

Gender Welfare Effects of Regional Trade Integration on Households in Ghana

Emmanuel Orkoh, North-West University, South Africa ^{1,2}

1. Introduction

Over the past two to three decades, a number of developing countries have pursued regional economic integration to harmonize trade policies and increase their weight in global trade. Economic integration, particularly in Africa, has also been seen as a way to diversify the structure of African economies, boost intra-African trade and investment, build supply capacity, and sustainably reduce poverty (Osakwe, 2015). These integration efforts have resulted in the creation of regional blocs such as the Economic Community of West African States (ECOWAS), West African Economic and Monetary Union (WAEMU), Common Market for East and Southern Africa (COMESA), Economic Community of Central African States (ECCAS), Central African Economic and Monetary Community (CEMAC), Southern African Customs Union (SACU), and Arab Maghreb Union (AMU). The trade-related objectives of these blocs include the establishment of custom unions,³ with a common external tariff (CET) as a major trade policy instrument.

In January 2015, ECOWAS began the implementation of a common external tariff (CET), a process expected to be completed by 2020. The envisioned benefits of the CET include a reduction in lost revenues that arise from competition in external tariff rates between the member

states, a reduction in the complexities associated with rules of origin requirements and protection of some emerging sectors. In 2015, about 12% of ECOWAS exports went to other member countries, 6% to other African countries and about 80% outside of Africa. The region ranked third in the 2016 Africa Regional Integration Index (AfDB, OECD, UNDP, 2017). However, the potential challenge for the CET is its coherence with the broader objectives of Africa's Continental Free Trade Area (CFTA), which seeks to harmonize or replace existing arrangements governing trade and the movement of persons in the continent. The concern has been whether the CFTA, (ratified by 44 out of the 55 AU member states during its extraordinary summit held between 17–21 March 2018 in Kigali), will add a layer of complexity or will simplify the existing agreements enshrined in the CETs and other Regional Economic Communities (RECs) (Gutowski, Knedlik, Osakwe, Ramdoo & Wohlmuth, 2016; UNCTAD, 2016).

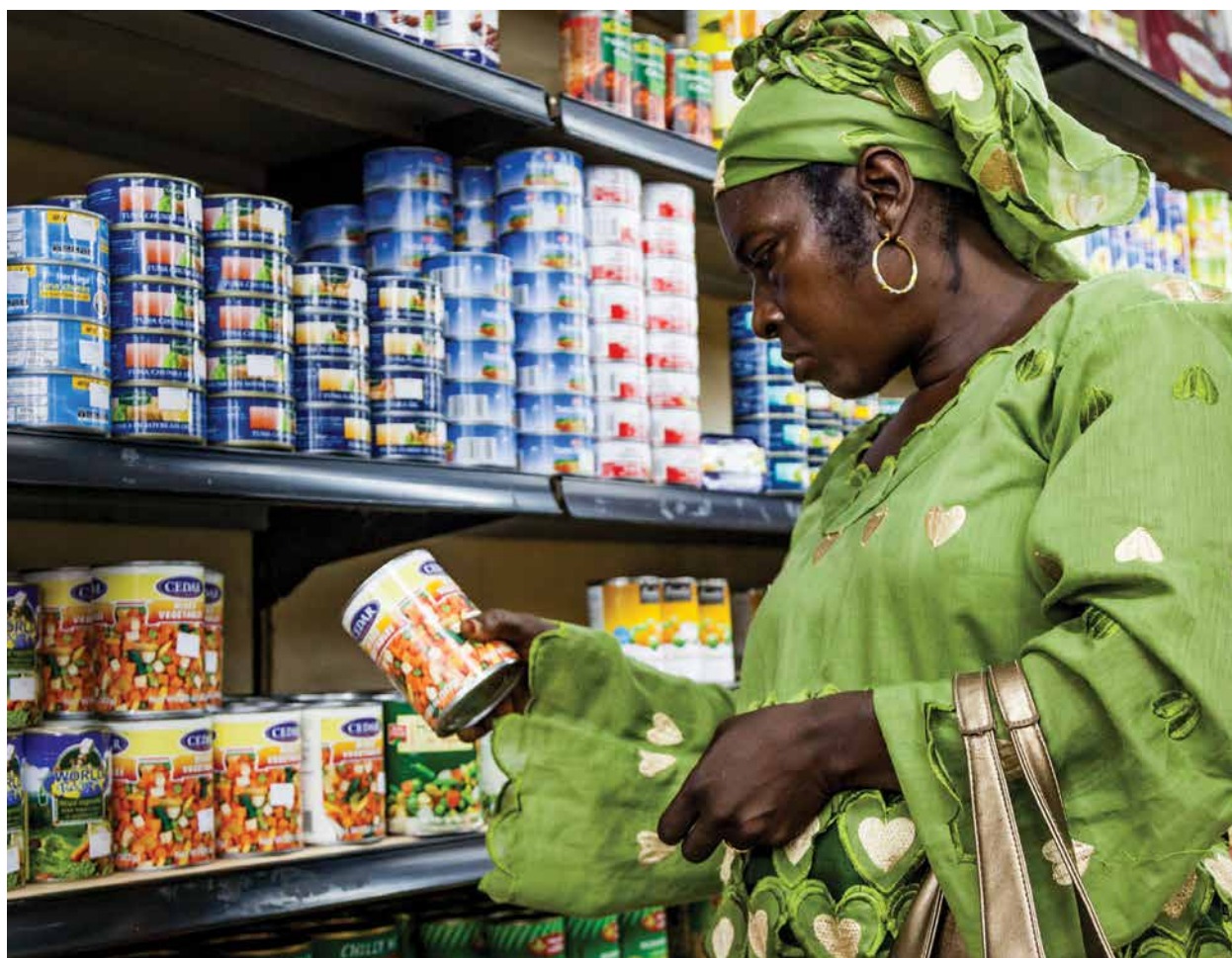
Regional trade integration through the creation of a customs union with a CET has been found to have both direct and indirect implications for household poverty and welfare in general. Trade integration affects poverty and welfare through three main channels: (a) changes in employment structures and wages; (b) changes in prices and their impact on consumption and production patterns; and (c) changes in financing for social expenditure by

¹ TRADE Research Focus Area, Faculty of Economic and Management Sciences, North-West University, Potchefstroom Campus, South Africa. Email: aorkoh@gmail.com

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³ A customs union is a trade agreement under which certain countries preferentially grant tariff-free market access to each other's imports and agree to apply a common set of tariffs to imports from the rest of the world. That is, they enter into a free trade agreement and apply a common external tariff to imports from non-members (Adams, 1993).



governments (Winters et al., 2004; Harrison and Tang, 2005). Trade reforms can also affect poverty indirectly via economic growth. Increased trade openness resulting from trade reforms can improve access to technology and hence foster productivity growth, leading to faster economic growth and reduced poverty (UNCTAD, 2010). Conversely, increased trade restrictions can impede productivity growth and slow economic growth, leading to increased poverty.

Among the various channels of effects, this study analyses the price channel. The focus on this channel is due to the fact that most often trade policies such as a CET affect import tariffs and thus domestic prices of commodities, which in turn affect the consumption and production

decisions of households (Marchand, 2012; Nicita, 2009). We can therefore consider the price channel as the mechanism that affects households more directly in the short term.

Between 2007 and 2015, Ghana alternated between its own tariff system and the CET of the regional economic bloc of which it was a member at a given time. From 2007 to 2011, the country implemented its own tariffs, but in 2012 it adopted the WAEMU CET, before switching back to its own tariff system in 2013 and finally adopting the ECOWAS CET starting in 2015. This followed negotiations by ECOWAS members in Dakar, Senegal, on the CET for the region, which concluded in October 2013 (Roquefeuil et al., 2014).⁴

⁴ According to Article 3.2(d) of the revised ECOWAS treaty, one of the aims of ECOWAS is "the establishment of a common market through: (i) the liberalization of trade by the abolition, among Member States, of customs duties levied on imports and exports, and the abolition, among Member States, of non-tariff barriers in order to establish a free trade area at the Community level; (ii) the adoption of a common external tariff and a common trade policy vis-à-vis third countries; and (iii) the removal, between Member States, of obstacles to the free movement of persons, goods, service and capital, and to the right of residence and establishment." (see http://www.courtecawas.org/site2012/pdf_files/revised_treaty.pdf#page=4&zoom=auto,-82,12). The member countries of ECOWAS are Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, the Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal, and Togo.



