FOREIGN DIRECT INVESTMENT AND REAL GROSS DOMESTIC PRODUCT: ANALYSIS OF EMPIRICAL EVIDENCE FROM SRI LANKA

Kengatharan, L.[1] and Jeyan Suganya, D.F.[2]

Abstract

Foreign Direct Investment is one of the crucial forms of international equity flows for having undeniable growth in gross domestic product among emerging countries. The main objective of the study is to investigate the empirical relationship between foreign direct investment and real gross domestic product in Sri Lanka. Net foreign direct inflow was considered as the independent variable while real gross domestic product was considered as the outcome variable in this study. However, Exchange rate and money supply were selected as the control variables on the relationship between foreign direct investment and real gross domestic product. The current study used annual time series data over the period from 1970 to 2019 which were collected from the annual reports of the Central Bank of Sri Lanka. Stationary of the data was tested using the Augmented Dickey-Fuller test. Johansen co-integration rank test, max Eigen value test, Vector Error Correction (VEC) were used to estimate the relationship between foreign direct investment and real gross domestic product. At the 5% level of significance, the co-integration rank test and max Eigen value test revealed that there is only one co-integration equation existing in the study. Therefore, it was concluded that foreign direct investment has long-run impact on economic growth. Likewise, VEC revealed that foreign direct investment, exchange rate and money supply cause real GDP in the short run. The results support the theoretical prediction that foreign direct investment would play an active role in economic growth as it positively leads to the GDP. The study, therefore, concludes that foreign direct investment is driving the economic growth in Sri Lanka.

Keywords: Foreign Direct Investment, Economic Growth, Vector Error Correction Model, Sri Lanka

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1. Introduction

Maximizing the standard of living and achieving stable economic growth are the overarching goals of macroeconomy of a country. Generally, economic growth is measured by the increase of Gross Domestic Product (GDP) and the quality of life and living standards (Botha et al., 2020). It can be attainable while minimizing unemployment and underemployment, increasing productivity through new investment, managing inflation, etc. Domestic and foreign investments are key components to the growth through improved productivity levels and employment (Okwu et al., 2020). However, Foreign Direct Investment (FDI) is considered as one of the most prominent factors motivating economic growth of developing countries (Gunawardhana & Damayanthi, 2019). Because of the public and private sectors of under developed nations such as Sri Lanka, India, Thailand, Bangladesh and etc do not have sufficient savings for investing in the country itself to boost the economy (Rasmidatta, 2011). Therefore, there is a strong urge for generating FDI in each emerging country. FDI is an investment of a firm or an individual from one country into a business or corporation in another country. FDI is made in terms of long-term physical capital, production techniques, products and services, managerial skills, marketing expertise, promotion activities and organizational processes (Mahembe, & Odhiambo, 2014). It stimulates economic growth of the country directly by increasing production, employment, added value and export and indirectly by transition of technology and knowledge and by providing job training to improve the quality of human resources (Chakrabarti, 2001). Hence, the spillover effect of FDI can be benefited by domestic firms.

Therefore, most governments of the developing countries are redesigning their economic policies to attract inflows of FDI by publicizing current and future economic growth of their country (Gokmen, 2021). Even though recipient nation is being benefited with FDI, some other countries like Egypt have adverse impact on service sectors such as finance, retail and telecom (Ingham et al., 2020). It may make domestic firms less efficient compared to foreign firms by the market stealing process and capital-intensive production method, extracting natural resources from host country without any compensation, affecting stability of macroeconomic factors by immediate appreciation of domestic currency in the short run, increasing pollution due to low regulations, etc. Therefore, developing countries should rigorously assess the quality of FDI to reduce the risk of attracting it and promote environmental protection (Pao & Tsai, 2011).

