THE CAUSAL LINKS BETWEEN TRADE OPENNESS AND FDI INFLOWS IN SRI LANKA

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Abstract: *The study examine the causal links between trade openness and FDI inflows in Sri Lanka from 1997 to 2019 using the ARDL test and Granger causality test. The results of the ARDL bound test indicate that an increase in trade openness does not affect FDI in the long-run. However, short-run results indicated that an increase in trade openness attracts more FDI. The Granger causality test shows that Sri Lanka has a unidirectional causal relationship that runs from trade openness to FDI. The study suggests that the government should focus on long-term FDI target trade policies in order to improve the investment climate in Sri Lanka.*

Key words: *FDI inflows, Trade openness, ARDL model, Granger causality test, Sri Lanka.*

1. Introduction

Growing international relationships through FDI is a critical component of the globalization process. According to Janicki and Wunnava (2004), FDI has been a key element in the globalization process. It has acquired significant importance in improving growth prospects in transition and developing countries. It is regarded as an essential component of an effective and open international economy. All countries, including developing and emerging, have implemented several economic reforms and introduced new policies in recent years to rearrange their economies to encourage and attract more FDI.

When we examine FDI at the global, regional, and national levels, we find that FDI has a fluctuation pattern caused by changes in the economic, political, and social determinants of FDI. Many factors influence FDI, including economic (market size, trade openness, human capital, infrastructure, macroeconomic stability, etc.) and institutional factors (political stability, corruption, government stability, rule of law, etc.). Among the

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potential determinants of FDI, trade openness is one of the most important factors influencing FDI inflows. It allows us to observe the balance of the country's exports and imports and is seen as a significant factor in FDI inflows. The global system and open trade policies and trade reforms impact the level of production capacity and encourage more foreign investors. Therefore, it is crucial to recognize the range of trade policies that have been liberalized. For this purpose, countries make their economies more open to the global economy and apply a number of liberal and advanced trade policies and trade reforms.

FDI is a very significant contributor to the Sri Lankan economy. According to the World Development Indicator database (2021), FDI inflows into Sri Lanka increased from 43 million US dollars in 1990 to 434 million US dollars in 2020. It has been increasing steadily. Sri Lanka has taken many actions to attract more FDI, paying more attention to trade expansion. Trade liberalization took place in the 1970s when Sri Lanka began to open its economy to global integration. Trade policies affect the level of output and might attract foreign investors, so it is important how much trade policies are liberalized and how trade openness behaves.

In Sri Lanka's economy, the public sector was the dominant entity, and it controlled the country's resources during the period of 1948 to 1977. As some authors mentioned, Wijeweera and Mounter (2008), Sri Lanka operated under an import substitution policy regime from 1960 to 1977. Before introducing the economic liberalization reform in 1977, FDI inflows were negligibly small. After the introduction of economic liberalization reform in 1977, FDI inflow started to play a major role in the economy. The main elements of the Sri Lankan economic liberalization process were foreign investment development and trade policy reform that focused on export expansion. In general, the changing global economic situation and the political environment have a crucial impact on FDI and also on the decision-making process of investors. The country's geographically strategic location and its touristic potential, the creation of free zones, and the reduction of food subsidies and other consumer goods might be the reasons for attracting foreign investment to Sri Lanka. However, FDI net inflows have been decreasing since COVID-19. In the most recent year, 2020, FDI inflows were USD 434 million, which was half of what was received prior to the pandemic. As both FDI and trade openness connect to each other, it is important to identify the causal links between FDI and trade openness since there has been no study attempt to examine the link in the recent period in Sri Lanka.

In the study, we examine the causal links between trade openness and FDI inflows, in Sri Lanka. The main hypothesis of the study is the following:

Hypothesis 1: Trade openness positively affects FDI inflows in Sri Lanka.
Hypothesis 2: Trade openness does Granger cause FDI inflows in Sri Lanka.

