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Article

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Balance of payment constrained economic growth in Nigeria: How useful is the Thirlwall's hypothesis?



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ABSTRACT

This paper examines the Balance-of-Payment (BOP) constraint growth model in Nigeria for the period of 1980 to 2012 using the bounds testing Auto regressive Distributed Lag (ARDL) approach. The ARDL test suggests that the variables in the framework have a long run relationship. The empirical findings reveal that import is cointegrated with relative price and income, and the equilibrium growth rates coincide with actual growth rates, hence, the result shows that the Thirlwall's law, of actual growth rate being equal to the predicted growth rate by the balance of payment current account equilibrium holds in Nigeria. This reason may be due the fact that the economy of Nigeria depends mainly on international trade even though oil dominates the export. This Thirlwall's BOP-constrained growth approach provides some significant policy prescriptions for Nigeria's development policy. Achievement of potential growth can be stimulated by making exports more competitive through macroeconomic stability, sound institutional qualities, improvement in human and physical capital development, reducing access problems to external market, among other factors.

1. Introduction

In the real world, no economy survives with total autarky; every economy depends on another for one or more commodities or services. But the pattern of trade of a nation affects its rate of economic growth, meaning that international trade must be well appraised by nations to ensure they are not at the detriment of trade. Given the desire of the various economies of the world to grow and translate their growths into sustainable development that will lead to several structural adjustments and the stimulation of demand and supply, hence the reason for striving continuously to determine a model of economic growth that suits different nations so as to monitor their rate of growth and make adjustments when necessary (Olayemi, Adedeji, Adenekan, & Owonikoko, 2017).

According to the Say's law, supply creates its own demand and the perfect workings of the economy will always ensure that what is produced is consumed. This is an important assumption upon which many neoclassical theories are based (Braudel, 1979). Meanwhile, the failure of the neoclassical supply constrained economy that assumes the growth of the economy as a result of changes in factors of production and technical progress (hence supply driven) lead to the emergence of the Keynesian effective demand driven economy (see Keynes, 1936; Thirlwall, 1979; McCombie & Thirlwall, 2004; and Aricioglu Ucan, & Sarac, 2013). In addition to their tenets, the aggregate demand in an economy is influenced by the activities in the international market; meaning that its demand can be constrained by its balance of payment. Therefore, it will be difficult to understand differences in the long run economic growth of a country without understanding the balance of payment of the economy (McCombie & Thirlwall, 2004; Olayemi et al., 2017).

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The balance of payment constrained growth model is originally due to Thirlwall (1979), according to him "no country can grow faster than the rate consistent with the balance of payment equilibrium on current account unless it can finance ever growing deficits which in general it cannot". As a natural process, when the ratio of a country's debt to its GDP exceeds 50%, the international financial market shivers, though the extent of this nervousness depends on the level of development of the country concerned. Following Thirlwall (2011), the growth rate of a country approximates to the rate of growth of export divided by the income elasticity of demand for imports; this is referred to as the Thirlwall's law. According to Olayemi, Adedeji, Adenekan, and Owonikoko (2017), in an open economy, more important is the aggregate demand; what if, what is produced is not demanded as against the Say's Law, would it not be better to allow demand creates its own supply? The growth of an economy is usually constrained by its aggregate demand earlier before the attainment of optimum supply. If therefore, balance of payment equilibrium constrains economic output, it is impossible to grasp the differences in the economic growth in long run among countries without reference to the balance of payment (McCombie & Thirlwall, 2004 and Bastos, Irffi, & Castelar, 2017).

Recalling periods before oil was discovered in 1960s, the Nigerian government was able to carry out capital projects through non-oil sector support especially via domestic savings, earnings from agricultural product exports and foreign aids. However, the capacity of the economy to accumulate domestic savings to finance investment was limited. There was therefore, the inability of government to generate sufficient foreign exchange due to persistent balance of payments problem arising from the reliance on monoprotect primary export which is not competitive at the international market. This consequently led to unfavourable terms of trade and instability in government revenue. All these have served as checks on demand (import demand) and a constraint to effective implementation of national development plans.

