

CHAPTER FOUR

Impact of Foreign Direct Investment Inflows on Domestic Firm Productivity with Special Reference to Sri Lankan Manufacturing Sector

Nathavitharana NVHP¹ & Amarasinghe AAMD²
Department of Accountancy & Finance, Faculty of Management Studies
Sabaragamuwa University of Sri Lanka
malith@mgt.sab.ac.lk

Abstract

The role of Foreign Direct Investment (FDI) inflows in a developing country, can be recognized as a major influence on the economy or the productivity of the host country. A country must have the ability to create numerous ways and means to attract FDI inflows to the country, since it is acting as a major channel for the development of the host country by creating a great platform for higher productivity of the host country's economy. Domestic firms can learn and uplift their competitiveness with the help of FDI which is carried out by multinational enterprises. This research will be an attempt to examine whether the FDI inflows impact the productivity of domestic firms in the Sri Lankan manufacturing sector. Further, it explored the long-run relationship between FDI inflows and the productivity of domestic firms in Sri Lankan manufacturing industries. Data were collected from 2010 to 2019 and they were analyzed using a panel data regression model to achieve the major objective of the study. A fixed effect model was selected as the fitted model for the study and it revealed a significant positive impact of FDI on the output. A panel cointegration model is used to explore the long-run relationship and it is evidenced that there is no long-run relationship among variables.

Keywords: *Cointegration, Foreign Direct Investment, Firm Productivity.*

1. Introduction

Foreign Direct Investment (FDI) can be identified as an investment that is made by a firm or individual in one country into business interests located in another country. Generally, FDI happens when an investor establishes foreign business operations or acquires foreign business assets in a foreign company. In other words, FDI refers to a long-term investment by an investor in an enterprise in another economy, resulting in lasting interest with significant influence over the overseas enterprise. Typically, FDI occurs through mergers and

acquisitions of the setting up of business operations by the investor in the foreign economy. Moreover, FDI is measured by the sum of three components known as equity capital, retained earnings and net inter-company loans.

Besides, there are more benefits that are arisen from FDI for both the host economy and the investor. Economic stimulation, development of human capital, job creation, knowledge transfers, and technological transfers are some of the benefits for the host economy while market diversification, tax incentives, lower labour cost, preferential tariffs and subsidies are some of the benefits for the investor. For investors, undertaking FDI will help to build distribution networks and gain access to new technologies or natural resources. Furthermore, it is depicted that there are different types of FDI namely horizontal FDI, vertical FDI, conglomerate FDI and platform FDI. Horizontal FDI takes place when a company invests in another company in a different country where both companies produce similar products. This can be recognized as the most common type of FDI. Vertical FDI happens when an investment is made within a typical supply chain in a company. In this scenario it is not an essential fact for companies to be in the same industry. On the other hand, conglomerate FDI occurs when investments are made in two entirely different companies of completely different industries. If a business expands into a foreign country and the products manufactured are exported to a third country, it is explained as a platform FDI (Broking, 2021).

Assuredly, a developing country like Sri Lanka can reap benefits from FDI inflows in a significant manner. Basically, FDI can boost economic growth by creating job opportunities. It will accelerate productivity and make the economy more competitive. Then, FDI can drive technology exchange and innovations which will pave the way to be replicated by domestic firms and enhance productivity. Similarly, FDI can strengthen the revenue of the government by elevating tax revenues (Nenova, 2018).

From time immemorial, Sri Lanka is a country that is rich in natural resources. Even the geographical position where Sri Lanka is located in the Indian Ocean, paves the way to attract multiple foreign businesses, since Sri Lanka is considered to add immense strategic value to the international maritime trade sector by being located in the center of the Indian Ocean. Not only natural resources, but also Sri Lanka is capable enough to maintain a high level of education with an adult literacy rate of over 90% throughout these years (Macrotrends.net, 2021). This indicates that Sri Lanka has highly trainable workers. Align with that, Sri Lankan workers can reap the utmost benefit which is arisen from FDI inflows.

Generally, it is believed that joint ventures can derive more benefits for domestic firms than wholly owned subsidiaries. Joint ventures play a vital role as a more efficient mechanism for

the transfer and learning of novel technology and novel knowledge that are embedded in organizations. Basically, joint ventures facilitate both local and foreign partners to exploit each other's strengths. Here, they work together and local knowledge will be contributed by local partners while advanced knowledge-based assets will be provided by foreign partners. Consequently, this close interaction between local partners and foreign partners will lead to mutual learning between foreign and domestic firms by transferring knowledge-based assets from multinational enterprises (Konara and Wei, 2016).

