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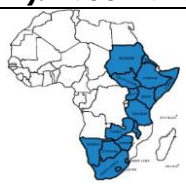

The Influence of Trade Policy on the Relationship Between Capital Productivity and the Growth of Cross-Border Trade of Maize Business at Tunduma, Songwe Region

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KEYWORS

Capital productivity, maize business growth and cross-border trade policy

ABSTRACT

Capital productivity was one of the factors influencing the growth of the cross-border trade of maize; this study used trade policy as a moderating factor. The study examined the influence of capital productivity on cross-border trade growth of maize businesses and the influence of the moderating role of trade policies on the growth of cross-border trade of maize businesses at the Tunduma border. Data was gathered from 311 respondents using closed-ended questionnaires and analysed using the PLS-SEM system. Questionnaires were created based on labour productivity, capital productivity, and opportunity cost as independent variables with maize business growth as the dependent variable and trade policy as a moderating variable. The study discussed capital productivity as one of the important factors, connected to its significant effect on maize business growth. Tanzania has a comparative advantage over Zambia in producing maize and the primary data revealed an increase of revenue and profit resulted from production increase. The findings informed policymakers, agribusiness, and cross-border stakeholders to strategize in enhancing cross-border maize trade by improving the productivity of cross-border maize business and optimizing policy frameworks. The results contributed to the cross-border trade operations knowledge and opened room for further studies related to cross-border trade.

1.0 Introduction

Maize was set to overtake wheat as the most traded cereal globally (Erenstein, Jaleta & Sonder, 2022). Maize, wheat, rice, barley, and sorghum were the five most produced cereal species in 2022 and maize had the highest production of almost 1.2 billion tons; maize was the second most widely grown cereal crop in the world after wheat (FAO, 2022). Production of maize in Zambia was noted 2.39 MT, 3.38 million MT, 3.4 million MT, 3.6 MT, 3,606,549 MT and 2,394,907 MT in year 2018, 2020, 2021, and 2022 respectively (Oirere, 2022). Tanzania's maize production in tonnes in recent years was 6.681 million (2017), 6.273 million (2018), 5.652 million (2019), 6.711 million (2020) and 7.039 million (2021) while the maize exports in tonnes over the years was 85,465 (2019), 82,543 (2020) and 187,185 (2021) (Tanzania Ministry of Agriculture, 2022). Maize was the staple food for the majority of Tanzanians and Zambians, it was both a subsistence and a cash crop (Wilson and Lewis, 2015).

The United Republic of Tanzania was a major trade hub for neighboring countries and even more for the landlocked countries of Malawi and Zambia (UNCTAD, 2019). The government of Tanzania put in place enabling infrastructure and carried out necessary reforms to contribute to improving the "doing business" environment and enhancing efficiency and competitiveness through reduced trade costs and time (URT, 2023). Tanzania Ministry of Agriculture in 2022 recorded an increase in maize export to 189,277 tonnes worth Sh72.4 billion in 2021, up from 92,825 tonnes worth Sh.58.02 billion in 2020. South Africa remains the continent's top maize producer with annual yield of between 13-15 million tonnes and Tanzania became the second largest producer of maize where it recorded an output of 11.7 million tonnes in the 2023/24 season and in the same year Tanzania earned a foreign income of Tshs. 348.9 billion on maize export while South Africa earned USD 162 million (URT, 2025).

Tanzania in the 2020/21 season, recorded a surplus of 951,504 tonnes of maize after 6.908 million tonnes were produced against demand of 5.957 million tonnes whereas, maize exports increased to 189,277 tonnes worth Sh72.4 billion in 2021, up from 92,825 tonnes worth Sh. 58.02 billion in 2020 (URT, 2022). An increase or decrease in a crop production including maize determined the level of country crop export trade. There was an opportunity to stimulate cross border maize business and therefore; in achieving full maize business potential it was important to consider capital productivity as one of the important factors in the growth of cross-border trade of maize business in facilitation of trade policies. The study addressed three policies relates to government subsidies, tariff and voluntary export restraints. Tanzania and Zambia continued to use these policies strategy apart from its effects on the maize grain business growth at Tunduma border. This study aimed at examining the influence of trade policy on the relationship between capital productivity and the growth of

cross-border trade of maize business at Tunduma, Songwe region which was known as the main gate of Southern African Development Community (SADC).

2.0 LITERATURE REVIEW

Capital productivity described the efficiency at which capital is utilized in producing output of goods and services (Central Statistics office-Ireland, 2022). Capital productivity played a role of improving production efficiency and market access. Capital productivity measures the efficiency in producing output with capital input. These roles necessitated this study to measure the influence of capital productivity on maize business growth through roads and network, power supply, market infrastructures and capital investment as an important indicator. Market infrastructure was an important component in marketing systems that stimulates increased production of goods and services, incomes and employment opportunities (URT, 2023).

