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ABSTRACT

Purpose: The purpose of the study is to determine the effect of COMESA RTA on welfare of member states.

Methodology: The study has used a panel data analysis of eighteen COMESA member countries and their major trading partners to determine the effects of regional trade arrangements using the augmented gravity model of trade. A random verses fixed effect models were used to estimate the model putting into consideration the time invariant variables.

Results: The results showed that the variables used are significant and determines the effects of bilateral trade on welfare. The estimated results showed that exporters GDP significantly improves export trade by more than 100%; while the importers GDP does less proportionately. The size (population) variable coefficients are positive and significant. The estimated results also shows that resistant factor (distance) as a proxy for transportation cost plays an important role in determining trade flows.

Unique contribution to theory, practice and policy: The study recommended that, member countries governments promote more active regional participation that promote welfare gain that can be distributed to the nationals in terms of development projects geared towards alleviating poverty in the region.

Keywords: *welfare, economic integration, trade*

1.0 INTRODUCTION

1.1 Background of the Study

Trade liberalization and regional integration are important drivers of economic growth. This is evidenced by the formation of worldwide, multilateral trade arrangements like World Trade Organization (WTO) with the objective of reducing trade barriers (tariffs, quotas and non-tariff measures). This triggered more emphasis in favor of the formation of Regional Trade Arrangements (RTAs) as an important element of global trade. As a result, global trade has been benefiting more from the Preferential Trade Arrangements (PTA). In general, most active participants of RTAs are developing countries, particularly in Sub-Saharan Africa yet these countries still form the largest part of the developing world. They have played key roles in the formation of RTAs, especially, the North-South and South-South basis after independence. Measuring welfare effects of regional trade integrations is very challenging due to data limitations. Most scholars, have therefore, resorted to an alternative method of measuring the impacts of the regional trade arrangements on trade flows and welfare. They base their studies on ex-post analysis which analyzes trade flows after the implementation of the RTAs. This is then compared to the actual trade levels in the absence of RTAs. Others have used ex-ante analysis (analysis prior to joining the partnership) to estimate trade patterns by measuring trade elasticities and computing their general equilibrium. This is done in the absence of trade agreement to estimate the effects of trade barriers in attempting to measure welfare effects of the region.

However, these approaches have been criticized by a number of studies. According to Panagariya (2000), the empirical approach used pose problems of heterogeneity leading to unreliable results. The study findings concluded that ex-post studies (studies done after the formation of the RTA) should present factual evidence based on trade that would have taken place without the establishment of trade agreements. Clausing (2001) similarly noted that the success of measuring the impacts of trading blocs has always proved to be very difficult making researchers not conclude whether or not the formation of RTA is welfare enhancing.

The history of Africa's regional economic integration dates back to the period when South African Customs Union (SACU) was formed (1919), followed by the rising number of Regional Economic Cooperation (REC) within the continent. Currently, almost all countries in Africa belong to more than one regional economic grouping. Nonetheless, Forountan and Prichett (1993) noted the large intra-Africa trade in comparison to what was expected before. However, Johnson (1995) finds that the multi membership within regions is due to failures of the African union that lead to unwillingness of member states to relax and subject their macroeconomic policy making to that of the regional authority; particularly those related to consumption costs as well as accepting the unequal distribution of the losses and gains from trade; and breaking from cooperation with the non-member countries.

1.2 Statement of the Problem

Regional integration is an area extensively discussed in most African countries in attempting to resolve political and economic backwardness of most developing countries especially on economic growth. However, the issue of welfare enhancement has not been prioritized in addressing the impacts of RTAs on economic growth. Therefore RTAs while addressing trade liberalization has not been focused on welfare impact of the member countries but on factors that

can improve trade amongst its member countries. The study seeks to ascertain whether COMESA RTA is justifiable on account of its contribution through trade creation or trade diversion, leads to welfare improvement or welfare loss.

1.3 Objectives of the study

The main objective of the study is to determine the effect of COMESA RTA on welfare of member states. The specific objectives are:

1.3.1 To determine whether COMESA is trade creating or trade diverting.

1.3.1 To use findings of 1.3.1 above to suggest policy recommendations

2.0 LITERATURE REVIEW

2.1 Empirical Literature Review

Balassa (1967, 1975) examined the changes that might occur in trade in the absence of the European Integration by finding their pre-integration of income elasticities that were to continue during the post-integration period. The study found pre and post integration elasticities to vary substantially between these periods affecting the sampling techniques of the periods to be covered. However, others such as (Frankel and Wei, 1995; Frankel and Kahler, 1993; Frankel, 1997; Willmore, 1976) also used the gravity model to determine the impacts of RTAs in a preferential trade arrangement.