Predominantly, the role of FDI inflows in a developing country, can be recognized as a major influence on the economy or the productivity of the host country. Therefore, being a host country, Sri Lanka must have the ability to create numerous ways and means to attract FDI inflows to the country since it is acting as a major channel for the development of the host country by making a great platform for higher productivity of the host country's economy. Accordingly, domestic firms can learn and uplift their competitiveness with the help of FDI which is carried out by multinational enterprises. Though there are various ways for FDI inflows to the country, it is an essential thing to get considered whether those arrived FDI is absorbed properly. As long as, they are not absorbed properly or they waste in vain, definitely the host country would collapse in achieving their pre-determined goals and objectives which have been designed to make fruitful with the aid of FDI inflows. Therefore, this research will be an attempt to examine whether the FDI inflows matter the productivity of domestic firms in the Sri Lankan manufacturing sector. At the same time, this research will make an effort to observe the long-run and short-run effects of FDI on the productivity of domestic firms in the Sri Lankan manufacturing sector.

When it comes to the Sri Lankan context, there are only a handful of research which have conducted in the area of FDI. Most of them are about determinants of FDI. If the country is attracting FDI inflows, it is necessary to scrutinize whether the host country exploits the benefit at the utmost level in a proper way. Simultaneously, the host country must be strategic enough to attract more FDI inflows to the country and uplift their economy by increasing productivity.

As a developing country, Sri Lanka must pay much attention to the area of FDI inflows. If it is proved that the FDI inflows have a significant positive impact on the productivity of domestic firms, FDI inflows must be encouraged. By attracting more FDI inflows, Sri Lankan people may tend to improve their knowledge by experiencing novel technical knowledge which is embedded in relevant organizations. Consequently, it will pave the way for new job creations which ultimately leads to higher productivity in the economy. Hence, it will be a great assistance when making decisions related to FDI inflows.

This study contributes to the scope of FDI in the Sri Lankan context. Since this study is aiming at the relationship between the productivity of domestic firms and long-run / short-run effects with FDI inflows, expected findings will guide relevant parties, when implementing new economic policies related to FDI. Together with that, this research will provide a considerable advantage for the parties who intend on FDI including policy makers, academicians, and future researchers.

2. Theoretical and Empirical Literature

Foreign direct investment can be identified as an investment that is made by a firm or individual in one country into business interests located in another country. As well as, FDI happens when an investor establishes foreign business operations or acquires foreign business assets in a foreign company. When considering FDI, the following theories come along.

Production cycle theory was developed in 1996 to demonstrate certain types of FDI made by US companies in Western Europe after the Second World War in the manufacturing industry by Vernon. Under this theory, he believes that the production cycle consists of four stages namely; innovation, growth, maturity, and decline. As per his theory, innovative products for domestic consumption were created and the surplus was exported at the innovation stage by the U.S. transitional companies. After the Second World War, the demand for those manufactured and exported products by the USA was highly grown in Europe. Consequently, American firms identified the advantage of technology over international opponents and continued exporting (Hendrick, 2017). When the product develops, the technology becomes familiar. As a result of that, European firms began to imitate American products which the U.S. firms exported. Thereby, to maintain the market shares of U.S. companies in relevant areas, they were compelled to perform production facilities on the domestic markets. Accordingly, the production cycle theory of Vernon pronounced certain types of investments made by U.S. companies in Europe Western from 1950 to 1970 and the areas where Americans did not possess the technological advantage and FDI within that period.

Theory of Exchange Rates on Imperfect Capital Markets

At the very first age, foreign exchange risk has been inspected from the viewpoint of international trade (Cushman, 1986). In his study, the influence of uncertainty has been analyzed as a factor of FDI. Similarly, he has explored that foreign currency appreciation has decreased American FDI when the real exchange rate growth stimulated FDI made by USD. Eventually, he has shown that the dollar appreciation has directed to depletion by 25% in U.S FDI. Nevertheless, it is said that currency rate risk theory fails to explain concurrent FDI

between countries with various currencies. The argument arises that such investments are made at various times even so there are adequate cases that oppose these claims.

The Internalization Theory

Originally, Coase (1937) in a national context and Hymer (1976) in an international context established this theory. Then the theory was further developed by Buckley and Casson (1976) and then by Hennart (1982). This theory attempts to elaborate on the growth of transitional companies and their inspiration towards FDI. Hymer (1960) in his doctoral dissertation has identified the removal of competition and the advantages firms possessing in a particular activity as two major determinants of FDI. According to Buckley and Casson (1976), this theory signifies, intending to develop peculiar advantages, transitional companies are maintaining their internal activities. Dunning (2003), who employed the internalization theory even in the eclectic theory, argues that only a part of FDI is explained through this theory (Buckley, 2020).