Meanwhile, since the discovery of oil in the 1970s, it is expected that more foreign exchange earnings will accrue to the economy, and the economy would be able to undertake viable capital projects that will channel a path for sustainable growth and development. Between the 1971-75 periods which is attributable to the oil peak in 1974, the country experienced a positive balance of payments (BOP) position which also signaled that the economy was financially buoyant. The unprecedented fall in the oil price in the early 1980s resulted in a substantial reduction in export earnings that accrued to government. The reverberation of this was massive and recurring fiscal deficits, balance of payments and debt crises, due to unsustainable huge public sector expenditure and lack of alternative source of export earnings. In an attempt to address the various macroeconomic problems in the economy, government adopted the demand management policy in 1982 when the problems were perceived as demand driven which was latter supported by a number of stabilisation measures made the government to adopt the structural adjustment programme (SAP) in 1986. In effect, various stabilisation measures were introduced. Such measures include imposition of tariffs and application of contradictory fiscal and monetary policies in order to reduce the level of aggregate demand and achieve fiscal and balance of payments equilibrium.

The economic performance of Nigeria has been greatly dependent on both domestic production and consumption activities as well as foreign transactions in goods and services. Specifically, it has been acknowledged that foreign trade is an engine of growth and development. The high dependence of the economy on oil exportation and other goods and services has exposed it to the activities in the international market. The Thirlwall's law of growth rate constraint has been tested in many countries and its importance and validity (despite several criticisms) has been established. Therefore it becomes necessary to check whether the outcome of the popular theory holds water in the Nigerian economic system.

Foreshadowing the main results, Thirlwall's law of actual growth rate being equal to the predicted growth rate by the balance of payment current account equilibrium holds. This is because the economy of Nigeria depends solely on international trade even though oil dominates the export. The assumption that the relative price remains insignificant overtime also holds and negative according to the theory.

The remainder of the paper is organized as follows. Following section one is section two which deals with the literature review. In section three, the methodological framework of the study is pursued while the empirical results are discussed in section four and section five concludes the paper.

2. Review of related literatures

The Mercantilists had the view that encouraging exports and discouraging imports helps to strengthen the wealth and power of the states. The submission of the capitalist of a self interested economy which increases export while reducing its import of raw materials and technology supports this argument. The research on the importance of international trade and finance to nations in the world, is one of the oldest specialties in economics; for long, international trade theory has passed through different stages and has reached the level where it is considered one of the major components of globalization, along with foreign direct investment (FDI) and other forms of financial flows (Mishra, 2014). Several gains can be expected from international trade, even though there are losses but the gains are more numerous if well managed as already established by Adam Smith and David Ricardo. It is however surprising that today, despite specialisations of countries in their region of productive power, many nations still suffer from low economic growth and development. According to Thirlwall (2006) there are three major reasons for the unequal benefits of trade today: manufacturer in the developed countries prefer low import content of primary goods; technology enables some producers to substitute synthetic inputs for raw materials; and the developed countries widely follow the protectionist policy on imports from the developing countries.

Complementing the three factors cited against the free-trade theory by Thirlwall, is the argument by Todaro and Smith (2006) that some assumptions of the neoclassical economists are far from being true. According to them, some assumptions of the neoclassical economists which include: "the fixed resources, full employment and international immobility of capital and skilled labour; unemployment, resource underutilization and the vent-for-surplus theory of international trade; fixed, freely available technology and consumer sovereignty; and the trade gains accruing to nationals are easy to make on paper but difficult to achieve in practice."

The impossibility of satisfying these conditions of the neo classicalists makes it impossible for so many nations to benefit as expected from international trade. This was the contention of Thirlwall, when he suggested that it is impossible to measure the growth rate of a country without considering its balance of payment. The equilibrium of the balance of payment is the way to ensure sustainable growth, since nations cannot survive alone, then it becomes important for them to monitor their trade with other economies else they run into deficit which will still be paid for by their growth. This impossibility of equal beneficial gains from trade necessitates the validation of international trade theories in developing countries to choose the right model for which to base international trade decisions and avoid the possible defects of trade.

