



The **KENYA INSTITUTE** for **PUBLIC**  
**POLICY RESEARCH** and **ANALYSIS**

# Impact of Trade Agreements on Welfare, Investment, Economic Growth, and Tax Revenue: A Computable General Equilibrium Application to Kenya

Shadrack Mwatu and John Karanja

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**THE KENYA INSTITUTE FOR PUBLIC POLICY  
RESEARCH AND ANALYSIS (KIPPRA)**

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Kenya Institute for Public Policy  
Research and Analysis

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## Abstract

*This study examines the impact of tariff liberalization under trade agreements on welfare, investment, economic growth, and tax revenue using a Computable General Equilibrium (CGE) model anchored on the 2021 Social Accounting Matrix (SAM) for Kenya. Hitherto, the country has been trading on non-reciprocal trade agreements that provide preferential tariff liberalization for Kenyan exports without commensurate tariff reductions on imports entering the Kenyan territory. However, after the country transitioned to a lower-middle-income economy in 2014, there has been a shift in trade policy debate towards a need for Kenya to negotiate reciprocal trade agreements under which all parties liberalize tariffs. Eight bands of tariff liberalization as stipulated under the East African Community (EAC) Common External Tariff (CET) and an additional three bands within the neighbourhood of those covered under the CET are examined to inform policy. The findings reveal that liberalization of tariffs under trade agreements has a positive impact on welfare as a measure of living standards and contributes towards a reduction in the cost of living as measured by the consumer price index (CPI). To maximize welfare, the 84 per cent level of liberalization could be considered for agrifood and manufactured commodities while the 90 per cent level could be considered for imports of services. On the consumer price index (CPI) as a measure of the cost of living, liberalization could be considered at the 84 per cent and 50 per cent levels of liberalization for manufactured and agrifood commodities, respectively. To support GDP from expenditure on commodity imports, the 84 per cent level of liberalization could be considered for agrifood commodities, 50 per cent for manufactured commodities, and 90 per cent for services. Since tariff liberalization on services, agrifood, and manufactured products has a negative impact on total investments, tariff revenue, sales tax, and VAT revenue, negotiation for free trade agreements should transcend tariff liberalization and incorporate sustainable provisions on investment, climate change, and institutional support. Provisions on investments could promote GDP growth supported by public and private investments while widening the tax base for improved government tax revenue in line with the Bottom-up Economic Transformation Agenda (BETA). Provisions on climate change could encourage market and product competitiveness while provisions on institutional support could encourage information sharing and resolution of trading bottlenecks.*

## **Abbreviations and Acronyms**

GAMS	General Algebraic Modelling System
SUT	Supply-Use Tables
BOP	Balance of Payment
EU	European Union
US	United States
GSP	Generalized System of Preference
CGE	Computable General Equilibrium
SAM	Social Accounting Matrix
LDC	Least Developed Countries
MFN	Most Favoured Nation
ACP	African, Caribbean, and Pacific
WTO	World Trade Organization
EPA	Economic Partnership Agreement
STIP	Strategic Trade and Investment Partnership
EAC	East African Community
CET	Common External Tariff
AGOA	African Growth Opportunity Act
UAE	United Arab Emirates
GATT	General Agreement on Tariffs and Trade
FTAs	Free Trade Agreements
USA	United States of America
GDP	Gross Domestic Product
PTAs	Preferential Trade Agreements
VAT	Value Added Tax
COM	Commodities
HHD	Households
GOV	Government
FAC	Factors of Production
SAV	Savings
INV	Investment

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## 1. Introduction

Kenya has been trading on non-reciprocal trade agreements,<sup>1</sup> which provide preferential tariff liberalization for Kenyan exports without commensurate tariff reductions on imports entering the Kenyan territory. The United States (US), Canada, Japan, and the European Union (EU) are the leading providers of non-reciprocal trading preferences, which extend market access to developing countries at tariff rates below those offered under the Most Favoured Nation (MFN) regime (Liapis, 2007). Examples of non-reciprocal trade frameworks that Kenya has benefited from include the Cotonou Agreement between the European Union (EU) and African, Caribbean, and Pacific (ACP) countries (Curran et al., 2008; Sorgho and Tharakan, 2019). Non-reciprocal trade agreements are supported by the World Trade Organization's (WTO) Generalized System of Preference (GSP), which requires commodities from least developed countries (LDCs)<sup>2</sup> to be granted preferential market access, especially through liberalization of tariffs (McQueen, 1998; Dicaprio and Trommer, 2010; UNDESA, 2008). Specifically, GSP is a preferential tariff system that creates formal exemptions from the general rules of the WTO that advocate for reciprocity in negotiating trade agreements (Sorgho and Tharakan, 2019; Aiello et al., 2008).

Individual countries and economic blocs have endeavoured to create GSP frameworks that allow preferential market access to commodities from LDCs (Olarreaga and Ozden, 2005; Sorgho and Tharakan, 2019; Davies and Nilsson, 2019; Muhammad, 2009; Muhammad et al., 2010). Dicaprio and Trommer (2010) argue that the dominance of Economic Partnership Agreements (EPAs) as trading frameworks has moved least developed countries towards effective graduation from special and differential treatment with institutional support to address under-development.<sup>3</sup>

Kenya transitioned from a least-developed country to a lower-middle-income economy in 2014 (Africa Research Bulletin, 2015; World Bank, 2022). Projections indicate that the country is on course to attain middle-income status (World Bank, 2022). This development has shifted the trade policy debate towards negotiation for reciprocal trade agreements under which all parties liberalize tariffs. A current policy debate on the issue has been on negotiations for the Strategic Trade and Investment Partnership (STIP) between Kenya and the United States of America (USA) and an Economic Partnership Agreement (EPA) between Kenya and the United Arab Emirates (UAE).<sup>4</sup> The STIP is expected to replace the African Growth Opportunity Act (AGOA), which expires in 2025.

Despite the shift in trade policy debate from non-reciprocal to reciprocal trade agreements that require Kenya to equally liberalize tariffs and thus open her

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1 An example is the African Growth Opportunity Act (AGOA), which has been in force since 2000.

2 Least developed countries are characterized by low levels of income and structural impediments to growth and, as such, require special interventions to address the underdevelopment (UNDESA, 2008).

3 By 2010, 40 out of the 49 countries in the United Nations' List of Least Developed Countries (LDCs) were negotiating for an Economic Partnership Agreement with the European Union (EU).

4 Within the framework of the East African Community (EAC), Kenya has previously negotiated for Economic Partnership Agreement (EPA) with the European Union (EU).



market, few studies have employed an ex-ante policy analysis tool to examine the potential impact of such liberalization on the Kenyan economy from the prism of welfare as a measure of living standards, investment expenditures, economic growth as measured by Gross Domestic Product (GDP) from expenditure, and government tax revenue (Akinboade, 2008; Karingi and Siriwardana, 2002; Tyler and Akinboade, 1992; Akinboade, 1993; Thurlow, 2011). Partridge and Rickman (2008) observe that ex-ante techniques are yet to become dominant in development policy analysis. This study contributes to the existing literature and generates evidence to guide trade policy debate on the potential impact of tariff liberalization on the Kenya economy in a scenario where the country would liberalize tariffs.

Specifically, the ex-ante trade policy analysis<sup>5</sup> reveals the potential impact of tariff liberalization on welfare, investment, and GDP from expenditure on imports of agrifood, manufactured, and services products<sup>6</sup>, and tax revenue with a focus on commodities from three key sectors—agrifood, manufacturing, and services. The results, as presented in section five (5), reflect the impact of tariff liberalization on imports of agrifood, manufactured, and services products. The study's findings have practical policy implications on the ongoing trade policy debate on whether the time is ripe for Kenya to embrace the principle of reciprocity in negotiating for trade frameworks such as the Strategic Trade and Investment Partnership (STIP) between Kenya and the United States (US) and the Economic Partnership Agreement (EPA) between Kenya and the United Arab Emirates (UAE).

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5 The Computable General Equilibrium (CGE) approach is a power tool in undertaking ex-ante trade policy analysis.

