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Exchange Rate Misalignment and Economic Growth in Pakistan: The Role of Financial Development

ZAINAB JEHAN and IFFAT IRSHAD

This study endeavours to examine empirically how real exchange rate (RER) misalignment affects economic growth in Pakistan. In this regard, we have not only estimated the direct impact but also the indirect impact of misalignment on economic growth by using the financial development channel. We have used time series data ranging from 1980 to 2016 to carry out the empirical analysis. After testing the time series properties of the selected variables, we computed long run equilibrium RER later used to calculate RER misalignment. Finally, we estimated the impact of misalignment on per capita economic growth, both direct and indirect. Our results reveal an adverse impact of RER misalignment on economic growth. However, we report that financial development helps in minimising the adverse impact of RER misalignment, though not fully eliminating it. Based on the empirical findings, the study suggests that exchange rate policies need to be managed more cautiously. Moreover, the financial sector development needs to be strengthened which may help in fully alleviating the adverse impact of RER misalignment on economic growth.

JEL Classification: F31, GOO, O47
Keywords: Real Exchange Rate Misalignment, Financial Development, Economic Growth, FMOLS

1. INTRODUCTION

Exchange rate misalignment and exchange rate volatility have become two important considerations while formulating exchange rate policy since the new era of exchange rate arrangements. Therefore, policy makers stress the importance of aligning actual exchange rate closer to the long run equilibrium exchange rate. The persistent failure to meet this objective may lead towards the incidence of exchange rate misalignment, which is largely reported as detrimental for macroeconomic performance.

Theoretically, real exchange rate (RER) misalignment may occur due to changes in macroeconomic or structural factors. Macroeconomic induced RER misalignment is a consequence of inconsistencies between macroeconomic policies, particularly monetary policy, and nominal exchange rate. An expansionary monetary policy, for instance, generates a higher increase in domestic prices as compared to world prices, and thus leads to real exchange rate appreciation. This, eventually, diminishes foreign reserves, expands foreign borrowings, and intensifies black market activities. On the other hand, structural misalignment occurs when RER does not immediately respond to changes in its determinants (Edwards, 1988).

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Empirically, the existing body of research has widely recognised that exchange rate management is one of the most important channels through which economic policy affects the economic performance of an economy (Cottani et al. 1990). Particularly, the link between exchange rate misalignment and economic growth is widely examined for both large and small open economies. In this regard, the pioneering work is done by Edwards (1988), which empirically proves the adverse impact of RER misalignment on economic growth. Evidence from the developing world specifically supports the view that RER behaviour and economic growth are strongly related (Cottani et al. 1990; McPherson, 1997; Eichengreen, 2008; Rodrik, 2008; Rapetti et al. 2011; Ndlela, 2012; Jordaan & Eita, 2013; Bannaga & Badawi, 2014; Ali et al. 2015; Akram & Rath, 2017). Several studies, employing data for a larger set of countries, have also provided consistent results (Dollar, 1992; Ghura & Grennes, 1993).

Furthermore, some studies test the existence of possible asymmetries in the misalignment-growth relationship such as (Razin & Collins, 1997; Aguirre and Calderon, 2005; Gala, 2008; Rodrik, 2008; MacDonald & Vieira, (2010); Abida, (2011); Bhalla, (2012); Akram & Rath, 2017), among others. In particular, an overvalued exchange rate negatively affects economic performance by restricting economic activity, instigating balance of payment emergencies, and stimulating rent-seeking and black market practices (Rodrik, 2008). In contrast, exchange rate undervaluation helps to boost exports, increase employment and achieve higher economic growth (Rodrik, 2008 & Bhalla, 2012). Additionally, another strand of literature has proved that exchange rate misalignment in either form is harmful for economic growth (Sekkat & Varoudakis, 2000; Masunda, 2011; MacDonald & Vieira, 2010) conclude that the adverse impact of RER misalignment is higher for developing and emerging economies than developed countries.[1]

The recent surge in empirical literature, however, is to identify factors that help in plummeting and/or alleviating the unfavourable impact of RER misalignment on macroeconomic performance, specifically economic growth. In this regard, the role of financial development has gained considerable attention. Empirical studies have shown that financial development can limit the adverse impact of RER fluctuations on economic growth (Aghion et al. 2009; Elbadawi et al. 2012; Sekkat, 2012). For instance, financial development enhances economic growth by increasing financial resources and improving the efficiency of financial markets. Furthermore, financial development can provide better hedging tools to safeguard against the uncertainty attached with RER fluctuations and/or misalignment (Abu-Bader & Abu-Qarn, 2008).

Pakistan, being a small open economy, has witnessed misalignment in exchange rate due to both structural and macroeconomic factors. Exchange rate policies pursued by the country have contributed in an important way in determining the extent and span of misalignment in the exchange rate. Exchange rate policies have maintained a depreciated exchange rate most of the time in Pakistan, though the country has also experienced some episodes of appreciation with respect to equilibrium exchange rate (Debowicz & Saeed, 2014; Hyder & Mehboob, 2005).

[1] In addition to economic growth, Nabli et al. (2003) and Ebaidalla (2014) have shown the misalignment of exchange rate also deteriorate export performance of a country.

