

Household Welfare Impact of Trade Liberalization in Nigeria: A Computable General Equilibrium Model¹

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Abstract

Trade liberalization policy across countries gathered momentum in the 1990s and has not abated ever since. These policy reforms have been fueled by the desire of countries to harness the benefits embedded in international trade. While the empirical link between trade liberalization and its economic growth outcomes in Nigeria has received considerable attention in the literature, the household welfare implications or income distributional effect of this policy remains under-researched. This study examines the various household welfare scenarios that will result from the imposition of shocks on import taxes in the Nigerian economy. The paper utilizes the computable general equilibrium model based on a 2006 social accounting matrix for Nigeria to conduct a macro-micro simulations of the economy. The study found evidence that a policy of full or partial trade liberalization of the Nigerian economy will on overall, have a mixed welfare implications for Nigerian households in the short run. While the policy will lead to a general improvement in consumption of goods and services as well as in real income of all households, it will at the same time hurt households by inducing unemployment in the two key sectors of agriculture and industry. It will therefore be helpful to pursue a trade liberalization policy on a sectorial basis with emphasis on those sectors that will not severely undermine the welfare needs of Nigerian households.

1. Introduction

Trade liberalization policy across countries of the world gathered momentum in the 1990s and has not abated ever since. The major impetus for these policy reforms has been the strong desire of countries to harness the benefits embedded in international trade (this is as suggested by the recent experiences of economic growth in many economies particularly, the emerging market economies), and hopefully increase the standard of living of citizens. Data from the World Bank *World Development Indicators*, indicate a strong correlation between a reduction in the average tariff rate in the world and a rise in trade openness as measured by the ratio of imports plus exports to Gross Domestic Product (GDP). These figures also suggest a strong positive link between trade liberalization and economic growth in these countries. The figures further indicate that trade has grown faster than output during the period under review and also connote that accelerated economic growth has been largely driven by a more liberal trade policy in the African continent particularly in the Nigerian economy.

Nigeria embarked on its most ambitious and comprehensive program of trade reform in history under the structural adjustment program (SAP) of the country which commenced in 1986. The SAP itself was designed to address the lingering problem of structural imbalances in the economy then. Some of the problems that plagued the national economy then included an adverse balance of payments position, severe unemployment, a huge national debt profile, low capacity utilization in the industrial sector and a general decline in the quality of life. The country engaged a combination of fiscal, monetary and trade policies to re-direct the economy back on the path of a balanced, non-inflationary and self-sustaining growth. The emphasis of the economic reform was on the trade and exchange rate areas of the external sector of the economy. Embedded in SAP therefore, was a deliberate trade policy of liberalization of the exchange rate, relaxation of import restrictions, and reduction of tariffs on imports.

A major goal of the trade reform policy was to integrate the Nigerian economy into the global market by liberalizing the economy and enhancing the competitiveness of domestic industries. While a policy of diversifying the export base of the economy by de-emphasizing the dominant role of crude oil in Nigeria's exportable was pursued, a complementary policy of import liberalization that promotes efficiency and international competitiveness of domestic producers was considered compelling for the economy. Some of the inherent benefits envisaged in the policy of trade liberalization and integration into the multilateral trading system include a encouragement of fostering of productivity growth through the transfer, acquisition and adoption of appropriate technologies that will enhance the productive base of the Nigerian economy and ultimately improve the standard of living within the country (Bardhan, 2006, Belhaj Hassine, 2008).

While the empirical link between trade liberalization and its economic growth outcomes in Nigeria has received considerable attention in the literature, the household welfare impact or income distributional effect of

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this policy remains under-researched. For example, it is not clear from the literature whether the trade liberalization policy of the Nigerian government has the capacity to improve the general wellbeing of people and the overall standard of living in the country. Moreover, a number of key human development indices for the country do not seem to suggest a considerable improvement in the wellbeing of Nigerians over the years since trade liberalization was introduced. Curiously, a number of questions arising from the foregoing will bother on various “what if” scenarios for the Nigerian economy. For example, what if import tariff is further reduced in Nigeria? What if import restrictions on some imported goods is further relaxed in Nigeria? Are there substantial welfare gains to be derived by Nigerians from such policy shifts? Which sector(s) will benefit most from such policy changes? The answers to these questions will hopefully provide improved insights into the household welfare implications of a trade liberalization policy in Nigeria.

This study examines the various household welfare scenarios that will result from the imposition of shocks on tariffs and other trade liberalization related parameters in the Nigerian economy. To achieve this, the paper utilizes the computable general equilibrium model based on a 2006 social accounting matrix for Nigeria to conduct a macro-micro simulations of the economy. The computable general equilibrium model is implemented in a comparative static mode making it a good instrument for controlled policy simulations and experimentations. The paper further tracks the patterns of possible welfare losses or gains for the rural and urban households under the various simulation scenarios. An important question which the study attempts to address is; what category of households in Nigeria will benefit the most from a policy of tariff-income tax reform? This question is examined under the various simulation scenarios and it helps to determine the potential relative benefits of a tariff rationalization policy that is accruable to each identified household type within the Nigerian economy.

