MENTOR | The Journal of Business Studies
JBS
Faculty of Commerce and Management, Eastern University, Sri Lanka

# The Impact of Imports on Inflation in Sri Lanka

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## ABSTRACT

The objective of this study is to examine the impact of imports on inflation in Sri Lanka using annual time series data from the period 1977 to 2017. The model estimated used inflation as a dependent variable, while imports, real gross domestic product, broad money supply (M2), exports and exchange rate as the explanatory variables. To test stationary, the Augmented Dickey Fuller Test was used. In addition to that, Long-run and short-run elasticity of the variables were examined using the Autoregressive Distributed Lag (ARDL) bounds test co-integration method proposed by Pesaran et al. (2001). An error correction modeling approach was applied to the double log functional form in order to investigate the significance and effect of Supply side and demand side inflationary factors to inflation in Sri Lanka. The unit root test results indicate that inflation and exchange rate are stationary at level [I(0)] but imports, real gross domestic product, exports, exchange rate and broad money supply have a unit root problem. But, when these variables are tested at first difference the problem of the unit root has disappeared and hence it has become stationary at first difference [I(1)]. The results of the ARDL bounds F test indicate that there is a long-run relationship among the variables. According to the results of ARDL in long-run, inflation rises up by 4.64% for every one percent increase in imports. The findings of this study confirm that imports have a positive impact on inflation in Sri Lanka and the impact is significant at 1% level.

**Keywords**: Imports, Inflation, ARDL Bounds testing, Error Correction modeling, Sri Lanka,

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## 1. Introduction

Inflation is a rise in the general level of prices of goods and services in an economy over a period of time. When the general price level rises, each unit of currency buys fewer goods and services. Consequently, inflation also reflects an erosion in the purchasing power of money - a loss of real value in the internal medium of exchange and unit of account in the economy (Islam, 2013). In a closed economic situation, besides a number of causative factors, inflation is attributed by excess demand created within that economy. But in open economy inflation is also affected by international trade situation that is import and export condition. According to Dexter et al. (2005), "The availability of imports can affect domestic inflation directly via the prices of these imports included in the price index, and indirectly through competition with domestic goods and services.

Normally, a rise in imports will cause depreciation in the exchange rate. This tends to increase inflationary pressure through to make import costly. Economic theory states that inflation and imports have positive relationship (Munepapa & Sheefeni, 2017). For example, an increase in aggregate spending exceeds the local demand that leads to the need for import to meet the local demand. As import quantity's demanded increase, the price of imported goods and services rise, causing the inflationary pressure to the economy. The lack of sufficient resources for production in many developing countries has led to a dependency on import for consumption (Ogbokor & Sunde 2011; Islam, 2013). Moreover, when a country imports raw material then depreciation of local currency or appreciation of foreign currency makes import expensive and subsequently the cost of production for goods increases due to a rise in the price of raw materials. So, higher import tends to increase inflation. It is called imported inflation.

Inflation makes everyone worse off by reducing the purchasing power of incomes, eroding living standards and adding, in many ways, to life's uncertainties (Lipsey et al. 1982: 752). In recent times, the Sri Lankan economy has experienced a rising rate of inflation which is a major threat to the macroeconomic stability of the country. A number of factors contribute to this inflation of Sri Lanka. Imported inflation through depreciation of the exchange rate, import dependency, money supply growth, interest rate differentials, trade deficit, foreign debts and impact of petroleum prices are the major factors which result inflation in Sri Lanka.

A notable feature of the Sri Lankan economy has been its heavy reliance on international trade. International trade which accounted for 55% of the GDP at independence, declined considerably during the ensuring period with attempts at import substitution. With the removable of import and exchange controls during the post liberalization period, imports began to gain greater significance in affecting prices. By 1987, external trade accounted for 57% of GDP the difference between the 1950's and post liberalization periods being that imports had come to account for a larger share of the GDP than exports. In 1977 November, the Sri Lankan rupee was devaluated and allowed to float against a basket of currencies. Over the years, the rupee has progressively depreciated against the major currencies. With imports beginning to gain greater importance in price determination, the impact of exchange rate movements on the rate of inflation has also come to acquire greater significance (Cooray, 2018).

