

WTO Trade Facilitation Measures and the Extensive Margin of Exports in the Tripartite: Comesa – EAC – SADC

Leudjou Njiteu Rostant Roland

Research Paper 454

AFRICAN ECONOMIC RESEARCH CONSORTIUM
CONSORTIUM POUR LA RECHERCHE ÉCONOMIQUE EN AFRIQUE

WTO Trade Facilitation Measures and the Extensive Margin of Exports in the Tripartite: Comesa – EAC – SADC

By

Leudjou Njiteu Rostant Roland
North-West University,
Potchefstroom, South Africa

AERC Research Paper 454
African Economic Research Consortium, Nairobi
August 2021

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are, however, those of the author and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 – City Square
Nairobi 00200, Kenya

ISBN 978-9966-61-152-9

© 2021, African Economic Research Consortium.

Contents

List of tables	v
List of figures	vi
Abstract	viii
Acknowledgements.....	1
1.0 BACKGROUND and problem of the study.....	2
2.0 Literature review	5
3.0 MethodologY	9
4.0 Results	15
5.0 Conclusion and policy implications	21
References.....	23
Annexes.....	27

List of Tables

- Table 1: Effects of WTO’s TFA on the extensive margin of Tripartite exports 16
- Table 2: Effects of WTO’TFA measures on extensive margin of
Tripartite exports 17
- Table 3: Effects of WTO TFA compliance on extensive margin of
Tripartite exports (% change) 18
- Table 4: Extensive margin effects of trade facilitation measures by
Tripartite, within Tripartite economic bloc 19
- Table 5: Extensive margin effects of trade facilitation measures by
Tripartite economic bloc with rest of world 20
- Table A 1: State of implementation of each OECD’s TFI by
Tripartite country (2015) 28
- Table A 3: Mapping OECD TFIs, TFA articles and trade costs 29
- Table A 4: Variables of the study 30
- Table A 5: Number of variables and weight of each variable within
each OECD TFI 31
- Table A 6: List of variables, weight, answer and score of the
indicator category “involvement of the trade community”
in South Africa in 2015 31
- Table A 7: Summary statistics of dependent variables,
number of exported products, 2015 32

Table A 8: Summary statistics of TFA variables, 2015	32
Table A 9: Countries used in gravity model	33
Table A 10: Effects of WTO's TFA on Tripartite exports	34
Table A 11: Effects of each WTO' TFA measure on Tripartite exports	34
Table A 12: Status of implementation of each trade facilitation indicator at regional level	35

List of Figures

Figure A 1: Evolution of Tripartite exports and number of
exported products 27

Abstract

This study uses a gravity model for the year 2015 to analyze the impact of the World Trade Organization's (WTO) Trade Facilitation Agreement (TFA) on extensive margin of exports (export diversification proxied by the number of products exported) by the Tripartite (COMESA, EAC and SADC) country members. It appears that all trade facilitation measures (except "fees and charges") have a positive and significant effect on export diversification irrespective of the type of product or trading partner. "Appeal procedures" (the rights to traders to obtain review and correction of decisions made by Customs officials in an administrative and/or judicial proceeding) measures have the most critical effect. Exports within the Tripartite are more impacted than exports with partners outside the region. The increase in number of exported products is higher for commodities than for manufactured goods with intra-tripartite exports, whereas the opposite is observed with exports to partners in the rest of the world. Counterfactual analysis shows that if the Tripartite countries comply with regional best practice (or the WTO requirement) in trade facilitation, "advance rulings" (binding information about customs treatment of goods before imports) and "appeal procedures" measures would have the greatest effect on exports diversification respectively within the Tripartite, and with the rest of the world. SADC trade facilitation policies perform better than the EAC's and COMESA's, regardless of the type of product, partner or trade facilitation measure (except for "fees and charges"). The EAC performs better than COMESA. This study recommends implementing the WTO TFA which could increase export diversification both within the Tripartite Free Trade Area and with rest of world partners.

Key words: World Trade Organization, Trade Facilitation Agreement, extensive margin, gravity model, tripartite, trade diversification

Acknowledgements

I wish to express my deep appreciation to the African Economic Research Consortium (AERC) for the financial support to carry out this study. I am also grateful to the resource persons, members of AERC's thematic group D 'Production, trade and economic integration', for various comments and suggestions that helped the evolution of this study from its inception to completion. I especially thank my resource person for his very helpful comments. I am indebted to TRADE (Trade and Development) a research focus area at the North-West University, Potchefstroom (South Africa) for hosting me in the framework of the research fellowship for this project. All errors are my sole responsibility.

1.0 Background and problem of the study

June 10, 2015 is a historic date in the process of economic integration of the African continent. The 26 member countries¹ of the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC) decided to merge and launch a Tripartite, which is the biggest-ever Free Trade Area (FTA) in Africa. It covers about 80% of the African continent, from the Cape (South Africa) to Cairo (Egypt). This “Grand FTA” forms an important economic bloc of \$1,087 billion in gross domestic product (GDP), or about 84% of sub-Saharan Africa's (SSAs) GDP (57% of African GDP). One of the Tripartite FTA objectives, as mentioned in the final report (paragraph 40) of the first Tripartite Summit of Heads of State and Government held in Kampala (Uganda) in October 2008, is to provide “...a wider choice...” of goods and services to its 600 million potential customers.

The Tripartite FTA has experienced an upward trend in the value of its total exports since the early 2000s (Annex 1). The contrasting trade outcome is the downward trend of the number of exported products, also called the extensive margin of exports (Dennis and Shepherd, 2007; Persson, 2013; Persson and Wilhelmsson, 2016; Beverelli, Neumüller and Teh, 2015). This drop in the number of exported products means a lack of export diversification.² Thus, export growth in the Tripartite FTA, as confirmed in a large body of studies in developing countries (e.g., see Amurgo-Pacheco and Pierola, 2008; Helpman, Melitz and Rubinstein, 2008; Besedes and Prusa, 2011), is mainly driven by the increase in the trade volume (quantity of the same products basket), also called the intensive margin of exports.

1. COMESA (19): Djibouti, Eritrea, Ethiopia, Sudan, Kenya, Uganda, Burundi, Rwanda, DRC, Malawi, Madagascar, Mauritius, Zambia, Zimbabwe, Comoros, Egypt, Libya, Seychelles and Swaziland. EAC (5): Kenya, Uganda, Burundi, Rwanda and Tanzania. SADC (15): DRC, Madagascar, Malawi, Mauritius, Zambia, Zimbabwe, Tanzania, Angola, Mozambique, Swaziland, Seychelles, Botswana, Lesotho, Namibia and South Africa.

2. In 2015, intra-tripartite exports were 81.34% (86.46% in 2000) for primary commodities and 83.98% (87% in 2000) for manufactured goods. As for exports with the rest of the world, it was 79.62% (86.32% in 2000) for primary commodities and 80.65% (86.24% in 2000) for manufactured goods. This suggests a relative lack of structural transformation in the Tripartite between 2000 and 2015.

According to Melitz's (2003) seminal study on the heterogeneity of firms, the lack of trade diversification by the Tripartite FTA can be explained by the presence of trade costs that the region's traders face (see Pearson, 2011). Melitz (2003) theoretically gives a microeconomic explanation for the decision of firms to export after a trade cost reform. The main conclusions of Melitz's model predict that any reduction in trade cost would increase the productivity level of each firm and would enable the most productive firms (above a productivity threshold) to benefit from exports because their revenues allow them to cover fixed costs. Firms that exported before the reform would continue to export larger volumes (intensive margin), whereas those who operated within the country but did not export before the reform would enter export markets, and consequently supply new products in the international market³ (extensive margin).

The Tripartite FTA strategy comprises a comprehensive trade facilitation programme that intends to reduce trade costs within the region. This regional programme is largely consistent with the multilateral one concluded in the framework of the World Trade Organization (WTO)'s Trade Facilitation Agreement (TFA) (UNECA, 2011; Pearson, 2011) that has so far (as at 19 October 2018) been ratified by 15 of the 26 Tripartite member countries.⁴ The WTO defines trade facilitation as any activity that aims at the "simplification and harmonization of international trade procedures" (WTO, 2015). Trade procedures included here are: "...activities, practices and formalities of collect, presentation, communication, and transmission of data, and other information required for the mobility of goods in international trade".

So far, the level of compliance by the Tripartite FTA with the WTO's TFA legal provisions is still far below the WTO requirements (Annex 2). According to the Organisation for Economic Co-operation and Development's (OECD's) Trade Facilitation Indicators (TFI), which follow a scoring system where a score of 2 corresponds to best practice (WTO requirements), an average of 0.9403723 in 2015 at the regional level shows that much still needs to be done by the majority of Tripartite country members to comply with the WTO requirements.

The WTO's TFA entered into force on February 22, 2017; it applied to each of the 20 Tripartite member countries that are WTO members⁵, whether it has ratified it or not. It might therefore impact the Tripartite FTA's whole economy. It can be expected that the implementation of the WTO's TFA would reduce certain trade costs⁶ and positively increase export diversification (Melitz 2003).

As far as known, no study has looked at whether the low number of exported products by the Tripartite FTA could be explained to some extent by the low level of the WTO's TFA measures implemented by its member countries so far. The export

3. The monopolistic competition hypothesis states: each firm produces a good that has a particular characteristic, but the good is not different in term of its utility compared to other firm goods.

4. TFA Facility: <http://www.tfafacility.org/>

5. Eritrea, Ethiopia, Sudan, Comoros, Libya and Swaziland are not WTO members.

6. See table in Annex 3 for the correspondence between each TFA measure and trade cost reduction.

growth of Tripartite country members does not augur well for the Tripartite FTA economy in the sense that manufactured goods exports still account for a small share of total exports: only 30.20% in 2015 compared to a few primary commodities that constitute 60.9% (notably mineral fuel/lubricants, the largest share of total exports in 2015 at 33.82%).⁷ It would be very important for the Tripartite member countries to have a strong export performance that, according to Blanke et al. (2011), does not necessarily mean high export growth but also an increased export diversification from low value-added activities (primary commodities) to higher value-added ones (manufactured goods). By diversifying, Tripartite member countries are better able to lower the volatility of growth through a reduced vulnerability of exports to external shocks (Fundari, 2013), notably due to primary commodity prices' volatility on the international markets. So, what would the export diversification effect be for the Tripartite FTA if the legal provisions concluded in the framework of the WTO's TFA are implemented (WTO requirement)?

The main objective of this study is to determine the impact of the implementation of the WTO's TFA measures on the extensive margin of exports in the Tripartite FTA. Specifically, answers will be sought to the following questions: What are the export diversification effects of each WTO TFA measure, and which one has the most impact?; Which type of product (primary commodities or manufactured products) is the most affected, and by which of the WTO's TFA measures?; What is the export diversification effect if all Tripartite countries move up to best-performing country level (similar to Mauritius)?; Does the WTO's TFA implementation most affect export diversification within the Tripartite, or with other partners? Which economic bloc, the EAC, COMESA or SADC, has the most important diversification effect, and through which type of product?

The results of this study could encourage the implementation of WTO's TFA measures, and guide the position of policy makers and trade negotiators in negotiating the SADC/EAC-EPA (Economic Partnership Agreement) with the EU, the Tripartite FTA and the African Continental Free Trade Agreement (AfCFTA), as well as other trade discussions. It could also help the design of aid-for-trade strategies at the national/regional level through the selection of projects that should benefit from technical and financial assistance in terms of the WTO's TFA compliance.

