

EMPIRICAL ANALYSIS OF THE TRADE BALANCE AND ITS DETERMINANTS IN SRI LANKA

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Abstract

Every economy has experienced an expansion in international trade in recent years, and some developing countries frequently experience persistent trade deficits. The investigation of the short-term and long-term relationships between trade balance and its macroeconomic determinants is the main goal of this study. In particular, the study explores the impact of the real exchange rate, foreign direct investment, inflation, budget deficit, private consumption, real money supply, and gross domestic product on the trade balance. For this purpose, the paper employed an autoregressive distributed lag (ARDL) bounds test co-integration model that covered the period from 1980 to 2020. The data were mainly gathered from the annual reports of the Central Bank of Sri Lanka, the World Development Indicators, and the UNCTAD database. The findings show a co-integration between the trade balance and selected macroeconomic variables. The study found that real exchange rate and foreign direct investment have a statistically significant and positive association with trade balance, indicating these two determinants will improve the trade balance in the long run. The real exchange rate balances the trade deficit following currency devaluation through expansion in real exports and collapse in real imports. The real exchange rate, however, is insignificant, with positive signs in the short run indicating that Sri Lanka has no J-curve effect. Further, the results demonstrate that in the long run, the budget deficit, private consumption expenditure, and real money supply have a negative impact on the trade balance. However, there is no evidence that inflation and trade balance are related over the short and long term. The results of this analysis suggest that the government should focus on exchange rate policy, followed by monetary and fiscal policies, in order to improve Sri Lanka's trade balance.

JEL: C1, F1, F4, F49


Keywords: Co-integration, Macroeconomic determinants, Sri Lanka, Trade balance

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INTRODUCTION

Liberalisation of the trade regime has been the centrepiece of the economic reform programmes of neo-liberalism. As revealed by Dornbusch (1992), trade liberalisation could bring benefits mainly through improved resource allocation, access to better technologies, inputs and intermediate goods, greater domestic competition, availability of externalities such as transfer of know-how and a shakeup of industry that is conducive to growth. The changing ethos in developing countries in favour of trade liberalisation can be attributed to three factors (Bhagwati et al., 2016): Firstly, the outstanding economic performance of some countries like South Korea and Taiwan; secondly, the failure of protectionism to create industrialisation and growth; and thirdly, policies of loan conditions of World Bank and IMF towards trade liberalisation.

It is worth noting that having a favourable trade balance in a country can generate a substantial volume of foreign currencies needed to import capital, as well as consumable goods and services. Since the trade balance is a critical component of the current account balance, it can severely influence both the balance of payments and growth.

In general, it is argued that a trade deficit is detrimental to an economy since it causes an excessive and growing reliance on imports at the expense of domestic production. It also implies that economic growth in the future will be sacrificed for current consumption. Huge trade imbalances can also foster an environment that could lead to financial crises, which may have an impact on an economy (Osoro, 2013). According to Griswold (2007) and Pindyck (1991), large trade deficit volatility causes economic insecurities by affecting the long-term profitability of investment activities.

The neo-liberal package of trade liberalisation adopted in 1977 had profound effects on the Sri Lankan economy (World Bank, 2004). This policy package unshackled the economy from rigid quantitative import controls, cut down high-level tariffs, and formed a unified exchange rate system. The exchange rate of the rupee was allowed to float with only limited intervention of the Central Bank. The important purpose of liberalisation has been to narrow the gap between the official and parallel exchange rates by means of devaluation. As a result, the reform started with a significant devaluation of the nominal effective exchange rate, which depreciated by 42% in 1977. It has been revealed that the continuous trade deficits have seriously affected international trade in most of the post-liberalisation periods, adversely affecting the country's foreign exchange reserve. Indeed, the adverse trade balance experienced throughout this period was generated by real exchange rate appreciation (Rajapathirana, 1988). Expansionary fiscal and monetary policies, as well as declining terms of trade in Sri Lanka, led to an appreciation of the real exchange rate that adversely affected the production of tradables and, hence, the balance of trade. In this context, the government was forced to depreciate currency to improve competitiveness and bring about external stability. The depreciation of the nominal exchange rate has been the major mechanism during the liberalised period to adjust the

real exchange rate to avoid misalignment (Jayasuriya, 2004). It is important to investigate the extent to which the exchange rate regime changes were adequate to restore competitiveness and the external balance. As noted above, the major aim of this reform was to promote exports and, especially, to open the economy in the manner in which the country benefits from international competition.

Researchers have been primarily inspired by the factors affecting trade balance to investigate numerous empirical studies, mostly in developing countries. For policymakers to effectively balance a country's trade deficit, they must be aware of the factors that affect the trade balance. Trade liberalisation in Sri Lanka, which was introduced and implemented in 1977, was indeed aimed at improving the country's trade balance and promoting economic growth. However, the persistence of a trade deficit even after these reforms suggests that there are underlying factors contributing to this imbalance. In this context, the key research question of the study is to re-examine the factors that might be the main causes of the prolonged trade deficit in Sri Lanka.

The current study will focus on examining the short-run and long-run determinants of trade balance in Sri Lanka by applying the ARDL bounds test approach to annual data covering the period of 1980 to 2020. Compared to prior studies (Weerasinghe & Perera, 2019; Pushpakumara & Kumari, 2009) that focused on a narrower set of macroeconomic indicators in Sri Lanka, the current study seeks to broaden the scope by including additional variables such as budget deficit, real money supply and private consumption to provide a more comprehensive analysis of the economic conditions and factors affecting Sri Lanka's trade balance.

The remainder of the paper is organised as follows: Section two of the paper provides a brief review of literature relevant to the study area, and a brief overview of the recent performance of trade balance in Sri Lanka is presented in section three. Section four presents the econometrical technique and data. The empirical findings are provided in section five, along with the conclusions and policy implications in the last section.