Maize export restrictions as its primary policy instrument to cope with production and price volatilities in Zambia, it has opted to restrict exports in years when maize surpluses were perceived as declining or when domestic prices of mealy meals were and these policies have taken a variety of forms, including ad hoc export bans, and government-to-government export deals increasing (World Bank, 2022). The World Bank revealed that export restrictions have mainly been driven by concerns around domestic food shortages and related consumer price spikes in Zambia. Business was taken as a commercial activity involving the exchange of money for goods or services (Encarta, 2008). The Growth means increasing sales, assets, net profits and a chance to take advantage of the experience curve to reduce the per unit cost of products sold and thereby increasing profits, growth involved increasing sales, assets, net profits and a chance to take advantage of the experience curve to reduce the per unit cost of products sold and thereby increasing profits (Sumari, 2013). Maize business like any other business targeted the growth attached to revenue and profit.

Trade policy can be expressed as procedure, rule or strategy used to guide social-economic activities including the exchange of goods or services involved in cross border trade. In Myanmar for example cross-border trade experienced various constraints such as an export-first policy, licensing system, and high tax related to exports in conducting formal trade (Aung, 2009). Cross border trade policies comprise all policies links to cross border trade, for example tariffs, import licenses, export licenses, import quotas, voluntary export restraints, local content requirements, embargo, currency devaluation and trade restrictions to mention the few. The amount of capital needed to produce a certain output can influence the maize business growth starting from the production side.

2.0 METHODOLOGY

The study used explanatory research design, because it explained the relationship of cross-border trade policies and business growth variable. Explanatory study attempts to explain an event, act or characteristic measured by research (Cooper, Schildler & Sharma, 2012). Sekarani (1992) suggested, the sample size to range between 30 and 500. The sample size was between the Sekarani's range contained 311 respondents. According to Kotler (2000), if well-chosen a sample size of 1% of the population can repeatedly provide good reliability.

The study was conducted at Tunduma, Momba district-Songwe region in Tanzania which is known as the main gate of SADC countries with 1393 maize cross-border traders. The area was selected because it was a vibrant border town between Zambia and Tanzania where cross border business of maize grain has been conducted for many years, Tunduma border had a market known as Tunduma International Cereal Market and the unauthorized TAZARA market very close to Tunduma border; where Zambians and Tanzanians cross border traders do businesses; Zambia is a land locked country whereby most of their commodities passed through Tunduma border. Maize is the staple food for the majority of Tanzanians and Zambians, it is both a subsistence and a cash crop (Wilson and Lewis, 2015).

Variables in this study was measured by Likert-scale (five points) as adapted from Mungai (2011). Likert-style rating questions is the rating question that allows the respondent to indicate how strongly she or he agrees with a statement (Saunders, Lewis & Thornhill, 2012). Answers like Strong agree, agree, neutral, disagree and strongly disagree was used. Whereby, strongly agree and agree termed as agree while disagree and strongly disagree as disagree.

The designed questionnaires used roads network, water supply, power supply and infrastructures in the physical capital productivity and tested the moderating policies on the area of tariff, voluntary export restraints and government subsidies policy. The study comprised of three (3) independent variables labour productivity, capital productivity and an opportunity cost. Whereas, the dependent variable was maize business growth which was moderated by trade policies variable.

Structure Equation Modeling (SEM) was used to establish the relationship between measurement model and structural model based upon the assumptions supported by the theory firstly is normality where the observations must draw from a continuous and multivariate normal population, secondly; missing data the approach assumes that missing data is totally irrelevant in study, but this is not actually same, thirdly; Measurement and Sampling Errors, the Errors in measurement caused by biased tool and techniques used for collection of information, and errors on the part of respondents effects the model fit the variance of given dataset also affects the standard error as the variance increase the standard

error decrease, this violates the assumptions of normality in data (Kumar and Upadhaya, 2017). The data was collected and analysed using SmartPLS4 system.

4.0 FINDINGS AND DISCUSSION

4.1 Path Coefficient

4.1.1 Capital Productivity to Trade Policy

A coefficient of 0.327 in the context of SEM as per table 4.1 from capital productivity to trade policy as moderating variable indicates a weak positive relationship between the variables. When trade policy is taken into account. The positive value of 0.327 suggests slight positive influence, that as trade policy become more favourable or less restrictive capital productivity increases. Therefore, improving trade policies like those relates to tariff, voluntary export restraints and government subsidies tends to enhance the productivity of capital in the economy. Simply because trade policy was considered a moderating variable it doesn't directly influence the dependent variable rather it changes the strength of the relationship between capital productivity and the outcome variable maize business growth.

A positive value of 0.327 was relatively small. It implies that while the relationship exists, its impact was not significant, but other factors may contribute considerably to the outcome maize business growth. The path coefficient of 0.327 suggests that better trade policies that was tariff, voluntary export restraints and government subsidies increases the effectiveness of capital productivity in driving cross border trade of maize business growth. The value implied that a better trade policy enhanced the effect of capital productivity, positively influencing the dependent variable maize business growth.

