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Impact of Foreign Direct Investment (FDI) Inflows on Equilibrium Real Exchange Rate of Pakistan

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ABSTRACT

This study aims to analyze the impact of foreign exchange inflows on equilibrium real exchange rate of Pakistan for the period 1993 M7 to 2009 M3 through behavioral equilibrium real exchange rate (BEER) approach. The BEER approach uses econometric technique of cointegration to establish a behavioral link between the real exchange rate and relevant macroeconomic fundamentals. The study shall conclude that massive foreign direct investment inflows and workers 'remittances have significantly appreciated equilibrium real exchange rate of Pakistan. The purpose of this paper is to investigate the impact of foreign exchange inflows in Pakistan in the form of FDI and workers' remittances on equilibrium real exchange rate of Pakistan.

KEY WORDS: Foreign Direct Investment (FDI), Behavioral Equilibrium Real Exchange Rate (BEER), Real Exchange Rate Misalignment (RERM), Equilibrium Real Exchange Rate (ERER), GDP, Fiscal Year

Introduction

The Real Exchange Rate Misalignment (RERM) refers to a sustained departure of actual real exchange rate from its long-run equilibrium real exchange rate (ERER). RERM can be distressing for developing countries like Pakistan due to its several disruptive implications for growth, capital flow and currency stability.[1] Assessment of RERM depends on the estimation of unobservable Equilibrium Real Exchange Rate (ERER). In this regard, recent literature helps by developing several techniques to estimate ERER. Most of these approaches use some form of

cointegration technique to develop a long run relationship between actual real exchange rate and macroeconomic fundamentals like productivity of tradable sector, trade liberalization, foreign capital inflows and many others (Edwards, 1989; Montiel, 1997).

Foreign direct investment (FDI) is an important source of capital financing in capital deficient countries like Pakistan. FDI can affect equilibrium real exchange rate in both ways *i.e.* appreciation or depreciation of domestic currency depending on the use of these inflows. If FDI is used to finance imports, it does not affect equilibrium real exchange rate, however, its use for domestic nontradables will lead to the appreciation of domestic currency (Baffes, 1999).

In case of Pakistan, FDI was very low before fiscal year 2005 (FY 05) and except FY 96 it never surpassed US$ 1 billion. However, in FY 08, it rose to US$ 5.4 billion before dropping to US$ 3.7 billion in FY 09 (see Figure 1).

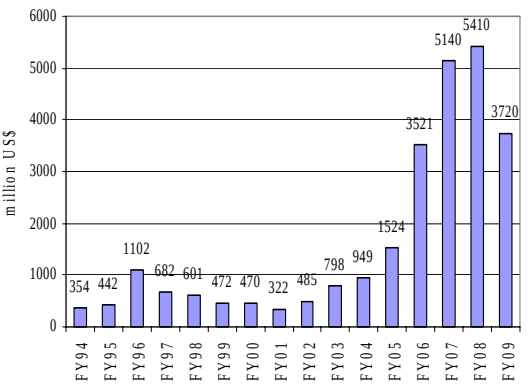

Figure 1: Foreign Direct Investment Inflows in Pakistan

From FY 1997 to FY 2009, Pakistan has received around US$ 24 billion as FDI from countries all over the world. Major sources of FDI in Pakistan include USA, UK and UAE (see Figure 2).

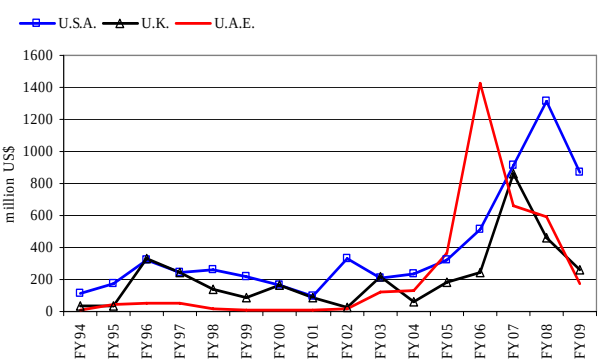

Figure 2: Major Sources of FDI Flows in Pakistan

An important aspect of FDI inflows in Pakistan is that it is concentrated to a few non-tradable sectors (see Tables 1 & 2). During FY 02-09, US$ 21.5 billion FDI inflows in Pakistan were concentrated to few sectors, including oil and gas exploration, power, communications and financial services. These four sectors received 72.5 percent of total FDI during FY 02-09 (see Tables 2).

