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The role of FDI inflows and export on economic growth in Sri Lanka: An ARDL approach

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Abstract: This paper examines the long-run and short-run relationship between Foreign Direct Investment (FDI) inflows, exports, and economic growth in Sri Lanka over 1980–2016. The study implies Autoregressive Distributed Lag (ARDL) bounds testing approach to reveal the relationship between the variables. The study indicates that FDI inflows have a positive and significant relationship with economic growth in the long-run and short run. If FDI inflows increase, GDP growth will increase. But for exports, it has a negative and significant relationship with economic growth in the long-run. If exports increase, the GDP growth will decrease. Sri Lankan exports strongly depend on primary goods. There is a risk of finite resources and price volatility. It's not surprising for developing economy like Sri Lanka. Also, in the short run, exports have a positive and significant relationship with economic growth. If exports increase, GDP growth will increase significantly. The findings suggest that both FDI inflows and exports influence economic progress in Sri Lanka. Based on emerging market economies, FDI inflows are useful in improving the production process in the host country, and hereafter it will contribute to quality exports and the economic growth of Sri Lanka. Policymakers should emphasize to gear up all the barriers for the economic development of Sri Lanka.

Subjects: Economics; Finance; Industry & Industrial Studies

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PUBLIC INTEREST STATEMENT

In the least developing countries, FDI Inflows & exports have a positive contribution to economic growth. However, many studies supported negative and positive effects for both cases. Hence, this paper emphasizes rigorous analyses among FDI Inflows, exports and economic growth of Sri Lanka. Our findings reveal the positive effects of FDI inflows and GDP growth. However, exports have negative effects with GDP for the long-term, but in short-term, exports have positive effects between exports and GDP. This study finds some barriers for FDI and exports in Sri Lanka such as terrorism, political instability, Ad hoc trade policy, lack of industrialization, poor export policy, lack of export diversification, investment barrier and poor collaboration between a domestic & foreign firm, etc. Policymakers should emphasize to gear up all the barriers for the economic development of Sri Lanka. Our findings are useful for the "engine of growth" of Sri Lankan economy.

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1. Introduction

The foreign direct investment (FDI) inflows and exports have contributed to the economic growth of many developing countries in recent decades. Globalization has significantly facilitated the flow of FDI, and some countries have aggressively offered tax incentives and subsidies to encourage foreign capital like FDI, implying that FDI promotes growth. In reality, the evidence is mixed and ambiguous. Previous researchers specified, FDI Inflows have a vital role in the development of the country. Neoclassical growth theory also advocates that the FDI inflows promote economic growth through enhancing the capital accumulation (Mello & Luiz, 1997). Before the global economic crisis in 2008, the South-Asia region registered tremendous growth of FDI inflows and surge in exports. In the aftermath of the crisis, resumption of growth rates alongside with FDI inflows and trade volumes was not such robust, and there are significant variations in the growth rates between the economies of the region. Sri Lanka was not able to insulate its economy, but from 2008 to 2016 Sri Lankan economy has changed on account of GDP growth, FDI inflows, and trade. There was a negative impact on the Sri Lankan textiles and garments exports in 2009 due to the continuation of the US and the Eurozone economic crisis. The US and the Eurozone were the vital marketplaces for Sri Lanka's textile and garments exports. After 2009, they also came back to the growth track significantly. Its economy has changed over from a mostly agricultural economy towards a more urbanized economy driven by service sectors. And the country is enjoying more export from the service sector. Also, total export (including goods and service) is performing well to boost up economic growth of Sri Lanka. Because, economic growth stimulates export-led growth if there are innovation and technological development, improving the execution of export in the trade sector which correlated with FDI. Moreover, continuous growth in exports may result in the productivity gains, facilitating cost reductions which also may lead to more productivity gains. In addition, a further technique postulates a response the relationship between exports and economic growth, i.e. the growth of trade stimulates more income, which leads to more trade of the country. Another point of view, FDI is the primary driver for the boost of both exports and economic growth. Because FDI inflows are initiating basically from multinational companies, which increase production and more export supply capacity of the recipient country. Nowadays, FDI inflows are executing as the important indicator for economic growth of the developing country as like as Sri Lanka. Especially, for developing countries where economic constraints are higher for domestic companies which interfere their productivity. In other words, FDI usually refers to the long-term contribution to economic growth by Foreign Investor to host country. FDI typically comprises involvement of Venture Capital, technology transfer, lead to productivity growth, capital transfer, generate skilled worker and then reduced poverty in the host country. Many researchers empirically reveal that the FDI has a direct effect on economic growth for the recipient Country (Levine & Renelt, 1992; Borensztein, de Geogorie, & Lee, 1998; Gunaydin & Tatoglu, 2005; Ray, 2012; Zhang, 2014; Fraga, Parre, & Rodrigues da Silva, 2016). Based on the International Monetary Fund (IMF) definition, FDI is the global venture in which a financier residing in the host economy gains a long-term "influence" in the organization of an associate firm in the host economy. FDI remains a dynamic growth component to many economists. In the method of capital accumulation, FDI offers aid to domestic investment. It may increase the total factor productivity and effective resource utilization by the method of technology spillovers. FDI helps to increase exports of recipient countries through the domestic production capacity growth. According to the Organization for Economic Co-operation Development report (OECD, 2002), FDI has the favorable environment in terms of poverty alleviation, employment opportunities and economic growth in a developing economy. Generally, this kind of favorable environment depends on the various economic factors, corruptions, infrastructure & technological developments and political stability. While corruption is low, improvement of FDI, export, economic growth and human development are more strongly and positively related. The FDI is supposed to assist to the underprivileged economy like Sri Lanka. It refers to an increase in the country's internal investment and export,