The remainder of the paper is organized in sections as follows: section two is the literature review, section three comprises the methodology and data which includes a description of the PEP-1-1 model, the analytical framework as well as the simulation design and macro-closures. Section four comprises the simulation results and some policy implications of major findings. Section five is the concluding section and it provides some general concluding remarks.

2. A Brief Review of the Literature on Trade Liberalization and Household Welfare

In the view of the classical economists, the labour market provide the key transmission channel between international trade and household welfare in developing countries (Winters, 2000). Arguably, trade liberalization could have various impact on individuals and households depending on the price transmission mechanisms, and the sources of income of individuals and households (Porto, 2006). One of the main channels through which trade policy could impact households in an economy is the domestic prices of goods and factors of production, these include; wages, profits, returns to capital and rental on land and these will in turn, affect household welfare and income distribution (Winters et al., 2004). Another channel through which trade liberalization could have implications for household welfare is the employment channel. Rural households in their different roles as factors of production and economic agents may be adversely affected by the trade liberalization – welfare nexus. According to Bardhan (2007), the above group in their capacity as self-employed and formal markets workers, private consumers, beneficiaries of public services, and consumers of common resources may suffer severe welfare loss from a suboptimal policy of opening up the product markets without the required institutional and infrastructural adjustments.

Trade liberalization is often part of a broader policy of trade openness and integration into the global market. In this case, the issue of an enduring international labour mobility across national boundaries could create difficulties for generating employment in a globalized world economy. Ghose et al (2008) opined that while there are roles for domestic policy in offsetting negative welfare implications arising from the trade liberalization-employment channel, other policy challenges that can only be dealt with at the global level still remain. Trade liberalization may this sense raise governance questions *vis-à-vis* the compelling need for freer trade and factor mobility as it affects many developing countries with vulnerable structures.

A number of authors posit that factors specific to each country will determine the welfare impact of trade policy on households. In other words, welfare shocks confronted by households on account of trade liberalization could be either negative or positive and of course, country-specific. For example, McCulloch et al. (2001) is of the view that the poverty or welfare impact of trade liberalization is country specific, being pro-poor in some cases and anti-poor in others. Hoekman et al (2001) identify factors such as the initial size of the economy, import tariffs, the sectoral structure of import tariffs, the geographical distribution of the poor, as well as wage and employment as key determinants of trade liberalization on household welfare in a given country. Other authors who agree with this view include (Cockburn, 2001, McCulloch et al, 2001 and winters et al, 2002). Essentially, the nature or structure of the labour market according to Chan et al (2002) is what will determine the effects of trade liberalization on household welfare in each economy.

On the question of whether trade liberalization promotes household welfare, Dollar and Kraay (2004) believe that trade liberalization could lead to faster growth in average incomes, and also, growth decreases

absolute poverty by increasing the incomes of the poor “proportionately”. They suggest that developing countries could adopt a strategy of trade liberalization to alleviate poverty. According to Chitiga, and Mabugu (2006), the halving of tariffs in Zimbabwe would favor the export-oriented sectors, mainly in agriculture, inducing a rise in unskilled wages relative to skilled wages and finally leads to a fall in poverty. Cho and Diaz (2008) also found that trade liberalization reforms in Slovenia would induce a fall in import prices, a rise in production within the export sector, and an improvement in aggregate welfare.

However, Ravallion (2007), utilizing both macro and micro modelling frameworks, queries the strong relationship between globalization and poverty reduction. The paper argues that it is not under all conditions that trade openness or liberalization would be effective in reducing poverty or increasing household welfare. Some studies found results in support of Ravallion. Pradhan and Amarendra (2006) found that a general cut in tariffs in India will lead to a decrease in overall welfare and reduction in poverty for urban households. Also, Sapkota and Cockburn (2008) found that trade liberalization in Nepal reduces the nominal returns to urban factors of production in comparison with rural factors of production, resulting in a reduction in the relative income of urban households. Diallo, Koné and Kamagaté (2010) found in their simulation results for a study on Côte d’Ivoire that a partial or complete unilateral liberalization would induce a decrease in GDP, household income and household welfare when compared to the baseline. However, multilateral trade liberalization would positively affect economic growth, income, consumption and wellbeing for almost all the household categories. Similarly, Aredo, Fekadu and Kebede (2012) found that a complete tariff cut in Ethiopia would result in an increase in poverty by 2.8 percent, while a uniform tariff scheme raises poverty by 2.3 percent.

3. Methodology and Data

3.1 The model

The PEP-1-1 (1 period – 1 country) model – version 2.1 (Robichaud, Lemelin, Maisonnave and Decaluwé, 2013), is adopted for this study. The PEP-1-1 model is the PEP standard CGE model and it is a static computable general equilibrium (CGE) model designed for the study of a national economy. The PEP standard CGE model is grounded in the *neoclassical general equilibrium theory* and its main theoretical features is built on the assumption that *perfect competition* prevails, so that producers and consumers take as given the relative prices that simultaneously equalize the quantity produced to the quantity demanded in each market. The static model as applicable to the Nigerian economy is built on the assumption that a typical agent optimizes an objective function subject to some constraints. *Producers* maximize their profit under a given technology and independent prices in supplying a given quantity of product to the market. *Consumers on their part*, maximize utility under limited budgets and given market prices in addressing their demand of a given quantity of products to the market (AGRODEP, 2014).

