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How Democratic and Military Regimes and Monetary Parameters Influenced Exchange Rate Over Fifty Years of Existence in Pakistan

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Abstract
This paper aims to find out how far the types of governance – democratic and military regimes and macroeconomic variables such as interest rate, inflation rate – founded in purchasing power parity theory, and foreign debt and foreign reserves – founded in the balance of payment theory, act as determinants of the exchange rate in Pakistan. The time period covered by this paper encompasses from 1971 to 2019 where annual (year-end) data has been used. A nominal (dummy) variable has been incorporated for the type of government with a benchmark of the democratically elected government. Maintaining a fair level exchange rate is a point of concern for policymakers all over the world. This is for the reason that the foreign exchange rate not only affects exports and imports – the balance of payment, but also can influence the inflation in the country. Pakistan being a net importing country can witness that after 2018 a great deal of inflation is caused by a drastic depreciation of PKR. High foreign exchange reserves and a low level of foreign debt can get a country better financial standing in the global financial fraternity and can get better risk rating from international rating agencies spurring high foreign direct investment and low-cost borrowing from multilateral agencies. Eviews software was used to run regression and Auto-Regressive Distributed Lag Model (ARDL) with Bound test to understand the short- and long-term relationships. We find that the exchange rate remains relatively stable during military regimes. Interest rate positive and insignificant; inflation rate negative but insignificant; foreign reserves negative and significant; and foreign debt positive and significant determinants of the exchange rate.

Keywords: Foreign Exchange Rate, Foreign Exchange Reserves, Inflation rate, Interest rate, Foreign Debt

JEL Classification: F31, E31, E43, H63

Introduction
Right from the day Pakistan came into being in 1947, its economy has been affected owing to power struggle between democratic and autocratic (military) powers (Azam, 2020). Pakistan has seen outright military takeovers in 1958, 1969, 1977, and 1999 (Alam et al., 2020). However, the elections of July 2018 were the first ever in history when the government was passed on to a civilian government by a civilian government for the second successive time (Siddiqa, 2019). The point that which type of government, whether democratic or military, is good for a country's economy is still highly debatable. Few are of the point of

view that better economic growth breeds in a democratic style of governance (Arif et al., 2012). While the opponent school of thought stresses that democracy brings with it illnesses like corruption, nepotism, and imbalanced growth that adversely affect the economic growth (Shabbir, 2017), and hence military type of governance is beneficial for the economy. Though export performance having linkage with exchange rate has been a topic of research like (Azam, 2020) a direct study of the exchange rate with type of governance, to our knowledge, has not been explored yet.

In free-market economies, exchange rate is one of the most monitored measures since it plays an essential role in economy particularly between trading partners in the global economy (Asari et al., 2011). Since it has direct consequences on the level of prices, profitability of firms and financial standing of a country, the exchange rate movements have critical implications for any country's economy (Benita & Lauterbach, 2007). Determining and understanding the factors that shape up the behavior of exchange rate dynamics has been an unsolved and hence significantly sought after question for the policymakers as well as the researchers alike (Saeed et al., 2012a).

Pakistani Rupee (PKR) was pegged against Great British Pound (GBP) from independence in 1947 till 1970, and afterward, until 1982 was pegged against US Dollar (USD). De-pegging from USD after 1982, brought a depreciation of 38.5% in PKR value during 1982-88 under managed float regime (Khan & Ismail, 2012). With the present government coming to power, Pakistani exchange rate has been left to be determined purely by market forces, with minimal intervention from State Bank of Pakistan (SBP), as a consequence of which PKR again depreciated heavily during 2018-19. As stated above, since the issue of exchange rate is vital for national economy; from national level to firm's level and to the level of common people, it appears quite plausible to study the determinants of exchange rate in Pakistan with latest empirical data, hence this research.

Khattak et al., (2012) have studied the role of FDI and balance of payment – both having a direct bearing on a nation's level of foreign debt and foreign exchange reserves. Exchange rate instability and its effects of FDI and inflation have also been the focus of interest for quite a few studies like Eichengreen, (2007). Engel & Rogers, (2001) have focused on purchasing power parity theory to see relationship between inflation and foreign exchange rate. Whereas, Effiong, (2014) and Clostermann & Schnatz, (2000) have researched to determine how interest rate can impact foreign exchange rate.