reduces employment, creates domestic competition, transfer of new technology, and various positive externalities. For the context of Sri Lanka, the country has created the attractive strategies to accept FDI form the foreign investor. But, FDI has fluctuated last few decades due to canceling the Generalized System of Preferences (GSP) quota from the importing country like EU and US, while Sri Lanka was in GSP list as an exporter country. Moreover, the country is going to mitigate the foreign trade policy and developing the diplomatic relations with the foreign countries as well. Moreover, before 2009 terrorism was a great hinder for implementing FDI and export-led growth in Sri Lanka. In recent years, statistically many researchers proved FDI is the key indicator for Sri Lankan Economy. Because developing country like Sri Lanka, there are many opportunities for the foreign investor such as; low labor cost, business-friendly environment policy, tax holiday and so on. The contribution of FDI is essential in the boost of economic growth of a country. But FDI is not stable from 2010 due to the unprofitable business environment in Sri Lanka. After evaluating the data of FDI, export and economic growth, there is sometimes increasing and sometimes decreasing all of the economic indicators like fluctuating economy. However, there are big opportunities for the foreign investor to explore their business and help to increase the economic growth through export-led growth. Also, investors need to take the time to make a profit in Sri Lanka. If we evaluate some largest and fastest growing economy, the study suggested that the Indochina and Vietnam are very successful in attracting FDI, and they have a good achievement for rapid growth in exports (Xuan & Xing, 2008). We also look forward to the Bangladesh economy. According to the World Investment Report (2017), its economy observed a "modest" growth of the FDI in last year, but globally 2% decreased and 14% FDI was a decline in developing countries. In terms of total world FDI inflows, Bangladesh was 4.4%'s growth from the previous year; the country accounted for 0.1% of global FDI flows. Also, Trade is the key indicator to Bangladesh's economy. Total trade (exports plus imports) occupied together equals 42% of GDP including the average applied tariff rate 10.7%, and the Bangladesh government has implemented a strategy to reduce bureaucratic obstacles to trade and investment. Now Bangladesh economy becomes the top 10 fastest growing economy in the world while the country is the 2nd largest readymade garments (RMG) exporter in the world. Since the late 1980s, Sri Lanka had been an attractive economy for FDI and trade friendly destination in the South Asian continent. From the perspective of these countries, the linkage among FDI inflows, exports, and economic growth would be positive. Sri Lankan economy can change, if the foreign investor can invest for long-term basis in Sri Lanka.

According to the World Bank report, Sri Lanka is a lower middle-income country with 21.20 million population, and the US $3,835 was a per capita income in 2016. After the long-term civil war (which ended in 2009), the Economy of Sri Lanka achieved an average of 6.16 % GDP growth among 2010–2016. Moreover, Sri Lanka had experienced negative GDP growth rate in the year 2001 due to the political instability and counterterrorism in the country. Then the GDP growth was improved steadily. Also, in the economic history, Sri Lanka has gained the maximum level of GDP growth as 8% in the year 2010. Economic growth can create a competitive advantage in many sectors of the country, such as; facilitating exports and fascinating FDI. There are many drivers between FDI, exports and economic growth, which leads into, FDI-led growth and export-led hypothesis. Following the hypothesis, any host economies can enjoy higher economic growth rates. Recently the study of Tsitouras (2016) confirms regarding small open economy like Greece that exports and inward FDI could directly stimulate economic growth in the long-run and short-run but exports slowly in the short-run. However, inward FDI can play a key generator of Greece economy than exports. So it's proved that FDI inflows can stimulate the efficacy of production and also can stimulate the specialty and productivity in the host country. The macroeconomic practice, FDI advocates that there can be bi-directional causality between FDI and export in two stages. First, FDI causes export. Second, export causes FDI slowly but surely. And FDI and export, both cause for any country's Economic Growth. Those notable practices have stood out from this group: product lifecycle approach and the evolutionary perception of FDI. Right now, very few researchers (e.g. Balamurali & Bogahawatte, 2004; Mustafa & Santhirasegaram, 2013; Thilakaweera, 2012) has been tried to investigate the relation between FDI inflows, export and GDP growth of Sri Lanka.

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In recent decades, time-series analysis along with Autoregressive Distributed Lag (ARDL) bounds testing approach are the most popular model to identify the relationship between the variables. In the 1990s, Pesaran and Smith (1995) have created a new dimension (ARDL model) in econometric analysis. The ARDL model, which can investigate long-run relationships and causality with the different order $I(0)$ and $I(1)$ or purely $I(0)$ or purely $I(1)$ of stationary of the variables. The model has mostly emphasized by many famous economists, such as; Pesaran, Shin, and Smith (2001), Oh and Lee (2004), Pacheco-Lo'pez (2005), Narayan (2005) and Zachariadis (2006). According to their application, we have applied the ARDL model in this paper. This model has become a significant powerhouse of economic research in recent years due to the robust success of the model. This paper contributes extensive literature theoretically based on FDI inflows, exports and economic growth of Sri Lanka. Moreover, there are plenty of empirical studies where researchers widely focused FDI, export and GDP growth in an ARLD framework with other economies (Acarvaci & Ozturk, 2012; MAH, 2017; Naveed, Asif, & Mehmood, 2013). However, this study is the new dimension and the front of knowledge for investigating the relationship among FDI inflows, exports, and economic growth jointly in the context of Sri Lanka over the year of 1980–2016. That's why we have motivated to study with this empirical research. Moreover, this research is unique from the recent and previous study on FDI, exports and GDP growth in the advance econometric model. Whereas Sri Lanka is an emerging economy and she experienced many economic shocks by the terrorist attack and civil war. This study may contribute to facilitating the flow of FDI and exports for the development of Sri Lankan economy.

The structure of the study as follows: in the 2nd section empirical literature has discussed on the assumed link among FDI inflows, exports, and economic growth. Whereas, 3rd section discusses data and methodology including the characteristics of data, Econometric Methodology, the 4th section is findings and discussions using ARDL model for the co-integration relationship as well as long-run and short-run estimation. Finally, 5th Section exits conclusions and policy implications of the study.