The relationship between the domestic economy and *the rest of the world* is governed by the substitutability between imported and domestically produced commodities on the supply side (Armington assumption) and by the transformation between the domestic and international markets on the demand side. While commodity markets follow the neoclassical market-clearing price mechanism, producer and consumer prices vary by given taxes and subsidy rates, as well as margins rates. Calibration of the model parameters was carried out using the 2006 social accountability matrix (SAM) developed for the Nigerian government by the International Food Policy Research Institute, IFPRI (2010). The structure of this SAM is described in Nwafor, Diao and Alpuerto (2010). The SAM was however aggregated and reformatted to make it suitable for use in the PEP standard CGE model. A description of the principal characteristics of the PEP-1-1 model is presented in Robichaud, Lemelin, Maisonnave and Decaluwé, (2012). The building blocks of the PEP standard CGE model as applicable to this study follow a nesting structure capturing the theoretical relationships or transmission channels among sectors and products within the economy under study as indicated in Figures 1 – 3 below.

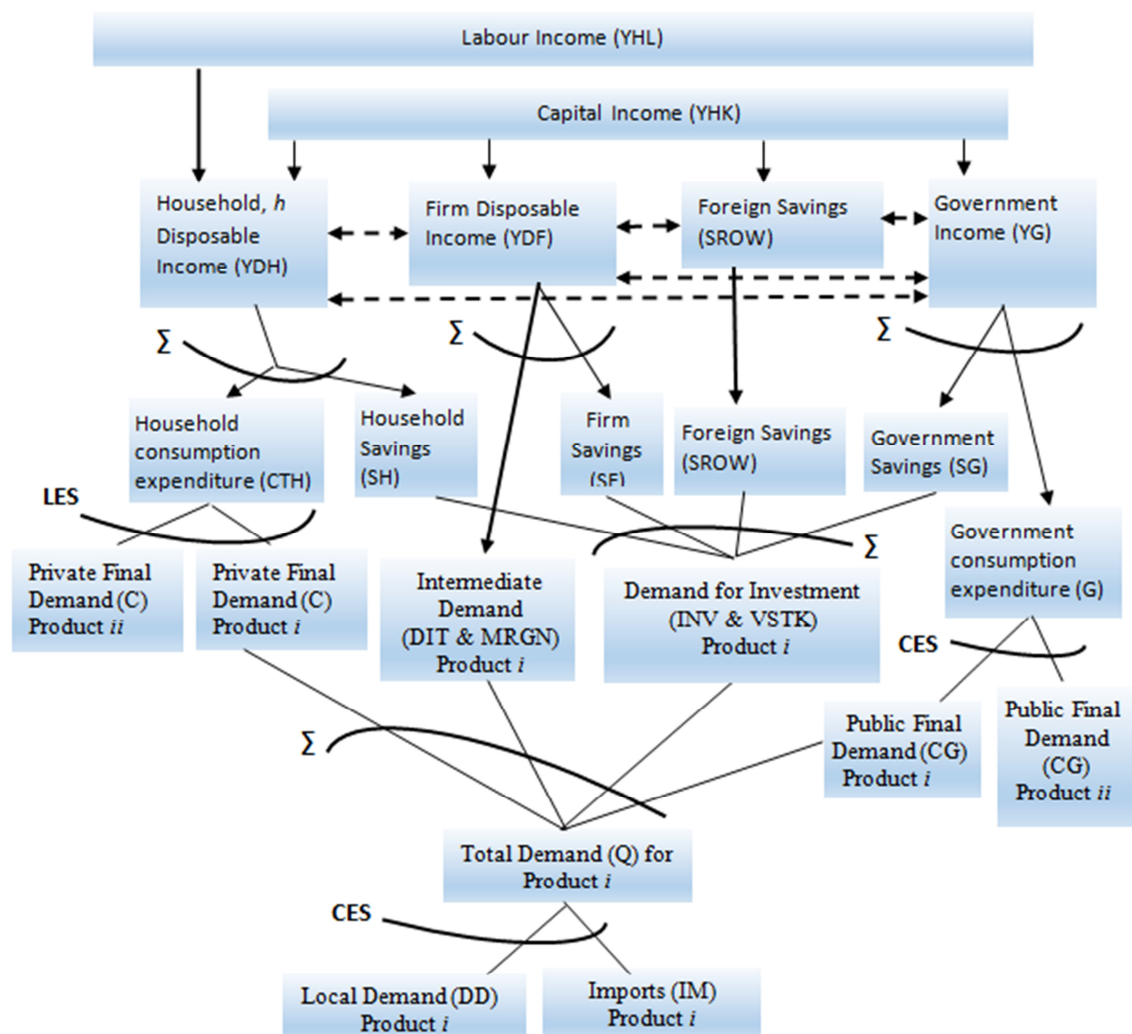


Figure 2: Building Block B – Income, Saving and Demand

Source: AGRODEP (2014) – modified by authors

Goods and services produced are converted into income for the factors of production. As can be seen in Figure 2, labour income and capital income are distributed among households, firms, *rest of the world* and government. These agents exhibit a composite demand for saving and consumption