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The effects of exchange rate volatility on stability of money demand in Pakistan: An ARDL bounds testing approach

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Abstract:

This paper attempts to examine the stability of money demand function for Pakistan by including a new variable volatility of exchange rate. A time series annually data for the period 1972-2014 has been used in the estimation of money demand function, employing the ARDL Bounds Testing approach. The results show long-run cointegration among monetary aggregates (M1 and M2) and set of independent variables including exchange rate volatility. The paper further shows long-run effects of exchange rate volatility with only M2 and contributes in its stability rather than M1 in Pakistan. Thus real broad money supply should be considered as policy tool for formulating and implementing monetary policy.

Keywords: *Exchange Rate Volatility, Money Demand, Stability, ARDL, Error Correction Model.*

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1. Introduction:

Pakistan is an open and emerging economy hence, the economy highly depends upon the fluctuations of exchange rate. Generally, its depreciation posits a positive impact to the economy. As a result of depreciation, cost of imports increases that lessens the imports and increases the exports that leave positive effects on trade-balances. Whereas, appreciation in the exchange rate lowers exports and increases imports and affects the terms of trade.

Different countries are following different regimes of exchange rate in form of fixed and floating. Flexible exchange rate system shows independence from one to other economies devising optimal policies like monetary and fiscal. Whereas, in fixed exchange rate regime one economy should follow the adopted policy of other one to that it depends. Qiao (2007) argues that here is not a comprehensive theory that predicts the appreciation or depreciation in the exchange rate. According to the argument of Koray and McMillan (2006), there are mixed results of exchange rate and the balance of trade depending on the fluctuations in the exchange rate. Consequently, money demand is affected in the economy.

The Exchange rate volatility is defined as uncertainty in exchange rate or fluctuations in exchange rate. Volatility in exchange rate warns the investors to consider prevailing conditions of the economy. More volatility lowers the investment while less volatility broadens the investment. Stability of the exchange rate is a positive symptom and encourages new investment in the economy. More investment in the economy ascertains the increase in number of transactions of the money among the households and the firms.

Mundell (1963) argued, regarding floating rates, that the efficiency of both fiscal and monetary policy would depend upon sensitivity regarding money demand towards exchange rate and further argued that exchange rate volatility plays a contributory role in estimating money demand along with exchange rate. It has been witnessed that it has affected many currencies that remained under crises in the past in several economies. Therefore, policy makers have been attracted to focus on the role of volatility exchange rate around the globe. The exchange rate volatility has proved to determine the economic position of the country that articulates specific amount of money demand in this current age of globalization.

To the best of the researchers' knowledge, there is limited number of studies regarding money demand where volatility exchange rate is introduced as a contributing factor. The studies analyzing empirically impact of the exchange rate volatility on money demand have shown ambiguous results. According to suggestions proposed by Bahmani (2011) and Bahmani and Bahmani-Oskooee (2012), there is a dire need to incorporate volatility of exchange rate as a factor in money demand function in case of other economies. There is hardly any study that has considered the volatility exchange rate as determinant of money demand for Pakistan. So this variable needs to be analyzed in context of Pakistan. The remainder of the paper is organized as follows. Section two presents the review of empirical literature. Section three discusses the methodology and data. Section four presents and discusses the empirical results and section five concludes the paper.

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2. Literature Review:

After incorporating exchange rate as a determinant of money demand function in an open economy, exchange rate volatility becomes one of the core economic issues. It has gained deeper insight in the decade of 1970's by many researchers. It affects many macroeconomic variables such as foreign trade, foreign direct investment, and aggregate monetary and non-monetary stocks that remain accountable for the appropriate quantity of money in the economy. Empirical literature furnishes mixed conclusions; for instance, Cushman (1983), Thursby and Thursby (1987), and Peree and Steinherr (1989) report the adverse effects of exchange rate volatility on trade flows. On the other hand, Gotur (1985) and Lastrapes and Koray (1990) concludes non sensitivity of trade flows to exchange rate volatility. Since the impact of volatility of exchange rate affects the trade flows, it ascertains specific quantity of money in the economy.