According to Thirlwall “It is demand that ‘drives’ the economic system to which supply, within limits, adapts. Taking this approach, growth rates differ because the growth of demand differs between countries”. This statement has survived many heterodox challenges over time with some adjustments introduced in the case of developing and underdeveloped economies (see, [Razmi, 2011, 2016](#); [Ros, 2013](#); [Clavijo & Ros, 2015](#); and [Ibarra & Blecker, 2016](#)). Crosschecking the Thirlwall’s law is well acclaimed; studies that promote Thirlwall’s law include but not limited to [Lima and Carvalho \(2008\)](#), where it is narrated that in determining economic growth in the long run aggregate demand plays an important role. If a country’s import growth rate rises above growth of exports as a result of economic growth, the balance of payments deteriorates and disturbs the system of economic growth and hence reduces economic growth ([Acaravci & Ozturk, 2010](#)). [Kilavuz and Topcu \(2012\)](#) also explain that when the supply elasticity of demand and the demand elasticity of demand for a country’s commodity rise; this stimulates the export-led growth of the economy pioneered by its industrialization, this is why they reasoned that [Kaldor \(1968\)](#) referred to industry as the “engine of growth”. To Kaldor, growth in industrial manufacturing sector is made possible by growth in external demand; that is, through export growth. The higher the manufacturing industry growth rate that export determines, the faster the transfer of labour from sectors in which economic productivity is low to the industrial sector, which leads to a faster productivity increase and results in macroeconomic growth ([Olayemi et al., 2017](#)).

In support of these is the confirmation of the theory in the South African economy, using an Autoregressive Distributed Lag (ARDL) Bounds Testing approach, [Ozturk and Acaravci \(2010\)](#) applied the Thirlwall’s basic balance of payments constraint growth model to South African economic growth for the period of 1984 to 2006, the empirical results revealed that import is co integrated with relative price and income, and the equilibrium growth rates coincide with actual growth rate. They therefore recommended that a successful economic growth policy, which reduces income elasticity of imports and promotes export, should be put into play which will permit South Africa to have a rapid growth in demand and supply without suffering deterioration in its balance of payments. [Ebru, Okyay, and Bahadır \(2013\)](#) also used the same methodology of autoregressive distributed lag model but with the Kalman Filter method in the case of Turkey, the study revealed that the Turkish economy has been experiencing balance of payment deficit for the last three decades; the result found that the Thirlwall’s law is not valid for Turkey. The study recommends that instead of total export and total import values, specific sector (automotive, textile and etc.) values may be taken into consideration. Surprisingly however, is the result of [Ahmad, Roozbeh, and Ramezan \(2011\)](#), the relative price was found to be a significant determinant of import growth as confirmed by the long run relationship between import growth rate, economic growth rate and relative prices in Iran using the autoregressive distributed lag bound testing approach. This is against the Thirlwall’s assumption. The study further finds that Thirlwall’s law of estimated growth rate being equal to the actual growth rate is statistically insignificant as the constant of the regression and coefficient of the actual growth rate is found not be equal to zero and one respectively, this means that the Thirlwall’s law is not valid for Iranian economy. They conclude that the reason for this may be due to the fact that Iran is a member of OPEC and its oil export plays a significance role in the country’s foreign trade and that a policy of export promotion combined with an import substitution strategy could not help the economic growth, since both strategies do not lead to moderate balance of payments constraints in the long run. This means that the long-run growth of real GDP depends on some other variables that are not included in the model such as capital flow, economic structure and so on.

Distinct from the above empirical researches that employed ARDL, [Mwega, Mwangi, and Ochilo \(1994\)](#) used an alternative framework (three - gap framework) to investigate whether it is savings, fiscal and foreign exchange gaps that is the binding constraint on growth capacity in Kenya, while examining macroeconomic constraints and medium-term growth in Kenya. They also examine how these various gaps have evolved since the early 1970s. They discover that, for some reasonable ratios of intermediate import, foreign exchange is a major resource constraint to potential growth in Kenya. They conclude that with increased supply of foreign exchange and the associated reduction of import compression, savings, fiscal and external gaps that inhibit good macroeconomic performance will be alleviated. This study is therefore expected to corroborate the earlier findings that export and import performances are very crucial to growth. Furthermore, [Bastos et al. \(2017\)](#) employed the GMM dynamic panel estimator testing for Thirlwall’s law, the study like [Ozturk and Acaravci \(2010\)](#) among others confirms the validity of the law, the Brazilian states’ import elasticity is greater than export growth.

