AN ECONOMETRIC ANALYSIS OF MONEY SUPPLY AND BALANCE OF PAYMENT IN SRI LANKA (1977-2019)

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Abstract

This study examines the relationship between Balance of Payment and Money Supply in the context of Sri Lanka using annual data from Sri Lanka over the period of 1977-2019. The data of Balance of Payment (BOP), Money Supply (MS), Gross Domestic Product (GDP), Inflation (INF) and Government Expenditure (GE) was collected from the world development indicator and Annual Reports of Central bank of Sri Lanka. ADF and PP unit root test methods were employed to test the stationary of the series. The ARDL Bound test was applied to identify the co-integrating relationship and long-run relationship between the variables. Error Correction Model (ECM) was adopted to investigate the short-run relationship as well as long-run adjustment of the model. Finally, Granger Causality Test was adopted examine the causality relationship between variables. All unit root test methods confirmed that all variables are stationary at their both level and differences of the variables. The ARDL Bound Testing results confirmed that, there is a co-integrating relationship between the variables. Further, this test suggests that, BOP has positive and significant impact on MS in the long run. The Error Correction Model found that, there is no short run relationship between BOP and MS. Granger causality test reveals that uni-directional causality exists from MS to BOP. This result emphasizes that, in order to reduce the deficit of BOP in Sri Lanka MS could be used as a policy instrument in the long run.

Key words: Balance of Payment, Money Supply, ARDL, Bound test

1. Introduction

The money supply is all the currency and other liquid instruments in a country's economy on the date measured. The money supply roughly includes both cash and deposits that can be used almost as easily as cash. Governments issue paper currency and coin through some combination of their central banks and treasuries. Bank regulators influence money supply available to the public through the requirements placed on banks to hold reserves, how to extend credit and other regulation. The various types of money in the money supply are generally classified as MS, such as M0, M1, M2, M3 and M2b.

An increase in the supply of money typically lowers interest rates, which in turn, generates more investment and puts more money in the hands of consumers, thereby stimulating spending. Businesses respond by ordering more raw materials and increasing production. The increased business activity raises the demand for labor. The opposite can occur if the money supply falls or when its growth rate declines. Change in the money supply has long been considered to be a key factor in driving macroeconomic performance and business cycles. Macroeconomic schools of thought that focus heavily on the role of money supply include Irving Fisher's Quantity Theory of Money, Monetarism, and Austrian Business Cycle Theory.

The Balance of Payments (BOP) is a statement of all transactions made between entities in one country and the rest of the world over a defined period of time, such as a quarter or a year, also known as balance of international payments, summarizes all transactions that a country's individuals, companies, and government bodies complete with individuals, companies, and government bodies outside the country. These transactions consist of imports and exports of goods, services, and capital, as well as transfer payments, such as foreign aid and remittances.

The Balance of Payments divides transactions in two accounts: the current account and the capital account. Sometimes the capital account is called the financial account, with a separate, usually very small, capital account listed separately. The current account includes transactions in goods, services, investment income, and current transfers. The capital account, broadly defined, includes transactions in financial instruments and central bank reserves. Narrowly defined, it includes only transactions in financial instruments. The current account is included in calculations of national output, while the capital account is not.

The sum of all transactions recorded in the balance of payments must be zero. A trade deficit occurs when a country's imports exceed its exports during a given time period. It is also referred to as a negative balance of Payment (BOP). If the export value is greater than the value of import, the Balance of Payment becomes positive. That ia called a surplus Balance of Payment.

In the point view of Sri Lanka's Money supply, it fluctuates from year to year. In 1977 the Money supply was 24.24 percentage of GDP. This trend was observed for the first 4 months of 1978. After 1978 there has been a significant decline in Money supply. A higher Money supply showed at 60.79 percentage of GDP in 2018. And, a lower Money supply showed at 24.24 percentage of GDP in 1977. Sri Lanka's balance of Payment was 3.67 percentage of GDP surplus in 1977 following the liberalization. Since then the Balance of Payment has continued to be seen as negative.

The background of Money supply and the Balance of Payment, an increase in Money supply decreases a country's monetary value. The depreciation of this monetary value reduces the export price per unit in foreign currency and increased demand for exports. Further, the prices of imported goods will increase in the form of domestic currency. There by, demand for imports will decrease. On the other hand, the opposite effect can occur when the Money supply decreases. Next, with regard to the Balance of Payment, the excess Balance of payment will increase the Money supply and Balance of Payment deficit will decrease the Money supply.

The continued deficit of the Balance of payment leads to an economic downturn and a challenge to achieving an economic balance of the nation. Hence, there is a strong correlation between Money supply and the Balance of Payment. As a deficit Balance of Payment country, Sri Lanka's Balance of Payment effect by the Money supply. Hence this paper examines the relationship between Money supply and Balance of Payment, over the period of 1977-2019.