LITERATURE REVIEW

In recent years, there has been an increasing amount of literature on determinants of trade balance with mixed results. Many scholars have highlighted exchange rate depreciation as a key determinant in the improvement of trade balance. This stance is supported by the Bickerdike-Robinson-Mertzler (BRM) model, which is well-known as the elasticity approach (Bickerdike, 1920; Robinson, 1947; Mertzler, 1948). This implies that consumption and production may be impacted by relative price changes (local versus foreign) caused by currency depreciation. Marshall (1923) and Lerner (1944) conducted preliminary work on the elasticity approach, which was later developed by Robinson (1947) and Metzler (1948). The Marshall-Lerner condition, which states that depreciation will improve the trade balance if the overall price elasticity of demand for imports and

exports is greater than unity, was the main inspiration for this opinion. Those who favoured the BRM and Marshall-Lerner condition believed that devaluation would balance the trade deficit and stabilise the foreign exchange market. Nevertheless, many researches on the elasticity approach have generated a variety of results depending on various time periods and methodologies (Rose & Yellen, 1989; Bahmani-Oskooee, 1991, 1992, 1994; Stucka, 2004; Jha, 2003).

To ascertain how currency devaluation affects the trade balance, Alexander (1952) shifted the central focus to domestic spending. This approach is referred to as the absorption theory. This theory was mainly based on the ideology that trade balance is the difference between domestic income and expenditures. It is a widely held view that currency depreciation can balance the trade deficit if the economy is not at full employment (Mankiw, 2003). According to proponents of the monetary perspective of the balance of payments (Alexander, 1952; Polak, 1957; Pearce, 1961; Mundel, 1968, 1971; Duasa, 2007), if money demand exceeds money supply, foreign currency will flow into fill the gap, which will lead to an improvement in the trade balance. The findings of some studies highlighted the lags in the response of trade flows after changing the relative price resulting from currency depreciation (Magee, 1973; Donovan, 1981; Stucka, 2004; Bahmani-Oskooee, 1985).

Peter and Sarah (2006) found a strong relationship between foreign direct investment and trade balance in Mexico employing a vector error correction (VEC) model. Foreign Direct Investment (FDI) can have a significant impact on a country's trade balance, and Mexico has experienced notable effects due to FDI inflows from the United States. FDI from the United States has likely led to an increase in inter-firm exports and imports. Sugema (2005), based on the quarterly data covering the period from 1984: Q1 to 1997: Q2, used the error correction model (ECM) to analyse the effects of real exchange rate depreciation and supply side shocks on the trade balance in Indonesia. According to the results, the devaluation will lead to an increase in the trade balance. The long-run and short-run determinants of trade balance in Pakistan were explored by Mohammad (2010) using the Johansen co-integration approach and the error correction model. According to his study, the main significant factors in the trade balance were foreign income, FDI, domestic household spending, and real effective exchange rate. In an important study, Mutana et al. (2018) assessed the macroeconomic determinants influencing the trade balance of Kenya using data from the year 1963 to 2016 and the VEC model. According to the study, FDI, trade liberalisation, and terms of trade are statistically significant and have a long-term positive impact on the trade balance. The findings also showed a statistically significant and negative correlation between the real exchange rate and the trade balance. Yuen et al. (2008) used co-integration methodology, Engle-Granger test and VEC model, and impulse response analysis to examine the effects of real exchange rate on trade balance in Malaysia over the period of 1955 - 2006. The analysis finds a significant long-

term association between exchange rate and trade balance and notes that the J-curve hypothesis is not valid for Malaysia.

Preliminary work on determinants of trade balance in Malaysia was undertaken by Duasa (2007) using the ARDL model. The results reported that the real exchange rate, money supply and income were the main determinants of the trade balance in the country. Findings further revealed that the Marshall-Lerner condition does not hold in the long run, and the Malaysian trade balance should be analysed from absorption and monetary approaches. Shawa & Shen (2013) focused on the major determinants of trade balance in Tanzania by applying the ordinary least square method based on the period of 1980 – 2012. The findings of the study indicated that factors for determining the trade balance in Tanzania are human capital development, inflation, natural resources availability, foreign income, and trade liberalisation. Alhanom (2016) analysed the determinants of the trade balance for Jordan based on the bounds co-integration test using the annual data spanning the period of 1970 – 2010. In this model, domestic income and foreign income have been identified as the most important factors of trade balance in the long run, while the study found exchange rate is not an important factor. Nga (2020) discussed the influence of openness, FDI, and exchange rate on the trade balance in Vietnam by employing the ordinary least squares technique covering the period of 2005 – 2018. It demonstrated that foreign direct investment and trade openness had a significant and negative effect on the trade balance in Vietnam, while it was observed that the exchange rate had insignificantly contributed to the change in the trade balance.

With reference to the case of Sri Lanka based on quarterly data from 2000: Q1 to 2015: Q2, Weerasinghe & Perera (2019) investigated the effects of macroeconomic variables on the trade balance by applying a multiple regression model. Their results suggested that no significant effect of nominal exchange rate and FDI can be observed on trade balance. Meanwhile, the results further showed that the gross domestic product, volumes of imports and inflation rate were the significant factors in determining the trade balance in Sri Lanka. Pushpakumara & Kumari (2009) used correlation and regression analysis to conduct an empirical analysis based on the annual data from 1999 to 2008. The findings showed that there was a strong negative association between the trade balance and the exchange rate. Further, findings showed that GDP was negatively related to the trade balance while no significant effect of inflation and interest rate could be observed on the trade balance. Previous studies on Sri Lanka's trade deficit have identified several key components that contribute to the trade deficit, including nominal exchange rate, foreign direct investment, GDP, and inflation rate. However, these studies did not adequately address other factors, namely the budget deficit, real money supply, and private consumption. The current study aims to enhance the understanding of how various macroeconomic factors affect Sri Lanka's trade balance by employing a bound testing approach to co-integration, which will offer advantages over traditional co-integration

methods. This approach will likely provide valuable insights into the dynamics of trade balance and its determinants in the Sri Lankan context.

