The Presence and Effects of Foreign Multinational Firms on the Survival of Domestic Agricultural Products Export Firms in Tanzania

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Abstract
This paper investigates whether and how the presence of export-oriented foreign multinational firms affects the survival of domestically owned Agri-export firms in Tanzania using the 2010 – 2020 transaction firm-level customs data. The empirical analysis is based on the life table estimator function and the logistic regression survival model with fixed effects. After controlling for firm specific characteristics such as age, size, export volume, productivity, number of destinations per firm, and number of products per firm, we find that foreign firms have higher survival rates than domestic firms and at some point, they positively influence the survival of the domestic firms in international agricultural exports. The positive impact on the domestic firms could be due to knowledge spillovers from the foreign firms. The results also suggest that the presence of foreign-owned firms has a significant impact on the exit hazard of domestic firms. This perseverance could be due to the reasons that mostly foreign firms export to countries where they originate, sometimes they are aware to market information than local firms. Finally, the findings offer insightful implications including supporting locally owned firms with increased international markets access to information and continue improving business and investment environment for foreign multinational in agricultural exports.

Keywords: Foreign multinational firms; domestically owned firms; discrete-time survival model; Tanzania

JEL Classification Codes: C25, Q12

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1. Introduction

Agricultural products exporting firms experience obstacles that make them prone to exit risks. In developing countries, local firms have low survival rates (Blum et al., 2013; Cadot et al., 2013; Fernandes et al., 2016; Schmidt and Hansen, 2017). It is a challenge for domestic companies from developing markets such as Tanzania to export products while foreign direct exporters or foreign intermediaries handle goods from several producers (Felbermayr & Jung, 2011; Kokko & Thang, 2014). Due to their trade networks, finances and experience, foreign intermediaries should be more resilient to export market shocks than local firms and may be more diversified than foreign direct exporters and are sensitive to market disturbances. Both foreign direct and intermediaries have advantages in international markets.

Research has concentrated on foreign firms (Ferragina et al., 2014; Kokko & Thang, 2014; Wagner & Gelübcke, 2011;Taymaz & Özler, 2007) and recognised the role of export intermediaries (Ahn *et al.*, 2011; Bai *et al*., 2017; Felbermayr & Jung, 2011) but their effect on firm survival is inadequately investigated. Export firms are dynamic while attention to the risks of firms' export survival has been made, results are indecisive (Besedeš & Prusa (2006) although firms' survival determinants have been identified including productivity, size, experience (Görg, Kneller, & Muraközy, 2012), ownership advantage (Helpman, Melitz, & Yeaple, 2004), destination market characteristics (Araujo, Mion, & Ornelas, 2016) and export entry modes such as indirect export via intermediaries (Ahn et al., 2011; Akerman, 2018; Bernard & Jensen, 2004).

Research is lacking foreign firms' entry mode impact on exporting domestic firms' survival. This study hypothesizes that foreign export intermediaries and foreign direct exporters positively influence domestic firms' survival in export markets, following the concept that domestic exporters learn from foreign firms' specific knowledge and skills (Meltiz, 2003). However, available studies neglect the effect of foreign multinational firm's presence on domestic firms and foreign intermediaries (Cadot *et al*., 2013; Milanzi, 2012; Hansen *et al.*, 2018; Phiri et al., 2021; Benkovskis, 2022& Baumöhl & Kočenda, 2022). Investigation of foreign firms' effects on the success of local exporting firms at export markets using firm-level transaction data is virtually absent for Tanzania. This paper assesses this impact using firm-level transactions data of 2010 – 2020 for Tanzania. Two hypotheses are tested through a discrete-time survival analysis method that considers the evolution of exit risk and the impact of the covariates of interest and foreign presence (i.e., foreign direct and foreign intermediaries). Firstly, the assumption is that foreign direct exporters and foreign export intermediaries have higher survival rates than domestic firms. The second hypothesis is that foreign firms are expected to affect survival of domestic export firms.

This topic is important as foreign firms are regarded as conduits for domestic firms to learn and improve their competitiveness. This may lead to an expansion of Tanzania's participation in global markets, economic growth and unemployment reduction. The current paper centers on agricultural products' exports for two reasons: first, with trade balance deficits, internationalisation through exports and foreign investment is central to policy. Second, exports of agricultural commodities account for about 30%, of Tanzania's total exports, mainly from tobacco, cashew nuts, coffee, tea, cloves, cotton, sisal, horticultural crops and fish fillets. Moreover, local agricultural traders are relatively small-scale, and the majority export indirectly while foreign companies increasingly dominate the export market.

Tanzania produces a limited number of exports which inhibits locally owned firms from exporting overseas and surviving in foreign markets (Aikaeli, 2012; Wangwe et al., 2014)). The statistics on export performance give the ratio of exports to GDP at about 28%, 31%, and 29% in years 2010, 2011, and 2012, respectively. A similar trend was registered subsequently at 25 %, 18%, and 20% in 2013, 2014, and 2015, respectively. The causes of low levels of exports include inadequate market information, and poor participation of firms (World Bank, 2017; URT, 2016a; URT, 2016b and URT, 2015). The increased trade balance deficit (URT, 2008) calls for intervention.

