the selling) with STLI and STLI with STLC have bi-directional Granger causality. It implies foreign company investors and local company investors tend to follow short-run trading behaviour considering the share volume traded of Local individuals in the Colombo Stock Exchange.

Cointegration

Johansen cointegration test is used to examine the long-run relationship between these two time series. The Johansen cointegration test results suggest that two variables are cointegration at a 5% significant level. After the comparison of the Lag Length Criteria (AIC), it has been found that the optimal lag order for this VAR model is 14.

After revealing the optimal lag order, there is a need to conduct a cointegration test to determine whether there is a long-run relationship between the variables. Johansen cointegration test on purchases suggests four cointegration equations exist (Table 1). According to the Maximum Eigenvalue value test stated in the Table 2, there are two cointegration equations. It means a stable long-term relationship exists among all variables, i.e., BFC, BFI, BLC, and BLI. The results imply that the variables are cointegrated. Johansen's cointegration model concludes that four types of investors are interdepending over the long-run period. In the presence of cointegration relationships between the variables, VEC modelling can be further conducted.

Table 1: Unrestricted cointegration rank test (trace) – Purchase (turnover)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.106349	809.4579	47.85613	0.0001
At most 1 *	0.077627	459.0963	29.79707	0.0001
At most 2 *	0.051098	207.3064	15.49471	0.0001
At most 3 *	0.013982	43.87431	3.841466	0.0000

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 2: Unrestricted cointegration rank test (maximum Eigenvalue) - Purchase (turnover)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.106349	350.3616	27.58434	0.0001
At most 1 *	0.077627	251.7899	21.13162	0.0001
At most 2	0.051098	163.4321	14.2646	0.0001
At most 3 *	0.013982	43.87431	3.841466	0.0000

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Vector Error Correction Model – Long-run Relationship

Having established that the trading behaviour of local investors and foreign investors are co-integrated, the Vector Error Correction Model (VECM) is estimated. Table 3 shows the long-run causal relationship among the different investor groups' total purchases (Turnover) in CSE. All the investor groups' (-) minus indicates the significant long-run causal relationship among all investor groups. When considering BFC, it has a positive causal relationship (+0.387668) with the BFI and BLC (+0.105416) and a negative relationship (-0.091506) with the BLI. Thus, BFC has a positive effect on foreign individuals and local companies' purchases and a negative impact on the local individuals.

Table 3: Long run relationship – Purchasing (turnover)

	BFC(-1)	BFI(-1)	BLC(-1)	BLI(-1)	C
BFC	1	-0.387668	-0.105416	0.091506	-2.932952
		-0.146950	-0.038650	-0.035210	
BFI	-2.579527	1	0.271924	-0.236041	1.137011
	-0.516010		-0.054430	-0.038690	
BLC	-9.486207	3.677498	1	-0.868040	0.309181

	-0.861000	-0.345320		-0.047560	
BLI	10.928300	-4.236553	-1.152020	1	-0.268381
	-1.045000	-0.327000	-0.063360		

Source: CSE daily trading data

On the other hand, local individuals' purchases also have a positive long-run relationship on BFC and BLI. It may occur in the short-run relationship. However, it is a significant feature in the long run relationship purchasing shares.

Further, foreign companies get the highest coefficients in all four cointegration equations. It implies that most of the investors tend to follow foreign institutions trading patterns in large volumes. When purchasing Rs.1 share by foreign companies, local companies buy shares at a price that is almost four times greater than foreign institutions.

These long-run coefficients also indicate that foreign companies act opposite to local individuals. For example, when local individuals tend to buy shares, foreign individuals tend to sell shares in the CSE. The following most significant coefficients are from foreign individuals. So, it seems that other investor groups also follow individual foreign purchases after the local companies. The reason might be the irrational investor behaviour of the local investors.

Further analysis shows the short-run contribution of the purchasing variables. These coefficients should multiply by the speed of adjustment to get the actual coefficient for the interpretation. According to the results, BFC follows its purchase values of the past fourteen days. It indicates by the significant coefficients of BFC lag 1 to lag 14. BFC also harms foreign individual's previous six days purchases. And also, BFC carrying insignificance coefficients with BLC for the past eleven days. BFC also harms local individuals with the last eleven days of purchases.

