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Appropriate Exchange Rate Regime for economic structure of Pakistan

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Abstract

This study empirically finds the appropriate exchange rate regime for economic structure of Pakistan. To find long run association between exchange rate regime and its determinants; ARDL bond testing approach is concern however for the estimation of short run analysis Error correction model (ECM) is applied. Time series data is used over the period from 1984 to 2012. Findings reveal that Trade openness, foreign exchange reserves, rate of inflation and financial development are important determinant while choosing appropriate exchange-rate regime for economy having features like Pakistan. On the basis of analysis, this study suggests that both extreme ends hard peg and free float are unfavorable for it. Still, lot of attention is required on this topic. Choice of regime is a difficult task in empirical analysis because few factors cannot explain actual regime.

JEL Classification: F31, F33, F44

Key Words: Exchange Rate Regime, Classification, ARDL

1. Introduction

After the down fall of Bretton Wood System¹ most countries decided leave their exchange rate regime to float (Vuletin, 2004). Historical evidence suggests that a lot of literature² has been devoted for choosing the appropriate exchange rate regime. Despite all the efforts, determination of exchange rate regime is still a question for the developing economies (Frankel, 1999). In the developing regions of the world, open economies are the most vulnerable ones, economic constructs are closely interrelated and exchange rate determination becomes a crucial decision. Because of the complexities of the open economies, an appropriate exchange rate regime has its influences on all other macroeconomic variables (Yagci, 2001).

¹ A system in which different currencies were pegged to gold and IMF was given authority to intervene when imbalance of payments arose

² Chang (1999), Fisher (2001), Frankel (1999 and 2003), Hoffman (2007) , Stockman (2003)

Analysis of the Global Economies has shown that a couple of developed states (United States, Australia, Canada, Germany, Japan and United Kingdom) adopted free float whereas few developed countries (Denmark, Switzerland, Ireland, Hungary and Hong Kong) have followed fixed regime from 1974 to 2001. Surprisingly the pattern of Gulf Countries (Bahrain, Saudi Arabia, Qatar, and Oman) has been quite stable and they have always adopted the fixed regime (Levy-Yeyati & Sturzenegger, 2001 and 2003). Unfortunately, the developing world is still looking for optimum choice of regime that may be suitable for economic improvement.

According to (Frankel, 1999) one single regime cannot be considered beneficial for all countries even if they are similar in nature. Every country has its own economics structure, characteristics and economic preferences. So choice of exchange rate regime is a country-specific concept. It depends upon economic strength, degree of openness, trade volume, capital inflow, source and nature of economic disturbances (shocks), inflation history, financial development and policy objectives of the country (Yagci, 2001). Empirical literature has evidently shown that oil exporting countries are following fixed regime (Klein & Shambaugh, 2010). Their decision may be rational because they are exporting single commodity and their stages of financial development, capital inflow and policy objectives are same.

This particular study aims to make clear the mechanism of exchange rate regime determination by taking theoretical backing from Mundel-Flaming theory of optimal currency area (OCA). Mostly literature is developed in comparison of extreme ends of fixed and floating regime (Hoffmann, 2007) but doesn't discuss managed float and intermediate regimes. This Paper is going to seek that Pakistan is natural candidate of fixed regime or float regime, if not then which range of exchange rate regime Pakistan should follow. Ranges of exchange rate regime remain between zero to one (0 to 1). Where zero and one are both extreme ends respectively free float and hard peg. In this study we used annual data of Pakistan over the 1984-2012 periods.

2. Theoretical back ground

Theoretically, there are three main approaches available in the line of adoption favorable exchange rate regime.

First, the Structural approach which focus characteristics of economic structure of country. This approach is based on theory of optimal currency area (OCA). Under fixed and flexible

arrangements, it requires capability to keep internal and external balance, secondly keeps an eye on economic shocks that are caused by fluctuation in trade and deterioration in terms of trade (Mundell, 1961). Basically, these studies conclude size and nature of economic shocks and economic structure³ of country are main determinants of optimal regime (Frenkel, 1982). These studies suggest if domestic and foreign shocks are real in nature even foreign are nominal in nature this will shift the demand for domestic goods. But if economy is facing nominal domestic shocks, amendment in exchange rate is not required.

Second, the credibility and flexibility approach (Pagano, 1988) discuss that the monetary authority has two options to capture trade-off between flexibility and credibility. They can either maximize utility function or minimize cost function. This framework is useful when monetary authority want to choose exchange rate regime between two extreme ends (fixed and flexible). Monetary authority develops a scenario where expected benefits and expected losses are compared. Flexible regime provides independent monetary policy and also provides flexibility to accommodate foreign and domestic shocks but impart a high level of credibility.

