

External Debts and Exchange Rates of Oil-Producing and Non-Oil-Producing Nations: Evidence from Nigeria and Pakistan

Muhammad Umar Draz

Faculty of Business and Information Science, UCSI University, Kuala Lumpur, Malaysia
Email: umardraz2626@yahoo.com

Fayyaz Ahmad

School of Economics, Lanzhou University, Lanzhou, China
Email: fayyazahmad19@hotmail.com

Abstract—External debts affect the economy in both ways. Where efficient use of external debts can bring economic prosperity to a nation, their inefficient use can cause severe damages as well; one of those damages is their impact on exchange rate. The exchange rate of Pakistani Rupee (PKR) with the United States Dollar (USD) has escalated from 4.60 to 108 during the past four decades. This study is primarily focused on: finding the impact of external debts and world oil prices on PKR's exchange rate; comparing the findings with Nigeria and urging the necessary policies by the Govt. of Pakistan. Least Square Regression model with lag variables and Granger Causality Test are used to analyze the data of 1965 to 2009. The results portray that external debts have significant influence over PKR's exchange rate, while no such evidence was found for the world oil prices. These outcomes vary from the previous studies and their results obtained for Nigeria.

Index Terms—economy, exchange rate, external debts, world oil prices

I. INTRODUCTION

AS every picture has two sides i.e. the bright and the dark, same is the case with external debts as well. There are numerous benefits and opportunities that can be achieved by obtaining external debts; for instance, external debts can be utilized to boost-up economic growth. We can find such nations that obtained external debts and now they are in a position of extending loans to others; the example of Peoples' Republic of China is an open secret in this regard. If the borrowed funds are utilized properly, i.e. in the form of productive investments, the borrowing country can easily accelerate their economic growth and settle their debt obligations as well. Moreover, as noted by Wahab [1], external debts play a key role in various development programs and enable the government to bridge the gap of budget deficit.

On the other hand, external debts have some dark sides as well e.g. the heavy burden of interest, stipulated

conditions in terms of specified usage of the borrowed funds and undue influence of the creditors etc. If a nation is unable to cope up with the regular repayments, the vicious circle of foreign debts and dependency becomes the fate of that nation. In the worst case, the internal policies are dictated by the creditors and even the sovereignty of that nation can go in danger. As asserted by Sayeed and Rashid [2], an increasing debt burden may result into compromising the economic and political sovereignty of the borrowing country. Another drastic upshot of external debts is their impact on the exchange rate, which not only increases the burden of interest and principal repayments but also affects the inflation level of the country. Consequently, it damages the economic and social fabrics of that nation like a double-edged sword.

While studying Pakistan's external debt situation, Hameed, Ashraf and Chaudhary [3] noted that external debts have mounted to a dreadful point, exerting a negative impact on the labour and capital productivity, which obviously lowers the economic growth. The work of Chaudhry, Malik and Ramzan [4] also describes the harmfulness of external debts for Pakistan's economy; the authors have stated that foreign debts are partially utilized to finance the investment projects and the rest is used for consumption purposes.

What makes Pakistan and Nigeria comparable regarding external debts and exchange rate? First of all, both of the nations are categorized as developing countries by the World Bank; and obviously they can be compared due to this common attribute. Secondly, both countries are facing the exchange rate crisis which makes them comparable. Another important reason to compare these two economies is the surprising fact about Nigeria, as studied by Ajayi [5] and Ezirim and Muoghalu [6], that external debts have no significant impact on its currency's exchange rate with the USD.

The theoretical underpinning of our work is based on the fact, as mentioned by Hameed, Ashraf, and Chaudhary, that large amount of foreign debt dries-up the foreign exchange and capital, because these reserves are utilized

for repaying the principal and interest of the foreign debts. If we look further, the lack of foreign reserves turns the economic position of a country unstable; and the key reason for such instability is that the insufficient available reserves limit the foreign trade and decreases the overall reserves held for backing-up the currency issued; consequently, the exchange rates of such nation drops against other currencies.

