Effects of Trade and Exchange Rate Policies on Imports and Trade Tax Revenue in Nigeria

Adeolu O. Adewuyi
Department of Economics, University of Ibadan, Ibadan, Nigeria

This paper examines the impact of trade and exchange rate policies on import and trade tax revenue in Nigeria. This study, which covers 1970 - 2007, adopted the ordinary least squares (OLS) method, and some diagnostic tests were performed. Time series properties of the variables were tested and error correction models were estimated. Results show that the average tariff in Nigeria has a negative impact (hinders) on import, with an impact lag. Specifically, it produced a significant negative impact on consumer goods and raw material imports, but a significant positive effect on capital goods import. The case of capital goods import is different, perhaps because of the various waivers and low tariff on this type of import. Real exchange rate is found to have an unstable or unpredictable relationship with import of all categories. Real GDP produced a significant impact on all the four categories of imports. The coefficient of income elasticity of demand for import varies from 1.6 in the case of capital goods import to 1.2 in respect of consumer goods import. In the same vein, results show that tariff has a positive and significant relationship with trade tax revenue, with an impact lag. Real exchange rate is found to have an unstable or unpredictable relationship with trade tax revenue. Real GDP produced a positive and significant impact on trade tax revenue, with an impact lag. The foregoing therefore suggests that the link between import and trade tax revenue is trade and exchange rate policies. Some policy recommendations are made to inform the finetuning of existing policies.

Introduction

The role of macroeconomic policies, particularly those on trade and exchange rate, in promoting macroeconomic performance, including growth of government revenue cannot be overemphasized. This is because these policies have been found to have direct influences on tax bases, such as sectoral output, exports, imports, consumption, and overall output of the economy (Tanzi, 1989; Adewuyi, 2005).

There has been controversies and debates in both theoretical and empirical literature concerning the impact of trade and exchange rate policy reforms on trade tax revenue. One of the arguments is that trade reform (reduction of both tariff and non-tariff barriers) lowers tariff revenue (Khattry et al, 2002). Another says that trade reform results in a rise in the volume of imports, and hence, an expansion of tax base which in turn raises tariff revenue (Agbeyegbe et al, 2003). The overall effect of trade reform depends on the magnitude of the increase in demand for imports, the response of different import categories to the reform, and differences in duty rates applicable to the various groups of import (Agbeyegbe et al, 2003; Economic Commission for Africa, 2004; Khattry et al, 2002). Given these controversial positions, there is a need to investigate the case of Nigeria so as to provide useful recommendations for policy. Besides, a review of the literature shows that results reported by previous studies have been contradictory and inconclusive. This therefore informs further studies in this area. This is part of the motivation for this study.

A number of studies have been undertaken in the area of tax revenue and import in Nigeria in recent times. However, many of them have focussed
exclusively on either tax revenue or import, without linking the two together. For instance, issues such as productivity of the Nigerian tax system and sustainability of tax revenue were examined by Ariyo (1997). Also investigated was the impact of value added tax (VAT) on key sectoral and macroeconomic aggregates (Ajakaiye, 1999). Among those that have worked on import (Olayide, 1968; Ozo-Eson, 1984; Ajayi, 1975; Egwaikhide, 1999), none of them has linked it directly with either trade tax revenue or trade and exchange rate policies. Thus, the impact of trade policy on tax revenue should be assessed in a comprehensive manner by looking at the transmission mechanism through import. This also informs this study.

The emerging questions therefore are:

1. What are the roles of trade and exchange rate policies in promoting trade tax bases (particularly imports), and hence, trade tax revenue in Nigeria?
2. What are the impacts of trade and exchange rate policies on a major trade tax base-import?
3. What is the relationship between trade and exchange rate policies and trade tax revenue in Nigeria?
4. What is the link between import and trade tax revenue?

The main objective of this paper therefore is to examine the impact of trade and exchange rate policies on imports and trade tax revenue, and to analyse the linkage of import and trade tax revenue through policies.

Overview of Trade and Exchange Rate Policies in Nigeria

Prior to the introduction of the Structural Adjustment Programme (SAP) in 1986, custom duties were as high as 300%. But due to trade policy reforms undertaken during SAP and trade negotiation at both multilateral and regional levels, it has come down drastically. There was exchange control before SAP was introduced. With the adoption of SAP, a package of macroeconomic policy reform was implemented. Among these reforms were liberalization of trade and payments and adoption of market-determined naira exchange rate. Liberalization of trade regime started with a partial removal of quantitative restrictions in 1986, which ushered in interim measures that resulted in a reduction of the number of items in the import prohibition list, from 72 to 17 product categories. Thus, there was selective import prohibitions and elimination of import licensing. Coupled with this was a tariff reform, which was instituted via the Customs, Excise and Tariff Consolidation Decree 1988. This decree featured a new classification based on the Harmonized System of Tariff Classification (HS Chapters), which permitted direct international comparison of the country’s tariff lines and levels. It also featured a seven-year tariff regime, so as to ensure stability and predictability. This reform was continued with Decree No. 4 of 1995, which specified another seven-year tariff regime, spanning 1995 to 2001 (Ogunkola, Bankole and Adewuyi, 2006).

Consequent upon the reform, tariff policy became more liberalized than the pre-SAP period. Between 1988 and 2001, the tariff rate ranged from an average of 33.6 to 27.5%, and fell further to about 25% in 2003 (Ogunkola, Bankole and Adewuyi, 2006). Export policy reform during SAP led to the abolition of export duties, scrapping of commodity marketing boards, and the abrogation of export licensing and duties in 1986. Various export incentive schemes and other complementary policies (exchange rate reform, interest rate deregulation, etc) have been introduced since 1986. The naira depreciated significantly during the SAP period, and various exchange rate systems, including the Dutch Auction System (DAS) have been implemented to achieve stability. The average tariff reduced from a mean of about 22.0% to an average of about 13.0%. In effect, the import penetration ratio, which was a mean of about 17.0%, rose to an average of 22.0% in the SAP period.

The post-SAP period has been characterized by a mixed trade policy stance. However, analysis of tariff revenue and import data from the Central Bank of Nigeria show that average import tariff fell further and the degree of openness of the economy increased. With the relative stability in the exchange rate achieved in the post-SAP period, the rate of inflation
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declined. The objectives of adopting the current National Economic Empowerment and Development strategy (NEEDS) include designing favourable macroeconomic policies to promote private sector activities, so as to boost the level of non-oil tax revenue in Nigeria (National Planning Commission, 2004).

The Uruguay Round, which was concluded in the mid-1990s, had substantial impact on tariffs in the developing countries, including Nigeria. Tariff fell between 2.0% and 75.0%, following the implementation of the Round. The trade liberalization scheme at the regional level, particularly at the Economic Community of West African States (ECOWAS), in which Nigeria is a founding member, has led to the adoption of the common external tariff (CET), which ranges between 0 - 20%. This has consequently resulted into a further fall in tariff rates in Nigeria to between 0 - 35% beginning from 2006 (35% is the fifth band of tariff negotiated by Nigeria and approved by the ECOWAS) (Adewuyi, 2010).

Overview of Trends and Structure of Imports and Trade Tax Revenue in Nigeria

Prior to the discovery of oil, agriculture was the mainstay of the Nigerian economy, in terms of provision of output, employment, exports, imports and income. It contributed a significant proportion of total revenue during this period. By 1970, non-oil activities (in which agric is a major part) accounted for over 70.0% of total revenue. However, at the discovery of oil, particularly after 1970, oil displaced agriculture as the main source of government revenue.