Third, the bipolar view suggests international capital flow is not sustainable when countries are using intermediate exchange rate regime. So countries should move to extreme range of exchange rate regimes (Obstfeld and Rogoff 1995).

2.1 Classification of regime

We will discuss here two type of classification of exchange rate regime

2.1.1 IMF Classification

Exchange rate regime is classified by International Monetary Fund in three categories for their members. First, Fixed or pegged (with a single currency or basket of currencies), second managed float (intermediate) and third is independent float. These three categories are based on official exchange rate of members and also their policies and flexibilities about exchange rate. Whenever members make any change in their exchange rate they have to report IMF. The basic problem is when countries actually follow different (de-facto) to officially claim (de-jure). This increases the ambiguities in analysis of exchange rate regime and also reduces transparency,

³ Economic structure describes output, unemployment, inflation, financial development exchange rate and governance situation of any economy.

effectiveness and performance of research policy. That's why often exchange rate regime is found different from declared regime. Existence of inaccuracy in regime mislead monetary policy, after identifying this problem IMF constructed new classification that have all information about exchange rate, monetary policy and intention of policy on the basis of foreign reserves movement and actual exchange rate.

2.1.2 Alternatives Classification

In 1999, IMF adopted new method to improve earlier classification but its practical usefulness was limited due to insufficient historical data. The flaws of this classification were empirically exposed when (Levy-Yeyati, 2001) identified 35 countries as free floaters but actually 12 of them were not found free floaters. These 12 countries are amongst the emerging markets. Calvo & Reinhart (2000) found many countries that were following hard peg regime arrangements but they had declared themselves as free floater. Bubula & Otker (2002) construct new classification on de-facto regime by using monthly database of all member countries. The sample period of this classification was limited (1990 to 2001) but this analysis was meaningful and interesting since it differs from Levy-Yeyati's de-facto classification, which ignored official classification of International Monetary Fund (Darne & Ripoll-Bresson, 2004).

2.2 Literature Review

It's become a tradition among economists, discussion on exchange rate and performance of fiscal policy based on Mundell-Flaming model and optimal theory (Mundell, 1960). That determines the desirable exchange-rate for economies of different characteristics. For example, if a country is categorized in small open economy, price shock is not its subject so fixed exchange rate regime is best for it. The traditional estimation was really useful in past, but nowadays it does not prove useful. It is evidence from history that decision of choosing exchange-rate regimes are not at once and ever, either willingly or unwillingly these are changed often (Vuletin, 2004).

A possible and reliable effect of the exchange-rate regime has been focusing more recently, emerging a trade-off between credibility and flexibility. There are four fields of study in economics that cover all theoretical discussion, and examine the relationship between fiscal performance and exchange regimes: Stabilization policies, "Dynamic stochastic models",

political economic issues (economic integration and crisis) and impulsiveness of the capitals market.

Bachetta et al (1999) for general equilibrium they used dynamic stochastic model in their paper. The study observes government expenditures and technological shocks under different regimes of exchange rate. Authors find that macroeconomic variables are affected not only under different exchange rates but also under monetary policy.

The groups that follow stabilization policies (Masson, Goldstein, & Frenkel, 1991) their point of view is fixed exchange rate provide more discipline in fiscal policy than flexible exchange rate. A good fiscal policy leads to enhance reserves, these reserves become cause of fiscal extension and fiscal extension appreciates exchange rate. So fixed exchange rate is collapsed, history shows fixed exchange rate mostly fails to discipline fiscal policy and causes devaluation crisis (Vuletin, 2004).

Studies related to political economic issues (Alberola-Ila & Sanchez, 2001) express that there are hidden theoretical and empirical drawbacks in thoughts of conventional research papers on policy stabilization. Author mentions fiscal authority should spend more when it is socially advantageous. At fixed exchange rate, unstable policies deteriorate reserves and cause debt. And in flexible exchange rate unsound policies protect their self through variation in prices and exchange rate. So in this situation fiscal authority requests central bank to help. It is vital for central bank only pre-commit not to accommodate, except for short period.

The study related to financial crises (Chang, 1999) argued crises emerge in capital market due to “Bad policy” and “wrong predictions”. Bad policy augments debt burden, and fixed exchange rate becomes unsustainable under debt burden. So in this situation if economy wants to maintain fixed exchange rate it has to bear fixed cost of devaluation. Wrong prediction refers to public trust on different institutions and projects. If people get back all deposits in fear of bankruptcy a chain of disturbance occur in economic activities. So in this situation, keep exchange rate regime fixed become impossible for economies, definitely countries have to float their exchange rate regime.

