

Foreign Debts and Exchange Rate in Nigeria: The Stepwise Regression

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Abstract

The considerable argument on the relationship between foreign debt and exchange rate remains debatable among the researchers. Various conclusions had been drawn with different methodology and variables considered in the existing studies. Therefore, this study investigated the relationship between foreign trade and exchange rate in Nigeria for the period of 30 years between 1990 and 2019. The study relied on a secondary source of data gathered through CBN statistical bulletin 2020 version. Foreign debt was strictly represented with multilateral debt, bilateral debt, Paris club and London club debt while exchange rate was considered as a dependent variable. Stepwise regression and vargranger were considered for the analysis and revealed that multilateral debt, Paris club and London club debt are the major debt positively influencing exchange rate fluctuation while bilateral debt has a negative relationship. Also, multilateral debt, bilateral debt and London club debt have a significant impact on exchange rate compared to Paris club debt with insignificant impact on exchange rate. Various models analyzed in the study show Multilateral debt remains significant in the entire model while bilateral debt became insignificant in model 4 and Paris club debt is not significant in Model 4 and 5. The granger causality test revealed that exchange rate does not influence multilateral debt but multilateral debt influences exchange rate. The study concluded that foreign debt has a significant relationship with the exchange rate. Therefore, the study recommends the government should maintain a favorable and controlled public external debt in order to reduce the exchange rate in Nigeria.

Keywords: *Exchange Rate; Multilateral Debt; Bilateral Debt; Paris Club Debt; London Club Debt*



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INTRODUCTION

The functionality of government across the world depends solely on the various revenue sources and budgeting strategies. However, the inability to meet the expenditure aspects of the budget forced many governments to borrow domestically and internationally. Borrowing bridges the wider gap between expected revenue and proposed expenditure of the government which is known as budget deficit. In the literature, borrowing is referred debt which means the obligations or promises to be fulfilled in the nearest future. Meanwhile, the privilege to enjoy certain amount of funds and make repayment in the future is referred debt but absolutely different from deferred payment that is related to goods and services. Debt could be contacted by different economic agents such as firms, household and government or simply put private and public sector of the economy for different purposes. In this paper the focus is in the debt contacted by the public sector or

government. Relative to public sector, debt can be classified into internal and external debt that is fully repaid by the successive government in the nearest future (CBN, 2018). This serves as financial obligations of government that pay interest rate on redemption. In his work, Ugwu (2011) opined that borrowing internationally is necessary to revitalize the slow economic growth and enhance productivity in the economy. It was further stated that foreign debt which also known as international loan are used to finance wars and solve the problem of unemployment. This situation could be traced to the revolutionary war of the United States from England in the earlier years where colonies have accumulated huge debt to finance war. In addition, the funds raised in the domestic economic are referred to internal debt which is to improve the existing capital formation and contribute to the gross fixed capital formation of a country.

The issue of debt occurs from two major activities such as government obligations to provide adequate infrastructure and capital projects for economic development which leads to the borrowing and the imbalance between revenues and expenditures which is referred to as budget deficits. The latter arises when the government financed the difference by issuing debt to either internal or external investors. Recently, there has been an increase in the level of public debt in many developing countries especially Nigeria being a Lower-middle income country. This has spurred the interest of many finance experts on the management of public debt, and the implication on the economic growth which become the significant public finance issues. The problem of Nigeria's foreign debt has become a more important issue because of its magnitude and the high amount required to service such foreign debts due to disparities and misalignment in rate of exchange between Naira and Dollars.