Ghana's implementation of the ECOWAS CET will result in significant changes in the country's tariff structure for both agricultural and non-agricultural products (World Bank Group, 2015). Some of the tariff rates will be lower and some will be higher as a result of the CET. For instance, implementation of the CET will reduce the number of commodities admitted under zero percent tariff rates from 725 to 85, but increase the number of commodities admitted under the 5% band from 375 to 2,146. The changes in tariffs related to implementation of the CET will affect prices and, consequently, the welfare of households, depending on their position as either net producers or consumers of these products.

Given the different roles of men and women in society and the economy, trade policies such as those enshrined in the ECOWAS CET have different implications for male- and female-headed households. This assertion has been widely supported by findings of several trade-gender specific studies. For instance, Bird (2004) emphasizes that changes associated with trade integration may be positive or negative for women and men depending on their individual characteristics, including education and skills, marital status, family size, social group

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characteristics such as whether the household is a net producer or a net consumer of goods whose prices have changed, urban/rural location, and economic and social status. In the Ghanaian context, the extent to which this assertion holds remains an important policy question, especially in the wake of the country's recent adoption and implementation of the ECOWAS CET.

The aim of this study is to measure the effects that implementation of the CET will have on household poverty, income, and consumption through the price channel, with a special focus on gender. A review of the literature reveals that even though some *ex-ante* studies of this nature on Ghana have looked at the poverty and income effects of trade liberalization (Bhasin and Annim, 2005; Bhasin, 2012), no study has focused on the impact

of the different ECOWAS CET bands on household welfare and the gender dimensions of this impact. The aim of this study is to fill these gaps and contribute to the existing literature on the links between international trade policy and household welfare.

To assess the implications of the CET, the study applies a top-down approach by combining a macro computable general equilibrium (CGE) (top-down) model and a micro (bottom-up) household model, with the latter using data at the household level (Bourguignon and Savard, 2008). Section 2 provides an overview of the evolution of Ghana's tariffs and poverty over the years. Section 3 explains the methodology and Section 4 the data used in the study, while Section 5 describes the simulations and presents the results. The final section provides conclusions.

It is hoped that the findings of this study may serve as input to policy makers and industry in formulating gender-aware policies to ensure that all population segments and household categories share appropriately in the gains and losses associated with the country's adoption of the CET. More broadly, it is hoped that the study may help policy makers in formulating policies to enhance gender equality and promote human development.

2. Overview of Ghana's trade reforms and poverty trends

Ghana's trade policy evolved from being fairly liberal in the 1950s to a significantly controlled regime in the 1970s, after which the country embarked on major trade liberalization and other economic reforms in the 1980s. This approach to trade policy has been greatly influenced by developments in international trade under the General Agreement on Trade and Tariffs (GATT) and the World Trade Organization (WTO). It has also been shaped by trade agreements between Ghana and its major trading partners, the country's economic development policy, and the structural adjustment programs of the World Bank and the International Monetary Fund, particularly in the 1980s and 1990s (Ackah and Aryeetey, 2012). Significant trade liberalization in Ghana began with the downward adjustment of tariffs in 1983, from rates of 35%, 60%, and 100% to rates of 10%, 20%, 25%, and 30%. The tariffs were further simplified and lowered to



0%, 25%, and 30% the following year while some import controls remained in place. Further reductions were made in 1986, when the higher rates were lowered to 20 and 25% (Ackah and Aryeetey, 2012).

Major trade policy reforms took place between 2007 and 2015, when the most-favored-nation (MFN) tariff applied by the country was frequently modified. In 2012, the country adopted the WAEMU CET, which was based on four tariff bands comprised of a zero duty on social goods such as medicine and publications, 5% duty on imported raw materials, 10% duty on intermediate goods, and 20%

duty on finished goods (Office of the United States Trade Representative, 2014). In 2013, Ghana switched from the WAEMU CET back to its own national tariffs. In this context, it abolished the non-ad-valorem tariffs applied to petroleum products, and replaced them with ad valorem rates in January 2014. This was accompanied by

a reduction of duties on some products and an increase in the duties on others.⁵ As shown in Table 1, the average unweighted applied MFN tariff in 2013 was 12.8%, compared to the 12.7% rate in 2007. The MFN rates on agricultural products were generally higher than those on non-agricultural products.

Table 1: Trends in Ghana's most-favored-nation tariffs, 2007–2015 (percent)

Categories	Ghana 2007	WAEMU CET 2012	Ghana 2013	ECOWAS CET 2015	Change 2007–2013 ^b	Change 2013–2015 ^b
Total	12.7	12.3	12.8	12.3	1.0	-4.0
By Harmonized System category^a						
Agricultural products	17.5	14.9	17.3	15.6	-1.0	-10.0
Animals and products thereof	19.4	18.5	19.0	23.9	-2.0	26.0
Dairy products	20.0	14.4	20.0	16.0	0.0	-20.0
Fruit, vegetables, and plants	18.9	17.6	18.3	17.6	-3.0	-4.0
Coffee and tea	20.0	17.2	20.0	12.0	0.0	-40.0
Cereals and preparations	17.8	12.7	16.2	13.5	-9.0	-17.0
Oils seeds, fats, oil and their products	14.6	10.5	14.6	14.1	0.0	-3.0
Sugar and confectionary	11.1	13.3	11.0	13.8	-1.0	25.0
Beverages, spirits, and tobacco	19.8	19.0	19.8	17.0	0.0	-14
Other agricultural products	14.4	9.4	15.1	9.5	5.0	-37
Non-agricultural products	12.0	11.8	12.0	11.7	0.0	-3.0
Fish and fishery products	11.1	15.5	9.8	15.4	-12.0	57.0
Minerals and metals	12.2	11.8	12.5	11.7	2.0	-6.0
Chemicals and photographic supplies	11.9	7.7	12.1	8.0	2.0	-34.0
Wood, pulp, paper, and furniture	16.1	11.3	16.8	11.4	4.0	-32.0
Textiles	16.9	16.5	16.8	16.0	-1.0	-5.0
Clothing	20.0	20.0	20.0	20.8	0.0	4.0
Leather, rubber, footwear, and travel goods	14.3	14.2	15.0	12.9	5.0	-14.0
Non-electric machinery	2.8	7.3	3.1	7.0	11.0	126.0
Electric machinery	10.3	11.3	10.6	11.2	3.0	6.0
Transport equipment	6.0	11.0	5.5	10.2	-8.0	85.0
Non-agricultural products n.e.s.	15.6	14.3	15.0	14.3	-4.0	-5.0
Petroleum	9.0	7.9	4.3	7.9	-52.2	84
By ISIC sector						
Agriculture, hunting and fishing	15.7	13	15.1	11.5	-4.0	-24
Mining and quarrying	11.2	5.0	11.2	5.1	0.0	-54
Manufacturing	12.6	12.4	12.7	12.5	1.0	-2.0

^a Source: Prepared by the author based on data from WTO (2014).

^b The Harmonized Commodity Description and Coding System (HS) is a multipurpose international product nomenclature developed by the World Customs Organization.

^c "Change 2007–2013" and "Change 2013–2015" are the percentage changes in tariffs for 2007–2013 (before the ECOWAS CET), and 2013–2015 (after the ECOWAS CET), respectively. WTO (2014) explains that the 2007 tariff is based on HS 2002 nomenclature consisting of 5,969 tariff lines (at the 10-digit tariff line level). The 2013 tariff is based on HS 2012 nomenclature consisting of 6,062 tariff lines (at the 10-digit tariff line level). The WAEMU tariff schedule consists of 2012 tariff rates (5,550 tariff lines at the 10-digit tariff line level) based on the HS 2007 nomenclature, while the ECOWAS tariff schedule is based on HS 2012 nomenclature consisting of 5,899 tariff lines (at the 10-digit tariff line level). According to WTO (2014), the tariff data were obtained from Ghanaian authorities. CET: common external tariff; ECOWAS: Economic Community of West African States; ISIC: International Standard Industrial Classification; n.e.s.: not elsewhere specified; WAEMU: West African Economic and Monetary Union.

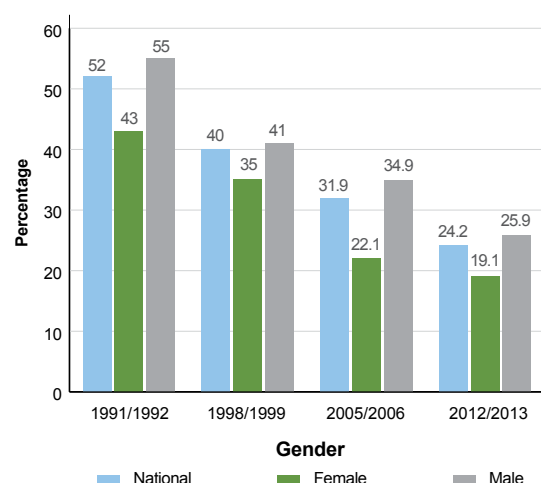
⁵ Items for which duties were reduced from as high as 20% to duty-free included fish livers, roe and flour, seeds, clinker and bulk cement, gasoil and related products, fishing yarn and equipment, mosquito nets, and contact lenses. Items for which tariffs increased included mobile phones, online telephone sets, cordless handsets, rough wood, ferrous and non-ferrous metal scrap, air coolers, and battery chargers.

