BEHAVIOUR EQUILIBRIUM EXCHANGE RATE AND MISALIGNMENT: EMPIRICAL CASE FROM PAKISTANI RUPEE

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ABSTRACT

This study used Vector Error Correction Model to estimates the behavioural equilibrium exchange rate (BEER) and the exchange rate misalignment in case of Pakistan for the period of 1980 to December 2006. To explain the behaviour of real effective exchange rate, we have used seven economic variables, i.e. Government Expenditures (GOV), Degree of Openness (OPEN), Relative productivity (PROD), Monetary Policy Proxy (MP), Reserve to GDP (RES), Terms of Trade (TOT) and Net Capital Flow (NCF) .The results indicate that the degree of misalignment ranged between -12.71 to 10.93 percent with zero reversion mean from 1980 to 2006.Furtherrmore,we have identified four episodes of undervaluation and three episodes of overvaluation. The BEER has been undervalue during 1987-92, 1996-97,1999-00 and overvalued during 2004-05, 1981-86, 93-95 and 2006. The estimates also showed that the misalignment getting smaller and smaller during 1980s and 1990s;where the misalignment were 10 and -10 percent, while during 2000s the biggest variance was 3 percent.

Keywords: Real exchange rate equilibrium, Behavioural exchange rate. Cointegration Misalignment.

1. Introduction

Exchange rate is one of the most important determinants of a country's relative level of economic health. It plays a vital role in a country's level of trade, which is critical to most every free market economy in the world. For this reason, exchange rates are among the most watched analyzed and governmentally manipulated economic measures. Fluctuations in the exchange rate may have a significant impact on the macroeconomic fundamentals such as interest rates, prices, wages, unemployment, and the level of output. This may ultimately results in a macroeconomic

disequilibrium that would lead to real exchange rate devaluation to correct for external imbalances (Parikh and Williams, 1998).

The exchange rate provides a key link between a country and the rest of the world, both in goods and assets markets. Poor exchange rate policy risks misrepresenting trade opportunities, resulting in misallocation of resources. A competitive and stable real exchange rate (RER) should, therefore, be the optimal policy target.

Owing to multiple factors, over the years, Pakistan exchange rate remains fluctuating. This has further aggravated by the current financial crisis 2008-2009.The gaps between real exchange rate (RER) and nominal exchange rate (NER) has widened in Pakistan. During the past five decades, Pakistan's foreign exchange regime has been moving towards a deregulated and market-oriented direction. Before the 1970s, Pakistan linked its currency, rupee, to the Pound Sterling. With the economic influence of the USA getting more apparent, in 1971, Pakistan linked rupee to the U.S. Dollar. In 1972 Pakistan devalued its currency by 131%. The exchange rate at that time was $1= PKR 11.That act significantly increased our export revenue. Despite the loss of East Pakistan's exportable produce, West Pakistan doubled its foreign exchange earnings. However, in 1973, OPEC increased the price of oil and Pakistan had to pay higher price to import oil. During that year there was a worldwide recession and the demand for goods and services decreased throughout the world which also caused Pakistan's export to decline. All these factors greatly damaged Pakistan's economy.

Pakistan fell into a budget deficit in 1982, when the strengthening U.S. Dollar made remittances abroad through official channels slumped. In this view, Pakistan put the rupee on a controlled floating basis. In 1998, to alleviate the financial crisis in Pakistan, the authorities adopted a multiple exchange rate system, which comprised of an official rate (pegged to U.S. dollar), a Floating Interbank Rate (FIBR), and a composite rate (combines the official and FIBR rates). Export proceeds, home remittances, invisible flows, and "non-essential" imports can be traded at the FIBR rate.

From 1999-2007, the exchange rate remained stable at $1=PKR 60. The reason for this was high amount of foreign aid

and remittances inflow in Pakistan. In 2008, due global financial crisis, hyper inflation, and sky rocketing rates of oil and unstable political and security conditions, Pakistan felt short of it foreign reserves and in February 2009, the price of all major currencies namely, US Dollar, Pound, Euro appreciated all time high to Pakistan Rupee. Such a high depreciation of Pak currency viz-viz major currency has posed a serious challenge to the economy and calls for new strategy; which will not only ensures stable exchange rate regime but also works as a safety net against any future shocks.

