# Topic : An assessment of the effect of the common external tariff on imports for export.

## 1.0 Introduction

Nowadays, the production of goods and trade is organized within global supply networks. The consequent increase of trade in intermediates – i.e., goods and services used (as inputs) by importing countries to produce their exports- augments trade costs occurs many times along the supply chain (Yi, 2003). This means that import tariffs lead to high costs related to countries' exports. Consequently, restrictive trade policies negatively affect domestic producers' competitiveness in international markets since they cannot afford to buy cheap, efficient inputs abroad (Cattaneo et al, 2013; Fusacchia et al, 2021and Taglioni and Winkler, 2014). Consequently, assessing the effect of protectionism on global value chains (GVC) is of great interest.

The foreign value-added trade policy restrictiveness index (FVATRI) is ideal since it captures the effects of the tariff structure on exporting firms that rely on imports for their exports[1]. Following such a measure of bilateral trade policy restrictiveness developed by Fusacchia et al (2021) by extending the set of trade restrictiveness indexes primarily developed by Anderson and Neary (2005) to assess the impacts of trade policies on GVC-related trade, this paper measures trade protection based on gross imports and GVC-related trade and articulates the effects of the tariff levels on exporting and importing firms. This is done by calculating the protection indexes at bilateral level using the Global Trade Analysis Project (GTAP) computable general equilibrium model (CGEM). These indexes are also crucial in understanding the nexus between the Southern African Development Community's (SADC) common external tariff (CET) and the region's involvement in global value chains.

The analysis uses a framework that is based on the global input-output accounting framework and trade-in value-added. Since in international fragmentation of production, inputs from various countries are used to produce the final products, it is vital to acknowledge the contribution of each country’s value addition in the stages of production. This helps identify

[1]In this paper the researcher computes only the foreign value-added since the tariffs directly affect imported goods more than exported goods.

an industry/country that pays more taxes during production. Cusolito et al (2016) identified industries/countries that rely more on imported inputs or semi-processed products to produce their exports as paying high taxes "in terms of value-added."

International trade statistics (primary data) used to measure/analyse the international production networks have overstated the amount of domestic value-added in exports. They do not reveal the destination of the value-addition embodied in those exports. This has been caused by an increase in international fragmentation of production that has weakened the analytical interpretability of these data. This occurs when intermediate goods and services cross borders many times to their final demand (a double-counting problem of international trade statistics). Thus, gross trade is misleading in how value-added is traded amongst countries. To overcome this challenge, trade-in value-added databases have been developed to provide new insights into GVCs. These databases that are formed through global inter-country input-output tables (ICIO) give a comprehensive map of global transactions of goods and services in a large data set that combines the national input-output tables of different countries at a given point in time (Borini and Mancini, 2019). The World Bank (2017) noted that these tables use information on the "supply-use relation" between industries and across countries which enables global value chains to be identified and the flow of value-added from one country/region to the other to be measured (Nenci, 2020). In the words of Fusacchia et al (2021), "this metric allows all backward linkages between countries and sectors to be considered and captures the value of the imported inputs used directly and indirectly in the manufacturing of exported goods."

Fusacchia et al (2021) noted that at the national account level, what is internationally traded is value-added (VA) and the adequate measure of trade distortion is now on the protection of value-added and not on the gross output. Thus, by relying on this metric, different benchmarks that can measure restrictiveness according to where value-added originates (domestically or abroad) and where it is finally consumed, can be defined. Those identified trade restrictiveness indexes are equivalent to the actual trade policies on both domestic and foreign value-added embedded in a country's exports. To perform the empirical analysis, the research employs the GTAP-VA module[2], a modified version of the GTAP model (Antimiami et al, 2018a) calibrated to the GTAP MRIO version (an extension of the standard GTAP version).

[2] For more on the GTAP VA module, see Antimiani et al, 2018.

**This research aims to:**

- use the Foreign value-added Trade Restrictiveness Index (FVATRI) (see subsection 1.3.3 for a definition of the Index) to establish how the proposed SADC CET affects the integration of the five SADC countries into global value chains.
- obtain uniform tariff equivalents by keeping constant gross imports, i.e., the use of the Import Trade Restrictiveness Index (MTRI) (see subsection 1.3.3 for a definition of the Index).
- assess the impact of the common external tariffs on the SADC exporting firms that acquire their inputs abroad using the FVATRI approach.

## 1.1 SADC trade policy and the regional specialisation patterns

In this analysis, the most traditional trade barriers – tariffs – are used to measure the trade restrictiveness index. As is generally known, the tariffs applied to agriculture and food products are higher compared to those applied to non-agricultural products, and this is the case in the SADC region. Table 1.1 shows the average applied tariffs in the SADC region in 2014. For the sake of coherence, the tariffs applied in 2014 are presented, as the database used has 2014 as its baseline. Table 1.1 shows that food products (56%) have higher applied tariffs (threefold) compared to non-agriculture (17%), with a standard deviation of 0.14 compared to 0.15 for non-agricultural products. Agricultural products are almost twofold compared with non-agriculture products, but with the same standard deviation of 0.15. Indeed, the tariff level varies from one product to the other.

*Table 1.1 SADC Tariffs.*

| PRODUCT GROUP | IMPORT-WEIGHTED TRADE TARIFFS (AD VALOREM RATES, 2014) | STANDARD DEVIATION |
|---|---|---|
| **AGRICULTURE PRODUCTS** | 31% | 0.15 |
| **FOOD AND BEVERAGES** | 56% | 0.14 |
| **INDUSTRIAL PRODUCTS** | 17% | 0.15 |

Source: GTAP Database Version 10.

Figure 1.1 illustrates the SADC tariffs for each aggregated region as of 2014. Bilaterally, according to GTAP Database version 10 (2014) as shown in the graph, countries apply different tariffs to different exporters. For example, Botswana (22%) and Zimbabwe (19%) have the highest tariffs applied to the goods imported from East Asia and the rest of the world. The high barriers between these countries and different regions reduce the volume of specific (different) products being imported by consumers, as noted by Melitz (2003). On the contrary, Tanzania (2%) and Malawi (1%) have the lowest tariffs applied to the goods imported from the rest of Africa, suggesting the advantages of the consumers who import from this region. On average, the rest of Africa, Latin America and the EU_28 face lower tariffs from SADC countries whereas East Asia and South Asia face higher tariffs from the same (SADC) countries. These weighted trade averages presented in Figure 1.1 are helpful in interpretation of the results. The graph bars represent the tariffs applied to the imports from different regions. The names under the graph bars represent the countries applying tariffs to imported goods from different regions.

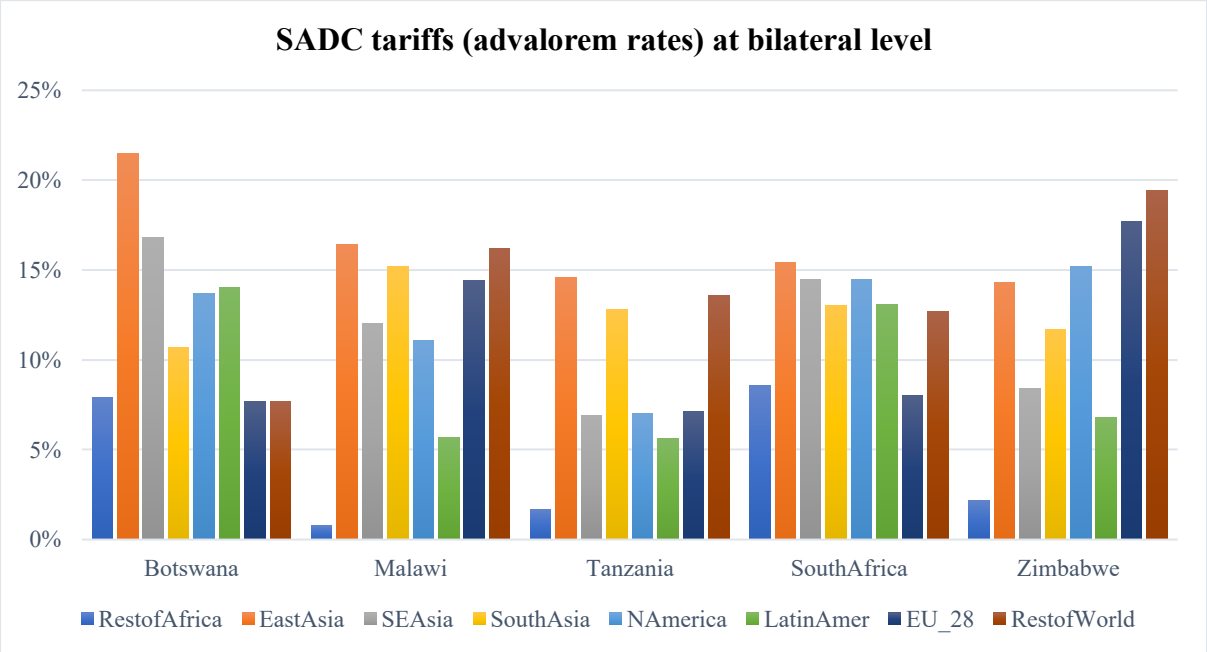


*Figure 1.1 SADC countries' ad valorem tariffs rates at the bilateral level.*

Source: GTAP Database, version 10.

As we move to the SADC common external tariff (CET), the region has proposed tariff levels based on different categories: raw materials (0%), capital goods (0%), intermediate goods (10%) and final goods (25%). These are the tariff levels used in this analysis. However, evaluating any trade policy involves methodological challenges: measurement and aggregation

(Amador and Cabral, 2014). Measuring trade policy is challenging, even when using tariff measures to evaluate this policy. With respect to aggregation, Fusacchia et al (2021) noted that 'even when trade restriction quantification is readily available, as in the case of import tariffs, the information comes at a highly disaggregated level whereas global economic models must aggregate the information to a higher level.'

The following subsection briefly discusses the existing literature on trade restrictiveness indexes.

## 1.2 Literature on the measures of protection

This subsection presents literature on the equivalence measures of tariffs that establishes a reference circumstance as a benchmark for determining the relative and absolute degree of restrictiveness. Cipollina and Salvatici (2008) defined *relative metrics* as those that make it possible to compare tariff reforms whereas absolute measurement is the one that reveals whether protection has doubled or not depending on the situation.

To begin with, Anderson and Neary (1996, 2005) established a tariff index theory that can be articulated in a general equilibrium framework[3]. This framework accounts for linkage between sectors, permits adjustment of relative prices and factors to be reallocated across sectors, and permits substitution effects in output and consumption – domestically and internationally (Ferrarini and Hummels 2014). Moreover, their theoretical model provides a consistent aggregation procedure that solves the endogeneity problem[4] in theoretical weighting schemes (Cipollina and Salvatici, 2008; Anderson et al, 2013; Laborde et al, 2017). These theoretically

[3]Their theoretical framework has laid the foundation for establishing the index numbers for the policy variables that keep the link between the aggregated information and the economic variable in which interest lies (Antimiani et al, 2018).

[4]In this context, the "endogeneity problem" refers to a challenge in creating consistent aggregation procedures and weighting schemes for tariff indices within a general equilibrium framework. Thus, endogeneity, in this context, generally means that the variable in question is influenced by other variables within the system and this influence can be bidirectional. In the case of tariff indices, a problem arises because tariffs (import taxes) are determined by economic forces and policies, and they, in turn, influence various economic variables, including relative prices, factor allocation, and substitution effects in both domestic and international markets. To create a meaningful tariff index, one needs to account for this endogeneity issue. If not properly addressed, the endogeneity problem can lead to inconsistent or biased results when constructing tariff indices.

based measures provide indices that are equivalent to the original data related to the variable of interest (Fusacchia et al, 2021).

Anderson and Neary (1994) have analysed the effects of the structure of trade policy on national welfare. They defined the Trade Restrictiveness Index (TRI) as "the single tariff that yields the same welfare as the original differentiated tariff structure." Bureau and Salvatici (2004a, b) have also computed this Index (TRI) for agricultural sectors that are incorporated in the GTAP database for four countries: Canada, the EU, Japan, and the USA. In addition, they used the Index to compare "the performance of different tariff-cutting formulae" (Cipollina and Salvatici, 2008).

For effective protection, Anderson (1998) defined the Distributional Effective Rate of Protection (DERP) as the unit tariff that yields the same sectoral factor income as the actual tariff structure. This measures the extent to which the level of protection is translated into sector-specific factor income. Anderson (1998b) and Antimiani et al (2003) computed this Index to evaluate the protection imposed on the US agriculture sector and EU agri-food sectors, respectively.

To analyse the import flows, Anderson and Neary (2003, 2005) defined the Mercantilist Trade Restrictiveness Index (MTRI) as the consistent tariffs that maintain the value of gross imports at current market (world) prices. Scholars such as Bureau et al (2000), Antimiani and Salvatici (2005), Kee et al (2006) and Fusacchia et al (2021) have computed this Index at a bilateral level to capture the trade restrictiveness imposed by countries on each other.

Rouzet and Miroudot (2013) calculated the "cumulative tariff" (i.e., the total cost-push effect of direct and indirect tariffs for a specific importer) which quantifies the whole cost-push effect of direct and indirect tariffs while accounting for the upstream GVC structure. Muradov (2017) expanded the concept to account for indirect bilateral trade flows and suggested two alternative metrics, the cumulative tariff at origin and destination, to account for the associated expenses. Cappariello et al (2018) employed these measures to estimate both the cost-push effect of tariffs and the cumulative resistance of export flows added to an industry's exports to assess the indirect costs of Brexit.

