TRADE CREATION AND DIVERSION EFFECTS IN THE TRIPARTITE REGION: A GRAVITY APPROACH

Michael Takudzwa Pasara

North-West University

E-mail: Michael.Pasara@nwu.ac.za

Orcid ID: https://orcid.org/0000-0003-4298-9585

Steven Henry Dunga

North-West University

E-mail: Steve.Dunga@nwu.ac.za

Orcid ID: https://orcid.org/0000-0002-0911-144X

─**Abstract**─

The paper employed the augmented gravity model to determine the trade creation and trade diversion effects of economic integration. Results indicate that the income importing country was significant at the 1% level, while the exporting one was weakly significant at the 10% level. Weighted distance was negative and significant at the 1% level. Of the country idiosyncratic factors, language was insignificant and shared border was significantly positive, while landlocked was significantly negative at 1%. The free trade area (FTA) variable indicated the degree of economic integration was significant at the 1% level. In terms of welfare effects, the study observed trade creation in SADC, but the results were inconclusive for COMESA. The EAC coefficient was significantly negative, implying that economies traded below the expected levels among themselves. The regional openness dummies indicated trade diversion effects. The EAC sign was positive and significant, implying that imports into the EAC from non-member countries in the rest of the world (RoW) were higher than the gravity model would

predict, making it difficult to statistically determine the net welfare effects. The trade diversion coefficient for SADC was significantly negative. The net effect for SADC was negative, since trade diversion outweighs trade creation. The net effect for COMESA was positive, but statistically insignificant.

Key Words: trade creation, trade diversion, welfare effects, economic integration, gravity, tripartite

JEL Classification: E32, E61, F15, F36, F41, F42, F43, F44

1. INTRODUCTION

The change in the global trading structure has stimulated the majority of African leaders to look internally and find measures to boost intra-African trade. At present, Africa is trading at peripheral levels of global standards with its share declining in recent years (Pasara & Dunga, 2019:49-51). This resulted in radical moves such as the signing of the relatively large ambitious trade agreement such as the Tripartite Free Trade Agreement (TFTA) in July 2015 in Egypt, and more recently, the African Continental Free Trade Area (AfCFTA) in March 2018 in Kigali, Rwanda (AEO, 2016; AfDB, 2014). The TFTA was signed between member states of the Common Market for East and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC) (UNECA, 2016). Despite the anticipated benefits, the feasibility of economic integration within an African context still remains contentious (Mold & Mukwaya, 2015:2). In the past, the majority of Africa's trade agreements have been with limited success due to several constraints, which include a fragmented geo-political configuration characterised by low per capita income, poor road, rail and air transport infrastructure densities, resulting in poorly developed cross-country connections (Claassen *et al*., 2016:7; Mold & Mukwaya, 2015:2; AfDB, 2014). The dynamics of interaction of these factors become complex as the distance between two countries increases, taking into account the fact that the TFTA arrangement covers a large geographical space from Cape Town in South Africa to Cairo in Egypt and that high transport costs were cited as a major constraint to regional trade in the continent. Comparable studies have shown that intra-trade is higher in the European Union and Asia-Pacific Economic Cooperation, at approximately 61% and 67%, respectively (Mold & Mukwaya, 2015:3; Krapohl & Fink, 2013). This could be attributed to a smaller geographical span both in Europe and Asia coupled with developed transport infrastructure and liberalised air transport systems (Khan & Marwat, 2016:105; Ridhwan, 2016:257; Krapohl & Fink, 2013). In contrast, the African continent is still characterised by poor road and rail transport infrastructure and

stringent air transport regulations, and more language barriers [1] among other factors (AfDB, 2014; AEO, 2016; UNECA, 2016). Several other factors influence intra-trade on the continent. This paper seeks to achieve two things. Firstly, to investigate the factors that influenced bilateral trade between 2000 and 2015. The EAC is the newest of the three, established in 2000 and the TFTA was signed in 2015. Secondly, the paper seeks to add to economic literature by employing the augmented gravity model in determining the geographical and spatial effects on trade creation and trade diversion within the TFTA.