FDI inflows in non-tradable sectors has worsened the balance of payments (BOP) problems for Pakistan through its impact on repatriation of profit. This has built pressure on income account of current account balance of the country. Further, the profitability in the banking sector of Pakistan has been very high, which has attracted foreigners to invest in this sector. But high profitability in this sector was maintained by paying negative real interest rates to depositors.

The authorities argue that at the initial stages, developing countries should not be choosers of sector specific investment. Once the investor's confidence in domestic economy builds, they also start investing in tradable sectors. Further, the development of non-tradable sectors like telecommunication and banking are considered to be helpful in enhancing productivity of tradable sector.

Million US$	**FDI**	**Share in Total**
Food, Beverages, Tobacco	173	6.8
Chemicals, Pharmaceuticals & Fertilizers	324	12.7
Power	723	28.4
Transport , Storage & Communication	160	6.3
Financial Business	146	5.7
Others	1,022	40.1
TOTAL	**2,548**	**100.0**

Table 1: Sector-Wise FDI (FY 97-01)
Source: State Bank of Pakistan

Million US$	**FDI**								**Total 2002-09**	**Share in Total FDI**
Sectors	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**		
Oil & Gas Explorations	268	187	202	194	313	545	635	775	3119	14.47
Power	36	33	–14	73	321	193	70	130	842	3.91
Communications	13	24	222	518	1938	1899	1627	879	7120	33.04
Financial Business	4	208	242	269	329	930	1865	707	4554	21.14
Others	164	347	297	470	621	1573	1213	1228	5913	27.44
Total	**485**	**798**	**949**	**1524**	**3521**	**5140**	**5410**	**3720**	**21549**	**100**

Table 2: Sector-Wise FDI Inflows during FY 02-09
Source: State Bank of Pakistan

Workers' Remittances

Workers' remittances are an important source of capital for developing countries like Pakistan. These inflows are directly received by the families of remitters, thus has direct impact on poverty reduction in receiving countries. Further, these inflows are treated as unrequited current private transfers in the balance of payments accounts which curtails the current account deficits of the receiving country. However, despite the importance of workers' remittances as source of financing of trade deficit, these inflows have important implications for equilibrium real exchange rate. If these inflows are largely spent on non-tradable goods, it may result in the appreciation of real exchange rate.

In case of Pakistan, workers' remittances have grown from US$ 1.5 billion in FY 94 to US$ 7.8 billion in FY 09 (see Figure 3). Major jump in remittances was observed after 9/11, when remittances increased to US$ 4.2 billion in FY 03 from US$ 1.0 billion registered in FY 01. Major cause of this shift was the strict stance of US government on money laundering. Further, after 9/11 many Pakistanis were not feeling safe in the United States and they preferred to transfer their money in Pakistan. However, consistent rise in remittances inflows suggests that now the shock of 9/11 is over and this growth will pertain in the future.

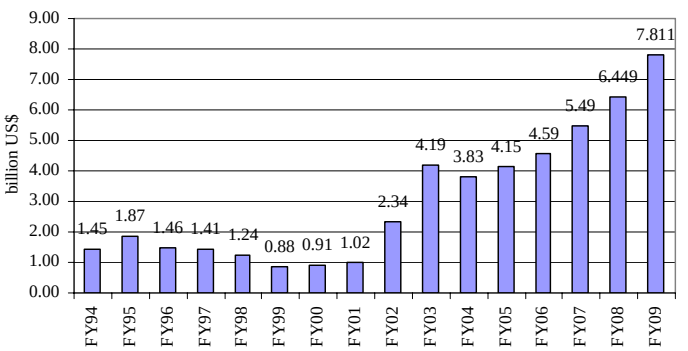

Figure 3: Workes' Remittances Inflows in Pakistan

Major source of remittances inflows in Pakistan are USA, UK, Saudi Arabia and UAE. Before FY 01, Saudi Arabia was the largest source of workers' remittances in Pakistan but after that USA has become the leading source of remittance (see Figure 4).

