

**Determinants of Imports under Regional Integration Scheme:
The Impact of Political Violence on East African Community's Trade**

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ABSTRACT

This paper aims to determine the effects of regional trade agreements as well as the impact of political crises on the East African Community's (EAC) imports with control of other traditional determinants of imports. I use a sample of bilateral imports for 5 EAC member countries from 142 partners for the period 2001–2018 and I account for common and individual slope. Using an 'augmented' gravity model with specific dummies and isolation of non-observable characteristics of countries and time, I apply a Poisson Pseudo Maximum Likelihood High Dimensional Fixed Effects (PPMLHDFE) estimator that deals with the problem of heterogeneity. I found that regional trade agreements have disproportionate effects on EAC member countries' imports; Kenya beneficiaries the most from these agreements given its advanced economic level. Political crises have disproportionate effects on EAC imports, with a higher negative impact found for Burundi due to the failed putsch in 2015.

ملخص

تهدف هذه الورقة البحثية إلى تحديد آثار اتفاقيات التجارة الإقليمية وكذلك تأثير الأزمات السياسية على واردات مجتمع شرق أفريقيا (EAC) مع مراجعة المحددات التقليدية الأخرى للواردات. وقد استخدمت عينة من الواردات الثنائية لخمسة دول أعضاء في مجموعة دول شرق أفريقيا من 142 شريكا لفترة 2001-2018 وقمنا بحساب المنحدر المشترك والفردى وباستخدام نموذج الجاذبية

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"المعزز" مع نماذج محددة وعزل الخصائص التي لا يمكن ملاحظتها للبلدان والوقت، قمنا بتطبيق مُقدر دالة الاحتمالية القصوى لنموذج معلمات التأثيرات الثابتة عالية الأبعاد (PPMLHDFE) الذي يتعامل مع مشكلة عدم التجانس. ولقد وجدنا أن اتفاقيات التجارة الإقليمية لها تأثيرات غير متكافئة على واردات البلدان الأعضاء في مجموعة دول شرق أفريقيا؛ وتستفيد كينيا أكثر من غيرها من هذه الاتفاقيات نظرا لمستواها الاقتصادي المتقدم. وللأزمات السياسية آثار كبيرة على واردات مجتمع شرق أفريقيا، مع وجود تأثير سلبي أكبر على بوروندي بسبب الانقلاب الفاشل في عام 2015.

ABSTRAITE

Cet article vise à déterminer les effets des accords commerciaux régionaux ainsi que l'impact des crises politiques sur les importations de la Communauté d'Afrique de l'Est (CAE) avec le contrôle des autres déterminants traditionnels des importations. J'utilise un échantillon d'importations bilatérales pour 5 pays membres de l'EAC en provenance de 142 partenaires pour la période entre 2001-2018 et je tiens compte de la pente commune et individuelle. En utilisant un modèle de gravité "augmenté" avec des dummies spécifiques et l'isolation des caractéristiques non observables des pays et du temps, j'applique un estimateur de Poisson Pseudo Maximum Vraisemblance à Effets Fixes de Haute Dimension (PPMLHDFE) qui traite le problème de l'hétérogénéité. J'ai remarqué que les accords commerciaux régionaux ont des effets disproportionnés sur les importations des pays membres de la CAE ; le Kenya bénéficie le plus de ces accords étant donné son niveau économique avancé. Les crises politiques ont des effets disproportionnés sur les importations de la CAE, avec un impact négatif plus important pour le Burundi en raison du putsch manqué de 2015.

Keywords: Regional integration, Imports, Political violence, Gravity Model, PPMLHDFE, East African Community.

JEL Classification: C23, C51, F1, F15

1. Introduction

Africa, especially Sub-Saharan Africa, is recognised for various forms of political instability: changes in governments, coups d'Etat, electoral crises, crises between countries and within countries, etc. These different forms of crises are the source of internal conflicts which may have tragic economic and social implications for the concerned countries, and the

world in general. The East African Community (EAC) is no exception to this phenomenon. Re-established in 2000 between the Republics of Kenya, Tanzania and Uganda after his collapse in June 1977², the new EAC which is currently made by seven Partner States –Burundi, Democratic Republic of Congo, Kenya, Rwanda, South Sudan, Tanzania, and Uganda, has faced several political crises that shake the region and whose economic consequences need to be assessed. Although the Partner States have signed engagements to the promotion of peace, security, and stability within, and good neighbourliness among the Partner States; political violence remains a reality within some EAC member countries.

For instance, Kenya has experienced electoral violence caused by strong tensions between presidential candidates' supporters at the end of 2007 and earlier 2008, following the announcement of Mwai Kibaki as the president of the Republic of Kenya on December 29th, 2007 (Dupas and Robinson 2012). The announcement triggered violent protests that quickly turned into ethnic clashes leading in a state of emergency that virtually shut down roads and markets (Dupas and Robinson 2012). In the wake of the vote, over 1000 people were killed; this was previously confirmed by Kiai (2008) and Kilonzo (2009). An estimated 300,000 to 500,000 people were forced to flee their homes, 75% of whom were women and children (Kiai 2008; Obonyo et al. 2008) . Similar violence was observed in 2012-2013 in the Coast, Eastern, and North Eastern provinces of the country and resulted in more than 500 people killed and almost 120,000 people displaced (Pommerolle and Josse-Durand 2017). In Burundi, the alarming situation was observed in 2015 after the failed putsch that led to the suspension of activities of many transport agencies linking many countries in the region. On May 13th, 2015 a putsch was attempted, initiating a downward spiral of political violence, repression, and killings that have continued till early 2016. This violence caused enormous losses that have repercussions on the productivity and

² Kenya's dominance was among the reasons for the collapse of the old EAC that was established in 1967: Tanzania and Uganda believed that Kenya was getting a disproportionate share of the benefits given its more advanced industry (Buigut 2016; Kimenyi and Kuhlmann 2012). Beyond economic factors, divergent political positions and ideologies are among the causes that bring the old EAC to collapse (Mathieson 2016; Wama 2014).

development of the country. For example, travel agencies such as Gaga, Horizon, Jaguar coaches, etc. between Bujumbura Kampala via Kigali were forced to suspend their activities following insecurity in Bujumbura and other political tensions between Burundi and Rwanda in 2015.

