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Determinants of FDI Inflows: Bounds Testing Approach

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ABSTRACT

Nowadays, heightened academic interest in foreign direct investment (FDI) inflows derives from a shift in host-country policymakers' perspectives on encouraging and attracting more FDI, which would generate possibilities and assist developing nations in achieving sustainable development. This study analyzes the determinants of FDI inflows in Sri Lanka using secondary data from 1978 to 2019. We used the Autoregressive Distributed Lag (ARDL) bound testing procedure to examine the long-run relationships between variables. The result revealed that the gross domestic product (GDP) growth rate positively affects FDI inflows to Sri Lanka. A higher GDP paves the way to higher market size, leading to more FDI in Sri Lanka. Openness to trade also positively impacts foreign FDI inflows into Sri Lanka, and this effect is statistically significant. It means that trade liberalization policies implemented since 1978 have increased FDI inflows into Sri Lanka. The exchange rate has a significantly positive impact on FDI inflows to Sri Lanka.

KEYWORDS: Foreign direct investment; Developing nations; ARDL approach.

I. INTRODUCTION

At present, in international economic relations, international investment has be-come a significant aspect. Its significance has grown, particularly since the progressive removal of international financial regulation in both developed and developing. Foreign direct investment (FDI) can help developing economies like Sri Lanka achieve economic growth by bridging the gap between domestic savings and investment and introducing advanced technology and management know-how from developed countries. [1]. FDI has been a key source of funding for capital projects in most of the world's economies over the last several decades. Several recent studies have identified the determinants of inward FDI in developing countries. Existing literature has produced contradictory findings regarding the relationship between FDI and its determinants. Some researchers contended that FDI inflows could stimulate technological change by encouraging the adoption of foreign technology, capital, and skills required to achieve high productivity levels [2–9].On the other hand, some researchers believed that FDI would crowd domestic investment, increase external vulnerability and dependence, create destructive competition between foreign affiliates and domestic firms, and steal market share due to low absorptive capacity [10–12].

Since the 1980s, most countries have introduced liberalization of trade and in-vestment policies due to globalization. In recent decades, FDI and trade in goods and services have grown faster than the world output due to trade and investment policies liberalization. The average growth rate of global world trade activities recorded 6%, while the average growth of FDI inflow accounted for 13% between 1981-2015 [13]. In 2010, FDI recovery occurred after a drastic worldwide decline in FDI in 2009. Developed countries accounted for the largest share of FDI inflows until 2008, although FDI inflows continuously in-creased. In 2015, FDI recovery was strong, reaching the highest level since the global economic and financial crisis of 2008–2009.FDI to developing countries recorded a new high amount higher than in 2014, and developing Asia remained the largest FDI recipient globally. The share of global FDI to developing countries accounted for 54 percent by 2019.FDI to developing countries has been relatively stable compared to developed countries since 2010. Although FDI to developing Asia declined by 5 percent in 2019, it remained the largest FDI recipient region, receiving more than 30 percent of global FDI. More than half of global FDI inflows are absorbed by developing economies [14,15]. While the global FDI to developing countries increases over time, competition among countries to attract FDI intensifies. As a result, it is easy to realize why many developing countries are looking for new ways to attract FDI inflows. Some developing countries have been fruitful in attracting FDI,

while others have not. This is due to how a country handles the factors that influence FDI inflows.

Nowadays, renewed research interest in FDI inflows stems from a shift in policy-makers' perspectives in host countries to encourage and attract more FDI, which would create opportunities and assist developing countries in achieving sustainable development [16–18]. Regulation of FDI in developing countries to emphasize its long-term benefits to the host economy is gaining traction. The international community emphasizes the need to mobilize investment contributing to host countries' sustainable development. Developing countries are revising their legal and policy frame-works to accommodate inclusive FDI that promotes long-term development [19].

Sri Lanka moved away from a socialist orientation and opened up to foreign in-vestment in 1978. Over the last four decades, investment-friendly policies implement-ed by successive governments have resulted in FDI inflows into Sri Lanka. The establishment of the Greater Colombo Economic Commission (GCEC) in 1978 and operate Export Processing Zones (EPZs) was a significant aspect of the FDI policy. The investment promotion policy package provided to Free Trade Zones (FTZs) investors was more appealing than incentive packages offered by other countries' FTZs. The policy package includes (a) allowing for complete foreign ownership of investment projects; (b) a tax holiday lasting up to 10 years, with a complete tax exemption for remuneration of foreign employees, royalties, and dividends paid to shareholders during that time; (c) duty exemption for the importation of inputs and assistance with customs clearances; and (d) access to foreign-currency credit at no cost [20]. Sri Lanka has seen a significant increase in FDI inflows in recent years, but it is evident that it is still relatively low compared to other Asian countries, as shown in Table 1. In 2018, Sri Lanka recorded its historically highest FDI inflow of US$ 1,614 million, and Sri Lanka managed to receive only US$ 758 million by 2019 [15].

