



EFFECTS OF NON -TARIFF BARRIERS ON MAIZE PRICE AMONG SMALLHOLDER FARMERS IN TANZANIA

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ABSTRACT

This research presents a comparative analysis of the effects of Non-Tariff Barriers (NTBs) on prices received by maize smallholder farmers in Mbozi and Momba districts in Tanzania. Cross sectional data were collected from farmers in the two districts using structured questionnaires. A two-stage stratified sampling procedures were used in selecting a sample size in which a total of 400 smallholder farmers were selected. T-test was used in comparing the effects of NTBs on farm gate prices among farmers in the two districts. Findings show that, there was a statistically significant difference between the mean NTBs effects on prices experienced by farmers in the two districts. These effects were higher for farmers in Mbozi District (as indicated by mean 6.47) than those of their counterpart farmers in Momba District. This is because more NTBs costs were incurred by farmers in Mbozi District to reach the Tunduma market. Comparatively, the mean effects of NTBs on maize prices were higher in Mbozi than those in Momba District. This was explained by Momba district being closer to Tunduma market. Basing on these results, it can be concluded that, the effects of NTBs were higher for farmers Mbozi district than those in Momba. It is recommended that, protective food policy such as weighing bridges and road blocks should be reduced in order to maintain reasonable high prices in rural areas and low prices in urban deficit centers contrary to the current situation whereby prices are lower in surplus areas and higher in deficit urban centers.

Keywords: NTBs effects; maize; prices; farmers; Tanzania

1.0 INTRODUCTION

1.1 Background Information

Since 1990s, Tanzania has embarked on the transformation of its agricultural sector from subsistence production mode of agriculture to commercialized production where farm inputs and products are increasingly purchased and sold to markets (Minot, 2014; FAO, 2016). However, the process of transforming agricultural small households to commercialization especially in surplus regions has been affected by high marketing costs some of which are related to Non-Tariff Barriers (NTBs) costs (World Bank, 2012; Minot, 2014; Musumba and Costa, 2015). The existence of these transaction costs along the supply of maize is thought to have welfare effects on both poor smallholder farmers in rural areas and consumers in deficit urban centers. This is because high transaction costs are translated into high prices for the consumers and low farm-gate prices for

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producers in the rural areas in Tanzania (Mkenda and Van Campenhout 2011; Sitko, Kuteya and Chisanga, 2014). Minot (2010) and Musumba and Costa (2015) argued that, the most productive regions located to the Southern Highlands of Tanzania face very high transaction costs in moving products to deficit regions in Dar es Salaam, Shinyanga, and Dodoma regions. Due to these transaction costs, itinerant traders could offer different prices to smallholder farmers in rural areas depending on the spatial distance between buying and selling centers (Mkenda and Van Campenhout, 2011; FAO, 2013). Moreover, the excessive transaction costs including those emanating from Non-Tariff Barriers (NTBs) application are also reported to have reduced the benefits of protection policy and keep producers' prices for maize lower than what would have been the case without protection (FAO, 2013; Sebatta, Mugisha, Katungi, Kashaaru and Kyomugisha 2014; Magrinia, Montalban, nencid and Salvaticid, 2014). NTBs in this study refer to policy measures other than ordinary customs tariffs that are instituted by governments to ensure food security and price stability in the country (Mold, 2005; Karugia, Wanjiku, Njuma, Freeman, Gbegbelegb, Macharia and Masawe, 2009). These include; roadblocks, Municipal and Council permits, trade license, customs procedures, red tape and weighbridges as applied at the region, district, and wards levels within the country. However, NTBs which are involved in cross border maize trade such as export bans, quotas and those related to Technical Barriers to Trade (TBT), Sanitary and Phytosanitary (SPS), standards and regulations were not considered in the analysis of this study.