The present paper aims to study the determinants of exchange rate in Pakistan, more particularly as to how the types of governance like democratic and military regimes and macroeconomic variables like interest rate, inflation rate (harnessing the purchasing power parity theory) and foreign debt and foreign reserves (indicating the balance of payment theory) determine the foreign exchange rate in Pakistan. Using dummy variable for democratic and military rule from 1971 to 2019, the study aims to ascertain whether there exists any relation between type of government and exchange rate in Pakistan.

The outcomes of this stud are expected to assist the central bank and the policymakers of the country in reviewing policy frameworks and making informed decisions as to managing monetary policy and financial markets ensuring a stable exchange rate. For academia, the study is anticipated to help understand the impact of purchasing power parity and balance of payment theories coupled with the impact of types of governance on the foreign exchange rate in Pakistan

Literature Review and Hypotheses Development

"Purchasing power parity theory assumes that the exchange rate between the two countries depends on the values of local currencies and inflation" (Gong & Dai, 2017). On the other hand, Balance of Payments can be defined as "A systematic record of all economic

transactions between the residents of a country and residents of foreign countries during the period" (Dwivedi, 2008). Hence theoretical foundation of foreign reserves (and foreign debt) are narratable by theoretical construction of balance of payment (Nzotta, 2004). If there is a deficit in current account, the balance of payment, the country has to run short on reserves and resort to borrowing (Dwivedi, 2008) yielding pressure on foreign exchange reserves and giving rise to foreign debt.

Foreign exchange reserves not only serve a nation's needs to meet their foreign obligations as they arise but also serve as an indicator of economic stability and prosperity (Emmanuel, 2013). For that very reason, the foreign exchange rate and its determinants have been the focus of pretty great amount of research as they indicate economic prosperity and as well as a level of acceptance that a country may desire internationally (Eichengreen, 2007). A country's level of exchange rate can also be taken to indicate its economic competitiveness among the nations as also the internal economic stability of that country (Gala & Lucinda, 2006). Recent studies have found both positive and negative association between foreign exchange reserves and exchange rate; for example, positive association has been found in Nigeria (Emmanuel, 2013) while a negative association has been an outcome of a study in Pakistan (Saeed et al., 2012)

A big question for researchers has been to determine what factors have influence over foreign exchange rate and its stability. A country can attract a good amount of foreign direct investment (FDI) resulting in a better positive foreign trade balance if its foreign exchange rate is stable (Khattak et al., 2012). Unstable exchange rate, on the other hand, brings low level of FDI coupled with inflation on the back of adverse balance of payment (Eichengreen, 2007).

For a net importing country like Pakistan, country's inflation has a direct bearing from foreign exchange rate. Purchasing power parity theory that sets out relationship between inflation and foreign exchange rate stipulates that the exchange rate between two countries will hit equilibrium if buying power in both the countries is similar, ceteris paribus. This follows that for countries having high inflation rate the exchange rate will face depreciation (Engel & Rogers, 2001) and for Pakistani context, the negative association between inflation and exchange rate was determined by (Khan & Ismail, 2012).

Mundell-Fleming model links the fiscal deficit with current account deficit. It follows that increase in fiscal deficit tends to push interest rate upwards that results in increased inflow of capital and hence appreciation of foreign exchange rate. This increase in local currency value pushes up current account deficit (Fleming, 1962; Jawaid & Raza, 2013; Mundell, 1963). Thus it explains the relationship among the foreign exchange rate, interest rate, foreign exchange reserves as well as foreign debt.

Parity of interest rate concept studies the relationship between interest rate and foreign exchange rate (Effiong, 2014). This concept states that with increase in interest rate, the value of local currency appreciates leading to depreciation of foreign exchange rate of home country in comparison to other countries not having high interest rates (Clostermann & Schnatz, 2000). Several studies have found positive relationship (Amjad, 2020), (Raza & Afshan, 2017) and also negative relationship between interest rate and foreign exchange reserves (Mirchandani, 2013).

