INTERNATIONAL TRADE, GENDER AND LABOUR MARKETS: A CASE STUDY OF FEMALE ENTREPRENEURS IN LESOTHO

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Abstract

This study examines the determinants of ease to export for Lesotho firms with a specific interest on the gender of the head of the firm. The data used are drawn from the 2023 firm survey collected by the National University of Lesotho – World Trade Organisation Research Chair. Exploiting the ordered probit model for the analysis and a tobit model for robustness checks, the findings show that female-headed firms have a higher probability of finding exporting more difficult than their male counterparts, though not statistically significant. Therefore, the empirical analysis fails to detect strong or persuasive statistical evidence of gender disparity with respect to ease to export of the firm. This observation could be partly attributed to the global and local push for female education and empowerment, aimed at bridging gender disparities and fostering gender equality across various spheres, thereby gradually mitigating gender differences, hence the need to sustain such programs.

Keywords: Exports, Trade, Firms, Gender, SDGs, Lesotho.

1. Introduction

Three key targets of Goal 17 of the Sustainable Development Goals (SDGs) that seeks to enhance global partnerships for sustainable development is premised on promoting international trade. The 10th, 11th and 12th targets of SDG 17 seeks to promote universal and equitable multilateral trading system, significantly increase the exports of developing countries with a view to doubling the Least Developing Countries' (LDCs) share of global exports by 2020, and to promote duty-free and quota-free market access on a lasting basis for all LDCs respectively (Sengupta, 2016). Beyond these direct targets, International trade is a key enabler in attaining most of the SDGs such as reducing poverty, hunger, gender equality, climate action as well as responsible production and consumption (International Trade Council, 2023). The global testament to the progressive role of international trade in general and export promotion in particular for LDCs is therefore unquestionable.

At the regional level, the Africa Continental Free Trade Agreement (AfCFTA) recognizes the role of trade and more importantly the need for a free market for goods and services in Africa. Lesotho has enjoyed free trade in the Southern African Development Community (SADC) since it's the achievement of the SADC free trade zone in 2008 alongside the 15 other member states. In

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Addition, The Southern African Customs Union (SACU) Strategic Plan 2022-2027 has been perceived as an instrument to promote industrialization, exports, and investment; facilitate trade and logistics; diversify export markets and strengthen trade relations (World Trade Organisation [WTO], 2023). In line with the prospects of regional trade, the African Union Integration report of 2021 show that intra-SADC trade improved by 4 percentage points from 23% in 2019 to 23% in 2021 (Southern African Development Community, 2022). Similarly, intra-SACU exports increased by 24.6% from 188,252 million ZAR in 2020 to 234,644 million ZAR in 2022 (SACU, 2024).

Nevertheless, authors such as Matsipa (2022) argue that trade gain in the AfCFTA will be unequal and that LDCs in particular will have little to due to their limited capacities in technology and infrastructure as well as internal squabbles on governance and political instability. The argument of unequal trade gain is not new and is implied in the classical international trade theories. This further explains why targets 11 and 12 of SDG 17 has specific provisions to improve *exports* for LDCs such as Lesotho. It also justifies the need for LDCs such as Lesotho, to constantly re-evaluate the factors that determine exports in Lesotho and more importantly the ease with which exports take place. Especially because, for several decades, trade in Lesotho has been dominated by imports and not exports which it so desperately needs for the creation of jobs, increase in productivity, as well as the reduction in dependency ratio, poverty and inequality etc.

The 2021 statistics of the World Integrated Trade Solutions ([WITS], 2024) shows that, Lesotho's exports of goods and services as percentage of GDP is 45.55%, which is about half the imports of goods and services as percentage of GDP of 93.52%. Similarly, while Lesotho's services export is 21,619,374.33 in BoP current USD, Lesotho's services import is about 18 times higher, valued at 407,711,025.79 in Bop, current USD. This explains why net trade in goods and services (BoP, current US$) in Lesotho is valued at -1.17 billion USD in 2022, a deterioration of about 128% in 2 decades, when compared to the 2002 value of -511,704,023 USD (World Bank, 2024). The World Bank statistics further show that Lesotho recorded lower net trade in goods and services (BoP, current US$) in 2022 when compared to other LDCs such as Angola (21,556,000.87 USD), Guinea (3,149,560USD), Liberia (41,456.44USD), Djibouti (577,744.64 USD) and Comoros (-314,592.83USD) and marginally higher than Mauritania (-1,637,405.93USD) and Madagascar (-1,351,885.54 USD).

The Government of Lesotho have put in place policies and laws to address the export deficiency in Lesotho. The most prominent highlight of the second National Strategic Development Plan (NSDP II) is that it aims to transform Lesotho from a consumer-based economy to a producer- and export-driven economy. Specifically, the second strategic objective of the Intermediate outcome 1.2, seeks to strengthen business and trade facilitation for export promotion in Lesotho (Government of Lesotho, 2021). In addition, the National Trade Policy Framework 2021-2025 identifies Horticulture, Textiles & Apparel, and Light Industry as priority sub-sectors to project and attain full potential. Other related policies that were more inclined in restricting imports include: The Agricultural Marketing Regulations of 1967, the Import and Export Control Act of 1984, the Import Restrictions Regulations of 1988, and the Customs and Excise Amendment Act of 2021. In spite of these policies, the gap between exports and imports seem to be widening.