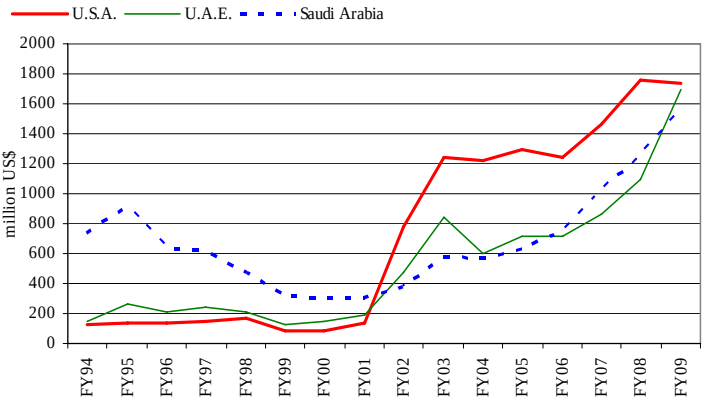

Figure 4: Three Major Sources of Remittances in Pakistan

Literature Review

Empirical Literature on RERM

Best known traditional single-equation reduced-form studies are those of Edwards (1989 and 1994). Edwards (1994) uses panel data for 12 developing countries over the period, 1962-84 to estimate a regression in which the actual RER was the dependent variable and the set of independent variables included, both potential fundamentals – such as the rate of growth of total factor productivity, the terms of trade, the share of government consumption in GDP, a measure of openness of the trade regime, and a measure of the severity of capital controls, and other variables interpreted as not affecting the LRER, but potentially causing RER to deviate from the LRER. These primarily included proxies for temporary aggregate demand shocks and changes in the nominal exchange rate.

Using the cointegration technique, Elbadawi & Soto (1997) estimate ERER for seven developing countries based on annual data from 1966 to 1999. They reject the PPP approach and adopt the approach based on fundamentals. The paper extends the model of the determinants of RER of Rodriguez (1989) and Edwards (1989) by including two more elements, the effect of financial flows and role of the country risk. Except minor differences, the results support the theory of ERER based on fundamentals.

To determine the impact of export diversification and trade protection on the RER of Algeria, Sorsa (1999) includes oil price, government consumption, and level of protection and volume of oil as real variables. His results based on OLS confirm the hypothesis that in the long run, only real variables affect RER while nominal variable are insignificant in the long run.

MacDonald (1999) concludes that fundamentals have a clear and significant role to play in determining the in-sample and out-sample performance of exchange rate models, such as monetary model. He further concludes that exchange rates are

predictable at horizons as short as one month ahead and both short-run and long-run modeling of exchange rate are alive.

Based on Edwards' (1989) inter-temporal general equilibrium model Asfaha & Huda (2002) estimate the degree of RERM and its impact on the international trade competitiveness of South African economy for the period, 1985:1-2000:4. For this purpose, a one step Engle Granger approach and five years moving average technique have been employed to estimate exchange rate misalignment, while impulse response analysis and variance decomposition technique of cointegrated VAR have been established to assess the impact of the misalignment on trade competitiveness. The results show that over-valuation episode of the misalignment had been characterized by periods of relative political stability, removal of the sanction and integration of South African economy into global market.

RERM Literature on Pakistan

In case of Pakistan, a few studies have been made to empirically examine the exchange rate misalignment. These include Chishti & Hassan (1993), Afridi & Siddiqui (1994), Afridi (1995), Siddiqui et al. (1996), Siddiqui & Salam (2000), and Hussain (2008).

By applying a small open economy model of Edwards (1988), Chishti & Hassan (1993) identify the real and monetary factors that determine the behavior of real exchange rate in Pakistan. Monetary variables consist of excess supply of domestic credit and government deficit as proportion of monetary base, while real factors comprise of terms of trade, tariff, nominal devaluation, technical progress, capital inflow and spread of official exchange rate and parallel black market rate. Contrary to existing empirical studies, their results support long-run effects of the nominal variables such as excess credit and deficit financing. The study has been criticized on the use of improper proxies for excess supply of domestic credit, productivity and openness.