Historically, factors that have contributed towards an overvalued exchange rate in Pakistan are weakening of the US dollar against other currencies, current government expenditures, and deteriorating terms of trade, among others (Hyder & Mahboob, 2005). The episodes of undervalued exchange rate relative to equilibrium exchange rate during the 1980s (1982 onwards), in contrast, occurred due to appreciation of the US dollar against other major currencies, high domestic inflation relative to trading partners, abandoning of fixed exchange rate system, and trade liberalisation. During the 1990s, the exchange rate was kept undervalued mainly to combat the adverse impact of inflation on real exchange rate. In addition, Hyder and Mahboob (2005) document that during the managed and flexible exchange rate regimes Pakistan experienced not only a lower degree of exchange rate misalignment but also the variations in misalignment were less during these regimes in comparison to the fixed exchange rate regime. Recently, massive undervaluation in PKR was observed and the exchange rate has reached PKR154/$ from historically low rates of PKR18.60/$ in 1988. Insufficient foreign exchange reserves and the escalation of current account deficit are the prominent reasons behind the weakening PKR position against the US dollar.

Thus, it is evident from the above discussion that the relationship between RER movements and economic growth proves to be an important issue from both positive and normative perspectives. Although, there is ample evidence on estimating the equilibrium real exchange rate (Chishiti & Hasan, 1993; Afridi, 1995, & Siddiqui et al. 1996) and computing real effective exchange rate misalignment (Qayyum et al. 2004; Hyder & Mehboob, 2005; Janjua, 2007; Debowicz & Saeed, 2014; Hamid & Mir, 2017 & Bhatti et al. 2018) for Pakistan, these studies are confined only to computation and/or presentation of the trends of RER misalignment in Pakistan over different time periods. These studies conclude, at large, that Pakistan has experienced various episodes of undervaluation and overvaluation. However, the literature is scant on estimating the impact of RER misalignment on economic growth of Pakistan. Notably, there is only one study by Zakaria (2010) which has empirically tested the impact of RER misalignment on economic growth of Pakistan and concludes that undervaluation promotes economic growth in Pakistan. Bhatti et al. (2018) only provide evidence that real effective exchange rate misalignment granger cause economic growth in Pakistan.

A review of existing literature for Pakistan shows that a large body of literature has focused on either computing equilibrium RER or calculating RER misalignment. A dearth of literature on estimating the macroeconomic implications of RER misalignment for Pakistan reflects a gap in existing literature. For instance, only two studies examine the impact of RER misalignment on economic growth. Specifically, Zakaria (2010) has focused on estimating the impact of RER undervaluation on economic growth while Bhatti et al. (2018) have reported pairwise granger causality between RER misalignment and economic growth. No study explores the role of different moderating and/or mediating channels in the RER misalignment-growth relationship. To bridge this gap, this study primarily aims to empirically examine the role of a moderating channel in the RER misalignment-growth relationship. Firstly, we examine the direct impact of RER misalignment on economic growth. Secondly, we estimate the indirect/conditional impact of RER misalignment on economic growth by using the moderating role of financial development. As emphasised by literature such as Aghion et al. (2009), Elbadawi et al.

2012 & Sekkat, 2012), financial development helps in mitigating the adverse impact of exchange rate fluctuations by providing better hedging facilities, and improving the efficiency and transmission mechanism of financial markets. Pakistan's financial sector is still in an embryonic stage although it has gone through various regulations and modifications. Therefore, it is pertinent to examine the role financial development plays in the misalignment-growth relationship. Finally, by using direct and indirect impact, the overall/total impact of misalignment on economic growth is estimated at various percentiles of financial development. Our analysis will be helpful in identifying the importance of financial development in controlling the harmful impact of RER misalignment on economic growth.

To carry out an empirical analysis, the study utilises time series data from 1980 to 2016. RER misalignment is computed by employing the Behavioural Equilibrium Exchange Rate (BEER) approach developed by Clark and MacDonald (1998) whereas, the Fully Modified OLS (FMOLS) approach is employed to empirically estimate the direct and indirect impact of RER misalignment on economic growth. The findings of the study state that RER misalignment hampers while financial development triggers economic growth of Pakistan. Moreover, the adverse impact of misalignment diminishes with the help of financial development. Therefore, financial development proves an important channel through which misalignment fallouts for economic growth can be controlled. Our findings are consistent with existing literature which supports the moderating role of financial development in misalignment-growth relationship. Being a developing country, Pakistan still needs to focus on its financial sector development so that the exchange rate can be kept closer to its equilibrium and its fallouts on economic growth can be mitigated.

The rest of the study is organised as follows: Introduction is followed by Section 2 which explains the analytical framework employed to carry out the empirical analysis. Section 3 presents the findings of the study with a detailed discussion. Finally, Section 4 concludes the study with some policy recommendations.

2. METHODOLOGY AND DATA

The empirical examination comprises two steps: first step explains the computation of RER misalignment while the growth impact of RER misalignment is estimated in the second step.

2.1. Computation of Real Exchange Rate Misalignment

Exchange rate misalignment is the persistent departure of the observed exchange rate from the long run equilibrium exchange rate.[2] Therefore, to compute exchange rate misalignment, it is important as a first step to calculate the equilibrium exchange rate.

Broadly, there are three main approaches available to measure exchange rate misalignment, (i) Purchasing Power Parity Approach, (ii) Fundamental Equilibrium Exchange Rate Approach developed by Williamson (1994), and (iii) Behavioural Equilibrium Exchange Rate (BEER) Approach developed by Clark and MacDonald

[2] The long run equilibrium exchange rate is that rate which is compatible with the simultaneous achievement of external and internal equilibrium.