⁷ Shares computed by the author from data collected from the World Integrated Trade Solution (WITS) (World Bank). Primary commodities (SITC 0 + 1 + 2 +3 + 4 + 68) and manufactured goods (SITC 5 to 8 less 667 and 68) are considered in the Standard International Trade Classification:

http://unctadstat.unctad.org/EN/Classifications/DimSitcRev3Products_DsibSpecialGroupings_Hierarchy.pdf

2.0 Literature review

It is worth noting that studies on the trade effects of trade facilitation differ in terms of their approach to trade facilitation. The first group, which comprises very few studies, uses the WTO's trade facilitation approach (WTO 2015). The second group includes a vast number of studies using a wider approach to trade facilitation. In this approach, trade facilitation aims to reduce trade costs related to transporting goods from the producer to the consumer, excluding production costs (WTO, 2015; Anderson and Van Wincoop, 2004). Here, trade facilitation goes beyond reforming procedures at the border and therefore includes changes in trade barriers within countries.

In the wider approach, the following variables of trade costs are found in the literature: Transport costs and the number of days required to trade (Inmaculada and Márquez-Ramo, 2007) time delays (Persson, 2008); port efficiency, the customs environment, regulatory environment and service sector infrastructure (Njinkeu, Wilson and Fosso, 2008; Wilson, Mann and Otsuki, 2004); access to finance, regulatory quality, energy infrastructure, telecommunications, transport obstacles and customs efficiency (Hoekstra 2013); quality of physical infrastructure, border efficiency, regulatory environment, e-business, and the logistics performance index (LPI) (Seck 2017);⁸ aid-for-trade (Ferro, Portugal-Perez and Wilson, 2014; Helble, Mann and Wilson, 2009); presence of an authorized economic operator and a single-window programme, and the existence of a mutual recognition arrangement (de Sá Porto, Canuto, and Morini, 2015). These studies all show trade facilitation has a positive effect on export diversification. Moreover, it can increase African firms' probability to participate in international trade (Hoekstra 2013) and improve intra-African trade (Njinkeu, Wilson and Fosso, 2008; Portugal-Perez and Wilson, 2008), particularly in SSA (Seck 2017).

Trade-across-borders indicators and the LPI have also been used by Dennis and Shepherd (2007) and Lee and Kim (2012), respectively, to investigate the trade diversification effect of trade facilitation. Dennis and Shepherd (2007) find that export costs (related to the preparation of documents required for trading; costs associated with the transportation of goods to the relevant seaport; administrative costs; and ports and terminal handling charges) and international transport costs (proxied by distance) have a negative and significant impact on export diversification. Lee and Kim (2012) find that developing countries with higher trade facilitation levels export a wider range of products, especially primary goods.

⁸ The LPI is also used by Portugal-Perez and Wilson (2008), Turkson (2011) and others.

The above-listed studies of the wider approach to trade facilitation cannot assess what is negotiated at the WTO. The group of studies that use the WTO's Trade Facilitation approach is tiny, especially those employing trade diversification analysis. Hillberry and Zhang (2015), Moisé, Orliac and Minor (2011) and Moisé and Sorescu (2013) are interested in the effects of the WTO's Trade Facilitation approach, but focus on trade costs and trade volumes. The few studies can be explained by the lack of indicators representing quantitative border procedures until the recently released OECD TFIs.

Beverelli, Neumüller and Teh (2014) published the first study using the OECD's TFI database for export diversification investigations. They measured export diversification according to two extensive margins: the number of products exported (HS6 sub-headings) by destination, and the number of export destinations served by product (HS6 sub-headings). They also consider the bilateral extensive margin in the robustness analysis, as suggested by Hummels and Klenow (2005). The 11 OECD TFIs in the baseline estimations have been aggregated by a simple average. However, as an alternative they created a TFI based on Principal Component Analysis (PCA). The sample in their study comprises 133 countries for which OECD's TFIs are available, including 18 Tripartite countries out of the 33 SSA countries in the database. Thanks to the gravity model in a cross-sectional analysis,⁹ they find in all specifications (correcting for endogeneity using PCA, Poisson and negative binomial, or NB, estimators), including those for robustness analysis, that the WTO's TFA should reduce fixed costs and create new trading opportunities as predicted by the Melitz (2003) firm heterogeneity theory.¹⁰ The coefficients on TFI remain positive and significant when considering various potential sources of heterogeneous effects (belonging to the same preferential trade agreement or not; having the same development status or not; or exporting intermediated or final products). However, they note that the coefficients are larger for developed nation exporters. However, as developing countries have, on average, lower TFI scores than developed ones, developing countries are bound to experience the largest gains from TFI reforms as a group. Moreover, the number of products exported by destination (HS6 sub-headings) is increased by up to 15.7% and 12.2%, respectively, for SSA countries, and Latin American and Caribbean countries. The gains are smallest in the Middle East, North Africa and South Asia.

Using the same methodology, Beverelli, Neumüller and Teh (2015) extend their analysis (Beverelli, Neumüller and Teh, 2014) by investigating what aspect of TFI is more likely to reduce the fixed costs of exporting and will therefore have a positive effect on export diversification (Melitz 2003). To this end, they performed each regression with each TFI as the main explanatory variable. They found that most indicators have coefficients that are consistently positive and significant across all specifications (correcting for endogeneity; Poisson and NB estimators), except

9 For the year 2009, for all variables in the baseline estimations; 2012 for the other variables except TFI when correcting for endogeneity.

10 Although the coefficients are slightly lower than in the baseline regressions when considering reverse causality.

“cooperation-internal” where the coefficient is consistently negative and significant for all specifications.

Since TFI provisions affect fixed and/or variable trade costs differently, Fontagné, Orefice and Piermartini (2016) estimate that it is important to disentangle the effect of different provisions on trade margins. Consequently, they use the OECD’s TFI database to analyze the impact of various aspects of TFI on three trade-related outcomes: (i) exported value (firm intensive margin); (ii) number of products exported (product extensive margin); and (iii) average export value per product exported (product intensive margin); as well as on (iv) firm-product export diversification (Herfindahl index).¹¹

HS6 sub-headings are used in their baseline analysis. Unlike in Beverelli, Neumüller and Teh (2015), the analysis is carried out at the firm level using a cross-section econometric model of French firms’ export data for 2010. Moreover, the contribution of this study is to look at how progress on the different aspects of the TFI adopted in the importing country affects exporters (French firms) of different sizes.¹² They focus only on those TFIs that correspond to the 8 main policy areas¹³ negotiated at the WTO (Fontagné, Orefice and Piermartini, 2016) by interacting detailed indicators with exporter size bins. The authors expected that trade facilitation (TF) should make firms happy, especially small firms, for two reasons. First, when the fixed costs of exports are reduced, less productive firms (small firms) enter the export market as their revenues can cover the lower fixed costs of exporting (Melitz, 2003). Second, sales elasticity with respect to variable trade costs decreases with firms’ size (Arkolakis, 2010). In an ordinary least squares (OLS) estimation (dependent variable in log), their results clearly show that TFA provisions affect small and large firms differently. Information availability, advance rulings and appeal procedure TFIs favour small firms in particular. A 10% increase in the information availability index implies a 2.36% increase in the number of exported products for small firms, and a 1.75% increase for medium-sized firms. Conversely, formalities-documents (2.33%) and formalities-procedures (1.45%) seem to have a positive effect on big firms only. In a counterfactual analysis, if all

11. The extensive margin can be computed at different levels of aggregation and a variety of definitions have been used in empirical work. For example, Hillberry and Hummels (2008) work at the shipment level, (Eaton, Kortum et Kramarz 2004), and (Berthou and Fontagné 2008) work at the firm level, Hillberry and McDaniel (2002), and Hummels and Klenow (2005) define the extensive margin at the sector-product level, and (Helpman, Melitz and Rubinstein, 2008) consider data at the country level.

12. They constructed size “bins” for firms belonging to each percentile category based on quartiles. Firms below the 25th percentile of the (size) distribution were classified as small. Firms above the 75th percentile of the distribution were classified as big. The other firms were assigned to the medium category. Based on Mayer & Ottaviano (2008), who argue that the total amount of exports is nevertheless a plausible proxy for the size (and productivity) of the firm, they use the total export value of the firm in 2010 (across all destinations) as a proxy for firm size because the French custom dataset does not contain other firm-specific measures.

13. Information availability, advance rulings, appeal procedures, fees and charges, formalities in documentation, formalities in automation, formalities in procedures, and border agency cooperation.

East Asian and Pacific countries adopted the region's best practice for information availability, small firms would export, on average, 43.7% more while medium-sized firms would export 25% more. No effect on big firms is expected. Globally, the results of their study are confirmed by a robustness analysis to solve relevant issues: Poisson estimations to account for the count nature of the dependent variable, a propensity-score-matching approach to account for the randomized treatment by countries of destination,¹⁴ and size bins based on firms' size distribution in 2005 and on HS2-specific size distribution for solving endogeneity issues.

The above review of the literature using the WTO's trade facilitation-restricted approach shows that there is a need for further research to obtain more insight into the effects of the TFA concluded at the WTO in 2013. One of the main points raised by Hoekman and Njinkeu (2017) is the fact the focus is usually on the technical and hard infrastructure aspects (wider approach) at the cost of the policy dimension (WTO's approach), which is also responsible for most of the high transaction costs. This paper contributes to filling this gap. Unlike previous studies, the analysis is conducted in the African context. African countries are rarely involved in studies on TF (Njinkeu, Wilson, and Fosso, 2008). To the author's knowledge, this study is among the first empirical studies to contribute to the debate on the development effect of the WTO's TFA in the African context, and at the level of each specific TF measure negotiated at the WTO. The study also contributes to the corpus of knowledge on the debate related to the role of the type of product exported (commodities and manufactured products). Beverelli, Neumüller and Teh (2015) concluded that developing countries – particularly those dependent on commodity and natural resource exports – who have long sought greater export diversification, should implement the agreement as a central part of their trade policy priorities. This study contributes to testing this hypothesis.

14. Some countries may set trade facilitation to ease/impede French exporters specifically.

3.0 Methodology

3.1 Econometric Model

The number of exported products (proxy of the extensive margin of exports) that is the dependent variable of interest is a bilateral trade outcome. Therefore, the gravity model is the methodological approach adopted for this study. This is the most commonly used methodology to analyze the impact of natural and human trade obstacles. For some authors, it is a “workhorse” for empirical studies of trade (Eichengreen and Irwin, 1998; Cheng and Wall, 2005). It is different from quantitative analytical tools such as the computable general equilibrium (CGE) model that offered no possibility to analyze the extensive margin of trade (Kehoe 2005).

The conditional mean of the augmented gravity equation can take the following general form:

$$E [nexp_{ij} | X_{ij}, X_{i(j)}, x_i, x_j] = f(X_{ij}'\beta + X_{i(j)}'\alpha + x_i' + x_j')$$

$$nexp_{ij} | X_{ij}, X_{i(j)}, x_i, x_j] = f(X_{ij}'\beta + X_{i(j)}'\alpha + x_i' + x_j') \quad (1)$$

Where $nexp_{ij}$ represents the number of exported products from a country of origin, the exporter (i) to a country of destination, the importer (j); $X_{i(j)}$ represents the vector of individual country variables including the policy variable (trade facilitation: $tfa_{i(j)}$); X_{ij} represents the vector of bilateral gravity variables; x_i and x_j , respectively, capture non-observable country-specific fixed effects to take into account the effects of multilateral resistance following Anderson and van Wincoop (2003). β and α are the vectors of coefficients to be estimated.

