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Determinants of Foreign Direct Investment in Sri Lanka

by

Kalaichelvi Ravinthirakumaran, E. A. Selvanathan, Saroja Selvanathan and Tarlok Singh

Economics and Business Statistics Discipline
Griffith Business School
Griffith University, Queensland
AUSTRALIA

Abstract

This paper empirically investigates the determinants of foreign direct investment inflows (FDI) in Sri Lanka by employing the Autoregressive Distributed Lag (ARDL) model. The study uses annual data from 1978 to 2012. The results confirm the existence of a long run equilibrium between the FDI and five explanatory variables, namely trade openness, GDP growth rate, infrastructure, wage and rate of inflation. Trade openness, GDP growth and infrastructure have a positive impact while the rate of inflation has a negative impact on FDI as expected. The effect of wage is found to be statistically insignificant and this implies that there is no support for the cheap labour-led FDI hypothesis in Sri Lanka. From a policy point of view, the results suggest that, to promote FDI, Sri Lanka should develop and introduce policies that increase the level of trade openness, GDP growth and infrastructure and that the maintain the low level of inflation.

Key words: FDI, cointegration, bound test, Sri Lankan Economy

JEL Codes: F21, C32, O53

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1. Introduction

Identifying the factors that determine foreign direct investment inflows into a country is a complex problem. The amount of foreign direct investment (FDI) inflows into a country depends on various factors such as market size and growth potential of a host economy, financial and natural resources endowments and quality of workforce; macroeconomic environment, law and order situation; legislative and incentive structure, openness to international trade and access to international markets, quality of physical, financial and technological infrastructure. Political instability and inadequate security in a country could also disrupt foreign and domestic investments. Unstable political environments increase the risk for investments which all investors generally prefer to avoid, the risk also adds direct cost to the investment. Good governance practices give a clear signal to domestic and foreign investors that the country in question values their contribution to the betterment of the society and will work with them to achieve mutual benefits.

There are many theories which attempt to explain the determinants of FDI. However, Dunning's research work (1977, 1981) provides a comprehensive analysis based on ownership, location and the internationalization (OLI) paradigm. It is also called an eclectic theory and has remained the dominant analytical framework for accommodating a variety of operationally testable economic theories of the determinants of FDI and the foreign activities of Multinational enterprises (MNEs) (Dunning, 2000). United Nations Conference on Trade and Development (UNCTAD, 1998) also refers to Dunning's OLI paradigm and confirms that FDI usually goes to the countries where it is possible to combine the ownership advantages with the location specific advantages of the host countries through the internationalization of foreign investments.

Different MNEs might have different kinds of investment incentives. The motives for firms to engage in foreign production activities can be classified into four groups: *market seeking, resource seeking, efficiency seeking and strategic asset seeking* (Dunning, 1993). *Market seeking* FDI attempts to secure market and sales growth in the target foreign market. It may represent a deeper involvement of the firm, following the success of exports, or the expansion

of the firm to entirely a new market. Transportation costs and government regulations are the main reasons behind market seeking FDI. *Natural resources seeking* FDI attempts to acquire particular resources (e.g. minerals, raw materials and agricultural products) with a guaranteed cheap and safe supply. *Efficiency seeking* FDI has two main forms. First, and probably the most frequent type, firms often seek to increase their cost efficiency by transferring production, totally or in part, to low labour cost locations. This is especially likely to happen in industries where unskilled or semi-skilled labour represents an important part of the production costs. The second type of efficiency seeking FDI corresponds to investment aimed at rationalising the operations of existing MNEs. The target may be the exploitation of comparative advantages in adjacent territories (e.g. following a process of economic integration, such as the creation of the Single European Market, in 1992), or to make use of economies of scale and scope across borders. However, prior market seeking FDI is a pre-condition for this variation of efficiency seeking foreign investment. Finally, *strategic asset seeking* attempts to acquire the assets of foreign firms so as to promote their long-term strategic objectives, especially advancing their international competitiveness. MNEs with this intention often establish global strategic alliances or acquire local firms. Firms increasingly use FDI to obtain strategic assets (whether tangible or intangible) that may be critical to their long-term strategy but are not available at home.

The objective of this paper is to identify the determinants of FDI in Sri Lanka. During the late 1970s, major changes in economic policy took place in Sri Lanka due to the adaptation of the economic liberalization policy. These new policies led the government to use the private sector as the main engine of economic growth and development. The importance of FDI to Sri Lanka arises in light of the dismal performance of previous policies that emphasized more attraction of FDI in Sri Lanka (Sahoo et al, 2014). Although many relevant investment policy reforms have been introduced in Sri Lanka, the institutions and investment authorities supporting FDI were weak, fragmented and uncoordinated. Their services are quite basic, mainly focusing on short term benefits. There were hardly any initiatives for targeted, comprehensive and sustained support specifically to facilitate upward mobility of FDI in Sri Lanka. As a result, in Sri Lanka, FDI has performed below expectations. This situation is likely to worsen as competition intensifies with ongoing globalization. It is in line with the above argument that this paper intends to identify the determinants of FDI in Sri Lanka. This study makes contribution to the knowledge on the determinants of FDI in Sri Lanka as this study uses more recent data combined with recent developments in time series analysis.

The remainder of the paper is organised as follows: Section 2 reviews the previous empirical literature on the determinants of FDI. Section 3 deals with the data, methodology, results and findings. Section 4 provides the conclusion and policy implications.