Performance of External Trade in Sri Lanka

According to several studies, countries which pursued liberalisation programmes found an improvement in their export performance (Thomas, 1991; Helleiner, 1994; Bleaney, 1999; Ahmed, 2000). Based on an empirical investigation, Parikh & Stirbu (2004) suggest that trade liberalisation in developing countries has a tendency to worsen the trade balance.

Sri Lanka has indeed implemented significant trade reforms since the first wave of liberalisation, with a noticeable acceleration of reform efforts in the 1990s. These reforms were aimed at opening up the country's economy to international trade and fostering economic growth. By the early 1980s, Sri Lanka was caught in a severe economic crisis; especially, the country experienced a stringent external imbalance, and distorted policies exacerbated the problem. In this context, the management of the balance of payments was the crucial area on which action needed to be taken. As the currency had not been adjusted to reflect its real value against hard currencies, the country was unable to realise the objective of export promotion (Quibria, 1994). The major aim of restructuring the trade system was to redirect the economy away from Import Substitution Industrialization (ISI) and towards the world market. It should be noted that the performance of exports was very unfavourable in the ISI policy regime, 1960-1976, growing by only 3 per cent per annum.¹ Sri Lanka has become an export-oriented economy, and trade policy has steadily been liberalised, creating a favourable environment for export promotion and strengthening competition. Trade reform involves the elimination or reduction of quantitative restrictions and /or substitution of such restrictions with tariffs. Export policy was steadily liberalised so that exporters could hold back an increasing share of earnings. Export taxes have been completely withdrawn, and the import tariff bands have been lowered to three bands for tariff simplification and liberalisation.

During the liberalisation period, the export composition changed from primary products to manufactured goods. The share of agricultural products fell from 62 per cent of total exports in 1980 to 36 per cent in 1990 and to 21 per cent in 2019, whilst the industrial export share has moved up sharply from 33 per cent to 52 per cent and to 79 per cent in the same period. The manufacturers now dominate the country's merchandise exports, accounting for about three-quarters of the total exports for the last quarter century, and also, the share of manufacturing exports clearly shows a stable pattern over the past period (Athukorala, 2017). The decline in the anti-export bias of the trade has led to an increase in industrial exports, although there has been little in the way of export diversification. It

¹ During this period Sri Lanka's exports were concentrated in a few primary commodities, like tea, rubber and coconut, whose prices are notoriously volatile.

is worth noting that the export growth of manufactures was contributed by largely a single item, namely, garments. Apparel has been the single largest export product in Sri Lanka since 1992 (Athukorala, 2017). The garment industry in Sri Lanka might be a source of vulnerability as it faces many challenges from other countries with better market access and competitiveness and intense regulation of the international trade in garments. Although there has been an effort to redirect the economy from the import substitution industrialisation (ISI) regime to an export-oriented regime through trade structuring, the direction towards this goal has been very modest in reality. This is because manufactured exports have a relatively high proportion of imported inputs. Net foreign exchange earnings per exported garment production unit are still modest (Abeyratne, 1997; Athukorala & Jayasuriya, 1994). Rather, Sri Lankans add a small amount of value added to inputs imported and then re-exported. In sum, the overall performance of exports of Sri Lanka relative to many of its competitors, especially in East Asia, is poor. Sri Lanka's share in world manufacturing exports increased slightly to 0.08 per cent in 2018 from 0.06 per cent in 1990 (World Bank, 2020).

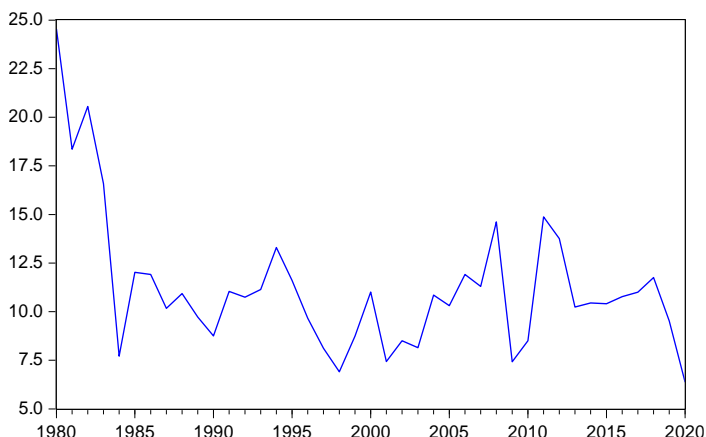
With the elimination of trade restrictions, both exports and imports picked up sharply. During this period, imports tended to increase faster than exports due, as noticed earlier, to manufactured exports being highly composed of inputs imported. Sahn et al. (1996) report that whatever increase in exports resulted from reforms was devoted to meeting the foreign exchange requirement on imports rather than used to generate a current account surplus.

Even though trade liberalisation has been in place since 1978 with the intention of improving the trade balance, the country has not lately seen any appreciable improvement. Figure 1 shows that the trade balance continued to remain unfavourable until recently. As shown in Figure 1, despite the official exchange rate devaluation, the trade deficit continued to expand over the past four decades. This is in sharply controversial to the widely accepted neoclassical argument that devaluation stimulates exports, discourages imports, and improves the trade balance when a country devalues its currency.