A matter of concern is the economic costs associated with electoral violence which generally are high and multifaced. At the micro level, conflict can compromise economic growth and impede human development. As noted by Fukuda-Parr (2008) et al. And Lopez and Wodon (2005), the short-run economic impact of conflict is especially pronounced in the casualty levels, displacement, and destruction of physical capital which can have immediate repercussions on production, internal trade, and output levels. At the macro level, conflicts' costs and consequences analysis is extended to conflicts-affected contexts with economic impacts such as declines in GDP growth, Foreign Direct Investments, and international trade. In one hand, political instability leads to lower performances observed in trade agreements in Africa by reducing investments (Jung 2017). In another hand, evidence shows that almost 20 years after the implementation of the East African Customs Union, trade within EAC remains relatively low –less than 40% of intra-exports– with variations despite efforts made by the Partner States to boost intra and inter-trade significantly. Against this background, could the low performances observed in EAC's trade be related to electoral violence? Do election conflicts have proportionate effects on trading activities between EAC's trading partners? To my knowledge, little emphases has been made on such concern. Previous studies have focused on the trade creation/ diversion effects of RTAs (see Buigut 2012; Shinyekwa 2015; Buigut 2016; Ejones et al., 2021), or on challenges of the full implementation of their protocols (see Wama 2014; Bangayandusha and Mwendata 2016). Little is known on the causes behind the stagnation and fluctuation of intra and inter-EAC's trade.

This paper aims to investigate the impact of electoral violence on trade performance using an approach based on the application of the law of gravity. It has been highlighted in previous studies that the gravity equation is a well-founded theoretical and successful tool to assess the effects of regional trade agreements (see Anderson 1979; Feenstra,

Markusen and Rose 1998, Yotov et al. 2016). I estimate an augmented gravity model with dummy variables by applying Poisson Pseudo Maximum Likelihood High Dimensional Fixed Effects –PPMLHDFE– estimator.

The rest of the paper is articulated as follows. Section two reviews the relevant literature, section three describes the model and data used for econometric analysis. Section four presents the econometric results and section five concludes.

2. Literature Review

Theoretically, political instability has been seen by economists as a threat to economic development. Authors argue that an unstable political system can slow down investment or accelerate inflation, and consequently reduce the GDP growth rate (see Aisen and Veiga 2013; Durnev et al. 2012; Guillaumont et al. 1999; Gurgul and Lach 2012). In Sub-Saharan Africa, the various forms of political instability previously discussed may lead to political violence. These two terms will have to be differentiated in the context of my analysis. Political instability is seen as the set of policy reforms (Rodrik 1991), propensity for government changes (Gurgul and Lach 2013), cabinet changes (Aisen and Veiga 2006), coup d'état, political regime change, and revolutions (Jong-A-Pin 2009). By contrast, political violence is defined as the set of all violent acts that result from political instability, such as ethnic clashes (Dupas and Robinson 2012; Reuss and Titeca 2017), assassinations (Kiai 2008; Kilonzo 2009; Pommerolle and Josse-Durand 2017), arrests and forced displacements (Kiai 2008; Obonyo et al. 2008; Pommerolle and Josse-Durand 2017).

There is no doubt that several forms of political violence have heavy consequences on EAC's economic development and especially, on EAC's international trade. The previously mentioned crises may decrease trade in the region leading to the decrease of the welfare of the population. As I mentioned it earlier in the introduction, few studies have addressed this concern. Many studies that assess the impacts of EAC focused importantly on the impacts of trade liberalisation on trade creation or trade diversion (see Buigut 2012; Buigut 2016; Ejones et al., 2021; Shinyekwa, 2015).

These studies largely found positive impact on trade creation among member countries, giving an impression that the East African Customs Union (EACU) has been quite successful in bolstering intra-regional trade.

Meanwhile, despite positive effects of EACU found in the above studies, challenges on its successful implementation remain. This can be observed through intra-trade patterns in the region. Twenty years after EACU implementation, trade between member countries remains low with fluctuations. Given this, studies have addressed challenges on the successful implementation of the EACU-CM (Wama 2014; Bangayandusha and Mwenedata 2016). Wama (2014) argues that the issue of state sovereignty, language barrier, poor infrastructure, bureaucracy and corruption, low public awareness across the community, slow harmonization of Partner States' laws, policies, and systems are among challenges faced by EAC countries. In the same vein, Mwenedata (2016) investigated the legal challenges in the realization of the free movement of capital in Rwanda under the EAC common market. Lack of effective institutions for monitoring the implementation of the Common Market and contradiction in laws of countries and the Protocol are among challenges that affected the successful implementation of the EAC. This gave the impression that to the moment, many issues that impede trade developments in the region remain outstanding such as the imposition of legal non-tariff barriers, non-recognition of EAC certificates of origin at borders and political violence. In this study I am interested in the last challenge, which has attracted less attention in empirical studies. Given the importance of political stability to the economy and especially to international trade enhancement, there is a need to investigate the impact of political crises on trade activities especially, how the electoral violence affect trade flows between member and trade partners of the EAC countries.

To my knowledge, few studies has assessed the linkage between electoral violence and trade in Africa in general, and particularly in EAC. The working paper by Jung (2017) is among the few studies that have addressed the issue. Jung (2017), in his working paper produced recently, argues that political instability leads to lower performances observed in

trade agreements in Africa by reducing investment which are important in African countries given the gains from the stimulation of investment in production for export and export-linked industries. Thus, his argument joined Rodrik (1991) and Durnev et al. (2015)'s results in this quote:

Foreign investors, African countries' primary financial source, are less willing to invest in a country or region where political instability and international conflict are evident (Jung 2017).

However, Jung (2017) does not show clearly empirical evidence of how political violence affect trade, a gap that this study will try to fill. I should clarify that this study does not analyse violence itself; rather, the objective is to analyse the impact of those violence on import flows in EAC member countries. Filling this gap may be useful for researchers and policy makers, as it could be the first step in a more complex analysis of the economic impact of different forms of political violence in the EAC region.

3. Methodological Framework

3.1. Specification of the gravity model

Assessment of RTAs could not be possible without the contribution of the famer gravity model. Gravity models first appeared in economics in 1962 with the pioneering study of Tinbergen (1962), who applied Newton's law of gravity to bilateral trade flows, theorizing that trade flows between two countries are proportional to the size of their incomes and inversely proportional to the distance between them.

The basic form of the gravity model is as follows:

$$T_{ij} = \beta \frac{Y_i Y_j}{D_{ij}} \quad (1)$$

Where T_{ij} measures bilateral trade flows between countries i and j ; Y_i and Y_j are the gross domestic products (GDP) of countries i and j , respectively;

and D_{ij} is the geographic distance between countries i and j , a proxy for trade costs. Trade flows are expected to increase with the size of GDP and decrease with the geographic distance between trading partners. Specifically, a high level of income in the importing country indicates high demand leading to increased imports, while a high level of income in the exporting country suggests a higher level of production which increases exports. In this case, Y_i and Y_j are positively correlated with the level of bilateral trade flows (Cernat 2001).