6 Economic growth measured by Gross Domestic Product (GDP).

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## 2. Prevailing Import Tariff Regime

Kenya's import tariff policy is determined by the East African Community's Common External Tariff (CET)<sup>7</sup>, which specifies the *ad valorem* tariff that member countries should charge for commodities imported from outside the Customs Union (East African Community, 2022). Tariffs are at the core of trade agreements in that trade agreements undertake to enhance market access and regional integration by effectively lowering applied tariff rates for imported commodities. Lowering tariffs liberalizes markets, makes access to imported commodities easier, and ultimately exposes domestic import-competing sectors to enhanced competition. Raising tariffs is used as a policy tool whose aim is to protect a country's infant sectors against excessive competition. Governments rely on import tariffs to generate revenue to support the provision of public services.

Under the 2022 Common External Tariff, the prevailing import tariffs are zero (0) per cent, 10 per cent, 25 per cent, 35 per cent, 50 per cent, 60 per cent, 75 per cent, and 100 per cent. The majority of the imported commodities access the market for individual member countries at Zero (0) per cent, 10 per cent, 25 per cent, and 35 per cent. While negotiating for trade agreements with countries outside the East African Community, Kenya negotiates to liberalize tariffs within the framework of the East African Community Common External Tariff schedule. Where possible, Kenya negotiates for trade agreements on the principle of variable geometry, which allows other EAC members to be enjoined into the negotiated trade agreement later. In this case, the levels of tariff liberalization entered by Kenya with other countries are within the neighbourhood of the applied intra-EAC tariffs. One of the key contributions of this study is revealing whether the commonly applied tariff rates are optimal for Kenya or not.

Commodities with a prevailing import tariff of zero (0) per cent are 100 per cent liberalized and are high-technology and high-capital-intensive commodities. The full elimination of tariffs on these commodities is aimed at allowing member states to gain access to sophisticated imports in which members do not have a comparative advantage in producing domestically. It aims at encouraging knowledge and technology transfer to domestic-competing industries. The commodities that attract an import tariff of zero (0) per cent are raw materials and capital goods.

Commodities that attract import tariffs at the rate of 10 per cent, 25 per cent, and 35 per cent have 90 per cent, 75 per cent, and 65 per cent levels of tariff liberalization. The domestic sectors producing these commodities are considered established and can cope with external competition. With appropriate incentives, the commodities could drive intra-industry trade for member countries both within and outside the Customs Union. Commodities under this band are mainly intermediate and finished goods.

A few commodities attract import tariffs at the rate of 50 per cent, 60 per cent, 75 per cent, and 100 per cent—meaning the level of tariff liberalization is 50 per cent,

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<sup>7</sup> The new CET has been in force since July 2022. It accommodates flexibility among EAC member States in applying the import tariffs. The aim is to allow for adjustments to reflect to existing trade and economic realities among individual member countries.

40 per cent, 35 per cent, and zero (0) per cent, respectively. Under schedule two (2) of the 2022 CET, these are sensitive commodities. They are sensitive in the sense that the import-competing domestic sectors producing the commodities are deemed infant or vulnerable sectors that still need targeted protection. These are agrifood and manufacturing sectors producing milk and cream, yoghurt, cheese and curd, maize, wheat and meslin, rice, cane, and beet sugar, and woven fabrics of cotton and linen.

Owing to her lower-middle-income status, Kenya has increasingly become constrained in trading under GSP and the Most Favoured Nation (MFN) regime accorded to least developed countries. The status not only makes trade agreements necessary for Kenya but stimulates debate on the timeliness for the country to consider reciprocal trade agreements. It has stimulated policy debate on the ripeness of the application of the principle of variable geometry in negotiating trade agreements to allow other member states to automatically enjoin the trade agreement after attaining middle-income status.<sup>8</sup> If Kenya were to consider reciprocal liberalization of import tariffs in negotiating for future trade agreements, other levels of liberalization outside those covered by the current EAC CET (0%, 10%, 25%, 35%, 50%, 60%, 75%, and 100%) would need to be factored and their policy implications examined. This study examines the impact of the current tariff liberalization under the 2022 EAC CET and includes additional liberalization levels within the neighbourhood of the existing rates for possible consideration in negotiation for future trade agreements. A valuable extension of the study is the consideration of liberalization of *services imports* as they are not covered by the current EAC Common External Tariff (CET).

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<sup>8</sup> Least developed countries could still benefit from preferential market access under GSP and MFN, even in the absence of a trade agreement.

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### **3. Literature Review**

#### **3.1 Theoretical Literature**

##### ***3.1.1 The Theory of Regional Integration***

Trade agreements reduce trade barriers and promote growth and improvements in welfare (Bhagwati and Panagariya, 1996; Vamvakidis, 1998). In policy practice, trade agreements are embedded in the General Agreement on Tariffs and Trade (GATT) Article XXIV, which provides for the establishment of free trade agreements (FTAs) and customs unions. Custom tariffs are one of the barriers to trade in the sense that they raise import costs and consequently raise the final price of imported goods and services (Bourne, 1886). Liberalizing tariffs under trade agreements, therefore, lowers the cost of importation and consequently reduces the final prices of imported commodities, and this improves welfare.

Modern trade agreements are considerably expanding in scope compared to the traditional ones whose focus was tariff liberalization. The expanded trading frameworks include institutional provisions addressing issues such as standards, intellectual property rights, labour rights, investments, digital trade, anti-corruption, and the environment (Osnago et al., 2015; Mattoo et al., 2022; Timini et al., 2022; Kareem, 2023; Yan, 2023; Bastiaens and Postnikov, 2017; Morin and Jinnah, 2018; Rahman and Rahman, 2022; Brandi et al., 2020; Obeng et al., 2023; Hoekman et al., 2023; Zhang et al., 2023). The provisions encouraging factor movement (labour and capital) are considered key in driving investment and sustainable development (Chang, 2006; Feng et al., 2023). Given their potential benefits, Kenya could embrace deeper trade agreements as a channel for promoting sustainable development.

##### ***3.1.2 The Theory of Economies of Scale***

This theory holds that production becomes more efficient with the rise in the scale in which it occurs and with cost reductions (Krugman et al., 2017; Cary, 2015). Tariff liberalization under trade agreements is a policy tool that can support economies of scale and incentivize international trade. Specifically, economies of scale arise from a reduction in production and trading costs. Free trade agreements, which conventionally reduce prevailing custom tariffs imposed on commodities entering the territory of the importing country, lower the costs experienced by traders. This is so because custom duty as an import tax raises the price of the imported commodity, making it more expensive. Its reduction through tariff liberalization under free trade agreements, therefore, lowers the cost of importation and consequently lowers the final price of imported commodities.

This impacts welfare, investments, economic growth, and tax revenue. For imports of final consumer products,<sup>9</sup> a reduction in import costs through the reduction of customs duties improves the availability and affordability of the commodities. Through a reduction in the final prices of consumer commodities, welfare improves as consumers access a larger quantity of imported commodities with the same level of disposable income. It also incentivizes production in the exporting country and drives up GDP growth supported by expenditure on commodities in the importing country. Given customs duties are applied to raise government revenue and protect vulnerable local industries, reduction of customs tariffs under trade agreements could have adverse effects on government revenue and investments in the domestic import-competing industry. Since tariff liberalization lowers final prices of the imported products, which are substitutes to those produced by the domestic industry, the consequential price effect may hurt domestic investments especially if the domestic competing firms do not enjoy internal and external economies of scale.

For imports of raw materials and intermediate commodities, which are inputs into the local industry, liberalization of tariffs under free trade agreements reduces custom costs and supports activity of the domestic industry. The reduction in the cost of inputs with tariff liberalization, in effect, could drive both internal<sup>10</sup> and external economies of scale<sup>11</sup> (Allen and Liu, 2007; Auty, 1975; Mosheim and Lovell, 2009; Robinson, 1958). Trade agreements encourage production efficiency (Levy and Wijnbergen, 1992) and this is an important element of economies of scale. The incentive from tariff liberalization especially on imports of raw materials and intermediate inputs may, therefore, encourage a shift of investment activities from countries with relatively higher customs duties to those with relatively lower customs duties (Cigno, 2007; Crystal, 2003).

