

The ECOWAS free trade area: An ex ante and ex post analysis of the impact on Nigeria's imports

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Abstract

A partial equilibrium model was used to estimate the impact of a free trade agreement within ECOWAS on imports by Nigeria, based on trade data prior to implementation in 2015. Estimated trade creation for agro-processed goods was just more than double that for agricultural products, which may point towards increased competition for domestic value-added industries that are targeted for support by Nigeria's industrial policy for diversification. The welfare gains for Nigeria are positive, despite the tariff revenue loss. The results of the model are upper-bound estimates because Nigeria still applies non-tariff barriers. When comparing the model results with actual trade trends since 2015, it is found that the increase in trade indeed takes place in the year after the implementation of the zero rating, but this increase in intra-ECOWAS trade is not maintained. In subsequent years, the trade levels appear to revert to pre-agreement levels.

Key words: ECOWAS; Nigeria; free trade area; partial equilibrium; SMART model

1. Introduction

The theory of regional economic integration can be traced back to the work of Viner in 1950. He introduced the traditional theory of the customs union, while other authors made subsequent extensions. According to Arguello (2000), Viner focused on two types of production effects, namely trade creation and trade diversion, and ignored the consumption effect, which was later included by Meade in 1955 and Lipsey in 1957. The production effect is referred to as a change in the source of supply of a commodity from a more expensive domestic one to a cheaper member-state producer (positive trade-creation effect) and from a lower-cost foreign one to a higher-cost member-state producer (negative trade-diversion effect). In 1965, Johnson modified the theory of customs union by considering its total welfare gain.

Welfare gains are generally expected from trade liberalisation but, if so, the question arises why the progress with integration is often so slow. Nshimbi (2015) concludes that short-term domestic considerations often make member states neglect long-term goals for regional integration. According to Forson (2013), the lack of progress with economic integration amongst the ECOWAS countries can be ascribed to a lack of political commitment among some of these West African states.

Lack of political commitment is also visible in Nigeria. One of the aims of Nigeria's Structural Adjustment Programme (SAP) in the 1960s, which was later abandoned, was the liberalisation of trade. Trade liberalisation policy still competes with incongruent domestic policy as Nigeria's top

priority. The past few years were also marked by negotiations on an economic partnership agreement between West Africa and the EU, which the Nigerian president has refused to sign on the grounds that it will jeopardise industrialisation and job creation (Berthelot 2018). The Nigerian economy is dominated by oil, which accounts for nearly 90% of foreign earnings, 25% of the gross domestic product (GDP), and about 80% of public revenue (Agbaeze *et al.* 2015). However, the long-term development of Nigeria cannot be based on one resource (crude petroleum), since it can be depleted and is subject to the fluctuations of international demand and price conditions. According to the United Nations Industrial Development Organization (UNIDO 2012), what is being proposed is the diversification of the economic base of the country, with the purpose of securing regular and sustainable inflows of revenue for economic development. The diversification of the economy is expected to come largely from agriculture, particularly from well-developed agro-industry and agribusiness activities. Regional integration in West Africa is a very relevant issue in view of agro-processing in Nigeria. The demand for food and fibre makes reliance on agriculture and agro-industrial products inevitable.

This paper explores whether the deeper regional integration within West Africa, specifically ECOWAS, will be favourable for Nigeria. The objective is to estimate the effect of an ECOWAS free trade area on Nigeria as predicted by trade creation and trade diversion theory in the context of economic integration. Specifically, a zero tariff rating on all products imported by Nigeria from ECOWAS is implemented. This scenario shows the potential for a full liberalisation within ECOWAS, with a specific focus on agricultural and agro-processed products. As an evaluation of the predictive nature of the theory and model, estimated changes are then compared to actual changes that took place in Nigeria's imports since 2015.

2. Background

The determination of Adebayo Adedeji resulted in the formation of the Economic Community of West African States (ECOWAS). This former Executive Secretary of the United Nations Economic Commission for Africa (UNECA) believed that, without economic and political unity, Africa could not match up to the rest of the world. The motive behind the existence of ECOWAS was for an economic cooperation and integration scheme among its West African members (Van Nieuwkerk 2001).

The precursor to ECOWAS had started as early as in 1965 with the signing of the Agreement on Interim Organization for West African Economic Cooperation, by Guinea, the Ivory Coast, Liberia and Sierra Leone. The aim of the agreement was to create an interim organisation in order to establish a permanent organisation for West-African economic cooperation (International Legal Materials 1965). The discussions that led to the signing of the ECOWAS treaty in Lagos began again in earnest in 1973 (Banks & Muller 1998). ECOWAS was established on 28 May 1975 and currently comprises 15 states (Nigeria, Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, The Gambia and Togo; Mauritania dropped out in December 2000).