Voluminous research has been conducted on exchange rate volatility that mainly affects international trade. Since the end of Bretton wood system, world-economies started journey from fixed to flexible exchange rate, and they have been receiving sudden shocks or fluctuations in terms of volatility of exchange rate. This shift in regime has attracted many researchers with specific objective to investigate the effects of volatility of the exchange rate on trade flows (Aftab *et al*., 2012).

Theoretically, it is believed that the more the volatile exchange rate, the more the risk and vice versa. The higher the volatility the lower the volume of foreign trade due to introduction of risk for future profit through export trade. The firms can lessen the amount of uncertainty by making timely payments through forward markets in the short-run. It may also endanger foreign trade indirectly by affecting firms' investment decisions in the long-run. However, investors (traders) are left with limited possibilities regarding trade claims for future cash flows (Vianne and De Vries, 1992 and Wei, 1999). Arguing for the facts, it is costly or impossible to hedge for the investors that are risk averse. Therefore, exchange rate volatility would shorten risk-adjusted profit through foreign trade (An exporter, who is very risk averse, may export more in high risk, worries about revenue fall. Alternatively, an individual, who is less risk averse, may export less in high risk, considers less attractive returns on export), reduce the monetary transactions; hence, it may affect domestic money demand.

Mcgibany and Nourzad (1995) estimated the function for money demand using the quarterly time series data of the US covering the time span of 1974Q1-1990Q4 with effects of exchange rate. By focusing short-run dynamics, they analyzed the money demand function, which is not only affected by exchange rates but also the volatility. While domestic interest rates' volatility shoots up, uncertainty in financial markets of the economy increases. The study findings reveal that the exchange rate volatility exerts negative and statistically significant effects affecting the function for the broad money demand. The authors conclude that an increase in exchange rate volatility causes decline in domestic money demand.

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Exchange rate volatility possesses real economic cost. It exerts impact on price stability, profitability of firms, and financial stability of the country. Majority of the countries attempted to reduce fluctuations in their domestic currencies through regulating constraints over exchange rate movements such as crawl band, monetary measures like changes through domestic interest rates, intervening foreign currency market, and restricting capital inflow and outflow of the country.

Uncertainty among international transactions is expected with incorporation of exchange rate volatility. Hall *et al.* (2010) investigated that exchange rate uncertainty shortens the economic welfare and households cannot enjoy same bundle of goods and services against the currency. By lowering economic welfare, money supply might be affected in the economy.

In theoretical perspective, exchange rate volatility has positive or negative impact on foreign trade (Verheyen, 2012). Empirical studies, using different proxies and econometric techniques for exchange rate volatility like cointegration and panel data analysis, find no any clear and unanimous consensus about the effects of exchange rate volatility with international trade, which may affect the money demand (Zelekha & Bar-Erfat, 2011; and Nishimura & Hirayama, 2013).

Review of empirical studies, considering the impact of exchange rate volatility on the money demand. According to Coric and Pugh (2010), there is an adverse effect of exchange rate volatility and foreign trade in the study of 49 economies that covers the period of 1978 to 2008. These findings are mainly significant in developing economies where future forwards and option markets are not relatively well developed. Exchange rate volatility could deter country's trade in international markets. So, output inflation may be changing agent's money demand and it is affected transitively by exchange rate volatility. In this regard, Bahmani-Oskooee and Bhol (2008) covered a study between US and India on the trade data in 40 industries with ARDL bounds testing approach and discovered the mix findings about the coefficient of exchange rate volatility. It has mix results of negative and positive impacts in the short-run within 16 out of 40 industries. These effects remain for short-run but do not remain in many cases for the long-run.

Bahmani (2011) estimated money demand for the 15 less developed countries (LDC) using annual time series data with ARDL bound testing approach. She proposed that exchange rate volatility could affect money demand and concluded that exchange rate volatility exerts short run effects on real broad money aggregates (M_2) in LDCs. However, short run effects do not sustain in most of the countries. Bahmani and Bahmani-Oskooee (2012) analyzed the function for money demand using Iranian time series annual data for post-revolutionary period of 1979 to 2007. By employing an ARDL bound testing approach, they argued that exchange rate volatility sources the uncertainty into expectation effect or wealth, it may affect money demand.

