

THE IMPACT OF EXCHANGE RATE ON BALANCE OF PAYMENT: AN ECONOMETRIC INVESTIGATION ON SRI LANKA

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ABSTRACT

The exchange rate and its direct and indirect impacts are widely addressed issue at present. Exchange rate is a fundamental macroeconomic variable that affects not only for economic performance of the particular country but also it has an impact of other countries throughout the world. The exchange rate is a key determinant of balance of payments (BOP) of the country. Thus, this study attempts to examine the impact of exchange rate on balance of payment by adopting Sri Lanka data over the period of 1978 to 2016. Johansen cointegration technique is used to identify the number of cointegrating relationship and long run relationship, Short run relationship and long run adjustment are examined by using error correction model. Johansen co-integration Trace test statistics and Maximum Eigen value both are identified two co-integrating relations in the system of equation. The results of Johansen co-integration identified exchange rate have a positive and significant long-run relationship with balance of payment. There is a positive and significant adjustment towards the long-run equilibrium between exchange rate and balance of payment in Sri Lanka. Error correction coefficient (0.003) of exchange rate reveals that 0.3% (less than 1%) disequilibrium is corrected by each year one period after the exogenous shocks which implies that exchange rate moves downward towards the long run equilibrium path. while error correction coefficient of balance of payment and lending interest rate move upward towards with long run equilibrium path in each year one period after the shocks. But other macroeconomic variables do not have adjustment towards long-run equilibrium. Finally, this study concludes either devaluation under fixed exchange rate regime or allowing depreciation under freely floating exchange rate regime of the domestic currency against foreign currencies can use as a short term and long term policy measurement to correct the balance of payment imbalance situation.

Keywords: *Exchange Rate, Balance of Payment, Johansen Cointegration, Error Correction Model*

INTRODUCTION

The exchange rate and its direct and indirect impacts are widely addressed issue at present. Especially exchange rate has an impact on balance of payment (current account, capital account and financial account), inflation, interest rate, remittance, foreign direct investment, money supply, unemployment, tourism, government operations (public debt, budget deficit) and some of other macro-economic variables. Though, exchange rate has a major impact on balance of payment among other macro-economic variables. Initially exchange rate is a fundamental macroeconomic variable that affects

not only for economic performance of the particular country but also it has an impact of other countries throughout the world. Exchange rate plays a major role in the international economic integration because all nations are not hold autarky equilibrium so they are holding an international economic relation with other countries (Oladipupo and Onataniyohuwo, 2011). Trade openness affirms exchange rate is an imperative endogenous variable because it opens the door for international trade.

Basically exchange rate refers to the price of one currency in terms of another foreign currency. Different countries operate under different exchange rate regime. Both fixed exchange rate regime and floating exchange rate regime were adopted within the Sri Lankan context. Sri Lanka's exchange rate policy has gradually evolved from a fixed exchange rate regime in 1948 to an independently floating regime by 2001. Sri Lanka, which followed a managed floating exchange rate regime with crawling bands since 1977, shifted to an independently floating exchange rate regime in January 2001 due to the strong need of maintaining a large stock of international reserves. As Sri Lanka currently follows a flexible exchange rate regime the exchange rate of the country is determined by the supply and demand for foreign exchange in the economy (Central Bank of Sri Lanka, 2016).

The supply of foreign exchange depends on the inflows to the economy such as export proceeds, workers' remittances, tourist earnings, direct investment flows and foreign loans while the demand for the same depends on outflows such as import payments and loan repayments. The exchange rate is a key determinant of balance of payments (BOP) of the country. One of the major objectives of the exchange rate based stabilizations is to improve the balance of payment performance through international competitiveness (Alawattage, 2002). Balance of Payments is a balance of international monetary transactions at a specific period; it encompasses all transactions between a country's residents and its nonresidents involving goods and services and income; financial claims on and liabilities to the rest of the world; and transfer such as gifts. Usually, the BOP is calculated every quarter and every year.

There is a currency depreciation as well as appreciation situation under the flexible exchange rate regime. Appreciation is an increase in the value of one currency in terms of another while depreciation is a fall in the value of a currency. Appreciation of the exchange rate brings some positive impact of economy. Especially it reduce the burden of public debt, budget deficit and other resettle the external loans of the country. More over the biggest disadvantage of the higher or stronger exchange rate leads to the trade deficit because the higher exchange rate brings imports more cheaply for domestic consumer and exports are expensive for foreigners. This causes the imbalance situation of balance of payment through the impact of current

account deficit. Trade deficit or current account deficit or balance of payment deficit can exert a contradictory effect of economy.