Subsequently, as a member of ECOWAS, Ghana endorsed the ECOWAS CET, which was adopted by ECOWAS Ministers of Finance on 20 March 2014, and came into effect on 1 January 2015. The ECOWAS CET is based on the four tariff bands of the WAEMU CET and an additional fifth band involving a 35% duty on goods in ‘sensitive’ sectors such as poultry and rice that the government sought to protect. The revision of Ghana’s trade policy triggered by implementation of the ECOWAS CET in 2015 resulted in considerable changes in Ghana’s tariff structure for agricultural and non-agricultural products. Overall, there was a slight reduction in the country’s average unweighted applied MFN tariff from 12.8 to 12.3%.

The implications of changes in import tariffs for poverty and household welfare are important policy issues. Poverty indicators based on reports of the last four rounds of the Ghana Living Standard Survey (GLSS) show that poverty in the country declined considerably from 1991 to 2013,⁶ although there were some variations across regions and across segments of the population. The decline in poverty since 1998/1999 was concentrated mostly in the Central, Western, Eastern, Upper East, and Northern regions of Ghana. Households of farmers in general, the non-farm self-employed, and public sector employees enjoyed the greatest gains in their standard of living, while private sector employees and households with unemployed heads experienced the smallest gains. Consistent with the general reduction in the poverty level, female-headed households appear to be better off than male-headed households and are increasingly less impoverished (Figure 1) (Ghana Statistical Service, 2007).

Poverty at the national level decreased by 52.5% between 1991 and 2012—with the reduction in poverty of female-headed households being slightly greater than that of male-headed ones (54.3% and 52% reductions, respectively). The poverty level remained consistently lower among female-headed households than male-headed households, which is contrary to the “feminization of poverty” hypothesis. This may be partly due to the fact that over these years, Ghana’s economic

Figure 1: Poverty distribution in Ghana between 1991 and 2013



growth was largely driven by the services and agricultural sectors, where the shares of women’s employment are higher than the shares of men’s employment.

3. Methodology

This study applies a top-down approach by combining a macro CGE (top) model and a micro (bottom) household model (Bourguignon and Savard, 2008). The CGE model used for the macrosimulation is based on the dynamic (recursive) computable general equilibrium (DCGE) model developed by Breisinger et al. (2008). The model is an extended version of a static standard CGE model developed in the early 2000s by Löfgren et al. (2002) at the International Food Policy Research Institute (IFPRI) (Diao, 2011). The Ghana DCGE is an economy-wide, multisectoral model that simultaneously and endogenously solves for a series of economic variables, including commodity prices. It is made up of households aggregated into a small number of representative household. On the other hand, the micro (bottom) model considers all the households in the Ghana Living Standard Survey and models their behavior.

⁶ Poverty indicators are based on reports of the last four rounds of the Ghana Living Standards Survey (GLSS). These data are subject to two caveats. First, the contribution of the various tariff reforms to this reduction in poverty remains an important policy question. This is because there have been several policy interventions, including the Livelihood Empowerment Against Poverty Programme and the Ghana School Feeding Programme. Their contribution to the reduction in poverty among households will be difficult to disentangle from the effects of the reform. Second, the poverty estimates of the 2012/2013 survey may not be fully comparable with the estimates of the previous four GLSS rounds because of changes in the Consumer Price Index basket and new consumer items that have been introduced onto the market, leading to changes in household consumption. Only the 2005/2006 indicators were adjusted by the Ghana Statistical Service to make them comparable to the 2012/2013 indicators (Ghana Statistical Service, 2014).

The top-down approach required that the two frameworks would be used sequentially: first, we used the CGE model to simulate the effect of tariff changes between 2013 and 2015 on commodity prices. Then in the second stage, the simulated percentage changes in prices of goods and services were passed down to the microsimulation model, taking into consideration the gender of the household head, as shown in Figure 2. In linking the parameters from the CGE to the microsimulation model to assess the consumption and poverty effects, we matched the commodities in the SAM with the same commodities in the household survey data, and then applied the first-order approach as described in Deaton (1989). This approach consists of calculating the share of household consumption expenditure and income (where the household is also a producer in the case of farmers) related to the commodities for each household. These shares are multiplied by the changes in prices obtained from the CGE model, and added to obtain the total change in welfare.

Following Deaton (1997), the function for the net welfare effect of the changes in prices for each commodity can be specified as:

$$\frac{\partial x_0}{\partial Y} = S_i \partial \ln P_i - S_i^* \partial \ln P_i = (S_i - S_i^*) \partial \ln P_i \quad (1)$$

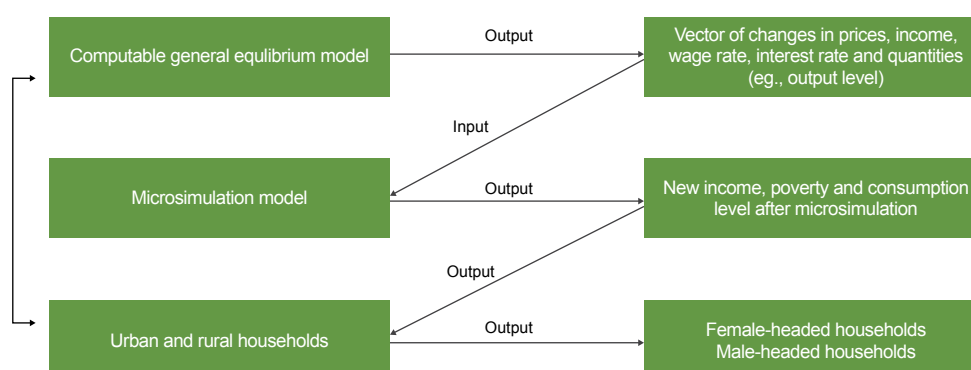
where S_i and S_i^* are, respectively, the income and budget shares of commodity i , and $\frac{\partial x_0}{\partial Y}$ is the compensating variation associated with a change in the price of good i . The compensating variation is the revenue that the social planner (government) would have to provide to

the household to compensate for the effects of the price change. It is imperative to stress that the household can be both a consumer and a producer of the commodity. Assuming that the price increases and the household is a net producer ($S_i > S_i^*$), it will benefit from this price change. On the other hand, if the household is a net consumer ($S_i < S_i^*$), then a price increase will make it worse off.

4. Data and description of household statistics

The CGE model used in this study was built using the 2005 SAM for Ghana, which was constructed by IFPRI based on the fifth round of the Ghana Living Standard Survey.⁷ Effort was made to update the model to 2013, but the needed data were not available. As a result, the model was used to simulate the changes in prices from 2007 to 2013 (before the ECOWAS CET), and from 2013 to 2015, after implementation of the ECOWAS CET. The model is a comprehensive dataset that encapsulates all the information contained in the national income and product accounts and the input-output table, as well as the monetary flows between institutions in the country. The SAM estimates the structure of the Ghanaian economy in 2005 and includes detailed information on 56 production sectors, six factors of production, income and expenditures of rural and urban households, the government budget, and the balance of payments (Breisinger et al., 2007). The data on tariffs (presented in Table 1), obtained from WTO (2014), were based on calculations of the WTO Secretariat using data provided

Figure 2: The top-down computable general equilibrium approach



Source: Adapted from Bourguignon and Savard (2008).

⁷ The SAM dataset was obtained from the IFPRI website, and the GLSS6 dataset from the Ghana Statistical Service. The SAM can be downloaded from IFPRI at <http://www.ifpri.org/publication/ghana-social-accounting-matrix-2005> and the GLSS6 from the Ghana Statistical Service at <http://www.statsghana.gov.gh/nada/index.php/catalog/72>.

by Ghanaian authorities. Table 2 shows the import structure based on the SAM.