The firm survey data collected by the National University of Lesotho- World Trade Organisation Research (NUL-WTO) Chair in 2023 shows that the challenges to export in order of importance include: what extent is the standards compliance (legal requirements), cost of export,

competitiveness, insufficient information on foreign markets, customs and border procedures, limited access to trade finance, poor infrastructure, insecurity and lack of safety, and inadequate transport links (NUL-WTO Chair, 2024). These challenges evidently hamper exports in Lesotho generally and heterogeneously across socio-demographic and economic characteristics. Particularly, this study is interested in ascertaining the context of gender dynamics in determining ease to exports. This is motivated by the fact that literature suggest that females are disadvantaged in terms of international trade policies (World Bank, 2020) and in terms of competing with their male counterparts in international trade (Tran-Nguyen & Zampetti, 2004; International Trade Centre, 2023). In addition, the OECD/World Trade Organization (2017) argue that there is little evidence to support that women-owned or managed firms are less productive than the men-owned and managed counterparts; meanwhile the difference in productivity between exporters and non-exporters is roughly half the size for women-owned firms than what it is for their male counterparts.

Gender statistics in Lesotho show that, the school enrolment, primary (gross), gender parity index (GPI) has oscillated around 1 in the last 3 decades and was 0.95 in 2019, suggesting some level of parity between males and female enrolment in the primary education of Lesotho (World Bank, 2024). This means that, the ratio of female to males was only marginally lower than equal. The World Bank Data further posits that the gender parity index for gross secondary schools in Lesotho was higher than the primary at 1.24 in 2019 and for tertiary was even higher, given as 1.34 in 2018. Similarly, the Country Policy and Institutional Assessment (CPIA) gender equality rating for Lesotho is as high as 4 in 2022 on a scale of 1 (low) to 6 (high). The CPIA gender equality rating for Lesotho is higher than most of the other LDCs such as Mali (3), Guinea (3), Liberia (3), Mozambique (3.5) Malawi (3.5), as well as the sub Saharan average of 3.2 and the World average of 3.3. This infers that, unlike what obtains in most African countries, the gender dimensions are slightly different in Lesotho and the analysis of how women perceive exports trade and how they are actually involved will offer fresh perspectives to the existing stock of literature. It is on this premise that this study seeks to ascertain the extent to which gender roles perceive and are involved in export trade. The study employs the ordered probit model to measure the relationship between the ease to export and its covariates with keen interest on gender.

2. A review of the literature

International trade theories dates back to the 16th century with the mercantilist theory which posited that trade is a zero-sum game – winner take it all. This ideology propelled the struggle for more labour to increase production and the need to promote exports as against imports amongst the economies of the time, all in an attempt to be the winner and not the looser. Then the classical theories of Absolute cost advantage, comparative cost advantage and the Heckscher-Ohlin argued that international trade does not need to be a zero-sum game and that countries involved in trade could all gain from trade if they trade with products in which they have absolute cost advantage, lower opportunity cost and relative factor efficiency respectively (Yuni, 2023). Though these theories do not suggest that trade gains will be equal amongst countries, they are founded on that fact that trade gains will be better for economies that get involved in international trade, when compared to the before-trade scenario. Today, the question of trade is not about whether to trade or not, but on how trade is carried out and the partners involved in trade that determine the outcome for each economy.

The hypothesis of export-led growth strategies or import substitution seem to revisit the ideals of the mercantilist era, though not to its extreme position of the zero-sum. The growing interest in regional integrations, fuelled by the desire for free trade increasingly reduce the popularity on import substitution via calls on the elimination of its instruments such as tariff barriers and ban of goods. By promoting duty-free and quota-free market access in target 12 and encouraging multilateral trading system that significantly increase the exports of developing countries in target 11 of SDG 17, the United Nations evidently recognise the need to promote export and minimise trade protection strategies often employed for import substitution. However, there seem to be a subtle assumption, especially in the classical theories of international trade, that increase in productivity or production translates to increase in export trade.

For example, Adam Smith posits that, the practice of division of labour will enhance specialisation and over time, economies of scale will reduce cost of production and hence improve productivity and exports. Nevertheless, the inability to get licenses for exports or the knowledge on how to export; which have been noted as challenges of exports in the Lesotho economy, could influence the actual export volumes. Therefore, the modus operandi of what and how to produce as stated by the classical trade theories may be the necessary condition, but the sufficient condition borders on all the other factors that facilitate the actual act of exporting goods and service.

Incidentally, though there exist tons of empirical literature on international trade in general, empirical literature on export promotion is relatively scarce and empirical literature on the ease to export is scarcer. A number of studies investigate the determinants of exports from a macro (Skosana & Kabuyab 2014; Majeed 2006; Halmurzaev 2015; and Bulut & Yasar 2023) and micro (Mpunga 2016; Niringiye & Tuyiragize 2010; Farole 2013; Dholakia & Kapur 2007; Hultman et al., 2011) perspectives. From a macro perspective, Majeed, (2006) employs panel fixed effect estimates to show that GDP, GDP growth rates, depreciation of real exchange rate, industrialisation and the development of communication facilities significantly promote exports for 75 developing countries. Similarly, employing a panel quantile regression model, Bulut and Yasar (2023) shows that nominal exchange rate, economic growth and foreign direct investments significantly determine export performance in the BRICS plus Turkey, Egypt, Indonesia, and Colombia, between 1980 and 2020. And then Skosana and Kabuyab (2014) employs the vector error correction model to show that foreign direct investment (FDI), world demand, and nominal exchange rate were significant determinants of export performance in Swaziland. While, Halmurzaev (2015) shows that changes in the world price levels, changes in exports of machinery and food, and real effective exchange rate significantly affect total exports in Uzbekistan.