expenditure as the case may be. In addition, these four agents represent the distinct sources of demand for investment as well as for final demand within the economy. The representative household's optimization problem generates household demand. It is assumed that households have Stone-Geary utility functions (from which derives the Linear Expenditure System, or LES). Government consumption expenditure is another source of final demand. Firms generate final demand via its demand for intermediate inputs. Government and firm's final demand exist in fixed quantities. International trade is modeled via the Armington assumption. In other words, a single Armington composite for household, intermediate, government and investment demands exists in this model. Besides, the Armington aggregator function is of the CES form. The economy is assumed to be a single open economy with respect to import markets. No re-export of imported goods is allowed in this economy also. Total demand for goods and services in this economy is satisfied by consuming both locally produced as well as imported goods and services

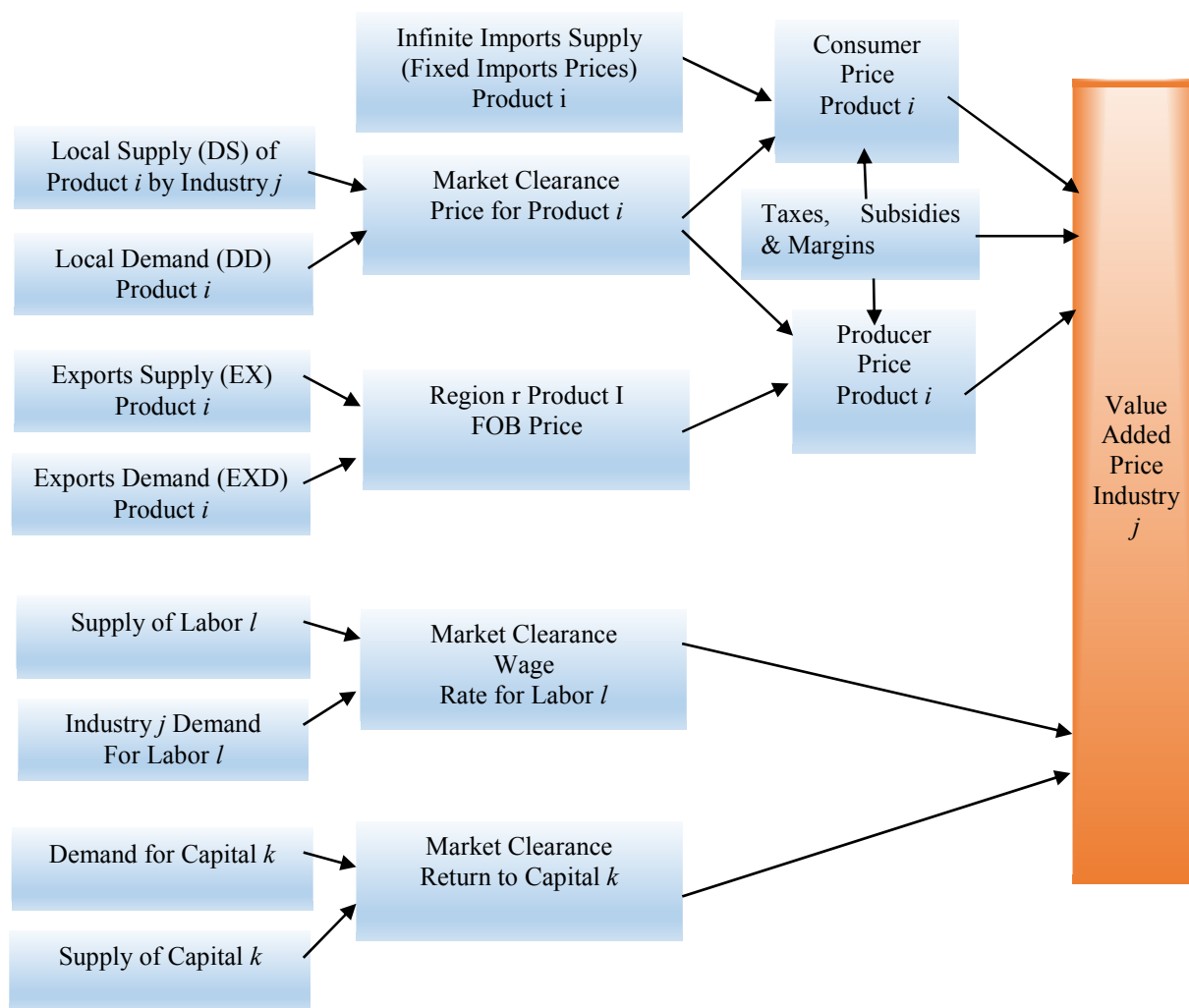


Figure 3: Building Block C – Equilibrium and Prices

Source: AGRODEP (2014)

Figure 3 shows equilibrium and prices in the economy. Equilibrium is established via the interplay of market forces in the goods and labour markets. World prices of imports is assumed fixed in the model. Typical policy distortions exist and these include tariffs and other trade taxes, subsidies, production taxes, consumption taxes and factor taxes. These distortions tend to exert upward or downward pressures (as the case may be) on the value added price of industry j .

