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External Sector Macroeconomic Indices and Real Economy of Nigeria: An Empirical Analysis (1981 – 2020)

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

In recent times, the external sector of Nigeria's economy has been characterized by instability, while the performance of her Real Economic Growth (RGDP) has remained below average. This study, therefore, investigated the relationship between her (RGDP), and some external sector macroeconomic indices, namely: Foreign Exchange Rate (FXR), Total Export (EXP). Trade Openness (TOR), Total Import (IMP), External Debt (EXTD), External Debt Service Charges, (EXDINT) and Foreign Direct Investment (FDIR), CBN is the source of the study data, spanning for a period of 1981 to 2020. The study applied Co-integration technique, Error Correction Model (ECM) and Granger Causality tests for the econometric analysis. Evidence from empirical results confirmed that, in the long run, only FDIR contributed positively to (RGDP), while the rest, had significant adverse effect on RGDP. The Granger Causality test established that only FDIR had bilateral relationship with RGDP while RGDP preceded EXP, TOR and FXR, implying that RGDP determines those variables without a feedback. EXTD, EXDINT and IMP maintained independent causal relationship. The ECM coeficient (-1.14), is significant and correctly signed (negative). It measures the speed of the adjustment, at which equilibrium is restored to RGDP, after the short-run disequilibrium in the selected indices. The implication is that RGDP growth process in Nigeria, in the long run, adjusts slowly to the changes in the selected indices, indicating a Policy lag effect. Consequently, Monetary authority should maintain efficient debt monitoring and management; effective and sustainable exchange rate management; infrastructural and technological development to beep up exportation. They should lay emphasis on stable political environment and sustainable

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economic policies to encourage more FDI. The Policy makers should make policies that would match the magnitude of the expected changes.

Keywords: External sector indices; RGDP Co-integration test; ECM and Granger causality test.

1. INTRODUCTION

In most developing economies, one of the cardinal macroeconomic objectives, is maintenance of sustainable Economic Growth and Development. Regrettably, in recent times, the overall performance of Nigeria's Real Economic Growth has remained suboptimal while her external sector has been characterized by instability. CBN [1]. Financial and economic stability is paramount for the growth of any economic system while instability can severely disrupt the growth of any economy. [2,3]. In Nigeria, there are many staggering structural imbalances, but the present and most undesirable, is the challenge posed by poor performance of her external sector and how the policy cardinal goals could be achieved to enhance RGDP [1,4]

The Nigerian economic planners have been in the fore front to stabilize the external sector in order to foster sustainable growth. In pursuit of this objective, they have initiated several economic policies, following the global trend, yet the problem still seem insurmountable [5,6].

"Nigeria's external sector is a reflection of the economic transactions between her residents and her trading partners all over the world. A surplus disposition of the sector, indicates a situation where receipts are in excess of the payments, while deficit disposition represents a situation where receipts are inadequate to accommodate the payments" [7]. An ideal external sector must be stable and in equilibrium over time, which implies that external reserves must be adequate, the external receipts and payments must be equal, and there must be a stable exchange rate. However, in most cases, it is difficult to have such a perfect system in more practical terms, [8,9].

"Economic growth could be referred to as a sustained and positive boost in the level of total goods and services produced by a country within a given period of time, and it is generally represented by Gross Domestic Product. It's benefits include: enhancing the basic needs of man to a substantial and sustainable extent; raising the general standard of living of the citizenry, as measured by per capita national income; and making income distribution easier to achieve, if well-managed. Conversely, economic stagnation can result to destabilization and hardship on the citizenry" [10].

"It is therefore necessary for economies that seek to move on the path of sustainable economic growth, to manage their economic activities efficiently and effectively. This is decisively dependent on proper knowledge of the interrelationships among the various mechanism and sectors of the economy, as well as those factors that influence their dynamics. It is also important in this regard, to identify and dismantle those binding constraints that hamper the growth of the economy. This can only be effectively addressed, if policy makers can learn from the past experience [11].

In consideration of the above background, this study is motivated to investigate, whether the selected external sector indices, have positively or negatively influenced the Nigeria's real economy, (RGDP). This is based on the Balance of Payments (BOP) account that captures the transactions on goods, services and financial flows between Nieria's domestic economy and the rest of the world.

"The problem that led to this study centers on the instability of the Nigeria's external sector and the unimpressive performance of her RGDP. In the first place, the Nigeria's economy is basically an open economy, and her international transactions with the rest of the world, constitute the greater part of her aggregate economic activity. As a result, the economic prospects and development of Nigeria, rest largely on her international interdependence.Over the years, notwithstanding the significant degree of her trade openness, her BOP has continued to record deficits and this has become a serious challenge in Nigeria since 1970s" [12,13].

Many other reasons have been advanced for the sluggish performance of her economic growth, which include: negligence of her non-oil export due to increasing oil price in the international market; persistent high demand for foreign goods and services in addition to increased importation

of capital input for manufacturing sector, all in the face of dwindling foreign exchange earnings, external debt overhang in addition to its attendant increasing debt interest charges, decline in fresh equity participation in Nigerian enterprises, among others.

"For instance, negligence of agricultural produce which accounted for over 80 per cent export income on average in early 1960s, has been on the increase with oil revenue representing almost 90 per cent of foreign exchange earnings and about 85 per cent of total exports. This was attributed to the oil-boom, resulting from the Arab oil embargo on the USA in 1973 among others [1]. World Bank [14] Despite the steady growth in value of agricultural export between 2016 and 2018, the country's agricultural exports remain below 2 percent of GDP.

Furthermore between 2012 and 2017, the Nigeria's exports income, decreased at an annualized rate of USS122 billion to USS46.8 billion respectively. As at the end of 2020, the value of import stood at N19,898.0 billion while total exports was valued at N12,522.7 billion, , thereby creating a trade imbalance. "Consequently, while the boom afforded the government much needed revenue, it also created a serious structural imbalance" [15]. There is therefore, need to investigate the impact of external sector on the real economy of Nigeria .

Similarly, Nigeria as a developing nation has been an import-dependent economy. (16]. The import structure has been unimpressive. For instance, import bills, which averaged US$5.9 billion between 1986 and 1998, rose significantly from 8,817.5 to 9,562.7 billions between 2016 and 2017, giving a percentage increase of 8.5 [17]. As at 2020 ending, goods valued at a total of 55 billion U.S. dollars were imported into Nigeria and the top imports of Nigeria were refined petroleum at 10 billion US dollars, CBN [18].