In Sri Lanka, the supply side factors have greater influence than demand side factors on inflation. The Institute of Policy Studies (Sri Lanka) and the IMF highlight the importance of cost push factors, in particular, import prices and the exchange rate as factors contributing to inflation in Sri Lanka after the open economy. Cooray (2008), in a study that estimates a price equation for Sri Lanka under both closed and open economy scenarios, suggests greater support for the open economy model and concludes that supply side factors are important in influencing the general price level in Sri Lanka.

In the case of Sri Lanka, the export industry highly depends on imported goods. Sri Lanka's export manufacturing supply chains are largely import dependent. When analyzing the composition of imports, the increasing relevance of imported inputs in production is evident with the intermediate goods and investment goods accounting for more than 80 percent of the import trade. For example, textile and garments, which holds an export share of about 44 percent and is the single largest export revenue earner for Sri Lanka, is heavily dependent on imported intermediate goods in the manufacturing process. Import of textile and textile articles as an intermediate input of production accounts for 47 percent of the revenue earned from textile and garments exports (Daily mirror, 2019). As import quantity's demanded increase, the price of imported goods and services rise up. As a result, it causes the inflationary pressure to the Sri Lankan economy.

In the wake of economic deregulation Sri Lanka experienced a steady rise in the rate of inflation as measured by the Colombo Consumer Price Index (CCPI). According to the World Bank database, Inflation which averaged 2.2% in the 1960's, after the economic liberalization, inflation is recorded 12.14% in 1978, with the highest recorded in 1980 at 26.14% and lowest of 3.14% recorded in 2014. A country needs a favorable rate of inflation to keep the performance of the economy at a satisfactory level. However, the inflation was recorded 7.7% in 2017 compared to the average of 3.9% in 2016 (World Bank database, 2016). If this continues, it is expected that prices of goods (especially food) and services will rise resulting in lower economic growth. This will require the central bank of Sri Lanka to intervene in order to stabilize the inflation by increasing the interest rate, particularly the repo rate. However, the rise in interest rate will hurt Sri Lanka who still has debts to settle as the costs are likely to go up. In the end, the economic and financial problems in the country will upswing. Hence, the need to study the impact of import on inflation in Sri Lanka is very crucial.

The main objective of this study is to find out the impact of imports on inflation in Sri Lanka between the time periods of 1977 to 2017. Secondly, this study tries to find out the short run and long run association between these two variables. This study also tries to investigate other demand side and supply side inflationary factors which also contribute to the inflation in Sri Lanka.

## 2. Literature Review

There are three major theories that explained the cause of inflation namely, the Monetarist model, Keynesian view and Structuralist model. In addition, the paper also attempted to explain the demand-pull and cost-push inflation.

The monetarist argues that domestic inflation is caused by the excess supply of money within the economy as stated by Friedman in 1969. Monetarists do not believe that domestic inflation can be caused by changes in demand for money, and the cost of production of goods and services in the country. Rather, it is money supply that boosts transactions mechanisms, which eventually causes the demand to exceed the money supply (Likukela, 2007). Furthermore, monetarists highlighted that the government budget deficit is an important factor that contributes to inflation. This is because in the presence of budget deficit, the government finds it necessary to borrow or print more money for expenditure. This subsequently, leads to more money in circulation resulting in inflation (Ogbokor and Sunde, 2011). Keynesians argue that controlling money supply with fixed monetary policy will not guarantee a controlled spending within the economy. Spending does not only depend on money that is circulating in the economy but also on how rapid, money is used in the economy (Ogbokor and Sunde, 2011). On the contrary, monetarists conclude that inflation is caused by interest rate movement but not the money supply in the economy. This means that when the interest rate is low, demand for money will increase, which will dispose of individuals to have a lot of money or more money circulating in the economy resulting an increase in price.

Structuralists argue that inflation is caused by demand pressure structural factors and cost pressure. This can lead to changes in prices in the real world of money prices such as wages. Wages tend to be inflexible downward; this could lead to inflation (Ogbokor and Sunde, 2011; Likukela, 2007). The structuralists further state that changes in the economics structure causes relative prices to rise. This leads to influence in money prices, in other words leads to growth in money supply. The cost-push inflation is when there is a shift in the supply curve such that any level of output will require a higher price level than before a shift (Hiller, 1997). It is believed that a shift in aggregate supply can be caused by factors, such as push for high money wages, increase in the price mark-up over cost of employers. Generally, the cost of raw materials and an increase in wages are more likely to push the prices up.