Figure 1 illustrates how the trade balance in Sri Lanka has consistently been negative. Besides the fact that there has been little in the way of export diversification throughout the liberalised period, the trade balance has been negative all the years. Sri Lanka's trade balance as a percentage of its GDP has been continuously deteriorating over the past period. Figure 2 below shows that between 1985 and 2000, the trade balance slightly improved, mainly as a result of a significant rise in exports. The level of trade balance has fluctuated rather than showing a distinct pattern between 2000 and 2020. This can be attributed to economic shocks such as weathered prolonged droughts, the tsunami disaster, thirty years of prolonged civil war in the North and East provinces, and political unrest in other parts of the country (Jayawardene, 2011). While trade liberalisation is often expected to lead to improvements in a country's trade balance, the actual outcomes

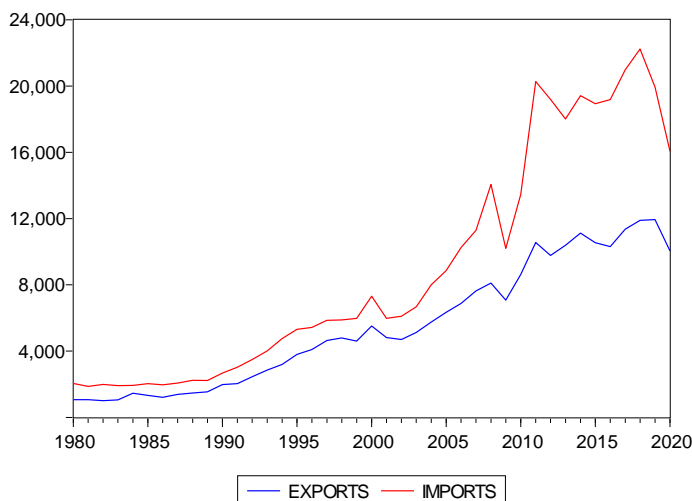
depend on various factors and the specific policies implemented. The macroeconomic environment, such as volatility of exchange rates, inflation, interest rates, and global financial and economic crises, could have influenced the trade balance in the country. Between 1994 and 2020, the trade deficit ratio halved from 8 to 14 per cent.

Figure 1: Trade Balance % GDP in Sri Lanka, 1980 – 2020



Source: Annual reports of Central Bank, Sri Lanka

Figure 2: Exports and Imports % of GDP, 1980 – 2020

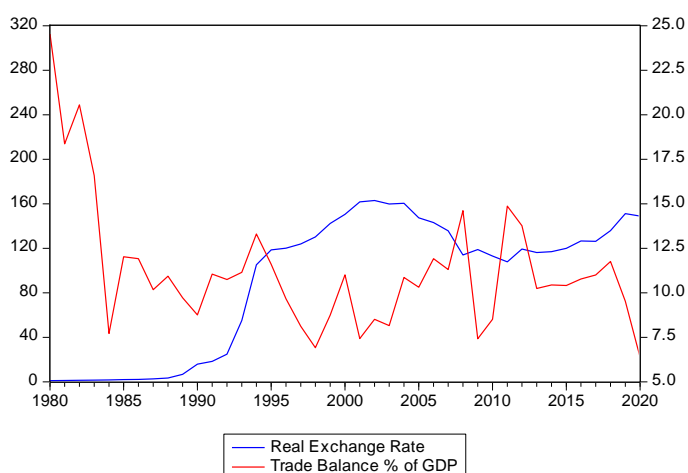


Source: Annual reports of Central Bank, Sri Lanka

The availability of benefits from trade liberalisation was seriously hampered by the escalation of civil war in the Northern and Eastern provinces in the early 1980s (Athukorala, 2017). After ending the civil war in May 2009, the country returned to a state of normalcy. A better understanding of Sri Lanka's trade balance is demonstrated in

Figure 2, which shows that import values as a percentage of GDP increased faster than exports over the past four decades. The global economic recession triggered by the subprime financial crisis in 2008 had a substantial impact on Sri Lanka's external trade, as both exports and imports plummeted (Jayawardene, 2011). By contrast, imports grew faster than exports in 2009. During the liberalisation period, the relative share of consumer and investment goods declined, and the share of intermediate goods imports increased. From 1980 to 2020, the trade balance and the Sri Lankan Rupee to Dollar exchange rate are plotted in Figure 3 below. As revealed by economic theory, a real devaluation of the currency improves the trade balance as long as the Marshall-Lerner condition is satisfied.

Figure 3: Real Exchange Rate and Trade Balance % GDP, 1980 – 2020



Source: Annual reports of Central Bank, Sri Lanka

Depreciation significantly affects the trade balance, but the effects vary depending on the level of economic development (Yuen et al., 2008). On the other hand, Sri Lanka's trade deficit displayed a growing trend with some ups and downs. It is worth noting that the remarkable depreciation of the real exchange rate was achieved with the introduction of a liberalised economic policy in 1978 (Athukorala, 2009). A key lesson from the changing exchange rate in Sri Lanka over the past period is that the value of the currency has made little help in closing the trade gap. After the end of the civil war in 2009, the country experienced a significant appreciation of the real exchange rate. The massive foreign borrowings to finance large-scale infrastructure projects helped to notable real exchange rate appreciation during this period.

METHODOLOGY

For this study, the ARDL bounds test approach was used to investigate the long-run relationships and short-run dynamic interactions of trade balance and specified variables.