To determine the equilibrium path of real exchange rate in Pakistan, Afridi (1995) estimates a model originally developed by Edwards (1989). His theoretical underpinnings and selection of variables are improvements over previous studies. His main contribution is the selection of proper variables and particularly measurement of those variables. Technological progress has been measured by slow residual and real per capita GDP growth rates. Government expenditure on non-tradables is measured by aggregating expenditure on education, health, transport and communication, housing, rural developments and social welfare. However, the study ignores the fact that in the presence of non-stationary variables OLS may give biased results.

In their well known paper, Siddiqui et al. (1996) estimates both single-and-simultaneous equation models. The results show that both monetary and real sector variables affect the equilibrium path of real exchange rate. On the basis of

these results, authors conclude that controlling only the monetary side of the economy may not be sufficient to maintain a competitive and stable RER. Controlling domestic prices instead of repeated devaluation of currency may be another way to maintain a stable RER.

By assuming that, equilibrium real exchange rate is determined by "real" factors, Siddiqui & Salam (2000) analyze the determinants of equilibrium exchange rate. The paper also analyzes the trade pattern of Pakistan over time. Authors conclude that the role of Japan is becoming important and is reflected in sharp fluctuation in Rs/YEN exchange rate. The price of other major currencies in terms of Rupee increased 4-5 times after 1982, whereas price of Japanese Yen increased 9 times. Analyzing the determinants of the equilibrium, the path of exchange rate shows that the terms of trade, resource inflow and openness are important determinants of ERER.

In a recent study, Hussain (2008) applies cointegration technique to compute Pakistan's ERER and its misalignment. By using annual data from 1970 to 2007, the study estimates the impacts of real and monetary variables on RER. The study concludes that ERER depends on terms of trade, capital inflows, government consumption and GDP growth.

Estimation Methodology[2]

There are a number of approaches to measure RER misalignment, however, among these Fundamental Equilibrium Exchange Rate (FEER) Approach and Behavioral Equilibrium Exchange Rate (BEER) model are prominent.

The FEER approach uses a formal model for determining the equilibrium RER. In the FEER approach, Williamson (1994) defines the equilibrium exchange rate as the real effective exchange rate (REER) that is considered with macroeconomic balance, which is generally interpreted as when the economy is operating at full employment and low inflation (internal balance) and a current account that is sustainable, *i.e.*, that reflects underlying and the desired net capital flows (external balance). This exchange rate is denoted as "fundamental", as it abstracts from short-term factors in that and emphasizes instead determinants that are important over medium and long term. A comparison of REER with FEER is used to estimate exchange rate misalignment. The major disadvantage of this approach is that it requires considerable parameter estimation and judgment.

The BEER approach uses econometric methods to establish a behavioral link between the real exchange rate and relevant economic fundamentals.[3] Estimation of the BEER model is dependent on theoretical guidance for the choice of an appropriate set of economic fundamentals. Following Edwards (1988, 1994), there is now a large body of literature on identifying such a set of variables. According to Montiel (1999), the long-run equilibrium real exchange rate is determined by the steady-state values of pre-determined variables and permanent (sustainable)

values of both policy variables and exogenous variables. The set of variables that may act as the long-run determinants includes the following four components:

Firstly, domestic supply-side factors and particularly the Balassa-Samuelson effect, arising from faster productivity growth in the traded-goods sector than in the non-traded goods sector are considered. Secondly, liberalization of commercial policy may affect the long-run real exchange rate. Thirdly, changes in the international economic environment, *e.g.* capital inflows and foreign interest rates are important. Fourthly, fiscal factors such as permanent changes in the composition of government spending between traded and non-traded goods, is relevant.[4]

Once the fundamentals are identified according to the theory, the next step is to find a cointegrating vector showing a long run relationship between RER and fundamentals. After that, sustainable values of fundamentals are substituted in the cointegrating relation to obtain equilibrium real exchange rate. Finally, RERM is calculated as a difference between actual and equilibrium exchange rates.