The study by Schwanen (1997) on the impact of increased continental integration on trade, investment, and jobs in Canada focused on changes within the Canadian trade patterns. The comprehensive study looked at the effects of the CUSFTA and NAFTA between the periods of 1989 and 1995. In addition, the study involved a comparison of trade between the liberalized sectors and the non-liberalized sectors. The finding shows that there was growth in trade in the liberalized sectors of the United States than the rest.

Several authors like Clausing (2001), Ghosh and Yamarik (2004), Cernat (2003), Sarker and Jayasinghe (2007) and Coulibaly (2004) have made use of the regional dummies with the gravity model especially in the ex-post analysis to capture effects of trade creation and trade diversion on welfare. Their estimated coefficients captured several policy issues and effects allowing the gravity model to measure trade flows at an aggregate level of the regional arrangements.

However, most researchers have tended to use the gravity model with data at an aggregate level, but there are contradictory findings that estimations that are done at aggregate data could also capture and include changes that occur at a disaggregated data level. More important, the disaggregated data level allows the researchers to exploit the variation in tariff liberalization within the regional block. Sarker and Jayasinghe (2007) find from their study on regional trade agreements and trade in agri-food products that there is a significant increase in agri-food trade within the EU at the expense of trade involving non-members.

Clausing (2001) further realized the existing deficiency in the literature on his analysis of trade creation and trade diversion of the Canada-United States Free Trade Agreement and employed data at the commodity level in the demand and supply analysis of trade. The results revealed that CUSFTA have a substantial trade creation and little evidence of trade diversion. He argued that, disaggregated data is important in analyzing the actual effects of a tariff change to the trade flows.

According to the World Bank (2009) on regional trade agreements gateway, south-south RTAs are more trade diverting, especially, when external tariffs are set high. Similarly, Park (1995) and Yeat (1998) do not see much meaningful intra-trade in Africa's RTAs that can generate significant impacts on their economic gains. This can have negative impacts on industrialization and economic growth, since imports will be diverted from low cost to high cost production points. Furthermore, it makes the non-member products to cost high due to the high tariffs worsening off the welfare of the citizens. Africa's RTAs have very small intra-regional trade due to lack of comparative advantage and production of similar products for trade that can be more trade diverting. However, Cernat's (2001) empirical study on assessment of regional trade arrangements concludes that south-south RTAs can fundamentally lead to trade creation, while others might have trade diversion effects irrespective of their sizes.

In Africa, there are a number of empirical studies that have employed the gravity model in analyzing the impacts of regional integrations. A bilateral study of trade flows within COMESA by Alemayehu and Haile (2002) shows that the insignificant effects of regional groupings could only be explained by the conventional gravity model on the standardized variables involved. They further proposed some of the factors that have attributed to these insignificant effects on performance of African regional blocs as including non-commitments by politicians, issues of compensation, overlapping membership, and lack of policy harmonization and ignored private sector participation.

According to Kwentua (2006) from the sample of 39 countries, the analysis showed that the investigations of trade creation and trade diversion effects within the EU-SA agreement increased, both between members of the EU-SA and the non-members of the EU-SA agreements indicating that there was trade creation. Moreover, the increase in trade between the EU-SA members and the rest of the world is as a result of the income effects.

The study on intensity of trade creation and trade diversion in COMESA, ECCAS and ECOWAS has also been estimated using the gravity model (Musila, 2005). The study used annual data for the years 1991 to 1998, and found that the intensity of trade creation and trade diversion varies from one region to another and from period to period. Indeed, empirical results showed that ECOWAS countries recorded an intense trade creation followed by COMESA countries. However, the finding of ECCAS area was not empirically corroborated. In addition, the estimated results also suggest that the effects of trade diversion were weak in the three regional organizations.

Ogunkola (1998) conducted a comparative analysis of the determinants of sub regional trade by considering an ex-ante period (1970–1972) and ex-post integration period (1978–1980) of ECOWAS. The estimated results showed a weaker intra-ECOWAS trade in spite of the integration efforts considerations.

Longo and Sekkat (2004) on economic obstacles to expanding intra-African trade, obtained similar results that the different integration schemes did not produce effects of trade creation or trade diversion and therefore were not able to lead to a growth in intra-African trade that could lead to welfare improvement.

3.0 METHODOLOGY

The study has used a panel data analysis of eighteen COMESA member countries and their major trading partners to determine the effects of regional trade arrangements using the

augmented gravity model of trade. A random versus fixed effect models were used to estimate the model putting into consideration the time invariant variables. The study used the hausman test to determine the choice of the model estimated.

4.0 RESULTS

4.1 Descriptive Statistics

This section gives a summary of the main variables used in the estimation of the model. This is shown in Table 1.

The results in Table 4.1 indicate that the data was a balanced panel with 5195 observations. The mean average of the dependent variable *lnexport* in COMESA stands at 15.88 with the highest level of variability and a dispersion around the mean of 6.35. The high standard deviation indicates a variation of intra and extra-COMESA trade among the sampled countries.