Back to Nigeria, some authors have examined the role of export and capital flows in the growth process. For instance, [Fajana \(1979\)](#) investigates the impact of export and foreign capital on economic growth. He finds that export has greater impact on GDP growth than foreign capital inflows over eleven years period, 1964 to 1974. He recommends that Nigeria should de-emphasise reliance on foreign capital while export should be promoted. Similarly, [Oyejide \(1975\)](#), drawing a sample from 43 countries (including Nigeria), reported a positive relationship between average growth rates of GDP and export as a percentage of GDP over 1960 to 1967 period. In the same vein, [Egwaikhide \(1991\)](#) examines the quantitative effects of export (non-oil) expansion on Nigeria’s economic growth over the period 1960 to 1983. Based on simulation experiment, he observes among others, that a 75 per cent rise in non-oil export led to 1.4 per cent increase in real GDP. He concludes that there is need to promote export in order to enhance GDP growth in Nigeria. The mixture of results in the validity of Thirlwall’s law in different economies necessitates the examination of the validity of the law in Nigeria.

2.1. Export, import and economic growth rate

From [Fig. 1](#) it is obvious that export growth rate mostly equates GDP growths rates but with spikes in export growth preceding

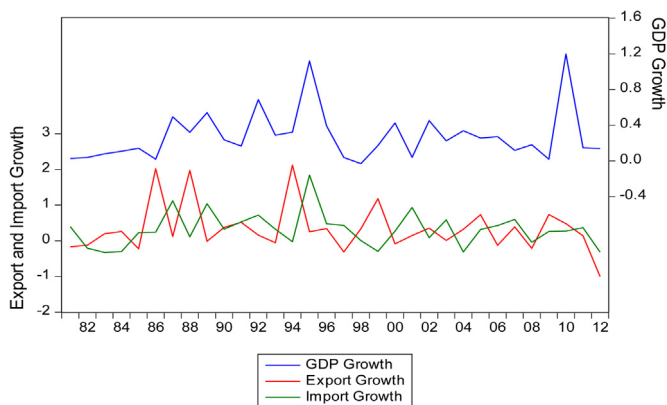


Fig. 1. Interplay between export, import and GDP growth.

growth rate, this makes great economic sense as increases in export today will encourage more production and productivity in the later years not today. Import growth on the other hand seems to be better stable and possibly with a better fit, but it can be deduced from the early years of 1981 to 1985 that export growth was rising, import was reducing and economic growth was also steadily picking up, until early periods of 1985 corresponding to periods of debates on Structural Adjustment Programme and its implementation in 1986. Between 1981 to 1985, export, import and economic growth rate are relatively stable, but during and after the structural adjustment of 1986, fluctuations set in for economic variables and the downfall in economic growth between 1996 to 1998 corresponds to the civil war periods. The whole picture reveals a situation of export import boost growth, which may not picture well the situation at hand until the revelation by further analysis.

3. Theoretical framework and methodology

3.1. Theoretical framework

Given the balance of payment current account equilibrium, then the value of export equals to that of import i.e.

$$P_H E = P_F I \tag{1}$$

Where P_H and P_F are the price at home and price at foreign market respectively. E is export while I denotes import. Taking the differential logarithm of Eq. (1), the variables are turned into growth rates

$$P_h + \dot{e} = P_f + i \tag{2}$$

Given that export is a function of relative price and the world income and that import is a function of relative price and home income, then we have

$$E = a(P_H/P_F)^\theta Z^\alpha \tag{3}$$

$$I = b(P_F/P_H)^\varphi Y^\pi \theta, \varphi < 0 \text{ and } \alpha, \pi > 0 \tag{4}$$

Where a and b are constants, Y denotes the Nigerian income measured by GDP and Z is the world income α and π represent the income elasticity of export and import respectively. Taking the differential logarithm of Eqs. (3) and (4), we can derive the export and import growth rates

$$\dot{e} = \theta(P_h - P_f) + \alpha(\dot{z}) \tag{5}$$

$$i = \varphi(P_f - P_h) + \pi(\dot{y}) \tag{6}$$

Substituting Eqs. 5 and 6 into Eq. 2

$$P_h + (\theta(P_h - P_f) + \alpha(\dot{z})) = P_f + (\varphi(P_f - P_h) + \pi(\dot{y})) P_h - P_f + \theta(P_h - P_f) + \alpha(\dot{z}) = \varphi(P_f - P_h) + \pi(\dot{y})(P_h - P_f) + \theta(P_h - P_f) + \varphi(P_h - P_f) + \pi(\dot{y}) - \alpha(\dot{z})(P_h - P_f)(1 + \theta + \varphi) + \alpha(\dot{z}) = \pi(\dot{y})\dot{y} = \frac{(P_h - P_f)(1 + \theta + \varphi) + \alpha(\dot{z})}{\pi} \tag{7}$$