Every country differs from other in economic environments that is not clear yet which exchange rate regimes country should follow? Fischer (2008) indicate a period (1999 to 2006) in their

study 15 countries shift from floating exchanges to intermediate and 6 countries move intermediate to floating exchanges. Frankel (2003) suggests in his study at the same time no single currency regime is beneficial. Husain et al (2005) recommends in developing countries relatively pegged exchange rate is better for policy implementation and also helped to maintain inflation at lower level. Another study (Berg et al 2000) indicates if a country has sustainable and flexible fiscal policy, international reserves and low capital mobility than fixed exchange rate is good for economy. And if the country has same economic conditions and economic shocks as its trade partners have, fixed exchange rate is appropriate otherwise flexible is good as it serve as a shocks absorber.

Open economy under flexible exchange rate considered as shocks absorber (Edwards, 2005), in situation of domestic over production economy enhance its exports by devaluation of its exchange. The economic literature postulates that macro-economic targets (inflation, output, economic growth) can be achieved by different exchange rate policies. There is also link between output and exchange rate, fixed exchange rate and low inflation attract investors and higher level of investment push economy at growing path. Here it is a key point if exchange rate is pegged at wrong level then resources could be misallocated. Another key point investment increased in economies with fixed exchange rate regimes but productivity and per capita growth also remains low as compare to flexible exchange rate (Ghosh et al.1997).

Hussain (2006) identifies important factors that affects exchange rate regime and also worked on choosing right regime for Pakistan. He used “Score card method” and compares economy of Pakistan with other 52 countries on the basis of size of economy, trade orientation, financial integration, fear of floating and macroeconomic stability. Paper finds the case against peg regime and concludes that Pakistan is not a natural candidate of fixed exchange rate regime. In policy recommendation this study recommends flexible exchange rate regime.

Exchange rate regime effects the adjustment of fiscal policy, how countries handle and adjust financial, nominal, real shocks. Mostly countries face financial crises to follow fixed regime but this is proved theoretically that exchange rate has indirect effect on economic growth through investment and productivity. There is a series of connection that have direct and indirect effect on economic growth. However, fixed exchange rate build confidence and remove uncertainty

thus investment and productivity increased than trade and growth. Fixed exchange rate regime leads to currency overvalue in long run then investors start losing their confidence in economy.

The countries with more stable and developed financial markets get benefits from flexible exchange rate regime in term of improving capability of adjusting real shocks, without scarifying economic stability that a credible fixed exchange rate may require. A study (Stotsky et al. 2012) found strong relationship between non-agricultural growth and exchange rate regime. Author states in his paper that there is positive relationship between economic growth and flexible exchange rate in African countries but in some specification real exchange rate is significant. Over all, the paper suggests that appreciation is bad and overvaluation is damaging in non-agricultural economies. It is true that exchange rate regime matter for growth but reforms packages more.

Mostly economies are in effort of finding the rising inflation and its impacts on growth and also maintain appropriate exchange rate regime (Edwards, 2006). This is the dominant objective of economic policies. Numerous studies are in favor of fixed exchange rate because it helps to achieve low inflation. Normally expansion of fiscal policy builds pressure on economy and force inflation to increase but sometimes market structure play role in shocks absorbing. When prices raise markets reduce their profit margin and do not allow shocks to disturb exchange rate regime. We can wind up debate by saying; fixed exchange rate regime maintains low inflation and economic growth under the support of good market structure. (Stotsky et al., 2012)

Karass (2012) conducted an empirical study on 66 developing and developed economies study advocates that under fixed exchange rate regimes performance of fiscal policy is effective and ineffective under flexible exchange rate regimes. The reason behind is that under flexible exchange rate regimes government expenditure crowds out private investment.

Aliyav (2015) studies determinants of exchange rate regime in resource abundant and resource scarce countries by using multinomial logit regression. In this study data of 145 countries is used from 1975-2004. Findings point out that resource rich countries have more probability of having fixed regime and resource poor countries are less likely to have fix regime. Moreover, the author finds, independence of central bank and democracy has stronger and significant role in resource rich countries as compare to resource poor countries.

With the help of literature we can build argument that every country has its own economic conditions, trade orientation, financial integration and level of development and also every country has different economic objectives to meet growth and welfare. So Pakistan should make individual decision to follow exchange rate regime by considering its economic condition and desired policy objectives instead of following other developing or developed countries.

