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Comparative Advantage and Trade Performance of Food Products among Selected East African Community Partner States: Implications for Policy Formulation

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Abstract

Despite the potential benefits of regional trade, economic disparities among East African Community (EAC) member states persist. This study investigated the relationship between trade openness, comparative advantage in food trade, and economic performance within the EAC, focusing on Tanzania, Kenya, and Uganda. The study adopted export data from the United Nations Commodity Trade Statistics Database, the World Bank, and the International Trade Centre, as well as GDP data from the Bank of Tanzania and the National Bureau of Statistics. Data were analysed through descriptive statistics, causality analysis, Revealed Comparative Advantage (RCA), and vector autoregressive model. Findings reveal a positive impact of trade openness on Tanzania's economy but negative impacts on Kenya and Uganda, suggesting Tanzania benefits from EAC integration while Kenya and Uganda face trade challenges. The causality analysis shows that Tanzania's economic performance drives food exports, trade openness impacts Kenya's economic performance significantly, and Uganda sees a reciprocal link between economic growth and food exports; however, trade openness does not significantly affect Ugandan economic growth. The analysis of the Balassa index indicates Kenya's food export advantage, a decline in Uganda's export advantage since 1996, and Tanzania's lack of export advantage with potential for improvement. The study recommends cautiously implementing trade openness policies within the EAC to prevent trade distortions and currency devaluation.

Keywords: Agri-food products; Trade; Comparative advantage; East African countries; Policy.

1. Introduction

The East African Community (EAC) is a regional intergovernmental organisation consisting of seven partner states: Burundi, the Democratic Republic of Congo (DRC), Kenya, Rwanda, South Sudan, Tanzania, and Uganda. Originally established in 1967 by Kenya, Tanzania, and Uganda, the EAC disbanded in 1977 but was later revitalised in 2000 (WB, 2021). The treaty for its re-establishment was signed on November 30, 1999, and came into effect on July 7, 2020, after being ratified by the original three partner states (Kiraso, 2009). Rwanda and Burundi joined as full members on July 1, 2007, and South Sudan became a full member on September 5, 2016 (Binda, 2017). The most recent addition

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to the EAC is the DRC, which became a member in March 2022.

The EAC represents one of the largest regional economic integrations in Africa, boasting an estimated population of 283.7 million and a Gross Domestic Product (GDP) of US $305.3 billion in 2021 (Ejones et. al., 2021). Economic growth within the EAC reached 5.7% in 2018, the highest among African regions. The economies of EAC partner states encompass a wide spectrum, ranging from primary products to service sectors. Tanzania, for instance, witnessed a trade surplus with EAC partner states amounting to USD 589.2 million in 2021 (WB, 2021), surpassing the surplus of USD 340.2 million recorded in 2020 (Lwesya, 2022). This surge in exports to EAC members suggests enhanced growth that is potentially attributable to trade integration, fostering a conducive business environment among member states.

Despite being part of the East African Community (EAC), some of the member states engage more in trade with non-EAC countries, highlighting the underutilization of regional integration benefits (Lwesya, 2022). Tanzania for example, predominantly exports goods to non-EAC nations, neglecting potential benefits from its geographical and customs union advantages (WB, 2020; WB, 2021). Studies indicate that trade integration within the EAC promotes growth, particularly in manufacturing trade, which positively impacts economic growth, whereas increased trade in primary goods can hinder growth (Beyene, 2014; Vhumbunu, 2019; Lwesya, 2022).

Numerous scholars have conducted studies on comparative advantages among regional member states. For instance, Chingarande et al. (2013) examined the comparative advantages of East African Community (EAC) member states to identify which country possessed the most comparative advantages. The present study focuses specifically on the trade of agricultural products, which are fundamental to the founding countries of the EAC. Paul and Dhiman (2021) carried out a comprehensive systematic review of export competitiveness literature spanning three decades. Their objective was to synthesise existing research and suggest directions for future studies. They inquired about the mechanisms and conditions affecting exporters' innovation and productivity via the learning-by-exporting effect, pointing out the fragmented nature of current findings and the need for systematic analysis to pinpoint factors influencing learning from exporting. While their study is broader, the current research concentrates on the three EAC founding member states. Nyangweso (2018) explored the determinants of expenditure among sorghum-producing households and their implications for food security in Kenya and Uganda. This study highlighted the importance of access to extension services, market information, and land in shaping the food security of young farmers in Africa. Although Nyangweso's research focused on food security in two countries, the current study examines the economic performance of the three founding members of the EAC.

The existing trade dynamics within the EAC reveal that some member states have a comparative advantage in specific food products, while others face challenges in maximising their trade potential (WB, 2020; WB, 2021; Lwesya, 2022). There is a need for a comprehensive analysis to identify these comparative advantages and understand their implications for regional trade policies. This research aimed to fill the gap by examining: the comparative

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advantage of food products, the impact of EAC trade openness on the economy, and the causality relationship between food trade comparative advantage and economic performance among the three founders of EAC member states.

The study is intended to enhance understanding of comparative advantage among EAC states and other regional integration groups. By crafting tailored policies, the EAC member states can address challenges like high commodity prices and inflation by leveraging their comparative advantage in products and services. With the Democratic Republic of Congo (DRC) joining the EAC, market opportunities expand, facilitating increased intra-EAC trade for Tanzania and other EAC states. Moreover, the study sheds light on the comparative advantage of food exports among EAC countries, informing policymaking.

The study was grounded in the Comparative Advantage Theory (CAT), which was developed by the economist David Ricardo in the early 19th century (Fisher, 2015). CAT is founded in the field of international trade and provides a robust framework for understanding trade dynamics between nations. The CAT posits that countries should specialise in the production of goods and services for which they have a comparative advantage, i.e., they can produce these goods at a lower opportunity cost compared to other countries; and by specialising and trading based on comparative advantage, all participating countries can benefit from trade.

