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Keywords: *var, granger causality, foreign direct investment, stock market.*

GJMBR-B Classification: *JEL Code: F21, F31,F60,G28*



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R P C R Rajapakse

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I. Introduction

The low level of savings in developing countries like Sri Lanka is a major reason for the slower economic growth, in order to enhance domestic investment and accelerate growth a country needs to find the capital required. Consequently most of the countries turned to foreign sources of financing during the transition from a centrally planned to a market economy The dominant form of foreign capital inflows was foreign direct investments (FDI), which, due to their characteristics, may have many positive effects on the host economy (Blomström, Lipsay and Zejan, 1992; Borensztein, De Gregorio and Lee, 1998; Bosworth and Collins, 1999; Loungani and Razin, 2001; etc.). Theory regarding the characteristics of FDI emphasizes the stability, long-term motivation and flexibility of this type of capital investment, even during financial crises (Lipsey, 2001). On the other hand, stock market and portfolio investments are characterized as short-term, speculative and, thus, prone to quick disinvestment and capital flight. Despite these significant differences between the two types of capital flow, no study has been done so far to prove the existence of a connection between FDI and portfolio investments.

Hence, the underlying interlinkages and the direction of the causality still remain un-clarified.

The main purpose of this study is to explore the existence and explain the characteristics of the relationship between long-term (FDI) and short-term (stock market) investments in Sri Lanka. The study emphasizes on the strength and the direction of the relationship between the two variables in the long run by using the Engle-Granger and Johansen cointegration methodology. In the long run, FDI should, influence economic growth through the transfer of know-how and technology and, indirectly, capital markets. Alternative explanations of this long term relationship include the assumption that the presence of FDI inflows causes spillover effects on the domestic stock market and encourages policy makers to adopt market-friendly regulations, which encourage stock trading. In addition, the existence of the short-term relationship between FDI stock and trading volume is also tested using the vector autoregressive (VAR) model approach. In the short run, assumed direction of the connection stems from events on capital markets which send signals regarding the domestic investment climate to foreign investors, and thus affect FDI. Hence, the direction of causality in the short run should be reversed. Therefore, the main hypothesis of this study is that, in the long run, trends in FDI flows influence trading on the Sri Lankan stock market, while in the short run events on the domestic stock market affect the volume of foreign direct investment in Sri Lanka.

II. Literature

FDI is considered more stable and secure because it is, (in theory), less prone to capital withdrawals and financial contagion. This is because the presence of large, fixed and illiquid assets, which comes with a direct investment. Portfolio investors in contrast are usually not primarily interested in controlling and managing the enterprise, but interested in short-term capital gains. Accordingly, portfolio investments are characterized by frequent changes of ownership and places of investment, as well as by an anonymous relationship between the issuer and the holder of securities. Those investments are driven by investors'

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speculative expectations and due to their short-term character and the moral hazard that stems from it, portfolio investments are sometimes considered as unfavorable. That is, in the event of a financial crisis or negative expectations of investors, this type of capital is the first to flee the country and may cause serious disturbances at the micro and macro levels of the economy.