4.1.2 Capital Productivity to Maize Business Growth

The data also show that Capital productivity to maize business growth suggests a moderate to strong positive relationship between the two variables involved in the path for a coefficient of 0.374 meaning that for every one-unit change in the predictor, the results was expected to change by 0.374 units assuming other variables in the model remain constant. For a path coefficient in the range of 0.6 to 0.7 is still considered a moderate to strong effect, indicating a meaningful influence between variables in the model.

4.1.3 Trade Policy to Maize Business Growth

Table 4.1 below show a path coefficient of 0.817 for the moderating variable trade policy to dependent variable maize business growth suggests a strong moderating effect of trade policy on the relationship between other factors like capital and labour productivity and the dependent variable maize business growth. A positive path coefficient of 0.817 indicating

that trade policy enhances the effect of other variables such as labour productivity, capital investment and technological improvements on maize business growth.

A coefficient of 0.817 indicates that the relationship is strong but not intense as if the coefficient were closer to 1. It still reflects a substantial positive influence. The moderating variable trade policy does not directly affect maize business growth; it influences the strength of the relationship between other variables labour productivity, capital productivity and opportunity cost towards maize business growth. A path coefficient of 0.817 suggest that trade policy has a strong moderating effect on the relationship between independent factors including capital productivity, However, better trade policies can help to unlock the full growth potential of maize business by amplifying the effects of other business enabling factors.

Table 4.1 Path Coefficient of Variables

	Path coefficients
Capital Productivity -> Maize Business Growth	0.374
Capital Productivity -> Trade Policy	0.327
Trade Policy -> Maize Business Growth	0.817

Source: Research data. 2025

4.2 Total effect

4.2.1 Capital Productivity to Maize Business Growth and Trade Policy

A total effect of 0.586 in Table 4.2 below show that capital productivity to maize business growth show that for every unit change in capital productivity backed by improving farm to market roads network, market infrastructure from the farm the maize business increases by 0.586 units. The value implied that improvement in capital productivity but not strongly as the case of labour productivity with a total effect of 0.740. improving capital production may lead to efficiency gains, cost reduction and higher profits but may require complementary improvements such as labour productivity so as to accelerate to a significant business growth.

The case of capital productivity to trade policy table 4.2 below show a total effect of 0.327 thus suggests that for every one unit increase in capital productivity including farm to market roads network, market infrastructure and capital investment there was a 0.327 unit increase in trade policy effectiveness this implied a positive moderate influence on dependent variable with a moderate strength relationship between capital productivity and trade policy. So, a value suggests that in case capital productivity improved greater benefits from trade policies was expected.

4.2.2 Trade Policy to maize business growth

Table 4.2 below indicates a total effect value of 0.817 from trade policy to maize business growth quantitatively show the relationship between trade policy and the maize business growth. This value indicates a positive relationship between trade policy and the growth of maize business. So, as trade policies improve and become more favorable the maize business growth tends to increase. The value of 0.817 can be interpreted as the strength of the effect thus suggests that trade policy has a substantial impact on the growth of the maize business. The trade policies such as tariff, voluntary export restraints and government subsidies could be significant factor in driving expansion of the maize business. Therefore, the value 0.817 indicates that trade policy is strongly positively correlated with the growth of the maize business with relatively high impact.

Table 4.2 Total effect

	Total effects
Capital Productivity -> Maize Business Growth	0.586
Capital Productivity -> Trade Policy	0.327
Trade Policy -> Maize Business Growth	0.817

Source: Research data, 2025

4.3 Direct effect

Table 4.3 below show a direct effect of 0.319 for capital productivity to maize business growth indicates a moderate relationship. This means that the impact of capital productivity on maize business growth is nothing without a mediator. Strategies like capital investment, market infrastructure, power supply and roads network can succeed in addition of another variable that is moderating variable.

The capital productivity to trade policy shows a direct effect of 0.327 show a moderate positive relationship between predictors and growth of maize business. This means that an investment on market infrastructure, power supply, farm to market roads network influenced the trade policies. An availability of government subsidies policy on fertilizer which is an important capital investment. The value indicates a good sign towards maize business growth. The relationship for this value indicates a that the relationship was not strong.

The direct effect value 0.817 of trade policy to maize business growth in table 4.3 show the important of trade policy as a moderating variable to maize business growth. Trade policy directly influenced maize business growth. Improving policies like voluntary export restraints, tariff and government subsidies leads to the growth of maize business had a large direct effect on maize business growth.