According to the Central Bank of Sri Lanka (CBSL), recently, the largest amount of FDI has been attracted in real estate, mixed development projects, ports, and telecommunications sectors in Sri Lanka (Annual Report of CBSL, 2020). When FDI flow in Sri Lanka was analyzed, the great economic downturn was found during the period from 1960 to 1976 with lower GDP growth rate due to the closed economic system. GDP growth rate -0.4% was reported in 1972 in Sri Lanka. After the liberalization in 1977, a considerable long-term growth in GDP was identified from 3.2% in 1976 to 4.8% in 1983 with annual average FDI inflows as a percentage of Gross Domestic Capital Formation (GDCF) increased to 4.2%. In this period, the government introduced several strategies to attract international investors such as preferential tax rate and tax holidays establishment of foreign

banks, removal of foreign exchange restrictions, and the establishment of Greater Colombo Economic Commission (Thilakaweera, 2012). This upward trend in inflow of FDI was interrupted due to the uncertainty of the investment by civil war in 1983. Another notable lower GDP growth rate -1.5% was experienced in 2001 as it was unable to attract FDI in the uncertain environment. After 30 years of civil war, which ended in 2009, Rapid GDP growth rate from 3.5% in 2009 to 9.1% in 2012 was identified with higher amount of FDI inflow in the country. Again, the country faced the economic fallout due to the COVID-19 pandemic and subsequently island-wide lockdowns and closure of the airport. Inflow of FDI into Sri Lanka was decreased to 548 million US$ in 2020, compared to 793 million US$ in 2019 and 1.6 billion US$ in 2018. Moreover, the country was pushed back into the dangerous situation with GDP growth rate -3.6% in 2020. However, it is being recovered as it was revealed that Sri Lanka direct investment abroad expanded by 4.4 million US$ in Jun 2021 in the recent report (Census and Economic Information Center, 2021). Flow of FDI and its impact on GDP growth rate clearly shows the essentials of FDI in the Sri Lankan Economy (Census and Economic Information Center, 2021).

The topic of FDI in developing the economy is receiving more attention among government, academics, policy makers and management of domestic and foreign companies. Even though, it is an important factor for determining GDP growth in Sri Lanka, limited recent studies have been conducted to prove it statistically in Sri Lanka. Therefore, this study aims to examine long term and short term relationship between FDI and GDP growth in Si Lanka by employing time series analysis using 50 years annual data from 1970 to 2019. Figure -1 presents the trend of FDI inflows and its percentage of GDP from 1970 to 2019 in Sri Lanka. It clearly shows that there is a similar movement pattern of the both. This study focused on theoretical and empirical review of the study, methodology consists of data collection and statistical tests applied empirical findings and discussion and finally conclusion of the study.

2. Literature Review

Initial thought of FDI rose with the early work of Smith (1776) related to international specialization of production to gain absolute advantage. It can be utilized by a country when there is trade between two nations. Then, the thought of Ricardo (1817) emerged to explain FDI using the theory of comparative advantage. Hymer (1976) laid the foundation for other authors to come up with more relevant theories of FDI and he argued that FDI should be motivated to reduce international competition among firms. However, despite the arguments made in different perspectives of FDI by many scholars, Dunning's (1980) Eclectic Paradigm theory is considered the best-known theory of FDI. The theory says that FDI occurs under different scenarios of ownership, locational and internalization advantages. Later, Povici and Calin (2014) stated that FDI theory is based on three integrative theories such as the theory of international capital market, the firm theory and the theory of international trade. Further, they said that FDI theories should be examined under the macroeconomic and the microeconomic views. According to Lipsey (2004), the macroeconomic view of seeing FDI as a particular form of the flow of capital across

national borders, from home countries to host countries, measured in balance-of-payments statistics. Market size, economic growth rate, GDP, infrastructure, natural resources, institutional factors are considered as Macro-level determinants of host country to attract FDI. The microeconomic view examines FDI motivations from the investor's perspective, which would be similar to take a firm-level or industry-level perspective for making a decision.

Many researchers found that FDI has the ability to contribute positively to the economic growth of host countries by playing an active role in providing institutions, legal framework, incentives and other related services that facilitate the generation of benefits and advantages from FDI (Oetzel & Doh, 2009). Mustafa and Santhira segaram (2013) intended to emphasize the impact of FDI on economic growth in Sri Lanka using time series data. It was found that FDI strongly and positively impact on economic growth of the country and further found that actual impact of FDI will only be after a time lag of two years. Similar result was revealed in a prior study (Balamurali & Bogahawatte, 2011) carried out using the data from 1977-2003 by employing Johansen's full information maximum likelihood method. The researcher suggested better trade policy reforms, implementation aimed at promoting foreign direct investment. Subhasinghe and Sameera (2021), investigated the impact of FDI on GDP when labor force, exports, unemployment and gross domestic fixed capital formation were treated as mediating variables using the data from 1990 to 2018 by employing regression analysis. The results of the study showed that there was a strong positive correlation between FDI and GDP by mediating the labour force, gross domestic fixed capital formation, exports, and unemployment.