In addition to that the appreciation of exchange rate directly has an impact on the consumer price index through the reduction of price of the imported goods and services. This causes the inflation issues inside countries. Moreover exchange rate appreciation leads a slower growth of real gross domestic product because of cut down net exports (rise up the demand for imports and fall down the demand for exports) of the country. This exerts the impact on circular flow of the economy. Reduction of demand for output carries out the unemployment problem within the country. When the imports share take up the higher portion in the domestic market which permanently rise up the jobless issues. Therefore exchange rate appreciation reduces the burden of the public debt while it has a huge negative multiplier effects on the economy.

On the other hand, depreciation of the exchange rate stimulates demand, profits, outputs, employment, investment and remittance. Appreciation provides a competitive boost to an economy and it has a positive multiplier impact in the economy. Cheaper exchange rate brings the makes imports more expensive for domestic consumers and exports cheaper for foreigners. It has a positive impact on the country's trade deficit which erodes the imbalance situation of balance of payment crisis through the reduction of current account deficit. Such a policy would encourage domestic consumers to consume domestically produced alternative goods.

More importantly, depreciation of the exchange rate would improve export competitiveness of the country as the depreciated exchange rate would lower the cost of goods exported from that country to the rest of the world. The combined effect of exchange rate depreciation on imports and exports would boost domestic demand for alternative domestically produced goods and foreign demand for our exports, thus favourably contributing to enhancing exports, employment and economic growth in the country (Central Bank of Sri Lanka, 2016). Depreciation of also has the effect of increasing the value of profits and income for a country's businesses with investments overseas. And it is a boost to tourist and farming industries while it rise up the public burden of the country. But in the short term depreciation may not improve the current account of the Balance of Payments.

Theoretically, the BOP should be zero which indicates the assets (credits) and liabilities (debits) should be balance but in the practice this is rarely happened not only for the Sri Lankan situation but also all over the world. Exchange rate has an impact on each and every account of BOP such as current account, capital account and financial account and its sub divisions therefore it is related with the international market and the supply and

demand for a specific currency market. If there is any impact of exchange rate on the balance of payments only exist under a free floating exchange regime; does not in the fixed floating system. The impact of exchange rate on balance of payment is explained theoretically by using J-Curve analysis.

There are number of empirical studies have been carried out the impact of exchange rates on BOP with mixed results. Ahmad et al. (2014) estimated the impact of exchange rate on the balance of payment in Pakistan employed with the unit root, ARDL and Granger causality test. The study concludes there is a significant and positive relationship between exchange rate and BOP. Therefore the stability of exchange rate creates a positive environment by encouraging the investment and that can improves balance of payment.

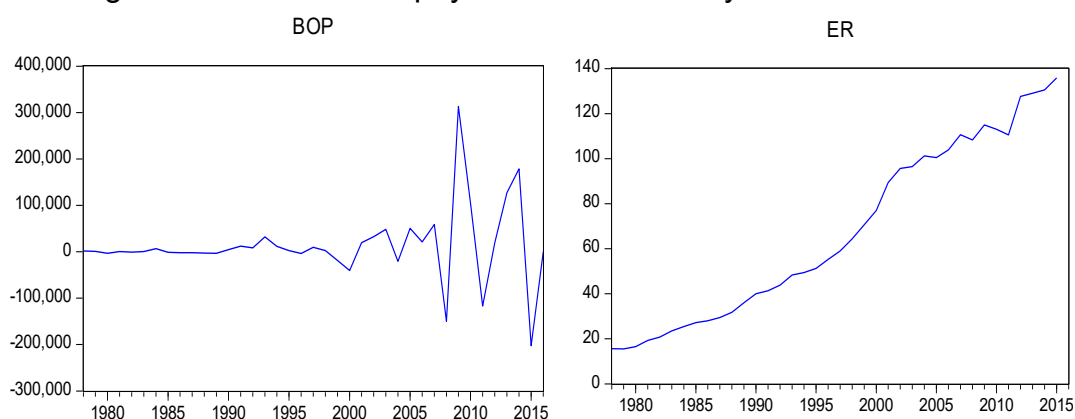
Lyoboyi and Muftan (2014) analyzed the impact of exchange rate depreciation on the balance of payments in Nigeria using multivariate vector error correction framework, generalized impulse response functions and variance decomposition methods over the period of 1961–2012. The study found a long-term relationship between BOP and exchange rate and there are bidirectional causalities between BOP and other variables which are employed into the study. Moreover, Odili (2014) also investigated the impact of exchange rate on the balance of payment position in Nigeria from 1971 to 2012 by using autoregressive distributed lag (ARDL) co-integration estimation technique. The study was found a positive and statistically significant relationship in the long-run while a positive but statistically insignificant relationship in the short-run. The results further revealed that devaluation improves balance of payment and that Marshall-Lerner (ML) condition subsists for Nigerian context.