Table 4.3 Direct effect

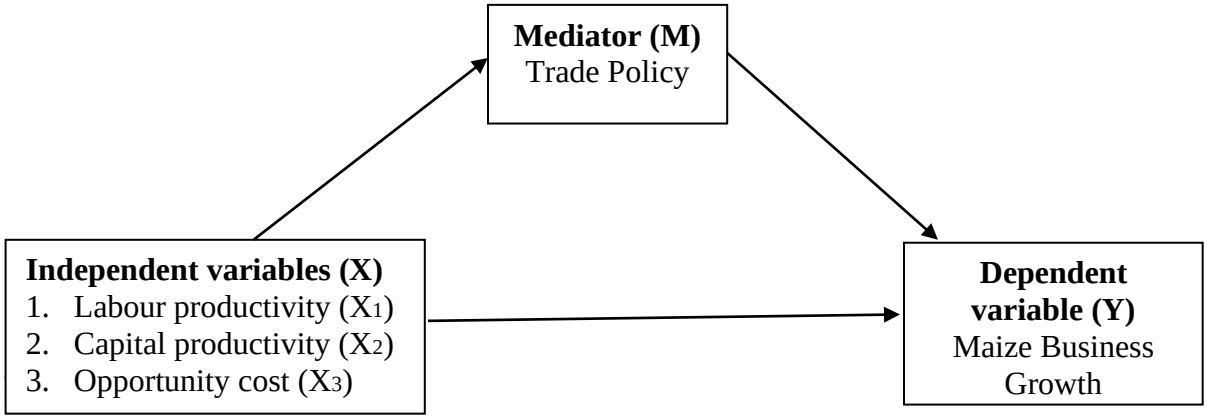
Relationship	Direct effect
Capital Productivity -> Maize Business Growth	0.319
Capital Productivity -> Trade Policy	0.327
Trade Policy -> Maize Business Growth	0.817

Source: Research data, 2025

4.3 Mediation Analysis

4.3.1 Mediation Analysis using Baron, (1986) steps

The analysis followed the Baron (1986) steps, where a mediation analysis comprised three set of regression X ⟶ Y, X ⟶ M, and X+M ⟶ Y. This was done for all three independent variables mentioned above. Table 4.18 show the total effects including direct and indirect effects.



Testing the mediation effect of Trade Policy in relationship between Capital Productivity and Maize Business Growth

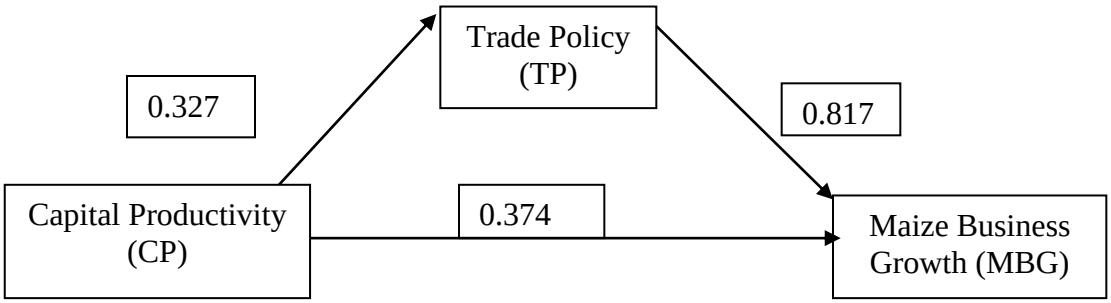
Table 4.4 below illustrate that for P=0.001 indicated the strong evidence, the result was considered not statistically significant, even though it is still suggestive of the possible effect. According to SEM Indirect Effect < Direct Effect, the mediation does not occur. Both indirect path (CP to TP and TP to MBG) are not significant.

Table 4.4: The standard regression weights and its significance for each path

Construct	Path	Construct	Standard estimates	P-Value	Results
Trade policy	⟵	Capital productivity	0.327	0.001	Not Significant

Maize business growth	←	Trade policy	0.817	0.001	Not Significant
Maize Business Growth	←	Capital Productivity	0.374	0.001	Significant

Source: Research Data, 2025



i. The indirect effect = 0.327 x 0.817 = 0.267
ii. The direct effect = 0.374
iii. Since Indirect Effect < Direct Effect, the mediation does not occur
iv. Both indirect path (CP to TP and TP to MBG) are not significant
v. Type mediation here is Partial Mediation since Direct Effect is still significant after mediator enters the model effect is still significant after mediator enters the model

Figure 4.2: Testing Mediator for Capital Productivity

The main hypothesis statement for testing mediator: *H4: The trade policy moderates the influence between capital productivity and maize business growth*

Table 4.5 The Results of Mediation

Hypothesis Statement for Path Analysis (three sub-hypothesis)	Estimates	P-value	Remarks on hypothesis
Ha: **Capital productivity has significant effect on trade policy**	0.327	0.001	Not Supported
Hb: **Trade policy has significant effect on maize business Growth**	0.817	0.001	Supported
Hc: **Capital productivity has significant effect on maize business growth**	0.374	0.001	Supported

Source: Research Data, 2025

4.4 The trade policy in the model

4.4.1 Tariff policy influence the maize business growth

The governments of Tanzania and Zambia have simplified the exportation, but the issue is that complying with the procedures and documentation was a challenge. The export procedures needed registration and permits, like registration as a limited company or sole proprietor, obtaining a Tax Identification Number (TIN) Certificate, registering as an exporter, and obtaining a Business License, Food Crop Export Permit, Phytosanitary Certificate, SADC Certificate of Origin, Radioactivity Analysis Certificate, and other necessary exportation documents.

