An Investigation of Factors Affecting the Exchange Rate in Sri Lanka

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Introduction

The exchange rate is defined as the number of units of domestic currency that are needed to buy one unit of foreign currency. It plays a vital role in a country's level of trade, which is critical to every free market economy in the world. This is because changes in exchange rates have pervasive effects on prices, wages, interest rates, production levels, and employment opportunities. Further, depreciation and appreciation of the exchange rate affect the economy in different ways. In general, appreciation of a country's currency lowers the inflation and domestic prices of imports. Also, the burden on foreign debt becomes less. Lower import prices will encourage imports and worsen the country's trade balance. Exporters will be discouraged by the reduction in their income in domestic currency. Depreciation will have the opposite effect. For these reasons, exchange rate is the most watched economic measure of any country.

In Sri Lanka, during the fixed exchange rate period, the currency was devalued from Rs. 4.76 per US$ at the end of 1950 to Rs.15.56 at the end of 1977. After commencing the managed float exchange rate regime, it further depreciated to Rs. 80.06 at the end of 2000. Immediately after the flexible exchange rate regime, the exchange rate depreciated from Rs.93.16 at the end of 2001 to Rs. 182 at the end of 2019. These changes reflect a 415% depreciation during the managed float period of 22 years (nearly 19% per year) and 102% depreciation during the flexible exchange rate system of 18 years (nearly 6% per year) so far. The total currency depreciation is nearly 941% in 40 years of managed and flexible float period which is nearly 23.5% per year on average (www. daily news.lk, 2020). However, it is difficult to identify particular reasons for such different rates of currency depreciation.

There are many studies showing the relationship between the exchange rate and its determinants for a number of countries. According to Saeed et al. (2012) stock of money and foreign exchange reserve balance positively contribute to exchange rate appreciation in Parkistan. Further, debt and political instability affect it negatively. Venkatesan and Ponnamma (2017) found that foreign direct investment, Gross Domestic Saving and inflation contribute negatively to the exchange rate in India. Meanwhile, current account deficit and interest rate positively affect the exchange rate. Rajakaruna (2010) has investigated the factors that affect exchange rate fluctuation in Sri Lanka. The study revealed a negative relationship between exchange rate and inflation, interest rate, remittance and terms of trade. In addition, it identified a positive relationship between the exchange rate and net foreign purchase.

However, none of the previous studies have considered the relationship between exchange rate and its determinants using the ARDL Bound testing approach in Sri Lanka. Further, this is the first study to include foreign direct investment net inflow, public debt and consumer price index as explanatory variables when estimating factors that affect the exchange rate. These motivate to fill this gap in literature. Further, findings of this study would help policymakers to adopt appropriate strategies and policies regarding exchange rate in Sri Lanka.

Objective

The primary objective of this study is to investigate the main factors that affect the exchange rate in Sri Lanka.

Methodology

This study covers the Annual data of Sri Lanka over the period 1977 – 2018. Data for the exchange rate (ER), interest rate (IR), current account deficit (CAD) and public debt (PBD) were extracted from Annual Reports of the Central Bank of Sri Lanka, while those for consumer price index (CPI), foreign direct investment net inflow (FDINI) and remittance (REM) were obtained from World Development Indicators of the World Bank data base. All variables, except IR, were transformed into a natural logarithm. ADF and PP unit root test methods were adapted to test the stationarity property of the series. Akaike Information Criterion (AIC) is applied to determine the optimal lag length of each series. The empirical model was formulated based on the literature as given below:

$$\mathrm{LER_t} = \beta_0 + \mathrm{LFDINI_t} + \mathrm{LPBD_t} + \mathrm{LREM_t} + \mathrm{IR_t} + \mathrm{LCAD_t} + \mathrm{LCPI_t} + \mathrm{U_t} \quad (1)$$

Where, $\mathrm{U_t}$ is the white noise error term, t = 1, 2, 3 ………T.

Autoregressive Distributed Lag (ARDL) Bound testing procedure developed by Pearsan et al. (2001) was employed to find out whether there is cointegration and the long - run relationship between variables. Error correction version of ARDL model was adopted to examine the short – run relationship between variables and long – run adjustment. In addition, diagnostic tests were conducted to check whether the results are robust and Cumulative Sum (CUSUM) test was conducted to check the stability of the model.

