

A case study of Cointegration relationship between Tax Revenue and Foreign Direct Investment: Evidence from Sri Lanka

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Abstract

The government of Sri Lanka is to move their policy both taxes and foreign direct investment as an income factors. The main objective of this study is to explore the Cointegration relationship between tax revenue and foreign direct investment in Sri Lanka and also this study has some sub objectives. To achieve these objectives, both TAX and FDI data are collected from the year 1990 to 2013 as a sample periods. All collected data are analyzed based on the regression method. Especially this analyze is considering the constant elasticity model. As per the results of the regression outcome, the FDI is contributing 77 percent on the TAX revenue in the Sample period. As well as, both TAX and FDI variables encompass long run relationship between them. Finally this study suggests to policy makers of the Sri Lankan government that, they have to take indispensable action to increase the FDI, for the reason that, the FDI is one of the income generating factors of the Sri Lankan economy.

Keywords: Taxes, Foreign Direct Investment, Cointegration test, Regression Method, Constant Elasticity Model

1. Introduction

Taxes are one of the major income sources for a country and all ruling party of the nation is running their policy setup through taxes to increase the income (Jhingan, 2004). It is classified two main categories in Sri Lanka which are direct and indirect taxes. The direct tax is separated five types such as income tax, economic service charges, customs duties, remittances tax and other social responsibility levy. The indirect tax is segregated three types such as Value Added Tax, Turn over tax and National Budget Tax. The direct and indirect taxes are usually defined on the basis of the effects and expectations or intentions.

Foreign direct investment is defined as an international venture in which an investor residing in the home economy acquires a long – term influence in the management of an affiliate firm in the host economy. FDI has the favorable climate in terms of economic growth, employment opportunities and poverty alleviation in an economy (Organization for Economic Co – operation and Development, 2002).

According to the above definitions of Tax and FDI, in the real world, lot of researchers studied about

relationship of tax and FDI. Their statement of tax and FDI is bellow.

Brander and Spencer (1987) presented about the differences of direct and indirect taxes, according to their definition, the direct tax is really paid by a person and it is legally compelled on him the imposed person could not transfer on other person, while an indirect tax is imposed on one person, however the imposed person can transfer on another person.

Mahmood and Chudhary (2013) say that, tax revenue depends on government policy, either it relaxes the direct taxes for attracting foreign investment or imposes to collect revenue for example, tax holidays and tax credits for new foreign investment and exemption of import duty in case of imports of raw material and machinery. Secondly, indirect tax depends on the sales of goods and services. Foreign Direct Investment has generally positive effect on the economic growth and income levels in a country, so there will be greater aggregate demand and economic activity in a country which could help the government to generate more indirect taxes.

Kemp (1962) told that, all countries of the world have to introduce the optimal taxes rate on their foreign investment to increase welfare from Foreign Direct Investment rather offering subsidies to attract Foreign Direct Investment.

Streeten (1969) notified that the foreign direct Investment are accelerating the government revenue, saving and foreign exchange gaps, and also Caves (1971) presented that the Foreign Direct Investment had a positive impact of welfare through collection of corporate income taxes. The FDI could increase general welfare in the host country through increase in the tax revenue. The welfare decreases when a country offers relaxation in the tax for foreign investment or if there had been a transfer pricing from foreign firms to their mother countries (Kopits, 1976).

Bond and Samuelson (1986) stated that the host countries could lose some tax revenue in short run if tax holidays were given to attract FDI in early period. Tax revenue could increase in the long run because foreign investment would not pull out after that tax holiday period.

Horstman and Markusen (1987) analyzed the welfare effect through government revenue, change in consumer surplus and trade policy. The cost country government might impose tax on imports and might relax foreign investors from tax. As tariff increased government revenue, so it had better welfare effect then foreign investment with tax concession. So, welfare depended on whether foreign investment took place or imports were continued with tariff.