Trade tax revenue (TTR) in Nigeria was low in the 1960s and early 1970s. It was ₦370.0 million in 1970, before it more than doubled in 1975 to ₦760.7 million. The significant rise in trade tax revenue could be due to the fact that the value of import to the country increased substantially from ₦756.4 million in 1970 to ₦3721.5 million in 1975. The increase in import around this period could be attributed to the oil export boom of the 1970s. There were further increases in TTR to ₦1813.5 million in 1980 and ₦2183.5 million in 1985. The remarkable increase in import recorded in 1990 reflected in the TTR, as it increased to ₦8640.9 million in the same period. It could be noticed that there was a direct relationship between TTR and import. This is because TTR rises as import rises. By the mid-1990s, the pattern of relationship changed, as there was an appreciable increase in TTR in 1995 to ₦37364.0 million. The ratio of trade tax revenue to import (TTR-import ratio) declined from 82.7% in 1985 to 75.8% in 1990. This implies that the TTR did not increase as much as the rate of total import. The TTR continued to increase thereafter, as it stood at ₦101,500 million in 2000 and ₦170,600 million in 2001. This was also accompanied by a decline in the TTR-import ratio. The improvement in TTR was steady till 2007, though not without a decline in the TTR-import ratio. The downward trend of the TTR-import ratio during the period was due to the various policy reforms at different levels (unilateral, bilateral and multilateral) (Ogunkola, Bankole and Adewuyi, 2006).

Nigeria’s imports can be broadly categorized into three: consumer goods import, capital goods import and raw materials import. The share of raw material imports in the total imports fluctuated throughout the period of study. It was 33.1% in 1970 and dropped to 26.9% in 1975. The raw materials import share of total imports got to its peak of 45.3% in 1995 and has been declining since then. It stood at 34.8% in 2007. Consumer goods imports accounted for 28.9% of the total import in 1970. The share of this type of import rose to 30.5% in 1975, but dropped to 27.9% in 1980. Despite the decline in the total imports in 1985, the share of consumer goods imports dropped from 37.4% to 26.7% in 1990. The share of consumer goods imports in the total imports increased consistently from 33.1% in 1995 to 44.6% in 2003. Although, the share dropped to 24.8% in 2004, it rose again in the subsequent year and remained at this point till 2007. The import of capital goods has been fluctuating since 1970. It rose from 37.7% in 1970 to 42.3% in 1975. It dropped to 31.4 percent in 1980. Despite the decline in the total imports in 1985, the share of consumer goods imports dropped from 37.4% to 26.7% in 1990. The share of consumer goods imports in the total imports increased consistently from 33.1% in 1995 to 44.6% in 2003. Although, the share dropped to 24.8% in 2004, it rose again in the subsequent year and remained at this point till 2007. The import of capital goods has been fluctuating since 1970. It rose from 37.7% in 1970 to 42.3% in 1975. It dropped to 31.4 percent in 1985. The value increased to 40.5% in 1990, but dropped again to 21.5% in 1995, and remained at 21.15 between 2000 and 2002. The share of capital goods imports continued to fluctuate and reached 33.7% in 2007 (table 1).
### Table 1. Composition of Imports, Real Exchange Rate and Trade Tax Revenue (1970-2007)

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumer goods import (%)</th>
<th>Capital goods import (%)</th>
<th>Raw materials goods import (%)</th>
<th>Total import value (₦ million)</th>
<th>Real exchange rate</th>
<th>Trade tax revenue (₦ million)</th>
<th>TTR-import % (Ave. Tariff)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>28.9</td>
<td>37.7</td>
<td>31.1</td>
<td>756.4</td>
<td>0.71</td>
<td>370</td>
<td>48.92</td>
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<tr>
<td>1975</td>
<td>30.5</td>
<td>42.3</td>
<td>26.9</td>
<td>3721.5</td>
<td>0.61</td>
<td>760.7</td>
<td>67.02</td>
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<tr>
<td>1980</td>
<td>27.9</td>
<td>30.2</td>
<td>32.9</td>
<td>9095.6</td>
<td>0.54</td>
<td>1813.5</td>
<td>71.46</td>
</tr>
<tr>
<td>1985</td>
<td>37.4</td>
<td>31.4</td>
<td>28.9</td>
<td>7062.6</td>
<td>0.89</td>
<td>2183.5</td>
<td>82.66</td>
</tr>
<tr>
<td>1990</td>
<td>26.7</td>
<td>40.5</td>
<td>32.8</td>
<td>42717.9</td>
<td>8.03</td>
<td>8640.9</td>
<td>75.76</td>
</tr>
<tr>
<td>1995</td>
<td>33.1</td>
<td>21.5</td>
<td>45.3</td>
<td>755127.7</td>
<td>21.88</td>
<td>37364</td>
<td>14.95</td>
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<tr>
<td>2000</td>
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<td>21.1</td>
<td>39.4</td>
<td>985022.4</td>
<td>102.10</td>
<td>1015000</td>
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<td>2001</td>
<td>38.8</td>
<td>21.1</td>
<td>39.4</td>
<td>1358180.3</td>
<td>111.94</td>
<td>170600</td>
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<tr>
<td>2002</td>
<td>39.2</td>
<td>21.1</td>
<td>39.4</td>
<td>1512695.3</td>
<td>120.93</td>
<td>181400</td>
<td>30.59</td>
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<tr>
<td>2003</td>
<td>44.6</td>
<td>23.2</td>
<td>31.8</td>
<td>2080235.3</td>
<td>129.30</td>
<td>195500</td>
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<td>2004</td>
<td>24.8</td>
<td>23.8</td>
<td>29.7</td>
<td>1987045.3</td>
<td>133.50</td>
<td>217200</td>
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<td>2005</td>
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<td>3412176.6</td>
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<tr>
<td>2007</td>
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<td>33.7</td>
<td>34.8</td>
<td>4381930</td>
<td>125.83</td>
<td>275142</td>
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The exchange rate of the naira to major currencies of the world, particularly the pound and the dollar, was very strong prior to the early 1980s, when reforms were introduced. The introduction of the Structural Adjustment Programme (SAP) in 1986 changed the pattern.

With the devaluation of the naira and liberalization of the foreign exchange market, as well as external trade and payment system, the naira exchange rate moved from₦0.89 to $1 in 1985 to₦8.03 to $1 in 1990. This might have hampered the importation of goods and services, as the devaluation of the naira makes prices of goods dearer. By 2000, the exchange rate was₦102.10 to $1, and has since been on the increase. It rose to₦133.50 to $1 in 2004, though it depreciated to₦125.83 to $1 in 2007.

### Literature review

**Review of Empirical Literature on Policy Determinants of Imports**

Razafimahefa and Hamori (2005) using the Unrestricted Error Correction Method-based ‘bounds test’ to investigate cointegration, analysed the long-run relationship among the variables in the aggregate import demand functions of Madagascar and Mauritius, in order to evaluate the appropriateness and effectiveness of the Structural Adjustment Programmes (SAP). The study confirmed the existence of cointegration relationship, and therefore concluded that the stabilization and devaluation policies under SAP can be effective in reducing import demand. Leith (1974) in a wider study, estimated an equation describing the behaviour of the import system in Ghana, taking into account GDP and licensing, but not the price-level-deflated effective exchange rate facing importers, because the latter was not a restraining influence on imports during the period under study. The study found that GDP in current prices and the licensing dummy of pre-devaluation experienced continued to explain the level of imports. The system governing imports did not appear to have changed significantly with devaluation.

Abby and Clark (1974) estimated import demand function for Ghana using a nine-commodity
classification. The sample period used consisted of two sub-periods: 1956 to 1961, in which there were no import quotas, and 1962 to 1969, in which import quotas were applied. For the no-quota period, import of all commodities, except mineral fuel and machinery and transportation equipment, were observed to be explained by real disposable income alone or together with relative price. They argued that the quotas were not effectively applied during the quota period. Most of the quotas were not commodity-specific, but instead, permitted buyers to import over a wide-range of commodities. As a result, there was no way of knowing what the value of imports would be for a specific commodity classification.