2. Empirical literature

Vast theoretical literature has captured the relationship between FDI, export and economic growth. Usually, FDI contributes significantly to capital inflows and economic development of a country that causes a growth of export. Nevertheless, there is a lot of debate regarding the contribution of FDI to economic growth as well as export. In between the 1960s and 1970s, most of the economists believe that diversification of export could stimulate the economic growth in the least developing countries (LDCs). One study observes export growth as the key generator of economic growth (Bhagwati & Srinivasan, 1979). Also, Dritsaki, Dritsaki, and Adamopoulos (2004) find the bidirectional causal relationship between real exports and real GDP for the economy of Greece. According to Iqbal, Faiz, and Amir (2010), they aim to find the relationship FDI and economic growth using VECM framework over the data from 1998 to 2009 in Pakistan that there is a bidirectional causal relationship among FDI, export and economic growth. Moreover, FDI has a positive effect on the trade growth in Pakistan. They advocate that the Pakistan government should confirm a positive role in providing investment security environment to the foreign investors. The research of Xu (2000) reveals the results from the majority-owned partners of US MNEs in 40 countries covering the panel data of 1966–1994 that FDI conveys technology and inspires economic growth only when the recipient country has a minimum threshold level of Human Capital. The study also concludes that the technology spillover effects of MNEs are statistically positive in Developed Countries (DCs) but are negative in the least developed countries (LDCs). These studies have mainly determined the importance of FDI inflows on the economic development of developing and developed economies. Ahmed, Cheng, and Messinis (2011) test the Granger causality and ARDL approach in sub-Saharan African (SSA) countries (Ghana, Kenya, Nigeria, South Africa and Zambia). The results indicate that exports, imports, FDI, and income are interrelated and these SSA's have positive links between FDI-exports and FDI-income. The study is advocating that the contribution of FDI has a higher rate of growth in these economies through its effects on export directly and indirectly. However, many studies reveal that FDI

stimulates the economic growth directly of host countries' or under some specific circumstances. Among these articles are (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004; Balamurali & Bogahawatte, 2004; Blomstrom, Lipsey, & Zejan, 1994; Blonigen & Wang, 2005; Borensztein et al., 1998; Chuang & Hsu, 2004; Dunning, 1993; Mustafa & Santhirasegaram, 2013; Thilakaweera, 2012; Yao, 2006). Although, Yao and Wei (2007), who try to examine how FDI stimulates the growth of the newly industrializing economies from the perception of the development of production efficiency and switch of production frontier. Another comprehensive study by Zhang (2014), this research follows the industrial competitiveness (IC) index to estimate multi-dimensional industrial performance. They develop for the Role of FDI in IC level and IC growth with panel data of 21 manufacturing sectors for 31 regions during 2005–2010. Results recommend that FDI has large positive impacts on the industrial performance of China; such effects are smaller on medium & high-tech industries and larger on low-tech manufacturing, and FDI inflows interface contributes the local human capital. Resulting, the FDI affect changes in industrial performance. Sakyi and Egyir (2017) aim to investigate through the Bhagwati hypothesis for 45 African countries using generalized method of moment (GMM) technique over the data 1990–2014. Their findings show that FDI inflows and trade (exports) have a significant effect on economic growth in these countries. However, Zahonogo (2017) suggests that trade openness has a positive and significant relationship with economic growth in sub-Saharan African countries.

Azam (2013) aim to conduct over 1995–2011 by using ECM estimation that the effect of FDI on economic growth is statistically positive in Kazakhstan and negative in Azerbaijan. They also find that financial deepening is statistically significant in Azerbaijan. But, that study does not suggest any policy for future research. Even the study of 42 developing countries and 28 developed countries over the series 1998–2008, there is a positive effect on FDI inflows and economic growth in both the long-run and the short-run. There are only lower levels of corruption influence the impact for the case of developing countries that FDI inflows affect economic growth. The researchers advocate that the policymakers and a sustainable developing economy should promote FDI carefully (Freckleton, Wright, & Craigwell, 2012). In a study of Jude and Levieuge (2013) aim to examine the effect of FDI on the growth of 94 developing countries (including five CIS countries: Armenia, Azerbaijan, Belarus, Kazakhstan and Ukraine) during the period 1984–2009. The results estimate that only FDI hadn't had the significant effect on economic growth, but institutional quality has had a moderating impact on FDI that in turn impacts economic growth. Besides, Azam and Ahmed (2015) empirically investigate the Commonwealth of Independent States-CIS (ten countries) covering the time-series panel data from 1993 to 2011. They conduct the Fixed and Random Effects Models for finding the role of Human Capital and FDI on economic growth in those countries. The study finds that Human Capital (life expectancy and gross secondary school enrollment proxy for health and education) has a significant effect on economic growth. And the role of FDI in promoting growth has been found to be less positive on economic growth. Also after the independence of many CIS countries were not able to attract their desirable volume of FDI flows. At the initial stages, these economies have also suffered from capital scarcity and latest technology in the production process. The research suggests that policymakers can consider the role of FDI inflows to economic growth and development of host countries. The Host economies should smooth and attract the potential investors by the favorable business environment, better domestic conditions and economic policies.

Another study of Cambazoglu and Karaalp (2014) investigate for Turkish Economy during 1980–2010 by employing the Vector Auto-Regression (VAR) Model, the analysis finds that there are positive linkages among FDI inflows exports and economic Growth. Hence, the study suggests that the more inward FDI is the higher growth rate economy for the host countries. For the case of Malaysia, FDI is found to be positively associated with economic growth but insignificant effect on economic growth in Malaysia. There are many important economic growth indicators such as domestic investment, macroeconomic stability, financial development, human capital, and infrastructure. The Study also advocates that Trade openness does not indicate a significant impact on economic growth and FDI in Malaysian Economy (Kinuthia, 2010). Also, Gunaydin and Tatoglu