This paper is a minuscule step to this endeavor. The paper seeks to estimate the long run behavioral equilibrium exchange rate in Pakistan. The empirical analysis builds on quarterly data from 1980 to 2006 and derives a Behavioral Equilibrium Exchange Rate (BEER) and a Permanent Equilibrium Exchange Rate (PEER).

The rest of the paper is organized as follows: section two presents the literature review. In section three, we will explain the research methodology of the paper. Section four elucidates results and discussions. Section five wraps up the paper.

2. Literature Review

There is a large body of theoretical and empirical literature available on the topic. Most of the empirical literature focuses on identifying the equilibrium exchange rate for the G7 economies which were generally based on methods, including: (1) purchasing power parity (PPP) by Ahlers and Hinkle (1998) (2) Trade Equation Approach (TEA) by Devarajan (1998), and (3) Structural Approach Model (ADM) by Devarajan (1998) and Haque and Montiel (1998). Studies of MacDonald (1995) and Rogoff (1996) indicates that PPPs are not an appropriate model for determining the equilibrium exchange rate because of the slow mean reversion of real exchange rates to a constant level implied by the PPP assumption.

A number of studies, for instance have found that the level of the RER relative to an equilibrium RER, and its stability, has strong influence on exports and private investment (e.g., Caballero and Corbo, 1989; Serven and Solimano, 1991,Ghura and Grennes, 1993; Rodrik, 1994 and Yotopoulos 1996).Yotopoulos and Sawada

(2005) discover that systematic deviations of nominal exchange rate from their purchasing power parity (PPP) levels may endanger serious instabilities of the international macroeconomic system. Baffes and others (1999) use co-integration techniques to estimate the equilibrium exchange rate. Montiel (1997) suggests that co integration technique is superior method of estimating the real exchange rate over the PPP methodology.

Razin and Collins (1997) focus their estimation using a reduced form of the real exchange rate equation derived from a Mundell-Fleming model. Bahmani-Oskooee (1984, 1986) found that exchange rate has a significant impact on trade flows of selected developing countries even in periods when most of them had pegged exchange rates. Coes (1981) and Rana 1983) analyzed this issue on the basis of Hooper-Kohlhagen (1978) study using annual data. Coes (1981) examines Brazilian exports (as a proportion of the total value added) in 9 primary and 13 manufacturing sectors for 1965-74. His result indicated that the significant reduction in exchange rate uncertainty in the Brazilian economy during the crawling peg period might have contributed as much as the changes in prices toward explain the greater openness of the economy after 1968.

Elbadawi, and O'Connell (1999) examined misalignment for Côte d'Ivoire and Burkina Faso using single-equation time series. They found that for Côte d'Ivoire the actual real exchange rate was overvalued by 34 percent on average during the period 1987–93, but, contrary to the findings by Devajaran (1997) the Burkina Faso's currency does not seem to be overvalued; rather it was undervalued by 14% in 1987 - 1993. Dufrenot and Yehoue (2005) analyzed the relationship between real exchange rates and economic fundamentals in 64 developing countries; findings show that exchange rate dynamics are less likely to be explained by fundamentals such as productivity, terms of trade, and trade openness for middle-income countries than for low income countries. Maesofernandez, Osbat and Schnatz (2001) using quarterly data from 1975 to 1998 and up to four different specifications of BEER/PEER methodology arrived at results that show that the euro effective exchange rate is unambiguously undervalued in 2000, although the extent largely depends on a particular specification chosen. The driving fundamental variables

in their models were long term real interest rates differentials, productivity, net foreign assets, relative fiscal stance, real price of oil, and relative total consumption differentials.

Iossifov and Loukoianova (2007) estimated BEER model for Ghana and results show that most of the REER's long-run behavior can be explained by real GDP growth, real interest rate differentials (both relative to trading-partner countries), and the real world prices of Ghana's main export commodities.

Afridi (1995), and Siddiqui, Afridi and Mahmood (1996), Chishiti and Hasan (1993) examined the relevance of PPP in Pakistan through Engle and Granger co- integration test on quarterly data from 1957.1-1992.2.They used the VAR approach to investigate the monetary and real channels for the determination of real exchange rate. Their results show that simple PPP model is not appropriate for Pakistan while VAR analysis shows that monetary expansion and deficit financing led to a medium term disturbance in the equilibrium level of real exchange rate coupled with the impact of real variables i.e., terms of trade, tariff revenue, nominal devaluation, technical progress, and capital inflows in the long-term.