This paper's theoretical framework builds on Melitz's (2003) model of dynamic export of heterogeneous firms and Ahn *et al.*'s (2011) model in the Markusen type model. These provide an explanation of firms' survival in internationalization taking into account firm characteristics. This study investigates whether foreign firms' presence has a significant impact on the exit hazard of domestic exporting firms.

This investigation offers four contributions to the existing literature; methodology: the survival of exporting firms is analyzed using Tanzanian customs transaction panel firm-level data (2010-2020), unlike earlier studies that used aggregate data focusing on technological spillover in manufacturing firms in developed countries; theoretical: the study applies the discrete-time method (i.e., logistic regression with fixed effect) for survival of firms in exports. Melitz's (2003) model of heterogeneous firms modified by Ahn *et al*. (2011) has been extended by including intermediary service and survival models. This is the first empirical work on the role of foreign presence for the survival of local firms and direct exporters in Tanzania. The success of the firms is linked to export modes, including direct and indirect exports, which previous studies have neglected.

The rest of this paper is structured as follows. Section 2 provides a brief literature review, covering theoretical and empirical contributions. Section 3 presents methodology and data. Section 4 presents the empirical results, and Section 5 concludes

2. Literature survey

No single theory explains the link between firms' survival and presence of international export intermediaries in the host economy. Earlier studies cover firm behavior and survival (Jovanovic, 1982; Nelson and Winter, 1982 &1988; Hopenhyan, 1992; Pakes and Ericson, 1998). Models (Nelson and Winter, (1982), Jovanovic's (1982) and Hopenhyan's (1992) found that firm size (entry time), age, initial export value, export volume, time-invariant productivity and minimum efficiency scale (MES) contribute to survival in export markets.

International trade theory explains the role of intermediaries on firms' survival. Productive firms can afford to export and survive in foreign markets Melitz's (2003). The model overlooks that the intermediary sector offers resilience to less productive firms. Blum *et al*. (2008) incorporated the intermediary sector in Melitz's (2003) approach but focused on import intermediaries. Countries aim for export-led economic growth; thus, another construct predicts that export intermediary firms provide a mechanism for domestic firms to access global markets irrespective of productivity level. Ahn *et al.'s* (2011) and Åkerman's (2018) frameworks differ in cost structure. Ahn et al. (2011) claim that firm needs a country-specific fixed export cost, Åkerman (2018) assumes that intermediary wholesalers pay a fixed cost of entry for each market, suggesting that firms self-select to export indirectly, reducing market

entry costs such that it benefits the indirect exporters. That is, potential firms choose whether to establish a wholesale affiliate abroad and sell via intermediaries (Felbermayr and Jung, 2011).

The empirical literature testing the hypothesis that foreign firms have a higher chance of survival than domestic firms in export markets has been acknowledged but findings vary: in EU states 2006 to 2015 (Baumöhl, Iwasaki, & Kočenda, 2020), Ireland (Godart, Görg, & Hanley, 2011) and elsewhere foreign firms influenced domestic firms' survival (Fernandes *et al*., 2016; Kokko and Thang, 2014; Blum *et al*., 2013; Cadot *et al*., 2013; Ferragina *et al*., 2013) but in Italy domestic firms have higher survival rates than foreign multinationals (Ferragina *et al*., 2014; 2012). While intermediaries' role in firm survival in export markets is recognised (Bai *et al*., 2017; Békés & Muraközy, 2012; Ahn *et al*., 2011; Helpman *et al*., 2004), various factors determine this. Bai *et al*. (2017) analysing learning-by-doing through changes over time by export mode, direct against indirect exporting, confirm that export through an intermediary may assist local exporters' survival in export markets.

Studies concentrate on developed rather than emerging economies. Békés & Muraközy (2012) investigating firms' survival by European exporters' choices; exploiting the survivor principle of Stigler (1958), of firms' exit decisions, suggested that higher productivity, with other firm characteristics, enables firms to survive. Except for intermediaries, the effect of foreign presence in export modes is less studied. Ahn *et al.* (2011) maintain that intermediaries are resilient as they can enter complex markets. Felbermayr & Jung (2011) in the US indicate that intermediary firms are successful in export markets irrespective of ownership structure.

Other determinants are exchange rates, transport costs, productivity, export experience and product diversification (Pelkmans-balaoing and Heuvelen, 2016); though Albornoz *et al.* (2016) studying Argentine (1994–2006)_ found firm survival unaffected by fixed costs. Fugazza & McLaren (2014); Volpe & Carballo (2009) and Bernard, Jensen, Redding, & Schott (2007) found diversification of market destinations increased chances of firm survival. Experienced firms know about destination markets (Araujo *et al*., (2016); Czinkota *et al.*, (2014); Carrere and Strauss-Kahn (2012)); market information asymmetries and key players involved in trade affect export decisions (Melitz, 2003 Ahn *et al.*, 2011). However, studies disregard foreign presence in intermediary firms on survival of exporting firms.