Sultanuzzaman et al. (2018) attempted to investigate long and short run relationship between FDI inflows and economic growth in Sri Lanka by employing ARDL bound testing and found that if 1% increase in FDI inflows, it leads to 0.97% increase in the GDP growth in the long run and if FDI inflows increases 1%, GDP growth will increase 0.66% in the short-run. positive short-run and long-run relationship between FDI and economic growth was found by Chaudhry et al. (2013) in China using World Bank's annual time series data from 1985 to 2009 by employing the ARDL co-integration approach and Error Correction Mode. Phuyal and Sunuwar (2018) found that FDI in all sectors functioning in Nepal had positive and significant effect on economic growth. Further, the study suggested that the government should give priority to export oriented FDI over domestic demand oriented FDI to foster economic growth. Kulu et al. (2021) revealed that FDI and a quality institutional index together had significant and positive effect on a country's economic growth in Ghana in both the short and long run using the result found on the ARDL model. They recommended that government policies should be aimed at attracting FDI while strengthening institutions and regulations to enhance output growth.

On the other hand, some other researchers argued that FDI can have a negative impact on economic growth of the host countries based on dependency theory. Saqib et al. (2013) tried to investigate the relationship between FDI and economic growth and confirmed that foreign investment had negative effect on the economic performance in the Pakistan economy. Similar result was found by Herzer

(2012) who used data over a period of 35 years. Further, the researcher said that removal of market distortionary policies, natural resource dependence and enhancement of economic and political stability may protect countries from negative consequences of FDI and promote FDI led growth in the long run.

However, Siddikee and Rahman (2020) found an insignificant effect of FDI on economic growth for the short and long run by using the VECM approach to show the relationship between net FDI inflows and GDP with annual data from 1990 to 2018 in Bangladesh. Demirsel et al. (2014) conducted a study to find long run relationship between FDI inflows and GDP considering quarterly time periods between 2002:Q1 and 2014:Q1. The results of the study revealed that there was no long-run relationship between those variables by only employing the Johansen co-integration test. Yabi (2010) argued that FDI inflows may not have significant effect on economic growth at all the time as the researcher found high economic growth with the direct influence of FDI, however, this was not found in countries with low economic growth, owing to the heterogeneity of countries.

Even though so many studies were conducted in various countries, the empirical evidence has not provided a consensus result on the relationship between FDI and Real GDP or economic growth because the studies have been carried out in different countries with various demographic, economic and political structure. In addition, each study used data in different timeline and for various variables. It might not have given consensus results. Therefore, there is a need to conduct the study for analyzing the relationship between FDI and Real GDP in each country.

3. Methodology

Data collection

The current study mainly employed time series analysis since the data gathered from secondary sources is considered as time series data which means datasets record observations of the same variable over various points of time. The annual reports of the Central Bank of Sri Lanka from 1970 to 2019 were the main data sources for this research. For each of the variables, 50 annual observations were used in the study. Secondary data is justified by the fact that it is more precise in terms of gathering high-quality data from a variety of sources while still saving time. In this study, real GDP is the dependent variable, while real foreign direct investment was considered as independent variables to investigate the relationship between foreign direct investment and real GDP in Sri Lanka.

Table 1: Variables and their measurements

Variables	Measurements
Real Gross Domestic Product (GDP)	Log of real GDP
Foreign Direct Investment (FDI)	Log of net foreign investment
Real Exchange Rate (EXR)	Log of exchange Rate (rupees against dollar)
Money Supply (MS)	Log of money supply

Source: Compiled by authors

Empirical model specification

The long-run and short-run dynamic equilibrium relationships between foreign direct investment and real GDP in Sri Lanka are investigated using Johansen co-integration with VECM (Banerjee, et al., 1993) in this study. VECM requires that the time series should be co-integrated in the same order as a starting point. The sequence can be various periods until it becomes stationary if it is non-stationary. According to Granger et al. (1986), VECM can be used to determine the equilibrium relationship between the variables, to find long run relationships between variables if the variables are co-integrated under the same conditions. The error correction model was used in the analysis to analyse the relationship between foreign direct investment and real GDP. The VECM is given as follows (Seneviratna & Jianguo, 2013).

$$\Delta y_t = \delta + \sum_{i=1}^{n} \beta_{ia} \Delta y_{t-1} + \sum_{i=1}^{n} \alpha_{ib} \Delta x_{t-1} + \sum_{i=1}^{n} \varphi_{ic} \Delta y_{t-1} + \lambda_1 ECT_{t-1} + e_{1t}$$

Where:

t-1 = the lag length is reduced by 1

ECT $_{t-1}$ is the error correction term lagged one period

λ is the short-run coefficient of the error correction term ($-1 < \lambda < 0$)

ε is the wide noise.