These studies have not take into account some variables which motivated us to re-investigate these issues by providing estimates of exchange rate misalignment.

3. Methodology

We use Johansen (1988) and Johansen and Juselius (1990) co-integration analysis to determine the long-run relationship of non-stationary variables series, whether these variables are co-integrated or not. In other words, the purpose of this test is to find out if there is long-run relationship between REER and fundamental variables. In order to apply co-integration series and to determine the order of integration, we use Augmented Dickey Fuller (ADF) and Pillips-Perron test.

Equation (1) shows Johansen method in the form of vector error correction model (VECM) in order to determine the co-integrating vectors.

$$\Delta y_t = c + \sum_{i=1}^{K} \tau \Delta y_{t-1} + \prod y_{t-1} + \eta_t \qquad (1)$$

Where y is a -vector of non-stationary I (1) variables and c is the constant. The information on the coefficient PP abmatrix between the levels of the $\prod$ is decomposed as $\prod = \alpha\beta$ and βy_t is $I(0)$ where athe relevant elements the matrix are adjustment coefficients band the β matrix contains the cointegrating vectors. Johansen and Juselius (1990) specify two likelihood ratio test statistics to test for the number of cointegrating vectors. The first likelihood ratio statistics for the null hypothesis of exactly r cointegrating vectors against the alternative r + 1 vector is the maximum eigenvalue statistic. The second statistic for the hypothesis of at most r cointegrating vectors against the alternative is the trace statistic.

Finally, we used Hodrick-Prescott filter (H-P filter) which hep to obtain the permanent values of the economic fundamentals. Because the economic fundamentals may not be in the long-run equilibrium so we use H-P filter to smooth them.

4. Data sources and Definitions

In this section we define our variables and show their effect on real effective exchange rate. The fundamental variables are expected to be signed as follow:

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$$REER = f(GOV, OPEN, PROD, RES, SAVING, TOT, NKF)$$

a) Real Effective Exchange Rate (REER):

The weighted average of a country's currency relative to basket of other major currencies adjusted for the effects of inflation. REER Calculated as a geometric weighted average of bilateral real exchange rates.

$$REER = \prod_{i=1} \left[\frac{S^{PKS} \cdot CPI^{PKS}}{S^{i} \cdot CPI^{i}} \right]^{W}$$

S^{PKS} and S^{i} are the bilateral exchange rate of Pakistani Rupee and country i's currency respectively. CPI^{PKS} and CPI^{i}, w are the consumer price index for Pakistan, consumer price index for country i and the trade weight (percentage) of Pakistan's trader partner country i. Data collected from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).

b) Government expenditures (GOV):

Government expenditures measure as a ratio of government spending to nominal GDP. The influence of GOV on REER depends on government spending on tradable and non-tradable goods. If government spending towards tradable goods is stronger, thus it will worsen the current account which will lead to depreciate REER, and if government spending towards non-tradable is stronger, this will lead to appreciate REER. Data collected from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).

$$GOV = \frac{\text{Governement Spending}}{\text{GDP}}$$

c) Degree of openness (OPEN):

Degree of openness measures as a ratio of total trade to Gross Domestic Product (GDP). The impact of degree of openness on REER can not be signed priori because degree of openness is theoretically ambiguous. Data of total export, total import, and GDP collected from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).

$$OPEN = \frac{\text{Export} + \text{Import}}{\text{GDP}}$$

d) Relative productivity (PROD):

Relative productivity is calculated as a ratio of labor productivity relative to geometrically weighted foreign labor productivity, where labor productivity is a ratio of GDP to the total employment.

$$PROD = \frac{\text{Labor Productivity}}{\prod \text{Labor Productivity}^{w}} = \frac{\frac{GDP}{\text{Total Employment}}}{\prod \left(\frac{GDP}{\text{Total Employment}}\right)^{w}}$$

The sign of PROD would be positive which reflects that the increase in PROD lead to appreciation of REER according to Balassa-Samuelson. Data collected from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).

e) Reserve to GDP (RES):

RES is measure as a ratio of total reserve to GDP to capture the effect of reserve on exchange rate behavior.