On the other hand, huge amount of foreign debts, especially in a country like Pakistan where foreign debts are used for the consumption purposes and not for the productive investment projects, increases inflation and results into a decrease in economic growth; it obviously affects the exchange rate as well. Apart from these theoretical logics, it is very easy to understand that when a nation is having piles of foreign debts, its economy is weak enough to meet the internal needs of funds; this vulnerable spot of economy affects the exchange rates.

II. LITERATURE REVIEW

In the present era, when our world is highly linked and full of information about almost all the topics, it is pretty obvious that the exchange rate fluctuations, impact of external debts and world oil prices have also been discussed from various viewpoints. According to the work of Nishijima [7] regarding Latin American countries, the budget deficit and appreciated real exchange rate are the main reasons of external debts in developing countries. In case of Brazil, according to Yu [8], the external debt shocks have negative relationship with the output. Siregar and Pontines [9] studied the impact of external debts' accumulation on exchange rate overshooting for the four East Asian countries i.e. Indonesia, Korea, Philippines and Thailand. They found that the buildup of external debts have considerably contributed towards the exchange rate overshooting of these nations' currencies. Amano and Norden [10] are of the view that the U.S. effective exchange rate and oil price shocks are linked with each other. Using stationary and cointegration tests for the members of Organization of the Petroleum Exporting Countries (OPEC), Nikbakht [11] has asserted that oil prices and real exchange rates have long run relationship.

When we explore the literature about the impact of Nigeria's external debts and world oil prices over Nigerian Naira's exchange rate, this relationship has already been studied. The work of Ajayi and Ezirim and Muoghalu tend to be among the most prominent ones in this regard; the former has statistically proved by using the Two Staged Least Square Simultaneous Equation Model that the world oil prices have significant relationship with Naira's exchange rate while external debts have no noteworthy linkage with the exchange rate; the latter have also concluded the same outcome for these variables using the Ordinary Least Square and Exact Maximum Likelihood methods in their analysis.

As far as the case of Pakistan is concerned, various studies have been conducted with respect to exchange rate, oil prices and external debts. Ahmed [12] utilized the error correction model based on vector autoregression

techniques and explored that the PKR's nominal exchange rate variations happen due to the involvement of monetary authorities. The findings of Zakaria, Ahmad and Iqbal [13] asserting the sudden policy changes as a primary cause of the unsteadiness of nominal exchange rate also affirm the previous work; they applied the generalized methods of moments estimations to prove their point. The study of Khan and Qayyum [14], by employing the multivariate cointegration and bound testing approach to cointegration, asserts that PKR has a long run purchase power parity against USD. Malik [15] has used the augmented Phillips curve and found that the crude oil prices have initially non-linear and later on negative relation with the output of Pakistan but its impact on exchange rate is not studied in this research.

Syed [16] has also statistically confirmed that the oil prices are negatively linked with the Pakistan's GDP, moreover, the average exchange rates also impact on the GDP. This study also lacks the exploration of impact of oil prices on exchange rate. The impact of external debts on various macroeconomic aspects of the Pakistan's economy is prominently discussed in the two studies: Hameed, Ashraf and Chaudhary have analyzed the impact of Pakistan's external debts over its short-term and long-term economic growth while Chaudhry, Malik and Ramzan have examined the impact of foreign debts on savings and investment in Pakistan. The former work found that the external debts have both short-run and long-run relationship with the GDP whereas the latter study discovered a limited confirmation for the positive impact of foreign debts towards the savings and investments. Just like the studies conducted about the impact of oil prices, these two works are also deficient of external debts' relationship with PKR's exchange rate.