"Furthermore, in 1980s, the external sector which was under pressure, was as a result of the external debt overhang. Other factors include, the decline in foreign receipts, and difficulties in meeting its scheduled external debt service obligations. Prior to the Paris and the London Club of Creditors debt exit, external debt stock stood at US$35.9 billion in 2004" [19] and it later started rising again after the exit [17]. As at December, 31st 2020, the external debt stock was US$4 .billion, and 36.60 per cent of her Public debt which stood at N32. 71 trillion, was external [6]. The adverse cumulative effect was a sharp rise in the cost of servicing the external debts and the improper direction of the external loans to non-productive sector of the economy [6].

"Likewise, the reduction in Foreign Direct Investment (FDI) inflow resulted to the decline in fresh equity participation in Nigerian enterprises, Consequently, the main source of inflow was from unremitted profits" [17,20]. The inability to sustain the inflows of FDI has presumably given rise to stunted growth [21]. As at December ending 2020, the value of FDI stood at US$3.45 billion while its percentage of GDP was 0.6.

In the same vain, exchange rate was unstable and there was an implicit belief by stakeholders that this was a major contributor to the stunted RGDP. The rate has been depreciating persistently. According to CBN 2013 [22,23], the official exchange rate moved from a low level of 0.54/ US $ 1.00 in 1980 to a height of N394.9161 / US $1.00.

.Finally, there is also controversy among economic scholars and practitioners over the nature of relationship (negative or positive) between external sector macroeconomic indicators and RGDP in Nigeria.. Even where such relationship exists, the issue of the direction of their causal relationship has spurred up much debate with divergent outcome.. Studies like (Nwanze [24] (Udeaja and Obi [25], (Ayodele, [26], (Julen, Berasaluce and Jose [27], and Mukamil and Rizwan [28] are examples.

Regrettably, past analysis of external sector developments in developing economies like Nigeria, had been extreemly devoid of in-depth pragmatic econometric analysis [29], The constraints facing the external sector could be loosely addressed by applying reliable qualitative information and appropriate policy but well-articulated econometric analysis of the nature of this study, would provide a stronger basis for solving the problem of the sector.

For instance, most reviewed studies made no serious attempts to apply unit root test to reduce misleading results. Studies like Ajayi and Oke [30], Obadan [31], Konya [32], Ayodele, [33] did not apply unit root test. "Estimation of non-stationary time series on another, are subject to accidental or induced auto-serial correlation. This

can give rise to spurious regression but Unit root test could form the strategy of reducing the risk of spurious regression" [34].

Likewise,, Konya [35] and Awokuse [36], applied cross country analysis which does not take into consideration, country's specifics.. " Result from such analysis is plagued by multiplicity of parameter heterogeneity, omitted variables, model uncertainty and measurement error" [37]. Inference based on such results, leads to potential biases. Blonigen and Wang [38] are also of the opinion that pooling rich and poor countries together without distinguishing between their level of development, leads to incorrect conclusions.

Consequently, based on the above gaps and challenges, there is need to have an in-depth reexamination of these problems, by updating the number of observations of the study to 2020, applying Nigerian time series and some realistic econometric techniques (unit root test, co-integration, error correction model, and Granger Causality test), to see if a more authentic result could be achieved for effective policy planning.

The general objective of this study is therefore, to establish the effect of external sector on Nigeria's RGDP while the specific objectives are to investigate the collective and individual effect of the selected external sector macroeconomic indices, (as listed below) on the Nigeria's RGDP.

To achieve these objectives, the hypothesis are stated below:

i. There is no long run relationship between the growth of Nigeria's real economy proxies by (RGDP) and some selected external sector macroeconomic indices namely: Foreign exchange rate, External Debt, External debt Interest charges, Total Export, Total Import, Foreign Direct Investment and Trade openness .

ii. There is no direction of causal relationship between RGDP and the above selected external sector macroeconomic indicators.

2. REVIEW OF RELATED LITERATURE

The concepts of external sector and economic growth have been defined in various ways by different scholars of economics. However from the various definitions, attempt could be made to explain how external sector indices influence economic growth. This chapter therefore covers the related literature under the conceptual, theoretical and empirical studies.

2.1 CONCEPTUAL FRAMEWORK

2.1.1 External Sector

The external sector encapsulates a country's economic transaction or activities with other countries of the world (trading partners). Maurice [39] defines the external sector as that sector of an economy of a country that interacts with the economies of other countries in services and goods market. The external sector involves exports and imports and in the financial market, it involves capital flows. According to Nwanze (40] it measures the economic transactions between the residents of an economy and the rest of the world. The economic features related to external sector include: BOP, current Account, capital account, external debt, exchange rate, foreign exchange reserves, external investment position and others.

An ideal external sector could only be achieved when it is stable and in equilibrium over time. Equilibrium is achieved when external receipts and payments are equal, the exchange rate is stable and external reserves are adequate, but such ideal system is difficult to get in more practical terms, Ephraim Clerk (41] and Maurice [42].

The external sector affects the various sectors of the real economy through the linkages of the various current account components in BOP as well as its contributions to net foreign assets [43].

2.2 Overview of Nigeria's External Sector

Nigeria's external sector since the 1970's has been dominated by crude oil exports. Prior to the 1970's, the major non-oil exports were palm-oil, rubber, timber, cocoa, tin, columbite and groundnut etc. Similarly, the import structure had not shown any significant positive change over the years, as capital goods and raw materials remained the bulk of total imports. World Bank [44] and Mordi et al [45]. The external sector has been experiencing shock as a result of continued crash in the international prices of crude oil in 2015 among other factors which include subsequent low inflow of foreign exchange

earnings. These have impacted adversely on the external account. The negative outcome in the foreign exchange earnings account was further affected by other challenges in the global economy which resulted from the slowdown in the Chinese economy and the effects of all the normalization of monetary policy in the United States in 2008. Consequently, external sector recorded an overall BOP deficit of - 1,150.13 billion in 2015, which is equivalent of 1.4 per cent of GDP, compared with 1,329.32 billion or 1.7 percent of GDP in 2014. As at December 2020, the overall BOP position remained in deficit of minus 16.975 billion US Dollars.