In building the microsimulation model, the study relied on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6), which provides nationally and regionally representative indicators covering a broad range of topics such as education, health, employment, housing conditions, migration, tourism, poverty, household agriculture, access to financial services, and asset ownership. In order to address the needs of Savannah Accelerated Development Authority (SADA) areas and also to provide nationally representative quarterly labor force statistics, the numbers of primary sampling units

and households were increased from 580 and 8,700 to 1,200 and 18,000, respectively. This represents an increase of about 107% compared to the GLSS5 (Ghana Statistical Service, 2014). The household survey data used for the micro-level analysis covered 16,772 household heads, with more male-headed households (69.5%) than female-headed households (30.5%) (Table 3). Most of the female household heads lived in urban areas.

Figure 3 compares the structure of employment and average consumption expenditure across different categories of households (female/male and rural/urban) and shows that, in general, female-headed households spend more on food than male-headed households.

Table 2: Ghana's imports of selected commodities as a percentage of total imports

Commodity	Import share	Commodity	Import share
Maize ^a	0.2	Clothing	4.5
Rice	3.4	Footwear	0.9
Other grains ^a	0.1	Pulp and paper	0.4
Other crops ^a	0.2	Oils ^a	9.6
Chicken	1.5	Fuel	4.7
Beef ^a	0.7	Fertilizers	2.6
Goat ^a	0.2	Chemicals	6.4
Other livestock ^a	0.4	Metals	2.7
Formal food processing	8.2	Capital goods	43.9
Dairy	0.2	Electricity ^a	0.1
Meat	2.8	Other services ^a	4.9
Textile	1.4		

Source: Author's calculations based on Ghana's 2005 Social Accounting Matrix (SAM).

Note: The structure of the SAM shows that there is not an import share for all commodities.

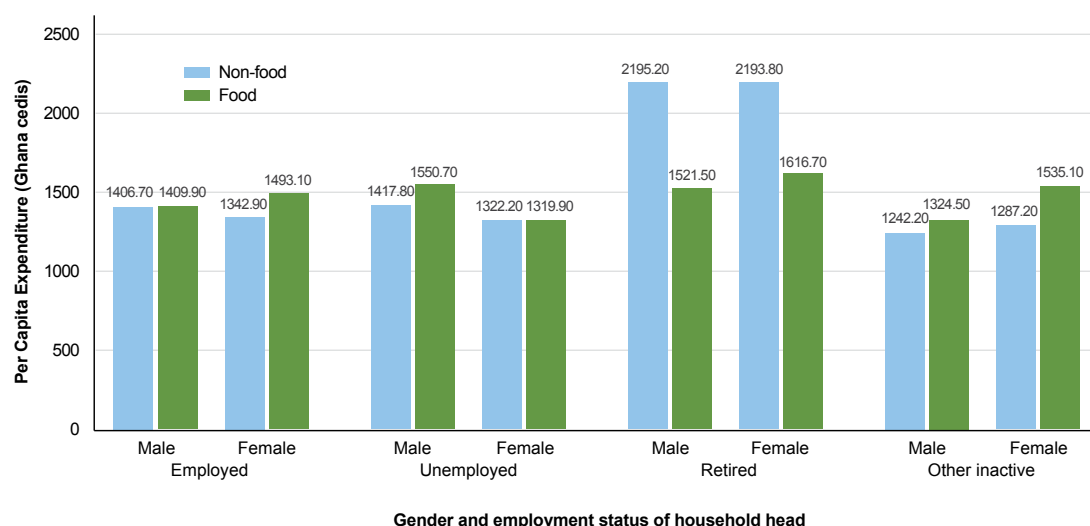
a Though the SAM reports imports for these commodities, no import tariffs are reported.

Table 3: Distribution of households by gender of household head and place of residence

Gender and place of residence	Number of households	Share (%)
Male household head	11,652	69.50
Female household head	5,120	30.50
Total	16,772	100.00
Female household heads in rural areas	1,950	11.63
Female household heads in urban areas	5,532	32.98
Male household heads in rural areas	3,170	18.90
Male household heads in urban areas	6,120	36.49
Total	16,772	100.00

Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).

Figure 3: Structure of employment and average consumption by gender of household head

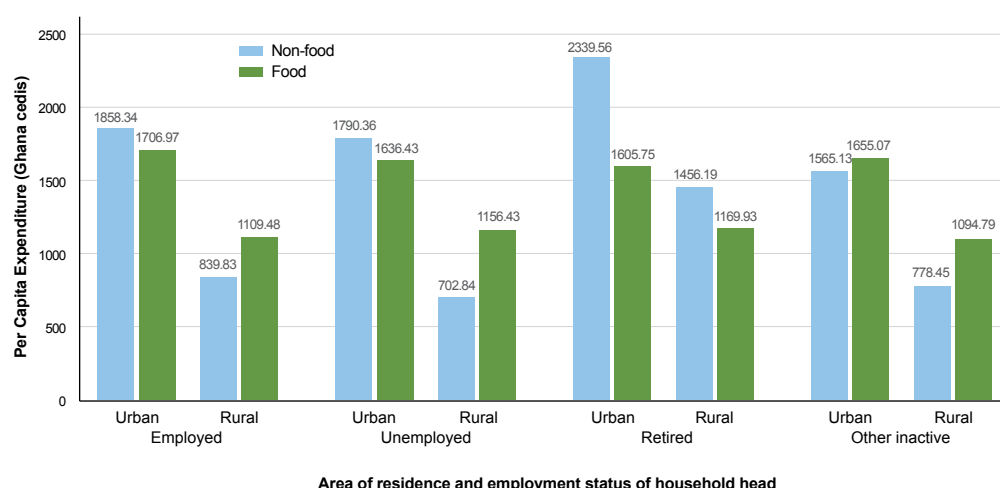


Source: Prepared by the author based on the Ghana Living Standard Survey (GLSS6) data.

This observation is consistent across all the categories of employment status except households in which the head is unemployed. Conversely average expenditure on non-food items is higher in all the categories of male-headed households, except those in which the head is not employed. Observe further that average expenditure and the differences in expenditure between food and non-food items are relatively higher in households in which the head is retired compared to the other households. This could be due to the fact the households with a retired head are more likely to have more members who are in the labour-force than the other category of households.

Figure 4 shows that on average, urban households spend more on both food and non-food items than their rural counterparts. Apart from a household headed by a retiree, all the households in the rural areas spend more on food than non-food items. As in the distribution across gender of the household head, the average expenditure on non-food items and the difference between expenditure on food and non-food items are higher for households in the urban area headed by a retiree than the other households. Households in the rural areas that have unemployed heads spend the least on food. These distributions suggest that any changes in the prices of

Figure 4: Structure of employment and average consumption by area of residence



Source: Prepared by the author based on the Ghana Living Standard Survey (GLSS6) data.

commodities due to the introduction of the CET may have differential effects on the income and consumption of households depending on the gender of the head and geographical local location of the household.

5. Simulations and results

Following the methodology described in Section 4, we use the CGE model to simulate the changes in prices of commodities after the implementation of the ECOWAS CET. Then we introduce the resulting changes in commodity prices in the microsimulation model to simulate the changes in welfare. This section provides a disaggregation of the dataset based on the gender of the household heads. We further disaggregate the data into female-headed and male-headed households in rural and urban areas, as well as across the 10 regions of the country, to determine potential winners and losers from the reform based on gender and residence.

5.1 Computable general equilibrium results

This sub-section presents the simulated results on prices from the CGE model. In simulating the changes in prices, we introduced the changes in tariffs (Table 1) as the trade shocks. The simulated prices (Table 4) involved 60 food and non-food commodities and services. The simulated results for the 2007/2013 and 2013/2015 periods show that most of the commodities whose prices decreased were non-food items. These include pulp and paper, fertilizers, chemicals, clothing, textiles, and metals. Among the 33 food items, only the price of rice decreased. This reduction may have a positive impact on households as consumers, since rice is the second most widely consumed cereal by Ghanaian households, after maize. Available statistics suggest that in 2014, Ghanaians consumed 754,698 metric tons of rice and imported 52% of that. This price reduction will therefore benefit consumers and may further increase demand for rice, while at the same time potentially reducing local rice production if domestic producers cannot withstand foreign competition.

Changes in the prices of imported commodities (that reported import tariffs in the SAM—Table 2) depend on

the change in the tariff: an increase in tariffs results in higher prices and a decrease in tariffs results in lower prices (Table 4). For all other commodities, the changes in their prices come from indirect effects, given the general equilibrium nature of the CGE model.