According to Match Maker Associates (2010) and FAO (2013), the maize marketing system in Tanzania is characterized by a very large number of small traders operating from both the main production areas and major urban centers. Under such nature of marketing system the possibility of untruthful traders to discriminate smallholder farmers in the rural areas in term of price can be accelerated. Therefore, an increase in implementation of ad hoc NTBs strategies by the government could even make worse the situation especially in the surplus regions as farmers will continue to receive the lowest farm gate prices from traders. Moreover, studies on price transmission in Tanzania (such as Kweka, 2006; World Bank, 2008; Kilima, Kenkel and Mbiha 2008; Moser, Barrett and Minten 2009; Minot, 2010; Hella, Haug and Kamile, 2011; Ismail, 2014 and Baffes, Kshirsagar and Nitchell, 2015) have reported that, maize markets in Tanzania are least and weakly integrated in which prices in surplus areas have poor relationships. Together with these arguments, a number of studies in Tanzania have been conducted on the relationship of NTBs costs and maize prices, but most of them emphasized more on general effects of NTBs as part of transaction costs and not separate costs. These studies include that of Karugia *et al.*, (2009) who analyzed trade barriers on maize and cattle trade in EAC and found export ban reduces the welfare of producers in Tanzania, where Mkenda and Van Campenhout (2011) estimated transaction costs at different level of maize value chain and conclude that price dispersions were higher for farmers as compared to traders.

Moreover, studies by Porteous (2012) and IFPRI (2013) examined the effects of export bans on maize trade using a general equilibrium model, their findings indicate that, temporary export bans reduces the welfare of producer in rural areas. Moreover, Gabagambi (2013) surveyed the barriers to trade for smallholder farmers in Tanzania specifically NTBs and found that, farmers were constrained with NTBs in accessing markets. However, very little it is empirically known to what extent are the NTBs costs influences the level of producer prices especially in the surplus districts



in relationship to spatial distance. Thus, the main objective of the study was to compare the extent and magnitude of NTBs effects on farm gate price among farmers in the two districts using the independent t-test approach. The study was guided by the null hypothesis which states that, “there is no significant difference of NTBs effects on maize prices among farmers in the two districts”. Findings from this study will contribute to empirically relevance explanations on the spatial effects on transaction costs as attributed by NTBs on price changes on the market integration studies in LDCs. Moreover, the findings will provide more inputs for policy makers and private sector in Tanzania and other parts of world to estimate the policy effects based on distance and nature of rural infrastructure before their implementation.

2.0 REVIEW NON-TARIFF BARRIERS

2.1 Definition of the Key terms

2.1.1 Transaction costs

The concept transaction cost has many meanings and explanations. Some authors such as Holloway, Nicholson, Delgado, Staal and Ehui (2000) define transaction costs as all the costs involved in transacting a product between markets. Coase (1937) on the other hand define transaction costs as the costs associated with the searching, negotiation, monitoring, coordination, and enforcement of contracts. Therefore basing on these definitions, transaction costs constitute five components namely, the search cost, screening cost, negotiation cost, monitoring cost, and contract enforcement cost. The searching cost is the cost which is associated with identifying and contacting potential buyers and sellers of a particular product. Screening cost, on the other hand, refers to cost which is associated with gathering information about the reliability of a particular buyer or seller and the quality of the goods being transacted. Negotiating or bargaining cost is the cost of gathering information on prices in other transactions and on factors that might influence the willingness of the other party to bargain. Monitoring cost includes the cost which is associated with monitoring the contract performance and the cost of labour that monitors the delivery of the product. On the other hand, enforcement cost is the cost which is incurred in insuring that contract provisions are met and this includes the costs associated with default provisions in the contracts (Bwalya, Mugisha, and Hyuha,2013).

2.1.2 Non-tariff barriers (NTBs)

The concept NTBs is defined differently by different scholars in the literature of economics and marketing. Baldwin (1970) defines non-tariff barriers as any measure (public or private) that causes internationally traded goods and services or resources devoted to the production of these goods and services to be allocated in such a way as to reduce potential real world income. Movchan and Eremenko (2003) define NTBs as measures other than tariffs that are closely connected with state (administrative) activity and influence prices, quantity, structure and/or direction of international flows of goods and services, as well as resources used to produce these goods and services.