The first four years after the signing of the treaty were mostly used to address institutional matters (Onwuka 1980). The ECOWAS Trade Liberalization Scheme (ETLS), which is ECOWAS's comprehensive trade liberalisation programme, was supposed to start in 1979 but was only launched in 1990 (Ukaoha & Ukpe 2013). It is the main framework for trade and market integration in ECOWAS, as it addresses protocols on the free movement of goods, persons and transportation. Initially it included covered agricultural, artisanal handicrafts and unprocessed products, with a phasing in of industrial products.

The ETLS was the initial step aimed at the free circulation of goods to create a region where all tariff and non-tariff barriers on member countries are removed and a common external tariff (CET) on non-member countries is created. Besides free trade, the rationale for the ETLS is the development of entrepreneurial skills, increased economic growth and competitiveness of the domestic market on a global level, and an improvement in welfare.

However, this free movement of people and goods within ECOWAS remained elusive. A revised ECOWAS Treaty was signed on 24 July 1993 to expand the political mandate of its members and to allow for the formation of new bodies, such as a regional parliament (Van Nieuwkerk 2001). Between 1993 and 2012, about eight more agreements were signed with various other economic groups and countries (GlobalEdge 2018). Article 3 of the Revised Treaty of ECOWAS stipulates the removal of trade barriers and the harmonisation of trade policies for the establishment of a free trade area, a customs union, a common market and, eventually, a monetary and economic union in West Africa (UNECA 2018).

A lot of instability in some of the member countries has hindered the process of regional integration, and intra-ECOWAS trade has remained relatively low. Due to the incomplete implementation of the ETLS, intra-ECOWAS trade has been on the increase, but at a decreasing rate until 2011 (UNCTAD 2012). Although the creation of a customs union via the introduction of a CET was outlined in the original ECOWAS Treaty of 1975 and the Revised Treaty of 1993, consecutive deadlines for its adoption were often postponed during the 2000s because of little or no progress in negotiations (Ajayi & Osafo-Kwaako 2007). Notable progress, however, was made in the ECOWAS regional integration process at the October 2013 summit with the establishment of the CET, which Nigeria agreed to implement on 11 April 2015. The implementation of the CET was accompanied by the zero rating of intra-ECOWAS tariffs in 2015.

Despite progress in terms of tariff liberalisation, there are still non-tariff barriers in Nigeria. Nigeria's protectionist position and bureaucratic problems, for example, give rise to informal trade on the sub-regional level, also in agricultural products. It is suspected that Nigeria's informal trade with neighbouring countries could be several times larger than the volume of trade officially reported (Hoffmann & Melly, 2015).

3. Method

A partial equilibrium model was used to carry out a simulation that assumed a complete tariff removal on Nigeria's imports from other ECOWAS countries, using data prior to the actual tariff removal in 2015. Estimated indicators include the potential trade created and trade diverted, the impact on tariff revenue, and the welfare effects under full tariff liberalisation.

The specification by Jammes and Olarreaga (2005) for the WITS SMART model follows from Viner's theory and is followed in this study. The method appears well established in the literature, with case studies that apply to Africa as well, for example Khorana *et al.* (2009) and Guei *et al.* (2017).

The partial equilibrium model is discussed in the remainder of section 3, and the relevant results of the 'before' event estimation of the anticipated effects are presented in sections 4.1 to 4.4. For the 'after' event analysis, actual trade data obtained from ITC Trade Map was used, and the results are presented in section 4.5.

3.1 The partial equilibrium (SMART) model

The SMART model is contained in the World Integration Trade Solution (WITS) software and was developed by the World Bank and the United Nations Conference on Trade and Development (UNCTAD) (Lang 2006). The WITS software puts together various trade flows from three major trade databases: the United Nations Commodity Trade Statistics (UNCOMTRADE), the UNCTAD Trade Analysis and Information System (TRAINS), and the World Trade Organization (WTO) integrated database or Consolidated Tariff Schedule (CTS) database. This study required trade flows, tariffs and elasticities, all of which are contained in the WITS software database. Therefore, it does not need any extra trade or tariff data, unless one decides to change the default elasticities. It considers the importing country and its individual trading partners and analyses the imports at a detailed product level (HS6).

3.2 Modelling trade diversion

If Nigeria reduces the tariff on imports from country c (or group of countries c), then the lower tariff changes the relative prices of the good traded when compared with other countries (not c). More of the imported good from country c is consumed, while imports from other countries are reduced.

If the tariff reduction on good g from country c does not apply to other countries (i.e. $\neq c$), the imports of good g from country c will increase more because of the shift from imports of good g from other countries that are more costly (Jammes & Olarreaga 2005).