Hennart (1982) developed models between vertical integration and horizontal integration and convince the idea of internalization to the literature. Hymer the author who developed the concept of firm-specific advantages illustrates that FDI happens only if the advantages of exploiting firm-specific advantages exceed abroad operations cost. As per Hymer's findings (1976) deviation happens within the perfect competition in the final product market which is also known as market imperfection paved the way to emerge multinational enterprises (MNE). Hence, he has discussed some problems such as information cost for foreign firms against local firms, the government's numerous treatments, and currency risk. After studying his results, he concludes that FDI is a firm-level strategy neither capital market nor financial decision (Buckley, 2018).

The Eclectic Paradigm of Dunning

With a mix of three different theories of FDI (O-L-I), Dunning (2000) has developed the eclectic theory. "O" – Ownership advantages; this component is all about intangible assets. This refers at least for a while exclusive possesses of the company and may be transferred within transitional companies at a low cost and as a result of that either to increase income or decrease cost. "L" – Location; after fulfilling the first condition, it is more benefitted a company to own them to use them itself despite selling them or renting them to foreign firms. When determining host countries, location plays a vital role. According to Hanson (2001), specific benefits that a country can reap from location have been divided into three as economic benefit, political advantages and social advantages. "I" – Internalization; when the above two conditions are fulfilled, a company can generate profits at least utilizing some

factors from outside of the origin country. Simply, a firm tends to attract foreign production itself despite of the license right to do so when the net benefits of internalizing cross-border intermediate product market go higher.

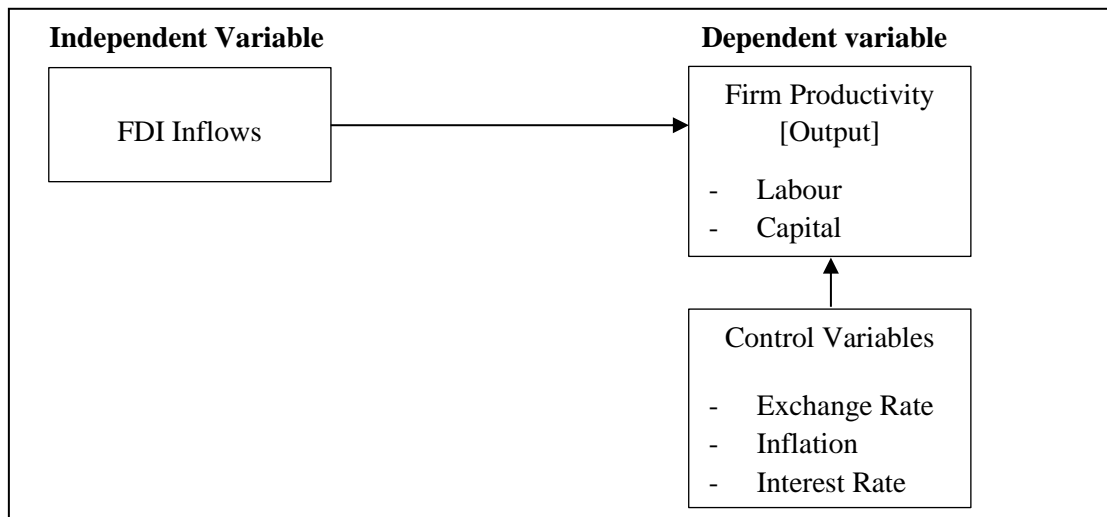
This section is related to the studies including foreign direct investment inflows and domestic firm productivity. According to Ietto-Gillies (2012) the reasons behind FDI and multinational enterprises were demonstrated by neoclassical economics based on macro-economic principles prior to Stephen Hymer's theory related to direct investment in the 1960s. Hymer has stated that FDI is not about the transfer of capital, it could be even supplied to local firms with the help of other international financing ways and means. As well as, the theory has emphasized that FDI is about the international transfer of proprietary and intangible assets such as technology, business techniques and skilled personnel. Moreover, Hymer has pronounced that the existence of FDI is exclusively because of the imperfection of the international markets for these assets (Hymer, 1960).

Furthermore, there are some studies that have examined the impact of FDI on the productivity of domestic firms. Zhou, Li and David (2002) have found that FDI deploys a different impact on firms at the regional level than it does on firms at the industrial level. Simply, they highlighted that the domestic firms in regions that attract more FDI or have a long history of FDI tend to have higher productivity while domestic firms in industries that have more FDI or have a long history of FDI tend to have lower productivity. They have found that FDI inflows have played a positive role in raising the labour productivity of China's key sectors. Moreover, they emphasized by grounding the theory of FDI, multinational enterprises not only transfer capital but also managerial skills and advanced technologies. Consequently, the authors demonstrated that the attracted foreign investments have resulted positively in a beneficial and productive way (Buckley et. al., 2010).