Diakantoni et al (2017) noted that, at least from a normative perspective, after sinking into relative obscurity, effective protection rates (EPRs) may resurface when global trade shifts

from "trade-in (final) goods" to "trade-in tasks" (Fusacchia et al, 2021). In the classic definition of the effective protection rate, several contributions (Diakantoni and Escaith, 2012; Feenstra, 2017; Rouzet and Miroudot, 2013; Chen et al, 2016) consider multiple border crossings. In addition, Diakantoni et al (2017) recently expanded the definition of effective protection to include the impact of import duties on the foreign value added to an industry's exports.

Regarding global value chains, the tariff index measures related to this concept, as noted by Fusacchia et al (2021), are based on simplified assumptions, including the fixed technological coefficients and infinitely elastic supply of factors available to the economy. Accordingly, the output can instantly, and cost effectively react to any difference in final demand. Global value chains, on the other hand, can be best understood as a complex set of general equilibrium interdependencies between countries reflecting the combination of preferences, technology, endowments and policy (Walmsley et al, 2014).

As a result, in line with a theoretical framework established by Anderson and Neary (2005), Antimiami et al (2018b) defined various benchmarks in general equilibrium which are used to measure restrictiveness according to where the value-added originates. Consequently, these authors noted that “the resulting Value-Added Trade Restrictiveness Indexes are equivalent to the actual trade policies in terms of the effect on domestic or foreign (direct or indirect) value-added embedded in imports."

Additionally, Fusacchia et al (2021) established the value-added trade restrictiveness index to evaluate the effect of the rate of protection on imports for exports (intermediate goods imported and used as inputs to produce goods that are later exported) known as foreign value-added. The Index captures the backward integration of global value chains. Using the general equilibrium framework, they used the Index (FVATRI)[5] to assess the impact of the EU Common External Tariff (CET) on Italy's imports and its effects on the Italian firms that import to export. Their results confirmed that EU tariffs harm Italian producers, especially those exporters sourcing inputs of chemical products, clothing apparel and leather from abroad, and more so those who used imported intermediate inputs to produce their exports, especially those obtained from China.

[5]Trade policies have two different impacts: distributive and allocative, and in this case, the FVATRI has a latter impact.

Also, when comparing Italy to Germany, they showed that the EU's common external tariffs have different effects on Italian and German firms regarding foreign inputs. The German firms were overall in a better position than the Italian ones, although there was a substantial variation at the bilateral and sector level' (Fusacchia et al, 2021). Consequently, this research work goes hand in hand with Fusacchia et al's 2021 paper which used the computable general equilibrium model (CGE) to assess the effect of the level of protection or uniform tariff equivalence on trade and value-added.

## 1.3 Empirical modelling and data

### 1.3.1 The extended GTAP model for value-added analysis

To assess trade restrictions, the GTAP VA module (Antimiani et al 2018a) – a modified version of the standard GTAP model – is used. This perfectly competitive comparative static global CGEM incorporates the deconstruction of the gross trade flows to show the origins of the value-added generated in manufacturing goods and services (Antimiami et al, 2018a). According to Hertel and Tsigas (1997), this model is based on the general equilibrium theory and has been designed to evaluate the inter-regional and economy-wide prevalence of economic policies. Fusacchia et al (2021) noted that the main advantages of the CGE approach are its solid micro-theoretical underpinnings and its economy-wide scope as well as its detailed inter-sectoral linkages for each of the economies represented and the complete and consistent coverage of all bilateral trade flows.

The GTAP model used in this analysis has a symmetric structure, with production and utility functions uniform across the regions (Salvatici, 2020). However, utility functions differ by sector and regions differ because the shares of different products in their outputs vary according to local characteristics (Fusacchia et al, 2021).

Additionally, in the model, regional households collect the factor rewards and distribute regional income (through a Cobb-Douglas utility function) among private consumption, government consumption, and savings to maximize its utility. There is also a nest of the utility function with a first aggregation made over distinct goods/sectors and the choice is then made between domestic and imported goods. According to Hertel (2013), the model parameters are usually taken from the available literature.

As for the production side, the model assumes separable, constant returns to scale technologies. Fusacchia et.al (2021) noted that “a common approach in CGE literature is to model the production side through a sequence of nested constant elasticity of substitution (CES) functions that aims to re-produce the substitution possibilities across the full set of inputs."

The condition of a firm's demand for value-added components relies on relative prices of production factors while composite value-added and intermediates are used in fixed proportions (a fixed coefficient function of Leontief type) (Salvatici, 2020). On the intermediate input side, imported intermediate goods are differentiated from domestically produced intermediate inputs.

As for the demand for imports, the model assumes the Armington aggregation structure in which the products are differentiated according to their geographical origin. Domestic and trade partner variations comprise a CES composite of consumer and intermediary commodities. This specification outlines how similar products are transported across borders and allows for tracking bilateral trade flows.

Even though the GTAP model is built on complete input-output tables that account for all sources and stages of production, it requires some alterations to perform global value chain analysis. First, in the standard GTAP, imports are sourced at the border, giving data on the total value of the firm's purchases of intermediate goods and the total purchases of final commodities by households, the government, and for investment (domestic and imported). This occurs while not showing the bilateral trade to the consuming agent, i.e., firms or final consumption. This leads to applying the proportionality assumption which could be more realistic[6]. Conversely, this research study uses the GTAP Multi-Regional Input Output (MRIO) database (an extension of the GTAP database) developed by Carrico et al (2020)[7].

Second, value-added multipliers are derived from a sector's cost structure. They combine each country's sectoral VA shares with direct and indirect intermediate usage in the production

[6] As it better reflects the intricacies of modern global trade patterns and production processes.

[7] An explanation of this MRIO is provided in the next subsection (1.3.2).

process. The multipliers are applied to trade to retrieve the complete value structure underlying gross trade, thus disentangling each country's contribution to the creation of traded goods in terms of (value-added) income. This allows the value-added trade restrictiveness index benchmark to be constructed within the GTAP framework (Fusacchia et al, 2021).

### 1.3.2 The extended GTAP database

GTAP Data Base, version 10, is a standard of coherent data on consumption, production and trade (Aguiar et al, 2019). This GTAP Data Base is a fully recorded global database that provides all-inclusive and balanced data on production, bilateral trade, transport, and trade policies covering 121 countries, signifying 98% of the world's GDP, 92% of the world's population and 20 aggregate regions for 65 commodities. Moreover, the advantage of using this database for trade-in value-added evaluation comes from its reconciliation of data from various sources and locating them into a single consistent database that has a wide range of sectoral and regional coverage (Koopman et al, 2010).

This database's main shortfall in GVC analysis is the need to account for how imported intermediate products are used. Generally, its framework does not allow tracking of the industry-to-industry trade which is usually required to construct the ICIO data. However, previous research has used a proportionality assumption[8] to allocate the imports of products from any given country between final demand and intermediates, and then within intermediates, between the intermediate usage by individual production commodities (Salvatici, 2021). However, this research uses the GTAP Database 10 A in its MRIO version (Carrico et al, 2020) with a four-dimensional arena that covers a source and destination country sector. The GTAP MRIO (an extension of the GTAP database) is also constructed from IO tables of various countries, complemented by the trade database containing end users' bilateral trade flows. These end users include firms, consumers, and investors. The database also distinguishes bilateral trade and tariff flow by agents or by end users. In this MRIO framework, trade occurs when the producers in the source region export a commodity, classified by end use, to corresponding agents (producers, investors, and consumers) in importing region (Carico et al, 2020).

[8]For example, Daudin et al., 2011; Kawasaki and Beaujeu, 2017; Salvatici, 2021.

This GTAP[9] MRIO is constructed by incorporating the United Nations Statistics Division's (UNSD) Harmonized System (HS) to Broad Economic Categories (BEC)[10] to System of National Accounts (SNA) and GTAP centre's HS to GTAP concordances into MacMap GTAP commodities are then aggregated and the trade and tariff data are given by end users in MacMap.[11] Consequently, this information is used to disaggregate their associated flows in the standard GTAP database. Constrained optimization procedures are employed to ensure that the GTAP-MRIO trade and tariff flows when summed over end users, aggregate back to the standard GTAP database (Carico et al, 2020).

### 1.3.3 Value-added composition of gross imports

The current research considers intermediate goods and allocates the value-added according to where it comes from (geographical origin). This allows the share of the value in a country's gross imports to be allocated as per usage. Then, following Fusacchia et al's (2021) concept, the research decomposes the gross imports of country ***s*** (any SADC country) from country ***r*** into two main components; final goods (those directly consumed in the importing country's domestic market) and intermediate goods (those used as inputs by domestic companies within the importing country). Additionally, within intermediate goods, the research makes a distinction between the portion of these inputs that domestic firms utilize to manufacture final products for the domestic market and the part of these intermediates that is integrated into products that are exported to foreign markets (Fusacchia et al, 2021). This last category represents the imported content or the foreign value added in a country's exports and, as a percentage of total exports, offers insights into the country's connections to global value chains (Fusacchia et al, 2021). From this, the researcher then illustrates trade restrictiveness indexes on gross and value-added terms.

In the diagram, ***r*** and ***s*** symbolize countries, ***L*** and ***V*** denote the matrix of the Leontief coefficients, and the diagonal matrix with "elements equal to the share of direct domestic value-

[9]Fusacchia et al (2021) noted that this data set gives a "set of consistent and exhaustive ad valorem equivalents of applied border protection worldwide" (Fusacchia et al, 2021).

[10] BEC can identify the heterogeneity by sources based on 6-digit HS trade data; hence the GTAP MRIO construction uses its classification to separate the trade of final and intermediate goods.

added in total output in each sector of each country" (Fusacchia et al, 2021). I then compute the total value-added component of trade flows utilizing the total value-added multiplier ***(VL)*** whereby $\boldsymbol{V_r l_{rs}}$ provides the portion of the country ***s***'*s* value-added originally produced by country ***r***. Additionally, the multiplier matrix disintegrates the movement of the value-added across the country or sector of the production since the diagonal and off-diagonal sub-blocks denote the domestic or foreign value-added in domestic production (Fusacchia et al, 2021).

Next, gross bilateral imports ($M_{rs}$) is decomposed into two main components - the imports for exports (FVA) and domestic final consumption (FIN) as follows:

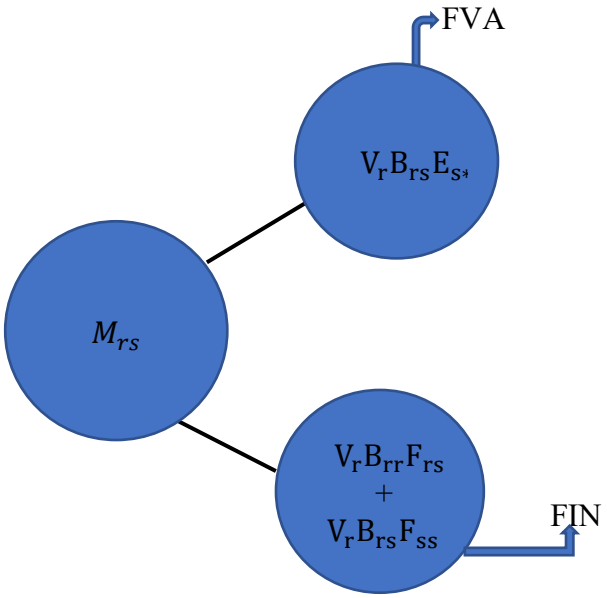


*Figure 1.2 Decomposition of gross imports*

Source: Author's elaboration.

*NB, for the sake of clarity, in this equation, it is assumed that the exporting country r uses solely domestic inputs to export both final and intermediate commodities to country s. However, in the empirical analysis), this assumption is loosened.*

*(i)* $V_r B_{rs} E_{s*}$ defines the value of the imported intermediate goods or inputs used for exports (FVA). This can be calculated as a share of the gross exports which is global value chain-related because it includes goods and services that cross borders multiple times before reaching the final market. This component is used as the value-added benchmark to measure trade policy.

*(ii)* $V_r B_{rr} F_{rs}$ defines the value-added originated in country **r** ( $V_r$) to produce final goods exported to and directly consumed in country **s** (no additional process in the importing country).

*(iii)* $V_r B_{rs} F_{ss}$ provides the value-added originated and exported by country **r** to ***s*** and used by s to produce ($B_{rs}$) final goods for domestic consumption ($F_{ss}$). (ii) and (iii) provide the value of imports related to the final demand in the importing country. $F_{rs}$ is then defined as the vector of the demand for final goods from country ***r*** to country ***s***, and $E_{s*}$[12] as the vector of country s' exports,

Next, to keep the volume of bilateral gross imports constant, I first define the Index that yields the uniform tariff equivalents:

- $MTRI_{rs} : M_{rs}\left[\left(1+\tau_{j(u)rs}\right) p_I(T), b_0\ \omega\right] = M_{rs}\ [p_0, p_I\ (T), b_0\ \omega]$ **(1)** (Anderson and Neary, 2005).