2. Literature Review

Asiedu (2002) determined the variables that are relevant in explaining the variation in FDI/GDP in 71 selected African countries using the Ordinary Least Squre method. According to the OLS results, higher trade openness leads to attracting FDI to both

categories of African countries. However, the average value of trade openness is lower for sub-Saharan Africa, signifying that trade openness will produce more FDI for non-sub-Saharan African nations compared to other categories.

Onyeiwu and Shrestha (2004) examined the determinants affecting inward FDI into the African Continent. The study sample ranges from 1975 to 1999. According to the findings of the Random and Fixed effect models, economic growth, inflation, the openness of the economy, international reserves, and natural resource availability all majorly influenced the fluctuation in inward FDI. Nevertheless, contrary to common perception, political rights, and infrastructural facilities were found to be statistically insignificant. An increase in trade openness encourages FDI inflows, indicating that greater trade openness motivates the flow of FDI to the African region.

Demirhan and Masca (2008) found the elements that influenced FDI from the period 2000 to 2004 in developing economies. The dependent variable in the econometric models was inward FDI. The degree of openness variable, per capita GDP growth variable, inflation variable, telephone lines per 1,000 people variable, labor costs per worker in the manufacturing industry variable, risk factor, and corporate tax rate variable are employed as factors of FDI. The findings show that increases in the variables of trade openness, per capita GDP growth variable, and telephone lines per 1,000 people variable increase FDI inflows to developing economies, whereas increases in inflation rate variable and tax rate variable reduce inward FDI. Labor cost variables and risk factor variables have no influence on FDI inflows.

According to the outcomes of fixed effect panel-data analysis, trade openness led to increased FDI inflows in BRIC and Malaysia from 1997 to 2010. Furthermore, market size significantly explains the variation of FDI positively, and a seemingly unrelated regression model indicates that government consumption decreases FDI for this group of emerging economies (Ho, et al., 2013).

The study employed the Feasible Generalized Least Squares method to identify the determinants of inward FDI in ASEAN countries over the period 1991 to 2009. As a result, trade openness, infrastructure, market size, human capital, and labor variables are employed as the key factors of inward FDI. The results show that key variables have a positive influence on inward FDI. Furthermore, political risk, real interest rates, exchange rate policy, and corruption variables all have an influence on inward FDI (Hoang and Bui, 2015). Aziz and Mishra (2016) analyzed the key economic determinants and institutional factors of inward FDI Arab economies using the Arellano-Bover-Blundell-Bond GMM technique over the period from 1984 to 2012. The results indicated that more open trade policies led to attracting more FDI into Arab countries. Furthermore, the results revealed that market size, trade agreements, and capital formation favor FDI inflows.

Bobenič Hintošová, et al. (2018) examined the factors influencing inward FDI into the Visegrad economies. They found that higher wages and an educated workforce attract FDI. In addition, it has been found that an increase in trade openness, research and development spending, and corporate taxes negatively affect the inflow of FDI. Consequently, greater trade openness discourages FDI inflow, meaning efficiency-driven FDI is discouraged. The study did not show how GDP per capita, unemployment rate,

inflation rate, or innovation output (as a sum of patents and brands) affect the inflow of FDI to the markets of the Visegrad countries.

Zaman, et al. (2018) used FE and pooled OLS methods to examine time-series data to measure single country effects, group effects, and time effects of trade liberalization on FDI inflows into Asian economies, such as India, Iran, and Pakistan, between 1982 and 2012. The results showed that trade openness encourages inward FDI. In the regression model, inflation, GDP per capita, and the official exchange rate were the other potential factors of inward FDI. Furthermore, the estimated results showed that when GDP per capita increases, FDI inflows also increase. FDI inflows decrease when inflation and the official exchange rate increase. Sazali, et al. (2018) investigated the connection between trade and inward FDI. The study was conducted in Malaysia. The Granger causality test was used to extract causal links, and the results showed one-way granger causality; the causal direction shifted from trade openness to FDI.