Empirical Results

The BEER approach benefits from cointegration technique to establish a long run relationship between REER and its fundamental determinants. The variables used as proxies of fundamentals include: log of industrial production index (LPROD) as a proxy for productivity in tradable; log of exports (LOPEN) as a proxy of trade openness; log of foreign direct investment inflow (LFDI) as a proxy of capital inflows and log of workers' remittances (LREMIT) as an important inflow in recent years.

Before implementing the cointegration technique, the stationarity of LREER and fundamentals (LPROD, LOPEN, LFDI, and LREMIT) is checked by applying Augmented Dickey-Fuller (ADF) tests (see Table 3). Table 3 shows that variables included in BEER model (LREER and fundamentals) are non-stationary at level but are stationary at first differences. Hence they are I(1), which fulfills the criterion for estimating long run relationship through cointegration technique.

Series in BEER Model	**At Level**		**At First Difference**	
	With Intercept	With Inter. & Trend	With Intercept	With Inter. & Trend
LREER	–2.107(1)	–2.5246(1)	–11.65(0)***	–11.64(0)***
LREMIT	–0.4236(2)	–1.7164(2)	–13.8946(1)***	–13.8984(1)***
LFDI	–0.956(5)	–1.7966(5)	–10.7522(4)***	–10.7277(4)***
LPROD	0.0789(12)	–1.5694(12)	–5.550(11)***	–5.5659(11)***
LOPEN	–0.011(12)	–1.44(12)	–5.165(11)***	–5.1726 (11)***

Table 3: Unit Root Test

*; ** and *** denote significance of test statistic at 10%, 5% and 1% level of significance against the null hypothesis of unit root. The critical values are taken from MacKinnon (1996). Figures in the parenthesis represent lags selected on the basis of Schwarz Information Criterion (SIC). White noise of residuals in ADF tests was also checked.

Johansen's (1988) cointegration technique is used to estimate the long-run relationship between LREER and fundamentals (LPROD, LOPEN, LFDI, LREMIT). Unlike Engel Granger (1987), the Johansen's technique for estimating cointegration is said to be superior because it is based on Maximum likelihood procedure that provides test statistics to determine number of cointegrating vectors as well as their estimates.[5] The results of Johansen's test for cointegration rank are presented in table 4.

Series (LREER, LPROD, LOPEN, LFDI, LREMIT)							
Eigen Values in Descending Order: 0.1978, 0.1051, 0.0659, 0.0272, 0.0104)							
Trace-Stat				**Max-Stat**			
Null Hyp.	Alter. Hyp.	LR	5% C.V	Null Hyp.	Alter. Hyp.	LR	5% C.V
r = 0	r ≥1	70.16**	68.52	r =0	r =1	34.89**	33.46
r ≤ 1	r ≥2	35.27	47.21	r =1	r =2	20.71	27.07
r≤ 2	r ≥3	14.56	29.68	r =2	r =3	8.04	20.97
r≤ 3	r ≥4	6.52	15.41	r =3	r =4	6.35	14.07
r≤ 4	r =5	0.16	3.76	r =4	r =5	0.16	3.76

Table 4: Johansen's Cointegration Test Results

**denotes rejection of the hypothesis at 5% level. The lag length (1-13) of VAR was selected based on AIC criterion. Cointegration tests were conducted, assuming that series have trend but the cointegrating equation has only intercepts.

The results reported in table 4 show that both Trace test and Maximum Eigen value tests indicate single cointegrating vector at the 5% level of significance. The long-run relationship can be obtained by normalizing the cointegrating vector on LREER.