$$RES = \frac{\text{Total Reserve Include Gold}}{GDP}$$

Government interventions decide the sign of the RES. If RES is significant, this means there is not government intervention, but if it is not significant it means there is government intervention. Data collected from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).

f) Monetary policy proxy (MP):

Dufrenot and Yahuoe (2005) use MP as a proxy of the monetary policy. MP defined as the ratio of the change in domestic credit to lagged money supply. A high level of this ratio strengthens the central bank balance sheet position, and is expected to lead to a real currency appreciation. Data collected from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).

g) Net capital flows (NKF):

Net capital flows calculated as the balance of goods and services minus the change in reserves as percentage of GDP.

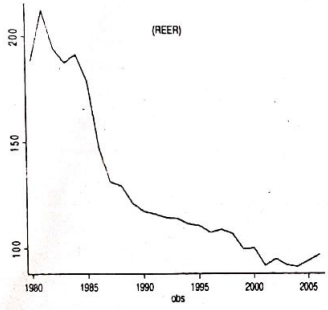
$$NKF = \text{Balance of goods \& services} - \text{change in gross international reserves}$$

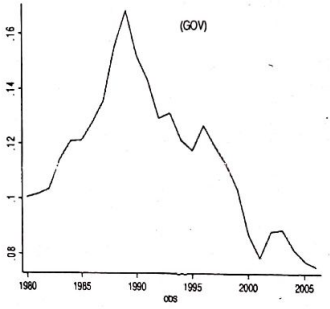
$$NKF = \left[-\left(\frac{\text{export} - \text{import}}{GDP}\right)\right] - \left(\frac{\Delta \text{ Reserve}}{GDP}\right)$$

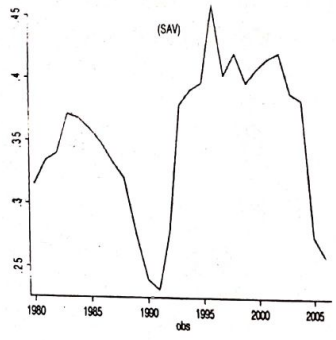
The sign of NKF depends on the government intervention. If NKF is significant this means there is no government intervention but if it is not significant it means there is government intervention. Data collected from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).

h) Terms of trade (TOT):

Terms of trade measure as a ratio of export price index to import price index (Baffes, Elbadawi and Connell, 1999). The impact of terms of trade on REER can be either positive or negative depending on substitution and income effect. If substitution effect is greater than income effect, REER will depreciate and if income effect is greater than substitution effect REER will appreciate (Elbadawi, 1997). Data obtained from International Monetary Fund (IFS CD-Rom version 1.1.82, 2008).






(SAV)
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.3
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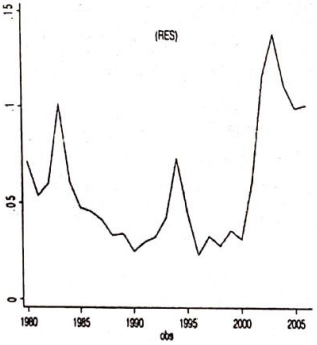
1980
1985
1990
1995
2000
2005
obs


(RES)
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1985
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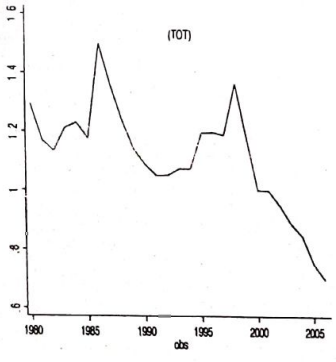
(TOT)
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1
1.2
1.4
1.6
1980
1985
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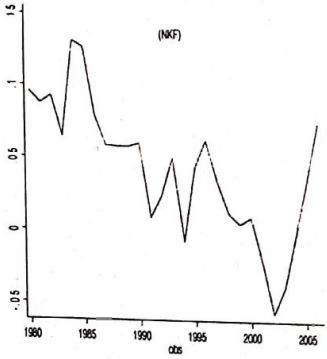
2000
2005
obs


(NKF)
-.05
0
.05
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1980
1985
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1995
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5. Empirical Result

5.1 Stationary analysis

We transformed all time series into natural logarithm values as the first step. Thus, we tested for unit roots in REER and the fundamental variables to determine the order of integration of these series. We used the Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test with and without trend as recommended by Engle and Granger (1987).