The formula for trade diversion under the assumption of upward sloping supply curves, which is used in the sensitivity analysis in this study, is shown in equation (1). Under the assumption of perfectly elastic export supply, which was used in the base case in this study, the terms in square brackets above and below the line are omitted from equation 1.

Trade diversion (Jammes & Olarreaga 2005)¹:

$$TD_{g,c} = \frac{m_{g,\neq c} * m_{g,c} * \frac{dt_{g,c}}{(1+t_{g,c})} * \sigma_{g,c,\neq c} \left[\frac{(m_{g,c} + m_{g,\neq c}) \mu_{g,c}}{(m_{g,c} + m_{g,\neq c}) \mu_{g,c} - m_{g,\neq c}} \right]}{m_{g,\neq c} + m_{g,c} + m_{g,c} * \frac{dt_{g,c}}{(1+t_{g,c})} * \sigma_{g,c,\neq c} \left[\frac{(m_{g,c} + m_{g,\neq c}) \mu_{g,c}}{(m_{g,c} + m_{g,\neq c}) \mu_{g,c} - m_{g,\neq c}} \right]} \quad (1)$$

where:

$TD_{g,c}$ is the trade diversion of product g : The value of new imports of product g imported from country c

$m_{g,c}$ is the initial import value of product g from country c

$m_{g,\neq c}$ is the initial import value of product g from other countries

$dt_{g,c}$ is the change in tariff rate of product g from country c

$t_{g,c}$ is the initial tariff rate of product g imported from country c

$\sigma_{g,c,\neq c}$ is the elasticity of substitution with respect to relative prices of the same product from different sources of supply

$\mu_{g,c}$ is the elasticity of export supply by country c with respect to export price of product g

¹ Although the Jammes and Olarreaga (2005) specification of trade diversion is officially referenced by WITS as the specification used in the SMART model, it was found that the specification is not consistent with the results from the SMART model. Current employees at WITS were not forthcoming to present the actual formula used in the calculation of trade diversion in the SMART model, and the authors were just referred back to the Jammes and Olarreaga (2005) document.

The tariff rate change in the formula above, $\frac{dt_{g,c}}{(1+t_{g,c})}$, is calculated by deducting the initial rate from the new rate and using the initial rate in the denominator (Punt & Sandrey 2015). For instance, when the tariff rate reduces from 25% to 10%, the term is calculated as follows:

$$\frac{dt_{g,c}}{(1+t_{g,c})} = \frac{0.1-0.25}{1+0.25} = -0.12 \quad (2)$$

The imports of a product ($m_{g,c}$) represent the value and quantity of imports since world prices were normalised to unity in the derivations of the trade creation equation (Jammes & Olarreaga 2005).

3.3 Modelling trade creation

If Nigeria reduces the tariff on imports from country c (or group of countries c), then the lower tariff changes the relative prices of the good traded when compared to domestically produced goods. More of the imported good from country c is consumed, while domestic consumption might either stay constant (income effect) or decrease (substitution effect).

Country c will enjoy a positive trade creation effect and a positive trade diversion effect, whereas other countries will have no trade creation effect and will suffer a negative trade diversion effect.

The reduction in the tariff set on good g from country c causes the new partner country's imports of good g to increase (WITS 2011). Based on the assumption of the nature of the export supply elasticity, trade creation can be estimated in two ways following Jammes and Olarreaga (2005). Considering the upward sloping export supply assumption, which was used in the sensitivity analysis in this study, trade creation is calculated as shown in equation (3). Under the assumption of perfectly elastic export supply, which was used in the base case in this study, then the last term in equation (3) is omitted. It can be seen that the export supply elasticity ($\mu_{g,c}$) only enters the equation under the assumption of an upward sloping export supply curve.

Trade creation (Jammes & Olarreaga 2005):

$$TC_{g,c} = \varepsilon_{g,c} * m_{g,c} * \frac{dt_{g,c}}{(1+t_{g,c})} * \frac{1}{(1-\varepsilon_{g,c}/\mu_{g,c})} \quad (3)$$

where:

$TC_{g,c}$ is trade created from product g : the value of new imports of product g imported from country c
 $\varepsilon_{g,c}$ is the elasticity of import demand with respect to domestic price
 $m_{g,c}$ is the initial imports of product g from country c
 $dt_{g,c}$ is the change in tariff rate of product g imported from country c
 $t_{g,c}$ is the initial tariff rate of product g imported from country c
 $\mu_{g,c}$ is the elasticity of export supply by country c with respect to export price of product g

3.4 Modelling tariff revenue

The SMART model calculates the impact that a change in trade policy has on tariff revenue as the difference before the agreement and thereafter. According to WITS (2011), the change in tariff revenue comprises two contrasting effects – A tariff revenue loss due to the lowering of the tariff(s), and a tariff revenue gain because of increased imports.