Substituting Eq. (5) into (7)

$$\dot{y} = \frac{(P_h - P_f)(1 + \varphi) + \dot{e}}{\pi}$$

Assuming that relative price remains constant, the differential logarithm would have yielded zero, then we have

$$\dot{y} = \frac{\dot{y}}{\pi}, \quad \text{that is, } \dot{y} = y_t \tag{8}$$

Eq. (8) was the bone of contention of the Thirlwall's basic law, that the growth rate of an economy is constrained by the balance of payment and is equal to the ratio of export growth rate to income elasticity of import. Since we are interested in the growth rate of the home economy, this is achievable by the import equation stated in Eq. (4). Taking the logarithm of both sides of Eq. (4), we have that

$$\ln I_t = k + \varphi \ln P_t + \pi \ln Y_t + u_t \tag{9 from 4}$$

Where Y = Gross Domestic Product

- I = Volume of Import
- P = term of trade $\left(\frac{p_f}{p_h}\right)$
- π = income elasticity of import

3.2. Methodology

To empirically analyze the impact of income and relative prices on import, thereby validating or possibly invalidating the Thirlwall's law, the ARDL model specification is used to show the long run relationships and dynamic interactions between import, term of trade and GDP, using Autoregressive Distributed Lag (ARDL) co-integration test popularly known as bound test. This method is adopted for this study for three reasons. Firstly, it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified. Secondly, adopting the bound testing approach means that pre-test such as unit root is not necessary. That is, the regressors can either I (0), purely I (1) or mutually co-integrated. Thirdly, the long-run and short run parameters of the models can be simultaneously estimated. Therefore the newly Autoregressive Distributed Lag (ARDL) bound test proposed by Pesaran, Shin, and Smith (2001) is used to show the relationship between import, GDP and relative price.

$$\Delta \ln I_t = \gamma + \sum_{i=1}^p \alpha_i \Delta \ln I_{t-i} + \sum_{i=0}^q \beta_i \Delta \ln P_{t-i} + \sum_{i=0}^r \delta_i \Delta \ln Y_{t-i} + \vartheta_1 \ln I_{t-1} + \vartheta_2 \ln P_{t-1} + \vartheta_3 \ln Y_{t-1} + \varepsilon_t \tag{10}$$

Eq. (10) is the unrestricted error correction model. However for better understanding, recall from Eq. 1 that

$$\begin{aligned} \ln I_t &= k + \varphi \ln P_t + \pi \ln Y_t + e_t \\ -e_t &= (k + \varphi \ln P_t + \pi \ln Y_t - \alpha \ln I_t) \\ -e_{t-1} &= (k + \varphi \ln P_{t-1} + \pi \ln Y_{t-1} - \vartheta_1 \ln I_{t-1}) \\ e_t &= ECM \end{aligned}$$

This means that the equation above can be represented as follows

$$\Delta \ln I_t = \gamma + \sum_{i=1}^p \alpha_i \Delta \ln I_{t-i} + \sum_{i=0}^q \beta_i \Delta P_{t-i} + \sum_{i=0}^r \delta_i \Delta Y_{t-i} + \mu ECM(-1) + V_t \quad \text{where } \mu < 0 \tag{11}$$

This study employs Eq. (10) to test for co-integration without restricting the coefficients variables after which equation one and three are estimated to derive the long run and short run effects respectively. The predicted growth rate will then be calculated by the ratio of export growth rate and income elasticity of import (π) after which the predicted growth rate will be regressed on the actual growth rate and the Wald F statistic will be used to test for the Thirlwall's law i.e.

$$\dot{y}_t = a + b y_t \quad H_0: a = 0, b = 1$$

3.3. Source of data

This study employed annual data that covers the period 1980 to 2012 for Nigeria. The data is primarily gathered from the World Bank data base for Nigeria. The variables of interest are import, gross domestic product and term of trade.