Table - 1

Results of ADF unit root tests applied to the level of REER and major variables series

Series	With Constant and Trend	Constant and no Trend	No Constant and no Trend	Conclusion
LREER	-0.885	-1.383	-2.015	Series has unit root
LGOV	-2.118	-0.062	0.698	Series has unit root
LPROD	-0.700	-1.801	-1.157	Series has unit root
LOPEN	-1.877	-2.101	-0.425	Series has unit root
LRES	-1.813	-1.563	-0.445	Series has unit root
LPM	-1.819	-2.023	0.102	Series has unit root
LTOT	-1.222	-0.136	-0.887	Series has unit root
NKF	-1.940	-1.930	-1.508	Series has unit root

Tables (1) show the result of Augmented Dickey Fuller (ADF) test for all variables. Schwartz Info Criterion (SIC) is used to determine the optimal length of suitable lags for ADF test. According to ADF test all variables in levels are either I (1) or I (0). The null hypothesis of a unit root in the level series cannot be rejected in all variables. In order to achieve stationary, we differenced the data as a result all variables are unit root rejected in the first differences (see Table 2). Therefore, all variables are integrated of same order I (1) which we can carry out to estimate the long run relationship.

Table - 2

Results of ADF unit root tests applied to first differences of REER and major variables series

First Differences	With Constant and Trend	Constant and no Trend	No Constant and no Trend	Conclusion
DLREER	-5.899*			Series stationary
DLGOV	-3.778**			Series stationary
DLOPEN	-4.947*			Series stationary
DLPROD	-4.093**			Series stationary
DLRES	-4.627*			Series stationary
DLPM	-3.697**			Series stationary
DLTOT	-5.149*			Series stationary
DNKF	-4.910*			Series stationary
C. Value at 5% Significant level	-3.410	-2.860	-1.950	

5.2 Cointegration Result

Table 3 presents the results of the unrestricted Johansen cointegration test. Akaike information criterion (AIC) used here to choose the optimal lag length. According to the results of cointegration test we conclude that there are four cointegration equations existed. The trace statistic and the maximum eigenvalue are both greater than their critical values in the first four ranks which are accepted at 5 percent level of significance. The result shows cointegration the relationship among the variables which indicate that there is evidence of long run relationship between REER and its fundamentals.

Unrestricted Cointegration Test

Sample (adjusted): 1982 2006
Series: LREER LGOV LOPEN LPROD LRES LMP LTOT NKF
Lags interval (in first differences): 1 to 4

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	354.6342	159.5297	107.8760	52.36261	0.0000
At most 1 *	246.7582	125.6154	88.01404	46.23142	0.0000
At most 2 *	158.7441	95.75366	66.41061	40.07757	0.0000
At most 3 *	92.33353	69.81889	41.55284	33.87687	0.0050
At most 4	46.78069	47.85613	23.36891	27.58434	0.1583
At most 5	27.41179	29.79707	16.41273	21.13162	0.2017
At most 6	10.99906	15.49471	10.97423	14.26460	0.1555
At most 7	0.024831	3.841466	0.024831	3.841466	0.8747

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Although there are number of cointegration vectors equations exist, the fist cointegration vector used to show the long run relationship between REER and its fundamentals. Multiple cointegration vectors make the equilibrium interpretation condition complicated. We follow Cheng and Orden 2005, and Ilimi 2006 they mention that reduced rank regression provides information on how many unique cointegrating vectors span the conintegrating space, while any linear combination of the stationary vectors is stationary vector by itself.

5.3 Estimation result

Table 4 shows the result of cointegration vector coefficient of behavioral REER model in the long run. All variables that enter system are correctly signed and statistically significant at 5 percent

level. The coefficient of government expenditure is negative which lead to REER depreciation if government expenditures increase. This is because the proportion of government expenditures on tradable goods is greater than proportion of government expenditures on non tradable goods.