### **3.1.3 The Theory of Consumer Choice**

Consumers seek to maximize welfare from the consumption of goods and services given a certain level of disposable income—their wants are unlimited but the financial resources available to facilitate meeting their wants are limited (Mankiw, 2001). The limitation in the disposable income available means consumers cannot buy everything they want and they must consider the prices of various goods and services in the market and take the bundle that best suits their needs and desires.

The theory, therefore, explains how consumers make decisions about what to buy and how much to buy given the prevailing market price, disposable income, and preferences regarding the goods and services available in the market (Pantzar, 1996). For open economies such as Kenya, the consumer has preferences between

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9 Products generally constitute commodities and services.

10 Translate to growth in output of individual firms due to efficiency driven by lower cost of inputs. Internal economies of scale are associated with cost advantages to larger firms compared to smaller firms and lead to a market structure that is imperfectly competitive.

11 Expansion of the domestic industry due to an increase in the number of firms. Lower cost of imported raw materials and intermediate inputs could attract new firms into the domestic industry and thus drive external economies of scale. External economies of scale manifest in an industry being comprised of many small firms; the market structure in this case tends to mimic perfect competition.

domestically produced goods and services and their imported substitutes. The prevailing price and quality of available goods and services influence consumer behaviour and the choice of whether to buy domestically produced goods and services or imported substitutes (Liu et al., 2005).

Tariff liberalization under trade agreements directly influences consumer behaviour and choice through price mechanisms and indirectly through quality and variety considerations for imported goods and services in comparison to those produced domestically (Turner and Edwards, 1974). Tariff reductions lower import costs and this in effect lowers the price of imported goods and services. This is the direct *price effect* of a trade agreement. For a constant level of disposable income, the reduced price of imported goods and services enables consumers to purchase more goods and services. This is the *income effect* of tariff liberalization under trade agreements. The price and income effects have welfare implications for consumers.

Assuming the quality of domestically produced and imported goods and services is the same, consumers would prefer the cheaper imported goods and services to the domestically produced ones if the price of domestic goods remains unchanged. Consequently, producers of domestic goods and services may respond to lower prices of imported goods and services by enhancing production efficiency, quality, and variety (Amiti and Khandelwal, 2013). In effect, the competition emanating from tariff liberalization under trade agreements improves variety and quality, and lowers the prices of domestically produced goods and services, which improves people's welfare.

#### **3.1.4 Institutional Theory**

The shift in trade policy from preferential trade agreements (PTAs) to economic partnership agreements (EPAs) has partly been informed by the evidence that special and differential treatment of least developed countries under trade agreements had failed to address the structural vulnerability and weakness that is characteristic of the LDCs (Dicaprio and Trommer, 2010). Specifically, economic growth in least developed countries had not been commensurate with the strength of domestic institutions that are needed to sustain economic development in the long term (UNCTAD, 2008). To address this reality, negotiation for modern trading frameworks – such as the Kenya-UAE Economic Partnership Agreement (EPA) and the Strategic Trade and Investment Partnership (STIP) being negotiated between Kenya and the United States have incorporated sustainability provisions, including institutional support and coordination. This is so especially given that some studies have shown that institutions have a larger impact on trade than tariff liberalization alone (Marquez-Ramos et al., 2012; Chang, 2010; Anderson and Marcouiller, 2002; Levchenko, 2007).

Institutional theory conceptualizes institutions as comprising humanely devised constraints that structure and shape economic interaction (North, 1991). They embody the rules of the game by which economic agents should abide and provisions that maximize economic efficiency. Including provisions on institutional support

and coordination in modern trade frameworks, therefore, ensures some aspects such as corruption, climate change, labour rights, and investments which are key in sustaining growth and development in the long term are tackled.

## **3.2 Empirical Literature**

### **3.2.1 Trade Agreements and Welfare from Consumption of Imports**

Kohler and Keuschnigg (1995) use Computable General Equilibrium (CGE) to simulate the impact of tariff liberalization on welfare and foreign debt using Austrian data. The findings indicate that liberalization is expansionary in the long term and is associated with notable sectoral adjustments. Welfare improves but foreign debt rises in the long term. Using a CGE approach in a developing country context, Ngeleza and Muhammad (2011) find that trade liberalization has a positive impact on welfare. Studies find that full liberalization of tariffs reduces overall poverty though richer households benefit more (Nahar and Siriwardana, 2013; Blomqvist and McMahon, 1986; Cockburn et al., 2008; Zhu et al., 2015).

Improvement in welfare is associated with a reduction in import costs<sup>12</sup> and they have enhanced access to imports into the country with tariff liberalization. Cadot et al. (2005), for instance, find that a third of the rise in border prices of apparel products exported within the North American Free Trade Agreement (NAFTA) are traceable to costs of complying with the trade agreement's rules of origin. Fang and Shakur (2018) note that custom tariffs constitute a trade cost and liberalization contributes to over half of the growth in trade between China and the EU. Given that liberalization enables buyers to have access to larger quantities of imports for the same level of disposable income (Kose and Riezman, 2000; Egger and Larch, 2011; Herault, 2007), welfare in this study is a measure of improvement in living standards emanating from consumers being able to satisfy more of their unlimited wants for the same level of disposable income. This measure of welfare is complemented by the consumer price index (CPI) which is indicative of the prevailing cost of living.

Employing a structural gravity model, Sanchez-Albornoz and Timini (2021) find that free trade agreements promote regional integration and enhance trade flows and the welfare of participating members. Studies reveal that tariff liberalization improves welfare from a global perspective (Kose and Riezman, 2000; Yi, 2000; Mukunoki, 2017). The welfare effect of tariff liberalization is, however, prominent if the trade agreement is multilateral compared to bilateral (Egger et al., 2007).

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<sup>12</sup> Elsewhere, a rise in trade costs through sanctions in Iran has been shown to reduce welfare (Gharibnavaz and Waschik, 2018).



### **3.2.2 Trade Agreements and Investments**

Import tariffs on intermediate goods affect the domestic manufacturing industry and have direct implications on investment, GDP growth, and consumer welfare (Kreuter and Riccaboni, 2023). Liberalization of tariffs on input commodities has been shown to enhance the export duration of manufactured commodities (Zhou et al., 2019). It incentivizes the domestic manufacturing industry by making raw materials and intermediate inputs available to the local industry and the outcome is enhanced industrial activity reflected in the growth and survival of exports of manufactured commodities (Ahn et al., 2018; Amiti and Konings, 2007; Kasahara and Rodrigue, 2008). This argument is corroborated by the Learner Symmetry Theorem which holds that policy measures that encourage imports also encourage exports (Costinot and Werning, 2019; Linde and Pescatori, 2019).

Amiti and Konings (2007) find that a 10-percentage point fall in input tariffs translates to a 12 per cent increase in the productivity of firms that import inputs. Although the work also reveals that reducing output tariffs increases productivity through the induction of competition with the domestic competing industry, the productivity impact of tariff liberalization on inputs is larger than that on output commodities. The three broad products examined by this paper are mainly output commodities. For Kenya and other developing countries, the domestic industrial sector experiences structural challenges that affect its competitiveness (Golub et al., 2017; Olofin, 2002). The implication is that tariff liberalization on output commodities imported by Kenya may likely not encourage investment and competitiveness of the domestic industry. While this is highly likely to hurt domestic investment expenditure, liberalizing import tariffs could encourage GDP growth albeit driven mainly by consumption expenditure on imported output commodities.

To realize a GDP growth partly driven by investments in the domestic industry, the design of free trade agreements could have provisions encouraging foreign direct investments and technological transfers to local firms. To promote fair competition while sustaining the productivity of the local import-competing firms, targeted antidumping protection measures could be considered. This is because firms reveal heterogeneous responses to antidumping protection depending on current productivity and specific sectors (Konings and Vandenbussche, 2008).