Table 1. FDI inflows of selected Asian countries 2014-2019 (US$ million)

	2014	**2015**	**2016**	**2017**	**2018**	**2019**
South Asia						
Sri Lanka	894	680	897	1373	1614	758
Banglades h	1551	2235	2333	2152	3613	1597
India	3458 2	4406 4	4448 1	3990 4	4215 6	5055 3
Pakistan	1887	1673	2576	2496	1737	2218
South-East Asia						
Indonesia	2181 1	1664 1	3921	2057 9	2056 3	2342 9
Malaysia	1087 7	1008 2	1133 6	9399	7618	7615
Republic of Korea	9274	4104	1210 4	1791 3	1218 3	1056 6
Singapore	7328 7	5970 0	6881 8	8360 4	7973 9	9208 1
Thailand	4809	5624	1815	6661	1039 9	4146
Vietnam	9200	1180 0	1260 0	1410 0	1550 0	1612 0

Source: UNCTAD , 2020

Furthermore, Sri Lanka is one developing country that desperately needs FDI be-cause its capacity to allocate its funds for development is limited due to limited domestic savings (Table 2). Only 18.8 percent as a percentage of gross domestic product (GDP) in 2020.

Table.2 Domestic savings as a percentage of GDP 1980-2020 in Sri Lanka.

Year	**Domestic savings as a percentage of GDP**
1980	17.9
1985	16.7
1990	17.7
1995	16.5
2000	18.0
2005	17.9
2010	23.0
2015	20.5
2020	18.8

Source: WDI data

The remainder of this paper is organized as follows. Section II discuss literature review .section III presents data and methodology. Section IV empirically identifies the factors that determined the FDI inflows into Sri Lanka. Section V provides the discussion and conclusions.

II. LITERATURE REVIEW

According to the literature on FDI, there are numerous reasons for FDI. Many theories have been advanced to explain multinational corporations' actions and locational preferences, and many empirical studies in various country settings have tested these theories. These studies have progressed in two distinct directions. Some researchers have focused on micro-level factors, delving deeply into MNCs to determine the motivations behind their actions. Others have focused on macro-level factors to determine which factors entice MNCs to locate in specific countries or regions. Identifying the factors that influence FDI inflows into a country is difficult. A growing corpus of liter-ature gives theoretical and empirical information concerning the factors influencing FDI inflows into a host country. Analyzing the literature, we can easily see a larger emphasis on specific groups of determinants (for example, economic, institution-al-political, or cultural). At the same time, the impact of other

categories on FDI re-mains ambiguous, owing to the need for additional research. According to there are "supply-side" determinants, such as skilled labor, research, and development, or infra-structure, "demand-side" drivers, such as host nation economic and social variables, and "institutional factors," which may favor or disfavor the other two categories [21].

The eclectic paradigm of Dunning (1977) was the first theoretical consideration providing a framework for the FDI determinants. This framework classified FDI drivers into micro-and macro-level factors influencing why multinational corporations invest abroad. A firm's foreign investment is based on three advantages: ownership, location, and internalization [22]. Various theoretical and empirical issues have been identified as barriers to attracting FDI to most developing countries. These variables include macroeconomic, political, and governance concerns [23,24]. Fedderke and Romm[4] characterized these elements as policy or non-policy factors, and Calvo et al. [25] classed them as a push or pull factors. However, a comprehensive summary of FDI determinants may be of significant value for an empirical study.

Market Size and Growth of the Host Country: Although the name of this component varies according to the study, all investigations refer to GDP, also known as market size [26–28], size of the economy [29,30], and size of domestic market [31,32], or directly GDP [1,33–35]. Market size and growth are essential sources of location advantage, particularly for FDI wanting to invest in local or regional markets. Market seekers invest in a specific location to supply goods or services to the host country or neighboring countries. Such FDI, also known as horizontal FDI, duplicates production in the host nation to service the host country's market, and hence market size and growth in the host country are critical [36,37]. Almost all studies indicated a significant positive effect of market size on FDI flows [1,3,7,26–29,33–35,38–43], while a few studies [22,31,32,44] found market size on FDI flows insignificantly. The possibility of growth has a favorable impact on FDI inflows, and nations with high and persistent growth rates attract more FDI flows than volatile or low growth economies [7].Given the potential for significant earnings, many MNCs' market sizes matter. As a result, larger markets can attract a bigger number of foreign enterprises, raising competitiveness.

Trade Openness: The ratio of overall trade within an economy is reflected in trade openness. In other terms, it is the ratio of the total exports and total imports to GDP. There is widespread agreement on the perceived importance of trade openness in attracting foreign investors to host countries [45,46]. Trade barriers and trade restrictions imposed by host countries are both factors that influence openness. Unfavorable trade regulations that are detrimental to the interests of multinational firms tend to raise trade barriers for accessing the host country's markets [47]. With a low degree of trade openness, MNCs will be more likely to participate in horizontal FDI (import-substituting). In contrast, a high degree of trade openness will increase transaction costs for multinationals engaging in vertical FDI [48]. Lower trade barriers can supplement greater vertical FDI or export-oriented FDI, particularly if such FDI is associated with a significant proportion of intermediate and capital goods imports [49].

Many research on FDI determinants employ trade openness as an explanatory variable, typically represented as trade intensity, i.e., total trade as a percentage of GDP. Trade openness is found to have a favorable impact on FDI inflows in most empirical studies [2,7,22,40,50–58].