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3. Methodology and Data:

The money demand function takes the form fashioning the way developed by Bahmani-Oskooee (2011) and Bahmani and Bahmani Oskooee (2012) as follows:

$$\boldsymbol{LnM_t = b_0 + b_1 LnY_t + b_2 LnI_t + b_3 \pi_t + b_4 LnRER_t + b_5 LnVX_t + \varepsilon_t \ldots\ldots\ldots (01)}$$

Where, M shows the money supply (narrow and broad), "Y" is real domestic gross product, "I" is discount rate, " π" is inflation rate, "RER" is real exchange rate, and "VX" is the exchange rate volatility. The signs to be expected for the coefficients in the model expressed above in equation (01) are as follows.

$$\boldsymbol{b_1 > 0, b_2 < 0, b_3 < 0, while\ b_4\ and\ b_5\ \ may\ be\ positve\ and\ negative.}$$

The nominal variables create so many caveats rather than real variables (Sriram, 1999). Thus all the variables are in real terms in the model. The function for the demand for money is generally specified in the real terms due to price homogeneity. In this model, the narrow nominal monetary aggregate (M1) and nominal broad monetary aggregates (M2) are converted into real terms by the GDP deflator for the year 2006. In this paper, all the variables are converted into natural logarithm form except the inflation rate.

The real gross domestic product has been taken as a proxy to real income (LNY) on the basis of base year 2006's price level. Since there is positive relationship between real income and monetary aggregate, so its coefficient is expected to be positive (b_1>0). It increases number of transactions due to rise in the real income.

The bank discount rate (LNI) is the opportunity cost of money holding and used as proxy of domestic interest rate. Mostly all the rates are concerned with bank discount rate that is issued by the central bank. There is negative relationship between the discount rate and both of the monetary aggregates (b_3<0) means the discount rate rises the domestic money demand falls (James, 1998). Inflation rate (π) is a continuous change in the price level in the economy and it is taken as GDP deflator and calculated by the formula as:

$$\frac{GDP\ \text{Deflator(t+1)-GDP Deflator (t)}}{\text{GDP Deflator (t)}}$$

Where GDP-Deflator (t+1) is the value for coming (t+1)th year and GDP-Deflator (t) is the current (t)th year. It is expected that inflation has positive effects on the monetary aggregates with (b_3<0). The general price level (π) rises and it causes to increases the demand of money in the economy.

The exchange rate is called the foreign opportunity cost of holding domestic money and is defined the nominal exchange rate as number of Pakistani rupees versus US dollar. It can be converted into real exchange rate (RER) and calculated by the formula as follows:

$$\boldsymbol{RER = \frac{EX * P^f}{P^d}.}$$

Where EX shows the nominal exchange rate of Pakistan versus US dollars. P^f and P^d are inflation rates in US and Pakistan respectively. It is observed that the sign of exchange

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rate is not obvious in the literature. The negative and positive sign result in currency substitution effect and wealth effect hypothesis respectively.

Exchange rate volatility is an indicator that captures the risk experienced by investors because of unpredictable fluctuations in exchange rates. Since, the data is unavailable on volatility of exchange rates under the period of the study in Pakistan; hence, this study intends to measure it by GARCH Model technique suggested by Bollerslev (1986). It has also been used before by Alam and Ahmad (2011). Its expected sign is not clear like exchange rate. Thus it is expected to be positive or negative supporting the wealth expectation effect or currency effect respectively. Now, the ARDL Cointegration approach would determine the role for exchange rate volatility in money demand model for long-run and short-run relationship which is defined in Equation (01).

The ARDL Bounds Testing Approach: It is used to achieve specific objectives and is a nascent cointegration approach for analyzing the short-run and the long-run effects between dependent and independent variables in this paper. This technique is appropriate for the small sample size. It is preferred to other techniques of cointegration such as Johansen cointegration approach needs large sample size for valid findings (Ghatak and Siddiki, 2001). All the cointegration techniques assumes that the variables must have the same order of integration but ARDL bounds approach does not require so. It rejects all the pretesting for standard cointegration tests **(**Pesaran, Shin and Smith, 2001). Besides this, the ARDL model is also possible for the optimal number of lags must be same while the other traditional techniques do not follow this pattern.