Mugableh (2021) studied the causal relationships between FDI inflows and their influencing factors in Jordan from 1980 to 2018. The results of the VEC model show that Jordan's trade opening has a beneficial effect on FDI. In addition, GDP, education, infrastructure, and technological capabilities have increased the flow of foreign direct investment. Rathnayaka Mudiyanselage et al. (2021) used the ARDL test and the Granger causality test to determine the causal relationship between trade opening and FDI inflows in Romania. They found that greater trade openness reduced FDI inflows into Romania. The causality test revealed that trade openness and FDI inflows have a one-way link in Romania. Furthermore, as the results show in the long term, the labor force's education level positively influences inbound foreign direct investment, whereas the variables of inflation, GDP, and the exchange rate are unable to explain FDI inflows.

3. Methodology

3.1. Research design, data, and sources

This study used annual time series data for the period 1997 to 2019. Data was gathered from the World Development Indicator (Sri Lanka-2021). This study adopted the Zaman, et al. (2018) theoretical framework to find out the relationship between FDI inflow and trade openness. Furthermore, we developed the model by adding an indicator of education in Sri Lanka.

The following econometrics model can be specified as equation (1):

$$FDI = f(LGDP, EXR, TOP, INF, EDU) \quad (1)$$

The description of the variables is shown below:

FDI   Per capita Foreign Direct Investment Inflows (Current USD)
LGDP   Log of Gross Domestic Product (Current USD)
EXR   Exchange rate (Official Exchange Rate)
TOP   Trade Openness [(Exports+Emports)/GDP]
INF   Inflation (Consumer Prices, annual %)
EDU   Labour force with advanced education (% of working-age population)

The above functional form can be specified in the following econometric model in Equation (2):

$$FDI_t = \beta_0 + \beta_1 LFDI_{t-1} + \beta_2 LGDP_{t-1} + \beta_3 EXR_{t-1} + \beta_4 TOP_{t-1} + \beta_5 INF_{t-1} + \beta_6 EDU_{t-1} + \varepsilon_t \quad (2)$$

where:

β_0 is the intercept,

$\beta_1 - \beta_6$ are the slope coefficients

ε_t is the white noise error term, and the subscript t indicates time.

3.1. Estimation method

We have employed several econometrics estimation techniques. It is as follows: In order to make the model and variables free from problems associated with time-series data, we used ADF and PP unit root test approaches to test the stationary nature of the variables. Moreover, diagnostic tests were conducted to check whether the results were robust. The tests conducted are the Breusch-Godfrey Serial Correlation LM Test to detect serial correlation among residuals, the test of skewness, and the Kurtosis test to check whether the residuals are normally distributed to detect heteroscedasticity in the model. The study employs a Cumulative Sum of recursive residuals (CUSUM) and a Cumulative Sum of squares of recursive residuals (CUSUM of squares) to check the stability of the model. E-view 10 software was used to analyze the data. The ARDL cointegration procedure, developed by Pesaran et al. (2001), was employed to empirically examine Equation (3). An ARDL representation of Equation (3) is formulated as follows:

$$\Delta FDI_t = \beta_0 + \beta_1 LFDI_{t-1} + \beta_2 LGDP_{t-1} + \beta_3 EXR_{t-1} + \beta_4 TOP_{t-1} + \beta_5 INF_{t-1} + \beta_6 EDU_{t-1} + \sum_{i=1}^{q1} \gamma_{1i} \Delta FDI_{t-i}$$
$$+ \sum_{i=0}^{q2} \gamma_{2i} \Delta LGDP_{t-i} + \sum_{i=0}^{q3} \gamma_{3i} \Delta EXR_{t-i} + \sum_{i=0}^{q4} \gamma_{4i} \Delta TOP_{t-i} + \sum_{i=1}^{q5} \gamma_{5i} \Delta INF_{t-i} + \sum_{i=1}^{q6} \gamma_{6i} \Delta EDU_{t-i} + e_t$$

$\beta_1 - \beta_6$ are the slope of long-run coefficients

$\gamma_1 - \gamma_6$ are the slope of short-run coefficients

4. Results and Discussion

Before checking the stationary properties of the variables, we employed lag selection criteria to find the optimum lag length. The optimal lag level is usually determined by observing the values of the sequential modified LR test statistic (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC), and Hannan-Quinn Information Criterion (HQIC). Table 1 illustrates the findings of the LR, FPE, AIC, SBC, and HQC tests. According to the data from Sri Lanka, one lag is the best number to include in the analysis according to all of the lag selection criteria mentioned above. Therefore, we have used AIC as our lag indicator. Figure 1 illustrates the AIC results for the optimum lag length of each variable.