The Nigeria's Current account balance data which was 2.714 USD billion in December, 2016, made a marginal increase of 2.72% of GDP or 10.381 USD billion as at December, 2017.. According to CBN [46] the deficit in current account persisted, giving a balance of (-17. 0) and -15.8 billion US Dollars in 2019 and 2020 respectively.

The financial sub-account which consists of portfolio and direct investments, other long and short-term capital and capital transfers, had an inflow of direct investment of N128 million in 1970, (only 2.47% of GDP), and thereafter , declined sharply to N404.1 million in 1980, giving rise to minus 0.81% of GDP. This, contributed to the mounting pressures on the capital account and ultimately on RGDP. The reduction in Foreign Direct Investment inflow was as a result of the decline in fresh equity participation in Nigerian enterprises. The value of FDI as at 2018, 2019 and 2020 stood at US$0.78 billion, US$2.31 and US$2;4 respectively while FDI as percentage of GDP was only 0.6 as at December ending 2020, [36], implying poor contribution.

The delisting of the FGN Bonds from the JP Morgan GB-Emerging market index, short term capital reversal and the effect of the US monetary policy normalization, heightened foreign exchange pressure which resulted to 17.4% depletion of external reserves to US$28.28 billion in 2015 [16]. The external reserve level as at September, ending 2020, was $35.96 billion, and this could only finance 6.9 months of goods and services of import. As at 31st December, 2020, the Nigeria's external reserve which commenced the year 2020 with $38..53 billion in 2019 ending, dropped to $35.37 billion [16]. This must have also contributed to the sluggish growth of the RGDP.

2.2.1 Economic Growth

Economic growth could be referred to as a sustained and positive change in the level of aggregate goods and services produced by a country over a certain and a given period of time. When economic growth is measured over the population of a given country, it can be stated in terms of per capita income, according to the aggregate goods and services produced in a given year which is divided by the population of the country within that given period. It can also be stated in nominal or in real terms. Based on this, when the increase in the aggregate level of goods and services is deflated by the rate of inflation, real economic growth is achieved, but when it is measured without deflating, it is referred to as nominal economic growth [47,48]. Economic growth is a key policy objective of any government and monetary policy is a major instrument for attainment of such objective. Maurice [49].

However, understanding the concept of economic growth and its measurements in real terms. has not been quite easy. Some economic authors have tried to differentiate between Economic Growth and the term "Economic Development" in different ways. Todaro [50] and Baran [51] are of the view that mere positive boost in the aggregate level of goods and services, produced within an economy, expresses nothing about the quality of life of a citizenry within the economy, when threats of chronic and deadly diseases, abysmal lop-sided distribution of aggregate income, environmental degradation, global pollution, and absence of freedom and justice, are taken into consideration. These authors believe that more emphasis should be laid, not merely on increase in aggregate output and income, but also on the total quality and standard of living of the populace.

Apparently economic growth is seen as a boost in the aggregate level of output within a given time period in a country while economic development is seen as an increase in the aggregate level of output and income, with due consideration given to the quality of life that hopefully takes into consideration those factors that enhance the quality of life of citizenry within the economy. Todaro [50].

By implication, economic development is therefore a process by which an economy experiences three main phenomena namely:

growth in output, institutional changes and structural changes. If these three phenomena take place, it will lead to a rise in standard of living of the populace. This is why some economies could enjoy RGDP but not all experience development. It is pertinent that economic growth should go with development for it to be effectively and practically experienced [52,53].

2.3 Theoretical Framework

2.3.1 Economic Growth

The theoretical aspect of economic growth in the long run, is rooted in two main theories that are related to possible sources of growth. These include: the growth theory and the growth accounting theory. Growth theory refers to the theoretical modeling of the interactions among growth of factor supplies, savings and capital formation, while growth accounting explains the qualification of the contributions of different determinants of growth [54].

Three waves of interest have currently emerged in studying growth. The first wave is the linear-stages growth theory which is associated mainly with the work of Sir F. Harrods and E. Domar in what was termed the "Harrods–Domar Model" and that of Walt W Rostow's theory. Generally, the linear stages theory supports the view that economic growth could be achieved through industrialization. The Harrods-Domar theory presumes that growth depended on a country's savings rate, capital/output ratio, and capital depreciation. This theory has been criticized for three reasons. Firstly, it centers on the assumption of erogeneity for all key parameters. Secondly, it ignores technical change, and lastly, it does not allow for diminishing returns when one factor expands, relative to another [55].

The second is the neoclassical (Solow) model, which reflects the thinking that growth encapsulates technical progress and key inputs, (labour and capital). This school of thought is concerned with the efficient and cost effective allocation of resources and with optimal growth of those resources over time. This school holds that countries could develop economically, without government intervention, through the markets and that private markets, which are critical for development The model allowed for diminishing returns, perfect competition but not externalities. The major problem associated with this neoclassical thinking is that it hardly explains the sources of technical change, Uwakaeme [56].

The third is the newer endogenous growth theory, which captures a diverse body of theoretical and empirical work that emerged in the 1980s. It differentiates itself from the neoclassical growth model by emphasizing that economic growth was an outcome of an economic system, and not the outcome of forces that impinged from outside. Its central idea is that the effort to economize, accumulate knowledge and capital, were the proximate causes of economic growth. The newer theory emphasizes that government should provide key intermediate inputs, establishes rules, and reduces uncertainly, by creating conducive macroeconomic environment for growth. It also traces growth of output per capita to two main sources namely: savings and efficiency, which implies that it is not only factor accumulation that drives growth but also efforts to utilize them effectively. Therefore, anything that increases efficiency and savings is good for growth [53].

Generally, the theories discussed above have not explained why there are divergent growth trajectory among countries. However, the newer growth theory, unlike others, seem to fit into the real world based on its attributes which includes: indigenizing the rate of technological progress, stressing that the growth rate of output per capita is traceable to two main sources – savings and efficiency and that government policy measures can have an impact on the long-run growth rate of an economy. This implies that countries with high level of efficiency, appropriate economic system, sound economic policy, are expected to grow more rapidly than others [57-59].

2.3.2 External Sector

The major theories relating to external sector are discussed under BOP, Open Economy , Foreign Balance Framework and Mundell-Fleming theory.