Punt and Sandrey (2015) estimated the tariff revenue effect consistent with the SMART model results, using the following equation:

$$dR_{g,c} = (m_{g,c} + TT_{g,c}) * (t_{g,c} + dt_{g,c}) - (m_{g,c} * t_{g,c}) \quad (4)$$

where:

$dR_{g,c}$ is the change in tariff revenue from product g imported from country c

$m_{g,c}$ is the initial imports of product g from country c

$TT_{g,c}$ is the total trade effect (created plus diverted) from product g imported from country c

$t_{g,c}$ is the initial tariff rate of product g imported from country c

$dt_{g,c}$ is the change in tariff rate of product g imported from country c

A decrease in the tariff rate will not only cause changes in tariff revenue, but will also increase consumer surplus and welfare, and decrease the deadweight loss.

3.5 Modelling welfare

The change in welfare is the welfare benefit that the importing country obtains by lowering the tariff. The gains constitute two positive effects. The first effect is the additional tariff revenue due to increased imports, while the second effect is the additional consumer surplus due to increased imports (Punt & Sandrey 2015).

Punt and Sandrey (2015) derive the change in welfare consistent with the SMART model results by using the following equation:

$$dW_{g,c} = [TT_{g,c} * (t_{g,c} + dt_{g,c})] + [0.5 * TT_{g,c} * dt_{g,c}] \quad (5)$$

where:

$dW_{g,c}$ is the change in welfare as a result of product g imported from country c

$TT_{g,c}$ is the total trade effect (created plus diverted) from product g imported from country c

$t_{g,c}$ is the initial tariff rate of product g imported from country c

$dt_{g,c}$ is the change in tariff rate of product g imported from country c

3.6 Elasticities in the SMART model

The partial equilibrium (SMART) model uses three types of elasticities, namely import demand elasticities, substitution elasticities and export supply elasticities. The import demand and substitution elasticities refer to the demand side, while the export supply elasticities refer to the supply side (WITS 2011).

The import demand elasticity measures the change in import demand by the importing country from country c after lowering the tariff following the implementation of the agreement. The elasticity considers the substitution between the demand for domestic goods versus imports given relative price changes between domestic and import prices. The elasticity is used when calculating trade creation. For the purposes of the simulation, the default SMART model values were used. These elasticities are unique for each product.

The substitution elasticity determines how much of a product is imported from each of the exporting countries. The Armington assumption treats the same product from two different countries as imperfect substitutes. This elasticity is used in the calculation of trade diversion. This elasticity estimates the level of substitution among products derived from the respective trading partners.

According to the assumption of Armington, products from different countries cannot be used in the exact way as the ones they substitute. The SMART model uses 1.5 as a default substitution elasticity for all products. The value of 1.5 was also used in the simulation.

The export supply elasticity is the rate of change in the supply of exports to the change in the price of export, i.e. it indicates the degree of responsiveness of export supply to a change in export price. This elasticity is used in calculating both trade creation and trade diversion under the assumption of somewhat elastic, or infinitely inelastic, export supply.

The export supply elasticity can be:

- Infinitely elastic, i.e. flat export supply curves and exogenous world prices: the market adjusts only through quantity, since suppliers can meet the level of demand at the same price;
- Finite or somewhat elastic, i.e. upward sloping export supply curves: the market adjusts through both price and quantity;
- Infinitely inelastic, i.e. vertical supply curves: the market adjusts only through price, since the quantity offered by suppliers is fixed.

The SMART model uses a default value for export supply elasticities that are infinitely elastic (flat supply curves). This study assumes flat supply curves in the base case; hence, there is only a quantity effect. In the sensitivity analysis, this assumption is relaxed to assume elastic substitution (i.e. upward sloping supply curves), and then there is a price effect in addition to the quantity effect.

4. Results

The trade effects when Nigeria removes all tariffs for products imported from ECOWAS were identified to analyse trade opportunities for ECOWAS due to the tariff preference given by Nigeria.

Nigeria is in a transition from over-reliance on the oil and gas sector to a more diversified economy. The agricultural sector and its value chains have untapped potential for growth, so emphasis was placed on the impacts on imports of primary agricultural products compared to agro-processed goods.

4.1 Trade effects of tariff removal on ECOWAS imports

Table 1 reveals that the ECOWAS partners that benefited most are Cote d'Ivoire, Niger, Ghana and Benin. Meanwhile, countries with the least total trade effects are Mali, The Gambia and Cape Verde. ECOWAS partners benefit both from trade creation (new exports to Nigeria) and trade diversion (replacing exports to Nigeria that were previously from non-ECOWAS countries). The magnitude of the impact depends on a combination of the original trade value (Table 1), the weighted average applied duty before the zero rating (Table 1), and the product-specific import demand elasticities.