After diving in to the literature, it convinces that there are some studies that focus on firm productivity and FDI. However, when it comes to the Sri Lankan context, there are only a handful of researches that have been conducted in the area of FDI. Most of them are about determinants of FDI. The researcher has identified this literature gap in prevailing literature and expects that this study will pave the way to fill the existing literature gap relevant to the current research topic.

3. Methodology

Based on the literature review and pre-determined research objectives, the following conceptual framework will be considered for this study.



Source: Developed by authors

Even though the conceptual framework shows a diagrammatic representation of the selected variables, in this section it is discussed in detail the variables which are selected for the study.

Firms' Productivity / Output - The study has employed “output” as the dependent variable which represents the productivity of a firm or a company and that has been used by most of the researchers as their dependent variable as well (Oloyede, 2014; Akulava & Vakhitova, 2010; Smarzynska, 2004). Cobb-Douglas production function was used to determine the output. Therefore, the output has been adjusted with the capital and labour of each selected manufacturing company.

FDI - Align with the purpose of the study, Foreign Direct Investment inflow has been taken as the main independent variable of this study. According to the explanation given on the Production Cycle Theory of Vernon, he has pronounced the relationship between FDI and the manufacturing industry. Furthermore, Konings (2001) has found in his study, there may be a spillover that has been generated by FDI to local firms. Consequently, being grounded by theories and being used by many numbers of researchers in their studies, the researcher has selected FDI as the main independent variable in the study.

Exchange rate, Inflation and Interest rate - To uplift the accuracy of the model and based on previous literature, three controlling variables were selected namely exchange rate, inflation, and interest rate (Oloyede, 2014; Sultanuzzaman et al., 2018). Simply exchange rate refers to the rate at which one currency will be exchanged for another currency (Wikipedia, 2021). USD vs LKR has been used as the proxy for the exchange rate. Inflation can be identified as the rate at which the value of the currency falls and as a result the general level of prices for goods and services rises (Fernando, 2021). Changes happen in the Colombo Consumer Price index were used as the proxy for inflation. From time-to-time Central Bank

will impose the treasury bill rate for the trading of bills. Considering the short-term fluctuations, three months treasury bill rate was used as the proxy for the interest rate for this study.

Operationalization provides a spirit of details on the variables which have been used for the study with the aim of achieving the pre-determined objective of the study.

Table 1: Operationalization

| Variable | Notation | Measurement | Source |
|-----------------------------------|----------|--|-----------------------------|
| Foreign Direct Investment Inflows | FDI | Annual FDI inflows (USD) | World bank |
| Exchange rate | EXR | Annual rate of USD vs. LKR | |
| Inflation rate | INF | Annual inflation rate | |
| Interest rate | TBILL | 3 months Treasury bill rate | |
| Firm output | Y | Cobb-Douglas Production function (LKR) | Annual reports of companies |

The study follows a quantitative and deductive approach since the study has been focused on developing hypotheses based on existing theories. It begins with prevailing theories and make confirmations by observing the developed hypotheses. Furthermore, secondary data is used to conduct the study and panel data regression analysis and Johansen cointegration test have been used for the analysis of collected data.

The population of the study refers to a set of similar items, events or components which is of interest for some experiment (Wikipedia, 2021). Since the study is on the manufacturing sector in Sri Lanka, the population of this study can be identified as listed manufacturing companies in Colombo Stock Exchange (CSE).

The technique of obtaining a sample originated, due to some limitations including time and money that researchers faced when studying the whole population. Accordingly, even in this study the researcher faced some difficult situations such as limitations of accessibility, unavailability of data, time constraints, money constraints and so on when trying to gather the required data. Due to the above reasons, the researcher has to select only 10 companies out of 31 listed companies in CSE and under purposive sampling. The selected companies are as follows.

| | | | |
|----|---------------------------------|----|--------------------------|
| 01 | ACL Cables PLC | 06 | ACL Plastics PLC |
| 02 | ACME Printing and Packaging PLC | 07 | Central Industries PLC |
| 03 | Chevron Lubricant Lanka PLC | 08 | Kelani Cables PLC |
| 04 | Lanka Aluminum Industries PLC | 09 | Lanka Ceramic PLC |
| 05 | Piramal Glass Ceylon PLC | 10 | Royal Ceramics Lanka PLC |

A secondary data set has been used for the study. World data bank (from 2010 - 2019) has been taken as a data source for FDI inflows, exchange rate, inflation rate and interest rate. Annual reports of selected manufacturing companies (from 2010 - 2019) were taken to derive relevant outputs using the Cobb-Douglas production function.

