



An Econometric Study of Exchange Rate, Current Account and Inflation of Pakistan From 1976 to 2012

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ABSTRACT: This paper is confined to investigate the relation between the dependent variable exchange rates, and independent variables inflation, and current account. . Relevant data has been taken for the period 1976 to 2012 and econometric tests such as unit root, Johansen Juselius (1990) cointegration, ECM, and CUSUM, and CUSUMSQR tests (for stability) have been carried out. The likelihood ratio test, of Johansen shows one cointegrating equation at 5 % level of significance with normalized coefficients INF and CA having elasticities of 0.35 and 0.30 respectively. CUSUM and CUSUM SQUARED statistics indicate that there are signs of structural instability.

Key words: Exchange rate, current account balances, inflation, structural breaks.

INTRODUCTION

One of the most important macroeconomic variables that affect inflation, balance of exports, imports and economic activity of a country is exchange rate. The higher the currency rate of a country the more expensive are its exports whereas imports become more cheaper in foreign markets. As compared to a lower currency rate that makes a country's exports cheaper and imports more expensive. The principal determinants of the exchange rate considered during the present study are: Inflation, and Current-Account balance. Jaewoo Lee, Menzie D. Chinn (2006) described in their studies the effects of permanent and temporary shocks on inflation and current accounts and observed permanent shocks having long term effects on exchange rate and small effect on current account. Shagufta Kashif (2012) reported that inflation in foreign countries affects domestic inflation, with the result that efforts to control domestic inflation have become ineffective. A number of research workers have worked on various aspects of the interdependent relationships of the variables, exchange rate, current account, and inflation. These include the work done by Jaewoo Lee, Menzie D. Chinn (2006), Marcel Fratzscher, et al (2009), Micheli Cavallo, Fabio Ghironi (2002), Ramiz ur Rehman, et al (2010), Marcel Fratzscher, et al (2009), Hong Ying Ang and Siok Kun Sek (2011), and Abdul Rashid and Fazal Husain (2010)

The set up of research paper is as; Section 1, Introduction; Section 2, Literature Review; Section 3, The estimation methodology, and results; Section 4, Conclusion, and Section 5 is the References

Section 2 Literature review

Francisco Nadal De Simone (1997), during the study of equilibrium behavior of current account, observed current account to display deficit in case price of domestic goods rises. Rehman, et al (2010) during their study observed a positive relation of inflation towards exchange rate. Ahmad E, et al (1999) concluded from their studies that "the practice of managing exchange rate as an independent instrument is not sustainable in presence of inflation". Munir A. S. et al (2007) during their studies observed devaluation having positive effect on output but at the same time negatively affects price level. Rehman, S. et al (1999) described no significant relation between exchange rate and domestic prices. Asif Idrees Agha, et al (2006), reported inflation is related to fiscal imbalances in the long run. Ahmad Zubaidi B, et al (2007) observed domestic currency appreciations have effects on deficit of current account. Ehsan et al (2002) reported an association of short run between inflation and exchange rate.



Three types of CUCUM and QUSUMSQ are reported in the literature to study the stability of the model. These are:

- plots of both CUSUM and CUSUM SQUARE do not cross the critical limits of 5 %, and indicate stability of the model, Hafeez et al. (2007), Muhammad Afzal et al. (2010), Pahlavani Mosayeb (2005), Safdari Mehdi and Motiee Reza (2011).
- Plots in which CUSUM is within the critical limits of 5 % and CUSUMSQ crosses the limits of 5% showing instability of the model, and this may be due to some structural breaks resulted from political uncertainties or reformations in the economic system (Sofia Anwar and Nabila Asghar (2012), Mohsen Bahmni-Oskooee and Yongqing Wang (2007), Yelda Yücel (2005)).
- Plots, when both CUSUM and CUSUMSQ crosses the critical limits of 5 % showing instability of the model and may be due to structural breaks resulted from political uncertainties or reformations in the economic system, Prakash Singh et al. (2009), Nikolaos Dritsakis (2011), Chaido Dritsaki (2011).

SECTION 3 METHODOLOGY

For the present study following tests have been applied on the data, obtained from WDI, and various reports of State Bank of Pakistan.

UNIT ROOT TEST

Augmented Dickey-Fuller (ADF) test is conducted to check for a unit root for all variables in both levels and first differences. The results of ADF test are given in table 1, which shows that all variables are integrated of degree one, I (1).

TABLE 1

AUGMENTED DICKEY-FULLER TEST RESULTS FOR UNIT ROOTS

Variables level	ADF stats	Variable first difference	ADF stats	Results
ER	-2.151586	Δer	-5.901663	I(1)
INF	-2.731110	Δinf	-6.453409	I(1)
CA	-2.655838	Δca	-5.869203	I(1)

COINTEGRATION ANALYSIS:

The results of likelihood ratio test, of Johansen (1998) are given in table 2., showing one co-integrating equation at 5 % level of significance.

TABLE 2

JOHANSEN TEST FOR COINTEGRATION

Maximum Eigen Value Test

Null Hypothesis	Alternative Hypothesis	Test Statistic
$r = 0$	$r = 1$	17.70375
$r = 1$	$r = 2$	8.786701
$r = 2$	$r = 3$	3.079393

Trace Test

Null Hypothesis	Alternative Hypothesis	Test Statistic
$r = 0$	$r \geq 1$	29.56984
$r = 1$	$r \geq 2$	11.86609
$r = 2$	$r \geq 3$	3.079393



Table 3 shows results of estimated long run(ER) function.