Most of the Tunduma CBT stakeholders found themselves doing an international business without knowing that they were doing an international trade. In the Tunduma Cereal International Market, for example, maize business dealers from Zambia and Tanzania meet together and do business. This was considered indirect export business that involves a company or an individual selling maize to customers in Zambia using an intermediary, such as a distributor or export management company, transporters, and agents rather than directly to the end-user, and the export business environment facilitated the indirect exporting at the Tunduma border.

4.4.2 Voluntary export restraint policy influences the growth of maize grain business

Tanzania and Zambia continued to use a voluntary export restriction policy strategy. For example, the Republic of Zambia export restraints of 10th April to 15th may 2024 the policy resulted into reduced price of maize to Tshs 48,000.00 from Tshs. 72,000.00 per bag of 108 kg. This means that maize cross border traders and maize producers was affected directly by this policy.

4.4.3 Government subsidies policy on most used agro-inputs like fertilizer influences the maize production and business

According to the United Republic of Tanzania Ministry of Agriculture (2025), fertilizer subsidies will continue for maize farmers, and the registration system will continue through the Tanzania Fertilizer Regulatory Authority (TFRA). Due to fertilizer subsidy for the past three years Tanzania enjoyed a good increase in maize production and the local government in Momba district revealed a good revenue increase through crop cess. Momba district for example in 2023/2024, crop-cess increased for 84% since the government started to implement this policy in 2020/2021.

4.5 Maize business growth R-square

The dependent variable maize business growth R-squared value of 0.726 in table 4.6 show that approximately 72.6% of the variance in maize business growth was explained by the model including the independent variable. The value indicates the proportion of the total

variation in maize business growth that was explained by the factors included in the model that was labour productivity, capital productivity and opportunity cost. The value also means that 72.6% of the changes in maize business growth can be accounted for by the factors in this model.

The R-square value of 0.726 suggests that the model was relatively good at explaining the variation in maize business growth and therefore the factors studied seem to have a significant impact on the growth of maize business. Moreover, the remaining 27.4% of the variation in maize business growth was unexplained by the model and therefore thre could be other factors not included in the model that can also affect business growth. Although value of 0.726 was fairly strong, this R-squared alone doesn't guarantee that the model is perfect by goodness of fit. An Adjusted R-square value of 0.711 means that after accounting for the number of independent variables in the model, about 71.1% of the variation in maize business growth was explained by the factors including this model. This value suggests that the model was still explained a large proportion of the variation in maize business growth and the 71.1% explanation of variability was strong indicating that the independent variables in this model were relevant to the maize business growth.

Table 4.6 R-Square for Trade policy and Maize Business Growth

Variable	Type of Variable	R-square	R-square adjusted
Maize Business Growth	Dependent Variable	0.726	0.711

Source: Research data, 2025

4.6 Findings as per theory of Comparative Advantage

The comparative advantage theory as firstly introduced by David Ricardo in 1817 focused on the ability of a country to produce a particular good or service at a lower opportunity cost than another country. He mentioned six variables underlying the theory including labour productivity, capital productivity, technological advancement, infrastructure, education and skill levels and opportunity cost. The study tested three items as a study variable that is labour productivity, capital productivity and opportunity cost.

4.6.1 Comparative advantage analysis by production cost

The cost of maize farming in Zambia per acre can be estimated based on the cost per hectare mentioned earlier. Considering the average cost per hectare and converting it to cost per acre (1 hectare = 2.47 acres), the cost of maize farming in Zambia per acre was approximately $200 to $320 (Zambia Nitumezi farm, 2024). Table 4.7 below explained that the cost of maize production in Tanzania was low as USD 606.34 compared with the cost of maize

production in Zambia that was USD 800.00. Therefore, Tanzania has a comparative advantage of producing maize over Zambia.

According to the Tanzania Ministry of Agriculture (2022) maize exports increased to 189,277 tonnes worth Sh72.4 billion in 2021, up from 92,825 tonnes worth Sh. 58.02 billion in 2020 and in the 2020/21 season, the country recorded a surplus of 951,504 tonnes of maize after 6.908 million tonnes were produced against demand of 5.957 million tonnes. The increase in maize exports in tonnes over the years was 85,465 (2019), 82,543 (2020) and 187,185 (2021). There is an opportunity to stimulate cross border maize business.