2. Determinants of FDI inflows: A review of the Literature

There is a growing body of research literature that provides empirical evidence about the factors determining the FDI inflows across different countries and regions. To identify the most important determinants of FDI, we review previous research studies on determinants of FDI. There are a number of studies that analyse data from developed countries as well as developing countries. Table 1 presents a summary by research studies and Table 2 presents the same information but based on the type of dominant determinants that influence FDI. In most studies, market size and market potential or prosperity are proxied by GDP (Gross domestic product) and GDP growth rate. As can be seen, wage, exchange rate and rate of inflation have a negative impact on FDI inflows while GDP and GDP growth, infrastructure and trade openness (except, Koojaroenprasit, 2013) have a positive impact on FDI inflows. The impact of interest rate on FDI inflows is inconclusive.

Table 1: Determinants of FDI: A Summary Review

Author(s), Year	**Country**	**Period**	**Methodology**	**Determinants**
Albert and Stuart (2008)	Sri Lanka	1950–2004	VAR (Vector autoregressive method)	• Labour cost • GDP • Exchange rate • Interest rate • Trade Openness
Ali and Guo (2005)	China	2004	Descriptive Method	• GDP • Government incentive policies • Labour cost • Return on capital • Global integration
Ang (2008)	Malaysia	1960–2005	2SLS (Stepwise lease squares)	• GDP • Financial development • Infrastructure • Trade openness
Asiedu (2002)	71 developing countries (SSA-Sub-Saharan Africa and non SSA)	1988–1990 1991–1993 1994–1997	Panel regression	• Return on capital • Infrastructure development • Trade openness
Bhavan et al (2011)	Pakistan India Bangladesh Sri Lanka	Panel data 1995–2008	GMM (Generalised method of moments)	• Distance • Trade openness • Human development • Population • Infrastructure

Billington (1999)	7 industrialized countries and 11 UK regions	7 Countries – 1986–1993; 11 Regions– 1984,1986, 1990–1994	Pooled regression	• GDP • GDP growth • Unemployment • Host country imports • Corporate tax • Interest rates • Population density • Labour cost
Casi and Resmin (2010)	25 European countries	2005–2007	OLS (Ordinary lease squares) & spatial error model	• GDP • GDP growth • Labour cost
Cevis and Camurdan (2007)	17 developing countries and transition economies	1989(1) –2006(4)	GLS (Generalised least squares)	• Lagged FDI • Rate of inflation • Interest rate • GDP growth • Trade openness
Demirhan and Masca (2008)	38 developing countries	2000–2004	OLS	• GDP per capita • Infrastructure • Trade openness • Rate of inflation • Tax rate
Hara and Razafimahefa (2005)	Japan	1980–2001	OLS	• GDP • Volatility exchange rates • Land price • Deregulation
Janicki and Wunnava (2004)	European Union and 8 Central and East European countries (CEEC)	1997	WLS (Weighted least squares)	• GDP • Risk • Labour cost • Trade openness
Khan and Nawaz (2010)	Pakistan	1970–2004	OLS	• GDP growth • Exchange rate • Whole sale price index • Tariff rate • Exports
Koojaroenprasit (2013)	Australia	1986–2011	OLS	• GDP • Custom duty • Interest rate • Exchange rate
Mold (2003)	US and developed European countries	1978–1995	Panal regression	• GDP • Exchange rate variability • Labour costs
Piteli E (2010)	17 developed OECD countries	1972–2000	Panel regression	• Total factor productivity
Ramasamy and Yeung (2010)	OECD countries	1980–2003	GMM	• Lagged FDI • GDP • GDP growth • Trade openness • Labour cost • Education • Infrastructure • Risk • Interest rate
Sader (1995)	36 developing countries	1988–1993	OLS	• Trade • Domestic investment • Government consumption
Sahoo (2006)	5 South Asian countries (India, Pakistan, Bangladesh, Sri Lanka and Nepal	1975–2003	Panel regression	• GDP • Labour force growth • Infrastructure • Trade openness

Severiano A (2011)	Portugal	1980–2009	OLS	• Trade openness • Exchange rate • Minimum wage • GDP per capita
Singhania and Gupta (2011)	India	1991–2008	ARIMA (Autoregressive integrated moving average model)	• GDP • Rate of inflation • Scientific research
Vogiatzoglou (2007)	South and East Asia (9 host-countries from South and East Asia and 10 major home or investing countries)	1994–2003	Panel gravity model	• Bilateral trade • vertical specialization

Table 2: Previous findings on the effect of selected variables on FDI

Variables	**Effect on FDI**		
	POSITIVE	***NEGATIVE***	***INSIGNIFICANT***
GDP or GDP Growth	Billington (1999); Hara & Razafimahefa (2005); Mold (2003); Janicki & Wunnava (2004); Ali & Guo (2005); Sahoo (2006); Albert & Stuart (2008); Ang (2008); Demirhan &Masca (2008); Casi and Resmin (2010); Ramasamy &Yeung (2010); Singhania & Gupta (2011); Khan & Nawaz (2010); Koojaroenprasit (2013)		Asiedu (2002); Vogiatzoglou (2007)
Trade Openness	Asiedu (2002); Janicki & Wunnava (2004); Sahoo (2006); Cevis & Camurdan (2007); Albert & Stuart (2008); Ang (2008); Demirhan &Masca (2008); Ramasamy & Yeung (2010); Bhavan et al. (2011); Severiano (2011)	Koojaroenprasit (2013)	
Infrastructure	Asiedu (2002 , non-SSA); Sahoo (2006); Ang (2008); Demirhan & Masca (2008); Ramasamy & Yeung (2010); Bhavan et al. (2011)		Billington (1999); Asiedu (2002, SSA)
Exchange rate		Ang (2008); Khan & Nawaz (2010); Severiano (2011); Koojaroenprasit (2013)	Sader (1995); Mold (2003)
Wage		Janicki & Wunnava (2004); Ali & Guo (2005); Casi & Resmin (2010); Albert & Stuart (2008)	Cevis & Camurdan (2007); Koojaroenprasit (2013)