Jebuni, Oduro and Tutu (1994) in a broad-based macroeconomic model (with trade sector) of Ghana, estimated an aggregate import demand for the country. The model used in this study was based on Khan and Knight (1988), except that they replaced relative prices by the real exchange rate to reflect the emphasis of the paper. Using ordinary least squares (OLS), they indicated that the real exchange rate has a significant effect on imports, but with the unexpected sign. The results showed that real devaluation increases the level of imports, which they claim was as a result of the fact that the country was highly-dependent on imports for key sectors, such as industry, mining and timber. Also, they found out that liberalization has led to an increase in import volumes and real import values.

... studying the East Asia crisis and its impact on the Ghanaian economy, Dordonu and Sackey (1998) estimated that overall imports depended on Ghana’s income earnings from exports (capacity to import) and exchange rate. They also found out that there is a positive relationship between imports of capital equipment and raw materials, and such variables as domestic income, earnings from exports, and terms of trade. However, a negative relationship was observed between capital imports and the exchange rate variable. An important issue noted from their regression results is the positive causal relationship between capital imports and export earnings. Their results also show a similar positive causal relationship between Ghana’s imports of consumer goods and export earnings.

Mwega (1993) used an error correction model and Chow test to estimate the elasticities for aggregate imports and components stability during trade liberalization in Kenya, for 1964 - 1991. The paper shows that short-run relative price and real aggregate import demand elasticities are weakly significant. On the other hand, aggregate imports were strongly responsive to lagged foreign assets and foreign receipts. The Chow test revealed the stability of the function.

Egwaikhide (1999) also estimated error correction specification of import demand model for Nigeria, and indicated that foreign exchange earnings, relative prices and real income all significantly determine the behaviour of total imports in the reference period. These findings also show that the short-run import decisions are determined by the dynamics of foreign exchange, which is tied to the long-run effect through the feedback mechanism. The results of the disaggregated imports also reveal the importance of foreign exchange.

Harvey and Sedegah (2007) analysed the structure of, and model demand for imports into Ghana using time series data from 1967 to 2004. They also assessed the long-run and short-run elasticities of aggregate imports and their components, and determined whether the import demand function has shifted during the period under consideration. Empirical results show that the policies under the trade liberalization have specific impact on demand for individual import categories. However, the different impacts on import categories lead to neutral impact of the trade liberalization on aggregate import demand.

Khan (1974) estimated the import demand function for fifteen developing countries of Asia, Latin America and Africa, for 1951 - 1969. This study adopted two stage least squares method of two forms of equations of import demand. Empirical results indicated that prices appear to play an important role in the determination of imports. In a number of developing countries, the estimated price...
elasticities were found to be fairly high. In 1975, Khan again conducted an analytical (empirical) study on import demand function in Venezuela for 1953-1970, using OLS. The same variables showed that the simple specifications involving only relative prices and real income as explanatory variables are adequate to explain a large proportion of the variation of Venezuelan imports; this is true at the aggregated as well as disaggregated levels. With the exception of the imports of construction materials, tobacco and beverages, all other categories of imports have price elasticities that are significantly different from zero at 5% level and have the expected negative signs.

Ajayi (1975) introduced some dynamism into the modelling of import demand by observing the behaviour out of equilibrium through the specification of a partial adjustment mechanism for retained imports. He studied factors that are important in the determination of imports in Nigeria for 1960 - 1970, and using OLS, found that relative prices and real income are important determinants of the demand for retained imports. When the retained import per capita was used as the dependent variable, relative prices, foreign exchange availability per population and real income were all found to be important determinants, which did coincide with both studies done by Khan.

Moran (1989) formulated an empirical model, where import volumes and relative import prices are determined endogenously, when he studied import demand for developing countries for the period of 1970 – 1983. He argued that consistent estimates of the demand elasticities can only be obtained by using a simultaneous equation procedure such as two-stage least squares (see also Arize and Afifi, 1987). The empirical results show that although price and income effects are important in the analysis of imports in developing countries, it appears that foreign exchange constraints also play a critical role in determining imports. Import demand estimation should also account for the endogeneity of the domestic prices of imports.

Arize and Afifi (1987) utilised the iterative Cochrane–Orcutt method to produce two-stage least squares estimates in one large econometric study. They examined the import demand functions of 30 developing economies, including 27 countries in Africa. Their results show that import functions are stable for the entire sample. Price elasticities are generally large, and import demand appears to be more responsive to variations in domestic goods prices than to import prices.

Senhadji (1997) estimated import functions for 77 countries during the period of 1960 – 1993. For most of the countries, a unique long-run relationship between import demand and its determinants was found. The cointegrating vector is estimated using the fully-modified technique suggested by Phillips and Hansen (1982). The price elasticity is generally close to zero in the short-run and slightly larger than 1 in the long-run; while income elasticity is smaller than 0.5 in the short-run and rises to around 1.5 in the long-run. Industrial countries exhibit higher income and lower price elasticities than developing countries. Dutta and Ahmed (1999) also used the cointegration analysis and error correction models to examine the aggregate import demand function in Bangladesh. They identified a unique and stable relationship between the variables and also reported a substantial influence of income on import demand. Gumede (2000) examined aggregated and disaggregated import demand for South Africa in a framework of cointegration analysis. They obtained the long-run relationship among the variables from the two-step Engle-Granger technique and introduced it into a short-run dynamic model. Income elasticity is found to be much larger than price elasticity.

Tang and Nair (2002) evaluated the stability of the import demand function in Malaysia using the bounds test. Import demand, income and relative price are found to be cointegrated. Their study derives long-run income and relative price elasticities of 1.5 and 2.13, respectively.

It can be seen from the above that empirical studies of import behaviour in developing countries have generally concentrated on Asia and Latin America, while the African countries have been largely ignored. Many developing countries rely heavily on import controls for achieving adjustment...
in the balance of payments. In spite of this, most of the empirical analysis of imports of these countries has failed to address explicitly the issue of the impact of trade and exchange rate policies. This study therefore focuses on this neglected area.

Review of Empirical studies on Impact of Trade and Exchange Rate Policies on Trade Tax Revenue

Ebrill et al (1999) examined two complementary models of the determinants of import and international trade tax revenue. They employed a panel of 27 countries from Africa, Asia and the western hemisphere, spanning the period between 1980 - 1992. Using a fixed-effects and an instrumental regression framework, they concluded that tariff reforms do not necessarily lead to lower trade tax revenue. They found that, in both models, depreciation of the exchange rate is significantly related to higher trade tax revenues. This result reaffirms Tanzi’s hypothesis, but contrast with Ghura (1998), which found no significant linkage. In the same vein, Khattry and Mohan Rao (2002) looked into this issue, using a panel of 80 developing and industrialized countries, covering the period of 1970 - 1998. Adopting a fixed-effects regression framework, they found that the relationship between total tax revenue and international trade tax revenue and trade liberalization (measured by the openness ratio) is negative, but found no significant relationship between the exchange rate and international trade tax revenue.