3.2 Analytical Framework

The analytical framework for the study is presented in Figure 4. The figure captures the essential characteristics of the PEP-1-1 model adopted in this study. It further shows the channels through which a negative shock on import duties (parameter) may be transmitted into wellbeing or otherwise for households in the economy. In addition, the figure demonstrates the inter-connectedness of the entire economy in a general equilibrium framework.

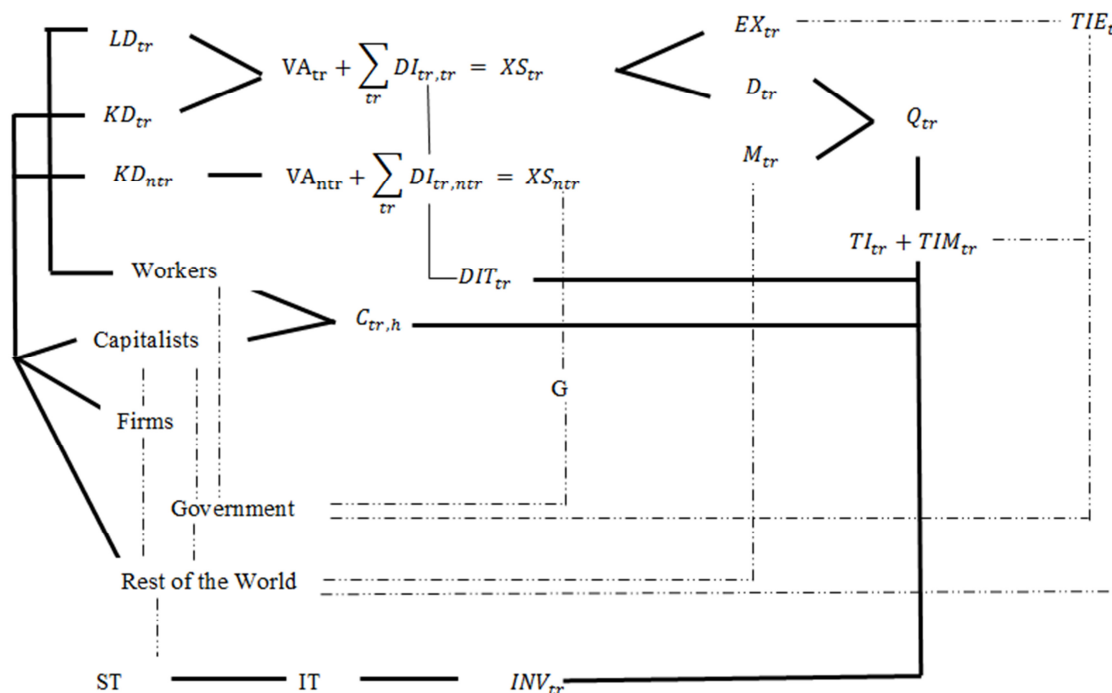


Figure 4: Schematic Representation of the Circular Flow of Resources in the PEP-1-1 Model

Source: Robichaud (2013) - modified by the Author

From Figure 4, a negative shock applied to tariffs for all imported commodities, TIM_{tr} will induce more imports in the import dependent sectors provided the increase in imports can be financed by export revenue. This is because CAB and foreign saving are fixed. For sectors that are efficient in production and import dependent for raw materials, such negative shock on import duties will be favorable, otherwise there will be some undesirable consequences. In general, a negative shock on import duties will mean cheaper prices of goods imported by each sector into the economy. This will immediately stimulate domestic demand or consumption but at the same time, induce a shift of consumption preferences in favor of imported commodities. If the imports are raw materials or production inputs, then cost of production or producer's price will fall and consumption of the resultant locally produced commodities will increase. Intermediate consumption and value added in the concerned sector will also increase and this will in turn increase demand for labour or employment in that sector. Household income will increase and household welfare will also increase in the concerned sector.