Vector Error Correction Estimates

Standard errors in ( ) & t-statistics in [ ]

Variables	CointEq1	Adjustment coefficients (standard error in parentheses)
REER(-1)	1.000000	0.034318 (0.12811) [0.26788]
GOV(-1)	-0.293294 (0.15526) [-1.88901]	-0.080131 (0.22284) [-0.35959]
OPEN(-1)	-0.781679 (0.32664) [-2.39312]	-0.420159 (0.17248) [-2.43598]
PROD(-1)	0.499455 (0.04003) [12.4779]	0.292368 (0.15065) [1.94071]
RES(-1)	-0.401251 (0.06264) [-6.40578]	-0.158251 (0.05551) [-2.85102]
PM(-1)	1.087288 (0.16870) [6.44496]	0.721773 (0.19487) [3.70386]

TOT(-1)	-1.292802	-0.110698
	(0.27762)	(0.26774)
	[-4.65676]	[-0.41345]
NKF(-1)	1.368446	0.166280
	0.453363	(0.07961)
	[3.01843]	[2.08868]
C	-8.504381	

It is empirically proved that the trade openness (OPEN) has also negative effect on the long run REER. We interpret this phenomenon as the rise of openness degree reduces the support to import competing industries and resources are channeled to non-traded goods sector, which ultimately results in depreciation. It means that the REER is affected by degree of openness negatively (Chen, 2000). The coefficient of relative productivity (PROD) is consistent with economic theory which has positive impact on REER.

The reserve to GDP ratio (RES) has a negative effect on REER, opposite to the one we expect. Detken (2001) found that the net foreign reserve accumulation can be associated with domestic currency depreciation in the medium run but eventually an appreciation in the long run. RES is significant which can be interpreted by less central bank intervention.

Both MP and NKF have a positive impact on REER and significant at 1 percent level. The positive sign for SAVING is consistent with our expectations which indicate that as monetary policy level increase so does the REER.

The terms of trade (TOT) coefficient is negative and significant at 1 percent level. Here the negative sign of TOT suggests that substitution effect is greater than income effect which leads to depreciation of REER.

6. Behavioural Equilibrium Exchange Rate and Misalignment

To obtain the long run equilibrium level of the REER, in the next section, we estimate the coefficients of the fundamentals variables by using VECM. Figure 2a shows the BEER and BEER

residual. Next, we use HP filter to smooth out the BEER equilibrium by removing the short-term variations from the explanatory variables to obtain the permanent equilibrium exchange rate (PEER). Figure 2b presents the permanent and cyclical series take from HP filter. We can see PEER is less volatile than BEER.

Finally, we calculate the misalignment based on the PEER by applying the following formula:

$$\text{Misalignment} = \left(\frac{\text{REER} - \text{PEER}}{\text{PEER}}\right) * 100$$

The three series (REER, PEER, BEER), and misalignment are presented in figure 2c. The range of misalignment lies between -12.71 to 10.93. When the misalignment is greater than zero, it means the REER is over-evaluated; when misalignment is less than zero then REER is under-evaluated.

Figure 2a:

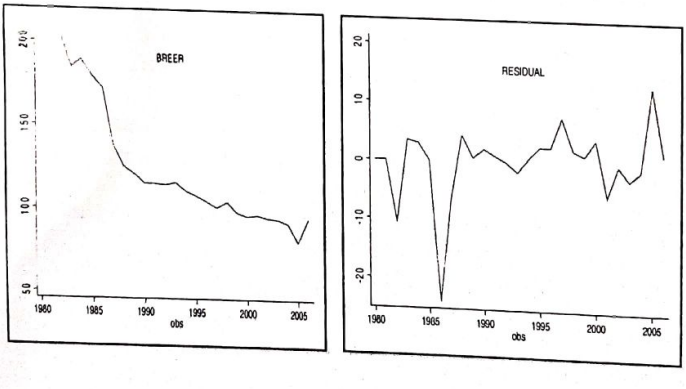
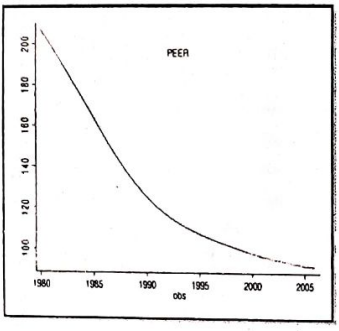


Figure 2b:



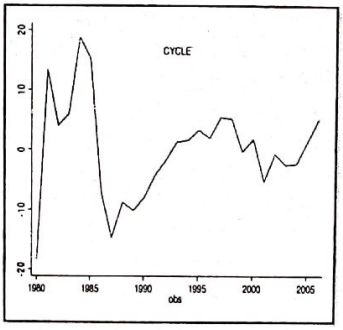
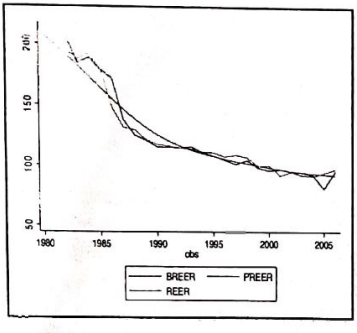
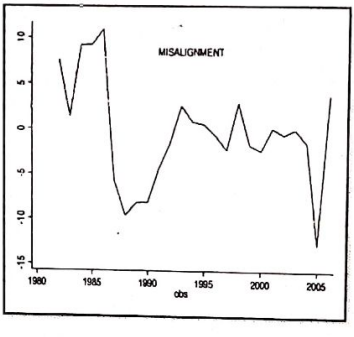


Figure 2c:





Above figure shows this phenomenon. The positive deviations reflect the appreciation of actual REER relative to EREER, while negative deviations indicate the depreciation of actual REER. As reflect by Figure 2c, exchange rate misalignment ranged between -12.71 to 10.93 percent with zero reversion mean from 1980 to 2006. This duplicates the long-term convergence of trend of actual REER towards EREER in Pakistan.

As evident from the study, the actual REER of 2005 depreciated by -12.71 percent on the basis of our estimated regressions, while in 2006 REER appreciated by 3.66. This advocates that the current exchange rate is little bit away from the

EREER and more or less reflects the underlying macroeconomic fundamentals. Moreover, our estimates indicated that there are four episodes of undervaluation (from 1987-92, 1996-97, 1999-00 and from 2004-05) and three episodes of overvaluation (from 1981-86, 93-95 and in 2006).

Exchange rate misalignment registered a positive misalignment in 1981 and remained positive until 1986. During this period, actual REER started to appreciate mainly due to the appreciation of US Dollar vis-à-vis major currencies. In 1987, the sharp weakening of US Dollar vis-à-vis other major currencies further put downward pressures on actual REER and it overtook the declining EREER. As a result, the real exchange rate became undervalued after five years of overvaluation and it remained undervalued up to 1992 with noticeable reduction in misalignment magnitude from 1994.

During 1996-97, EREER depreciated by 1.5 percent on average as against the appreciation of actual REER by 0.8 percent on average. After September 2001 a major structural shift was observed, when large inflows of foreign exchange brought the fundamentals to the convergence of equilibrium real exchange rate. Specifically, the real exchange rate on average reflects a slight undervaluation of real exchange rate.

Due to excess foreign liquidity in the foreign exchange market, the rupee has been under pressure due to the appreciation of currencies. Intervention policy of the central bank had not only built foreign exchange reserves but also protected the export competitiveness of undue exchange rate appreciation.

Despite the appreciation of the rupee, the real exchange rate has continued to maintain the competitiveness due to the fact that the basket of currencies against the dollar appreciated by more than the rupee and absorbed the negative impact of inflation due to high relative trading partners and the depreciation of EREER slip downs.

7. Conclusion

This paper used vector error correction model to estimate the behavioural equilibrium exchange rate (BEER) and the exchange rate misalignment in Pakistan for the period 1980 to December 2006. In order to explain the behaviour of real effective exchange

rate, we have used seven economic variables including; Government Expenditures (GOV), Degree of Openness (OPEN), Relative productivity (PROD), Monetary Policy Proxy (MP), Reserve to GDP (RES), Terms of Trade (TOT) and Net Capital Flow (NCF).We have found that the degree of misalignment ranged between -12.71 to 10.93 percent with zero reversion mean from 1980 to 2006.Our study further identified four episodes of undervaluation and three episodes of overvaluation. The REER has been undervaluing during 1987-92, 1996-97, 1999-00 and during 2004-05 and it has been overvalued during 1981-86, 93-95 and in 2006. The result also show that the misalignment getting smaller and smaller during 1980s and 1990s where, the misalignment were 10 and -10 percent. While during 2000s the biggest variance, except 2005, was 3 percent.

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