Adam, Bevan, and Chambas (2001) investigated the relationship between tax revenue, exchange rates and trade openness in sub-Saharan Africa, using a difference Generalised Method of Moments (GMM) dynamic panel estimation. They reported that openness raises tax revenue in CFA franc countries, while it has little effect in non-CFA franc countries; though the disaggregated revenue outcome suggests that it raises trade revenue and lowers tax on goods and services. They also found that depreciation and removal of real exchange rate disequilibrium reduces tax yield in CFA countries, while it has the opposite effect in non-CFA countries. Their results vary by component of tax revenue. In the case of income taxes, the exchange rate has no significant impact in non-CFA countries, while depreciation has a significant positive impact in CFA countries, though it weakens over time. Equilibrium exchange rate has a negative effect on income taxes. For trade taxes, depreciation of the exchange rate is associated with higher revenue, though the precise effect differs across CFA and non-CFA countries. For goods and services taxes, real exchange rate depreciation and movement of misalignment in a more appreciated direction appear to increase goods and services taxes in non-CFA countries, but decrease the tax yield in CFA countries. They concluded that the poor revenue performance in the CFA countries is due to variations in environmental and structural factors, and to different responses to changes in the equilibrium real exchange rate, while misalignment of the exchange rate is also important.

Agbeyegbe, Stotsky and WoldeMariam (2004) examined the relationship between tax revenue, trade liberalization, and changes in the exchange rate. Further, they attempted to verify whether the mixed results found in the literature can be attributed to the use of different measures of the main variables, including the indices of trade liberalization, model specification and estimation methods. Employing a panel of 22 countries in sub-Saharan Africa, between 1980 and 1996, they considered two indices of trade liberalization and performed Generalized Method of Moment regressions. They reported that the result on the relationship between trade liberalization and tax revenue is sensitive to the measure used to proxy trade liberalization. Although the two measures do not provide results that are qualitatively different for total taxes, trade taxes, or goods and service taxes, they do provide qualitatively different results when income taxes were considered. They also reported that there is a positive and significant statistical relationship between trade liberalization and total revenues and trade taxes, but did not find clear-cut evidence that goods and service taxes are responsive to trade liberalization. Moreover, they indicated that there is a negative relationship between trade liberalization and income tax revenues. In a similar study, Adam et al (2001) did not find a strong link of
exchange rate with revenue. They concluded that although these results are still tentative, there is hope that some light have been shed on this issue for policymakers.

Brafu-Insaidoo and Obeng (2006) verified the direction and extent of the impact of import liberalization on import tax revenue in Ghana. Specifically, they evaluated the productivity of import tax revenue in Ghana. They also determined the effect of reduction in the average tariff rates on import tax revenue in the country and analyzed import duty evasion. They reported that their results do not sufficiently validate the proposition that trade liberalization is fiscally-incompatible. They found that trade liberalization improves tariff revenue in the short-run. They also noticed that real depreciation (as a result of liberalization of exchange rate) promote substantial rise in import value, thereby increasing tariff revenue in the short-run. They observed that, in the short-run, reduction in import duty rates works to reduce incentives for evasion. They stated, however, that leakages in the form of evasion still remain a problem in Ghana. They concluded that further measures have to be put in place to address the problems relating to tax evasion, and probably, further reduction in tax rates applicable to consumer goods import, and the imposition of super tax on luxury goods.

Baunsgaard and Keen (2005) addressed the issue of whether, over the past 25 years, countries have actually managed to offset reductions in trade tax revenue by raising their domestic tax revenue. They employed a panel data for 111 countries to address this issue. Empirical results show that high-income countries clearly have been able to achieve balance. In the case of the middle-income countries, recovery has been in the order of 45-60 cents for each dollar of lost trade tax revenue, with signs of close to full recovery when separately identifying episodes in which trade tax revenue declined. Unfortunately, however, revenue recovery has been extremely weak in low-income countries (which heavily rely on trade tax revenue). This group of countries has recovered at best, no more than about 30 cents of each dollar lost. They reported that there is insufficient evidence that the presence of a value-added tax has made it easier to cope with the revenue effects of trade liberalization.

Theoretical Review

A consensus has not been reached in the literature regarding the effect of trade reform on trade tax revenue. Nevertheless, a dimension of the argument is that trade reform (in the form of reduction in tariff and non-tariff barriers) reduces tariff revenue. For instance, Khattry et al (2002) advanced that efforts to liberalize trade lead to loss of revenue in most cases, without emergent alternative domestic revenue sources to replace the lost trade revenue. In another dimension, trade reform has been argued to engender a rise in volume of imports, and hence, an expansion in the tax base and revenue. The overall effect is, however, a function of the magnitude of increase in demand for imports, the response of different import categories to the reform and differences in duty rates applicable to the various groups of imports (Agbeyegbe, Stotsky and WoldeMariam, 2003; Commission of Africa, 2004; Khattry et al, 2002). The nature of the relationship between trade reform and tax revenue are determined by some factors, including the size of real devaluation, the restrictiveness of the trade regime, comprehensiveness, timing and sequencing of the trade reform policies and the characteristics of the economy (Tanzi 1989).

Analysis of revenue effect of trade reform is usually undertaken by examining the ‘Laffer’ effect. This effect shows that with high trade restrictions, initial cuts in tariffs induce an upsurge in trade volumes and revenues. However, further reductions in tariffs when the trade regime is already fairly-liberalized, only reduce the rate of increase in tariff revenues, which later declines in absolute terms (Economic Commission of Africa, 2004; Agbeyegbe, Stotsky and WoldeMariam, 2003; Khattry et al, 2002).

Trade policy reform is mainly thought to be linked to tax revenue through its effect on international trade tax revenue, though the precise
relationship depends on several variables, including the nature of trade reform and the response of imports and exports to the reform. Often the first step in trade reform is the replacement of quantitative barriers with import duties, which could result in higher trade tax revenue, depending on the level of duties that are set and the change in the value of imports in response to the liberalization measures. Trade reform ultimately leads to the reduction of import duties, and thus, would be likely to be linked to reduced international trade tax revenue (Ebrill, Stotsky and Gropp, 1999).

The relationship between trade reform and tax revenue is also uncertain and depends on a number of factors, including the structure of the tax system and administrative capabilities (Ebrill et al, 1999; Keen and Ligthart, 2002). Macroeconomic changes also have an influence on tax revenue. Tanzi (1989) presents several wide-ranging hypotheses of the relationship between various macroeconomic variables, including inflation and exchange rate, and tax revenue. He observes that there is often an inverse relationship between a country’s tax revenue and the real level of its official exchange rate. He argues that overvaluation has a direct effect by suppressing import and export bases measured in domestic currency terms. This reduces the collection of international trade taxes and sales and excise taxes, which are usually levied on domestic and imported consumption. Overvaluation also has indirect effects by reducing the incentive to produce goods for export, encouraging capital flight and currency substitution, weakening the balance of payments, encouraging black markets, and encouraging trade restrictions. He concludes that even in heavily indebted countries, where it is generally assumed that devaluation weakens the fiscal balance through its effect on debt service, higher revenues may offset increases in debt service so that the overall effect of devaluation is largely an empirical question.

Countries collect taxes in different ways. It is, therefore, not possible to generalize about the effect of changes in trade reform and the surrounding macroeconomic environment on tax revenues without examining the structure of the different components of revenues and the importance of each different component in the total. In addition, components of tax revenues interact in ways that may either reinforce or offset any changes in one on the other. Taxes constitute the largest share of revenues for most Sub-Saharan African countries, with the main exception being those that rely heavily on natural resource production such as Nigeria, where non-tax revenue may be dominant. Tax systems encompass a wide variety of taxes, which can be divided into three general categories: taxes on income and profits, taxes on goods and services, and international trade taxes. Corporate and personal income taxes are the components of the taxes on income and profits. General sales taxes and excises are the main components of taxes on goods and services. General sales taxes are mainly value added taxes (VAT) but may also include some turnover-type taxes.