TABLE 3

NORMALIZED COEFFICIENTS OF JOHANSEN TEST ON ER

Variables	Coefficients	Standard Error	T – Value
INF	0.348763	-0.025421	0.207815
CA	0.304115	-0.477388	0.034244

The estimated coefficients of INF and CA have elasticity of 0.35 and 0.30 respectively.

ERROR CORRECTION MODEL (Short Run Dynamic Adjustment)

The error correction model estimated in this study can be represented by the following equation.

$$\Delta ER = \beta_0 + \beta_1 \Delta ER(-1) + \beta_2 \Delta ER(-2) + \beta_3 \Delta INF(-1) + \beta_4 \Delta INF(-2) + \beta_5 \Delta CA(-1) + \beta_6 \Delta CA(-2) + EC(-1)$$

Where EC(-1) is the error correction term.

The following ECM is established to determine the short-run dynamics of the regression model.

$$CI \text{ relation : } ER_t = -84.33226 + 18.38542 INF_t + 11.91918 CA_t + U_t$$

$$ECM : \Delta ER_t = 1.525240 - 0.203U_{t-1} + 0.506532 \Delta ER_{t-1} - 0.130188 ER_{t-2} + 0.035440 INF_{t-1} - 0.129734 INF_{t-2} - 0.353566 CA_{t-1} + 0.026393 CA_{t-2} + 0.006025 EC(-1)$$

The estimation results are given below in table 4.

TABLE 4

Variables	Coefficients	Standard Errors	T stats.
$\Delta ER(-1)$	0.506532	0.21034	2.40814
$\Delta ER(-2)$	-0.130188	0.34610	-0.37616
$\Delta INF(-1)$	0.035440	0.21631	0.16384
$\Delta INF(-2)$	-0.129734	0.18514	-0.70073
$\Delta CA(-1)$	-0.353566	0.27364	-1.29210
$\Delta CA(-2)$	0.026393	0.23934	0.11027
EC(-1)	0.006025	0.00944	0.63857
C	1.525240	0.96239	1.58485

Most of the variables become statistically insignificant in the error correction model which suggests that, the impact of these variables is not very important in the short run.

DIAGNOSTIC TEST

The validity of the estimated model is tested by the CUSUM and CUSUM SQUARES. The graphical presentation of CUSUM and CUSUM SQUARES are given in figures 1, 2



FIGURE 1

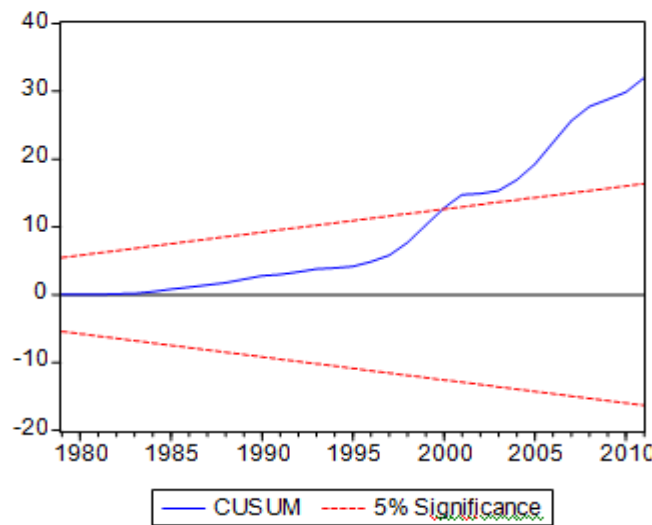
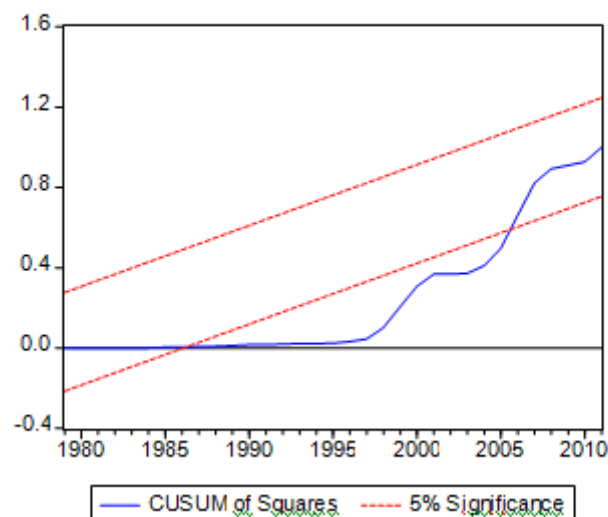


FIGURE 2



- The plots of these two tests cross the critical value line, indicating a non stable long- run relationship. between exchange rate ,current account and inflation rate .Both CUSUM and CUSUMSQ statistics indicate that there are signs of structural instability in the model may be due to certain political instability within the country, that is affecting investment and development as described by Prakash Singh et al.(2009), Nikolaos Dritsakis (2011) ,and Chaido Dritsaki(2011).

SECTION 4 CONCLUSION

In this paper an econometric study of exchange rate, current account balance and inflation has been carried out, using various econometric tests such as Dickey Fuller test, Johansen Co-integration test, and Error Correction estimation test using data for the period 1976 to 2012. The likelihood ratio test, of Johansen shows one co- integrating equation at 5 % level of significance with normalized coefficients INF and CA having elasticities of 0.35 and 0.30 respectively. The plots of CUSUM and CUSUMSQ cross the 5 % critical value line, indicating signs of structural instability in the model which may be due to political uncertainties, Afghan war and terrorist activities within Pakistan. These are affecting



its trade, investment and development activities, thus affecting the variables exchange rate, current account, and inflation.

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