In the context of the East African Community (EAC), applying the CAT may involve the identification of comparative advantages that can be measured through the Revealed Comparative Advantage (RCA) index, analysis of trade patterns, assessment of economic performance using indicators such as GDP growth and trade balances, and formulate policy recommendations to enhance trade opportunities based on comparative advantages. Policies could include improving infrastructure, reducing trade barriers, and providing support for sectors where each country has a comparative advantage. The policies can foster sustainable and equitable economic growth across the EAC.

2. Data and Methods

2.1. Data

The study employed secondary data sourced from diverse governmental bodies and international entities, encompassing export data from the United Nations Commodity Trade Statistics Database (Borchert et al., 2021), the World Bank (WB, 2021), the International Trade Centre (Aguiar et al., 2022), as well as GDP data from the Bank of Tanzania (Mgangaluma et al., n.d.), and the National Bureau of Statistics (NBS, 2022).

2.2. Methods

Descriptive statistics were utilised to comprehensively grasp the dataset, while diagnostic tests were conducted to assess the accuracy and reliability of the model. The Balassa Index served as a tool to gauge the comparative advantages of exports. Specifically, the study employed the Balassa Revealed Comparative Advantage (RCA) method to determine Tanzania's comparative advantage in food products compared to other member states of the East African Community (EAC). Widely recognised, this index stands as a predominant measure for assessing Revealed Comparative Advantage (RCA) in export trade. Let country *I*'s comparative advantage in product *j* as:

$$BRCA_{ij} = \frac{\left({}^{E_{ij}}/_{E_i}\right)}{\left({}^{E_j}/_{E}\right)} \quad \text{.....(i)}$$

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Where,

$BRCA_{ij}$ = Balassa revealed comparative advantage index for commodity *i* of

Country *j*

E_{ij} = exports of commodity *j* of Country *i*

E_j = total exports of Country *i*

E_i = total EAC exports of commodity *j*

E = total EAC exports.

The equation above describes the market share of country "*I*" in export of commodity "*j*" and compares its market share in the EAC export market. If the calculated value of BRCA*ij* is greater than unity it means country "*I*" has comparative advantage in export of commodity "*j*" over other countries in EAC market.

Indices interpretation

I. If BRCA*ij* is less than 1, it indicates that country "*I*" has comparative disadvantage in export of commodity "*j*".

II. If BRCAij is equal to 1, it means country "*I*" has neutral comparative advantage in commodity "*j*".

Model specification

This study adopted a multiple regression econometric model from Nguto (2020) to assess how international trade openness impacts economic growth in Tanzania relative to Kenya and Uganda. The model served the purpose of analysing the influence of several independent variables (food exports, the Balassa index of food exports, the inflation rate, and trade openness) on GDP as a dependent variable. Ordinary Least Squares (OLS) regression was applied to estimate the parameters of independent variables, with the OLS technique used to derive the unknown parameters of the model. Granger-causality analysis was conducted to determine the causal relationship between trade exports and economic performance, with the Granger-causality test executed based on the estimated econometric model.

The predictor variables in this study included food exports, the Balassa index of food exports, the inflation rate, and trade openness spanning the years 1996 to 2020, while GDP served as the dependent variable. The general regression model was specified as follows:

$$GDP_i = B_{0i} + B_{1i}foodexports + B_{2i}tradeopenness + B_{3i}INFL + \varepsilon_t \quad \text{...(ii)}$$

Where:

GDP_i = Gross Domestic Product of country "i", foodexports = trade comparative advantage of food exports of country "i", trade openness = index of trade openness on EAC. $INFL = Inflation\ rate$, B_0 is the value of interception, B_1, B_2 *and* B_3 are coefficients of independent variables and

ε_t = Error term.

Specifically;

$$GDP_{TZ} = B_0 + B_1 foodexportsTZ + B_{2i}tradeopennessTZ + B_3 INFLTZ + \varepsilon_t \ldots\ldots Model\ 1$$

$$GDP_{KE} = B_0 + B_1 foodexportsKE + B_2 tradeopennessKE + B_3 INFLKE + \varepsilon_t \ldots\ldots Model\ 2$$

$$GDP_{UG} = B_0 + B_1 foodexportsUG + B_2 tradeopennessUG + B_3 INFLUG + \varepsilon_t \ldots\ldots Model\ 3$$

3. Results

3.1. Descriptive characteristics

Descriptive analysis was done to clearly understand the characteristics of the variables included in the study. The results in Table 1 show that the median value of the natural logarithm of Gross Domestic Product for Tanzania (*lnGDP_TZ*) was 3.3, while the median value for the natural logarithm of food product exports in the country (*lnfoodExTZ,*) was -0.12, for trade openness (tradeOpenTZ) was 0.45 and for the Balassa index of food product exports (*BRCA_TZ*) was 0.83. On the other hand, the median value of the natural logarithm of

Gross Domestic Product for Kenya (*lnGDP_KE)* was 3.58, while the median value for the natural logarithm of food product exports (*lnfoodExKE)* was 0.67, for trade openness (*tradeOpenKE*) was 0.54 and for the Balassa index of food product exports (*BRCA_KE*) was 1.06. Likewise, the median value of the natural logarithm of Gross Domestic Product for Uganda (*lnGDP_UG)* was 2.9, while the median value for the natural logarithm of food product exports (*lnfoodExUG*) was -0.27, for trade openness (trade*OpenUG*) was 0.42, for the Balassa index of food product exports (*BRCA_UG*) was 1.25, and for the inflation rate in Uganda (*INF_UG*) was 0.058 (5.8%). This indicates the GDP distribution of all countries follows a log-normal distribution pattern where most values cluster around a central point with fewer extreme values on either end. That implies relative stability or consistency in the growth rates or changes in the GDPs over time, as reflected by the clustering around the median value on a logarithmic scale. These descriptive results also imply that Kenya had the highest average gross domestic product (GDP) of the three, followed by Tanzania and Uganda (Table 1).