(1998). This study employs BEER approach developed by Clark and MacDonald (1998) for estimating the equilibrium exchange rate as it is suggested by recent literature for computing equilibrium exchange rate (e.g. Aguirre & Calderon, 2005; Hyder & Mehboob, 2005; Sallenave, 2010; MacDonald & Vieira, 2010; Abida, 2011 & Ndlela, 2012, among others). This approach works as follows:

(i) Real exchange rate is estimated against the fundamental determinants of RER.
(ii) The estimated coefficients from the regression in the first step and the permanent components of the determinants of RER are used to compute equilibrium RER.
(iii) RER misalignment is computed as the difference of the observed real exchange rate from the computed equilibrium RER.

In pursuance of Step 1 above, the following model adapted from Berg and Miao 2010; Naseem et al. (2013); Conrad & Jagessar, 2018) has been estimated including both domestic as well as external factors determining equilibrium exchange rate:

$$LRER_t = \beta_0 + \beta_1 G_t + \beta_2 RIRD_t + \beta_3 TO_t + \beta_4 GC_t + \beta_5 NFA_t + \mu_t \quad \ldots \quad (1)$$

where, *t* is the time period from 1980–2016. $LRER_t$ shows log of real bilateral exchange rate. The US dollar is used as a benchmark currency considering its significance as the vehicle currency in international exchange. Moreover, the foreign exchange of Pakistan is denominated in terms of dollar which justifies the use of USA dollar as the benchmark currency; We use CPI of Pakistan and the USA to convert nominal exchange rate in to real. $[RER = NER * (\frac{CPI^{usa}}{CPI^{pak}})]$. G_t is log of real gross domestic product per capita; $RIRD_t$ indicates short term real interest rate (rir) differential of Pakistan and the USA $(rir^{pak} - rir^{usa})$. As per standard practice, the interest rates are made real by using the inflation rate of the respective countries. The study uses money market rates as the short-term interest rate; TO_t represents trade openness (sum of exports and imports as a percentage of GDP); GC_t is the government consumption expenditure as a percentage of GDP; NFA_t indicates net foreign assets as a percentage of GDP; μ_t is error term.

GDP per capita is expected to cause depreciation in real exchange rate. On the other hand, the impact of trade openness depends on whether it leads to increase exports or imports. Therefore, TO may lead to appreciation or depreciation of RER. The impact of government expenditure depends on the composition of government expenditure. Higher consumption from the tradable sector would create disturbance in current account and depreciates the domestic currency and vice versa. Net foreign assets are expected to affect exchange rate through current account channel, for instance, an increase in foreign reserves leads to appreciation in the domestic currency and vice versa (Lane et al. 2004, & Mariano et al. 2016). Finally, the impact of real interest rate differential depends on whether the differential is positive or negative. A positive interest rate differential is expected to attract more foreign capital thus creating domestic currency appreciation, whereas depreciation of the same is expected due to the negative interest rate differential.

After obtaining these estimates, the above model is fed with the stable/equilibrium values of the determinants of real exchange rate (obtained from HP Filter) to attain the

equilibrium real exchange rate. Following Toulaboe (2006) and Nouira and Sekkat (2012), real exchange rate misalignment is thus computed as follows:

$$Mist_t = \frac{RER_t - EERER_t}{EERER_t} X\ 100 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

where, $Mist_t$ represents Misalignment of RER, RER_t is the Observed RER, $EERER_t$ shows Estimated Equilibrium RER.

2.2. Impact of RER Misalignment on Economic Growth

By following Conrad and Jagessar (2018), Akram and Rath (2017), and Naseem et al. (2013)[3], we have estimated the unconditional impact of RER misalignment on economic growth as follows:

$$G_t = \alpha_0 + \alpha_1 LEMP_t + \alpha_2 LGFCF_t + \alpha_3 LTO_t + \alpha_4 GSSE_t + \alpha_5 LRER_t + \alpha_6 Mist_t + \mu_t \quad (3)$$

As explained above, in addition to estimating the direct/unconditional impact of RER misalignment on economic growth, this study also attempts to estimate the indirect/conditional impact of RER misalignment on economic growth. The existing literature on RER-growth relationship has pondered on some transmission channels which affect the exchange rate and growth relationship (Razin & Colins, 1997; Bhalla, 2012; Levy-Yeyati & Sturzenegger, 2007; Rodrik, 2008). One of the possible channels is the financial sector development which may influence the impact of RER misalignment on economic growth. Therefore, we take financial development to examine its role as a moderator in misalignment-growth relationship. (Schumpeter, 1911; McKinnon, 1973 & Shaw, 1973) have developed the models in which they have shown the importance of financial development in explaining economic growth through innovations and identification and funding productive investment. Moreover, McKinnon (1973) and Shaw (1973) argue that financial development causes increase in savings and capital accumulation that, in turn, lead to economic growth. These growth-enhancing effects of financial development can be strong enough to surpass the adverse effects of RER fluctuations (RER volatility and/or RER misalignment) on economic growth. Moreover, financial development can provide better hedging tools to safeguard against the uncertainty attached with RER fluctuations and/or misalignment (Aghion et al. 2009; Elbadawi et al. 2012, and Basirat et al. 2014). To test whether financial development actually plays this moderating role, the interaction of RER misalignment and financial development has been introduced in model 3, the model then takes the following form:

$$G_t = \gamma_0 + \gamma_1 LGFCF_t + \gamma_2 LEMP_t + \gamma_3 LTO_t + \gamma_4 GSSE_t + \gamma_5 LRER_t + \gamma_6 Mist_t + \gamma_7 FD_t + \gamma_8 Mist * FD_t + \varepsilon_t \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