Table 1
Unit root test.

Variable	Variable in levels		Variable at first differences	
	ADF Statistic	PP Statistic	ADF Statistic	PP Statistic
LNGDP	0.438(0.982)	0.4389(0.981)	-5.401(0.000)***	-5.403(0.000)***
LNIMP	-0.397(0.898)	-0.429(0.892)	-4.716(0.000)***	-4.767(0.001)***
LNTOT	-1.837(0.357)	-1.855(0.349)	-4.525(0.004)***	-5.615(0.000)***

Note: Values in parenthesis are p-values. The asterisks *** indicate significance at 1 percent.

Table 2
VAR lag order selection criteria results.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6.144702	NA*	0.115375*	0.677385*	0.821367*	0.720199*
1	-5.860061	0.484945	0.121808	0.730375	0.922351	0.787459
2	-5.831419	0.046675	0.131175	0.802327	1.042297	0.873683
3	-4.412101	2.207828	0.127573	0.771267	1.059230	0.856893
4	-4.409218	0.004271	0.137981	0.845127	1.181085	0.945025
5	-4.403899	0.007486	0.149456	0.918807	1.302759	1.032976

Note: * indicates lag order selected by the criterion.

Table 3
ARDL bounds testing to co-integration results.

Model $F_T(P, Y)$	F-statistic 4.755***				Inference Co-integration	
	99%		95%		90%	
$k = 3$	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
	3.43	4.37	2.86	3.78	2.57	3.46

Note: *** (***) [*] indicates rejection of the null hypothesis at 1% (5%)[10%] significance level.

4. Empirical results and discussion

Most time series data do not exhibit a constant trend i.e. They trend over time, this causes their means to always vary continuously, and the use of such series for regression will generate a spurious output as it will be against the classical linear regression model assumptions. Therefore, there is need to test for the presence of unit root (non stationary) and correct for the same where necessary (Tables 1 and 2).

The unit root result shows that all the series are integrated of order 1, i.e. they are all stationary only after the first difference. This means that at level they contain unit root and their mean are not constant, we can then be thinking of a possibility of long run relationship among these variables, since their value today actually differ from that of tomorrow. The study therefore proceeds to bound test to test for the presence of co-integration.

The lag order however needs to be determined before the ARDL model is estimated. Using the VAR lag order selection based on these five criteria; Log likelihood, final prediction error (FPE), Akaike information Criterion (AIC), Schwarz information criterion and Hannan-Quinn information criterion (HQ). The results show that all the criteria have suggested a lag length of zero as an optimal lag length.

Table 3 presents the ARDL bounds result and the F-statistic is found to be greater than the upper critical boundary. After the confirmation of the presence of co-integration, we then move on to estimating the short run dynamics as well as the speed of adjustment to the long run as presented in Table 3 below;

The income elasticity of import is found to be positive and significant as suggested by the Thirlwall's law, the table shows that a 1% increase (decrease) in GDP will generate though less that proportionate but positive 0.68% increase (decrease) in import. This relationship is found to be significant at 5%. This tells us that an increase in economic growth in Nigeria often lead to a rise in import in the short run.

The coefficient of the term of trade as well confirms the Thirlwall's law, it has no statistically significant effect on the pattern of import in Nigeria, and it is negatively related with import (law of demand). It suggests that in the short run, a 1% increase (decrease) in term of trade will generate a 0.013% decrease (increase) in import, though this effect is not statistically different from zero. The coefficient of the ECM which yields the speed of adjustment is negative and significant, it informs us that 51% of all errors or disequilibrium in the short run is adjusted for in the long run.

All situations in the short run persists in the long run, except that the income elasticity of import is now elastic, an indication that in the long run, Nigeria will import more than it actually export, because a 1% increase (decrease) in GDP will yield a more than proportionate increase (decrease) of 1.09% increase in import. The term of trade however remains insignificant.

The diagnostic test shows that our model is not misspecified, there is homoscedasticity and there is no presence of serial correlation, the error is as well normally distributed (Fig. 2).

The plot of the cumulative sum and cumulative sum of square which falls within the boundary of 5% critical value also confirmed the diagnostic tests on Table 4, that the coefficients estimated are stable over time (Tables 5 and 6).