2. LITERATURE REVIEW

The paper acknowledges that there are several international trade theories that are relevant and applicable to this study. These include, but are not limited to the absolute and comparative advantage theories by Smith (1776) and Ricardo (1817), respectively. Others include the factor endowment theory (Leamer, 1995), factor-price equalisation theory (Samuelson, 1949; Bernhofen *et al*., 2012), Viner's (1950) trade theory and other recent developments such as the 'new' economic geography (Krugman, 1990; Krugman *et al*., 2010). However, this paper will only provide an overview of the gravity model of trade, since the empirical model adopted in this study is the augmented version. The gravity function states that bilateral trade is dependent upon the economic mass and distance of the respective trading units. It was first applied by Tinbergen (1962) and Poyhonen (1963), but had been used earlier in other fields such as investment flows and human migration. The model draws from the 'law of universal gravitation' by Isaac Newton in 1867, which posits that the attraction force between two units is positively related to their respective masses and inversely related to the squared distance between these two units. Newton's basic representation can be expressed as:

$$F_{ij} = G \left(\frac{M_i^{b1} M_j^{b2}}{D_{ij}^b} \right) \qquad (1)$$

where F represents attractive force or trade flow, M denotes economic mass of the respective economies, *i* and *j*, in which GDP is often used as a proxy, D represents the physical or weighted distance between these units, and G is a trade multiplier

---

[1] Language barriers contribute to social and political conflicts, uneasiness of doing business, and market fragmentation, all of which reduce the volume of intra-trade.

or gravitational constant that depends on measurement units of mass. Equation (1) can be transformed into the following representation by employing logarithms:

$$\ln F_{ijt} = A + b_1 \ln M_{it} + b_2 \ln M_{jt} + b_3 \ln D_{ij} + b_4 X_{ij} + s_{ij} \qquad (2)$$

In Equation (2), A, b_1, b_2 and b_3 are estimated constants, and s_{ij} captures the shocks and fortuitous developments influencing bilateral trade. X_{ij} denotes a vector of plausible supplementary variables that influence international trade. The gravity is more efficient with large data volumes, especially in the case of countries with similar factor endowments (Warin *et al*., 2009; Shujiro & Misa, 2010; Frankel & David, 1999:388-391). This argument supports the Leontief paradox (Leontief 1965; Leamer 1980). However, despite its empirical success, some analysts argue that the model does not have theoretical justification and does not take into account comparative advantage, which economists believe forms the bedrock of international trade (Warin *et al*., 2009; Krugman *et al*., 2010; Karambakuwa *et al*., 2015). However, it is almost irrefutable that there is a gravity relationship in any trade function where trade costs increase with distance.

An extensive number of scholars have employed the gravity model and econometrically tested the variables that influence the volume of trade (Karambakuwa *et al*., 2015:5; Jayasinghe & Sarker, 2007:2; Warin *et al*., 2009; Shujiro & Misa, 2010; Rojid, 2006). Several trade researchers generally concur with the basic gravity model specification in equation (2) above. However, contention arises on additional variables to augment the model. Ghosh and Yamarik (2004:371) responded to the contention by providing a list of 48 dependent variables employed in empirical trade literature when augmenting the gravity equation, although in various combinations. Among these variables, a regional trade agreement (RTA) variable was used as a proxy for economic integration. RTA variables allow the effects to be isolated into trade creation and trade diversion (Jayasinghe & Sarker, 2007:7). Using the above argument of RTA dummies, this study followed the specification by Frankel, Stein and Wei (1995:77), Jayasinghe and Sarker (2007), and Makochekanwa (2012b:20), and estimated the following gravity model:

$$\ln(\text{trade}_{ijat}) = A + b_1 \ln GDP_{it} + b_2 \ln GDP_{jt} + b_3 \ln(\text{distance}_{ij}) + b_4 \ln P_{it} +$$
$$b_5 \ln P_{jt} + b_6 COMESA_{ij} + b_7 COMESA0_{ij} + b_8 EAC_{ij} + b_9 EAC0_{ij} +$$
$$b_{10} SADC_{ij} + b_{11} SADC0_{ij} + b_{12} \text{lan}_{ij} + b_{13} \text{border}_{ij} + s_{ij} \qquad (3),$$

and $i = 1,2,3; j = 1, \ldots ,n$.