Moreover, in the EAC protocol (2012), NTBs is defined as laws, regulations, administrative, and technical requirements other than tariffs which are imposed by a partner state whose effect is to impede trade. On the other hand, Mold (2005) and Karugia *et al.*, (2009) define NTBs as barriers

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to trade that are not tariffs and include both trade-restricting measures (quotas, technical barriers, etc.) and trade-promoting measures such as export subsidies and the like. However in this study NTBs refers to policy measures excluding ordinary customs tariffs that are instituted by governments to reduce the flow of food crops from one region to another and which are intended to ensure food availability and hence food security and price stability in the country (Karugia *et al.*, 2009; World Bank, 2012). These measures include Municipal and Council permits, export permits, roadblocks associated with bribes; police check points, customs procedures and weighbridges applied at the region, district, and cross borders.

2.2 The effects of NTBs on trade and marketing of Maize

Using a Spatial Equilibrium Model (SEM), Karugia *et al.*, (2009) estimated the impacts of NTBs on cross border maize and beef trade in the EAC market. Their study identified roadblocks, police check points, bribes and custom rules and procedure as the main NTBs to trade in East Africa. Furthermore, the findings from SEM model indicate that 50% reduction on the cost of NTBs, or their complete elimination would improve the social welfare of farmers and traders in EAC. Okumu and Nyankori (2010) examined the NTBs in EAC customs union and their implications on trade between Uganda and other EAC countries. The study concluded that there are several NTBs in existence and some have persisted in the EAC for a longer time than expected. The NTBs that are still persisting include customs documentation requirements, cumbersome formalities, un-standardized weighbridges, several road blocks, lack of recognition of individual country's standards, and the existence of several un-harmonized standards. Similarly, Minot (2010) also found out that in Tanzania, the presence of weighbridges, roadblocks, and bans on staple food supply channel forced some traders to sell their products to illegal markets across the country borders. The two studies also emphasizes more on the cross border trade between the member states within the EAC and overlooked their domestic effects on production especially in the surplus areas such as Mbozi and Momba Districts.

Porteous (2012) also investigated the impacts of export bans on agricultural markets using price data from 12 countries in East and Southern Africa over 10 years. By developing a structural model, the author showed that export bans do not have a statistically significant effect on the price differences between markets and that they (export bans) are correlated with equivalent price increases in both the country of destination and the country of origin due to the price surge on both sides of the border. Prices in the country of origin continue to track prices in the country of destination, despite that trade is cut off. The author concludes that export bans force traders to stockpile maize, causing prices in both countries origin and destination to rise higher than they otherwise would have been the case.

Gabagambi (2013) conducted a cross-sectional survey on the impact of trade barriers on smallholder farmers in Kongwa and Karangwe Districts in Tanzania. Gabagambi study found that maize farmers and traders have to pass through six road blocks along the way to Kibaigwa maize market in Kongwa District. At each road block, there is a considerable delay as farmers and traders have to show receipts but sometimes the post guards disagree with the quotations indicated on the receipts regarding the quantity of maize. Therefore, farmers and traders have to spend 1 to 4 hours to seek for clearance from all the road blocks established by local governments along to Kibaigwa



market. To avoid such delays and related disturbances at road blocks, some farmers and traders resort to bribery whose cost ranges from TZS 3 000 to 5 000 for the 40 to 50 bags.

From the foregoing literature review it can be deduced that most of the studies ignored the effects of NTBs on domestic farm gate prices level especially in the surplus area such as Mbozi and Momba Districts. This is because the imposed NTBs do not only influence cross border trade, but they also indirectly affect the prices at the lower level of the maize supply chain in the local markets (i.e. at farm level). It is within this background this study intended to fill this gap of knowledge by providing explicit empirical information to policy makers and the government regarding the effects of NTBs on prices among smallholder farmers in the two districts.