Results and Discussion

According to the results of ADF and PP unit root tests, IR is stationary at level while the other variables of the model are stationary at their 1st difference, implying that variables are integrated in order zero (IR) and order one (LER, LCAD, LFDINI, LPBD, LREM and LCPI). Therefore the ARDL model was ued. Akaike Information Criteria (AIC) advocates use of ARDL (4, 1, 3, 1, 2, 1, 0) model for the analysis. As a prerequisite for accurate estimation, diagnostic tests were employed and results are given in Table 1

Table 1: The results of Diagnostic Tests

Test	Probability
Normality (Jarque – Bera Test)	0.6956
Serial Correlation (BG LM Test)	0.7928
Omitted Variables (Ramsey RESET Test)	0.7626
Heterockedasticity (BPG Test)	0.3946

Results of the above mentioned diagnostic tests confirm that residuals are distributed normally, residuals are not serially correlated, there is no specification error in the estimated model and disturbance term in the equation is homoscedastic. Meanwhile, recursive estimates of CUSUM plot lies within the upper and lower critical Bounds at 5% significance level, so that the stability of parameters is estabilished. As the next step of estimation, the results of the Bound test shows that the F – statistic is 3.79. This exceeds the critical value of upper bound 3.28 and confirms a long-run relationship. The long - run results of the corresponding ARDL model are presented in Table 2 below:

Table 2: Results of Long run Relationship (Dependent Variable: LER)

Cons	LFDINI	LPBD	LREM	IR	LCAD	LCPI
-7.412	-0.108***	0.499***	-0.259**	-0.032***	0.079***	0.548***
(-8.751)	(-3.105)	(5.0127)	(-2.701)	(-2.939)	(3.359)	(2.943)

Note: t – statistics are given in parenthesis. *, ** and *** show significance at 10%, 5% and 1% level respectively.

As expected by the monetary approach to balance of payments theory and similar to the existing study, (Venkadesan and Ponnamma, 2017) CAD positively and significantly affects the exchange rate in the long run. This implies that increasing CAD causes exchange rate depreciation in Sri Lanka. Meanwhile, CPI is the main factor that largely affects ER in the long run. When CPI increases by 1 percent, the ER increases by 0.548 percent, holding others fixed. This reflects a high inflation rate reducing the value of currency and encouraging exchange rate depreciation. PBD is the next variable that largely affects the exchange rate in the long run. When PBD increases by 1 percent, the ER increases by 0.499 percent, holding others fixed. Sri Lanka's past experience reflects a continuous budget deficit which encourages the government to rely on public debt to fulfill the deficit. Therefore, continuous increase in public debt causes currency depreciation. As expected by the theory and some of the empirical findings (Venkatesan and Ponnamma, 2017; Manurya, 2017) FDINI negatively affects the exchange rate in the long run, which means an increase in FDINI induces appreciation of the currency. Likewise, IR and REM negatively and significantly impact on the exchange rate in the long run.

Next, the results of the short - run dynamic and long - run adjustment coefficient are presented in Table 3. Accordingly, lagged, three and four period lagged values of the ER positively and significantly affects the exchange rate in the short run. Moreover, current value of FDINI negatively affects the ER while current value of CAD positively affects the ER. Lagged values of FDINI and IR have a negative and significant impact on the ER.

Current and lagged values of PBD have a positive and significant impact on the ER in the short run. Moreover, ECT (-1) carries an expected negative sign, which is highly significant, which illustrates that there is an adjustment toward a steady - state line in the long run one period after the exogenous shock; i.e. about 60.29 % of disequilibrium in the ER is corrected every year one period after the exogenous shocks.

Table 3: Results of Short run Relationship and Long run Adjustment

Panel A: Short – run Coefficient Estimates			$\mathbf{R^2}$ = 84.54		
Dependent Variable: LER					
Lag Order	0	1	2	3	4
ΔLER		0.852*** (4.187)	-0.238 (-1.552)	0.496*** (2.925)	0.553*** (3.843)
ΔLFDINI	-0.030** (-2.196)	-0.039*** (-3.178)			
ΔLPBD	0.521*** (3.850)	0.380** (2.370)	0.346** (2.480)	0.313** (2.351)	
ΔLREM	-0.004 (-0.038)	-0.168 (-1.597)			
ΔIR	0.001 (0.311)	-0.011** (-2.396)	-0.012** (-2.490)		
ΔLCAD	0.023 (1.925)	0.042*** (3.591)			
ΔLCPI	-0.011 (-1.159)				
Panel B: Error Correction Representation					
ECT (-1) = -0.6029 (-6.444)***					

Note: t – statistics are given in parentheses. *, **and *** show significance at 10%, 5% and 1% level respectively.

Conclusion

The main objective of this study was to identify the factors that affect the exchange rate in Sri Lanka. To achieve this objective, time series data for the period 1977 – 2018 were used. The selected ARDL model passes all the diagnostic tests and the stability test. The result of the ARDL Bound test implies that there exists a co - integrating relationship between the variables. According to the long run results consumer price index and public debt largely affect the exchange rate in Sri Lanka. Meanwhile, the current account deficit also positively affects the exchange rate in the long run, whereas REM and IR have negative impacts on the exchange rate. In addition, FDINI negatively affects the exchange rate whereas PBD positively and significantly affects the exchange rate in the short run. Therefore, proper management of public debt, consumer price index, and current account deficit is necessary to increase the value of rupee against USD. Further, the study emphasizes the necessity of foreign direct investment net inflow, remittance inflow and high level of interest rate to increase the value of the rupee against USD. Moreover, policymakers can develop appropriate macroeconomic and monetary policies, by taking into account these factors that affect the exchange rate in the short run and in the long run.

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