The recent studies on exchange rate and its macroeconomic indicators have used different time periods. Period from 2008 to 2017 has been under focus for study by (Amjad, 2020); (Khan & Ismail, 2012) have taken period from 1975 to 2010; (Raza & Afshan, 2017) 1972 to 2013; (Saeed et al., 2012) 1982 to 2010. (Jawaid & Raza, 2013) have taken time period from 1976 to 2010. However, none have taken period from 1971 to 2019 – as for this paper.

As we can see interest rates, inflation rate, foreign debt and foreign reserves can be determinants of foreign exchange rate of a country. With this target in sight this paper aims to study how these variables determine foreign exchange rate in Pakistan. An added indicator is dummy variable for the type of governance, democratic government and military rule, Pakistan

witnessed during the period from 1971 to 2019. Hence for the present study, the following hypotheses have been developed based on the above literature review:

H_1: Interest rate has no statistically significant relationship with foreign exchange rate
H_2: Inflation has no statistically significant relationship with foreign exchange rate
H_3: Foreign debt has no statistically significant relationship with foreign exchange rate
H_4: Foreign exchange reserves have no statistically significant relationship with foreign exchange rate
H_5: Types of governance have no statistically significant relationship with foreign exchange rate

Methodology

The dependent variable for this study is foreign exchange rate. Independent variables include inflation rate, interest rate, public debt and foreign exchange reserves of Pakistan. For these variables, year-end data from 1971 to 2019 has been taken. Data of public debt in US Dollars (USD) has been taken as a percentage of Gross Domestic Product (GDP) in USD for that particular year. Similarly, foreign exchange reserves are taken in USD and then converted into a percentage of GDP USD for that year. In order to improve comparability, public debt percent, as well as foreign exchange rates, have been taken in natural log for running Ordinary Least Squares (OLS) regression in Eviews software. Dummy variable has been adopted for type of government with bench mark as "0" for democratically elected government and "1" for military rule.

The data have been picked from the following web-based sources.

Table 1: Data and sources

Variable	Source
Foreign exchange rate (Annual average)	The World Bank Database
Lending Interest Rate (Year-end)	The World Bank Database & State Bank of Pakistan
Inflation Rate (CPI - Year-end)	The World Bank Database
Foreign exchange reserves (Year-end)	The World Bank Database
Foreign Debt (Year-end)	The World Bank Database
Dummy for Government Type (1971-2019)	

The variables studied with modifications for this paper are summarized in Table 2 below:

Table 2: Variables, symbols, and modifications

Variable	Type	Symbol	Modification
Foreign exchange rate (Annual average)	Dependent	lnexchrate	Taken natural log of absolute value
Lending Interest Rate (Year-end)	Independent	interest	-
Inflation Rate (CPI - Year-end)	Independent	lninflat	Taken natural log of absolute value
Foreign exchange reserves (Year-end)	Independent	lndebper	Taken natural log of percent to GDP value
Foreign Debt (Year-end)	Independent	lnreservperc	Taken natural log of percent to GDP value

Dummy (Nominal)	Independent	Dummy	Period from 1971 to 2019

Based on the above, the following empirical model is arrived at for this paper:

$$\text{lnexchrate} = a + b_1\,\text{dummy}_{1971\text{-}2019} + b_2\,\text{interest} + b_3\,\text{lninflat} + b_4\,\text{lndebper} + b_5\,\text{lnreservperc} + e$$

where e is the error term of the model.

Descriptive Statistics

The descriptive statistics of the data are given below:

Table 3: Descriptive statistics of the data

	LNEXRATE	INTEREST	LNINFLAT	LNDEBTPER	LNRESERVE
Mean	3.444812	9.297732	2.042317	3.687443	1.643664
Median	3.454507	9.250000	2.059783	3.737300	1.647782
Maximum	5.010877	17.79000	3.283278	4.270298	2.555409
Minimum	1.560647	2.430000	0.927954	3.204756	0.621162
Std. Dev.	0.927149	3.084673	0.545207	0.258521	0.478429
Skewness	-0.104801	0.184163	0.068784	-0.286540	-0.135027
Kurtosis	1.705807	3.265064	2.653897	2.203304	2.174603
Jarque-Bera	3.509358	0.420427	0.283204	1.966424	1.539845
Probability	0.172963	0.810411	0.867967	0.374108	0.463049
Sum	168.7958	455.5889	100.0735	180.6847	80.53952
Sum Sq. Dev.	41.26109	456.7299	14.26803	3.207999	10.98691
Observations	49	49	49	49	49

