



**Economic Development in Africa Report
2024:**

**Unlocking Africa's trade potential
Boosting regional markets and reducing risks**

Methodological Note to chapter 4 of the *EDAR 2024*:

**Random effects probit estimates on the export status of firms
in South Africa**



1. Introduction

Chapter 4 of the *Economic Development in Africa Report 2024* examines the factors and risks that may be associated with the export status of African firms. This methodological note provides additional details on the analysis presented in chapter 4, section 4.3. Using firm-level data from South Africa as a case study, the chapter empirically assesses a variety of identified risk variables associated with the export status of African firms to identify potential characteristics that could either strengthen or hinder their export performance. Additionally, the chapter highlights some of the existing obstacles and challenges faced by African exporting firms. The analysis has used the World Bank Enterprise Surveys (WBES) of South Africa for the years 2007 and 2020.

2. Data source

The WBES are nationally representative firm-level surveys conducted with business owners and top managers, providing insights into various aspects of the business environment, such as access to finance, corruption, infrastructure, business performance, and more.¹ The firm-level micro data consist of a stratified random sample of non-agricultural formal private sector businesses, which are stratified by firm size: small (5–19 employees), medium (20–99 employees), and large (over 100 employees). For South Africa, the pooled sample for the years 2007 and 2020 included 2,028 firms (792 firms in 2007, 958 firms in 2020, and 278 firms surveyed in both years). The sectors in the sample include manufacturing, construction, motor vehicles sales and repair, wholesale, retail, hotels and restaurants, storage, transportation, communications and information technologies, and other services.

3. Empirical methodology and results

We hypothesize that both firm-specific characteristics and factors, and risks related to intra-Africa trade are associated with a firm's export status. The dependent variable is a dummy variable capturing a firm's export status, which is equal to 1 if the South African firm engages in exports and 0 if it only serves the domestic market. The explanatory variables used in the regression were constructed based on the WBES and include:

- Women's ownership: A dummy variable that indicates whether the firm has at least one-woman owner.
- Foreign ownership: A dummy variable that indicates whether the firm is foreign- or domestic-owned.
- Quality certification: A dummy variable that indicates whether the firm has received an internationally recognized quality certification.

¹ <https://www.enterprisesurveys.org/en/enterprisesurveys>.



- Power outages: A numerical variable representing the number of power outages experienced in a typical month during the past fiscal year.
- Transport: A dummy variable that takes the value of 1 if a firm identifies transport as an obstacle.
- Trade customs and regulations: A dummy variable that takes the value of 1 if a firm identifies trade customs and regulations as an obstacle.
- Informal competition: A dummy variable that takes on the value 1 if a firm has competed against unregistered or informal firms.
- Breakage: A dummy variable whose value is 1 if a firm has incurred a loss of value in transit due to breakage or spoilage.
- Theft in transit: A dummy variable that takes the value of 1 if a firm has incurred a loss of value in transit due to theft.
- Working capital: The percentage of a firm’s own resources or retained earnings used to finance operations and manage the business.

Since the hypothesis of interest is correlational rather than causal, and given that the dependent variable is a binary variable, a random effects probit model² has been selected to analyze the likelihood of each firm-specific factor and risk contributes to a firm’s export status:

$$\Pr(y_{it} = 1 | X_{it}) = \Phi(X_{it}\beta + v_i) \dots\dots\dots(1)$$

where y is a dummy variable that takes the value of 1 for exporting firms and 0 for non-exporting firms. X_{it} represents the above-mentioned list of explanatory variables capturing firm-level characteristics and risk factors associated with firm i at year t , v_i represent the random effects and Φ is the standard normal cumulative distribution function. The coefficient estimates are shown in table 1.

Table 1: Estimation results: Random effects probit estimates on the export status of firms in South Africa

Explanatory variables	Coefficient	Standard error
Women’s ownership	0.1349015	0.1028234
Foreign ownership	0.4757686***	0.1324881
Quality certification	0.9629764***	0.0881171
Power outage	0.003825	0.0045893
Transport	0.0734484	0.0949082
Trade and customs regulation	0.4412665***	0.1001962
Informal competition	-0.3256052***	0.0965716
Breakage in transit	-0.3234966***	0.1077387
Theft in transit	0.1906519	0.1197621
Working capital	-0.0058727***	0.0013858
Constant	-0.9513529***	0.1339498

² A robustness check is done using the random effects logit model; the estimated coefficients are qualitatively similar.



Observations	1 915	
Number of firms	2 028	

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.