It has been recorded that foreign debt owned by Nigeria follows an upwards trend since 1981 till date. For instance, the N8.8 billion owned in 1982 grew to about N17.3 billion and N41.4 billion between 1985 and 1986 respectively. The foreign debt reached N100 billion in 1987 as a result of Federal government guarantees obtained by the state government to secure foreign loans which further raise the debt burden in Nigeria (CBN, 2015). Between 1988 and 2000, the foreign debt has risen to N3 Trillion, surprisingly; the debt repudiation enjoyed from Paris Club reduced the Nigeria debt by 13% declining from N3 Trillion to N2.5 trillion in 2005 and further reduces N451.46 billion in the 2006 onwards (CBN, 2018). However, in 2017, 2018, 2019 and 2020, the foreign debt has risen to N18, 376.99B, N7,759,229B, N9,022.42B and N12,705.62B respectively (DMO, 2020). Meanwhile, the exchange rate pattern during this period has not been completely favorable due to low exportation and overreliance on importation. Some economic growth scholars have attributed the exchange rate fluctuations to various factors and mainly economic management factors such as low trades and high bills, and policy issues. But little attention has been directed towards the influence of high foreign debt. It is noted that the persistent fluctuations of exchange rate is a major concern of policy makers and efforts have been channeled to reduce the fluctuation or balance the purchasing power, however, the rate of exchange between Naira and other developed currency such as dollar, pounds and other dollars is deteriorating. It was reported by the monetary authority that since 1981 till 2020 the exchange rate has fluctuated and depreciated from N2 to a dollar to N358 /\$1.

Theoretically, the relationship between foreign debt and exchange rate depreciation is positive. It was revealed by the IMF, 2015 that accumulation of foreign liability is translated to the recent depreciation in the currency of developing economies and further translated to financial

vulnerabilities. Upon this assumption, the reflection of it in the empirical strands is debatable. There are various arguments against the conclusion that foreign debt is a major factor causing significant depreciation in the exchange rate of developing economies. However, a sect of the literature agreed completely that heavy foreign debt contributes hugely towards the adjustment of exchange rate in developing economies. For instance, the study conducted by Aderemi, Fagbola, Sokunbi, and Ebere (2019, 2020), Blessy and Lakshmi (2020), Aigbedion, Iyakwari, and Mairana (2020), Mehta and Hatim (2014), confirmed that foreign debt positively influences exchange rate instability, which means as public foreign debt increases, the exchange rate decreases in value. Meanwhile, Odera (2012), Onafowora and Owoye (2014), found a negative relationship between foreign debt and exchange rate fluctuation. However, as the debate continues empirically, it was observed that methodology and estimation techniques adapted by various researchers contributed to the mixed results deduced from the existing studies. The previous studies overemphasized the nature ARDL model to measure the short-run and long run influence of regressors on regressands, however, this current study argued that inability to identify out of all the various foreign debt leads to the lingering problem of exchange rate fluctuations in developing countries. In order to contribute to the body of the literature, this current study adapts stepwise regression for identification of most effective and less effective of all foreign debt in Nigeria and its impact and relationship with the exchange rate fluctuations. Since then, the foreign debts had been increasing and amounted to N2,111.51B in 2015 and N3,478.91B in 2016. In 2018, 2019 and 2020 Nigeria's foreign debt stood at N7,759,229B, N9,022.42B and N12,705.62B. In view of this, the study aimed to find out the implication of foreign debt on the exchange rate in Nigeria. This study employed Paris Club debt, multilateral debt, London Club debt, bilateral debt and exchange rate which will cover the period of 30years ranging from 1990 to 2019. This will bridge the research gap of previous study that has lent their contribution on public foreign debt in Nigeria.

LITERATURE REVIEW

Despite the issues attached with foreign debt, its importance in government activities cannot be overemphasized. It was noted that many developing countries are faced with huge budget deficits characterized with low sources of income and persistent increase in government expenditures. Therefore, to meet the ever-increasing population's need, the government resulted into borrowing both locally and internationally. The adverse effect of using monetary policy and fiscal policy to eliminate economic problems leads to the external borrowing to provide adequate funds without causing inflationary pressure or further deteriorating the economic situation through increase in taxes. However, the use of foreign debt does not come without its resultant effect as economic scholars continually link the exchange rate depreciation to the huge foreign debt (Kouladounm,2018).

The link between foreign debt and exchange rate has long been established since the inception of macroeconomic variables assessment in developed economies. The funds made available for foreign borrowers by the lenders such as developed government and international banks or clubs categorized as foreign debt (Focus Economics, 2019). However, the loan granted by some countries like Japan and China attract a certain rate of interest and the payment must be done through the country's currency. This process requires the demand of foreign currency to make the payment and leads to the pressure of the exchange rate. This is another channel where foreign debt

influences exchange rate fluctuation. This influence is direct and easily transmitted because many of the developing economies operate a floating exchange rate regime which responds swiftly to any shocks in the system. Meanwhile, in order for the borrower's country to earn the foreign currency, there is a need to improve exports of goods and services to the various countries involved. This will equally enhance a unit of currency rate against the other foreign currency. Fosu (2010) further stated that heavy foreign debt may pose a huge disaster on the economy or expose it to greater shocks. It is noted in most developing countries like Nigeria that one of the important macroeconomic variables is exchange rate that requires closer monitoring and management (Nelasco, 2012). The mismanagement of exchange rate may positively or negatively affect the level of export, import and inflation in the economy; therefore, it becomes imperative to identify direct or indirect factors that are likely to outburst the rate of exchange rate.