Where: $COMESA_{ij} = 1$ if j is a COMESA member , 0 otherwise

$COMESA0_{ij} = 1$ if i is a net importer from a non-member j, 0 otherwise

$EAC_{ij} = 1$ if j is a member of EAC, 0 otherwise

$EAC0_{ij} = 1$ if i is a net importer from a non-member j, 0 otherwise

$SADC_{ij} = 1$ if j is a member of SADC, 0 otherwise

$SADC0_{ij} = 1$ if i is a net importer from a non-member j, 0 otherwise

In Equation (3), the variable $trade_{ij}$ at bilateral trade in current USD; *i* and *j*, in a given time period or year. GDP represents gross domestic product in nominal value and P_{it} and P_{jt} are populations of the two respective countries. Language is represented by lan_{ij} while $border_{ij}$ indicates whether the two trading countries, *i* and *j*, have a shared border. The variable $distance_{ij}$ measures weighted distance as opposed to geo-distance, because some capital cities may not necessarily represent 'economic centres'. For instance, Pretoria is the South African capital, but Johannesburg is the commercial capital. However, estimation results were not significantly different from the nominal distance variable whose results are not reported in this paper.

The study also inferred to earlier scholarships by Frankel and Wei (1995:62), Ghosh and Yamarik (2004:392), Jayasinghe and Sarker (2007), and Makochekanwa (2012b: 14) to define two dummies, namely: (i) regional bloc and (ii) trade openness dummy. For instance, $COMESA_{ij}$ in equation (3) denotes an RTA between two countries, *i* and *j*. The interpretation would be that a significantly positive regional bloc coefficient implied that intra-COMESA trade was stimulated with the implementation of the COMESA FTA. This is incremental trade, which occurs beyond what would be feasible by only factoring the economic and geographic characteristic. This coefficient would reflect the degree of trade creation attributable to implementing the COMESA FTA (Aitken, 1973:885; Endoh, 1999: 209-211). Similar interpretation was applied for EAC_{ij} and $SADC_{ij}$.

On the other hand, the $SADC0_{ij}$ dummy reflects the degree of SADC openness, which is the extent to which member countries permit imports from the rest of the world (RoW). The dummy will reflect the magnitude of trade diversion that would have transpired within the import structures of SADC countries. In other words, this will indicate the extent to which SADC members would have under-

or over-imported in comparison with the standard gravity model predictions. A significantly negative coefficient reflects the extent of under-importing from RoW (Frankel 1997; Eichengreen & Irwin 1998). It is therefore possible to separate scenarios where SADC is trade creating only from one, where increases in intra-regional trade are derived at a cost of exports from non-members to the bloc. The former leads to increases in intra-regional trade, while the latter is trade diversion (Karambakuwa *et al*., 2015). Similar interpretations were applied to the coefficients of $COMESA_{ij}$ and EAC_{ij}.

The parameter estimates on GDP_i, GDP_j, P_i, P_j, and $distance$ are elasticities. For instance, ceteris paribus, β_2 in equation (3) depicts the percentage change in $trade_{ijat}$ that would have been stimulated by a 1% change in GDP_j. However, the parameters β_6 and β_7 cannot be expressed in logarithmic form. As such, Halvorsen and Palmquist (1980) proposed a method of calculating the percentage effect of dummy variables and this was later expounded upon by Giles (2011). Therefore, the estimated coefficient β_6 (that is, $trade_{ijat}$) can be calculated as a dummy transitioning from zero to one by: $(trade_{ijat(1)} - trade_{ijat(0)})/$ $trade_{ijat(0)} = e^{\beta_6} - 1$. For example, the SADC dummy in equation (3) shows that SADC members traded an additional $[\{exe^{\beta_6 - 1}\} \times 100]$ in relation to the traded volumes with non-members. This implies that two SADC countries trading with each other have an average that is greater than their average trade with RoW by $[\{exe^{\beta_6 - 1}\} \times 100]$. Makochekanwa (2012b) noted that the benchmark, however, is when countries trade with non-member countries. Similarly, if the $SADC0$ parameter, β_7 is negative then aggregate trade of an SADC member (where a SADC member is a net importer) with a non-SADC trading partner is $[\{exe^{\beta_7 - 1}\} \times 100]$ will be lower than its net exports to the RoW. Bilateral trade data, language, border and weighted distance data were sourced from the websites of CEPII (2018) and the International Trade Center (2018) and demographic data were mainly obtained from the World Bank (2018) website.