Following the definition in Diagram 1.2, I then define GVC related Index as a uniform tariff that, if put in place (instead of the actual existing tariffs), would leave the current value-added in exports at its present level as follows:

- $FVATRI_{rs}\ : FVA_{rs}\left[\left(1+\tau_{j(u)rs}\right) p_I(T), b_0\ \omega\right] = FVA_{rs}[p_0, p_I\ (T), b_0\ \omega]$**. (2)**

*In equations 1 and 2, subscript 0 refers to the reference period so that* $b_0$ *expresses the equilibrium at the point of reference which has to be maintained once the uniform tariff replaces the initial tariff structure and* $p_0$ *are the initial prices. International prices (*$p_I$*) are expressed as a function of the tariff vector* ***(T)*** *to allow for endogenous world prices, thus dropping the small country assumption (Salvatici, 2001; Antimiani and Salvatici, 2005). The right-hand sides of the equations represent the total value of the imports and the foreign value exports embedded in bilateral imports at the initial non-uniform tariffs. The left-hand side*

[12]The star symbolizes the summation of all other destination countries without including country ***s***

*maintains the same values when applying a uniform (product-generic) tariff ($(\mu)$) (Fusacchia et.al 2021).* To implement these two indexes – MTRI and FVATRI, a four-dimensional information level on the source and destination country sector is needed.

### 1.3.4 Data aggregation

Since data needs to be aggregated to cater to the relevant sectors and regions to the research question(s), here GTAP database 10 is aggregated into 11 agricultural sectors, 7 food sectors, textiles and clothing, light manufacturing, heavy manufacturing, others and services. It is also aggregated into five SADC countries and several regions, identified in terms of their relevance as suppliers of goods and services to the selected five countries in 2014 (the benchmark year of the GTAP database).

## 1.4 Results and analysis – GTAP Baseline results

The results are presented for five selected SADC countries: Botswana, Malawi, South Africa, Tanzania and Zimbabwe. Since these countries are key to the current research, they are selected according to their GDPs and level of involvement in GVCs.

This section presents the results obtained in the absence of a customs union. It first shows the gross imports of SADC countries and then the levels of imports of intermediate goods used for SADC exports (foreign value-added) from different regions at the bilateral level. Generally, as shown in Figure 1.2, SADC countries have a higher volume of imports consisting of final goods for domestic consumption compared with imports of intermediate goods that are used for the production of goods intended for exports. Lastly, the section gives the results for the two indexes - MTRI and FVATRI.

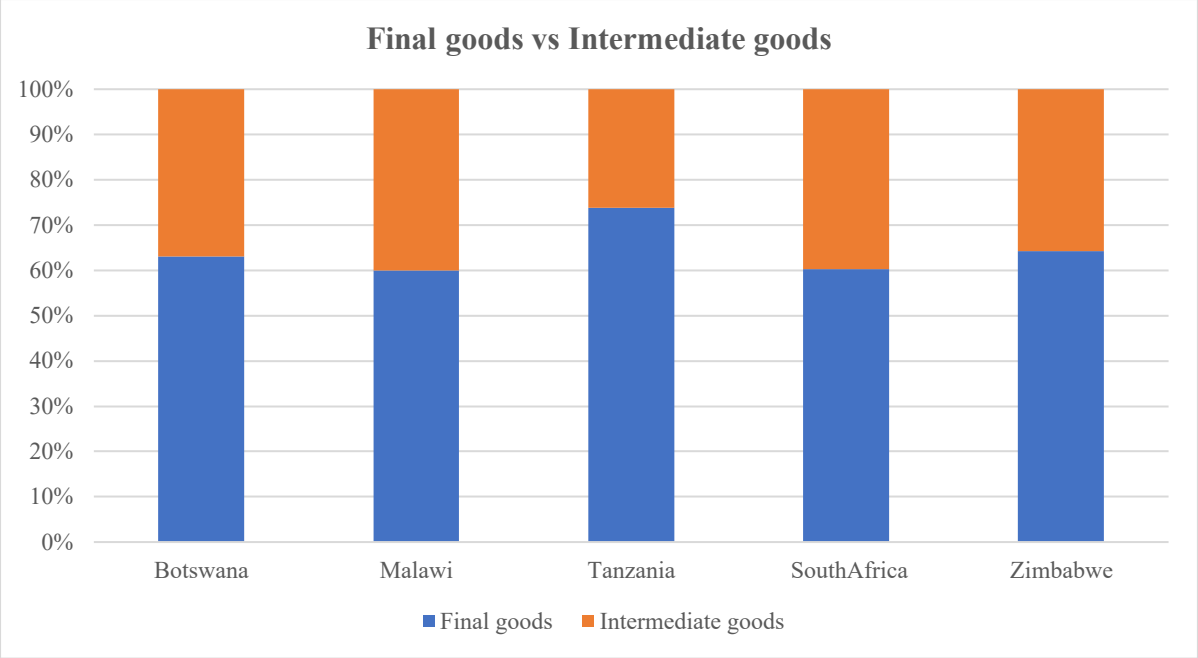


*Figure 1.3 Imports of final goods and Intermediate goods in SADC countries.*

Source: GTAP Database version 10.

To begin with, Table 1.2 shows the share of gross imports of SADC countries and the corresponding value from the different exporters at the bilateral level. On average, it shows that SADC countries import more goods from the EU_28 (25%) and East Asia (25%) and less from Latin America (2%) and the Rest of Africa (3%). This confirms what has been said by Behar and Edward (2011), that is, that there are strong ties between the SADC countries and the EU_28 and East Asia that various economic agreements have made necessary.

At the bilateral level, there is a high discrepancy between the imports from different exporters. For example, it shows that South Africa (5%) and Tanzania (5%) import more from the rest of Africa than any other selected SADC country whereas Botswana (1%) imports less. Tanzania (38%) is the SADC country with the highest imports from East Asia, whereas Botswana (10%) has the lowest value. Also, for imports from Southeast Asia, Tanzania (7%) has higher values whereas Zimbabwe (2%) and Botswana (3%) have lower values from this region. Table 1.2 shows the SADC countries' shares of gross imports at the bilateral level in 2014. Overall, it shows that these countries have differences in terms of import sourcing and the level of integration (intra-imports and exports) among the SADC countries is higher.

*Table 1.2 SADC countries' bilateral shares of gross imports[13] in percentages in 2014*

| | | IMPORTER | | | | |
|---|---|---|---|---|---|---|
| | | Botswana | Malawi | Tanzania | South Africa | Zimbabwe |
| Exporter | Rest of Africa | 1 | 4 | 5 | 5 | 2 |
| | East Asia | 10 | 22 | 38 | 26 | 30 |
| | Southeast Asia | 3 | 6 | 7 | 6 | 2 |
| | South Asia | 5 | 21 | 21 | 6 | 13 |
| | North America | 37 | 8 | 5 | 8 | 12 |
| | Latin America | 1 | 1 | 1 | 3 | 4 |
| | EU_28 | 34 | 24 | 13 | 32 | 22 |
| | Rest of World | 10 | 15 | 11 | 14 | 15 |

Source: Author's computation using GTAP VA module.

## 1.5 SADC countries' imports of intermediate goods used for their exports at the bilateral level[14]

Here the research reviews the SADC countries' imports of intermediate goods and firms' international linkages, with some descriptive statistics on countries' backward integration at the bilateral level with the selected partners. Table 1.3 illustrates the aggregate backward integration for SADC countries, that is, the imported goods used by each SADC country to produce their exports. It shows that, on average, SADC countries are significantly involved in international production networks as buyers of intermediate goods which they use to produce their exports. As a result, these SADC countries have witnessed a remarkable increase in global value chain participation in the last decade compared with other African regions/countries. This increase in participation enhances export growth by adding value to the domestic value-added through the growing share of gross exports. Moreover, this also symbolises the value-added imported from other countries (Altomonte et al, 2018 Fusacchia et al, 2020).

[13] The aim is to demonstrate the import levels of the selected SADC countries from external non-SADC countries. Therefore, SADC countries are not included in the list of exporters.

It is also interesting to note that in this increase in GVC participation, SADC countries also source the inputs they use to produce their exports inside the (SADC) region. For example, Botswana (84,3%), Zimbabwe (72,3%) and Malawi (41,6%) have higher percentage shares of sourced inputs from the region. Even though South Africa has higher percentage shares from the EU_28 and Tanzania from South Asia, the figures for regional sourcing of inputs confirm the importance of regional value chains in the growth of GVCs, as noted by Baldwin and Lopez-Gonzalez (2013).

Additionally, it is important to note that SADC countries have on average less than 20% of imported intermediate goods from a single region[15]. Among these extra-SADC providers, the role of the EU_28, South Asia and East Asia is significant since these regions provide an average of 14.2%, 14.1% and 12.9% of foreign inputs to the SADC countries. This suggests the strong GVC relations between the SADC countries and these regions. Table 1.3 illustrates the backward integration of SADC countries at the bilateral level with selected regions.

*Table 1.3 SADC countries' bilateral FVA shares in percentages in 2014.*

| | | **IMPORTER** | | | | |
|---|---|---|---|---|---|---|
| | | Botswana | Malawi | Tanzania | South Africa | Zimbabwe |
| Exporter | SADC | 84,3 | 41,6 | 6,4 | 8,8 | 72,3 |
| | Rest of Africa | 0,2 | 2,4 | 6,0 | 2,5 | 0,9 |
| | East Asia | 1,7 | 8,8 | 26,5 | 20,2 | 7,1 |
| | Southeast Asia | 0,8 | 5,6 | 7,6 | 10,3 | 1,0 |
| | South Asia | 1,6 | 20,6 | 31,8 | 10,1 | 6,2 |
| | North America | 2,9 | 2,0 | 2,0 | 4,7 | 1,5 |
| | Latin America | 0,2 | 0,5 | 0,5 | 1,8 | 0,9 |
| | EU_28 | 6,4 | 12,7 | 11,6 | 33,7 | 6,6 |
| | Rest of World | 1,9 | 5,8 | 7,6 | 7,9 | 3,4 |
| | **Toal FVA** | **21** | **10** | **26** | **12** | **11** |

Source: GTAP VA module.

[15]Here, "region" refers to different aggregated countries to form a region(s), such as the rest of Africa, East Asia, Southeast Asia, South Asia, North America, Latin America, the EU_28 and the rest of the world.

## 1.6 The protection on gross and trade in value-added in the absence of the customs union.

Since the research work aims to evaluate the impact of SADC trade policy on selected SADC countries in terms of both total flows through the MTRI and in terms of foreign inputs imported to be used for exports through FVATRI, this is done in bilateral terms. As mentioned, the focus is on the five selected SADC countries[16] with different GDPs. These countries also have different trade specialization patterns. Accordingly, comparing the tariff equivalents between these countries enables us to show how the impact of a trade policy also depends on the pattern of integration in global networks and the economic structure of each country.

To calculate the protection granted (uniform tariff equivalents) by the SADC tariffs to the selected countries, extra-regional imports (excluding SADC intra-imports) are kept constant in both gross and value-added terms. The research follows Salvatici (2001), Antimiami and Salvatici (2005) and Fusacchia et al (2021) and defines a new variable, tr (r, s), as the product-generic tariff levied on imports from region ***r*** into region ***s***. Then bilateral tariffs are set to zero and replaced with uniform ones that maintain imports in both gross and value-added terms. In this analysis, services are excluded and deal with goods only since services are not subjected to tariffs.

Figure 1:3 shows the uniform tariff equivalents on SADC countries' overall gross imports (MTRI) and foreign value-added in exports (FVATRI) and the corresponding values for the aggregated trading partners. The results highlight high heterogeneity in import restrictions on different selected SADC countries and exporters. Indeed, Tanzania has the highest total MTRI index of 20.9% compared with other countries meaning that consumers in Tanzania are more affected than other countries. On the contrary, Malawi registers the lowest MTRI index of 0.8%, indicating relatively fewer import restrictions and potentially greater market access.

The impact of these import restrictions becomes evident when examining the production and export performance of these countries. This is because high import restrictions can lead to reduced production, affecting industries and sectors that can rely on imported inputs. Consequently, this can result in decreased exports which can have a detrimental impact on a

[16]The research also uses the term “SADC countries” to refer to the five selected SADC countries.

country's trade balance and overall economic growth. Indeed, Tanzania's increase production in sectors such as sugar, wool and silk, animal products, milk and sugar cane are not sufficient to offset the decline in output production, particularly in processed rice, wheat, crops and nec, extraction, text Wapp and manufacturing. Hence, the explanation why Tanzania is more affected than other selected countries. Accordingly, this also suggests that high import restrictions could potentially hinder production and subsequently affect the overall economy.

On the other hand, Malawi with lower import restrictions has favourable growth in a number of industries, including vegetables, oil and fats, raw milk, cattle, sheep and goats, wool and silk. This positive growth outweighs the adverse losses in output production in industries such as manufacturing services, extraction, text Wapp and beverages and tobacco. Indeed, this suggests that a more open trade environment, characterized by low tariffs and fewer import restrictions, can positively impact a country's production and export growth. Therefore, this underscores the importance of trade policies that balance the need to protect domestic industries with the advantage of opening up markets for trade. However, given that all the countries register an increased decline in the manufacturing industry, this may be an area of concern that needs strategic policy planning[17].