Demand-pull inflation is said to occur as a result of an increase in real aggregate demand at any price level (Hiller, 1997). Inflation results as aggregate demand exceeds aggregate supply in the economy. According to Hiller (1997) when GDP increases, that is an increase in the national economy, unemployment is likely to go down and households are more likely to increase their consumption. The economy will have more money and few goods and services causing prices to increase. The prices, however, are not expected to continue increasing as supply will also increase in the long run due to demand. Several studies previously looked at the relationship between inflation and imports. Cole (1986) examined the relationship between imports and domestic inflation in Latin America. The study employed the Ordinary Least Square (OLS) method of Double-log model to estimate the relationship and effectiveness between the dependent variable and independent variables. The results confirmed that import or import prices had no statistical significance

with the domestic inflation. Gaomab II (1998) modelled inflation in Namibia for the period 1973 to 1996. The study employed the method of cointegration, error correction model and structural stability for testing time series and forecasting. The results obtained revealed that there was dominance of foreign prices and imported inflation from South Africa on Namibian prices and inflation. Furthermore, the results showed a little impact from the rest of the world, especially the United States, although it was indicated that the effect was indirect through South Africa. Cheng and Tan (2002) determined the factors that caused inflation in Malaysia using quarterly data from the year 1973 to 1997. The study used the time series approach namely, multivariate cointegration, vector-error correction modeling, impulse response functions and decompositions, to run ant tests for regressions. The outcome showed that inflation from other Asian countries had a big impact on Malaysia inflation. Ogbokor (2004) analysed the impact of inflation on Namibian economic growth using data for the period 1991 to 2001. The study employed the double-log transformation models that helped to interpret the results in elasticity form (percentage form). The results showed that imported inflation was one of the problems that were experienced as it decelerated economic growth.

Corrigan (2005) analysed the relationship between import prices and inflation in the United States, using quarterly data for the period 1986 to 2004. The study adopted a triangle model to measure the relationship between economic-wide inflation to import prices, a measure in demand excesses in the economy and inertia variable. The results indicated that import prices have played a significant role in explaining inflation patterns. Chaudhry and Chaudhry (2005) examined the determinants of inflation in Pakistan using ARDL approach to cointergration. They found that the growth rate of import prices is the most important determinant of inflation in Pakistan both in the short run and long run, which is followed by the growth rate of output in terms of importance. The effect of Money supply on inflation is negligible and statistically insignificant.

Narayan (2005) empirically assessed Fiji's import demand function using the data for the period 1970 to 2000. The cointegration method was used to test for the long-run relationship between import and independent variables which included relative prices. The result revealed that there was a long run relationship between import and independent variables, and all variables were significant to the model. The study implied that inflation had an influence on import prices. Based on the empirical studies, it is good enough to conclude that import prices and inflation have a relationship.

**Review of literature on Inflation in Sri Lanka**

Quite a number of studies have been conducted with respect to the determinants of inflation in Sri Lanka. Ratnasiri (2009) examined the main determinants of inflation in Sri Lanka for the period of 1980 to 2005 and reported that Sri Lanka's inflation is influenced by both demand and supply side factors in the short-run as well as in the long-run. According to Ratnasiri (2009), money supply growth and the increase in the price of rice are the most important determinants. However, in the short run, exchange rate depreciation can also influence inflation whereas GDP growth does not exert any influence on inflation either in the short run or in

the long run. Bandara (2011) investigates the determinants of inflation in Sri Lanka during 1993–2008. Vector autoregressive (VAR) models were used to find out appropriate explanations for inflation with accompanied application of Granger Causality Tests. The overall findings of estimated VAR models imply that the money supply, exchange rate and the GDP have information which helps in exploring the behavior of the inflation in Sri Lanka. Cooray (2008), in a study that estimates a price equation for Sri Lanka under both closed and open economy scenarios, suggests greater support for the open economy model and concludes that supply side factors are important in influencing the general price level in Sri Lanka. The study found a long run relationship between the price level, real GDP, the import prices and exchange rate.

Duma (2008) examined the impact of external shocks on inflation in Sri Lanka. He found external shocks explain only about 25 percent of the variation in consumer price inflation in Sri Lanka. In his study, only a combination of external variables, namely, exchange rate, oil prices and import price shocks, is used to identify the external impact on inflation. Jayawardana & Jayasinghe (2016) has conducted a study to identify the short and long-run determinants of inflation in Sri Lanka, using annual data for the period from 1977 to 2014. This study employs an Autoregressive Distributed Lag (ARDL) bounds testing approach to test for co integration between inflation and its causes. The findings of this study indicate that increased money supply, depreciation of the rupee and higher public wages are the major causes of inflation in both the short and long-run. This study also stated that inflation in Sri Lanka is affected by both demand and supply side factors.