3. RESULTS

The regressions conducted in this paper considered bilateral trade among all 26 member countries of COMESA, the EAC and SADC. Prior to discussing the results, pre-estimation and diagnostic tests were conducted. There is no multicollinearity among variables. Stationarity tests were done using the Augmented Dickey-Fuller (ADF) and the Im, Perasan and Shin (IPS) test, and the results indicated that we can reject the null hypothesis and conclude that the variances across entities are not zero, implying a panel effect. Therefore, the paper

employed a random effects model based on the LM test. This was complemented by the Hausman test results, which also preferred the random effects model. This implies that country idiosyncratic and time invariant factors have an influence on bilateral trade levels and must be included in the estimated model. In terms of post estimation, the Durbin-Watson (D-W) statistic tests for serial correlation using residuals from the regressions indicated a value of 1.869, which is within the acceptable range of 1.5 and 2.5. The study also employed the robust random effects model, which takes into account time invariant variables and heteroskedastic-robust standard errors. This eliminates the need to conduct cross-dependence tests on the random effects model.

3.1. Presentation of augmented gravity model results

Five models are presented in Table 1 below. These models reflect different scenarios of international trade and regional economic integration. Models 1 to 4 indicate the generated results of the random effects panel autoregressive distributive lag (ARDL). Model 1 presents the basic gravity model. Model 2 is an extension of model 1 plus the country idiosyncratic factors. Model 3 adds the free trade area (FTA) variable to Model 2, which is a proxy for economic integration since some countries are members of an REC, but not part of the FTA. Model 4 extends Model 3 and measures the degree of trade openness by including regional bloc variables and openness dummies. This model will assist in answering the question of whether or not there was trade creation or trade diversion among the three RECs (COMESA, EAC and SADC) that make up the TFTA. Model 5 is the Generalised Least Squares (GLS) and was included simply for comparison purposes with Model 4. The rationale behind the inclusion of the GLS model is that it controls for cross-sectional dependence, serial correlation and heteroskedasticity in its modelling.

In the Table 1 below, the dependent variable is LNBiTrade, which is the natural logarithm of the level of bilateral trade between two TFTA countries. The exporting country is denoted by the subscript (i) and the importing country is denoted by (j). DLNGDP represents the first-difference of the natural logarithm of the Gross Domestic Product; DLNPopulation represents the first-differences of the natural logarithm of population; and LNDISTANCEW represents the natural logarithm of the weighted distance. LANGUAGE and BORDER are the shared or common language and border, respectively, between the trading partners. The LANDLOCKED variable denotes whether or not a country is landlocked or coastal, while the FTA variable represents whether or not a country is a member

of a free trade area. The EAC, EAC0, COMESA, COMESA0, SADC and SADC0 variables represent the respective regional economic communities.

Table 1: Gravity model regression results

	Model 1	Model 2	Model 3	Model 4	Model 5 (GLS)
Dependent variables	LNBiTrade	LNBiTrade	LNBiTrade	LNBiTrade	LNBiTrade
DLNGDP(i)	1.683* (2.38)	1.694* (2.39)	1.790* (2.53)	2.007* (2.83)	1.123* (2.53)
DLNGDP(j)	2.097*** (4.23)	2.095*** (4.23)	2.078*** (4.20)	2.064*** (4.17)	1.132*** (3.93)
DLNPOP(i)	2.892 (0.41)	7.351 (1.03)	7.701 (1.09)	8.928 (1.24)	-3.791 (-0.63)
DLNPOP(j)	12.74* (2.08)	11.64 (1.91)	11.81 (1.94)	11.00 (1.82)	0.219 (0.11)
LNDISTANCEW	-1.839*** (-6.54)	-1.088*** (-3.36)	-1.008** (-3.13)	-1.138*** (-3.94)	-1.405*** (-12.72)
LANGUAGE		0.159 (0.48)	0.248 (0.75)	0.508 (1.69)	0.251* (2.29)
BORDER		3.499*** (6.13)	3.540*** (6.25)	3.308*** (6.64)	2.647*** (17.35)
LANDLOCKED		-1.997*** (-6.06)	-1.753*** (-5.24)	-0.702* (-2.23)	-0.936*** (-6.13)
FTA			1.470*** (3.56)	1.867*** (4.70)	1.419*** (7.44)
COMESA				0.0234 (0.03)	0.0797 (0.30)
EAC				-3.249*** (-4.74)	-3.657*** (-8.73)
SADC				4.418*** (4.94)	3.370*** (10.80)