Exchange Rate and Exchange Rate Volatility: Exchange rates affect FDI through two primary channels: the wealth effect channel and the relative production cost channel. The strength of the exchange rate affects FDI inflows [59]. In terms of the wealth effect, currency depreciation raises the relative wealth of foreign investors relative to domestic investors. All production inputs (such as labor, land, machines, and assets) in the host nation become cheaper following the depreciation, enticing foreign investors who measure capital in foreign currency to acquire more domestic assets. In terms of the relative production cost channel, a devaluation of the host nation's currency reduces local production costs in terms of foreign currency, increasing the profit of export-oriented FDI. Higher returns entice additional FDI inflows. Depreciation of the host country's currency can boost FDI inflows, whereas appreciation of the host country's currency can discourage FDI inflows [60].

According to the empirical investigations, the link between FDI and exchange rates has produced mixed results. Some studies [40,43,61–66] have discovered an inverse association between the exchange rate and FDI. On the other hand, Boateng et al. [7] and Caves [67] found a positive link. In contrast, Russ [68] found the non-significant effect of exchange rate volatility on the FDI inflow.

Inflation Rate: Inflation, used to measure macroeconomic instability, is a macroeconomic element that influences FDI flows. A high rate of inflation usually diminishes the return on investment. According to economic and investment theories, inflation encourages FDI through local and global shocks and influences other macroeconomic factors [43].

In most empirical investigations [3,7,43,57,69,70] there was a negative association between inflation and FDI inflows, while other studies [71–74] found no significant impact of inflation rate on FDI inflows.

Human capital: Theoretical literature has reflected that human capital in host nations is a determinant of foreign investment in emerging countries. According to Lucas [75], a human capital shortage discourages foreign investment in less-developed countries. Zhang and Markusen [76] provide a model in which the availability of skilled labor in the host

nation is a direct requirement for transnational corporations (TNCs) and impacts the volume of FDI inflows. Dunning [77] contends that worker skills and education levels influence FDI inflows and TNC activity.

Human capital is commonly seen as a crucial factor of FDI inflows, and both FDI and human capital are regarded as important drivers of economic growth [50,78]. This basic reality has gained particular importance at the beginning of the twenty-first century, as more and more multinational corporations invest abroad, utilizing a knowledge sourcing strategy to keep up with competitors and get technical diversity. This is referred to in the literature as "technology seeking" or "knowledge seeking"[79].

Although the role of human capital in attracting FDI is well acknowledged in the literature, extant empirical evidence is inconsistent. One possible explanation for the discrepancies in study outputs is the proxies chosen by researchers. Adult literacy rates and secondary/primary school enrollment ratios are the most commonly used measurements. When employed as a proxy for the level of human capital, all of these indicators have significant drawbacks [80,81]. However, some studies [31,39,50,82–84] have found a positive association between human capital and FDI inflows. On the other hand, some studies [85][86][36][87] have discovered a negative or no link between these two.

Institutional Environment/ Institutional Quality (IQ): North [88] described institutions as human-created formal rules (such as constitutions, laws, property rights, and regulations) and informal restraints (such as codes of behavior, norms, values, and customs) that organize political, economic, and social relationships. The institutional environment is a critical element in determining FDI inflows, with emerging countries being more essential than industrialized countries. Researchers have long recognized the impact of institutional quality on economic growth, particularly as a primary driver of FDI. Nonetheless, the emphasis of the studies on institutional quality has been devoted mostly from 2005 to the present [89]. A large number of studies related to determinants of FDI are focused on regional institutional quality (IQ) investigations. As an examples ,emerging economies [90] ,developed and developing countries [91,92] , OECD countries [93], and Asian economies [94,95].

Recent empirical research has concluded that improved institutional quality in countries is more likely to attract FDI inflows [91,93,96–110]. Institutional variables, notably corruption, political constraints, and property rights protection, are major determinants of FDI inflows [111]. Various research, however, does not discover a significant association between FDI and some characteristics of institutional quality. According to Daude and Fratzscher [112] and Daude and Stein [113] , FDI is less susceptible to corruption. According to Arbatli [31], while internal conflict and political instability negatively affect FDI, law and order and bureaucratic excellence do not affect FDI. According to a recent study Asiedu [114], the FDI risk variable, which consists of contract viability, profit repatriation, and payment delay indicators, does not affect the volume of FDI inflows. Poor institutions stymie FDI and can operate as a tax, raising the cost of FDI. Investors are hesitant to invest in countries where institutions foster corruption, nepotism, and red tape since these factors raise the cost of doing business [104,115]. It has been suggested that the quality of the institutional and regulatory environment lowers the cost of doing business and increases the profitability of businesses, consequently influencing foreign investment [91,116,117]. Aziz and Mishra [118] underline improving the institutional environment to attract additional foreign investment in Arab. Government instability, which creates doubt about the nation's economic and political principles and widespread corruption, has substantially influenced FDI in Arab countries. According to Harms and Ursprung [119], foreign investors prefer to invest in nations with robust democratic frameworks, whereas authoritarian societies frequently face policy reversals and attract less FDI.Sabir et al.[91] analyzes the impact of institutional quality on FDI using panel data from developed and developing countries. The findings revealed that institutional quality has a beneficial impact on FDI in all groups of nations. The magnitude of the coefficients of control of corruption, government effectiveness, political stability, regulatory quality, rule of law, and voice and accountability for FDI inflows is stronger in developed nations than in developing countries. They conclude that institutional quality is a more important driver of FDI in developed economies than in developing economies.