Source: Author's estimations

Taking lead from JarqueBera statistics (value closer to zero to indicate normalcy distribution) (Bera & Jarque, 1981; Jarque & Bera, 1980) we can indicate that data for interest rate and inflation is better normally distributed, followed by foreign debt and foreign reserves, than foreign exchange rate during the period under study.

On the very onset, we check the impact of type of government (democratic "0" and military "1") on the foreign exchange rate by running a regression on the data using Eviews 9. Since the time series data are more prone to suffer from autocorrelation (Gujarati, 2011), we use Newey-West (Newey & West, 1987) standard errors method being the dominant method for estimating heteroscedasticity and autocorrelation robust results (Kolokotrones & Stock, 2019). The results of the regression are given in Table 4 below:

Table 4: HAC based Least Squares Regression

Dependent Variable: LNEXRATE
Method: Least Squares
Sample: 1971 2019
Included observations: 49
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	10.24139	1.771213	5.782133	0.0000
INTEREST	0.053761	0.043027	1.249458	0.2183
LNINFLAT	-0.490514	0.235857	-2.079709	0.0435
LNDEBTPER	-1.798283	0.413876	-4.344981	0.0001
LNRESERVE	0.401983	0.284884	1.411042	0.1654
DUMMY	-0.722319	0.270845	-2.666909	0.0107

R-squared	0.610420	Mean dependent var	3.444812
Adjusted R-squared	0.565120	S.D. dependent var	0.927149
S.E. of regression	0.611413	Akaike info criterion	1.968188
Sum squared resid	16.07449	Schwarz criterion	2.199840
Log likelihood	-42.22061	Hannan-Quinn criter.	2.056076
F-statistic	13.47506	Durbin-Watson stat	0.477231
Prob(F-statistic)	0.000000	Wald F-statistic	15.55836
Prob(Wald F-statistic)	0.000000		

Source: Author's estimations

Inferring from the Table above, we can reject our null hypothesis that types of governance have no statistically significant relationship with foreign exchange rate as the t-statistic is greater than 2 and probability is less than 5% suggesting evidence to reject null hypothesis. For quantification of impact, we turn to the coefficient, that is -0.722 instantaneous and -0.514 compounded effect. Negative sign suggests an inverse relation. This on the whole implies that during military governments the exchange rate decreases – a sign of a more stable exchange rate, as compared to changes during democratically elected government.

Data Stationarity Test

In time series, stationarity of data is one of the important assumptions, assuming that mean and variance are constant over time and that the covariance between two time periods depends on the distance between those time periods (Gujarati, 2011). Ensuring that data is stationary is hugely important because it is essential to avoid non-sense or spurious regression and for the generalizability and forecast power of the model (Bistacchi et al., 2020; Gujarati, 2011). In order to check data stationary properties of the variables before we test long-term relationship, we apply Augmented Dickey & Fuller test (Dickey & Fuller, 1979). The results are given below:

Table 5: Data stationarity output at level and at first difference

		At level		At 1st Difference	
		I	**T&I**	**I**	**T&I**
LNEXRATE	t	1.2924	3.1725	8.899	8.5955
	Prob	0.6257	0.1024	0	0
INTEREST	t	3.2045	3.2025	7.2522	7.1596
	Prob	0.0258	0.0961	0	0
LNINFLAT	t	3.2252	3.9388	6.7971	6.7084
	Prob	0.0245	0.0185	0	0
LNDEBTPER	t	1.6974	3.1504	5.9278	5.8067
	Prob	0.4261	0.1068	0	0.0001
LNRESERVE	t	3.5468	3.4664	6.5992	6.4956
	Prob	0.0108	0.0547	0	0

Source: Author's estimations

The above results show that interest rate, inflation rate and foreign exchange reserves are stationary at level since the probability with Intercept only is less than 5% and t-statistics is above 2. However, foreign exchange rate and foreign debt become stationary at first difference, again viewing at the probability that is greater than 5% at level and lower than 2 t-statistics that becomes zero at first difference and the t-statistics above 2 respectively.