We have observed from the literature survey that, in case of Pakistan, most of the studies address the issue of external debts and economic, business and investment growth. There is lack of research about the impact of Pakistan's external debts on its exchange rate; our work is intended to bridge this research gap. Moreover, no literature was found comparing the impact of external debts of oil-producing and non-oil-producing nations on their exchange rates; we aim to conduct this comparison for Nigerian and Pakistan, since former is an oil-producing and latter is a non-oil-producing nation.

III. RESEARCH METHODOLOGY

Our analyses are based on the data of PKR exchange rate with USD, the external debts of Pakistan and world oil prices from 1965 to 2009. The data of exchange rate is taken from the official website of The Federal Bureau of Statistics, Govt. of Pakistan while external debts' values have been taken from two websites, i.e. The Ministry of Finance, Govt. of Pakistan (from 1965 to 2005) and State Bank of Pakistan (from 2006 to 2009). The source of world oil prices is the website of British Petroleum. The data of exchange rate is in current prices while oil prices are also inflation adjusted in terms of 2009 USD. Moreover, medium and long term disbursed external debts are taken

into consideration while conducting all the statistical analysis.

We have used the Granger Causality Test and Linear Regression Model in our statistical analysis. The Granger Causality Test is based on the fact that future or present cannot cause the past i.e. the past can cause the present and future. Hacker and Hatemi-J [17]; therefore, we can observe the impact of Pakistan's external debts on PKR's exchange rate with USD by using the past data. The variables used in our statistical analysis are abbreviated as follows:

EXRT = Exchange Rate of PKR with USD
{Dependant Variable}

EXDT = External Debts of Pakistan
{Independent Variable # 1}

OILPR = World Oil Prices {Independent Variable # 2}

The following hypotheses are tested at 5% Level of Significance (i.e. $\alpha = 0.05$):

H_0 = EXDT / OILPR has no significant impact on EXRT

H_1 = EXDT / OILPR has significant impact on EXRT

The hypotheses for White Heteroskedasticity test are:

H_0 = No Heteroskedasticity was discovered

H_1 = Heteroskedasticity was discovered

IV. FINDINGS AND DISCUSSION

First of all, Augmented Dickey-Fuller (ADF) test is used to explore the unit root of the above-mentioned variables; the results are as follows:

TABLE I. AUGMENTED DICKEY-FULLER TEST EQUATION
DEPENDENT VARIABLE: D(EXDT,3)

ADF Test Statistic	-4.9424	1% Critical Value*	-4.1958
		5% Critical Value	-3.5217
		10% Critical Value	-3.1914

Source: Authors' analysis by using EViews

TABLE II. AUGMENTED DICKEY-FULLER TEST EQUATION
DEPENDENT VARIABLE: D(EXRT,2)

ADF Test Statistic	-2.7717	1% Critical Value*	-3.5930
		5% Critical Value	-2.9320
		10% Critical Value	-2.6039

Source: Authors' analysis by using EViews

TABLE III. AUGMENTED DICKEY-FULLER TEST EQUATION
DEPENDENT VARIABLE: D(OILPR,2)

ADF Test Statistic	-4.2879	1% Critical Value*	-3.5930
		5% Critical Value	-2.9320
		10% Critical Value	-2.6039

Source: Authors' analysis by using EViews

The results of ADF test, given in Table I to Table III, indicate that EXDT has no unit root and time series is stationary at the second difference while EXRT and

OILPR had no unit root at the first difference and their time series was stationary.