Experience as one of the firms' survival determinants in export markets and product differentiation, reduces information asymmetries and uncertainty of demand. Inui *et al*., (2017) and Jovanovic (1982) identify size, age, R&D, chosen trade technology, productivity, export experience and product diversification are among the key factors for firms' survival .Hiller *et al*., (2013), and Schröder and Sørensen (2012; 2013) found that higher productivity increased firm survival in export markets. Manjon-Anton & Arauzo-Carod (2008) grouped determinants of firms' survival into external and internal factors. Agarwal *et al.* (2002); Esteve-Pérez & Mañez-Castillejo (2008) and Kokko & Thang (2014) report that external determinants for firm survival include industry or sectoral characteristics, spatial and business cycle factors, minimum efficient scale of production and market concentration.

Conceptually, firms' survival in export markets includes foreign presence in terms of foreign intermediaries and direct export firms. Ahn *et al*.'s (2011) model, the evolutionary theory of

economics and organization ecology theories are applied to test whether export intermediary firms positively influence domestic firms' survival in international markets. Other determinants are firm characteristics. Foreign presence includes foreign direct and foreign export intermediaries. Survival analysis involves time to event data which is an outcome variable.

The presence of foreign firms in international trade is the main covariate of interest, the remainder are control variables. The first hypothesis, explained non-parametrically, states that the survival rate of foreign firms is higher than domestic firms. The second hypothesis predicts that foreign firms influence survival probability of domestic firms in international exports and is estimated using econometric approaches following Melitz's (2003) model of international trade with heterogeneous firms. That is, foreign firms, claimed to affect domestic firms' survival in export markets, enjoy economies of scale, leading to higher productivity than domestic firms. Figure 1 shows the interactions and directions of impact.

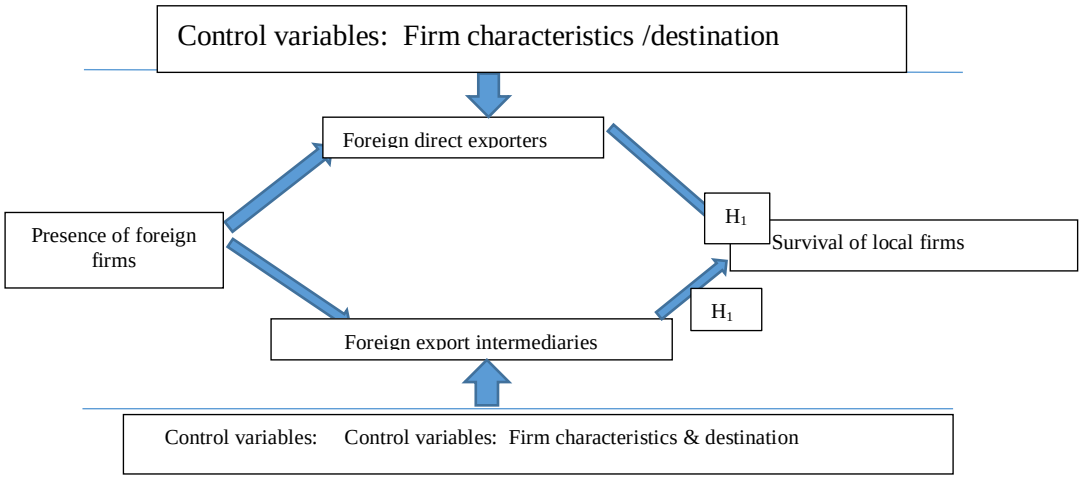

Figure 1: Conceptual framework for the study

3. Data and Methodology

3.1 Data and variables

Yearly 2010 – 2020 firm-level customs transactions unbalanced panel data from Tanzania Revenue Authority (TRA) is used. Only 3,137 Agri-export firms with complete information on firm characteristics including firm size, start dates, dates of export, export volume, export value, sales, modes of export-direct and indirect through intermediary, products and ownership were followed. Two types of firms based on ownership structure were identified: foreign firms and domestically owned firms. Table 2 presents a summary description of the variables.