Micro evidence has the ability to allow the interrogation of firm level characteristics in determining firm exports. In 2007, Dholakia and Kapur uses a panel tobit model to analyse 557 firms for the period 1980-1 to 1995-6. Dholakia and Kapur (2007) identified various firm level, economic and environmental factors to explain improved export performance in India. Similarly, Hultman et al., (2011) using data from 336 export ventures to show that the scope, sociocultural distance and promotion adaptation, significantly affect export performance in developing countries. Converse to Dholakia and Kapur (2007) and Hultman et al., (2011); Niringiye and Tuyiragize (2010), Farole (2013) and Mpunga (2016) studied the determinants of export performance from a country-specific perspective. Niringiye and Tuyiragize (2010) employs the tobit and probit models to empirically show that firm size, capital-labour ratio, skill intensity and being a chemical firm significantly determined the propensity for Ugandan firms to export to Africa the region. Meanwhile Farole (2013) opines that electricity and credit are the only determinants of export participation for

manufacturing firms in developing countries. And Mpunga (2016) uses the Likert scale analysis to show that export competencies, language, production technology, ICT and information search competencies, standard of products, restrictive entrance procedures into the country, export market characteristics, customers' indifference with foreign goods, price uncertainty in the export markets, product competition in the export market, and complicated travel accreditation (passport/Visa) are the most significant barriers to trade in Tanzania.

Even fewer studies examined the gender dynamics involved in determining the volume, ease or propensity to export. The few that exists have heterogeneous findings. For example, on the one hand, Expósito et al., (2022) uses a sample of 1,405 Spanish SMEs with the aid of a bivariate probit model to show that there exist no significant disparities in exporting propensities between male- and female-run businesses. On the other hand, the OECD/World Trade Organization (2017) argues that the exporter productivity premium is roughly half the size for women-owned firms compared to men owned firms, because women-managed firms are 12% less likely to use emails and find it difficult to use the single window digital tools at the border in selected East African countries.

3. Data

The 2023 NUL-WTO Research Chair data provides the main data source for the analysis in this study. The study will employ the Firm Survey Instruments (FSIs) of the 2023 NUL-WTO Research Chair data. The data employed a multi-stage sampling technique for the FSIs, questions on firm's demographic factors such as gender of the head of the firm, size of the firm, location, and involvement in international trade were interrogated. A sample of 150 firms were surveyed across five districts in Lesotho. The FSIs targeted firms engaged in both goods and services trade, including those not involved in international trade for control group analysis. The data collection instruments underwent several stages of validation for reliability and consistency. The enumerators were graduate students, many with prior experience in data collection for esteemed development aid agencies. They underwent a one-day workshop covering survey methodology, instrument administration, and best practices in data collection. Physical administration of instruments by enumerators was implemented, and respondents were not permitted to fill out the instruments themselves. Enumerators were deployed to their respective districts to minimize costs, and the survey covered data collection up to October 2023.

4. Variable Description and Selected Summary Statistics

Table 1 below furnishes a comprehensive breakdown of the variables essential for the central empirical examination. The primary variable of interest is the ease of exportation, characterized by an ordinal scale comprising four distinct levels: extremely difficult, fairly difficult, fairly easy, and extremely easy. The principal explanatory variable is a gender dummy, a binary indicator taking the value of 1 to denote male gender and 0 otherwise. This variable serves to elucidate the potential influence of gender on the perceived ease of exportation across the sample. Furthermore, Table 1 offers summary statistics for the ease of exportation alongside other control variables. The findings indicate that a majority of the surveyed firms perceive exportation to be extremely difficult, constituting approximately 58 percent of the sample. This could partly explain why net export in Lesotho has been negative for over 4 decades. Conversely, the smallest proportion, approximately 6 percent, perceive exportation as extremely easy. The category of fairly easy

accounts for about 15 percent of the sample, which is five percentage points lower than the fairly difficult category. Regarding the gender variable, male heads of firms dominate, representing almost 58 percent of the total firms surveyed, while the remaining firms are headed by females.

Table 1: Variable names, Description of Variables and Descriptive Statistics for the Estimating Sample

VARIABLE NAME	VARIABLE DESCRIPTION	Mean	Min	Max
Ease to Export	= 1 if it is extremely difficult	0.5833	0	1
	= 2 if it is fairly difficult	0.2014	0	1
	= 3 if it is fairly easy	0.1528	0	1
	= 4 if it is extremely easy	0.0625	0	1
Individual Level Variables				
Gender	=1 if firm head is a male; =0 otherwise;	0.5833	0	1
Age	Age of the head of the firm (Years)	45.9161	17	75
Experience	The number of years that the firm head has been in international trade	11.1259	0	70
Education				
Primary or no education	=1 if the head of the firm has a primary education; 0, otherwise	0.1831	0	1
Secondary education	=1 if firm head has a secondary education; =0, otherwise;	0.2746	0	1
Diploma or certification	=1 if firm head has a diploma or cert. education; =0 otherwise;	0.1549	0	1
BSc/BA education	=1 if firm head has a BSc or BA education; =0 otherwise;	0.2394	0	1
Post graduate education	=1 if firm head has a post graduate education; =0 otherwise;	0.1479	0	1
Expertise in international trade				
None	=1 if the head of the firm has no expertise; =0 otherwise;	0.1736	0	1
Limited Knowledge	=1 if the head of the firm has limited knowledge; =0 otherwise;	0.2986	0	1
Knowledgeable	=1 if the head of the firm has knowledge; =0 otherwise;	0.4306	0	1
Expert	=1 if the head of the firm is an expert; =0 otherwise	0.0972	0	1
Firm Level Variables				
Access to internet	=1 if the firm has access to internet; =0 otherwise;	0.625	0	1
Website	=1 if the firm has a website; =0 otherwise;	0.2867	0	1
Location	=1 is the firm is located in urban area; =0 otherwise;	0.7917	0	1
District				