Lag selection criteria   Table 1

Lag	LogL	LR	FPE	AIC	SC	HQIC
0	-380	NA	74953041	35.2	36.5	35.2
1	-245	184.3*	10473.2*	26.1*	28.2*	26.6*

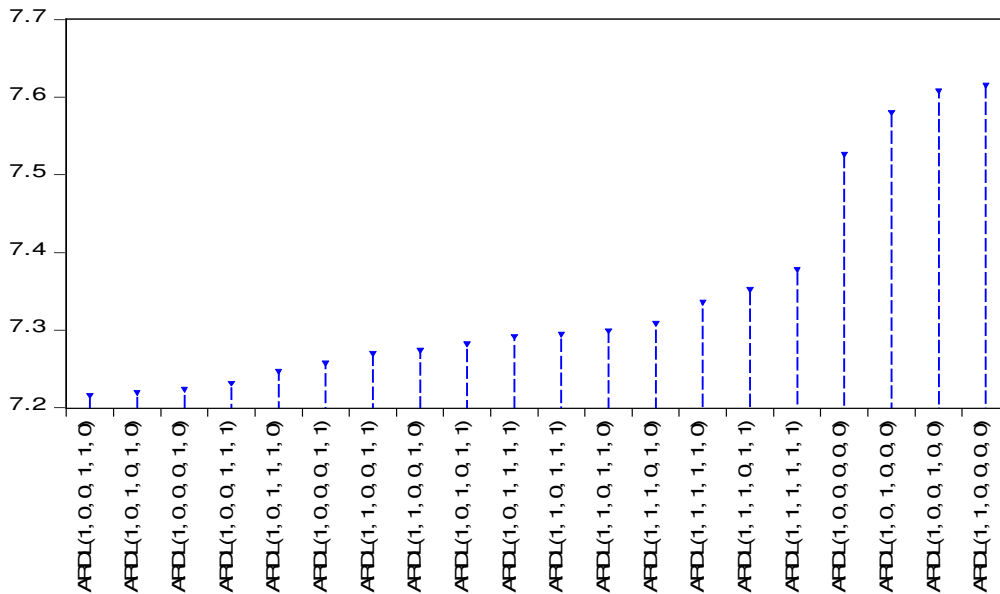Source: In the researchers' calculations, E-Views 10.

Fig. 1. *Results of Optimum Lag Length of Each Variable (AIC)*
Source: Researcher's calculation using E-Views 10.

The second step of the estimation procedure employs ADF and PP unit root tests to check the stationary. The results of the unit root tests for both countries are presented in Table 2 below.

ADF and PP unit root tests   Table 2

Variable	ADF		PP		Order
	I(0)	I(I)	I(0)	I(I)	
FDI	-4.8965***	-4.4740***	-6.4011***	-0.1143	I(0), I(I)
LGDP	-1.0063	-5.8321***	-1.2714	-6.5197***	I(I)
EXR	-0.7284	-3.9689**	-0.7284	-3.9631**	I(I)
TOP	-1.7424	-3.9595**	-1.7961	-4.2656**	I(I)
INF	-3.4941*	-5.1811***	-3.4303*	-14.4344***	I(0), I(I)
EDU	-2.2487	-7.0209***	-2.2487	-18.3093***	I(I)

Note: ***, **, and * denote statistically significant values at the levels of 1%, 5%, and 10% respectively. Source: Researchers' calculation using E-Views 10 statistical software.