In addition, Bergen (2017) in his study tries to explain the relationship between foreign debt and exchange rate. The explanation is based on the fact that though the country financed a huge project with debt my experienced high productivity in the long-run, however, the huge debt exposed the nation to fewer foreign investors. This was further explained that inflationary pressures will be encouraged by the debt because the government tends to print more money to be converted to foreign currency and paid off which threaten the rate of money supply and subsequently leading to inflation. Also, the foreign investor may be wary of a country with huge foreign debt, especially if the risk of repayment is very high, therefore, it has been established that a country's debt rating is a significant determinant of exchange rate in developing countries.

Theoretical Review

To this very end, there is still a missing theory in the economics literature that links directly external debt and the responses of exchange rate. However, there are fundamental theories that explain the importance of external and exchange rate behavior respectively. This study hinged on the idea postulated by one of the classical economists David Ricardo in 1821 called Ricardo Equivalence Theorem. The assumption of Ricardo was that the consumers are affected when the government engages in borrowing either raising funds through bonds, direct borrowing or tax increment to finance its budget deficits. Since raising funds through bonds is equally a debt, the expectation of the economic agent is that it would be repaid both by paying higher taxes now or later and the agents' responds by saving and reducing their consumption today. This means that the deficits created by the tax cuts today will be paid by the tax collected tomorrow from the economic agents. Meanwhile, fund raising or loan is referred to public debt which could be categorized into foreign or domestic debt but this study emphasized on the foreign debt. Since foreign borrowing requires prompt servicing, it is often expected to be repaid with foreign currency. Therefore, the constant demand for foreign currency in the market for the repayment tends to affect the exchange rate between the countries involved.

Empirical Review

In their study conducted in 2019, "impact of external debt and exchange rate volatility on domestic consumption in Pakistan between 1980 and 2014. Kumar, Bhutto, Mangrio and Kalhoro, adapted Cointegration and Error Correction modeling and found out that interest rate, exchange rate, its volatility and external debt have a long run and short run relationship and the error

observed in the short-run will be adjusted very quickly in the long-run. Ranging between 1975 and 2014, Kouladoum (2018) used GMM to analyze the effect of external debt on the real exchange rate in Chad. The study opined that external debt positively and significantly affects the real exchange rate at 5% significance level. Also, Muhammad and Masaru (2018) used OLS and VECM to reexamined the relationship between foreign currency borrowings and foreign exchange rate volatility. It was shown in their study that both in the long -run and short run, external debt influences exchange rate volatility. And also, government and corporate foreign debt have a significant impact on the exchange rate through OLS results.

Anidiobu and Okolie (2016) examined responsiveness of foreign exchange rate to foreign debt in Nigeria. Ordinary Least Squares method was used to estimate the variables and the result shows that the response of exchange rate to foreign debt is positive but insignificant. Also, the research carried out by Saheed, Sani and Idakwoji (2015) in Nigeria using OLS revealed that all the explanatory variables significantly influence the exchange rate. Nwanne and Eze (2015) investigated the relationship between external public debt servicing and receipt and exchange rate fluctuations in Nigeria from 1981 to 2013. The study agreed that external debt positively influenced the exchange rate while debt servicing enhanced the exchange rate negatively.

RESEARCH METHOD

This study used ex-post facto research design because it allows already computed data for the analysis. The study relied on secondary data sources and was gathered from CBN statistical bulletin for the period of 30 years between 1990 and 2019. It uses Ordinary Least Square method of estimation, computed with STATA 12. The variables considered for this study include exchange rate (dependent variable) and the explanatory variables include; Paris club debt, multilateral Debt, London Club debt and Bilateral Debt.