Rasaq (2013) investigated the impact of exchange rate volatility on macroeconomic variables by using correlation matrix, ordinary least square (OLS) and Granger causality test. That study confirmed the exchange rate volatility has a positive influence on Gross Domestic Product, Foreign Direct Investment and Trade Openness but with negative influence on the inflationary rate in the country. Ontaniyohuo and Onataniyohuwo (2011) analyzed the impact of exchange rate on balance of payments in Nigeria using ordinary least square method of estimation or data covering the period of 1970-2008. They found out exchange rate depreciation can lead to improve the balance of payments position. They also found out that improper allocation and misuse of domestic credit, fiscal indiscipline, and lack of appropriate expenditure control policies due to centralization of power in government is some of the causes of persistent balance of payments deficits in Nigeria.

Alawattage (2002) examined the effectiveness of exchange rate policy of Sri Lanka in achieving external competitiveness since liberalization of the

economy in 1977. He found out the real effective exchange rate does not have a significant impact on improving the trade balance particularly in the short run. Even though the co-integration tests revealed that there is a long-run relationship between trade balance and the real effective exchange rate, it shows very marginal impact in improving trade balance in the long run. Lotfalipour and Bazargan (2014) investigated the impact exchange rate volatility on trade balance of Iran by using the GARCH approach and balance PANAL data model for the sample period from 1993 to 2011. The study found real effective exchange rate has no significant effect on the trade balance.

Exchange rate is an important macro-economic policy tool in the economy. In recent decades there is ongoing debate about the rupee value appreciation and depreciation in the Sri Lankan context. Sri Lanka is straggling with the public debt issues; it was accounted 77% of GDP in 2016. In order to resettle the public debt, Sri Lanka will rely on the exchange rate appreciation within the country, but if it maintains the exchange rate appreciation it can't keep the balance of payment balance situation. While it maintains the depreciation it can achieve all other macro-economic goals of the country except resettlement of the public debt. Therefore Sri Lanka faces the exchange rate difficulties within the country. On the other hand Sri Lanka faces the balance of payment crisis because of the fundamental weakness in the trade balance, capital outflows and inadequate foreign investment which leads balance of payment crisis in the country. A sound macro-economic and financial policy is imperative to resolve the current crisis of balance of payment and pressure of exchange rate policy in order to ensure the stability in the country's external finances. Therefore this study trying to investigate the impact of exchange rate on balance of payment of the country.



Source: World Development Indicators(1978 - 2016)

According to the above Sri Lankan data, it is difficult to identify the clear relationship between exchange rate and balance of payment deficit. This is also motivated to do the econometric investigation between these variables since the quantitative assessments between these variables are inadequate

and limited in the Sri Lankan context. Therefore this study attempts to fill this gap by investigating the impact of exchange rate on balance of payments situation in Sri Lanka.

OBJECTIVE

The main objective of this study is to empirically analyze the impact of exchange rate on balance of payment in Sri Lanka during the period of 1978 to 2016. Sub objectives are to identify the causal relationship, short run relationship, long run relationship and long run equilibrium of the model.

METHODOLOGY

There are two main theories explained the behavior of exchange rate (Olidi, 2011). First, elasticity approach is the substitution effects in consumption and production induced by relative price change resulting from exchange rate devaluation. Another aspect of elasticity approach to balance of payment – exchange rate relationship is the Marshall-Lerner (ML) condition (Marshall, 1923, Lerner, 1944).