Table 1: Descriptive statistics of the variables

	Model 1 (Tanzania)				
Statistics	**lnGDP_TZ**	**lnfoodExTZ**	**INF_TZ**	**tradeOpenTZ**	**BRCA_TZ**
N	25	25	25	25	25
Mean	3.155283	-0.1643841	0.08196	0.4400176	0.825052
Median	3.309448	-0.1248423	0.061	0.4496548	0.82943
SD	0.720828	0.6010509	0.0447	0.1024584	0.142275
Skewness	-0.35371	0.035666	1.380806	0.4029998	-0.3657
Kurtosis	2.045574	1.586872	4.027155	2.613436	3.997801
Min	1.669592	-1.02503	0.041	0.2891305	0.455308
Max	4.161224	0.7202963	0.21	0.6862878	1.149295
	Model 2 (Kenya)				
Statistics	**lnGDP_KE**	**lnfoodExKE**	**INF_KE**	**tradeOpenKE**	**BRCA_KE**
N	25	25	25	25	25
Mean	3.485954	0.5678908	0.07128	0.548262	1.023284
Median	3.580737	0.6684949	0.06	0.539648	1.060754
SD	0.702579	0.4504508	0.030529	0.147481	0.105965
Skewness	0.118028	-0.3619012	1.117927	0.730616	-0.40318
Kurtosis	1.565822	1.838996	3.805836	3.373677	2.309366
Min	2.607862	-0.4008667	0.022	0.280809	0.813979
Max	4.644775	1.131317	0.151	0.896748	1.211118
	Model 3 (Uganda)				
Statistics	**lnGDP_UG**	**lnfoodExUG**	**INF_UG**	**TradeOpenUG**	**BRCA_UG**
N	25	25	25	25	25
Mean	2.716941	-0.2787739	0.06716	0.4253576	1.349433
Median	2.900872	-0.0196616	0.058	0.4402527	1.246587
SD	0.605763	0.6634486	0.04155	0.0792666	0.258885
Skewness	-0.08171	-0.2155752	1.139805	0.0221401	1.05209
Kurtosis	1.42832	1.456284	4.221411	1.699006	3.119839
Min	1.924249	-1.372653	0.009	0.3112725	1.031751
Max	3.629395	0.5493804	0.187	0.576811	1.966279

3.2. Unit root tests

The unit root test was conducted using the Augmented Dickey Fuller (ADF) test and the Philips Perron (pperron) test to check for the variables' stationarity at level and at first difference. The unit root test results as shown in Table 2 and Table 3 indicate that all included variables were stationary at levels I (0) and/or at first difference I (1) based on Augmented Dickey Fuller (ADF) test results and/or Phillips Perron (PP) tests. Both tests were conducted at a 5% level of significance. The relationship between the study variables is shown further in Appendices 1(a,b), 2(a,b), 3(a,b), 4(a,b) and 5.

Table 2: Unit root test for GDP, Balassa indices and food export variables

		Augmented Dickey-Fuller(ADF) and Phillips-Perron (PP)tests			
		At level (constant)		**At first difference**	
Variable	Type of equation	ADF(p-value)	PP (p-value)	ADF(p-value)	PP (p-value)
lnGDP_TZ	Constant	0.9592	0.9148	0.0542	0.1175
	Constant and trend	0.0959	0.1815	0.0000**	0.0005**
lnGDP_KE	Constant	0.9804	0.0000**	0.2736	0.4697
	Constant and trend	0.9911	0.3882	0.0089**	0.0373**
lnGDP_UG	Constant	0.9399	0.0818	0.0699	0.0699
	Constant and trend	0.9629	0.6115	0.0141**	0.0141**
BRCA_TZ	Constant	0.0043**	0.0043**		
	Constant and trend	0.0073**	0.0073**		
BRCA_KE	Constant	0.0114**	0.0114**		
	Constant and trend	0.0014**	0.0014**		
BRCA_UG	Constant	0.0525	0.0525		
	Constant and trend	0.0043**	0.0043**		
lnfoodExTZ	Constant	0.7888	0.4087	0.0084**	0.0565
	Constant and trend	0.9026	0.0745	0.0000**	0.0000**
lnfoodExKE	Constant	0.8485	0.5557	0.0001**	0.0015**
	Constant and trend	0.8288	0.2381	0.0000**	0.0000**
lnfoodExUG	Constant	0.8674	0.6363	0.0001**	0.0001**
	Constant and trend	0.8974	0.5010	0.0011**	0.0011**

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Table 3: Unit root test for trade openness and Inflation rate variables

		Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests			
		At level (Constant)		At first difference	
Variable	Type of equation	ADF(p-value)	PP (p-value)	ADF(p-value)	PP (p-value)
tradeOpenTZ	Constant	0.3555	0.1164	0.0974	0.0974
	Constant and trend	0.7696	0.3383	0.0110**	0.0110**
tradeOpenKE	Constant	0.4643	0.6208	0.0000**	0.0000**
	Constant and trend	0.4195	0.2933	0.0000**	0.0000**
tradeOpenUG	Constant	0.6269	0.6775	0.0009**	0.0009**
	Constant and trend	0.9382	0.9096	0.0066**	0.0066**
INFL_UG	Constant	0.0037**	0.0037**		
	Constant and trend	0.0203**	0.0203**		
INFL_KE	Constant	0.6406	0.0007**		
	Constant and trend	0.9091	0.0049**		
INFL_TZ	Constant	0.2433	0.0117**	0.0002**	0.0002**
	Constant and trend	0.5771	0.119	0.0015**	0.0015**

3.3. Lag selection

Several selection criteria were used to select the optimum number of lags used in the model, including the Akaike Information Criterion (AIC), Final Prediction Error (FPE), Hannan-Quinn Information Criterion (HQIC), and Schwarz Bayesian Information Criterion (SBIC). The decision on which information criterion to choose depends on several factors, including the type of data, whether annual, quarterly, or daily, and the number of observations in the study. According to Asghar and Abid (2007) for small sample size (60 or less) AIC and FPE have the highest probability of correct estimation for selecting the optimal number of lags and for large sample (greater than 60) HQIC has the best performance. This study used AIC and FPE as optimal lag selection criteria as the study had only a sample size of 21 annual data (Table 4).