Model Specification

The model for the study is given below:

Mathematically,

$$Y = f(X_1, X_2, X_3, X_4, \dots, X_n) \text{ -----equ(1)}$$

Where Y denotes dependent variable and X_1, X_2, X_3 and X_4 represent explanatory variables

$$EXC = f(MLD,)$$

$$EXC = f(MLD, BLD,)$$

$$EXC = f(MLD, BLD, PCD)$$

$$EXC = f(MLD, BLD, PCD, LCD)$$

In econometric term

$$EXC = \beta_0 + \beta_1MLD + \beta_2BLD + \beta_3PCD + \beta_4LCD + \mu \text{ -----equ(2)}$$

Where:

EXC = Exchange Rate, MLD = Multilateral Debt, BLD = Bilateral Debt, PCD= Paris Club Debt

LCD = London Club Debt, β_0 = Constant term, $\beta_1 - \beta_4$ = coefficient of explanatory variables, μ = Error term.

FINDINGS AND DISCUSSION

Table 1. Descriptive Statistics

. summarize exc pcd mld bld lcd

Variable	Obs	Mean	Std. Dev.	Min	Max
exc	30	122.0576	88.85287	8.0378	306.9206
pcd	16	1443.403	1392.204	154.55	4196.84
mld	30	795.6413	1068.23	34.61	4127.28
bld	27	218.0985	304.8946	24.6	1254.26
lcd	16	114.7463	80.06903	41.89	228.95

. corr exc pcd mld bld lcd

The table 1 above shows the descriptive analysis that was conducted on the data employed for the basis of assessing the behavior of variables. The mean value shows the average figure, for instance the average figure of exchange rate for the period under review is #122, while Paris debt club has the highest figure among the various debts compiled with \$1443 compared with Multilateral debt of \$795, Bilateral with \$218 and London Club debt \$114. The next on the table is standard deviation which further explains how the deviated from the actual mean of the data or expected value. A figure of standard deviation is said to be low when it's very close to mean value and a high standard deviation means that the numbers are spread out and not close to mean value. For instance, the standard deviation of exchange rate and London club debt is low because it's relatively close to mean value while multilateral debt and bilateral debt is very high because the figures are highly deviated from the mean value.

Table 2. Correlation Matrix

(obs=16)

	exc	pcd	mld	bld	lcd
exc	1.0000				
pcd	0.9482	1.0000			
mld	0.9743	0.9404	1.0000		
bld	0.8298	0.7963	0.8929	1.0000	
lcd	0.9570	0.8861	0.9572	0.8992	1.0000

From table 2, it was revealed that there is a strong correlation which connotes a strong linear dependence among the variables employed. For instance, exchange rate strongly correlated with multilateral debt at 97%, Paris club debt at 94%, bilateral debt at 82% and London Club debt at

95%. Meanwhile, since the model was undertaken with stepwise regression, the problem of multicollinearity is limited but not completely averted.

Table 3. Unit Root Test

UNIT ROOT TEST RESULTS TABLE (ADF)					
Null Hypothesis: the variable has a unit root					
At Level					
		EXC	LCD	MLD	PCD
With Constant	t-Statistic	0.6608	-0.8123	4.9662	-1.1651
	Prob.	0.9890	0.7861	1.0000	0.6599
		n0	n0	n0	n0
With Constant & Trend	t-Statistic	-2.3898	-1.8632	3.9008	-1.8353
	Prob.	0.3764	0.6232	1.0000	0.6368
		n0	n0	n0	n0
Without Constant & Trend	t-Statistic	2.6870	0.2634	4.8415	-0.3416
	Prob.	0.9974	0.7488	1.0000	0.5447
		n0	n0	n0	n0
At First Difference					
		d(EXC)	d(LCD)	d(MLD)	d(PCD)
With Constant	t-Statistic	-3.7086	-3.0347	1.0664	-1.8556
	Prob.	0.0096	0.0559	0.9960	0.3412
		***	*	n0	n0
With Constant & Trend	t-Statistic	-3.7314	-2.9073	-0.3280	-1.2329
	Prob.	0.0366	0.1893	0.9851	0.8612
		**	n0	n0	n0
Without Constant & Trend	t-Statistic	-3.1285	-3.0069	1.7745	-1.9817
	Prob.	0.0029	0.0056	0.9786	0.0487
		***	***	n0	**

In the Table 3 above, the stationarity of the variables are determined. It was shown that at level, Exchange rate, multilateral debt, Bilateral debt, Paris club debt and London club debt are not stationary, which is an indication of the presence of unit root. However, the data were subjected to the first difference, and the result shows that Exchange rate, multilateral debt, bilateral debt, Paris club debt and London club debt are stationary and indicated that no unit root was present at first difference.