(2005) employ the same economy's time series secondary data over 1968–2002 for finding the impact of FDI and Economic Growth by the Johansen co-integration test, error correction model (ECM) and augmented vector autoregressive (VAR) model which is developed by Toda and Yamamoto. The empirical results advocated that FDI has a strong bi-directional causal relationship with economic growth of Turkey. GMM estimation technique for cross-section analysis for 72 countries during 1960–95. They investigate that FDI inflows don't independently influence economic growth. Also, sound economic strategies may boost both economic growth and FDI; the empirical results are not consistent with the prospect of FDI exerts a positive effect on growth that is independent of other growth determinants (Carkovic & Levine, 2002). Moreover, Mello, Luiz, and Fukasaku (2000) study analyze the selected Latin American and Southeast Asian economies over the period 1970–1994. They discover that the imports precede FDI is conveyed by their empirical outcomes in Latin America for Argentina, Ecuador, and Peru. The FDI may consequently increase Chile's exports, and there is bi-directional causality in the long run. For the Southeast Asian countries like Indonesia, Singapore, and Thailand, only Indonesia has bi-directional causality in the long-run between imports and FDI. Exports also Granger-cause with FDI in Indonesia, but Malaysia has reverse causality. On the other hand, there is a bi-directional causality between FDI and exports for Singapore in the short-run and Thailand in the long-run. The authors conclude that "the effect of FDI on the trade balance is stronger in trade-oriented economies and that net FDI is more sensitive to changes in exports in Southeast Asian countries than in their Latin American counterparts, specify the export orientation of foreign investment in the former region." In the evidence of Korea, Mah (2017) investigates thorough ARDL model using annual data during 1963–2014. His study reveals that there is export expansion weekly causing economic growth and import protection strongly causing economic growth, import liberalization is not caused the economic growth of Korea. The study also investigates, domestic investment has strongly caused economic growth, whereas FDI inflow has not caused of Korea. An error correction model (ECM) assesses that distinct investment and trade openness to international trade, FDI has not played a positive role in promoting economic growth in Bangladesh, India, Nepal, Pakistan and Sri Lanka who are the member of SAARC countries. His study summarizes that the effectiveness of FDI might depend in part on the size of the inflows, along with the level of economic development (Basnet & Pradhan, 2014). Inekwe's (2013) study investigates that FDI in the servicing sector has a significant impact on economic growth. However, FDI in the manufacturing sector has no significant effect on economic growth. Also, FDI in the manufacturing sector has a significant impact on employment rate, while FDI in the servicing sector has no significant impact on the employment rate. The study also suggests that for the beneficial effect on growth, the Nigerian Government should attract more FDI inflows into the service sector.

However, Lee and Chang (2009) explore that the dynamic relationship between financial development, real output of growth and FDI, its long-run equilibrium and causality has received little attention. It is also interesting to see that there is a robust long-run relationship among FDI, financial development, and economic growth with a more massive effect on economic growth from financial development indicators than FDI element. In a global economy, they support the view that FDI yields better performance with financial development. Xuan and Xing (2008) focus in their paper that the trade liberalization and FDI are expressively increased Vietnam's exports and FDI inflows. The study also suggests that FDI has extensively increased its exports to source countries; even 1% increase in FDI can be estimated to give rise to 0.13% increase in exports to the FDI in Vietnam's source countries. One of an interesting study by Pereira and Xu (2000) reveal a negative export growth on economic growth in long-term for six countries (Algeria, Argentina, Burundi, Kenya, Mexico, and Peru) out of 39 countries in their multivariate VAR and impulse-response analysis. Their study has got positive and strong effects of export growth on economic growth for 30 economies, while three countries (El Salvador, Sudan, and Thailand) are having a small effect of export growth on their economy but positive in long-term. Sutton and Trefler (2016) address that low-income countries always try to produce low-value-added (primary) as well as low-quality products. So their export does not enhance the economic growth.

Naveed et al. (2013) estimate the ARDL approach for the case of China; there are long-run and short-run relationships between FDI and GDP. They also find "the research gap between theory and practice as it empirically verifies the positive relationship between FDI and economic growth." Also, Acarvaci and Ozturk (2012) investigate the causal relationship between FDI, export and economic growth in the ten new EU member states. They estimate the ARDL bounds test method and the Granger causality test for analysis based on quarterly data over 1994 −2008. There is both long run and short-run relationships among FDI, export and economic growth for only four countries (Czech Republic, Latvia, Poland and Slovakia) out of the ten countries. Moreover, there is FDI-led growth causality in the Czech Republic and Slovakia and growth-led FDI in Latvia, while in Poland, there is an un-idirectional causality from FDI to export. The study also finds that there is bidirectional causality between export and economic growth in Latvia and the Slovak Republic and bidirectional causality between export and FDI in Latvia. However, the study does not find the long run relationship for Bulgaria, Estonia, Hungary, Lithuania, Romania, and Slovakia. For instance, their research advocates that the capacity of public policies may exist for the development of economic growth through attracting FDI from the foreign investors and in the creation of investment friendly free trade zone, the quality of infrastructure, providing tax holidays, financial system, improving the human capital and financial market regulations. Another study (Majid & Elahe, 2016) aims to test the effect of FDI, exports and economic growth through Tri-Variate Panel vector error correction (VECM) model in eight European developing countries and eight Asian developing countries. The study reveals that there is a bi-directional relationship between GDP and FDI and uni-directional relationship from GDP and FDI to exports through short-run analysis in the European developing countries. Also in the Asian developing countries, there is a bi-directional relationship between exports and economic growth in the short-run. While, there is a long-run relationship running from export and FDI to economic growth, and running from economic growth and export to FDI of the European and Asian Developing Countries. The study also suggests that the European countries can stimulate and promote economic growth by attracting FDI inflows through expanding free trade zones, enhancing security in socio-economic, political and other aspects. Moreover, Asian developing countries can practice higher economic growth by boosting exports of goods and services. For that those countries can reduce the export taxes and trade barriers, inspire the industrial-based export, and develop quality control and skilled labor base training programs. The recent study by Sothan (2017) also supports the relationship between FDI and economic growth for Cambodia. He examines these two variables from 1980–2014 using VECM. The empirical findings prove the strong causality (uni-directional) running from FDI to GDP in the long-run, while in the short-run, no causality found between FDI and economic growth of Cambodia. Ahmad, Draz, and Yang (2018) examine the causality between FDI, exports and economic growth for ASEAN5 (Indonesia, Malaysia, the Philippines, Singapore and Thailand) economies. They use Johansen co-integration and Granger causality for the period of the analysis of 1981–2013. The study reveals that FDI and growth have bi-directional causality in the long-run and there is an uni-directional causality from FDI to exports in the short-run. Their findings confirm that there is export-led growth (ELG) and FDI-led growth in the long and short-run. They also suggest that policymakers should enhance the quality of exports and decrease the investment barrier of FDI of ASEAN5 economies.

