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The Euro - Dollar Exchange Rate & Pakistan Economy

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Abstract

The core idea of the paper is to empirically assess the effect of Euro-Dollar Exchange rate on chosen macroeconomic variables, like, real output, price level, and money supply of Pakistan. We applied VAR based approaches to find the relation among the said variables due to high reliance on United States dollar; the results are apparent that there is no significant impact of Euro and US dollar exchange rate on the selected macroeconomic variables, GDP, CPI and money Supply of Pakistan.

Key words: Exchange rate, Impulse response, Macroeconomics Aggregates

JEL Classification: F31, C01, B22

1. Introduction

The selection of exchange rate preparations has long been a debatable concern in international economics and finance. According to traditional view, the extent to which an economy responds to foreign shocks depends on the exchange rate which actually characterizes the economy. There are two types of exchange rate systems first is the fixed exchange rate system that expresses the economy to independent shocks, and the second is floating or flexible exchange rate system which automatically adjusts the economy from foreign shocks. Most economists prefer floating exchange rate system that allows running their own stabilization policies. However, in fewer situations fixed exchange rate system may prefer for greater stability, the introduction of flexible exchange rates since the end of the Bretton Woods system there are no any example that completely insulate from foreign shock but in long run. Lastrapes and Korey in 1990 analyzed the impact of foreign shock across countries regardless of exchange rates system.

The risks related with impulsive exchange rates are viewed as major impediment for countries that attempt to build up by export growth approach and monetary liberalization. Therefore, many countries, especially small developing countries, have a tendency to stabilize their exchange rates against the other foreign currencies like US dollar and Euro.

Khalifa H. Ghali (2000) empirically tested the export led growth hypothesis using Tunisian 1965-1999 time series data. He used Johansen co integration model for long run relation between trade and economic growth he is also used Granger causality test for his finding which shows positive correlation between export and economic growth

Mansoor H. Ibrahim (2006) analyze empirically the yen-dollar exchange rate impact of macroeconomic variables on Malaysian economy the result shows that yen-dollar exchange rate highly correlated with Malay economic aggregates

At this juncture policy makers focused on stabilizing real effective exchange rate in less developing countries and makes an arrangement of exchange rate according to condition of macroeconomic aggregates of the country. Asian, Latin American and African countries support the view that the relationship between real exchange rate situation and economic performance. Empirically, there are many studies that analyze the output impact on exchange rate fluctuations, especially for developing countries. Econometric techniques may be use full to highlight this kind of research.

Looking at Pakistan's foreign trade it is found that trade gap increasingly increased throughout the trade history see appendix. Last year it was found a decline in trade gap, but that was not affected on exports, the decline shows the impact of real exchange rate which was due to the world financial crises and oil prices shocks which caused to increase world commodity price.

Table exhibits the Pakistan major import Sources (Percentage share)

Country	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	July-March	
							2007-08	2008-09*
U.S.A.	6	8.5	7.6	5.8	7.5	6.1	6.5	4.7
Japan	6.6	6	7	5.6	5.7	4.6	4.4	3.6
Kuwait	6.6	6.4	4.6	6.2	5.7	7.5	6.7	7.9
Saudi Arabia	10.7	11.4	12	11.2	11.4	13.4	12.6	13.6
Germany	4.6	3.9	4.4	4.7	3.9	3.2	3.2	3.8
U.K.	2.9	2.8	2.6	2.8	2.3	1.9	1.9	2.2
Malaysia	4.6	3.9	2.6	3.0	3.1	3.9	3.8	4.1
Sub-Total	42	42.9	40.8	39.3	39.6	40.6	39.1	39.9
Other Countries	58	57.1	59.2	60.7	60.4	59.4	60.9	60.1
Total	100	100	100	100	100	100	100	100

Economic survey of Pakistan 2008-09

Table exhibits the Pakistan major export sources (Percentage share)

