Access to Credit and Firm Performance from a Gender Perspective: Evidence from Sub-Saharan Africa

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I. Introduction

Access to credit is critical for a firm's growth (Ayyagari et al., 2021; Beck et al., 2005; Presbitero et al., 2014), especially for small enterprises and start-ups (Banerjee and Duflo, 2008; Klapper et al., 2006). Therefore, it is imperative to ensure broad accessibility to financial services to enable diverse investment avenues and direct funds to investments. This aids in the efficient allocation of capital, which is essential for growth and productivity (Beck et al., 2005).

Enterprise access to credit is further aggravated by gender of the entrepreneurs (Aterido et al., 2013). This attracted considerable attention in the literature, and it is seen as one of the most critical indicators of entrepreneurial success and survival (Presbitero et al., 2014; Bardasi et al., 2011). Gender-based discrepancies in entrepreneurial performance are attributed to potential bias against female entrepreneurs in obtaining credit. This hypothesis is corroborated in the literature indicating that women encounter more obstacles (Coleman 2007). Consequently, the lower performance of female-owned enterprises may be linked to gender disparities in credit acquisition (Beck and Demirguc-Kunt, 2006).

Previous research has primarily focused on gender bias in accessing finance (Aterido et al., 2013; Beck and Demirguc- Kunt, 2006) and studies on entrepreneurial performance by gender are mostly centered on developed countries (Watson 2002). As such, it is imperative to examine the role of gender and the influence of credit on firm performance, especially in the region, where the private sector is behind other economies and female-owned enterprises are more likely to be financially limited than their male counterparts. This paper delves into Sub-Saharan Africa (SSA), acknowledging the significant influence of cultural, institutional, and economic factors in shaping the dynamics between female entrepreneurship, credit access, and business performance. We investigate the impact of owners and managers of female entrepreneurs in determining a firm's access to credit and firm's productivity in the region. The moderating effect of these two variables was neglected in most of the earlier

studies mentioned above as they focused mainly on using female in top management as the main gender variable (Nyeadi et al., 2021). It is imperative to examine the role of gender and the influence on credit access and firm's performance, especially in SSA, where the private sector is behind other economies and female-owned enterprises are more likely to be financially limited than their male counterparts. Arguably, the disparity in financial access by gender has ripple effects on individuals, households headed by women, and female entrepreneurs (Aterido et al., 2013). Empowering women economically by bridging the gender gap does not only have a substantial impact on the welfare of households and enterprises but also the overall economy. Studies have shown that empowering women economically yields better social outcomes and reduces poverty (Qubbaja, 2019; Duflo, 2012). Empowering women economically through accessible funds not only leads to increased capital investment but also amplifies their impact on family well-being surpassing the spending patterns of men (IFC, 2008).

II. Methodology and Data

This paper utilizes firm level data from the World Bank Enterprise Survey (WBES), focusing on manufacturing, retail, and other services across 24 Sub-Saharan African countries from 2005 to 2020. The survey provides comprehensive business information, employing a sampling strategy for cross-country comparisons.

A. Measuring Gender and Credit Access

This paper adopts a dual classification of the target variable 'female' based on Aseidu et al. (2013) and Presbitero et al. (2014). The gender of the owner is determined when at least one owner is female, constructed from responses to the question, "Are there any female owners of the firm?" If yes, the indicator is 1; otherwise, it's 0. To refine gender-based differences, a female management variable is introduced, indicating a female top manager. Access to credit or loans is measured as a binary variable (1 if the firm has access, 0 if not).

B. Control Variables

This study addresses the importance of controlling for various factors influencing a firm's risk and creditworthiness to assess gender bias in credit access (Presbitero et al., 2014). Firm age, size, top manager experience, and financial transparency are controlled for, as these factors significantly impact credit access. Established, larger firms with managerial experience are more likely to secure credit. Additionally, the study considers a firm's export orientation and financial transparency, measured by external audit review. We source data from the WB's World Development Indicators (WDI) for country level data such as

control for corruption and GDP per capita as small businesses in low-corruption countries tend to apply for bank loans more than those in high-corruption environments, emphasizing the impact of a stable legal and regulatory business environment (Presbitero et al., 2014; Aseidu et al., 2013; Aterido et al., 2013; Galli et al., 2017).

C. Methodology

We employ the multilevel model (MLM) technique to accommodate the nested data structures of the WBES, addressing the violation of the independence assumption. This approach extends the scope of our investigations beyond the logit and probit models employed in previous empirical analyses (De Andrés et al., 2021). The MLM distinguishes between many effects in a single model including the main impacts of both firm-level and macro-level variables. Complex variation can be addressed at several levels using multilevel models without treating individuals or countries as having the same error variance (Schyns, 2002).