Import and export duties are often in form of ad valorem levies on import and export values respectively. However, in some cases these taxes are imposed on a specific (or unit) basis or in some more complex form, especially export levies. The effect of trade reform on trade tax revenues is a function of a number of factors, including the structure of the reform. For instance, the substitution of tariffs for quantitative restrictions can raise revenues. The effect of tariff reductions depends on how the level and coverage of tariffs changes. With stable import values, a fall in tariffs reduces revenues from trade taxes and can equally be accompanied by reductions in revenues from excises and value-added taxes levied on imports. However, the variation in relative prices would induce changes in imports and exports. The effect on revenue depends also on the price elasticity of demand for imports and the price elasticity of supply of import substitutes. If imports are sufficiently price elastic, there may be a revenue gain.

Since trade reform often entails a significant reduction of the highest tariffs applied to goods that are mainly elastic in demand, the response in terms of higher imports may be sufficient to outweigh the revenue losses from a lower rate of tariff. The
elasticity of supply of import substitutes should also be taken into consideration. The lower this elasticity, the smaller the reduction in output for a given reduction in price of imports and the domestic good in a competitive market, and hence, the smaller the increase in import values. Since elasticities vary over the range of prices, the starting point for tariff changes is also important. If protectionist motives are dominant, tariffs may be above their revenue maximizing levels (Ebrill et al., 1999; Agbeyegbe, Stotsky and WoldeMariam, 2004).

Exchange rate adjustments translate directly into changes in domestic revenue on imports and exports. For a given level of imports or exports, a more depreciated real exchange rate would increase the base of trade taxes in domestic currency terms, which would in turn increase trade tax revenue. If the real exchange rate were stable, then there would likely be a little change in the share of import tax revenue in GDP, to the extent that a real exchange rate depreciation leads to a lower level of imports. This would offset to some extent the higher collections induced by higher domestic currency values. If aggregate elasticities of import demand were inelastic in the short-run, then the valuation effect would likely dominate, leading to an overall increase in revenue from imports. A real exchange rate depreciation would also tend to increase exports, which would lead to a decrease in revenue, as both the valuation and volume effect would support each other. In general, however, the tax effects on imports would dominate those on exports, since export taxes are insignificant in most countries today. In the short-term, imports are also likely to adjust more quickly than exports to a change in the value of the currency, reinforcing the importance of changes in import collections initially.

Even though at aggregate level, import demand is likely to be relatively inelastic in most developing countries, import taxes apply to a wide range of goods, some of which are elastic in demand, especially consumer or finished goods. These goods also appear to be subjected to the highest tax rates. Real depreciation of the exchange rate is likely to engender a shift in composition toward more price inelastic and less heavily-taxed goods, including domestic substitutes, adding to the factors that contribute to lower revenues.

Theoretical Framework and Methodology

**Theoretical Linkage Between Trade and Exchange Rate Policies, Imports and Trade Tax Revenue**

Theoretical framework and modelling exercise in this paper starts with the presentation of an import equation as follows:

A standard import function where real imports are assumed to be a function of relative prices (the real exchange rate) and domestic real income was adopted. Assuming that the price and income elasticities of demand for imports are constant, real import function can be written as (Thirlwall, 2003):

\[
RM = L \left( \frac{P_f E}{P_d} \right)^{\delta} NRY^{\delta_1} 
\]

Expressing equation (1a) in logarithm form and variables in real terms, we have:

\[
\log RM = \delta_0 + \delta_1 \log REXR + \delta_2 \log RGDP + e_t 
\]

where: RM is real import; L in equation (1a) is replaced with (\(\delta_0\)) in equation (1b) as a constant term; NRY is Nigeria's real income (RGDP), REXR-Real exchange rate (which is a combination of foreign and domestic price indices (Pf and Pd) and the nominal exchange rate (E)); \(\delta_1\) and \(\delta_2\) denote the price and income elasticities, respectively. Some authors (Brafu-Insaidoo and Obeng 2006) have directly incorporated tariff into the import equation such as (1b) to capture the impact of trade policy. This approach is also adopted in this paper, and the import equation to be estimated is expressed as follows:

\[
\log RM_t = \delta_0 + \delta_1 \log REXR_t + \delta_2 \log RGDP_t + \delta_3 \log AATR_t + e_{t,t}
\]

where: AATR is actual average tariff rate.
The consumer theory of demand forms the basis for explaining demand for imports with emphasis on the important roles played by income and relative prices in explaining individual demand. Summing up the individual demand for consumer imports constitutes the aggregate imports demand for the entire economy. The above shows that the determinants of imports are real exchange rate (nominal exchange rate adjusted for price level differential-REXR), real domestic income (NRY-RGDP) and tariff rate.

In order to link import with trade tax revenue, the following identity employed by Brafu-Insaidoo and Obeng (2006) is presented:

\[
RTTR = t_m RM \quad \text{(3a)}
\]

where: RTTR is real trade tax revenue in current year, \( t_m \) is the average effective tax rate on import and RM is real imports measured in domestic currency terms in current year. When expressed in log form we get the following:

\[
\log(RTTR) = \log t_m + \log RM \quad \text{(3b)}
\]

The estimation equation for trade tax revenue is derived from the equation (3b). Since regressing log RTTR on log \( t_m \) and log RM could give rise to an identity, thereby distorting the estimated coefficients, we replace the average effective tariff rate \( t_m \) with actual average tariff rates as follows:

\[
\log RTTR_t = a_0 + a_1 \log AATR_t + a_2 \log RM_t + e_t \quad \text{(3c)}
\]

where: AATR is actual average tariff rate, which replaces \( t_m \).

Determinants of real import (RM) in equation (1b) are introduced into equation (3c) so as to see the variables linking import (RM) with trade tax revenue (TTR). This gives rise to equation (4), which is written as follows:

\[
\log RTTR_t = c_0 + c_1 \log AATR_t + c_2 \log REXR_t + c_3 \log RGDP_t + e_t \quad \text{(4)}
\]

This equation shows that trade and exchange rate policies (variables) and real income are the links between import and trade tax revenue. A rise in real income, which promotes import, will also promote trade tax revenue and vice-versa. If trade and exchange rate policies promote tax bases (GDP and import), it will definitely promote trade tax revenue. Changes in tariff can have an independent effect on trade tax revenue. This is because changes in tariff without changes in GDP or import can influence trade tax revenue, depending on elasticity of import.

Methodology of the study

**Specification of Model**

Two equations are estimated in this paper, which are import equation (2') and trade tax revenue equation (4'). These two equations are as follows:

**Import equation**

\[
\log RM_t = \delta_0 + \delta_1 \log REXR_t + \delta_2 \log RGDP_t + \delta_3 \log AATR_t + \delta_4 DL + e_t \quad \text{(2')}\]

**Trade tax revenue equation**

\[
\log RTTR_t = c_0 + c_1 \log AATR_t + c_2 \log REXR_t + c_3 \log RGDP_t + DL + e_t \quad \text{(4')}\]

All the variables in this equation are as defined earlier. DL is a policy reform dummy variable introduced to capture the effect of trade and exchange rate policy shift, which takes the value of zero for the pre-reform period (1970 - 1985) and the value of one for the reform and post-reform periods (1986-2007).

**Measurement of variables**

All the variables in the equation are expressed in real values except for the tariff rate variables, and \( e_t \) as well as \( e_t \) represent well-behaved residuals. It should be mentioned that other determinants of imports, such as foreign exchange availability (FOREX) and external reserves (EXTRES) are used. It should also be mentioned that import equations are estimated at both aggregate (total import-TIMP) and disaggregate levels. The disaggregated import categories used are capital goods import (CAPGDIMP), raw materials import (RMIMP), and consumer goods import (CGIMP).
Data sources, Estimation Techniques and Scope of the Study

Data for variables used in the estimation of equations in this paper were gathered from various sources, including the publications of the Central Bank of Nigeria (the statistical bulletin, annual report and statements of account), the Federal Office of Statistics—now National Bureau of Statistics (National Account Statistics and Digest as well as Annual Abstract of Statistics), as well as World Bank publications (World and African Development Indicators).