The number of products by destination ($nexp_{ij}$) has been used in many studies as a proxy of the extensive margin (Beverelli, Neumüller and Teh, 2015; Beverelli, Neumüller and Teh, 2014; Persson and Wilhelmsson, 2016; Dennis and Shepherd, 2007). Persson and Wilhelmsson (2016) and Dennis & Shepherd (2007) find that it has the advantage of being a direct measure of the expansion of the export base. In addition, this indicator is not affected by price inflation in the global market, as is the case for trade diversification indexes like the Hirschmann-Herfindahl (HH) and Theil indexes. Also, it is easy to compute and interpret. Cadot, Carrère and Strauss-Kahn (2011) also found that most policies intended to reduce trade costs can be viewed in

terms of new exports. To compute the number of exported products in this study, $nexp_{ij}$ consists of the highest level of internationally comparable disaggregated country-level trade data, namely the 5-digit level of the Standard International Trade Classification (SITC),¹⁵ revision 3. The concept of “product” is attached to a 5-digit level of the SITC. The variable $nexp_{ij}$ counts how many products the exporter exports to the importer. According to the SITC there is a total of 3,117 products. Thus, theoretically, for each pair of countries ij , $nexp_{ij}$ varies between 0 in the case of no trade and 3,117 if the exporter exports all products to the importer.

As shown in the summary statistics in Annex 7, zero trade with the rest of the world, for example, represents up to 50.56% of observations in the case of exporting primary commodities. An application of the natural logarithm on $nexp_{ij}$ (considering the conditional mean as a linear function of explanatory variables), will lead to the suppression of all these observations, thereby discarding all information contained in the zero-trade flow (Anderson and Yotov, 2010). To solve this problem, Santos Silva and Tenreyro (2006) propose estimating Equation 1 with $nexp_{ij}$ in levels using a Poisson pseudo-maximum likelihood (PPML) estimator that utilizes the information contained in the zero trade flows,¹⁶ and that is often appropriated for count data,¹⁷ as is the case for the variable of interest (number of products). In addition, what is more important, $nexp_{ij}$ does not even have to be an integer – and the data do not have to be Poisson at all – for the estimator based on the Poisson likelihood function to be consistent (Santos Silva et Tenreyro 2006). Finally, PPML tends to control for heteroscedasticity that often-affects international trade data (Cerasa, Torti et Perrotta 2016). In this case, the conditional mean of Equation 1, $f(\cdot)$, is an exponential function (see Equation 2 further along).

$tfa_{i(j)}$ ($i=1, 2, \dots$, or 11) is the variable that captures the effects of the i^{th} WTO TFA implemented. The TFIs developed by the OECD are used as the proxies of this variable. Data are for the year 2015.¹⁸ The OECD TFIs include data on 152 countries – 33 are OECD members and 119 are non-OECD members. The OECD TFIs correspond

15 The SITC is a product classification of the United Nations (UN) used for external trade statistics (export and import values, and volumes of goods), allowing for international comparisons of commodities and manufactured goods. The groupings of SITC reflect: production materials; processing stage; market practices and uses of the products; the importance of the goods in world trade; and technological changes.

[https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Standard_international_trade_classification_\(SITC\)#:~:text=The%20Standard%20international%20trade%20classification,of%20commodities%20and%20manufactured%20goods.](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Standard_international_trade_classification_(SITC)#:~:text=The%20Standard%20international%20trade%20classification,of%20commodities%20and%20manufactured%20goods.)

16. Zeros can be the result of rounding errors that are more likely to occur for small or distant countries. Trade data can suffer from many other forms of errors, as described in Feenstra, Lipsey and Bowen, 1997.

17. See Cameron, and Trivedi (2013) and Winkelmann (2003) for more detail on the Poisson regression and on more general models for count data.

18. The dataset is publicly available only for 2015 (<http://sim.oecd.org/default.aspx?ds=TFI>). Raw data were obtained (in Excel) directly from the OECD.

to the main policy areas under negotiation at the WTO, enabling the indicators to be mapped to the relevant provisions of the TFA (Annex 3). Eleven indicators are constructed from 155 variables. The answers to these variables are collected from questionnaires that were sent to governments and the private sector. The values of each score attributed to each answer follow a “multiple binary” scoring system, in which a score of 2 corresponds to best performance, 0 corresponds to worst performance and a score of 1 lies in-between.¹⁹ The relationships between variables in each category of TFI were analyzed to identify logical links and attribute different weights according to their relative importance (Moïsé, Orliac and Minor, 2011).²⁰ The total score of each indicator is the simple average of the products of the score for each variable composing the indicator and its corresponding weight.²¹ Consequently, the TFIs across all areas are continuous variables that range between 0 and 2. Thus, a country with a TFI score equal to 0.5 should improve its TF policies by 5 basis points of 0.1 in order to attain the 1-point score of the TFI. So, 1.0 is a better score than 0.5, but it can’t be interpreted as being twice as good because the scale is arbitrary (it is 0 to 2, but could just as easily be 0 to 5, or 0 to 100). The variables seek not only to reflect the regulatory framework in the selected countries but to delve into, to the extent possible, the state of implementation of various trade facilitation measures. The OECD’s TFIs allow comparing countries with best global practices in 11 policy categories at the border: Information availability (infav); involvement of the trade community (intra); advance rulings (advan); appeal procedures (appro); fees and charges (feech); formalities-documents (fordo); formalities-automation (forau); formalities-procedures (forpr); border agency cooperation, internal (intbo); border agency cooperation, external (extbo); and governance and impartiality (govim). As explained in Moïsé, Orliac and Minor (2011) and Moïsé and Sorescu (2013), these indicators were constructed based on the relevant provisions of the WTO TFA. The variables reflect the regulatory framework in the surveyed nation, and the state of implementation of the trade facilitation measures. As observed in Annex 3, each of the 11 indicators intends to reduce trade costs. They are therefore expected to positively influence trade flows and product diversification.

Estimating Equation 1 with the variable $tfa_{i(j)}$ poses the challenge of a non-discriminatory trade policy. Indeed, the issue with non-discriminatory trade policy

19. A scoring system that assigns discrete numerical values according to some metric of performance requires determining thresholds for what is best, worst or in-between. Sometimes there are “natural” thresholds, for example for the variable “Establishment of a national customs website”. Thus, a country without a customs website will be assigned a score of 0; a country with a customs website will be assigned 1; and a country with a customs website which makes available a minimal set of information related to import or export procedures in one of the official WTO languages will be assigned a 2. In other cases, no natural thresholds can be identified. In these cases, if the variable is numerical in nature, the score could be determined by deviation from the sample mean or by its percentile rank.

20. The weight attributed to the each of the 21 variables composing the indicator “involvement of trade community” (0.125) is the most important (Annex 5).

21. See Annex 6 for the indicator “Involvement of trade community” for South Africa in 2015.

covariates is that they are exporter- and/or importer-specific, and therefore they will be absorbed, respectively, by the exporter-time and by the importer-time fixed effects that need to be used in order to control for multilateral resistance in the structural gravity model (Yotov et al., 2016). To solve this issue, this paper adopts the method of Baier and Bergstrand (2009), also used by Beverelli, Neumüller and Teh (2015), to compute multilateral resistance terms for all the bilateral gravity variables. The variables à la Baier and Bergstrand (2009) (Indist_bb, contig_bb, comlang_bb, colony_bb, comcol_bb, agree_fta_bb) are therefore included in the model while excluding specific-country fixed effects. Finally, only one coefficient is chosen for estimation, which measures the combined trade facilitation (e.g. $tfa_i * tfa_j$) effect (instead of tfa_i or tfa_j) on the number of exported products. There are two main reasons for this: (i) this paper is interested in the results of all countries implementing trade facilitation measures simultaneously (exporter and importer at the same time); and (ii) there is less likelihood of finding reverse causality (with the number of exported products) and correlation with the gravity error term. As a result of the latter, endogeneity is taken into account.

The general specification of the model that accounts for all theoretical and empirical developments is as follows:

$$E [nexp_{ij} | X_{bb_{ij}}, X_i X_j] = \exp[(X_{bb_{ij}})' \beta + (X_i X_j)' \alpha]$$

$$nexp_{ij} | X_{bb_{ij}}, X_i X_j = \exp[(X_{bb_{ij}})' \beta + (X_i X_j)' \alpha] \quad (2)$$

Where $X_{bb_{ij}}$ is the vector of variables à la Baier and Bergstrand (2009) (Indist_bb, contig_bb, comlang_bb, colony_bb, comcol_bb, agree_fta_bb) and $X_i X_j$ represents the combined trade facilitation measures. β and α are coefficients to be estimated. The table in Annex 4 presents the proxies of all variables and their sources.

3.2 Estimation Strategies

182 countries are split into two samples (see Annex 9 for the list of countries): sample 26x26, where the 26 Tripartite member countries are both exporters and importers; sample 26x135, where the 26 Tripartite member countries are exporters; and 135 rest-of-world countries as importers. Each of these samples is analyzed for all products, manufactured goods and primary commodities.

As a first step, the overall effect of the WTO's TFA on export diversification is assessed by estimating the impact of the simple average of 11 sub-indicators of the OECD as the explanatory variable. Indeed, Beverelli, Neumüller and Teh (2015) argue that there is no criterion in the WTO's TFA to classifying different indicators in terms of their relevance. In a second step, the effect of each OECD TFI is estimated in the regression on a measure-by-measure basis. Each OECD TFI is inserted into the equation in level (not in log) as some had a value of 0 (Annex 8).

The impact of the improvement of the scores is simulated as if all Tripartite countries are moving up to be the best-performing country in the region and to have the best score (WTO requirement).

Finally, as described in Annex 12, the different regional economic communities do not have the same performance in terms of trade facilitation. Thus, the SADC is the most efficient of the economic blocs in the Tripartite. It is therefore important to highlight the contributions of each of these economic blocs on the extensive margin of the Tripartite. To do this, the analysis was carried out looking at the interaction between the trade facilitation variables and the regional economic blocs (the EAC, COMESA and SADC), to take into account the specificity of the trade facilitation measures to specific geographic location. Each economic bloc is entered into Equation 2 as a dummy variable equal to one if the exporter is a member of the bloc, and 0 if not.

3.3 Descriptive Statistics

Annexes 7 and 8 present the descriptive statistics for the dependent variables and TFA variables.

The highest number of products is exported from South Africa to Namibia (1,932) for manufactured goods.²² Egypt exports the highest number of primary commodities to another African non-tripartite country (Tunisia). These top exporters are among the Tripartite member countries with the highest gross domestic product., indicating that the number of exported products may be correlated to level of development. The same pattern is also found for intra-tripartite exports, where South Africa has the largest basket of manufactured goods and primary commodities exported to Namibia, 511 and 1,932, respectively. An important point is the fact that the number of products exported, regardless of type of product, is more important within the Tripartite than with the rest of the world. This implies that liberalization and the facilitation of trade in the framework of the process of regional integration in the Tripartite could be a real engine of structural transformation in the Tripartite.

Annex 8 shows summary statistics for the 11 indicators that proxy the WTO's TFA measures. Each of these indicators, developed by the OECD, follows a scoring system where a score of 2 corresponds to WTO requirements. In general and on average, the state of implementation of the TFA in 2015 (0.9403723) in the Tripartite is below the WTO requirement score (2). Having such a big gap of 1.0596277 points at the regional level, it is estimated that more than half (52.98% of the total score) of the Tripartite countries need to achieve a higher rate of implementation to comply with the WTO requirements. The best performer is South Africa with the highest score in most of the TFA sub-indicators. Only Ethiopia (52.72%), Zambia (52.63%), Rwanda (59.18%), Kenya (60.27%), Zimbabwe (63.23%), Botswana (64%), Mauritius (72.18%) and South Africa (85.14%) succeeded in achieving more than 50% of the OECD's TFI total points.