Cote d'Ivoire is ahead of the other ECOWAS countries, with a gain of US\$ 53.4 million in trade creation and US\$ 26.8 million in trade diversion, giving a total trade effect of US\$ 80.2 million – as shown in Table 1. Thus, as the products from Cote d'Ivoire become cheaper by the amount of its tariff cut, there will be new customers in Nigeria who would buy these products from Cote d'Ivoire. Furthermore, there will be a shift in demand from other non-ECOWAS suppliers to Cote d'Ivoire, because the price of imports by Nigeria from Cote d'Ivoire decreases relative to the price of other non-ECOWAS countries. Total trade creation is the additional imports by Nigeria from ECOWAS (US\$ 205.2 million). Trade diversion in all the ECOWAS member countries is valued at US\$ 69.6 million.

Table 1: Trade effects of tariff removal on ECOWAS imports

Partner	Base trade value (US\$'000)	Trade creation (US\$'000)	Trade diversion (US\$'000)	Total trade effect (US\$'000)	Base weighted ave tariff rate (%)
Cote d'Ivoire	162 665	53 389	26 783	80 171	23.5
Niger	283 375	49 910	22 458	72 369	9.4
Ghana	280 268	35 874	11 885	47 759	20.2
Benin	103 480	41 606	2 769	44 375	6.3
Togo	15 735	10 326	2 455	12 781	14.3
Guinea	8 352	4 726	1 322	6 048	13.0
Burkina Faso	1 002	4 198	356	4 554	34.9
Senegal	16 875	2 684	697	3 382	6.3
Guinea-Bissau	1 784	1 424	317	1 741	14.3
Liberia	476	634	112	746	20.0
Sierra Leone	5 707	294	384	678	5.2
Mali	1 323	57	32	90	6.0
The Gambia	301	32	47	79	11.9
Cape Verde	6.16	0.64	0.98	1.62	12.1
ECOWAS total	881 348	205 154	69 619	274 773	
Non-ECOWAS	42 382 000	0	-69 619	-69 619	
Total for Nigeria	43 263 348	205 154	0	205 154	

Source: SMART model simulations

The trade diversion effects for all suppliers sum to zero, meaning the gain by all ECOWAS partner countries is equal to the loss from all non-ECOWAS countries. As shown in Table 1, all ECOWAS partner countries have a positive trade creation and positive trade diversion effect, being beneficiaries of the tariff cut by Nigeria. The non-ECOWAS countries experienced a negative trade diversion effect and no trade creation effect. The tariff reduction shifts US\$ 69.6 million worth of Nigeria's imports away from the rest of the world to imports from ECOWAS partner countries. As a result, many non-ECOWAS countries lose market share in Nigeria, for example China, Malaysia, the United States, India and Indonesia, as shown in Table 2.

Table 2: Top 10 countries that lost market share in Nigeria

Countries	Base trade value (US\$'000)	Trade diversion effect (US\$'000)
Unspecified	2 466 485	-13 983
China	9 673 178	-9 935
Malaysia	253 814	-7 071
United States	3 899 385	-5 450
India	2 107 879	-4 878
Indonesia	381 215	-3 609
France	1 244 346	-2 850
United Kingdom	2 338 172	-2 358
Netherlands	2 417 672	-2 233
Belgium	2 169 715	-1 589
Other non-ECOWAS	15 430 139	-15 663
Total non-ECOWAS	42 382 000	-69 619

Source: SMART model simulations

Turning from country effects to effects on product groups, Table 3 indicates that trade creation exceeds trade diversion in all three product groups. Agro-processing products account for about 30.0% of the total trade creation and 32.8% of trade diversion. The maximum trade creation (56.9%) and trade diversion (65.0%) effects for Nigeria were from non-agriculture or non-agro-processing products. The least trade creation (13.1%) and trade diversion effects (2.1%) were contributed by primary agriculture. The base weighted average duties for primary agriculture, agro-processing and all other products are 8.4%, 11.2% and 10.7% respectively, whereas the base weighted average import

demand elasticities for primary agriculture, agro-processing and all other products are 1.53, 2.72 and 5.24 respectively. As mentioned, the base duties and elasticities, in combination with the base trade values, drive the results.