Maize was the most important food crop in Tanzania, cultivated on over 45% of total arable land and generating close to 50% of rural cash income. at an average of 100 USD per maize producing household in 2018 (Baijukya et al, 2021). According to the Ministry of Agriculture (2025), Tanzania was the second-largest maize producer in Africa, with 11.7 million tons harvested in the 2023/2024 season that led to the third producer of maize on the African continent.

This is a significant increase in production and makes Tanzania the third largest producer of maize on the continent. Maize is grown in all 20 regions of Tanzania. 45% of Tanzanian land is used for maize cultivation. Smallholders contribute 85% of the total national cultivation. An increased maize production for the first time is a major step in the agricultural sector and increased the government will improve the agricultural environment to ensure we continue to take action. The country aims to produce 15 million tons by 2025/2026, including 30 sacks per acre, which will increase the economy of farmers but also expand the maize cultivation.

Table 4.7: Comparative advantage analysis by production cost

Country	Average Maize Production (Kg/ha)	Average Production Cost Per ha (Tshs.) Rate Tshs. 2,680	Average production Cost (USD)/ha;
Tanzania	5,000.0	1,625,000.00	606.34
Zambia	4,500.0	2,144,000.00	800.00

Source: Constructed data from (Zambia Nitumezi Farm 2024), Research data, 2024

4.6.2 Tanzania and Zambia Average Maize Harvest from 2018/20219 to 2022/2023

The average maize harvest from 2018/20219 to 2022/2023 indicated the good production of maize position for Tanzania. The Tanzania self-sufficiency position for 2023/2024 was 122% while in Zambia was 98% as shown in the table 4.8 below.

Table 4.8 Tanzania and Zambia Maize Self-Sufficiency Position for 2023/2024

Country	Item	2022/23	2023/24	5-year average (2018/19 - 2022/23)	% Change over one year	% change over five years	Change one year	Change 5-year average
Tanzania	Harvest	6,540	8,109	6,356	24.0%	27.6%	▲	▲
Tanzania	Opening Stocks	441	611	494	38.5%	23.6%	▲	▲
Tanzania	Supply	6,981	8,720	6,851	24.9%	27.3%	▲	▲
Tanzania	Requirements	6,320	6,897	6,061	9.1%	13.8%	▲	▲
Tanzania	SGR Carryover	241	268	235	11.2%	13.8%	▲	▲
Tanzania	Net Supply	420	1,555	554	270.2%	180.7%	▲	▲
Tanzania	Self-sufficiency	106%	122%	109%	15.3%	12.9%	▲	▲
Zambia	Harvest	2,706	2,653	2,823	-2.0%	-6.0%	▶	▼
Zambia	Opening Stocks	1,503	768	768	-48.9%	-0.1%	▼	▶
Zambia	Supply	4,209	3,421	3,591	-18.7%	-4.7%	▼	▶
Zambia	Requirements	2,505	2,997	2,304	19.6%	30.1%	▲	▲
Zambia	SGR Carryover	500	500	560	0.0%	-10.7%	▶	▼
Zambia	Net Supply	1,204	-76	727	-106.3%	-110.5%	▼	▼
Zambia	Self-sufficiency	140%	98%	125%	-42.2%	-27.5%	▼	▼

Source: Southern Africa Regional Supply and Market Outlook Update, (2024)

4.6.3 Maize Production Trend in Songwe Region

It was reported that maize production grew from 396,570 MT in 2021/2022 to 686,303 MT in 2023/2024. The production increase indicated also an increase of production per Ha from 2.4 MT per Ha in 2021/2022 to 3.1 MT per Ha in 2023/2024. Maize production area increased from 164,119 Ha in 2021/2022 to 215,382 Ha in 2023/2024. This data indicated that farmers were encouraged by the available policies and agriculture technology and therefore, farmers were motivated to increase maize farming area Table 4.9 below proved the stated position.

4.6.4 Maize Business Chain

Cross-border trade of maize business employed over 172 permanent maize business dealers at Tunduma International Cereal Market and over 80 at Tazara cereal market. Maize business chain employed over 3000 people around the border area including informal maize traders.

Tunduma Town Council reported to have 1394 maize business traders at Tunduma border. Tunduma International Cereal Market for example was able to collect between Tshs. 100 million to Tshs. 130 million per month on average from April to November 2024, Maize traders at Tunduma border find themselves doing an international business with Zambian people more and they continued to enjoy the business because in three consecutive years they did good business following the increase in production as shown in table 4.9 below.