The theory states that devaluation helps to improve BOP deficits of a country by increasing its exports and reducing its imports. But the extent to which it will succeed depends on the country's price elasticity of domestic demand for imports and foreign demand for exports. The main substance of Marshall – Lerner condition is that when the sum of price elasticity of demand for exports and imports, in absolute terms is equal to unity, depreciation or devaluation has no effect on the balance of payment situation which will remain unchanged. $E_X + E_M = 1$: No change

Where: E_X is the demand elasticity of exports and E_M is the demand elasticity for imports.

The sum of price elasticity of demand for exports and imports in absolute terms is greater than unity; depreciation or devaluation will improve the country's balance of payments. $E_X + E_M > 1$: Improvement

On the other hand, if the sum of price elasticity of demand for exports and imports, in absolute terms is less than unity, depreciation or devaluation will worsen on the balance of payment because which increase the burden of the balance of payment deficit. $E_X + E_M < 1$: Deterioration

Second, monetary approach focuses on both the current and capital accounts of the balance of payments but elasticity only consider the current account (Ontaniyohuo and Onataniyohuwo (2011). Monetary approach suggested examining the balance of payment in terms of demand for goods and services and supply of money (Kouri, 2011). In this approach also

indicates the depreciation or devaluation leads to correct the balance of payment imbalance situation.

Another thought is the Mundell Fleming model, in which exchange rate are not having a direct effect on output, but indirectly having the impacts on import, export and the money supply (Iyoboyi & Muftan, 2014). In this model, depreciation is theoretically expected to have positive effect on export and it would reduce import as a result of the higher relative price of imported goods, thus increasing net export and income where the Marshall Lerner condition is satisfied.

Apart from the theoretical background, in this study has been used the time series data gathering from World Bank and Central Bank Reports spanning from 1978 to 2016. ADF, PP and Ng-Perron unit root test is applied to check out the stationary properties of the data. Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), Sequential modified LR tests statistics are adapted to determine the optimal lag length. The granger causality test is employed to find out the relationship and number of co-integrating relationship is examined by using Johansen co-integration approach which is described as:

$$BOP_t = \Pi_0 + \Pi_1 CA_t + \Pi_2 ER_t + \Pi_3 RGDP_t + \Pi_4 LIR_t + \Pi_5 CPI_t + \Pi_6 TO_t + U_t \quad (1)$$

Where, BOP: Balance of Payment, CA: Current Account Balance, ER: Exchange Rate, RGDP: Real Gross Domestic Product, LIR: Lending Interest Rate, CPI: Consumer Price Index, TO: Trade Openness and U_t Is the white noise error term. Following general specification of theoretical framework was developed by Oladipupo & Ogheneovo (2011).

Error correction model (ECM) used to identify the short-run and long-run relationship as well as long-run equilibrium of the model. The model is given below:

$$\Delta Y_t = \delta_0 + \Psi Y_{t-1} + \sum_{i=1}^{p-1} \gamma_i^* \Delta Y_{t-i} + \varepsilon_t \quad (2)$$

Where, $\Psi = \alpha B'$. where, α : error correction term B' : (1×7) vector of cointegrating coefficients, $Y_t = [BOP_t, CA_t, ER_t, RGDP_t, LIR_t, CPI_t, TO_t]'$ vector of dependent variables, Y_{t-i} : lagged value of Y_t and ε_t : white noise error term.

RESULTS AND DISCUSSIONS

All three unit root tests method are ADF, PP and Ng-Perron applied to check out the stationary properties of the data. The results of ADF and PP are reported in Table 1.

H_0 = There is Unit Root

H_1 = There is no Unit Root

Table - 1, Results of ADF and PP Unit Root Test (With and Without Trend)

Variables	ADF				PP			
	Level		1 st difference		Level		1 st difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept	Intercept	Trend & Intercept	Intercept	Trend & Intercept
BOP	0.6449	0.0638	0.0000	0.0044	0.0754	0.0624	0.0001	0.0000
CA	0.9459	0.6538	0.0786	0.0704	0.1689	0.0764	0.0000	0.0000
CPI	1.0000	0.9795	0.0514	0.0212	1.0000	0.9757	0.0601	0.0237
ER	0.9684	0.4345	0.1899	0.4637	0.9969	0.3919	0.0000	0.0000
LIR	0.2440	0.0818	0.0000	0.0000	0.2440	0.0813	0.0000	0.0000
RGDP	1.0000	1.0000	0.2162	0.0089	1.0000	1.0000	0.3335	0.0101
TO	0.8201	0.8876	0.0001	0.0004	0.7918	0.8616	0.0001	0.0004