Country	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	July-March		% Change
							07-08	08-09*	
USA	23.5	23.9	23.9	25.5	24.6	19.5	20.3	18.8	-7.4
Germany	5.2	4.9	4.8	4.2	4.1	4.3	4.4	4.1	-6.8
Japan	1.3	1.1	1.1	0.8	0.7	0.7	0.8	0.7	-12.5
UK	7.1	7.6	6.2	5.4	5.6	5.4	5.5	4.8	-12.7
Hong Kong	4.6	4.7	3.9	4.1	3.9	2.7	2.9	2.2	-24.1
Dubai	9	7.3	3.3	5.6	1.1	0	0	0	-
Saudi Arabia	4.3	2.8	2.5	2	1.7	2	1.9	2.2	15.8
Sub-Total	55	52.3	45.7	47.6	41.7	34.6	35.8	32.8	-8.4
Other Countries	45	47.7	54.3	52.4	58.3	65.4	64.2	67.2	4.7
Total	100	100	100	100	100	100	100	100	

Economic survey of Pakistan 2008-09

Trade to GDP ratio in Pakistan is very low, even not similar to the small developing countries due to lack of development in export region, absolute technology, no value addition, energy shortage, political instability, no diversification in international market and international terms of trade also barriers of Pakistan trade volume.

United states is a big trading partner of Pakistan, and more than eighty percent international trade transactions are made in terms of dollar, above mentioned tables shows the import and export volume region wise, this study will prove whether the empirical result support traditional theoretical approaches or not. Section 2 highlights the econometric approach and section 3 shows the data source, section 4 discusses the empirical results and section 5 consists of conclusion of this study.

2. Econometric Approach and its Justification

Vector autoregressive (VAR) based co-integration (Johansen 1988) and (Juselius 1990), variance decomposition and impulse response function techniques have use to analyze the influences of the Euro-dollar exchange rate on the Pakistan's economy. Vector autoregressive model, which is a system of reduced-form equations treating all variables in the system as endogenous. The VAR model captures empirical regularities of data and also curtails the theoretical restrictions that imposed on the system.

Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are used to check stationary of series. For bi-variate model we use Engle Granger (1987) cointegration but in case of multivariate model if order of series is at same level we use Johansen co integration VAR-based technique other wise economist prefer to use ARDL (auto regressive distributed lag model). Johansen developed two test statistics to determine the number of co integrating vectors first is trace eigen test and second is maximal eigen test. The first statistics's null hypothesis is that there are at most thus r co integrating vectors against a general alternative, and the second test is based on the null hypothesis, number of co integrating vectors is r against the alternative hypothesis that it is r + 1.

The VAR based Johansen co integration model:

$$X_t = A_0 + \sum_{k=1}^p A_k X_{t-k} + e_t,$$

X_t is an $n \times 1$ vector of variables, A_0 is an $n \times 1$ vector of constant terms, A_k is an $n \times n$ matrix of coefficients, e_t is an $n \times 1$ of residual term having zero mean, and p shows auto regression order. To estimate the VAR based cointegration model, we specify the lag length criteria of VAR (i.e., p) that the errors are serially uncorrelated, in line with the Johansen and Juselius long run relation test.

After cointegration test we used VAR based technique variance decomposition and impulse response specification, impulse response functions generated from a VAR based VECM tend to imply the effects of shocks are permanent or temporary and trace the directional responses of a series to a one standard variation shock in other series. The variance decomposition shows the percentage of a variable predicts error variance attributable to its own innovations and innovations in other variable.

3. Data Source

Time series annually data for the period 1960–2004 was collected and taken natural log of all our considering variables LGDP, LCPI, LM1, LERUS, and LPKUS. Real gross domestic product (LGDP) and consumer price index(LCPI), money supply(LM1), Euro exchange rate(LERUS) and Pakistan US dollar exchange rate (LPKUS) respectively. All variables are expressed in natural logarithm.

Data is collected from world development indicator, international financial statistics software and hand book of Pakistan economic survey 2008-09.