The pioneers of introducing this approach were Pesaran & Shin (1999) and Pesaran et al. (2001). As revealed by some researchers, three main advantages of this co-integration model can be seen (Harris & Sollis, 2003). The first benefit is that while the variables in the model might be integrated as I (0) or I (1), they all shouldn't be integrated in the same order I (1). Secondly, this method is more efficient even in the case of small and finite sample data sizes. Thirdly, by employing this approach, we can derive unbiased estimates for the long-run model. In order to confirm the model's applicability, necessary diagnostic tests are applied. The Akaike Information Criterion is used to determine the best lag lengths (AIC). The following equation 1 illustrates how the ARDL model is used in this study:

$$\begin{aligned} \Delta \text{LnTB}_t = & a_0 + \sum_{i=1}^n a_{1i} \Delta \text{LnTB}_{t-i} + \sum_{i=0}^n a_{2i} \Delta \text{LnGDP}_{t-i} + \\ & \sum_{i=0}^n a_{3i} \Delta \text{LnFDI}_{t-i} + \sum_{i=0}^n a_{4i} \Delta \text{LnINF}_{t-i} + \sum_{i=0}^n a_{5i} \Delta \text{LnPCONS}_{t-i} + \\ & \sum_{i=0}^n a_{6i} \Delta \text{LnREM2}_{t-i} + \sum_{i=0}^n a_{7i} i \Delta \text{LnREX}_{t-i} + \\ & \sum_{i=0}^n a_{8i} \Delta \text{LnBDEFI}_{t-i} + a_9 \text{LnTB}_{t-1} + a_{10} \text{LnGDP}_{t-1} + a_{11} \text{LnFDI}_{t-1} + \\ & a_{12} \text{LnINF}_{t-1} + a_{13} \text{LnPCONS}_{t-1} + a_{14} \text{LnREM2}_{t-1} + \\ & a_{15} \text{LnREX}_{t-1} + a_{16} \text{LnBDEFI}_{t-1} + e_t \dots \dots \dots (1) \end{aligned}$$

Where TB represents the trade balance, and it was measured by the ratio of export value to import value. This measure was widely used by many researchers as this ratio is insensitive to unit measurement and can be represented as a nominal or real trade balance (Alhanom, 2016). According to the national income identity, GDP has a positive relationship with trade balance. GDP will be used as a proxy for income. It is the general consensus that foreign direct investment (FDI) inflows stimulated by multinational companies play a vital role in enhancing exports and thereby improving the trade balance. Accordingly, we expect a positive sign for the FDI variable, while high levels of inflation (INF) and private consumption (PCONS) could affect the trade balance negatively. In addition, a change in the real money supply (REM 2) could impact the trade balance. Real money supply and trade balance are predicted to be inversely related. A fall in money supply improves the trade balance since it leads to control of inflation and thereby improves the exports of the country.

Real exchange rate (REX) was defined as $NER \left(\frac{P^f}{P^d} \right)$ where NER represents nominal exchange rate, P^f is world price and P^d stands for domestic price. As the increase in real exchange rate resulted from a devaluation of the domestic currency, we expect to have a positive sign for REX and tend to improve the trade balance. The relationship between the budget deficit (BDEFI) and trade balance can be explained mainly based on the saving-investment gap theory and absorption approach to balance of payment. The trade balance is defined by national income accounting as the sum of private and government savings. Thus, while remaining all other things being equal, an increase in budget deficit

will lead to deteriorate trade balance of a given economy². Further, the absorption approach to the balance of payments (BOP) can be used to demonstrate the connection between the trade balance and the budget deficit. It is noteworthy that the trade balance is a significant part of the BOP. As revealed by this approach, BOP can be interpreted as the difference between the national income and aggregate expenditure.³ Thus, the increase in the budget deficit will worsen the trade balance, and hence, it is expected to have a negative sign. e_t is the error term. L refers to the logarithm of variables. The log-log specification is employed to facilitate the interpretation of estimated coefficients as elasticities.

The null and alternative hypotheses for the co-integration test among variables in equation (1) are as follows:

$$H_0: a_9 = a_{10} = a_{11} = a_{12} = a_{13} = a_{14} = a_{15} = a_{16} = 0$$

against

$$H_1: a_9 \neq a_{10} \neq a_{11} \neq a_{12} \neq a_{13} \neq a_{14} \neq a_{15} \neq a_{16} \neq 0$$

$$H_0 = \text{no long-run relationship}$$

$$H_1 = \text{a long-run relationship}$$

If there is evidence for a long-run relationship (co-integration) of the selected variables, the following long-run model will be estimated:

Long-run Equation

$$\begin{aligned} \ln TB_t = & b_0 + b_1 \ln TB_{t-1} + b_2 \ln GDP_{t-1} + b_3 \ln FDI_{t-1} + b_4 \ln INF_{t-1} + \\ & b_5 \ln PCONS_{t-1} + b_6 \ln REM2_{t-1} + b_7 \ln REX_{t-1} + b_8 \ln BDEFI_{t-1} + \\ & \varepsilon_t \dots\dots\dots (2) \end{aligned}$$

Error Correction Model

Establishing the co-integration relationship, short-run dynamic parameters can be obtained from estimating the error correction model. The ECM model is specified as follows:

² The savings-investment identity approach is a concept in national income accounting which postulates that by the expenditure approach the sum of private consumption. The saving investment identity approach defines consumption expenditures (C), domestic investment (I), government expenditure (G) and net exports (X-M) equals the gross domestic product of an economy.

$C + I + G + (X - M) = C + S + T$, Thus, $(X - M) = (S - I) + (T - G)$.

³ See, Herberger (1950), Meade (1951) and Alexander (1952, 1959).

$$\begin{aligned} \Delta \ln TB_t = & \alpha_0 + \sum_{i=1}^n \alpha_{1i} \Delta \ln TB_{t-i} + \sum_{i=0}^n \alpha_{2i} \Delta \ln GDP_{t-i} + \\ & \sum_{i=0}^n \alpha_{3i} \Delta \ln FDI_{t-i} + \sum_{i=0}^n \alpha_{4i} \Delta \ln INF_{t-i} + \sum_{i=0}^n \alpha_{5i} \Delta \ln PCONS_{t-1} + \\ & \sum_{i=0}^n \alpha_{6i} \Delta \ln RM2_{t-i} + \sum_{i=0}^n \alpha_{7i} \Delta \ln REX_{t-i} + \\ & \sum_{i=0}^n \alpha_{8i} \Delta \ln BDEFI_{t-i} + \theta ECM_{t-i} \dots \dots \dots (3) \end{aligned}$$

The study used the annual time series data for the period of 1980 to 2020. The data was gathered from different sources: annual reports of central bank of Sri Lanka, World Development Indicators, and UNCTAD data base.