At the bilateral level, the situation is quite different. Accordingly, given the variability of trade-weighted averages presented in Figure 1.2 above, it is not surprising there are discrepancies in tariff equivalents. Indeed, Botswana emerges with the highest import restrictions on imports from Latin America, whereas South Africa imposes substantial restrictions on imports from Southeast Asia (see Figure 1.4). These restrictions partly explain the relatively lower import levels from these regions in these countries. Contrarily, lower import restrictions are observed in Zimbabwe (0.1%) for the rest of Africa and in Botswana (0.4%) and South Africa (0.5%) for East Asia and the EU_28. This accounts for the higher import shares of South Africa (30%) from the EU_28. However, Botswana's situation is different; it exhibits lower import

[17]This requires attention since manufacturing is often considered a key driver of economic growth and development since it typically generates higher value-added products, creates jobs and contributes to technological advancement and innovation. Indeed, a decline in this sector could potentially result in reduced economic growth, lower employment opportunities and decreased competitiveness in global markets. The need for strategic policy planning arises since it may require interventions and measures to reverse or mitigate the decline in the manufacturing industry sector. This could include policies that promote industrialization, innovation and technology upgrading.

percentages (1%) from the Rest of Africa despite lower protection rates for imports from this region. One plausible explanation is rooted in the well documented phenomenon where trade between African countries remains low compared with their trade with external regions as observed by Songwe, 2019.

Furthermore, looking at the differentiation in market protection levels by SADC countries, the rank of protection of markets from different exporters is undoubtedly consistent with expectations regarding geographical location and preferential access or bilateral trade agreements. Indeed, on average, at SADC level, the lowest tariff barriers are imposed on imports from the EU_28 (3.4%) and the rest of Africa (8.8%). The historical context is vital since the European Union has been an investing and trading partner with SADC countries since the 19th century, governed by a series of agreements including Lomé Conventions and the Cotonou Agreements, (Hartzenberg, 2011)[18]. These conventions provided unilateral preferential access to EU markets and explain the lower tariffs. Hence, this historical and geographical relationship has contributed to the EU_28 being a dominant source of imports for SADC countries compared with other regions (Hartzenberg, 2011).

The FVATRI results are also in line with those obtained by Fusacchia et.al (2021) who state that the FVATRI rates vary from country to country (see Figure 1.8). Thus, the notable variation in tax rates on intermediate goods across different countries and regions underscores the direct impact of these variances on the competitiveness of exporting firms in the global market. Tanzania's relatively lower participation in backward integration (as compared to other SADC countries), appears to be influenced by high tax rates on imported intermediate goods. Consequently, it is important for Tanzania to address these tax rates to bolster the involvement of its firms that import to export in global value chains. However, the difference between the two indexes matters a great deal to the exporters. Thus, the data highlights the significant disparities in the impact of tax rates on exporting firms in countries such as Malawi (65,7%) and Zimbabwe (39,2%) compared to other SADC countries when sourcing intermediate goods from South Asia and Latin America.

[18] They even increased when signing the bilateral agreements (e.g., the EU-SADC EPA in 2016) which continue to trigger this long-standing relationship.

Therefore, the exporting firms in these countries that rely on intermediate goods from the said two regions face more substantial adverse impact compared to other firms in other SADC countries. This necessitates the implementation of targeted policy interventions to support firms facing these challenges, including trade negotiations and diversification of sourcing. Additionally, the advantage enjoyed by Tanzanian and Malawian firms when importing from the EU_28 and the rest of Africa due to lower tax rates underscores the opportunity for these countries to promote backward integration.

Furthermore, the study reveals a compelling trend, mirrored in the MTRI, where on average, the selected SADC countries apply lower import tariffs to intermediate goods used for exports originating from the rest of Africa, the EU_28 and East Asia. This trend sheds light on why a substantial portion of SADC's intermediate goods sourced from outside the region predominantly comes from these specific regions. Thus, the underlying economic dynamics and trade practices are evidently influenced by the preferential tax treatment of imports from these regions.

A comparison between the MTRI and FVATRI totals suggests that Tanzania's consumers face more challenging conditions than their counterparts in other SADC countries, contributing to their decline in welfare conditions. The data also reveals a favourable trend for exporting firms in Malawi and South Africa in terms of their backward integration. Furthermore, the analysis points to the challenges facing Tanzania's output production due to high import taxes which affects the exporting firms, with a notable -3% decline. Indeed, this negative trend for Tanzania have broad economic implications affecting the overall economic health of the country. This contrasts with South Africa and Malawi where production records significant growth that highly support the growth of exports destined primarily for the EU_28 and Southeast Asia, and this contributes to their economic health.

Lastly, it is also worth noting that the rank changes as it is evidenced in MTRI where Zimbabwe and Botswana impose the lowest import taxes on goods from the EU_28 and East Asia while Botswana levies the highest taxes (compared to other SADC countries) on imports from Latin America. Overall, these findings emphasize the need for countries to address tax rate disparities to promote equitable and competitive trade environments, aligning with established international trade norms and standards.

Finally, the research highlights a noteworthy positive correlation between MTRI and FVATRI rates in the SADC countries. This correlation further emphasizes the interconnectedness of tax policies and their impact on the competitiveness of exporting firms. Consequently, the need for countries within the SADC region to take coordinated actions to mitigate the effects of high taxes on intermediate goods and bolster the prospects of their firms in the global marketplace becomes increasingly evident.

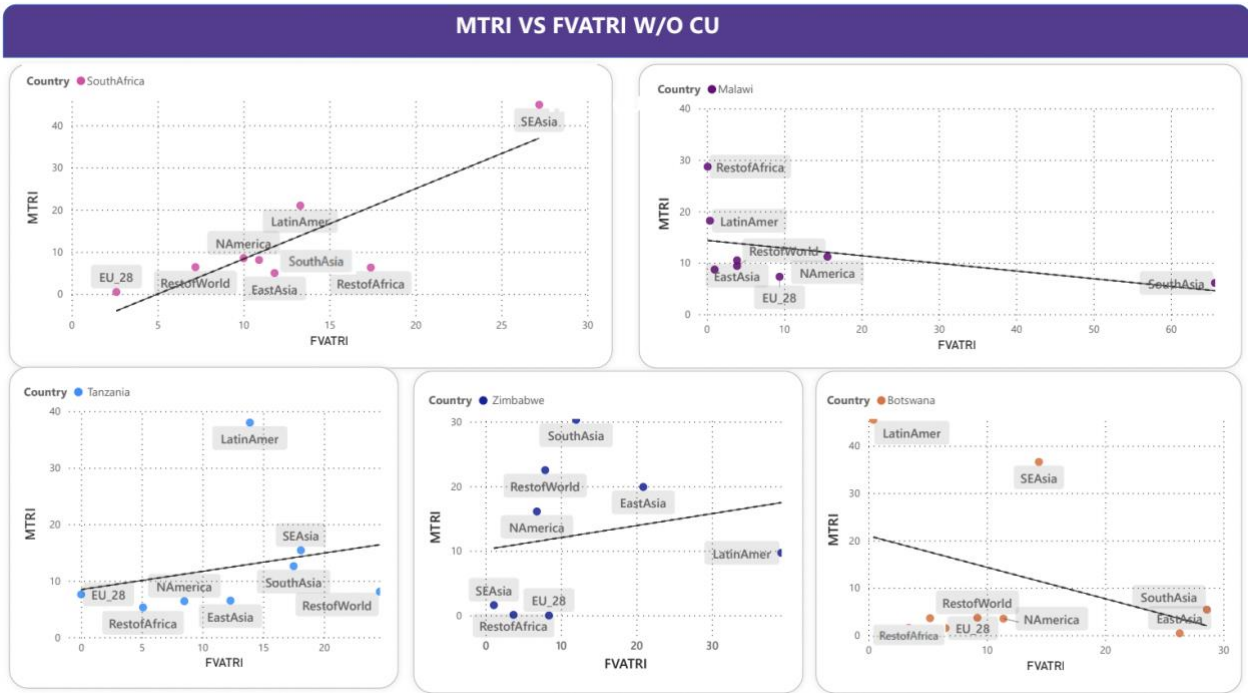


*Figure 1.4 Uniform tariff equivalents for gross and trade in value-added without the customs union in percentages.*

Source: Author's simulation using GTAP VA module.

Furthermore, the research computes the weight of each sector at the index level to explain what drives the MTRI and FVATRI results. These sector weights are computed by defining the subtotals of each sector's imports from non-SADC countries/regions to SADC countries. Hence, they are calculated as the weights of the total Index. Figure 1:5 shows the sector weights of MTRI and FVATRI for SADC countries calculated with gross trade flows and value-added terms. For visualization and straightforward interpretation of the results, only sectors whose tariffs are more relevant in the production of each selected country are presented. These are the

sectors with weights above 3% and the percentages shown are their (sector) weights in 2014 (i.e., the percentage of the Index's total value).

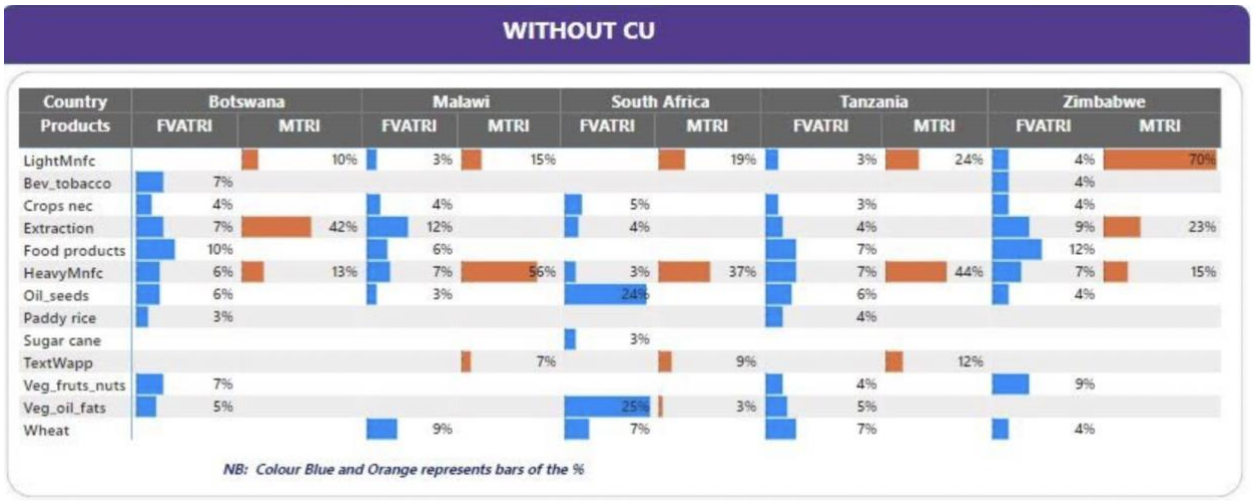


*Figure 1.5 MTRI and FVATRI sector weight indexes in percentages.*

Source: Author's simulation using GTAP VA module.

The levels of importance of the sectors are quite different from one country to the other. As demonstrated in Table 1.1, imports of industrial sectors (such as text Wapp, light manufacturing, extraction, and heavy manufacturing) face lower tariffs from SADC countries than agricultural products. Therefore, these sectors play a prominent role in explaining the MTRI and FVATRI indexes in each of the selected SADC countries. Accordingly, heavy manufacturing (23%) has the highest MTRI weight in Malawi. Indeed, this could be linked to the fact that this sector is more highly taxed in Malawi than in other countries, as noted by Mangazi, M (2021). This outcome solicits profound reflection: is it conducive to the broader interests of Malawi's economic development and its participation in regional trade to sustain such an onerous tax structure for the heavy manufacturing sector?

While the majority of sectors exhibit MTRI weights below the 10% threshold, their collective impact on the overarching trade milieu remains significant. Consequently, the normative discourse should focus on the need to recalibrate tariff policies to foster a fair, sector-specific approach that advances the interests of both industrial and agricultural sectors. Such an approach, emblematic of equitable trade policy, champions the ideals of regional economic growth and cross-border collaboration enshrined in SADC's mandate.

Furthermore, even though agri-food products are more highly protected than industrial goods, as shown in Table 1.1, as in the MTRI index, these products play a more significant role in explaining the FVATRI index (see Figure 1.4). Their relevance varies according to the country, for example, wheat, vegetables, fruits and nuts, oilseeds, sugar cane, crops, vegetable oil and fats, processed rice, cattle, sheep and goats, food products, beverages, and tobacco are highly relevant to the selected countries. Their different roles are linked to the fact that their demand is partly influenced by the pricing of the commodities that use them as inputs; hence FVATRI sector weights are not directly impacted by nominal tariffs. It also demonstrates that there is no clear relation between these sector weights and the tariffs of each sector. When explaining this Index, the cattle, sheep and goats' sector has the highest weight in FAVTRI in Zimbabwe at 21% whereas most of the sectors' weights are below 8%. Accordingly, these results do not correspond to those obtained by Fusacchia et.al (2021) which state the importance of industrial sectors in explaining the MTRI and FAVTRI in Italy and Germany. Indeed, the main reason is that Africa is well known for agricultural production whereas developed countries are well known for manufacturing.

On the other hand, given that these sectors play quite different roles in bilateral export flows, this also hints at the bilateral protection levels. Indeed, sectors such as extraction, text Wapp, light manufacturing, and heavy manufacturing play a prominent role in the EU_28 and South Asia exports. At the same time, crops, nec, and food products are quite significant in the Rest of Africa and East Asia's exports. Hence, the repercussions of these sector-specific trends outline that the SADC countries that rely on inputs from heavy manufacturing, light manufacturing, and extraction are highly affected whereas those that rely on agricultural inputs are less affected.