Model Specifications: the first model looks at the different definitions of gender and firm access to finance where the observed variable is measured at firm level i in country c at the time t and is given as:

$$\left(\frac{p_{ict}}{1-p_{ict}}\right) = \alpha + \rho(F_{ict} * FM_{ict}) + \delta(X_{ict}) + \gamma(I_{ct}) + \theta(C_{it}) + \varepsilon_{ict} \quad (1)$$

where $\ln\left(\frac{p_{icst}}{1-p_{icst}}\right)$ represents a dummy variable with the value of 1 where a firm has access to credit (overdraft, loan, or credit) and 0 otherwise, F represents female presence or participation in ownership and FM denotes female manager. I and C are the clusters representing the different firms and countries the survey was conducted whereas X controls for firm and country level variables. The second model specification examines the gender differences in terms of how productive firms are given inputs using two firm-level metrics. The first firm-level indicator considered is labour productivity (output per worker), expressed as sales per worker (Martinez-Zarzoso, 2017 and Bardasi et al., 2011). In addition, total factor productivity (TFP) is calculated by estimating a Cobb-Douglas production function (Martinez-Zarzoso, 2017 and Bardasi et al., 2011) and is given as:

$$\ln sales_{ict} = \alpha + \beta(F_{ict}) + \rho(FM_{ict}) + \tau(FM_{ict} * AC_{ict}) + \delta ln(L_{ict}) + \eta ln(C_{ict}) + \lambda ln(M_{ict}) + \varepsilon_{ict} \quad (2)$$

where AC is access to credit, ln denotes the natural logarithm, the inputs comprise labour (L), which refers to the total number of permanent employees, capital (C), which represents the firm's total fixed tangible assets, and materials (M), which represents the total purchases of raw materials and intermediate goods.

III. Results

The estimated results in Table 1 (column 2) without control variables show that enterprises with female top managers were 23% less likely to access loans than businesses headed by the other gender. For instance, the findings are comparable to those of De Andrés et al. (2021), who found that a female top manager reduces the probability of obtaining a loan. Additionally, the likelihood of securing credit for business with the presence of female among owners is significant at 66%. In the third column, the inclusion of control variables reveals a non-significant negative association between female top managers and credit. To test the association between female involvement in ownership and management (owner-manager effect), an interaction term between the gender variables was introduced in column (4) and a further intriguing observation is made. Firms with female top managers in which there are no female owners are on average 15 % more likely to access credit than male managed firms. However, access to finance is reduced by 23% if females are among owners and the top manager is female.

Table 1 Table 1. Multilevel Model analysis of gender, credit access and firm productivity

	Credit	**Credit**	**Credit**	**Labour Productivity**	**TFP**
Female top manager (ftm)	**-23.41 (0.11)***	-14.80 (0.11)	15.52 (0.17)	1.08 (0.08)	**-0.38 (0.09)*****
Female Presence (fp)	**65.94 (0.08)*****	**52.07 (0.08)*****	**62.48 (0.08)**	-1.92 (0.05)	**0.25 (0.06)*****
Access to credit (credit)				**69.51 (0.06)*****	**1.15 (0.07)*****
ftm*fp			**-38.70 (0.22)***		
ftm*credit				**-28.77 (0.34)***	**-0.37 (0.18)***
intercept	-74.68 (0.22)	-88.10 (0.82)	-88.96 (0.83)	12.15 (0.58)	13.56 (0.42)
R-squared	0.35	0.34	0.34	0.34	0.46

Standard errors are presented in parentheses. Control variables, firms ID, country ID, and year ID have been accounted for in the analysis.

(15.52-38.70). This suggests that enterprises with female representation have less financing availability than those with a male representation. These findings are all

significant at the 1% significance level. The second objective explores gender differences in credit access and their impact on firm productivity, assessed through total factor productivity (TFP) and labour productivity at the firm level. The results[1] in column 5 uses labour productivity as a measure and firms with credit access and no female top managers exhibit, on average, a 70% higher productivity compared to firms without credit access. On the other hand, if a firm had access to credit with a female top manager, labour productivity was 28 % lower (1.08 - 28.77). In column (6), when TFP is used as a proxy for productivity, the results are similar, female top managers show a 38 % less productivity than male managed firms, when firms have no access to credit. Whereas if a firm has access to credit and the top manager is female, labour productivity was 75 % lower (-0.38-0.37).

IV. Discussion and Conclusion

Examining the two gender variables separately, the results initially support gender differences in top managers' use of credit, which suggests that women face discrimination in the acquisition of financial services. This gender gap, however, disappears when observable firm characteristics are considered and these findings are similar to (Aterido et al., 2013; Bardasi et al., 2011 and De Andrés et al., 2021). De Andrés et al. (2021) argues that as the firm grows older and more information on firm performance (accounts statements) becomes available and are credible, banks and credit institutions no longer need to monitor or obtain individual information and factors such as gender are no longer significant. Smaller and younger companies are typically less able to provide banks with reliable information about their business operations, making them more likely to experience credit restrictions. In a similar vein, Aterido et al. (2013) contend that women are more likely to work in smaller businesses with no foreign ownership and an export focus, which puts them at a disadvantage. Therefore, female entrepreneurs are not immediately disqualified from loan applications due to their gender status; rather, their applications are weak due to the type and nature of the businesses they engage in drifting away from the single gender indicators, gender owner-manager effect shows a negative and significant association between female managers and owners' likelihood of receiving finance. The study indicates that depending solely on the gender of the top manager raises

[1] Because the dependent variable (labour productivity) is log-transformed, the coefficients are exponentiated for simplicity of understanding. One is subtracted from this value and multiplied by 100 to yield a percentage increase or decrease. Also, for easy comparison TFP is reported in percentages.

the likelihood of taste-based gender discrimination in credit access. Introducing a second gender variable, female ownership participation, offers a more nuanced perspective. While having female owners increases credit likelihood, the interaction effect suggests that businesses with senior female representation have a lower access rate.

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