

IMPACT OF EXCHANGE RATE TARGETING TO HANDLE INFLATION IN PAKISTAN

Humera Sherazi¹, Tahir Mahmood²

¹Assistant Profssor, Department of Economics, Lahore Garrison University Defense Sector C Phase VI

²Associate Professor, Department of Economics, University of Veterinary and Animal Sciences

*Corresponding author: humera@lgu.edu.pk

ABSTRACT : This study will analyze exchange rate targeting to bring price stability in Pakistan. This research construct single equation model to empirically investigate exchange rate targeting. Empirical results of this study suggest that during long time period the relation between nominal exchange rate and inflation rate remains statistically insignificant. Furthermore, there remains inverse relation among nominal exchange rate and inflation rate. It means that it is not appropriate to use exchange rate as a policy instrument to handle inflation in Pakistan. We will consider inflation rate as a dependent variable in this model which will be measured in terms of CPI. This study uses real GDP growth as controlled variable. The study will use annual time series data from 1975 to 2013. This research uses Unit Root test to examine the stationarity of data. Based upon stationarity of time series data the technique of Autoregressive Distributed Lag Model has used.

Key words: Monetary policy, central bank. JEL Classifications: C32, E31

Inflation Rate and Exchange Rate in Pakistan:

The model in this study investigates the role of exchange rate targeting in controlling inflation in Pakistan. The remainder of the paper is organized as follows. Section II consists of the literature review. Section III explains theoretical frame work. In section IV we develop our model which analyzes the impact of exchange rate strategy to overcome the problem of inflation both in the short and long-run with reference to Pakistan. Section V gives estimation outcomes related to model made. Section VI provides the conclusion.

2. Review of Literature:

Researchers [1] suggested that no long-term significant association exists among exchange rates and domestic price level. Researchers [2] analyzed that use of flexible exchange rate regime is appropriate. Researchers [3] explored that nominal exchange rate has no effect on long-term economic stability. Researchers [4] have investigated that nominal exchange rate volatility is less sensitive to change in net foreign reserve as compared to fluctuations regarding real effective exchange rate. Researchers [5] explained that how exchange rate and supply of money influence volatility in prices. Researcher [6] has found that in inflation targeting economies central banks were facing the problems of exchange rate pass through or foreign price shocks. Researcher [7] explored the association among exchange rate and inflation is long-term. Researchers [8] empirically analyzed that movements in exchange rate, inflation and movements in output are significantly associated with each other.

3. Theoretical framework: Figure 1 (a) helps to explain the expected association among price of domestic commodities and nominal exchange rate according to existing literature.

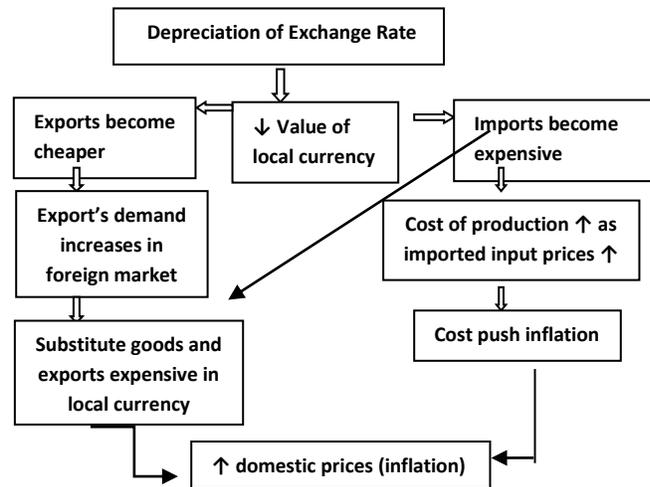
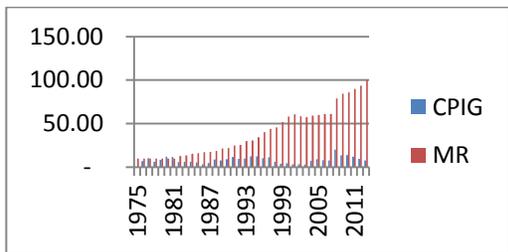


Figure 1 (a) Association among Inflation Rate and Exchange Rate

Fluctuations in exchange rate bring changes in country's domestic prices through many channels. The exchange rate depreciation results in decreasing the value of local currency. In response to this the exports become cheaper and imports become expensive for that country. Foreign finished commodities will become costly due to rise in their prices. Furthermore, the expensive imported inputs raise the cost of production. The increasing cost of imports correlated with depreciation of exchange rate will generate cost-push inflation. On other side if the exchange rate appreciation leads to enhance the value of local currency. It made the value of imports cheaper. It made substitute goods and exports expensive in local currency. So the economy will face upward rise in domestic price level. The following figure 2

(b) depicts that there exists ambiguous association among rate of inflation as well as in nominal exchange rate in Pakistan.



Source: Author's own contribution

Figure 2 (b) Relationships between Inflation Rate and Exchange Rate

4. Exchange Rate Targeting Model:

To analyze the short-term and long-term relationships among Pakistan's inflation rate (CPIG), real gross domestic product growth (RGDPG) and exchange rate (ER), we test following regression model.

$$CPIG_t = a_0 + a_1ER_t + a_2RGDPG_t + \epsilon_t \text{ ----- (1)}$$

Where: CPIG = Growth Rate of Consumer Price Index, (2005 = 100), ER = Market Exchange Rate, measured as rupees per U.S. dollar, RGDPG = Growth Rate of Real Gross Domestic Product, and ϵ_t =error term

Hypotheses for Exchange Rate Targeting: The model investigates the following hypotheses.