5.2 Non-parametric regression results

This sub-section presents the analysis of the effects of changes in commodity prices on household welfare. The analysis is carried out for female- and male-headed households separately and also considers regional (urban and rural) and geographical disparities. The estimation of non-parametric regressions is useful because they do not require specific assumptions on the distribution of the data or any econometric specification of the functional form of the relationship between the variables of interest (Deaton, 1989; Calvo, 2014). In this analysis, the dependent variable is the change in welfare due to changes in prices. The explanatory variable is the log of per capita expenditure. The objective is to assess the welfare effect of the CET on households. We divide the analysis into three steps: the welfare effect on households as consumers (through their expenditure), on households as producers (through their income), and the net welfare effect.

First, we calculate the welfare effects of implementation of the CET on households as consumers by multiplying the budget share of each consumed item by its change in price⁸ simulated by the CGE model (Table 4). Figure 5 shows the results of the non-parametric regression. The downward sloping curve suggests a pro-poor effect of implementation of the CET for households as consumers. Figure 5 also shows that implementation of the CET favors poor female-headed households more than poor male-headed households. The expected improvement in the welfare of poor households as consumers may be due to the reduction in the price of the commodities that are consumed most within these households.⁹ Moreover, female-headed households stand to be better off than male-headed households because the budget share of items whose price decreases is higher for female-headed households than for male-headed households.

⁸ This corresponds to the expression $-S_i^* \partial \ln P_i$ in Equation 1. The negative sign indicates that an increase in price results in a decrease in welfare for households as consumers.

⁹ For instance, Table 4 shows that the price of rice decreases by more than 2 per cent and the budget share of rice is higher in poor households.

Table 4: Simulated prices of commodities from 2007 to 2015

Commodity	Log Sim1 2007–2013	Log Sim2 2013–2015	Change in price (%)
Maize	0.444	0.445	0.064
Yams	0.225	0.226	0.080
Groundnuts	1.024	1.026	0.215
Export vegetables	1.450	1.465	1.513
Chicken	-0.001	0.035	3.637
Forest	0.001	0.001	0.000
Cocoa processing	0.001	-0.001	-0.200
Footwear	0.053	0.030	-2.303
Diesel	0.457	0.456	-0.063
Capital goods	0.625	0.642	1.698
Other nuts	0.022	0.026	0.391
Plantain	0.002	0.000	-0.200
Rice	1.320	1.299	-2.025
Cocoyam	-0.313	-0.313	0.000
Other nuts	-0.499	-0.496	0.329
Plantain	-0.276	-0.273	0.263
Eggs	0.001	0.001	0.000
Fish	0.001	0.007	0.598
Dairy	0.108	0.099	-0.902
Wood products	0.107	0.104	-0.270
Fuel	0.001	0.001	0.000
Construction	0.003	0.002	-0.100
Transport	0.025	0.023	-0.195
Public administration	0.001	0.002	0.100
Sorghum and millet	1.206	1.206	0.030
Cowpea	1.204	1.206	0.120
Domestic fruits	0.808	0.81	0.134
Cocoa	2.342	2.339	-0.241
Beef	0.001	0.000	-0.100
Mining	0.001	0.001	0.000
Meat	0.035	0.041	0.577
Pulp and paper	0.119	0.067	-5.195
Fertilizers	0.093	0.061	-3.240
Water	0.149	0.151	0.172
Communication	0.018	0.013	-0.492
Education	0.001	0.006	0.498
Other grains	0.001	0.001	0.000
Soya beans	0.684	0.685	0.151
Export fruits	-0.128	-0.121	0.68
Other crops	0.985	0.984	-0.037
Goat	0.001	0.000	-0.100
Formal food processing	0.093	0.103	0.907
Textile	0.103	0.093	-0.907

continued

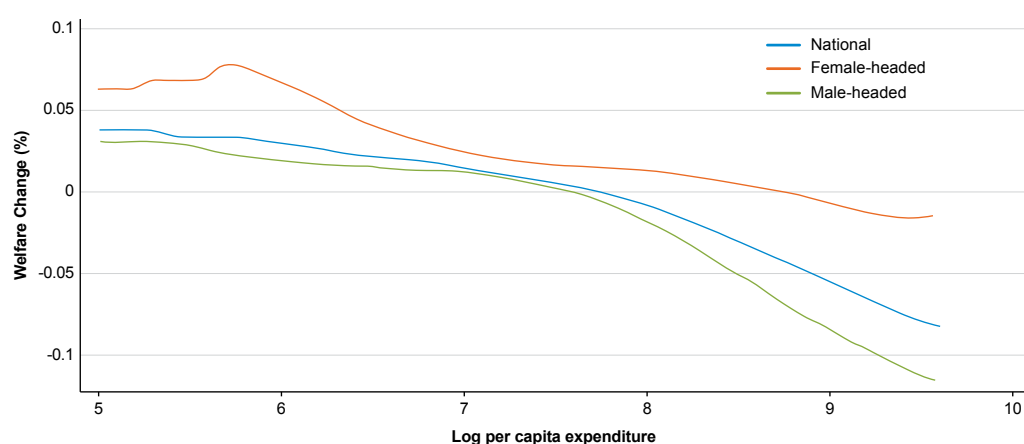
Table 4: Simulated prices of commodities from 2007 to 2015 (continued)

Commodity	Log Sim1 2007–2013	Log Sim2 2013–2015	Change in price (%)
Oil	0.001	0.001	0.000
Chemicals	-0.088	-0.102	-1.429
Electricity	0.001	0.007	0.598
Business services	0.115	0.112	-0.268
Health	0.001	0.005	0.399
Cassava	-0.728	-0.726	0.207
Palm oil	0.913	0.918	0.480
Domestic vegetables	0.903	0.902	-0.122
Other export crops	1.707	1.718	1.155
Other livestock	0.001	0.000	-0.100
Local food processing	0.001	-0.001	-0.200
Clothing	0.032	0.033	0.097
Petrol	0.491	0.490	-0.061
Metal	-0.666	-0.669	-0.390
Trade	0.154	0.154	0.086
Real estate	0.002	-0.004	-0.601

Source: Prepared by the author using the computable general equilibrium model for Ghana.

Note: The variables labelled *Log Sim* show the simulated prices of the commodities. For instance, *Log Sim1* is the simulated price of the commodities in from 2007–2013. These values were used as the base values for the simulation of the prices from 2013–2015 (*Log Sim2*), which represents the period in which Ghana switched from its own tariff to the ECOWAS CET. The third column (change in price) is the difference between the first two columns, the log of prices in from 2007–2013 (before the ECOWAS CET) and 2013–2015 (the period of the ECOWAS CET).

Figure 5: Change in welfare of households as consumers



Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).

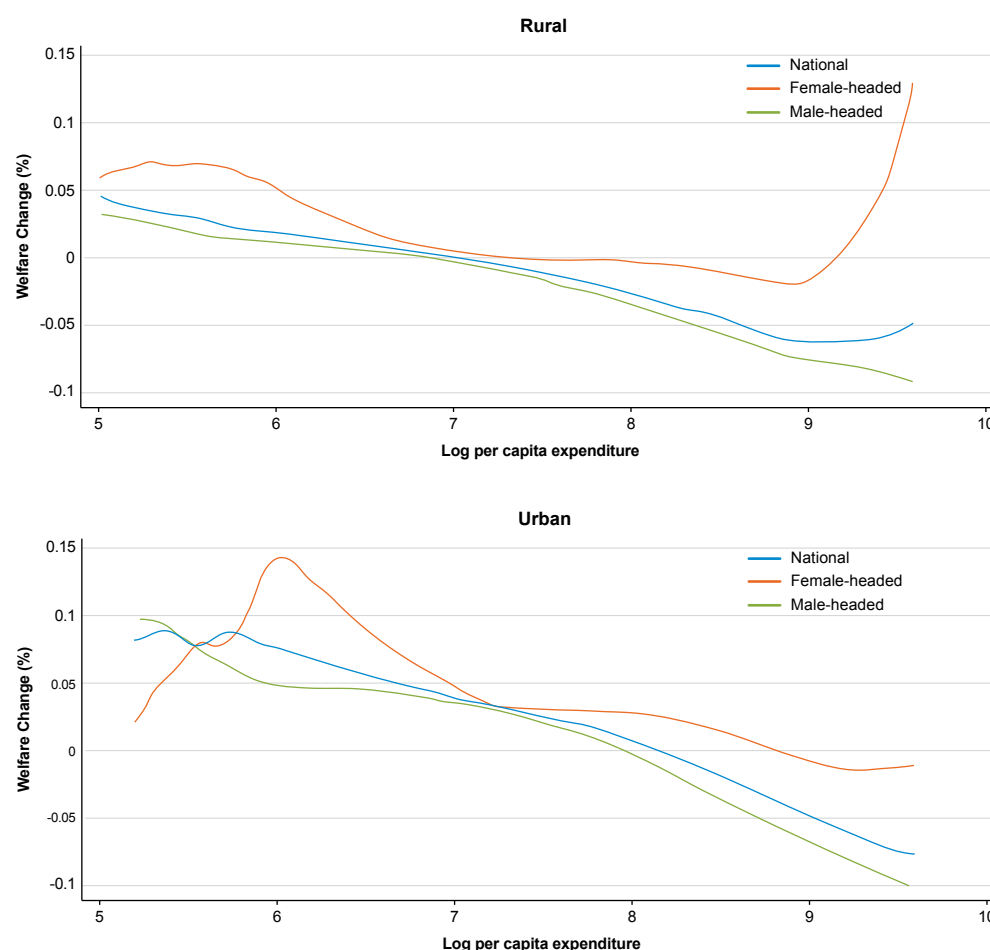
Note: The consumption shares of the commodities, used as an indicator of welfare changes due to changes in expenditure, were obtained by dividing each household's expenditure by total household expenditure and multiplying the result by the change in price obtained from the macrosimulation (computable general equilibrium).