For estimation purposes, the log-linear form of the gravity model is used to estimate the effects of RTAs on trade in terms of trade creation and diversion. By adding the time dimension, equation (1) becomes:

$$\ln T_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln D_{ij} + \varepsilon_{ij} \quad (2)$$

Where \ln is the natural logarithm of the variables. T_{ijt} measures bilateral trade flows between countries i and j in period t at constant prices (USD); Y_{it} and Y_{jt} are the GDPs of countries i and j , respectively, in period t at constant prices (USD); β_0 is the global constant of the model, ε_{ij} is a normally distributed log error. D_{ij} is as defined above and remains constant over time. The sign of β_3 is negative due to proximity: the greater the distance between trading countries, the higher the costs, which negatively affects trade flows between countries.

3.2. Handling gravity equation estimation issues

I underline in this section four major gravity estimation issues and how I address them to obtain consistent and reliable estimates. Firstly, the traditional gravity model (1) has been criticized for tending to lack strong theoretical foundations. According to Shinyekwa (2015), it has been argued that the model lacks the ingredients of the most important international trade models, namely the Ricardian model (differences in technology) and the Heckscher-Ohlin (HO) model (differences in factor endowments) as a basis for trade (UNCTAD and WTO 2012). This view has, so far, been reconsidered due to more illuminating empirical work and details, as reported in Shinyekwa and Othieno (2013). A review by Cernat (2001) argues that most early papers using gravity models were ad

hoc rather than based on sound theoretical foundations. Exceptions to this trend include the later work of Anderson (1979), Bergstrand (1990) and Feenstra, Markusen and Rose (1998) that have highlighted some theoretical foundation of the gravity equation. To overcome this challenge and following Kahouli and Maktouf (2014); Baltagi et al. (2003); I include in the equation (2), a new variable ‘Sim’ variable to capture similarities in the size of economies of the trading countries.

The second challenge is related to trade costs. The term D_{ij} in equation (2), which is account for distance between two cities, is considered as the only proxy for trade costs. However, it has been highlighted that other variables may influence trade costs either positively or negatively. To overcome this challenge and following some studies using the gravity model to estimate RTAs’ impacts (see e.g. Urata and Okabe 2014, Yotov et al. 2016; Helpman and Krugman 1985; and Helpman 1987), I assume that the bilateral trade cost is expressed as the following linear combination of observable measures including contingency, colonial ties (colony and common colony), language official and political crises.

$$T_{ij} = Dist_{ij} \exp(-\beta_3 Contig_{ij} - \beta_4 Colony + \beta_5 Col + \beta_6 Comcol + \beta_7 Comlang + \beta_8 Polcris) \quad (3)$$

Where $Dist_{ij}$ is the geographical distance between the largest cities of countries i and j measured by kilometer, $Contig_{ij}$ and $Comlang_{ij}$ are dummy variables that take unity if country i and j share a common border and common official languages, respectively. I include the variable political crises –to account for election conflicts– as one of observable measure of bilateral costs. This choice is powered by the fact that electoral violence during election periods in the country of destination –importer country– infers in trade costs through several dimension such as reduction of labor and infrastructure disruption. It is a well-documented fact that volume and quality of infrastructure across countries are important determinants of trade flows given their impacts on transport costs, especially for landlocked countries. As it was argued by Bougheas et al. (1999), the benefit of infrastructure is the reduction in transport costs which effectively reduces the price of imports.

The EAC infrastructure, –mainly made by roads, railway– is subject to attacks in electoral periods in some countries. The rise in crime through activities of organized gangs contributed to worsening insecurity on main roads. An example is the erection of roadblocks on the Eldoret-Nairobi road via Nakuru during the first election related crisis in Kenya in 2007 (Porhel 2008). The deterioration of infrastructure may raise costs leading to reduction of trade volumes.

Thus, for estimation purposes, I use the log-linear form of bilateral imports, the equation including all the above variables is given as follows

$$\begin{aligned} \ln M_{ijt} = & \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln Dist_{ij} + \beta_4 \ln Pop_{it} + \beta_5 \ln Pop_{jt} \\ & + \beta_6 \ln RER_t + \beta_7 \ln Sim_{ijt} + \beta_8 Conting_{ij} + \beta_9 Col_{ij} + \beta_{10} Comcol_{ij} \\ & + \beta_{11} Lang_off_{ij} + \beta_{12} Polcris_{it} + \kappa_i + \kappa_j + \varepsilon_{ijt} \end{aligned} \quad (4)$$

Where *Polcris* stands for capturing the effects of election conflicts on bilateral imports when contagion effects³ are taken in consideration. This variable takes value of one for periods of violence in region 2008, 2013, 2015 and zero otherwise.

The choice of bilateral imports as the dependent variable is influenced by two major reasons:

- a) This study aims to analyses the impact of political violence which infers to trade costs. Here I assume that trade costs affect the aggregate imports values.
- b) The availability, credibility, and reliability of import data. This argument is supported by Deme and Ndrianasy (2016) when they argue that import data are known to be more readily available and reliable than export data.

³ Contagion effects simply mean that given the interaction between EAC member countries, electoral violence in one country will affect directly or indirectly other countries.

The third challenge is the issue of missing trade flows. Due to missing data in most of the dataset for gravity model, several approaches have been proposed to handle missing data, among them replacement of missing data by zero (Mujahid and Kalkuhl 2016; Urata and Okabe 2014). For instance, the percentage of zero-trade flows in sample of this study is 25%. It has been highlighted by Urata and Okabe (2014), that a large number of studies on the gravity model have omitted zero-trade flows given the linear logarithmic form of gravity equation that does not allow to define the log value of zero. However, omitting zero trade may lead to inconsistent results. To this end, following Correia et al. (2010), I use STATA software and apply PPMLHDFE estimator which deals perfectly with missing data in gravity equation.

The fourth challenge is related to the heteroscedasticity of trade data. It is a well-documented fact that trade data are characterised by heteroscedasticity. This issue is of a serious matter as it was highlighted by Santos Silva and Tenreyro (2006) that, when the gravity model is estimated in log-linear form with the Ordinary Least Squares –OLS– estimator (or any other estimator that requires non-linear transformation), the estimates of the effects of trade costs and trade policy are biased and inconsistent, in the presence of heteroscedasticity. Again, I apply PPMLHDFE estimator to overcome this challenge as proposed by Correia et al. (2019).

Finally, I use countries effects, country-pair effects and time effects to capture all the unobservable characteristics that are specific to countries, country-pair and time, and that may influence trade relations between countries.