LREER	LPROD	LOPEN	LFDI	LREMIT	C
1	**–0.392** (0.1793) –2.18	**0.8238** (0.1499) 5.5	**–0.071** (0.0231) –3.08	**–0.1252** (0.0321) –3.90	**–7.3337**

Table 5: Normalized Cointegrating Equation

Table 5 shows normalized cointegrating vector. The numbers in parentheses under the estimated coefficients are the asymptotic standard errors. In equation form, the normalized vector can be expressed as follows[6]:

$$LREER = 7.3337 + 0.392\ LPROD - 0.8238\ LOPEN + 0.071\ LFDI + 0.1252\ LREMIT \quad (1)$$

In this long run relationship, LPROD, LFDI, and LREMIT have positive (appreciating) effect whereas LOPEN and have negative (depreciating) effect on real effective exchange rate. The positive sign of LPROD is according to the so called Balassa Samuelson theory which states that productivity rise in tradables leads to increase in demand of non-tradables, thus real exchange rate appreciates. As far as the impact of FDI on REER is concerned, it is positive and shows that increase in long-run capital inflows appreciate real exchange rate. FDI can affect equilibrium real exchange rate through both supply and demand channels. In the supply channel, FDI inflows increase the existing capital stock and bring spillover effects of technology transfer which in first round lead to an increase in output and fall in prices of non-tradables thus depreciating the real exchange rate and in the second round, the increase in output of non-tradables expands disposable income and thus tends to appreciate the RER. Second round effect is dominated by first round supply effect. By contrast, the contemporaneous effect through demand channel is realized after FDI inflows, if they are not crowding out domestic investment. This typical RER appreciation mechanism is highlighted by the literature as “Dutch disease” problem, associated with foreign capital flows. Finally, the sign of LREMIT is positive, showing that the use of remittances for consumption of non-tradable is dominant.

In the next step, combining long run parameters of the cointegrating equation (2) with the sustainable components of the fundamentals, which are computed by Hodrick-Prescott Filter (HP Filter), derives the equilibrium real effective exchange rate (LEREER).[7]

$$LEREER = 7.3337 + 0.392\ LROD^* - 0.8238\ LOPEN^* + 0.071\ LFDI^* + 0.1252\ LREMIT^* \quad (2)$$

Real exchange rate misalignment is then calculated as the difference between actual and equilibrium real effective exchange rates.

$$MIS = LREER - LEREER \quad (3)$$

Figure 5 shows the actual and equilibrium real effective exchange rates. This figure shows that equilibrium real exchange rate is a path instead of a single value. When actual real effective exchange rate (LREER) is above the equilibrium real effective exchange rate (LEREER), it shows over-valuation and vice versa. Therefore, problem of misalignment needs policy intervention, only when co-movement of REER and EREER do not follow the movements in macroeconomic fundamentals.

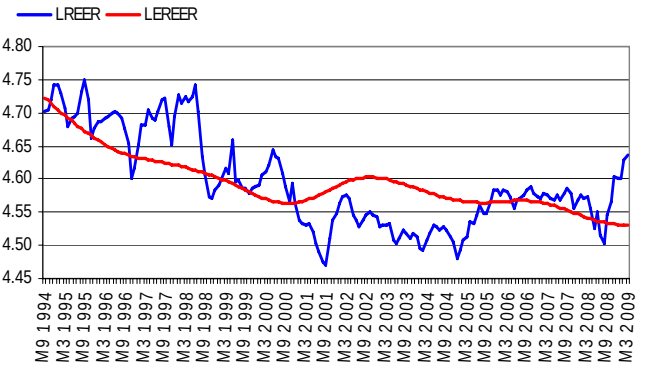

Figure 5: Actual and Equilibrium Real Exchange Rates

The results reject PPP school of thought and support Edwards and Elbadawi's view of fundamentals approach that equilibrium real exchange rate is not constant over time, as supposed by PPP approach.[8] Equilibrium real exchange rates can change over time, as a result of change in fundamentals like productivity and capital inflows. Further, the hypothesis that markets have well defined views of the equilibrium exchange rate, determined by fundamentals is not convincing. Because, determining the equilibrium real exchange rate is quite difficult task even for economists. Thus, markets do not have well-defined rational expectations view of what is implied by the fundamentals. However, markets may develop a very well-defined view that a rate being defended by the authorities is inconsistent with the fundamentals.

Conclusion and Policy Recommendations

Besides confirming the balassa effect hypothesis, the results show that foreign exchange inflows in the form of FDI and workers remittances appreciate the equilibrium real exchange rate in Pakistan. During the sample period more than 70 percent, FDI was concentrated in four nontraded sectors. FDI inflows in Pakistan appreciate the equilibrium real exchange rate which reflects the existence of 'Dutch Disease'.