Studies have demonstrated that the liberalization of tariffs under trade agreements generates investment incentives and accelerates the flow of technical knowledge (Santos-Paulino, 2005; Cuevas et al., 2005). Tariff liberalizations also raise both the intensive and extensive margins of trade (Disdier et al., 2015; Anderson and Yotov, 2016) and this signifies an increase in investment activity (Osnago et al., 2017). Trade agreements influence the regulative environment of member countries, reduce the regulative distance (Perera, 2015), and consequently positively influence the growth of business activity. Deep preferential trade agreements have been found to positively influence global value chain trade flows as they include institutional provisions anchoring coordination of national policies, facilitation of smoother operation of production activities across borders, reduction of uncertainties associated with contracting, and improvement of



survivability of firms participating in global value chains (Lee and Kim, 2021; Antras and Staiger, 2012; Baldwin, 2012; Lawrence, 1996; Ruta, 2017). Whereas traditional trade agreements focused on mainly tariff liberalization, modern trade agreements have become more deeper and include provisions on intellectual property rights, investments, and standards<sup>13</sup> (Osnago et al., 2015; Mattoo et al., 2022). Modern trade agreements also include environmental provisions that aim to protect forests and biodiversity (Abman et al., 2021).

### **3.2.3 Trade Agreements and Gross Domestic Product (GDP)**

Chou et al. (1997) similarly apply CGE simulations to determine the impact of tariff liberalization under trade agreements on the Taiwan economy. The simulations reveal that tariff liberalizations within the context of trade agreements are beneficial to domestic economies. Specifically, liberalization increases real GDP while consumption and welfare also increase. Household incomes and consumption improve due to lower prices of imported commodities in the case of tariff liberalization. Although the study considers the agriculture and manufacturing sectors, it excludes the services sector. By considering the services sector in addition to the agricultural and manufacturing sectors, the current study fills an important gap in the literature.

Elsewhere, CGE simulations examining the economic effects of trade liberalization across the Taiwan Strait demonstrate significant and positive effects of liberalization on domestic investment, external trade, and real GDP (Chen et al., 2009). A CGE application to Cameroon has also revealed that liberalization of tariffs raises the GDP by between 0.41 per cent and 0.62 per cent (Bakoup and Tarr, 2002). A study on the impact of tariff liberalization between China and Laos also found that a reduction in customs duties has a positive impact on overall economic performance measured by GDP growth, reduces poverty, and thus improves welfare, but is associated with a decline in output of some sectors in the economy (Kyophilavong et al., 2017). The decline in sectoral output is because of increased competition with tariff liberalization. Such sectors are largely uncompetitive and targeted policy support is necessary to improve their efficiency and competitiveness.

CGE simulations also reveal that tariff liberalization under trade agreements has a positive impact on economic growth (Nguyen et al., 2021; Liyanaarachchi, 2016; Vamvakidis, 1998; Mabugu and Chitiga, 2009). Liberalization lowers the cost of importing commodities, lowers prevailing market prices for the commodities, and improves disposable incomes, which increases GDP growth from spending. Sadoulet and Janvry (1992) observe that poorer African countries that are net cereal importers have larger expenditures on imports. The work recommends targeting policies towards local agricultural sectors to encourage domestic investments in the sector.

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<sup>13</sup> Intellectual property rights and standards are institutional elements which are important in attracting and safeguarding investments. Deeper trade agreements have therefore gone beyond the traditional liberalization of tariffs only and now include institutional provisions which promote sustainable development.

Studies have also employed non-ex-ante techniques to examine the impact of trade agreements on welfare, investment, economic growth, and tax revenue. Using structural analysis of a bilateral trade flow model, Egger, and Larch (2011) have examined the effect of European trade agreements on bilateral trade, GDP, and welfare. The findings reveal that trade agreements have a positive and significant effect on the intensive margin of trade and are associated with the redirection of trade flows. Trade agreements are also associated with an increase in GDP and welfare. Reduction of prevailing custom tariffs due to trade agreements lowers prices of imported commodities and this raises welfare. Access to cheaper imported commodities with tariff liberalization encourages expenditure on final commodities and intermediate inputs and this supports GDP growth. Fontagne et al. (2023) hold that deepening the already existing trade agreements instead of signing new ones could boost world trade to 3.9 per cent and world GDP to 0.9 per cent.

### ***3.2.4 Trade Agreements and Tax Revenue***

As a policy tool, customs duties are applied to raise revenue and cushion the local industry against excessive competition. Tariff liberalization, therefore, leads to a loss of government revenue, and this could drive fiscal deficit thus necessitating a rise in public borrowing. CGE simulations also reveal that a rise in import tariff raises government revenue but at the expense of welfare (De Melo et al., 1989; Li et al., 2016; Vos and De Jong, 2003). Studies also demonstrate that the least developed countries are likely to experience negative outcomes from tariff liberalization especially given their heavy reliance on revenue from customs duty (Tekere and Ndlela, 2003; Busse and Grossmann, 2007), governance and institutional challenges (Weller and Ulmer, 2009), and risks of de-industrialization (Shafaeddin, 1995). Import tariffs as a policy tool are also associated with the redistribution of jobs away from the sectors with higher tariffs to sectors with lower tariffs.

## 4. Methodology

The study employed Computable General Equilibrium (CGE) policy analysis technique to investigate the impact of *tariff liberalization* on:

- i. welfare — which is a measure of living standards;
- ii. GDP from expenditure on imports of agrifood, manufactured, and services products;
- iii. total investment expenditure; and
- iv. import tariff revenue, sales tax revenue, Value Added Tax (VAT) revenue, indirect tax revenue, income tax revenue, and factor income tax revenue.

Throughout the analysis, the focus was on imports of agrifood, manufactured, and services products. Equations (4.1), (4.2), and (4.3) present the simulation instructions carried out to generate the results presented in section five (5).

$$DABTMSIM ("w", "c\_agrifood", "import\_tariff") = -scaler \quad (4.1)$$

$$DABTMSIM ("w", "c\_manuf", "import\_tariff") = -scaler \quad (4.2)$$

$$DABTMSIM ("w", "c\_serv", "import\_tariff") = -scaler \quad (4.3)$$

Where:

- i. DABTMSIM is the simulation command representing a change in the applied tariff;
- ii. w is the trading partner in this case representing the world;
- iii. c\_agrifood, c\_manuf, and c\_serv stand for imports of agrifood, manufactured, and services products respectively;
- iv. import\_tariff instructs the General Algebraic Modelling System (GAMS) upon which the Dynamic Equilibrium Model for Economic Development, Environment, and Agriculture (DEMETRA) operates to read from the Social Accounting Matrix (SAM) embedded in the model that the applied shock pertains to import tariffs; and
- v. scaler represents the actual shock that is implemented to show policy change on the effectively applied import tariff for the three broad categories of imported products. The scaler ranges between zero (0) and one (1) with one (1) implying that the effectively applied tariffs on the imported products are reduced by 100 per cent while zero (0) would mean zero reduction in import tariffs. The negative sign before the scaler represents the reduction (liberalization) in the effectively applied tariffs on imported commodities.

Once each of the simulation instructions in equations (4.1), (4.2), and (4.3) is successfully executed, the consequential impacts of the shock on various

components of interest — including aggregate welfare as a measure of living standards, Consumer Price Index (CPI) as a measure of the cost of living, investments, Gross Domestic Product (GDP) from expenditure on imports of agrifood, manufactured, and services products, and tax revenue are simultaneously generated and stored in various GAMS Data Exchange (GDX) files. It is the results in these files that are read and reported in section five (5) on *results*.

CGE simulations are anchored on Social Accounting Matrices (SAMs). In this ex-ante policy analysis, the SAM is a storehouse for quantitative data that the CGE model reads to execute desired adjustments in policy. The SAM is, therefore, an independent component without which CGE simulations would be untenable. The results presented in section five (5) are not read from the SAM. They are read from the GAMS Data Exchange (GDX) files after the DEMETRA model propagates the implemented shock across the whole economy. The structure of the SAM presented in Figure 4.1 is, therefore, aimed at illustrating the various accounts of the SAM.