Moreover, it is worth noting that a significant correlation emerges between MTRI and FVATRI sector indexes for some countries within the SADC region, underscoring the interplay between the market conditions and trade restrictions.

## 1.7 MTRI and FVATRI in the presence of the customs union: A comparison between SADC countries.

In this subsection, the research work repeats a similar analysis to illustrate how the implementation of the SADC proposed common external tariff leads to different outcomes based on the economic structure of the country it has been applied to. As previously noted, the study computes the protection indexes for five SADC countries: Botswana, Malawi, Tanzania, South Africa and Zimbabwe. These countries are selected according to their varying GDPs including two with the highest GDPs in the region (South Africa and Tanzania), two with middle GDPs (Botswana and Zimbabwe), and one with the lowest GDP (Malawi). Additionally, comparing these countries to each other seems an ideal choice, given their levels of integration in global and regional value chains. Therefore, through an analysis of MTRI and FVATRI, we can affirm that the effect of trade policy does not rely only on the tariff structure, but also on the economic development of the country to which it is applied and in the case of FVATRI, on the pattern of involvement in international production networks.

Indeed, an analysis of the two indexes provides insightful conclusions. Notably, both MTRI and FVATRI indicate that the introduction of the common external tariff leads to adjustments in protection rates among SADC countries. Indeed, some countries increase their protection rates to align with the common external tariff whereas others reduce theirs. Consequently, these changes affect consumers and firms differentially, with some gaining and others losing.

Specifically, SADC countries that import their goods from the Rest of Africa and Latin America are highly affected since the common external tariff results in higher import tariffs for these regions while lower tariffs are applied to North America, Southeast Asia and the EU_28. This highlights how the change in tariff structure reshapes trade relations between SADC countries and other regions. Prior to the new policy, Latin America and Southeast Asia faced the highest tariffs from SADC regions, but the situation changed due to the new policy. Therefore, SADC countries are likely to maintain strong ties with Southeast Asia, Latin America and the EU_28 compared with other regions, as with the absence of the common external tariff.

There are two possible explanations for these results. First, some tariff lines could witness a decrease in imports following the alignment of import duties upwards to meet the common external tariff, for example, in Botswana and Zimbabwe, more than one thousand tariff lines could increase their import taxes, especially for imports from the rest of Africa and East Asia. Second, previously low-taxed goods, especially from the rest of Africa, North America and the

rest of the World, primarily final and intermediate goods, for example, paddy rice, food products, text wapp and sugar, could be highly taxed since they fall in the range of 0-9% which must be raised to 10% and 25% under the intermediate and final goods prescribed by the SADC nomenclature. However, for the exporters who are less taxed than others, the explanation could be that:

(i) most of the import taxes towards those exporters could be reduced to align with the common external tariff, therefore enhancing SADC countries' imports, or

(ii) even though import duties towards different tariff lines are increased to meet the SADC nomenclature, the level of increase could be low compared with other exporters. Therefore, even if they have increased, they may remain at the level of tradeable tariff structures.

On the other hand, a comparison between the countries is quite striking. Contrary to the situation without the common external tariff in which Tanzania's consumers were the most affected, Malawi's and Zimbabwe's consumers are now worse off, as their total MTRIs are higher than those of other countries. This could be seen as potentially detrimental to consumer welfare and access to a variety of goods at competitive prices. While this may not bode well for consumers, it could signify positive news for the country's revenue collection, in line with findings in Rugano et al (2011). This indeed suggests that sometimes policymakers face a trade-off between consumer well-being and revenue generation.

South Africa, Malawi and Zimbabwe have lower FAVTRI than other countries, indicating a relatively favourable environment for their exporting firms. Likewise, the explanation for these varying effects depends on the initial conditions before the imposition of common external tariff rates. Therefore, the countries that have high initial average tariffs such as Zimbabwe are the ones that will be able to expand their imports most since they will cut their tariffs to meet the common external tariff. In contrast, those with lower initial average tariffs, such as Botswana, will be unable to expand their imports since they increase their tariffs the most to align with SADC nomenclature. These results therefore highlight the importance of initial conditions in shaping the outcomes which can impact a country's ability to harness the benefits of regional trade agreements while navigating the trade-offs between competing policy objectives.

The comparison also shows significant differences at the bilateral level. Accordingly, Botswana's consumers who import from Latin America are no longer worse off since

Zimbabwean consumers importing from the rest of Africa are now worse off because imports from this region are now highly taxed. These results show that the relative competitiveness of imports from different regions is significantly affected. Thus, the composition of imports also contributes to these differences since firms and consumers from SADC countries source different goods from different regions with varying tariff structures.

On the contrary, Tanzania's exporting firms importing their intermediate goods from the EU_28 are no longer experiencing a competitive advantage since the new policy highly benefits the Malawian and Zimbabwean firms that source their intermediate inputs (imports for exports) from South Asia and Southeast Asia, boosting their growth in global value chains through backward integration. Indeed, the explanation for this could be that previously highly taxed intermediate goods (e.g., crops and nec, vegetables oil and fats, food products etc) from South Asia will be taxed at lower prices since they were above 10% and have to be reduced to 10% as per SADC nomenclature.

Figure 1.6 illustrates the uniform tariff equivalent rates (in percentages) which keep the imports of SADC countries from different regions constant in the presence of the customs union at the bilateral level. It also reveals that these countries have significantly different FVATRI/MTRI ratios and that an inverse relationship exists between the two variables in the majority of the countries. The vertical dimension of the graph provides the values for the MTRI index whereas the horizontal dimension provides the values for the FVATRI index.

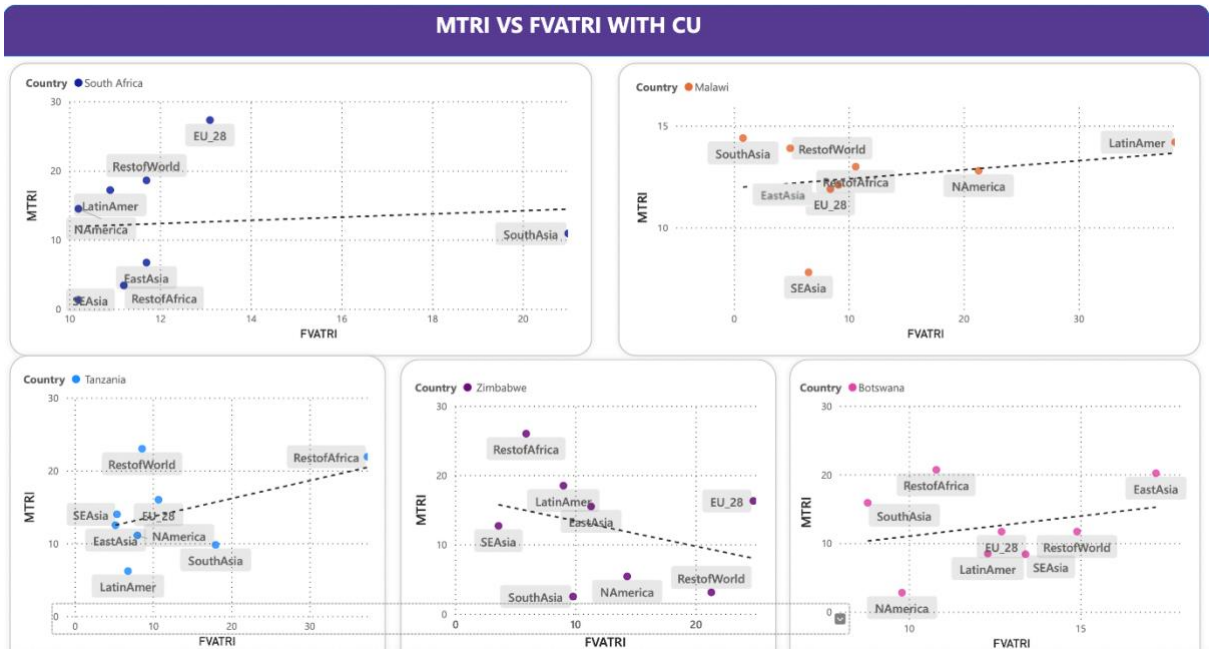

*Figure 1.6 Uniform tariff equivalents for SADC countries with the customs union in percentages.*

Source: Author's simulation using GTAP VA module.

Additionally, these uniform tariff equivalents obtained reveal why the selected countries import varying levels of intermediate goods used to produce their exports from different regions. Notably, the results indicate an inverse relationship between foreign value added and the FVATRI under the common external tariff and those countries with a lower percentage share of foreign value-added at the bilateral level tend to have a higher level of protection in their markets, as shown in Figure 1.6. A perfect example is that of Tanzania which applies higher tariffs to the rest of Africa and has lower shares of imported intermediate inputs from this region. Also, Zimbabwe applies higher tariffs on imports from the EU_28 and imports lower percentages of foreign-value-added shares from this region. Hence, these results also signify how the applied tariffs under the common external tariff influence the degree of participation in backward integration and the interactions between different countries/regions.

However, these results are contrary to the situation without the customs union. Some countries with the highest (or lowest) applied taxes on different exporting regions also tend to import the highest (or lowest) intermediate goods from those regions. For example, Botswana applies the lowest taxes to imports from South Asia and has the lowest foreign value-added shares from that region. On the other hand, South Africa applies the highest import tariffs to the EU_28 and has higher imports of intermediates goods from this region. Thus, these observations highlight the complex interplay between trade policies, protectionism and economic efficiency, raising normative questions about trade-offs between protecting domestic industries and fostering competitiveness and integration.

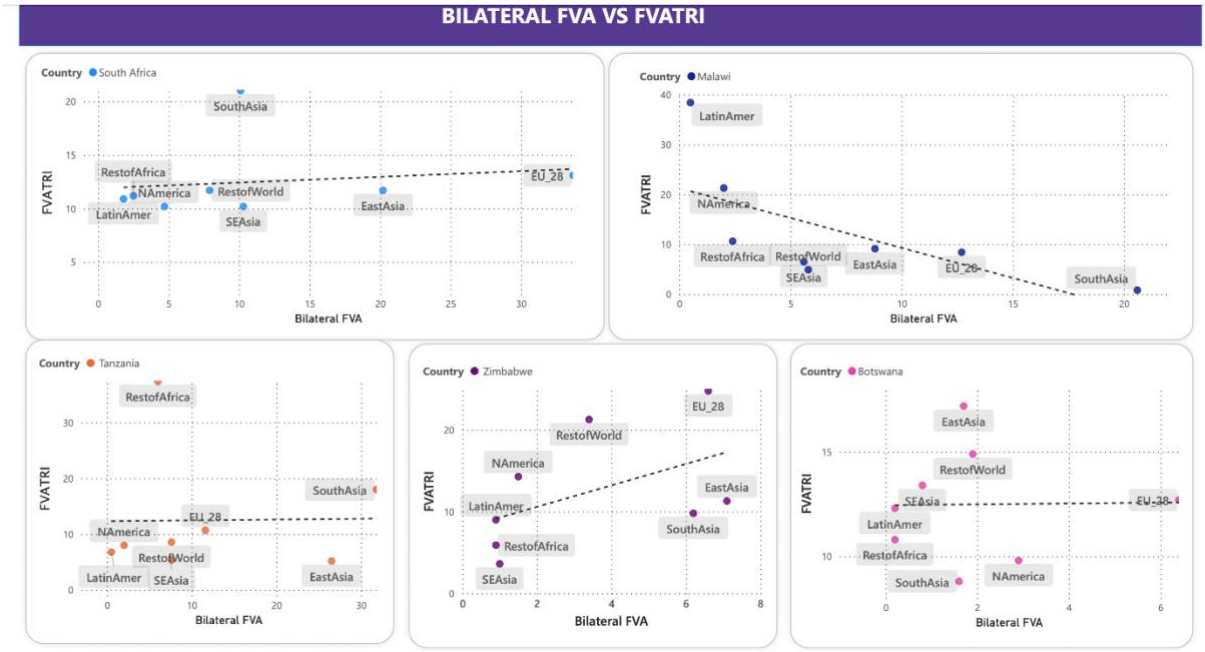


*Figure 1.7 The correlation coefficient between FVA shares and FVATRI in the presence of the customs union in percentages.*

Source: Author's simulation using GTAP VA module.

## 1.8 A comparison with and without a customs union

The comparison of the MTRI with and without the customs union suggests that the tariff equivalents change at different scales from one importer to the other, meaning that the common external tariff will affect the consumers differently from one country to another. Moreover, the explanation for these results lies in the direction in which the common external tariff makes the tariff rates move compared to the initial levels. Considering the changes (either an increase or decrease) brought about by the common external tariff (see Table 1.4), we can assume that consumers in Zimbabwe and Malawi are worse off than other regional countries. This is because the new policy increases the protection of their markets while increasing the openness of Tanzanian markets. Indeed, this results in the output produced in Malawi and Zimbabwe declining by +/- 3% whereas in Tanzania it increases by more than 20%. Hence, even though an increase in the tariffs may relieve industries and workers that directly compete with the affected imports, it is largely contractionary, reducing output, investment and employment in the affected countries' economies and worsening the trade deficit in the end, therefore, decreasing the total exports of the affected countries while increasing that of the benefitting country (Tanzania). Hence, the increased export growth in Tanzania signifies the capability of

this country to improve its competitiveness in the world market and Tanzania's products therefore become attractive to the world's market. Indeed, Tanzania's export growth results due to the customs union coincide with Karingi et al (2014) who observed the significant impact of the COMESA customs union on Tanzania's exports[19]. Hence, Tanzania's tariff reduction by more than 15% due to common external tariffs signifies a significant change that promotes market openness.