Overall, according to most of the empirical studies on inflation in Sri Lanka, it is evident that both demand and supply side factors are among the important sources of inflation. However, based on the above literature on inflation pertaining to Sri Lanka it can be stated that there is no comprehensive study which highlight the importance of cost push factors, in particular, imports and the exchange rate as factors contributing to inflation in Sri Lanka after the open economy.

**Hypothesis Formulation**

This study tries to identify the impact of imports on inflation in Sri Lanka. Based on the objective, the following hypotheses were developed.

*a) Hypothesis 1*

**$H1_0$: Imports does not have an impact on inflation in Sri Lanka.**

**$H1_1$: Imports has an impact on inflation in Sri Lanka.**

*b) Hypothesis 2*

**$H2_0$: Imports does not have a long run association with inflation in Sri Lanka**

**$H2_1$: Imports has a long run association with inflation in Sri Lanka**

## 3. Methodology

### Data and Empirical model

The sample consists of annual time series data between 1977 and 2017. The duration of time series data is decided based on the availability of data, and 1977 is the period where Sri Lanka's economy was liberalized. The data for regressors were obtained from the World Bank Development indicators database. This study used the annual data for inflation rate as the dependent variable, while imports, real gross domestic product, money supply (M2), exports and exchange rate as the explanatory variables. Table 1 provides a descriptive summary of the variables.

All series are transformed into the natural logarithm for econometric analysis. The general function of inflation is expressed below:

$$INFLA = f(IMPO, RGDP, EXPO, EXCHR, BROMO) \quad (1)$$

The regression equation is denoted in the double log-linear model as follows:

$$lnINFLA = \beta_0 + \beta_1 lnIMPO + \beta_2 lnRGDP + \beta_3 lnEXPO + \beta_4 lnEXCHR + \beta_5 lnBROMO + \varepsilon_t \quad (2)$$

In the above equation, *INFLA* represents the inflation rate in Sri Lanka; *IMPO* represents the imports expenditure of goods and services; *RGDP* denotes the Real Gross Domestic Product; *EXPO* represents the exports revenue of goods and services; *EXCHR* represents exchange rate of Sri Lankan rupees per United States Dollar; *BROMO* represents the Broad Money supply. $\beta_0$ and $\beta_i$ are the parameters known as the intercept and slope coefficient and $\varepsilon_t$ represent the white noise error term.

**Table 1: Summary Statistics**

| | LNINFLA | LNIMPO | LNRGDP | LNEXPO | LNEXCHR | LNBRMON |
|---|---|---|---|---|---|---|
| Mean | 2.134359 | 26.49778 | 24.18462 | 26.20723 | 4.006342 | 26.43552 |
| Median | 2.256649 | 26.68467 | 24.11332 | 26.50798 | 4.077446 | 26.53341 |
| Maximum | 3.263674 | 28.98493 | 25.24126 | 28.70065 | 5.026837 | 29.66397 |
| Minimum | 0.202843 | 23.11925 | 23.24713 | 23.23376 | 2.182994 | 22.90071 |
| Std. Dev. | 0.679543 | 1.668726 | 0.575777 | 1.660960 | 0.759798 | 1.922969 |
| Skewness | -1.015007 | -0.204344 | 0.322384 | -0.218082 | -0.492135 | -0.012687 |
| Kurtosis | 4.007968 | 1.883678 | 2.060506 | 1.746802 | 2.160628 | 1.913529 |
| | | | | | | |
| Jarque-Bera | 8.775634 | 2.414217 | 2.218056 | 3.007939 | 2.858613 | 2.017648 |
| Probability | 0.012428 | 0.299061 | 0.329879 | 0.222246 | 0.239475 | 0.364648 |
| | | | | | | |
| Sum | 87.50873 | 1086.409 | 991.5695 | 1074.496 | 164.2600 | 1083.856 |
| Sum Sq. Dev. | 18.47113 | 111.3858 | 13.26075 | 110.3516 | 23.09170 | 147.9124 |
| | | | | | | |
| Observations | 41 | 41 | 41 | 41 | 41 | 41 |