The global model is decomposed as follows:

$$\begin{aligned}
 \ln M_{ijt} = & \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln Dist_{ij} + \beta_4 \ln Pop_{it} \\
 & + \beta_5 \ln Pop_{jt} + \beta_6 \ln RER_{ijt} + \beta_8 \ln Sim_{ijt} + \beta_9 Contig_{ij} \\
 & + \beta_{10} Col_{ij} + \beta_{11} Comcol_{ij} + \beta_{12} Lang_off_{ij} \\
 & + \beta_{13} Polcris_{it} + \kappa_i + \kappa_j + \varepsilon_{ijt}
 \end{aligned} \tag{5}$$

3.3. Dataset characteristics

I use panel data consisting of 5 cross-sectional units (of EAC member countries⁴), 142 major trading partners, making a total of 147 countries for a period of 18 years (2001-2018), giving a sample size of 2,646 and a total pool of 13,230 data points. The percentage of missing data is about 25%. Data on aggregate bilateral imports were extracted from the COMTRADE database. Data on GDP, population and exchange rate were taken from the World Development Indicators database and finally data on distance, contingency, colonial ties, and language were extracted from the CEPII database. The remaining data were constructed by the author. All estimations are done using Stata 16.1 which perfectly deals with missing data.

I classify the exporters according to their income levels to allow us to measure the sensitivity of trade between countries with regards to political violence. Table 1 Shows that 21.46% of the EAC's trading partners from 2001 to 2018 are low-income countries while 29.25% are high-income countries. The remaining exporters, about 50% are middle-income countries.

Table 1: Classification of main exporters of EAC's member countries

Classification	Frequency	Percentage
Low-income	2839	21.46
Middle-income lower bracket)	3266	24.69
Middle-income upper bracket)	3255	24.60
High-income	3870	29.25
Total	13230	100.00

Note: Low-income: per capita GDP \leq 1025 USD

Middle-income lower bracket): 1025 < per capita GDP < 3996

Middle-income upper bracket): 3995 < per capita GDP < 12376

High-income: per capita GDP \geq 12376

⁴ With the exception of Democratic Republic of Congo and South Sudan given their recent adhesion to the EAC.

4. Findings and discussions

This section presents the econometric results and their interpretations. I estimate several sets of regression models. For estimates, in accordance with what has been suggested in many studies, I run estimation controlling for multilateral resistance terms (MRT) by considering importer effects and exporter effects using Pseudo Poisson Maximum Likelihood (PPMLHDFE) estimator. In the same vein, country-pair fixed effects also are used to handle the endogeneity of variables. In this case, the estimator used is robust to statistical separation and convergence issues as developed in Correia, Guimarães and Zylkin (2019). I start by omitting effects of political violence, and then I add 'Polcris' variable in second specification to account for its effects on EAC imports. Second, I continue with the estimation accounting for heterogeneous across countries and I estimate the gravity specification for individual country, this will allow me to focus on the comparison of magnitude of political violence's effects in each EAC member country.

4.1. Estimating the determinants of EAC's imports: bloc results

Bloc results are presented in Table 2. When country-pair unobservable characteristics are fixed, the income elasticities of importer and exporter are positive and statistically significant at 1% level, clearly demonstrating that imports are strongly correlated with GDPs of traders. The magnitude of the coefficients of GDPs suggests that trade flows to the EAC region are more sensitive to the economic development of exporters than they are to the income level of the importers. The impact become negative when outwards MRT are controlled.

As expected, the distance to the exporter's capital is highly significant and negative, consistent with the theory suggesting that distance is associated with transportation and distribution costs in international trade. This is confirmed by the coefficient associated to the distance in the Model 1 to 6 of Table 2. For example, results in Model 1 indicate that all things being equal, an increase of 10 % in distance between two capital cities of traders decreases trade among them 18.12 %. As the distance in kilometres increases, trade decreases about 2 times; in other words, distance has a

strong negative effect on the volume of trade between the sample countries suggesting that the more countries are far from each other, the less they trade. These results align with the theory of geographic proximity in trade (Krugman, 1991) and many other results such as reported by Yotov et al. (2016); Urata and Okabe (2014); Kahouli and Maktouf (2014) and Ejones et al. (2021).

With exception to Model 6 where country pair effects are accounted and, showing a negative impact, other estimations show a positive statistically significant impact of the population of traders —EAC members countries and their partners—. For instance, the coefficients associated with the size of the population of exporters (partners) are statistically significant at the 1% level indicating that the more the population size of partners increases the more there is a production of a wider variety of goods with more efficiency (economies-of-scale effect), resulting in a higher level of exports. These results are consistent with results obtained by Kahouli et Maktouf (2014); they contradict somehow findings in Deme and Ndrianasy (2016), suggesting that the population of both importer and exporter countries have a negative impact on imports of ECOWAS members.

As I expected, estimates show a negative and statistically significant impact of the movements in the official exchange rate. The significance attributed to the variable measuring the similarities in economic development shows a statistically significant and positive coefficient in all estimates suggesting that countries with similar economic size will have important trade relations. The results are strongly consistent with results found by Baltagi et al. (2003), but contradicts results obtained by Kahouli and Maktouf (2014) due the heterogeneity in their trade data.

The coefficients of contiguity and common language are negative when importer effects are included (in Models 1 and 4). Accounting for exporter specific unobservable characteristics and adding the RTAs' variables in regressions (Model 5) changes the signs of these two variables from negative to positive, suggesting that sharing border increases trade among countries. Differences in findings may result in the dependent variable — bilateral imports—, heterogeneity of exporters as well as the effects

accounted while running regressions. The effects are not similar across countries as I underlined it in the following sub-section. Similar to the findings of this study, positive effects are found in studies by Buigut (2016), Deme and Ndrianasy (2016), Shinyekwa (2015); negative effects were found in study by Kahouli and Maktouf (2015), while no effects were pointed out in study by Ejones et al. (2021).

Coefficient associated with colonial ties shows a positive and statistically significant impact of EAC imports. For instance, index of colony in Model 2 indicates that imports from EAC coloniser increase over $(100*(e^{0.806}-1)) = 123.89\%$. Trade relations are strong in countries that shared the same coloniser with an increase of over 186.62% as shown in column (1). These results align classical results of the gravity model (see Linders and Groot 2006; Deme and Ndrianasy 2016) but contradict with results in Kahouli and Maktouf (2015) when they apply fixed effects model.