Table 3: Trade effects in product groups for ECOWAS countries

Product group	Base trade value (US\$'000)	Trade creation (US\$'000)	Share (%)	Trade diversion (US\$'000)	Share (%)
Primary agriculture	290 474	26 917	13.1	1 474	2.1
Agro-processing	131 371	61 569	30.0	22 840	32.8
Non-agriculture and non-agro-processing	459 503	116 668	56.9	45 304	65.1
Total	881 348	205 154	100	69 618	100

Source: SMART model simulations

4.2 Revenue effects of tariff removal on ECOWAS imports

The revenue effects examined in this analysis concentrate on the direct impacts from the loss of tariff revenue. One of the pitfalls of the ECOWAS free trade area for Nigeria is the expected fall in tariff revenues. Nigeria's tariff revenue decreased by US\$ 146.5 million because of the tariff cuts on imports from ECOWAS (Table 4). The analysis shows that the tariff reduction may lead to significant tariff revenue loss to the government. Revenue loss is the lowest in primary agriculture, followed by agro-processing products. Revenue from imports from all countries is taken into account.

Table 4: Revenue effects of tariff removal on ECOWAS imports

Product group	Loss in tariff revenue (US\$'000)
Primary agriculture	-44 188
Agro-processing	-45 496
Non-agriculture and non-agro-processing	-56 827
Total	-146 511

Source: SMART model simulations

4.3 Welfare effects of tariff removal on ECOWAS imports

The estimates in Table 5 show a positive total welfare effect, valued at US\$ 18.7 million, with the highest gains from agro-processing products, notably 54.5% of the total welfare gains recorded. This is due to cheaper ECOWAS imports. The increase in imports after a full tariff liberalisation is a positive impact from the perspective of the consumers in Nigeria. All three product groups show welfare gains. The lowest gains are from primary agricultural products.

Table 5: Welfare effects of tariff removal on ECOWAS imports

Product group	Welfare effect (US\$'000)
Primary agriculture	1 641
Agro-processing	10 210
Non-agricultural and non-agro-processing	6 887
Total	18 738

Source: SMART model simulations

4.4 Sensitivity analysis

The results of the SMART model simulation are influenced by the values of parameters like the export supply elasticities. To test the responsiveness of the model, a sensitivity analysis was conducted. The SMART model uses a default export supply elasticity of 99, but this value is not used in the calculation because the value of 99 merely allows the SMART model to revert to the model that accounts for infinitely elastic supply. The sensitivity analysis focused on determining the impact of

full tariff liberalisation on ECOWAS imports for different values of the export supply elasticity. The assumption of infinitely export supply elasticity in the base case means that the reduction of tariffs by Nigeria will not influence the prices in the partner country, only the quantity exported. The price effects therefore go to zero. Finite export supply elasticity, however, implies that the change in tariff will cause price and quantity effects.

Table 6 shows that, as the export supply elasticity increases from relatively inelastic (1.5) to relatively elastic (10), to perfectly elastic (99), both trade creation and trade diversion increase. The price effect decreases, but there is still an increase in total trade because, at more elastic substitution elasticities, the increase in the quantity effect more than offsets the decrease in the price effect. The tariff revenue also decreases slightly, while the welfare effect increases. Trade creation is more responsive and total trade effect follows the same pattern, while tariff revenue loss is less responsive. The results of this sensitivity analysis confirm that the results are sensitive to changes in the level of the export supply elasticity.

Table 6: Sensitivity analysis results – export supply elasticity (100% tariff reduction) (US\$'000)

	$\mu_{g,c} = 1.5$	$\mu_{g,c} = 10$	$\mu_{g,c} = 99$ (base)
Trade creation	66 175	132 647	205 154
Trade diversion	35 727	58 221	69 619
Price effect	67 935	19 087	0
Total trade	169 838	209 955	274 773
Revenue effect	-147 274	-147 136	-146 510
Welfare effect	12 878	14 518	18 738

Source: SMART model simulations

4.5 Comparison between estimated effects and actual trade trends

It should be noted that, in doing the comparison between estimates derived from the SMART model and actual trade trends as reported in the ITC database, it became apparent that the 2014 data in the SMART model is consistent with the 2013 data from ITC. Upon further investigation, it became apparent that 2011 was the last year in which the SMART model and ITC data were consistent. There is no option for Nigeria in the SMART model for 2012, and the 2015 and 2016 data in the SMART model corresponds to 2016 and 2017 in the ITC database respectively. There seems to be no consistent data in the SMART model for the 2014 and 2015 ITC data, which is of particular importance for this study, being the period during which the ECOWAS zero rating took place. The results in sections 4.1 to 4.4 should therefore be compared to the 2013 data from the ITC, hence this section reports trends based on the ITC data for 2013 until 2017.

As indicated in Table 7, imports valued at US\$ 881.3 million were sourced by Nigeria from ECOWAS in 2013. There was a substantial decline in 2014 to US\$ 292.8 million. It can be seen that there was a significant increase in trade in 2015, when the intra-ECOWAS tariffs were set to zero and the CET was implemented. It is noteworthy, however, that the increase was not sustained. By 2017, imports from ECOWAS had reverted back to levels comparable to 2014.