RESULTS AND DISCUSSION

ADF and Philips-Perron Test

The Augmented Dickey-Fuller (ADF) and Phillip-Peron (PP) unit root tests will be used to assess if the series are stationary or not, as well as their order of integration. It should be noted that the ARDL bounds testing approach is mainly based on the crucial assumption that all the variables are integrated in order zero, I (0) or order, I (1). The results of both ADF and PP unit root tests statistics show that except *LnINF*, most of the variables are non-stationary in levels while they became stationary after taking the first differences or I (1) (see Table 1). Once the stationary of variables is confirmed, the ARDL bounds test approach can be applied:

Table 1: ADF and PP Unit Root Test Results

Variable	ADF				Phillips-Perron			
	Intercept	P-value	Intercept and trend	P-value	Intercept	P-value	Intercept and trend	P-value
ΔLTR	-6.83	0.00	-7.57	0.00	-10.58	0.00	-7.93	0.00
$\Delta LGDP$	-4.53	0.00	-4.44	0.01	-4.78	0.00	-4.85	0.00
$\Delta LFDI$	-6.79	0.00	-4.69	0.00	-10.03	0.00	-10.27	0.00
$LINF$	-4.32	0.00	-4.13	0.01	-5.23	0.00	-4.32	0.00
$\Delta LPCONS$	-3.31	0.02	-5.33	0.00	-6.74	0.00	-6.45	0.00
$\Delta LRM2$	-17.57	0.00	-17.84	0.00	-14.61	0.00	-14.50	0.00
$\Delta LREX$	-7.99	0.00	-7.89	0.00	-9.34	0.00	-9.59	0.00
$\Delta LBDEFI$	-5.74	0.00	-5.70	0.00	-5.74	0.00	-5.71	0.00

Source: Authors' Computation

ARDL Bounds Tests Method for Co-integration

The first issue of estimating ARDL model is to decide Lag intervals of the variables. There are different methods that can determine the optimal lag period for the ARDL model. The optimum lag order of the model, as determined by the Akaike Information Criterion (AIC) criteria, is ARDL (1, 1, 0, 0, 1, 0, 1, 1). The first step of the ARDL bound

test approach is estimating the ARDL model in order to identify whether there is a long-run relationship among the variables through employing the F- test. Table 2 below illustrates the results of the estimated ARDL model.

However, the F-statistics must be compared with the bound critical values based on Pesaran et al. (2001) Table C1 case III in order to apply the ARDL bound test approach in verifying the existence of long-run link between trade balance and its determinants. The null hypothesis, i.e. here is no co-integration (no long-run relationship) was rejected based on the result from the equation 2. The existence of co-integration among the variables can be tested using the two critical values obtained from Pesaran et al. (2001) for a given significance level. The estimated F statistic (which is 14.69) is higher than the upper bounds critical value (4.26) at the 1% level of significance⁴. From these results we can conclude that co-integration relationship exists among trade balance and the other explanatory variables in the model.

After co-integration is established, the conditional ARDL long-run model can be estimated based on the equation 2. The results of the long-run model are presented in the Table 2.

Table 2: Long-Run Coefficients

Variable	Coefficient	Standard Error	T - Statistics	P - Value
LBDEFI	-0.189830	0.073094	-2.597056	0.0153
LFDI	0.069707	0.028247	2.467789	0.0205
LGDP	-0.258807	0.115663	-2.237604	0.0340
LINF	0.046337	0.032482	1.426516	0.1656
LPCONS	-0.449280	0.140717	-3.192795	0.0037
LREM2	-0.288782	0.106634	-2.708162	0.0118
LREXR	0.052823	0.017773	2.972141	0.0063
C	2.487942	0.868673	2.864072	0.0082
R-squared	0.88	DW-Statistic	2.00	
Adjusted R-squared	0.82	F- Statistic	16.58 (0.000)	
S.E regression	0.0596	Residual sum of Square	0.0924	

Source: Authors' Computation

As revealed by the empirical results among the variables budget deficit, foreign direct investment, gross domestic product, private consumption, real money supply, and real exchange rate were found to be significant at five per cent, and signs are correct as hypothesised, while inflation rate was found to be insignificant with incorrect sign.

⁴ The critical bounds values for lower and upper bounds at 1% level are 2.96 and 4.26 respectively with unrestricted intercept and no trend. See Pesaran et al. (2001).

Contrary to expectations, this study did not discover a substantial link between trade balance and inflation. It seems possible that this result is due to the threshold effect of inflation on the trade balance. This finding of the current study is supported by the outcomes of the study conducted by Bruno & Easterly (1995). They suggest that countries with high inflation rates, particularly those above the threshold of 40%, may experience worse trade balances than those with inflation rates below that level. Note that Sri Lanka's inflation rate ranges from 3.2 per cent to 26 per cent during the study period.

It is apparent from this table that a one per cent increase of budget deficit deteriorates the trade balance by 0.07 per cent. This finding seems to be consistent with the findings of Shawa and Shen (2013). However, this result contradicts with Yeshineh (2017) in his study of Determinants of Trade Balance in Ethiopia found that there is a positive and strong impact from the budget deficit on trade balance. The twin deficit hypothesis is supported by the coefficient BDEFI, showing that fiscal deficits lead to current account deficits. When the government increases budget deficits, it leads to crowd out private investment by reducing available finance for private investors (Bernadin & Korbala, 2016). In this context, government will encourage borrowing from overseas to prevent crowding out of private investment. Over the past four decades, rising budget deficits have been accompanied by a real appreciation of the domestic currency and a worsening of the trade balance. The Keynesian absorption theory emphasizes that budget deficits raise domestic absorption, which causes import growth and exacerbates the trade deficit.