Figure 6 presents the change in welfare of households as consumers based on their region of residence. The curves for both rural and urban areas follow the same downward sloping shape as for the whole population. The regression curve for female-headed households lies above the one for male-headed households, indicating a pro-poor and pro-female effect of implementation of the CET. The only exception is for very poor urban households, where female-headed households benefit less than their male counterparts. In both urban and rural areas, the welfare gap between male-headed and female-headed households is larger at the extremes of the expenditure distributions and much narrower in the middle, which may be due to a more homogeneous consumption structure

across middle-income households. Welfare rises for both urban and rural households at higher levels of per capita expenditure. However, the increase is sharper for the latter than the former, possibly due to higher gains in purchasing power from a reduction in the domestic prices of goods.

We now move to the analysis of the welfare effects of the CET on households as producers. As indicated in the methodology discussion, some households are not only consumers, but also producers who earn income from producing some of the commodities analysed in this study. The relationship between the change in welfare of households as producers¹⁰ ($S_i \partial \ln P_i$ in Equation 1) and the

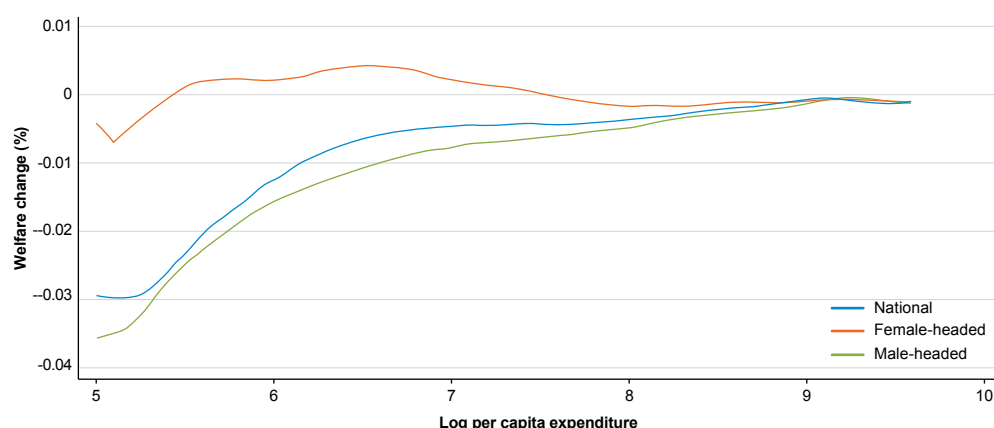
Figure 6: Change in welfare of households as consumers by area of residence



Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).

¹⁰ In this case, the welfare effect is given by $S_i \partial \ln P_i$ as shown in Equation 1. The expression has a positive sign, indicating that an increase in prices increases the welfare of producers.

Figure 7: Change in welfare of households as producers



Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).

Note: The share of commodity income used as the measure of welfare due to changes in income was obtained by dividing the share of income obtained by households from the sale of commodities by total income of the household. The results were further multiplied by the change in price of the commodities from the macrosimulation.

level of expenditure is positive, and the overall change in welfare at the national level is negative (Figure 7). This means that implementation of the CET will reduce the welfare of both poor and rich households as producers, but poor households are the most disadvantaged. The tariff reduction will redistribute income from producers to consumers as the domestic prices of commodities decline, and the purchasing power of producers will fall

as their income declines. Poor producers stand to lose more than richer producers. Male-headed households will be the most affected, while the effect on female-headed households is almost zero at all income levels. This may be due to the fact that most producers are poor male-headed households, for example rural farmers, for whom the prices of their products have decreased (e.g. rice or cocoa).



The net welfare effect for female-headed households is positive for those at the lower and middle ends of the income categories, but negative for the rich.

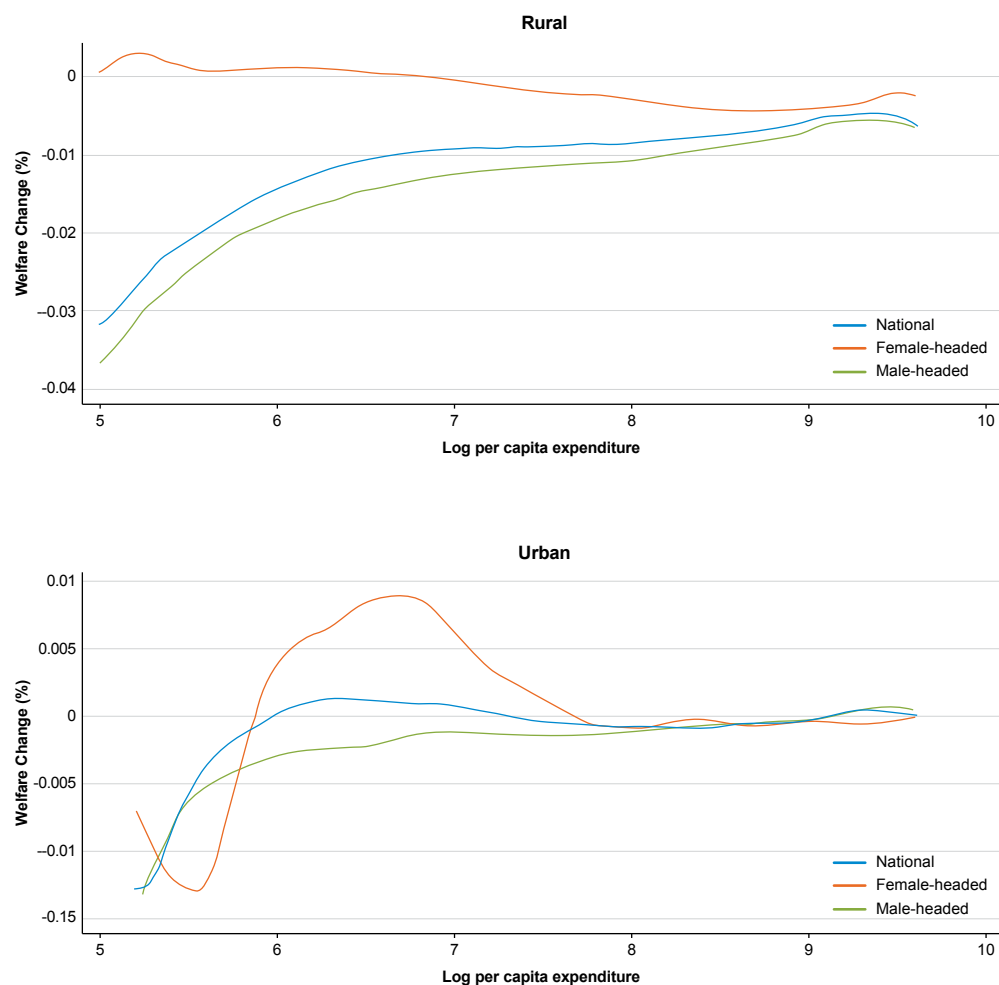
Households as producers in rural areas experience greater losses in welfare than those in urban areas (Figure 8): the average reduction in welfare is 0.028% in rural areas and 0.014% in urban areas. In both rural and urban areas, male-headed households are more affected than female-headed households. These differences in welfare losses can be partly explained by the greater reliance on agriculture in rural households than in urban households, and in male-headed households than in female-headed households (about 83% of households for which agriculture is the main occupation are in rural areas, and they are largely male-headed). About 3.2 million households, representing 46% of all households, operate non-farm enterprises, with 52% of them in urban areas. Almost half (49.5%) of all businesses involve trading, while the rest involve some kind of manufacturing activity. Women operate 72% of these businesses (Ghana Statistical Service, 2014).

