

Testing for the Sustainability of Current Account Deficit in Nigeria

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Abstract

This paper investigates the sustainability of current account deficit in Nigeria for the period, 1970Q1 to 2015Q4, using the Autoregressive Distributed Lag (ARDL) Bounds testing procedure. Evidence from the Bounds testing cointegration approach revealed the existence of long-run relationship between Nigeria's exports and imports. The sign and significance of the error correction estimate further reinforces the evidence of cointegration, thus confirming the first and necessary condition required for sustainability, and indicating that the trade imbalance is short-term. Results from the ARDL regression indicate that the Log of Export (LXP) is positive and statistically significant at one percent level. Also, the estimate of β (the coefficient of LXP) in the long run results is 0.92% which is closer to unity and indicating that a one per cent increase in exports is associated with a 0.92% increase in imports, resulting in sustainable current account position during the sample period. In other words, imports in Nigeria are fully covered by export earnings during the sample period. It therefore follows that estimates of long run coefficients based on ARDL shows that Nigeria satisfies the sufficient condition for sustainability of her current account over the long run. It is therefore recommended that policies be put in place that would encourage the expansion of the country's export base so that the growth momentum can be maintained.

Keywords: Sustainability, Current account deficit, Imports, Exports, ARDL

1. Introduction

A country's current account measures its exports of goods and services to the rest of the world, less imports of goods and services, plus net investment income and unilateral transfers, such as remittances. It is in deficit if imports exceed exports and in surplus if the change is the other way round. The study of this inter temporal change in the current account position of countries has become increasingly important as the country's current account position mirrors the changes in the nation's net indebtedness and the overall health of the economy. Current account deficits may occur in the short-term. Such temporal deficits show capital reallocation to countries where capital is most productive, and this may not create problems for a country (Wu, 2000). Permanent or persistent deficits however can have serious implications for a country as it is capable of triggering an increase in domestic interest rates, a rapid depreciation of the domestic currency, and exerting excessive burden of interest payments on the future generation with the attendant reduction in living standard (Olamade and Oni, 2016). Consequently, the existence of cointegration relationship between exports and imports in a country suggests that the current account deficits of the country are short-term and are sustainable in the long-run. This, according to Olamade and Oni in the same work, is important for the following reasons. First, it shows that the country is not violating its inter temporal budget constraint and has no incentive to default on its international debts (Hakkio and Rush, 1991). Secondly, cointegrated export and import suggests the absence of productivity gap between the economy and the rest of the world or permanent technological shock to the domestic economy (Irandoust and Ericsson, 2004). Thirdly, the long-run convergence of exports and imports is in agreement with modern approach to current account and hence supports its validity (Obstfeld and Rogoff, 1996). In addition, Bahmani-Oskooee and Ree (1997) and Arize (2002) observed that the knowledge of cointegration between exports and imports is necessary for the formulation and evaluation of present and future macroeconomic policies.

Although the relationship between exports and imports has been examined extensively in the past three decades, there has been no consensus with respect to their cointegration relationship. While some of the studies have reported long-run relationship between exports and imports, others have found weak or no cointegration relationship. Also, majority of earlier studies were conducted on cross-country basis (Narayan and Narayan, 2005; Tang and Mohammad, 2005; Holmes, 2006; Husein, 2014; Camarero et al., 2015; Olamade and Oni, 2016; Afonso, et al., 2017), very few were country-specific (Edward, 2005; Konya and Singh, 2008; Herzer and Nowak-Lehman, 2006; Erbaykal and Karaka, 2008; Hye and Siddiqui, 2010; Emmy et al., 2009; Ali, 2013; Babatunde, 2014; Shuaibu and Oyinlola, 2017).

The main objective of this paper is to examine the sustainability of exports and imports in Nigeria from 1970Q1 to 2015Q4. The specific objectives are to (i) investigate the existence or otherwise of long run relationship between exports and imports in Nigeria and (ii) verify if the cointegrating coefficient is close to unity in Nigeria (the closer it is to unity, the more effective macroeconomic policies are in the country).