The 2021 Social Accounting Matrix (SAM) for Kenya is, therefore, imported into the DEMETRA CGE simulation model<sup>14</sup> which runs on the General Algebraic Modelling System (GAMS). SAM construction relies on data from various sources including supply-use tables (SUTs), national accounts, and balance of payments (BOP). Survey data is also utilized in generating shares that are consequently used to apportion weights and further disaggregate macro-variables.

Since tariff liberalizations — which happen under all forms of trade agreements — are applied to products (commodities and services) imported into the country, the

**Figure 4.1: Structure of the 2021 Social Accounting Matrix (SAM) for Kenya**

	ACT	COM	FAC	HHD	GOV	INV	ROW	TOT
ACT		Marketed output						Activity incomes
COM	Intermediate demand			Private consumption	Public consumption	Investment demand	Exports	Total demand
FAC	Value added							Factors incomes
HHD			Income distribution		Social transfers		Remittances	Household incomes
GOV	Producer taxes	Tariffs, VAT & excise taxes		Direct taxes			Foreign aid	Government revenues
SAV				Private savings	Public savings		Foreign savings	Total savings
ROW		Imports	Repatriated profits		Debt repayments			Foreign payments
TOT	Gross output	Total supply	Factor payments	Household expenditures	Government expenditures	Total investment	Foreign receipts	

*Source: Author's impression based on the 2021 SAM for Kenya*

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See Emanuele et al. (2020).

products in the SAM are aggregated into three broad categories; services, agrifood, and manufactured products. The aim is to demonstrate the aggregate sectoral impact of tariff liberalization on imported products to inform policy. The policy variable that is shocked – in this study *import tariffs*, is an account in the SAM showing import tariffs paid on imported commodities to the government. The desired outcomes of welfare, investments, GDP from expenditure on imports of the three broad products, and tax revenue are read from the GAMs GDX files after executing the simulation. Cutler and Davies (2008) utilized the CGE framework to examine the sector-specific impacts of increases in total factor productivity and labour and capital productivity.

CGE frameworks comprise a large set of structural equations that link producing sectors, factor markets, households, government, and the rest of the world. Since they are anchored on a SAM, it ensures internal consistency and the conventional national accounting identities hold (Tyler and Akinboade, 1992; Castellanos et al., 2023). The supply of commodities equals their demand; generated revenue from a productive sector is exhausted by payments to factors; household incomes are completely spent on consumption of goods and services, payment of taxes, transfers to other households, or savings; government revenue from direct and indirect taxes is equal to total investment and total current receipts from foreign exchange is equal to total earnings.

The CGE model is anchored on the neoclassical theory that assumes profit maximization behaviour by producers and utility maximization by consumers (Karingo and Siriwardana, 2002). Market clearing occurs through flexibility in the adjustment of prices and wages. CGE models are therefore superior<sup>15</sup> in that, they can trace the impact of a change in policy across various sectors of an economy while allowing for adjustment in changes in estimates of factors, prices, and output (McGregor et al., 2010).

Table 4.1 illustrates the structure of the 2021 Social Accounting Matrix (SAM) upon which the Computable General Equilibrium analysis is anchored. It is a circular flow of accounting where expenditures are equal to incomes with the assumption of the absence of leakage. Specifically, the columns represent expenditures while the rows represent incomes. ACT stands for productive activities, COM stands for commodities, FAC stands for factors of production, HHD stands for households, GOV stands for government, INV stands for investment, ROW stands for rest of the world, SAV stands for savings, and TOT stands for totals. Investments are equal to savings.

When the SAM is balanced, the column totals are equal to the row totals. When Kenya levies a tax on imported commodities, the tax becomes revenue to the government in the form of import tariff revenue, VAT revenue, and other revenue from taxes like excise duty.

From the SAM, GDP is obtained by summing the values for *private consumption*, *public consumption*, *investment demand*, and *net exports (exports-imports)*. This constitutes GDP from expenditure in the SAM. The GDP from the SAM differs from the one from the CGE GDX files in that while the one in the SAM

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<sup>15</sup> CGE models are superior to partial equilibrium approaches or the input-output methods.

Table 4.1: Structure of the 2021 Social Accounting Matrix (SAM) for Kenya

	ACT	COM	FAC	HHD	GOV	INV	ROW	TOT
ACT		Marketed output						Activity incomes
COM	Intermediate demand			Private consumption	Public consumption	Investment demand	Exports	Total demand
FAC	Value added							Factors incomes
HHD			Income distribution		Social transfers		Remittances	Household incomes
GOV	Producer taxes	Tariffs, VAT and excise taxes		Direct taxes			Foreign aid	Government revenues
SAV				Private savings	Public savings		Foreign savings	Total savings
ROW		Imports	Repatriated profits		Debt repayments			Foreign payments
TOT	Gross output	Total supply	Factor payments	Household expenditures	Government expenditures	Total investment	Foreign receipts	

Data source: Author's impression based on the 2021 SAM for Kenya

is in monetary form, the one reported in the CGE GDX files is growth rates and it is only from expenditure on imports of agrifood, manufactured, and services products. The same applies to investments and taxes in the SAM which are in monetary form but from the CGE GDX files they are growth rates (percentage changes from base).

Welfare is derived from adjustment in prices of imported products with liberalization. The CGE equations in the DEMETRA model allow for price adjustments. It comes from CGE simulations in GAMS after accounting for price adjustments. It is read from CGE GDX files after executing the simulations which account for price effects emanating from the reduction in applied tariff rates.

The applied tariff rate is the tariff that exists in the presence of a trade agreement (after liberalization) while the equivalent tariff liberalization shows the level of tariff restrictions that have been removed through liberalization. For instance, an applied tariff rate of 16 per cent means that the prevailing tariff rate in a scenario with a trade agreement would be 16 per cent and that 84 per cent of the originally existing tariffs have been eliminated.

The entire range of tariff liberalizations that have been considered in the study is aimed at showing levels at which the various desired outcomes (welfare, investments, GDP from expenditure on imports, and tax revenue) rise and the levels at which they start to fall to generate an indication of the levels that would be considered optimal levels for policy consideration, especially by trade agreement negotiators.

The services commodities include trade services, accommodation and food services, transportation and storage, information and communication, finance and insurance, real estate, and other services.

Agrifood commodities are broadly crops, processed food, and other agricultural commodities and specifically include maize, wheat and barley, rice, other grains, other roots, other oil seeds, fruits and nuts, vegetables, sugar cane, coffee, tea, beef, dairy, poultry, goat, other meat, milled grains, bakery, beverages, and other food commodities.

Manufactured commodities include textiles, leather and footwear, paper and printing, petroleum products, other chemicals, fertilizers, non-metallic minerals, machinery and other equipment, and other manufacturing.

Imports of these products compete directly with domestic industrial activities producing the same commodities. Custom tariffs are applied mainly to raise government revenue and cushion the domestic industry against excessive external competition, especially under the infant industry argument. Liberalizing import tariffs, therefore, has policy implications on what happens to welfare as a measure of living standards, government revenue, investment, and economic growth, and the competing domestic sectors producing the liberalized commodities.



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## 5. Results and Discussion

### 5.1 Trade Agreements and Welfare from Consumption of Imports

In this analysis, welfare is a measure of living standards emanating from consumers being able to satisfy more of their wants with the same level of disposable income in the wake of imported commodities becoming cheaper with tariff liberalization. It is complemented by the consumer price index which is a proxy for costs of living. The hypothesized channel of the relationship between the consumer price index (CPI) and the cost of living is that CPI is indicative of the general price level of a basket of consumer goods and services purchased by households. The higher the CPI, the more expensive consumer goods and services are and the higher the cost of living. An assumption is made that welfare accrues to households that are purchasers of final products. Estimates indicate that over 25 per cent of the value of imported products constitutes consumption expenditure for households and this implies trade policy in the form of import tariffs has implications on welfare.