To analyze the mutual relationship of our three variables, first of all we have used the Granger Causality Test and Correlation. The results are shown as under:

TABLE IV. PAIR-WISE GRANGER CAUSALITY TEST

No.	Null Hypothesis:	Obs.	F-Stat.	Prob.
(1)	EXDT does not Granger Cause EXRT	43	12.2322	7.9E-05
	EXRT does not Granger Cause EXDT		1.93479	0.15842
(2)	OILPR does not Granger Cause EXRT	43	0.16215	0.85090
	EXRT does not Granger Cause OILPR		3.33403	0.04634

Source: Authors' analysis by using EViews

TABLE V. CORRELATION MATRIX

	EXRT	EXDT	OILPR
EXRT	1.000000	0.965198	0.237381
EXDT	0.965198	1.000000	0.348831
OILPR	0.237381	0.348831	1.000000

Source: Authors' analysis by using EViews

In the first case of Granger Causality test, with 5% level of significance, we can observe that the probability is less than level of significance while finding the relationship of external debts and exchange rate. It leads towards rejection of null hypothesis and we accept the alternative hypothesis i.e. external debts do Granger Cause exchange rate.

On the other hand, the association of oil prices and exchange rate shows the probability of 0.85 which is greater than the level of significance and results into the acceptance of null hypothesis i.e. world oil prices do not Granger Cause the exchange rate of PKR. The values of correlation co-efficient also ratify the results of Granger Causality test since exchange rate and external debts have strong positive correlation (0.965) while correlation is very weak in case of exchange rate and oil prices (0.237).

To further evaluate the significance of relationship among our variables, Least Square Regression Model i.e. Non-Linear Least Square and ARMA (NLS and ARMA) is used.

TABLE VI. LEAST SQUARE MODEL (USING OBSERVED DATA VALUES)

Variable	Coeff.	Std. Error	t-Statistic	Prob.
C	3.1417	1.7279	1.8181	0.0762
EXDT	1.7195	0.0673	25.521	0.0000
OILPR	-0.1057	0.0368	-2.8723	0.0064
R-squared	0.9428	Mean dependent var		27.815
Adjusted R-squared	0.9401	S.D. dependent var		23.035
S.E. of regression	5.6370	Akaike info criterion		6.3609
Sum squared resid	1334.6	Schwarz criterion		6.4813
Log likelihood	-140.1	F-statistic		346.36
Durbin-Watson stat	0.3773	Prob(F-statistic)		0.0000

Source: Authors' analysis by using EViews

Initially, the model is constructed from the observed values of all the three variables without any change. As

shown in Table VI, the probability of t-Statistic for both independent variables is less than the level of significance; hence, both external debts and world oil prices are having significant relationship with the exchange rate. Moreover, the value of R-squared is also very high.

TABLE VII. WHITE HETEROSKEDASTICITY TEST

F-statistic	5.349374	Probability	0.001512
Obs.*R-squared	15.68284	Probability	0.003476

Source: Authors' analysis by using EViews

These figures (i.e. probability of t-Statistic and R-Squared) apparently make this model attractive but on the other hand are contradictory to the outcome of correlation and Granger Causality test regarding impact of world oil prices on the PKR exchange rate. The values of Durbin-Watson statistic and White Heteroskedasticity test also make these results highly questionable as the model is no more reliable in the presence of Autocorrelation and Heteroskedasticity. Durbin-Watson statistic value 0.377 is less than the d_1 value 1.43 (with $N = 45$, $k = 2$) and it results into positive autocorrelation. The probability of Obs.*R-squared is also less than the level of significance so we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1) i.e. Heteroskedasticity is discovered.

To deal with the problem of Autocorrelation and Heteroskedasticity, we have applied the combination of logarithm and lag variable. Lag variable AR (1) and AR (2) is used to overcome the issues of Autocorrelations and Heteroskedasticity. The outcome of this model is as under:

TABLE VIII. LEAST SQUARE MODEL WITH LAG VARIABLE

Variable	Coeff.	Std. Error	t-Statistic	Prob.
C	0.5345	0.2549	2.0964	0.0428
LOG(EXDT)	1.0079	0.0721	13.962	0.0000
LOG(OILPR)	-0.0276	0.0495	-0.5578	0.5802
AR(1)	1.1931	0.1426	8.3642	0.0000
AR(2)	-0.4457	0.1253	-3.5569	0.0010
R-squared	0.9893	Mean dependent var		3.0110
Adjusted R-squared	0.9882	S.D. dependent var		0.8890
S.E. of regression	0.0965	Akaike info criterion		-1.7286
Sum squared resid	0.3542	Schwarz criterion		-1.5238
Log likelihood	42.165	F-statistic		880.79
Durbin-Watson stat	1.9163	Prob(F-statistic)		0.0000
Inverted AR Roots	.60 -.30i		.60+.30i	