4. Emperical Results

The development in the field of econometrics explains that most of economic variables are non-stationary as said above. The result of such kind of regression is spurious and unreliable if the series are not found stationary therefore we can say integrated on different order. So it's significant to check stationary of time series data before checking the long run relationship between these variables, ADF and PP unit root test have used to check stationary in the time series, the results are mentioned in the below table-1

Table 1: Augmented Dickey Fuller (ADF) and Phillips Perron (PP) Unit Root test

Variables	ADF				PP			
	Level		First Difference		Level		First Difference	
	critical value	p-value	critical value	p-value	critical value	p-value	critical value	p-value
LGDP	0.128	0.964	-6.660*	0.000	0.170	0.968	-6.680*	0.000
LCPI	-3.445	0.059	-3.548*	0.047	-2.532	0.312	-2.609*	0.279
LM1	-3.851	0.023	-6.576*	0.000	-3.842	0.023	-6.820*	0.000
LSRUS	-2.643	0.264	-4.697*	0.003	-2.000	0.585	-4.129*	0.012
LPKUS	-2.947	0.158	-6.279*	0.000	-3.027	0.137	-6.302*	0.000

*show values are significant at 5 % level

The results accept our null hypothesis at a level and reject it at first difference, and suggest that there is no stationary in all our series, all variables are stationary at a level and non stationary at a first difference in other word all our chosen variables are integrated of order 1 or I(1). First we use Augmented Dickey fuller method this test captures the serial correlation problem by taking dependent variable lag as independent variable equation of ADF is:

$$\Delta X_t = \phi_0 + \phi_1 X_{t-1} + \sum_{j=1}^k \alpha_j \Delta X_{t-j} + \eta_t$$

We have also confirmed our results with the help of Phillips Perron unit root test. ADF and PP both test suggesting the integrated of order 1 or I(1), analyzing the stationary in the series, result shows that the data is integrated at order 1 next step is to check the co-integration among the variables for this purpose we have used the Johansen co integration test, Johansen develops two test statistics: Trace statistics (λ_{trace}) and maximum eigen statistic (λ_{max}). The results of cointegration tests are in Table-2.

Table 2: Johansen-Juselius cointegration

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5% Critical Value	Prob.	Trace Eigen Statistic	5% Critical Value	Prob.
Ho R=0, H1 R=1	0.651	45.318*	30.439	0.0004	83.052*	60.061	0.0002
Ho R>1, H1 R=2	0.296	15.103*	24.159	0.0995	37.734*	40.174	0.0862
Ho R>2, H1 R=3	0.265	13.239*	17.797	0.0128	22.630*	24.275	0.0795
Ho R>3, H1 R=4	0.186	8.897*	11.224	0.0248	9.390*	12.320	0.0475
Ho R>4, H1 R=5	0.011	0.493	4.1299	0.0456	0.493*	4.129	0.0456

*significance at 5% level

Note: r represents number of cointegrating vectors and k represents the number of lags in the unrestricted VAR model.

Johansen-Juselius test results are positive so presenting non-causality between our variables for further analysis we apply impulse response function and variance decomposition.

The results suggest the presence of cointegration, long run relationship among the variables, trace statistics (λ_{trace}) and maximum eigen statistic (λ_{max}) both criteria show same finding. under consideration permits us to estimate the VAR using the variables in level. From the VAR model we generate variance decomposition and impulse response functions on the bases of inference.

We have used Cholesky factorization as suggested by Sims (1980) to recognize the shocks in the VAR structure. Order of the chosen variables is in the following way: LERUS LPKUS LGDP LCPI LM1, ordering reflects our argument of the relative independency or dependency of these variables. The euro dollar exchange rate should be most exogenous to other variables.

To analyze whether our ordering is on a right path, we calculate correlations among the shocks in the VAR,

Table 3: Shows the correlation Results of our chosen variables.

	LERUS	LPKUS	LGDP	LCPI	LM1
LERUS	1	0.142796	-0.35266	-0.25679	0.02507
LPKUS	0.142796	1	-0.15917	-0.23146	0.147189
LGDP	-0.35266	-0.15917	1	-0.23688	0.027702
LCPI	-0.25679	-0.23146	-0.23688	1	0.106664
LM1	0.02507	0.147189	0.027702	0.106664	1

The result of correlation exhibits very low correlations in among our selected variables but Euro exchange rate with GDP and CPI are a little considerable.