Domestic Investment: The influence of DI on FDI has received very little study. The impact of FDI on DI is still being debated. According to the literature, FDI has two possible effects on DI. One possible outcome, crowding in effect, is widely regarded as beneficial to the economy, whereas the other impact is on the rise. The impact of crowing out is still ambiguous, depending on the economy. A crowding-out effect is more likely in economies and sectors where investment and expansion opportunities are limited and where absorption capacity is limited [120]. DI and FDI are more likely to complement rather than substitute economies that have reached a certain level of development [87]. Countries that have enacted crowding are expected to encourage FDI inflows with little or no opposition from domestic investors. Domestic investors' attitudes in countries with a crowding-out effect may change. Some researchers reveal that increases in FDI drive out DI [121,122]. Other researchers have shown that FDI boosts DI [123–125] and mixed [126–128] or no effect evidence [1,129] between FDI and DI. As a result, it is necessary to keep an eye on domestic investment in the current investigation.

An economy's ability to attract FDI depends on various factors, as shown in the theoretical and empirical literature. Therefore, considering the above facts, this studyr's main objective is to investigate the determinants of foreign direct investment in Sri Lanka.

III. METHODOLOGY

This section presents the data and model used to identify the determinants of FDI inflows in Sri Lanka. While previous research on FDI determinants has suggested several potential explanatory variables, it is not possible to include all of them. Section 1 of this paper provides in details the literature on determinants of FDI inflows. The amount of inward FDI is taken as a percentage of GDP following the method of Farla et al [120]. We use GDP growth to represent market size and its growths as a determinants of FDI inflows [36,37]. To identify the effect of DI on FDI inflows, we utilize the gross fixed capital formation (GFCF) as a proxy for DI. The GFCF includes both domestic investment from the public and private. It is anticipated that these two forms of investment would raise the rate of return on new investment and encourage FDI. The average official US dollar to Sri Lankan Rupees (SLR) is used as the exchange rate. Inflation may impact FDI in either a positive or a negative way. We measure inflation using the annual percentage change in the consumer price index (CPI). The higher the human capital, the more likely international investors will want to invest their money in that country, while the lower the anticipated expenses of training and retraining individuals or hiring skilled labor from outside [87]. Here, we employ the human capital index (HCI) based on years of schooling and return to education as in Penn World tables developed by Feenstra et al. [130]. The degree to which a country is open to trade with other countries is called trade openness or openness to trade. It is measured using (export +import)/GDP in our model. A description of the variables used in this analysis presents in Table 3. We use annual time series data for the period 1978-2019 in Sri Lanka for our analysis.

Table 3. Description of the variables

Variable name	Description	Data source
Inward FDI (IFDI)	Inward FDI as a percentage of GDP	World Development Indicator
GDP growth (GDPG)	GDP growth rate	World Development Indicator
Domestic investment (DI)	Gross fixed capital formation as percentage of GDP	World Development Indicator
Exchange rate (ER)	Average annual local currency relative to US$	Central Bank of Sri Lanka (CBSL), Annual reports
Inflation rate (INF)	Annual percentage change in consumer prices	World Development Indicator
Human capital (HC)	Human capital index based on years of schooling and return to education.	Penn World Table
Trade openness (TO)	The sum of exports and imports of goods and services measured as a share of GDP	World Development Indicator

Following the literature discussed in section 1, to find out the major determinants for FDI inflows in Sri Lanka, we estimate the basic full formulation of the model to be tested in this analysis as in Equation 1.

$$IFDI_t = f(GDPG_t, DI_t, INF_t, ER_t, TO_t, HC_t) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where,

$IFDI_t =$ Inward foreign direct investment (FDI) as a percentage of GDP at time *t*.

$GDPG_t$= Gross Domestic Product (GDP) annual growth rate at time *t*.

DI_t= Gross Fixed capital formation as a percentage of GDP at time *t*.

INF_t= Annual percentage change in consumer prices at time *t*.

ER_t= Exchange rate at time *t*.

TO_t= Trade openness at time *t*.

HC_t= Human capital index at time *t*.

To obtain normality of data, all variables except ratio or percentage form, are converted to natural log form, which may improve the potential for reliability and efficiency. Therefore, the empirical model can be rewritten as in Equation 2.

$$IFDI_t = \beta_0 + \beta_1\, GDPG_t + \beta_2\, DI_t + \beta_3\, INF_t + \beta_4\, lnER_t + \beta_5 lnTO_t + + \beta_6 HC_t + e_t \dots (2)$$

In the case of appropriate variables, ln refers to transforming the base value to the natural log. Where t is the time series operator, and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 are the coefficients of GDPG, DI, INF, lnER, lnTO, and HC, respectively and e_t is the error term.

The usefulness of model building in economics is to simplify the complexities of problems. Koutsoyiannis (1997) opines that in attempting to study any relationship between variables, it is very important to express the relationship in a mathematical form to specify the model with which the economic phenomenon is explored

empirically. For this analysis, we first applied unit root tests, cointegration tests, and causality tests to check stationarity, long-run relationships and directions of causality of the variables. Finally, diagnostic tests were conducted for robustness check.