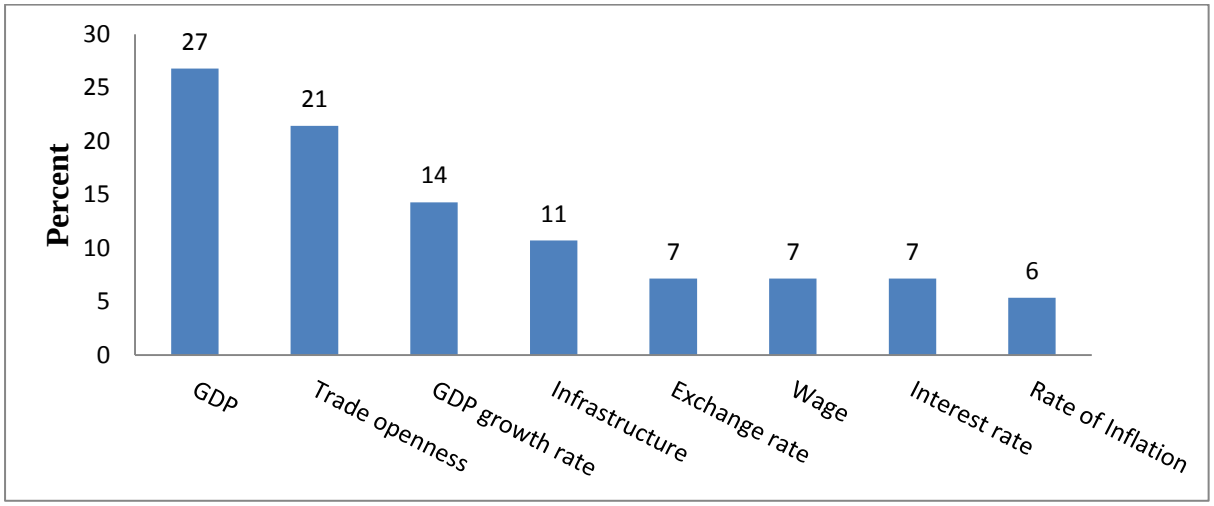
Interest rate	Billington (1999); Cevis & Camurdan (2007)	Ramasamy & Yeung (2010); Koojaroenprasit (2013)	
Rate of inflation		Cevis & Camurdan (2007); Demirhan & Masca (2008); Singhania & Gupta (2011)	

3. Preliminary Data Analysis

This section summarises the factors affecting the level of FDI as reviewed in the previous section. We also present the sources of data used in the study and conduct a preliminary analysis of the data. In the following section, we use time series analysis to analyse formally the relationship between FDI and its determinants.

Figure 1 presents the frequency distribution of the factors that influence the level of FDI based on the review summary presented in Table 2. As can be seen, GDP, trade openness, GDP growth, infrastructure, exchange rate, wage, rate of inflation and interest rate are the dominant determinants identified by the majority of the studies reported in Table 2.

Figure 1: Major determinations of FDI



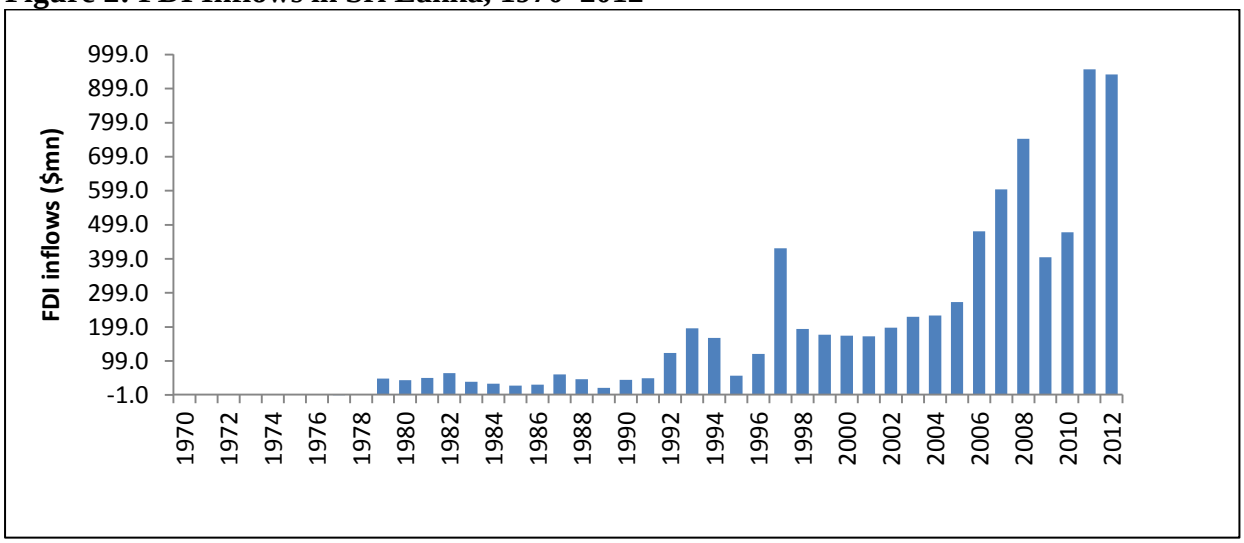
Note: This figure is based on Table 1 & 2

Figure 2 presents the FDI inflows to Sri Lanka during the period 1970–2012. As can be seen, before the implementation of inward oriented policies in 1977, FDI inflows were negligibly small. FDI inflows began to increase with the establishment of the *Greater Colombo Economic Commission* (GCEC) and the *Export Processing Zone* (EFZ) in 1978. FDI inflows have increased from $47m in 1979 to $64m in 1982. Major ethnic riots against the Tamils

took place during July 1983 and the start of the civil war between the Sri Lankan government and the Liberation Tigers of Tamil Eelam (LTTE) from that year made the investment climate less attractive to foreign investors.