There is still a research gap in the empirical literature correlated to the conduct of FDI and export and their spillover effect on the economic growth of Sri Lanka using time series data analysis. After reviewing the thriving literature, many researchers revealed the positive impact of FDI, export and economic growth for the host country. So the objectives of this study are as follows:

(a) To find out the importance of FDI Inflows on Economic Growth and prospects of Sri Lankan Economies.

(b) To estimate the positive or negative long-run relationship between FDI, export and economic growth in Sri Lanka

(c) To determine the short-run relationship between FDI, export and economic growth of Sri Lanka.

3. Data and methodology

3.1. Characteristics of data
In order to check the relationship, this paper has incorporated with some important variables, such as GDP growth rate, FDI inflows, and exports. We used yearly secondary data over the period 1980–2016 as provided by World Bank, World Development Indicators (WDI), which contains 37 observations. Although, Sri Lankan economic data is not available after 2016 in WDI or other indicators in favor of our variables. Sri Lankan Economic Growth proxied by GDP growth rate which is denoted by GDP, FDI net inflows denoted by FDI and Exports Goods and Services denoted by EX.

3.2. Definition of variables
GDP Growth rate (GDP): GDP growth rate is measured as "Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product" (World Bank [WDI], 2017).

FDI inflows (FDI): "FDI inflow is measured as Foreign direct investment net inflows (BoP, current US$). Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment" (WDI, 2017).

Exports Goods and Services (EX): Export is measured as "Exports of goods and services (BoP, current US$). Exports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to nonresidents of general merchandise, net exports of goods under merchanting, nonmonetary gold, and ser-vices" (WDI, 2017).

We have applied to all variables data as natural logarithm form; GDP growth rate, FDI inflows and export are represented as *lnGDP, lnFDI* and *lnEX* respectively. We have used EViews' 9.5 software for the investigation and data analysis.

3.3. Econometric methodology
The empirical estimations on the association-ship between FDI inflows, exports and economic growth in the LDCs have implied mixed results. Also Sri Lanka one of the LDC. We investigate the relation and nature of any causality by using the ADRL in a tri-variate estimation technique and an error correction metric (ECM). The use of ARLD model is the most appropriate and effective model to examine the dynamic relationship between the variables, which proved by many studies such as Pesaran and Smith (1995), Pesaran et al. (2001), Pacheco-Lo'pez (2005), Chaudhry and Choudhary (2006) and Zachariadis (2006). As a result, this paper estimates the relationship between FDI, export and economic growth in both the long run and short run through the most recent and robust ARDL bound test estimation (Pesaran et al., 2001). The ARDL technique implies a single concentrated form of the equation whether the regressors should be a mixture of at level, $I(0)$ and first difference, $I(1)$ or purely $I(0)$ or purely $I(1)$. But must be careful that there should not be $I(2)$ variables in ARDL Model. Otherwise, the model will be lead the spurious results. Narayan (2005) suggested that the ARDL estimation technique are well known to run with small sample size (i.e. 30–80 observations) for more robust and consistent results. However, we will employ a robustness check by Vector Error Correction Model (VECM) for Granger causality whether our empirical model is robust or not.

Our Empirical Model is as follows:

$$lnGDP_t = \alpha_0 + \beta_1 lnFDI_t + \beta_2 lnEX_t + + \varepsilon_t \tag{1}$$

Where,

lnGDP = Log of GDP growth rate (annual)

lnFDI = Log of foreign direct investment inflows

lnEX = Log of exports

t = Represents the time from 1980 to 2016

ε = Represents the Error term and

β_1 & β_2 are the relevant parameters

For this study, firstly we test the descriptive statistics for Mean, Median, Standard Deviation and correlation for Multicollinearity checking. Secondly, for the stationary test, we examine unit root tests through Augmented Dickey and Fuller (ADF), DF-GLS and Phillips Perron tests. Although before testing co-integration association-ship, we selected the lag using unrestricted VAR. Lag length criterion is the third step for checking the optimal lag of the model. Fourthly, we run ARLD model for the long-run co-integration association-ship, after getting the result we test for the long-run and short-run relationship in the fifth step. In the sixth step, we test Serial correlation-LM, Heteroscadacity, and Stability tests are to check goodness fit of the model and finally, we test robustness check of our model through Granger causality which is formulated by VECM (Engle & Granger, 1987).

4. Findings and discussions

This paper inspects the relationship among FDI inflows, export and economic growth in Sri Lanka. According to empirical results, the relationship may vary depending on country characteristics, i.e. the level of economic development, structure of exports and natural resources benefaction of Sri Lanka.

4.1. Descriptive and correlation analysis

Table 1 indicates the descriptive statistics that contains Mean, Median, Maximum, Minimum and standard deviation. Mean and standard deviations are presented for determining the range and coverage of the data. Calculation shows that there is maximum value 0.96 %, median 0.69% and mean 0.67% in Sri Lankan GDP. However, the wide range and high standard deviation suggest that the economic growth varies in Sri Lanka. The correlation results state that the series of FDI inflows, exports, and economic growth are correlated. The highest coefficient of correlation is 0.36% of lnEx in the series. However, analysis of the correlation should be below 0.80–0.90%, which is usually accepted to specify the multicollinearity of the series as guidelines of Kennedy (1986).