The choice of Nigeria as a case study in this paper is justified on several grounds. Very few country-specific studies have been done on Nigeria the most recent of which are the works of Babatunde (2014) and Shuaibu and

Oyinlola (2017) to the best of my knowledge. In Babatunde's work, annual time series data were employed for the period, 1960 to 2013. Although equations were estimated for aggregate exports and imports, the data used were also disaggregated to oil and non-oil exports and imports, and their respective equations also estimated. Shuaibu and Oyinlola's work employed annual time series data in re-examining the sustainability of current account in Nigeria from 1981 to 2013. In this current study, Quarterly time series data were employed to find out if current account deficits are only short-term in Nigeria. The period scope for this present study was extended beyond 2013 where the analysis of these earlier works stopped, to 2015 in order to accommodate the changes that took place in the Nigerian economy after 2013.

The sequence of this paper proceeds as follows. Section 2, which is the next, presents a review of related literature on earlier works done on the subject matter. In section 3, the theoretical background of the study, methodology and model specification are highlighted. Empirical results are presented in section 4, while section 5 concludes the paper.

2. Literature Review

Following the work of Husted (1992) who laid the theoretical and empirical foundation of the examination of cointegration relationship between exports and imports, several other studies have investigated the long-run current account sustainability for developed countries. These include Bahmani-Oskooee (1994) for Australia, Fountas and Wu (1999), Holman (2001) and Christopoulos and Leon-Ledesma (2010) among others.

Husted (1992) examined the long-run association between exports and imports of the US using quarterly data on trade for the US economy and export as the dependent variable. The result revealed that a long-run relationship exists between exports and imports. Following the pioneering work of this author, several researchers have investigated the cointegration relationship between exports and imports in both developed and developing. The results however have been inconclusive in spite of the relevance of the co-movement of exports and imports in understanding sustainability of trade deficits. While some of the studies have found cointegration relationship between exports and imports, others have concluded the relationship to be either weak or nonexistent.

The following studies among others, reported the existence of cointegration relationship between exports and imports (Bahmani-Oskooee, 1994; Arinze, 2002; Baharumshah, 2003; Tang and Mohammad, 2005; Tang, 2006; Ali, 2013; Al-Khulaifi, 2013; Pillay, 2014; Babatunde, 2014; Afonso et al., 2017)

Bahmani-Oskooee (1994) investigated the long-run relationship between Australian imports and exports for the period, 1960 to 1992 using Engle and Granger (1987) cointegration technique. The results showed that Australian imports and exports are cointegrated with the cointegrating coefficient very close to unity, suggesting that Australian macroeconomic policies have been very effective. In a joint work carried out by Bahmani-Oskooee and Ree (1997) using quarterly data and the Johansen and Juselius's (1990) cointegration technique, it was found out that South Korea's exports and imports are cointegrated, and that the coefficient of export as an explanatory variable was positive. This suggests that South Korea did not violate its international budget constraint.

On a similar note, Arize (2002) using imports as dependent variable, and quarterly data for the period 1973 to 1998, found that 35 out of the 50 countries examined, supported the existence of cointegration relationship between exports and imports using the Johansen cointegration technique. Arize in the same work also used Stock and Watson's (1993) cointegration technique as a complementary test to the Johansen test. The results indicated the existence of long-run relationship between exports and imports in all the countries sampled for the study with the exemption of Mexico. It was therefore conclude that macroeconomic policies in these countries have been effective, which suggests that international budget constraints have not been largely violated.

Baharumshah, et al. (2003) using annual data for the period 1961 to 1999, and the Gregory-Hansen (1996) cointegration test, investigated the sustainability of current account deficits in four Asian countries - Indonesia, the Philippines, Thailand and Malaysia. The results revealed that there is cointegration relationship between exports and imports for Indonesia, the Philippines and Thailand.