Maseru	=1 if the firm is located in Maseru; =0 otherwise;	0.4722	0	1
Botha Bothe	=1 if the firm is located in Botha Botha; =0 otherwise;	0.1042	0	1
Leribe	=1 if the firm is located in Leribe; =0 otherwise;	0.2083	0	1
Mafeteng	=1 if the firm is located in Mafeteng; =0 otherwise	0.1111	0	1
Mokhotlong	=1 if the head firm is located in Mokhotlong; =0 otherwise;	0.1042	0	1
Insurance	=1 if the firm is insured; =0 otherwise;			
Branches outside Lesotho	=1 if the firm has branches outside Lesotho; =0 otherwise;	0.1806	0	1
Involvement in global (beyond regional) value chains	=1 if the firm is involved in global value chains; =0 otherwise;	0.1875	0	1
Involvement in regional (SACU) value chains	=1 if the firm is involved in regional value chains; =0 otherwise;	0.2361	0	1
Trade Union	=1 if the firm is a member of a trade union; =0 otherwise;	0.2014	0	1
Business Type				
Manufacturing	=1 if the firm is involved in manufacturing; =0 otherwise;	0.3958	0	1
Wholesale and Retail	=1 if the firm is involved in wholesale and retail; =0 otherwise;	0.3611	0	1
Services	=1 if the firm is involved in services; =0 otherwise;	0.2431	0	1

Notes
(a) Own calculations from the National University of Lesotho, World Trade Organization (NUL-WTO) Research Chair Survey (2023)
(b) The mean column reports the sample proportion for binary variables and conventional means for the continuous variables.
(c) The other two columns depict the minimum and the maximum, respectively.

4. Empirical Framework

In this section, we present the empirical methodology used to trace the relationship between the ease to export and its covariates.

The NUL-WTO data set categorises the perception of ease to export into four levels. These levels are; extremely difficult, fairly difficult, fairly easy and extremely easy. This study adopts the same levels as the measure of the dependent variable. To model ease to export, we use an ordered probit model. Following Greene (2008), the general expression of the aforementioned model can be expressed in a generic below:

$$y_i^* = \boldsymbol{\beta} x_i + \varepsilon_i \tag{1}$$

Where, y_i^* is the latent variable for measuring ease to export of the ith firm

$\boldsymbol{\beta}$ is a vector of coefficients to be estimated?

X_i is a vector of covariates that determine the level of ease to export

ε_i is a white noise error term, that is $\varepsilon_i \sim N(0, \sigma^2)$

This study attributes ease to export to the ordinal categories as follows; 0 for extremely difficult, 1 fairly difficult, 2 fairly easy and 3 for extremely easy. Therefore, following Greene (2008), the modified ordered probit model with four levels of ease to export based on the latent variable can be expressed as below:

$$y_i = \begin{cases} 0 \ if \ -\infty < y_i^* \leq \theta_0 & (\text{"extremely difficult"}) \\ 1 \ \ if \ \ \theta_0 \leq y_i^* < \theta_1 & (\text{"fairly difficult"}) \\ 2 \ \ if \ \ \theta_1 \leq y_i^* < \theta_2 & (\text{"fairly easy"}) \\ 3 \ if \ \ \theta_2 \leq y_i^* < +\infty & (\text{"extremely easy"}) \end{cases} \tag{2}$$

Where, y_i is the observed variable for the measure of ease to export for the ith firm and θ_i's are the threshold estimates to be level i.

For the probabilities, the probability that firm i finds it ease to export ($i = 1,2,3,4$) can be expressed as shown below:

$$\begin{aligned} \Pr(y_i = 0|x_i) &= F(\theta_0 - \boldsymbol{\beta} x_i) \\ \Pr(y_i = 1|x_i) &= F(\theta_1 - \boldsymbol{\beta} x_i) - F(\theta_0 - \boldsymbol{\beta} x_i) \\ \Pr(y_i = 2|x_i) &= F(\theta_2 - \boldsymbol{\beta} x_i) - F(\theta_1 - \boldsymbol{\beta} x_i) \\ \Pr(y_i = 3|x_i) &= 1 - F(\theta_2 - \boldsymbol{\beta} x_i) \end{aligned} \tag{3}$$

Where, F($\cdot$) is the cumulative distribution function (CDF) of a standard normal probability distribution. From the above probabilities, the associated partial effects can then be derived by employing the following set of equations below:

$$\frac{\partial \Pr(y_i = 0|\boldsymbol{x}_i)}{\partial \Pr x_i} = \boldsymbol{\beta}[-\boldsymbol{f}(\theta_0 - \boldsymbol{\beta}\boldsymbol{x}_i)]$$

$$\frac{\partial \Pr(y_i = 1|\boldsymbol{x}_i)}{\partial \Pr x_i} = \boldsymbol{\beta}[\boldsymbol{f}(\theta_0 - \boldsymbol{\beta}\boldsymbol{x}_i) - \boldsymbol{f}(\theta_1 - \boldsymbol{\beta}\boldsymbol{x}_i)]$$

$$\frac{\partial \Pr(y_i = 2|\boldsymbol{x}_i)}{\partial \Pr x_i} = \boldsymbol{\beta}[\boldsymbol{f}(\theta_1 - \boldsymbol{\beta}\boldsymbol{x}_i) - \boldsymbol{f}(\theta_2 - \boldsymbol{\beta}\boldsymbol{x}_i)]$$

$$\frac{\partial \Pr(y_i = 3|\boldsymbol{x}_i)}{\partial \Pr x_i} = \boldsymbol{\beta}[\boldsymbol{f}(\theta_2 - \boldsymbol{\beta}\boldsymbol{x}_i)]$$

(4)

Where, f(·) is the probability density function (PDF) of the standard normal distribution. As a matter of fact, the estimation technique involved in the estimation of the parameters is the maximum likelihood estimation which has proved to be relatively consistent.

Furthermore, the log likelihood function is expressed as follows;

$$lnL(\beta) = \sum_{i}^{n} \sum_{j}^{4} \delta_{ij} log_e Pr(y_i = j|x_i) \qquad (5)$$

Where, $lnL(0)$ is the log-likelihood function of the model without any covariates and $lnL(\beta)$ is that of the full model, that is, the model with all the covariates as well as the constant term.