Unit root test: Checking data stationarity of time series data through unit root tests is a prerequisite because results without checking stationarity may lead to spurious or wrong. The values of mean and variance of series are used to establish its stationarity. It is non-stationary and has a unit root if the time series' means and variances fluctuate with time. A time series is said to have an integration of order one I (1) if it becomes stationary after differencing by one time. Order two is used when a series has to be differed by two times. Similarly, if a difference of "d" time is required, it is indicated by I(d), and if a difference is not needed, it is denoted by I (0). Here, we used the Augmented Dickey-Fuller (ADF) and Phillips– Perron (PP) statistical tests to determine the level of stationarity [131,132]. The test results are based on the decision of the null hypothesis (H0) or the alternative hypothesis (H1). To make the test systematic, it is observed "in level," and its "first difference" with intercept, and time trend [133]

cointegration test

The results of the unit root tests lay the foundation for applying Auto-Regressive Distributed Lag model (ARDL) for cointegration. In the presence of a linear relationship in a group of time series variables, some are stationary, I (0), and other non-stationary but do not surpass I (1). It is recommended the use of the ARDL bounds test to confirm whether a long-run relationship exists between the model variables. We applied the ARDL method developed by Pesaran et al. (2001) and McNown et al. (2018) to discover dynamic relationships between the variables in the long-run and short-run. Several cointegration techniques can be seen in the literature [136,137]. But, The ARDL model has the following advantages over the existing cointegration techniques [138–141].It can be functional when variables are I (0) and I (1) or in mixed order of integration. Evaluations based on the ARDL model are reliable, regardless of sample size or endogeneity.ARDL method can assist in developing an unrestricted error correction model (ECM) using a simple linear transformation, and It deals with endogeneity and serial correlation in time series data.

Equation 2 is transformed into the ARDL model, as shown in Equation 3.

$$IFDI = \sigma_0 + \sum_{i=1}^{p} \beta_{1i}\, IFDI_{t-i} + \sum_{i=0}^{p} \beta_{2i}\, GDPG_{t-i} + \sum_{i=0}^{p} \beta_{3i}\, DI_{t-i} + \sum_{i=0}^{p} \beta_{4i}\, INF_{t-i} + \sum_{i=0}^{p} \beta_{5i}\, lnER_{t-i} + \sum_{i=0}^{p} \beta_{6i}\, \Delta lnTO_{t-i} + \sum_{i=0}^{p} \beta_{7i}\, HC_{t-i} + \lambda_1\, IFDI_{t-i} + \lambda_2\, GDPG_{t-i} + \lambda_3\, DI_{t-i} + \lambda_4\, INF_{t-i} + \lambda_5\, \Delta lnER_{t-i} + \lambda_6\, \Delta lnTO_{t-i} + \lambda_7\, \Delta HC_{t-i} + \mu_t \quad \ldots(3)$$

In the next step of the process, we obtain the short-run coefficients of the explanatory variables using the ARDL based error correction method (ECM) as shown by Equation 4.

WhereΔ is the 1st difference operator, p is the lag length, and coefficients of the long run and short run are shown; from β_1 to β_7 and λ_1 to λ_2 respectively. From Equation 3, which represents long-run relationships, we construct two types of hypotheses. The first of which is the null hypothesis ($H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$) of no cointegration and the second of which is the alternative hypothesis ($H_1 = \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq 0$).

Here, the method for testing these hypotheses is to compare the F-statistic with the upper and lower bounds of critical values for the bounds test. The calculated F-statistics are compared with the higher and lower bounds of critical values. Suppose the calculated F-statistic surpasses the higher bound critical value at the taken into account significance value. It directs that the situation is significant and the null hypothesis is rejected, and there is a long-term relationship between the variables. If the F-statistic is lower than the lower bound of the critical value, it is insignificant, and the alternative hypothesis is accepted; there is no long-term relationship. However, the decision regarding the long-term relationships between the variables is indecisive; if the F-statistics is neither lesser nor larger than the two critical values, the value lies between the higher and the lower bound of the critical value. The critical bounds values are changed according to the sample size [134,142,143].

In the next step of the process, we obtain the short-run coefficients of the explanatory variables using the ARDL based error correction method (ECM) as shown by Equation 4.

$$\Delta IFDI = \alpha_0 + \sum_{i=1}^{q1} \alpha_{1i}\, \Delta IFDI_{t-i} + \sum_{i=0}^{q2} \alpha_{2i}\, \Delta GDPG_{t-i} + \sum_{i=0}^{q3} \alpha_{3i}\, \Delta DI_{t-i} + \sum_{i=0}^{q4} \alpha_{4i}\, \Delta INF_{t-i} + \sum_{i=0}^{q5} \alpha_{5i}\, \Delta lnER_{t-i} + \sum_{i=0}^{q6} \alpha_{6i}\, \Delta lnTO_{t-i} + \sum_{i=0}^{q7} \alpha_{7i}\, \Delta HC_{t-i} + \gamma ECT_{t-i} + \mu_t \quad \ldots(4)$$

In Equation 4, where *ECT* stands the error correction term that measures the speed of adjustment toward equilibrium after a shock, α represents the short-run dynamics, and γ is the related parameter that yields this measure. The expected value of the corresponding *ECT* parameter varies from -1 to 0, where 0 indicates no convergence toward equilibrium and -1 indicates complete convergence, which means that any shock this period is perfectly accustomed the subsequent period if the value is -1.