PP test confirmed that all the variables are stationary at their first difference with trend which suggesting that all variables considered under this study are integrated in order one in PP test. Once, established the order of integration, the study process requires the estimation of the relationships among the variables included. However, before estimating this relationship need to identify the optimal lag length of the model. Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), Sequential modified LR tests statistics are adapted to determine the optimal lag length. The lag length selection results are provided in the Table 2.

Table - 2, Results of Optimal Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2455.294	NA	1.50e+49	133.0969	133.4017	133.2044
1	-2170.260	446.8100*	4.53e+43*	120.3384*	122.7765*	121.1979*

Note: * indicates lag order selected by the criterion. LR: sequential modified likelihood ratio test statistic, FPE: final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion and HQ: Hannan Quinn information criterion test statistics

All the lag length selection criteria suggested that to use one lag as an optimal lag length for this study. Therefore, one lag included into the model. The granger causality test is employed to find out the causal relationship between balance of payment and exchange rate in Sri Lanka. The results of Granger Causal Test are presented in Table 3.

Table - 3, Results of Granger Causal Test

Nulhypothesis	obs	F-Statistics	Probability
ER does not Granger Cause BOP BOP does not Granger Cause ER	37	2.76934 17.7468	0.1053 0.0002
CA does not Granger Cause BOP BOP does not Granger Cause CA	37	4.78224 9.29444	0.0357 0.0199
LIR_ does not Granger Cause BOP BOP does not Granger Cause LIR_	37	0.00812 5.97324	0.9287 0.0199

The above table reflect relationship between balance of payment and exchange rate as well other macro-economic variables which are having a causal relationship with balance of payment. The results show that real exchange rate does not granger

cause with balance of payment but balance of payment granger cause with exchange rate because null hypothesis rejected at 5% level of significant. Therefore there is a unidirectional causality between balance of payment and exchange rate. But there is a bi-directional causality running from current account to balance of payment and balance of payment to current account. There is a unidirectional causality running from balance of payment to lending interest rate.

The trace statistics and maximum eigenvalue statistics of Johansen co-integration technique are detected to identify the co-integrating relations in the system of equation at 5% level of significance. The results of Johansen Co-integration test are presented in Table 4.

Johansen Co-integration Trace test statistics and Maximum Eigen value both are identified two co-integrating relations in the system of equation at 5% level of significance since reject null hypothesis at rank 0 and 1 but failed to reject null hypothesis at rank 2. This indicates the existence of long-run correlation between the variables. Therefore, two co-integrating relations are adopted into the Vector Error Correction Model of this study.

Table - 4, Results of Johansen Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.880696	229.3962	150.5585	0.0000
At most 1 *	0.787207	152.8574	117.7082	0.0001
At most 2 *	0.625396	97.14971	88.80380	0.0109
At most 3	0.535997	61.80182	63.87610	0.0738
At most 4	0.348820	34.15872	42.91525	0.2813
At most 5	0.301995	18.71584	25.87211	0.2979
At most 6	0.148159	5.772814	12.51798	0.4897

Results of Johansen Co-integrating Equation

$$BOP_t = -103.23LIR_t + 0.000000289CA_t - 47.18CPI_t + 6.19ER_t + 0.0000000888RGDP_t$$

(35.79)
(0.0000002)
(18.6)
(13.14)
(0.000000053)

Note: t-statistics are given in the square brackets and standard error in parentheses

First, the results of Johansen Co-integration in long run identified two co-integrating relations which confirmed the long-run relationship among the regressions. It shows that increase in exchange rate has a positive and significant long-run relationship with balance of payment. When exchange rate increases by 1 unit that should be increased the balance of payment by 6.19 units while other variables are holding constant at 5% level of significant. Which reflect the exchange rate depreciation leads to increase the balance of payment deficit through the effects current account, capital account and financial account of Sri Lanka.