4. Results and Discussions

The current research focused on empirical methodologies such as Unit Root, Johansen co-integration, Vector Error Correlation Model, and Wald Test, which are used to understand long- and short-term predictability.

Augmented Dickey-Fuller (ADF) test (Fuller, 1976) was performed to check the stationary level of the data. According to the results of the unit root test presented in table 2, all the variables considered in this study were not stationary at level zero. Therefore, the first level difference was conducted for all the variables and the results were found to be stationary at first difference. As a result, the stationary status of real GDP, foreign direct investment, exchange rate and money supply showed stationary at first difference 1% level of significance. Finally, all variables were considered stationary. Therefore, it was decided to perform the Johansen Co-integrating Test to further proceed the study.

Co- integrating test and vector error correction model

The null hypothesis (proposing no Co-integration) should be rejected at 5% significant level, according to Johansen Co-Integration test results. It was performed to test the presence of long run relationship among the variables using Johansen's maximum likelihood approach. The long run co-integrating relations between FDI and GDP normalized as in table - 3.

Before performing the Co-integration rank test, it was formulated the null hypothesis as there is no co-integration among the variables and alternative hypothesis as there is co-integration among the variables. According to the co-

integration rank test results presented in the table 3, Trace statistic value (32.6750) is higher than the 0.05 level critical value (29.7970) with 1% level of significant (p = 0.0010). However, Maximum Eigenvalue test value is 20.7043 and the 5% level of critical value is 21.1316. As per these results, null hypothesis rejected that there was a co-integration among the variables at the rank at most 1. Even though, at most 2 should not be rejected at the 5% significant since the Trace statistic value (11.9706) was less than the 0.05 level critical value (15.4947). Also Maximum Eigenvalue test value (11.5295) was less than the 0.05 level critical value (14.2646). Likewise, the same observation was driven to at most 3 where null hypothesis was accepted.

Given the results generated, the null hypothesis of no co-integration equation was rejected at the 5% level for the co-integration rank at most 1. As a result, Johansen's co-integration indicated that there was only one co integration equations existing at the 0.05 level of significance, In the long run, the findings indicate a significant relationship between foreign direct investment and real GDP.

Vector Error Correction Model (VECM)

The presence of co-integration between variables suggests a long-term relationship among the variables under consideration. Then, the VEC model can be applied. Since the deviation from long-run equilibrium is gradually resolved by a series of partial short-run changes, the co-integration term is known as the error correction term. The VECM's dynamic specification allows for the deletion of irrelevant variables while retaining the error correction word. The length of the error correction term indicates how easily some disequilibrium will adjust to a long-run equilibrium state.

The long-run relationship between foreign direct investment, exchange rate, money supply and real GDP was examined with co integrating vector error correction model for Sri Lanka in the period 1970-2019 is displayed below as per the results presented in table 4. As per the results presented in table 4, it can be summarized that foreign direct investment, exchange rate and money supply have a significant ($p < 0.01$) impact on economic growth. Therefore, the hypothesis of the study supported the results of the study that there is a significant relationship between foreign direct investment and economic growth, which is consistent with previous studies done by Sultanuzzaman et al. (2018) in Sri Lanka, Chaudhry et al. (2013) in China and Phuyal and Sunuwar (2018) in Nepal.

Long run normalized co integration model can be re-parameterized as below:

$$ECT_{t-1} = [1.000lnGDP_{t-1} - 0.8582FDI_{t-1} - 0.7699lnEXR_{t-1} + 1.1583lnMS_{t-1} - 1.4409c]$$

In the long run, foreign direct investment and exchange rate have a positive impact while money supply has a negative impact on real GDP. The coefficients are statistically significant at the 1 % level. Thus, foreign direct investment, exchange rate and money supply have asymmetric effects on economic growth in the long run, on average ceteris paribus.