Source: Researcher's computation

**Unit root analysis**

The first step prior to estimating the regression model is to test the variables for the unit root in order to determine the order of integration which either is zero I(0), one I(1) or higher order I(n). According to Gujarati (2004) the unit root test is a test ordered to test for trends in time series variables, that is, if the variables are stationary or non-stationary. Stationary means a variable has a mean of zero and a constant variance over time, with the covariance that have an error term with the mean equal to zero. If a variable is non-stationary it has a unit root meaning there is a problem of spurious if the regression is to be estimated using the ordinary least squares (OLS). Therefore, to correct for the unit root in variables, it must be differenced. In this study, the unit root test is performed by using the Augmented Dickey Fuller (ADF) test. Equation two (2) above can be differences when:

$$\Delta lnINFLA = \beta_0 + \beta_1 \Delta lnIMPO + \beta_2 \Delta lnRGDP + \beta_3 \Delta lnEXPO + \beta_4 \Delta lnEXCHR + \beta_5 \Delta lnBROMO + \varepsilon_t \quad (3)$$

Where $\Delta$ denotes difference, although a variable can be differenced once or more than once. A model specification for the unit root test can also exclude both constant and trend or include constant without trend or include constant and trend:

$\Delta y_t = \beta_t y_{t-1} + U_t$ (No constant and no trend)

$\Delta y_t = \beta_0 + \beta_t y_{t-1} + U_t$ (Constant)

$\Delta y_t = \beta_0 + \beta_1 t + \beta_t y_{t-1} + U_t$ (Constant and trend)

**ARDL Bound Test Approach for Co-integration**

This study employs the Auto Regressive Distributed Lag (ARDL) bound test approach of cointegration to investigate the long-run relationship and dynamic interaction of the demand side and supply side inflationary factors with the control variable. The ARDL which was presented by Pesaran et al. (2001) allows having efficient findings for long-run equilibrium and the short-run dynamic relationship between the non-stationary time series variables. ARDL bounds test is used in this study, because this method has some advantages when it is compared to other alternatives such as Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990) procedures. First of all it has more power and therefore recommended when the sample size is small (Pesaran et al., 2001; Ghatak & Siddiki, 2001; Acaravci & Ozturk, 2012).

One other flexibility of the ARDL bounds F testing is its usability when not all variables have the same order of integration. The only necessary condition for the integration order of the variables is order's being at most 1 (Pesaran et al., 2001; Acaravci & Ozturk, 2012). The ARDL bounds testing method allows the variables' to have different optimal lags, while it is impossible with conventional co-integration procedures.

It should be noted here that the ARDL approach helps to identify cointegrating vector(s) and then which is reparameterized into Error Correction Method (ECM). The existence of the long-run relationship between the variables is confirmed by the bound F-statistic. The ECM gives the results of short-run dynamics (Emika

and Aham, 2016). Thus, Unrestricted Error Correction Model (UECM) of ARDL is incorporated to examine the long-run and short-run relationship taking the following model into consideration.

$$\Delta lnINFLA_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta lnINFLA_{t-i} + \sum_{i=1}^{n} \alpha_2 \Delta lnIMPO_{t-i} + \sum_{i=1}^{n} \alpha_3 \Delta lnRGDP_{t-i} + \sum_{i=1}^{n} \alpha_4 lnEXPO_{t-i} +$$

$$\sum_{i=1}^{n} \alpha_5 lnEXCHR_{t-i} + \sum_{i=1}^{n} \alpha_6 lnBROMO_{t-i} + \delta_1 lnINFLA_{t-1} + \delta_2 lnIMPO_{t-1} +$$

$$\delta_3 lnRGDP_{t-1} + \delta_4 lnEXPOR_{t-1} + \delta_5 lnEXCHR_{t-1} + \delta_6 lnBROMO_{t-1} + \varepsilon_t \quad (4)$$

Where $\alpha_0$ is constant and $\varepsilon_t$ is white noise error term. Δ denotes the first difference. The terms associated with the summation signs, $\alpha_i$ in the above model represent the short-run dynamics, whereas $\delta_i$ is the long-run multipliers. STATA statistical software is used for the estimation of ARDL model, which estimates long-run and short-run relationships in one regression. As a first step, the unconditional ARDL model is estimated by setting a maximum number of lags permutations, which will lead to selecting optimum lag length. With the suggested optimum lag length, as a second step, the coefficients for long-run and short-run dynamic relationship and error correction term are obtained. As a third step, the ARDL bound test is estimated to confirm the existence of the long-run relationship between the variables.