- **The Balance of Payments (BOP) Theory**

According to Jhingan, [8] and Thirlwall, [55], the BOP theory states that BOP position determines the value of a country's currency or exchange rate in a floating exchange rate regime. If the BOP is favourable, exchange rate appreciates and when it is unfavourable, exchange rate depreciates. Moreover, the adjustment in exchange rate occurs through the forces of

demand and supply of foreign exchange. Unfavourable BOP occurs when the demand for foreign exchange exceeds its supply, thereby putting pressure on the foreign exchange market, and ultimately depreciating the value of domestic currency relative to a foreign currency [48,50].

In an adverse BOP situation, if exchange rate is below the equilibrium exchange rate, export of goods and service increases and equilibrium will be restored. On the other hand, if exchange rate is above equilibrium rate in a favourable BOP situation, exports decline to restore equilibrium in the BOP. The theory outlines some key factors that determine the shape of the demand and supply of foreign exchange to include the domestic elasticity of demand for imports, and the elasticity of supply for imports. It, however, added that factors that influence demand and supply of foreign exchange are independent of the exchange rate. Jhingan (8].

- **Open Economy Theory**

According to Jhingan, [8] an open economy is one that interacts freely with other economies round the world. It is where, not only domestic factors, but also entities in other countries, engage in trade of products (goods and services). External sector modeling starts with a simple open economy model, where total spending in the domestic economy is divided into domestic and foreign components. This can be represented as shown below:

$$Y = (C - C^*) + (I - I^*) + (G - G^*) + EXP \quad (2.1)$$

where C is domestic consumption of goods and services. C* is consumption of foreign goods and services, while I is domestic investment in goods and service and I* is investment in foreign goods and services. G and G* are government purchases of domestic and foreign goods and services, respectively. EXP is exports of domestic goods and services. Interaction between EXP and IMP reflect the external sector performance, if EXP exceeds IMP, external sector is said to be in surplus, but where the reverse holds, external sector is said to be in deficit.

2.3.3 Theory of Foreign Balance

According to Matlanyane [42], the foreign balance framework is built on the assumption that the economy is open and too small to influence the prices of goods and services as well as interest rate in the global market. The framework further assumes all trade-partner countries as the rest of the world. The mode of exchange between domestic economy and the rest of the world is the real exchange rate and is computed as $eP_f IP_d$, where e stands for nominal exchange rate, Pr represents the foreign price level and P_d is the domestic price level. The relationship between exports and the real exchange rate is assumed to be positive i.e. when real exchange rate goes up or depreciates, domestically produced goods become cheaper and attractive to foreigners, thereby increasing domestic exports.

However, a rise in exchange rate (depreciation) makes import more expensive, while home goods become more attractive to domestic residents, thereby reducing imports. On the other hand, a rise in the domestic income increases the demand for imports under the assumption that the imports are normal goods with positive income elasticity of demand [29].

2.4 Related Empirical Review

The related empirical studies reviewed used different countries (both developed and developing), methodologies and variables and and as such there were divergent results.

Edoumiekumo and Opukri [19] investigated determinants of economic growth factors in Nigeria taking into consideration the role of trade openness among others. They applied Nigeria's annual time series data The result established positive long run relationship between growth and trade openness.

Nwanze [46] in his study on external sector variables and macroeconomic stability in Nigeria, established that the effect of external debt stock is positive but non-significant on economic growth. The result also confirms the general weakness of other indices (exchange rate, import etc) in driving economic activities in Nigeria and also highlights the adverse effect of misappropriated foreign loan.

Mukamil and Rizwan [44] examined the external sector and economic growth of Pakistan. The study revealed that financial integration (globalization) has positive while trade openness has negative impact on Pakistan economic growth.

Kamik and. Femandes [33] constructed a macro-econometric model for United Arab Emirate, (a country that has similar features with Nigeria, being oil-producing and an oil-dependent economy), to capture the impact of the external sector indices namely: investment income, nominal exports, nominal imports, and two identities, on the four sectors of the economy (output, government, monetary and external),. The results indicated that the oil sector had a positive and significant multiplier impact with the indices.

Amini, Oushehi, Ahranjani and Aminii [5] examined the effect of trade liberalization on BOP and economic growth in Iran. They tested for trade balance, internal income, foreign income, real exchange rate, and trade openness. Their results showed that the effects of trade openness on the trade balance and economic growth is positive and significant in the long run, but its effects on the current account of BOP are not significant.

Ajayi and Oke [2] investigated the effect of external debt burden on the economic growth and development of Nigeria, using the OLS. They found that external debt burden has an adverse effect on the growth of the economy.

Konya [37] investigated export-led growth and growth-driven export by testing for Granger causality relationship between real export and real GDP in OECD countries with annual data between (1960 - 1997) and finds a mix result in their causal relationships.

Julen Berasaluce and Jose [32] in their research titled “Economic growth and External sector: Evidence from Korea, and lesson for Mexico” using quarterly data and applied Granger causality test. They concluded that export and FDI are not driving growth in Korea.

Awokuse [6], using, panel data and time series for three transition economies, investigated the impact of total trade, export and import on the output growth of Bulgaria, Czech Republic and Poland. The findings provides positive and significant support to import as an engine of output growth thereby nullifying the singular support of many previous studies that concluded that export was the driver of growth with exclusion of import.

Adelowokan and Maku [3] investigated the relationship between non-oil trade and economic growth in Nigeria between 1975 and 2013, with emphasis on aggregate trade, export and import. The result revealed that non-oil export has positive impact on GDP in the short run while aggregate trade , export and import have negative and significant relationship with GDP in the long r.

In summary, the related literature survey, suggests that efficient and effective management of external sector will enhance the growth of RGPD within an economy, provided RGDP is “endogenous”. This implies that growth must respond to economic forces and policies. An economic system, such as central planning, is likely bound to stifle economic efficiency and growth while a mixed market economy (openness to trade) increases productivity, Secondly, past empirical studies, using different methods and variables, have been employed to investigate the external sector effect on GDP and they came up with divergent results. The variations in methodology and variables reflect structure of individual economy and therefore, account for the differing results . However this study, using standard econometric analysis and Nigerian time series, has contributed to the knowledge that in Nigeria, the external sector indices used for this study are not efficiently and effectively managed, especially exchange rate, external debt and its interest charges. The persistent exchange rate depreciation and volatility has adversely affected the long term investment decisions of productive sectors while misappropriation of external debt and its mounting interest charges, has brought hardship and abject poverty to the citizenry, hence the suboptimal performance of her RGDP.