VEC Model

$\Delta EG_t = 0.02108 + 0.1157\ EG_{t-1} - 0.0386\ lnFDI_{t-1} + 0.2886\ lnExR_{t-1} - 0.1041\ lnMS_{t-1} - 0.0146\ ECT_{t-1}$

The adjustment term (-0.0146) is not statistically significant, suggesting that previous year's errors (or deviation from long run equilibrium) are not corrected within the current year at a convergence speed.

Co-integrated results

Table 5 shows that the coefficient of co-integrated is significant at the 0.05 level of significance ($P < 0.05$) and has a positive sign (0.-1.135322). It means that the short-run relationships between foreign direct investment and GDP are causal.

Diagnostics test

Lagrange multiplier test was performed to examine the autocorrelation among the variables. As per the results presented in table 6, probability values are more than 0.05. It clearly says that there is no autocorrelation. As per the results presented in the table 7, eigen value stability condition is satisfied in this study.

5. Conclusion and recommendations

The empirical relationship between foreign direct investment and GDP is explored in this report. Annual reports from the Central Bank of Sri Lanka were used to compile data from 1970 to 2019. The data was found as stationarity using the ADF test. The relationship between foreign direct investment and GDP was estimated using the Johansen co-integration test and VECM. The findings of the co-integration test showed that foreign direct investment of Sri Lanka has a significant long-run effect on GDP. Likewise, VCE causality showed that, in the short run, FDI, exchange rate and money supply have significant effect on GDP. The findings back up the theory that foreign direct investment plays a significant role in GDP, and it insists the government of Sri Lanka to find a way of having more FDI since it has the significant effect in long as well as short – run. Futher, as an implication of the result, FDI should be attracted to the targeted sectors and domestic investment can be arranged for the rest of the sectors for reaching expected economic growth. In order to, reap maximum benefits in terms of FDI, policy makers should take the responsibility to channelize the investment in proper direction. Few limitations of the study were experienced such as sectorial data analysis on FDI could not be carried out due to the absence of such data for most of the selected periods and it was found to have some difficulties to compare the impact of FDI and domestic investment on GDP due to the gap of data availability in several data sources. Further research is needed for investigating the sector on which high percentage of FDI should be attracted to achieve economic growth in Sri Lanka by comparing different sectors and relationships between FDI and the economic growth can be compared by generating data from various Asian countries in the future to find which country has a favorable environment to use FDI to rocket up economic growth promptly.

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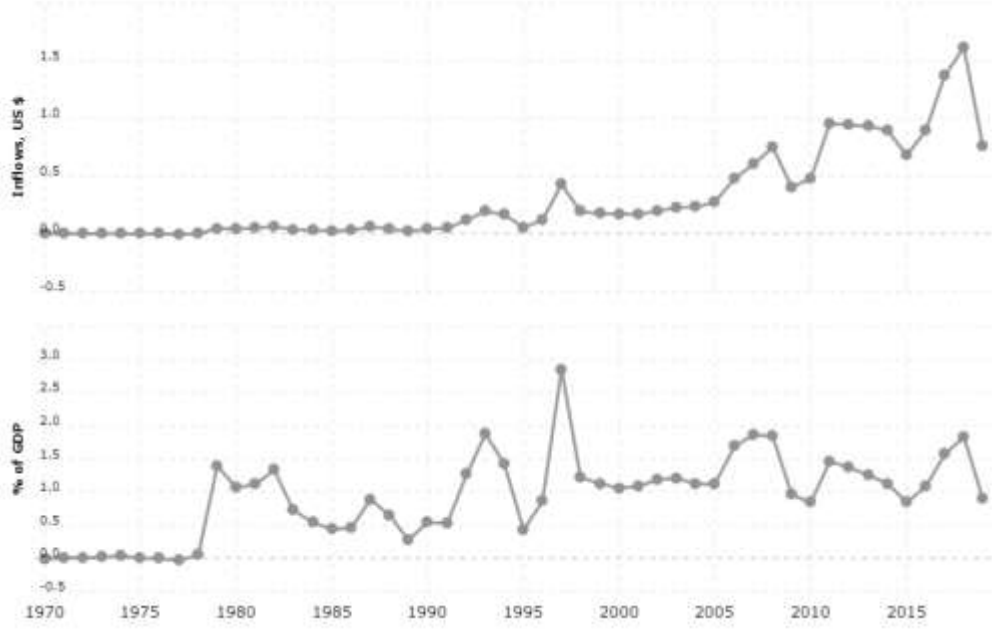
Appendix