Table 4: Lag selection

Lag selection criteria								
Sample: 2005 thru 2020							**Number of obs = 16**	
Lag	**LL**	**LR**	**df**	**p**	**FPE**	**AIC**	**HQIC**	**SBIC**
0	13.3561				0.012498	-1.54451	-1.54204	-1.49622
1	13.4899	0.26755	1	0.605	0.013943	-1.43623	-1.43129	-1.33966
2	16.7627	6.5457*	1	0.011	.010528*	-1.72034*	-1.71292*	-1.57548*
3	17.5419	1.5584	1	0.212	0.010891	-1.69274	-1.68285	-1.49959
4	17.7362	0.38864	1	0.533	0.012176	-1.59203	-1.57966	-1.35059

3.4. Diagnostic tests of the models

The results from diagnostic tests of the resulting models indicated no violations of the time series models' assumptions. Table 5 indicated no violation of autocorrelation assumptions for all models since all the p-values were insignificant at the 5% significance level. Table 6 shows the results of the normality test assumptions. All tests, including Jarque-Bera, Skewness, and Kurtosis tests for all models, indicated that there was no violation of the normality assumption. The results of the stability test for Model 1 in Appendix 5 indicate that Model 1 is stable. However, for models 2 and 3, the results indicate that the two models are not very stable. Yet, the situation is not alarming, as only a few measures of modulus columns from Models 1 and 2 indicate values above 1; thus, the models were deemed fit for statistical inference.

Table 5: Lagrange multiplier results of autocorrelation

Model 1 (Tanzania)				Model 2 (Kenya)				Model 3 (Uganda)			
Lag	χ^2	df	p value	Lag	χ^2	df	p-value	Lag	χ^2	df	p-value
1	19.989	16	0.221	1	25.484	16	0.062	1	18.833	16	0.277
2	12.272	16	0.725	2	17.516	16	0.353	2	12.005	16	0.744

Table 6: Normality test results for the models

	Model 1 (Tanzania)			Model 2 (Kenya)			Model 3 (Uganda)		
	Jarque-Bera test	**Skewness test**	**Kurtosis test**	**Jarque-Bera test**	**Skewness test**	**Kurtosis test**	**Jarque-Bera test**	**Skewness test**	**Kurtosis test**
Equation	Prob > chi2	Prob > chi2	Prob > chi2	Prob > chi2	Prob > chi2	Prob > chi2	Prob > chi2	Prob > chi2	Prob > chi2
ln (GDP)	0.389	0.294	0.378	0.396	0.725	0.188	0.285	0.712	0.123
ln (food export)	0.268	0.613	0.123	0.353	0.728	0.162	0.209	0.705	0.084
Inflation rate	0.583	0.925	0.301	0.600	0.461	0.489	0.349	0.189	0.536
Trade openness	0.295	0.784	0.124	0.247	0.766	0.099	0.311	0.827	0.131
ALL	0.429	0.837	0.159	0.458	0.928	0.142	0.259	0.727	0.091

3.5. Food Trade Comparative Advantage between Tanzania, Kenya, and Uganda

The Balassa index was used to measure the comparative advantage of food products between Tanzania, Kenya, and Uganda. The index of 1 implies neutrality of the exported products (indicates neither comparative advantage nor comparative disadvantage). An index above 1 indicates that the country has a comparative advantage in the export of food products, while an index below 1 indicates that the country has a comparative disadvantage in the export of food products.

The results from Figure 1 show that Kenya had a comparative advantage in the export of food products, BRCA_foodKE_1, from 2009 to 2013, then dropped to a minimum in 2014. But again, it attained its comparative advantage from 2015 up to 2020. Uganda has had a comparative advantage in exporting food products, *BRCA_foodUG_1,* since 1995, but its trend has declined. The projections based on the graph trend predict even further

decline in 2021 and the years to come. Tanzania has not had a comparative advantage in the export of food products based on the Balassa index results, *BRCA_foodTZ_*1, since 1995, and has been continuously declining up to the year around 2017. From there, the Balassa index trend indicates an increase in Tanzania's export index of food products. The projection based on the trend analysis indicates that the country is nearing to attain a comparative advantage in food exports in the few years to come. The data on exports of food products from Tanzania for 2021, 2022, and 2023 might probably give a good presentation of the real situation.