Accordingly, panel data was used for the purpose of this study. Since the variables had different measurement units such as billions, points, smaller figures and so on, a natural logarithm was employed to remove effects when they are being analyzed together. These analytical methods have been used by previous researchers who have conducted studies regarding the same area (Saidharan & Ramanathan, 2007; Marcin, 2008; Smarzynska, 2004). Further, Johansen co-integrating test was applied to explore the cointegrating relationship.

When deriving output for selected manufacturing companies, the researcher has employed the Cobb-Douglas production function. Briefly the Cobb-Douglas production function is a particular functional form of the production function, widely used to represent the technological relationship between the amounts of two or more inputs (labor and capital) and the amounts of output that can be produced by those inputs (Wikipedia, 2021). The Cobb-Douglas production function is mentioned below.

$$Y = AK^\alpha L^\beta$$

Where, Y is the total production, A is the total factor production, K is the value of capital input, α is the output elasticity of capital, L is the labor input and β is the output elasticity of labor.

To find out α and β , the researcher has taken the total value derived from the production process of relevant manufacturing companies as the total production, the total value of fixed assets as the value of capital input, and personnel or staff cost as the labor input. After converting those into natural logarithm, the value of α and β has been derived for each year using excel regression data analysis. The intercept value given from the above output has been applied to another formula to calculate the value of A for each end of every company in a selected 10 years period of time.

$$A = e^x$$

Where, A is the total factor production, e is the exponential constant (2.718) and x is the intercept derived from the data analysis regression output in each year. Finally, all calculated values were applied to the Cobb-Douglas production function and derived relevant output values for selected manufacturing companies (Dobra, 2020; Gmaz, 2014).

As per the literature, there are some studies that have examined the impact of FDI on the productivity of domestic firms. Zhou, Li & David (2002) have found that FDI deploys a different impact on firms at the regional level than it does on firms at the industrial level. Simply, they highlighted that the domestic firms in regions that attract more FDI or have a long history of FDI tend to have higher productivity while domestic firms in industries that have more FDI or have a long history of FDI tend to have lower productivity (Zhou, Li & David, 2002). In the study “The impact of FDI on the productivity of China’s automotive industry”, the authors have found that FDI inflows have played a positive role in raising the labour productivity of China’s key sectors.

Accordingly, the following hypotheses have been developed for this study.

Hypothesis 01

H₀; There is no significant impact of FDI inflows on the productivity of domestic firms of the manufacturing sector in Sri Lanka vs. H₁; There is a significant impact of FDI inflows on the productivity of domestic firms of the manufacturing sector in Sri Lanka

Hypothesis 02

H₀; There is no long-run / short-run relationship between FDI inflows and productivity of domestic firms in the manufacturing sector in Sri Lanka vs. H₁; There is a significant long-run / short-run relationship between FDI inflows and productivity of domestic firms of the manufacturing sector in Sri Lanka

The model for the study has been developed by the researcher based on previous literature.

$$Y_{it} = \alpha_0 + \alpha_1 FDI_{it} + \alpha_2 INF_{it} + \alpha_3 EXR_{it} + \alpha_4 TBILL_{it} + U_{it}$$

Where, “Y” is the firm output, “FDI” is the foreign direct investment, “INF” is the inflation rate, “EXR” is the exchange rate, “TBILL” is the interest rate, “ α ” is the coefficients of each variable, “i” is the firm, “t” is the time and “U” is the Error term.

4. Results and Discussion

Descriptive statistics

Descriptive statistics are brief descriptive coefficients that summarize a given data set which can be either a representation of the entire population or a sample of a population. Utterly, descriptive statistics split into two parts as measures of central tendency and measures of variability respectively.

Table 2: Descriptive statistics

| Variable | Mean | Median | Maximum | Minimum | Std. Dev. |
|----------|----------|----------|----------|----------|-----------|
| Y | 21.4156 | 21.3015 | 23.2948 | 19.9228 | 0.7228 |
| INF | 0.0517 | 0.0509 | 0.0770 | 0.0214 | 0.0195 |
| TBILL | 5.1324 | 5.0883 | 7.7041 | 2.1350 | 1.9865 |
| EXR | 138.6600 | 133.2500 | 178.7000 | 110.6000 | 20.4153 |
| FDI | 9.1231 | 9.1480 | 1.6140 | 4.7756 | 3.1221 |

Note: Y = firm output, INF = inflation rate, TBILL = interest rate, EXR = exchange rate, and FDI = foreign direct investment

The above table provides a descriptive statistic of the variable used in the study over the period from 2010 to 2019. The key descriptive measures are the mean and standard deviation. The mean value of output is 21.4156 and the maximum value shown among the period in output is 23.2948 while the minimum is 19.9228. The main independent variable FDI shows a mean value of 9.1231.