Where 't' represents time period (1980 to 2016); G_t is the log of real gross domestic product per capita; $LEMP_t$ shows log of employment; $LGFCF_t$Is log of gross fixed capital formation; LTO_tindicates log of trade openness; $LRER_t$shows log of real bilateral exchange rate (Rs/US$); $GSSE_t$ represents human capital measured through gross secondary school enrolment rate; $Mist_t$ indicates RER misalignment (in percent); FD_t is

[3]These Studies, however, have taken growth of GDP per capita while we proceed by taking log of GDP per capita

the financial development which is captured through domestic credit to private sector (as % of GDP);

$Mist * FD_t$ is the interaction of RER misalignment and financial development. The interaction term captures the moderating role of financial development in this model. In other words, it indicates the growth impact of RER misalignment through the channel of financial development. μ_t and ε_t are error terms. All variables are taken in constant dollar form with 2010 as the base year. In Eq. 4, $\gamma_6$and $\gamma_7$capture the direct effect of RER misalignment and financial development on economic growth, respectively. Whereas, γ_8 captures the indirect effect of RER misalignment on economic growth, considering the level of financial development.

Real Exchange rate misalignment is expected to retard economic growth. There are many channels through which exchange rate misalignment transmits the harmful effects on economic growth. For instance, a misaligned exchange rate adversely affects the tradable sector and its relative competitiveness thus causes output to decline (Aguire and Calderon, 2005). Moreover, exchange rate misalignment can also lead to sub-optimal allocation of resources across sectors by giving wrong signals based on the distorted relative prices of tradables and non-tradables and consequently may harm the economy (Razin & Collins, 1999). Based on theoretical foundations, financial development, GFCF, level of employment, and the level of education are expected to boost economic growth while trade openness may trigger or hamper the process of economic growth.

The study covers the period from 1980 to 2016. For empirical analysis, the study has accessed data form various data sources namely, World Development Indicators (WDI) published by World Bank (2018), data on the employment level is obtained Penn World Tables 9.0, and Pakistan Economic Survey (2018). The data on interest rate is accessed from International Financial Statistics (2018) published by IMF.

Before empirical proceedings, it is important to test the stationary properties of the time series as it helps in adopting the appropriate econometric technique for estimation. For this purpose, the study uses the most widely recommended test for the order of integration: the Augmented Dickey Fuller (ADF) test. Moreover, for robustness, we use a more efficient test of unit root, Dickey Fuller-Generalised Least Square (DF-GLS) developed by Elliott, Rothenberg and Stock (1996) for the order of integration. This test is more powerful in terms of testing the unit root properties. One of the advantages of this test is that it locally de-trend the data series to efficiently estimate the deterministic parameter of the series and use the transform data to perform the usual ADF test.

Next, to establish econometric relationship among the selected variables, the present study employs the Fully Modified Ordinary Least Squares (FMOLS) technique to estimate Equilibrium RER as well as direct and indirect impact of RER misalignment on economic growth (Equation 1, 3 & 4). FMOLS, proposed by Phillip and Hansen (1990), is a semi-parametric approach to co-integration. One of the prerequisites of the FMOLS is that it is used to estimate the single equation co-integration relationship with the combination of variables that are integrated of order one. Particularly, the dependent variable should be I (1). One of the important properties of FMOLS is that it caters the problem of possible endogeneity in the model which makes it more relevant in our case.[4]

[4] For robustness, we have also estimated our models by employing an alternate technique i.e. Dynamic OLS (DOLS). The results from DOLS are reported in the Appendix.

3. DISCUSSION OF RESULTS

3.1. Descriptive Statistics

The descriptive statistics presented in Table 1, The RER misalignment values, highlight that the extent of negative misalignment (–59.26), on average, remains greater than the positive (26.41 percent). The largest spell of overvaluation was experienced post 2001 by the country due to huge inflow of capital after the initiation of war on terror. However, the positive misalignment is experienced for a longer time span in the selected time period of the study. By looking at the exchange rate movements, we can observe that the lowest rate is 40.86 while the highest is 113.24, in real terms. Interestingly, the minimum and maximum values of equilibrium RER remain higher than the actual RER. The real GDP per capita growth is 6.7 percent, on average with a minimum value of 6.3 and a maximum of 7.1. This indicates nearly stagnant economic growth over the sample period.

Table 1

Descriptive Statistics

Variable	No of Obs.	Mean	Std.Dev.	Min	Max
G	38	6.738	0.213	6.321	7.108
$GFCF$	38	16.114	1.668	12.521	19.235
GC	38	11.227	2.064	7.781	16.785
$GSSE$	38	26.510	8.349	16.956	46.109
$LRER$	38	4.329	0.241	3.701	4.729
TO	38	33.542	3.269	25.306	38.909
FD	38	23.501	3.956	15.386	29.786
NFA	38	1.521	4.985	–6.578	11.561
$RIRD$	38	–1.193	3.375	–8.655	4.439
Mist	38	18.407	29.548	–59.264	26.412
Mist_FD	38	–3.865	6.899	–15.931	6.386
LEmp	37	3.552	0.296	3.097	4.053

Notably, the level of financial development proxied by domestic credit is very low, indicating that the country needs to focus more on improving the level of financial development. Interestingly, on average, the real interest rate differential is negative indicating that the US real interest rate remains higher than Pakistan.

3.2. Unit Root Tests

The unit root test is applied on two sets of variables: (a) the set of variables that are used to measure real exchange rate misalignment (b) variables required to estimate the misalignment impact on economic growth. The unit root estimates are presented in Table 2. Both the test statistics (ADF and DF-GLS) confirm that the selected set of variables are integrated by order of one.