3. Data Source and methodological frame work:

Sample contains 29 observation 1984 to 2012 annual data of Pakistan. The data on exchange rate attain from “Penn world table version 8.0 and IMF-IFS. While the data on real GDP, foreign exchange reserves, inflation, are attained from WDI and Pakistan Economic Survey international financial statistics. Data on fiscal budget deficit is collected from State bank of Pakistan website and data on financial openness (capital account openness) collected from Chinn-Ito website.

3.1 Methodological frame work

Stationary test is the first step in econometric analysis. We can say a series is stationary if it has constant variance and its mean value should also be zero. If our series is not stationary then analysis is not valid the results would be called spurious regression. For example, if series has only two variables with decreasing or increasing trend over time; the regression result confirms with high value of R^2 that both series are highly interconnected but actually they are totally unrelated. The outcome of unit root tests shows that all variables have different order to integration I(1) and I(0) so we will apply ARDL because of OLS is best if all variables are I(0) and Johansen can be applied in case of only I(1) (Johansen, 1988 and 1991).

The functional relationship of variables is given under;

$$ERR_t = a + \beta_1 SIZE_t + \beta_2 TOPEN_t + \beta_3 INF_t + \beta_4 KaOpen_t + \beta_5 FBGDP_t + U_t$$

Where, ERR_t denotes exchange rate regime at time particular time t) and a is intercept term \betaetas are coefficients of variables, $Size$ stands for size of economy (real gdp), $Toppen$ stands for trade openness and liberalization, Inf refers inflation rate, $KaOpen$ (capital account openness) is used

as proxy of financial openness, *Fbgdp* is the proxy of fiscal shocks to economy and *U* for error term.

3.2 Estimation Technique:

For long run relationship between Exchange rate regime and its predictors is found by ARDL bound testing approach by following the given equation;

$$\begin{aligned}
 dERR_t &= b_{11} + b_{12}(ERR)_{t-1} + b_{13}(LSIZE)_{t-1} + b_{14}(LTOPEN)_{t-1} + b_{15}(INF)_{t-1} + b_{16}(KaOpen)_{t-1} \\
 &+ b_{17}FBGDP_{t-1} + b_{12} \sum_{i=0}^n d(ERR)_{t-i} + b_{13} \sum_{i=0}^n d(LSIZE)_{t-i} + b_{14} \sum_{i=0}^n d(LTOPEN)_{t-i} \\
 &+ b_{15} \sum_{i=0}^n d(INF)_{t-i} + b_{16} \sum_{i=0}^n d(KaOpen)_{t-i} + b_{17} \sum_{i=0}^n d(FBGDP)_{t-i} + \mu_{11}
 \end{aligned}$$

In the above equation *i* ranges indicates chosen lag length

d Symbolize as operator of first difference

α_{11} is the drift component and μ_{11} is random term

3.3 Construction of dependant variable

Exchange rate is amount of one currency in terms of other currency. In other words units of one currency (Rs) we can exchange to get one unit of other currency (\$) is called nominal exchange rate. Exchange rate regime is setting of nominal exchange rate that is decided by central bank either nominal exchange rate is automatically chosen by demand and supply of currency or it is fixed at any point by central authority. Here we use de-facto (opposite of de-jure) classification of exchange rate regime by Eduardo Levy- Yeyati and Federico Sturzenegger (Levy-Yeyati, 2003).

Most of the studies on Exchange rate regimes have been used Dummy variable for exchange rate regimes eg , zero for fixed and one for flexible. But Exchange rate regime cannot be exact ‘‘

zero or one’’ it may be between these two extremes. In this study we attempt to convert data set in frictions (from zero to one) we put one for fixed and zero for flexible. So we can easily decide which regime country is following eg; Pakistan and United States both are using de jure flexible Exchange rate regimes. So question is this how can we differentiate their level of flexibilities?

In our model we can easily solve this problem. We converted data in friction by using idea of ‘‘Karras (2012)’’. For example According to his data set the value for USA is 0.10 in 2013 and value for Pakistan is 0.24 in same years it means both countries are following flexible Exchange rate regimes difference is this US following 10 percent fixed or 90 percent flexible and 0.24 means Pakistan is following 24 percent fixed or 76 percent flexible (because of zero means ‘‘ 100 percent’’ flexible’’

We used monthly average data of Exchange rate. If nominal Exchange rate (PKR/\$) is same as previous and next month we put ‘‘ 1 ‘‘ (fixed) if current, previous and next value is not same then we put ‘‘ 0’’ (flexible) then find average value that will indicate Exchange rate regimes for specific year (Karras 2012).