EAC0				3.411***	3.336***
				(5.09)	(8.08)
SADC0				-5.263***	-4.479***
				(-7.31)	(-22.63)
COMESA0				-0.213	-0.0569
				(0.27)	(-0.20)
Constant	27.06***	21.67***	19.66***	20.12***	24.62***
	(12.25)	(8.18)	(7.31)	(7.76)	(23.99)
N	3646	3646	3646	3646	3630
R^2: within	0.0088	0.0086	0.0084	0.0078	-
:between	0.1133	0.2586	0.2850	0.4556	
:overall	0.0707	0.2245	0.3322	0.5836	

Source: Author (*,**,*** denotes significance at 10%, 5%, 1% level).

3.2. Discussion of results of the regression models 1 to 5

The variables in the basic gravity regression model 1 have the expected signs and are significant. The results indicate that the income of the importing country [GDP(j)] is significant at the 1% level, while the income of the exporting country [GDP(i)] is weakly significant at the 10% level. This implies that the income of the importing country carries more weight in influencing bilateral trade than the income of the exporting country. The population variable is not significant in the first model, implying that it is economic mass rather than the size of the population that has an influence on the level of bilateral trade within the context of the TFTA. The weighted distance variable in model 1 is negative and significant at 1%, which agrees with the postulations of the postulated in the basic gravity model. This implies that countries that are further from each other were less likely to trade with each other than those countries that are closer to each other.

Model 2 has three additional country idiosyncratic variables and results indicate that common language was not insignificantly influencing the level of bilateral trade possibly because translation facilities are now readily available even on most internet websites. In model 2, the shared border variable is positive and highly significant at the 1% level, implying that, *ceteris paribus*, countries with a

shared border are likely to trade more with each other than those that do not share a border by an approximate factor of 3.5. The landlocked variable is negative and highly significant at 1%, implying landlocked countries have an inherent disadvantage when it comes to trading to coastal countries, by a factor of approximately 2. These disadvantages have nothing to do with economic policies being pursued by the respective countries and yet they have a bearing on the level of bilateral trade.

The FTA variable in model 3 reflects the degree of openness and the coefficient is significantly positive at the 1% level. On average, a country that decides to join a FTA will have additional bilateral trade by a factor of 1.5, because tariff removal will lower costs and stimulate intra-trade. Model 4 takes into account the trade creation and diversion effects. A positive and statistically significant coefficient for COMESA, EAC and SADC in model 4 implies that there was trade creation during the period 2000 to 2016. However, a negative and statistically significant coefficient does not necessarily imply that there was trade diversion, but rather that the member countries of COMESA, EAC or SADC traded less among themselves compared to RoW during the period under consideration. More specifically, the coefficient of the regional bloc dummy of COMESA is positive, but not significant, implying that being a member of COMESA does not lead to significant increases in the level of trade creation. This is possibly because of the issue of dual membership for most African countries implying that there was little value addition to becoming dual members, an argument raised by Botswana, Lesotho and Mozambique when they refused to join COMESA. Therefore, the TFTA will add value by addressing this issue of multiple membership by most African countries.