Auto Regressive Distributed Lag Results

With this kind of a data set where variables are stationary at different levels, we can apply Auto Regressive Distributed Lag Model (ARDL). The choice of ARDL over OLS is due to the fact that ARDL wields power, unlike OLS, to simultaneously calculate the contemporaneous as well as lagged relationships between the dependent and independent variables (Kalu, 2019). ARDL results are produced below in Table 6.

Table 6: Auto Regressive Distributed Lag (ARDL) results

Dependent Variable: D(LNEXRATE)
Method: ARDL
Sample (adjusted): 1974 2019
Included observations: 46 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): INTEREST LNINFLAT LNRESERVE D(LNDEBTPER)
Fixed regressors: @EXPAND(DUMMY)
Number of models evaluated: 2500
Selected Model: ARDL (1, 1, 0, 1, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(LNEXRATE(-1))	0.270931	0.150070	1.805365	0.0796
INTEREST	0.007045	0.004201	1.676949	0.1025
INTEREST(-1)	-0.005668	0.003535	-1.603214	0.1179
LNINFLAT	-0.006469	0.017733	-0.364793	0.7175
LNRESERVE	-0.067571	0.021523	-3.139485	0.0034
LNRESERVE(-1)	0.028211	0.024595	1.147027	0.2592
D(LNDEBTPER)	0.259315	0.095008	2.729389	0.0099
D(LNDEBTPER(-1))	-0.090830	0.071812	-1.264838	0.2143
D(LNDEBTPER(-2))	0.060551	0.088141	0.686976	0.4966
DUMMY=0	0.108980	0.047114	2.313099	0.0267
DUMMY=1	0.113672	0.047498	2.393205	0.0222

R-squared	0.486109	Mean dependent var	0.058888
Adjusted R-squared	0.339283	S.D. dependent var	0.061013
S.E. of regression	0.049594	Akaike info criterion	-2.964937
Sum squared resid	0.086084	Schwarz criterion	-2.527653
Log likelihood	79.19356	Hannan-Quinn criter.	-2.801128
Durbin-Watson stat	1.870171		

Source: Author's estimations

The above output of ARDL from Eviews shows the short-term relationship between the dependent and independent variables. We can note that in our model there exists no significant statistical relationship between foreign exchange rate and interest rate and inflation rate – since both have t-statistics less than 2 and probability of greater than 5%. On the other hand, however, there exists a strong and significant statistical relationship between the dependent variable and foreign reserves and foreign debt as both these independent variables have absolute t-stats above 2 and probability less than 5%. As we have taken natural log for the dependent variable and both these significant independent variables, we can interpret that 1% increase in foreign exchange reserves brings about a decrease of 0.07% in foreign exchange rate. Similarly, a 1% increase in foreign debt brings 0.26% increase in foreign exchange rate. Now in order to check whether there exists any long-term relationship between the dependent and independent variables in our model, we undertake the Bounds Test developed and adopted by (Pesaran et al., 2001). Our calculations show that the F statistics 3.80 is above the upper bound of 5% that is 3.48, hence there exists long-term relationship among the variables in the model. The results are given in Table 7 below:

Table 7: ARDL Bounds Test results

ARDL Bounds Test
Sample: 1974 2019
Included observations: 46
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	3.801377	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.9	3.01
5%	2.26	3.48
2.5%	2.62	3.9
1%	3.07	4.44

Source: Author's estimations

Multicollinearity

Multicollinearity is a phenomenon where two or more regressors are correlated. Existence of multicollinearity can make regressors statistically insignificant when they in fact are significant statistically. Variance Inflation Factor (VIF) is used to check multicollinearity (Daoud, 2017). For our model calculation for VIF is given in Table 8 in Appendix I, which shows the coefficient variance is below 2 for all the regressors indicating low collinearity among the regressors of our model.