Since 1983, the FDI inflows have declined during periods of hostilities between the Sri Lankan government forces and the LTTE and increased during peace negotiations. During the final phase of the civil war, FDI inflows have declined sharply from $752m to $404m in 2009 and since then have increased to $941m in 2012.

Figure 2: FDI Inflows in Sri Lanka, 1970–2012



Now, we investigate whether some of these main determinants are also relevant to Sri Lanka and their role in attracting FDI inflows to Sri Lanka. For this purpose, we use annual time series data for the period 1978–2012 on FDI, GDP, trade openness, GDP growth rate, infrastructure, exchange rate, wage, interest rate and rate of inflation. These data are collected from various issues of *World Development Indicators* and *Annual Reports* and *Economic and Social Statistics Reports of Central Bank of Sri Lanka.*

Real net Foreign direct investment is measured in US$ million. We use GDP and GDP growth as proxies for market size; trade openness (TOPEN) as total trade to GDP (that is, TOPEN = [(X+M)/GDP)] as a proxy for 'openness' of the country. An 'infrastructure index' is used as a proxy to measure the level of infrastructure. We have constructed this index[1]

[1] The index construct based on three commonly used variables namely, the total number of fixed telephone lines (per 100 people), and the road mileage (national highway roads) and the electricity production (kWh). In order to weight these variables, we use the share of these variables on GDP, where each variable is weighted by its relative importance to the infrastructure.

based on three variables namely, telephone line, road mileage, and electricity production (Li, 2004: Ramasamy et al. 2010). Exchange rate is used as a proxy for economic policy; the wage index as a proxy for labour cost; Interest rate as a proxy for cost of capital. The annual rate of inflation is proxy for the level of economic stability.

The expected signs of the determinants are as follows: GDP, trade openness, economic growth, infrastructure and interest rate are expected to have a positive impact on FDI while exchange rate, wage and rate of inflation are expected to be negative. These expected signs are also supported by the review summary presented in Table 2. A larger size of GDP results in more FDI inflows due to the benefits of the economies of scale. Trade openness is often interpreted as a measure of trade restrictions. As less trade restriction encourages export, the presence of high openness (less trade restriction), will increase FDI inflows. Economic growth could attract more FDI as it provides market potential. Well-developed infrastructure raises the productivity of investments and therefore stimulates FDI inflows. An appreciation of the domestic currency reduces FDI. Higher labour cost discourages FDI because it makes production in an economy more costly. If the rate of interest in the host nation is low (relative to world interest rates), foreign MNEs will invest more in the host country. As a high rate of inflation would reduce the return on investment, FDI inflows will be discouraged.

As a preliminary investigation, we present scatter plots of FDI inflows against each of the possible determinants i) GDP, ii) trade openness (OPEN), iii) GDP growth (GRO), iv) infrastructure (INFRA), v) exchange rate (EXCH), vi) wage, vii) interest rate (INT) and viii) rate of inflation (INF). The corresponding scatter plots are presented in Figures 3 to 10. As can be seen, as expected we observe a positive relationship between FDI and GDP, trade openness, GDP growth, infrastructure and interest rate while a negative relationship between FDI and rate of inflation and wage, with the exception of exchange rate.