Tang and Mohammad (2005) examined the cointegration relationship between the volume of exports and imports of 27 OIC countries, using Engle and Granger's cointegration technique. Only four of the countries – Benin, Burkina Faso, Cameroon and Guyana – exhibited cointegration relationship. Tang (2006) re-examined the cointegration relationship between exports and imports for OIC member countries, using Gregory and Hansen's (1996) cointegration test with structural break, and export as the dependent variable. The results revealed cointegration between exports and imports for 9 out of the 27 countries selected for the study. These are Bangladesh, Cameroon, Chad, Guyana, Indonesia, Mali, Morocco, Niger and Senegal. Jain and sami (2012) found exports and imports cointegrated in Singapore from 1976 to 2009 using the bounds testing cointegration approach. The long-run association between Pakistan's exports and imports was investigated by Ali (2013). The empirical analysis revealed that a long-run relationship exists between the two variables. The error correction model results revealed that exports and imports converge towards the long run equilibrium. Al-Khulaifi (2013)

and Uddin (2009) reported similar finding for Qatar and Bangladesh respectively.

Pillay (2014) investigated the long run relationship between South Africa's exports and imports, using Johansen's Maximum Likelihood cointegration technique, with import as the dependent variable, and using quarterly data for the period, 1985 to 2012. The empirical results revealed that a statistically significant cointegration relationship exists between exports and imports.

Babatunde (2014) examined the long run relationship between Nigeria's aggregated and disaggregated exports and imports for the period, 1960 to 2013, and using Johansen, Bounds testing and the Hansen parameter test cointegration techniques. The empirical results showed that Nigeria's exports and imports at the aggregate and disaggregated level are cointegrated with the cointegrating coefficient very close to unity. Sahoo, Babu and Dash (2016) used the Bayer-Hanck (2013) combined cointegration test to examine the long run relationship between exports and imports for China and India. The results indicate that China has a sustainable current account balance in the long run.

Afonso et al. (2017) assessed the current account sustainability in the European Union using two complementary approaches. First using Quarterly time series and panel data for the period, 1970-2015, conducted stationarity and cointegration tests on exports and imports of goods and services. Secondly, they used annual data over 1995-2015 to assess the level of trade balance that stabilizes the net international investment position of these countries. From the first assessment the results showed that sustainability could not be rejected for Austria, Belgium, Denmark, Estonia and Germany.

Studies that have considered the cointegration relationship between exports and imports to be either weak or nonexistent include Keong et al. (2004), Cheong (2005), Konya and Singh (2008), Dumitriu, et al. (2009) and Hussein (2014) among others.

Keong, et al. (2004) examined the long run relationship between exports and imports in Malaysia using cointegration technique. The study did not find cointegration relationship between these two variables. Cheong (2005) found no evidence of cointegration between Malaysian exports and imports. On a similar note, Konya and Singh (2008) investigated the presence of cointegration relationship between exports and imports in India using annual data for the period, 1949/50 – 2004/05 and the Johansen cointegration methodology. The results revealed that Indian exports and imports do not exhibit cointegration relationship.

Dumitriu, et al. (2009) employed the dynamic relationship between the Romanian exports and imports using monthly data from January 2005 to March 2009. They tested the cointegration and causality relationship between the two variables. The study came up with the conclusion that the Romanian current account deficit is not sustainable. Also, Hussein (2014) examined the long run convergence between exports and imports for nine MENA (Middle East and North African) countries, using annual data and the bounds testing approach to cointegration. The study reported cointegration between exports and imports for Iran, Israel, Jordan and Tunisia, but failed to find long run relationship for Algeria, Egypt, Morocco, Sudan and Syria, thus violating their international budget constraint.

3. Methodology of the Study

3.1 Theoretical framework and Model Specification

Pillay (2004) and Al-Khulaifi (2013) following the works of Hakkio and Rush (1991), Husted (1992) and Herzer and Nowak-Lehman (2006) provided a framework of inter temporal budget constraint that implies a long run equilibrium relationship between exports and imports. The framework made the following assumptions

- (i) The presence of a representative agent of a small open economy without government
- (ii) This agent produces and exports a single composite good
- (iii) He can borrow and lend money in international markets at the world interest rate using one- period financial instrument
- (iv) He has the objective of maximizing life-time utility subject to budget constraint
- (v) His current period budget constraint is given as:

$$C_t = Y_t + \beta_t - I_t - (I + r_t)\beta_{t-1} \text{-----(1)}$$

Where, C_t , Y_t , β_t , I_t and r_t represent current consumption, output, international borrowing, investment and one-year period world interest rate respectively, and $(I + r_t)\beta_{t-1}$ is the debt of the agent from the previous period.