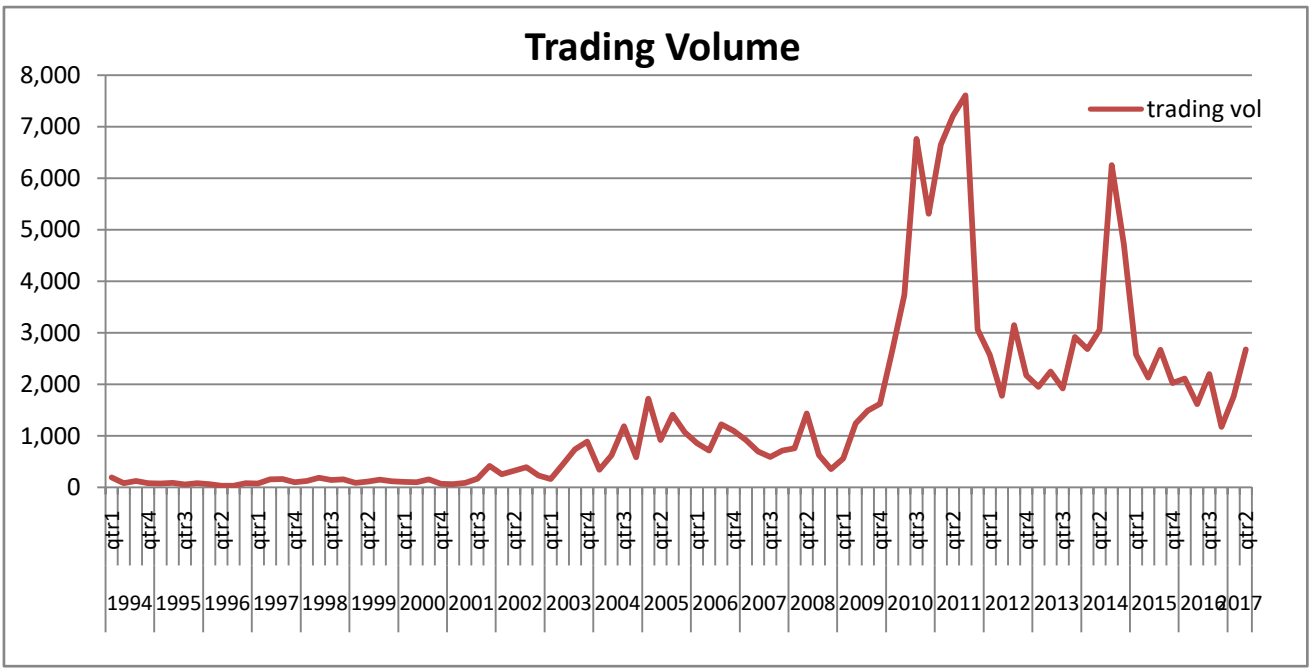
Although the volume of global capital flows has reached unprecedented levels over the past 20 years, the interrelationship and connection between FDI and portfolio investments has remained largely unclear. Despite the differences in character and motivation of the two types of investments, a relatively large number of empirical studies deals with the finding of causality and inter linkages between these two variables.

Based on an empirical analysis, De Santis and Ehling (2007) concluded that the movements on the stock market are the most important determinant of FDI and portfolio transactions. The stock market affects the movement of FDI flows by producing signals that are important for corporate investment decisions. On the other hand, foreign and domestic stock markets determine portfolio investments because "they measure the investment opportunity set and wealth effects."Adam and Tweneboah (2008) highlight an indirect, but strong relationship between stock markets and FDI inflows for Ghana. FDI inflows are a source of technological progress and increasing employment in most developing countries, which increases the production of goods and services and, ultimately, increases GDP. Economic growth then has a positive effect on the development of stock markets and the rise of share prices.

The financial markets of developing countries shows a developing trend especially in the Stock markets during the last two decades. A well-managed stock market attracts foreign investments in to the country. Studies on this subject show a positive relation between FDI and Stock market development. Tsaurai (2014) discovered that there exists a long run relationship between stock market and FDI net inflows in Zimbabwe. Further, Kalim & Shahbaz (2009), Baker, Foley & Wurgler (2004), Halalmeh & Sayah (2010) found a positive impact of FDI on stock market development. Arbacic, Globan and Raguz (2012) found that there is short run relationship evident for the case of Croatia. Claessens, Klingebiel, & Schmukler (2001) cited in Raza, et. al (2012) and Malik and Amjad (2013), found a strong positive relationship between foreign direct investment and stock market development for Pakistan. Njane (2017) found that FDI is statistically insignificant in stock market performance in Kenya.

III. The Colombo Stock Exchange

The Colombo Stock Exchange (CSE) is the main stock exchange in Sri Lanka. It is one of the exchanges in South Asia, providing a fully automated trading platform. The headquarters of the CSE is located in Colombo since 1995 and it also has branches across the country in Kandy, Jaffna, Negombo, Matara, Kurunegala, Anuradhapura and Ratnapura. The CSE has 296 companies representing 20 business sectors as at 3 August 2015, with a Market Capitalization of Rs. 3115.52 Bn. The graph indicates an Increase in Trading Volume after 2009. This year marked the ending of the 30 year old civil conflicts in the country.



Source: Compiled by Author

Figure 1: Trading Volume

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IV. Foreign Direct Investment

The Cambridge Dictionary defines FDI as "money that is invested in companies, property, or other assets by people or organizations from other countries"

Foreign investment inflows to Sri Lanka increased over the last decade as a result of favorable investment policies adopted by the successive governments. Since the beginning of the 90's, the annual value of FDI inflows to Sri Lanka has started to continue with an increasing rate when compared to 80's. This upward movement of FDI can be interpreted as an outcome of the liberalization reforms initiated in 1977. The incentives under structural adjustment and stabilization programme implemented in 1990s were of great importance in generating a surge in FDI. Economic theory assumes a positive relation between FDI and economic growth (and thus indirectly between FDI and the capital market).This connection has not been empirically confirmed in the case of Sri Lanka.

a) *Objectives of the Study*

This study aims at explaining the relationship between FDI and Stock Market in Sri Lanka.