4.1.1. Estimating the impact of RTAs on imports

RTAs effects are shown from Model 4 to Model 6 of Table 2. Generally, including RTAs variables in estimates does not change significantly the sign of other determinants of imports in the EAC. The estimated coefficients of EACU are statistically not significant in columns (4) and (5), suggesting that EACU has a no trade effect over time on imports of EAC members under trade liberalisation policy. But when countries pair specific non-observables effects are absorbed the EACU reports a negative effect about over $(100*(e^{-0.461}-1)) = -34.36\%$ on imports of EAC as a group. These results have economic implication on trade diversion and then welfare decreasing in the concerned countries. But, again here, the effects largely differ among EAC member countries as it is pointed out in Table 4.

COMESA is a RTAs that influence trade flows within EAC members. Its coefficient is positive in most of estimates. The estimations of Model 5 and Model 6 in Table 2 show a strong statistically significant coefficient suggesting that there are important intra-EAC bilateral imports that are resulting of the COMESA free-trade agreement (and not of EAC agreement). This can be seen specially in Model (6). Its statistically and

positive coefficient (2.233) suggests that all else being constant, COMESA increases trade between members by about $(100*(e^{2.233}-1) = 832.78\%$. The magnitude of coefficients of EACU and COMESA states that trade flows are sensitive and important within COMESA than EAC agreements. These results are similar to results from Ejones et al. (2021). His estimate at baseline found that the coefficient for COMESA was quite higher than EAC with 2.906 and 0.557 for COMESA and EAC, respectively.

Table 2: Effects of trade liberalisation on EAC's imports: bloc results

Independent variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
In GDP importer		-0.295***	0.650***		-0.313***	0.619***
		(0.0935)	(0.228)		(0.0928)	(0.225)
In GDP exporter	1.593***		1.352***	1.598***		1.415***
	(0.0832)		(0.176)	(0.0828)		(0.174)
In Distance	-1.812***	-1.017***		-1.771***	-0.699***	
	(0.107)	(0.221)		(0.138)	(0.271)	
In population Importer		0.913***	-2.631**		0.933***	-2.652**
		(0.122)	(-1.040)		(0.121)	(-1.031)
In Exporter population	0.122***		-0.484***	0.120***		-0.464**
	(0.0257)		(0.188)	(0.0260)		(0.190)
In official exchange rate		-0.132***	0.210		-0.133***	0.195
		(0.0188)	(0.369)		(0.0183)	(0.367)
Similarity	0.743***	0.803***	0.360*	0.751***	0.810***	0.400**
	(0.0902)	(0.0591)	(0.188)	(0.0883)	(0.0597)	(0.187)
Contiguity	-0.539***	-0.0209		-0.670***	0.751***	
	(0.198)	(0.105)		(0.178)	(0.185)	
Official language	-0.277***	0.270***		-0.286***	0.242***	
	(0.0891)	(0.0891)		(0.0922)	(0.0873)	
Colony	0.126	0.806***		0.135	0.834***	

Independent variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	(0.0845)	(0.0890)		(0.0888)	(0.0907)	
Common colony	1.053***	-0.168**		1.071***	-0.109	
	(0.113)	(0.0836)		(0.127)	(0.0824)	
EACU				0.233	-0.421	-0.461***
				(0.225)	(0.298)	(0.141)
COMESA				0.0632	0.844***	2.233***
				(0.120)	(0.142)	(0.720)
Constant	-9.529***	22.49***	21.14*	-9.963***	19.81***	20.29*
	(-1.789)	(-2.138)	(11.56)	(-1.916)	(-2.543)	(11.43)
Observations	9,889	9,701	9,889	9,889	9,701	9,889
Fixed effects						
Importer fixed effects	Yes	No	No	Yes	No	No
Exporter fixe effects	No	Yes	No	No	Yes	No
Country-pair fixed effects	No	No	Yes	No	No	Yes

Notes: This table reports estimates of the effects of RTAs on EAC imports as a group. All estimates are obtained with data for the year 2001 to 2018. The dependent variable is bilateral imports. I use importer time, exporter time, and country pair fixed effects to control MRT and endogeneity of variables. All estimates apply PPMLHDFE estimator. Models 1 to 3 indicate the estimates ignoring RTAs. Models 4 to 6 add RTAs on previous regressions. Standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

4.1.2. Estimating the effects of political violence on imports: bloc results
 A further factor affecting trade flows in the region is the political crises that are observed in several forms. Here, I am interested in the question “what are the impacts of electoral violence related to first-order election on EAC imports?.” I incorporate ‘Polcris’ dummy variable to capture crises effects in EAC regional trade agreements. For estimation purposes, I consider violent conflict in the importer country, leading us to use importer fixed effects as the variable “Polcris” varies with time. Results are presented in Table 3.

Table 3: Effect of political crises on EAC's imports, bloc results

Independent variables	Model 1	Model 2
In GDP importer	0.230 (0.277)	0.161 (0.272)
In GDP exporter	1.628*** (0.0837)	1.624*** (0.0827)
In Distance	-1.778*** (0.139)	-1.776*** (0.138)
In population Importer	-2.501 (-1.569)	-2.350 (-1.525)
In Exporter population	0.119*** (0.0265)	0.119*** (0.0263)
In official exchange rate	0.256 (0.504)	0.298 (0.510)
Similarity	0.784*** (0.0892)	0.779*** (0.0886)
Contiguity	-0.718*** (0.180)	-0.721*** (0.181)
Official language	-0.288*** (0.0923)	-0.287*** (0.0922)
Colony	0.117 (0.0915)	0.117 (0.0913)
Common colony	1.069*** (0.128)	1.068*** (0.128)
EACU	0.263 (0.215)	0.269 (0.215)
COMESA	0.0575 (0.121)	0.0554 (0.122)
Political crises		0.128 (0.0919)
Constant	25.85 (18.55)	24.68 (18.12)
Observations	9,889	9,889
Fixed effects		
Importer fixed effects	Yes	Yes
Exporter fixe effects	No	No
Time effects	No	No

Notes: This table reports estimates of the effects of political crises on EAC imports. All estimates are obtained with data for the year 2001 to 2018 and apply PPMLHDFE estimator. The dependent variable is bilateral imports. Only estimates obtained absorbing importer unobservable effects are presented for brevity. Standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

Two findings stand out from the PPMLHDFE estimates of the gravity model reported in Table 3. First, in contrast to the expectations, the coefficient of variable Polcris is not statistically significant, suggesting that the political crises occurred during presidential elections in EAC does not have an impact on imports. Second, and most important, there is no larger difference in the magnitude of coefficients for variables when RTAs are included in the estimation, confirming the consistency of results.

4.2. Estimating the determinants of EAC's imports on individual country

I am now focusing on estimations on individual level. Tables 4 provides details of the disaggregated country effects, using PPMLHDFE estimates. The objective is to compare the magnitude of effects in each EAC member country.