Figure 3: FDI inflows vs GDP

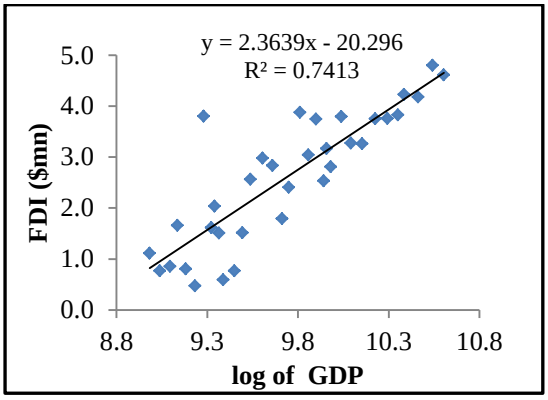


Figure 4: FDI inflows vs Trade Openness

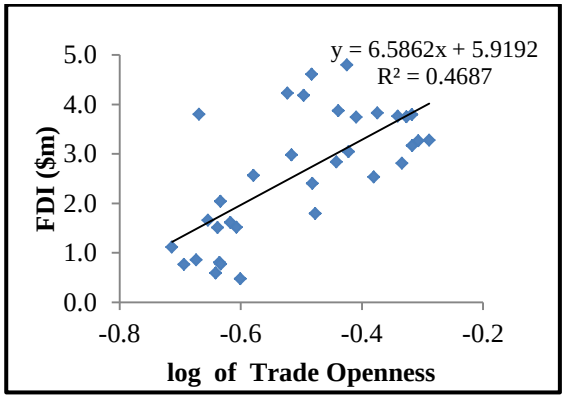


Figure 5: FDI inflows vs GDP Growth

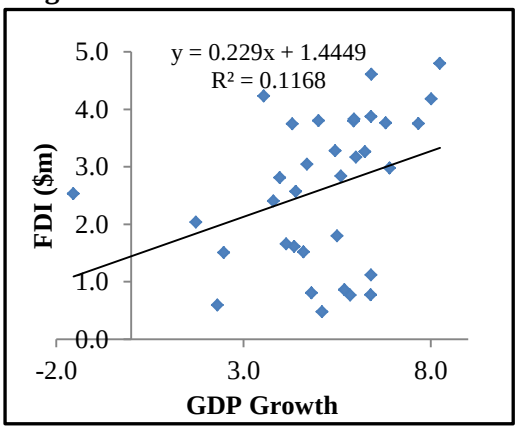


Figure 6: FDI inflows vs Infrastructure

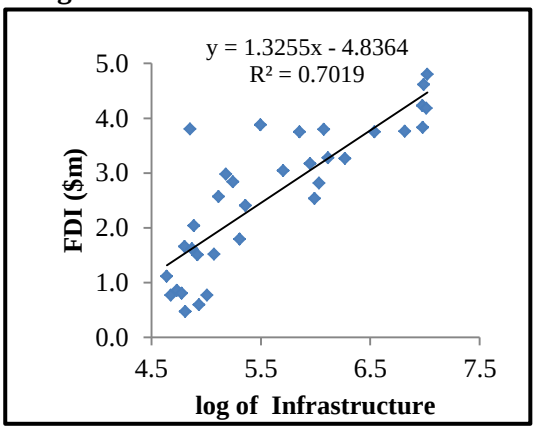


Figure 7: FDI inflows vs Exchange rate

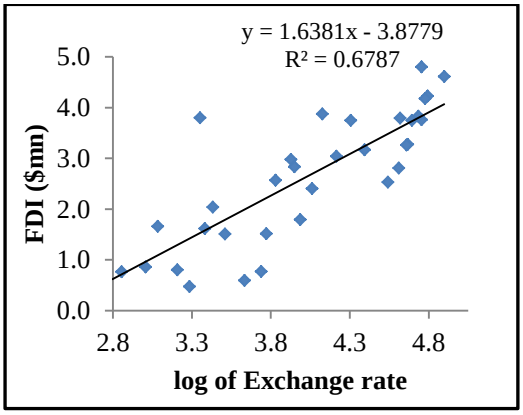


Figure 8: FDI inflows vs Wage

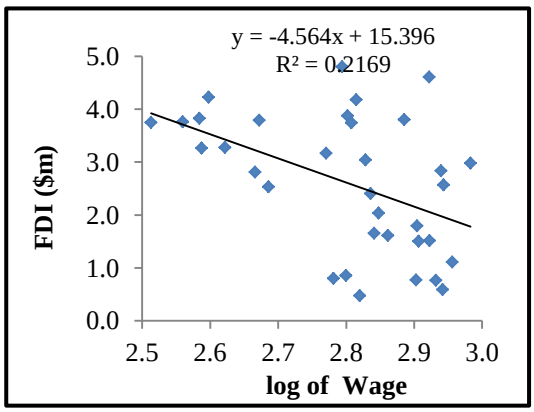


Figure 9: FDI inflows vs Interest rate

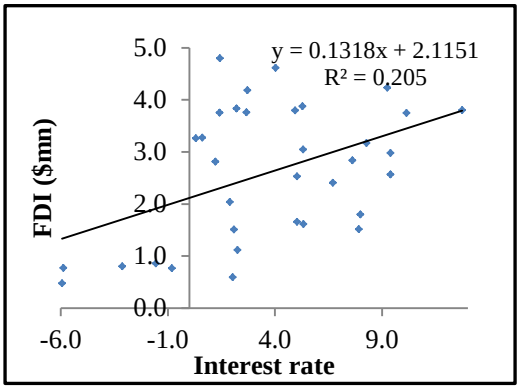
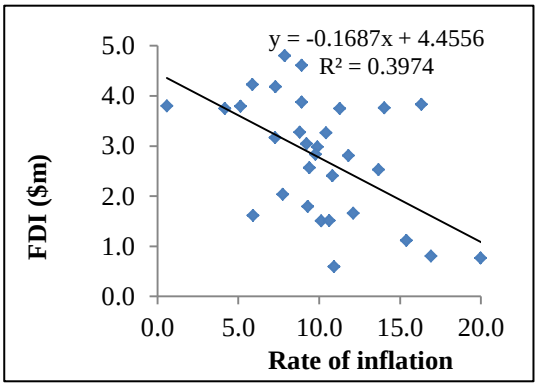


Figure 10: FDI inflows vs Rate of inflation



Empirical Analysis

Since both variables exchange rate and interest rate are highly correlated with the remaining independent variables, we exclude these two variables from here onwards to avoid the multicollinearity problem. Also, in the analysis below, among the two proxies for market size, GDP and GDP growth rate, we use only GDP growth rate to measure the dependent variable, market size.

To investigate the relationship between FDI and the five variables, we express FDI as a linear function of the variables such as trade openness, GDP growth, infrastructure, wage and rate of inflation. All variables, except GDP growth and rate of inflation are in natural logarithm. The estimating equation takes the form,

$$LnFDI = \alpha_0 + \alpha_1 LnOPEN + \alpha_2 GRO + \alpha_3 LnLINFRA + \alpha_4 LnWAGE + \alpha_5 INF + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots (1)$$

Now, we first test formally the stationarity status of the six time series variables of interest and determine their order of integration. For this purpose, we use the Augmented Dickey-Fuller test. The results of the unit roots tests are reported in Table 3.

Table 3: Augmented Dickey-Fuller Unit root Test Result

Variables	Level	First difference	Order of integration
lnFDI	-3.42 (0.01)		I(0)
lnOPEN	-1.58 (0.48)	-6.04 (0.00)	I(1)
GRO	-4.32 (0.00)		I(0)
lnINFRA	-2.45 (0.34)	-3.30 (0.02)	I(1)
lnWAGE	-1.37 (0.58)	-5.76 (0.00)	I(1)
INF	-4.02 (0.00)		I(0)

Note: Numbers in parenthesis are the p-values.

As can be seen from Table 3, trade openness, infrastructure, and wage are integrated of order one, I(1) and FDI, growth rate and rate of inflation are integrated of order zero, I(0).