V. Methodology

a) *Data*

In order to determine the relationship between stock market movements and FDI in Sri Lanka, quarterly data on FDI and trade volume on the Colombo Stock Exchange (FTRV) for the period 1994:Q1–2017:Q2 are used in the analysis.

FDI data are taken from the Central Bank of Sri Lanka (CBSL) while the trade volume data were taken from the Colombo Stock Exchange database. The series "volume" is constructed as a quarterly average of daily trade volumes. For the purpose of the analysis, both time series have been deflated by the CCPI and expressed in natural logarithms. The data length was limited by the availability of data. Both FDI and FTRV are measured by million US$.

All variables will be operated on econometric software EVIEWS.

b) *Analysis Techniques*

Economic theory suggests a possible bi-directional relationship between FDI and the stock market. In the short run, developments in stock markets may affect the decision of investors whether to invest abroad, i.e. may affect the amount of FDI inflows. A growth in stock markets and positive expectations are usually an indication of market vitality, a favorable investment climate and the openness of the country to FDI (Desai, Foley and Hines, 2006; Soumaré and Tchana Tchana, 2011). However, if the long-term impact of FDI on economic growth is channeled through the process of rapid technological progress, then the causality direction is reversed, because FDI then indirectly affects stock market movements (Adam and Tweneboah, 2008).

Different techniques will be used in analyzing the data. The Unit root test, Co-integration test, optimal lag length, Vector Auto-Regression (VAR) and Granger causality will be employed in this research in order to investigate the relationship between, FDI and FTRV.

Unit Root Test: To investigate whether the time series data contain unit root or not. Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979) and Phillips-Perron (PP) (Phillips & Perron, 1988) unit root tests which are generally used in most researches will be used.

Optimal Lag Length Test: The number of lagged terms is chosen to ensure that the errors are uncorrelated. To determine the suitable optimal lag length, two most popular methods are the Akaike's information criterion (AIC), and Schwarz information criterion (SC) for Vector Auto regression (VAR). By choosing optimal lag length of explanatory variables based on data, the explanatory variables with appropriate lag length in the model will cover all the related information and better explain the endogenous variable.

Co-integration Test: Co-integration implies that causality exists between the two variables, but it does not indicate the direction of the causal relationship. This paper applies the co-integration approach to examine whether, FDI and FTRV have long run equilibrium interaction. If the series do not have co-integration and no long run equilibrium relation among time series, VAR model will be applied to measure Granger causality effect. In contrast, if there is equilibrium interrelation among the time series, restricted VAR (or VECM ie. Vector Error Correction Model) is used to examine Granger causality.

Granger Causality: Can be used to verify whether one time series is capable of forecasting another (Granger, 1969) [26]. As mentioned earlier, if the variables have one unit root and are co integrated, then the bivariate VECM is specified and estimated. The Granger causality test is then conducted in the context of the VECM. If the two series have one unit root and are not co integrated, then the bivariate VAR is specified and estimated.

VI. Data Analysis

a) *Data*

Quarterly data from 1994:1 to 2017:2 compiled by the Central Bank of Sri Lanka and Colombo stock Exchange are used in this study. FDI and FTRV are measured by US$ millions.

