EXOGENOUS GROWTH: AN EVIDENCE FROM EXTERNAL FINANCE IN CONTEXT OF SRI LANKA

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ABSTRACT[1]

Inflow of external finance into Sri Lanka in terms of FDI is instrumental to overcome socio-economic issues detrimental to achieve economic growth. Objective of this study is to find nexus between Economic Growth and FDI in Sri Lanka by employing time series data from 1978 to 2020. The econometric techniques used in this study are listed as Kernel Fit, Confidence, Ellipse, Co integration, and Error Correction Mechanism – ECM. The dependent variable in the econometric model defined is GDP- GDP which is the proxy for Economic Growth in Sri Lanka. The independent variables are defined as FDI– FDI and EFI – EFI. There is a direct relationship or upward trend between GDP and Foreign Direct Investment. One percent increase in FDI – FDI leads to increase GDP – GDP by 1.39 percent. An increase of one percent in EFI – EFI lowers down GDP – GDP by 7.99 percent in long run. FDI and integration with the world market are the endogenous determinates which stimulate the economic growth of the county. As per the findings of this study, a positive relationship between Economic Growth and FDI as propounded by Endogenous Growth Model exists.

KEYWORDS: Growth, External Finance, Foreign Direct Investment and Unit Root Test

1. INTRODUCTION

Foreign Direct Investment is a factor representing the composition of external finance of Sri Lanka. Trade and FDI in the external finance are together complementary each other. Integration in international trade is promoted by the contribution of Foreign Direct Investment. Networking of domestic business in international production, export market, and global value chains are accessed and enabled by FDIOECD, 2002. FDI is considered as one of the driving forces to achieve economic growth and development in the respective host country as this driving force inflows financial capital along with management skills and technological innovation required by host developing economics all over the world (Moran, 2005)

The inflow of FDI is constrained in Sri Lanka with sharp uncertainties in year 2020. COVID – 19 pandemic primarily attributes to the restrictions in FDI in Sri Lanka during year 2020. A significant decline is recorded in flows of global FDI due to the uncertainties generated from the global pandemic (CBSL, 2021). In turn, it considerably deteriorated Sri Lankan economy with the current confrontation of recessionary pressure (shortage of foreign reserve, hyper inflationary pressure in price level, and shortages of essentials, depreciation in domestic currency values). Accordingly, this study is significant to study the impact of FDI– FDI (one of the factors in the composition of external finance in Sri Lanka) on GDP- in the context of Sri Lanka.

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2. LITERATURE REVIEW

The respective empirical studies previously carried by the scholars all over the world in connection with the link between Economic Growth and FDI are constrainedly reviewed.

Mustafa (2019) aimed to investigate the nexus between FDI and GDP by employing time series from year 1977 to year 2017. Econometric tools he used were Kernel fit, Confidence Ellipse, ECM, and Co integration. He found there was a positive and significant relationship between FDI and Gross Domestic Production. Effect of FDI on GDP in the short-run was statistically significant. In addition, he found that there was a one way causal relationship between FDI and Gross Domestic Production.

Irsania and Noveria focused to asses relationship between FDI and Economic Growth – EG in Indonesia by employing multiple regression with the coverage of time series from year 1983 to year 2012. From the results of data analysis, they found that there was a significant impact of FDI on Economic Growth in the respective country. Direct relationship between these two variables was found between FDI and Economic Growth. From the study, they predicted the expectation of increase in the Economic Growth in the future.

Roy and Mandal (2012) examined the relationship between FDI and Economic Growth in context of some of the Asian countries (Singapore, Philippines, China, Sri Lanka, Pakistan, Indonesia, Thailand, Malaysia, and India) by ranging time period from year 1981 to 2008 by using the econometric tool of Granger-Causality Test. They observed a causational direction from Economic Growth to FDI in the economies such Sri Lanka, India, China, Philippines, Pakistan, and Singapore. Granger Neutrality was found between FDI and GDP in Malaysia. In relation to causality, bidirectional causation was found between FDI and Economic Growth in Thailand. They concluded that no uniformity in policy recommendation might work for the respective Asian economies.

Andinuur (2013) aimed to link the relationship between FDI– FDI and Economic Growth in Ghana by collecting time series data set spanning from year 1980 to 2011. He employed Co integration (by Pesaran, Shin and Smith) and Ganger Causality techniques (by Toda and Yamomanto) to attain objective of his study. It was found in his study that there was a direct association between FDI and Economic Growth – EG in long run as well as in short run. Bi-causational association was found between Economic Growth and FDI at statically significant level. Finally, he suggested and recommended to attract a large volume of FDI so as to boost up economic growth of respective country.