The coefficient for EAC is negative and significant at 1%. This implies that EAC economies traded less than with RoW during the period 2000 to 2016. This is generally below the expected levels especially considering the fact that the EAC is already in the dispensation of zero tariff reduction complemented by the free movement of persons under its customs union (CU). The negative coefficient obtained for EAC in this study are similar to the results by Makochekanwa (2012) and Karambakuwa *et al*. (2015) for the same regional bloc. The implication for the TFTA is that it is likely that EAC countries will not gain much in terms of trade creation because the EAC is already at a deeper level of integration (that is, customs union) than the tripartite agreement (free trade area). However, due to long-term dynamic effects there is a possibility that the level of trade creation for EAC economies will increase once they implement the TFTA. The coefficient for the SADC regional dummy on overall trade is positive and statistically significant

at the 1% level. The coefficient of the SADC bloc indicates that there was trade creation between 2000 and 2016. The percentage of trade within the SADC bloc was much higher than the other regional blocs of COMESA and EAC. The positive and statistically significant regional dummy suggests that SADC countries traded more with each other than with the rest of the world (RoW). This could be explained by the fact that South Africa[2] is among the highest trading partners of SADC countries. Although they employed the WITS-SMART model to determine the welfare effects of economic integration in the tripartite region, Pasara and Dunga (2019:57-63) also observed that South Africa and the Democratic Republic of Congo were among the leading beneficiaries due to scale economies in both production and consumption.

Trade diversion effects are reflected by COMESA0, EAC0 and SADC0 indicators. The coefficient of EAC0 is positive and statistically significant at the 1% level, suggesting that imports into the EAC from non-member countries in the rest of world (RoW) were higher than would be predicted by the gravity model. The estimated coefficient for the SADC0 openness dummy in model 4 is significantly negative. This indicates that there was trade diversion within the SADC community. The net effect for SADC is negative, since the coefficient of trade diversion outweighs the coefficient for trade creation. The net effect for COMESA0 was positive although statistically insignificant. Statistically determining the net welfare effects for the EAC becomes challenging, since both the regional dummy coefficient and the openness coefficient were higher than would have been predicted by the gravity model.

4. RECOMMENDATIONS

The study recommends that countries should engage in regional projects towards infrastructural development, especially in transport hard and soft infrastructure. This recommendation is derived from the gravity model results, which indicated that distance is a significant variable and negatively affects the level of intra-regional trade within the TFTA. Hard transport infrastructure includes improved road networks, standardised railway systems, better infrastructure at ports and airports. Soft infrastructure includes less regulation in air transport to increase competition and efficiency and better infrastructure at the ports. There is also a need to harmonise civil aviation regulations such as light safety standards (which

---

[2] South Africa is an FTA member country and has a huge economy bySouthern African standards.

include licensing of personnel, flight operations and airworthiness), certification of aerodromes and other aviation services such as security. Cross-border infrastructure can also be harmonised into one-stop border posts to accelerate processing time since results indicated a significantly positive outcome on shared borders. The inherent disadvantages of landlocked economies can be counteracted by granting them special trading privileges to compensate for their loss. This will reduce polarisation of benefits (or costs) to certain parts of the economic region thereby getting closer to an even distribution of wealth among the member countries. The paper also recommends that member countries of the TFTA should continue to engage in other measures that open up their economies even further. This is because the results indicate that being a member of a free trade area (FTA) has positive and significant effects on the level of bilateral trade. Membership of REC indicates the amount of incremental trade that can occur beyond what the physical and geographical characteristics of the respective countries can allow. Therefore, the results indicate that countries trade more when they relax their borders and move towards trade liberalisation. However, elimination of tariffs is not the only way of opening up an economy. An economy can also be opened up through other non-tariff measures such as reducing quotas, addressing policies regarding rules and regulations of customs procedures, and introducing a regional system of payments and regional markets. These will, in turn, boost the level of trade. In other words, the elimination of tariffs should be complemented by the removal of non-tariff barriers for trade liberalisation to be complete. This is because it is possible for an economy to eliminate some tariffs and still not be liberalised due to the presence of non-tariff barriers.

REFERENCES

OECD (2016). Trade policies and regional integration in Africa. *African Economic Outlook 2016: Sustainable Cities and Structural Transformation*, OECD Publishing, Paris, https://doi.org/10.1787/aeo-2016-7-en.Accessed 17/03/2019.

AfDB (2014). *Regional Integration for Inclusive Growth*, Abidjan, Cóte d'Ivoire.

Aitken, N. (1973). The Effects of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis. *American Economic Review*, 63, pp.881–892.