Tariff liberalization which happens under trade agreements improves welfare up to a certain level after which it starts to decline (Table 5.1). Specifically, welfare from consumption of imported agrifood and manufactured commodities increases steadily till the 84 per cent level of tariff liberalization then starts to decline.<sup>16</sup> For imported services, welfare increases up to the 90 percent level of tariff liberation after which it starts to decline. Moreover, the impact of tariff liberalization on welfare is highest for imports of manufactured commodities, followed by agrifood commodities. Tariff liberalization has the least impact on welfare for imports of services. The different optimal levels are indicative of the inherent heterogeneities in accrued welfare from the consumption of the three broad products. In other words, agrifood, manufactured, and services products do not have uniform optimal levels at which consumers derive the maximum possible level of welfare. Given the three broad commodities have different price elasticities for each level of tariff liberalization, the ensuing welfare outcomes would be expected to be different across the three products. The same is reflected in Table 3 which shows different optimal levels of consumption of the three broad commodities.

Liberalization reduces import duties on imported products and this lowers the cost of importing goods and services. Lower import costs are reflected in lower product prices for the imported products. For the same amount of disposable income, lower prices for imported products mean that buyers purchase and consume larger quantities of the imported products, and this is welfare-improving. Trade agreements, therefore, have a positive impact on the welfare of the importing country. Previous studies indicate that tariff reductions incentivize consumers to substitute imported products which become cheaper with liberalization for those produced domestically (Cockburn et al., 2008). For the same level of disposable income, the decline in final product prices with liberalization means consumers can purchase more of the imported commodities and this improves their welfare (Herault, 2007).

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<sup>16</sup> At the 84 per cent level of liberalization, the effectively applied tariff rate is 16 per cent.



**Table 5.1: Impact of tariff liberalization on living standards (welfare)**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>17</sup> (%)	c_manufactures <sup>18</sup> (%)	c_services <sup>19</sup> (%)
100	0	0.000	0.000	0.000
99	1	2.120	11.733	0.194
75	25	65.063	402.975	5.733
60	40	122.227	874.272	10.307
50	50	173.925	1452.470	14.042
35	65	292.350	210.666	22.143
25	75	435.912	1177.420	36.496
20	80	557.139	1508.240	57.605
16	84	707.444	1641.230	97.467
10	90	605.732	1029.510	285.246
0	100	456.616	-34.871	26.779

Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model

Tariff liberalization under trade agreements lowers the cost of living as measured by the consumer price index (Table 5.2). The evidence reveals that tariff liberalizations reduce the cost of living for manufactured and agrifood commodities imported but it is associated with a rise in the consumer price index (CPI) for services imports. For manufactured commodities, the reduction in consumer price index (CPI) is highest (-5.934%) at the 84 per cent level of tariff liberalization while for agrifood commodities reduction in the consumer price index is highest (-1.310%) at the 50 per cent level of tariff liberalization. The different optimal levels indicate that tariff reductions for agrifood, manufactured, and services products have heterogeneous price effects and thus differential CPI levels.

Tariff liberalization lowers the cost of importing and this lowers prices experienced by buyers. Lower prices for imported commodities reduce the cost of living. Agrifood and manufactured commodities also constitute real consumer goods necessary for the sustenance of life and price reductions driven by tariff liberalization have a direct impact on the cost of living. Services largely are non-necessities. High-earning individuals are also likely to be consumers of imported services while low-earning individuals are likely to be consumers of locally produced services. The implication is that services imports are likely to have inelastic import demand in addition to being imperfect substitutes for locally produced services. This would explain why the consumer price index for imported services would rise with tariff liberalization.

<sup>17</sup> Crops, processed food, and other agricultural commodities.

<sup>18</sup> Manufactured commodities.

<sup>19</sup> Service products.

**Table 5.2: Impact of tariff liberalization on consumer price index (CPI) (welfare)**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>20</sup> (%)	c_manufactures <sup>21</sup> (%)	c_services <sup>22</sup> (%)
100	0	0.000	0.000	0.000
99	1	-0.020	-0.011	0.001
75	25	-0.638	0.027	0.048
60	40	-1.056	1.645	0.128
50	50	-1.310	12.655	0.239
35	65	-1.472	-1.787	0.635
25	75	-1.114	4.324	1.323
20	80	-0.579	-5.494	1.973
16	84	0.186	-5.934	2.746
10	90	-0.448	1.823	4.348
0	100	-1.198	-2.030	0.920

Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model

## 5.2 Trade Agreements and GDP from Expenditure on Imports

Tariff liberalization has a positive impact on Gross Domestic Product (GDP) from expenditure for services, agrifood, and manufactured commodities (Table 5.3). The rise in GDP is highest for manufactured commodities followed by agrifood commodities, and is the least for services. The GDP from expenditure on imports of agrifood commodities is highest (6.195%) at the 84 per cent level of tariff liberalization, imports of manufactured commodities are highest (45.177%) at the 50 per cent level of liberalization, while that for services is highest (3.494%) at the 90 per cent level of liberalization.

Tariff liberalization lowers the cost of importing goods and services and this is reflected in lower prices for imported products. For the same level of disposable income among buyers of imported goods and services, lower prices for imported products strengthen the demand and encourage spending. The implication is that liberalization under trade agreements encourages consumption-driven growth in GDP. Although GDP growth driven by consumption expenditure is not essentially bad, a more resilient and sustainable GDP growth should be driven by investments. Widening and deepening modern trade agreements to capture provisions on investments and competition could be considered.

<sup>20</sup> Crops, processed food, and other agricultural commodities.

<sup>21</sup> Manufactured commodities.

<sup>22</sup> Service commodities.

**Table 5.3: Tariff liberalization and GDP from expenditure on imports**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>23</sup> (%)	c_manufactures <sup>24</sup> (%)	c_services <sup>25</sup> (%)
100	0	0.000	0.000	0.00
99	1	0.004	0.163	0.001
75	25	0.122	6.127	0.029
60	40	0.269	16.013	0.046
50	50	0.455	45.177	0.055
35	65	1.152	-0.326	0.078
25	75	2.519	25.054	0.206
20	80	4.024	11.838	0.471
16	84	6.195	13.371	1.006
10	90	4.505	18.503	3.494
0	100	2.558	7.491	0.098

Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model

### 5.3 Trade Agreements and Investments

Tariff liberalizations are associated with a decline in total investment expenditure on services, agrifood, and manufactured products (Table 5.4). Investments are a key component in constructing a country's GDP and a decrease in investment with liberalization should be a policy concern. Policymakers should be keen on trade agreements that despite lowering import tariffs also encourage investments. The decline in investment expenditure is highest among manufactured commodities followed by agrifood commodities. The decline in investment expenditure for agrifood and manufactured commodities is highest at the 84 per cent level of tariff liberalization while that for services is highest at the 90 per cent level of liberalization.

Tariff liberalization under trade agreements exposes local industry to external competition. The competition discourages local investment expenditure especially if local firms have a comparative disadvantage in internal and external economies of scale. More specifically, tariff liberalization is associated with price competition between imported and locally produced goods and services. If local producers have a comparative disadvantage in producing the same goods and services that can be imported, then prices of domestically produced goods and services are likely to be higher than prices of imported substitutes.

23 Crops, processed food, and other agricultural commodities.

24 Manufactured commodities.

25 Service products.

If buyers are rational and the quality of imported products is the same as that of domestically produced substitutes, then there would be a shift in demand away from the more expensive goods and services produced domestically to the more affordable imported substitutes. This shift discourages local investment as local producers respond by cutting down on investment expenditure. Modern trade agreements could, therefore, consider incorporating provisions on investment, competition, and knowledge and technological transfers to local firms.