3. METHODOLOGICAL FRAMEWORK

This section highlights the various methods adopted in organizing this study. The study made use of reliable secondary data sourced from CBN Statistical Bulletin 2020 and other CBN publications, spanning from 1981 to 2020 and World Bank Journals.

3.1 Model Specification

In specifying the effect of some selected external sector indices on Nigeria’s RGDP, it is expected that increase in financial resources through trade and external debt will increase RGDP, in accordance with endogenous growth theory [51,52]. Exchange rate devaluation or depreciation, theoretically, is expected to induce

higher import prices, while over valuation/appreciation, is expected to increase exportation, [46-50].

Theoretically, FDI which represents the exposure of the domestic economy to the external sector is expected to give positive impact through its capital inflow and exchange of technology etc, High external debt over hang and its attendant service interest charges and high import bills, will lead to depletion of external reserves and ultimately, suboptimal RGDP [17].

Leaning on modified open economy theory Jhingan, [8] and the Endogenous growth theory, [53], the linear model could be specified in functional and mathematical forms, respectively, as stated below: applying natural-log to make the calculation less tedious

$$RGDP = f(EXTD, EXP, IMP, FXR, FDIR, EXDINT, TOR \mu) \quad (3.1)$$

$$\ln RGDP_t = \beta 0 - \beta 1 \ln EXTD_t + \beta 2 \ln EXP_t - \beta 3 \ln IMP_t + \beta 4 FXR_t + \beta 5 \ln FDIR_t - \beta 6 EXDINT + \beta 7 TOR_t + \mu t \quad (3.2)$$

Where:

RGDP = Real Economic growth
EXTD = External Debt
EXP. = Total Export
IMP = Total Import
FXR = Nominal Foreign Exchange Rate
FDIR = Foreign Direct Investment (as percentage of RGPD)
EXDINT = External Debt Service Interest charges.
TOR = Trade Openness (ratio of Export + Import to GDP)
ut = Error term

Theoretical priori expectations are as below:

β1, β3, and β6, < 0; β2, β5, and β7 > 0; and β4 < 0 or > 0;

The above long-run linear equation 3.1 indicates that the real economy of Nigeria, proxies by (RGDP), is a function of external sector selected macroeconomic indicators which are also independent variables while RGDP is the dependent variable,. This could be estimated using equation 3.2. 't' stands for time dependent, μt stands for unobserved component variables in the model , reffered to"white noise" or error term.

3.2 Estimation Technique and Procedure

The study applied OLS regression at the first stage to test for long run relationship between RGDP and the selected external sector indices. However, based on the outcome of the estimation, there was possibility that the variables used for the study might be non-stationary. As a result, Augmented Dickey Fuller (ADF) [18] unit root test was applied to check the stationary characteristics of the variables Non-stationary time series, when included in a model, often give rise to spurious regression.

The objective of Unit root test is to establish if the selected time series have a stationary trend, and, if non-stationary, the selected time series are 'differenced' in order to make them stationary and also show the order of their integration. A time series is stationary if its means, variance and auto-variance are not time- dependent. (Gujarati and Porters [28] .It is assumed that the selected time series used for this research are non-stationary. The process could be represented in a mathematical form as stated below:

$$\Delta\lambda t = \omega o + \omega 1 t + \alpha \lambda t\text{-}1 + \ldots \sum_{i=1}^{m} \acute{a}i \, \Delta\lambda t - I \, \xi t \quad (3.3)$$

where λ stands for each single time series used, namely: EXTD, FDIR, EXP, IMP, FXR, EXDINT, and TOR, which are tested individually and 'ω' is the parameter coefficient, ' ξt' is a pure white noise error term. 'άi 'and 'α' are coefficients of the lag terms and ' m' is the length of the lag term which is automatically selected using Akaike information criteria. If 'α' is 0, then there is unit root, but if it is less than zero (negative), the null hypothesis is rejected and the alternative is accepted, implying that the time series are stationary.

Johansen co-integration test was applied after the unit root test. This is based on the possibility that the selected time series in their behavior, trend together towards a stable long run equilibrium relationship and are also, of the same order of integration. The objective of this test is to determine if there is a long-run equilibrium relationships among the selected time series used in this research. The concept of co-integration establishes a linkage between integrated process and the steady state of equilibrium among the variables used for the study [20]. Co-integration occurs when two or more time series variables which themselves

may be non-stationary, drift together at roughly the same time, indicating that the linear combination of the variables is stationary. The null hypothesis of the study is that the variables have no long run relationship.

The process can be mathematically specified using the full information maximum likelihood equation of vector autoregressive (VAR) as stated below: [32],

$$Z_t = a_1 Z_{t-1} + ...+ b_k Z_{t-k}+cx_t + \mu_t \quad (3.4)$$

where:
Zt is a k-vector of 'differenced' stationary time series, 'k' being the lag length for the first order differenced variables, 'xt' is a vector of deterministic variables, 'b' is a constant, c is the coefficient of the deterministic variables and μ_t is a vector of innovations or error term and it is known as the 'adjustment parameters' in the vector ECM while "t" indicates time -dependent.

The equation could be estimated in an unrestricted form and then tested whether the restriction implied by the residual rank of the co-integration could be rejected. The number of co-integration equations could be established by applying the maximal non-zero eigen-values and the trace test of the maximum likelihood ratio, in addition to the level of significance. The number of co-integration equations existing determine the long run relationships.

The next stage of the procedure is application of ECM. Basd on the fact that co-integration process ignores the short run dynamics that might cause a relation not to hold in the short run, the ECM was applied. ECMi is an extension of the partial adjustment model in Co-integration technique and it is the traditional approach to modeling of short run dynamics with long run equilibrium. ECM preserves the long run relationship while specifying the process in a short run dynamic way. Granger and Newbold [26] and Engel and Granger [20] in their studies established that a co-integration is a sufficient condition to run an ECM process.

An ECM is a restricted VAR, that has co-integration restriction built into the specification to enable it accommodate non-stationary error correction term, since the deviation from the long equilibrium is corrected gradually through series of partial short-adjustment, Gujarat and Porters [28].