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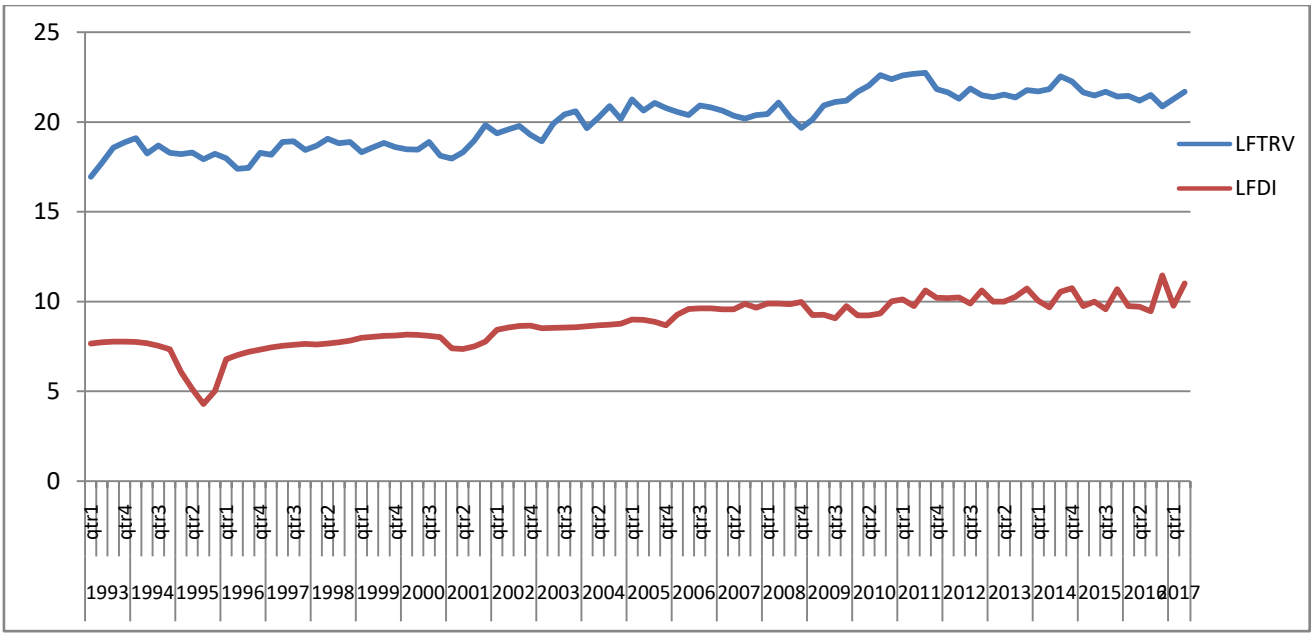

Figure 2: LFDI and LFTRV for the period 1995:1-2017:2

Figure 2, the raw data for the two variables in our study. The nature of the graphs indicates that there is trend effect in the variables.

b) Unit Root Test

This study starts with investigating whether the time series data contain unit root or not. If they do, they are non-stationary. It is important because if time series data are not stationary, the results may contain what is called a "spurious regression problem" (Granger & Newbold, 1974). The spurious regression has a high R squared and t-statistics that appear to be significant, but the results do not have any economic significance (Enders 2008). If the data have unit roots, then all the usual regression results might be misleading and incorrect (Koop, 2008). A regression of variables should never be carried out if they contain unit root (Koop, 2008). It is required to verify whether the data series is stationary or not before examining the correlations among series to avoid the problem of the spurious regression. Number of tests has been suggested to perform in order to assess whether the data series contains a unit root or not. The Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979) and Phillips-Perron (PP) (Phillips & Perron, 1988) unit root tests are generally used by many researchers. According to Greene (2003), the hypothesis to be examined with unit root test is as follows:

H0: There is a unit root (data series are non-stationary)

H1: There is no unit root (data series are stationary)

The unit root hypothesis for non-stationarity was checked using ADF test which both depend on the structure of model (with or without trend and drift). If the H0 is accepted, the series contain unit root and are non-stationary. Converting non-stationary data to a stationary one could be done by taking difference of the data from the first lag. If a series in level form is non-stationary and its first difference is stationary, this series has integration order of 1, I (1); the difference would be I (0). The integration order informs how many times the data need to be differenced to become stationary. Once the data are differenced, and become stationary, the data are ready to proceed with regression analysis.

Table 1: Unit root using ADF Level/Tend and Drift for Trading Volume and FDI

(ADF Test Statistic)	LTRV	LFDI
Constant	-1.43128 (0.5637 Prob.)	-1.14697(0.6941 Prob.)
Trend and Drift	-3.80649(0.0204 Prob.)	-4.02098 (0.0112 Prob.)

Source: Author's Calculations

We observe that, both the trading volume and FDI are stationary at levels but with a trend and drift.

c) Co Integration

Table 2 depicts the co-integration test carried out in order to assess whether there is long run association among the variables FDI, and TRV.

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Table 2: Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.17084	17.85265	15.49471	0.0217
At most 1	0.008801	0.804479	3.841466	0.3698
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				

** Denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values*

The test results indicate that there is co-integration among the two variables which means that there is long run association between the variables and that in turn enabled the estimation of VECM model instead of a VAR model.

d) Optimal Lag Length

In order to determine the suitable optimal lag length: the Akaike's information criterion (AIC), Schwarz information criterion (SC), log-likelihood ratio test (LR) Criterion, and the Hannan-Quinn information criterion (HQ) are being used. However, most popular methods are AIC and SC. VAR or VECM with the optimal lag length will make the estimated model have higher explanatory power than using the other lag lengths. The smallest AIC / SC can be applied for choosing the most efficient and accurate optimal lag length. As indicated by the Table 3, the optimal lag length is 2.