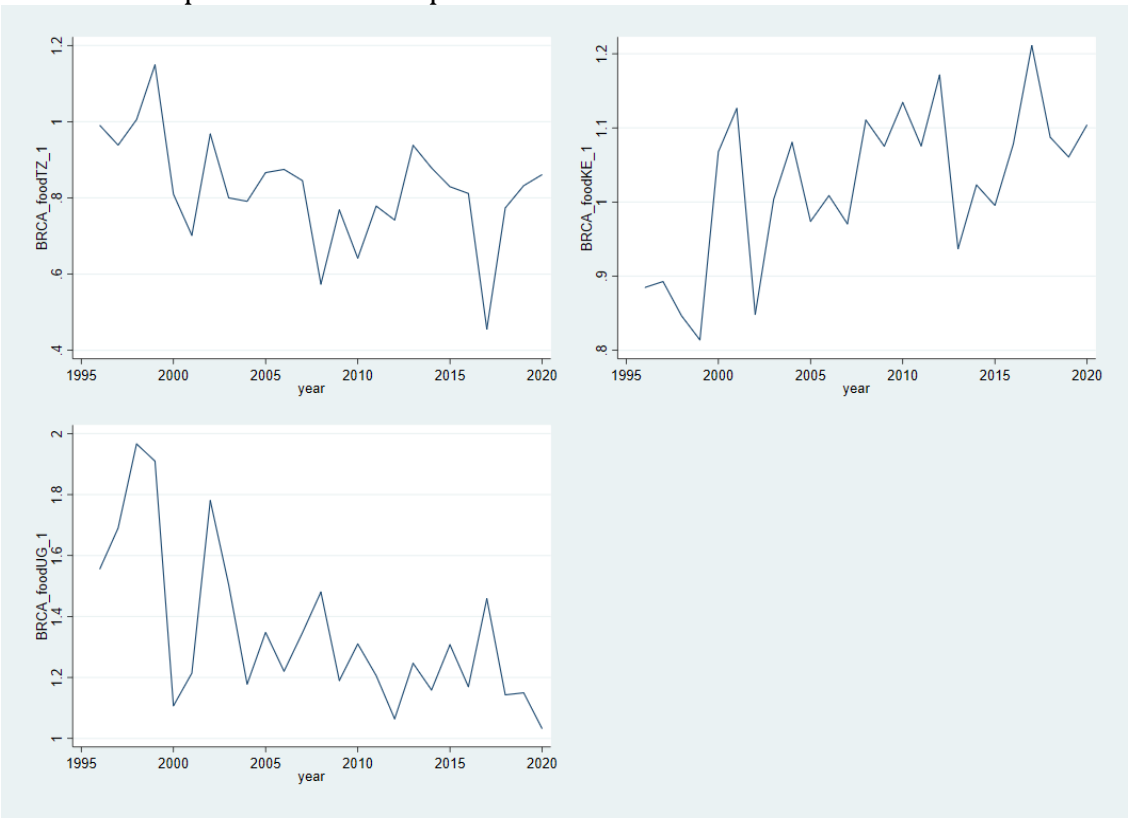

Figure 1: Balassa index analysis results

3.6. Causality Relationship between Food Trade Comparative Advantage and Economic Performance of the East African Countries

Granger causality was used to check for the causal relationship between food trade comparative advantage and the economic performance of Tanzania, Kenya, and Uganda countries.

The results from Table 7 indicate that the comparative advantage of Tanzania's food exports does not greatly affect Tanzania's economic performance. However, the economic performance of the country granger causes of food exports. The results imply that Tanzania's food product exports have not effectively contributed to the country's economic growth. Trade openness in the EAC granger causes the growth of the Tanzanian economy. Generally, all the variables in the model were found to granger causes Tanzanian economic growth.

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Table 7: Granger causality test results for Tanzania

Equation	Excluded	F	df	df_r	Prob > F
lnGDP_TZ	lnfoodExTZ	0.07026	1	16	0.7943
lnGDP_TZ	INF_TZ	7.1246	1	16	0.0168
lnGDP_TZ	tradeOpen_TZ	15.256	1	16	0.0013
lnGDP_TZ	ALL	8.3225	3	16	0.0015
lnfoodExTZ	lnGDP_TZ	24.867	1	16	0.0001
lnfoodExTZ	INF_TZ	0.5783	1	16	0.458
lnfoodExTZ	tradeOpen_TZ	5.4637	1	16	0.0327
lnfoodExTZ	ALL	9.5645	3	16	0.0007

The results from Table 8 indicate that Kenya food exports do not granger cause the economic performance of the country. Likewise, the economic performance of the country (Kenya) does not granger cause food export growth. Trade openness granger causes the economic performance of the country. Generally, all variables included in the model granger cause the economic performance of the country (Kenya). The study findings align with those of Ulasan (2012), who investigated the relationship between trade openness and economic growth in African countries using Granger causality tests and found that trade openness causes economic growth in several African countries. Apart from that, Mbulawa (2015) explored the causality between export performance and economic growth in Botswana using Granger causality tests, and the results concluded that export performance causes economic growth. Moreover, Dash and Parida's (2013) findings in India showed that there is a bidirectional causality between trade openness and economic growth and between investment and economic growth

Table 8: Granger causality test results for Kenya

Equation	**Excluded**	**F**	**df**	**df_r**	**Prob > F**
lnGDP_KE	lnfoodExKE	0.45097	1	16	0.5115
lnGDP_KE	INF_KE	0.22208	1	16	0.6438
lnGDP_KE	tradeOpen_KE	10.373	1	16	0.0053
lnGDP_KE	ALL	5.118	3	16	0.0113
lnfoodExKE	lnGDP_KE	0.9833	1	16	0.3361
lnfoodExKE	INF_3_KE	0.5995	1	16	0.4501
lnfoodExKE	tradeOpen_KE	9.2773	1	16	0.0077
lnfoodExKE	ALL	6.0178	3	16	0.006

The results in Table 9 indicate that food exports granger causes Uganda's economic growth. Likewise, economic growth granger causes food exports. However, trade openness was found not to granger cause Ugandan economic growth. The results suggest that food export clearly plays the role for economic growth

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Table 9: Granger causality test results for Uganda

Equation	Excluded	F	df	df_r	Prob > F
lnGDP_UG	lnfoodExUG	8.0074	1	16	0.0121
lnGDP_UG	INF_3_UG	0.06837	1	16	0.7971
lnGDP_UG	tradeOpen_UG	0.41785	1	16	0.5272
lnGDP_UG	ALL	3.0893	3	16	0.0569
lnfoodExUG	lnGDP_UG	15.444	1	16	0.0012
lnfoodExUG	INF_3_UG	0.08914	1	16	0.7691
lnfoodExUG	tradeOpen_UG	0.00393	1	16	0.9508
lnfoodExUG	ALL	6.7264	3	16	0.0038

3.7. The Impact of EAC Trade Openness on the Economy for Tanzania, Kenya and Uganda

A Vector autoregressive (VAR) model was used to determine the impact of EAC trade openness on the economies of Tanzania, Kenya, and Uganda. The results in Table 10 indicate that a unit increase in trade openness results in a 1.78% increase in the economic performance of Tanzania. A percentage increase in the inflation rate results in a 2.23% decrease in the country's economic performance. Further, a percentage increase in lag 4 of economic performance results in a 0.76% increase in the country's current economic performance.

Further, the results indicate that a 1-unit increase in trade openness results in a 1.03% decrease in the performance of the Kenyan economy. Likewise, a 1% increase in Lag 4 of economic performance results in a 1.1% increase in the country's current economic performance.