Hence, the methodology elucidated above can be contextualized within the framework delineated by Reilly and Bellony (2009), which builds upon the seminal work of Caudill and Jackson (1993) and Stewart (1983), as referenced in Machin and Stewart (1990). According to Reilly and Bellony (2009), Stewart (1983) extends the likelihood function initially proposed by McKelvey and Zavoina (1975) to accommodate predetermined threshold values, thereby facilitating the formulation of the interval regression model and enabling parameter estimation for the error term's variance function. However, it is noteworthy that Stewart (1983) upholds the pivotal assumption of homoscedasticity of the error term throughout the modelling process. Subsequently, Caudill and Jackson (1993) address concerns regarding potential biases and inconsistencies arising from the violation of homoscedasticity, by refining the Stewart (1983) methodology to accommodate this altered condition. Nevertheless, their contribution is constrained by the primary aim of rectifying the model for a specific issue, namely heteroscedasticity, thereby limiting the scope of their intervention. Consequently, we proceed with the estimation of equation (1) in its original form also having incorporated controls for heteroscedasticity in a form of robust standard errors.

a. Diagnostics tests

This paper acknowledges the potential misspecification of the model under investigation, particularly when it encompasses the explanatory variables outlined in Table 1. Key indicators of potential misspecification include non-constant error variance, non-normal error terms, and heterogeneous thresholds across various characteristics. To rigorously assess these issues, it is imperative to compute ordered probit (OP) pseudo-residuals utilizing maximum likelihood (ML) estimates. Furthermore, to formally examine the possibility of omitted variables within our model specification, we turn to higher-order conditional moments for latent variables, as articulated in Stewart (1983), as referenced in Machin and Stewart (1990). Additionally, we conduct diagnostic testing to evaluate the correctness of the functional form, adapting a modified version of the RESET test initially proposed by Ramsey (1969) or Ramsey and Schmidt (1976). Notably, our

analysis fails to reject the null hypothesis of no omitted variables, signifying that our model is appropriately specified. Consequently, quadratic or nonlinear terms for age and experience, conventionally included in similar studies, were not incorporated in our model formulation.

Secondly, the choice between a probit and logit model often hinges on the underlying assumptions regarding the distribution of the error term. The probit model assumes that the error term follows a standard normal distribution, while the logit model assumes a logistic distribution. Therefore, the decision between the two models relies heavily on the normality assumption. If the normality assumption holds, the probit model may be preferred due to its more straightforward interpretation and the ease of estimating coefficients using maximum likelihood estimation. However, if the normality assumption is violated or uncertain, the Logit model might be more suitable as it does not explicitly rely on the normality assumption and is known for its robustness to deviations from normality. We evaluated this characteristic through the utilization of a Jarque-Bera test (1980), a statistical test designed to assess the normality of data distributions. Our analysis indicated that the data did not provide sufficient evidence to reject the null hypothesis of normality. Consequently, in light of these findings, we selected an ordered probit model as our preferred modelling approach.

b. Robustness checks
Given that the ease to export as perceived by the firm heads is a subjective measure of the ability to export, the study estimates the tobit model on a more objective dependent variable - percentage of sales that are exported. We estimate the following Tobit model:

$$y_i^* = \boldsymbol{\beta} \boldsymbol{x}_i + \varepsilon_i \tag{6}$$

Our focus is on a dependent variable denoted as y, which represents the percentage of sales that are exported. However, y is subject to censoring at both ends, meaning it cannot fall below 0 or exceed 100. To model this scenario, we employ the Tobit model, which accounts for such censoring. The Tobit model framework introduces a latent variable y∗, which fully captures the underlying continuous distribution of the percentage of sales that could potentially be exported. This latent variable y∗ is influenced by a set of explanatory variables denoted as x, similar to those utilized in a probit model. The relationship between the observed dependent variable y and the latent variable y∗ is governed by certain censoring rules: If y∗ falls below 0, the observed value of y is truncated at 0 and if y∗ exceeds 100, the observed value of y is capped at 100.

The vector β represents the coefficients associated with the explanatory variables x. These coefficients indicate the marginal effects of the explanatory variables on the latent variable y∗. The error term u captures unobserved factors that influence the relationship between the explanatory variables and the latent variable. In line with common assumptions in econometric modelling, u is assumed to follow a normal distribution with a mean of zero and constant variance. Due to the presence of censoring and the consequent violation of the assumptions underlying ordinary least squares (OLS) estimation, the Tobit model employs maximum likelihood estimation (MLE) for parameter estimation. MLE seeks to maximize the likelihood function, which captures the probability of observing the given data under the specified Tobit model. Greene (2003), Cameron and Trivedi (2005), Wooldridge (2010), and Amemiya (1985).

5. Results
a. Probit Model Results (Main Results)

The results obtained from estimating equations (1) and (2) are presented in Table 2. In the table, the first column displays the maximum likelihood (ML) estimates for the ordered probit mean regression model (1), while the second column presents the results for a similar equation that has been adjusted for heteroscedasticity. Notably, while the coefficients in these two columns exhibit a degree of similarity, the standard errors differ due to the explicit handling of heteroscedasticity in the second column. The ordered probit model is commonly employed to analyze discrete ordinal cases in empirical research. The estimated coefficients offer insights into the average impact, holding other factors constant, of a characteristic on the standardized probit index, measured in terms of standard deviations. The signs associated with these coefficients indicate the directional influence of the characteristics on the firms' ease to export. A positive coefficient signifies a positive correlation between the variable of interest and the likelihood of experiencing extreme ease category, whereas the opposite sign indicates an association with extreme difficulty.