Table 1. Descriptive and correlation analysis			
Variables	**lnGDP**	**lnFDI**	**lnEx**
Mean	0.672060	8.215286	9.670738
Median	0.698918	8.246524	9.745114
Maximum	0.961164	8.980422	10.24174
Minimum	−10.189043	7.295376	9.111508
Std.Dev.	0.209366	0.524649	0.369062
Observations	37	37	37
lnGDP	1		
lnFDI	0.181885	1	
lnEX	0.369324	0.338371	1

Source: Authors Calculation

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4.2. Unit root test for stationary

To examine the stationary of FDI inflows, export and GDP growth rate, we use Augmented Dickey-Fuller (ADF), DF-GLS and Phillips Perron(PP) unit root tests through Akaike Information Criterion (AIC) with constant. According to Hill, Griffiths, and Judge (2001), if the time-series variables are non-stationary, variables should not be applied in any regression. All variables should be stationary for avoiding the spurious regression.

Also ARDL model suggested that all variables should be stationary in $I(0)$ and $I(1)$or $I(1)$ for running the model. So after unit root (ADF, DF-GLS, and PP) tests, we observe in Table 2, all variables, lnFDI in $I(1)$, lnEX in $I(1)$ and lnGDP in $I(0)$ & $I(1)$ are stationary at 1, 5 and 10% significant level. All the variables are stationary for ARDL parameter (i.e. the order of $I(0)$ and $I(1)$. The degree of mixing order leads us to employ the ARDL bounds testing approach to the presence of co-integration for the long-run relationship between the variables over the period of 1980–2016 in case of Sri Lanka. Next step, we need to check the appropriate lag order, it would be in Table 3.

4.3. Lag length criteria

The appropriate lag order is also one of the criteria for the ARDL method. We use LR for sequentially modified LR test statistic, FPE for Final prediction error, AIC for AIC, SC for Schwarz information, and HQ for Hannan–Quinn information criterion to select the optimal lag length. In Table 3, maximum criteria are selected appropriate Lag 4 for F-statistics computation to reveal the co-integration relationship between the variables. The appropriate Lag order is also the key instrument to avoid the serial correlation of the error correction terms. By Lu̇Tkepohl (2006), we prefer to select appropriate lag following AIC, because the lag order of AIC provides robust and reliable information as related from other Criterion.

Table 2. Unit root tests

	ADF Test		DF-GLS Test		PP Test	
Variables	**t-Statistic**	**P.-Value**	**t-Statistic**	**P.-Value**	**t-Statistic**	**P.-Value**
lnGDP	−4.9.1637	0.0003*	−4.859528	0.0000*	−4.901637	0.0003*
ΔlnGDP	−9.144552	0.0000*	−9,274,689	0.0000*	−19.46226	0.0001*
lnFDI	−1.086559	0.7105	−0.781230	0.1399	−0.639385	0.8491
ΔlnFDI	−6.633720	0.0000*	−6.659566	0.0000*	−9.719546	0.0000*
lnEX	−0.223849	0.9263	−0.457291	0.6509	−0.181980	0.9319
ΔlnEX	−6.272271	0.0000*	−6.143064	0.0000*	−6.302327	0.0000*

Notes: Δ denotes first differences. Significant at * 1% level ** 5% level and *** 10% level; ADF, DF-GLS, and PP Tests are determined by the Mackinnon (1996) formula.
Source: Authors Calculation

Table 3. Lag length criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	9.280803	NA	0.000137	−0.380655	−0.244609	−0334879
1	84.77951	132.6947	2.45e−06	−4.410880	−3.866695*	−4.227778*
2	94.43428	15.21358	2.39e−06	−4.450563	−3.498240	−4.130135
3	107.3011	14.93558*	1.97e−06	−4.684916	−3.324454	−4.227162
4	117.7963	12.72142	1.94e−06*	−4.775532*	−3.006932	−4.180452

Notes: * indicates lag order selected by the criterion. LR: Sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information, and, HQ: Hannan-Quinn information criterion.
Source: Authors Calculation

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Table 4. ARDL Bound test estimates				
K	F-Statistic	Significant	Lower Bound,I(0)	Upper Bound,I(1)
2	8.262815	10%	2.63	3.35
		5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Source: Authors Calculation

4.4. ARDL bound test approach

Table 4 indicates that the ARDL bound testing approach (developed by Pesaran et al., 2001 as well as Narayan, 2005) applied to test for the existence of the long-run relationship among the variables while the model has got all criterion already for best fit.

We have used AIC to select a maximum lag order of 4 for ARDL estimation. We ran the model with constant and no trend. The ARDL is estimated based on the AIC. The test results show the calculated F-statistics is 8.262815and significant, which is higher than lower bound I(0) and upper bound I(1) in 1, 2.5, 5 and 10% significant level specified by Pesaran et al. (2001). But if the calculated F-statistics is lower or median than lower bound and upper bound critical values, the results will inconclusive, observed by Narayan (2005). This ARDL bound test approach gives us lags of the model, which helps to check the long-run and short-run relationship. The lag of this estimated model is (4, 3, 3). So the study results suggest that there is long-run co-integration association-ship among the variables. Next step we can find the long-run relationship in the model.

4.5. Long-run estimates of ADRL approach

The long-run parameters are shown in Table 5. The coefficient of FDI inflows is positive and significant in 1% level. If 1% increase in FDI inflows, it leads to 0.97% increase in the GDP growth. The result indicates that FDI inflows are one of the most important factors for Sri Lankan economy. This finding suggests by Borensztein, Gregorio, and Lee (1998). Findings also advise that foreign investments are superior in technology transfer and increase the knowledge-based skill worker in the host economy. The policy maker must consider the FDI inflows as a vital benchmark of their economy. On the other hand, we have failed to reveal the positive relationship between exports and GDP. Our result suggests that exports have a negative on GDP growth and it is also statistically significant at 1% level. If 1% increase in exports, it leads to 1.21% decrease in the GDP growth. Although, the study of Pereira and Xu (2000) also found some countries have negative effects of exports on GDP growth in their study. The negative impact of exports denotes that exports take more time for positive spill-over effects on Sri Lankan economic growth. May be, there is the risk of finite resources and price volatility. According to the central bank of Sri Lanka, their exports strongly depend on primary goods. It's not surprising for developing economy like Sri Lanka. The study of Sutton and Trefler (2016) supports the empirical findings of exports and GDP growth. They stated that low-quality and primary products do not effect to the growth of economy. Also, the