Diagnostic tests: We performed several diagnostic procedures. To begin, we used the "Harvey test" to determine whether the residuals of the augmented ARDL model were heteroscedastic, which they were. Second, we used the "*Breusch-Godfrey*" Serial Correlation LM test to determine whether or not the residuals were serially correlated. The "Ramsey reset" test was utilized as a model specification test in the third step. Fourth, we used the "Jarque-Bera" normality test to determine whether or not the

residuals of the models were normally distributed. Finally, we performed the cumulative sum (CUSUM) test and the cumulative sum of squares (CUSUMSQ) test to determine whether or not the model was stable [144,145].

IV. RESULTS AND DISCUSSION

The results of the empirical analysis and their discussion are presented in this section. The empirical study begins with a descriptive statistic (Table 4) to gain a better understanding of the data used for the study followed by empirical results.

Table 4. Descriptive Statistics

Variables	Mean	Md	SD	Min.	Max.
FDI	1.108415	1.115880	0.519892	0.053944	2.849586
GDPG	4.969026	5.003545	1.936527	-1.545408	9.144572
DI	26.85589	26.32723	3.987965	20.04922	39.05554
ER	76.12111	67.54278	46.70349	15.57183	178.7800
HCI	2.649001	2.806509	0.280163	2.088921	2.889646
INF	10.06232	9.457637	5.552573	1.481180	26.14541
TO	67.42079	68.42521	12.11909	46.36389	88.63644

Note: Md denotes median; SD denotes standard deviation; Min and Max mean minimum and maximum values respectively.

The summary of the ADF and PP tests results is presented in Table 5.

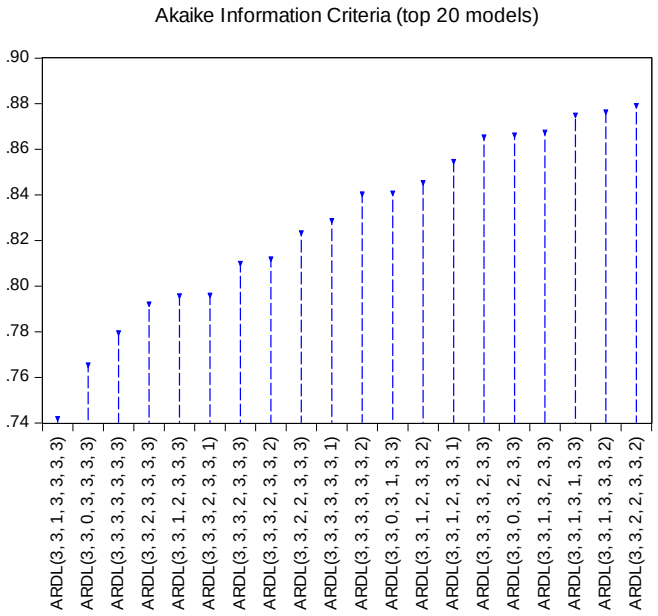
Table 5. Results of ADF and PP tests

Variable	ADF test (with trend and intercept)		PP test (with trend and intercept)		Order of Integration
	Levels	First difference	Levels	First difference	
FDI	-4.906*	-6.291	-4.413*	-13.602	I (0)
GDPG	-4.523*	-9.366	-4.523*	-15.457	I (0)
DI	-3.023**	-7.015	-3.083*	-7.540	I (0)
HC	-3.469**	-7.740	-3.050**	-0.740	I (0)
INF	-4.305*	-7.682	-4.274*	-19.015	I (0)
lnER	-1.933	-5.366*	-1.941	-5.467*	I (1)
lnTO	-0.987	-5.628*	-1.058	-5.623*	I (1)

Note: * and ** indicate statistical significance at the 1% level and 5% level, respectively. Source: Author's computation in E-views 10.

Both unit root tests, ADF and PP, show that all variables are integrated at the level form or the first difference level. Exchange rate (ER) and trade openness (TO) are integrated at first difference I (1) and, the rest of variables; FDI, GDPG, DI, HC and INF are integrated of level form I (0).

The results evidence that the data are mixed type of I (0) and I (1) underlying regressors; therefore, the ARDL could be continued with. The suitable lag order of data series is chosen initially, and then the long-run association between the variables is examined using F-statistics. The Akaike Information criteria (AIC) were applied in this analysis for optimal lag selection. AIC supported the ARDL (3, 3, 1, 3, 3, 3, 3) for this analysis as shown in Figure 1.



When FDI is the dependent variable, the result of the bound test for the ARDL (3, 3, 1, 3, 3, 3, 3) model is shown in Table 6. The null hypothesis of the F-Bounds test is that there is no cointegration among variables. The null hypothesis is accepted if the calculated F-statistic is below the lower bound. If the F-statistic is higher than the up-per bound, the null hypothesis is rejected, and the integration among variables is con-firmed (Pesaran et al. (2001). Hence, the estimated value of the F-statistic used to test the null hypothesis stated above.