Source: Authors' analysis by using EViews

TABLE IX. WHITE HETEROSKEDASTICITY TEST

F-statistic	0.5902	Probability	0.6717
Obs.*R-squared	2.5154	Probability	0.6418

Source: Authors' analysis by using EViews

This model not only overcomes the problems of Autocorrelation and Heteroskedasticity but also confirms the results of Granger Causality test and Correlation. The Durbin-Watson statistic (i.e. 1.916) is considerably above

the d_1 value 1.62 (with $N = 45$, $k = 2$) which falls into 'No Autocorrelation' criterion. The probability of Obs.*R-squared (i.e. 0.64) is clearly beyond the level of significance too which directs towards the acceptance of null hypothesis i.e. No Heteroskedasticity was found. Furthermore, the probabilities of t-Statistic for both LOG (EXDT) and LOG (OILPR) are fairly decisive to explain that external debts have significant relationship with the PKR exchange rate while vice versa in case of world oil prices.

V. CONCLUSION

The results of our study indicate that PKR's exchange rate is significantly influenced by the external debts while no such evidence was found for the world oil prices. On the other hand, the results of Ajayi [2] and Ezirim and Muoghalu [5] obtained for Nigeria are entirely opposite to our study. As found in our analysis, the impact of world oil prices and external debts is not the same on both nations' exchange rates. Since both Pakistan and Nigeria are developing countries, it necessitates a careful insight by the developing nations individually regarding the impact of external debts and world oil prices on their currencies' exchange rate with USD. Our study suggests some policy measures for the developing countries in general and for Pakistan in specific. For Pakistan, control over alarming situation of external debts is urgently required since it is vulnerable in many ways.

It is an unfortunate fact that Pakistani government is forced to seek debts from local as well as from international market for the development expenditures. In the light of our study, government of Pakistan needs to take some crucial steps regarding the utilization of external debts. Government should seek experts' advice in various development plans; most importantly, those plans should be practical and must add value towards managing the finance. The overall results of our study suggest that government of Pakistan must control the debt burden because excessive debts dry-up foreign exchange and capital because huge amounts are transferred to the lenders to pay back principal and interest. Furthermore, when a country does not payback the debt on time, it is considered as a high risk country; and such a nation has to pay huge interest while obtaining the external debt again. All of these factors have negative impact towards exchange rate and ultimately on the country's economy.

The analyses are based on the values of disbursed external debts outstanding. The total debt outstanding (disbursed + undisbursed) might produce the different results. Moreover, the results are limited to one country only i.e. Pakistan and in clear contradiction with the Nigeria. It is desirable to extend this research worldwide for making any global remarks about the impact of external debts and world oil prices.

Since Pakistan is not an oil producing country while Nigeria is an oil producing nation and the impact of external debts on both countries' exchange rate is exactly opposite, that's why this work can be extended through a broader data set of oil-producing and non-oil-producing

nations for studying the relationship of external debts, oil prices and exchange rate. The results derived from such comparative study of both groups will be more reliable and conclusive. Moreover, exploring the reasons of conflicting results regarding the impact of external debts and world oil prices over exchange rate for both Pakistan and Nigeria can also be a splendid addition to the existing literature.