Autocorrelation

is supposed to be a general phenomenon of time series data. It refers to the existence of problem where error terms of two points in time are correlated – making the regression results doubtful (Gujarati, 2011). Breusch-Godfrey Serial Correlation LM Test results as

residual diagnostic are given below in Table 9 in Appendix I. From the results we can see the F statistics are below 4 and its prob of 84% indicates high insignificance. Therefore, no autocorrelation exists in the model, which is also evident from Durbin Watson statistics being close to 2.

Ramsey's regression specification error test (RESET) measures model specification and stability (Ramsey, 1969). The results of the test are given below in Table 10 in Appendix I that show insignificant F statistics of 0.29 and its probability of 59.37% indicating that model has been correctly specified.

Results

Our estimations, calculations and analyses find that there exists a statistically insignificant relationship between the foreign exchange rate and interest rate and inflation rate in Pakistan during the period under study i.e., from 1971 to 2019. These results are in line with previous researches carried out for the relationship in question, for example by (Chowdhury et al., 2014; Raza & Afshan, 2017) and (Amjad, 2020; Chowdhury et al., 2014; Khan & Ismail, 2012; Raza & Afshan, 2017). However few studies have found results that contradict our findings like (Mirchandani, 2013) that has been carried out in the Indian context.

We find a statistically significant relationship between foreign exchange rate and foreign exchange reserves and foreign debt. These findings are majorly supported by the extant body of research literature like (Emmanuel, 2013; Saeed et al., 2012) and (Kalu, 2019; Saeed et al., 2012).

For democratic and military regimes' impact on exchange rate, we find that during military regimes the foreign exchange rate remains relatively stable. Though we could not find any research to support or contradict our findings, one of the earlier studies found that political instability has negative impact on foreign exchange rate (Saeed et al., 2012).

Summary of hypotheses testing results is tabulated below:

H	Hypothesis	Result
H_1	Interest rate has no statistically significant relationship with foreign exchange rate	Failed to reject
H_2	Inflation has no statistically significant relationship with foreign exchange rate	Failed to reject
H_3	Foreign debt has no statistically significant relationship with foreign exchange rate	Rejected
H_4	Foreign exchange reserves have no statistically significant relationship with foreign exchange rate	Rejected
H_5	Types of governance have no statistically significant relationship with foreign exchange rate	Rejected

Discussion

We set out to explore relationship between the types of governance and other macroeconomic parameters over foreign exchange rate. And our findings are summarized above. This paper contributes to the existing body of literature by addressing, for the first time to our knowledge, and discovering relationship between the foreign exchange rate and types of regimes – democratic or military, that Pakistan has had during the last half century of existence of Pakistan. We couldn't come across any study in Pakistani context that had this long span of time period under study i.e., from 1971 to 2019 – this too is a contribution to available research. Our selection of the independent variables as also the dummy variable in itself is the third contribution of this paper.

However, alongside the contributions, the selection of variables, time period and the country of context can also be taken as limitations of this paper – though the findings of this paper are equally generalizable to other similar contexts as well

Conclusion

This paper finds relationship of foreign exchange rate with foreign exchange reserves to be significant and positive and with foreign debt to be significant and negative and relatively stable exchange rate during military regimes. Though for obvious reasons it cannot be recommended to have military government in any democratic country, this paper can, however, recommend to the people on the helm of affairs – whether regulators or policymakers to look ways whereby the country can have political stability and better position of foreign exchange reserves in order to have a stable foreign exchange rate in the country. We had expected the interest rate to be positively and the inflation rate to be negatively associated with the foreign exchange rate, but that couldn't be established. Maybe, for future research, a different set of independent variables and extended time scale could look for contradiction to our findings.