In deriving a testable model, Hosted (1992) made several assumptions including that the world interest rate is stationary, and that exports and imports are non-stationary at levels. The testable model derived by him is of the form shown below:

$$XP_t = \alpha + \beta MP_t + e_t \text{-----(2)}$$

A variant of the above model adopted in this study in line with Arize (2002) is given as

$$MP_t = \alpha + \beta XP_t + e_t \text{-----(3)}$$

Where, MP_t and XP_t are imports of goods and services and exports of goods and services respectively. Sustainability of the inter temporal budget constraint requires that the necessary and sufficient conditions be met. The necessary condition is that exports and imports be cointegrated; while the sufficient condition is that the

coefficient β in equation 2 or 3 be equal to unity (one).

Using equation 3, current account is not sustainable in the long run if XP and MP are not cointegrated, and more importantly, if XP and MP are cointegrated but the coefficient $\beta > 1$. When $\beta > 1$, current account imbalance is not sustainable in the long run because imports are growing faster than exports and the country is in violation of its inter temporal budget constraint.

3.2 Data Sources and Estimation Procedure

The data employed in this investigation are obtained mainly from Central Bank of Nigeria Statistical Bulletin (2015). Data on imports and exports of goods and services in current local currency units were collected on quarterly basis for the period 1970Q1 to 2015Q4. The analysis began with the verification of the integration and cointegration properties of the data set. The Augmented Dickey Fuller (ADF) test proposed by Dickey and Fuller (1979) was employed to verify the presence or otherwise of unit root in the data series. This became necessary in order to avoid spurious regression results. To test for the cointegration relationship among the data series, the Autoregressive Distributed Lag (ARDL) bounds testing cointegration technique was adopted. The advantages of this approach over other cointegration approaches are that it can be used regardless of whether the time series are integrated of order I(0), I(1) or fractionally integrated; the OLS estimates of the short run parameters within the ARDL framework are consistent, and the estimates of the long run coefficients are incredibly reliable in small samples (Pesaran et al.,2001).

The ARDL specification of equation 3 above is given as

$$\Delta LMP_t = \alpha_0 + \sum_{i=1}^n \alpha_{1i} \Delta LMP_{t-i} + \sum_{i=0}^n \alpha_{2i} \Delta LXP_{t-i} + \beta_1 \Delta LMP_{t-i} + \beta_2 \Delta LXP_{t-i} + \mu_t \text{-----(4)}$$

Where,

LMP = Log of Real Imports, LXP = Log of Real Exports, Δ denotes the first difference operator, α_0 is the drift component and μ is the serially independent random error with zero mean and finite covariance matrix. The left hand-side is the import variable. The expressions carrying the summation sign ($\alpha_1 - \alpha_2$) on the right hand-side represents the short-run dynamics if the model. The expressions immediately after these ($\beta_1 - \beta_2$) are the corresponding long-run multipliers of the model. From equation 4, the null hypothesis of no cointegration relationship ($H_0 : \beta_1 = \beta_2 = 0$) is first tested against the alternative ($H_1 : \beta_1 \neq \beta_2 \neq 0$) using the F-test with upper and lower critical values that are calculated automatically. Cointegration is present if the computed F-statistic exceeds the upper critical bound value, and the null hypothesis of no cointegration is rejected. If F-statistic falls between the upper and lower bounds, then the test is inconclusive. If it falls below the lower critical bound value, then there is no cointegration relationship. If it is found that cointegration relationship exist between the two variables (exports and imports), the next stage is to compute equation 4 in order to obtain the long-run and error correction estimates of the ARDL model.

4. Empirical Results

4.1 Unit Root Test

As a first step in our empirical analysis the unit root test was conducted using the Augmented Dickey Fuller unit root test, in order to determine the stationarity status of the series. The results of the test are reported in Table 1 below.