Table 4.9 Maize Production Trend in Songwe Region

COUNCIL	2021/2022		2022-2023		2023/2024	
	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)
MBOZI	71,273	185,310	84,642	253,926	84,925	254,775
ILEJE	21,131	63,393	24,176	91,869	24,567	93,355
TUNDUMA	10,524	57,882	10,935	60,143	11,032	66,192
MOMBA	21,291	42,106	41,317	136,346	43,546	143,702
SONGWE	39,900	47,880	46,620	93,240	51,312	128,280
Total	**164,119**	**396,570**	**207,690**	**635,523**	**215,382**	**686,303**

Source: Songwe Regional Administrative Secretary Office, 2024

4.6.5 Maize Production, Consumption and Excess trend in Songwe region

Table 4.10 below illustrated the maize production, consumption and excess trend in Songwe region, this means that for three consecutive years Songwe region had a good excess that was sold locally and/or nearby country like Zambia.

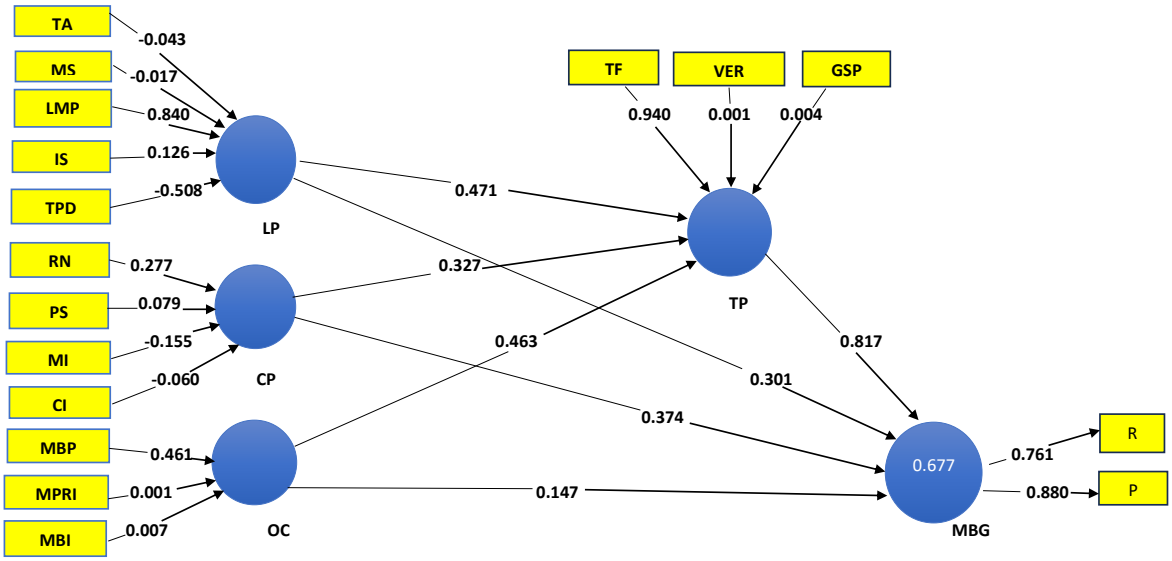
Table 4.10 Maize Consumption using Annual Per capita Consumption of 115 kgs/person (Shaban et al, 2015)

	2021/2022				2022-2023			2023/2024		
Council	Population	Production (MT)	Consuption (MT)	Excess (MT)	Production (MT)	Consumption (MT)	Excess (MT)	Production (MT)	Consuption	Excess (MT)
MBOZI	510,599	185,310	58,719	126,590.92	253,926	58,719	195,207	254,775	58,719	196,056
ILEJE	125,869	63,393	14,475	48,918.07	91,869	14,475	77,394	93,355	14,475	78,880
TUNDUMA	219,309	57,882	25,221	32,661.47	60,143	25,221	34,922	66,192	25,221	40,971
MOMBA	259,781	42,106	29,875	12,230.69	136,346	29,875	106,471	143,702	29,875	113,827
SONGWE	229,129	47,880	26,350	21,530.17	93,240	26,350	66,890	128,280	26,350	101,930
TOTAL	**1,344,687**	**396,570**	**154,639**	**241,931.30**	**635,523**	**154,639**	**480,884**	**686,303**	154,639	531,664

Source: Research data, 2024 (Computed from RAS Songwe Region Office data, 2024 and Shaban *et al*, 2015)

2.11 Research Model for Good Fit

The model tried to assess factors influencing cross-border trade of maize business growth, considering a moderating role of Trade policy at Tunduma border. The results show R^2 0.726 which means the model was doing fairly good at capturing the main factors say labour productivity, capital productivity and opportunity cost that influence the maize business growth as a dependent variable. The model explained 72.6% in maize business growth (R^2 = 0.726). The value shows a moderately strong relationship and it leaves room for improvement as 27.4% of variation was still unexplained. The results suggest a relatively good fit as for figure 4.3 below. The model goodness of the model fit was also explained relating to path coefficient, total effect, direct effect and indirect effect as shown in figure 4.3 and table 4.11 below.