4. Results and discussions

Table – 1: Descriptive Stat

Name of Variables	<i>ERR</i>	<i>LSIZE</i>	<i>LOPPEN</i>	<i>INF</i>	<i>LFER</i>	<i>KaOpen</i>	<i>FBGDP</i>
Mean	0.618035	6.372325	0.345383	8.497174	0.674129	-1.211838	-2.334483
Std. Dev.	0.217982	0.174531	0.027097	3.958215	0.270353	0.130217	2.765382
Skewness	-0.944168	-0.007421	-0.298005	0.719759	-0.764964	-5.102520	0.645222
Kurtosis	3.184572	2.069192	2.693171	3.646957	2.648655	27.03571	4.096676
Jarque-Bera	4.649848	1.119389	0.542990	3.217238	3.182824	823.9123	3.465434
Probability	0.097791	0.571383	0.762239	0.200164	0.203638	0.308614	0.176803
Sum	19.15909	197.5421	10.01611	263.4124	20.89801	-35.14331	-67.70000
Sum Sq. Dev.	1.425479	0.913832	0.020558	470.0240	2.192723	0.474778	214.1255
Observations	29	29	29	29	29	29	29

Data series should be normally distributed is the first step of econometric analysis. In descriptive statistics, we analyze the values of Jarque Bera test; the value of variables has found to be insignificant it means all data series are normally distributed. And also the estimated values of Kurtosis and Skewness indicate the normality of data. Stationarity of data is also required for valid analysis. There are four popular tests that can be applied to check unit root in data series. ADF, Phillips-Perron (PP) and KPSS these all test are equally valid for unit root. These tests actually reports about integration order of variables. In this study, we used ADF test that concludes order of integration is mixed. We find that the variable of inflation, foreign exchange reserve and capital account openness on level and remaining variables found to be stationary at 1st difference. So when we find I (0) and I (1) order of integration then we apply Auto Regressive Distributed Lag (ARDL). Output of unit root tests are given in Table – 2.

Table – 2: Statistics of ADF

Name of Variables	Intercept		Intercept & Trend	
	t-Stat	Prob.	t-Stat	Prob.
<i>ERR_t</i>	-5.348013**	0.0018	-5.552009**	0.0005
<i>LSIZE_t</i>	-3.521759**	0.0145	-3.477914**	0.0608
<i>LOPEN_t</i>	-2.744482**	0.0790	-6.752136*	0.0000
<i>INF_t</i>	-3.905330*	0.0068	-3.821596*	0.0330
<i>LFER_t</i>	-6.353556*	0.0000	-6.250032*	0.0001
<i>KaOpen_t</i>	-5.291503*	0.0000	-5.188035*	0.0013
<i>FBGDP_t</i>	-4.353594**	0.0002	-4.260462**	0.0003

Note: * is indication of having stationary on level and ** indicates having stationary on first difference

4.2 Optimal Lag Length

After checking the stationary of series, we have to see optimal lag length. Optimal lag length indicates that how many lag should be use in model. The results of above table shows three lag should be used in model.

Table – 3: Optimal Lag Length

<i>Lag</i>	<i>LogL</i>	<i>LR</i>	<i>FPE</i>	<i>AIC</i>	<i>SC</i>	<i>HQ</i>
0	-22.92365	NA	2.00e-08	2.137403	2.470454	2.239220
1	93.23331	165.9385*	1.85e-10*	-2.659522*	0.004887*	-1.844986*
<p>* indicates lag order selected by the criterion</p> <p>LR: sequential modified LR test statistic (each test at 5% level)</p> <p>FPE: Final prediction error</p> <p>AIC: Akaike information criterion</p> <p>SC: Schwarz information criterion</p> <p>HQ: Hannan-Quinn information criterion</p>						

We select optimal lag for our model on the on the basis of lowest value of H-Q Criterion. After selecting lag length criteria, we evaluate long term dynamics of variables under consideration.