Remittances inflows also appreciate real exchange rate in Pakistan. Although, remittances are growing at a very high rate since 9/11 but their sources are concentrated to a few countries. Further, the economic slow down in the last few years, has not affected their growth rate which has created several questions.

Real exchange rate misalignment is a better indicator of external competitiveness than actual real effective exchange rate. According to Martin (2007), "competitiveness assessments that are based only on the observation of the REER evolution through time can result in misleading conclusions". In case of

Pakistan, different publications (*e.g.* Economic Survey of Pakistan) report their analysis on the basis of actual REER and ignore the fact whether it is above or below than equilibrium exchange rate. This study suggests the estimation of equilibrium real exchange rate in Pakistan on regular basis.

The limitations of the study are that monthly data on fiscal sector and real sector variables is not available. Future research in this direction should explore variation in results based on different estimation techniques of equilibrium exchange rate.

Notes

1. Montiel (2002) argues that realignment of the actual real exchange rate to its long-run equilibrium value can be disruptive and costly. Razin (1997) shows that RER misalignment affects economic growth. Edwards (1988) argues that instable values of domestic currency and RER misalignment promote speculation and usually generate massive capital flight. Kaminsky et al. (1998) consider persistent overvaluation as a powerful early warning for currency crisis.
2. The IMF uses three approaches for RER misalignment: a "macroeconomic balance" approach, a reduced form "equilibrium real exchange rate" approach, and an "external sustainability" approach (see, Methodology for CGER Exchange Rate Assessment, IMF Research Department, November, 2006).
3. See, Edwards (1988, 1994), Montiel (1999), for the selection of fundamentals
4. In developing countries, it is difficult to find high frequency data on fiscal variables.
5. Although the Engle and Granger (1987) procedure is easily implemented, it does have several important defects: (a) it heavily depends on the choice of the variable, selected for normalization; (b) the method has no systematic procedure for the separate estimation of multiple cointegrating vectors; (c) another defect of the Engle-Granger procedure is that it relies on a two-step estimator. The first step is to generate the residual series $\{\hat{e}_t\}$ and the second step uses these generated errors to estimate a regression of the form $\Delta \hat{e}_t = a_1 \hat{e}_{t-1} + \ldots\ldots$ Thus, the coefficient a_1 is obtained by estimating a regression using the residuals from another regression. Hence any error introduced by the researcher in step 1 is carried into step 2.
6. EViews gives cointegration equation in deviation form, so independent variables and constant are brought to the right hand side in equation (1).
7. Where, the asterisks over the variables indicate the sustainable components of the fundamental determinants of equilibrium real exchange rate.
8. The absolute version of PPP holds that the equilibrium exchange rate between two currencies will be such as to equate purchasing power in the two countries involved. The relative version of PPP holds that the equilibrium exchange rate must change, so as to off-set differential inflation between two countries and thus leave the real exchange rate unchanged.

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Appendix 1: Literature Review Tables

	Authors	Hypothesis	Empirical Approach	Data	Findings Related to ERPT
1	Edwards (1994)	Response of RER movements	Single equation model was	panel data for 12 developing	1. Except the productivity variable, all explanatory variables