The results of the variable of interest i.e. gender of the firm's head, suggest that having a female head decreases the standardized ordered probit index by 0.204 standard deviations relative to having a male head, on average and holding other factors constant. However, this coefficient is statistically insignificant, indicating no significant gender disparity in ease of export in the case of Lesotho. This could be explained by the relatively high Country Policy and Institutional Assessment gender equality rating for Lesotho. This finding corroborates the study by Expósito et al., (2022) who used a bivariate probit model to show that there exist no significant disparities in exporting propensities between male- and female-run businesses for Spanish SMEs.

The probit estimates in columns 1 and 2 further indicates that each additional year of experience increases the standardized ordered probit index by an average of 0.033 standard deviations, all else being equal. This positive effect suggests that experience tends to elevate firms towards higher exporting categories, underscoring the significance of longevity in the trade environment for the head of the firm. Conversely, factors such as internet accessibility, including the presence of a firm's website, appear statistically insignificant in explaining variations in ease of export for Lesotho firms. Turning to spatial variables, particularly districts, the estimated coefficients suggests that locating a firm in Mokhotlong reduces the standardized ordered probit index by 1.615 standard deviations relative to being in Maseru, on average and holding other factors constant. This negative effect implies that being situated in Mokhotlong tends to lower firms' position towards more challenging export categories, possibly due to the region's remoteness and mountainous terrain, complicating transportation and trade activities.

Education and expertise of the firm's head generally do not seem to significantly influence ease of export. However, having secondary level education appears to facilitate trade compared to those with diplomas or certificates. This finding may be interpreted as suggesting that higher levels of education among firm heads correlate with greater difficulties in exporting, possibly due to the fact that firm heads with secondary education may have had more experience (about 11 years of experience on average) on surmounting certain challenges than those with diplomas or certificates (about 9 years of experience on average). An important observation is that not being part of the regional value chain, specifically the Southern African Customs Union (SACU), reduces the standardized ordered probit index by 0.569 of a standard deviation, on average and *ceteris paribus*, relative to participating in the regional value chain, on average and holding other factors constant. This underscores the importance of SACU in promoting intra-regional trade.

Table 2: Estimation Results for the Probit Model-Specification 1

VARIABLES	(1) Probit	(2) Probit
Female	**-0.204**	**-0.204**
	(0.230)	**(0.236)**
Age	-0.005	-0.005
	(0.011)	(0.010)
Experience	0.033***	0.033***
	(0.012)	(0.012)
No access to internet	-0.222	-0.222
	(0.309)	(0.301)
No website	0.027	0.027
	(0.295)	(0.308)
Urban	-0.217	-0.217
	(0.395)	(0.401)
DISTRICT		
Botha-Bothe	0.090	0.090
	(0.380)	(0.398)
Leribe	-0.217	-0.217
	(0.295)	(0.255)
Mafeteng	-0.586	-0.586
	(0.457)	(0.474)
Mokhotlong	-1.615***	-1.615***
	(0.585)	(0.588)
EDUCATION		
Primary or none	0.413	0.413
	(0.336)	(0.320)
Diploma or Certificate	-0.880**	-0.880***
	(0.405)	(0.329)
BSc. Or BA education	-0.029	-0.029
	(0.331)	(0.316)
Post Graduate	-0.061	-0.061
	(0.383)	(0.380)
EXPERTISE		
Limited Knowledge	-0.019	-0.019
	(0.399)	(0.365)
Knowledgeable	-0.266	-0.266
	(0.397)	(0.391)
Expert	-0.383	-0.383
	(0.521)	(0.493)
No insurance	-0.141	-0.141
	(0.283)	(0.272)
No branches outside Lesotho	-0.517	-0.517

	(0.346)	(0.351)
Not in global value chain	0.618	0.618
	(0.412)	(0.431)
Not in regional value chain	-0.569	-0.569**
	(0.349)	(0.272)
Not a member of a trade union	-0.340	-0.340
	(0.308)	(0.360)
SECTOR		
Services	-0.411	-0.411
	(0.302)	(0.317)
Wholesale and retail	-0.659**	-0.659**
	(0.264)	(0.259)
/cut1	-1.497*	-1.497*
	(0.849)	(0.869)
/cut2	-0.767	-0.767
	(0.846)	(0.875)
/cut3	0.187	0.187
	(0.841)	(0.888)
var(% of sales exported)	§	§
Constant	§	§
	§	§
Observations	140	140
Pseudo R2	0.151	0.151
Log likelihood	-132.32397	-132.32397
Prob > chi2	0.0033	0.0011
Jarque-Bera test, Ho: normality (P-Value)	0.0796	§
RAMSEY TEST, Ho: No omitted variables (P-Value)	0.5371	§

Notes:
   (a) Standard errors are reported in parentheses; Model 2 is corrected for Heteroscedasticity hence the Standard errors are Robust;
   (b) For RAMSEY and Jarque-Bera tests, the p-values at 5% level of significance are shown.
   (c) § denotes not applicable in estimation
   (d) ***, **, and * denotes statistically significant at the 1%, 5% and 10% levels respectively;
   (e) The base category for District is Maseru; Education is Secondary; Expertise is None and Sector is Manufacturing.

Table 3 below presents the marginal effects concerning gender and its impact on the ease of export. This analysis is necessitated by the fact that standard probit coefficients are typically interpreted in terms of the standardized probit index, which lacks direct policy implications in economics. Consequently, marginal effects provide a probability interpretation, making them more straightforward for policy purposes.

Specifically, being a female head of the firm increases the probability of being in the lowest export category ('extremely difficult') compared to being a male head by 0.079 probability points, equivalent to 7.9 percentage points, on average and holding all other factors constant. The results across the other three export categories reinforce this observation: being a female head reduces the probability of being in the 'fairly difficult', 'fairly easy', and 'extremely easy' categories by 2.8, 3.8, and 1.3 percentage points respectively, relative to being a male head, on average and holding other variables constant. It is worth noting that all of these effects are statistically insignificant, indicating that there are no significant gender variations concerning the ease of export for firms in Lesotho. This finding is further emphasized by Figure 1 below, which illustrates these effects. Importantly, the confidence intervals at the 95 percent level all contain zero, underscoring the non-significance of these effects.