Following that, we used the diagnostic tests in both countries. Table 3 illustrates the findings of the diagnostic tests. The diagnostic tests confirm that the models have the desired econometric properties. The Lagrange multiplier test of serial correlation between the error terms suggests that the residuals are not serially correlated since we failed to reject the null hypothesis of no serial correlation in the residual, as the probability value is greater than the 5% level of significance. The Jarque-Bera test has indicated that the null hypothesis of normally distributed residuals cannot be rejected, as the probability value is higher than the 5% level of significance, which means the error is normally distributed. The Breusch-Pagan-Godfrey test of heteroscedasticity detected that the disturbance term in the equation is homoscedastic, as we failed to reject the null hypothesis since the probability value exceeded the 5% significance level. The model is free from serial correlation and heteroskedasticity.

	Diagnostic tests	Table 3
Items	Test Applied	Probability Value
Serial correlation	Breusch-Godfrey Serial Correlation LM Test	0.0998
Normality	Normality Test (Jargu- Bera)	0.2604
Heteroscedasticity	Breusch-Pagan-Godfrey	0.6544

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively. Source: Researchers' calculations using E-Views 10 statistical software.

The main characteristic of the model parameters is their sustainability in the long run. Thus, the stability of the model parameters is confirmed by the "CUSUM" and "CUSUM of squares" tests in Figure 1.
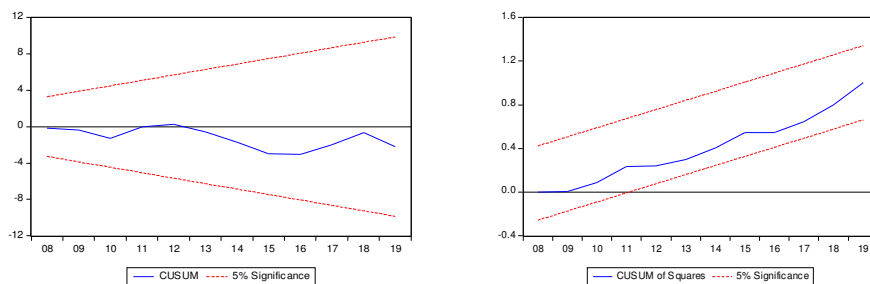

Fig. 2*. The Results of the Stability Test for ARDL*
Source: Researcher's calculation using E-Views 10.

Table 4 illustrates the results of the F-bound test. According to the data from Sri Lanka, the calculated F-statistic = 5.7378 is higher than the upper bound critical value at the 5% level of significance (3.38). Since we confirmed the cointegrating relationship between the variables through the bounds test, we estimated the long-run relationship among the variables via the ARDL model. There is strong evidence to support the existence of a long-run association between FDI inflows and their determinants. Hence, now we

estimate the model further in order to confirm whether there exists a long-run relationship between the variables under this study.

F -Test for the Existence of a Long-run Relationship   Table 4

F-Bounds Test		Null Hypothesis: No Levels Relationship		
Test Statistic	Value	Significant	I(0)	I(1)
F-statistic	5.7378	10%	2.08	3
K	5	5%	2.39	3.38
		1%	3.06	4.15

Source: Researchers' calculations using E-Views 10.

Table 5 illustrates the results of the long-run and short-run coefficient estimations in Sri Lanka. The regression results indicate that the R squared value is 0.8962, and an adjusted R^2 is 0.8324. Changes in GDP growth, trade openness, exchange rate, inflation, and education account for 89.62 percent of total FDI inflow variations to Sri Lanka. The F-statistic with a p-value is 14.04, at a 1 percent significance level, which reveals that all the independent variables were jointly significant in predicting foreign direct investment inflows to Sri Lanka.