Table 6. ARDL Bounds Test results

F-Bounds Test		**Null Hypothesis: No Relationship**		
Test Statistic	Value	Significant Level	I (0)	I (1)
F-statistic K=6	6.351420	10%	1.99	2.94
		5%	2.27	3.28
		1%	2.88	3.99

As shown in Table 6, calculated F -statistic =6.351420 is higher than the upper bound critical value =3.28, and significant at 5% level of significance. Therefore, we confirmed the cointegrating relationship between the variables in the model using Bound test.

In the Sri Lankan context, there is strong evidence to indicate the presence of a long-run relationship between FDI inflows and its determinants. As a result, we estimated the model further in order to confirm whether there is a long run link between the variables under consideration in this study. The results of the ARDL model presented in the above equation (3.3) are presented in Table 7.

Table 7. Estimated long-run coefficients of the ARDL (3, 3, 1, 3, 3, 3, 3) model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GDPG	0.183939	0.081170	2.266080	0.0412
DI	-0.032698	0.034236	-0.955064	0.3570
LNTO	1.482943	0.377650	3.926764	0.0017
LNER	1.108326	0.510322	2.171819	0.0490
INF	0.009856	0.014831	0.664531	0.5180
HCI	-1.463869	1.051096	-1.392707	0.1871
C	-6.072657	1.782001	-3.407774	0.0047
R-squared	0.871925			
Adjusted R-squared	0.625626			

The estimated coefficient for trade openness is 1.48, and it reflects the positive relationship between trade openness and FDI inflows to Sri Lanka. When all other factors are equal, a 1% increase in trade openness will result in a 1.48 % progress in FDI inflows. This result supports the argument that the degree to which a country reduces trade restrictions enables free mobility of goods and services in international trade. The result is in line with the literature found in the literature [2,7,22,40,50–58].

Depreciation of the host country's currency can increase FDI inflows, whereas appreciation of the host country's currency can reduce FDI inflows [60]. But, in our case, we come upon the line with a positive coefficient. The log of exchange rate measured by average annual local currency Sri Lankan Rupees (SLR), relative to US$, is statistically significant ($p<0.05$), and it reflect a positive influence on FDI inflows to Sri Lanka. A 1 % increase in exchange rate would lead to a 1.10 percent increase in FDI in the long run. FDI is positively correlated with LKR depreciation, and FDI is deterred by exchange volatility. This positive impact is consistent with some of the literature [7,66,146].

More ever, the estimated coefficient of the INF variable is positive and not significant. It confirms that inflation cannot account for major variations in FDI inflows to Sri Lanka throughout the years. This result support to the findings of [71–74].Surprisingly, the results in our study demonstrate no substantial association between FDI inflows and human capital, despite the fact that the function of human capital in attracting FDI is well recognized in the literature [31,39,50,78,83,86].

Finally, the R squared value associated the selected long run model is 0.871925. It means that 87 percent of total variations in FDI to Sri Lanka are explained by changes in GDP growth rate, domestic investment, exchange rate, inflation rate, openness to trade and the level of human capital.

As the next step of the process, we obtain the short-run coefficients of the ARDL-based error correction method (ECM) as discussed in Equation 4. A quicker return to equilibrium will be achieved with a higher error correction coefficient [134].

Table 8. ECM results of the ARDL (3, 3, 1, 3, 3, 3, 3) model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(FDI(-1))	1.085928	0.164355	6.607200	0.0000
D(FDI(-2))	0.557929	0.131220	4.251873	0.0009
D(GDPC)	0.080164	0.032226	2.487575	0.0272
D(GDPC(-1))	-0.315484	0.044993	-7.011873	0.0000
D(GDPC(-2))	-0.147694	0.031018	-4.761557	0.0004
D(DI)	-0.021586	0.023398	-0.922529	0.3731
D(LNER)	5.681302	1.238341	4.587835	0.0005
D(LNER(-1))	4.027474	1.326490	3.036188	0.0096
D(LNER(-2))	-2.694365	1.212896	-2.221432	0.0447
D(INF)	-0.015848	0.010428	-1.519753	0.1525
D(INF(-1))	-0.006762	0.011064	-0.611206	0.5516
D(INF(-2))	-0.024700	0.009973	-2.476689	0.0278
D(HCI)	-4.474439	8.492965	-0.526841	0.6072
D(HCI(-1))	38.78892	13.45189	2.883529	0.0128
D(HCI(-2))	-39.88180	9.139884	-4.363491	0.0008
D(LNTO)	4.031896	0.821519	4.907857	0.0003
D(LNTO (-1))	-2.044831	0.876181	-2.333799	0.0363
D(LNTO (-2))	-2.296541	1.000130	-2.296242	0.0389
CointEq(-1)*	-0.782191	0.237710	-3.290526	0.0066

R-squared	0.900411
Adjusted R-squared	0.810782

Source: Author's computation

Starting with the long-run findings, the error correction term's coefficient is important and has the predicted negative sign. The ECM (-1) is statistically significant with the right sign, as shown in the table 3.9 although the coefficient of –0.782191 indicates that approximately 78 % of the disequilibrium caused by the previous year's shock are restored to equilibrium in the current year. It backs up the results of the cointegration bounds test. A quicker return to equilibrium will be achieved with a higher error correction coefficient [134].