Table – 4: ARDL Bounds Testing Approach

<i>Estimated Models</i>				
<i>ERRt = f(Sizet,Opent,Inft, Fert, KaOpent,FBGDpt)</i>				
<i>Optimal lags</i>			(1,0,0,0,0,0,0)	
<i>Statistics for W</i>			28.4872 *	
<i>Statistics for F</i>			4.0696 *	
<i>Significance Level</i>	<i>Critical Bounds For F– Statistics</i>		<i>Critical Bounds For W – Statistics</i>	
	<i>Lower Critical Bound</i>	<i>Upper Critical Bound</i>	<i>Lower Critical Bound</i>	<i>Upper Critical Bound</i>
<i>5 per cent</i>	3.0274	4.5846	21.1915	32.0925
<i>10 per cent</i>	2.5055	3.8412	17.5385	26.8881
<i>DIAGNOSTIC TESTS</i>				
<i>Serial Correlation</i>	1.7289[.189]		<i>R²</i>	.54368
<i>Functional Form</i>	.10935[.741]		<i>Adjusted - R²</i>	.38397
<i>Normality</i>	7.7463[.021]		<i>F – Statistics</i>	3.4042
<i>Heteroscedasticity</i>	.49442[.482]		<i>DW – Statistic</i>	2.2808
Asterisks are the indication of significance of values, ***, **, and *, and show significance at 1%; 5% and 10% level respectively. The Probability Values are given in { } brackets				

After lag length criteria, now we are going to explore long run relationship among exchange rate regime and its determinants by using latest co-integration approach. As the null hypothesis of the test is “No co-integration” and it only be rejected only if calculated value of F- statistics is higher than upper critical bound value. The above Table reveals that the calculated value of F-statistics higher than its upper critical bound at 10% level of significance: $4.06 > 3.84$ so the null hypothesis is rejected and alternative hypothesis has been accepted and value of W- statistics is also higher than its upper critical Bound at 10% level of significance: $28.48 > 26.88$. It means the model has long-run relationship, in other words, exchange rate regime has stable and long run link with independent variables. The diagnostics reveal that there is no problem with Heteroscedasticity and the error term is normally distributed. Serial correlation and the functional form of model are also correct.

Table – 5: Long Run and Short Run Dynamics

<i>Estimated Long Term Coefficients using the ARDL Approach</i>			<i>Error Correction Representation for the Selected ARDL Model</i>		
<i>Dependant Variable:ERRt</i>			<i>Dependant Variable:ΔLERRt</i>		
<i>Name of Variables</i>	<i>Coefficient</i>	<i>P-value</i>	<i>Name of Variable</i>	<i>Coefficient</i>	<i>P-value</i>
<i>LSIZEt</i>	-.28665	[.341]	<i>dLSIZEt</i>	-.26393	[.353]
<i>LOPENT</i>	.28779	[.073]*	<i>dLOPENT</i>	.26498	[.052]*
<i>INFt</i>	-.064476	[.024]**	<i>dINFt</i>	-.059365	[.021]**
<i>LFERT</i>	.89984	[.024]**	<i>dLFERT</i>	.82852	[.017]**
<i>KaOpent</i>	-.18183	[.532]	<i>dKaOpent</i>	-.16742	[.524]
<i>FBGDPT</i>	.023024	[.283]	<i>dFBGDPT</i>	.021199	[.240]
<i>C</i>	1.2280	[.564]	<i>ECM_{t-1}</i>	-.92074	[.000]***
<i>Diagnostics for ECM</i>					
<i>R-squared</i>	.69685		<i>Mean Dependent Variable</i>	-.0089286	
<i>Adjusted R-squared</i>	.59074		<i>S.D. Dependent Variable</i>	.26995	

<i>S.E. of Regression</i>	.17270	<i>Akaike Information Criterion</i>	6.1546
<i>Sum Squared Residual</i>	.59647	<i>Schwarz Bayesian Criterion</i>	.82583
<i>Log Likelihood</i>	14.1546	<i>Durbin-Watson Stat</i>	2.2808
<i>F-statistic</i>	6.5676	<i>Prob. Value (F-statistic)</i>	[.000]
*; **, and *** reveals significance level of test statistic at 10%, 5% and 1% respectively.			

ARDL (1, 0, 0, 0, 0, 0, 0) selected based on Schwarz Bayesian Criterion

All variables except exchange rate regime and inflation are taken in Natural logarithmic form. ERR_t is dependent variable, while $LSIZE_t$, $LOPEN_t$, INF_t , $LFER_t$, $KaOpen_t$, $FBGDP_t$ are independent variables. Long run and short run results are given below:

The results show that coefficient of openness of economy is positively related to exchange rate regime and its impact on regime selection is statistically significant. Positive sign of openness push regime towards fixed because in this study “1” indicates fixed and “0” stands for flexible regime same as Karass (2012). The magnitude of coefficient shows that one percent change in openness push economy 0.287 percent in favor of fixed regime. So as the magnitude of coefficient is strong it would have more influence on exchange rate regime determination. Our results match with Aliyev (2015), (Walker, 2003), (Worrell et al 2000), Leblang (1999) and Malvin (1985).