Lastly, the results indicate that a 1% increase in Lag 4 of economic performance results in a 2.18% increase in the current economic performance of Uganda. Food exports in Uganda indicated a 0.93% decrease in the country's economic performance. The results may be due to decreasing food product exports since 1995. Trade openness negatively impacted the Ugandan economy, though the results were not significant at the 95% confidence level.

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Table 10: Autoregressive model results1

Model 1 (Tanzania)					Model 2 (Kenya)					Model 3 (Uganda)				
Variable	**Coeff**	**P>t**	**[95% conf. Interval]**		**Variable**	**Coeff**	**P>t**	**[95% conf.Interval]**		**Variable**	**Coeff**	**P>t**	**[95% conf.Interval]**	
lnGDP_TZ					lnGDP_KE					lnGDP_UG				
L4	0.7617	0.000	0.5029	1.0203	L4.	1.1022	0.0000	0.6235	1.5808	L4.	2.1804	0.0000	1.2657	3.0952
lnfoodExTZ					lnfoodExKE					lnfoodExUG				
L4.	-0.0397	0.794	-0.3576	0.2781	L4.	-0.2027	0.511	-0.8427	0.4372	L4.	-.9329	0.012	-1.6317	-0.2340
INF_TZ					INF_3_KE					INF_3_UG				
L4.	-2.2315	0.017	-4.0038	-0.4592	L4.	0.5959	0.644	-2.0850	3.2769	L4.	0.3858	0.797	-2.7419	3.5135
tradeOpen_TZ					tradeOpen_KE					tradeOpen_UG				
L4.	1.7876	0.001	0.8174	2.7578	L4.	-1.0268	0.005	-1.7027	-0.3509	L4.	-1.2952	0.527	-5.5427	2.9523
_cons	0.4569	0.39	-0.6385	1.5523	_cons	0.6639	0.393	-0.9405	2.2683	_cons	-2.6289	0.033	-5.0219	-0.2359

Note: [1] Lag 4

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4. Discussion

The study findings suggest that while trade openness positively affects Tanzania's economic performance, it has a negative impact on the economies of Kenya and Uganda. This implies that Tanzania has benefited from trade integration within the community, leading to increased exports. These findings contradict the results of Mahona and Mjema (2014), who found a negative impact of Tanzanian trade flows on economic performance within the EAC. One potential explanation for this contradiction is that Tanzania has implemented effective economic reforms since 2015, contributing to the growth and stability of its economy (WB, 2020; WB, 2021). However, it is important to note that Mahona and Mjema's findings were based on data predating 2015. Moreover, due to the competitive nature of becoming a major economy within the EAC region, the impact of trade integration is influenced by the performance of rival economies. This could elucidate the observed negative impact on countries like Kenya and Uganda. According to Sujová et al. (2021), a significant rise in exports alongside an increase in imports positively influences economic growth and performance. Conversely, a situation in which exports decrease while imports remain high has a negative impact on economic growth and performance. This scenario of declining net exports is more common in developing countries, as evidenced by Uganda's continuous downward trend in food exports since 1995.

The results indicate that Tanzanian food exports and overall goods exports have been on the rise since 2015, suggesting a potential for further export growth in the future. The comparative advantage analysis in food exports provides compelling evidence of Tanzania's notable long-term economic performance enhancement resulting from food exports and overall merchandise exports. These study findings align with established economic theories regarding the impact of exports on the economy.

According to Berg and Lewer (2015), when firms in developing countries achieve a competitive and cost advantage in specific products, they tend to enter the global market, potentially boosting economic growth, as observed in the case of the Kenyan economy, which has consistently been leading in the East African Community (EAC). However, Tanzania's ongoing economic reform efforts have succeeded in narrowing the significant gap in economic performance between Tanzania and Kenya. There is a projection that if Tanzania's current pace of growth persists or even accelerates, it could surpass the Kenyan economy in the future. Berg and Lewer (2015) proposed that while exports can contribute to increased economic growth, an alternative argument suggests that both exports and economic growth may stem from the process of development and structural transformation.

Similarly, the study findings on exports align with those of Sultanuzzaman et al. (2019), highlighting the long-term positive effects of exports on a country's economic growth. Additionally, Ali et al. (2017) found evidence of negative impacts of exports on economic performance, as observed in Uganda's economic downturn, which was attributed to a consistent decline in food exports.

The rising inflation rate has predominantly affected the Tanzanian economy, leading to a decline in economic performance. Recent evidence shows a general increase in the country's prices of goods and services, impacting individuals' purchasing power and per

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capita income, thereby hindering economic development. On the other hand, Kenya and Uganda experienced relatively positive effects from inflation, albeit not as significant. These findings align with those of Azam (2020), who found a significant negative association between inflation and growth above the threshold level of inflation. According to Zhao (2020), the strengthening of the local currency in China had positive effects on enhancing productivity. This currency appreciation encouraged productivity and contributed to the real exchange rate. If the inflation rate surpasses a certain threshold, it suggests a depreciation of the local currency, which in turn indicates reduced productivity and consequently leads to poor economic performance.

5. Conclusion

The study examined the comparative advantages in food trade among three major East African economies: Tanzania, Kenya, and Uganda. Results revealed that in Tanzania, food exports do not directly impact the country's economic performance. Rather, economic growth in Tanzania stimulates an increase in food exports to other East African partner states. Conversely, in Uganda, a decline in food exports leads to poor economic performance, while the country's economic struggles further exacerbate the downward trend in food exports. Similarly, in Kenya, there is no evidence that food exports drive economic growth. Although trade integration among EAC member states positively affected Tanzania's economy, its impact on Kenya and Uganda was less pronounced. The Balassa index analysis highlighted Kenya's comparative advantage in food product exports, while Uganda initially possessed such an advantage but has seen a continuous decline since 1996, significantly impacting its economic growth. Tanzania lacks a comparative advantage in food exports, but recent trends suggest potential for future attainment.

Based on the study findings, caution is advised when implementing trade openness policies within East African countries to prevent potential distortions in economic performance and currency devaluation. While promoting trade openness, monitoring imports and ensuring they do not overwhelm domestic markets or compromise quality is crucial. Additionally, although Tanzania currently lacks a comparative advantage in food exports, there's potential for future attainment. Therefore, government policies should prioritise measures to enhance agricultural production and manufacturing industries to boost food and non-food exports.