Table 2

Unit Root Estimates

Panel A: Estimates of Unit Root Test for Regression 1 (First Stage)

	Levels		First Difference		Order of
Variable	ADF	DF-GLS	ADF	DF-GLS	Integration
IR	–2.011	1.968	–7.089***	–7.217***	I(1)
	(3.51)	(–3.190)	(–3.496)	(–3.184)	
NFA	–2.352	–1.742	–6.419***	–6.515***	I(1)
	(–3.491)	(–3.167)	(–3.494)	(–3.171)	
GC	–2.060	–2.062	–7.269***	–7.204***	I(1)
	(–3.491)	(–3.168)	(–3.492)	(–3.171)	
G	–2.435	–1.349	–6.359***	–6.444***	I(1)
	(–3.490)	(–3.167)	(–3.492)	(–3.171)	
LTO	–1.973	–2.091	–7.929***	–6.756***	I(1)
	(–3.502)	(–3.190)	(–3.504)	(–3.190)	
Panel B: Estimates of Unit Root Test for Regression 3&4 (Second Stage)					
Mist	–2.430	–1.999	–6.051***	–6.123***	I(1)
	(–3.511)	(–3.190)	(–3.504)	(–3.190)	
LRER	–1.177	–1.312	–6.775***	–6.778***	I(1)
	(–3.491)	(–3.167)	(–3.492)	(–3.171)	
G	–2.435	–1.349	–6.359***	–6.444***	I(1)
	(–3.490)	(–3.167)	(–3.492)	(–3.171)	
LGFCF	–1.298	–0.969	–4.952***	–3.593**	I(1)
	(–3.508)	(–3.190)	(–3.511)	(–3.171)	
LTO	–1.973	–2.091	–7.929***	–6.756***	I(1)
	(–3.502)	(–3.190)	(–3.504)	(–3.190)	
LEMP	–2.598	–2.016	–7.312***	–7.302***	I(1)
	(–3.492)	(–3.171)	(–3.494)	(–3.174)	
FD	–2.917	–1.549	–6.194***	–6.296***	I(1)
	(–3.491)	(–3.167)	(–3.492)	(–3.171)	
Mist_FD	–2.561	–2.191	–6.161***	–6.282***	I(1)
	(–3.511)	(–3.190)	(–3.504)	(–3.190)	
GSSE	–0.865	–1.201	–4.784***	–4.896***	I(1)
	(–3.515)	(–3.190)	(–3.516)	(–3.190)	

Note: ***, ** refers to 1 percent and 5 percent level of significance.

3.3. Equilibrium Real Exchange Rate

The estimates of real exchange rate are presented in Table 3. The results depict expected signs and portray significant impact of selected indicators on real exchange rate. We have used the coefficients of these variables and their trend components to compute the equilibrium exchange rate. Finally, substituting the values of actual exchange rate and equilibrium exchange rate in Equation 2 generates a measure of real exchange rate misalignment.

Table 3

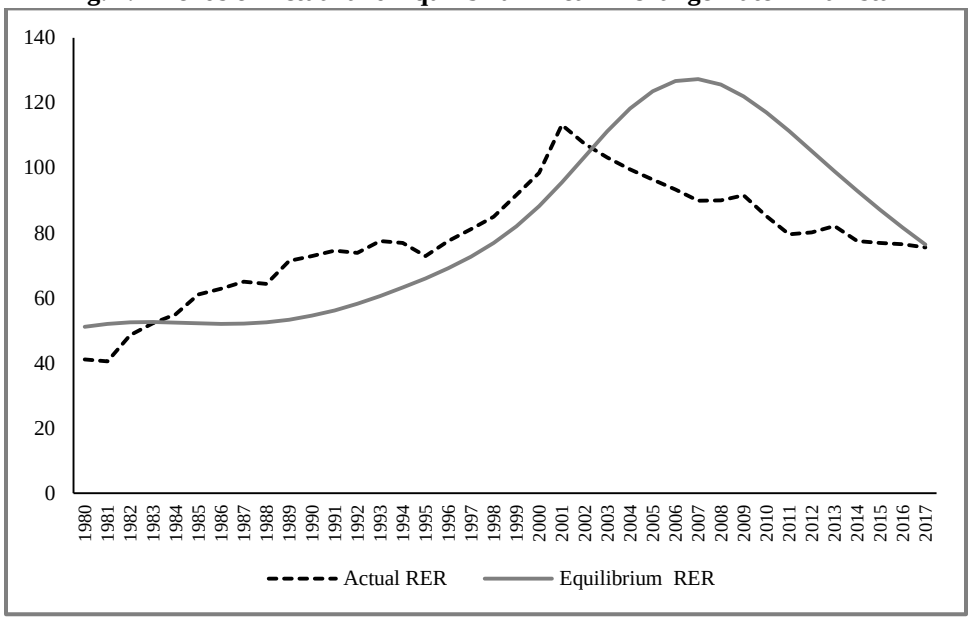
FMOLS Estimates of Exchange Rate Determination

Variable	Coefficient	t-stat	P-Value
G	0.917***	8.168	0.000
RIRD	–0.026***	–3.787	0.005
NFA	0.048***	6.503	0.000
TO	0.945***	5.039	0.000
GOV	–0.032*	–1.857	0.070
C	–4.731***	–5.928	0.000

Note: *, ***, indicates level of significance at 10 percent and 1 percent levels.