The coefficient of SIZE of economy is negative but statistically insignificant. It does not matter whether it has large size of economy or small that can determine the exchange rate regime. The magnitude of coefficient is also very small; it can be interpreted as one percent change in size of economy can change 0.286 percent towards fixed regime. However, size of economy influences the exchange rate and also matter for regime determination. In case of other developed countries number of studies support this negative relationship for instance Aliyev (2015), (Walker, 2003), (Worrell et al 2000), and Malvin (1985). These findings of Size and openness are consistent with theory of optimal currency area (OCA).

Inflation is negative and statistically significant. Coefficient indicates one percent increase in inflation force exchange rate regime change 0.064 percent in flexible direction. It is difficult to maintain stable exchange rate regime under higher consumer prices. In flexible regime countries have to bear increasing inflation rate but if an economy requires low inflation rate than country has to adopt fixed exchange rate regime. If a country has historically experienced of high inflation than it can get benefit from peg (Yagci, 2001) but weak central bank faces many hurdles in maintaining inflation at low level. According to “Hussain” (2006) on average Pakistan didn't face high inflation it remains between 8 to 10 percent. This situation is against fixed regime. Studies such as Aliyev (2015), (Worrell et al 2000) and Melvin (1985) support negative sign of inflation but contrast with Leblang (1999).

The coefficient of foreign exchange reserve is positive and statistically significant. Magnitude of coefficient is very strong. We can interpret as one percent increase in FER will push regime 0.899 percent towards fixed. In other words we can say country with more foreign exchange reserves, more probability to adopt fixed regime. In case of Pakistan, regime is highly influenced by foreign exchange reserves. Literature suggests if country has high ratio of foreign exchanges to GDP than fixed exchange rate regime is preferable otherwise opposite is best. Pakistan is not rich in exchange reserves it often borrows from international monetary fund (IMF) and World Bank to fulfill its demand so fixed is not preferable for Pakistan.

Capital account openness measures inflow and out flow of money and other financial assets, where as the surplus of KaOpen means inflow and deficit of KaOpen means out flow of financial resources. Here Capital account openness appears with insignificant and negative coefficient, for this analysis it means financial openness (KaOpen) is not affecting choice of exchange rate regime, but the negative sign having indication toward flexible.

Interestingly, Long run and short run dynamics are qualitatively same .These three variables $dLOPEN_t$, $dINF_t$ and $dLFER_t$ are significant in short run. In short run, our main focus is the value of ECM which is significant and negative as required. The coefficient authenticate that 92 percent of the divergence will converge to equilibrium in one year. The value of R square is 0.69 in long run result which indicates our independent variables are able to explain 69 percent variation in dependent variable. In other sense we can interpret as the weightage of our

independent variables is 69 percent to choose exchange rate regime under economic structure of Pakistan.

4.3 Diagnostic of CUSUM and CUSUM squares

Stability test

Stability of long run coefficient has been shown with the help of cumulative sum of recursive residuals (CUSUM) of cumulative sum of squares recursive residuals (CUSUM SQUARE) test.

Fig- 1:

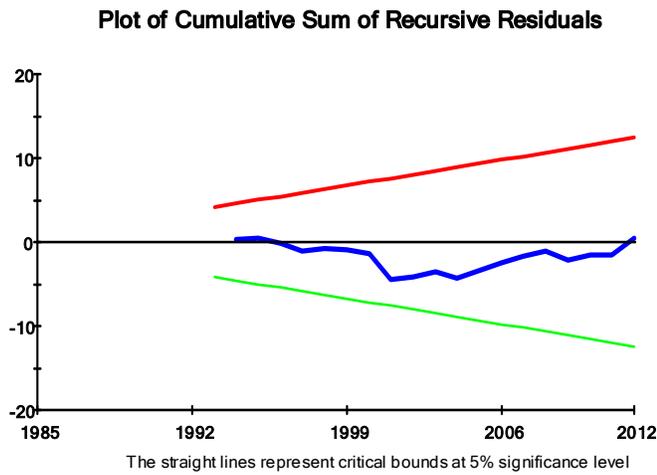
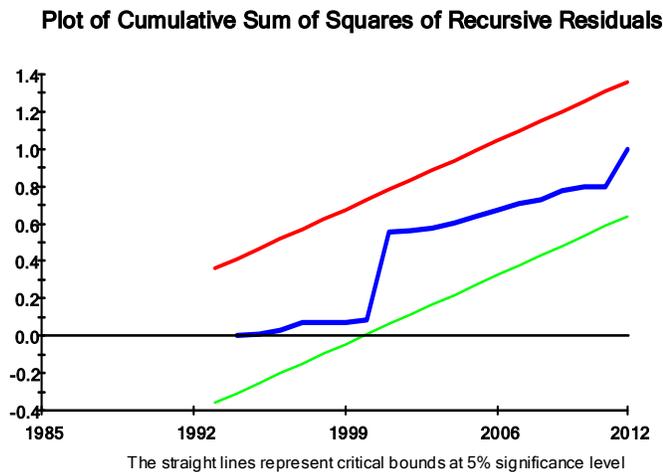