		to both nominal and real disturbances.	estimated for pooled data by using a fixed effect procedure with country specific fixed terms.	countries over the period 1962-84	had signs according to the theory. 2. Nominal devaluations can help to speed up the RER realignment.
2	Faruqee (1995)	Long-run determinants of real exchange rate.	Johansen's Cointegration technique	Post-war period data of **USA** and **Japan**	Sectoral productivity differentials explain a large portion of the trend variation in the real exchange rate in USA and Japan. However, for USA, NFA also confirms a long-run relationship with real exchange rate.
4	Elbadawi and Soto (1997)	Estimation of Long-run equilibrium real exchange rate.	Edward's (1989) and Rodriguez (1989) inter-temporal model; Cointegration and Error Correction were applied	For seven developing countries, using annual data from 1960 to 1994	Except minor differences, the results of the seven countries support the theory of ERER, based on fundamentals.
5	Mongardini (1998)	Estimation of equilibrium real exchange rate.	Applies Edward's methodology. Due to different order of integration of variables ARDL presented by Pesaran and Shin (1995).	Monthly data of **Egypt** from Feb. 1987 to Dec. 1996	1. Egypt's ERER was overvalued before 1993. 2. Paris Club debt relief phased in during the period 1991-96, had a significant impact on Egypt's real effective exchange rate.
6	Sorsa (1999)	Impact of trade liberalization on real exchange rate	Single equation estimation of the determinants of the real exchange rate. OLS, Cointegra-tion and ECM	Annual data of **Algeria** from 1980 to 1997	In the long run, only real variables affect RER while nominal variables are insignificant
7	Asfaha and Huda (2002)	Impact of the misalignment on trade competitive	Edward's model, Cointegration, ECM	Quarterly data of **South Africa**	The impact of the misalign-ment on trade competitiveness is felt over long-run and effect

		ness		from 1985:1 to 2000:4	is felt only through time lags of about four quarters.
8	Spatafora and Emil (2003)	Estimation of Russia's equilibrium real exchange rate.	Cointegration and ECM	Quarterly data of **Russia** from 1995-1 to 2002-3	ERER in Russia reflects both productivity and terms of trade (TOT).
9	MacDonald and Ricci (2003)	Estimation of South Africa's equilibrium real exchange rate.	Johansen (1995) cointegration estimation methodology	Quarterly data of **South Africa** from 1970Q1 to 2002Q1	1. In first quarter of 2002, the average value of Rand was 25 percent more depreciated than ERER. 2. Half life of the deviations was more than two years.

Table 2: Recent Empirical Literature on RERM in Pakistan

	Authors	**Hypothesis**	**Empirical Approach**	**Data**	**Findings Related to RERPM**
1	Chishti, Salim and M. Aynul Hasan (1993)	Impact of fundamentals on Real Exchange Rate Variation in Pakistan.	Small Open Economy Model of Edward's (1988); VAR methodology	Both Annual and Quarterly Data from 1957 to 1991.	1. PPP does not hold in Pakistan. 2. Results support long-run effects of the nominal variables, such as excess supply of credit and deficit financing.
2	Afridi, Usman (1995)	Impact of fundamentals on Real Exchange Rate Variation in Pakistan.	Small Open Economy Model of Edward's (1989); OLS technique	Annual Data from 1960 to 1990	1. Excess demand for domestic credit, capital flows, and openness were found inversely related to RER. 2. Results support for Balassa effect.
3	Bhatti, Razzaque H. (1996)	Whether PPP holds for eight Pak-rupee exchange rates with major industrial countries?	Cointegration and mean reversion test	Quarterly Data from 1982-I to 1994-IV	1. PPP holds in all cases except U.K. 2. The test for mean reversion strongly supports the PPP.
4	Siddiqui, Rehana, Usman A. Afridi, and Zafar Mahmood (1996)	1. Impact of monetary and Real variables on Real Exchange Rate Variation, 2. Whether the	Theoretical Framework developed in Afridi (1995); Both Single and Simultaneous	Annual Data from 1960 to 1994	1. Both monetary and real variables affect the equilibrium path of RER. 2. TOT is insignificant; Excess Domestic Credit Creation and Openness

		estimates of RER-model suffer from simultaneity bias.	Equation Models by applying OLS and 2SLS		contribute to RER appreciation. 3. Simultaneous equation model gives better results than the single equation model.
5	Siddiqui, Rehana, and Ayesha Salam (2000)	1.Determination of ERER 2.Analysis of trade pattern of Pakistan with USA and Japan		Annual Data from1972 to 2000	1. Japan is becoming important and is reflected in sharp fluctuation in Rs/Yen. 2. TOT, Resource Inflow and openness are important determinants of ERER.
6	Hussain, Shah (2008)	Determination of Real Exchange Rate Misalignment	Cointegration and Error Correction Model,	Annual Data from 1970 to 2007	The ERER depends on TOT, openness, Govt. consumption and capital Inflows

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