BFI has a positive effect from their previous fourteen days purchases. Further, the BFI model indicates that BFC follows (negative impact) foreign companies purchases 14 lags (09 last days). When we consider BLC as the dependent variable, it follows foreign companies previous fourteen days of purchases, foreign individuals previous 01 days of purchases, local companies previous fourteen days of purchases and local individuals previous eleven

days of purchases.

Local individual investors follow other all groups of investors in 14 lags as previous ten days of foreign companies and the previous two days of foreign individuals and previous 14 days of local companies when purchasing. Further, they follow their purchases of 14 lag (Previous 14 days).

The R square values are less than 0.5 in all four models. It indicates that all models are not best-fitted models. But LCP has the highest R square value that almost close to 0.5. It gets an R-square value of 0.4756. Hence, we can consider the BFC model as the best-fitted model among all four models of purchases.

Sales Model

As the previous model, this model also selects lag length criteria as lag selection for the VECM. It fixed the 13 lags as the optimal lag for further analysis, following the AIC value. Then this study runs the Johansen cointegration test and vector error correction model using the optimal lag order of 13.

The above tables evaluate the long-run relationship using the Trace Test and the Maximum Eigenvalue Test. In both cases, trace statistics and the Max-Eigen statistic values are more significant than the critical values at most three hypothesized equations. So, it indicates that there have four cointegration relationships within the sales model's variables.

Table 4: Cointegration relationship – VECM (sales model)

	SFC(-1)	SFI(-1)	SLC(-1)	SLI(-1)	C
SFC	1	-26.01890	-0.194959	0.247961	0.756035
		-4.061500	-0.030400	-0.041820	
SFI	-0.038434	1	0.007493	-0.009530	-19.671190
	-0.196970		-0.041740	-0.043540	
SLC	-5.129272	133.4580	1	-1.271859	-0.147396
	-0.380960	-10.785800		-0.073090	
SLI	4.032895	-104.9315	-0.786251	1	0.187467
	-0.452310	-9.710520	-0.063080		

Source: *CSE daily trading data*

According to the cointegration results of four-vector error correction models as stated in the Table 4, there is a significant causality running from SFC, SFI, SLC and SLI to all considered groups of foreign and domestic investors. The study then examines a positive long-run relationship among the SFC towards SFI and SLC and SLI. But there is a negative relation between SFC and SLI when we consider SLI as the dependent variable. Foreign individuals' sales have a negative (-0.247961) effect on SFC. A positive impact on SFI and SLC Local institutions' sales has a negative (-0.247961) effect on SFC and a positive effect on SFI and SLC. When we consider the coefficients, foreign individuals' sales have the highest coefficients on foreign and local individuals. LIS also negatively impacts SFC and positively impact local companies.

When comparing long-run relationships of sales and purchases, we can see similar causal relationships in both models. So, it can be concluded that there is a high herding behaviour among foreign and domestic investors in the Sri Lankan equity market in the same direction (positive relationship). The analysis also shows the error correction term (speed of adjustment) for the four VEC Models. The sales model displays a significant long-run causal effect, based on the t-statistics of P-value – 0.0000 with the coefficient and error-correction term having the expected negative sign. It implies the variables in the sales model are co-integrated and share a long-run relationship.

According to the short-run result of VECM , foreign companies follow their sales of stocks in the previous thirteen days of the period. The sales of SFI do not depend on the sales information of the foreign investors for twelve days. But it directly depends on this data on the 13th day of the lag period. Further, the SFI model indicates that SFC follows (negative impact) foreign companies' purchases 13 lags (11 previous days). SLC as the dependent variable follows the foreign companies when the selling previous eleven days of sales, foreign individuals previous one days of sales, local companies previous thirteen days of sales and local individuals previous thirteen days of sales. Local individual investors follow other all groups of investors in 13 lags as previous one day of foreign companies and the no previous days of foreign individuals and previous nine days of local companies when selling. Further, they follow their selling of 13 lags (Previous 13 days).