Table 1: Variable names, measurements and the expected signs

Variables	Measurements	Expected Sign
Firm size (log)	Measured as the number of employees at time *t*. The firm size is further set into categories as per the number of employees.	-
Export volume(log)	Quantity of goods exported in year measured in metric tones	+
Age	Difference between year *t* and the commencement year of the firm, measured as the number of years since the firm registered	-
Productivity (log)	Sales to firms' size ratio	-/+
Number of destinations per firm	Number of destinations per firm Network	
Number of products per firm (Nr. products per firm)	Number of agricultural products exported by a firm	+
Foreign presence		+
Foreign direct exporters	Firms that produce and export directly to the destination markets. They are measured in terms of a dummy that takes 1 if foreign direct and 0 otherwise; in terms of numbers of foreign direct exporting firms and volume of foreign direct agricultural exporters.	+
Foreign export intermediaries	Firms that collect and export agricultural products produced by other firms to the destination markets. They are measured in terms of a dummy that takes 1 if foreign export intermediaries, and 0 otherwise; in terms of numbers of foreign export intermediaries and volume of agricultural products exported by foreign intermediaries.	+

The amassed information indicates the firm's registration date as well as export spell start dates of the firms, to establish total time risk of failure of firms (Cleves *et al.*, 2010; Esteve-Pérez & Mañez-Castillejo, 2008); ignoring tracing the data before 2010 indicates that data are not randomly chosen to explain the firms' survival because of left-truncated spells. Firms that began, exited, or died before the start year of the study period are excluded. Firms that join during the study period may still persevere after the end of the study period, the survival rate only establishes firms that existed at start of study (Mishi et al., 2021).

Two types of foreign firms are identified by modes of export: direct and intermediaries. Foreign direct exporters have lower frequency than intermediaries participating in exports. From start of study period, only 0.47% and 0.1% of the foreign and local firms respectively survived until 2020. A comparison of survival rates between firms is based on the survival function.

3.2 Estimation model

We employ a discrete-time survival model in our analysis at the firm-product-destination level. The model was opted since it is suitable for analyzing export dynamics given the nature of trade data (Hess and Persson, 2012), in our case export information are recorded at yearly intervals. We start the basic survival analysis using a non-parametric life-table method for the survival function, which is the most appropriate for discrete-time data (Allison, 1982; Fu & Wu, 2014; Jenkins, 2005). This is analogous to the Kaplan and Meir (1958) estimator, which is suitable for continuous data albeit they share similar idea. The life-table estimator was deployed to establish the stylized facts of export survival patterns and rates in the markets. Here, discrete intervals are the time j until an event occurs or observation is censored c, given export data are recorded in a discrete form on yearly basis. The study considers an event as a risk of a firm exit from exporting product in the export market. It occurs in the case of three conditions that a firm f experiences: ceases, stops, or quits exporting product p to the destination d at the time j, given that it has not occurred prior.

Following Pelkmans-Balaoing & Heuvelen, (2016), the present survival analysis assesses the number of firms that stay in foreign markets for a certain period, the exit rate, and role of independent variables in the likelihood of firm exit. However, in a discrete setting, event times occurred J are grouped in intervals $I_j = [t_j, t_{j+1})$ where $j = 0,.....J-1, t_0 = 0$, and $t_J = \infty$, also T is the time a firm takes before an export spell stops in our sample that may take the values $\{1,2,.....J\}$ as $t = 1,2,3.....11$, such that $T_i = j$ if $t_{j-1} \le T_i < t_j$. But, the interval-censored data is considered by defining the intervals of time $I_j = [t_j, t_{j+1})$ where $j = 1,....J$ (in years); where d_j the number of failures observed in interval (number of events such as exits, stops, or ceases); t_j is the start of the interval, while end of interval is t_{j+1}; m_j denotes the number of censored export spell endings observed in interval (number of censored cases) m_j. N_j is the number of exporters at risk of failure at the start of an interval and $n_j = N_j - \frac{m_j}{2}$ represents the adjusted number of spells at risk of failure at the midpoint of the interval (Jenkins, 2005).

With this set of information, life-table estimator discrete-time survivor function is:

$$\hat{S}_{fj} = \Pr(T_i > j) = 1 - F(j) = \prod_{k=1}^{j}\left(1 - \frac{d_k}{n_k}\right) = \prod_{k=1}^{j}\left(1 - h_{fk}\right), \qquad T \in \{1, 2, ...11\} \tag{1}$$

Where $T_i = T_i = \min\left\{T_i^*, C_i^*\right\}$ is a latent failure time considered as a non-negative discrete random variable denoting the survival time of a firm until an event (ceases, death, or exit from exporting)-occurs. C_i^* is the latent censoring time for the survival event. h_{fk} represents hazard rate in the interval I_j. Then, firms' export survival patterns are compared based on the hypothesis that survivor functions across groups of firms as per ownership are equal. The non-parametric tests especially the log-rank tests are applied, to test the equality of survivor function across the group warrants proceeding with the hazard rates estimation.