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Appendix

Table 8: VIF Test results

Variance Inflation Factors
Sample: 1971 2019
Included observations: 46

	Coefficient	Uncentered

Variable	Variance	VIF
D(LNEXRATE(-1))	0.022521	16.85086
INTEREST	1.76E-05	140.9906
INTEREST(-1)	1.25E-05	91.86937
LNINFLAT	0.000314	127.7831
LNRESERVE	0.000463	128.5410
LNRESERVE(-1)	0.000605	174.4026
D(LNDEBTPER)	0.009027	9.717210
D(LNDEBTPER(-1))	0.005157	7.001054
D(LNDEBTPER(-2))	0.007769	3.882043
DUMMY=0	0.002220	81.93669
DUMMY=1	0.002256	46.55546

Table 9: Breusch-Godfrey Serial Correlation LM Test results

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.172457	Prob. F(2,33)	0.8423
Obs*R-squared	0.475817	Prob. Chi-Square(2)	0.7883

Test Equation:
Dependent Variable: RESID
Method: ARDL
Sample: 1974 2019
Included observations: 46
Pre-sample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEXRATE(-1))	-0.125503	0.600495	-0.209000	0.8357
INTEREST	4.10E-05	0.004322	0.009496	0.9925
INTEREST(-1)	0.000571	0.004181	0.136655	0.8921
LNINFLAT	-0.001685	0.021160	-0.079636	0.9370
LNRESERVE	-0.000381	0.027467	-0.013876	0.9890
LNRESERVE(-1)	-0.004488	0.045062	-0.099606	0.9213
D(LNDEBTPER)	-0.002138	0.101142	-0.021134	0.9833
D(LNDEBTPER(-1))	0.032489	0.142911	0.227338	0.8216
D(LNDEBTPER(-2))	-0.004940	0.072891	-0.067773	0.9464
DUMMY=0	0.013696	0.089947	0.152264	0.8799
DUMMY=1	0.012851	0.085097	0.151011	0.8809
RESID(-1)	0.165152	0.594555	0.277774	0.7829
RESID(-2)	-0.058420	0.279078	-0.209333	0.8355

R-squared	0.010344	Mean dependent var	6.03E-18
Adjusted R-squared	-0.349531	S.D. dependent var	0.043738
S.E. of regression	0.050810	Akaike info criterion	-2.888379
Sum squared resid	0.085193	Schwarz criterion	-2.371589
Log likelihood	79.43271	Hannan-Quinn criter.	-2.694786
Durbin-Watson stat	1.970084		

Source: Author's estimations

Table 10: Remsey RESET test for model stability results

Ramsey RESET Test
Equation: EQ04FINAL
Specification: D(LNEXRATE) D(LNEXRATE(-1)) INTEREST INTEREST(-1) LNINFLAT LNRESERVE LNRESERVE(-1) D(LNDEBTPER) D(LNDEBTPER(-1)) D(LNDEBTPER(-2)) DUMMY=0 DUMMY=1
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.538541	34	0.5937
F-statistic	0.290026	(1, 34)	0.5937

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000728	1	0.000728
Restricted SSR	0.086084	35	0.002460
Unrestricted SSR	0.085356	34	0.002510

Unrestricted Test Equation:
Dependent Variable: D(LNEXRATE)
Method: ARDL
Sample: 1974 2019
Included observations: 46
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic):
Fixed regressors:
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(LNEXRATE(-1))	0.207468	0.146421	1.416926	0.1656
INTEREST	0.005602	0.005818	0.962867	0.3424
INTEREST(-1)	-0.004105	0.004660	-0.880988	0.3845
LNINFLAT	-0.005160	0.018730	-0.275469	0.7846
LNRESERVE	-0.055195	0.024814	-2.224297	0.0329
LNRESERVE(-1)	0.022979	0.025096	0.915670	0.3663
D(LNDEBTPER)	0.202547	0.133451	1.517761	0.1383
D(LNDEBTPER(-1))	-0.072780	0.079508	-0.915384	0.3664
D(LNDEBTPER(-2))	0.043317	0.097007	0.446532	0.6580
DUMMY=0	0.086291	0.059765	1.443835	0.1579
DUMMY=1	0.091274	0.062978	1.449312	0.1564
FITTED^2	1.910324	3.673692	0.520001	0.6064

R-squared	0.490455	Mean dependent var	0.058888
Adjusted R-squared	0.325602	S.D. dependent var	0.061013
S.E. of regression	0.050105	Akaike info criterion	-2.929953
Sum squared resid	0.085356	Schwarz criterion	-2.452916
Log likelihood	79.38892	Hannan-Quinn criter.	-2.751252
Durbin-Watson stat	1.891210		

Source: Author's estimations