According to the results in the long run, LGDP, INF, and EDU are the only statistically significant independent variables in the model. The EXR and TOP variables are statistically insignificant, implying that the variables do not affect the dependent variable, FDI. In line with our principal variable, TOP is not statistically significant at any significant level, implying that trade openness cannot significantly explain the variation in FDI inflow throughout the years. However, it indicated a positive sign, as mentioned by many researchers. LGDP, with a coefficient of 40.9606, has a positive and statistically significant impact on FDI inflow. It is confirmed that market size is one of the main elements of FDI inflows in Sri Lanka. In empirical studies, the rate of inflation is frequently used as a proxy for macroeconomic uncertainty. The rate of inflation has long been recognized as one of the key factors determining FDI inflows. According to some studies, there is a positive and significant relationship between inflation and FDI inflows (Tahmad and Adow, 2018; Asiamah, et al., 2019; Sajilan, et al., 2019). FDI is more likely to be directed towards efficiency-seeking types, as many foreign investors are in search of cheap, unskilled labor. Thus, potential long-term incentives for higher education have been overshadowed by the immediate increase in job availability. Therefore, according to the theory of Butkiewicz (2008), in Sri Lanka, when the educated labor force increases, it causes a decrease in FDI inflows. According to the results of the short-run, in line with the objective of the study, trade openness positively affects FDI inflow in the short-run. In the short-run, results indicate that the rate of trade openness of a country is essential to attracting FDI inflows. And also in the short-run, LGDP, INF, and EDU variables are statistically significant with the same sign as in the long-run. ETC (-1) appears with a negative sign, and it is significant at a significant level of 1%, implying that the whole system can get back to the long-run equilibrium at a speed of 1.38 one period after the exogenous shock.

ARDL Estimation Results		Table 5
Long-run Coefficient Estimated		
Variable	Coefficient	Probability Value
Constant	-988.1682	0.0332**
LGDP	40.9606	0.0231**
EXR	0.2411	0.1690
TOP	0.3964	0.5679
INF	1.7842	0.0135**
EDU	-0.6923	0.0171**
R^2	0.8962	
Adjusted R-squared	0.8324	
F-statistics	14.0359***	
Short-run Coefficient Estimated		
Lag Order	Lag (0)	Lag (1)
Variable	Coefficient	Coefficient
ΔFDI		0.0486
ΔLGDP	43.1462*	
ΔEXR	0.1585	
ΔTOP	1.5700***	-1.1251
ΔINF	0.7710*	1.4943***
ΔEDU	-0.6325***	
ETC(-1)	1.3860 (0.0012) ***	

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.
Source: Researchers' calculation using E-Views 10.

The result of the Granger causality test (Table 6) indicated that Sri Lanka has a unidirectional relationship between trade openness and FDI. It also showed that the direction of causality ran from trade openness to FDI.

Pairwise granger causality Test		Table 6
Null Hypothesis	F-Statistics	Probability
TOP does not Granger Cause FDI	9.41454	0.0063***
FDI does not Granger Cause TOP	1.60725	0.2202

Note: *** indicates statistical significance at 1%. Source: Researchers' calculation using E-Views 10 statistical software.

5. Conclusion and Policy Recommendation

The empirical evidence revealed the following findings in Sri Lanka: LGDP, INF, and EDU variables are statistically significant independent variables in both the long-run and

short-run. EXR variables are insignificant in both periods. Trade openness, which was the main variable, has a positive trend, but is statistically insignificant in the long-run. It indicates that the openness of the economy of Sri Lanka is inefficient in attracting FDI. However, in the short-run, an increase in trade openness positively and significantly affects FDI inflows. The result of the Granger causality test indicated that Sri Lanka has a unidirectional relationship between trade openness and FDI. It also showed that the direction of causality ran from trade openness to FDI. FDI inflows are increasing, and FDI as a percentage of GDP is very significant for the Sri Lankan economy. The Sri Lankan economy has relied heavily on FDI in recent decades. However, Sri Lanka does not maintain an export and import balance. For many decades, Sri Lanka has been facing a trade deficit. However, Sri Lankan governments also do not pay attention to trade openness as a determinant of FDI inflows in the long-run. They implemented some trade-oriented policies for the short-run period, and, according to the changes in governments, the policy frameworks changed. This also affects the low level of attraction of FDI in Sri Lanka. Therefore, the study suggests that the government should focus on long-term FDI target trade policies in order to improve the investment climate in Sri Lanka.

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