Foreign direct investment showed a positive and strong impact on trade balance indicating an increase in FDI will cause a decrease on trade balance. According to the estimated model, one percent increase in FDI leads to improve the trade balance by 0.06 per cent. Trade liberalization embarked in end of the 1970s was supposed to be a key factor in encouraging FDI inflows into the country. In general, FDI has an impact on the expansion of trading activities, especially exports, which may contribute to improving the trade balance. This finding of the current study is consistent with many previous studies (Sharif, 2016; Shawa & Shen, 2013; Mutana et al., 2018; Mohammad, 2010; Ray, 2012). In contrast, the findings of Nga (2020), based on a case study of Vietnam has found that an increase in FDI may worsen the trade balance. However, Weerasinghe & Perera (2019) in their study of balance of trade determinants in Sri Lanka did not find any significant relationship between FDI and trade balance.

Another important finding was that the highly significant elasticity coefficient of GDP implying an increase of GDP by one per cent deteriorates the trade balance by 0.25 per cent. It is encouraging to compare this figure with the figure by Weerasinghe & Perera (2019), Pushpakumara & Kumari (2009) and Yeshineh (2017) who found similar results. As revealed by the theories, an increase in domestic income raises the aggregate demand, which will lead to an increase in imports. Unless production and productivity increase faster than demand, this could negatively affect the trade balance in the long-run. However, some argue that an increase in economic activities could be a sign that the

business environment is conducive to fostering exports and, consequently, improve the trade balance (Mutana, et al., 2018; Bigsten et al., 2000; Pan & Chen, 2008; Basri & Hill, 2011).

Private consumption shows negative sign and significant at one per cent level with an elasticity of 0.45 indicating that an increasing of private consumption by one per cent would cause the deterioration of trade balance by 0.45 per cent. This also accords with findings of earlier studies (Ray, 2012; Mohammad, 2010; Linda, 2016; Shawa & Shen, 2013). As consumption of commodities includes both domestic and imported goods, an increase in local residents' consumption expenditures raises the demand for both domestic and imported goods, explaining the negative link between the country's trade balance and household consumption expenditures. It is worth noting that growth in an economy may lead to high levels of consumption that need to be satisfied by the importation of goods from abroad, which would be detrimental to the country's trade balance. Likewise, a one per cent increase in the real money supply deteriorates the trade balance by about 0.29 per cent. Linda (2016) for Ghana & Yeshineh (2017) for Kenya have found similar results. If there is excess real money supply than the real money demanded, the surplus money supply will be reduced by outflows of money to other countries, which will deteriorate the trade balance. Contrarily, other evidence suggested that financial liberalisation could have a positive effect on exports through the provision of trade financing (Sugema, 2005).

The most interesting finding of the study was that the real exchange rate was found to be highly significant with the correct sign as expected in economic theory. It implies that devaluation will result in increased exports and decreased imports, which will improve the trade balance in the long run. On average, one per cent depreciation improves the trade balance by 0.05 per cent. Large-scale foreign borrowing over the past period contributed to the central bank keeping the nominal exchange rate stable, but capital inflows always caused the real exchange rate appreciation (Athukorala, 2017). Pushpakumara & Kumari (2009) have found similar results in their study of determinants of the trade balance in Sri Lanka. However, Weerasinghe & Perera (2019) did not find any insignificant relationship between TB and REER in the case of Sri Lanka. The positive effect of the real exchange rate is consistent with those of other studies and suggests that exports and imports are highly response to devaluation, confirming that it may increase the balance of trade towards the surplus (Baharumshah, 2001; Bahmani-Oskooee, 2001; Hacker & Abudlnasser, 2002; Stučka, 2004; Yeshineh, 2017; Yuen et al, 2008; Sugema, 2005; Mohammad, 2010).

Error Correction Model

By estimating the error correction model, it is possible to establish the relationship between short-term dynamic parameters and the long-term relationship. Table 3 presents the results of the error correction model of ARDL (2, 0, 0, 0, 0, 1, 0, 1) as estimated based

on equation 3. It is worth mentioning that the error correction term is negative and significant at 0% level justifying the results of the co-integration model. The value of coefficient of ECT is -0.9513; and this would mean that almost 95% of adjustment takes place each year. This high value of the coefficient reveals that the speed of adjustment of trade balance to changes in the variables to equilibrium value is very fast.

The findings indicate that the J-curve effect is invalid for Sri Lanka's situation because the real exchange rate is positive and insignificant determinant of trade balance in the short-term. Weerasinghe & Perera (2019) have found the same results for the case of Sri Lanka. However, budget deficit, FDI, GDP, inflation, and real money supply variables are highly significant variables in the short run. It is worthy to note that the FDI variables have negative sign indicating the FDI inflows would lead to worsen the trade balance in the short run. This rather contradictory result may be accompanied by high importation of the intermediate and capital goods. In this study, inflation and private consumption variables were found to be statistically insignificant in the short run.

Table 3: Results of Error Correction Model

Variable	Coefficient	Standard Error	T - Statistics	P - Value
$\Delta \text{LnTB}(-1)$	0.248844	0.137137	1.814571	0.0811
$\Delta \text{LnBDEFI}$	-0.180598	0.061373	-2.942620	0.0068
ΔLnLFDI	-0.066317	0.025031	-2.649390	0.0135
ΔLnLGDP	-0.246220	0.122383	-2.011877	0.0547
ΔLnLINF	0.044083	0.026977	1.634100	0.1143
$\Delta \text{LnLPCONS}$	-0.325774	0.216513	-1.504638	0.1445
$\Delta \text{LnLREM2}$	-0.274738	0.111784	-2.457746	0.0210
$\Delta \text{LnLREXR}$	0.006014	0.049923	0.120470	0.9050
ECT(-1)	-0.951365	0.182608	-5.209887	0.0000

Source: Authors' Computation

The validity of the model and results can be checked from the results of the diagnostic tests in Table 4 below.