This paper has considered the modern empirical techniques to analyze the effect of the exchange rate volatility on demand for the monetary aggregates. Further, the money demand function is analyzed by introducing set of other explanatory determinants such as real income, the discount rate, the inflation rate, and the real exchange rate. The ARDL model mechanized by (Pesaran *et al.*, 2001) is described as follows:

$$\Delta LnM_t = \alpha_0 + \sum_{i=1}^{q_1} a_i\, \Delta LnM_{t-1} + \sum_{i=1}^{q_2} c_i\, \Delta LnY_{t-1} + \sum_{i=1}^{q_3} d_i\, \Delta Lni_{t-1} + \sum_{i=1}^{q_4} e_i\, \Delta \pi_{t-1} + \sum_{i=1}^{q_5} f_i\, \Delta LnRER_{t-1} + \sum_{i=1}^{q_6} g_i\, \Delta LnVX_{t-1} + \rho_0 LnM_{t-1} + \rho_1 LnY_{t-1} + \rho_3 \pi_{t-1} + \rho_4 LnRER_{t-1} + \rho_5 LnVX_{t-1} + \mu_{1t} \quad \text{.....(02)}$$

The parameter , where ρ_j j=1, 2, 3, 4, 5 portrays long-run effects for corresponding variables normalized by ρ_0, meanwhile the a_i,c_i, d_i, e_i, f_i, and g_i the indicators of money demand in Pakistan depict short-run effects for ARDL model. In ARDL model null hypothesis is stated as (i.e.$H_0: \rho_1 = \rho_2 = \rho_3 = \rho_4 = \rho_5 = 0$), indicating lack of long-run relationship) is analyzed through F-statistic for all the variables in the model. One has to make comparison between the calculated F- value and the tabulated F-values framed by Pesaran *et al.* (2001). If the computed F-value lies in the right of upper bound, the null hypothesis of no cointegration is rejected. If it lies in the left of the lower bound, null hypothesis is accepted showing no long-run relationship. The result becomes inconclusive, if the computed F-value lies between the bounds.

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To confirm the long run relationship, Error Correction Model (ECM) has been calculated for the ARDL model as follows:

$$\Delta LnM_t = \alpha_0 + \sum_{i=1}^{q_1} a_i \, \Delta LnM_{t-1} + \sum_{i=1}^{q_2} c_i \, \Delta LnY_{t-1} + \sum_{i=1}^{q_3} d_i \, \Delta Lni_{t-1} + \sum_{i=1}^{q_4} e_i \, \Delta \pi_{t-1} + \sum_{i=1}^{q_5} f_i \, \Delta LnRER_{t-1} + \sum_{i=1}^{q_6} g_i \, \Delta LnVX_{t-1} + \gamma (ECM)_{t-1} + \mu_{1t} \quad \ldots\ldots\ldots\ldots\ldots\ldots (03)$$

Data: The data for the variables has been taken from reports issued by the State Bank of Pakistan, Pakistan Economic Survey, and Pakistan Statistical Bureau, International Financial Statistics (IFS) issued by the IMF and WDI, 2014 owned by the World Bank. The data for all the variables has been expressed in local currency units and unit less (percentage form) such as the discount rate and inflation rate. The variables including real narrow monetary aggregates and real broad monetary aggregates are dealt as dependent variables while the variables including real income, discount rate, inflation rate, real exchange rate, and the exchange rate volatility are considered as set of independent variables.

4. Empirical Results:

The stationarity is essential to confirm the absence of I(2) for the variables under consideration to employ the ARDL model. Thus the test for stationarity the Augmented Dickey Fuller (ADF) has been used for the data at the level and first difference.

Table No. 1: ADF Test Statistics Results for Stationarity for Data (1 972-2014).

	Level		First Difference	
	C	C+T	C	C+T
LnM1	0.15	-3.57**	-5.42***	-5.38***
LnM2	-0.35	-2.25	-5.05***	-4.99***
LnY	-0.37	-1.17	-6.56***	-6.81***
LnI	-3.12**	-3.24*	-4.54***	-4.44***
Π	-4.49***	-3.45*	-7.664***	-7.558***
LnRER	-1.05	-0.45	-4.81***	-4.79***
LnVX	-0.78	-9.85***	-13.87***	-13.36***
A	Critical Values			
1%	-3.63	-4.24	-3.64	-4.25
5%	-2.95	-3.54	-2.95	-3.35
10%	-2.61	-3.20	-2.61	-3.21

Note: *, **, and *** show the results significance at the level of 10%, 5%, and 1% respectively.