Table 1.4 MTRI and FVATRI for SADC countries.

| | *with CU* | | *without CU* | |
|---|---|---|---|---|
| | FVATRI | MTRI | FVATRI | MTRI |
| SouthAfrica | 16,30 | 28,90 | 1,9 | 4,4 |
| Tanzania | 20,90 | 22,80 | 44,3 | 20,9 |
| Malawi | 14,70 | 35,80 | 1,9 | 0,8 |
| Botswana | 30,90 | 0,10 | 9 | 4,6 |
| Zimbabwe | 17,10 | 33,10 | 8,9 | 19,6 |

Source: Author's simulation using GTAP VA module.

At the bilateral level, the results suggest that Botswana and South Africa consumers are better off compared with other consumers with their imports from Latin America and Southeast Asia since they increase their market openness by more than 30% (percentual change). Indeed, in the absence of the customs union, these countries' tariffs towards Latin America and Southeast Asia are above the common external level; hence, the new policy enhances their reduction while benefitting the consumers in these countries. However, these changes are not uniform to all countries since Zimbabwe's and South Africa's consumers who source their goods from the rest of Africa and the EU_28 are worse off than any other country. This is because, without the common external tariff, Zimbabwe and South Africa's tariffs towards imports from the two said regions are, on average, very low compared to other countries. Hence, the new policy enhances the protection increase by more than 20% to meet the common external tariff level while increasing the burden on the consumers that source their goods from these regions. Accordingly, the increase in tariffs results in high prices of goods and reduces their availability (goods), leading to lower income, employment, and economic output. Hence, these results

[19]It is important to note that the COMESA common external tariff and the SADC one, are identical.

could provide a vital rationale answer to the question: would the SADC economies be better off with the customs union? However, other policy questions should be addressed such as how countries can protect the advantages that the customs union may erode.

Figure 1.8 compares the MTRI index with and without the customs union for five selected SADC countries. The vertical dimension provides the importer's name. At the same time, the bars present the level of the import tariffs with and without common external tariffs and the changes brought about by the common external tariff.

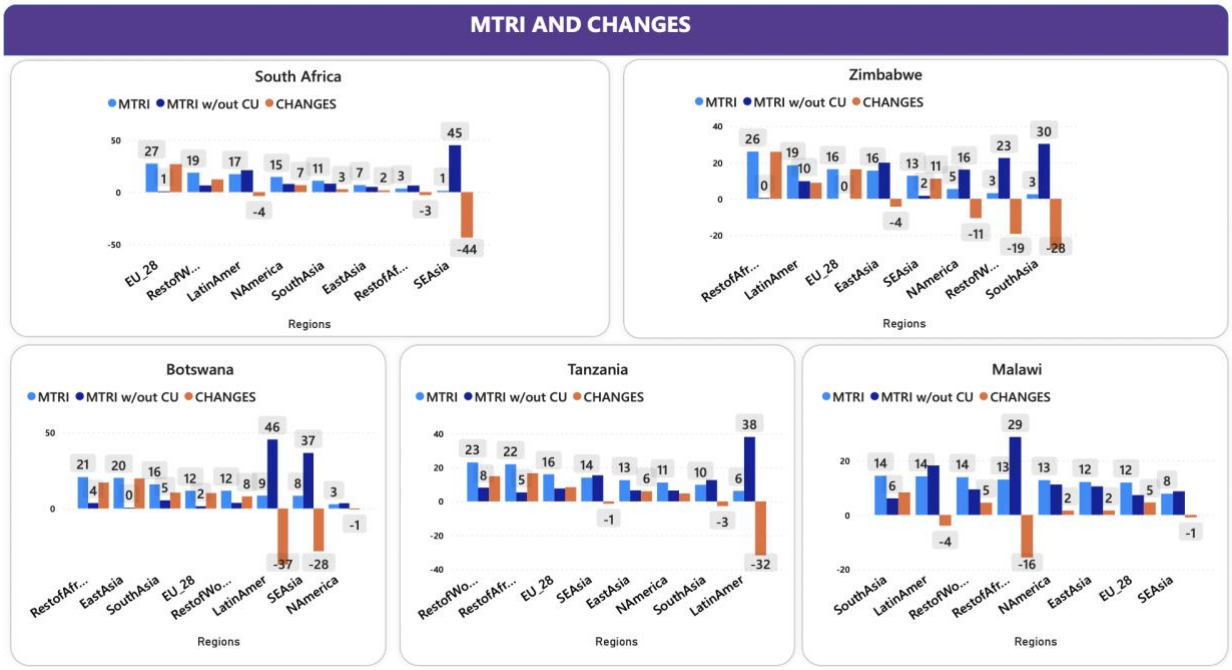


*Figure 1.8 Comparison of uniform tariff equivalents with and without the customs union in percentages.*

Source: Author's simulation using GTAP VA module.

As for FVATRI, bilaterally, the results suggest that the common external tariff increases the burden on the exporting firms from Tanzania and Malawi that source their intermediates inputs from the rest of Africa and Latin America more than other exporting firms (see Figure 1.10). Indeed, this significantly impacts global value chain participation through backward integration due to increased trade costs. This is because the exporting firms in countries with higher import restrictions could find it difficult to acquire cheap inputs from international markets and forced to substitute them with expensive local products. Additionally, this affects foreign goods providers and local markets by compressing their capacity to source inputs from

the lowest-cost suppliers. This impact also extends to affect their production capacities and international competitiveness.

On the contrary, as in Figure 1.10, the common external tariff also benefits the exporting firms from Zimbabwe and Malawi that source their intermediate goods in South Asia and Latin America since they have increased the market openness towards these regions more than other countries. Accordingly, this positively impacts backward integration since it can increase their access to cheap inputs, increasing output production, income and employment creation. Therefore, the different scales of protection on foreign value-added at the bilateral level signifies different scales of impact in each country depending on its level of economic development. What is more, the results suggest an inverse relationship between the MTRI and the foreign value-added in exports signifying a negative impact of tariffs on backward participation as noted by UNCTAD (2016).

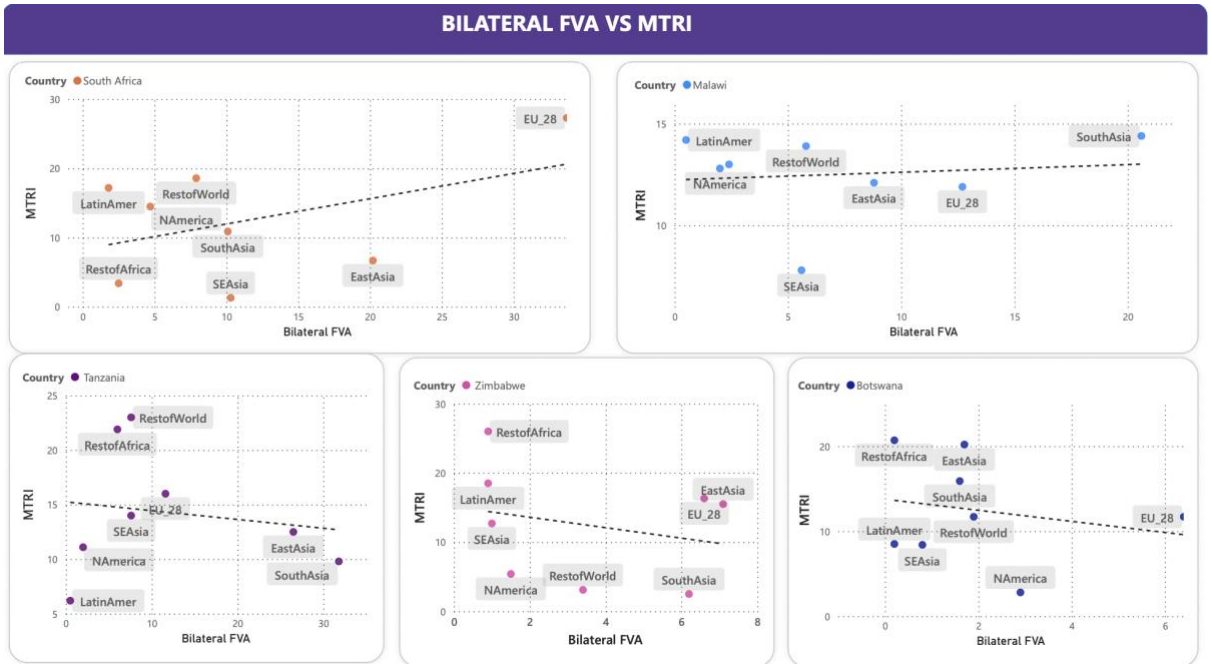


*Figure 1.9 FVA shares and MTRI rates at the bilateral level by country in percentages.*

Source: Author's simulation using GTAP VA module.

Botswana's increase in import taxes on exporting firms by 21% (percentual change) more than other countries is seen as a potential impediment to economic development and trade liberalization, and this demonstrates a challenge in promoting global value chains through

backward integration which implies high costs related to the imports of intermediates goods. Accordingly, this will significantly affect the output production and demand of sectors (especially agri-food sectors) whose production processes rely on foreign intermediate goods. Thus, a slightly better increase in animal production, sugar cane and extraction is not enough to counter the increased declines in vegetables, oil and fats, plant and fibre, vegetables and fruits and other crops. The domestic production will also be faced with lower competition than previously. Indeed, this has implications for food security since it may reduce the availability and affordability of food products and impact the well-being of the population.

On the other hand, the exporting firms in Tanzania would have the upper hand in terms of backward integration since taxes are reduced by more than 20% to align with the common external tariff. Indeed, Tanzania's value-added increases in manufacturing, textiles and beverages by close to 15% and it is therefore clear that the customs union will enhance Tanzania's participation in the international competitive markets. Additionally, even though the new policy increases the import taxes of other countries (e.g., Zimbabwe, Malawi and South Africa), their tariffs remain lower compared to other countries; hence they still have an advantage. Therefore, exporting firms in these countries still have the upper hand compared with other firms from other countries. Accordingly, Zimbabwe's increased output production is through food products and manufacturing whereas South Africa's is through food products, extraction, beverages, and tobacco. Moreover, the increase in these sectors matches a reduction in output production in other sectors such as dairy milk, paddy rice, wheat and sugarcane.

By comparing FVATRI with MTRI with the customs union, the rank changes as Botswana's firms seem to be affected more whereas those in Tanzania and Zimbabwe seem to benefit more. Lastly, a comparison between the changes in overall FVATRI and changes at the bilateral level shows no clear correlation between the two. Accordingly, only Tanzania and Botswana register a decrease in overall protection whereas at the bilateral level, all countries register both an increase and decrease in market protection towards different exporters (see Table 1.4). Hence, this reflects how moving from the initial conditions of tariffs to the new structure causes some countries to increase their tariff levels while others reduce theirs.

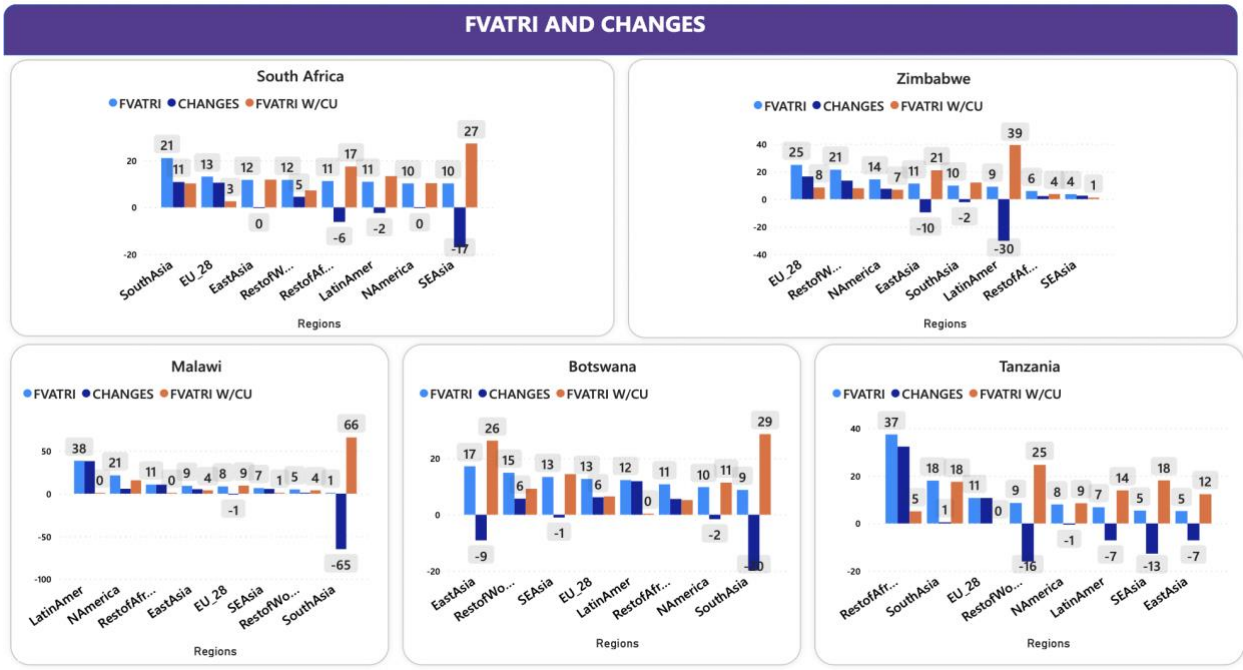


*Figure1.10 FVATRI with and without the customs union in percentages.*

Source: Author's simulation using GTAP VA module.