Masipa (2018) aimed to determine association between FDI inflow and Economic Growth in South Africa covering the data set from year 1980 to 2014. VECM was employed in this study to attain objective of the study. He found that there was a share of positive nexus between FDI and Economic Growth – EG in the respective country. The scholar recommended that the findings of this study were instrumental to reinforce attraction of FDI in order to achieve economic growth in South Africa.

Berasaluce and Romero (2016) set up an empirical analysis between Economic Growth and FDI in Korea by collecting the data set from year 1980 to year 2015. They used VAR (Vector Autoregressive) model to find association between Economic Growth and Foreign Direct Investment. From this study, they found that FDI was not the driving force of Economic Growth in Korea. As a result, they suggested and recommended to be cautious on the inflow of FDI which is one of tools to increase Economic Growth.

Review of foregoing studies on FDI– FDI and Economic Growth- EG attracts different appealing scope in connection with FDI and Economic Growth in the global arena. These limited empirical studies reviewed in this study vividly portray that there is no likelihood of drawing conclusion on a priori argument. It depends on nature of the country considered.

In the global context, the empirical studies previously carried out by employing different methods in connection with FDI and economic growth have confirmed optimistic or pessimistic or no relationship.

The studies available in this connection all over the global context are considerably higher than in comparison with Sri Lanka. This study updates and validates by coverage of the time series data up to year 2020, especially after Pandemic. In addition, an econometric analysis in a broader perspective such as long and short run linkage between the respective variables is analyzed in this study. Accordingly, in the above context, this study fills the gap of knowledge in context of Sri Lanka.

3. OBJECTIVE

The prime objective of study is to examine the association between Economic Growth and Foreign Direct Investment in Sri Lanka.

4. METHODOLOGY

The research method employed in the study is quantitative. Time series data have been collected from CBSL Annual Report of Sri Lanka. The time series data rages are varying from 1978 to 2020. The independent variables are listed as Foreign Direct Investment and Economic Freedom Index and dependent variable is Gross Domestic Production which is defined as proxy variable for economic growth of Sri Lanka. The prime tools such as Kernel Fit, Confidence Ellipse, Unit Root, Cointegration, and Error Correction Mechanism – ECM have been employed in this study so as to attain study objective.

The Kernel Fit and Confidence Ellipse are used as the parametric tools so as to find the underlying graphical representation and relationship between the respective variables (dependent and independent variables). Unit Root technique is employed to test (the test with Augmented Dickey Fuller) the stationary nature of the variables in context of short run and long run. Cointegration technique is employed to find static relationship between variables. ECM technique (Error Correction Mechanism) is employed in this study so as to detect the underlying short run (dynamic) relationship between dependent and independent variables.

E-Views 10 is the statistical software which is used to analyze data. Econometric model defined so as to achieve the objective of this study is as follows.

$$\log(GDP_t) = \beta_0 + \beta_1\log(FDI_t) + \beta_2\log(EFI_t) + \varepsilon_t$$

Where:
GDP = Gross Domestic Production – the proxy for Economic Growth
FDI = Foreign Direct Investment
EFI = Economic Freedom Index
Log = Logarithm
ε = Error Term
t = Time Period
$\beta_0, \beta_1, \beta_2,$ = Parameters

5. DATA ANALYSIS AND DISCUSSION

It analyses and discusses time series data in order to attain study objective with appropriate and respective tools such as non-parametric and parametric background.

5.1 Non Parametric Analysis (Variables: GDP and FDI)

Figure 01 shows the non-parametric relationship between the variables such as GDP and FDI. GDP is the dependent variable and FDI is independent variable. The tools such as Confidence Ellipse and

Kernel Fit are employed to find trend and association between such two variables. Kernel Fit indicates the fit of regression of one time series on another time series. Confidence Ellipse is used to find the confidence region of the respective two time series around the means. Visualization and examination of the two series on their trends are studied by using Kernel Fit and Confidence Ellipse. Figure 01 is as follows.