Table 1. ADF Unit Root Test Results

| Variable | Level | First Difference | Conclusion |
|-------------------|---------|------------------|------------|
| LMP | -1.7082 | -13.3683 | I(1) |
| LXP | -1.9105 | -13.9048 | I(1) |
| 5% Critical Value | -2.8777 | -2.8777 | |

Source: Author's computation using Microfit 5.0

The results indicate that all the variables are integrated at first difference. In other words, exports and imports are stationary at first difference. Since export and imports are integrated of order one, the next stage is to test for the cointegration relationship. The result of this test is reported in Table 2 below.

Table 2. ARDL Bounds Cointegration Test Results

| 5%Level | 10% Level | Computed F - Statistic | K |
|-------------|-------------|------------------------|---|
| I(0) I(1) | I(0) I(1) | 8.136 | 2 |
| 5.067 5.879 | 4.103 4.858 | | |

Note: K=2, where K represents the number of regressors

Source: Extracted from ARDL Bounds test, using Microfit 5.0

The ARDL bounds test results as shown in the above table reveal that export (LXP) and imports (LMP) are cointegrated since the computed F-statistic of 8.136 is higher than the upper bounds critical value of 5.879 at 5% level of significance. Consequently, the null hypothesis of no cointegration relationship between these variables is rejected for Nigeria. By this result, the necessary condition for sustainability of current account deficit in Nigeria is satisfied. This result agrees with Ayadi, Williams and Hyman (2013) and Babatunde (2014) and Olamide and Oni (2016).

The estimated long run coefficients of the ARDL model using the SBC and AIC criteria are reported in Table 3 below.

Table 3. Estimated long run Coefficients

| Variable | Coefficient | T – Values | P – Values |
|----------|-------------|------------|------------|
| LXP | 0.919 | 21.996 | 0.000 |

Source: Author’s computation using Microfit 5.0

The result shows that relationship between imports and exports is positive and statistically significant at 1% level. The estimated value of β is closer to unity (0.92%) and suggests that imports in Nigeria are fully covered by export earnings during the sample period, and are therefore not in violation of their intertemporal budget constraint. Specifically, a 1% increase in exports is associated with a 0.92% increase in imports, resulting in sustainable current account position during the sample period. This result agrees with Olamide and Oni (2016) but contrast with Ayadi, et al (2013) who found cointegration between exports and imports in Nigeria but the current account position was unsustainable in the long run.

Equally reported is the error correction estimates as presented in Table 4 below.

Table 4. Error Correction Representation of the ARDL Model

| Variable | Coefficient | T – Values | P – Values |
|----------------|-------------|-----------------|---------------|
| dLMP1 | -0.259 | -4.003 | 0.000 |
| dLXP | 0.334 | 6.477 | 0.000 |
| ecm (-1) | -0.363 | -6.766 | 0.000 |
| R ² | 0.329 | R – Bar Squared | 0.318 |
| RSS | 54.338 | F – Statistic | 29.123(0.000) |
| AIC | -152.247 | LL | -148.247 |
| D.W | 2.159 | SBC | -158.655 |

Source: Author’s computation using Microfit 5.0

5. Concluding Remark

This paper has empirically investigated the sustainability of current account deficits in Nigeria using quarterly data for the period spanning from 1970Q1 to 2015Q4. The ARDL Bounds testing approach to cointegration was employed to ascertain the long run relationship between Nigeria’s exports and imports, after the time series properties of the data series had been tested using the Augmented Dickey Fuller (ADF) test. The results revealed that exports and imports are stationary at first difference, and that a long run relationship exists between these variables. The results of the long run coefficient of the ARDL model revealed that the coefficient of the export variable is closer to unity (0.92). What this suggests is that imports in Nigeria are fully covered by export earnings during the sample period. Based on these results, which showed that Nigeria’s exports and imports are cointegrated, with the cointegrating coefficient very close to zero, it is concluded that Nigeria has sustainable current account balance in the long run, and that there is no violation of its inter temporal budget constrained. The results also revealed that macroeconomic policies in Nigeria have been very effective in bringing exports and imports into equilibrium in the long run, and that the imbalances experienced are short term concerns. In order to maintain this growth momentum, it is recommended that policies be put in place that would enhance the rate of growth of the country’s exports.

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