Diagnostic test results: The selected ARDL model were subjected to diagnostic tests for serial correlation, functional form, normality, and heteroscedasticity. Results of diagnostic tests indicate that the model exhibits desirable econometric properties, including a correct functional form and residuals that are serially uncorrelated, normally distributed, and homoscedastic, as well as a correct functional form. As a result, the findings are reliable and can be used to make meaningful interpretations.

Table 9. Diagnostic tests results

Items	Test	Probability Value
Heteroscedasticity	Harvey Test	0.4387
Heteroscedasticity	Breusch-Pagan-Godfrey	0.2894
Serial correlation	Breusch-Godfrey Serial Correlation LM Test	0.6209
Functional form	Ramsey reset test	0.8020
Normality	Jarque-Bera	0.6201

The CUSUM of recursive residuals and the CUSUMSQ tests are used to determine the parameter stability, respectively. The cumulative sum test can identify a systematic change in the regression coefficients. In contrast, a sudden change in the consistency of the regression coefficients can be identified applying the CUSUM test. The CUSUM and CUSUMSQ tests are presented in Figures 2(a) and 2(b).

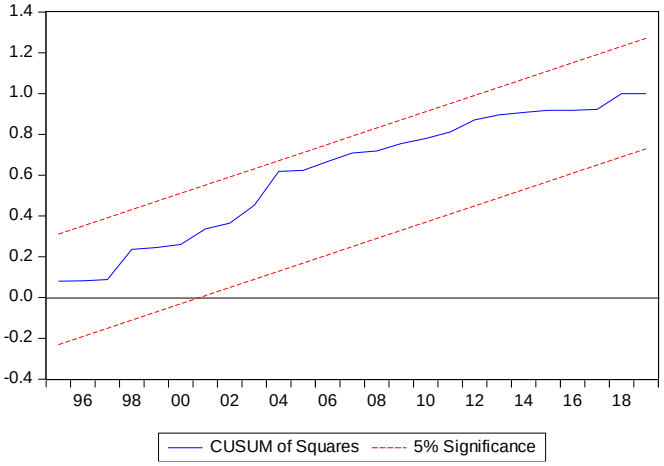


Figure 2(a) CUSUM test

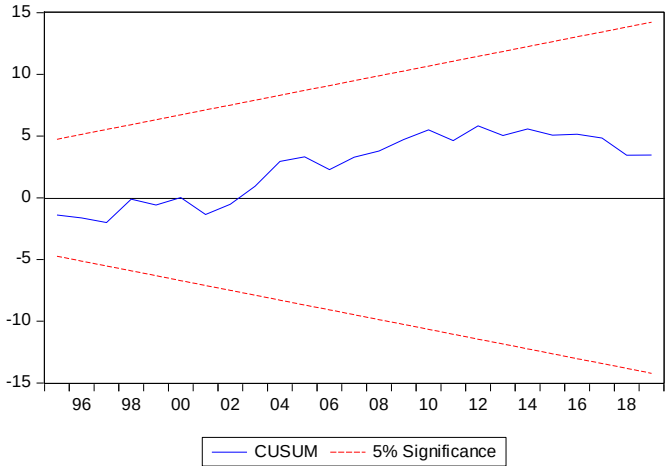


Figure 2(b). CUSUMSQ test

Since the plots of the CUSUM and CUSUMSQ statistics lie within the critical bounds of the 5 % confidence intervals of parameter stability, the outcomes imply that there is no instability of the coefficients in the data. As a result, there is consistency in the coefficients across the considered sample period in Sri Lanka.

V. CONCLUSION

Various major locational factors of FDI can be discovered in the literature, including the motives of multinational businesses, the scale of multinational corporations, the investment sector, and the forms of the entrance of FDI. The empirical studies on the drivers of FDI undertaken so far contain a wide variety of various independent variables that influence the flow of capital. To gain a more in-depth understanding of the variables included in the data panel, they might be subdivided into groups. In the past, some research on FDI determinants has concentrated on institutional variables, whereas others have concentrated on socio-political aspects. However, the selection of variables for any study depends on the researchers' opinions.

However, using time series data for the period 1978–2019, this study sought to build an empirical framework for identifying the determinants of FDI inflows into Sri Lanka's economy. Following a review of existing research, we

identified key characteristics that generally influence FDI inflows, as discussed in section 1.

An empirical analysis of Sri Lankan data reveals that the GDP growth rate positively affects FDI inflows to Sri Lanka. A higher GDP paves the ways to higher market size, leading to more FDI in Sri Lanka. Openness to trade also positively impacts foreign FDI inflows into Sri Lanka, and this effect is statistically significant. This means that trade liberalization policies implemented since 1978, have resulted to increase in FDI inflows into Sri Lanka. Exchange rate has a significantly positive impact on FDI inflows to Sri Lanka.

It may also be inferred that FDI and the six explanatory factors included in this study have a long-run equilibrium. However, the factors that influence FDI vary from one country to another, depending on the other incentives present in the country. Thus, the study recommends that the Sri Lankan government consider creating policies to increase market size and trade openness to enhance FDI in Sri Lanka for future FDI policy planning and execution.

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