Table 4: Diagnostic Test

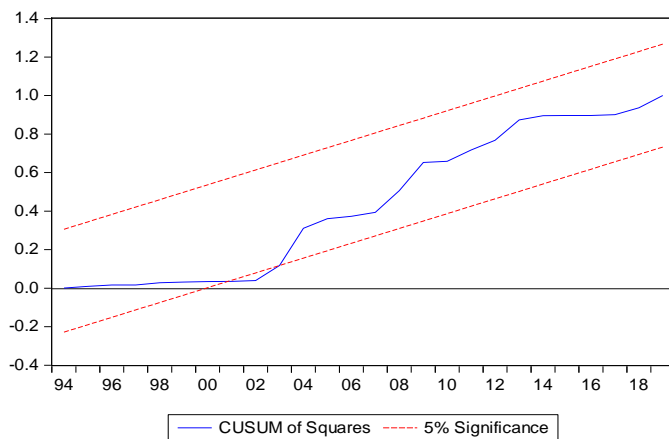
Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.6642	Prob.	0.2104
Heteroskedasticity Test: Breusch-pagan-Godfrey			
F-statistic	1.2706	Prob.	0.2944
Normality Test			
Jarque Bera	1.2467	Prob.	0.5361

Source: Authors' Computation

Serial correlation of residual will be checked by the results of the Lagrange Multiplier (LM) test. Heteroscedasticity test is based on Breusch-pagan-Godfrey test and normality of the residual will be checked by Jarque Bera statistic. These test results suggest that the model is specified and valid for interpretation of the results of the bound test for co-integration. From the data in Table 4, it is apparent that the model is not serially correlated, and the errors are homoscedastic as probabilities of F-statistics are higher than five percent level. Further, as revealed by normality test residual is normally distributed.

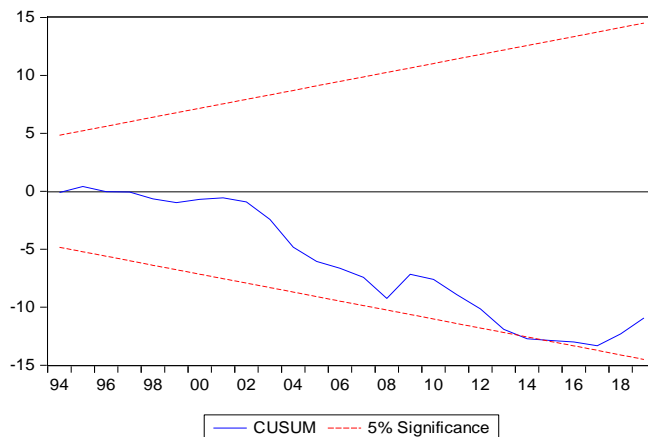
Figure 4 and 5 below depict the results of the CUSUM and CUSUM SQUARE tests. These figures clearly indicate that statistics fall within the bands of 5% confidential interval indicating the stability of parameters.

Figure 4: Cumulative Sum of Residual



Source: Authors' Computation

Figure 5: Cumulative Sum of Squares of Residual



Source: Authors' Computation

CONCLUSIONS

The study was designed to analyse the long run and short run association between trade balance and its determinants in Sri Lanka employing annual data covering the period of 1980 – 2020. The estimating method used in the study was the ARDL bounds testing approach to co-integration. The results of this study clearly show that there is a co-integration relationship between trade balance and its major determinants: budget deficit, foreign direct investment, gross domestic product, real exchange rate, and real money supply. One of the most significant findings emerged from this study is that except inflation all the other variables play a vital role in determining the trade balance in the long run as well as short run in Sri Lanka. The study found that inflation rate does not affect the trade balance both in the long and short run. Besides, the Error Correction estimates indicate that the real exchange rate did not influence the trade balance in the short run.

These findings have a number of important policy implication in improving trade balance in Sri Lanka. The most obvious finding was that the real exchange rate is positively associated with Sri Lanka's trade balance in the long run. It is, therefore, recommended that government should devalue the currency to gain advantage from the international competitiveness. However, the real exchange rate is positive and insignificant determinant of trade balance in the short-term. Accordingly, it can be concluded that J-curve hypothesis is not valid for Sri Lankan context. It was also shown that there is a significant positive correlation between FDI and trade balance. From a policy implication stance, government should provide more incentives and maintain more conducive investment climate to attract high quality FDI inflows to the country especially those with target to exports. The findings show that Sri Lanka's trade balance was negatively impacted by both the budget deficit and the real money supply. In this context, reducing the budget deficit and real money supply would be the best strategies to improve the trade deficit in the country. The policy implication which could be drawn from the study is that Sri Lanka should focus on addressing the trade imbalance by taking actions to reduce the budget deficit and control real money supply, rather than relying primarily on adjusting the exchange rate regime.

These findings of the study confirm that not only the exchange rate policy, but also fiscal and monetary policies are found to be influential on trade balance instruments in Sri Lanka. Further, the study has shown that private consumption has a negative effect on trade balance. There is, therefore, a definite need for implementation of the policy focusing on production of imported-substituted goods in order to reduce imports.

Finally, there are some important limitations of this study needed to be considered. The current study was specially designed to evaluate some important factors which can be influential on trade balance. This study has mainly examined only 6 factors. There might be several missing factors that current study didn't explore. Besides, the study has limited

to 40 observations as sample period study. Further, more research studies regarding the trade balance including more variables with broader sample period needs to be done to determine the factors of balance of trade in Sri Lanka.

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