Apart from the non-parametric analysis of the survivor function, we finally turn our analysis to assess the potential impact of the covariates on the hazard rate of agri-export firms in the foreign markets. Two forms of foreign multinational firms' presence are considered based on market entry mode: foreign direct exporters and export intermediaries. In all forms, presence of foreign multinational firms is determined as a dummy variable that takes the value of 1 for the presence of foreign firms and zero otherwise, number of foreign firms and volume of agricultural export products. Then, we specify equation (2) as the general discrete-time hazard model fitted in the logistic regression with fixed effects to estimate the impacts of the foreign presence which is the conditional probability of an event (i.e., ceases, stops, exit and or death) occurring in a time interval $[t_j, t_{j+1})$ as:

$$\log it(h_{fk|x,\beta}) = \log\left[\frac{h_{fk}}{1 - h_{fk}} \mid x_f\right] = y_{fj|x'\beta,k,p,d} = \alpha_k + x'_{fpdk}\beta + \lambda_{fpd} + \gamma_t + \varepsilon_{fk} \tag{2}$$

Where $y_{fj|x'\beta,k,p,d}$ represents the conditional probability (hazard rate) of an event during the interval j; x_{ft} & ε_{fk} is the vector of time varying covariates representing firm's characteristics and logistically distributed error term respectively, $f = 1, ...N$ & $k = 1, ...T$. The parameter α_{fk} denotes a baseline hazard function; β a vector of parameter coefficients to be estimated. A positive (negative) coefficient indicates a positive (negative) impact on the value of the hazard. Correspondingly, it has a negative (positive) impact on the survival rate of the firm in the export market; λ_{fpd} is the pair of firm-product-destination fixed effect and γ_t denotes year fixed effect. The fixed effects purge out the potential estimation bias from unobserved heterogeneity (frailty) disturbance export data between individual firms caused by self-selection process, time-invariant omitted variables and time-varying factors. This challenge is vital to be dealt since may cause correlation of variables as shared across groups of observations (Pelkmans-Balaoing and Heuvelen, 2016). The estimation of the discrete-time logistic model was enhanced after testing for the equality of survival functions.

The discrete-time logit regression is applied throughout this study since it is not bound by the strict assumption of proportionality (PH) introduced by Cox models that require explanatory variables to be constant over time. This kind of assumption is not appropriate for explaining discrete data that follows logistic regression (Hess&Persson, 2011; Jenkins, 2005), as it fails to control for unobserved heterogeneity in the trade data. The model was opted because it is a suitable for event times grouped (count times) in discrete intervals (Hess & Persson, 2012). The specified model is estimated using fixed effects techniques based on the Hausman test value for panel regression results with a Chi-square test value11125.283 and 0.00 p-value.

4. Empirical results

4.1 Descriptive statistics

Table 3 provides summary information on the firms in the study dataset and explains the distribution of key covariates extracted from a sample of firms involved in agricultural export in Tanzania spanning from 2010 to 2020.

Table 2:Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Number of firms per destination	111078	13.299	23.794	0	134
Number of products by firms per destination	111078	16.084	12.548	0	79
Age of Firm	111078	13.887	10.549	1	81
Firm size	111078	80.382	327.921	1	5500
Vol.agri-exports (tones)	111078	72482.532	585679.210	0	41000000

Source: Author's computation based on (TRA, 2020)

Table 4 provides the correlation coefficients of a test of multicollinearity by basic pairwise correlation analysis between explanatory variables. All variables except the square of age are not correlated therefore multicollinearity is improbable in the analysis.

Table 3:Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Foreign firms(dummy)	1.000							
(2) Vol.foreign firms(tonnes)	0.001	1.000						
(3) Nr.foreign firms	0.068	0.040	1.000					
(4) Age of firms	0.025	0.003	-0.075	1.000				
(5) Size of firms	0.043	0.046	0.029	0.120	0.147	1.000		
(6) Productivity	-0.017	0.021	-0.018	-0.005	-0.007	-0.024	1.000	
(7) Number of products per firm	-0.198	-0.029	0.229	-0.116	-0.079	-0.018	0.016	1.000

Source: Author's computation based on Tanzania Revenue Authority (2020)

4.2 Survival rates of firms

Figure 2 shows the survival curve of exporting firms. The survival rate of domestic firms declines sharply, especially during 2015 – 2016 and 2016 – 2017, while foreign firms drop drastically from 2016 – 2017 and 2017 – 2018, supporting the first hypothesis that foreign firms have higher survival rates than domestic.