Table 1 Summary Results

Variable	Mean	Std. Dev.	Min	Max	Observations
lnexport overall	15.87717	6.347257	0	26.371	N = 5195
between		6.195398	0	26.1932	n = 1039
within		1.390783	4.762567	27.98197	T = 5
lngdp_i overall	25.29107	2.840704	19.817	30.305	N = 5195
between		2.83759	20.0174	30.2722	n = 1039
within		.1545347	24.84207	25.64447	T = 5
lngdp_j overall	25.26381	2.865435	19.817	30.305	N = 5195
between		2.862401	20.0174	30.2722	n = 1039
within		.1539102	24.81481	25.61721	T = 5
lnpop_i overall	17.01285	2.029997	11.35	21.017	N = 5195
between		2.030644	11.3712	21.007	n = 1039
within		.0234118	16.94765	17.07765	T = 5
lnpop_j overall	16.96747	2.061834	11.35	21.017	N = 5195
between		2.0625	11.3712	21.007	n = 1039
within		.0230023	16.90227	17.03227	T = 5
lndist~j overall	8.485611	.8537917	5.081	9.777	N = 5195
between		.8541206	5.081	9.777	n = 1039
within		0	8.485611	8.485611	T = 5
comesa1 overall	.2473532	.4315153	0	1	N = 5195
between		.4316816	0	1	n = 1039
within		0	.2473532	.2473532	T = 5
comesa2 overall	.5091434	.4999645	0	1	N = 5195
between		.5001571	0	1	n = 1039
within		0	.5091434	.5091434	T = 5
comesa3 overall	.5072185	.4999996	0	1	N = 5195
between		.5001887	0	1	n = 1039
within		0	.5072185	.5072185	T = 5

4.2 Correlation Analysis

The correlation test was run to test for the existence of correlation between the variables at 5% level of significance. The correlations of interest are contained in the non-diagonal elements of the matrix

Table 2 Correlation Analysis

	lnexport	lngdp_i	lngdp_j	lnpop_i	lnpop_j	lndist~j	comesa1	comesa2	comesa3
lnexport	1.0000								
lngdp_i	0.6042	1.0000							
lngdp_j	0.4798	-0.0452	1.0000						
lnpop_i	0.3912	0.6727	-0.0353	1.0000					
lnpop_j	0.2915	-0.0288	0.5841	-0.0221	1.0000				
lndist_ij	0.0608	0.1863	0.1962	0.1254	0.1879	1.0000			
comesa1	-0.2423	-0.0533	-0.4569	0.0028	-0.2474	-0.1646	1.0000		
comesa2	-0.0148	-0.1075	0.0383	-0.0749	0.0189	-0.0399	0.5629	1.0000	
comesa3	-0.3829	0.0409	-0.8051	0.0320	-0.4293	-0.1709	0.5651	-0.0436	1.0000

From the Table we see that trade and GDP have a strongly positive correlation that are significant at 95% level. This finding supports the basic intuition that bigger countries tend to trade more. By contrast, we find a weak positive correlation between trade and distance: country pairs that are further apart tend to trade less. Again, this finding is significant at 1% level and is in line with the basic intuition of the gravity model. A high correlation (0.8) is seen between *comesa3* and *lngdp-j*. This may be due to the fact that *comesa3* captures the effects of COMESA on members' exports to non-members from the rest of the world. Most of the variables have the expected sign of correlation with the dependent variable except *lndist-ij*. It shows a positive relationship with the dependent variable on the contrary, and may be attributed to due to collinearity.

The covariance matrix is used to show the average of the product of deviations of data points from their respective means. It displays the matrix of relationship between two ranges of data. We can therefore infer whether two ranges of data are moving together. That is whether large values of one set are associated with large values of the other (positive covariance), or small values of one set are associated with large values of the other (negative covariance) or values in both set are unrelated (near zero covariance).

4.3 Woodridge Test for Serial Correlation

The hypothesis of no first order serial correlation is accepted at 1% significance level. The calculated F-statistics of about 8.18 yield a low probability of 0.0048 therefore significantly accepting the null hypothesis at 1% confidence level.

4.4 Empirical Results

The results from the analysis were estimated using OLS, Fixed Effect and Random Effect models as shown in the appendixes.

The pooled OLS estimator ignores the panel structure of the data while treating individual observations as being serially uncorrelated with homoscedastic error term. The p-value results show high significance at 5% level except for *comesa1* and *comesa3*. The standard gravity model variables are expressed in natural logs hence they are interpreted as elasticities. The coefficient of determination (the line of best fit) for the model is 65.11% which shows that the variables used explain up to 65% in the variation of exports.