Correlation analysis

Correlation analysis attempts to measure the strengths of the relationship and the direction between two variables by means of a single number called a correlation coefficient. This coefficient will lie in the range of +1 to -1. When this coefficient is zero, it indicates that there is no linear correlation between independent and dependent variables but it is possible to have a relationship that is not linear. +1 implies a perfect positive correlation whilst -1 implies a perfect negative correlation. If the correlation coefficient is closer to zero, the correlation between those two variables becomes weaker in spite of direction.

Table 3: Test of correlation

| Variable | LN Y | LN INF | LN FDI | LN EXR |
|----------|-----------|-----------|-----------|-----------|
| LN INF | -0.105346 | | | |
| LN FDI | 0.059409 | -0.064320 | | |
| LN EXR | 0.231947 | -0.523062 | 0.200501 | |
| LNTBILL | -0.111594 | 0.997583 | -0.037615 | -0.558470 |

As per the above-mentioned table, both LNINF (Natural log of inflation) and LNTBILL (Natural log of Treasury bill rate) have a negative correlation with output and other variables that show a positive correlation with output. It implies that, when the LNINF and LNTBILL go up, LNY goes down. On that other hand, when the LNFDI, and LNEXR go up, LNY also goes up.

Panel unit root test

Since the researcher needs more accurate results, a panel unit root test was conducted to test the stationarity as follows.

Table 4: Panel unit root test

| Null hypothesis : Variable has a unit root | | | |
|--|------------|---------------------------------|----------------------|
| Variable | Level I(0) | 1 st difference I(1) | Order of integration |
| LNY | 0.0955 | 0.0000 | I(1) |
| LNINF | 0.0008 | 0.0000 | I(0) |
| LNFDI | 0.0000 | 0.0000 | I(0) |
| LNEXR | 0.0023 | 0.0000 | I(0) |
| LNTBILL | 0.0011 | 0.0000 | I(0) |

According to the above table, the following hypotheses were tested.

H_0 – Variable has a unit root vs. H_1 – variable has no unit root

As the table shows, all other variables rather than LNY are stationary at level.

Regression Analysis

Predominantly, panel data refers to a type of data having observations of different phenomena collected over a different period for the same group of individuals, firms or countries. Thus, panel data refers to multidimensional data collected over a period of time. Therefore, panel data can be identified even as a combination of cross-sectional and time series data. Accordingly, panel data models describe individual behavior both across time and across individuals. Pooled Ordinary Least Square model (POLS), Fixed Effects Model (FEM), and Random Effect Model (REM) are the three types of regression models that can be identified under panel data models. Then the notable step appears to identify the most appropriate regression model for the study. Hence, the researcher has conducted redundant fixed effect likelihood ratio (F-test), Breusch-Pagan LM test and Hausman test to identify the most appropriate regression model.

Table 5: Specification test

| Specification test | Statistic | P-value | Tested | Selection |
|-----------------------|-----------|---------|-----------------|-----------|
| Breusch-Pagan LM test | 103.0740 | 0.0000 | POLS vs Random | Random |
| F-test | 148.8068 | 0.0000 | POLS vs Fixed | Fixed |
| Hausman test | 0.0000 | 0.0045 | Fixed vs Random | Fixed |

Initially, the researcher conducted F-test by using the redundant fixed effects-likelihood ratio. The redundant fixed effects-likelihood ratio is an efficient estimator between the pooled least squares model and the fixed-effects model. It is used to determine the most suitable model between the fixed effects model and POLS. When the p-value is less than 0.05 then the null hypothesis should be rejected whilst the alternative hypothesis should be accepted. The hypothesis to be tested is given below.

H_0 : Pooled OLS Model is the most appropriate than the Fixed Effect Model vs. H_1 : Fixed Effect Model is the most appropriate than the Pooled OLS Model.

According to the result of the F-test, the most appropriate model is the fixed effect model. Thus, the null hypothesis should be rejected and the alternative hypothesis should be accepted.

H_0 : Pooled OLS Model is the most appropriate than the Random Effect Model vs. H_1 : Random Effect Model is the most appropriate than Pooled OLS Model.