If on the hand imports are finished goods and production in the concerned sector is inefficient, then the purchaser's price of locally produced substitute commodities will become relatively more expensive and less competitive. In this case, import demands, M_{tr} will increase and demand for home made goods, D_{tr} will fall. The probable trade-off between imported goods and domestically produced commodities, will leave the quantity demanded of composite tradable commodity, Q_{tr} relatively unchanged. A fall in D_{tr} will depress total domestic output in the affected sector, XS_{tr} . Total intermediate demand in the same sector by the sector itself, $DI_{tr,tr}$ will also fall, value added for the sector in question, VA_{tr} will fall as well. The combined effect of all these will compel a reduction in labour demand, LD_{tr} meaning loss of employment. This will hurt the labour market. A reduction in labour demand will make capital in the concerned sector relatively abundant bringing about a reduction in rental on capital, KD_{tr} . Meanwhile, demand for capital in the non-tradable sector, KD_{ntr} (LAND) will not really be affected. A fall in KD_{tr} will in turn result to a fall in capitalist income. In all, fewer workers, a fall in capitalists' income and a fall in import tariffs will mean a fall in tax revenue for the government which also mean a decline in the provision of public services, G . Given a fall in income of agents (excluding ROW) and the assumption of a fixed current account balance, total savings (ST), indirect taxes (IT), and investment in the concerned sector (INV_{tr}) will all fall. In summary, cheaper imported goods alone is expected to leave households with more purchasing power and increase consumption of tradable goods by households, $C_{tr,h}$. Overall however, household welfare will vary depending on the characteristics of the importing sector.

3.3 Simulation Design and Macro-Closures

This study involves simulations of two scenarios of trade liberalization policies: these include:

- a unilateral 24% reduction in import tariffs in line with the Uruguay round (SIM1)
- a complete and unilateral elimination of all import tariffs (SIM2)

The closure rules for both simulation scenarios include: budget deficit is held constant and current

account balance (CAB) is fixed; this is to avoid financing of welfare through an increase in external debt or a depletion of external reserve as the case may be. Foreign saving (SROW) is assumed exogenous; international prices are fixed; and real exchange rate is flexible. The *numeraire* is the nominal exchange rate. Furthermore, following the argument in Diallo, Koné and Kamagaté (2010), the volume of total investment and foreign saving are assumed exogenous so that any decrease in the saving of the other agents must be compensated by an equivalent increase in household savings so as to maintain equilibrium between saving and real investment. Moreover, since the budget deficit is held constant and given the assumptions that nominal exchange rate and international prices are fixed, equilibrium in the current account is made through adjustment in the real exchange rate. The elasticity of substitution between imported goods and locally produced goods is assumed to be 2. This assumption is quite realistic for the Nigerian economy as some considerable substitutability between imported and locally produced household commodities is observable within the economy.

4. Simulation Results

The simulation exercise has been conducted within a framework of policy experimentations and they capture the sensitivity of the Nigerian economy to a 24% and 100% reductions in import taxes. Conclusive simulation results are usually obtained after satisfactorily conducting the price homogeneity and model behaviour tests. The simulation results for this study are thus presented in Tables 1 – 7. Interpretation of the presented results follow each result table.

Table 1 : Imports

Definition	Variable Symbol ¹	Base Period Value	Sim1: ($tm_i - 24\%$)	Sim2: ($tm_i - 100\%$)
Agriculture	M_{agr}	170352.156	204396.3556	395739.5566
Variation (%)			(19.98)	(132.31)
Food	M_{food}	317826.5555	335558.1296	353590.1203
Variation (%)			(5.58)	(11.25)
Industry	M_{ind}	3387513.012	3352298.617	3208578.764
Variation (%)			(-1.04)	(-5.28)
Services	M_{ser}	1091371.835	1068959.348	997372.1205
Variation (%)			(-2.05)	(-8.61)

Source: Computed by authors using GAMS 24.1.3

A negative shock to import taxes makes imported goods relatively cheaper. Given the Armington assumption and that the elasticity of substitution between imported and locally produced goods is 2. Demand for and consumption of imported goods are expected to increase as long as all imports can be financed by export revenue. The simulation results presented in Table 1 show that a 24% reduction in base period import taxes will make import demand for agricultural and food products to increase by 19.98% and 5.58% respectively. At the same time, this policy shift will lead to an increase in import demand for industry and services sectors by 1.04% and 2.05% respectively. Similarly, if a unilateral and complete removal of all import taxes in the country is assumed, import demand for agricultural and food commodities will increase by 132.31% and 11.25% respectively. While import demand in the industry and services sectors will reduce by 5.28% and 8.61% respectively.

¹ See Appendix 1 for Variable Legend

Table 2 : Exports

Definition	Variable Symbol	Base Period Value	Sim1: ($tm_i - 24\%$)	Sim2: ($tm_i - 100\%$)
Agriculture	X_{agr}	28827.98005	28748.62799	29972.82593
Variation (%)			(-0.28)	(3.97)
Food	X_{food}	5410.356093	5395.463518	5625.217623
Variation (%)			(-0.28)	(3.97)
Industry	X_{ind}	7446941.099	7450166.595	7579961.709
Variation (%)			(0.04)	(1.79)
Services	X_{ser}	355491.4166	360522.0696	375375.0592
Variation (%)			(1.42)	(5.59)
Current account balance	CAB	3443077.463	3443077.463	3443077.463
Variation (%)			(0.00)	(0.00)

Source: Computed by authors using GAMS 24.1.3

Given the base period values, exports of agricultural and food products will reduce marginally by 0.28% each following a 24% reduction in imports tariffs in the Nigerian economy. On the contrary, exports of industry and the services sectors will increase slightly by 0.04% and 1.42% at the same time. Meanwhile, a complete removal of all import tariffs in the country will be accompanied by an increase in exports of all four exporting sectors in the economy. Precisely, agricultural and food exports will increase by 3.97% each, industry exports will increase by 1.79% while exports of the services sector will increase by 5.59%. of course current account balance will remain unchanged given that it is fixed. In both simulation scenarios, the increase in exports is necessary for the economy to be able to finance any additional imports of agriculture and food products as seen in Table 1. This argument is in view of the fact that current account balance is assumed fixed in this study.