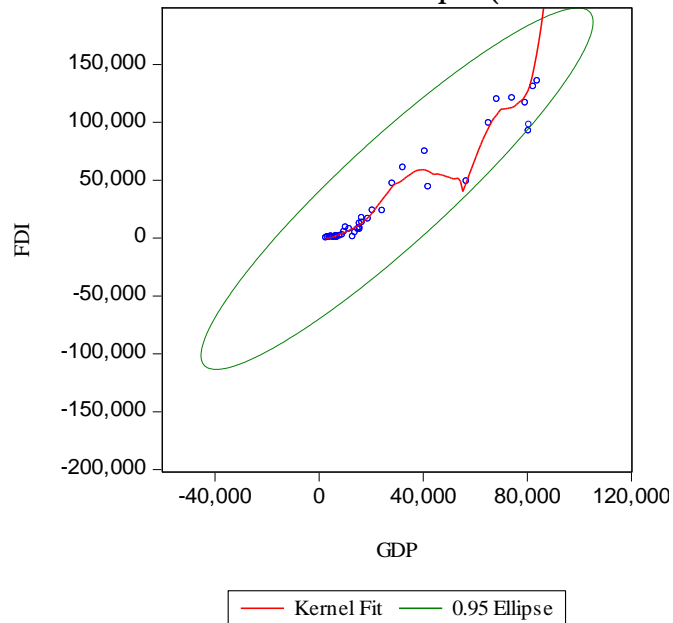**Figure 01: Kernel Fit and Confidence Ellipse (GDP and FDI)**

Figure 01 clearly shows that there is a direct association or upward trend between GDP and FDI. The underlying relationship between these two variables is positive. That is, increasing value in dependent variable of GDP leads to an increase in value of independent variable of FDI or vice versa.

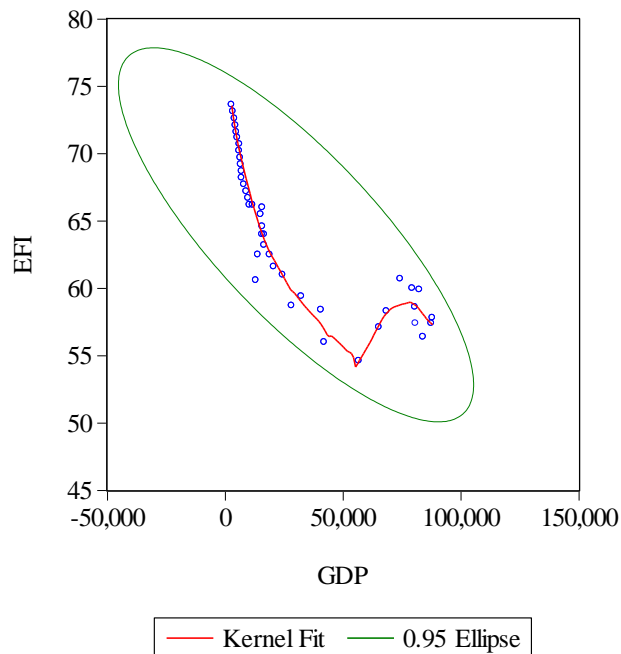**Figure 02: Kernel Fit and Confidence Ellipse (GDP and EFI)**

Figure 02 indicates the non-parametric relationship between GDP and EFI. The underlying association between dependent variable – GDP and independent variable - EFI is negative. The negative association indicates that an amount of increase in the independent variable of EFI leads to an amount of increase in dependent variable of GDP. Negative relationship between these two variables is ensured by employing the tools such as Kernel Fit and Confidence Ellipse.

5.2 Testing Unit Root (LGDP, LFDI)

Table 01 shows the test results of Unit Root test of variables such as LGDP, LFDI, and LEFI. The tool of Augmented Dickey Fuller Test - ADF is used with the intention of finding the stationary nature of all variables employed in respective regression model of this study. All the variables such as LGDP, LTED, and LEFI are not found stationarity at its data level form - $I(0)$, but variables are found as stationary at its first difference - $I(1)$ at less than 5 percent significance level ($p < 0.05$).

Table 01: Unit Root Test Result (LGDP, LTED, LEFI)

Variable	ADF test	Intercept		Overall Decision
		ADF - Test statistic value	Test Critical Value (5%)	
LGDP	Data Level	0.65	2.93	Non Stationary
	First Difference	4.53	2.93	Stationary
LFDI	Data Level	0.86	2.94	Non Stationary
	First Difference	5.00	2.94	Stationary
LEFI	Data Level	1.33	2.93	Non Stationary
	First Difference	7.10	2.93	Stationary

5.3 Testing Unit Root for Cointegration

Table 02 depicts the Unit Root test results in relation to the residuals of respective model of this model. ADF test is employed to study stationery status of residuals series of regression model. If residuals of respective model of this study are found as stationary at its level form $I(0)$, the regression model is meaningful and this model is found as a long run regression model. Variables of regression model such as LGDP, LTED, and LEFI are co-integrated.