22. Manufactured goods and primary products constitute a maximum of 2,398 and 703 products, respectively, according to SITC Rev.3 with 5 digits (3,117 products).

The DRC has the lowest score of .3890909. The most implemented WTO TFA provisions fall under "information availability" (66.10%), "formality procedures" (53%), "appeal procedures" (51.67%) and "fees and charges" (51.98%). The least implemented are "advancing rules" (22.79%). Globally, the Tripartite should make a much greater effort to achieve many of the TFA sub-indicators.

4.0 Results

4.1 Trade Facilitation as Simple Average of Sub-trade Facilitation Indicators

Table 1 presents the results of the estimates for the aggregated variable (simple average) of the 11 TFIs as the main explanatory variable. The signs of the coefficients of the control variables mostly correspond to the expected results. “Distance” and “colony” have the most important diversification effect within the Tripartite, whereas “contiguity” and “free trade agreement” have the most important diversification effect in the rest-of-world exports.

It appears that the WTO’s TFA generally has a positive effect on the diversification of Tripartite exports. The coefficient on TFA is positive and significant irrespective of the type of product exported or the trading partner. With a coefficient of 1.06, the TFA globally affects primary commodities the most within the Tripartite. This implies that a one-point improvement in the combined TFA is expected to have a 106% increase in the number of primary commodities exported within the region. The TFA has the most important extensive margin effect (99%) on manufactured goods exported outside the Tripartite free trade area.²³

These results are very similar to those in other studies found in the literature (Beverelli, Neumüller and Teh, 2014; Beverelli, Neumüller and Teh, 2015). The difference is the larger coefficients found in this study compared to those found by Beverelli, Neumüller and Teh (2015), and Fontagné, Orefice and Piermartini (2016). This can be explained by the diminishing returns of trade facilitation reforms (Seck, 2017). The Tripartite member countries are at the lower end of the WTO’s TFA compliance (Annex 12). There is therefore much more to gain from improving trade facilitation levels in these countries than in frontier countries that have less room remaining for similar reforms. The existence of many other non-trade-related factors inhibiting the structural transformation of Tripartite economies could also explain these huge coefficients. These factors (e.g. corruption) are eliminated with trade facilitation implementation.

23. These results are identical to those obtained from the “exports value” presented in Annex 10 where a 144% increase is expected in the number of manufactured products exported within and 142% outside the region.

Table 1: Effects of WTO's TFA on the extensive margin of Tripartite exports

	Intra-tripartite			Tripartite to partners in ROW		
	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods
Indist_bb	-0.63*** [0.15]	-1.12*** [0.19]	-1.04*** [0.16]	-0.07*** [0.01]	-0.07*** [0.01]	-0.07*** [0.01]
contig_bb	0.49* [0.29]	0.08 [0.37]	0.11 [0.30]	1.66** [0.76]	1.85*** [0.52]	1.56* [0.88]
comlang_bb	0.57* [0.32]	0.68* [0.36]	0.50* [0.31]	0.75*** [0.12]	0.75*** [0.12]	0.75*** [0.12]
colony_bb	0.97*** [0.30]	1.06*** [0.40]	0.88*** [0.31]	0.81** [0.33]	0.69** [0.33]	0.84** [0.33]
agree_fta_bb	0.31 [0.23]	0.14 [0.24]	0.34 [0.21]	1.17*** [0.20]	1.15*** [0.19]	1.16*** [0.20]
comcol_bb	-0.69*** [0.23]	-0.79*** [0.25]	-0.52** [0.22]	-1.05*** [0.18]	-0.82*** [0.18]	-1.14*** [0.20]
tfa	1.21*** [0.19]	1.06*** [0.23]	1.03*** [0.19]	0.96*** [0.12]	0.84*** [0.11]	0.99*** [0.13]
_cons	7.95*** [1.19]	10.45*** [1.52]	11.47*** [1.32]	11.93*** [0.97]	10.43*** [0.93]	11.66*** [0.99]
N	342	288	342	2140	2140	2100
R2	0.458	0.476	0.473	0.280	0.247	0.282

Notes: The dependent variable is the bilateral number of exported products (in level). The estimator is PPML. Values between parentheses are robust (clustered on paired) standard errors. Significance at 1, 5, and 10 percent is indicated by ***, ** and *, respectively.

4.2 Sub-trade Facilitation Indicators in the Regression

Given the high potential correlation between some trade facilitation indicators, separate regressions were performed with each combined TFI as the main explanatory variable. The results are given in Table 2.²⁴ All indicators (except “fees and charges” (feech)) have coefficients that are positive and significant across all samples. The most critical effect across all types of product and partner is found for “appeal procedures” (appro), whose coefficients vary between 0.97 and 0.77, respectively. It is worth noting that “appeal procedures” have the most important effects on manufactured exports diversification (97%) toward Tripartite partners and on primary commodities (83%) within the Tripartite.

Manufactured exports are positively more affected than primary commodities for all trade facilitation measures (except for “external border agency cooperation” (extbo), 14%) when exports to the rest of the world are considered. This is the same for intra-Tripartite exports, except for “internal border agency cooperation”(intra) (81%), “appeal procedures” (appro) (83%), “formalities-automation” (forau) (80%), “formalities-procedures” (forpr) (69%), and “external border agency cooperation”(extbo) (26%), which have more of a diversification effect on primary commodities.

24. Mostly like those with “total exports” as dependent variable (Annex 11).

Table 2: Effects of WTO/TFA measures on extensive margin of Tripartite exports

	Intra-tripartite			Tripartite to partners in the ROW		
	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods
infav	0.80*** [0.13]	0.63*** [0.15]	0.70*** [0.13]	0.56*** [0.08]	0.46*** [0.07]	0.58*** [0.08]
intra	0.65*** [0.17]	0.81*** [0.20]	0.73*** [0.15]	0.44*** [0.07]	0.35*** [0.06]	0.46*** [0.07]
advan	0.84*** [0.21]	0.65*** [0.25]	0.66*** [0.22]	0.54*** [0.07]	0.48*** [0.06]	0.56*** [0.07]
appro	0.92*** [0.19]	0.83*** [0.19]	0.77*** [0.17]	0.95*** [0.07]	0.84*** [0.06]	0.97*** [0.07]
feech	-0.26 [0.24]	-0.19 [0.27]	-0.32 [0.23]	0.13 [0.10]	0.01 [0.09]	0.14 [0.10]
fordo	0.50** [0.20]	0.31 [0.29]	0.35 [0.22]	0.52*** [0.09]	0.39*** [0.09]	0.55*** [0.09]
forau	0.88*** [0.14]	0.80*** [0.16]	0.74*** [0.13]	0.64*** [0.09]	0.57*** [0.08]	0.65*** [0.09]
forpr	0.79*** [0.21]	0.69*** [0.25]	0.67*** [0.22]	0.64*** [0.14]	0.59*** [0.13]	0.65*** [0.15]
intbo	0.51*** [0.13]	0.46*** [0.14]	0.48*** [0.11]	0.22*** [0.06]	0.18*** [0.05]	0.22*** [0.06]
extbo	0.27*** [0.07]	0.26*** [0.08]	0.24*** [0.07]	0.15*** [0.05]	0.18*** [0.04]	0.14*** [0.05]
govim	0.36*** [0.11]	0.27** [0.12]	0.28** [0.11]	0.34*** [0.06]	0.24*** [0.06]	0.37*** [0.07]

Notes: The dependent variable is the bilateral number of exported products (in level). The estimator is PPML. Values between parentheses are robust (clustered on paired) standard errors. Significance at 1, 5, and 10 percent are indicated by ***, ** and *, respectively.

4.3 WTO and Regional Best Practice Compliance

As the gaps are different across TFA measures (Annex 8), it is difficult to tell which one would yield greater benefits if the Tripartite complies with the WTO's TFA or best regional practice. Table 3 presents the percentage change for the number of exported products if each TFA measure improves from its value in 2015 (baseline) to reach the value of 2 (WTO requirement) or achieves best regional practice. "advance rulings" (advan) measures have the greatest effect on the extensive margin of exports within the Tripartite for both primary commodities (91% to fill regional gap and 100% for WTO gap) and manufactured goods (92% to fill regional gap and 102% for WTO gap). Regarding exports to the rest of the world, "appeal procedures" (appro) measures have the greatest effect on both primary commodities and manufactured goods. Implementing "appeal procedures" (appro) measures to comply with regional best practice will increase the number of exported primary commodities by 70% and manufactured goods by 81%. Also, complying with WTO requirement will imply an increase by 81% of the number of exported primary commodities and by 94% of the number of exported manufactured goods.

Table 3: Effects of WTO TFA compliance on extensive margin of Tripartite exports (% change)

	Intra-tripartite						Tripartite to partners in the ROW					
	Total products		Primary commodities		Manufactured goods		Total products		Primary commodities		Manufactured goods	
	Regional	WTO	Regional	WTO	Regional	WTO	Regional	WTO	Regional	WTO	Regional	WTO
tfa	92	128	81	112	78	109	73	102	64	89	75	105
infav	54	54	43	43	47	47	38	38	31	31	39	39
intra	76	76	95	95	85	85	52	52	41	41	54	54
advan	118	129	91	100	92	102	76	83	67	74	78	86
appro	76	89	69	81	64	75	79	92	70	81	81	94
feech												
fordo	50	59					51	61	39	46	54	64
forau	75	97	68	88	63	81	54	70	48	63	55	72
forpr	43	74	37	65	36	63	35	60	32	55	35	61
intbo	54	54	49	49	51	51	23	23	19	19	23	23
extbo	25	25	24	24	23	23	14	14	17	17	13	13
govim	40	40	30	30	31	31	38	38	27	27	41	41

Source: Computed by the author.

Note: Table 3 only reports percentage changes for significant coefficients of Table 2

4.4 Trade Facilitation Performance by Economic Bloc

Annex 12 shows that the economic blocs that constitute the Tripartite don't have the same performance when it comes to trade facilitation implementation. SADC is the best performer with a score of 47.99% of the total possible score. It is followed by the EAC (47.66%) and COMESA (41.38%). Furthermore, there is performance heterogeneity across trade facilitation measures. For example, in terms of "appeal procedures" (appro) SADC (53.61) performs better than the EAC (50.2). Thus, the estimation results shouldn't be lumped together, but broken down in terms of economic bloc, product type and trade facilitation measure.

Tables 4 and 5 summarize the extensive margin effects of trade facilitation measures by the Tripartite economic bloc within the Tripartite (Table 4), and with rest-of-world partners (Table 5). The first insight is that SADC trade facilitation policies perform better on export diversification than the EAC and COMESA's, regardless of type of product, partner, or trade facilitation measure (except "fees and charges" (feech)). The EAC performs better than COMESA which always has negative and significant effects on the number of exported products.

Within the Tripartite, SADC's trade facilitation policies have the greatest impact on primary commodities (81%) (Table 4), whereas with external Tripartite partners, manufactured goods are the most positively and significantly affected (50%) (Table 5). For SADC exports to other Tripartite members (Table 4), "advance rulings" (advan) have the most important diversification impact on total products (79%) and manufactured

goods (62%), and “formalities-automation” (forau) on primary commodities (72%). With the rest-of-world partners (Table 5) “advance rulings” (advan) still have the greatest effect on both primary commodities (44%) and manufactured goods (54%).