The results are reported in table no. 1 and reveal that narrow monetary aggregates (LnM1), discount rate (LnI), inflation rate (π), and the exchange rate volatility (LnVX) are stationary at the level due to rejection of null hypothesis of unit root. On the other

hand, broad monetary aggregates (LnM2), real income (LnY), and the real exchange rate (LnRER) are stationary at the first difference due to rejection of null hypothesis of unit root. Since the order of integration for all the variables is mixed at the level and first difference. It confirms the absence of I(2) for any variable in the data set. This glimpse of the results about stationarity reported in Table 1 makes way fair to employ ARDL model in this paper. Due to small sample size (43), the optimum number of lags were selected as three on the basis of Hannan-Quinn Criteria (HQC). The HQC has advantages over others criteria and the results are reported for both monetary aggregates in the case of Pakistan in table no. 2 and table no. 3 respectively.

The framework of an ARDL bounds testing cointegration makes comparison between the computed value of F and the tabulated value framed by Pearson, *et al.*, (2001) and Narayan and Narayan, (2005) for the specific sample sizes. Panel-Cs' show the results of bound tests for real narrow money demand (LnM1) and real broad money demand (LnM2) in the table no. 2 and Table 3 respectively.

Comparing computed F-value with the critical value framed by (Pearson *et al.*, 2001& Narayan, 2005), it is found that the computed values for the LnM1 and LnM2 lie above the upper bound so null hypothesis of no long-run relationship is rejected. Further, it is concluded that there is cointegration between the dependent variables and set of independent variables in case of LnM1 and LnM2 at the level 1%. Thus one can easily deduce valid long-run relationship in case of Pakistan.

After establishing the long-run relationship, the short-run and the long-run coefficients for LnM1 and LnM2 are reported in Panel-A and Panel-B of the table no. 2 and table no. 3 respectively. The coefficient of exchange rate volatility (LnVX) is statistically not significant and negative with LnM1 in the short-run and long-run. On the other hand, it is positive and statistically significant at the level 5% only in the long-run. The positive coefficient of exchange rate volatility with LnM2 and statistically significant showing uncertainty in exchange rate of Pakistan provides evidence for more holding of foreign exchange rather than Pak rupee. Therefore, newly introduced variable exchange rate volatility has only long-run effects on the real broad monetary aggregates in the case of Pakistan.

Panel-A and panel-B of the Table 2 and Table 3 show the results forLnM1and LnM2 that the coefficients of real income (LnYt) and (LnRER) are positive with the both models of real monetary aggregates (LnM1 and LnM2) in the long-run showing increase in income and exchange rate causes the rise in the demand of the both monetary aggregates. On the other hand, the long-run coefficients of discount rate (LnI) and Inflation rate (π) are negative in the both models revealing that rise in the discount rate and inflation rate decreases the demand for the both monetary aggregates. The Short-run coefficients are reported in the Panel-A and Panel-B of the Table 2 and Table 3 respectively but are not discussed here. Since the effects of long-run coefficients can be meaningful only if cointegration is established in the models as in equation (02). So the long-run policies are effective rather than the policies implemented on the basis of short-run effects in the economy. To confirm the convergence of disequilibrium in the short-run towards the equilibrium can be measured by the ECM term which is speed of adjustment towards the equilibrium in cointegrating model. The requirement for ECM coefficient is to be statistically significant and negative in sign. The Panel-Cs' in the Table 2 and Table 3

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show the ECM terms for the LnM1 and LnM2 respectively. The coefficient of ECM (-1) is -0.036 and -0.240 for LnM1 and LnM2 respectively. The former one is not significant while the later one is significant at the level 5%.