3.0. RESEARCH METHODOLOGY

3.1 Study area and Sampling procedures

The study was conducted in the Southern Highlands Zone of Tanzania covering two major surplus maize producing districts, namely Mbozi and Momba in Songwe region. Mbozi and Momba districts were selected based on their agricultural potential of being surplus-producing areas for maize in Mbeya region. The two districts also some extend depends more on external markets (Malawi, Zambia and DRC) for their surplus maize (Minot, 2010) and are also situated far from major domestic markets such as Dar es Salaam and Arusha. A cross sectional design was used in carrying out the survey of this study. A two-stage stratified sampling was used in the selection of sample size whereby in the first stage, wards from the available list at the districts office were stratified into two strata, first stratum for wards close to district markets and the second for those located far from district markets. Then, four wards were randomly selected, two from each district namely Igamba, Ihanda for Mbozi district, Nkangamo and Chiwenzi for Momba district. The selection of wards was also based on production potential, existence of NTBs and quantity of maize produced. In the second stage, two villages from each ward were randomly selected making a total of 8 villages namely, Igamba, Itepula, Shiwinga, Ihanda, Malonji, Mpemba, Chiwanda and Isanga). The total population of farm households for Igamba and Ihanda wards in Mbozi District was 36 230 people (60%) and 25 297 people (40%) for Chiwenzi and Nkangamo wards in Momba District (NBS, 2008). Therefore, using these population distributions, a proportion of 60% farmers were sampled from Mbozi District and 40% from Momba district. A total of 400 small householder farmers were randomly selected from the eight villages using the proportional of the population size of the famers in the two districts and interviewed (240 and 160 farmers from Mbozi and Momba districts respectively).

3.2 Data collection methods and analysis

Data on average costs of various NTBs, quantity of maize produced, transport costs, inputs and outputs prices for famers in Mbozi and Momba districts were collected through structured and semi-structured questionnaires. Focus Group Discussion was also conducted in the village and individual interview at the district level with key informants (Village officers, transporters, district officers, custom officials and extension officers). Collected data were coded and analyzed using STATA computer software. To compare the effects of NTBs among farmers in Mbozi and Momba districts, an independent sample T-test was conducted in which the mean difference of NTBs effects

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on maize price among farmers between the two districts was estimated. This is because independent T-test is an appropriate tool for comparing two groups with different sample means but equal variances like those of Mbozi and Momba (Key *et al.*, 2000).

However, in order to estimate the magnitude (Size) of the mean different effects of NTBs in the two districts, the Eta Squared was used in addition to T-test and was calculated using the following formula as proposed by Cohen (1988).

$$EtaSquare = \frac{t^2}{t^2 + (N_1 + N_2 - 2)} \dots\dots\dots (1)$$

Whereby: *t* = calculated T- statistics and *N*₁, *N*₂ presents number of sample size of farmers in Mbozi and Momba districts.

Eta squared is the statistical measures of the size of the effects of dependent variable which can range from 0 to 1 and represents the proportion of variance in the dependent variable that is explained by the independent (group) variable. According to Cohen (1988) a value of Eta Squared above 0.09 is interpreted to show a larger effect, 0.06 moderate effects and 0.01 small effects.

4.0 RESULTS AND DISCUSSION

4.1 Comparison of the effects of NTBs on maize price received by smallholder farmers in Mbozi and Momba districts

To compare the mean effects of NTBs costs on price received by smallholder farmers between the two districts, the study employed an independent sampled t-test. The independent sample t-test was selected because the two groups of farmers were found to have different sample means and therefore the independent t-test was an appropriate tool for comparing the two groups (Saunders *et al.*, 2009). Table 1 presents the results from independent sample t-test analysis which compared the statistical relationship for the effects of NTBs costs on farm gate prices among farmers between the two districts. The results show that, there was a statistically significant (at the 5 % level) difference between the mean NTBs effects on farm gate prices as experienced by farmers in the two districts (Mbozi and Momba). These effects were higher for farmers in Mbozi District (as indicated by mean 6.47) than those of their counterpart farmers in Momba District (with mean 6.27). This is because more NTBs costs were incurred by farmers or traders in Mbozi District to reach Tunduma market as a result of poor rural roads and long distances. However, the lower effects of NTBs in Momba District can be attributed to the close proximity of the district to border and the prevailing of informal cross border trade as explained early.