Figure 1 plots both real exchange rate and the estimated equilibrium exchange rate where the difference between these two is identified as real exchange rate misalignment. It is evident from the figure that the two lines do not overlap each other signifying that the real exchange rate in Pakistan has always remained misaligned, either in the form of overvaluation or undervaluation. A positive value shows undervaluation while the negative value shows overvaluation in the actual exchange rate.

Fig. 1. Trends of Actual and Equilibrium Real Exchange Rate in Pakistan

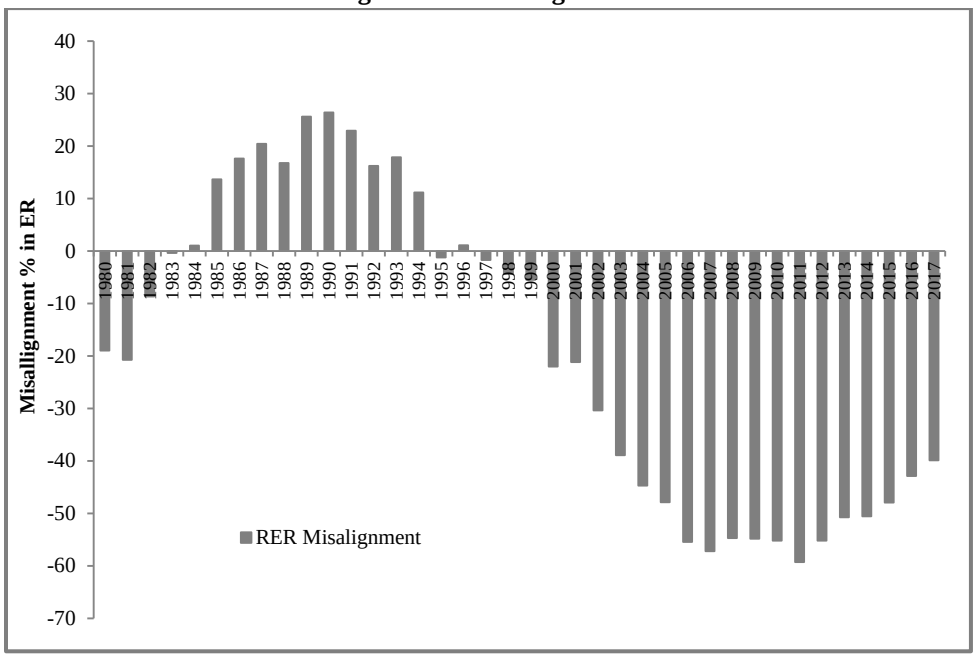


As is depicted in Figure 1 above, the real exchange rate of Pakistan has remained overvalued until 1982. However, it remained undervalued from 1983 to 2000 and it has remained overvalued. The magnitude of undervaluation is less as compared to the magnitude of overvaluation.

Furthermore, Figure 2 displays the trends of RER misalignment of the PKR against the US dollar. As mentioned above, on average, misalignment appears as 18 percent during the selected period. The main reason for the overvaluation of the PKR,

before the adoption of flexible exchange rates regime in 1982, is the overvaluation of the US$. In the early 1980s, the US increased its interest rate in order to reduce its large budget deficits, which resulted in capital inflow and overvaluation of the US dollar. As the PKR was linked to the US dollar, it was also overvalued. This has further resulted in a decrease in Pakistan's competitiveness in the international market.

Fig. 2. RER Misalignment



Later, in order to maintain international competitiveness and to reduce the resulting trade deficit, in 1982 the State Bank of Pakistan adopted the floating exchange rate regime, although it was controlled floating where the PKR was tied to a band of trade weighted currencies. Thus, it resulted in the devaluation of the PKR. From the 1990s to 2000, the depreciation in the PKR was observed in order to combat the inflationary pressure on RER (Janjua, 2007).

From 2001, the PKR remained overvalued. This estimate is consistent with a recent study by the IMF (2012) that reports that the Pakistani currency has appreciated by more than 17 percent, which is higher than that of the currencies of other countries in the region. The authors argue that the poor export performance and dependence of the economy on remittances for maintaining the reserves position at a sustainable level are indications of the prevalence of overvaluation of the PKR.

3.4. Growth Impact of RER Misalignment

Table 3 reports both the direct and indirect impact of RER misalignment on economic growth. Column 2 displays the direct impact while Column 3 demonstrates the indirect impact of misalignment on economic growth by using the financial development channel.

It is evident that all the estimates presented in Table 4 are statistically significant and carry expected signs. As emphasised by Neoclassical growth models, labour and capital are the two important factors of production in growth models. Therefore, to incorporate this aspect of the production function, we use both employment level (a measure labour input), and GFCF (a measure of physical capital stock), in order to check their significance in economic growth for Pakistan. The estimates in both specifications reveal a statistically significant and positive impact of both factors of production on GDP per capita of Pakistan. This finding aligns with existing literature such as Toulaboe 2006; Abida 2011 & Masunda 2011, among others. Moreover, the study has also incorporated the role of secondary school enrolment, which demonstrates a positive and significant impact on economic growth. Barro (1991) undoubtedly emphasises the vital role of human capital for growth through its positive effect on productivity and, thus, on economic growth.