Bound test for cointegration

Since some variables are I(0) and others are I(1), it is desirable to use the recently developed bounds test based on Autoregressive Distributed Lag (ARDL) model to analyse the determinants of FDI. The ARDL modelling approach was originally introduced by Pesaran and Shin (1999) and further extended by Pesaran, et al. (2001). Due to the lower power and further problems associated with other estimation methods, the ARDL approach to cointegration has become popular in recent years.

The unrestricted error correction model (UECM) for the ARDL bound test can be written as:

$$\Delta \ln FDI_t = \beta_0 + \beta_1 \ln FDI_{t-1} + \beta_2 \ln OPEN_{t-1} + \beta_3 GRO_{t-1} + \beta_4 \ln INFRA_{t-1}$$
$$+ \beta_5 \ln WAGE_{t-1} + \beta_6 INF_{t-1} + \sum_{i=1}^{j} \alpha_{1i} \Delta \ln FDI_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta \ln OPEN_{t-i} + \sum_{i=0}^{l} \alpha_{3i} \Delta GRO_{t-i}$$
$$+ \sum_{i=0}^{m} \alpha_{4i} \ln \Delta INFRA_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \ln \Delta WAGE_{t-i} + \sum_{i=0}^{p} \alpha_{6i} \Delta INF_{t-i} + \varepsilon_t \quad \text{.....(2)}$$

where Δ is the first-difference operator, ln (.) is the logarithm operator and ε_t is the white-noise disturbance term. The coefficients β_i (i =1,2,..,6) measure the long run effect, whereas the coefficients α_{i*} (i =1,2,..,6) measure the short run dynamics of the model. The structural lags *j, k, l, m, n, p* are to be determined by using minimum Akaike Information Criterion (AIC).

The ARDL approach to cointegration involves three steps for estimating long run relationship (Pesaran and Pesaran ,1997; Pesaran et al., 2001). The first step in the ARDL bounds testing approach is to estimate the above equation by ordinary least squares in order to test for the existence of a long-run relationship among the variables by conducting an *F*-test for the joint significance of the coefficients of the lagged levels variables.

Null hypothesis

$H_o : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ (no cointegration or no long run relationship)

Alternative hypothesis:

H_1: At least one $\beta_i \neq 0$ (cointegration or long run relationship exists)

The F-test statistic has a non-standard distribution which depends upon (i) whether variables included in the autoregressive distributed lags model are I(0) or I(1), (ii) the number of regressors, (iii) whether the ARDL model contains an intercept and/or a trend, and (iv) the sample size. Thus, the computed F-statistic is compared with two asymptotic critical values tabulated in Table CI (iii) of Pesaran et al. (2001). Table CI (iii) provides Critical Value bounds for all classifications of the regressors into purely I(1), purely I(0) or mutually cointegrated. According to Pesaran et al. (2001), the lower bound critical values assumed the explanatory variables are integrated of order zero, or I(0), while the upper bound critical values assumed that are integrated of order one, or I(1). Therefore, if the computed F-statistic is greater than the upper critical bounds, the null hypothesis should be rejected and we conclude that there is a long-run relationship between the selected variables. If the calculated F-statistic is below the lower critical bounds, the null hypothesis cannot be rejected and there is no long-run relationship between them. On the other hand, if the computed F-statistic falls inside the critical values bounds, the test is inconclusive unless we know the order of integration of the underlying variables.

ARDL (1, 0, 2, 0, 0, 0) model is selected based on the Akaike Information Criterion. Table 4 presents the results. The calculated *F-Statistics* for ARDL model is **5.294** which is greater than the upper critical bound values of 4.68 (α=0.01), 3.79 (α=0.05), and 3.35 (α=0.10), where α is the level of significance. Therefore, we conclude that there exists a cointegration or long run relationship between FDI and other variables of interest.

Table 4: ARDL Estimation Results

Regressor		Parameter Estimate	Standard Error	T-Ratio	P-value
ΔFDI (-1)	α11	-0.286	0.127	-2.241	0.035
ΔOPEN	α20	2.361	1.084	2.177	0.040
ΔGRO	α30	0.083	0.043	1.915	0.068
ΔGRO (-1)	α31	0.071	0.042	1.668	0.108
ΔGRO (-2)	α32	0.088	0.045	1.971	0.060
ΔINFRA	α40	1.120	0.208	5.390	0.000
ΔWAGE	α50	0.851	0.950	0.896	0.379
ΔINF	α60	-0.132	0.018	-7.267	0.000
C		-3.947	3.065	-1.288	0.210
R-Bar-Squared		0.892	S.E. of Regression		0.421
AIC		-22.019	SBC		-28.754
Computed F-statistics		3.294			

The lower and upper bound of the critical values at the 1, 5 and 10 percent significant levels are (3.41, 4.68), (2.62, 3.79) and (2.26, 3.35), respectively (Pesaran et al, 2001, Table C1 (iii)).

A point worth noting is that our sample size is 35 numbers of observations. However, the critical values available in Pesaran et.al (2001) are asymptotic, larger sample values. Narayan (2005) argues that existing critical values, because they are based on large sample size, cannot be used for small sample situations. As our study has only 35 observations, as a check, we use Narayan's (2005) critical values (sample sizes ranging from 30 to 80 observations) for T=35 to see whether our results hold even with a small sample situation. The critical values (Table: case III) are at the 5 per cent (3.03, 4.44) and at 10 percent (2.50, 3.76) level of significance lower bounds and upper bounds computed. Since the critical value 5.294 is larger than the upper bounds 4.44 and 3.76, the null hypothesis of no cointegration should be rejected in favour of the alternative hypothesis, the variables are cointegarted. Therefore, there exists a long-run relationship between the six selected variables even when we use small sample critical bounds.