These findings are consistent with those reported by World Bank (2009) and Minot (2014) who found that in Tanzania, the effects of transaction costs as experienced by farmers and traders vary with the spatial distance between the markets. Basing on these findings, it can be argued that NTBs have more effects on maize prices for the farmers who are located far from the district markets such as Mbozi and have fewer effects on farmers who are located closer to the border urban markets such as Momba District.



Table 1: t-test results for comparing the mean difference of NTBs effects on maize prices between Mbozi and Momba districts

District	N	Mean	Std. Deviation	Std. Error Mean	T value	Sig. (2-tailed)
Mbozi district	240	6.4749	0.30290	0.02560	4.061	0.000
Momba district	160	6.2791	0.40845	0.04084		
Eta Square					0.107	

Furthermore, the significant differences on the effects of NTBs between the two districts motivated the current study into wishing to understand the magnitude (size) of their mean effects on farm gate prices. Thus, to accomplish this objective, the Eta Square was used in the estimation of the magnitude size) of the NTBs effects in the two districts. The results from the Eta Square formula (1) indicate that the magnitude of the NTBs effects on the price received by farmers between the two districts was large enough to create a burden to farmers. This was implied by the value of Eta Square of 0.107 (Table 1) which in accordance to Cohen (1988) shows the existence of large effects of NTBs costs on farmers' prices. Therefore, the results from t-test and Eta Square enabled the study to reject the null hypothesis and accepted the alternative hypothesis that, there is a difference in NTBs effects on the prices received by farmers in the two districts (Mbozi and Momba).

However, the large differences on the effects of NTBs costs experienced by farmers between the two districts has policy implications that the implementation of NTBs strategies by the government in the forms of road blocks, council permits, and weighbridges would hurt more farmers in the rural areas of Mbozi District than would be the case with farmers in Momba District. This is because farmers in Momba were close to the market and therefore have more

These findings concur with those reported by Hella *et al.* (2011) who found that farmers who live in the remote villages with poor access to market in Tanzania were the main losers of the increase in prices caused by food crisis in 2008. Similarly, these findings concur with those reported by Moctaret *al.* (2015) in Burkina Faso that farmers who are located far from the urban markets received the lowest farm gate prices as opposed to those located closer to the urban markets. This was due to high transaction costs incurred by traders in transporting agricultural products from the village to the urban centres which in turn were deducted from the producer prices offered to farmers. On the other hand, the hypothesised assumption was tested using independent sample t-test by comparing the significant differences in NTBs effects between the two districts. The calculated results from the t-test indicate that there was a significant difference in the mean effect of NTBs costs as experienced by farmers between the two districts of Momba and Mbozi. The difference was statistically significant at 0.000 of 2-tailed test with a mean of t-value 4.061. Basing on these results, the study failed to reject its alternative hypothesis which stated that, "*the size of NTBs effect on maize prices received by smallholder farmers varies between Mbozi and Momba districts*". Therefore, the study had enough evidence to reject the null hypothesis which states that, "The size of the NTBs effect on price received by farmers is the same between Mbozi and Momba Districts.



5. CONCLUSION AND RECOMMENDATIONS

This study compared the effects of NTBs on farm gate prices among smallholder farmers in Mbozi and Momba districts. These arguments were also revealed by statistical differences from t-test and Eta Square value of 0.107 which indicated that there was a significant difference in the effects of NTBs on the prices among farmers in Mbozi and Momba districts. These findings carry a policy implication that, implementation of NTBs strategies by governments would harm more farmers in area located far from markets than those who live close to the urban markets. It was observed that, farmers from Mbozi district were located far from district market compared to those in Momba district. Therefore, in order to encourage farmers to allocate more resource on maize production and access markets especially in surplus areas, the study recommends removal of destructive NTBs strategies such as weighing bridges, road blocks and police check points in the study area. This will help the government to achieve its goals of creating high prices in surplus districts and low consumer prices in deficit urban centers. Also more investment on improvement of market infrastructures such as feeder roads which connects farmers to major urban markets could encourage farmers to allocate more resources in terms of labour, land and capital on maize production and thus contribute much to government efforts of reducing food insecurity and poverty among rural populations.

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