Fig-

2:



The diagnostics of CUSUM and CUSUM squares confirm the stability of our model. The above figures (1 and 2) show model got stability at 5 percent level. Here we are happy about the CUSUM and CUSUM squares because estimated lines are in the given limit of upper and lower critical lines. On the other hand if estimated lines positioned out of critical bounds then our model is not stable. So, now it is clear graphically that there exist long run and stable link between exchange rate regime and its determinants that are used in this study. We can conclude as; the function of exchange rate regime is stable for Pakistan over the estimated period. In other words, there is no structural break in model; policy maker can use it for policy options.

5. Conclusion

This study has empirically analyzed; economic, financial and political determinants of exchange-rate regime in Pakistan over the period of 1984 to 2012. We use “Auto Regressive Distributed Lagged” approach for empirical estimation. In line with other studies, we also confirmed that openness, foreign exchange reserves, rate of inflation and financial development are important determinant of exchange-rate regime for economy having features like Pakistan.

Our empirical findings suggest that appropriate regime for Pakistan is managed fixed exchange-rate regime⁴ but not peg. It should be near to intermediate because in our study not all variables give indication of hard peg or free float. Both extreme ends: peg and free float are unfavorable for it. Openness and foreign exchange reserves are in favor of regime towards fix but at the same time inflation appears with negative sign, it is the indication towards flexibility. The results are alike Asim (2006) as his study also informs that peg (hard fix) is not suitable for economy with

⁴ This study suggests managed fix exchange rate regime on the basis of estimated coefficient and their signs. As we assume zero for flexible regime and one for fixed regime, the coefficient appears with negative sign is indication of more likelihood to fixed regime, see the (Aliyev 2015).

Pakistan's characteristics and increase in regime flexibility would likely to improve its economic performance.

In our study governance and political stability found insignificant but appear with right sign that stands for flexibility. It means political institutions play important role in adoption of exchange-rate regime but in Pakistan they are not as important as economic institutions. "Aliyev" (2015) use democracy to capture political influence on exchange rate regime, his study supports flexible regime in resource rich country and study also specify that democratic countries have more probability of flexible exchange rate regime, doesn't matter they are resource rich or resource poor economies.

Policies and regime are interlinked; if economic policies are suitable then regime choice may lose its importance. Choice of regime is difficult task in empirical analysis because few factors cannot explain actual regime, for example, it is quite possible that some variables recommend flexible regime is suitable for a particular country and other factors may argue that flexible is inappropriate. Economic, financial and political situation of every country changes over the time that's why decision of exchange rate regime is not once and permanent. Study of Vuletin, (2004) supports our argument that decision of choosing right exchange-rate regime is not at once and ever, either willingly or unwillingly these are changed often.

It is confirmed that economic theories are not sufficient to give confirm answer to policy makers in prediction of appropriate regime. And there is no single theoretical approach that can claim of its victory and superiority over another (Ouchen 2013). Some studies find support from OCA approach and others acquire evidence from "Bipolar view and Trade off" (Fisher, 2001). The choice of appropriate exchange-rate regime is not clear-cut; it is much complicated, continuous revision is required in empirical and theoretical studies.

6. References

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Table – 2 Variables and Transformation

Variables	Names of the Variables	Transformation	Data Source	Data Range
ERR_t	Exchange Rate Regime	[See Karass 2012]	PWT 8.0 and IFS	1984 – 2012
$LSIZE_t$	Size of Economy	LN [Real GDP]	WDI [2013]	1984 – 2012
$LOPEN_t$	Trade Openness	LN[Imports +Exports/Real GDP]	WDI [2013]	1984 – 2012
INF_t	Inflation	Consumer Price Index	WDI [2013]	1984 – 2012
$LFER_t$	Foreign Exchange Reserves	LN [Foreign Exchange Reserves Gold excluded]	WDI [2013]	1984 – 2012
$KaOpen_t$	Capital account openness	Ito-Chin Methodology	Ito-Chin [2013]	1984 – 2012
$FBGDPt$	Fiscal Shocks	[Fiscal Budget Deficit to GDP]	SBP	1984 – 2012