Table 5. Long-run estimates				
Estimated long-run coefficients: GDP growth rate as a Dependent Variable				
Variables	Coefficient	Std. Error	t-Statistic	Probability Value
ΔlnFDI	0.976700	0.217752	4.485370	0.0002*
ΔEX	−1.217280	0.320352	−3.799817	0.0011*
Constant	4.346258	1.342828	3.236645	0.0041*

Note: Significant at * 1% level ** 5% level and *** 10% level
Source: Authors Calculation

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Table 6. Error correction representation for the ARDL model (short-run estimates)				
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Probability Value**
ΔlnFDI	0.667232	0.199092	3.351372	0.0032**
ΔEX	1.189432	0.687030	1.731267	0.0988***
ECM_{t-1}*	−2.231042	0.361880	−6.165140	0.0000*
R-squared		Adjusted *R*-squared		Durbin–Watson(D–W)
0.765444		0.673661		1.8801155

Note: Significant at * 1% level ** 5% level and *** 10% level
Source: Authors Calculation

country always plays the Ad Hoc trade policy. In those cases, exports can create a negative GDP growth in Sri Lanka. The Government of Sri Lanka must keep the big eyes of this parameter for the long-run because exports is also one of the vital factors for the economy. Next step, we use long-run elements to create an ECM.

4.6. Short-run estimates of ADRL approach

For short-run analysis, Table 6 shows that ΔlnFDI is positive and significant at 1% level. If current year FDI inflows increases 1% level, GDP growth increases 0.66%. It proves FDI inflows is the key indicator for economic growth of Sri Lanka. Also, exports is also positive and significant at 10% level. If exports increase 1%, GDP growth will increase 1.18%. In the short-run, exports causes positive spill-over effects for economic growth of Sri Lanka.

Estimated results also show that the sign of lagged error correction representations (ECM_{t-1}) is negative and statistically significant. It exits the relationships between the variables. The coefficient of the ECM_{t-1} is a speed of adjustment coefficient toward equilibrium. ECM_{t-1} is −2.231042 indicating that adjustments are corrected by 223.10% from short-run to long-run of the time span over every year. The large error term advocates, the faster the economies correct to the equilibrium rate of growth. The R^2 value is 0.765444, which reflects that the dependent variable is explained in 76.54% differences by the independent variables. Also, the adjusted$R^2$is 67.36%. The Durbin–Watson's (D–W) value is 1.8801155, which confirms that there is no autocorrelation among the variables The All the statistics results (R^2, Adj.R^2, D–W,) show that our model is robust and well fitted.

4.7. Sensitivity estimates

In Table 7, diagnostics tests also show that there is no serial correlation in the model confirmed by Breusch–Godfrey Serial Correlation LM Test.

Table 7. Diagnostic tests			
	Obs*R-square	**F-Statistic**	**Probability***
Serial correlation: Breusch–Godfrey Serial Correlation LM Test	0.782893	0.461710	0.3763
Heteroscedasticity: Breusch–Pagan–Godfrey	13.43166	1.143997	0.3385
Heteroscedasticity: Harvey	15.20149	1.423480	0.2306
Heteroscedasticity: ARCH	0.668798	0.640382	0.4135
Heteroscedasticity: Glejser	15.18442	1.420520	0.2315

Source: Authors Calculation

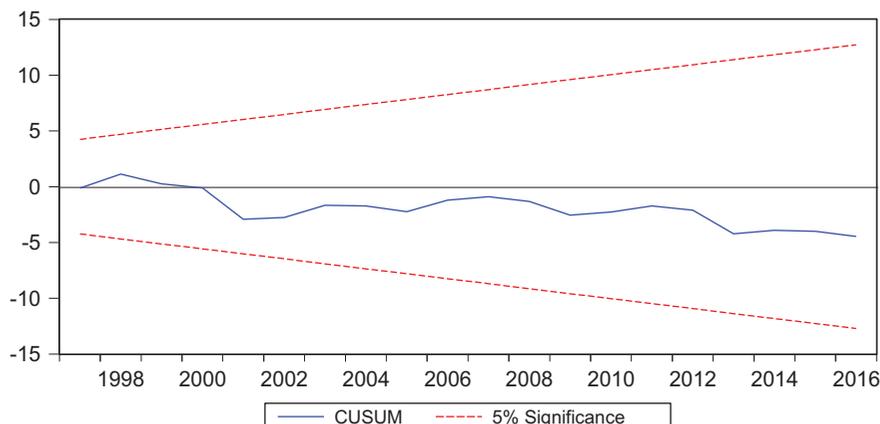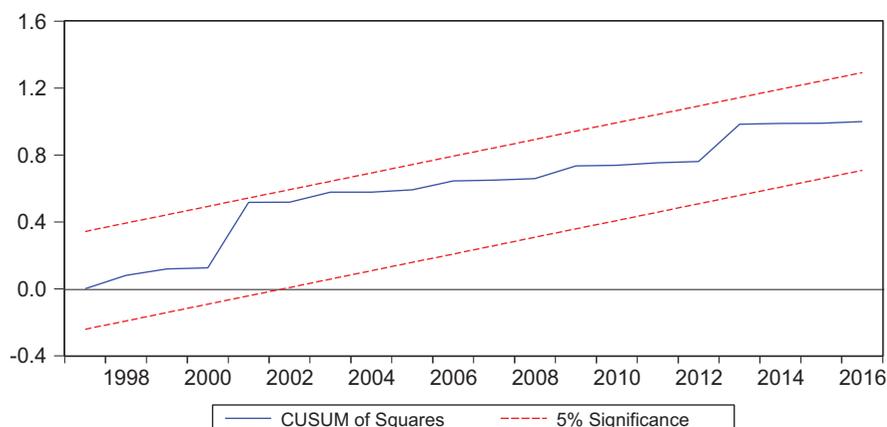**Figure 1. Stability test (CUSUM).**

Figure 2. Stability test (CUSUMQ).