Dunning (1993) observed that welfare effects of FDI in host country depended on bargaining power of host country with foreign investor, either it offered the tax rebates on energy or labor cost to attract foreign investment or imposed tax.

All researchers consider welfare affect of the Tax and FDI in their country. However, any researcher did not prove statistically the relationship of the tax and FDI. This situation is shown in Sri Lanka. Therefore, this study is going to fill up this gap.

2. Objective

The main objective of this study is to explore the Cointegration relationship between tax revenue and foreign direct investment in Sri Lanka and this study is going to satisfy following sub objectives

- To show the trend of foreign direct investment and tax revenue in Sri Lanka
- To find out the long run relationship between foreign direct investment and tax revenue
- To explore the casual relationship between foreign direct investment and tax revenue

3. Methodology

This study examines the Cointegration analysis between foreign direct investment and tax revenue in Sri Lanka. It uses time series data from 1990 to 2013. The Eviews software is applied to process the data and constant elasticity model is considered in this study.

3.1. Data collection

This study mainly considers secondary data which are collected from the central bank reports and economic prospective of Ministry of Finance and Planning in Sri Lanka.

3.2. Sample

Two types of variable are considered in this study, one is Foreign Direct Investment and another one is Tax revenue. The data for these variables were collected from year 1996 – 2013 as sample period.

3.3. Econometric Models of the study

In this study, the tax revenue is the function of foreign direct investment. However, the tax revenue does not depend only foreign direct investment, it depends in more variables; however other variables are omitted in this study based on the main objective of the study. Therefore, the econometric function and model is mentioned bellow

$$TR_t = f(FDI_t)$$

$$TR_t = \beta_0 + \beta_1 FDI_t + \epsilon_t$$

$$\ln TR_t = \beta_0 + \beta_1 \ln FDI_t + \epsilon_t$$

Where:

β_0 = Intercept

β_1 = Coefficient of the independent variable

TR_t = Foreign Direct Investment for the time period from 1996 - 2013

FDI_t = Tax Revenue for the time period from 1996 – 2013

3.4 Hypothesis

H₁: the long term relationship is between tax and foreign direct investments

H₂: Tax revenue and FDI have causality relationship between them

H₃: FDI significantly impacts on Tax revenue

3.5 Data analysis method

In this study, Tax revenue is considered as dependent variable. Foreign direct investment is an independent variable. Various statistical methods are used to conclude the data series. There are five types of data analysis methods; these are used in this study such as time series trend analysis, unit root test, regression analysis co - integrations test and granger causality test. Through all methods, the objectives (main and sub) of this study are achieved.

4. Results and discussion

4.1 Time series trend analysis

This study considers two (Tax Revenue and Foreign Direct Investment) variables, which are called dependent and independent variables, and also these two variables are in time series. So, each variable have a trend with time. This part analyzes the time series trend of these variables.

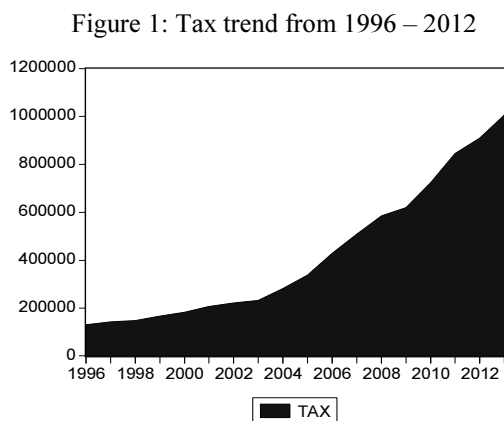
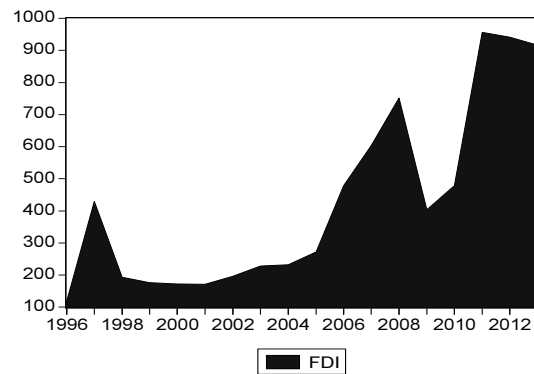