Table 3 : Output

Definition	Variable Symbol	Base Period Value	Sim1:($tm_i - 24\%$)	Sim2:($tm_i - 100\%$)
Agriculture	XS_{agr}	7751555.06	7742768.982	7575477.783
Variation (%)			(-0.11)	(-2.27)
Industry	XS_{ind}	9374177.642	9357670.977	9452699.936
Variation (%)			(-0.18)	(0.84)
Services	XS_{ser}	6633696.962	6659423.308	6697554.088
Variation (%)			(0.39)	(0.96)
Administration	XS_{adm}	3108960.071	3120733.575	3232321.483
Variation (%)			(0.38)	(3.97)

Source: Computed by authors using GAMS 24.1.3

Results in Table 3 suggest that domestic output in the agriculture sector will be depressed by 0.11% and 2.27% if import taxes are reduced by 24% and 100% of their base period values respectively. At the same time, domestic output in the industry sector will fall by 0.18% or increase by 0.84% of the base period import tax values if there is a 24% or 100% reduction in import taxes respectively. The results also reveal that a 24% and 100% negative shock on services sector will make domestic output here to rise by 0.39% and 0.96% respectively. Output in the administration sector will also increase by 0.38% and 3.97% respectively in response to a 24% or 100% reduction in import taxes. Given the Armington condition and that the elasticity of substitution between imported and locally produced goods is 2, it is not unexpected that domestic output in the agriculture and industry sectors will fall in order to accommodate the increase in imports results as observed in Table 1.

Table 4 : Labour

Definition	Variable Symbol	Base Period Value	Sim1:($tm_i - 24\%$)	Sim2:($tm_i - 100\%$)
Agriculture	LD_{agr}	3958624.786	3949438.357	3830757.429
Variation (%)			(-0.23)	(-3.23)
Industry	LD_{ind}	300773.417	297222.9955	321042.1857
Variation (%)			(-1.18)	(6.74)
Services	LD_{ser}	3925373.409	3934656.247	3996608.891
Variation (%)			(0.24)	(1.81)
Administration	LD_{adm}	914883.6071	918337.6196	951246.7134
Variation (%)			(0.38)	(3.97)

Source: Computed by authors using GAMS 24.1.3

Sectorial employment in the economy will also exhibit a pattern similar to those of domestic output if a

24% or 100% reduction in import taxes is applied. From Table 4, it can be seen that if import taxes are reduced by 24% of the base period value, employment in the agriculture and industry sector will fall by 0.23% and 1.18% respectively. However, employment in services and administration sectors will increase by 0.24% and 0.38% respectively. A complete removal of import taxes will employment in all (except agriculture) the sectors rise by the percentages indicated. It is also logical for labour demand to fall in sectors with declining domestic production. The consequence here is that unemployment will increase in the agriculture sector under both simulation scenarios and in the industry sector under simulation 1 only.

Table 5 : Income

Definition	Variable Symbol	Base Period Value	Sim1:($tm_i - 24\%$)	Sim2:($tm_i - 100\%$)
Rural Household	YH_{hrr}	6289097.012	6331948.561	5975358.575
Variation (%)			(0.68)	(-4.99)
Urban Household	YH_{hur}	9164102.57	9215074.572	8878959.691
Variation (%)			(0.56)	(-3.11)
Firm	YF	4865843.68	4874505.094	4858817.895
Variation (%)			(0.18)	(-0.14)
Government	YG	5622789.343	5599739.041	5352223.235
Variation (%)			(-0.41)	(-4.81)

Source: Computed by authors using GAMS 24.1.3

Income level for all sectors (except the government) will increase if a 24% reduction on import taxes is applied. However, a complete removal of all import taxes will see income in sectors of the economy fall dramatically. In this case, rural households and the government will be the most hurt. This will be followed by the urban households while agent firm will be the least hurt. The overall effect of a fall in prices of imported commodities leaves all households with more purchasing power. However, government's income expectedly must fall due to a decline in tax revenue from imports.