Table 02: Testing Unit Root for Residuals

ADF	t-Statistic	Probability (5%)
ADF test statistic	3.22	0.0000

Accordingly to ADF test results, the null hypothesis of "Residuals series of respective regression model are not found as stationary" is rejected at less than five percent significant level ($p < 0.05$), rather the alternative hypothesis of "Residual series of the respective regression model are stationary are confirmed at less than five percent significant level (p < 0.05). The co-integration indicates that long run associationship exists between variables.

5.4 Cointegration Regression Analysis

Table 03 shows the results of co-integration regression of the estimated model of this study. The model is defined as follows. FDI is defined as the focal independent variable of co-integration regression model along the other independent variables such EFI defined as control variable of the model.

$$\log(GDP_t) = \beta_0 + \beta_1\log(FDI_t) + \beta_2\log(EFI_t) + \varepsilon_t$$

The model 01 (5.1) is the long run multiple regression model as time series data representing all variables in Model 01 are detected as stationary at its first difference - $I(1)$ along with stationarity of residuals at data level $I(0)$. This multiple regression is considered as Co-integrating Regression model and long run model. In this model, β represents the parameter of co integration. As variables of regression model are co integrated, this model is not spurious.

Table 03: Co-integration Results (Dependent Variable: LGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	39.98568	5.084957	7.863525	0.0000
LFDI	1.393624	0.339380	4.106380	0.0002
LEFI	-7.999781	1.068325	-7.488151	0.0000
R Squared 0.919726, *F Statistic* 229.1480, *Prob. F Statistic* 0.000000, *Akaike Info* 0.557553, *Schwarz Criterion* 0.680428, *DW* 0.558202				

The long run estimated model is as follows.

$$\log(GDP_t) = \mathbf{39.98} + \mathbf{1.39}\log(FDI_t) - \mathbf{7.99}\log(EFI_t)$$

Equation (5.2) is the estimated results of co-integrated model of this study. Coefficient sings of model are coincided with the exiting theoretical context. A positive relationship is found between GDP and FDI. One percent increase in FDI raises down GDP by 1.39 percent. An increase of one percent in EFI rises up GDP by 7.99 percent in the long run. All the independent variables are statistically significant at less than five percent ($p < 0.05$). The value of R^2 is estimated at 0.91 (91 percent). It means influence of the internal factor determining the value of GDP is estimated at 91 percent. The rest of only 9 percent is the external determinants affecting the changes in GDP – Gross Domestic Production.

5.5 Error Correction Mechanism (ECM) and Short Run Model

As combination of non-stationary time series is found as co-integrated at the first difference, it is apt to define the short run model (dynamic model). The evolution of short run relationship and dynamic adjustment can be observed by using the defined short run model. Under the nature of short run model, values of both short run and EC (Error Correction parameters) can be estimated. The dynamic representation of short run model can be defined as follows.

$$\Delta\log(GDP_t) = \alpha_0 + \beta_1 \Delta\log(FDI_t) + \beta_2 \Delta\log(EFI_t) + \delta ECT_{t-1} + \varepsilon_t$$

Table 04: Error Correction Mechanism/Short Run Model Results – Dependent Variable: D(LDGP)

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	0.064571	0.009855	6.551787	0.0000
D(LFDI)	0.298512	0.075679	3.944460	0.0003
D(LEFI)	-1.001268	0.377838	-2.649992	0.0117
RESID01(-1)	-0.130557	0.032606	-4.004137	0.0003
R Squared 0.404624, *F Statistic* 8.608395, *Prob. F Statistic* 0.000174, *Akaike Info* (-2.724647), *Schwarz Criterion* (-2.559155), *DW* 1.778678				

Table 04 addresses results of estimated error correction or short run model or dynamic model. The estimated short run mode is as follows.

$$\Delta \log (GDP_t) = 0.06 + 0.3\, \Delta \log (FDI_t) - 1.0\, \Delta \log (EFI_t) - 0.13\, (ECT_{t-1})\ldots\ldots\ldots\ldots\ldots(5.4)$$

Equation (5.4) represents the short-run estimated model with estimated Error Correction Term (*ECT*). All the values of coefficient of short-run model are considered as the short-run coefficients. The value of R^2 is estimated at around 0.40 which indicates that the dependent variable (GDP) of the short-run model (5.4) is influenced by the independent variable such as FDI, and EFI by around 40 percent in the short run context. All the independent variables as well as the short run coefficients of the model (5.4) are statistically significant at less than one percent significant level in short-run.