The results suggest an inverse correlation between changes in FVATRI and MTRI at the bilateral level in many countries, except for South Africa, as demonstrated in Figure 1.11. Several factors emerge from the graph: the customs union would enhance SADC countries' imports roughly from South Asia, East Asia and the EU_28. This is because some member countries reduce their taxes towards these regions and for those that increase them, the level of increase towards them is lower than other regions. Thus, the policy could also enhance bilateral ties between SADC countries and other exporters. Overall, Tanzania, South Africa and Zimbabwe have more tax reductions towards different exporters at both FVATRI and MTRI whereas Malawi has few cases of tax reductions at the bilateral level. Indeed, these different changes are related to the initial tariffs versus the newly designed tariffs.

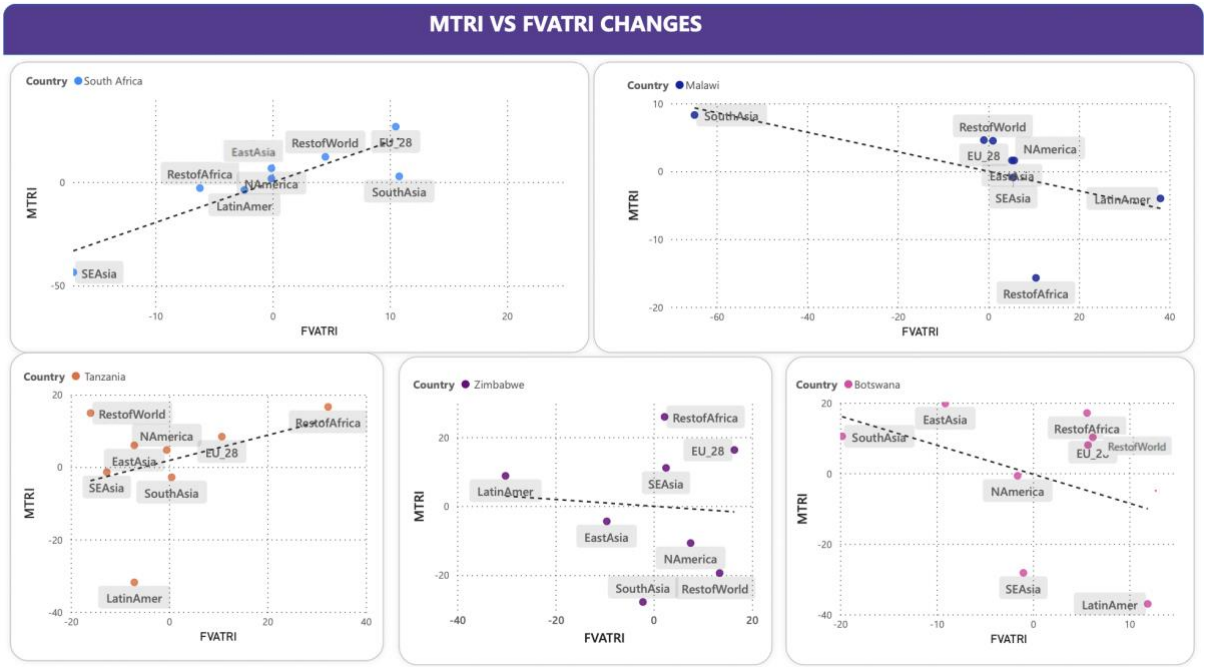


*Figure 1.11 Correlation coefficient between MTRI and FVATRI changes in percentages.*

Source: Author's calculation using GTAP VA module.

Lastly, the research study calculates the sector weights to explain what drives the results of the MTRI and FVATRI in the presence of a customs union. They are calculated as the percentages of the total of each Index. Figure 1.12 to Figure 1.16 presents the sectoral shares of TRI for SADC countries computed with two metrics of gross and value-added flows. For a clearer visualization of the graphs, the most important sectors are presented.

The vertical dimension of the diagrams presents the weight each sector has on the FVATRI expressed as a percentage of the Index's total whereas the horizontal dimension presents sectoral weights for the MTRI. The sectors above the bisector are those whose tariffs are more significant in the production of the SADC exporters. Likewise, the sectors more relevant for protection in gross terms are below the bisector.

The results of the sector share indexes show that different sectors have different significance in explaining the indexes. On average, agri-food sectors show a significant role in explaining FVATRI as in the case of vegetables, fruits and nuts, beverages and tobacco, sugar, animal products and meat. The sectors with higher weights also have higher contributions to the countries' value-added, meaning that these sectors play a vital role in the downstream

production of these countries. On the contrary, as in the absence of the customs union, although industrial sectors face low nominal tariffs in SADC countries, on average, they have more significance in explaining the MTRI as in the case of heavy manufacturing, light manufacturing, and extraction. Finally, there are sectors such as manufacturing or food products in which tariffs affect both the exporting firms and domestic consumers.

Results also showed that manufacturing products are more protected in all markets (except in Botswana) regarding the MTRI. Indeed, heavy manufacturing is highly protected in Malawi, South Africa, and Tanzania whereas extraction is more protected in Zimbabwe. However, as sector weights are presented, similar products turn out to be most (least) protected in both markets. On the contrary, with the FVATRI, the results are different since the sector's weight is not directly related to nominal tariffs and the demand for foreign intermediate goods relies on their prices and the prices of the goods using them as inputs. Accordingly, the wools and silk sectors are most negatively affected in Zimbabwe; Dairy products and paddy rice are primarily affected in Tanzania whereas the paddy rice sector is most negatively affected in Zimbabwe. Hence, the new policy could mostly affect the SADC exporting firms that acquire inputs for sectors such as agri-food and extraction while affecting less those that acquire inputs for industrial sectors such as heavy manufacturing and light manufacturing.

Lastly, the new SADC common external tariff provides the same protection to all the SADC countries; however, they are affected differently with regard to the costs of imported intermediate goods. Hence, SADC countries could otherwise decide on their trade negotiations, for example, which sectors or countries to target.

## 1.9 Conclusion and policy implications.

The rise of global value chains in recent years has challenged the old method of analysing international trade relations. For instance, international trade statistics databases, which were used before, had double counting challenges and some irregularities when evaluating the global supply chain networks. This has led to the formation of the multi-regional inter-country input-output (ICIO) tables based on value-added components which are now used together with the Leontief Matrix (Leontief, 1940) to measure/analyse international fragmentation of production at the country or sector level. This research has used the GTAP MRIO database to analyse the

impact of the protection index on gross imports and imports for exports (global value chains) of SADC countries.

The FVATRI considers how cross-border multi-stage production affects the transmission of trade policy to national welfare. The study computed this FVATRI (proposed by Fusacchia et al, 2021) together with the MTRI originated from Anderson and Neary (2005). These indexes are computed using an applied general equilibrium model of the global economy with the trade of both final and intermediate products. Through mapping bilateral production linkages with the value-added flows, the model gives an improved framework that considers the heterogeneity of countries in terms of the structure of their trade flows and participation in global value chains.

This model is based on comparative statistics and considers exceptional circumstances such as employment levels and international labour mobility. Therefore, this model does not consider dynamic effects such as the impact on productivity and growth, unemployment and migration. Nevertheless, as Fusacchia et al (2021) noted, this kind of simulation allows the impact of trade policies to be analysed by restructuring the global value chains and reveals that some tariffs have different impacts on different countries depending on their economies and access to foreign markets.

This research has analysed the impact of protectionism of the SADC customs union specifically on five selected SADC countries: Botswana, Malawi, South Africa, Tanzania, and Zimbabwe. The research first showed the baseline results without the customs unions and then the results in the presence of the customs union. Comparing the baseline results and the customs union shows that the MTRI index will change, and tariffs will vary from country to country. This indicates different effects on consumers and firms within the SADC countries.

As noted by Fusacchia et al (2021), the value of the Index for foreign value-added in the exports' component indicates the harm inflicted on domestic producers using foreign intermediate inputs to produce their exports. This shows the '*beggar thyself*' content of protectionism. By using the methodology for value-added accounting of trade flows, the research shows that, as in the case of MTRI, the customs unions alter each country's protection levels through the FVATRI and may have a different effect on all countries. Hence, the analysis shows that the bilateral nominal tariffs and trade flows do not give a straightforward answer regarding the effect of protection levels through backward linkages.

Also, since the nominal tariffs are (by definition) the same (in the case of the customs union), by considering the changes brought by the new policy, the results have shown that Tanzanian firms seem to be better off because the policy drives the country to reduce tariffs towards imports of intermediate goods by 22%. This is a significant change compared with other countries which all increase their tariffs to meet the new policy measures. Additionally, South Africa and Malawi also seem better off since they have a lower FVATRI compared with other countries. Indeed, the explanation for these varying gains depends on the initial conditions before the common external tariff rates were imposed.

Additionally, the results suggest that the consumers and firms in Tanzania and South Africa will no longer be worse off since the new policy affects consumers and exporting firms in Malawi and Botswana more than in other countries. Hence, countries with high initial average tariffs can significantly expand their imports since they will cut their tariffs. In contrast, those with lower initial average tariffs, such as South Africa, cannot expand their imports since they significantly increase their tariffs.

The comparison also shows significant differences at the bilateral level. Accordingly, with the common external tariff, Zimbabwe's consumers who import from Latin America will no longer be worse off than South African consumers who import from the EU_28. This is because the EU_28's gross exports to South Africa will be highly taxed. On the contrary, Zimbabwe's exporting firms acquiring their imports for exports from Southeast Asia will no longer be better off since the new policy mostly benefits Malawian firms importing intermediate goods from South Asia. This is a significant benefit compared to other firms sourcing their inputs from other regions/countries. Likewise, these changes are due to tariff adjustments to align with the common external tariff as per SADC nomenclature.

Additionally, the results suggest an inverse relationship between the FVATRI and the foreign value-added. Accordingly, the countries with lower tariffs register higher imports of intermediate goods (likewise, those with higher import tariffs register lower imports for exports), e.g., Malawi vs the rest of Africa and Zimbabwe vs the EU_28. This is different from the situation without the common external tariff since those countries with higher (lower) imports also record higher (lower) imports for exports, e.g., Malawi vs South Asia, Botswana vs the rest of Africa and Latin America, and South Africa vs the EU_28.

Moreover, the results suggest a strong positive correlation between the MTRI and FVATRI changes at the bilateral level. Accordingly, the new policy enhances SADC countries' imports roughly from the EU_28, Latin America and South Asia since the policy favours these regions. Indeed, Tanzania, Zimbabwe and South Africa have more tax reductions towards different exporters at FVATRI and MTRI level whereas Botswana has few cases of tax reductions. Accordingly, these changes are due to tariff adjustments to align with the common external tariffs as per SADC nomenclature. Additionally, the results show no positive correlation between the MTRI and foreign value-added.

The sector weights of the Indexes have been calculated to give a picture of what drives the results of the MTRI and FVATRI indexes. These sector weights have been calculated as the weights of the total indexes. Accordingly, the results suggest that different sectors have different roles in explaining the two indexes. For example, in the absence of the customs union, agri-food sectors have a prominent role in explaining the FVATRI whereas manufacturing sectors have a more significant role in explaining the MTRI. Also, those SADC exporting firms that import intermediate goods used in agri-food sectors and extraction are highly affected. In contrast, those that acquire inputs used in industrial sectors such as manufacturing are less affected. Therefore, these results shed light on the implications of the proposed SADC trade policy, especially towards global value chain participation.

Lastly, since the results also confirm that, at the bilateral level, firms and consumers will have different benefits from the same exporter, the policy will strengthen/affect the trade relations between SADC countries and other regions. For example, Botswana and Zimbabwe will strengthen their trade relations with the EU_28 since they will lower their protection levels. In contrast, Malawi and Tanzania will increase their tariffs on Latin America, probably affecting their trade relations negatively. Therefore, different SADC countries may have different opinions regarding policy negotiations.

In conclusion, these results offer an invaluable insight. Notably, the substantial reduction in Tanzanian tariffs on intermediate goods of 23% reflects a potential positive outcome with implications for enhancing competitiveness and economic growth. This reduction is expected to stimulate domestic industries by significantly reducing production costs and increasing their competitiveness in the global market. Additionally, the lowered tariffs could lead to reduced

consumer prices, potentially improving consumer welfare and influencing consumption patterns in Tanzania. However, the differential impact on consumers and exporting firms in Botswana and South Africa underscores the importance of considering distributional effects in policy design. Furthermore, the contrast between high-tariff and low-tariff countries in their ability to expand imports based on initial conditions highlights the need for tailored policy measures.

Moreover, the effects on trade relations, such as strengthening ties with the EU_28 and South Asia and increasing tariffs on rest of Africa, have geopolitical and economic implications. Indeed, the strengthened relations with the EU_28 and South Asia could open doors to increased trade, investment opportunities and diplomatic cooperation fostering economic growth. Conversely, higher tariffs on Rest of Africa could impact international trade relations and have diplomatic consequences that need careful consideration. The sector-specific implications emphasize the role of sectors such as agri-food and manufacturing, offering insights into strategic policy support and fostering global value chain participation. Lastly, the diverse impacts on SADC countries and their potential influence on policy negotiations underscore the need for cooperative and diplomatic approaches to address varying concerns among member states. These considerations offer valuable guidance for policymakers since they navigate the complexities of trade policy in the context of the SADC region, fostering collaborative efforts and ensuring that policies are not only economically beneficial but also diplomatically astute.