It has been found that foreign institutions depend on the trading

behaviour of the foreign institutions themselves for a maximum period of 12 days as the optimum lag length records 12 days. They rely on foreign individuals and local institutions' behaviour for three days and 12 days, respectively. But they do not respond as per the behavioural changes of the local individuals. It shows that the behavioural strength of the local individuals is relatively weak than the other participants in the stock market.

There are some significant factors identified within the behaviours of the above-analyzed parties. One of the essential matters is that the responsiveness of the local individuals to the other market participants is low. Hence, they can be treated as irrational participants who have paid less attention to the fundamental theories and the flow of the market actions. It is also clear that the attention of the foreign companies on the behaviour of the local institutions and the individuals is less as they believe that the local investor behaviour is not a result of practical market analysis.

When analyzing the behaviour of the four types of investors in the sales perspective, the significant feature that can be seen is the dependency of the investors on themselves when making investment decisions. Another feature that can be seen in the results obtained is the irrational behaviour of the local investors. The dependency of them on the information of the STFC and STFI is only one day. Due to this irrational behaviour, the dependency of STFI and STFI on STLI is also shown at a lower rate. Hence it is clear that the rationality of foreign investors is relatively standard than that of the local investors.

DISCUSSION

The study has observed an assertive herding behaviour between local individuals and local institutions. There is a powerful and statistically significant positive correlation between domestic companies and domestic individual investors within both sales and purchases. It also has been proved by the granger causality test and the cointegration relationship between the variables. The researchers have identified that the bi-directional causality runs between local individuals' and local companies' purchases and unidirectional causality from local individuals to local institutions in sales through the granger causality test. Furthermore, a significant positive coefficient in the cointegration results between the purchases and sales flows between the local individual and the local institutions. It implies that the local individuals tend

to follow local companies' trading behaviour. According to the VECM results, in the short run also, there is a significant positive relationship between these four investor groups.

Granger causality test results imply that both foreign and local individuals follow local institutions' trading behaviour. It is also evidenced by the cointegration relationships among the purchase and sales variables. There is a significant positive coefficient running from foreign investors and domestic individuals to the local companies. Foreign individual investors tend to herd local individuals and local companies highly; that evidence from the correlation among the investors, that correlation is almost more than 0.6. It is also proved by the short-run VECM relationships among these investors' trading flows.

According to the cointegration relationship of VECM, no investor group follows the trading of foreign individuals in the long run. The insignificant coefficients when we consider foreign individuals purchases and sales as an independent variable, this may result from the low attraction of foreign individuals to trade in CSE. It only got an average of 280,202,065.39 and 321,816,297.48 in total sales and purchases for a month. It is a meager amount when comparing to the other investors' monthly average. Therefore, this study also examines that foreign attraction is very low for the Sri Lankan equity market in the sample period.

On the other hand, local individuals play a significant role in the Sri Lankan equity market. In the short run, they follow foreign and local institutional purchases in making their purchase decisions in the equity market. But when selling stocks, they follow only their previous day sales and foreign individuals' sales. In the long run, local individuals follow both purchasing and sales behaviours of foreign and domestic institutions. One possible finding that can be drawn from these findings is that the Sri Lankan equity market is an inefficient market due to many herding behaviours among the local investors. However, the study's significant finding is the irrational behaviour of the local investors concerning the foreign investors.

The behaviour of the local investors is not having a good base, and they highly rely on their previous trading data rather than depending on the trading information of the foreign institutions and individual foreign investors. On the other hand, the foreign investors also do not rely on the behaviour of

the local investors as they have not identified a significant reason behind the trading decisions taken by local investors. Therefore, even though there is a significant relationship among the behaviours of local and foreign investors, it is clear that the rationality of foreign investors is relatively higher than the local investors.