It should be mentioned that EAC trade facilitation policies related to “information availability” (infav), “involvement of trade community” (intra), “advance rulings” (advan), “Appeal procedures” (appro), “formalities-documents” (fordo) and “formalities-automation” (forau) have a noticeable positive effect on diversification toward the rest of the world for primary commodities (Table 5).

Globally, these analyses confirm that SADC has the best performance in terms of trade facilitation implementation compared to other Tripartite economic blocs. This performance could be explained by South Africa’s membership of this bloc, the best regional practice for most trade facilitation measures (Annex 8), and for the extensive margin (Annex 7).

Table 4: Extensive margin effects of trade facilitation measures by Tripartite, within Tripartite economic bloc

	EAC			SADC			COMESA		
	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods
tfa	0.16 [0.23]	-0.03 [0.25]	0.14 [0.23]	0.84*** [0.17]	0.81*** [0.20]	0.73*** [0.17]	-0.27 [0.17]	-0.42** [0.18]	-0.28* [0.16]
infav	0.07 [0.10]	0.02 [0.12]	0.10 [0.11]	0.39*** [0.11]	0.33*** [0.11]	0.30*** [0.10]	-0.15* [0.08]	-0.21** [0.08]	-0.15** [0.08]
intra	0.30 [0.22]	0.20 [0.25]	0.42* [0.22]	0.40*** [0.15]	0.64*** [0.19]	0.50*** [0.14]	-0.17 [0.16]	-0.19 [0.16]	-0.09 [0.15]
advan	0.57* [0.31]	0.24 [0.29]	0.43 [0.31]	0.79*** [0.21]	0.65** [0.26]	0.62*** [0.22]	0.11 [0.26]	-0.23 [0.21]	0.06 [0.24]
appro	0.12 [0.17]	0.02 [0.19]	0.17 [0.17]	0.56*** [0.15]	0.59*** [0.16]	0.48*** [0.14]	-0.11 [0.15]	-0.19 [0.16]	-0.10 [0.14]
feech	-0.08 [0.29]	-0.33 [0.34]	-0.11 [0.32]	-0.15 [0.20]	-0.06 [0.25]	-0.19 [0.21]	-0.66*** [0.16]	-0.77*** [0.17]	-0.65*** [0.15]
fordo	-0.17 [0.24]	-0.31 [0.29]	-0.15 [0.26]	0.48** [0.19]	0.33 [0.26]	0.36* [0.20]	-0.40** [0.17]	-0.57*** [0.17]	-0.39*** [0.15]
forau	0.40** [0.18]	0.20 [0.21]	0.44** [0.19]	0.72*** [0.13]	0.72*** [0.16]	0.59*** [0.12]	-0.11 [0.13]	-0.21 [0.13]	-0.10 [0.12]
forpr	0.04 [0.18]	-0.12 [0.20]	-0.03 [0.20]	0.48*** [0.17]	0.56*** [0.19]	0.50*** [0.17]	-0.38*** [0.14]	-0.50*** [0.15]	-0.40*** [0.14]
intbo	-0.05 [0.13]	-0.22 [0.16]	-0.06 [0.13]	0.55*** [0.13]	0.52*** [0.14]	0.51*** [0.11]	-0.16 [0.11]	-0.30*** [0.11]	-0.13 [0.11]
extbo	0.11 [0.11]	0.05 [0.13]	0.01 [0.13]	0.24*** [0.08]	0.23*** [0.08]	0.22*** [0.07]	0.04 [0.07]	0.00 [0.07]	-0.01 [0.07]
govim	0.03 [0.21]	-0.02 [0.21]	0.03 [0.20]	0.36*** [0.10]	0.29** [0.12]	0.29*** [0.10]	-0.21 [0.13]	-0.31** [0.13]	-0.24** [0.12]

Table 5: Extensive margin effects of trade facilitation measures by Tripartite economic bloc with rest of world

	EAC			SADC			COMESA		
	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods
tfa	-0.14 [0.13]	0.18* [0.10]	-0.25* [0.15]	0.46*** [0.11]	0.31*** [0.10]	0.50*** [0.11]	-0.35*** [0.09]	-0.24*** [0.08]	-0.39*** [0.10]
infav	-0.10 [0.07]	0.08* [0.05]	-0.17** [0.08]	0.17*** [0.06]	0.07 [0.06]	0.20*** [0.06]	-0.19*** [0.05]	-0.13*** [0.05]	-0.21*** [0.06]
intra	0.07 [0.15]	0.32*** [0.11]	-0.02 [0.18]	0.16*** [0.06]	0.07 [0.06]	0.19*** [0.06]	-0.12 [0.08]	-0.09 [0.07]	-0.12 [0.08]
adva n	0.01 [0.20]	0.42*** [0.14]	-0.14 [0.24]	0.52*** [0.06]	0.44*** [0.06]	0.54*** [0.06]	-0.60*** [0.13]	-0.45*** [0.11]	-0.64*** [0.14]
appro	-0.08 [0.09]	0.18*** [0.07]	-0.18* [0.10]	0.30*** [0.07]	0.19*** [0.07]	0.33*** [0.08]	-0.01 [0.07]	0.07 [0.07]	-0.03 [0.08]
feech	-0.18 [0.19]	0.13 [0.13]	-0.30 [0.21]	0.04 [0.08]	-0.07 [0.07]	0.06 [0.08]	-0.41*** [0.09]	-0.34*** [0.07]	-0.44*** [0.09]
fordo	-0.23 [0.17]	0.22* [0.12]	-0.40** [0.20]	0.39*** [0.09]	0.24*** [0.09]	0.43*** [0.09]	-0.36*** [0.10]	-0.34*** [0.08]	-0.37*** [0.10]
forau	0.04 [0.14]	0.36*** [0.10]	-0.08 [0.16]	0.35*** [0.08]	0.25*** [0.07]	0.37*** [0.08]	-0.27*** [0.08]	-0.16** [0.07]	-0.31*** [0.09]
forpr	-0.20 [0.13]	0.08 [0.09]	-0.30** [0.14]	0.35*** [0.11]	0.23** [0.10]	0.39*** [0.12]	-0.44*** [0.09]	-0.32*** [0.08]	-0.48*** [0.09]
intbo	-0.21** [0.11]	0.06 [0.07]	-0.33*** [0.12]	0.24*** [0.05]	0.17*** [0.05]	0.25*** [0.06]	-0.36*** [0.08]	-0.29*** [0.07]	-0.39*** [0.09]
extbo	-0.18*** [0.06]	-0.02 [0.05]	-0.24*** [0.06]	0.16*** [0.05]	0.14*** [0.05]	0.16*** [0.05]	-0.19*** [0.04]	-0.07* [0.04]	-0.23*** [0.05]
govi m	-0.08 [0.10]	0.07 [0.08]	-0.13 [0.12]	0.33*** [0.06]	0.20*** [0.06]	0.36*** [0.07]	-0.23*** [0.06]	-0.21*** [0.06]	-0.24*** [0.07]

5.0 Conclusion and policy implications

The 26 Tripartite member countries that are WTO members are bound to implement at different rates the WTO's TFA that came into force in February 2017. Compliance with these provisions is likely to have a positive impact on export diversification for the Tripartite. The results of this study that estimates the effect of each WTO TFA measure on the number of exported products (primary products and manufactured products) within the Tripartite and with the rest of the world could be very helpful for policy makers and negotiators in the region.

The results of this study show that the WTO's TFA has a positive effect on the diversification of Tripartite exports irrespective of the type of product, the trading partner or the trade facilitation measure. The most important effect on manufactured goods is observed with rest-of-the world partners, whereas with other Tripartite partners the TFA mostly affects primary commodities.

Although all measures (except "fees and charges" (feech)) have coefficients that are positive and significant across all samples, the most critical effect across all types of product and partner is found for "appeal procedures" (apro), whose coefficients vary between 0.97 and 0.77, respectively. "Appeal procedures" (apro) have the most important effects on manufactured exports diversification (97%) toward Tripartite partners, and on primary commodities (83%) within the Tripartite. The manufactured exports are positively more affected than primary commodities for all trade facilitation measures (except for "external border agency cooperation", extbo, 14%) when exports to the rest of the world are considered. This is also the case for intra-Tripartite exports except for "internal border agency cooperation" (intra) (81%), "appeal procedures" (apro) (83%), "formalities-automation" (forau) (80%), "formalities-procedures" (forpr) (69%), and "external border agency cooperation" (extbo) (26%), which have more of a diversification effect for primary commodities.

The analysis shows that instituting "advance rulings" (advan) and "appeal procedures" (apro) measures, thereby complying with regional best practice (a WTO TFA requirement), would yield greater benefits. "Advance rulings" (advan) policies have the greatest effect on the extensive margin of exports within the Tripartite for both primary commodities (91% to fill regional gap and 100% for WTO gap) and manufactured goods (92% to fill regional gap and 102% for WTO gap). Similarly, "appeal procedures" (apro) measures have the greatest effects for both primary commodities and manufactured goods regarding exports to the rest of the world.

Implementing “appeal procedures” (apro) measures to comply with regional best practice (a WTO requirement) would increase the number of exported primary commodities by 70% (81%) and manufactured goods by 81% (94%).

SADC affects export diversification more than EAC and COMESA, regardless of the type of product, partner or trade facilitation measure. The EAC performs better than COMESA.

SADC’s trade facilitation policies have the greatest impact on primary commodities within the Tripartite (81%), and on manufactured goods with external Tripartite partners (50%). SADC’s “advance rulings” (advan) and “formalities-automation” (forau) policies have the most important diversification impact within the Tripartite. The former for manufactured goods (62%) and the latter for primary commodities (72%). With the rest-of-world partners, “advance rulings” (advan) have the greatest effects for both primary commodities (44%) and manufactured goods (54%). The EAC trade facilitation policies related to “information availability” (infav), “involvement of trade community” (intra), “advance rulings” (advan), “appeal procedures” (apro), “formalities-documents” (fordo) and “formalities-automation”(forau) have a noticeable positive effect on the diversification of primary commodity exports toward the rest of the world.

This study recommends implementing the WTO TFA if policy makers want to increase export diversification both within the Tripartite and with external partners. Special attention should be paid to “appeal procedures” measures to increase the number of export products both within and outside the Tripartite Free Trade Area. Tripartite member countries should rely on “appeal procedures” and “advance rulings” for helping them to export the greatest number of products in the region. This would help them attain best regional practice and compliance with the WTO requirement. SADC, and the EAC to a lesser extent, should be the main leading economic blocs to address the challenges of facilitating trade for the economic transformation for Tripartite member countries.

Although many studies have shown that the WTO’s TFA would be positive for export diversification, many countries have proven to be reluctant to ratify this agreement. TF measures raise some concerns and have failed to win unanimous support at the WTO; notably for developing countries (South Centre, 2011; ICTSD, 2012). Many of these countries believe that the agreement on TF will only open their markets to imports from developed countries, which will weaken the local industry while strengthening the deficits of trade balance. Further research should tackle this by investigating the impact of the WTO’s TFA on imports, deindustrialization and the balance of payments.