We now assess the net welfare effect of the CET on households by adding the welfare effect on households as producers and as consumers, as shown in Equation 1. Figure 9 depicts the relationship between the welfare effect and household per capita expenditure. The curve resembles the welfare effect on households as consumers (Figure 5), because the welfare effect on households as producers (Figure 7) is much smaller than the one on households as consumers. The net welfare effect for male-headed households is around zero for the poor and negative for the rich. The net welfare effect for female-headed households is positive for those at the lower and middle ends of the income categories, but negative for the rich.

In a nutshell, the main finding of this study is that implementation of the CET will lead to a decrease in prices of most items consumed by poor households, especially female-headed households, resulting in an improvement in the welfare of these households. At the same time, it will reduce the welfare of households that are net producers. This conclusion differs from the findings of a similar study conducted in Nigeria, which finds that implementation of the CET produces net welfare gains due to a reduction in prices of most agricultural products (Kareem, 2014). This difference in findings could be due to differences in methodological approaches, as the author used the pass-through effect approach which takes into account the combined effect of wage and prices. Although the results show a pro-poor and pro-female welfare effect, the variations in welfare are small (less than 0.1%), perhaps because some prices increase and some others decrease after implementation of the CET.

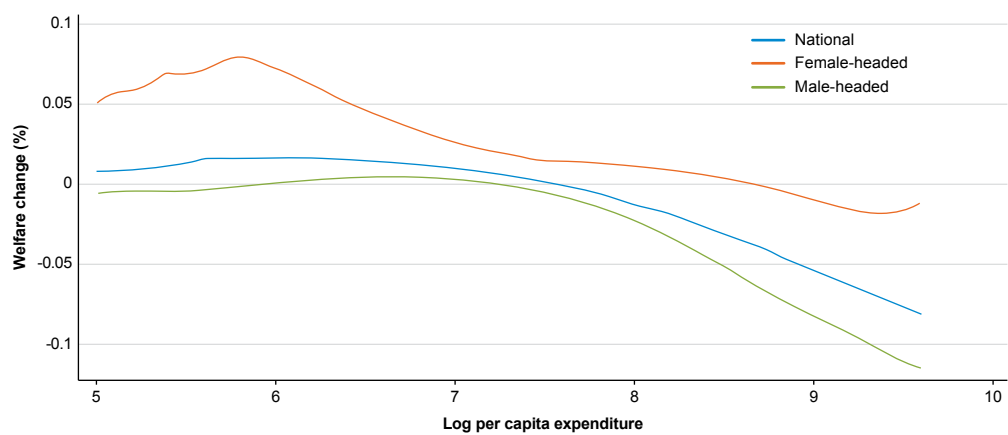
This same analysis was also performed for Ghana's 10 regions (Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East, and Upper West) to explore the regional dynamics of the welfare effects of the CET. The results (Figure A.1 in the Appendix) reveal the same structure as that for the national level in some locations (Greater Accra, Volta, Ashanti, and Upper West). In these cases, therefore, implementation of the CET is expected to have pro-poor and pro-female effects. However, the results are different for other regions. For example, in the Western region, where oil exploitation has been under way for a little over four years, the effect is pro-female but not pro-poor, since the net welfare function first decreases, then increases, and then decreases again as per capita expenditure increases (a sort of a U-shaped curve). In the Central region, the effect of the CET is pro-poor, but not pro-female. In the Brong Ahafo region, where agriculture is the predominant occupation, the results indicate a net welfare loss for all categories of households, regardless of the income status or the gender of the household head. These variations in the net welfare effect across the 10 regions could be explained by the heterogeneity in the production and consumption structures of households.

Figure 8: Change in welfare of households as producers by area of residence



Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).

Figure 9: Net welfare effect



Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).

To conclude, this analysis has shown that implementation of the CET is likely to affect households in different ways, depending on their positions as either net producers or net consumers. Other determinants are the gender of the household head, geographical location, and changes in the prices of the commodities.

To conclude, this analysis has shown that implementation of the CET is likely to affect households in different ways, depending on their positions as either net producers or net consumers. Other determinants are the gender of the household head, geographical location, and changes in the prices of the commodities. Overall, female-headed households stand to be better off than male-headed households. Likewise, poor households will gain, while rich households will lose marginally. The gain will favor households in coastal regions and urban areas more than those in non-coastal regions and rural areas. Moreover, the increase in commodity prices is expected to reduce welfare, while the opposite holds for the commodities for which prices are expected to decrease. These findings are consistent with those of the earlier studies (see Ackah & Aryeetey, 2012 and Quartey, Aidam, & Obeng, 2013) who suggest that trade liberalization has differential effects on the incidence, depth, and severity of poverty among households in Ghana.

6. Conclusions

In 2015, ECOWAS members, including Ghana, agreed to implement a common external tariff in order to harmonize the tariff structure and foster regional trade and economic growth. The objective of this study has been to assess the impact of the new tariff system on prices and the resulting effect on household welfare, with particular attention to gender differences.

The descriptive analysis shows that female-headed households spend more on average on food than male-headed households. Since poverty indicators in Ghana are based on consumption expenditure, female-headed households exhibit lower levels of poverty than male-headed households. The macrosimulation analysis (done through a CGE model) shows that implementation of the CET is likely to lead to mixed effects on commodity prices, given that some tariffs were scheduled to increase and others to decrease following implementation. When we introduce the changes in prices from the CGE into the microsimulation for the welfare analysis, the results

reveal that implementation of the CET will have a positive consumption welfare effect on poor households, but a negative effect on rich households. Moreover, the CET will reduce the welfare of both poor and rich households as producers, with poor households being the most affected.

From a gender perspective, female-headed households will be better off as consumers than their male counterparts. As producers, male-headed households will be the most affected by the reduction in welfare, while the effect on female-headed households will be almost zero. When we consider only commodities for which prices increase, there will be a reduction in household welfare. However, for commodities whose prices decrease, there will be an improvement in the welfare of households, meaning that the dominant effect is the one on households as consumers. The net welfare analysis shows that implementation of the CET will lead to a net loss for all income categories of male-headed households and for rich, female-headed households. However, there will be a positive effect on female-headed households in lower- and middle-income categories. Households in urban areas stand to gain more than their rural counterparts. Thus, urban households tend to benefit more from trade liberalization. On the basis of these findings, this paper concludes that a comprehensive tariff reform could be pro-poor in Ghana.

This study used the top-down approach. This general-equilibrium analysis has the advantage of capturing the direct and indirect effects of tariffs on prices. However, it is important to add some caveats. First, the feedback effects from household behavior are not taken into account. Second, the CGE model uses data from Ghana's 2005 Social Accounting Matrix. Having an updated SAM for 2013 may produce more accurate results. A further, useful step would be to include production factor effects in the analysis, given that the CGE model also simulates changes in wages and capital. However, this would require additional efforts to match the survey with the SAM, an analysis that was not within the scope of the present work.

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Appendix

Table A.1: Summary statistics of the net welfare effect by commodity

No	Commodity	No. of observations	Mean	Standard deviation	Minimum	Maximum
1	Cassava	5,750	0.000146	0.000828	-0.00152	0.006
2	Yams	5,750	0.000062	0.000825	-0.00206	0.008
3	Plantains	5,750	4.84E-05	0.000752	-0.0042	0.007
4	Oils	5,750	-1.8E-05	0.000406	-0.00167	0.005
5	Vegetables	5,750	-0.00016	0.000461	-0.004	0.004
6	Domestic fruits	5,750	3.61E-05	0.000522	-0.00192	0.007
7	Maize	6,643	0.001613	0.002319	-0.00252	0.006
8	Rice	6,643	-0.00021	0.002597	-0.015	0.013274
9	Cocoa beans	6,647	0.000942	0.001619	0.0000	0.004
10	Processed cocoa	16,750	-6.64E-06	2.17E-05	-0.001	0.0000
11	Sorghum	6,643	0.000143	0.000723	-0.00222	0.006
12	Groundnuts	6,643	0.00082	0.001898	-0.00144	0.007
13	Goats	7,145	0.000482	0.00153	-0.00269	0.008
14	Other livestock	7,145	0.000422	0.001489	-0.0065	0.007
15	Palm oil	5,750	-1.3E-05	0.000738	-0.009	0.009
16	Chicken	7,145	0.00215	0.009269	-0.02122	0.042
17	Fishing	7,145	6.72E-05	0.000416	-0.00098	0.003
18	Cocoyam	5,753	1.05E-05	0.000158	0.0000	0.005
19	Wood	6,647	1.29E-06	0.000068	0.0000	0.004
20	Other crops	6,647	9.09E-05	0.000661	0.0000	0.007
21	Other nuts	6,647	0.000219	0.001297	0.0000	0.01
22	Beef	16,750	-5.6E-05	0.000128	-0.00392	0.000
23	Dairy products	16,750	-0.00039	0.000383	-0.005	0.000
24	Eggs	16,750	-3.8E-05	7.14E-05	-0.0032	0.000
25	Petrol	16,750	-4.1E-05	0.00016	-0.00375	0.000
26	Transport	16,750	-0.00014	0.000221	-0.00463	0.000
27	Other services	16,750	-4.1E-05	8.77E-05	-0.004	0.000
28	Clothing	16,750	-0.00184	0.000836	-0.004	0.000
29	Electricity	16,750	-0.00038	0.000597	-0.005	0.000
30	Fuel	16,750	-3.3E-05	7.62E-05	-0.00095	0.000
31	Furniture	16,750	0.00061	0.002368	0.000	0.038022
32	Textile	16,750	0.000119	0.000172	0.000	0.004405
33	Fertilizers	16,750	0.0003	0.001678	0.000	0.024262
34	Footwear	16,750	0.000581	0.001044	0.000	0.016
35	Formal processed food	16,750	-4.44E-07	1.86E-06	-0.000793	0.000

Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).

Figure A.1: Net income share by gender and region of residence

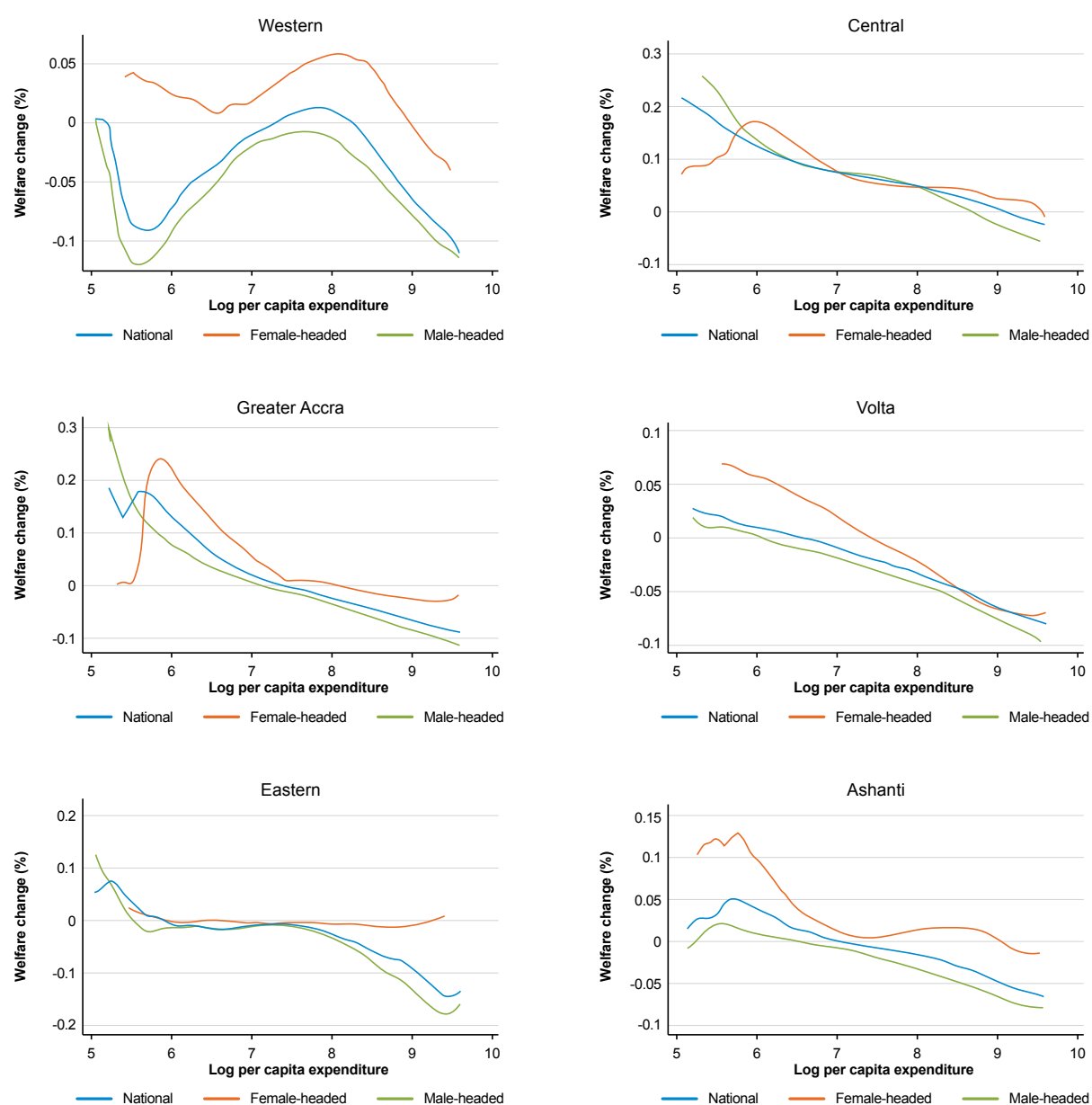
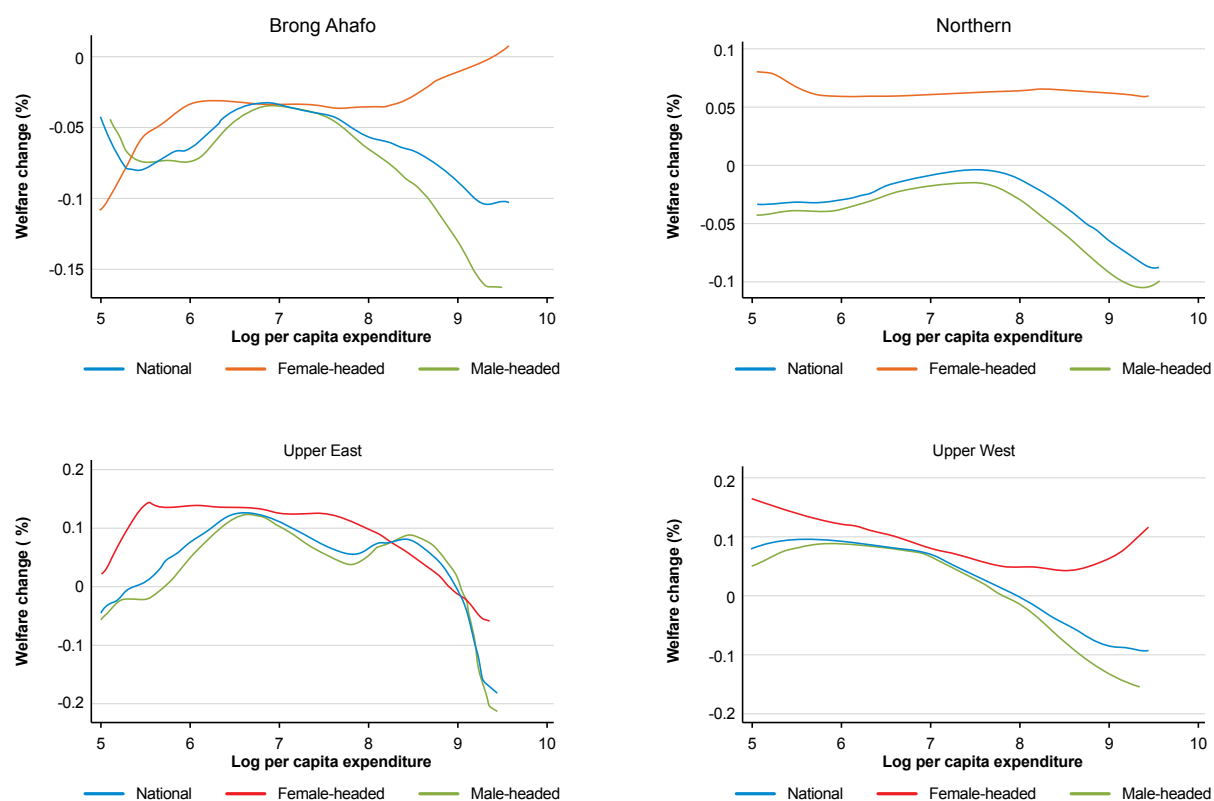


Figure A.1: Net income share by gender and region of residence (continued)



Source: Prepared by the author based on the 2012/2013 round of the Ghana Living Standard Survey (GLSS6).