Table 3: Lag Order Selection Criteria

VAR Lag Order Selection Criteria
Endogenous Variables: LFDI LTRV
Exogenous Variables: C
Sample: 1994Q1 2017Q2
Included Observations: 86

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-220.118	NA	0.600367	5.165539	5.222616	5.18851
1	-94.1482	243.1512	0.035201	2.329029	2.500262*	2.397942
2	-86.5735	14.26874*	0.032400*	2.245895*	2.531284	2.360751*
3	-84.3892	4.012933	0.033813	2.288121	2.687666	2.44892
4	-79.1047	9.462945	0.032845	2.258249	2.77195	2.46499
5	-77.1656	3.382123	0.034501	2.306177	2.934034	2.558861
6	-75.7002	2.487839	0.036664	2.365121	3.107133	2.663746
7	-74.3275	2.266596	0.039073	2.42622	3.282388	2.770788
8	-69.9978	6.947589	0.038904	2.418554	3.388877	2.809064

** Indicates lag order selected by the criterion*

Source: Authors Calculations

Thus this study determines and uses a lag length of 2 in estimating the restricted VAR (we call this VECM).

Vector Error Correction Model (VECM)

$$D(LFDI) = C(1)*(LFDI(-1) - 0.872605758537*LTRV(-1) - 3.24740068348) + C(2)*D(LFDI(-1)) + C(3)*D(LFDI(-2)) + C(4)*D(LTRV(-1)) + C(5)*D(LTRV(-2)) + C(6)$$

R squared = 0.240817 Adjusted R squared= 0.19616 DW statistic= 1.919948

The Error correction coefficient c(1)=0.30722, t statistic (3.58144) with a Probability of 0.0006 we can conclude that there is long run causality from TRV to FDI

C(4)	0.117214	0.12669	0.925206	0.3575

Short run causality is represented by c(4)=0.117214 , t statistic (0.925206) with a probability of 0.3575, we can conclude that there is no short run causality TRV to FDI

$$D(LTRV) = C(1)*(LTRV(-1) - 1.14599289567*LFDI(-1) + 3.72149811265) + C(2)*D(LTRV(-1)) + C(3)*D(LTRV(-2)) + C(4)*D(LFDI(-1)) + C(5)*D(LFDI(-2)) + C(6)$$

R Squared= 0.097448, Adjusted R Squared= 0.044356 DW Statistic= 1.962064

The Error correction coefficient c(1)=0.13319, t statistic (1.94501) with a Probability of 0.0551 we can conclude that there is no long run causality from FDI to TRV.

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Short run causality is represented by c(4)=0.15371, t statistic (1.48836) with a probability of 0.1404, we can conclude that there is no short run causality FDI to TRV.

Table 4: Wald Test: C(4)=C(5)=0 rejected

Test Statistic	Value	df	Probability
F-statistic	0.966037	(2, 85)	0.3847
Chi-square	1.932074	2	0.3806

Source: Authors Calculations

Table 5: Wald Test C(4)=C(5)=0 rejected

Test Statistic	Value	df	Probability
F-statistic	1.429552	(2, 85)	0.2451
Chi-square	2.859103	2	0.2394

Source: Authors Calculations

e) Granger Causality

There is Uni-directional causality from Stock Market to FDI

Table 6: Pairwise Granger Causality Tests

Null Hypothesis	Obs	F-Statistic	Prob.
LFDI does not Granger Cause LTRV	92	1.85676	0.1623
LTRV does not Granger Cause LFDI		7.22803	0.0012

TRV granger causes FDI in the long run
Source: Authors Calculations

VII. Conclusion

This study is a step towards the clarification of the unclear relationship between FDI and the stock market in Sri Lanka.

Literature suggests that the long run, trends in FDI flows influence trading on the Sri Lankan stock market, while in the short run events on the domestic stock market affect the volume of foreign direct investment in Sri Lanka, our findings do not go in line with this literature. In contrast our findings suggest that in the long run stock market influences the inflow of FDI while there is no short term relationship between the two variables. Authorities may use this relationship in promoting FDI to the country. If the stock market is developed and foreigner participation can be increased then that will motivate FDI inflows to the country. The main contribution of this paper is an additional step towards the clarification of the so far rather unclear relationship between FDI and the stock market in Sri Lank a, as well as of their characteristics and determinants both in long and short run. The research proceeds from accepted theoretical assumptions, and thus represents mainly a contribution in terms of empirical research. However, the confirmation of the existence of a long term connection and the inability to prove short-term causality between the stock market and FDI in Sri Lanka can also be useful to policymakers and financial investors in the decision making process.

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