2. Literature Review

When we go through existing literature Su-hua,T & Ming-dong (2007) estimate the dynamic relationship between "two surpluses" of BOP and monetary supply based on offset and sterilization coefficient, estimates recursive dynamic sterilization coefficient and discusses the effectiveness of specific sterilizing tools using the quarterly data from 1994 to 2007. They found that, since 2001, the rapid accumulation of net foreign assets has been the most important sources of domestic excess liquidity, and before 2004 the sterilization coefficient stood around -0.6, and since 2004 the coefficient has shown the complete sterilization, which to some extent realizes the quantitative object of monetary supply.

In the context of Zimbabwe, Shumba (2013) examines the efficacy of money supply on the Balance of Payments by adopting various polices in the country. Monetary Policy formulation in Zimbabwe is usually targeted at achieving some

macro-economic objectives amongst which is equilibrium in the country's Balance of Payments (BOP). The research was conducted using an Ordinary Least Squares (OLS) technique of multiple regression models using statistical time series data from 1980-2010. The estimated result shows a positive relationship between the dependent variable (Balance of Payments) and the Independent variables (Money Supply, Gross Domestic Product, Inflation and Government Expenditure.

Boateng (2015) analyzes the balance of payments for the context of Ghana using a monetary approach with the aid of econometric models. The results also show that domestic credit, GDP growth, and interest rate are found to be significant. Domestic credit and interest rate are negatively related to net foreign assets while GDP growth is positively related. Inflation however is insignificantly related to net foreign assets. However, government expenditure and public debt may influence the balance of payment in Ghana.

Mean while, when go through the literatures in Sri Lanka, Silva (2007) estimates the influence of monetary expansion on inflation during the period, 1959–74. And found that, for the entire period, 1959–74, money supply has not exerted a statistically significant influence on domestic inflation. But for the more recent period, 1967–74, the impact of money supply on inflation appears to be statistically significant. It is also found that domestic inflation has not been strong enough to have an adverse effect on exports.

Jariya & Hasan (2008), analyze the balance of trade and its relationship with current account of balance of payment of Sri Lanka. Trend analysis is used as the analytical technique of this study for the time series data from 2008 to 2017. The finding of this study shows that the annual trade deficit of Sri Lanka is between 9 and 15 percent of its annual GDP during the period of 2008-20017. More than one fourth of all exports of Sri Lanka is to United States of America where as more than 80 percent of exports are dominated by India, China, Middle East, Asia-other and European Union to Sri Lanka. During the last decade, Sri Lanka was experiencing continuous trade deficit, which in turn depends on the behavioral pattern of exports and imports of Sri Lanka.

Kathriachchinge (2020) analyze the impact of the monetary expansion on Balance of Payments. For this purpose, simple linear regression technique has been used for twenty-three years data from 1995 to 2018 were collected from Central Bank of Sri Lanka and World Bank. The data analyze concluded that there is a negative string relationship among the country's balance of Payment and broad money supply. Furthermore, it was noted that in Sri Lanka interest rate, inflation rate and the exchange rate to have a negative impact on the Balance of payments

Number of studies have analyzed the relationship between money supply, Balance of Payment, around worldwide and Sri Lanka. Hence, none of the studies identified the relationship between money supply and Balance of Payment in the context of ARDL approach. This study will be the bridge for this gap.

3. Methodology

This study used Money supply as the main independent variable to examine the relationship between the Money Supply and Balance of Payment, with Gross Domestic Product, Inflation and Government Expenditure as control variables. Secondary data for the period of 1977-2019 were collected from the World Bank indicator annual reports of Central bank of Sri Lanka. ADF and PP unit root test methods were adopted to test that the series is not containing I(2) variables.

Akaika Information Criterion (AIC) is applied to determine the optimal lag length of each series. Following the empirical literature in determination of MS, we develop the long-run relationship between the variables as below:

$$BOP_{it} = \beta_0 + \beta_1 MS_{it} + \beta_2 GDP_{it} + \beta_3 INF_{it} + \beta_4 GE_{it} + U_{it}$$

Where, U_{it} is a white noice error term, t=1,2......T

Where Balance of Payment (BOP) is used as an endogenous variable, and the indepented variables are Money Supply (MS), Gross Domestic Product (GDP), Inflation (INF) and Government Expenditure (GE).