Nigeria's imports from ECOWAS revealed that the country consumed goods largely from Côte d'Ivoire, with an import value of US\$ 164.4 million or 56.2% in 2014, 85.3% in 2015 and down to 51.4% in 2017.

Table 7: Nigeria's total imports from ECOWAS

Exporters	Imported values (US\$'000)				
	2013	2014	2015	2016	2017
Côte d'Ivoire	162 665	164 415	917 677	284 953	118 935
Ghana	280 268	103 114	66 012	68 925	54 408
Togo	15 735	9 767	10 331	37 788	13 745
Niger	283 375 ²	7 385	6 698	5 397	2 822
Senegal	16 875	2 989	5 320	3 678	16 594
Burkina Faso	1 002	1 718	570	107	116
Benin	103 480	1 389	61 461	6 248	15 486
Sierra Leone	5 707	588	996	2 694	313
Liberia	476	538	5 987	2 355	3 004
Guinea	8 352	477	16	54 525	5 077
Cape Verde	6	258	166	71	780
The Gambia	301	105	0	0	0
Mali	1 323	34	95	82	110
Guinea-Bissau	1 784	0	60	0	1
ECOWAS	881 348	292 777	1 075 389	466 823	231 391
Rest of the world	42 382 000	46 239 488	32 755 490	34 727 478	28 683 856
World	43 263 348	46 532 265	33 830 879	35 194 301	28 915 247

Source: Compiled from ITC Trademap data (downloaded 2018)

Nigeria's imports from ECOWAS declined significantly (by 56.6%) in 2016, despite a 6.0% increase in imports from the rest of the world. These numbers support the generally accepted view that tariffs are not the only barriers to trade, and that trade is more complex than what can be captured with trade models that only focus on tariffs. The data in Table 6 also confirms that decisions to trade within ECOWAS does not take place in isolation, but is affected by relationships between Nigeria and other countries. During December 2014, the West Africa–European Union Economic Partnership Agreement (EPA) was signed by 13 West African countries and, even though Nigeria was one of the countries that did not sign, Nigeria's trade with the EU is presented.

Figure 1 indicates that Nigeria's imports from the EU as a share of its total imports increased during 2016. The figure also indicates imports from other prominent partners such as the BRICS countries. Nigeria's imports from other ECOWAS countries remained below 4% of its total imports over the five-year period. These changes in relative shares took place within the context of a decline in Nigeria's total imports since 2014 – from US\$ 44.6 billion to US\$ 30.6 billion in 2017.

² Nigeria's ITC data reported an unrealistic US\$ 1.6 billion in imports from Niger in 2013, and the mirror data on ITC Trademap did not confirm this value, hence the value was adjusted to the mirror data value of US\$ 283.3 million. Subtotals and totals for 2013 were adjusted accordingly. Similar adjustments were also done in the SMART model estimates presented in earlier sections.

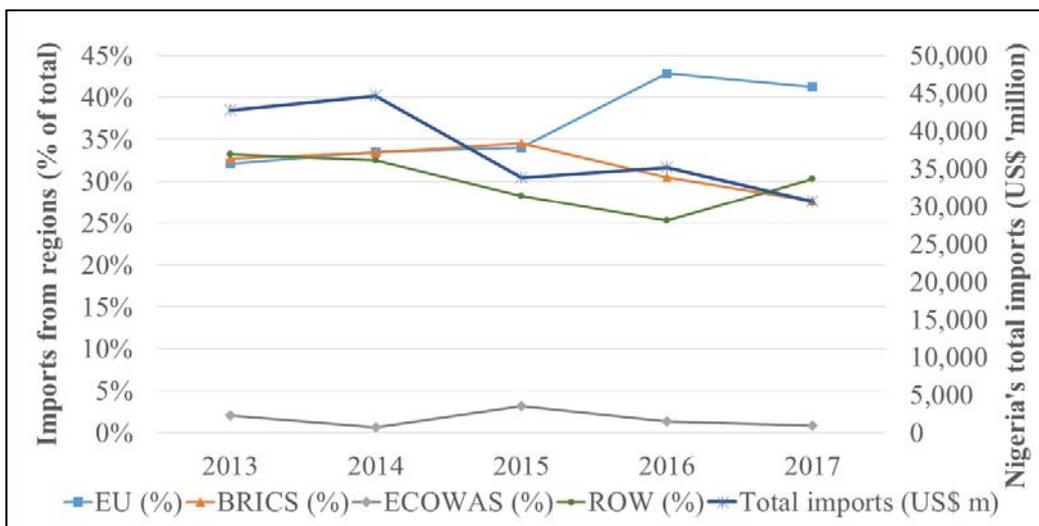


Figure 1: Nigeria's imports from different economic blocs

Source: Compiled from ITC Trademap data (downloaded 2018)

Tariff reduction did not take place within Nigeria only, and the expectation is that trade liberalisation leads to an increase in trade. So the question arises whether Nigeria perhaps benefited relatively more from an increase in exports (compared to imports) following the zero rating and implementation of the CET by ECOWAS, as well as the ECOWAS-EU EPA. Figure 2 therefore looks at Nigeria's export trends since 2013. It can be seen that total exports declined sharply, from US\$ 89.5 billion in 2014 to US\$ 32.9 billion in 2016, but then it picked up again in 2017, when it increased to US\$ 40.7 billion.