Ordinary Least Squares (OLS) technique was adopted to estimate the equations in this paper. An investigation of the time series properties of the variables was conducted using the Augmented Dickey-Fuller (ADF) and the Philip Perron (PP) tests. Thereafter, Johansen's Co-integration procedure was used to establish the long-run relationship between the relevant variables and the error correction models were set up. The study period covers 1970 to 2007. Some diagnostic tests, such as those for serial correlation (Breusch-Godfrey Serial Correlation Lagragian Multiplier test), white heteroskedasticity, ARCH effect (LM) and normality tests (Jarque Bera) were conducted.

Empirical Analysis: Estimations, Presentation and Analysis of Results

This section presents the results of econometrics estimations based on already outlined specifications and estimation procedures. This analysis begins with testing for the time series properties of the variables through the Augmented Dickey Fuller (ADF) and Philips-Perron (PP) unit root tests and the Johansen co-integration techniques. Also, the estimation results of total and disaggregated imports are presented and analysed, as well as that of trade tax revenue equation.

Time Series Properties of the variables: Unit Root/Stationary Test

The result of the test for time series behaviour of each of the variables used in this paper is presented in table 2. The lag order selection for the ADF test is based on Schwartz Information Criterion (SIC). Newey-West Bandwidth is used for the bandwidth selection for the Phillips-Perron test. Based on the Mackinnon tabulated values, all the series are integrated of order one I(1). This result is consistent across the two tests.

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF test stat</th>
<th>Mackinnon critical value</th>
<th>PP test Stat</th>
<th>Mackinnon critical value</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log (AATR)</td>
<td>-5.370407</td>
<td>-3.6422</td>
<td>-11.1346</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (RTTR)</td>
<td>-4.639733</td>
<td>-3.6422</td>
<td>-7.247065</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (RTIMP)</td>
<td>-5.060321</td>
<td>-3.6422</td>
<td>-11.15658</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (RCAPGDIMP)</td>
<td>-3.66843</td>
<td>-3.6422</td>
<td>-7.34345</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (RRMIMP)</td>
<td>-4.997892</td>
<td>-3.6422</td>
<td>-8.539853</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (RCGIMP)</td>
<td>-4.461322</td>
<td>-3.6422</td>
<td>-8.387336</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (RGDP)</td>
<td>-4.137723</td>
<td>-3.6422</td>
<td>-5.612562</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (REXR)</td>
<td>-3.658814</td>
<td>-3.6422</td>
<td>-4.572077</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (RFOREX)</td>
<td>-4.24663</td>
<td>-3.6422</td>
<td>-7.325544</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
<tr>
<td>Log (REXTRES)</td>
<td>-4.917213</td>
<td>-3.6422</td>
<td>-6.090031</td>
<td>-3.6353</td>
<td>I (1)</td>
</tr>
</tbody>
</table>

Source: Computed
Co-integration Test
The results of the Johansen cointegration test using likelihood ratio are presented in Table 3 and the optimal lag length is determined based on Hannan-Quinn information criteria in line with Harris and Sallis (2003).

Table 3. Number of Co-integrating vectors and the Optimum Lag order

<table>
<thead>
<tr>
<th>Variable</th>
<th>Other variable in the test</th>
<th>No. of co-integrating vector</th>
<th>Lag Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log (RTTR)</td>
<td>Log (RGDP), Log (REXR), Log (RFOREX), Log (REXTRES)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Log (RTIMP)</td>
<td>-</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Log (RCAPGDIMP)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Log (RRMIMP)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Log (RCGIMP)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Computed

The trace statistics indicates the presence of 2 cointegrating vectors for the trade tax revenue and aggregate import equations. On the other hand, 1 cointegrating vector, each for the disaggregated components of import is observed. This therefore implies the existence of long-run relationships among all the variables in each of the models.

The Impact of Trade and Exchange Rate Policy on Imports
The estimation results of the dynamic model of imports are presented in this sub-section. Table 4 below gives the results of the impact of trade and exchange rate policies on aggregate and disaggregate imports, classified as: total real import, real capital goods imports, real raw material imports and consumer goods imports. The value of the Adjusted R-squared is high, which means that the explanatory variables are able to capture the behaviours of imports by as much as between 82.0 and 90.2%. The Durbin-Watson statistics depicts no auto-correlation problem. The diagnostic tests conducted found no significant problem of any kind, as the coefficients of the test statistics are not significant, indicating absence of autocorrelation, heteroskedasticity and normality problems.

The results reveal that tariff has an inverse relationship with all categories of imports, except capital goods. This implies that high level of tariff hinders imports, since it makes import expensive; while low level promotes import, which is consistent with the theoretical expectation. The result shows that the level of average tariffs in Nigeria produce negative (hinders) on import. Specifically, it produced a significant negative impact on consumer goods and raw material imports, but a significant positive effect on capital goods import. The case of capital goods import is different perhaps because of the various waivers and low tariffs on this type of import. This finding conforms to the result obtained by Brafu-Insadoo and Obeng (2006).

Real exchange rate is shown to have an unstable or unpredictable relationship with import of all categories. For instance, it is found to have a significant negative impact on total imports in the short-term, and a significant positive impact in the medium-term. This result is supported by the report of Khan (1974) and Ajayi (1975). Also, it has a significant positive effect on both real capital goods imports and real raw material imports in the short-term, and a significant negative impact in the medium-term, while its impact on consumer goods import is negative in both short and long terms. These results suggest that high exchange rate reduces the capacity of the economy to import capital goods and raw materials, but cannot reduce capacity to import consumer goods. The effect of exchange rate on the various categories of import depends on their income elasticities, and thus, the result in respect of consumer goods import may be due to the fairly income inelastic nature of this category of import. These results were supported by Egwaikhide (1999) and Jebuni, Oduru and Tutu (1994), who also found a similar result of real exchange rate on imports.

Analysis of the impact of real GDP shows that it produces a significant impact on all the four categories of imports (total import, capital goods import, raw materials import and consumer goods...
import) considered. This result is consistent with the theoretical expectation that income is a major determinant of (import) demand. The coefficient of income elasticity of demand for import varies from 1.6 in the case of capital goods import to 1.2 in respect of consumer goods import. Thus, while consumer goods import is fairly income elastic, capital goods import is highly income elastic, which implies that a small change in income will cause a more than proportionate change in import demand. The result is in line with the finding of Leith (1974), Egwaikhide (1999) and Brafu-Insado and Obeng (2006), who maintained that GDP explained the level of imports.

With respect to external reserves, the result reveals that although with a lag, it produced a significant positive impact on real total import, real raw materials import and real consumer goods import, but a significant negative impact on real capital goods import. This implies that a percentage point rise in external reserves increases total import, raw material imports and consumer goods imports by 40.5%, 18.3% and 41.8%, respectively, but results in a decline in capital goods imports by 77.4%. This result suggests that external reserves are used to finance import of final goods for consumption, and intermediate goods for generating current income at the expense of import of capital goods for development.