***Key**: LP=Lablour productivity, CP=Capital Productivity, OC=Opportunity Cost, TP=Trade Policy, MBG=Maize Business Growth, TA=Technological Advancement, MS=Maize Supply, LMP=Labour Market Perfomance, IS=Input Supply, TPD=Time in Production, RN=Roads Network, PS=Power Supply, MI=Market Investment, CI=Capital Investment, MBP=Maize Business Profitability, MPRI=MaizeProduction and its Return on Investment, MBI=Maize Business Investment, TF=Tariff, VER=Voluntary Export Restraint, GSP=Government Subsidies Policy, R=Revenue and P=Profit*

Figure 4.3: Research Model

Table 4.11 Illustration of Path Coefficient and Total effect of Variables

	Path coefficients	Direct effect	Indirect effect	Total Effects

Capital Productivity -> Maize Business Growth	0.374	0.319	0.267	0.586
Capital Productivity -> Trade Policy	0.327	0.327	0	0.327
Trade Policy -> Maize Business Growth	0.817	0.817	0	0.817

4.12 Outer Loading Findings

In SEM the value greater or equal to 0.70 illustrate a very good indicator reliability and the value between 0.50 and 0.70 considered as acceptable value while the value less than 0.50 suggested to be removed. The results in table 4.12 below show that we can remove maize production and its return on investment to opportunity cost and market infrastructure to capital productivity.

Table 4.12 Outer loadings findings

List	
	Outer loadings
Capital Investment -> Capital Productivity	0.587
Government Subsidies Policy -> Trade Policy	0.734
Market Infrastructure -> Capital Productivity	0.451
Power Supply -> Capital Productivity	0.620
Profit <- Maize Business Growth	0.880
Revenue <- Maize Business Growth	0.761
Road Network -> Capital Productivity	0.981
Tariff Policy -> Trade Policy	0.980
Voluntary Export Restraint Policy -> Trade Policy	0.659

Source: Research data, 2025

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The aim of this study was to assess factors influencing the growth of cross-border trade of maize business, with a moderating role of trade policies. Objectively, the study examined the influence of capital productivity on cross-border trade growth of maize businesses and the influence of the moderating role of trade policies on the growth of cross-border trade of maize businesses. Cross-border trade (CBT), specifically in the maize business chain, seemed to be important in boosting the economy of maize business stakeholders and therefore to be an important economic activity that contributes to the development of the country.

The government of Tanzania had put in place enabling infrastructure and carried out necessary reforms to contribute to improving the business environment and enhancing efficiency and competitiveness through reducing trade cost and time (URT, 2023). Reducing trade cost and time needed a clear policy, and that was why this study assessed factors influencing the growth of cross-border trade of the maize business and the moderating role of trade policies. Favorable trade policies reduced input costs through the government subsidy policy on fertilizer from 2021/2022 to date.

Zambia, for example, producer losses from maize trade restrictions between 2023 and 2030 are projected to amount to about USD 1.42 billion (World Bank, 2022). This is an opportunity for Tanzania to produce more to reverse the said loss of the Republic of Zambia on maize business to be revenue for Tanzania. Improving trade policies such as voluntary export restraints, tariffs, and government subsidies might lead to increasing the positive effect that capital productivity has on the maize business.

The URT capital investment in agriculture, specifically in fertilizer subsidies and technology, positively influenced the growth of the maize business. The capital investment included the construction of farm-to-market road networks, market infrastructure, and investment in advanced technology for agricultural equipment like soil test kits, transport (motorcycles) for extension officers, and fertilizer subsidies. The business at the Tunduma cereal international market and TAZARA cereal market was done during the daytime, although customs activities were done on a 24-hour basis. The efficient use of capital can help businesses become more competitive internationally, allowing them to take full advantage of trade policy, trade agreements and/or better market access.

5.2 Recommendations

The cross-border maize business chain employed a good number of people; therefore, improving this kind of trade leads to an increase in the number of employments. Improving market infrastructure, specifically at Tunduma International Cereal Market and TAZARA Cereal Market, can improve the cross-border maize business and hence increase the number of maize traders.

The government of the United Republic of Tanzania should continue its capital investment in farmer-to-market road networks and irrigation systems as part of the water supply, which is the catalyst for promoting businesses, specifically cross-border trade of the maize business. Improving electricity supply will speed up cross-border trade for day and night business.

Cross-border maize business dealers are advised to invest in capital productivity, as they will be in a better position to benefit from the favorable improved policies, including reduced tariffs, improved voluntary export restraints, and government subsidies, especially on fertilizer and seeds. Adopting new and improved technologies can increase production efficiency and productivity.

Maize is grown in all 20 regions of Tanzania. 45% of Tanzanian land is used for maize cultivation. Smallholders contribute 85% of the total national cultivation (URT, 2025). As Tanzania aims to produce 15 million tons by 2025/2026, including 30 sacks per acre, which will increase the economy of farmers and expand the cross-border trade of the maize business, thus making a substantial growth of the maize business. The study advised the country to strategize to improve the position it holds on the production of maize, as it employs a good number of citizens on its chain, including cross-border maize trade.

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