Table 4: Variance Decomposition and Impulse Response Function When Euro and Dollar as Exogenous

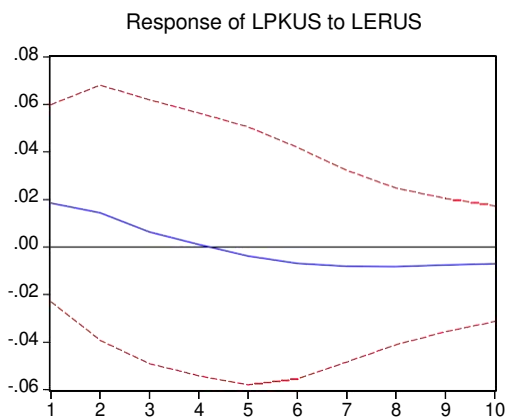
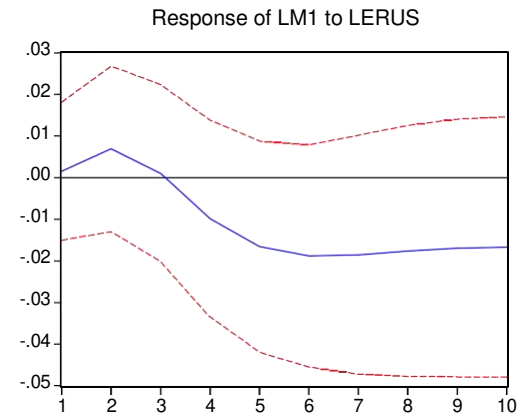
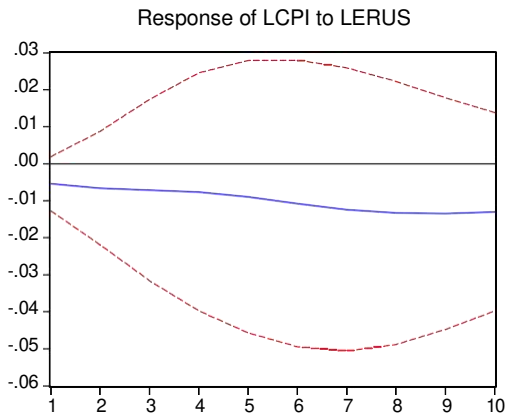
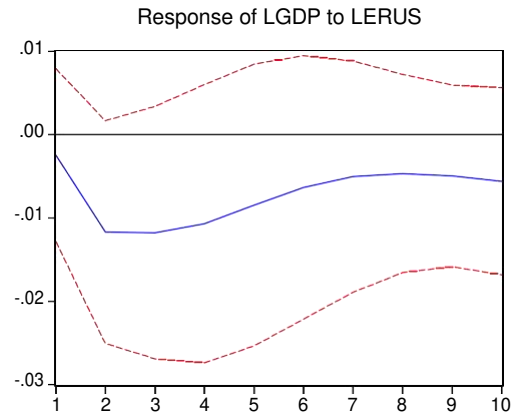
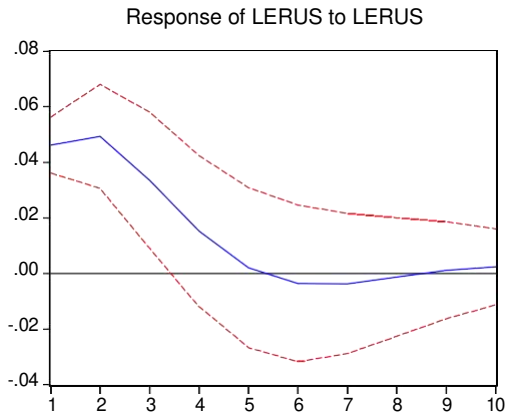
Period	S.E.	LERUS	LGDP	LCPI	LM1	LPKUS
1	0.046212	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.069305	95.04673	3.006962	0.825063	0.251899	0.869344
3	0.081731	85.16163	6.630203	5.238463	1.897103	1.072601
4	0.090355	72.51233	9.861797	11.75441	4.767136	1.104327
5	0.097063	62.88116	11.24181	17.47213	7.202238	1.202662
6	0.101623	57.48755	11.37692	21.09688	8.622500	1.416148
7	0.104074	54.93410	11.15141	22.86479	9.327313	1.722377
8	0.105077	53.90519	10.97184	23.48902	9.636032	1.997914
9	0.105363	53.62409	10.91528	23.60621	9.731975	2.122442
10	0.105424	53.61527	10.93120	23.59038	9.735747	2.127406
11	0.105507	53.58614	10.94825	23.57176	9.726651	2.167200
12	0.105691	53.42794	10.92814	23.55789	9.737494	2.348542
13	0.105944	53.17785	10.87792	23.53475	9.766632	2.642851
14	0.106198	52.92398	10.82919	23.50149	9.799749	2.945588
15	0.106403	52.72751	10.81017	23.46548	9.824798	3.172037
16	0.106545	52.60101	10.83102	23.43232	9.837007	3.298644
17	0.106640	52.52586	10.88458	23.40323	9.837851	3.348482
18	0.106708	52.47745	10.95511	23.37729	9.831764	3.358387
19	0.106764	52.43991	11.02726	23.35384	9.823083	3.355912
20	0.106812	52.40788	11.09116	23.33316	9.814532	3.353271