Table No. 2: ARDL (1, 2, 0, 0, 3, 0) Model for real narrow money demand (LNM1) in Pakistan

Panel-A: Short-Run Elasticities of Estimates

Lag Order

	0	1	2	3
ΔLnM2	-	-	-	-
ΔLnY	0.011(1.495)	-0.014(1.839)	-	-
ΔLnI	-0.085(1.319)			
Δπ	-0.011(2.488)			
ΔLnRER	-0.152(0.583)	-0.613(2.626)	-0.613(2.626)	
ΔLnVX	-0.029(0.911)			

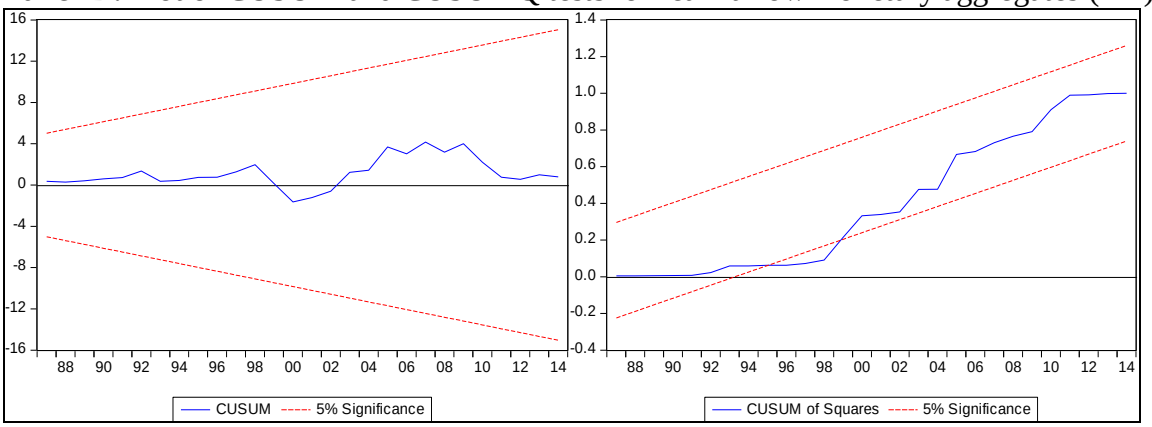
Panel-B: Long-Run Elasticites of Estimates

C	LNY	LNI	π	LNRER	LNVX	ECM(-1)
10.393	0.190	-2.399	-0.296	4.401	-0.833	0.036
(0.434)	(0.534)	(0.429)	(0.428)	(0.552)	(0.345)	(0.464)

Panel-C: Battery of Diagnostics

Wald Test for Bound		RESET		ARCH-Test		LM	
F	Prob	χ^2	Prob	χ^2	Prob	χ^2	Prob
53.134	(0.000)	10.091	(0.006)	0.006	(0.941)	1.976	(0.374)

Panel-D: Plot of CUSUM and CUSUMQ tests for real narrow monetary aggregates (M1)



Note: a. The values in parentheses are absolute t values in Exhibit-A and B and p values in

b. The upper bound critical value is 3.5 for the F statistics in Pesaran *et al.* (2001, Table CI-Case III, p. 300)at 5%.

c. Reset is Ramsey's specification test. It follows χ^2 distribution with one degree of freedom.3.84 is the critical value at 5%.

d. ARCH Testis for Hetroskedasticity of residuals. It follows χ^2 distribution with one degree of freedom. 3.84 is the critical value at 5%.

e. LM is the Lagrange multiplier test for serial correlation. I follows χ2 distribution with four degrees offreedom.9.48 is the critical value at the level of significance 5%.

Table 3: ARDL (2, 3, 3, 0, 0, 0) Model for real broad money demand (LNM2) in Pakistan

Panel-A: Short-Run Elasticities of Estimates

Lag Order

	0	1	2	3
ΔLnM2		0.368(2.345)		
ΔLnY	0.008(1.391)	-0.013(2.342)		
ΔLnI	-0.025(0.220)	-0.074(0.526)	0.280 (2.670)	
Δπ	-0.008(2.537)			
ΔLnRER	0.261(2.065)			
ΔLnVX	0.036(1.454)			