CONCLUSION

This study investigates the interdependency of trading behaviour between foreign and local investors from a new angle. This study's main objective was to determine whether the Sri Lankan equity market is an efficient market place for investors. To assess that, the scholar used four different types of investor groups who trade in CSE, namely foreign companies, foreign individual and local companies and local individuals. Then the researcher examines whether there are any relationship (herding behaviour) among the investor groups trading flows using different analyzing tools such as descriptive analysis, correlation analysis, Granger causality test, cointegration test, and VECM model. The output of the descriptive analysis reveals that the Sri Lankan equity market is not so popular among individual foreign investors because their trading values are shallow compared to the other investor groups. But foreign institutional trading amounts are in a good position when comparing to the local investors. According to the correlation analysis, local individuals and local company investors have a strong positive association. Granger causality test also reveals that there is a bi-directional causality among the domestic individuals and companies. The cointegration test and the VECM model also show a positive long-run and short-run relationship among both investors' groups. Therefore, we can conclude an assertive herding behaviour and inter-relationship among local individuals and local company investors.

Foreign individuals, foreign companies, and local individuals investors tend to follow the trading pattern of local company investors. Both the granger causality and VECM results prove it. On the other hand, no investor group follows the trading behaviour of foreign individuals in the long run, according to the VECM results. The reason for that will be a low attraction of foreign individuals to the Sri Lankan equity market. So other investors will not follow their trading behaviour because foreign individuals are not very influential players in the CSE. Local individuals also play a significant role in the Sri Lankan equity market. But they also have a high tendency to herd other

investor groups.

Samarakoon (2009) found similar results by examining the asymmetric investor behaviour regarding the buy-side and sell-side. Further, he has found that both investor groups have shown positive feedback, which was similar to the output received from this study. The analysis of the study examines that there was a lot of inter-relationships between all four investor groups. So, it implies that most of the investors tend to herd others trading behaviour when they buy and sell stocks in the Sri Lankan equity market. Overall, the study examined that the Sri Lankan equity market is not an efficient market place according to the Efficient Market Hypothesis.

Using a unique data set from the emerging market of Sri Lanka, the primary objective of this study was to understand the buy-side and sell-side behaviour of different investors. There is strong evidence of unequal investor behaviour on the buy-side and the sell-side. Foreign institutional investors behave differently from all other investors because the others' investor performance does not influence their buying and selling.

Implications of the Study

According to this study, the Sri Lankan equity market is not an efficient market for investors. So, the policymakers should take relevant actions to make the Sri Lankan equity market an efficient market place. Moreover, individual investors' knowledge about stock market trading is shallow in emerging countries like Sri Lanka. So, the prevailing government and Colombo Stock Exchange should promote investment in the equity market by providing relevant knowledge to the investors.

This study also examines that foreign individuals' trading amounts were deficient during the sample period. This will be due to the instability in the Sri Lankan economy and the government policies. Therefore, the government should attract foreign investors to Sri Lanka by establishing economic and political stability in Sri Lanka.

Most of the analysis proved that local individual investors are observing the same group investment patterns. It can be due to personal interactions among the local investors and local companies where there are more possibilities to share local market information. It will also prompt individual investors to follow local news more closely and pay more attention

to local companies' earnings predictions and announcements than to those of foreign individuals and foreign companies. It can also make local investors more responsive to the same group and perform stock market trading. Such an active response, in part, can also explain individual investors' tendency to favour local stocks. Assuming individuals process earning announcements similarly to how they would process other types of information, our results can be generalized; individual investors are more responsive to information about local companies. Therefore, it will lead local investors to invest more in CSE. It is naturally happening in capital markets of all other countries. Still, as an emerging market of Sri Lanka, CSE needs to attract foreign investors rather than local investors. Hence, implementing policies not to leak price-sensitive information from the listed companies is essential.

Different investor groups tend to follow other investors' behaviour in trading. On the other hand, some big investors try to manipulate the stock market prices. Investors should act responsibly and rationally in the stock market to make an efficient market place. So, they should get enough knowledge before going to trade in the stock market. Therefore, the Securities Exchange Commission should take relevant actions to minimize irrational trading and stock price manipulations. Then SEC can engage in making the equity market an efficient place by regulating investments in the CSE.

Stock markets play an essential role in the economy as they are now the financial indicators of growth in any country, and they represent the root of the functioning of all the country's sectors. CSE comprises 289 top Sri Lankan companies. Hence, improving Corporate Governance is vital. Since stock markets are regulated by the SEC, companies are bound to follow the rules and regulations to have a good market value of their stocks on stock markets. It will be possible only if they keep their shareholders satisfied.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest concerning the research, authorship, and publication of this article.

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