Table 4. Estimation result of imports equation by import types: dependent variables are log of real total import, real capital goods, real raw materials and real consumer goods imports (RTIMP, RCAPGDIMP, RRMMIMP and RCGIMP)

<table>
<thead>
<tr>
<th>Import category</th>
<th>RTIMP</th>
<th>RCAPGDIMP</th>
<th>RRMMIMP</th>
<th>RCGIMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>T-statistic</td>
<td>Coefficient</td>
<td>T-statistic</td>
</tr>
<tr>
<td>Constant</td>
<td>0.130657</td>
<td>1.335852</td>
<td>-0.215132</td>
<td>-3.061936*</td>
</tr>
<tr>
<td>D(Log Import by type)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-1)</td>
<td>-0.230415</td>
<td>-0.698581</td>
<td>2.026308</td>
<td>2.478880*</td>
</tr>
<tr>
<td>(-2)</td>
<td>0.914489</td>
<td>2.501531*</td>
<td>-0.523121</td>
<td>-0.94922</td>
</tr>
<tr>
<td>D(Log RGDP(-1))</td>
<td>1.690757</td>
<td>3.058146*</td>
<td>-1.004907</td>
<td>-1.600549</td>
</tr>
<tr>
<td>D(Log RGDP(-2))</td>
<td>- -</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D(Log REXR(-1))</td>
<td>-0.226251</td>
<td>-0.731522</td>
<td>1.884732</td>
<td>6.703273*</td>
</tr>
<tr>
<td>D(Log REXR(-2))</td>
<td>0.980605</td>
<td>2.457529*</td>
<td>-2.334128</td>
<td>-6.87282*</td>
</tr>
<tr>
<td>D(Log REXTRES(-2))</td>
<td>0.405881</td>
<td>2.795368*</td>
<td>-0.773972</td>
<td>-4.369885*</td>
</tr>
<tr>
<td>D(Log REXTRES(-4))</td>
<td>0.151104</td>
<td>1.379822</td>
<td>-0.985783</td>
<td>-5.933190</td>
</tr>
<tr>
<td>D(Log REXR(-1))</td>
<td>-2.959016</td>
<td>-2.372277*</td>
<td>0.52614</td>
<td>4.067838*</td>
</tr>
<tr>
<td>D(Log AATR(-1))</td>
<td>-2.079712</td>
<td>-4.963457*</td>
<td>0.669453</td>
<td>4.171664*</td>
</tr>
<tr>
<td>D(Log RFOREX(-1))</td>
<td>-0.319289</td>
<td>-1.300152</td>
<td>0.754073</td>
<td>4.807313*</td>
</tr>
<tr>
<td>D(Log RFOREX(-3))</td>
<td>0.575157</td>
<td>3.941877*</td>
<td>1.23469</td>
<td>5.610985*</td>
</tr>
<tr>
<td>DUMM</td>
<td>-0.499111</td>
<td>-2.713773*</td>
<td>0.542638</td>
<td>3.689592</td>
</tr>
<tr>
<td>D(ECM(-1))</td>
<td>-0.596644</td>
<td>-2.10858*</td>
<td>-0.386016</td>
<td>-2.345515*</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.945746</td>
<td>-</td>
<td>0.964898</td>
<td>-</td>
</tr>
<tr>
<td>Adj. R-Squared</td>
<td>0.87765</td>
<td>-</td>
<td>0.9029346</td>
<td>-</td>
</tr>
<tr>
<td>D-Watson statistic</td>
<td>2.144895</td>
<td>-</td>
<td>1.888778</td>
<td>-</td>
</tr>
<tr>
<td>F-statistic/prob.</td>
<td>11.46082</td>
<td>0.000033</td>
<td>6.22259</td>
<td>0.000594</td>
</tr>
<tr>
<td>Breusch-Godfrey Serial Correlation LM+</td>
<td>2.111234 (probability)</td>
<td>1.243678 (probability)</td>
<td>0.21099</td>
<td>2.23561</td>
</tr>
<tr>
<td>Heteroskedasticity +</td>
<td>0.906751</td>
<td>0.342189</td>
<td>1.00234</td>
<td>0.22242</td>
</tr>
<tr>
<td>ARCH LM+</td>
<td>1.54783</td>
<td>0.10678</td>
<td>2.31311</td>
<td>0.543601</td>
</tr>
<tr>
<td>Jarque Bera+</td>
<td>0.05003</td>
<td>0.45671</td>
<td>1.77342</td>
<td>0.2144</td>
</tr>
</tbody>
</table>

Source: Computation
* , ** , and *** indicate 1%, 5%, and 10% significance level, respectively

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Also, an important explanatory variable is availability of foreign exchange for import. The result reveals that although with lag, it has a significant positive effect on total imports, capital goods imports and consumer goods. Its effect on raw material import only becomes significant (but negative) in the medium-term (three-year lag). The result implies that the quantity of foreign exchange available in the economy determines import of all categories of goods. This result tends to be supported by Ajayi (1975) and Moran (1989), that foreign exchange constraint plays a critical role in determining imports.

Liberalization dummy variable introduced to capture the effect of trade policy shift shows significant impact on all categories of import, except the capital goods. The error correction terms show that about between 13.3% and 59.6% of past disequilibrium in the relationships is corrected annually.

Impact of Trade and Exchange Rate Policies On Trade Tax Revenue

Table 5 presents the results of the emerged parsimonious specification, which shows that the explanatory power of the model is high (as indicated by the adjusted R-squared value of 78.5%), while the DW statistics value depicts absence of serial correlation problem, which is also confirmed by the Lagragian Multiplier test (LM test) of serial correlation. Other diagnostic tests performed did not find any problem, as the coefficients of their test statistics are not significant, implying that heteroskedasticity and normality are not significant problems.

Analysis of the explanatory variables shows that tariff rate has a positive and significant impact on trade tax revenue with an impact lag. On theoretical grounds, the impact of tariff rate on tariff revenue depends on the size of the rate and availability of import substitutes. A small rate encourages imports, which results into a higher tariff revenue and vice-versa. However, higher tariff rate may engender higher import tariff revenue in the absence of import substitutes. The result shows that a percentage point rise in the tariff rate increases trade tax revenue by 26.0 percentage point. However, the impact is with a lag, which suggests that tariff policies in Nigeria work with lag. There is an impact lag between when the policy is been made and when it is been implemented. The result may also reflect policy reversal and inconsistency, which characterized the Nigerian economy.

Results in respect of real exchange rate are not stable, as the signs of the coefficients alternate over a four-year lag period. This implies that there is no stable and predictable relationship between movements of the real exchange rate and trade tax revenue in Nigeria. However, taking together, the net medium term effect is positive (4.0%). The positive net influence of real exchange rate is an indication of the relatively inelastic demand for imports in Nigeria, which makes the fall in overall demand for imports due to depreciation to be outweighed by the rise in the total value of imports. This is in line with Tanzi’s hypothesis and the works of Ebrill et al (1999) and Brafu-Insaidoo and Obeng (2006). With respect to the impact of real GDP, the results reveal that even though with a four-year lag, it produced positive and significant impact on trade tax revenue. This result suggests that growth in real GDP raises the capacity of the economy to import, thereby improving import tax revenue generation. This is a priori expected and consistent with the findings of Brafu-Insaidoo and Obeng (2006). Compared to the earlier finding on the productivity of the revenue, the inclusion of other variables in this case, has improved the result by turning it from negative to positive with lag. Thus, it takes a longer time for it to be productive. In essence, trade tax revenue seems not to be productive in Nigeria, in the short- to medium-term. This finding could be attributed to the inefficiency in tax administration and high level of corruption in the country.

Real external reserves (REXTRES – a measure of credit worthiness of the Nigerian economy) increase the tendency of trade tax revenue generation when monetized, particularly to finance imports. Results reveal that real external reserves positively, and significantly, influence tariff receipt with one- to two-years lag before changing subsequently to dampen tariff revenue. In the same vein, real foreign
exchange receipts (RFOREX – a measure of foreign exchange availability) dampen tariff revenue with a lag of effect.