The results in Table 4 reinforces the message from previous estimates suggesting that trade partners incomes increase imports volume in each EAC member as all estimations show a positive and statistically significance coefficients associated with exporter's GDP. Likely, the exporter population is strongly positive in all estimates indicating that EAC imports increase with partners' population. Exception is pointed out in Tanzania where a no statistically significant coefficient is found. Like in bloc results the distance is strongly negative and statistically significant in each EAC member country. This negative effect is stronger in all estimates still confirming the theory of geographic proximity in trade (Krugman, 1991).

Table 4: Effects of trade liberalisation on EAC's imports: individual results

Independent variables	Burundi	Kenya	Rwanda	Tanzania	Uganda
ln GDP importer					
ln GDP exporter	3.794***	1.368***	1.735***	1.639***	1.500***
	(-1.130)	(0.0918)	(0.189)	(0.217)	(0.188)
ln Distance	-2.014***	-1.683***	-1.380***	-2.241***	-1.401***

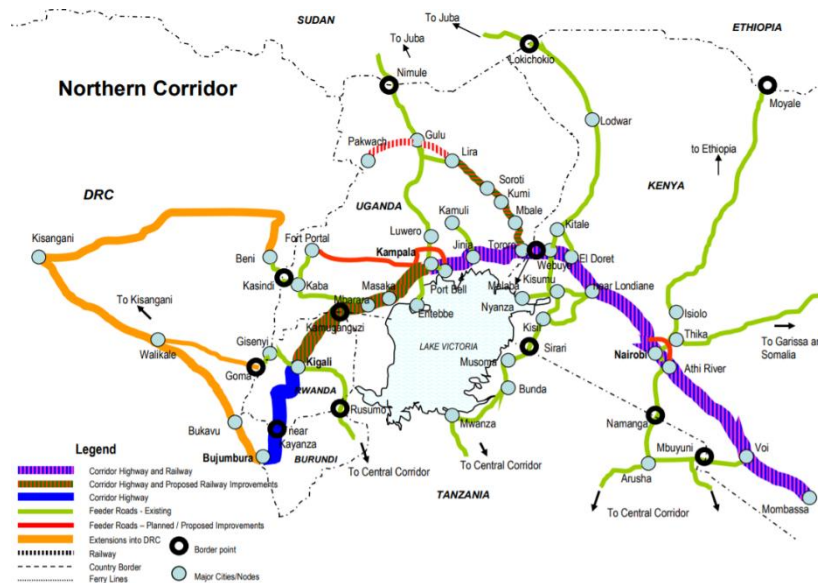
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Independent variables	Burundi	Kenya	Rwanda	Tanzania	Uganda
	(0.251)	(0.173)	(0.165)	(0.367)	(0.127)
ln population Importer					
ln Exporter population	0.166**	0.122***	0.288***	0.000491	0.241***
	(0.0768)	(0.0425)	(0.0589)	(0.0465)	(0.0411)
ln official exchange rate					
Similarity	3.014***	0.419***	1.093***	0.671***	0.708***
	(-1.132)	(0.113)	(0.188)	(0.231)	(0.222)
Contiguity	1.493***	-2.073***	0.356**	-0.308	1.006***
	(0.235)	(0.213)	(0.154)	(0.387)	(0.389)
Official language	0.690***	-0.456**	-0.0709	-0.143	-0.501***
	(0.158)	(0.203)	(0.122)	(0.170)	(0.176)
Colony	0.748***	0.391**	0.532***	-0.254	0.316*
	(0.245)	(0.194)	(0.207)	(0.192)	(0.172)
Common colony	-3.610***	1.268***	-0.233	0.921***	1.450***
	(0.434)	(0.245)	(0.282)	(0.237)	(0.223)
EACU	-0.298	0.806***	0.951***	-1.275***	-0.583
	(0.277)	(0.285)	(0.245)	(0.368)	(0.431)
COMESA	0.360	0.477***	0.126		-1.157***
	(0.252)	(0.163)	(0.165)		(0.344)
Constant	-57.84**	-5.113***	-19.40***	-4.929	-13.24***
	(23.69)	(-1.977)	(-3.253)	(-4.118)	(-4.372)
Observations	1,577	1,834	2,009	2,33	2,139
Fixed effects					
Importer time fixed effects	Yes	Yes	Yes	Yes	Yes
Exporter time fixed effects	No	No	No	No	No
Country-pair fixed effects	No	No	No	No	No

Notes: This table reports estimates of the effects of RTAs on each EAC member country's imports. All estimates are obtained with data for the year 2001 to 2018. All estimates apply PPMLHDFE estimator. The dependent variable is bilateral imports. Only importer time fixed effects estimate results are reported for brevity. Standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

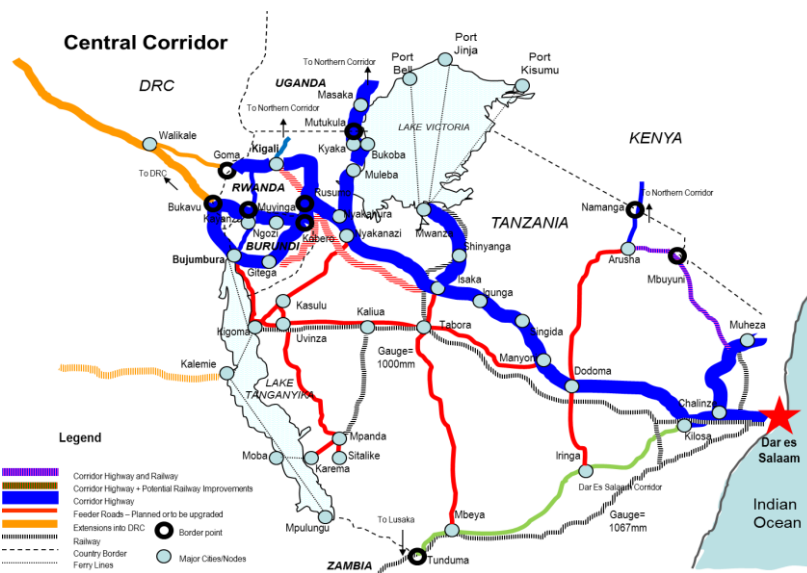
Like in bloc results, the similarity is strongly positive and statistically significance in each EAC member country. The impact decreases with countries' development levels, indicating that small economies trade mostly among them. The border has positive impacts in landlocked countries such as Burundi, Rwanda, and Uganda while negative impact is reported in countries with direct access to the ocean such as Kenya and Tanzania. These results seem valid since exports to Burundi, Rwanda and Uganda pass mostly through the North and the Central Corridors via Mombasa and Dar-es-Salaam ports respectively (Figure 1 and Figure 2). For instance, in 2018, 80 % of EAC imports consisting of petroleum products, machinery and medicines came from Middle Eastern trading partners including China, India and the United Arab Emirates and pass through Kenya (via the North Corridor) and Tanzania (via the Central Corridor) before being routed to Uganda, Burundi and Rwanda.