In the second step, once cointegration is established, the conditional ARDL long run model for ln *(FDI)* is estimated in the form of Equation (1). The estimated long run coefficients of the model are given in Table 5 below.

Table 5: Estimated Long Run Coefficients of the ARDL Model

Regressor		Parameter Estimate	Standard Error	T-Ratio	p-value
lnOPEN	α_1	1.835	0.779	2.356	0.027
GRO	α_2	0.189	0.054	3.524	0.002
lnINFRA	α_3	0.871	0.129	6.754	0.000
lnWAGE	α_4	0.662	0.719	0.920	0.367
INF	α_5	-0.102	0.015	-6.719	0.000
C	α_0	-3.068	2..298	-1.336	0.194

As revealed in Table 5, in the long run, trade openness coefficient is positive and significant at the 5 percent level. Particularly, a one percent increase in openness would create a 1.84 percent increase in FDI inflows, all things being considered equal. This supports the extent to which a country allows free movement of goods and services, which determines the level of FDI inflows. This result is in line with the results reported in Asiedu (2002), Janicki and Wunnava (2004), Sahoo (2006), Cevis and Camurdan (2007), Albert and Stuart (2008), Ang (2008), Demirhan and Masca (2008), Ramasamy and Yeung (2010), Bhavan et al (2011) and Severiano (2011).

GDP growth contributes positively to FDI inflows and is statistically significant at the 1 percent level confirming the argument of motivation of the market seeking FDI. A high level of GDP growth is a strong indication of market opportunities. Specifically, a one unit increase in GDP growth would generate a 0.19 percent increase in FDI inflows. This result is in line with the results reported in such as previous studies Billington (1999), Mold (2003), Janicki and Wunnava (2004), Ali and Guo (2005), Hara and Razafimahefa (2005), Sahoo (2006), Albert and Stuart (2008), Ang (2008), Casi and Resmin (2010), Khan and Nawaz (2010), Ramasamy and Yeung (2010), Singhania and Gupta (2011), Koojaroenprasit (2013).

The estimated coefficient for infrastructure variable is positive and statistically significant at 1 percent level. A 1 percent increase in infrastructure leads to 0.87 percent increase in FDI inflows, ceteris paribus. This reveals that developments in infrastructure facility attract FDI inflows to Sri Lanka. A similar finding is reported in Asiedu (2002), Sahoo (2006), Ang (2008), Demirhan and Masca (2008), Ramasamy and Yeung (2010) and Bhavan et al. (2011).

The coefficient of the rate of inflation is significant at 1 percent level and has a negative impact on FDI inflows. A 1 unit increase in rate of inflation would cause 0.10 percent decrease in FDI inflows, which confirms that the higher macroeconomic instability reduces FDI inflows to Sri Lanka. Our results relation to inflation also supported by the findings of Cevis and Camurdan (2007) Demirhan and Masca (2008) and Singhania and Gupta (2011).

While, trade openness, GDP growth, infrastructure and rate of inflation have the expected signs, the coefficient of the wage proxied by labour cost bears a positive sign, which is against the expectation. However, it is statistically insignificant. This unexpected sign of labour cost may be due to other factors dominate labour cost. That is, even if labour cost increases, due to the attractiveness of other factors, investors still invest in Sri Lanka. Our findings in relation to labour cost is in line with the results reported in Lucas (1993), Tsai (1994), Cevis and Camurdan (2007) and Koojaroenprasit (2013).

Based on the long run estimated results, we can conclude that the variables such as trade openness, GDP growth, infrastructure and rate of inflation are the major determinants of FDI in Sri Lanka.

In the third and final step, we obtain the short-run dynamic parameters by estimating an error correction model based on Equation (3).

$$\Delta \ln FDI_t = \delta_0 + \sum_{i=1}^{j} \delta_{1i} \Delta \ln FDI_{t-i} + \sum_{i=0}^{k} \delta_{2i} \Delta \ln OPEN_{t-i} + \sum_{i=0}^{l} \delta_{3i} \Delta GRO_{t-i} + \sum_{i=0}^{m} \delta_{4i} \Delta \ln INFRA_{t-i} + \sum_{i=0}^{n} \delta_{5i} \Delta \ln WAGE_{t-i} + \sum_{i=0}^{p} \delta_{6i} \Delta INF_{t-i} + \varphi ECM_{t-1} + \varepsilon_t \quad \ldots (3)$$

where, δ_{i*} ($i = 1,2,..,6$) are the short-run dynamic coefficients and φ is the speed of adjustment parameter and ECM is the error correction term that is derived from the estimation of Equation (1) in the following form.

$$ECM_{t-1} = \ln FDI_{t-1} - \alpha_0 - \alpha_1 LnOPEN_{t-1} - \alpha_2 GRO_{t-1} - \alpha_3 LnLINFRA_{t-1} - \alpha_4 LnWAGE_{t-1} - \alpha_5 INF_{t-1} \quad \text{-(4)}$$

The results of short-run dynamic coefficients associated with the long run relationships obtained from the ARDL-ECM equation (3) are presented in Table 6. The optimal lag length for the selected error correction representation of the ARDL model is determined by the Akaike Information Criterion.