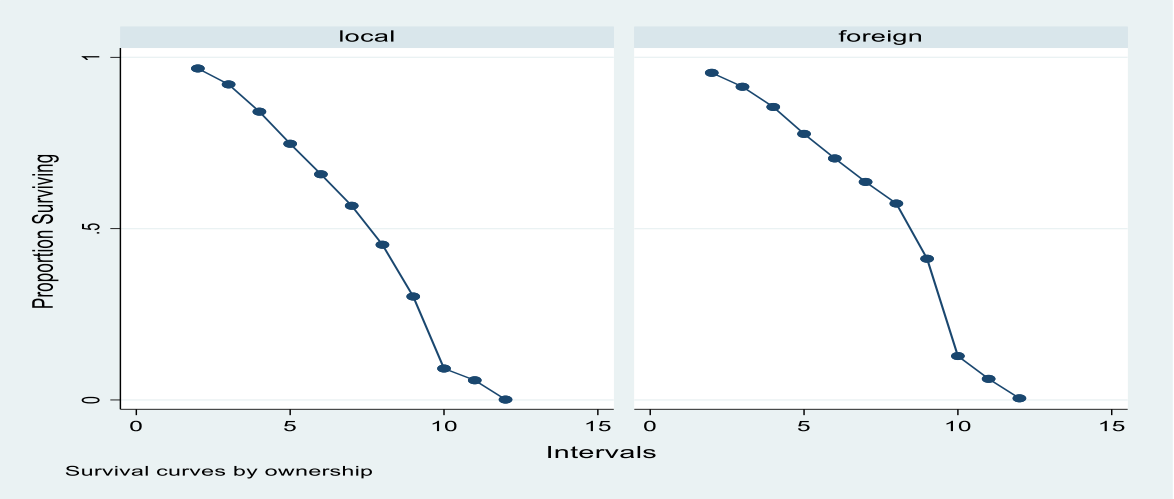

Figure 2: Estimates of survival cures for firms by ownership
Source: Author's computation based on Tanzania Revenue Authority data (2020)

Table 4:Survival of domestic and foreign firms

Interval	Beg. Total	Deaths	Lost	Survival	Std.Error	[95% Conf.	Int.]
Local firms							
1 2	2110	59	584	0.968	0.004	0.958	0.975
2 3	1467	69	63	0.921	0.007	0.907	0.933
3 4	1335	114	30	0.842	0.009	0.822	0.859
4 5	1191	131	29	0.748	0.0114	0.725	0.769
5 6	1031	121	29	0.659	0.013	0.634	0.683
6 7	881	122	16	0.567	0.0133	0.540	0.592
7 8	743	147	20	0.453	0.014	0.426	0.479
8 9	576	188	25	0.302	0.013	0.277	0.327
9 10	363	243	28	0.092	0.008	0.076	0.109
10 11	92	34	2	0.057	0.007	0.045	0.072
11 12	56	54	2	0.001	0.001	0.000	0.006
Foreign firms							
1 2	1027	42	194	0.955	0.007	0.939	0.966
2 3	791	33	33	0.914	0.010	0.894	0.931
3 4	725	46	22	0.855	0.012	0.829	0.878
4 5	657	60	9	0.777	0.015	0.746	0.804
5 6	588	54	5	0.705	0.0163	0.672	0.736
6 7	529	51	9	0.636	0.017	0.602	0.669
7 8	469	46	10	0.573	0.018	0.537	0.608
8 9	413	115	8	0.412	0.018	0.377	0.447
9 10	290	194	17	0.128	0.013	0.105	0.154
10 11	79	40	4	0.062	0.010	0.045	0.082
11 12	35	30	5	0.005	0.003	0.001	0.014

Source: Author's computation based on Tanzania Revenue Authority data (2020)

Table 5 presents lifetable estimates indicating that from 2010 - 2020 the median domestic firm's survival duration is approximately six years on average and seven years for foreign firms. More domestic firms are at risk of exit or getting lost than foreign firms. Column 1 represents number of years of firm survival, Column 2 provides total number of firms at risk of failure. During study period 2010 – 2020, 2110 domestic firms were established and at risk of exiting, death, or getting lost. Column 2 indicates that 59 local firms failed after their first year of entry. At the end of the tenth interval, there was a high number of 'dead' domestic firms. Column 4 indicates the number of firms out of risk of either exiting or death and shows survival of 584 domestic firms at end of period. Column 5 shows domestic firms' survival rates drastically declining between 2017 – 2020 until end of sample period; only 0.1 percent remained after 11 years. Table 5, column 5 shows survival rate higher for foreign firms than domestic. Results correspond with new EU member states (Baumöhl et al., 2020), Ireland (Godart et al., 2011) and elsewhere by Fernandes et al. (2016); Kokko and Thang (2014); Blum et al. (2013); and Cadot *et al*. (2013). Domestic firms' lower survival rates can be explained by their limited information and competitiveness compared to foreign firms.

In Figure 2's and Table 5's survival curves reveal that median survival duration of the domestic firms is approximately six years, for foreign firms about seven years. The survival rates of foreign intermediaries seem to be higher than domestic direct exporters; this is consistent to the hypothesis that foreign multinationals may be more aware of foreign markets and resilient in internationalisation than domestic firms exporting directly.

Statistically significant differences in survival times are assessed between the survival curves by a non-parametric log-rank test showing that firm dynamics depend on many factors not handled by the survivor function. Using other characteristics connected with the survival probabilities of exporting firms, a parametric method, the fixed effect logit regression model, models the firms' hazard rate.

4.3 Impact of foreign firms' presence on the survival of domestically owned exporters

The second hypothesis assessed the impact of foreign firms' presence on domestic exporters' survival. Foreign presence refers to foreign direct and foreign intermediaries, measured by a dummy variable, the number of foreign firms and the volume of exports by foreign firms. Combined effect results are presented of foreign presence in agricultural exports on domestic firms and disaggregated effects based on forms of foreign presence, illustrated in Table 6. Model 1 presents the impact of firm specific characteristics on survival; Models 2 – 4: impacts of foreign presence where estimations are done sequentially. Model 2 provides impact of foreign presence through a dummy variable; Models 3-4 present the foreign presence in terms of number of foreign firms and volume of agricultural products exported.