Bernhofen, D.M., Brown, J.C. & Masuyuki, T. (2012). A direct test of the Stolper-Samuelson theorem: the natural experiment of Japan. *University of Nottingham and CESifo*. http://economics.yale.edu/sites/default/files/brown- 120910.pdf. Accessed 2017/10/7.

Beyene, H.G. (2014a). Trade Integration and Revealed Comparative Advantages of Sub-Saharan Africa and Latin America & Caribbean Merchandise Export. *The International Trade Journal*, 28(5), pp.411–441. http://www.tandfonline.com/doi/abs/10.1080/08853908.2014.952851. Accessed 2017/04/25.

Beyene, H.G. (2014b). Trade Integration and Revealed Comparative Advantages of Sub-Saharan Africa and South Asian Merchandize Export. *Foreign Trade Review*, 49(2), pp.163–176.

http://journals.sagepub.com/doi/10.1177/0015732514525170.Accessed 2017/04/2

Cattaneo, N. (2009). Production networks, economic integration and the services sector: Implications for regional trade agreements in southern Africa. *Journal of Contemporary African Studies*, 27(4), pp.527–547.

Claassen, C., Loots, E. & Kabundi, A. (2016). Comovement Between Africa and Advanced Economies: 1980-2011, *Economic Research Southern Africa.*

Duede, E. & Zhorin, V. (2016). Convergence of economic growth and the Great Recession as seen from a Celestial Observatory. *EPJ Data Sci.* http://dx.doi.org/10.1140/epjds/s13688-016-0091-3. Accessed 2019/02/07.

Endoh, M. (1999). Trade Creation and trade Diversion in the EEC, the LAFTA and the CMEA. *Applied Economics*, 31, pp.207–216.

Frankel, J.A. (1997). *Regional Trading Blocs in the World Economic System*, Harvard University.

Frankel, J.A. & David, R. (1999). Does Trade Cause Growth? *American Economic Review*, 89(3), pp.379–99.

Frankel, J.A., Stein, E. & Wei, S. (1995). Trading Blocs and the Americas: The Natural, the Unnatural, and the Super-Natural. *Journal of Developing Economics*, 47, pp.61–95.

Ghosh, S. & Yamarik, S. (2004). Are Preferential Trade Agreements Trade Creating? Application of Extreme Bounds Analysis. *Journal of International Economics*, 63, pp.369–395.

Giles, D.E. (2011). *Interpreting Dummy Variables in Semi-logarithmic Regression Models: Exact Distributional Results*, Victoria, Canada. http://web.uvic.ca/~dgiles/downloads/working_papers/ewp1101.pdf. Accessed 2017/10/24

Greene, W. (2010). Testing Hypotheses About Interaction Terms in Nonlinear Models. *Economic Letters*, 107(2), pp.291–296.

Gurova, I. (2014). A Theoretical Model for Trade Integration in the CIS Region. *Problems of Economic Transition*, 57(5), pp.37–57.

Halvorsen, R. & Palmquist, R. (1980). The Interpretation of Dummy Variables in Semi-logarithmic Equations. *American Economic Review*, 70, pp.474–475.

Jayasinghe, S. & Sarker, R. (2007). Effects of Regional Trade Agreements on Trade in Agrifood Products: Evidence from Gravity Modeling Using Disaggregated Data. *Review of Agriculture Economics*, 30(1), pp.61–81.

Karambakuwa, R.T., Makochekanwa, A. & Kairiza, T. (2015). An Empirical Application of the Gravity Model to Assess the Trade Potential of Comprehensive Economic Partnership Agreements between the European Union and Southern African Countries. *Journal of Economics*, 6(3), pp.226–237.

Khan, S.A. & Marwat, Z.A.K. (2016). CPEC: Role in Regional Integration and Peace. *Research Journal of South Asian Studies*, 31(2), pp.103–112.

Krapohl, S. & Fink, S. (2013). Different Paths of Regional Integration: Trade Networks and Regional Institution-Building in Europe, Southeast Asia and Southern Africa *. *Journal of Common Market Studies*, 51(3), pp.472–488.

Krugman, P.R. (1990). *Rethinking International Trade*, Cambridge, MA: MIT Press.