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# Appendix 1A

**MTRI and FVATRI index sector weights by country.**

### a) South Africa

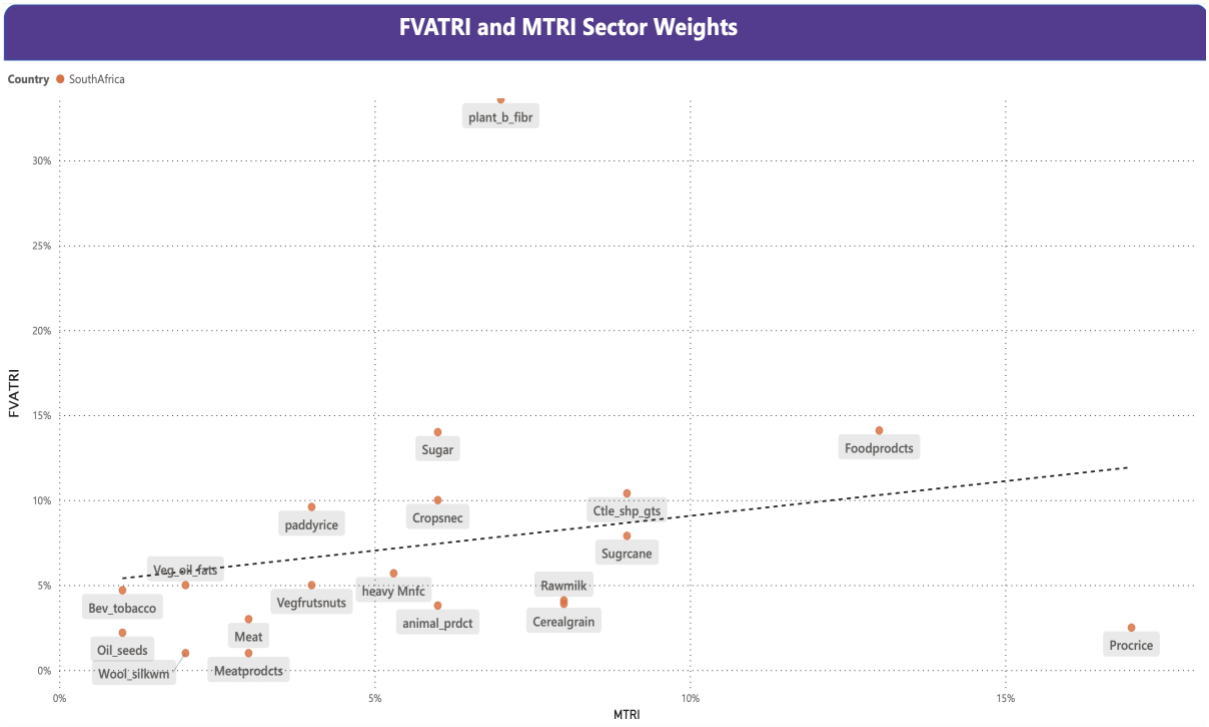


*Figure1.12 FVATRI and MTRI sector indexes with customs union in percentages.*

### b) Tanzania

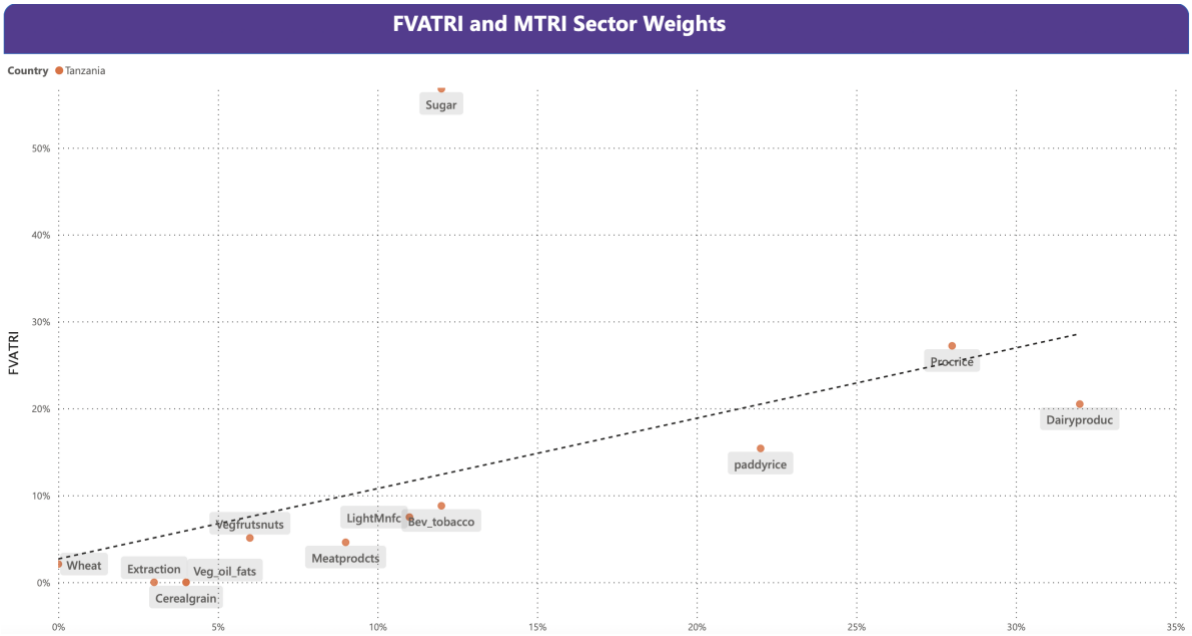


*Figure 1.13 FVATRI and MTRI sector indexes with customs union in percentages.*

## c) Botswana

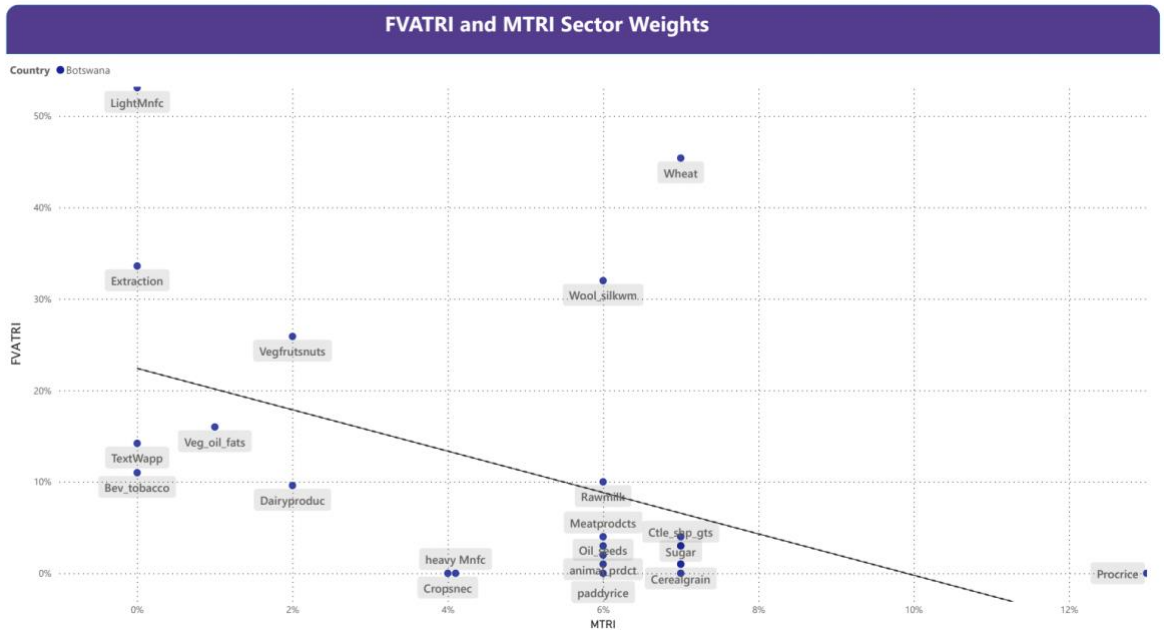


*Figure1.14 FVATRI and MTRI sector indexes with customs union in percentages.*

**d) Zimbabwe**

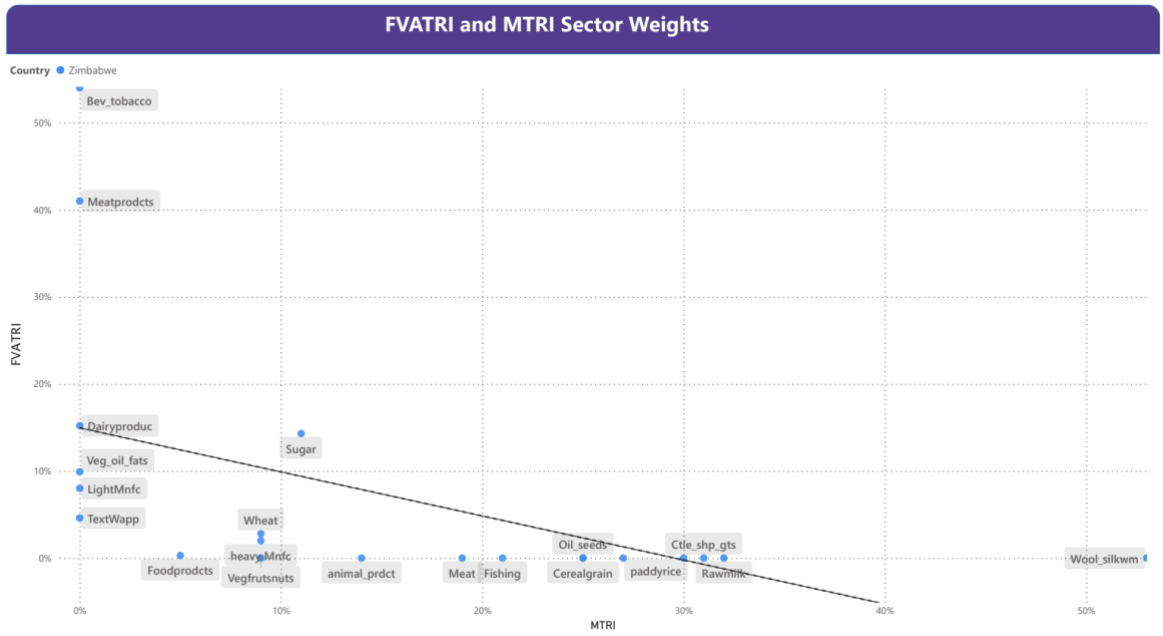


*Figure 1.15 FVATRI and MTRI sector indexes with customs union in percentages.*

**e) Malawi.**

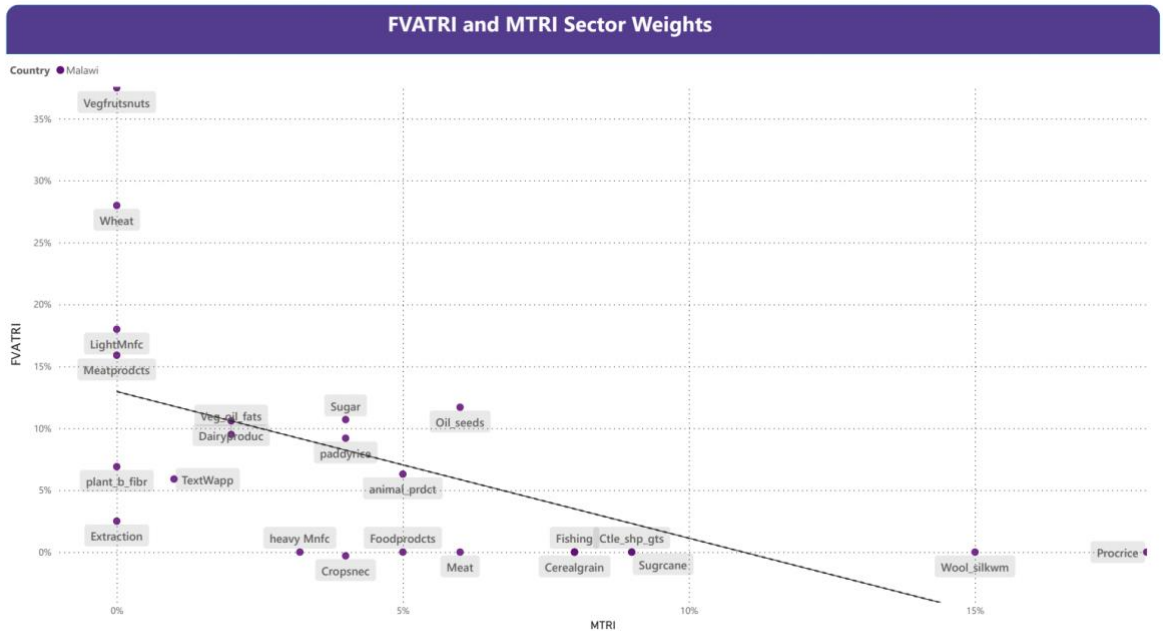


*Figure1.16 FVATRI and MTRI sector indexes with customs union in percentages*