Models 1- 4 indicate that presence of foreign firms in all forms positively and significantly affects the survival probability of domestic firms. If other variables are controlled, foreign presence is less likely to affect domestically owned firms. These results conform to the second hypothesis that the presence of foreign-owned firms positively affects the exit hazard rate of domestic firms' survival in international markets; this makes possible domestic agri-exporting firms' survival.

Model 2 indicates the relationship between foreign presence (i.e., proxied by a dummy variable) and domestic firms' survival. When foreign presence increases in one year, on average the probability of domestic firms surviving in the foreign export market increases by 45.6 percent; domestic firms are less likely to exit the market as presence of foreign firms generates positive information spillovers. Results accord with Ferragina *et al*. (2013) on Turkey and Italy where foreign firms influenced the survival of domestic firms.

Model 3 reveals that an increased number of foreign firms in one year significantly raises the survival chances of domestic firms in internationalization by 0.49 percent. Domestic exporters may be influenced by foreign firms participating in agri-exports in Tanzania. Model 4 shows that a year's increase in the volume of agricultural exports by foreign firms positively and significantly increases survival odds of domestic firms by 6.4 percent. Foreign firms are well informed about foreign markets and share information with domestic firms. Successful firms have knowledge about export markets and resilience (see, Melitz, 2003).

Table 6: The impact of foreign presence and firm charactersitics on domestic firms' survival (Dependent variable: Failure=1 and Otherwise=0)

Variable	Model1	Model2	Model3	Model4
Duration(log)	77.630***	77.696***	77.974***	77.628***
Firm age	0.004	0.006	0.021	0.007
Square of Firms' age (log)	-0.092	-0.093	-0.100*	-0.093*
Firm size (log)	0.022	0.021	0.019	0.020
Productivity (log)	0.012***	0.012***	0.010***	0.011***
Number of products per firm(log)	0.112***	0.114***	0.085***	0.115***
Foreign presence (dummy)		0.456***		
Number of foreign firms			0.005***	
Vol. exports by foreign firms				0.064***
FIXED EFFECTS				
Year_fixed effects	YES	YES	YES	YES
Spell number dummies	YES	YES	YES	YES
Number of observations	109,393	109,393	109,393	109,393
Log-likelihood	-7216.854	-7197.782	-7189.933	-7194.035

Note:(i) * p<0.05; ** p<0.01; *** p<0.001
(ii) All logistic regression estimations are in coefficient form rather than as hazard ratios
Source: Author' computation based on Tanzania Revenue Authority data (2020)

Table 6 also displays other determinants of firm survival besides ownership structure. The results indicate that duration of export has a positive and significant effect on the survival of domestic agri-export firms. Models 1 – 4, show that a year increase in the duration of export significantly promotes the survival odds of firms in internationalization by 77.63 percent, 77.69 percent, 77.97 percent and 77.62 respectively. Probability of domestic firms' participation increases with duration in export markets (Inui *et al*., 2017). Age of firm had no significant effect on firm survival. However, square of the age had a negative and significant on firm survival in foreign markets, showing that age of firm has a non-linear relationship with the survival odds of firms suggesting that at an early age the firm endures in foreign markets but as the firm ages, it may not survive in international markets.

Models 1 – 4 in Table 6 indicate that firm size has no significant impact on the survival odds for agri-export firms but a firm's labour has a positive and significant impact on survival. Model 1 and 2 indicate that an increase in a firm's labour productivity in a year contributes to an increase in survival of firms by 1.2 percent, respectively while rising by 1.0 and 1.1percent for Model 3 and 4 respectively. Productivity may affect survival odds of the exporting firm. Model 1 and 2 show that on average the number of products exported by each firm has a positive and significant effect: they contribute to raising survival chances of exporting firms by 11.2 and 11.4 percent respectively. In Models 3 and 4 survival likelihood of firms increases by 8.5 and 11.5 percent as number of products per firm per destination increases in a year, respectively.

Table 7 presents logistic regression results where Model 1 shows the impact of foreign presence as a dummy variable, Model 2 in terms of number and Model 3 volume of agricultural products exported by foreign direct exporters. The signs of all variables representing foreign direct firms are positive as expected and significant. This means that an increase in foreign presence in a

year positively and significantly influences the survival likelihoods of the domestically owned firms in foreign markets. In all models 1 – 3 presented in Table 7, Model 1 has the highest impact of all models. The results in model indicates that an increase in foreign presence participating in Tanzania's agricultural exports in a year positively and significantly increases the survival possibilities of the domestic firms by 27.9 percent which is higher than 16.3 and 3.1 percent recorded in Model 2 and 3 respectively. Ozler & Taymaz (2004) registered that foreign firms increase the likelihood that domestic firms continue operating despite challenges, especially early-on.