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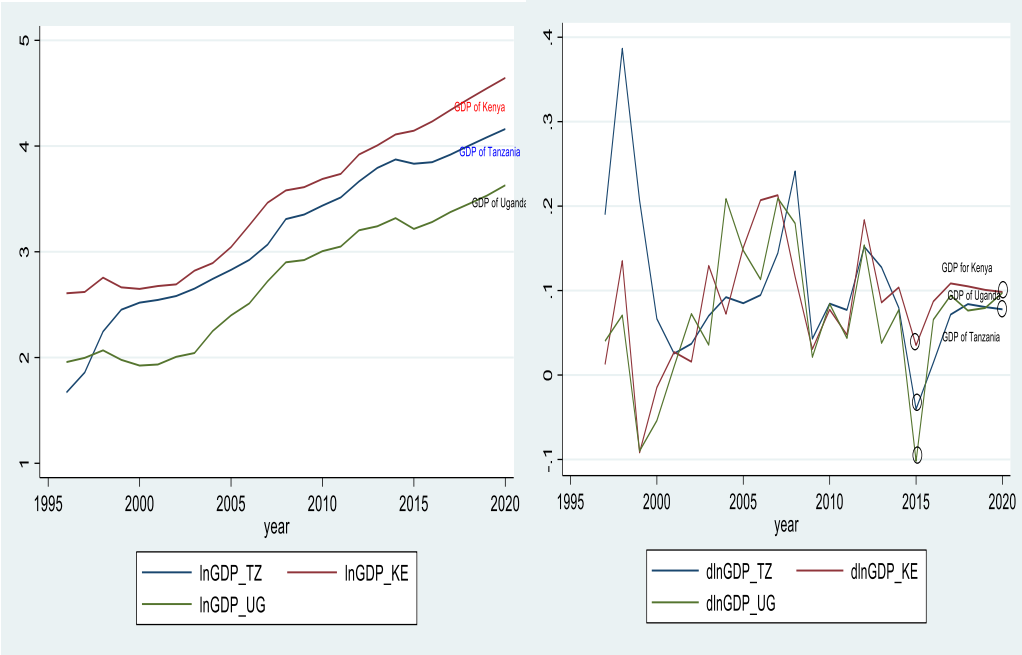
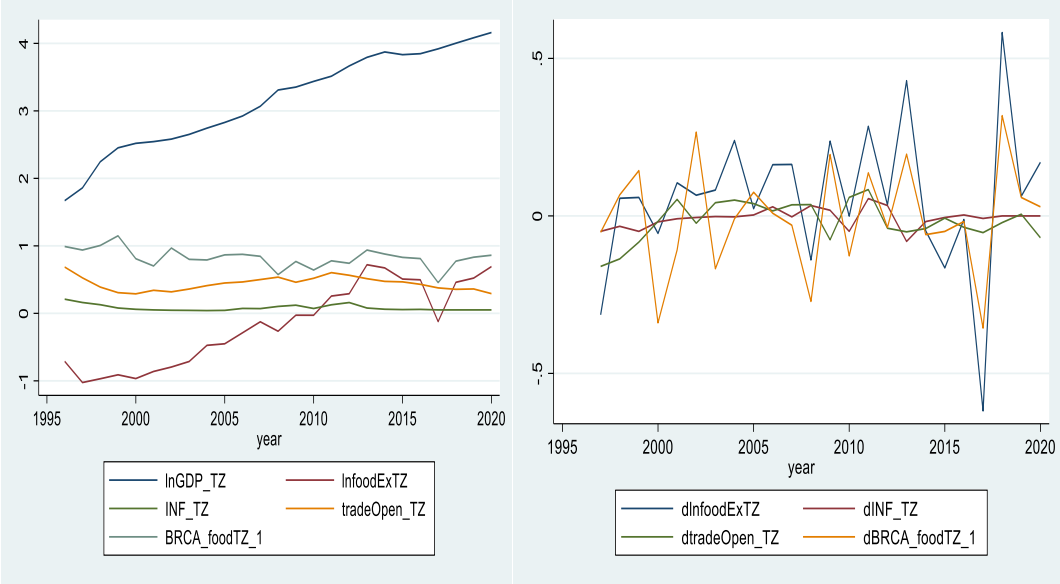
Appendices

Appendix 1: Non-stationary and stationary GDP variables



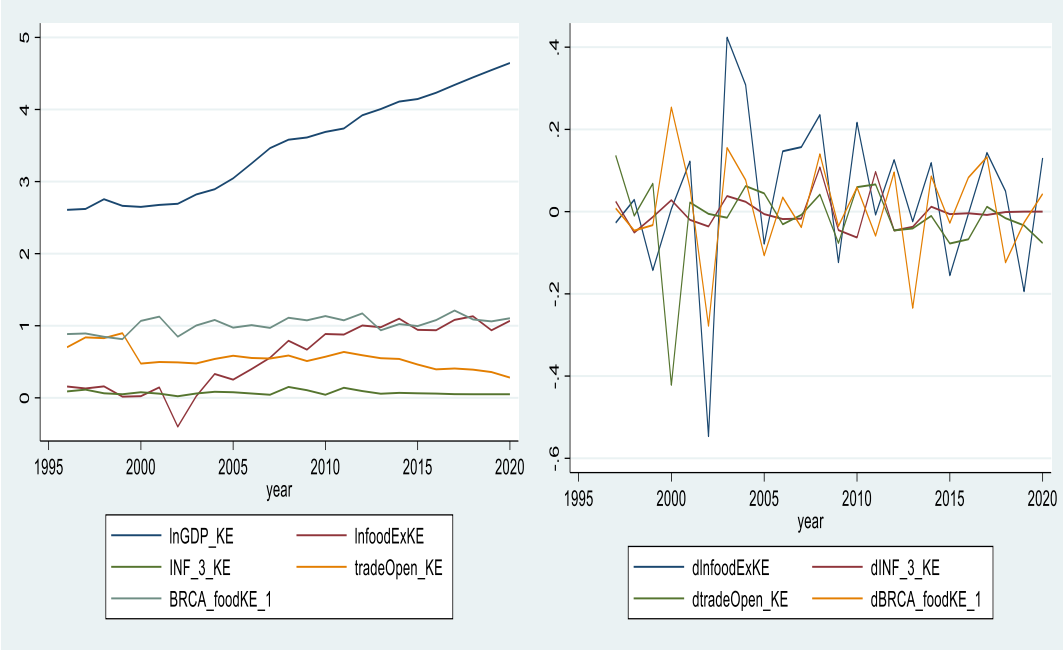
(a) (b)