The above model established that, under the null hypothesis of no co-integration and regardless of the degree of integration, the obtained F-statistic is non-standard. They develop two bounds of critical values for the different model specifications: the upper bound applies when all variables are integrated of order one, I(1) and the lower bound applies when all the variables are stationary, I(0).

If the calculated F-statistic, for a selected level of significance, exceeds the upper critical bound, then the null hypothesis of no co-integration is rejected. If the F- statistic is lower than, the lower bound, then the null hypothesis cannot be rejected. If, however, the calculated F-statistic lies between the lower and the upper bounds, conclusive inference may not be made. As Pesaran et al. (2001) note, a shortcoming of their method is that it is not appropriate in situations where there are more than one co-integrating vectors.

As the final step, beside bound test which is also considered as post estimation, the models go through further post estimation tests such as Durbin's-Watson d statistics and Breusch-Godfrey LM test for serial correlation, Breush- Pagan- Godfrey (BPG) test for heterocesdasticity, Ramsey Regression Specification Error Test (RESET) to test functional form misspecification and Cumulative sum test for parameter stability.

## 4. Results and Discussion

**Unit root test**

The study uses the Augmented Dickey Fuller test (ADF) for unit root test. The results in the Unit root test as shown in Table 2 confirm that no variables follow I (2). The results also show that the selected variables are integrated of orders either I(1) or I(0). Unit root test results shown in Table 2 ensure that none of the series integrated at I (2).

**Table 2: Unit root test results**

| Variables | Model | Test Statistic at level | Test Statistic at first difference | Lag | Order of integration |
|---|---|---|---|---|---|
| lnINFLA | Constant | -5.551*** | - | 1 | I(0) |
| lnIMPO | Constant | -2.576 | -5.610 *** | 1 | I(1) |
| lnRGDP | Constant | 0.624 | -5.946*** | 1 | I(1) |
| lnEXPO | Constant | -1.798 | -6.073*** | 1 | I(1) |
| lnEXCHR | Constant | -3.519 ** | - | 1 | I(0) |
| lnBROMO | Constant | -1.435 | -4.744*** | 1 | I(1) |

Source: Researcher's computation.
Note: *, **, *** indicate 10%, 5% and 1% significant levels, respectively

The ADF unit root test results shows that all the variables are not integrated in the same order. The results indicate that inflation and exchange rate are stationary at level [I(0)] but imports, real gross domestic product, exports, exchange rate and broad money supply have unit root or non- stationary problems. But, when these variables are tested at first difference the problem of unit root has disappeared and hence it has become stationary at first difference [I(1)].

**ARDL Cointegration test**

**Table 3: Estimated long-run coefficients**

| Variables | coefficient | Std. Err | t- statistic | P- value |
|---|---|---|---|---|
| lnIMPO | 4.641 *** | 0.819 | 5.67 | 0.000 |
| lnRGDP | -9.716 ** | 3.510 | -2.77 | 0.017 |
| lnEXPO | -7.207 *** | 1.760 | -4.10 | 0.001 |
| lnEXCHR | 1.301* | 0.754 | 1.73 | 0.110 |
| lnBROMO | 4.646* | 2.272 | 2.05 | 0.063 |
| R-square | 0.9409 | | | |
| Adj R-square | 0.8226 | | | |

*, **, *** indicate 10%, 5% and 1% significant levels, respectively.

The unit root analysis clearly indicates that all variables are integrated order at I(1) or I(0). So this study uses the ARDL bounds test for cointegration method to test the long run relationship among the variables. Estimated long-run coefficients of the model are shown in Table 3. According to the results of ARDL in long-run, the import is statistically significant at 1% level and found to have positive associated with inflation in Sri Lanka. Surprisingly, Real Gross Domestic Product has a significant negative impact on inflation in Sri

Lanka at 5% level. Export also has a significant negative impact on inflation in Sri Lanka at 1% level. Furthermore, Exchange rate and broad money supply have a positive impact on inflation in Sri Lanka at 10% significant level. According to the above estimated long run coefficients, when imports increases by 1% the country's inflation rises up by 4.64% holding other variables constant. Furthermore, inflation rate decreases by 9.716 percent for every one percent increase in real GDP and one percent increase in exports decrease the Sri Lanka's inflation by 7.207 percent. Then for every one percent increase in the exchange rate and broad money supply increase the inflation by 1.301 percent and 4.646 percent respectively.