Table 6: Estimates of Error Correction Representation

Regressor		Coefficient	Standard Error	T-Ratio	P-value
Δ OPEN	δ_{20}	2.361	1.084	2.177	0.040
ΔGRO	δ_{30}	0.083	0.043	1.915	0.068
ΔGRO(-1)	δ_{31}	-0.088	0. 045	-1.971	0.060
ΔINFRA	δ_{40}	1.120	0.208	5.390	0.000
ΔWAGE	δ_{50}	0.851	0.949	0.896	0.379
ΔINF	δ_{60}	-0.132	0.018	-7.267	0.000
ECM(-1)	φ	-1.286	0.128	-10.070	0.000

Beginning with the results for the long run, the coefficient on the lagged error-correction term (ECM) is highly significant with the expected sign, which confirms the result of the bounds test for cointegration. The larger the error correction coefficient the faster will be return to equilibrium, once shocked (Pesaran and Pesaran, 2009). The coefficient of ECM term is -1.29, which suggests a fast adjustment process. Approximately 129 percent of the disequilibrium of the previous year's shock adjusts back to the long run equilibrium in the current year. This larger error correction coefficient may be due to the characteristics of data sets of the variables, in our model. (For example, in 2000, Sri Lanka's GDP growth was 6 percent which has decreased to -1 percent in 2001; rate of inflation was 20 percent in 1984 which has fallen to 1 percent in 1985). In addition, this ECM implies that long run causality runs interactively from trade openness, economic growth, infrastructure, wage and rate of inflation to FDI.

Diagnostic tests

Diagnostic tests for serial correlation, functional form, normality and hetroscedasticity of the models have been conducted and the results are presented in Table 7. As can be seen, the model has the desired econometric properties, such that it has a correct functional form and residuals are serially uncorrelated, normally distributed and homoskedastic. Therefore, the results are valid for meaningful interpretation.

Table 7: Diagnostic Checking

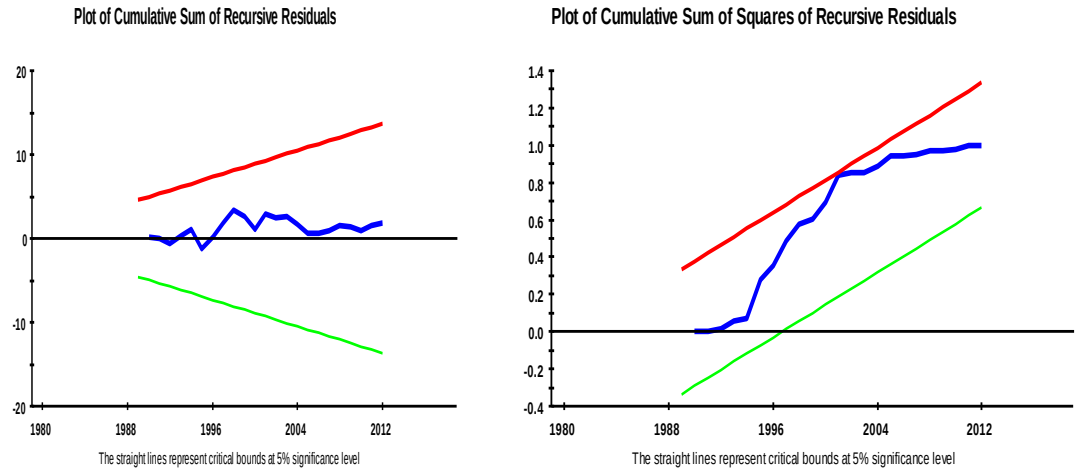
Tests	F- Statistic	p-value
Serial Correlation (a)	0.412	0.840
Functional Form (b)	0.081	0.778
Normality (c)	1.967	0.374
Heteroscedasticity(d)	0.284	0.598

Note:
a:Lagrange multiplier test of residual serial correlation
b:Ramsey's RESET test using the square of the fitted values
c:Based on a test of skewness and kurtosis of residuals
d:Based on the regression of squared residuals on squared fitted values

Stability tests

The cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests are applied to assess the parameter stability (Pesaran and Pesaran, 1997). Figure 11 plots the results for CUSUM and CUSUMSQ tests. The results indicate the absence of any instability of the coefficients because the plot of the CUSUM and CUSUMSQ statistic fall inside the critical bands of the 5 percent confidence interval of parameter stability. Therefore, there exists stability in the coefficients over the sample period for Sri Lanka.

Figure 11: CUSUM and CUSUMSQ tests for Parameter Stability



4. Conclusion and Policy implication

The objective of this study was to develop an empirical framework to identify the determinants of FDI inflows in Sri Lanka by using time series data for the period of 1978–2012. Based on review of previous research, we have identified five important determinants that generally determine the FDI inflows. They are trade openness, GDP growth, infrastructure, wage and rate of inflation. Our empirical analysis of the Sri Lankan data reveals that trade openness positively influences FDI inflows into an economy and is statistically significant. This implies that greater trade liberalization policies increase FDI inflows into Sri Lanka. GDP growth has a positive effect on FDI and is statistically significant. As strong GDP growth leads to larger market size, maintaining the momentum in GDP growth is necessary for Sri Lanka to attract FDI inflows. Infrastructure has a positive effect on FDI and is statistically significant. This suggests that improved infrastructure is essential to increase FDI inflows. Low rate of inflation (which is used as a proxy for the indicator of economic stability) in Sri Lanka negatively impacts on FDI and is statistically significant. This means that in order to increase FDI inflows, low rate of inflation is crucial for Sri Lanka. Wage has a positive impact on FDI. However, it is statistically insignificant. The evidence suggests that cheap labour-led FDI hypothesis is not supported by Sri Lankan data.

Finally, it can be concluded that there is a long run equilibrium between the FDI and five explanatory variables. However, wage is not statistically significant. This demonstrates that wage has not been an important factor in attracting FDI in Sri Lanka. Furthermore, the major determinants of FDI in Sri Lanka are trade openness, GDP growth, infrastructure and rate of inflation. As a recommendation for future FDI policy planning and implementation, Sri Lankan government has to consider developing policies to improve the trade openness, GDP growth, infrastructure, wage and rate of inflation. This will enhance the FDI inflows into Sri Lanka.

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