Table 6 : Consumption – Rural Household

Definition	Variable Symbol	Base Period Value	Sim1:($tm_i - 24\%$)	Sim2:($tm_i - 100\%$)
Agriculture	$C_{agr.hrr}$	449628.5342	460639.9504	503663.0391
Variation (%)			(2.45)	(12.02)
Industry	$C_{ind.hrr}$	712200.3371	720535.4863	701353.4874
Variation (%)			(1.17)	(-1.52)
Services	$C_{ser.hrr}$	596391.6147	605871.6487	597569.8271
Variation (%)			(1.59)	(0.20)
Food	$C_{food.hrr}$	4007839.685	4037214.835	4010447.628
Variation (%)			(0.73)	(0.07)

Source: Computed by authors using GAMS 24.1.3

Rural household's consumption of all sectorial goods and services will increase remarkably if a 24% reduction on import taxes is applied to all imported commodities into the economy. Apart from the industry sector, consumption will also increase in the other sectors of the economy if a 100% reduction in import taxes is applied to all imported commodities in the economy. In this case, agriculture will attract a sizable improvement in consumption. Consumption for rural households should necessarily increase given that prices of imported goods and services have fallen.

Table 7 : Consumption – Urban Household

Definition	Variable Symbol	Base Period Value	Sim1: ($tm_i - 24\%$)	Sim2: ($tm_i - 100\%$)
Agriculture	$C_{agr.hur}$	548760.6003	562388.4696	625265.8629
Variation (%)			(2.48)	(13.94)
Industry	$C_{ind.hur}$	1380578.533	1396964.031	1388526.205
Variation (%)			(1.18)	(0.58)
Services	$C_{ser.hur}$	1698004.449	1725375.472	1736645.196
Variation (%)			(1.61)	(2.28)
Food	$C_{food.hur}$	2424770.786	2442794.94	2478981.373
Variation (%)			(0.74)	(2.24)

Source: Computed by authors using GAMS 24.1.3

Urban household's consumption of all sectorial goods and services will also increase remarkably if a 24% reduction on import taxes is applied to all imported commodities into the economy. Similarly, urban household's

consumption will also increase in all sectors of the economy if a 100% reduction in import taxes is applied to all imported commodities into the economy. In this case, agriculture will again take the lead in attracting the greatest improvement in consumption. Consumption for urban households should expectedly increase also given that prices of imported goods and services have fallen.

4.1 Policy Implication of Findings

Given the results of this study, it is evident that a policy of full or partial trade liberalization of the Nigerian economy will on overall, have a mixed welfare implications for Nigerian households in the short run. A partial trade liberalization policy for instance, will particularly increase rural and urban households' consumption of goods and services produced in all sectors. A partial trade liberalization policy will also improve real income of all households. However, the policy will hurt households by inducing unemployment in the two key sectors of agriculture and industry. This is because the liberalization policy will induce a shift in consumption preferences within the agriculture and industry sector from domestically produced goods to imported goods. This possibility will of course cast doubts on the sustainability of any short-run welfare gains for households in terms of increased real income and consumption. Overall, the problem of employment loss will be more severe in the agriculture and industry sectors. Therefore, a policy of a complete or partial removal of import taxes will equally hurt both rural and urban households in the Nigerian economy.

4.2 Concluding Remarks

The study examined the welfare implications of trade liberalization policy for households in Nigeria. Two simulation scenarios involving a complete removal of import tariffs and a 24% reduction of import tariffs was conducted. The results revealed that trade liberalization policy will not be totally consistent with the welfare expectations of households in Nigeria at least in the short run. The results also reveal that the agricultural sector will be worse off under a trade liberalization policy thereby suggesting a problem of vulnerability of this sector to external trade competition. It will therefore be helpful to pursue a trade liberalization policy on a sectorial basis with emphasis on those sectors that will not severely undermine the welfare needs of Nigerian households.

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Appendix 1: Variable Legend

S/N	Variable symbol	Variable definition
1.	M_{agr}	Quantity of agriculture product imported
2.	M_{food}	Quantity of food product imported
3.	M_{ind}	Quantity of industry product imported
4.	M_{ser}	Quantity of product imported by services sector
5.	X_{agr}	Quantity of agriculture product exported
6.	X_{food}	Quantity of food product exported
7.	X_{ind}	Quantity of industry product exported
8.	X_{ser}	Quantity of product exported by services sector
9.	CAB	Current account balance
10.	XS_{agr}	Total output of agriculture sector
11.	XS_{ind}	Total output of industry sector
12.	XS_{ser}	Total output of services sector
13.	XS_{adm}	Total output of administration sector
14.	LD_{agr}	Demand for labor by agriculture sector
15.	LD_{ind}	Demand for labor by industry sector
16.	LD_{ser}	Demand for labor by services sector
17.	LD_{adm}	Demand for labor by administration sector
18.	YH_{hrr}	Total income of rural households
19.	YH_{hur}	Total income of urban households
20.	YF	Total income of type f businesses
21.	YG	Total government income
22.	$C_{agr.hrr}$	Consumption of agriculture products by rural households
23.	$C_{ind.hrr}$	Consumption of industry products by rural households
24.	$C_{ser.hrr}$	Consumption of services by rural households
25.	$C_{food.hrr}$	Consumption of food products by rural households
26.	$C_{agr.hur}$	Consumption of agriculture products by urban households
27.	$C_{ind.hur}$	Consumption of industry products by urban households
28.	$C_{ser.hur}$	Consumption of services by urban households
29.	$C_{food.hur}$	Consumption of food products by urban households

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