**Table 4: Error correction representation of ARDL model**

| Variables | coefficient | t- statistic | P- value |
|---|---|---|---|
| Δ lnINFLA(-1) | 0.562** | 2.19 | 0.049 |
| Δ lnINFLA(-2) | 0.375* | 2.01 | 0.068 |
| Δ lnEXCHR | -4.418** | -2.46 | 0.030 |
| Δ lnEXCHR(-1) | 3.612* | 2.11 | 0.057 |
| Δ lnEXCHR(-2) | -3.918** | -2.15 | 0.053 |
| Δ lnEXCHR(-3) | 0.929 | 0.90 | 0.385 |
| Δ lnEXPO | 12.499*** | 4.41 | 0.001 |
| Δ lnEXPO(-1) | 4.646* | 1.91 | 0.080 |
| Δ lnEXPO(-2) | 2.222 | 1.27 | 0.228 |
| Δ lnEXPO(-3) | 3.026** | 2.26 | 0.043 |
| Δ lnIMPO | -5.247*** | -3.61 | 0.004 |
| Δ lnRGDP | 9.175 | 1.64 | 0.126 |
| Δ lnRGDP(-1) | 9.543** | 2.33 | 0.038 |
| Δ lnRGDP(-2) | 2.689 | 0.83 | 0.420 |
| Δ lnRGDP(-3) | -4.551 | -1.29 | 0.221 |
| Δ lnBROMO | -8.914*** | -2.76 | 0.017 |
| Δ lnEXPO(-1) | -4.033 | -1.36 | 0.200 |
| Δ lnEXPO(-2) | -2.857 | -1.25 | 0.235 |
| ECM(-1) | -0.714*** | -5.22 | 0.000 |
| Constant | 299.3374 | | |

The results of short-run dynamics from ECM of ARDL are reported in Table 4. The short-run adjustment process which is presented by ECM (-1) coefficients in the model. The error correction coefficient -0.714 has the expected negative sign and is highly significant at 1% level, which shows that the equilibrium is convergent to the equilibrium path responding to external shocks. The estimated ECM (-1) indicates that

how the disequilibrium in the previous year's shocks are adjusted back to the long-run equilibrium in the current year. More specifically, 71.4% of any deviation from the long-run equilibrium following a short-run disturbance that occurred during the last time period is corrected in the current time period. In the view of Bannerjee, Dolado and Mestre (1998) [as cited in Pahlavani and Rahimi 2009], a highly significant error correction term is further proof of the existence of a stable long-term relationship (Cooray, 2008).

Error Correction model shows that inflation increases by 0.562 percent for every one percent increase inflation in the previous year holding other factors constant. In the short run, imports have a significant negative impact on inflation. However, in long run the impact of imports on inflation is positive at 1% significant level which is related to the economic theory.

According to the ARDL long run cointegration results that imports, exchange rate and broad money supply are found to have positively associated with inflation whereas exports and real GDP are found to have negatively associated with inflation in the long run. The results confirm the findings done by Likukela (2007) where a negative relationship was found between real GDP and inflation and the inflation in Nambia heavily depends on imports. The study also matches the result from Ogborkor and Sunde (2011) that found a positive relationship between imports and inflation and money supply and inflation.

**Table 5: ARDL Bound Test for the existence of Co-integration**

| Test Statistics | Test values | 10% critical value | | 5 % critical value | | 1% critical value | |
|---|---|---|---|---|---|---|---|
| | | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| F-statistic | 5.213 | 2.26 | 3.35 | 2.62 | 3.79 | 3.41 | 4.68 |
| T- statistic | -5.222 | -2.57 | -3.86 | -2.86 | -4.19 | -3.43 | -4.79 |

The results of the bound test approach as shown in Table 5 confirm the existence of the long-run relationship between the variables. According to the ARDL bound test, computed F-statistic 5.213 is higher than the upper and lower bound critical values at 1% level reject the null- hypothesis of no co-integration.