REFERENCES

- [1] A. Wahab. (June 26, 2010). To have debt or not to have debt. *The Express Tribune*. [Online]. Available: <http://tribune.com.pk/story/31084/to-have-debt-or-not-to-have-debt/>
- [2] A. Sayeed and E. Rashid, *Pakistan's External Debt Burden: Causes, Remedies and Complexities*, Karachi, Pakistan: Social Policy and Development Centre, 2003.
- [3] A. Hameed, H. Ashraf, and M. A. Chaudhary, "External debt and its impact on economic and business growth in Pakistan," *International Research Journal of Finance and Economics*, pp. 132-140, 2008.
- [4] I. S. Chaudhry, S. Malik, and M. Ramzan, "Impact of foreign debt on savings and investment in Pakistan," *Journal of Quality and Technology Management*, pp. 101-115, 2009.
- [5] R. Ajayi. (1991). *On the Simultaneous Interactions of External Debt, Exchange Rates, and Other Macroeconomic Variables: The Case of Nigeria*. [Online]. Available: <http://msuweb.montclair.edu/~lehelp/CERAfrm026Ajayi1991.pdf>
- [6] C. B. Ezirim and M. I. Muoghalu, "Exchange rate determination foreign investment burden and external debt crisis in less-developed countries: Nigerian experience," *International Journal of Business and Economics Perspectives*, pp. 1-15, 2006.
- [7] S. Nishijima, "External debt, real exchange rate and budget deficit in Latin American countries," *Journal of International Cooperation Studies*, pp. 45-60, 1993.
- [8] H. Yu, "Impacts of external debts and other macroeconomic policies on output in Brazil: A VAR approach," *Revista de Analisis Economico*, pp. 97-108, 2003.
- [9] R. Y. Siregar and V. Pontines. (2005). *External Debt and Exchange Rate Overshooting: The Case of Selected East Asian Countries*. [Online]. Available: <http://www.adelaide.edu.au/cies/papers/0520.pdf>
- [10] R. A. Amano and S. V. Norden, "Oil prices and the rise and fall of the U.S. real exchange rate," *Journal of International Money and Finance*, pp. 299-316, 1998.
- [11] L. Nikbakht, "Oil prices and exchange rates: The case of OPEC," *Business Intelligence Journal*, 83-92, 2010.
- [12] M. Ahmed, "Pakistan's exchange rate policy: An econometric investigation," *The Pakistan Development Review*, pp. 49-74, 1992.
- [13] M. Zakaria, E. Ahmad, M. M., and Iqbal, "Nominal exchange rate variability: A case study of Pakistan," *Journal of Economic Cooperation*, pp. 73-98, 2007.
- [14] M. A. Khan and A. Qayyum, "Exchange rate determination in Pakistan: Evidence based on purchasing power parity theory," *Pakistan Economic and Social Review*, pp. 181-202, 2007.
- [15] A. Malik, "Crude oil price, monetary policy and output: Case of Pakistan," *The Pakistan Development Review*, pp. 425-436, 2008.
- [16] N. I. Syed, "Measuring the impact of changing oil prices and other macro economic variables on GDP in the context of Pakistan's economy," *International Research Journal of Finance and Economics*, pp. 40-49, 2010.
- [17] R. S. Hacker and J. A. Hatemi, "Tests for causality between integrated variables using asymptotic and bootstrap distributions: Theory and application," *Applied Economics*, pp. 1489-1500, 2006.



Dr. Muhammad Umar Draz is with the Faculty of Business and Information Science, UCSI University, Kuala Lumpur, Malaysia. Previously, he was Lecturer in Accounting and Finance at Department of Commerce, Bahauddin Zakariya University, Multan, Pakistan. His research interests include accounting reforms, financial crisis, geopolitics, economics and Islamic finance.



Fayyaz Ahmad graduated with a Master Degree in Accounting and Finance from Bahauddin Zakariya University, Multan, Pakistan in 2011. He was the second topper in university for the aforementioned degree. In 2012, he received full scholarship from China Scholarship Council. At present, he is pursuing PhD in Regional Economics at School of Economics, Lanzhou University, China.