### Table 5. Estimation results of policy and trade tax revenue equation: dependent variable is log of real trade tax revenue (Customs Duties)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.01266</td>
<td>-0.1906</td>
<td>0.3518</td>
</tr>
<tr>
<td>D(log(RGDP (-2))</td>
<td>-0.617383</td>
<td>-1.35333</td>
<td>0.199</td>
</tr>
<tr>
<td>D(log(RGDP (-4))</td>
<td>1.240416**</td>
<td>3.340978</td>
<td>0.0053</td>
</tr>
<tr>
<td>D(log(REXR(-1))</td>
<td>0.510804**</td>
<td>2.596319</td>
<td>0.0222</td>
</tr>
<tr>
<td>D(log(REXR(-2))</td>
<td>-0.813594**</td>
<td>-2.56877</td>
<td>0.0233</td>
</tr>
<tr>
<td>D(log(REXR(-3))</td>
<td>0.644823**</td>
<td>2.550271</td>
<td>0.0242</td>
</tr>
<tr>
<td>D(log(REXR(-4))</td>
<td>-0.305736**</td>
<td>-2.42475</td>
<td>0.0306</td>
</tr>
<tr>
<td>D(log(REXTRES(-1))</td>
<td>0.175363*</td>
<td>3.130551</td>
<td>0.008</td>
</tr>
<tr>
<td>D(log(REXTRES(-2))</td>
<td>0.307321**</td>
<td>2.972021</td>
<td>0.0118</td>
</tr>
<tr>
<td>D(log(REXTRES(-3))</td>
<td>-0.171732***</td>
<td>-2.088</td>
<td>0.037</td>
</tr>
<tr>
<td>D(log(AATR (-3))</td>
<td>0.258429**</td>
<td>2.224223</td>
<td>0.0445</td>
</tr>
<tr>
<td>D(log(AATR (-4))</td>
<td>-0.173201</td>
<td>-1.52091</td>
<td>0.1522</td>
</tr>
<tr>
<td>D(log(RFOREX(-1))</td>
<td>-0.267401</td>
<td>-1.56283</td>
<td>0.1421</td>
</tr>
<tr>
<td>D(log(RFOREX(-3))</td>
<td>-0.277444*</td>
<td>-3.49479</td>
<td>0.004</td>
</tr>
<tr>
<td>D(log(RFOREX(-4))</td>
<td>-0.119076</td>
<td>-1.30385</td>
<td>0.2149</td>
</tr>
<tr>
<td>D(log(RTTR (-3))</td>
<td>0.563922</td>
<td>1.438463</td>
<td>0.1739</td>
</tr>
<tr>
<td>DUMM</td>
<td>-0.18349</td>
<td>-1.67057</td>
<td>0.1187</td>
</tr>
<tr>
<td>R (ECM(-1))</td>
<td>-0.211161**</td>
<td>-2.13217</td>
<td>0.0322</td>
</tr>
<tr>
<td>Adj. R-Squared</td>
<td>0.820363</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D-Watson stat</td>
<td>2.08389</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F-statistic</td>
<td>8.452237</td>
<td>-</td>
<td>0.0001</td>
</tr>
<tr>
<td>Breusch-Godfrey</td>
<td>1.3456</td>
<td>-</td>
<td>0.4351</td>
</tr>
<tr>
<td>Serial Correlation LM+</td>
<td>1.8567</td>
<td>-</td>
<td>0.6752</td>
</tr>
<tr>
<td>Heteroskedasticity +</td>
<td>2.7732</td>
<td>-</td>
<td>0.0297</td>
</tr>
<tr>
<td>ARCH LM+</td>
<td>0.8956</td>
<td>-</td>
<td>0.3324</td>
</tr>
</tbody>
</table>

### Summary of Findings and Concluding Remarks

This study has examined the effect of trade and exchange rate policies on different categories of import (total import, capital goods import, raw materials import and consumer goods import) and trade tax revenue in Nigeria. Empirical results show that the level of average tariffs in Nigeria produce negative impacts on import, and the impact is with a lag. Specifically, it produced a significant negative impact on consumer goods and raw material import, but a significant positive effect on capital goods import. The case of capital goods import is different perhaps because of the various waivers and low tariff on this type of import. Real exchange rate is found to have an unstable or unpredictable relationship with import of all categories.

Real exchange rate is shown to have an unstable or unpredictable relationship with import of all categories. Also, it has no stable and predictable relationship with trade tax revenue in Nigeria. The foregoing, therefore, suggests that the link between import and trade tax revenue is trade and exchange rate policies.

### Empirical Link Between Import and Trade Tax Revenue Through Policies

The results reveal that tariff has an inverse relationship with all categories of imports, except capital goods. This implies that high level of tariff hinders imports (since it makes import expensive), while low level promotes import. The result shows that the level of average tariff in Nigeria produces a negative impact on import, and the impact is with a lag. In the same vein, the results show that tariff rate has a positive and significant relationship with trade tax revenue with an impact lag. On theoretical grounds, the impact of tariff rate on tariff revenue depends on the size of the rate and availability of import substitutes. A small rate encourages imports, which results into a higher tariff revenue and vice versa. However, a higher tariff rate may engender higher import tariff revenue in the absence of import substitutes. Therefore, the result suggests that low level of tariff, which promotes import, may also promote trade tax revenue.

However, current growth in trade tax revenue is found to be independent of its past values, while trade and other macroeconomic policy reforms captured by the dummy variable (DUMM) were found to produce an insignificant impact on trade tax revenue. The error correction term shows that about 21.0% of past disequilibrium is corrected annually.
categories of imports. The coefficient of income elasticity of demand for import varies from 3.2 in the case of capital goods import to 1.2 in respect of consumer goods import. Thus, while consumer goods import is fairly income elastic, capital goods import is highly income elastic, which implies that a small change in income will cause a more than proportionate change in import demand. The result reveals that although with a lag, external reserves produced a significant positive impact on real total proportionate change in import demand. The result change in income will cause a more than trade policy shift shows significant impact on all categories of import, except the capital goods. The dummy variable introduced to capture the effect of capital goods for development. The quantity of goods import, but a significant negative impact on real capital goods import. This result suggests that external reserves are used to finance import of final goods for consumption and intermediate goods for generating current income at the expense of import of capital goods for development. The quantity of foreign exchange available in the economy determines the level of all categories of imports. Liberalization dummy variable introduced to capture the effect of trade policy shift shows significant impact on all categories of import, except the capital goods.

In the same vein, results show that tariff rate has a positive and significant relationship with trade tax revenue, with an impact lag. Real exchange rate is found to have an unstable or unpredictable relationship with trade tax revenue. With respect to the impact of real GDP, the results reveal that even though with a four-year lag, it produced a positive and significant impact on trade tax revenue. This result suggests that growth in real GDP raises the capacity of the economy to import, thereby improving import tax revenue generation. Real external reserves (REXTRES – a measure of credit worthiness of the Nigerian economy) increase the tendency of trade tax revenue generation when monetized, particularly to finance imports. However, real foreign exchange receipts (RFOREX – a measure of foreign exchange availability) dampen tariff revenue with a lag effect, while trade and other macroeconomic policy reforms captured by the dummy variable (DUMM) are found to produce an insignificant impact on trade tax revenue. Therefore, the result suggests that low level of tariff which promotes import may also promote trade tax revenue. The foregoing therefore suggests that the link between import and trade tax revenue is trade and exchange rate policy.

References


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Biographical Note
Adelou O. Adewuyi is a senior lecturer of the Department of Economics, University of Ibadan. His research interests include are international trade, finance and industrial macroeconomics policy.

Email: aoade@yaho.co.uk
Telephone: +2348034339580
A.O. Adewuyi: Effects of Trade & Exchange Rate Policies on Imports & Trade Tax Revenue in Nigeria

Appendix

Total Imports and Trade Tax Revenue

Consumer Goods Imports and Trade Tax Revenue

Raw Materials Goods Imports and Trade Tax Revenue
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Capital Goods Imports and Trade Tax Revenue

Real Exchange Rate

Trade Tax Revenue