The results further illustrate that with each additional year of experience, there is an increased likelihood of a firm being categorized into higher export brackets. This positive correlation underscores the importance of accumulated experience in steering firms towards more advanced export tiers, emphasizing the pivotal role of longevity within the trade landscape for firm leadership. On the similar note, the estimated coefficients indicate that establishing a firm in Mokhotlong decreases the likelihood of experiencing ease in exporting by approximately 4.9 percentage points compared to being situated in Maseru. This observation aligns consistently with findings derived from standard probit estimation techniques. Furthermore, there is a consistent indication that being part of a regional global value chain, particularly within the Southern African Customs Union (SACU) value chain, tends to bolster the ease of exporting. A notable discovery is that manufacturing firms exhibit a higher probability of encountering ease in exporting compared to those in the service and wholesale sectors. This disparity likely reflects the impact of the African Growth and Opportunity Act (AGOA), which has facilitated manufacturing firms in establishing a well-defined market presence in the United States.

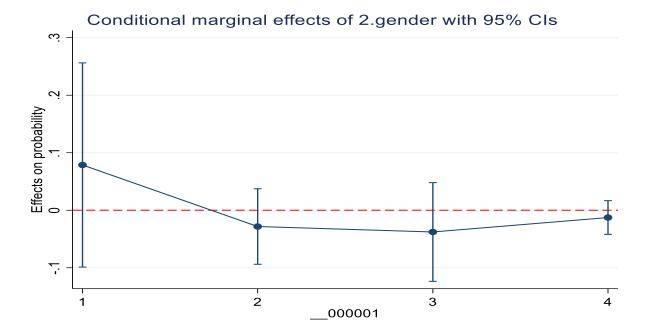**Table 3: Marginal Effects Estimates resulting from the Probit Estimation**

VARIABLES	EXTREMELY DIFFICULT		DIFFICULT		EASY		EXTREMELY EASY	
Female	**0.079**	**(0.091)**	**-0.028**	**(0.033)**	**-0.038**	**(0.044)**	**-0.013**	**(0.015)**
Age	0.002	(0.004)	-0.001	(0.001)	-0.001	(0.002)	0.000	(0.001)
Experience	0.013***	(0.004)	0.004**	(0.002)	0.006**	(0.002)	0.002**	(0.001)
No internet	0.085	(0.115)	-0.031	(0.044)	-0.041	(0.053)	-0.014	(0.019)
No website	-0.011	(0.119)	0.004	(0.043)	0.005	(0.057)	0.002	(0.019)
Urban **DISTRICT**	0.085	(0.159)	-0.027	(0.045)	-0.042	(0.082)	-0.016	(0.033)
Botha-bothe	-0.036	(0.158)	0.007	(0.027)	0.019	(0.085)	0.010	(0.046)
Leribe	0.086	(0.100)	-0.024	(0.030)	-0.044	(0.051)	-0.018	(0.021)
Mafeteng	0.223	(0.165)	-0.08	(0.079)	-0.106	(0.071)	-0.037	(0.025)

Mokhotlong **EDUCATION**	0.456***	(0.094)	0.224***	(0.063)	0.183***	(0.045)	-0.049**	(0.022)
Primary or none	-0.163	(0.125)	0.032	(0.029)	0.087	(0.068)	0.045	(0.039)
Diploma or Certificate	0.290***	(0.102)	0.139***	(0.048)	-0.121**	(0.052)	-0.03	(0.020)
BSc. or BA Education	0.011	(0.124)	-0.004	(0.040)	-0.006	(0.062)	-0.002	(0.023)
Post Graduate **EXPERTISE**	0.024	(0.149)	-0.008	(0.049)	-0.012	(0.073)	-0.004	(0.027)
Limited Knowledge	0.007	(0.145)	-0.002	(0.040)	-0.004	(0.074)	-0.002	(0.031)
Knowledgeable	0.104	(0.153)	-0.035	(0.050)	-0.051	(0.076)	-0.018	(0.030)
Expert	0.147	(0.186)	-0.053	(0.071)	-0.07	(0.089)	-0.023	(0.031)
No insurance	0.055	(0.105)	-0.019	(0.037)	-0.026	(0.051)	-0.009	(0.017)
No branches outside Lesotho	0.204	(0.137)	-0.054*	(0.028)	-0.104	(0.076)	-0.046	(0.043)
Not in global value chain	-0.222	(0.139)	0.095	(0.072)	0.099*	(0.060)	0.028*	(0.015)
Not in regional value chain	0.223**	(0.105)	-0.061**	(0.026)	-0.113*	(0.061)	-0.049	(0.031)
No trade union **SECTOR**	0.134	(0.142)	-0.040	(0.034)	-0.067	(0.076)	-0.027	(0.036)
Services	0.162	(0.122)	-0.046	(0.044)	-0.082	(0.061)	-0.034	(0.023)
Wholesale and retail	0.252***	(0.094)	-0.085**	(0.040)	-0.122**	(0.047)	-0.045**	(0.021)

Notes:
  (a) Standard errors are reported in parentheses for corresponding marginal effects estimates;
  (b) ***, **, and * denotes statistically significant at the 1%, 5% and 10% levels respectively;
  (c) The base category for District is Maseru; Education is Secondary; Expertise is None and Sector is Manufacturing.