Figure 1: EAC Northern Corridor



Source: Nathan Associates Inc. (2009).

Figure 2: EAC Central Corridor



Source: Nathan Associates Inc. (2009).

Another important result in each country's view is related to colonial ties. EAC member countries trade more with their colonisers with the exception to Tanzania where a no statistically significant relationship is reported. Trade relations are strong and significant among anglophone colonies —Kenya, Tanzania, and Uganda— and negative in francophone colonies —Burundi and Rwanda—. Among reasons of this difference in results may include the fact that anglophones countries have developed infrastructures (especially railways and roads) that connect them, resulting in increasing trade among them, which is not the case in francophone countries where any railway is available until now. Having shared the same coloniser has increased trade about 236.69 %, 145.2 % and 320.38 % for Kenya, Tanzania, and Uganda, respectively. Meanwhile, a decrease of over 40 time observed in Burundi.

4.2.1. Disaggregating effects of RTAs on imports: individual results

The PPMLHDFE estimates of gravity model in Table 4 show that the customs union has not had a significant effect on Burundi and Uganda's

imports while a positive impact is detected in Kenya and Rwanda. It has strong statistically significant effect about 123.89 % and 158.82 % respectively for Kenya and Rwanda. However, a negative effect of -72 % is reported in Tanzania. These results are somehow consistent with results in Buigut (2012).

The coefficients associated with COMESA show a positive impact on Kenya's imports (61.12 %) while a negative impact (-68.55 %) is found in Uganda. Statistically significant coefficients associated with EACU and COMESA in Kenya allow us to confirm that Kenya is the leader to benefit from these regional trade arrangements. Kenya takes advantage of its advanced economic level and infrastructures developments—comparatively to other EAC member countries—to benefit the most in these agreements. It should be remembered that disproportionate benefice share was among reasons for the collapse of the old EAC.

4.2.2. Disaggregating effects of political violence on imports by EAC country

I am determining in this point if the effects of political crises are equally distributed across EAC member countries. Tables 5 provides details of the disaggregated country effects on imports, using PPMLHDFE estimates. The objective is to compare the magnitude of effects in each country. Columns (2), (3), (4), (5) and (6) represent situation in Burundi, Kenya, Rwanda, Tanzania, and Uganda, respectively.

Table 5: Effect of political crises on EAC's imports: individual results

Independent variables	Burundi	Kenya	Rwanda	Tanzania	Uganda
ln GDP importer	-1.242 (-1.453)	1.026 (-1.117)	-0.537 (0.464)	3.084** (-1.224)	-0.260 (0.354)
ln GDP exporter	3.707*** (-1.207)	1.261*** (0.0862)	1.712*** (0.191)	1.561*** (0.198)	1.701*** (0.170)
ln Distance	-2.022*** (0.103)	-1.791*** (0.150)	-1.732*** (0.0924)	-2.190*** (0.367)	-1.537*** (0.113)

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Independent variables	Burundi	Kenya	Rwanda	Tanzania	Uganda
In population Importer	-3.290	-5.148	2.808	-17.00**	0.228
	(-4.080)	(-5.702)	(-3.712)	(-7.707)	(-1.700)
In Exporter population	0.177**	0.135***	0.295***	0.000627	0.223***
	(0.0790)	(0.0418)	(0.0589)	(0.0462)	(0.0402)
In official exchange rate	0.0635	0.827	-0.820	3.493	-0.598
	(-1.885)	(-1.245)	(-1.428)	(-2.385)	(0.571)
Similarity	2.947**	0.303***	1.029***	0.590***	0.852***
	(-1.214)	(0.113)	(0.197)	(0.212)	(0.210)
Contiguity	1.122***	-1.490***	0.532***	-1.369**	0.253
	(0.198)	(0.286)	(0.185)	(0.583)	(0.231)
Official language	0.678***	-0.422**	-0.0360	-0.154	-0.427***
	(0.153)	(0.195)	(0.120)	(0.171)	(0.164)
Colony	0.744***	0.320*	0.491**	-0.243	0.236
	(0.241)	(0.193)	(0.203)	(0.191)	(0.160)
Common colony	-3.248***	1.182***	-0.659***	0.936***	1.457***
	(0.463)	(0.226)	(0.238)	(0.242)	(0.204)
Political crises	-0.332**	0.0950	-0.0184	0.190	-0.00951
	(0.156)	(0.106)	(0.113)	(0.230)	(0.113)
Constant	23.13	59.97	-44.03	196.0**	-9.963
	(38.21)	(67.98)	(42.20)	(93.60)	(19.05)
Observations	1,577	1,834	2,009	2,330	2,641
Fixed effects					
Importer fixed effects	Yes	Yes	Yes	Yes	Yes
Exporter fixe effects	No	No	No	No	No
Time effects	No	No	No	No	No

Notes: This table reports estimates of the effects of political crises on each of the EAC member country's imports. All estimates are obtained with data for the year 2001 to 2018 and apply PPMLHDFE estimator. The dependent variable is bilateral imports. Only estimates obtained absorbing importer unobservable effects are presented for brevity. Standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

Three implications stand out from these results: (i) including “Polcris” variable in regressions does not change considerably the sign and significance of coefficients reported in Table 4. (ii) No significant but negative coefficients are reported in landlocked countries such as Rwanda and Uganda while a no significant but positive coefficient is found in Tanzania. (iii) Contrary to the expectations, no negative impact is found in Kenya. However, a negative impact of is reported in Burundi. The negative impact found in Burundi may result in the failed putsch in 2015 resulting in killings and others political disruptions that led to sanctions from the European Union (EU) and other important partner concerning the suspension of funding. Roads’ perturbations and insecurity during the crisis embedded goods transport with the suspension of transport agencies. These results align to findings suggesting a negative impact of various forms of political instability on macroeconomics aggregates (see Aisen and Veiga 2013; Durnev et al., 2012; Guillaumont et al. 1999; Gurgul and Lach 2013). In Kenya in contrast, any impact was found. This may be explained by the country’s economic level and surface: the road attacks during crises concern especially the Eldoret road which is located after Nairobi from the Mombasa port.