Here, U is the error term, and the subscript indicates time. Augmented Dickey-Fuller (ADF) unit root test were adopted to test the stationary property of data, and the Auto Regressive Distributed Lag (ARDL) model developed by pesaran et al. (2001) was employed to find the long-run and short-run relationship and long-run adjustment. The unrestricted Error Correction Model (ECM) was employed to the short-run dynamics of the ARDL model. Granger Causality Test was employed to check the causality relationship between the variables.

4. Results and Discussion

The ADF test confirmed that all the variables are stationary at their both level and differences of the variables. Akaika Information Criteria (AIC) suggested using ARDL (1,2,1,0,0) model for this analysis.
In table 1, calculated F-statistics=6.29 is higher than the upper bound critical value at 5% level of significance (3.49). Since we confirmed the cointegrating relationship between the variables through the bound test, we estimated the long-run relationship among the variables via the ARDL model.

According to the regression results, the MS has positive effect on BOP in the long run. This proves that as the increases, BOP improves. A 5% increase in the MS will lead to a 0.1995 unit increase in BOP. The GDP and the INF has adverse effects on BOP in the long run. A 5% increase in the GDP will lead to a 1.2692 unit decrease in BOP. And A 10% increase in the INF will lead to a 0.2418 unit decrease in BOP.

The research of the diagnostic test show the model is correctly specified and the parameters are correctly estimated. The all exhibit probability values that are greater than the significant level of 5% and 10% (see Tables 2 and 3).

Accordingly expected, ECT (-1) carries a negative sign. Which is highly significant, indicating that there should be and adjustment toward the steady-state line in the long run equilibrium at the speed at 98% one period after the exogenous shocks (see Table 4).

The Error Correction Model found that, there is no short run relationship between MS and BOP. The coefficient of GDP in the previous year (at lag 2) is negative. This means that during that period, a 5% decrease in the GDP will lead to a 0.7723 unit decrease in BOP. The INF in the current short- run period has a negative impact on BOP. A 10% increase in the INF brought about a 0.2015 unit decline in BOP. The GE in the previos year (at lag 1) has a positive impact on BOP. A 10% increase in the GE will lead to a 0.9445 unit increase in BOP (see Table 4).

The Granger Causality Test results suggest unidirectional causality that runs from MS to BOP and GDP to BOP (see Table 5).

Table 1: F-Test for the Existence of a Long-Run Relationship

F-Bound test 94% level of Confidence		
F-Statistics	**Lower Bound**	**Upper Bound**
6.29	2.56	3.49

Table 2: Regression Result

Constant	MS	GDP	INF	GE	R²
-12.3099 (0.0233)	0.1995** (0.0268)	-1.2692** (0.0105)	-0.2418*** (0.0593)	0.3911 (0.1508)	0.450008

Note: *P*-value is given in parenthesis. **,*** show significance at 5% and 10% level, respectively.

Table 3: Diagnostic Test Results

Diagnostic	P-value	Conclusion
Ramsey RESET Test	0.0380*	No Omitted Variables
White Test	0.6420***	No Heteroscedasticity
Bruesch-Godfrey Serial Correlation LM Test	0.7408**	No Serial correlation

Note: *P*-value is given in parenthesis. *,**,*** show significance at 1%, 5% and 10% level, respectively.

Table 4: Short-Run Co-efficient Estimates and Error Correction Representation

Lag order	D(MS)	D(GDP)	D(INF)	D(GE)	ECT(-1)
0	0.2555 (0.4372)	-0.3382 (0.2797)	-0.2015*** (0.0583)	-0.0937 (0.8126)	-0.9888* (0.0012)
1		-0.4530 (0.1792)		0.9444*** (0.0560	
2		-0.7723** (0.0147)			

Note: *P*-value is given in parenthesis. *,**,*** show significance at 1%, 5% and 10% level, respectively.

Table 5: Extracted output og Granger Causality Test

Null Hypothesis	Obs	F-Statistics	Prob.
D(MS) does not Granger Cause D(BOP)	39	1.9968	0.06842
D(BOP) does not Granger Cause D(MS)	39	1.7656	0.1864

5. Conclusion

This paper examines the correlation between Money Supply and Balance of Payment using Money Supply as the main independent variable and Gross Domestic Product, Inflation and Government Expenditure as control variables from 1977-2019. Augmented Dickey-Fuller (ADF) unit root test were adopted to test the stationary property of data. The Auto-

Regressive Distributed Lag (ARDL) model was developed to find the long-run and short-run relationship and long run adjustment. Bound test approach was employed to investigate the existence of a long- run relationship among the variables. The unrestricted Error Correction Model (ECM) was employed to the short-run dynamics of the ARDL model. Granger Causality Test was employed to check the causality relationship between the variables.

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This result emphasizes that, in order to reduce the deficit of BOP in Sri Lanka MS could be used as a policy instrument in the long run.

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