Figure1: Marginal Effects of Gender on Ease to Export

Conditional marginal effects of 2.gender with 95% CIs

Source: Own calculations from the 2023 NUL-WTO firm level data

b. Robustness Checks Results (Tobit Model)

The robustness of the preceding findings is now scrutinized through the utilization of a new outcome variable, namely 'the percentage of sales that are exported' by the firm, as elaborated comprehensively in section 5, the empirical framework. The primary aim is to investigate whether there exists a gender disparity in this aspect.

It is important to note that Tobit regression coefficients are interpreted in a manner similar to Ordinary Least Squares (OLS) regression coefficients; however, the linear effect is on the uncensored latent variable, rather than the observed outcome, Cameron, A. C., & Trivedi, P. K. (2005). Consequently, the results obtained from Table 4 reveal that being a female head of the firm is linked with approximately 15 more units of exports compared to their male counterparts, on average and *ceteris paribus*. This is consistent to the marginal effect coefficient which shows that being a female headed firm with positive export volume, that lowers the exports by almost 12 units relative to the male headed firms that reported positive exports volume. These coefficients are deemed insignificant, implying the absence of gender gaps concerning exports for firms in Lesotho. Thus, these results align with the probit estimates, reinforcing the consistency of the findings across different methodologies and outcome variable.

Table 4: Estimation Results for the Tobit Model-Specification 6

VARIABLES	(1) Mean Results	(2) Marginal Effects (dy/dx)
Female	**-15.497**	**-11.62**

	(13.982)	**(10.19)**
Age	-0.399	-0.304
	(0.684)	(0.519)
Experience	1.701*	1.297*
	(0.943)	(0.717)
No internet access	-16.029	-11.83
	(18.636)	(13.16)
No website	18.312	13.32
	(16.846)	(11.67)
Urban	-6.557	-5.134
	(25.135)	(20.18)
DISTRICT Botha-Bothe		
	7.177	5.625
	(20.665)	(16.57)
Leribe	4.144	3.196
	(14.751)	(11.45)
Mafeteng	-28.219	-16.73
	(42.808)	(18.78)
Mokhotlong	-3.509	-2.580
	(69.511)	(49.97)
EDUCATION Primary of none		
	9.520	7.952
	(17.336)	(14.54)
Diploma or Certificate	25.815	22.35
	(32.500)	(28.27)
BSc. Or BA. Education	0.423	0.340
	(18.066)	(14.55)
Post Graduate	-36.356*	-22.25**
	(18.674)	(11.00)
EXPERTISE		
Limited knowledge	34.887*	27.35**
	(19.809)	(13.92)
Knowledgeable	-6.310	-3.680
	(22.959)	(13.76)
Expert	85.583***	67.18***
	(30.327)	(17.71)
No insurance	-17.745	-13.33
	(14.324)	(10.59)
No branches outside Lesotho	0.462	0.351
	(20.565)	(15.63)
Not in global value chain	0.757	0.576
	(20.551)	(15.59)
Not in regional value chain	3.092	2.349
	(16.524)	(12.53)
Not in trade unions	-18.660	-15.09

	(23.266)	(19.54)
SECTOR		
Services	-29.134*	-21.05**
	(15.410)	(9.737)
Wholesale and retail	-25.462	-18.89*
	(17.213)	(11.37)
var(% of sales exported)	972.979***	§
	(249.214)	
Constant	49.628	§
	(48.251)	
Observations	53	53
Pseudo R-squared	0.102	§
Log Likelihood	-180.78502	§
Prob>chi2	0.0156	§
Lower	0	0
Upper	100	100

Notes:

(a) Standard errors are reported in parentheses;
(b) ***, **, and * denotes statistically significant at the 1%, 5% and 10% levels respectively;
(c) § denotes not applicable in estimation
(d) The base category for District is Maseru; Education is Secondary; Expertise is None and Sector is Manufacturing.

6. Summary and Conclusions

This study investigates the factors influencing the ease of export for firms in Lesotho, with a particular emphasis on the gender of the firm's leadership, marking the first investigation of its kind within the context of Lesotho. To tackle this inquiry, the study leverages firm-level primary data collected by the NUL-WTO Chair in 2023, which encompasses various facets including firm demographics, as well as export and import activities.

Given the ordinal nature of the outcome variable 'ease to export,' an ordered probit model is employed to address the aforementioned objective. While probit estimates shed light on the effect of infinitesimal changes in explanatory variables (denoted as 'X') on the standardized probit index concerning the outcome variable ('Y'), this lacks a direct economic interpretation conducive for policymaking. Therefore, to enhance the economic relevance of the findings, the study calculates marginal effects, which provide insights in terms of probabilities, thus facilitating a more meaningful economic interpretation. Furthermore, the study employs a Tobit model to corroborate the results obtained from the probit analysis, utilizing a censored dependent variable, namely the 'percentage of exports' by the firm.

The Probit regression results reveal that having a female head of the firm diminishes the standardized ordered probit index by 0.204 standard deviations relative to having a male head, on average and holding other factors constant. Moreover, the analysis of marginal effects illustrates

that being a female head increases the likelihood of falling into the lowest export category ('extremely difficult') by 0.079 probability points, translating to 7.9 percentage points, on average and holding all other factors constant. Similarly, across the other export categories, being a female head reduces the probabilities of being in the 'fairly difficult,' 'fairly easy,' and 'extremely easy' categories by 2.8, 3.9, and 1.3 percentage points respectively, relative to being a male head, on average and holding other variables constant. Subsequently, Tobit model results, both standard and marginal effects, indicate that being a female head of the firm is associated with roughly a 15 units' lower volume of exports compared to their male counterparts, on average and all else being equal. Importantly, all of these findings are deemed statistically insignificant, suggesting the absence of significant gender disparities in terms of ease of export in the context of Lesotho. This observation could be partly attributed to the global push for female education and empowerment, aimed at bridging gender disparities and fostering gender equality across various spheres, thereby gradually mitigating gender differences, hence the need to sustain such programs.

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