During this period, the shares of total exports to the different regions also changed. Notably, there was an increase in exports to the rest of the world (ROW), and the main destination that accounts for this increase is the United States (data not shown here). It can be seen that exports to the rest of ECOWAS remained relatively the same, although there was a small increase from 5.1% in 2014 to 6.4% in 2016.

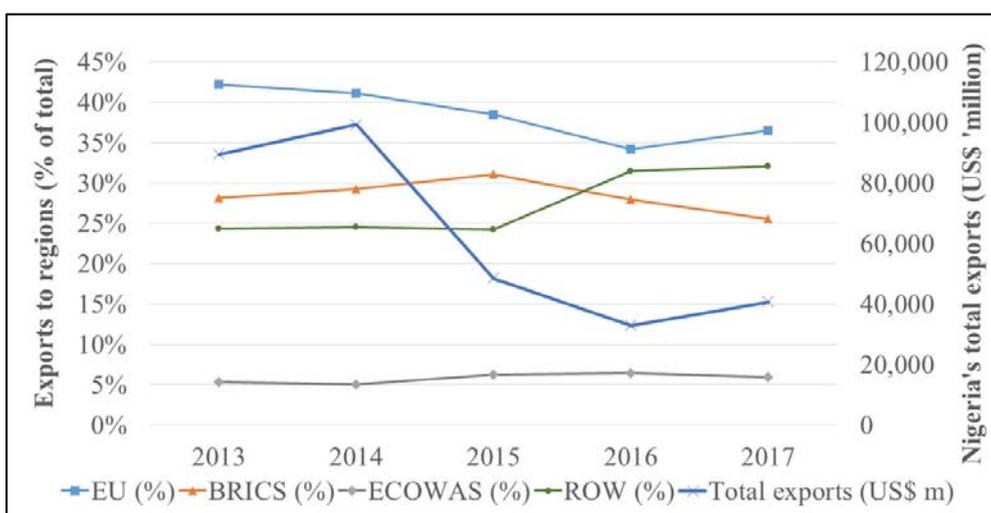


Figure 2: Nigeria's exports to different economic blocs

Source: Compiled from ITC Trademap data (downloaded 2018)

From Figures 1 and 2, it appears that Nigeria's trade has not increased as predicted after the trade liberalisation.

5. Conclusion

This paper applies a partial equilibrium model, the internet-based SMART model, to calculate the impact of a free trade agreement within ECOWAS on imports by Nigeria. Trade data for 2014 was used in order to capture the situation before the removal of intra-ECOWAS tariffs and the implementation of the Common External Tariff (CET), which Nigeria agreed to implement on 11 April 2015. Trade data after the implementation were then explored to determine if the predicted outcomes were attained.

The model results show that the implementation of a zero rating on import tariffs within the ECOWAS customs union had a trade-creating effect for Nigeria. Related to Nigeria's diversification strategy, emphasis was placed on the impacts on imports of primary agricultural products compared to agro-processed goods. Estimated trade creation for agro-processed goods was just more than double that for agricultural products, which may point towards increased competition for domestic value-added industries, which are a focus area of support by industrial policy for diversification. The model results show that growth in imports resulting from trade creation was about three times more than trade diversion. Most of the trade creation occurred in Cote d'Ivoire, whereas the non-ECOWAS country most negatively affected by trade diversion was China. Despite overall welfare gains from cheaper imports and heightened market competition, the model results also indicate a loss of tariff revenue for the government. The model results from this study are upper-bound estimates, because Nigeria still applies non-tariff barriers such as import bans, quotas, levies, etc.

When comparing the model results with actual trade trends since 2015, it was found that the increase in formal trade indeed took place in the year after the implementation of the zero rating, but this increase in intra-ECOWAS trade was not maintained. In subsequent years, the trade levels appear to revert to pre-agreement levels. Nigeria increased its share of imports from the EU in 2016, while imports from ECOWAS, BRICS and the other countries declined. In general, Nigeria's total imports have shown a declining trend since 2013, which is contrary to the expectation that trade liberalisation stimulates trade. The global context is therefore an important consideration, because these agreements do not take place in isolation. Similarly, domestic policy considerations and a history of informal trade are also important, as these are expected to influence trade response to liberalisation.

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