Table 4

Growth Impact of Misalignment: Direct and Indirect Impact

Dependent Variable: Log of GDP Per Capita	Model 1		Model 2	
Variable	Coefficient	P-Value	Coefficient	P-Value
LRER	0.042***	0.000	0.148***	0.000
	(0.008)		(0.009)	
Mist	–0.134***	0.000	–0.078**	0.019
	(0.006)		(0.031)	
FD	0.002***	0.000	0.006***	0.001
	(0.000)		(0.000)	
Mist*FD	–	–	0.004***	0.004
			(0.001)	
LGFCF	0.309***	0.000	0.170***	0.000
	(0.014)		(0.020)	
LEMP	0.441***	0.000	0.615***	0.000
	(0.018)		(0.019)	
LTO	–0.098***	0.000	0.120***	0.000
	(0.009)		(0.010)	
GSSE	0.005***	0.000	0.003***	0.000
	(0.000)		(0.000)	
R-Squared	0.956		0.982	

Note: **, *** indicates level of significance at 5 percent and 1 percent level of significance. Values in parenthesis are standard errors.

The significant role of trade in growth has been advocated by both trade and growth theories. The empirical literature, however, has provided mixed findings. The positive role of trade in economic growth has been documented by various studies such as (Cottani et al. 1990; Aguirre and Calderon, 2005; Béreau et al. 2009; Dufrenot et al. 2009 & Abida, 2011, among others). In contrast, another strand of literature provides empirical evidence for the unfavourable impact of trade on growth. Trade may lead to lower economic growth, particularly in developing countries. For Pakistan, our findings suggest a favourable impact of trade openness for per capita GDP growth (Model 2).

Our findings regarding the impact of RER on economic growth are in line with theoretical expectations where an increase in RER is expected to increase exports, employment, and thus economic growth, by making exports relatively cheaper in the international market. This result is also consistent with the findings of other studies like (Eichengreen, 2008; Rodrik, 2008 & Rapetti et al. 2011, among others).

In contrast to RER, misalignment in RER appears detrimental for economic growth in both specifications. This finding is statistically significant at a conventional level and in accordance with our theoretical expectations. Theoretically, misalignment distorts relative prices, which, in turn, lead to sub optimal allocation of resources and thus retards economic growth. In addition, investment decisions and the capital accumulation process is also sensitive towards the deviation of exchange rate from its equilibrium point. As investment is an important contributor to growth, exchange rate misalignment reduces economic growth by distorting investment. Similar findings are reported by (Edwards, 1988; Ghura & Grennes, 1993; Aguirre & Calderon, 2005; Toulaboe, 2006; Rodrik, 2008; Eichengreen, 2008L; Berg & Miao, 2010; Abida, 2011; Ndlela, 2012; Bannaga & Badawi, 2014; Akram & Rath, 2017; among others).

This finding supports the argument that exchange rate policy significantly affects economic growth particularly in developing countries like Pakistan. Thus countries, which are able to maintain their actual exchange rate closer to equilibrium, do witness a higher per capita growth.

In addition to management of exchange rate, the level of financial development also determines economic performance. An improved financial sector not only helps to channel resources into more efficient uses through innovation, and by introducing new financial services, but also creates new opportunities for savers and lenders. Consequently, it leads to higher economic growth. Levine (1997) describes the importance of financial development as an excellent predictor of not only economic growth but also of capital accumulation and technological change that further accelerates economic growth. Our findings also suggest a significant contribution of financial development in economic growth.

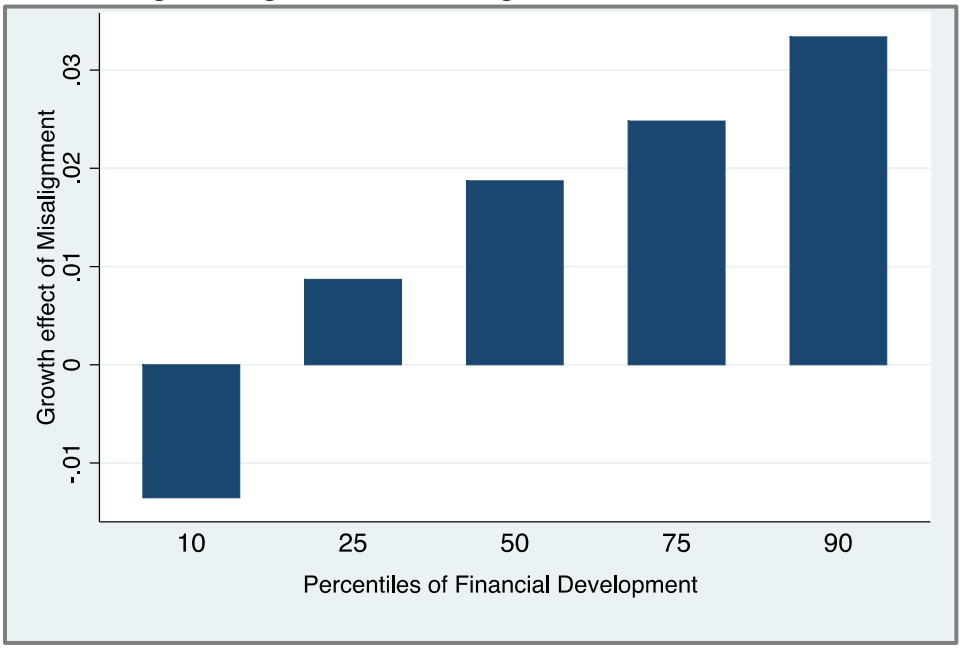
We now discuss the moderating role of financial development between misalignment-growth relationships. The coefficient of the interaction term of RER misalignment with financial development, capturing the indirect effect of misalignment on economic growth by using the financial development channel, is positive as shown in Regression 4. This finding implies that the level of financial development in Pakistan is helpful in transforming the adverse impact of misalignment into favourable for GDP per capita. The impact, however, is very small. This finding suggests that as the level of financial development increases, the adverse impact of RER misalignment on economic growth reduces. This further suggests that Pakistan still needs to improve the structure, performance, and efficiency of the financial sector in order to benefit from it.