ECM process usually starts with general–to-specific modeling (using various information criteria (Akaike, Schwarz, log likelihood, etc) which minimizes the possibility of estimating relationship while retaining long-run information. This is followed by searching for parsimony in this dynamic model, if the variables do not have the same order of integration, (Engel and Granger [20]. The functional form of the model, which initially is presented in a general form, incorporating many lag terms, is therefore reduced to a specific or parsimonious structure, by empirical testing and elimination which gives the final and more precise result of the estimation. The model specification is then re-parameterized in a dynamic process and OLS regression is finally applied to the model. The process could be specified mathematically as stated below:

$$\ln RGDP_t = b_0 + \sum_{i=-1} a_i \ln RGDPt\text{-}1 + \sum_{i=0} b_i Xt\text{-}1 + aiecmt\text{-}1 + \mu \quad (3.5)$$

Where:

a_0 is a constant, $\ln RGDP_t$ is a vector of endogenous variable and dependent variable, representing the Nigeria's real economy; Xt-1 is lag term of a vector of the selected independent variables as already explained and 'b' is the parameter coefficients, lnRGDPt-1 is the lag term of the dependent variable, the ecmt-1 or ECM term is the residuals from the long-run co-integration process. The ECM coefficient measures the speed of the adjustment of the disequilibrium arising from the short run changes in the selected independent variables, while μ_l is the unobservable error term.

"IF the co-integrating vector of ECM ecm_{t-1} is stationary and well- defined, (negative), the ECM estimation will then confirm the earlier conclusion in co-integration process that the there are long run relationships among the selected time series. The above equations 3, 3 represents the maintained hypotheses for the ECM specification I most cases, insignificant or redundant variables are usually omitted at the parsimonious stage. The last stage is the diagnostic tests which are applied to validate the results of the models" [20].

"The Granger causality test is another additional analysis that was applied. The objective is to determine if it is RGDP or external sector macroeconomic variables are significant in either enhancing or deteriorating the rate of each other in Nigeria. Correlation analysis deals with dependence of one variable on the other, but it does not imply causation in the real sense" [60]. "A statistical relationship in itself cannot logically

imply causation". [36]. Consequently, the Granger Causality test [27] "which measures both causation and direction, was performed on the variables".

The test also helps to determine whether lagged information on RGDP as well as that of the selected external sector indicators, have any statistical significant role in explaining the effect of external sector variables on Nigeria's RGDP. The test was run with an optimal lag of two.

According to Granger, [27], variable 'A' Granger causes variable 'B' if the past values of 'A' can be used to predict B'' more accurately than simply using the past values of A. The test is carried out by estimating a pair of regression as expressed below using FXR (independent variable) and RGDP (dependent variable) as example:

$$RGDPt = ao + \sum_{i=1}^{n} \acute{a}iFXRt\text{-}i + \sum_{j=1}^{n} \beta jlnRGDPt\text{–}j + \mu t_1 \quad (3.6)$$

$$FXR_t = bo + \sum_{i=1}^{n} \phi iRGDP.t - i + \sum_{j=1}^{n} \varphi jFXRt\text{–}j + \mu t_2 \quad (3.7)$$

Equation 3.6 indicates that current RGDP is related to a number of foreign exchange lags (FXRt–i) or past values of FXR as well as its own past values (RGDPt–j) where ά and β are their coefficients, i and j indicate length of time lags while μt1 is the error term and n is the number of lag terms included. RGDPt is the current value of real GDP of Nigeria.. It is assumed that the error terms μt1 and μt2 are uncorrelated. The F-statistic test is used for the joint test of hypothesis.

In like manner, equation (3.7) postulates that current foreign exchange rate (FXRt) is related to a number of RGDP lags ((RGDPt–i) or past values of RGDP as well as its own past values FXRt–j, where n is the number of lag terms. The same process applies to each selected parameter used in the study. Bilateral, unilateral and dependent relationship can be determined based on the outcome.

"Bilateral causal relation is established when both null hypotheses are rejected. There is usually a feed-back. Unilateral causal relation is established when one of the null hypotheses is accepted and the other rejected.. Lastly, independent causal relation is established when both null hypotheses are accepted" [28].

4. DATA PRESENTATION AND DISCUSSION OF FINDINGS

The data, the empirical results and discussions on the relevant findings of this study are presented in this section

4.1 Level Series OLS Estimation Result

LnRGDP = f(lnEXTD, lnEXP, lnIMP, FXR, FDIR, EXDINT. TOR)

Table 1. The Ordinary Least Square (OLS) level series

Dependent Variable: lnRGDP				
Method: Least Squares				
Date: 10/12/2021 Time: 08:05				
Sample(adjusted): 1981 2020				
Included observations: 40 after adjusting endpoints				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LnEXTD	-0.079865	0.020213	-3.95117	0.0005*
FDIR	0.089915	0.023241	3.868809	0.0010*
lnEXDINT	-0.208069	0.128492	-1.619314	0.1729
FXR	0.246828	0.091031	2.711508	0.0081*
LnIMP	-0.729104	0.254512	-2,864713	0.0072*
LnEXP	0.206251	0.147961	1.393955	0.1672
TOR	0.029183	0.029183	1.119785	0.1685
C	10.68752	0.382888	27.91293	0.0000
R-squared	0.862649	Mean dependent var		13.91639
Adjusted R-squared	0 76198	S.D. dependent var		2.180303
S.E. of regression	0.215755	Akaike info criterion		0.000554
Sum squared resid	0.898474	Schwarz criterion		0.376728
Log likelihood	7.892213	F-statistic		325.0974
Durbin-Watson stat	1.207724	Prob(F-statistic)		0.000000

Source: E-View Econometric Computer Software Application, Version 6

The OLS level series estimation is presented on Table 1 above. The coefficient of determination (R-squared) shows that 86% of the variations in RGDP are determined by the combined effect of changes in the independent variables. The F-statistics (325.097) confirms further that the selected independent variables are jointly and statistically important in explaining the changes in the RGDP process.

However, the diagnostics tests suggests possible spurious regression as indicated by low DW-statistics ratio of 1.20 and very high R-squared (0.86) which implies that the variables might be non-stationary at OLS level. Therefore, ADF (1981) unit root test was applied to confirm the state of the selected time series if they are stationary or not.