Figure 2: FDI trend from 1996 - 2012



In figure 1, the tax revenue of Sri Lanka has been increased from 1996 to 2013, several factors influenced to this increase in the period, according to the figure 1, the tax revenue decreased in flat from 1996 to 2002 then it increased up warded with time period.

In figure 2, when we considered the FDI variable, it increased from 1996 to 1997, later it declined and fled from 1997 to 2005, then it showed increased trend from 2005 to 2008. Then the FDI declined from 2008 to 2009, however the foreign direct investment is increasing in bendable movement from 2009. Meantime, we have to consider descriptive statistics details of the Tax revenue and FDI. This statistics is showed bellow

Table 1: Descriptive statistics for FDI and Tax revenue

Variables	Statistics						
	Mean	Median	Max	Min	St.Dev	Sum	Obs
FDI	428.7778	338.00	956.00	119.00	289.39	7718.00	18
TAX	426293.9	309190	1005895	130203	290400	7673290	18

Unit root test of each variable

Unit Root test helps to check that the time series variables (data) are in the position or not. To achieve this purpose, this study consider ADF test. This study imposes on tax and FDI. The results of ADF are as follow.

Table 2: The unit root result of the tax revenue

Null Hypothesis: D (TAX, 2) has a unit root
 Exogenous: Constant
 Leg Length: 1 (Automatic Based on SIC, MAXLAG = 3)

Test critical values	t-Statistic	Prob.*
ADF Statistics	-4.453447	0.0045
1% level	-4.004425	
5% level	-3.098896	
10% level	-2.690439	

Augmented Dickey fuller 2nd difference intercept method is used to check whether the tax revenue is unit root or not, as per the ADF test statistics results, the value of ADF test t - statistics is (-4.453447) and (MacKinnon one-sided p-values is 0.0045) in the mean time, the critical value of the t - statistics are (-4.004425) in 1% level, (-3.098896) in 5% level and (-2.690439) in 10% level.

The Unit Root test guide line says that, when the ADF's absolute value is compare with the any absolute critical value, if the ADF test statistics is less than critical vale, the null hypothesis is accept otherwise not accept. According to the results, the absolute value of ADF is 4.453447 so; the ADF is not less than all level. Therefore, the null hypothesis is rejected and alternative hypothesis is accepted. Therefore, the tax revenue is not unit root or stationary in 2nd difference intercepts equation.

Table 3: The unit root result of the FDI

Null Hypothesis: D (FDI, 2) has a unit root
 Exogenous: Constant
 Leg Length: 1 (Automatic Based on SIC, MAXLAG = 3)

Test critical values	t-Statistic	Prob.*
ADF Statistics	-5.138366	0.0014
1% level	-4.004425	
5% level	-3.098896	
10% level	-2.690439	

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4.2 Co integration Test

Cointegration test means long run equilibrium relationship between Tax revenue and Foreign Direct Investment. It means that, how Foreign Direct Investment is responding to the Tax revenue of Sri Lanka. This study is tested through the Cointegration test long run relationship between tax revenue and foreign direct, the Cointegration test results are bellow.