Increases of lending interest rate and inflation further encourage to the balance of payment deficit of the country through the effects of current account, capital account and financial account. Most of the Sri Lankan investors accumulate their investment accessing loans from the financial institutions. However increase of lending interest

rate is a barrier for the accumulation of investment as well as capital of the country and inflation affects the imports and foreign and local investment which result become deficit balance of payment. Hence real gross domestic product of the country and current account balance have a positive impact on balance of payment of Sri Lanka.

Table - 5, Results of ECM Long Run Equilibrium

	D(BOP)	D(TO)	D(LIR)	D(CA)	D(CPI)	D(ER)	D(RGDP)
Cointegrating Equation 1	0.197575	0.003143	0.001495	-1477196.	0.001491	-0.003113	231334.9
	(0.24846)	(0.00197)	(0.00074)	(331431.)	(0.00112)	(0.00100)	(313653.)
	[2.79519]	[1.59541]	[2.02475]	[-4.45702]	[1.33163]	[-3.12871]	[0.73755]

Second, the table 5 denotes the coefficients of speed of adjustment which explain how the above model is adjusted towards long-run equilibrium. There is a negative and significant adjustment towards the long-run equilibrium between exchange rate and balance of payment of Sri Lanka. Error correction coefficient (0.003) of exchange rate reveals that 0.3% (less than 1%) disequilibrium is corrected by each year one period after the shocks which implies that exchange rate moves downward towards the long run equilibrium path while error correction coefficient of balance of payment and lending interest rate move upward towards with long run equilibrium path in each year one period after the shocks.

The short run part of the results of ECM (given in appendix) shows that last year exchange rate has a positive and statistically significant short-run relationship with current year balance of payment which is also emphasize the exchange rate depreciation leads to reduce the balance of payment deficits in the short run as well. Johansen co-integration long run relationship, Long run equilibrium and short run relationship of the error correction model resulted there is a positive and statistically significant relationship between balance of payment and exchange rate in Sri Lanka.

CONCLUSION

All three unit root tests are ADF, PP and Ng-Perron applied to check out the stationary properties of the data. PP test confirmed that all the variables are stationary at their first difference with trend. All the lag length selection criteria suggested that to use one lag as an optimal lag length for this study. Therefore one lag included into this analysis. The granger causality test is employed to find out the causal relationship between exchange rate and balance of payment in Sri Lanka. In this study found there is a unidirectional causality between balance of payment and exchange rate. Johansen co-integration Trace test statistics and Maximum Eigen value both are identified two co-integrating relations in the system of equation. The results of Johansen co-integration identified exchange rate have a positive and significant long-run relationship with balance of payment

There is a significant adjustment towards the long-run equilibrium. Error correction coefficient (0.003) of exchange rate reveals that 0.3% (less than 1%) disequilibrium

is corrected by each year one period after the shocks which implies that exchange rate moves downward towards the long run equilibrium path while error correction coefficient of balance of payment and lending interest rate move upward towards with long run equilibrium path in each year one period after the shocks. But other macroeconomic variables do not have adjustment towards long-run equilibrium. The short run part of the results of ECM shows that last year exchange rate has a positive and statistically significant short-run relationship with current year balance of payment which also emphasize the exchange rate appreciation leads to increase the balance of payment deficits. In other words exchange rate depreciation improves the balance of payment (It followed the results of Ahmad et al, 2014; Odili, 2014 and Iyoboyi & Muftan, 2014).

A nation cannot continue to survive with a balance of payment deficit, as it results in continuous deterioration of the foreign reserves of the nation. If the nation does not have sufficient foreign reserves to meet the resources requirements to meet foreign obligation, it has to borrow abroad. The final outcome is increase in foreign debt service ratio and interest payments for a given period. In order to reduce the excessive balance of payment deficit, Sri Lanka can use exchange rate as a policy variable. First, need to reduce the trade deficits, therefore discourage over-reliance on imported goods and the promotion of domestic export is very imperative. Depreciation or devaluation of the domestic currency against foreign currencies encourages exports while imports are discouraged after the change in exchange rate. Both inflows and outflows of foreign exchange associated with transaction under the trade account are sensitive to exchange rate movements.