Variance decomposition results shows there is no significance relation between the variables which have shown in the above table while dollar-euro exchange rate have no significant on Pakistan macroeconomic aggregates.

After the sixth period CPI 23 percent, GDP 11 percent, money supply 9 percent and exchange rate 1 percent variation show which is negligible and insignificant. Impulse response shocks support our conclusion and analysis.

IMPULSE RESPONSE FUNCTION

Response to Cholesky One S.D. Innovations ± 2 S.E.



When we look at the impact of Euro fluctuation on GDP it is reported for only 10 to 17 percent approximately and no shock occurs from period 1 to period 10 Which is negligible When we look at the impact of Euro fluctuation on money supply it is reported for only 0.06 to 15 percent approximately and no shock occurs from period 1 to period 10 Which is negligible. When we look the impact of Euro fluctuation on CPI it is reported for only 3 to 7 percent approximately from period 1 to period 10 which is negligible the after 4th period the effect of shock dies out with fluctuation of 5 to 6 percent. Our overall result show there is no significant impact of euro dollar exchange rate on Pakistan macroeconomic aggregates.

5. Conclusion and Policy Recommendation

5.1. Conclusion

It is found during the study that there is no significant impact of Euro and US dollar exchange rate on Pakistan's macroeconomic chosen variables, gross domestic product (GDP), money supply (M1), average inflation (CPI), Pak rupee and US dollar exchange rate. Being a small open economy as well as low trade volume and heavy reliance on United States dollar has insignificantly impact on Pakistan's economy.

5.2. Policy Recommendation

- To diversify export markets to those countries with which Pakistan made agreements of free trade other than major trading partner United States etc
- The local productive capacity should be integrated with global supply chain Technology level should be acquired and upgraded which may be useful to switch over from low value export to high value export
- Design the tariff policy considering the structure of value addition in many industries
- Motivate the foreign investor to explore export potential of mineral sector and agro-processed Exports.
- Launch a composite plan for the export promotion services

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7. Appendix

Table shows average exchange rate and premium

	Inter Bank Rate (Rs / \$)	Open Market Rate (Rs/\$)	Premium (%)	Rs/ Euro
February	62.65	62.76	0.11	94.86
March	62.76	63	0.24	99.05
April	63.82	64.32	0.5	100.47
May	67.78	68.29	0.51	103.48
June	67.44	68.2	0.76	107.76
July, 2008	70.83	71.29	0.46	111.39
August	74.62	74.79	0.17	111.86
September	77.32	77.27	-0.05	112.05
October	80.74	82.37	1.63	104.74
November	80.01	79.72	-0.29	99.99
December	79.11	78.95	-0.16	111.37
January, 2009	79.28	79.28	0	101.25
February	79.64	79.65	0.01	101.15
March	80.42	80.31	-0.11	106.62

Source: State Bank of Pakistan

Table shows the unit value indices and term of trade

Year	(1990 = 100)		Terms of Trade
	Unit Value Indices		
	Exports	Imports	
1998-99	258.4	223.3	115.7
99-2000	253.8	259.0	98.0
2000-01	271.5	298.4	91.0
2001-02	271.2	298.6	90.8
2002-03	254.0	309.5	82.1
2003-04	279.6	355.4	78.7
2004-05	288.8	392.5	73.6
2005-06	299.3	460.4	65.0
2006-07	310.0	495.3	62.6
2007-08	350.4	632.3	55.4
July-March			
2007-08	334.7	582.0	57.5
2008-09*	454.9	808.1	56.3

Source: Economic survey of Pakistan 2008-09

Graph shows the real effective exchange rate trends