Test of Thirlwall's Law.

$$\dot{y} = \frac{e}{\pi} \text{ therefore } \dot{y} = a + by_t$$

$$H_0: a = 0 \text{ and } b = 1$$

Result of the test

$$\dot{y} = 0.001475 + 1.225443y_t \quad (0.9873) \quad (0.0000)$$

R² = 0.51 Adjusted R² = 0.50

Wald (F stat) = (0.4472)

The result from the Wald F-statistic shows that the Thirlwall's law holds in Nigeria. It suggests the acceptance of the null hypothesis that $a = 0$ and $b = 1$.

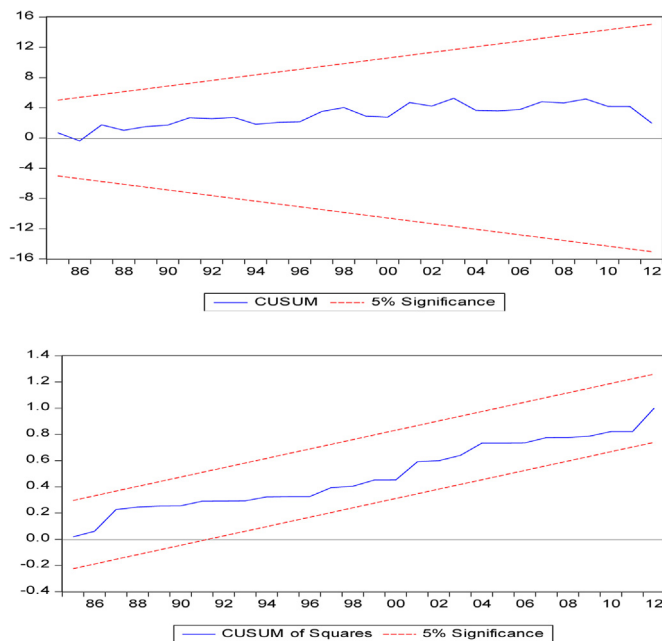


Fig. 2. Stability test.

Table 4
Error correction model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0738	0.0872	0.8467	0.4044
ΔLNGDP	0.6746	0.2982	2.2621	0.0316**
ΔLNTOT	-0.0127	0.2200	-0.0578	0.9543
ECM(-1)	-0.5067	0.1724	-2.9392	0.0065***
R-squared	0.37	Adjusted R-squared		0.31
F-stat	0.00	LM serial correlation		0.62

Note: Dependent variable lnI; *** (**) [*] indicates rejection of the null hypothesis at 1% (5%)[10%] significance level.

Table 5
The coefficients in the long run.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-3.095504	0.858427	-3.606020	0.0011***
LNGDP	1.085781	0.025915	41.89715	0.0000***
LNTOT	0.195769	0.133051	1.471382	0.1516

Note: Dependent variable lnI; *** (**) [*] indicates rejection of the null hypothesis at 1% (5%)[10%] significance level.

Table 6
Diagnostic test for the ECM.
SOURCE: Authors Computation

Test	Results	Prob.
Ramsey RESET Test	17.8817	0.24
Heteroskedasticity Test:	10.1124	0.53
Breusch-Godfrey LM Test:	2.7907	0.62
Normality Test	1.0880	0.58

5. Conclusion

This study examined the validity of the Thirlwall's law in Nigeria, the result shows that the Thirlwall's law of actual growth rate being equal to the predicted growth rate by the balance of payment current account equilibrium holds. This is because the economy of Nigeria depends solely on international trade even though oil dominates the export. The study therefore concludes that the growth in Nigeria is balance of payment constrained. The assumption that the relative price remains insignificant overtime also holds and negative according to the theory. Also the income elasticity of import is also positive and significant.

This study therefore recommends that the government should ensure the formulation and monitoring of efficient policies that will improve the growth rate of export to raise the economic growth rate. Productivity should be encouraged in the home country e.g. through subsidy, as an import substitution strategy, so as to reduce the income elasticity of import. Other sectors of the economy should be empowered so as to increase the level of export.

Appendix

See appendix [Table A1](#).

Table A1

Data used.