4.2 Analysis of the Unit Root Test Result

"The ADF (1981) unit root test was applied separately on all the variables at ordinary and first order levels of differencing, The summary of the unit root test results as presented on Table 2 above shows that the null hypothesis that the time series are not stationary at level, is accepted. This means that it could only be rejected after the first order /(1) differencing, indicating that the time series are stationary after the first order difference. stationary , at one and 5 per cent levels of significance. This is established through the ADF test result at the ordinary level, which shows that the computed negative ADF test statistics for each variable is less than the Mackinnon critical values in absolute term" [40],

Table 2. Summary of Unit Root Test Result Data Presentation

Variable	At Level		First Order Difference		Remarks
	ADF Test Stat	Order of Integration	ADF Test Stat	Order of Integration	
ln(RGDP	-1.777079	-	-5.900245	/ (1)	**
Ln (EXP)	-2.187727	-	-3.226134	/ (1)	***
ln(IMP)	-2.551152	-	-3.378214	/ (1)	**
(FXR)	-1.336187	-	-3.614013	/ (1)	**
ln (EXTD)	-2.223512	-	--6.966965	/ (1)	***
ln(EXDINT)	-2.259884	-	-5.900245	/ (1)	***
(FDIR)	-1.921806	-	-4.205172	/ (1)	***
(TOR)	-1.985359	_ -	-4.205172	/ (1)	***
	Critical Value:		Critical Value:		
Note:	1% = -3.6852		1% = -3.6959		
	5% = -2.9705		5% = -2.9750		
	10% = -2.6242		10% = -2.6265		

** = 10% level of Significance; ** = 5 % level of significance; *** = 1 % level of significance*
Source: E-View Econometric Computer Software application, Version 6 (See Appendix 3)

Table 3. Summary of Johansen Co-integration Data Presentation

Included observations: 40
Test Assumption: linear deterministic Trend in the data
Series: LnRGDP, FDIR ,FXR, lnIMP, lnEXP, , lnEXTD, lnEXDINT. TOR.
Lags interval: 1 to 1

Eigen- Value	Likelihood Ratio	5% Critical value	1% Critical value	Hypothesized No of CE (s)
0.948131	300.8006	124.42	133.61	None**
0.907041	203.2012	94.21	103.20	At most 1**
0.884455	189.5467	68.52	76.65	At most 2**
0.802773	131.0535	47.19	54.48	At most 3**
0.764715	44.09189	29.57	35.57	At most 4**
0.201013	12.02115	15.42	20.13	At most 5
0.151012	10.01305	12.34	15.12	At most 6
0.012397	0.424067	3.68	6.64	At most 7

**(**) denotes rejection of the hypothesis at 5%(1%) significance level*
L.R. test indicates five (5) co-integrating equation(s) at 5% significance level
Source: E-View Econometric Computer Software application, Version 6

The result of the unit root test, which confirmed that all the variables are 'difference' stationary at first order /(1) level, prompted application of co-integration test using the Johansen (1991) [32] method. The co-integration result as presented on Table 3 shows that there are five (5) co-integration relations at both one and 5% significant level, confirming long run relationship among the selected time series.. This implies that the test statistics rejected the null hypothesis that the variables are not co-integrated and accepted the alternative that they have long relationships.

The ECM parsimonious result, which is presented in Table 4 above, is the final stage of the search for both short and long run relationship between the Nigeria's RGDP and the selected external sector indicators. It gives a more precise and reliable estimation result when compared with the OLS level series result. The coefficient of determination, (R^2) which measures the overall goodness of fit is significantly high, and implies that 78% of variation in RGDP is collectively determined by the changes in the selected external sector indices. The F- statistics ratio of 15.7, with its significant probability, shows that the selected external sector indicators are in aggregate, relevant in explaining the changes in RGDP growth in Nigeria. The increase in Durbin-Watson statistics ratio from 1.207 to 2.318 is an indication that the unit root test has effectively screened the selected time series to become stationary and it also strongly suggests absence of auto- correlation, thereby reducing the chances of spurious regression.

The variables are correctly signed according to the priori expectation except export with non-significant inverse relationship, indicating non-significant adverse impact with RGDP.

Table 4. Summary of Parsimonious Error Correction (ECM) Model

Dependent Variable: Dln (RGDP)
Method: Least Squares
Date: 10/12/2021 Time: 12.:48
Sample (adjusted): 1982 2020
Included observation: 39 (after adjusting endpoints)

Variable	Coefficie	Std. Error	t-Statistic	Prob.
C	2.010053	0.299062	-6.721191	0.0001
Dln(GDP(-1))	0.965136	0.624621	1.545155	0.1352
Dln(GDP(-2))	1.572072	0.386204	4.070576	0.0005*
Dln(TOR-2))	1.244033	1.358973	0.915422	0.3611
Dln(EXTD(-2))	-1.065223	0.252853	- 4.212816	0.0003*
Dln(EXP(-1))	- 0.002995	0.010241	-0.292451	0.2153
Dln(IMP(2))	-1.150243	0..311456	- 3.693115	0.0011*
Dln(IMP(-2))	- 1.110234	0.412351	- 2.692448	0.0087
Dln(FDIR(-2))	0.038391	0.013111	2.928151	0.0069*
Dln(EXDINTI(-2))	- 0. 047491	0.01103	- 4.305230	0.0007*
Dln(FXR-2))	0.035641	0.011032	3.230692	0.0067*
ECM02(-1)	-1.140214	0.296413	-3.846707	0.0009*
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R-squared	-0.780912		mean dependent var	0.04322
Adjusted R-squared	0.711234		S.D dependent var	0.201011
4 S.E of regression	0.200234		Akaike info criterion	-2.20360
Sum squared resid	0.802396		Schwarz criterion	0.11354
Log likelihood	-18.43536		F-statistic	15.726027
Durbin-Watson stat	2.318802		Prob.(F-statistic	0.000201

Source: E-View econometric computer software application, Version 6

The positive and significant relationship of exchange rate with RGDP indicates high and persistent rate of depreciation. It is an important factor in investment decision as volatility in exchange rate does not encourage long term project investment decision. Exchange rate depreciation also increases cost of importation of production input and therefore affects RGDP adversely. It also increases cost of servicing external debt. Theoretically, an exchange rate overvaluation could hinder the pace of economic growth while an undervaluation is expected to provide an enabling environment for growth, under a regime of low inflation and stable economy. In the real sense, for a developing economy like Nigeria, with high inflation tendency, both over valuation and undervaluation are inimical to growth [41].