H_1 : There exists a long-run association among real GDP growth, nominal exchange rate and inflation rate. The equation (2) is made to depict ARDL illustration related to equation (1).

$$\Delta CPIG_t = b_0 + \sum_{i=1}^{m1} b_{1i} \Delta CPIG_{t-i} + \sum_{i=0}^{m2} b_{2i} \Delta ER_{t-i} + \sum_{i=0}^{m3} b_{3i} \Delta RGDPG_{t-i} +$$

$$b_4 CPIG_{t-1} + b_5 ER_{t-1} + b_6 RGDPG_{t-1} + \epsilon_t \text{ ----- (2)}$$

After confirming the long-term correlation among variables the representation of general error correction model regarding the ARDL model for equation (2) is given by:

$$\Delta CPIG_t = b_0 + \sum_{i=1}^{m1} b_{1i} \Delta CPIG_{t-i} + \sum_{i=0}^{m2} b_{2i} \Delta ER_{t-i} + \sum_{i=0}^{m3} b_{3i} \Delta RGDPG_{t-i} +$$

$$\lambda EC_{t-1} + u_t \text{ ----- (3)}$$

The symbols m_1, m_2, m_3 represent the best possible length chosen through ARDL technique and λ depicts the rate of adjustment process. The EC shows residuals which are obtained through estimating the co-integration model given in second equation.

5. Empirical Results of Model: Exchange Rate Targeting

The study uses annual data. We experimented up to 3 lags on the first-differenced of every variable and calculated F-statistics for the joint significance of lagged levels of variables in equation (2). Calculated F-test statistics when one lag is imposed is 10.5849. This is higher as compared to the critical value of the upper level of the band (i.e. 5.29) at the 5 percent level of significance. These results show that in equation (2) when the order of lags is 1, the calculated F-Statistics exceeds the upper bound and the null hypothesis amplifying no relation between the variable in equation (1) is not accepted. So, the long-run outcomes of equation (2)

depends upon Schwarz Bayesian Criterion are given in table 1.

Table 1: ARDL (1, 1, 0) Model Long Run Results
Dependent Variable is CPIG

Regressors	Coefficients	Standard Error	T-Ratios
ER	-0.044102	0.039479	-1.1171[0.272]
RGDPG	-0.40002	0.20805	-1.9227[0.063]
C	10.3714	2.1661	4.7881[0.000]

$$R^2 = .56954, \bar{R}^2 = 0.51573, F(4, 32) = 10.5849 [0.000]$$

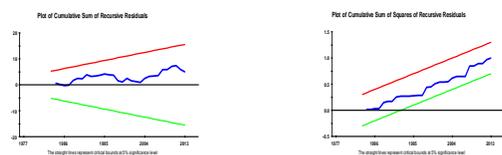
The table shows that the coefficients of market exchange rate (ER) and growth rate of real gross domestic product (RGDPG) have negative sign. The long-run findings given in table 1 explain that in the country most important variable which effects inflation rate is RGDPG in long-run. The variable of ER is statistically insignificant and it has weak effect on inflation rate in long-run. Findings of this study are similar to the results of Researchers [1] according to which no cointegration exists among nominal exchange rate and domestic inflation rate. The Auto Regressive Distributed Lag approach based on AIC and SBC approved the variety of diagnostic tests for instance residual correlation, functional form miss-specification, non-normal errors and heteroskedasticity as probability values of all tests are greater than 5%. The empirical results of ARDL error correction presentation of equation (3) are given in Table 3.

Table 2: Error Correction Representation for ARDL (1, 1, 0) Models: Dependent Variable is $\Delta CPIG$

Regressors	Coefficients	Standard Error	T-Ratios
ΔER	0.45494	0.13573	3.3518[0.002]
$\Delta RGDPG$	-0.19724	.094263	-2.0924[0.044]
Constant	5.1139	1.3587	3.7639[0.001]
ECM(-1)	-0.49308	0.12126	-4.0665[0.000]

$$R^2 = 0.47508, \bar{R}^2 = 0.40946, F(3, 33) = 9.6538 [0.000]$$

The results of error correction model in table 2 are similar to the findings of the researchers [9] which explored that in the short-run market exchange rate (ER) showed a strong and significant effect on the CPIG and it is positively related to inflation rate. Researchers [10] found that the real GDP growth has considerable and negative effect on inflation both during short and long run. The findings of some other researchers [11] are similar to the results as discussed above. The negative sign of real GDP growth (RGDPG) confirms that there exists a trade-off between CPIG and RGDPG. The coefficient of ECM term is statistically significant having accurate sign. This assures a long-run association among the variables given in equation (1). Further, to examine the stability of short-run and long-run coefficients of model this study uses cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) stability tests. The graphs of CUSUM and CUSUMSQ to verify steadiness for the short and long duration are represented in figure 2 (a) and (b).



(a)

(b)

Figure 2

CONCLUSION:

According to the empirical findings of this study following conclusions may be drawn that the results explain existence of a long-run relation among inflation rate, nominal exchange rate and real GDP growth rate. The long-run outcomes based on model indicate that exchange rate has no significant effect on inflation rate. While in short run market exchange rate (ER) is significantly related to inflation rate (CPIG) and it has accurate sign according to existing literature. The short-run impact of RGDPG on inflation rate is negative. It is significant at 4% level of confidence. The coefficient of ECM term has negative sign and it is extremely significant. It verifies a long-run relation amongst the above discussed variables. The coefficient of ECM term indicates that about 49 % of the disequilibrium in last year inflation rate from its equilibrium path will be corrected in present year.

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