In, the Breusch-Pagan LM test, the null hypothesis should be rejected if the p-value is less than 0.05. Since the p-value is less than 0.05, the alternative hypothesis should be accepted.

In the Hausman test, the null hypothesis should be rejected if the p-value is less than 0.05. Since the p-value is less than 0.05, the alternative hypothesis should be accepted

H_0 : Random Effect Model is the best-fitted model vs. H_1 : Fixed Effect Model is the best-fitted model.

Consequently, the Hausman test resulted in the Fixed Effect Model to investigate the impact of FDI inflows on the productivity of domestic firms in the manufacturing sector in Sri Lanka as the most appropriate panel data regression model.

Table 6: Fixed Effect Model

| Variable | Coefficient | Std. Error | Probability |
|--------------------|-------------|------------|-------------|
| LNFDI | 0.07984 | 0.08285 | 0.0021 |
| LNINF | -1.17205 | 1.01769 | 0.2724 |
| LNTBILL | 1.22262 | 1.02824 | 0.0321 |
| LNEXR | 1.59204 | 0.26186 | 0.0044 |
| C | 6.54322 | 1.38756 | 0.0089 |
| R-Squared | | | 0.9453 |
| Adjusted R Squared | | | 0.9370 |

As per the above result, all variables other than LNINF are significant at the 5% confidence level. Studying coefficient direction, LNEXR, LNTBILL, and LNFDI show a positive relationship with the LNY.

With the use of the above coefficients, the following model can be developed.

$$LNY_{it} = 6.5432 + 0.0798 LNFDI_{it} - 1.1721 LNINF_{it} + 1.5920 LNEXR_{it} + 1.2226 LNTBILL_{it} + U_{it}$$

Panel Co-integration

To observe the long-run relationship among variables the researcher conducted a panel data cointegration test.

Table 7: Panel Cointegration

| Description | Statistic Probability | Weighted Statistic Probability |
|---------------------|-----------------------|--------------------------------|
| Panel V statistic | 0.9369 | 0.9745 |
| Panel rho statistic | 0.9875 | 0.9932 |
| Panel PP statistic | 0.0006 | 0.0000 |
| Panel ADF statistic | 0.4700 | 0.0259 |
| Group rho statistic | | 0.9999 |
| Group PP statistic | | 0.0000 |
| Group ADF statistic | | 0.1927 |

The Table shows 11 outcomes under two scenarios called panel and group. The hypotheses to be tested under this test are as follows.

H_0 : There is no cointegration among variables vs. H_1 : There is cointegration among variables

According to the outcome of Table 6, it is clear that there is no enough evidence to accept the alternative hypothesis. Hence null hypothesis was accepted saying that there is no cointegration among variables. Out of 11 outcomes found for group and panel only 03 outcomes (Panel PP and Group PP) are less than 0.05. It means the majority (Group and Panel rho and ADF) are more than 0.05.

5. Conclusion

The main objective of this study was to examine whether the FDI inflows matter the productivity of domestic firms in the Sri Lankan manufacturing sector. As a developing country, Sri Lanka must pay much attention to the area of FDI inflows and then Sri Lankan people may tend to improve their knowledge by experiencing novel technical knowledge which is embedded in relevant organizations.

As per the results of the study the researcher was able to explore the pre-determined objectives of the study. The first objective was to investigate the impact of FDI inflows on the productivity of domestic firms in the manufacturing sector in Sri Lanka. Using panel data, the researcher found the best model as a fixed effect model for the study. Subsequently, FDI showed a positive impact on the output with a coefficient of 0.0798. Furthermore, the developed model showed a 94.53% accuracy level by R-squared. The second objective was about the long-run/short-run relationship between FDI inflows and firm output. Panel cointegration was used to achieve that objective. Since the majority of outcomes (08 out of 11) were more than 0.05, the null hypothesis was accepted which implied that there was no cointegration between variables. In other words, there was no long-run relationship among variables.

The researcher believes that the expected findings will guide relevant parties when implementing new economic policies related to FDI. Together with that, this research will provide a considerable advantage for the parties who are intent on FDI including policy makers, academicians, future researchers and so on. Finally, the existing literature is not sufficient in the Sri Lankan context related to FDI. However, the study overcomes that limitation by adopting a foreign context into Sri Lankan context. Thus, this research motivates potential researchers to study more on the related topic and this will be an attempt to fill the identified literature gap.