**The diagnostic tests**

**Test of Serial correlation:** the null hypothesis of this test denotes that the model does not suffer from autocorrelation, while the alternative denotes that the model suffers from autocorrelation. Using the Breusch-Godfrey Serial Correlation LM Test, the result shows that the model does not suffer from serial correlation since the p-value of Obs*R-squared is 0.3620 which is more than five percent. The serial correlation can be tested by using the Durbin-Watson's d test. Durbin-Watson's d tests the null hypothesis that the residuals are not linearly auto-correlated. While Durbin-Watson's d statistics can assume values between 0 and 4, values around 2 indicate no auto-correlation. As a rule of thumb values of $1.5 < d < 2.5$ show that there is no auto-correlation in the data.

In this study, the Durbin-Watson d Statistic is 2.0647. According to these statistics, it is certainly lies between 1.5 and 2.5. Therefore we can conclude that, this model does not suffer from autocorrelation problem.

**Test of Heteroskedasticity:** This test is based on the fifth assumption that should be satisfied in the regression model; **the variance of the error term should be constant.**

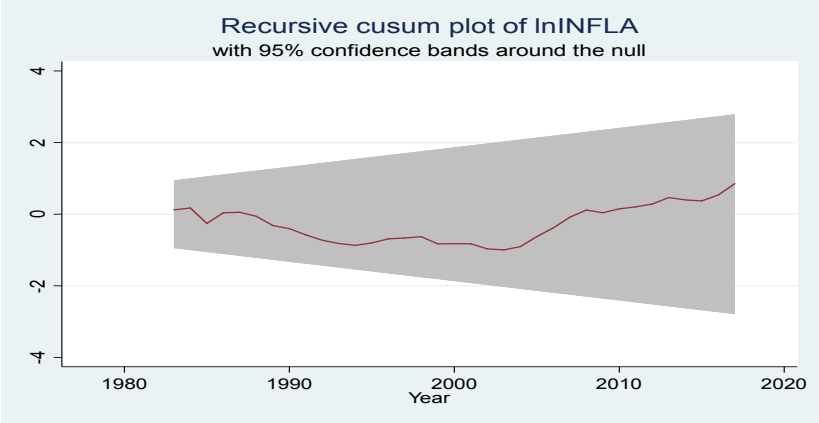
$$Var\ (u_i|X_i) = \sigma^2$$

It is assumed that the variance of the error term should be constant. This indicates that the variance of the error term does not depend on the sample unit. In other word, the variance of the error term does not change in response to the sample size. This constant variance of the error term called as 'homoscedasticity'. The violation of this assumption is called as 'Heteroscedasticity'. Therefore, it is more important to detect the heteroskedasticity. In this study, the 'Breusch-Pagan-Godfrey' (BPG) test is used. The null hypothesis of this test denotes that the model is homoskedasticity, while the alternative denotes that the model is heteroskedasticity. Using the BPG test the result shows that the model does not suffer from heteroskedasticity because the p-value of Obs*R-squared is 0.4787 which is more than 5 percent.

**Test of functional form misspecification:** the null hypothesis of this test denotes that the model does not have functional form misspecification, while the alternative denotes that the model suffers from having functional form misspecification. Therefore, this study used Ramsey Regression Specification Error Test (RESET) and the results indicate that the model does not suffer from functional form misspecification since the probability value of F statistics 0.3397 is higher than 5 percent.

**Test for parameter stability**

Figure 1 shows that the model was also checked for model stability and using the CUSUM test the red line did not exceed the best lines which indicate that the model is a good-fit.




Source: Author's Construction

**Figure 1: Stability test**

## 5. Conclusion

The main purpose of this study was to determine whether imports have an impact on inflation in Sri Lanka. The study employed the following econometrics techniques. The unit root test for testing the stationary in variables, ARDL bounds test to test for the long run relationship between variables as well as the error correction model for a short run relationship. These techniques were employed on yearly data for the period 1977 to 2017. The findings are that imports in Sri Lanka significantly affect the inflation in the short run. Furthermore, a significant positive relationship was found between imports and inflation in the long run. Therefore, it can be concluded that the impact of imports in Sri Lanka is important in explaining inflation in the short run but it is very important in the long run.

The huge impact of imports on inflation it is good enough to indicate that policy makers should focus more on imports effects on inflation in the long run. However the previous study done by Ogbokor and Sunde (2011) found a significant relationship in the short run. Sri Lankan policy makers need to establish project development that will reduce the heavy dependence on imports to keep stable prices in Sri Lanka. Some ways to do that is to encourage more investment into the economy in order to increase more production locally to reduce imports. The government can encourage more investment in small projects by increasing its investment through Small enterprise bank (SME bank).

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