Appendix 2: Non-stationary and stationary relationships for model 1



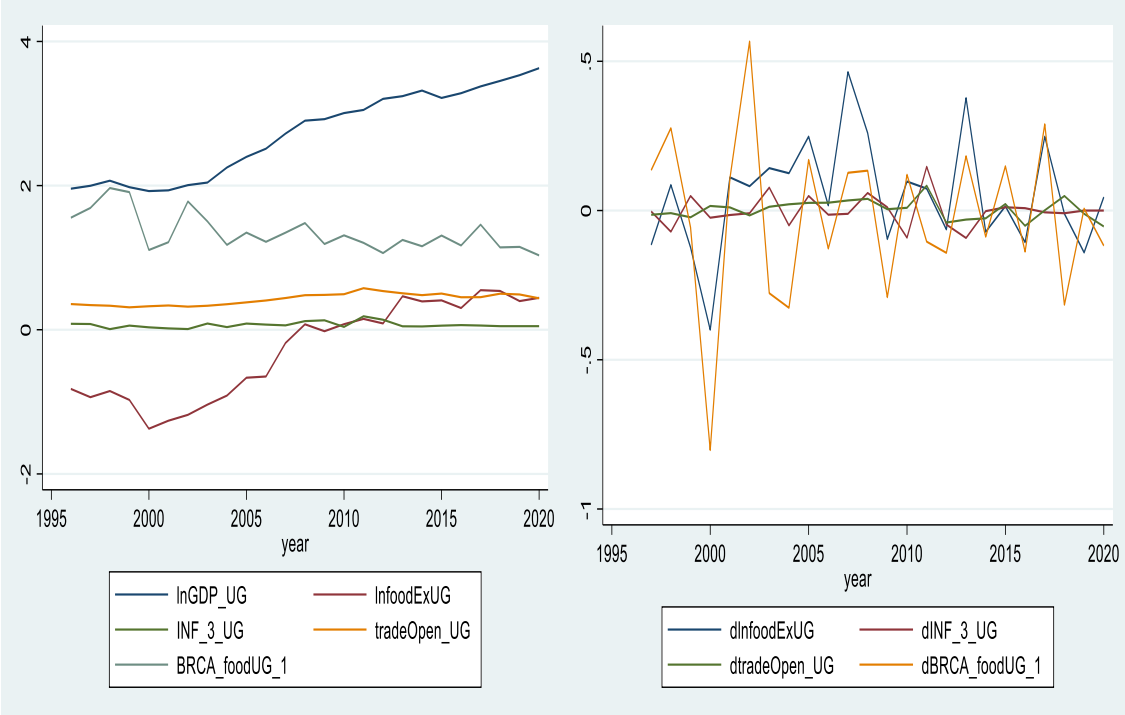
(a) (b)

Appendix 3: Non-stationary and stationary variables for model 2



(a) (b)

Appendix 4: Non-stationary and stationary variables for model 3



(a) (b)

Appendix 5: Stability test results of the models

Model 1 (Tanzania)				Model 2 (Kenya)				Model 3 (Uganda)			
Eigen value			**Modulus**	**Eigen value**			**Modulus**	**Eigen value**			**Modulus**
-0.90953	0.909531			1.023073				1.02152			1.02152
0.909531	0.909531			-3.05E-16	+	1.023073i	1.02307	-1.02152			1.02152
-6.25E-16	+	.9095307i	0.909531	-3.05E-16	-	1.023073i	1.02307	-9.16E-16	+	1.02152i	1.02152
-6.25E-16	-	.9095307i	0.909531	-1.02307			1.02307	-9.16E-16	-	1.02152i	1.02152
-0.6285	+	.6284998i	0.888833	0.768054	0.768054		1.02307	-0.68772	+	.1428626i	0.7024
-0.6285	-	.6284998i	0.888833	-0.76805	0.768054			-0.68772	-	.1428626i	0.7024
0.6285	+	.6284998i	0.888833	2.29E-16	+	.7680544i	0.768054	0.687718	+	.1428626i	0.7024
0.6285	-	.6284998i	0.888833	2.29E-16	-	.7680544i	0.768054	0.687718	-	.1428626i	0.7024
-0.79024	+	.2477985i	0.82818	-0.45742	+	.4574165i	0.646885	0.142863	+	.6877181i	0.7024
-0.79024	-	.2477985i	0.82818	-0.45742	-	.4574165i	0.646885	0.142863	-	.6877181i	0.7024
0.247799	+	.7902392i	0.82818	0.457417	+	.4574165i	0.646885	-0.14286	+	.6877181i	0.7024
0.247799	-	.7902392i	0.82818	0.457417	-	.4574165i	0.646885	-0.14286	-	.6877181i	0.7024
-0.2478	+	.7902392i	0.82818	0.439064	+	.4390635i	0.62093	0.482611	+	.4826105i	0.682514
-0.2478	-	.7902392i	0.82818	0.439064	-	.4390635i	0.62093	0.482611	-	.4826105i	0.682514
0.790239	+	.2477985i	0.82818	-0.43906	+	.4390635i	0.62093	-0.48261	+	.4826105i	0.682514
0.790239	-	.2477985i	0.82818	-0.43906	-	.4390635i	0.62093	-0.48261	-	.4826105i	0.682514

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