Table 4. Baseline Regression

Source	SS	df	MS			
Model	39479.0237	4	9869.75592	Number of obs =	16	
Residual	877.816249	11	79.8014772	F(4, 11) =	123.68	
				Prob > F =	0.0000	
				R-squared =	0.9782	
				Adj R-squared =	0.9703	
Total	40356.8399	15	2690.45599	Root MSE =	8.9332	

exc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
mld	.1848061	.0790479	2.34	0.039	.0108228	.3587895
bld	-.2957921	.1291611	-2.29	0.043	-.5800737	-.0115104
pcd	.0089046	.0050894	1.75	0.108	-.002297	.0201062
lcd	.2997491	.1059886	2.83	0.016	.0664697	.5330284
_cons	2.067816	5.504754	0.38	0.714	-10.04807	14.1837

The value in Table 4 reveals the baseline regression model for the analysis. The value of the intercept (dependent variable) which is 2.0678 shows that the exchange rate will increase at 2.067 units while keeping other variables constant. The coefficient of multilateral debt is 0.1848, this means that for every unit increase in multilateral debt will increase the exchange rate by 0.18 units. Also, the coefficient of bilateral debt is -0.2957 which means that for every unit increase in bilateral debt there will be the same unit decrease in exchange rate. The Paris club debt coefficient is 0.0089 which shows that for every unit increase in Paris club debt corresponding increases in exchange rate will occur. Furthermore, London club debt has a coefficient value of 0.2997 which connotes that for every unit increase in London club debt, exchange rate will also increase at the same value. The t-statistics result indicates that all independent variables have a positive relationship with the dependent except bilateral debt. Also, the probability values revealed that all independent variables multilateral debt, bilateral debt and London club debt are significant with p-value of 0.0039, 0.043, and 0.016 except for Paris club debt that revealed insignificant effect on exchange rate with P-value 0.108. Generally, the F-statistics revealed that public debt has a significant influence on the exchange rate in Nigeria.

Table 5. Stepwise Regression

	(1)	(2)	(3)	(4)	(5)
	exc	exc	exc	exc	exc
mld	0.185* (2.34)	0.0746*** (10.71)	0.159*** (6.29)	0.316** (3.92)	0.185* (2.34)
bld	-0.296* (-2.29)		-0.314** (-3.38)	-0.180 (-1.17)	-0.296* (-2.29)
pcd	0.00890 (1.75)			0.00816 (1.28)	0.00890 (1.75)
lcd	0.300* (2.83)				0.300* (2.83)
_cons	2.068 (0.38)	62.72*** (6.84)	56.84*** (6.99)	0.646 (0.09)	2.068 (0.38)
N	16	30	27	16	16

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

The result in the Table 5 above presents adequate information about each step and contribution of each variable considered in the study. It further explains if variables in the baseline regression are correctly fitted in the model. Each report shows the inferential statistics after the specified action of step by step entry was conducted. Initially, Table 4 revealed that multilateral debt has a strong impact on exchange rate and a positive relationship to influence exchange rate. The reason for the effect on exchange rate remains an issue in the literature which necessitates stepwise analysis. The stepwise analysis revealed that despite the presence of other variables in model 2, 3 and 4, multilateral debt remains a significant factor influencing exchange rate in the country. This may be attributed to the stringent condition given by the lender to repay the loan and favor personal interest. In the model 3, the presence of bilateral debt increases the degree in which multilateral debt influences exchange rate from 0.0746 units to 0.159 units. Also, it was revealed that bilateral debt shows a negative relationship in the entire model and posed significant impact except in model 4 where it shows an insignificant impact. This means that the presence of Paris Club debt changes the effect of bilateral debt on exchange rate though remains negative. The inclusion of Paris club debt in the model 4 increases the extent of multilateral debt to 0.316 while the extent in which bilateral debt reduces from -0.314 to -0.180, however, the effect of Paris club debt shows insignificant impact on exchange rate but indicates a positive relationship with exchange rate. In the model 5, the inclusion of London debt reduces the magnitude in which multilateral debt influences exchange rate from 0.316 to 0.185 but increases the bilateral debt from -0.180 to -0.296 but remains significant. It increases the Paris club debt influence but with little