**Table 5.4: Impact of tariff liberalization on total investment expenditure**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>26</sup> (%)	c_manufactures <sup>27</sup> (%)	c_services <sup>28</sup> (%)
100	0	0.000	0.000	0.000
99	1	-0.12	-0.393	-0.029
75	25	-4.796	-18.168	-1.383
60	40	-11.147	-52.222	-3.602
50	50	-18.487	-154.235	-6.574
35	65	-39.737	-5.096	-17.041
25	75	-70.292	-68.317	-35.305
20	80	-98.005	-166.899	-53.468
16	84	-133.959	-166.656	-77.387
10	90	-107.153	-50.265	-149.137
0	100	-71.853	7.916	-23.807

*Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model*

#### 5.4 Trade Agreements and Tax Revenue

Tariff liberalization has a negative impact on tariff revenue for services, agrifood, and manufactured commodities (Table 5.5). For agrifood and manufactured commodities, the decline in tariff revenue is largest at the 84 per cent level of liberalization. The decline is highest at the 90 per cent level of liberalization for services. Custom duties are a policy tool applied to achieve the dual objective of raising revenue for the government and protecting the domestic industry against excessive competition.

The larger the tariff liberalization, the larger the decline in tariff revenue and the more exposed to external competition the domestic industry is. Manufactured commodities have the largest loss in tariff revenue with liberalization because

<sup>26</sup> Crops, processed food, and other agricultural commodities.

<sup>27</sup> Manufactured commodities.

<sup>28</sup> Service products.

low-industrialized and developing countries have inelastic import demand for the commodities. Although evidence shows that liberalization of import tariffs translates to a decline in tariff revenue, it also shows that revenue from other forms of taxes like sales tax increases for manufactured commodities (Table 5.6), indirect taxes on agrifood and manufactured commodities (Table 5.8), direct income taxes on agrifood, manufactured, and services (Table 5.9), and factor income taxes, especially on agrifood and manufactured commodities. These taxes could compensate for the decline in revenue from import tariffs with liberalization.

**Table 5.5: Impact of tariff Liberalization on tariff revenue**

Applied tariff rate (%)	Equivalent tariff liberalization	c_agrifood <sup>29</sup> (%)	c_manufactures <sup>30</sup> (%)	c_services <sup>31</sup> (%)
100	0	0.000	0.000	0.000
99	1	-0.850	-5.264	-0.249
75	25	-33.454	-208.157	-10.655
60	40	-75.672	-544.926	-26.053
50	50	-123.615	-1561.720	-45.773
35	65	-261.331	-27.171	-113.018
25	75	-459.416	-1222.270	-228.861
20	80	-639.315	-1441.410	-344.373
16	84	-872.315	-1553.400	-497.402
10	90	-780.877	-1071.160	-959.597
0	100	-628.082	-248.266	-218.797

*Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model*

Tariff liberalization has a negative impact on sales tax revenue for services and agrifood products but a positive impact on sales tax revenue from manufactured commodities (Table 5.6). For services, the negative impact of tariff liberalization on sales tax is largest (-11.016%) at the 90 per cent level of liberalization while for agrifood commodities, the negative impact is largest (-4.622%) at the 100 per cent level of liberalization. For manufactured commodities, the impact of tariff liberalization on sales tax revenue is largest (191.361%) at the 50 per cent level of liberalization.

Sales tax is an indirect tax on sales of services and commodities produced domestically and it aims to raise government revenue. Tariff liberalization on services and agrifood commodities lowers prices of the products and shifts domestic demand away from domestically produced services and agrifood commodities to imported substitutes and this has a negative impact on sales tax revenue. Tariff liberalization on imports of manufactured commodities increases revenue from sales tax on domestically manufactured commodities. Manufactured commodities

<sup>29</sup> Crops, processed food, and other agricultural commodities.

<sup>30</sup> Manufactured commodities.

<sup>31</sup> Service products.

imported into Kenya are imperfect substitutes for commodities manufactured domestically and this sustains demand for domestic manufactures. This supports revenue from sales tax on domestic manufactured products.

**Table 5.6: Impact of tariff liberalization on sales tax revenue**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>32</sup> (%)	c_manufactures <sup>33</sup> (%)	c_services <sup>34</sup> (%)
100	0	0.000	0.000	0.000
99	1	-0.02	0.459	-0.008
75	25	-0.649	18.087	-0.342
60	40	-1.396	53.030	-0.819
50	50	-2.126	191.361	-1.402
35	65	-3.576	1.423	-3.193
25	75	-4.315	86.069	-5.670
20	80	-3.988	6.321	-7.519
16	84	-2.589	10.631	-9.224
10	90	-4.082	58.7215	-11.016
0	100	-4.622	-15.117	-4.327

*Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model*

Tariff liberalization has a negative impact on Value Added Tax (VAT) revenue for imports of services, agrifood, and manufactured commodities (Table 5.7). The negative impact of tariff liberalization on revenue from VAT is highest at the 84 per cent level of liberalization for services, agrifood, and manufactured commodities. The decline in VAT revenue is, however, largest for services imports followed by agrifood and manufactured commodities respectively.

From a policy perspective, VAT is mainly applied as a tool for raising government revenue and its reduction implies a reduction in government revenue. It is an indirect tax applied on sales of domestically produced commodities. Imported products are substitutes to those produced domestically and this means the price effect of tariff liberalization shifts demand away from domestically produced products to imported substitutes. This shift erodes revenue from VAT on services, agrifood, and manufactured commodities.

<sup>32</sup> Crops, processed food, and other agricultural commodities.

<sup>33</sup> Manufactured commodities.

<sup>34</sup> Service products.

**Table 5.7: Impact of tariff liberalization on Value Added Tax (VAT) revenue**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>35</sup> (%)	c_manufactures <sup>36</sup> (%)	c_services <sup>37</sup> (%)
100	0	0.000	0.000	0.000
99	1	-143.01	-100.000	-100.000
75	25	-99.998	-100.014	-100.019
60	40	-99.983	-99.933	-99.983
50	50	-99.919	-94.476	-100.005
35	65	-100.027	0.000	-99.938
25	75	-99.991	-99.808	-100.030
20	80	-100.002	-102.456	-99.955
16	84	-305.587	-107.000	-2553.160
10	90	-92.520	-96.184	-212.206
0	100	-84.310	-0.000	-100.152

Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model

Tariff liberalization has a positive impact on indirect tax revenue for agrifood and manufactured commodities but a negative impact on indirect tax revenue for services (Table 5.8). Indirect tax revenue for agrifood commodities is highest (13.775%) at the 84 per cent level of liberalization while for manufactured commodities, it is highest (122.333%) at the 50 per cent level of liberalization. Despite being negative at the other levels of liberalization, indirect tax revenue for services is positive (5.181%) at the 90 per cent level of liberalization.

Since indirect tax revenue is levied on commodities, tariff liberalization on agrifood and manufactured commodities incentivizes imports of the commodities and the growth in commodity import volumes drives growth in indirect tax revenue. Liberalization largely has a negative impact on indirect tax revenue from services and this means tariff reductions may not necessarily translate to an increase in services imports. Since liberalization encourages imports of agrifood and manufactured commodities, it could discourage local industrial activities producing agrifood and manufactured commodities with the outcome being a decrease in demand for services imports especially if the services are highly specialized and supportive of the local industry.

<sup>35</sup> Crops, processed food, and other agricultural commodities.

<sup>36</sup> Manufactured commodities.

<sup>37</sup> Service commodities.

**Table 5.8: Impact of tariff liberalization on indirect tax revenue**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>38</sup> (%)	c_manufactures <sup>39</sup> (%)	c_services <sup>40</sup> (%)
100	0	0.000	0.000	0.000
99	1	0.005	0.393	0.001
75	25	0.129	15.305	-0.011
60	40	0.276	41.622	-0.084
50	50	0.503	122.333	-0.201
35	65	1.633	-1.131	-0.582
25	75	4.449	62.247	-0.925
20	80	8.021	37.910	-0.829
16	84	13.775	41.849	-0.103
10	90	8.929	45.593	5.181
0	100	4.302	0.645	-0.828

*Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model*

Tariff liberalization has a positive impact on direct income tax revenue<sup>41</sup> from services, agrifood, and manufactured commodities (Table 5.9). The impact of liberalization on direct income tax revenue is highest for manufactured commodities (30.818%) at the 50 per cent level of liberalization, followed by agrifood commodities (6.000%) at the 84 per cent level of tariff liberalization. For services, the impact is highest (4.694%) at the 90 per cent level of liberalization.