Total import maintained significant and negative relationship with RGDP, implying adverse impact due to excessive demand for foreign goods and services and importation of manufacturing intermediate inputs [37,25].

FDI showed significant and positive relationship with RGDP indicating a good contributor to RGDP, while positive but non-significant relation of TOR implies that it does not contribute adequately to RGDP.

Both EXD and EXDINT have negative and significant relationship and therefore, they are not contributing to the growth of RGDP. This could be attributed to the improper administration of foreign loan, with little or no recognition given to the productive sector of the economy. The increasing rate of interest charges on debt has also affected infrastructural development and ultimately RGDP. (Udeaja and Obi [57]

Furthermore, keeping other variables constant, one percent increase in nominal FXR depreciation and total IMP will induce 3.5% and 11% reduction on RGDP respectively, on annualized basis. Total export has negative relationship with RGDP. The sub-optimal performance of total export could be attributed to non-diversification to the other non-oil export sector as a result of high dependence on crude oil- export sector.

The second lag of the Nigeria's RGDP (RGDPt-2) with negative sign, was also relevant in determining the effect of the selected explanatory variables on RGDP.

"The coefficient of the ECM term (-0.141) is significant and rightly signed (negative), at 5 percent level of significance. It measures the speed of the adjustment at which equilibrium is restored to RGDP. The disequilibrium resulted from the short run variations in the explanatory variables It also confirmed the earlier proposition of existence of long run relationship among the time series in the co-integration result" (Gujarati and Porters [28]

The ECM coefficient (-1.140214) also indicates the proportion of the short run disequilibrium in the explanatory variables, accumulated in the previous period that is corrected in the current period. The speed implies that in the long run, 14 per cent of the disequilibrium in RGDP, arising from the short run disequilibrium in the selected indices, is corrected within a lag. This result suggests that, in the long-run, RGDP in Nigeria, adjusts slowly to short run disequilibrium in the selected external sector indices since only 14 per cent of the accumulated disequilibrium in RGDPt is corrected within a lag (a lag is one year in this study). This implies Policy lag effect.

These findings are in tandem with Nwanze [47,1,2].

4.3 Summary of Pairwise Granger Causality Test Analysis

The essence of this test is to establish the direction of causal relationship between RGDP and selected external sector macroeconomic indicators and it was run on the model with optimal lag of 2. The test is preferred to traditional correlation method which measures only relationship without direction. Effective economic planning will be enhanced, especially in determining the relative weights to be assigned to these macroeconomic variables, when the variable that causes or promotes the other, could be determined. This can help in achieving economic objectives. The result is presented in Table 5. Capitalizing on the F-statistics ratios and the p-values, there exists unilateral causal relationships between RGDP and EXP, IMP, FXR, and TOR, with reference to their F-statistics and probability ratios respectively, at 5% level of significance. This indicates that RGDP determines these variables without a feedback. Significant bilateral causality runs between RGDP and FDI implying that the variables determine each other. Independent causality runs between the EXTD and EXDINT variables and RGDP implying none of the variables determined the other.

Table 5. Summary of data presentation on Pairwise Granger Causality Test

Sample: 1982 – 2020
Date: 10 /12/2021 Time: 1.55
Lags = 2
Observation = 39 (After Adjusting Endpoints)
At 5 per cent significant level

Null Hypothesis	F-Statistics	Probability
Ln(RGDP) doesn't Granger cause ln(EXTD)	0.41861	0.68288
Ln(EXTD) does not Gran ger cause ln(RGDP)	0.34915	0.708960
Ln(RGDP) does not Granger cause ln(FDIR)	7.02984	0.00416*
Ln(FDIR does not granger cause ln(RGD.	3.01346	0.04571*
Ln (RGDP.) does not Granger cause ln(FXR.)	6.55336	0.00502*
Ln(FXR.) does not Granger cause ln(RGDP.)	1.25643	0.30063
Ln(RGDP) does not Granger cause ln(EXD INT)	3.84841	0.68288
Ln(EXDINT) does not Granger cause ln(RGDP)	2.28160	0.12476
Ln(RGDP) does not Granger cause ln(EXP)	8.05879	8.05879
Ln(EXP) does not Granger cause ln(RGDP)	2.14023	0.14134
Ln(RGDP) does not Granger cause ln(IMP)	4.041861	0.03667*
Ln (IMP) does not Granger cause ln (RGDP)	0.34915	0.708960.
TOR does not Granger cause lnRGDP	1. 26657	0.30073
LnRGDP does not Granger cause TOR	6.49734	0.00582*

Source: E-View econometric computer software application version 6.

"The general results imply that causal relationships between RGDP and the selected external sector indicators are mixed . However, it agrees with the findings of Kara and Pentecost (2000)[35] and Konya (2004) [38] which show that causality tests are mixed and inconclusive depending on the variables used"**.**

5. SUMMARY AND CONCLUSION

This study examined effect of external sector macroeconomic indices on the real economic growth in Nigeria from 1981 to 2020. . The overall import of the findings and analysis imply that the level of external sector indices' contribution to the growth of Nigeria's RGDP is suboptimal and therefore the indices have adverse impact on RGDP . The study therefore recommends as follows:

i. that government should strive to achieve: sustainable price stability through effective management of exchange rate; economic, efficiency driven by infrastructural development and enhanced technological capabilities to enhance production capacity and diversification into non-oil sector to beep up export production.

ii. Managerial debt efficiency (in addition to adequate monitoring) that would channel external borrowed funds to their specific tied projects, should be highly emphasized.

iii. The policy makers should provide a laid down stable polity, relevant and consistent economic reforms and policies that would encourage TOR and FDIR.

iv. The policy makers should take cognizance of the lag effect and design policies in line with the magnitude of the expected changes

v. The key driver for intermediate imports is domestic production activity. Nigeria being an import dependent country, with its attendant high import bills, the stabilization of foreign exchange rate in order to reduce cost of domestic production and increase demand, is very pertinent. This will also enhance RGDP

vi. Finally, macroeconomic and social instability is quite undesirable and it has adverse effect on growth. There is therefore need to restore the confidence of the existing and prospective investors by restoring

political stability within the economy in order enhance economic growth.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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