Table 7. Granger Causality

. vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
exc	pcd	10.655	2	0.005
exc	mld	1.7566	2	0.415
exc	bld	17.489	2	0.000
exc	lcd	1.8189	2	0.403
exc	ALL	19.88	8	0.011
pcd	exc	8.331	2	0.016
pcd	mld	5.1585	2	0.076
pcd	bld	4.6709	2	0.097
pcd	lcd	1.5798	2	0.454
pcd	ALL	28.789	8	0.000
mld	exc	11.321	2	0.003
mld	pcd	15.667	2	0.000
mld	bld	14.982	2	0.001
mld	lcd	2.8536	2	0.240
mld	ALL	23.447	8	0.003
bld	exc	12.042	2	0.002
bld	pcd	14.855	2	0.001
bld	mld	5.1737	2	0.075
bld	lcd	3.1299	2	0.209
bld	ALL	25.363	8	0.001
lcd	exc	7.1648	2	0.028
lcd	pcd	11.561	2	0.003
lcd	mld	.68123	2	0.711
lcd	bld	19.912	2	0.000
lcd	ALL	30.232	8	0.000

From the Table 7 above, it was revealed jointly that the exchange rate has a causal relationship with Paris Club debt, bilateral debt and except multilateral debt and London debt. Also, the Paris club has a causal relationship with exchange rate only but not with multilateral debt, bilateral debt and London club debt. In addition, multilateral debt has a causal influence on exchange rate, Paris club debt, and London club debt which indicates the importance of multilateral debt in an economy. Also, bilateral debt has a direct relationship and influence on exchange rate, Paris club debt except multilateral debt and London club debt. Finally, London club debt has a direct relationship with exchange rate, Paris club debt and bilateral debt except for multilateral debt.

CONCLUSION

The study investigated the impact of public debt on the exchange rate in Nigeria for the period of 30 years between 1990 and 2019. The study considered the major debt contracted by the country in the last 30 years which are multilateral debt, bilateral debt, Paris club and London club debt as the factors contributing to the exchange rate depreciation in Nigeria. Although the influence of public debt has been established in various empirical studies, low attention was given to the debt mentioned above. The study employed different analysis from the existing studies for new evidence, and the results show in the stepwise regression adopted that multilateral debt, Paris club and London club debt are the major debt positively influencing exchange rate fluctuation while bilateral debt has a negative relationship. Also, multilateral debt, bilateral debt and London club debt have a significant impact on exchange rate compared to Paris club debt with insignificant impact on exchange rate. Various models analyzed in the study show Multilateral debt remains significant in the entire model while bilateral debt became insignificant in model 4 and Paris club debt is not significant in Model 4 and 5. The granger causality test revealed that exchange rate does not influence multilateral debt but multilateral debt influences exchange rate. Also, there is a bilateral relationship between exchange rate and bilateral debt and same goes with Paris club debt. In addition, the exchange rate does not influence London Club debt but London club debt influences exchange rate. Jointly, public debt has a significant impact on exchange rate fluctuation in Nigeria. Based on these findings, the study recommends that the government should rely more on Paris Club debt and reduce Multilateral and Bilateral debt to reduce the influence on exchange rate fluctuation. Government should maintain a favorable and controlled public external debt to reduce the exchange rate in Nigeria.

LIMITATION & FURTHER RESEARCH

The unavailability of balanced data on Paris club debt and London debt club poses a greater challenge to the analysis to be more reliable than other variables in the study. Lack of data on exchange rate variation is still a major concern despite the acceptability of real exchange rate in other existing studies. However, the study suggests inclusion of macroeconomic environment factors that will further help to understand the behavior of exchange rate and policy required to manage it favorably. A more robust analysis should be carried out on the topic for different results and authenticity of the existing studies and conclusions.

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