Second, improve the foreign reserves because primary reason for the low foreign exchange reserves is the fundamental flaws in the country's trade balance. Expansion of foreign reserves leads to the surplus of the balance of payment. Third, control the capital outflow from our country while international interest rate changes may have been an important reason for investors to move out of the Sri Lankan Treasury Bond investments, the domestic performance of the economy and uncertain policy environment, too contributed to the capital outflows. People have a limited lifetime and their generation overlaps gradually; therefore increasing balance of payment deficits allow to shift taxes on the next generation and reduce their expenditure on consumption and saving, so which have devastating consequences for economic growth.

This study confirms that the exchange rate appreciation leads to deficit balance of payment on contrast exchange rate depreciation improves the balance of payment of Sri Lanka. Sri Lanka relies on the exchange rate depreciation it can reduce the crisis of expanding balance of payment deficit. The combined effect of exchange rate depreciation on imports and exports would boost domestic demand for alternative domestically produced goods and foreign demand for our exports, thus favourably contributing to enhancing exports, employment and economic growth in the country. Therefore in this study suggested applying exchange rate as a policy instrument variable to remove the balance of payment crisis. Therefore, either devaluation under fixed exchange rate system or allowing depreciation under freely floating exchange rate system of the domestic currency against foreign currencies

can use as a short term and long term policy measurement to correct the balance of payment imbalance situation.

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APPENDIX : Results of ECM Short Run Relationship

Error Correction:	D(BOP)	D(TO)	D(LIR)	D(CA)	D(CPI)	D(ER)	D(RGDP)
D(BOP(-1))	-0.390153 (0.25749) [-1.51523]	-0.001587 (0.00248) [-0.64005]	0.001491 (0.00093) [1.60357]	126984.4 (417226.) [0.30435]	0.001206 (0.00141) [0.85507]	0.004013 (0.00125) [3.20354]	1009583. (394846.) [2.55691]
D(TO(-1))	16.12304 (21.8490)	0.125292 (0.21043)	0.166988 (0.07889)	14126961 (3.5E+07)	0.068986 (0.11963)	0.151273 (0.10629)	-35941846 (3.4E+07)

	[0.73793]	[0.59540]	[2.11677]	[0.39903]	[0.57664]	[1.42321]	[-1.07275]
D(LIR(-1))	5.658717 (51.6041) [0.10966]	-0.944957 (0.49701) [-1.90128]	-0.301849 (0.18632) [-1.62005]	48171774 (8.4E+07) [0.57610]	-0.021881 (0.28256) [-0.07744]	-0.337718 (0.25104) [-1.34527]	-84976853 (7.9E+07) [-1.07386]
D(CA(-1))	1.25E-06 (3.7E-07) [3.34891]	7.11E-11 (3.6E-09) [0.01983]	-2.07E-09 (1.3E-09) [-1.54003]	0.901678 (0.60308) [1.49511]	-1.63E-09 (2.0E-09) [-0.80115]	-4.87E-09 (1.8E-09) [-2.69208]	-1.474798 (0.57073) [-2.58404]
D(CPI(-1))	-77.33398 (60.5772) [-1.27662]	-0.004405 (0.58343) [-0.00755]	0.400702 (0.21872) [1.83204]	-1.87E+08 (9.8E+07) [-1.90869]	0.732686 (0.33169) [2.20895]	-0.820703 (0.29469) [-2.78495]	49630364 (9.3E+07) [0.53428]
D(ER(-1))	118.2194 (34.1649) [3.46026]	0.277707 (0.32905) [0.84397]	0.019385 (0.12336) [0.15715]	-1.21E+08 (5.5E+07) [-2.17707]	0.286875 (0.18707) [1.53352]	0.038749 (0.16620) [0.23314]	-10772831 (5.2E+07) [-0.20563]
D(RGDP(-1))	1.09E-07 (1.3E-07) [0.85164]	1.51E-09 (1.2E-09) [1.22001]	2.11E-10 (4.6E-10) [0.45508]	-0.293418 (0.20788) [-1.41148]	1.26E-09 (7.0E-10) [1.79185]	-1.97E-09 (6.2E-10) [-3.15826]	0.174627 (0.19673) [0.88765]
C	875.3059 (330.530) [2.64819]	-4.157525 (3.18341) [-1.30600]	-1.890473 (1.19341) [-1.58410]	1.53E+09 (5.4E+08) [2.85158]	-2.181635 (1.80982) [-1.20545]	9.048930 (1.60794) [5.62765]	1.19E+09 (5.1E+08) [2.35070]