Source: World Bank data (Nigeria)

GDP (y) (current LCU)	Import (current LCU)	Term of Trade $\frac{PN}{PF}$	Term of Trade (for import) $\frac{PF}{PN}$	Predicted growth rate $\dot{y} = \frac{\dot{e}}{\pi}$	Export growth rate $(\dot{e}) \frac{(X_t - X_{t-1})}{X_{t-1}}$	Income elasticity of import π
5.03E+10	9.65E+09	181.25	0.005517	-0.21	-2.23E-01	1.08578
5.17E+10	1.35E+10	192	0.005208	-0.15	-1.66E-01	1.08578
5.37E+10	1.07E+10	163.636364	0.006111	-0.11	-1.20E-01	1.08578
5.8E+10	7.25E+09	155.172414	0.006444	0.18	1.99E-01	1.08578
6.43E+10	5.08E+09	154.545455	0.006471	0.24	2.66E-01	1.08578
7.35E+10	6.26E+09	143.478261	0.00697	-0.20	-2.20E-01	1.08578
7.49E+10	7.79E+09	70.2702703	0.014231	1.86	2.02E+00	1.08578
1.12E+11	1.65E+10	72.6027397	0.013774	0.11	1.21E-01	1.08578
1.48E+11	1.84E+10	60.9375	0.01641	1.82	1.97E+00	1.08578
2.28E+11	3.75E+10	75.7142857	0.013208	-0.01	-9.60E-03	1.08578
2.82E+11	4.98E+10	88.5057471	0.011299	0.35	3.79E-01	1.08578
3.29E+11	7.63E+10	74.3902439	0.013443	0.48	5.18E-01	1.08578
5.55E+11	1.31E+11	65.0406504	0.015375	0.15	1.61E-01	1.08578
7.15E+11	1.74E+11	59.4059406	0.016833	-0.05	-5.00E-02	1.08578
9.46E+11	1.70E+11	56.122449	0.017818	1.96	2.12E+00	1.08578
2.01E+12	4.82E+11	55.5555556	0.018	0.24	2.56E-01	1.08578
2.8E+12	7.12E+11	86.9047619	0.011507	0.32	3.46E-01	1.08578
2.91E+12	1.02E+12	65.0943396	0.015362	-0.29	-3.11E-01	1.08578
2.82E+12	1.03E+12	43.877551	0.022791	0.31	3.42E-01	1.08578
3.31E+12	7.28E+11	59.5959596	0.01678	1.08	1.18E+00	1.08578
4.72E+12	9.27E+11	100	0.01	-0.08	-8.56E-02	1.08578
4.91E+12	1.79E+12	90.7823458	0.011015	0.14	1.49E-01	1.08578
7.13E+12	1.95E+12	91.8882619	0.010883	0.33	3.57E-01	1.08578
8.74E+12	3.10E+12	101.515226	0.009851	0.01	1.22E-02	1.08578
1.17E+13	2.13E+12	119.662168	0.008357	0.30	3.25E-01	1.08578
1.47E+13	2.81E+12	156.61055	0.006385	0.67	7.29E-01	1.08578
1.87E+13	4.02E+12	176.570004	0.005663	-0.11	-1.24E-01	1.08578
2.09E+13	6.44E+12	177.730992	0.005626	0.36	3.93E-01	1.08578
2.47E+13	6.19E+12	215.837585	0.004633	-0.19	-2.11E-01	1.08578
2.52E+13	7.83E+12	154.68693	0.006465	0.68	7.35E-01	1.08578
5.55E+13	9.99E+12	183.963345	0.005436	0.44	4.82E-01	1.08578
6.37E+13	1.37E+13	211.42776	0.00473	0.13	1.43E-01	1.08578

(continued on next page)

Table A1 (continued)

GDP (y) (current LCU)	Import (current LCU)	Term of Trade $\frac{PN}{PF}$	Term of Trade (for import) $\frac{PF}{PN}$	Predicted growth rate $\dot{y} = \frac{\dot{e}}{\pi}$	Export growth rate $(\dot{e}) \frac{(X_t - X_{t-1})}{X_{t-1}}$	Income elasticity of import π
7.26E+13	9.40E+12	115.774239	0.008638	-0.92	-1.00E+00	1.08578

Note: The income elasticity of import is constant since it is estimated in the equation, it is the coefficient of $\ln Y$

The term of trade for import is used, by finding the inverse of the term of trade data collected. This is because we are dealing with the import equation. The term of trade in import differs from that of export as can be seen in the equation derived (inverse).

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