Tables 4: Unrestricted Cointegration Rank test (Trace)

Hypothesized No. of CE(s)	Eigen value	Max – Eigen Statistics	0.05 Critical Value	Prob.**
None *	0.685591	22.77525	15.49471	0.0034
At most 1 *	0.233862	4.262294	3.841466	0.0390

Trace test indicates 2 co integrating eqn(s) at the 0.05 level

*denotes rejection of the hypothesis

** MacKinnon – Haug – Michelis (1999) P- value

Table 5: Unrestricted Cointegration Rank test (Maximum Eigen Value)

Hypothesized No. of CE(s)	Eigen value	Max – Eigen Statistics	0.05 Critical Value	Prob.**
None *	0.685591	18.51296	14.24460	0.0100
At most 1 *	0.233862	4.262294	3.841466	0.0390

Max – eigen value test indicates 2 cointegrating eqn (s) at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

** MacKinnon – Haug – Michelis (1999) P- value

As per the Cointegration test, the both maximum – Eigen statistic and trace statistics are used to finish

off the both variables' long run relationship decision and based on the above statistical results, the trace statistics value is 22.77525, this is higher than the critical value of the trace 15.49471 at five percent significant level in the None * level. Likewise the trace value is 4.262294 and its critical value is 4.262294. So, in this point, the conclusion is that the trace value is higher than its critical value at most 1* level at five percent significant level. Therefore, these trace statistics results indicate that, there is long run relationship between tax and FDI at five percent significant level.

According to Max – Eigen test, the Max – Eigen test result is 18.51296, its critical value is 14.26460 therefore Max – Eigen is higher than its critical value at five percent significant level in the None * level, at the same time the Max – Eigen statistics is 4.262294, its critical value is 3.841466 in the at most 1* level, so it is higher than its critical value at five percent significant level.

Therefore, the conclusion is that, tax and FDI is co integrated at five percent significant level.

Therefore H₁ is accepted

4.4 Granger Causality Test

This test is utilized to check the causal relationship between two variables, however the time series have to check before running the causality test by applying the unit root and Cointegration test.

Table 6: The test results of Pair wise Granger Causality test

Null Hypothesis	Obs	F-Statistic	Probability
TAX does not Granger Cause FDI	17	13.3581	0.00260
FDI does not Granger Cause TAX		9.59275	0.00788

As per the above test results, Tax revenue and FDI have granger causality relationship between of them. It means that the two variables are mutually correlated.

So, the H₂ is admitted

4.5 Regression Results between Tax and FDI

When the researcher regressed FDI on Tax revenue that the results of the regression model is under bellow

Table 7: Regression Results of Tax revenue and FDI

Coefficient	Std. Error	t – Statistics	Prob	
β_1	7.421479	0.716673	10.35546	0.000
β_2	0.90923	0.121828	7.463275	0.000
$Log(Tax) = 7.421479 + 0.90923 Log(FDI)$				
R ² = 0.776849		Mean dependent var 12.73657		
Adj R ² = 0.76		S.D. dependent var 0.699261		
Se R = 0.3404		Akaike info criterion 0.787570		
SSR = 1.8549		Schwarz criterion 0.886500		
LLH = (-5.088)		Durbin-Watson stat 1.386451		

In the regression analysis, there are some test statistics such as R – squared, standard error of coefficient of variables, probability value of the variables. These are important key factors of the any regression function. As per the regression results, R –squared is 77 percent, it means the explanatory variable effects 77 percent on dependent variable and the estimated standard deviation of the error term is 0.34. As per the regression analysis, FDI significantly effected on Tax revenue (Probability value of the factor of FDI < 5%).

Therefore, null hypothesis H₃ is allowed.

5. Conclusion

Based on the overall study, we concluded that, the foreign direct investment significantly and statistically impacts on tax revenue in Sri Lanka, which is 77 per cent impacts on dependent variable tax. According to the results of the Cointegration and causality test, the tax revenue and foreign direct investment have long run relationship between them.

Therefore, these study advices to the policy makers to increase the FDI. Because, FDI lift up the tax revenue. Therefore the government of Sri Lanka has to make an arrangement through the fiscal and monetary policy to get the benefits from the FDI, the reasons of the long run relationship between TAX and FDI.

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