References

- Akulava, M., & Vakhitova, G. (2010). The impact of FDI on firm's performance across sectors: evidence from Ukraine. *Kyiv School of Economics*, 26.
- Broking, A. (2021). Types of FDI, Retrieved from Angel Broking: <http://www.angelbroking.com/knowledge-center/share-market/types-of-fdi>
- Buckley, P. J. (2018). Internalisation theory and outward direct investment by emerging market multinationals. *Management International Review*, 58(2), 195-224.
- Buckley, P. J. (2020). The theory and empirics of the structural reshaping of globalization. *Journal of International Business Studies*, 51(9), 1580-1592.
- Buckley, P. J., & Casson, M. (1976). A long-run theory of the multinational enterprise. In *The future of the multinational enterprise* (pp. 32-65). Palgrave Macmillan, London.
- Buckley, P. J., Clegg, J., Zheng, P., Siler, P. A., & Giorgioni, G. (2010). The impact of foreign direct investment on the productivity of China's automotive industry.

- In Foreign direct investment, China and the world economy* (pp. 284-304). Palgrave Macmillan, London.
- Coase, R. H. (1937). The nature of the firm. *economica*, 4(16), 386-405.
- Cushman, D. O. (1986). Has exchange risk depressed international trade? The impact of third-country exchange risk. *Journal of international Money and Finance*, 5(3), 361-379.
- Dobra, M. (2020). Estimating a Cobb Douglas production function in excel. Retrieved from <https://youtu.be/vFVZxmpKNk>.
- Dunning, J. H. (2000). The eclectic paradigm as an envelope for economic and business theories of MNE activity. *International business review*, 9(2), 163-190.
- Dunning, J. H. (2003). Some antecedents of internalization theory. *Journal of International Business Studies*, 34(2), 108-115.
- Fernando, J. (2021). Inflation, Retrieved from investopedia: <https://www.investopedia.com/terms/i/inflation.asp>.
- Gmaz. (2014). Estimation - Cobb Douglas. Retrieved from <https://youtu.be/U9pCW07qxFAQ>.
- Hanson, G. H., (2001). Should Countries Promote Foreign Direct Investment?. G-24 Discussion Paper 9. Geneva: United Nations Conference on Trade and Development, and Cambridge, MA: Harvard University, Center for International Development.
- Hendrick, B. (2017). Raymond Vernon's Product Life Cycle Theory. Retrieved from <https://study.com/academy/lesson/raymond-vernons-product-life-cycle-theory.html>.
- Hennart, J. F. M. A. (1982). *A theory of multinational enterprise*. University of Michigan.
- Hymer, S.H. (1960). *The International Operations of National Firms: A Study of Direct Foreign Investment*, Cambridge, MA, *MIT Press* (1976).
- Ietto-Gillies, G. (2012). Transnational corporations and international production: concepts, theories and effects. *Edward Elgar Publishing*.
- Konara, P., & Wei, Y. (2017). Foreign direct investment as a catalyst for domestic firm development: The case of Sri Lanka. pearl.plymouth.ac.uk
- Konings, J. (2001). The effects of foreign direct investment on domestic firms: Evidence from firm-level panel data in emerging economies. *Economics of transition*, 9(3), 619-633.
- Macrotrends.net (2021). Retrieved from macro trends: <http://www.macrotrends.net/countries/LKA/sri-lanka/literacy-rate>

- Marcin, K. (2008). How does FDI inflow affect productivity of domestic firms? The role of horizontal and vertical spillovers, absorptive capacity and competition. *The Journal of International Trade & Economic Development*, 17(1), 155-173.
- Nenova, T. (2018). World Bank Org. Retrieved from World Bank Org: <http://blogs.worldbank.org/endpovertyinsouthasia/five-reasons-why-sri-lanka-needs-attract-foreign-direct-investments>.
- Oloyede, B. B. (2014). Impact of foreign direct investment on agricultural sector development in Nigeria, (1981-2012). *Kuwait Chapter of the Arabian Journal of Business and Management Review*, 3(12), 14.
- Sasidharan, S., & Ramanathan, A. (2007). Foreign direct investment and spillovers: Evidence from Indian manufacturing. *International Journal of Trade and Global Markets*, 1(1), 5-22.
- Smarzynska Javorcik, B. (2004). Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages. *American economic review*, 94(3), 605-627.
- Sultanuzzaman, M. R., Fan, H., Akash, M., Wang, B., & Shakij, U. S. M. (2018). The role of FDI inflows and export on economic growth in Sri Lanka: An ARDL approach. *Cogent Economics & Finance*, 6(1), 1518116.
- Zhou, D., Li, S., & David, K. T. (2002). The impact of FDI on the productivity of domestic firms: the case of China. *International Business Review*, 11(4), 465-484.