References

- Amurgo-Pacheco, A. and M. Pierola. 2008. "Patterns of export diversification in developing countries". Policy Research Working Paper No. 4473. World Bank, Washington, D.C.
- Anderson, J. and Y. Yotov. 2010. "Specialization: Pro- and anti-globalizing, 1990–2002". NBER Working Paper No. 16301. National Bureau of Economic Research, Cambridge, Massachusetts.
- Anderson, J. and E. Van Wincoop. 2003. "Gravity with gravitas: A solution to the border puzzle". *American Economic Review*, 93(1): 170–92.
- Anderson, J. and E. Van Wincoop. 2004. "Trade cost". *Journal of Economic Literature*, 42(3): 691–751.
- Arkolakis, C. 2010. "Market penetration costs and the new consumers margin in international trade". *Journal of Political Economy*, 118(6): 1151–99.
- Berthou, A. and L. Fontagné. 2008. "The euro effects on the firm and product-level trade margins: Evidence from France". CEPII Working Paper No. 2008-21. (I am unable to make an in-line comment so will add comments next to items.)
- Besedes, T. and T. Prusa. 2011. "The role of extensive and intensive margins and export growth". *Journal of Development Economics*, 96(2): 371–9.
- Beverelli, C., S. Neumüller and R. Teh. 2014. "A new look at the extensive trade margin effects of trade facilitation". WTO Staff Working Paper No. ERSD-2014-16. World Trade Organization, Geneva.
- Beverelli, C., S. Neumüller and R. Teh. 2015. "Export diversification effects of the WTO Trade Facilitation Agreement". *World Development*, 76: 293–310.
- Blanke, J., Z. Brixiova, U. Dadush, T. Gurcanlar and G. Iarossi. 2011. Exports, FDI, and Competitiveness in Africa. The African Competitiveness Report 2011. Geneva: The World Economic Forum.
- Cadot, O., C. Carrère and V. Strauss-Kahn. 2011. "Trade diversification: Drivers and impacts". Mimeo. International Labour Organization, Genève.
- Cameron, A.C. and P.K. Trivedi. 2013. "Regression analysis of count data", second edition. *Econometric Society Monograph No. 53*. New York: Cambridge University Press.

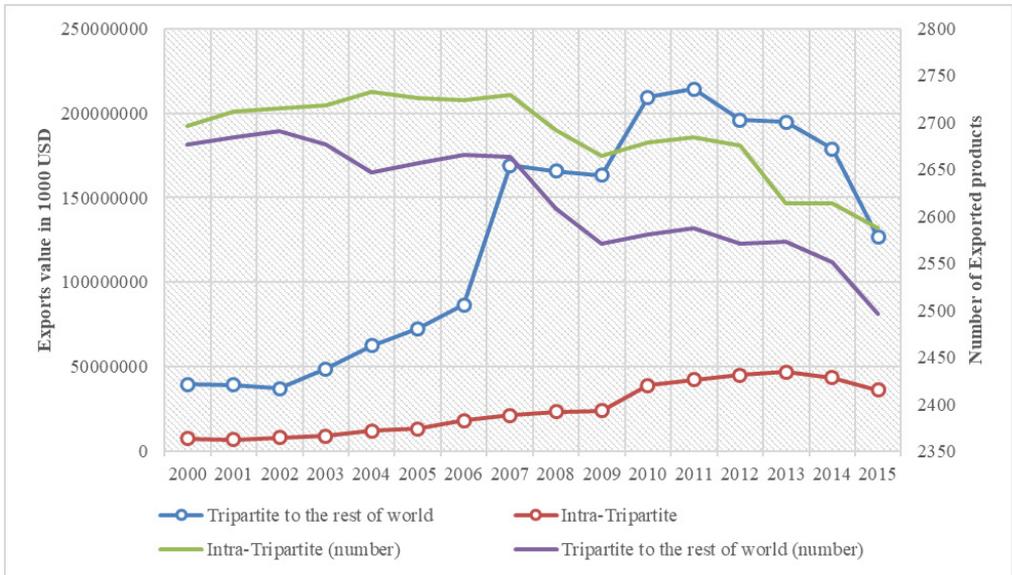
- Cerasa, A., F. Torti and D. Perrotta. 2016. "Heteroscedasticity, multiple populations and outliers in trade data". In E. M. Tonio Di Battista. In T. Di Battista, E. Moreno and W. Racugno, eds, *Topics on Methodological and Applied Statistical Inference*. Cham, Springer International Publishing.
- Cheng, I.-H. and H. Wall. 2005. "Controlling for heterogeneity in gravity models of trade and integration". *Federal Reserve Bank of St. Louis Review*, 49–63.
- De Sá Porto, P., O. Canuto and C. Morini. 2015. "The impacts of trade facilitation measures on international trade flows". Policy Research Working Paper No. 7367. The World Bank, Washington, D.C.
- Dennis, A. and B. Shepherd. 2007. "Trade costs, barriers to entry, and export diversification in developing countries". Policy Research Working Paper No. 4368. The World Bank, Washington, D.C.
- Eaton, J., S. Kortum and F. Kramarz. 2004. "Dissecting trade: Firms, industries, and export destinations". *American Economic Review*, 94: 150–4.
- Eichengreen, B. and D. Irwin. 1998. "The role of history in bilateral trade flows". In J.A. Frankel, ed., *The Regionalization of the World Economy*. Chicago: The University of Chicago Press.
- Feenstra, R., R. Lipsey and H. Bowen. 1997. "World trade flows, 1970–1992, with production and tariff data". NBER Working Paper No. 5910. National Bureau of Economic Research, Cambridge, Massachusetts.
- Ferro, E., A. Portugal-Perez and J. Wilson. 2014. "Aid to the services sector: Does it affect manufacturing exports?" *The World Economy*, 37(4): 530–41.
- Fontagné, L., G. Orefice and R. Piermartini. 2016. "Making (small) firms happy: The heterogeneous effect of trade facilitation measures". WTO Staff Working Papers No. ERSD-2016-03. World Trade Organization, Economic Research and Statistics Division, Genève.
- Fundari, T. 2013. "An analysis of Africa's export performance and export similarity for select countries within the Tripartite Free Trade Area market". Tralac Trade brief No.S13TB03/2013. Tralac, Stellenbosch. Please supply more information.
- Helble, M., C. Mann and J. Wilson. 2009. "Aid for trade facilitation". Policy Research Working Paper No. WPS 5064. The World Bank, Washington, D.C.
- Helpman, E., M. Melitz and Y. Rubinstein. 2008. "Estimating trade flows: Trading partners and trading volumes". *Quarterly Journal of Economics*, 123: 441–87.
- Hillberry, R. and D. Hummels. 2008. "Trade responses to geographic frictions: A decomposition using micro-data". *European Economic Review*, 52: 527–50.
- Hillberry, R. and C. McDaniel. 2002. "A decomposition of North American trade growth since NAFTA". Working Paper No. 15866, United States International Trade Commission, Office of Economics. Research Division, 500 E Street, SW, Washington, DC.
- Hillberry, R. and X. Zhang. 2015. "Policy and performance in customs: Evaluating the trade facilitation agreement". Policy Research Working Paper No. 7211. The World Bank Group, Washington, D.C.

- Hoekman, B. and D. Njinkeu. 2017. "Integrating Africa: Some trade policy research priorities and challenges". EUI Working Paper RSCAS No. 2017/43. European University Institute, Florence, Italy.
- Hoekstra, R. 2013. "Boosting manufacturing firms' exports? The role of trade facilitation in Africa". IEE Working Paper No. 197. ISBN 978-3-927276-83-3, RuhrUniversität Bochum, Institut für Entwicklungsforschung und Entwicklungspolitik (IEE), Bochum.
- Hummels, D. and P. Klenow. 2005. "The variety and quality of a nation's exports". *American Economic Review*, 95: 704–23.
- ICTSD. (2012). "Signs of momentum in WTO Doha round talks, Lamy says". *Bridges Weekly Trade News Digest*, 16(33), 3 October.
- Inmaculada, M.-Z. and L. Márquez-Ramo. 2008. "The Effect of Trade Facilitation on Sectoral Trade". The B.E. *Journal of Economic Analysis & Policy*, De Gruyter, 8(1):1-46 .
- Kehoe, T. 2005. "An evaluation of the performance of applied general equilibrium models of the impact of NAFTA". In T.J. Kehoe, T.N. Srinivasan and J. Whalley, eds, *Frontiers in Applied General Equilibrium Modeling: Essays in Honor of Herbert Scarf*(pp.341–77). Cambridge: Cambridge University Press.
- Lee, H.-y. and C-S. Kim. 2012. "The impact of trade facilitation on the extensive and intensive margins of trade: An application for developing countries". *Journal of East Asian Economic Integration*, 16(1): 67–96.
- Mayer, T. and G. Ottaviano. 2008. "The happy few: The internationalisation of European firms". *Intereconomics: Review of European Economic Policy*, 43(3): 135–48.
- Melitz, M. 2003. "The impact of trade on intra-industry reallocations and aggregate industry productivity". *Econometrica*, 71(6): 1695–725.
- Moisés, E. and S. Sorescu. 2013. "Trade Facilitation Indicators: The Potential Impact of Trade Facilitation on Developing Countries' Trade". OECD Trade Policy Paper No. 144. OECD Publishing. Paris.
- Moisés, E., T. Orliac and P. Minor. 2011. "Trade facilitation indicators: The impact on trade costs". OECD Trade Policy Working Paper No. 118. OECD Publishing. Paris.
- Njinkeu, D., J.S. Wilson and B. Fosso. 2008. "Expanding trade within Africa: The impact of trade facilitation". Policy Research Working Paper No. WPS 4790. The World Bank, Washington, D.C.
- Organisation for Economic Co-operation and Development (OECD) Trade Facilitation Indicators Database. OECD. Paris. Available at <http://sim.oecd.org/Default.ashx?lang=En&ds=TFI>.
- Pearson, M. 2011. "Trade facilitation in the COMESA-EAC-SADC Tripartite free trade area". Tralac Working Paper No. S11WP11/2011. Tralac, Stellenbosch.
- Persson, M. 2008. "Trade facilitation and the EU-ACP economic partnership agreements". *Journal of Economic Integration*, 23(3): 518–546.
- Persson, M. 2013. "Trade facilitation and the extensive margin". *The Journal of International Trade & Economic Development*, 22(5): 658–693.

- Persson, M. and F. Wilhelmsson. 2016. "EU trade preferences and export diversification". *World Economy*, 39(1):16-53.
- Portugal-Perez, A. and J. Wilson. 2008. "Why trade facilitation matters to Africa?" World Bank Policy Research Working Paper Series No. 4719. The World Bank, Washington, D.C.
- Santos Silva, J. and S. Tenreyro. 2006. "The log of gravity". *The Review of Economics and Statistics*, 88(4): 641–658.
- Seck, A. 2017. "How facilitating trade would benefit trade in sub-Saharan Africa". *Journal of African Development*, 19(1): 1–26.
- South Centre. 2011. "Trade Facilitation State of Play and Implications of an 'Early Harvest' for Developing Countries". Geneva: South Centre, May.
- Turkson, F. 2011. "Logistics and Bilateral Exports in Developing Countries: A Multiplicative Form Estimation of the Logistics Augmented Gravity Equation". Discussion Paper No. 11/06, University of Nottingham, Nottingham
- UNECA. 2011. "Study on the establishment of inter-RECs' free trade areas in Africa: Drawing on lessons from the COMESA-SADC-EAC FTA experience". Final Report, United Nations Economic Commission for Africa. Addis Ababa, Ethiopia.
- Wilson, J., C. Mann, C. and T. Otsuki. 2004. "Assessing the potential benefit of trade facilitation: A global perspective". Policy Research Working Paper No. 3224. The World Bank, Washington, D.C.
- Winkelmann, R. 2003. *Econometric Analysis of Count Data*, 4th edition. Berlin: Springer-Verlag.
- World Integrated Trade Solution (WITS) Database. World Bank Group. Washington, D.C. Available at <https://wits.worldbank.org/>
- WTO. 2015. "World Trade Report 2015. Speeding up trade: Benefits and Challenges of Implementing the WTO Trade Facilitation Agreement". World Trade Organization, Geneva.
- Yotov, Y., R. Piermartini, J.-A. Monteiro and M. Larch. 2016. "An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model". Geneva: World Trade Organization Publications.