Direct income tax revenue is paid from earnings by workers and firms and the implication is that tariff liberalization on imported services, agrifood, and manufactured commodities supports jobs and activity by firms along the import value chain. The outcome is an increase in direct income tax revenue. Lepelle and Edwards (2023) found that employment grew in manufacturing and services sectors that had experienced the largest reductions in tariffs. The rise in employment would translate to a rise in direct income tax revenue. Other studies have found that liberalization of tariffs led to households having more members working (Dai et al., 2021) and lower wages, especially in the tradable sectors (Dai et al., 2020). Lower wages could reduce firm costs, and this could translate to more labour being absorbed by the firms and enhanced firm activity (Nguyen, 2017; Nguyen, 2018). The absorption of more labour and enhanced firm activity could raise direct tax revenue paid by enterprises.

<sup>38</sup> Crops, processed food, and other agricultural commodities.

<sup>39</sup> Manufactured commodities.

<sup>40</sup> Service products.

<sup>41</sup> Direct income tax revenue is paid to the government by labour and firms.



**Table 5.9: Impact of tariff liberalization on direct income tax revenue**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>42</sup> (%)	c_manufactures <sup>43</sup> (%)	c_services <sup>44</sup> (%)
100	0	0.000	0.000	0.000
99	1	0.003	0.114	0.002
75	25	0.123	4.259	0.063
60	40	0.303	11.027	0.131
50	50	0.537	30.818	0.208
35	65	1.343	1.226	0.454
25	75	2.736	17.618	0.907
20	80	4.129	7.231	1.417
16	84	6.000	8.070	2.168
10	90	4.612	12.961	4.694
0	100	2.830	-1.994	0.624

Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model

Tariff liberalization has a positive impact on factor income tax revenue for agrifood and manufactured commodities but a negative impact on factor income tax revenue for services (Table 5.10). For agrifood commodities, the impact of tariff liberalization on factor income tax revenue is highest (3.826%) at the 84 per cent level of liberalization. For manufactured commodities, the impact of tariff liberalization on factor income tax revenue is highest (28.251%) at the 50 per cent level of liberalization. Overall, the rise in factor income tax revenue with tariff liberalization is higher for manufactured commodities compared to agrifood commodities. The decline in factor income tax revenue attributed to tariff liberalization for services is highest (-0.898%) at the 84 per cent level of liberalization.

The rise in factor income tax revenue with a reduction in import tariffs on agrifood and manufactured commodities means more jobs are created along the supply chain for agrifood and manufactured commodities for the locals who pay direct taxes from wages to the government thus the growth in factor income tax revenue. In contrast, imported services are highly specialized and require specialized support. This specialized nature means imported services do not support significant direct taxes on wages from locals hence the negative impact of tariff liberalizations on services imports on factor income tax revenue.

42 Crops, processed food, and other agricultural commodities.

43 Manufactured commodities.

44 Service products.

**Table 5.10: Impact of tariff liberalization on factor income tax revenue**

Applied tariff rate (%)	Equivalent tariff liberalization (%)	c_agrifood <sup>45</sup> (%)	c_manufactures <sup>46</sup> (%)	c_services <sup>47</sup> (%)
100	0	0.000	0.000	0.000
99	1	0.009	0.097	-0.0003
75	25	0.281	3.665	-0.021
60	40	0.514	9.722	-0.063
50	50	0.725	28.251	-0.122
35	65	1.253	2.921	-0.322
25	75	2.033	16.176	-0.598
20	80	2.797	3.393	-0.781
16	84	3.826	4.306	-0.898
10	90	3.099	11.716	-0.657
0	100	2.159	-1.541	-0.460

*Data source: Analysis based on the 2021 Kenya SAM and DEMETRA CGE model*

<sup>45</sup> Crops, processed food, and other agricultural commodities.

<sup>46</sup> Manufactured commodities.

<sup>47</sup> Service commodities.

## **6. Conclusion and Policy Recommendations**

### **6.1 Conclusion**

Tariff liberalization increases welfare steadily up to a certain level after which it starts to decline. The optimal level of tariff liberalization for agrifood and manufactured commodities is 84 per cent, while for services, the optimal level is 90 per cent level of liberalization. Welfare is largest among manufactured commodities followed by agrifood and services.

Moreover, the liberalization of tariffs also lowers the cost of living, thus improving welfare. Specifically, liberalization reduces the consumer price index (CPI) for manufactured and agrifood commodities, but it is associated with a rise in CPI for imports of services. Reduction in the consumer price index is highest for imports of manufactured commodities (84% level of liberalization) while for agrifood commodities, reduction in CPI is largest at the 50 per cent level of liberalization.

Gross Domestic Product (GDP) from expenditure increases with liberalization for services, agrifood, and manufactured products. It is highest for manufactured commodities followed by agrifood and services respectively. GDP from expenditure on agrifood commodities is highest at 84 per cent level of liberalization, 50 per cent level for manufactured commodities, and 90 per cent for services.

Total investment decreases with the liberalization of services, agrifood, and manufactured products. The decline is largest among manufactured commodities followed by agrifood commodities. For manufactured and agrifood commodities, the decline in total investment expenditure is largest at the 84 per cent level of liberalization while for services, it is highest at the 90 per cent level of liberalization.

Liberalization has a negative impact on tariff revenue from imports of services, agrifood, and manufactured commodities. The decline is largest at 84 per cent level of liberalization for manufactured and agrifood commodities and at 90 per cent level of liberalization for services. Liberalization also has a negative impact on sales tax revenue from services and agrifood products but has a positive impact on sales tax revenue from manufactured commodities. For services, the negative impact of liberalization on sales tax is largest at 90 per cent level of liberalization while for agrifood and manufactured commodities, the negative impact is largest at 100 per cent and 50 per cent levels of liberalization respectively. Moreover, liberalization has a negative impact on VAT revenue from imports of services, agrifood, and manufactured products with the negative impact being largest at the 84 per cent level of liberalization.

Liberalization, however, has a positive impact on indirect tax revenue from imports of agrifood and manufactured commodities but a negative impact on indirect tax revenue from imports of services. Indirect tax revenue from agrifood commodities is highest at the 84 per cent level of liberalization while for manufactured commodities, it is largest at the 50 per cent level of liberalization. It also has a positive impact on direct tax revenue from services, agrifood, and

manufactured products. It is highest for manufactured commodities followed by agrifood commodities. Further, liberalization also has a positive impact on factor income tax revenue from agrifood and manufactured commodities but a negative impact on factor income tax revenue from services.

## **6.2 Policy Recommendations**

Overall, tariff liberalization under trade agreements has a positive impact on welfare as a measure of living standards and largely contributes towards a reduction in the cost of living as measured by the consumer price index. Kenya should, therefore, continue pursuing trade agreements as a channel for improving welfare and reducing the cost of living while spurring economic growth from expenditure on commodity imports.

To maximize welfare, the 84 per cent level of liberalization should be considered for agrifood and manufactured commodities while the 90 per cent level should be considered for imports of services. On the consumer price index (CPI) as a measure of the cost of living, liberalization should be considered at the 84 per cent level of liberalization for manufactured commodities and 50 per cent for agrifood commodities.

To support GDP from expenditure on commodity imports, the 84 per cent level of liberalization should be considered for agrifood commodities, 50 per cent for manufactured commodities, and 90 per cent for services.

Given that liberalization of tariffs on services, agrifood, and manufactured products has a negative impact on total investments, tariff revenue, sales tax, and VAT revenue, negotiation for free trade agreements should go beyond the conventional tariff liberalization and include targeted sustainable provisions on investment, climate change, and institutional support. Provisions on investments could promote GDP growth supported by public and private investments. It could also support employment creation while widening the tax base for improved government tax revenue. Provisions on climate change could encourage market and product competitiveness while provisions on institutional support and coordination could encourage information sharing and resolution of bottlenecks experienced in the process of trading.

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