Figure 1: Trend of FDI and % of GDP



Source: World bank report, 2021

Table 2: Unit root analysis

	Zero Level			1st Level			Order of integration
Variables	t statistics	Prob.	Lag length	t statistics	Prob.	lag length	
Real GDP (lnGDP)	-0.0126	0.9526	0	-7.2697	**0.000**	0	I (1)
Foreign Direct investment (lnFDI)	0.3640	0.9792	2	-6.9381	**0.000**	2	I (1)
Real Exchange Rate (lnEXR)	-1.8424	0.3562	0	-7.3500	**0.000**	0	I (1)
Money Supply (lnMS)	-0.4243	0.8966	0	-4.2925	**0.001**	2	I (1)

Source: Survey data

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Source: Survey data

Table 3: Results of Johansen Test for Co-Integration

Hypothesized no. of CE(s)	Trace test			Maximum eigenvalue test		
	Test Statistic	Critical value 5%	Prob.**	Test Statistic	Critical value 5%	Prob.**
Series: EG_FDI_EXC_MS						
None *	63.1584	47.8561	0.0010	30.4833	27.5843	0.0206
At most 1 *	32.6750	29.7970	0.0227	20.7043	21.1316	0.0573
At most 2	11.9706	15.4947	0.1583	11.5292	14.2646	0.1296
At most 3	0.4414	3.8414	0.5064	0.4414	3.8414	0.5064

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

Table 4: Co integrating equation

Equation	Parms	Chi2	p>chi2
_cel	3	2179.614	0.0000

Johansen normalization restriction imposed

beta	Coef.	Std.Err	Z	P> Z	[95% conf.Interval]	
_cel						
lnGDP	1					
lnFDI	-.8582	.0447	-19.18	0.000	-.9459	-.7705
lnEXR	-.7699	.0535	-14.37	0.000	-.8749	-.6649
lnMS	1.1583	.2341	4.95	0.000	.6994	1.6171
_Cons	-1.4409					

Source: Survey data

Table 05: Co-integrated results

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.135322	0.370225	-3.066573	0.0040
C(2)	0.216742	0.316011	0.685868	0.4971
C(3)	0.080078	0.199975	0.400438	0.6911
C(4)	-0.297228	0.165229	-1.798884	0.0802
C(5)	-0.323857	0.152108	-2.129124	0.0400
C(6)	-0.881070	0.527883	-1.669063	0.1035
C(7)	-1.485335	0.541542	-2.742787	0.0093
C(8)	1.117609	0.482046	2.318470	0.0261
C(9)	0.769612	0.411382	1.870795	0.0693
C(10)	0.097417	0.031701	3.073033	0.0040
R-squared	0.472824	Mean dependent var		0.032279
Adjusted R-squared	0.344592	S.D. dependent var		0.152355
S.E. of regression	0.123343	Akaike info criterion		-1.161399
Sum squared resid	0.562896	Schwarz criterion		-0.767750
Log likelihood	37.29287	Hannan-Quinn criter.		-1.013266
F-statistic	3.687251	Durbin-Watson stat		2.258953
Prob(F-statistic)	0.002237			

D(GDP) = C(1)*(GDP(-1) - 0.615847970774*FDI(-1) - 0.85877937609 *EXCHANGE_RATE(-1) + 0.987388195449*MS(-1) - 1.01756955451) + C(2)*D(GDP(-1)) + C(3)*D(GDP(-2)) + C(4)*D(FDI(-1)) + C(5)*D(FDI(-2)) + C(6)*D(EXCHANGE_RATE(-1)) + C(7)*D(EXCHANGE_RATE(-2)) + C(8)*D(MS(-1)) + C(9)*D(MS(-2)) + C(10)

Source: Survey data

Table 6: Lagrange-multiplier test

Lag	Chi2	df	prob>chi2
1	12.7323	16	0.6922
2	13.4043	16	0.6430

Source: Survey data

Table 7: Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
.1642 + .9018i	.9166
.1642 + .9018i	.9166
.5875	.5875
-.2625	.2625
.0388	.0389

Source: Survey data