Annexes

Figure A 1: Evolution of Tripartite exports and number of exported products



Source: Author from WITS database

Table A 1: State of implementation of each OECD's TFI by Tripartite country (2015)

Category	Information availability	Involvement of trade community	Advance rulings	Appeal procedures	Fees and charges	Formalities-documents	Formalities-automation	Formalities-procedures	Internal border agency co-operation	External border agency co-operation	Governance and impartiality	Total points (out of 22)	Percentage of total points (%)
DRC	0.25	0.50	0.33	0.50	1.00	0.40	0.00	0.80	0.50	0.00	0.00	4.28	19.45
Djibouti	0.78	0.33	0.50	0.00	1.33	1.00	0.50	1.00	0.00	0.00	0.00	5.44	24.72
Egypt	1.10	0.75	0.00	1.43	0.67	0.40	0.50	0.56	0.00	1.00	0.17	6.57	29.86
Lesotho	1.50	0.00	0.67	0.83	1.00	1.00	0.33	0.80	0.00	0.00	0.63	6.76	30.72
Swaziland	1.50		0.00	0.67	1.00	1.50	0.33	0.67	0.00	0.00	1.25	6.92	31.45
Burundi	0.40	0.25	0.33	0.25	0.67	0.50	0.50	1.00	1.00	2.00	0.33	7.23	32.86
Malawi	1.50	1.00	0.00	1.00	1.00	0.33	1.00	1.00	0.00	0.00	0.86	7.69	34.95
Angola	1.30	0.50	0.29	1.00	0.75	0.33	0.75	0.88	2.00		1.17	8.96	40.72
Mozambique	0.70	0.67	0.00	0.63	1.33	0.33	0.67	1.10	1.00	2.00	0.57	9	40.91
Namibia	0.75	1.33	0.00	1.50	1.33	0.83	0.75	1.21	1.00	0.00	0.50	9.21	41.86
Madagascar	1.60	0.33	0.75	1.00	1.00	0.83	1.00	1.30	0.67		0.86	9.34	42.45
Uganda	1.40	0.50	0.33	1.00	0.67	1.00	0.75	1.13	1.00	1.75	0.00	9.54	43.35
Tanzania	1.50	1.00	0.86	1.14	0.50	0.83	1.00	0.83	1.50		0.50	9.67	43.95
Ethiopia	1.60	0.67	0.50	1.38	1.33	0.33	1.25	1.00	2.00	0.00	1.00	11.06	52.72
Zambia	1.60	1.00	0.29	1.25	0.67	0.83	1.50	0.69	1.00	2.00	0.75	11.58	52.63
Rwanda	1.80	0.67	0.33	1.25	1.00	1.00	0.67	1.56	1.00	2.00	1.75	13.02	59.18
Kenya	1.70	1.25	0.67	1.38	1.00	0.67	1.25	1.31	0.67	2.00	1.38	13.26	60.27
Zimbabwe	1.40	1.25	0.86	0.75	1.33	0.83	1.50	1.40	1.33	2.00	1.25	13.91	63.23
Botswana	1.78	1.33	0.00	1.63	1.67	1.17	1.33	0.89	1.33	1.25	1.71	14.09	64.00
Mauritius	1.60	2.00	1.00	1.25	1.33	1.83	1.50	1.53	2.00		1.83	15.88	72.18
South Africa	2.00	1.25	1.86	1.86	1.25	1.50	1.75	1.60	1.67	2.00	2.00	18.73	85.14
	27.76	16.58	9.57	21.70	21.83	17.44	18.83	22.26	19.67	18.00	18.51		
	66.10	39.48	22.79	51.67	51.98	41.52	44.83	53.00	46.83	42.86	44.07		

Source: Author from OECD TFI database

Note: Three countries (Libya, Eritrea and Seychelles) of the 26 countries of the Tripartite are not included in the dataset. The indicator is ranked from 0 (bad) to 2 (best).

Table A 3: Mapping OECD TFIs, TFA articles and trade costs

TFI	TFA article	Trade cost
(a) Information	Art. I: Required to publish information related to importation, exportation and transit promptly and in an easily accessible way, making it available on the internet, together with the necessary forms and documents, as well as providing the contact information for enquiry points	Reduce information frictions
(b) Involvement of the trade community	Art. II: Opportunity for traders to comment, get information before the entry into force of laws and regulations related to the movement, release, and clearance of goods	Avoid inefficient legislation
(c) Advance rulings	Art.III: Requires members to issue an advance ruling, which will be binding, in a reasonable, time-bound manner in response to any written request that contains all necessary information; inform an applicant in writing if the application is declined, specifying the reasons; and inform the applicant if the advance ruling is revoked, modified or invalidated	Improve impartiality, non-discrimination, transparency (reduce potential for corruption) ex ante, lower uncertainty
(d) Appeal procedures	Art. IV: Provides the right to appeal to an administrative decision from customs	Improve impartiality, non-discrimination, transparency (reduce potential for corruption) ex post
(e) Fees and charges	Art. VI: Requires members to publish information on the application of fees and charges sufficiently in advance of their entry into force; ensure measures are in place to avoid any conflicts of interest and incentives in the assessment and collection of penalties and duties	Improve impartiality, non-discrimination, transparency (reduce potential for corruption)
(f)–(h) Formalities–document, automation, procedures	Art. VII and X: Aimed at minimizing the complexity of import, export, and transit formalities and documentation requirements, this article contains provisions on: acceptance of copies, use of international standards, single window, pre-shipment inspection, use of customs brokers, common border procedures, expedited shipments, perishable goods	Time costs, complexity
(i)–(j) Cooperation – internal and external	Art. VIII: ensure that there is internal–external cooperation and coordination among border control authorities and agencies dealing with importation, exportation, and transit of goods	Reduce inefficiencies at the border
(k) Consularization	Not included in the WTO TFA	
(l) Governance and impartiality	Art. V. requires that notifications for enhancing border controls regarding food, beverages, or feed are based on risk; apply the measures uniformly, provide the opportunity for a second test if the results of the first one are negative	Improve impartiality, non-discrimination, transparency (reduce potential for corruption) for food and beverages
(m)–(p) Transit	Art.XI: Freedom of transit	Reduce costs when passing through transit countries

Source: Adapted by author from Fontagné, Orefice and Piermartini (2016).

Table A 4: Variables of the study

Variables	Description	Data sources
Dependent variables		
nexp	Number of exported products (extensive margins of products)	Computation from UN Comtrade trade data
exp	Exports (US\$('000))	UN Comtrade trade data
Independent variables of interest		
tfa	Product of simple average of trade facilitation measures (tfai*tfaj)	Computation from OECD TFI
infav	Product of information availability (infavi*infavj)	OECD TFI
invtr	Product of involvement of the trade community (invtri*invtrj)	OECD TFI
advan	Product of advance rulings (advani*advanj)	OECD TFI
appro	Product of appeal procedures (approi*approj)	OECD TFI
feech	Product of fees and charges (feechi*feechj)	OECD TFI
fordo	Product of formalities-documents (fordoi*fordoj)	OECD TFI
forau	Product of formalities-automation (forai*forauj)	OECD TFI
forpr	Product of formalities-procedures (forpri*forprj)	OECD TFI
intbo	Product of border agency cooperation – internal (intboi*intboj)	OECD TFI
extbo	Product of border agency cooperation – external (extboi*extboj)	OECD TFI
govim	Product of governance and impartiality (govimi*govimj)	OECD TFI
Independent variables of control		
agree_fta_bb	Baier and Bergstrand (2009) MR term based on Agree_FTA dummy	Computed from dynamic gravity dataset
Indistw_bb	Baier and Bergstrand (2009) MR term based on Indistw Geographical distance in kilometre	Computed from CEPII data
comlang_bb	Baier and Bergstrand (2009) MR term based on comlang_off dummy	Computed from CEPII data
contig_bb	Baier and Bergstrand (2009) MR term based on contiguity dummy	Computed from CEPII data
colony_bb	Baier and Bergstrand (2009) MR term based on colony dummy	Computed from CEPII data

Source: Author.

Table A 5: Number of variables and weight of each variable within each OECD TFI

Indicator code	Indicator	Number of variables	Weight of each variable
A	Information availability	21	0.047619048
B	Involvement of the trade community	8	0.125
C	Advance rulings	11	0.090909091
D	Appeal procedures	13	0.076923077
E	Fees and charges	14	0.071428571
F	Formalities-documents	9	0.111111111
G	Formalities-automation	13	0.076923077
H	Formalities-procedures	35	0.028571429
I	Internal border agency co-operation	11	0.090909091
J	External border agency co-operation	11	0.090909091
K	Governance and impartiality	9	0.111111111

Source: Author from OECD's TFI database.

Table A 6: List of variables, weight, answer and score of the indicator category "involvement of the trade community" in South Africa in 2015

Indicator code	Description	Weight	Answer	Score	Contribution
A.1	Establishment of a national customs website	0.047619048	2	2	0.095238095
A.2	Possibility to provide online feedback to customs	0.047619048	2	2	0.095238095
A.3	Publication of rate of duties	0.047619048	2	2	0.095238095
A.4	Establishment of enquiry points	0.047619048	2	2	0.095238095
A.5	Adjustment of enquiry points' operating hours to commercial needs	0.047619048	2	2	0.095238095
A.6	Timeliness of enquiry points	0.047619048	0	0	0
A.7	Information on import and export procedures	0.047619048	2	2	0.095238095
A.8	Required documentation easily accessible for downloading	0.047619048	2	2	0.095238095
A.9	Information about procedures published in advance of entry into force	0.047619048	2	2	0.095238095
A.10	Average time between publication and entry into force	0.047619048	2	2	0.095238095
A.11	Publication of agreements with any country or countries relating to the above issues	0.047619048	2	2	0.095238095
A.12	Publication of information on procedural rules for appeal	0.047619048	2	2	0.095238095
A.13	Publication of decisions and examples of customs classification	0.047619048	1	1	0.047619048
A.14	Publication of necessary information on advance rulings	0.047619048	1	1	0.047619048
A.15	Penalty provisions for breaches of import and export formalities published	0.047619048	1	1	0.047619048
A.16	Applicable legislation published on internet	0.047619048	1	1	0.047619048
A.17	Publication of judicial decisions on customs matters	0.047619048	2	2	0.095238095
A.18	Dedicated interactive page for professional users/companies	0.047619048	0	0	0
A.19	User manuals available online	0.047619048	2	2	0.095238095
A.20	Quality/user friendliness of the research/help function on the customs website	0.047619048	2	2	0.095238095
A.21	Transparency of government policymaking	0.047619048	4.5	2	0.095238095

Source: Author from OECD's TFI database

Table A 7: Summary statistics of dependent variables, number of exported products, 2015

	Intra-Tripartite				%Zeros	Tripartite to partners in the ROW				
	Obs.	Mean	Min.	Max.		Obs.	Mean	Min.	Max.	% zeros
Primary commodities	414	43.11	0	511 (South Africa to Namibia)	43%	3,192	6.94	0	277 (South Africa to the Netherlands)	50.56%
Manufactured goods	460	172.37	0	1932 (South Africa to Namibia)	32%	3,168	24.34	0	1171 (South Africa to the Netherlands)	44.54%
Total products	460	139.32	0	2443 (South Africa to Namibia)	29%	3,216	30.87	0	1448 (South Africa to the Netherlands)	37%

Source: Author from STATA 15.