Diagnostic Tests

The augmented version of the model for Fixed Effect (FE) and Random Effect (RE) fits the data remarkably well in explaining the variation in bilateral trade in COMESA. However, “the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not” (Green, 2008). Therefore, the choice between the two models depends on the hausman test for specification. The hausman test statistics shows that under the null hypothesis of no correlation between individual effects and the explanatory variables, the FE estimator is consistent while RE is efficient while FE are not. However under the alternative hypothesis of individual effects being correlated with the explanatory variables and following a random walk, the FE is consistent while the RE estimates are inconsistent. The chi-square statistics from the hausman test statistics is 81.30 and is significant at 1% level of confidence. This means we accept the null hypothesis that the difference in coefficient of the estimated model is not systematic. It therefore signifies that we estimate a fixed effect model.

A further confirmation is made by running a Breusch-Pagan Lagrange Multiplier (LM) test for random effect. This was done to confirm if there is any presence of random effect. The resulting chi-square statistics was significant at 1% confidence level. The likelihood-ratio (LR) test displayed is testing on the boundary of the parameter space. We are probably testing whether the estimated variance component (something that is always greater than zero) is different from zero. This further means we reject the null hypothesis that there is no random effect. Hence random effect model is the most appropriate.

Fixed Effect (FE) versus Random Effect (RE)

Appendix 3.4 gives a summary of the FE estimated model. The FE model allows us to analyze the impacts of variables that change over time by controlling for time invariant differences between the individuals leading to unbiased estimates. It treats variables as individual entities with distinct characteristics in influencing the predictor variable. The variables *Indist*, *comesa1*, *comesa2* and *comesa3* were omitted due to collinearity. The coefficients of the estimated equation 6 by fixed effect model are significant at 5% confidence level except *lnpop-i* rejecting the null hypothesis that each coefficients estimated is zero. The explanatory variables have their expected signs of the coefficients and magnitudes. However, the fitted line only explains 13.81% of the model as shown by the overall R-squared value. Intra-class correlation (ρ) shows that 96.07% of the variance is due to differences across panels.

In the presence of differences across entities having significant influences on the dependent variable, we estimate using random effect. It allows us to include time invariant variables as shown in the estimated model in appendix 3.3. The coefficients estimated by RE model have their expected signs and are significant at 1% confidence level except *lnpop-i*, *comesa1* and *comesa2*. The baseline variables *Indist* and *lngdp* provides the most explanatory power in all the independent regressors used in the model as seen by the predicted coefficients. However, the model explains 64.87% (overall R-squared) of the fitted regression.

5.0 CONCLUSIONS AND RECOMENDATIONS

5.1 Conclusion

From the findings of this study it is concluded that:

- i. COMESA RTA is not a stumbling block to the multilateral trading system since it does not divert much trade to non-member partners' similar to the proposition by Bhagwati (1993). It therefore creates much trade that can lead to an increase to the domestic income. This can translate into welfare improvements when there are proper mechanisms to monitor the equitable distribution of the national income to the citizens.
- ii. The change in trading partners GDP positively affects the ability of the trading partners to supply imports and consume exports. This confirms the important factor played by the demand side of the RTA in influencing the supply of import from their trading partners.
- iii. The population size was seen to affect trade either negatively or positively since it entails changes in the member countries market demand.
- iv. The resistance variable i.e. distance play an important role in determining the flow of exports amongst trading partners. It has a negative and statistically significant coefficient at 1% level showing that investment in transportation and communication can help reduce the cost of trade hence expanding the international trade within the region.

5.2 Policy Recommendations

The findings from the study are useful in advocating for economic policies that can lead to the expansion of trade activities within the region. The results points out the important need for co-existence between the COMESA member governments. There is need for trade liberalization within the region due to members' economic sizes and characteristics of the products that they have comparative advantage over. An increase in trade within COMESA imply either a reduction of protectionism on their sensitive export products like agricultural commodities or an increased openness of the regions market due to specialization. Furthermore, there is need to strengthen institutions within the region that can overcome obstacles for promoting greater trade. This will help in facilitating the implementation processes of trade protocols of the region at the appropriate scheduled time. In addition, they should strengthen their political relationships to eliminate trade barriers and structural rigidities to enhance intra-COMESA trade activities within the region. For example, the negative sign of the distance variable shows the importance of investment on transport and communication that can reduce the transportation cost for the expansion of the international trade. It is therefore recommended that member countries formulate policies on infrastructure and transport services that will enable them improve and facilitate more trade within the region. More emphasis can be made on air transport by improving member countries airports to the international levels standards as this will allow a faster and smooth flow of trade even to the member countries that are landlocked.

The results showed that due to trade creation that has outweigh trade diversion leading to the net effect of welfare gain, it is therefore advisable for member countries governments to promote more regional participation since the welfare gain can be distributed to the nationals in terms of development projects that are geared towards alleviating poverty in the region.

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