Krugman, P.R., Obstfeld, M. & Melitz, Marc, J. (2010). International Economics: Theory and Policy. In Boston: Addison-Wesley (Pearson). http://www.clementnedoncelle.eu/wp-content/uploads/KOM_IE9.pdf. Accessed 2018/05/16.

Leamer, E.E. (1995). THE HECKSCHER-OHLIN MODEL IN THEORY AND PRACTICE. *Princeton Studies in International Finance*, 77. https://www.princeton.edu/~ies/IES_Studies/S77.pdf. Accessed 2018/05/16.

Leamer, E.E. (1980). The Leontief Paradox, Reconsidered. *Journal of Political Economy*, 88(3), pp.495–503.

https://www.jstor.org/stable/pdf/1831928.pdf?refreqid=excelsior%3Af38a4fbedc6 21a66cef452ef9226b7ca. Accessed 2019/06/26.

Leontief, W. (1965). Factor Proportions and the Structure of American Trade. *Review of Economics and Statistics*, 38, pp.437–460.

Lopez, L. & Weber, S. (2017). testing for Granger causality in panel data. *The Stata Journal*, 17(4), pp.972–984.

https://www.stata-journal.com/article.html?article=st0507. Accessed 2019/05/29

Makochekanwa, A. (2012). Impacts of Regional Trade Agreements on Trade in Agrifood Products: Evidence from Eastern and Southern Africa. In African Economic Society, pp. 1–28.

Mold, A. & Mukwaya, R. (2015). The Effects of the Tripartite Free Trade Area: Towards a New Economic Geography in Southern, Eastern and Northern Africa? *CREDIT*, 15(4).

Mothae, M. (2005). Challenges for Regional Integration in Sub-Saharan Africa: Macroeconomic Convergence and Monetary Coordination. *Africa in the World Economy - The National, Regional and International Challenges Fondad, The Hague, December 2005*, (December), pp.129–155. http://www.fondad.org/uploaded/Africa in the World Economy/Fondad-AfricaWorld-Chapter11.pdf. Accessed 2018/11/09

Poyhonen, P. (1963). A Tentative Model for the Volume of Trade between Countries. *Welltwirtschaftliches Archive*, 90, pp.93–100.

Puga, D. (2002). European regional policies in light of recent location theories. *Journal of Economic Geography*, 2, pp.373–406.

Ricardo, D. (1817). *On Principles of Political Economy and Taxation*, London: John Murray.

http://socserv.mcmaster.ca/econ/ugcm/3ll3/ricardo/Principles.pdf. Accessed 2018/10/25.

Ridhwan, M.M. (2016). Inflation differentials, determinants, and convergence: evidence from Indonesia: North West University collections. *Journal of Developing Areas*, 50(5), p.257.

Rojid, S. (2006). COMESA Trade Protocol: A Gravity Approach. *Applied Economics Letters*, 13, pp.947–51.

Samuelson, P. (1949). International Factor-Price Equalisation Once Again. *Economic Journal*, 59(234), pp.181–197.

Shujiro, U. & Misa, O. (2010). Trade Creation and Diversion Effects of Regional Trade Agreements on Commodity Trade.

Smith, A. (1776). An Inquiry into the Nature and the Causes of the Wealth of

Nations. *The Glasgow Edition of the Works and Correspondence of Adam Smith*, 2, pp.1–743.

Tinbergen, J. (1962). *An Analysis of World Trade Flows in Shaping the World Economy*, New York: Twentieth Century Fund.

UNECA (2016). *Tripartite Agreement.* United Nations Economic Commission for Africa.

Viner, J. (1950). *The customs union issue*, New York: Carnegie Endowment for International Peace. Available at: http://north.worldcat.org/title/customs-union-issue/oclc/248615. Accessed 2019/05/29.

Walters, L., Bohlmann, H.R. & Clance, M.W. (2016). The Impact of the COMESA-EAC-SADC Tripartite Free Trade Agreement on the South African Economy, (September).

Warin, T. et al. (2009). Southern African Economic Integration: Southern African Economic Integration: Evidence from an Augmented Gravity Model, *African Finance Journal.*