Table A 8: Summary statistics of TFA variables, 2015

	Tripartite			Gap to regional Best practice	Gap to WTO	Partners in ROW		
	Min.	Mean	Max.			Min.	Mean	Max.
tfa	.3890909	.9403723	1.703636	0.76	1.06	.2588384	1.269396	1.789394
infav	.25	1.321905	2	0.678	0.678	.125	1.530475	2
intra	0	.829	2	1.171	1.171	0	1.350779	2
advan	0	.4557143	1.86	1.40	1.54	0	1.293892	2
appro	0	1.033333	1.86	0.83	0.97	.5	1.501014	2
feech	.5	1.039524	1.67	0.63	0.96	0	1.277259	2
fordo	.33	.8304762	1.83	0.99	1.17	.166667	1.101389	2
forau	0	.8966667	1.75	0.85	1.10	0	1.303532	2
forpr	.56	1.06	1.6	0.54	0.94	.222222	1.156657	1.85714
intbo	0	.9366667	2	1.06	1.06	0	1.329248	2
EXTBO	0	1.058824	2	0.94	0.94	0	1.116477	2
govim	0	.8814286	2,	1.12	1.12	0	1.319551	2

Source: Author from STATA 15.

Table A 9: Countries used in gravity model

Tripartite country members (i)	Africa Tripartite partners (j)	Rest of world Tripartite partners (j)					
South Africa	Algeria	Afghanistan	Canada	Hong Kong, China	Malta	Qatar	Uruguay
Angola	Benin	Albania	Chile	Hungary	Mexico	Romania	Uzbekistan
Botswana	Burkina Faso	Albania	China	Iceland	Micronesia, Federated States of	Russian Federation	Venezuela, Bolivarian Republic of
Burundi	Cameroon	Andorra	Colombia	India	Moldova	Samoa	Republic of Vietnam
Comoros	Cape Verde	Antigua and Barbuda	Costa Rica	Indonesia	Mongolia	Saudi Arabia	Yemen
Djibouti	Central African Republic	Argentina	Croatia	Iran, Islamic Rep.	Montenegro	Serbia, FR (Serbia/Montenegro)	
Egypt	Congo, Rep.	Armenia	Cyprus	Ireland	Myanmar	Singapore	
Eritrea	Côte d'Ivoire	Australia	Czech Republic	Israel	Nepal	Slovak Republic	
Ethiopia	Gambia, The	Austria	Denmark	Italy	Netherlands	Slovenia	
Kenya	Ghana	Azerbaijan	Dominican Republic	Jamaica	New Caledonia	Solomon Islands	
Lesotho	Guinea	Bahamas	Dominique	Japan	New Zealand	Spain	
Libya	Mali	Bahrain	East Timor	Jordan	Nicaragua	Sri Lanka	
Madagascar	Mauritania	Bangladesh	Ecuador	Kazakhstan	Nicaragua	St. Kitts and Nevis	
Malawi	Morocco	Barbados	El Salvador	Kiribati	Norway	St. Lucia	
Mauritius	Niger	Belarus	Estonia	Korea, Rep.	Occ.Pal.Terr	St. Vincent and the Grenadines	
Mozambique	Nigeria	Belgium	Fiji	Kuwait	Oman	Suriname	
Namibia	Sao Tome and Principe	Belize	Finland	Kyrgyz Republic	Other Asia, not elsewhere specified	Sweden	
Uganda	Senegal	Benin	France	Lao People's Democratic Republic	Pakistan	Switzerland	
DRC	Sierra Leone	Bermuda	French Polynesia	Latvia	Palau	Thailand	
Rwanda	Togo	Bhutan	Georgia	Lebanon	Panama	Tonga	
Seychelles	Tunisia	Bolivia	Germany	Lithuania	Papua New Guinea	Trinidad and Tobago	
Sudan		Bosnia and Herzegovina	Greece	Luxembourg	Paraguay	Turkey	
Swaziland		Brazil	Greenland	Macao	Peru	Ukraine	
Tanzania		Brunei	Guatemala	Macedonia, FYR	Philippines	United Arab Emirates	
Zambia		Bulgaria	Guyana	Malaysia	Poland	United Kingdom	
Zimbabwe		Cambodia	Honduras	Maldives	Portugal	United States	

Source: Author from WITS database

Table A 10: Effects of WTO's TFA on Tripartite exports

	Intra-Tripartite			Tripartite to partners in ROW		
	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods
Indist_bb	-0.70** [0.30] 0.63	-0.91*** [0.32] 0.45	-1.35*** [0.42] -0.09	-0.12*** [0.01] -0.91	-0.11*** [0.01] -0.11	-0.12*** [0.02] -170.45
contig_bb	[0.74] 0.56	[0.46] 0.05	[0.92] 0.49	[9.44] 1.29***	[1.57] 1.33***	[885.45] 1.08***
comlang_bb	[0.45] 1.92***	[0.47] 1.67***	[0.53] 1.97**	[0.20] 0.73	[0.20] 0.67	[0.27] 0.82
colony_bb	[0.65] 0.66	[0.41] 0.43	[0.81] 0.75*	[0.68] 0.76**	[0.67] 0.24	[1.04] 1.50**
agree_fta_bb	[0.44] -1.65***	[0.36] -1.58***	[0.42] -1.35***	[0.37] -1.41	[0.37] -1.24	[0.71] -1.73**
comcol_bb	[0.40] 1.56***	[0.34] 1.10***	[0.44] 1.44***	[0.92] 1.42***	[0.95] 1.41***	[0.80] 1.42*
tfa	[0.31] 13.43***	[0.31] 15.45***	[0.32] 18.62***	[0.24] 24.44***	[0.26] 23.48***	[0.84] 23.04***
_cons	[2.26] [2.26]	[2.71] [2.71]	[3.33] [3.33]	[1.63] [1.63]	[1.81] [1.81]	[3.06] [3.06]
N	342	192	268	1662	1376	1460
R2	0.462	0.576	0.378	0.446	0.400	0.421

Notes: The dependent variable is the bilateral export value (in level). The estimator is PPML. Values between parentheses are robust (clustered on paired) standard errors. Significance at 1, 5, and 10 percent are indicated by ***, **, and *, respectively.

Table A 11: Effects of each WTO' TFA measure on Tripartite exports

	Intra-Tripartite			Tripartite to partners in ROW		
	Total products	Primary commodities	Manufactured goods	Total products	Primary commodities	Manufactured goods
infav	1.16*** [0.24] 0.99***	0.75*** [0.21] 1.03***	1.40*** [0.28] 1.06***	0.79*** [0.26] 0.37***	0.77** [0.31] 0.38***	0.83*** [0.26] 0.28**
intra	[0.34] 0.62*	[0.37] 0.33	[0.31] 0.35	[0.12] 0.88***	[0.14] 0.87***	[0.13] 0.87**
advan	[0.36] 1.01***	[0.34] 0.79***	[0.45] 0.87**	[0.10] 1.26***	[0.11] 1.09***	[0.35] 1.57***
appro	[0.37] -0.10	[0.30] 0.09	[0.37] -0.06	[0.19] 0.33	[0.23] 0.48**	[0.21] 0.04
feech	[0.60] 0.77***	[0.38] 0.46**	[0.73] 0.44*	[0.21] 0.75***	[0.22] 0.76***	[0.27] 0.67***
fordo	[0.24] 1.25***	[0.22] 0.90***	[0.26] 1.11***	[0.16] 0.96***	[0.16] 0.94***	[0.22] 0.95
forau	[0.29] 0.51	[0.24] 0.28	[0.28] 0.64	[0.19] 1.19***	[0.20] 1.26***	[0.58] 0.94
forpr	[0.48] 0.63***	[0.43] 0.30	[0.56] 0.66***	[0.32] 0.37***	[0.33] 0.41***	[1.31] 0.24
intbo	[0.21] 0.36**	[0.21] 0.24**	[0.18] 0.50***	[0.11] 0.34***	[0.11] 0.31***	[0.16] 0.31***
extbo	[0.17]	[0.10]	[0.14]	[0.09]	[0.10]	[0.10]
govim	0.55*** [0.17]	0.39** [0.16]	0.50** [0.20]	0.59*** [0.15]	0.59*** [0.15]	0.59 [0.49]

Notes: The dependent variable is the bilateral export value (in level). The estimator is PPML. Values between parentheses are the robust (clustered on paired) standard errors. Significance at 1, 5, and 10 percent are indicated by ***, **, and *, respectively.

Table A 12: Status of implementation of each trade facilitation indicator at regional level

	Information availability	Internal border agency cooperation	Formalities-procedures	Fees and charges	Appeal procedures	Involvement of the trade community	Formalities-automation	Formalities-documents	Governance and impartiality	External border agency cooperation	Advance rulings	Percentage of total points (%)
USA	83.35	100	50	75	75	90	85.7	58.35	94.45	100	100	82.91
ALENA	75.92	100	66.72	66.67	76.67	80	80.62	58.33	92.60	100	90.73	80.75
EU	77..77	70..99	66..09	78..43	87..46	77..9	79..4	69..1	86..3	53..8	84..6	75..64
China	90	50	75	87..5	56..25	87..5	87..5	41..6	78..5	50	71..4	70..5
MERCOSUR	80	56..70	51..99	54..17	61..25	57..5	70	41..6	65..5	71..6	66..1	61..51
UMA	91..67	63..88	38..13	55..57	59..03	62..5	58..3	63..3	50..7	25	53..9	56..56
SADC	67..79	50	51..75	54..14	53..61	50..5	47..8	44..7	49..5	33..0	24..6	47..99
EAC	68	51..7	55..2	38..4	50..2	36..7	41..7	40	39..6	77..5	25..2	47..66
Tripartite	61...06	45..65	51..47	48..2	47..74	41..6	43..1	40..1	41..4	39..1	22..6	43..85
Africa	57..18	51..56	50..59	49..70	46..44	45..9	39..4	37..9	37..7	27..1	26..8	42..78
COMESA	58	39..09	51..81	44..78	41..84	40..8	41..4	38..9	37..5	39..8	21..0	41..38
ECOWAS	53..98	56..95	53..91	49..31	42..24	53..8	29..5	34..1	30..3	8..33	25..2	39..8
IGAD	58..1	43..4	54..5	43..3	37..6	30..8	37..5	36..7	23..8	37..5	20	38..46
CEPGL	40..83	41..67	51..88	44..44	33..33	23..6	19..4	31..6	34..7	75	16..6	37..57
CEN-SAD	48..96	50..02	48..89	47..22	39..11	44..8	31..7	35..2	28..4	14..2	22..9	37..42
ECCAS	35..46	57..41	47..74	49..09	40..46	31..0	30..1	24..7	35..1	32..4	25..8	37..23

Source: Author from OECD's TFI database



Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

www.aercafrica.org

Learn More



www.facebook.com/aercafrica



www.instagram.com/aercafrica_official/



twitter.com/aercafrica



www.linkedin.com/school/aercafrica/

Contact Us

African Economic Research Consortium
Consortium pour la Recherche Economique en Afrique
Middle East Bank Towers,
3rd Floor, Jakaya Kikwete Road
Nairobi 00200, Kenya
Tel: +254 (0) 20 273 4150
communications@ercafrica.org