4.3. Estimating the sensitivity on political instability’s impact according to partners’ economic level

I am interested in analysing how sensitive is trade —imports— between high-income, upper-middle, lower-middle to lower-income countries with regards to political violence. This will allow us to see the magnitude of effects of election conflicts given partners’ economic levels. Results in Table 6 show that the sensitivity of imports to political violence is decreasing function of exporter’s economic level.

Table 6: Sensitivity of trade within EAC member countries with regards to political crises

Independent variables	Model 1	Model 2
ln GDP importer	0.189	0.177
	(0.164)	(0.163)
ln GDP exporter	1.540***	1.544***
	(0.121)	(0.123)

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Independent variables	Model 1	Model 2
ln Distance	-1.826*** (0.0973)	-1.759*** (0.119)
ln population Importer	0.0876 (0.205)	0.0821 (0.203)
ln Exporter population	0.180* (0.0994)	0.195** (0.0980)
ln official exchange rate	-0.0584* (0.0346)	-0.0556 (0.0343)
Similarity	0.754*** (0.0893)	0.781*** (0.0878)
Contiguity	-0.566*** (0.191)	-0.731*** (0.187)
Official language	-0.162* (0.0894)	-0.171* (0.0912)
Colony	0.116 (0.0823)	0.130 (0.0851)
Common colony	1.132*** (0.108)	1.172*** (0.117)
EACU		0.320 (0.208)
COMESA		0.196* (0.115)
Political crises # high income exporters	-0.110 (0.290)	-0.0852 (0.286)
Political crises # upper middle-income exporters		
Political crises # lower middle-income exporters	-0.432* (0.228)	-0.472** (0.227)
Political crises # lower income exporters	-0.527* (0.275)	-0.617** (0.276)
Constant	-14.70*** (-1.157)	-15.23*** (-1.219)
Observations	9,889	9,889
Importer fixed effects	No	No
Exporter fixe effects	No	No
Time effects	Yes	Yes

Notes: This table reports estimates of the sensitivity of trade between high, upper middle, lower middle to lower income exporters with regards to political instability. All estimates are obtained with data for the year 2001 to 2018 and apply PPMLHDFE estimator. The dependent variable is bilateral imports of EAC. Model 1 represents estimates results without RTAs effects while in Model 2 all the dependent variables are included in regression. Only estimates accounting for time effects are reported for brevity. Standard errors are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

The impact is no significant for high-income countries and is negatively increasing with the GDP of exporters. For example, the coefficient associated with high income (-0.0865) is statistically not significant while the coefficient associated with low income (-0.567) is negative and statistically significant. These results underlined what I call 'shift of imports' during political crisis; imports will shift from lower income partners to high income partners given the dependence of EAC countries on imports from high-income countries especially petroleum products, machinery, and medicines. In other word, whenever the situation EAC countries need to imports basic products for economic activities from Middle Eastern trading partners including China, India and the United Arab Emirates.

5. Conclusion

Based on the theory of international trade using an extended gravity model, this paper explored the determinants of imports as well as the impact of political violence on EAC's trade. While it may seem difficult to assess the effects of the electoral violence on trade, I apply the augmented gravity model on a sample of 147 countries for the period 2001-2018. I control countries' unobservable characteristics by applying importer fixed effects and country-pair fixed effects. I analysed the effects on individual country and the sensitivity of trade to political crises' effects regarding their origin. Results suggest that the East African Customs Union does not contribute to a significant increase in intra-EAC imports proportionally in all members. Kenya leads to beneficiate from the trade liberalisation in the EAC in enhancing its imports from the region given its advanced economy. Likely, Rwanda is taking advantage of the EAC agreements to increase intra-trade. Tanzania is experiencing negative effects while the EACU has no influence on Burundi and Uganda imports from EAC members. The impact of COMESA agreements is positive in Kenya and negative in Uganda. In addition, trade relationship among members is higher within the COMESA agreement than EAC agreement. Regarding political crises, like the effects of RTAs, political crises have disproportionate effects on EAC member countries' trade. The results suggest that there is no significant impact of political crises in countries that are politically stable such as Tanzania, Uganda, and Rwanda. The

negative effect of political crises found in Burundi is resulting in several forms of internal crises that affect macroeconomics aggregates of the country, especially the failed putsch in 2015 that led to killings, human displacements, and infrastructures' disruptions in the country.

Imports from lower-incomes partners are more sensitive to political crises than imports from high-income exporters. This is resulting in the fact that EAC countries' economic activities mostly depend on imports from high-income (over 80 % of total imports). Given the importance of imports from high-income countries for economic development activities, EAC will continue to import regardless of the situation they face.

I conclude by foregrounding some of the implications of the findings for practice and future research. Firstly, being interdisciplinary, this study is among the first steps on the complex analysis of economic effects of various forms of political crises that shake the Central and Eastern African region. The study provides valuable information on the causes behind stagnation of trade in the EAC. RTAs will not have a positive impact unless measures to establish sustainable peace and security in the region are undertaken. The study underlines the need to sensitize all stakeholders including governments about the importance of peace and security for trade developments. For instance, the community should adopt a joint regional awareness campaign for the citizens, especially the lower classes, to maintain peace and security in the region since they are the ones who suffer from consequences of the violence. These campaigns are essential for all citizens in the region who have no choice but to cooperate and develop jointly, if they want to move forward.

Secondly, for policymakers, the findings of this study shed light on the measures to promote intra and inter EAC's trade. The easiest way is the harmonization of local industrial structures to promote increased domestic production and the full implementation of free trade agreements. Another way is the good allocation of natural resources. These factors will lead to a decrease in the dependence of imports from the rest of the world. Good infrastructures are likely to make a significant contribution to reducing transport and communication costs and increasing trade. Thus, measures

that improve infrastructures' quality and protect existing ones can greatly increase both the bilateral volume and the global volume of trade in goods.

Thirdly for researchers, this study brings a new technique that is more precise and more efficient for exploring RTAs' effects in developing countries where data unavailability is a reality. Most of the existing studies used bilateral exports as dependent variable and applied PPML estimator. This old method raised many problems such as, a high percentage of missing data of the dependent variable and this can lead to bias estimation results. The use of bilateral imports as dependent variable in combination with the PPMLHDFE effects opens debate to the comparability of different techniques used in the field.

However, I must recognize that the failure to capture other factors that may be behind low performance of EAC's trade is the major limitation of this study. It is therefore possible to envisage an extension of this research in the direction of the apprehension of other dimensions to capture the effects of several forms of political instability on trade. Moreover, when more data is available, an econometric analysis of dependencies between trade and political instability in disaggregate sectors and products levels in EAC economies will be an interesting research avenue to extend and supplement the outcomes of this paper.

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