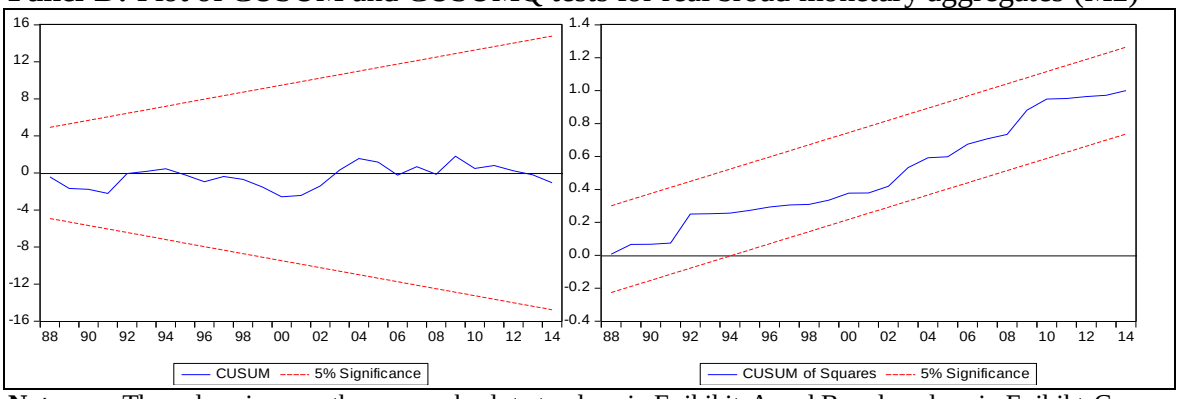
Panel-B: Long-Run Elasticites of Estimates

C	LNY	LNI	π	LNRER	LNVX	ECM(-1)
19.050	0.063	-0.510	-0.035	1.089	0.150	-0.240
(11.349)	(3.143)	(1.495)	(1.775)	(3.457)	(2.048)	(2.425)

Panel-C: Battery of Diagnostics

Wald Test for Bound		RESET		ARCH -Test		LM	
F	Prob	χ^2	Prob	χ^2	Prob	χ^2	Prob
26.344(0.000)		1.544(0.235)		0.305(0.581)		0.265(0.235)	

Panel-D: Plot of CUSUM and CUSUMQ tests for real broad monetary aggregates (M2)



Note: a. The values in parentheses are absolute t values in Exihibit-A and B and pvalues in Exihibt-C.

b. The upper bound critical value is 3.5 for the F statistics in Pesaran*et al.* (2001, Table CI-Case III, p. 300)at 5%.

c. RESET is Ramsey's specification test. It follows χ^2 distribution with one degree of freedom.3.84 is the CV at 5%.

d. ARCH Test is for Homoskedasticity of residuals with χ^2 distribution with one degree of freedom.3.84 is CV at 5%.

e. LM is the Lagrange multiplier test for serial correlation with $\chi 2$ distribution with four degrees of freedom.9.48 is the critical value at the level of significance 5%t.

It shows that 24% equilibrium is corrected each year for LnM2 through set of explanatory variables. It takes about five years to reach the equilibrium which is regarded as slow speed toward the equilibrium. A battery of the diagnostics tests and the stability test was

conducted to validate the goodness of the model. The Panel-C and Panel-D in the table no. 2 and table no. 3 reveal that all tests enlisting Ramsey RESET test for model misspecification, ARCH test for auto correlation and the LM test for homoscedasticity are cleared by the LnM2 that reveals signaling to no autocorrelation. However, the model for LnM1 does not qualify only ARCH test which shows symptoms of autocorrelation for LnM1. As for as the stability of parameters is concerned, it is evidence from the Panel-D of table no. 2 that LnM1 is not stable due to crossing the lines while LnM2 is stable looking the Panel-D of the table no. 3.

5. Conclusion:

Robert Mundell (1963) suggested incorporating the exchange rate volatility along exchange rate in estimating money demand function with other basic variables. Following the recommendations of Bahmani (2011) and Bahmani and Bahmani-Oskooee (2012), exchange rate volatility has been incorporated in the case of Pakistan with time series annual data spanning the periods 1972-2014. It is observed that the exchange rate volatility has long- run effects with only the model of real broad money demand (LnM2) contributing in its stability in the case of Pakistan. Therefore, it is suggested that broad money supply should be treated as a tool to control monetary policy in Pakistan reducing exchange rate volatility hence, enhancing the beliefs of economic agents in the holding of domestic currency as compared to foreign currency.

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