Table 7: The impact of foreign direct exporting firms on the domestic firms' survival (Dependent variable: Failure=1 and Otherwise=0)

Variable	Model1	Model2	Model3
Duration(log)	72.400***	72.568***	72.393***
Foreign direct firms (dummy)	0.279***		
Nr. Foreign direct firms(log)		0.163***	
Vol. foreign direct exports			0.031***
Firm age	0.075***	0.078***	0.076***
Square of firms' age (log)	-0.034	-0.044	-0.035
Firm size (log)	0.000	0.006	0.001
Productivity (log)	0.002	0.003	-0.001
Number of products per firm(log)	0.059**	-0.059	0.060**
Number of products per firm(log)	0.113**	0.118**	0.118**
FIXED EFFECTS			
Year_fixed effects	*YES*	*YES*	*YES*
Spell number dummies	YES	YES	YES
Number of observations	109,386	109,386	109,386
Log-likelihood	-7075.277	--7089.505	-7077.889

Note:(i) * p<0.05; ** p<0.01; *** p<0.001

(ii) All logistic regression estimations are in coefficient form rather than as hazard ratios

Source: Author' computation based on Tanzania Revenue Authority data (2020)

In Table 8 all proxy variables for foreign export intermediaries presented in Model 1 – 3 are positive and significant with signs of variables as expected. Foreign export intermediaries measured as a dummy variable display the highest coefficient estimates of all variables. Model 1 shows that an increase in foreign presence in export intermediaries in a year influences the survival odds of Tanzania's domestic agricultural products export firms by 68.6 percent. Models 2 and 3 show that an increase of foreign presence, measured by number and exports by foreign intermediaries in a year, influences the survival odds of domestic firms by 11.7 percent and 8.3 percent, respectively. Foreign intermediaries with experience in foreign markets indirectly benefit domestic firms. Others find that foreign firms influence domestic firms' participation and success in export (Rauch & Watson, 2004; Helpman, Meltz and Yeaple, 2004; Blomström & Kokko, 1998).

Table 8: The impact of foreign export intermediaries on domestic firms' survival(Dependent variable: Failure=1 and Otherwise = 0)

Variable	Model1	Model2	Model3
Duration(log)	72.285***	72.535***	72.259***
Foreign intermediary firms (dummy)	0.686***		
Nr. Foreign intermediary firms(log)		0.117***	
Vol. foreign intermediary exports			0.083***
Firm age	0.073***	0.078***	0.0735***
Square of firms' age (log)	-0.038	-0.045	-0.036
Firm size (log)	0.002	0.007	0.001
Productivity (log)	0.000	0.003	-0.000
Number of products per firm(log)	0.058*	-0.030	0.061**
Number of products per firm(log)	0.101**	0.119**	0.108**
FIXED EFFECTS			
Year_fixed effects		YES	YES
Spell number dummies		YES	YES
Number of observations	109,386	109,386	109,386
Log-likelihood	-7031.279	-7092.047	-7032.183

Note:(i) * p<0.05; ** p<0.01; *** p<0.001
(ii) All logistic regression estimations are in coefficient form rather than as hazard ratios
Source: Author' computation based on Tanzania Revenue Authority data (2020)

Foreign export intermediaries show a higher impact on survival chances of domestic firms than foreign direct exporters; through reducing search and matching costs (Ahn *et al.*, 2011; Antràs & Costinot, 2011; Petropoulou, 2008; Ma, 2006; Rauch & Watson, 2004; Solberg & Nes, 2002). Domestic firms learn-by-doing from firms with experience in foreign markets. Thus, on average firm characteristics have significant impact on the firms' survival odds in foreign markets.

5. Conclusion and policy implications

The paper assessed the impact of foreign firms' presence on the survival of Tanzania's locally owned firms in agricultural exports using annualized firm level customs transaction panel data from 2010-20. Two hypotheses were tested: firstly, whether foreign exporting firms have higher survival rates than domestic firms in exports; secondly, whether local exporters' survival is influenced by the presence of foreign firms.

The findings show that foreign presence in Tanzania's agricultural trade registers a positive and significant impact on locally-owned firm survival. It indicates that an increase of foreign multinational direct exporters in a year raises the survival chances of locally owned firms in the export markets by 45.6 percent. Of all foreign firms, presence of foreign intermediaries in Tanzania's agricultural products export register the highest impact on the increased survival odds of the locally owned firms. Foreign firms' survival rates are higher than domestic firms. Other characteristics of the firms explain their export behavior since they influence firm entry and exit from foreign markets.

In general, it seems that among others, ownership and market entry strategies such as intermediary export mode can play a great role on locally owned firms' survival chances and success in internationalization through exports. Notwithstanding, this work offers valuable insights and evidence-based policy implications. The results imply policy responses that include among others, to continue to have plausible measures that can enhance agri-exports trade; and maintaining the supportive business environment and investment promotion for the foreign multinationals in the Agri-exports sector to effectively participate.

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