Table 05 shows the coefficient values and the respective probability values of the long run and short estimated models.

Table 05: Short Run and Long Run Estimated Models

Model	Variable	Coefficient	P-Value
Short Run	C	0.064571	0.0000
	D(LFDI)	0.298512	0.0003
	D(LEFI)	-1.001268	0.0117
	RESID01(-1)	-0.130557	0.0003
Long Run	C	39.98568	0.0000
	LFDI	1.393624	0.0002
	LEFI	-7.999781	0.0000

Table 05 shows that FDI and EFI are statistically significant in short run along with long run at less than one percent significant level. Negative association exits between GDP and EFI in short and long run whereas positive association exits between GDP and FDI in short and long run. Discrepancy is found between the values of coefficients representing FDI and EFI of short run – dynamic and long-run – static models. Values of coefficient such as 0.298512 representing FDI and 1.001268 representing EFI are lower in the dynamic model than values of coefficient such as 1.393624 representing FDI and 7.999781 representing EFI in the static model.

6.   FINDINGS AND CONCLUSION

There is a direct relationship or upward trend between GDP and FDI. The underlying relationship between these two variables is positive**.** The underlying associationship between dependent variable – GDP and independent variable - EFI is negative. Coefficient sings of model are coincided with the exiting theoretical context. One percent increase in FDI raises up GDP by 1.39 percent.   An increase of one percent in EFI lowers down GDP by 7.99 percent in long run. Influence of the internal factor determining the value of GDP is estimated at 91 percent. The rest of only 9 percent is the external determinants affecting the changes in GDP. The discrepancy is found between the values of coefficients representing FDI and EFI of short-run – dynamic and long-run – static models. Values of coefficient such as 0.298512 representing FDI and 1.001268 representing EFI are lower in the dynamic model than values of coefficient such as 1.393624 representing FDI and 7.999781 representing EFI in the static model. There is a negative relationship found between GDP and EFI in short and long run whereas there is a positive relationship exiting between GDP and FDI in short and long run.

6.1 Implications for Theory and Practice

The prime findings of this study are inevitably incorporated with Endogenous Growth Model propounded by Romer (1986) in Economics. Accordingly, the investment decisions made by the international agents maximizing their profits progresses the technological transfer. The technology transferred to the host country is found as one of the inputs in the production function. In addition, according to endogenous growth model, human capital stock and global market integration are instrumental determinants which generate economic growth of host country (Romer, 1990). Endogenous growth model emphasizes that, in an economic system, the economic growth is derived from the endogenous effect. The impinged forces from outside don't result in the economic growth (Romer, 1994). Accordingly, the factors such FDI and integration with world market are the endogenous determinates which stimulate the economic growth of the county. As per the findings of this study, a positive relationship between Economic Growth and FDI as propounded by Endogenous Growth Model exists.

6.2 Recommendation

With consideration of the present dilemma of Sri Lanka after the pandemic, the policymakers and the respective officials are the pioneers playing key roles to determine in lowering the economic recession prior to experiencing economic depression in Sri Lanka through attraction of FDI to the country. Attraction of more FDI in industrial sector affects the production and supply side within the country. The excess supply within the country is lowering the price level by equalizing the excess demand arising within the country. The surplus and access production can be utilized to minimize the problems in BOP. Targeting the world market through the increase in volume of export is found as one of the key sources of foreign reserves which can be utilized in turn to import the essentials to fulfill the local demand.

An era of renaissance on economic growth, development, and prosperity for all the citizens of Sri Lanka should be right away established amidst the current struggles such as shortages of supply of **essentials,** shortages of foreign reserves, hyper inflationary pressure through the appropriate economic policy reforms from the respective economic experts derived from the international arena. It can be established by setting up of an appropriately regulated regime which mostly concentrates on the private investment (Foreign and Local) and export oriented growth and development so as to rescue all the citizens of Sri Lanka from the economic crisis.

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