For a better understanding of the role of financial development in the misalignment-growth relationship, by following Aghion et al. (2009), we have computed the impact of RER misalignment on economic growth at various levels of financial development.[5] These levels are determined by using the percentiles of financial

[5] This is done by taking the first derivate of Equation 4 with respect to FD and substituting the values of FD at different percentiles.

development. Figure 3 depicts that at the lowest level of financial development (10th percentile), the impact of misalignment remains negative. However, as we move to the higher percentiles of financial development, the growth impact of misalignment becomes positive. This finding is supported by the existing studies of a similar nature such as (Aghion et al. 2009; Sekkat, 2012 & Elbadawi et al. 2012). These studies have also proved that financial development limits the adverse impact of RER fluctuations on economic growth by providing protection through better hedging tools against RER risks.

Fig. 3. Marginal Effect of Misalignment on Economic Growth



In conclusion, our findings are new in terms of their contribution to the existing stock of empirical literature on various aspects of exchange rates, particularly for Pakistan. The above findings suggest that exchange rate policies need to be managed more cautiously to keep the actual exchange rate closer to its long run equilibrium exchange rate. Moreover, the stabilising role of financial development is required to be more rigorous to combat the adverse impact of RER misalignment.

4. CONCLUSION AND POLICY RECOMENDATIONS

The era of flexible exchange rate system has been challenging for policy makers on various grounds. These challenges include controlling exchange rate volatility and maintaining the actual exchange rate closer to its long run equilibrium. Therefore, much literature is devoted to providing theoretical background and empirical evidence on underlying causes of exchange rate fluctuations and their impact on economic growth.

This study aimed to provide some new evidence on exchange rate misalignment for Pakistan, an important dimension of exchange rate management. The findings of our study reveal an adverse impact of misalignment while a favourable impact of financial

development on economic growth was observed. For the indirect impact, we have used an interaction term of RER misalignment and financial development. The coefficient of this interaction term appears as positive. Therefore, we conclude that the level of financial development transforms the negative impact of RER misalignment into positive for economic growth in Pakistan. However, when we combine the direct and indirect impact, the overall impact is still negative. This finding implies that the financial sector development, in Pakistan does require improvements to help to eliminate the unfavourable impact of RER misalignment on economic performance.

Based on empirical findings, the study suggests a cautious management of exchange rate policies that can help the actual exchange rate to remain closer to its equilibrium point thus reducing its adverse impact. It is indeed a hard challenge for a country like Pakistan, which undergoes various economic and political glitches that impede successful implementation of market oriented exchange rate policies. Moreover, exchange rate is mostly set to cover an ever-increasing current account deficit. Pakistan needs to review the existing exchange rate management and adopt measures that not only reduce the extent of misalignment but also support the process of economic development.

To strengthen the role of financial development, the country should improve the domestic banking system, develop capital markets, and introduce new and advanced financial instruments. The financial system must be improved so better hedging facilities are available to investors. This helps in boosting investor confidence and triggers economic growth.

Keeping in view the current economic situation and exchange rate fluctuations in the country, our study is timely and relevant. Pakistan is facing an extreme undervaluation of the PKR against the US dollar due to both economic and political factors. This current wave of exchange rate misalignment has serious socioeconomic and political implications by creating uncertainty in the economy. For instance, it has not only reduced domestic investment but also restrained foreign direct investment. Investment decisions are on hold. Consumer preferences between saving and consumption are changed because investor and consumer confidence is shattered. A decline in overall economic activity is evident. On the external sector, the exchange rate undervaluation has led to an increasing current account deficit due to huge increase in import bills and mounting external debt.

Notably, the financial markets and financial institutions in Pakistan do not encompass appropriate hedging tools to safeguard against massive fluctuations in exchange rate and/or against speculative attacks. The structure and efficiency of financial systems in Pakistan must be improved to make them more predictive and responsive towards fluctuations in financial indicators. Additionally, a large proportion of the foreign exchange inflow/outflow is not documented; therefore, policy-makers must streamline the process of currency inflow and outflow. This will help in minimising the exchange rate fluctuations.

Finally, the importance of a credit channel is empirically verified as a significant transmission mechanism. However, due to less advancement in our financial markets, information asymmetry, adverse selection and moral hazard problems are common which reduces the effectiveness of this channel. To improve the functioning of the credit channel, regulation of financial services, and transparency and accountability of financial markets are critical aspects to ponder.

Table A1

Growth Impact of Misalignment: Direct and Indirect Impact (DOLS)

Dependent Variable: Log of GDP Per Capita	Model I		Model II	
Variable	Coefficient	P-Value	Coefficient	P-Value
LRER	0.479***	0.000	0.292*	0.086
	(0.082)		(0.039)	
Mist	–0.083**	0.019	–0.407**	0.052
	(0.028)		(0.033)	
FD	0.004***	0.054	0.009**	0.042
	(0.002)		(0.001)	
Mist*FD	–	–	0.014**	0.036
			(0.001)	
GFCF	0.225**	0.017	0.180	0.171
	(0.075)		(0.049)	
LEMP	–0.075	0.685	–1.586*	0.071
	(0.178)		(0.178)	
LTO	0.037	0.734	0.042	0.133
	(0.104)		(0.009)	
GSSE	0.027***	0.001	0.025*	0.064
	(0.006)		(0.002)	
R-Squared	0.999		0.999	

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