Source: Authors Calculation

Also, Breusch–Pagan–Godfrey, Harvey, ARCH and Glejser tests show that there is no sign of autoregressive conditional heteroscedasticity. The sensitivity analysis is followed by the corresponding F-statistics and the probability value of Table 7. Hereby, the findings represent that the model is perfect and well fit.

4.8. Stability estimates

For the stability test of the model, we have used the CUSUM and CUSUMSQ tests. The study follows that the model is stable or not. The ARDL based ECM proves that our model is stable through CUSUM and CUSUMSQ Tests in the Figures 1 and 2, respectively, the stability method, which was set by Brown, Durbin, and Evans (1975). The plots of each blue line did not cross the red line means critical value line, which directs the stability of the estimated techniques. This model is well specified to the goodness of fit. Sri Lanka would use the model in policy implications and decision making. The model also focuses that it's carrying robust results.

4.9. VECM granger causality robustness checking

For the robustness checking of the model, we have run VECM Granger causality for long-run and short-run analysis. The Table 8 shows that there is a long-run and short-run causality running form lnEX and lnFDI to lnGDP. Because for long-run estimates, ECM is negative (-2.317115) and probability value (0.0451) is in 5% significant level. However, short-run Wald test F-statistics probability value of independent variables reveals that lnFDI and lnEX are significant in 5% and 10% level respectively.

Figure 3 also implies the unidirectional causality from FDI inflows, export to economic growth. The ARDL model results also indicated in Tables 5 & 6, which are similar to the results of VECM

Table 8. VECM Granger causality robustness checking

VECM Granger Causality, lnGDP as a Dependent Variable				
Wald test(Short-run estimates) F-Statistics & P-Value			VECM long-run estimates	Decision of long-run & short-run causality
ΔlnGDP	ΔlnFDI	ΔlnEX	ECM t-Statistics P-Value	
—	3.455952	1.956569	−2.317115	ΔlnFDI → ΔlnGDP
—	0.0291**	0.0982***	−2.152848	ΔlnEX → ΔlnGDP
			0.0451**	

Note: Long-run and short-run probability (P) Value significant at * 1% level ** 5% level and *** 10% level
Source: Authors Calculation

Figure 3. Causality between FDI inflows, export, and economic growth: Sri Lanka.
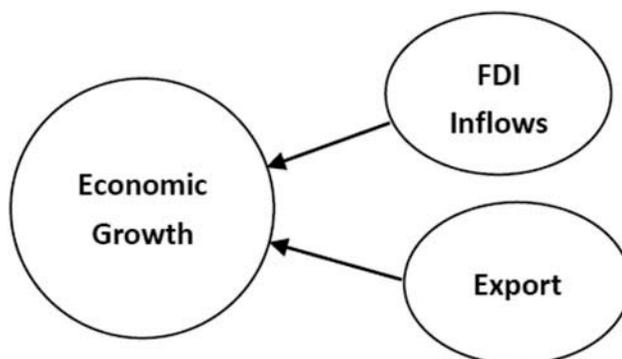
Granger causality. So the VECM Granger causality results have been proved that our ARDL model is robust, stable and well fit. Researchers would check the bi-directional causality between FDI inflows, export and economic growth for the future study regarding Sri Lanka.

5. Conclusions

The prior literature attempts to estimate potentiality of FDI inflows on economic growth in Sri Lanka, also the role of export on economic growth. Our empirical study is to provide some required systematic analysis of the impacts of FDI inflows and export on economic growth in the case of Sri Lanka using ARDL bound testing approach to co-integration of long-run relationship. The results indicate the positive and significant long-run relationship between FDI inflows and economic growth as well as short-run (Lee & Chang, 2009; Naveed et al., 2013). In the long-run, if 1% increase in FDI inflows, it leads to 0.97% increase in the GDP growth and if FDI inflows increases 1%, GDP growth will increase 0.66% in the short-run. The results indicate that FDI inflows are one of the most important factors for Sri Lankan economy. But, in the case of exports and GDP growth, there is a negative and significant relationship in the long-run. If 1% increase in exports, it leads to 1.21% decrease the GDP growth. The negative impact of exports denotes that exports take more time for positive spill-over effects on Sri Lankan economic growth. Although, the study of Pereira and Xu (2000) also found some countries have negative effects of exports on GDP growth in their study. The negative impact of exports denotes that exports take more time for positive spill-over effects on Sri Lankan economic growth. There is the risk of finite resources and price volatility. According to the central bank of Sri Lanka, their exports strongly depend on primary goods. It's not surprising for developing economy like Sri Lanka. Also, the country always plays the Ad Hoc trade policy. In those cases, exports can create a negative GDP growth in Sri Lanka. Although, there is a positive and significant relationship in the short-run between exports and economic growth. If exports increase by 1%, GDP growth will increase by 1.18%. In the short-run, exports causes

positive spill-over effects for the economic growth of Sri Lanka. The empirical findings advocate that both FDI inflows and exports influence economic progress in Sri Lanka. Hence, this paper represents a step forward in implying of the effect of FDI inflows as a vital source of economic growth and also in the short-run exports is a key generator of GDP growth in Sri Lanka. The Government of Sri Lanka must keep the big eyes of this parameter for the long-run because exports is also one of the vital factors for the economy. Our research is so limited with the availability of data as well as variables; researchers may integrate long length data and more variables such as import, exchange rate, human capital, inflation rate, etc. for future work of this study. Also, we estimate unidirectional causality; researchers have the privilege to examine the bidirectional causal analysis of this study.

For the policy implications viewpoint, the research recommends the focusing of FDI in Sri Lanka has a comparative advantage for export-oriented industrial, export-led growth strategies, agricultural, and other segments of their economy. Moreover, this study also recommends that the coordination of FDI inflows and exports policies may change in long-term development plans for Sri Lankan Economy. Furthermore, policymakers should try to promote FDI with reduction of investment barriers, encourage collaborations/joint venture between domestic firms and foreign players, and enhance exports friendly environment by stronger spillovers for accelerating the growth of the Sri Lankan economy. Based on emerging market economies, FDI inflows is useful in improving the production process in the host country, and hereafter it will contribute to quality exports and the economic growth of Sri Lanka.

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