Gender Gaps in the Performance of Small Firms

Evidence from Urban Peru

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Abstract

This paper estimates the gender gap in the performance of firms in Peru using representative data on both formal and informal firms. On average, informal female-led firms have lower sales, labor productivity, and profits compared to their male-led counterparts, with differences more pronounced when controlling for observable determinants of firm performance. However, gender gaps are only significant at the bottom of the performance distribution of informal firms, and these gaps disappear at the top of the distribution of informal firms and for formal firms. Possible explanations for the performance gaps at the bottom of the distribution include the higher likelihood of small, female-led firms being home-based, which is linked to lower profits, and their concentration in less profitable sectors. The paper provides suggestive evidence that household responsibilities play a key role in explaining the gender gap in firm performance among informal firms. Therefore, policies that promote access to care services or foster a more equal distribution of household activities may reduce gender productivity gaps and allow for a more efficient allocation of resources.

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Gender Gaps in the Performance of Small Firms: Evidence from Urban Peru[*]

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1   Introduction

Self-employment accounts for a substantial share of total employment in developing countries, with nearly half of all workers in low- and middle-income economies engaged in entrepreneurial activities. Informal firms, which operate outside legal and regulatory frameworks, are especially prevalent in these contexts. These businesses are often trapped in low productivity and limited growth (Jayachandran, 2021; La Porta & Shleifer, 2014; Schoar, 2010). Notably, women are disproportionately represented among self-employed entrepreneurs, typically managing smaller, less profitable businesses that are more vulnerable to market shocks (Allison et al., 2023; Bardasi et al., 2011; Bruhn, 2009; Campos et al., 2019; Islam & Amin, 2023). Understanding the determinants and dynamics of this gender gap in firm performance is crucial for advancing gender equality, improving aggregate productivity and fostering economic inclusion.

A growing literature has identified multiple barriers that contribute to the underperformance of female-led firms. These include constraints related to finance, business skills, access to networks, markets, and technology, and broader contextual factors such as discrimination, restrictive laws and entrenched gender norms (Campos et al., 2019; Love et al., 2023; Siegrist, 2025; World Bank, 2021). While interventions targeting these constraints have generally yielded modest average impacts, more promising results have emerged from programs that target growth-oriented women entrepreneurs, address multiple constraints simultaneously, and tackle contextual factors, such as access to childcare and flexible delivery options (Asiedu et al., 2023; Ubfal, 2024).

Recent evidence increasingly points to gender norms and domestic responsibilities as critical constraint on women's business growth (Bernhardt et al., 2019; Hardy & Kagy, 2018; Jayachandran, 2021). For example, Bernhardt et al. (2019) show that cash grants given to female-led firms are often diverted to other household businesses, particularly when the husband runs a separate business. Their findings suggest that gender norms may influence women to limit the growth of their businesses, possibly to avoid out-earning their husbands, as shown based on qualitative surveys in Ghana by Friedson-Ridenour and Pierotti (2019). However, these patterns may also reflect women's greater household and childcare responsibilities, which can restrict their mobility and lead them to operate home-based, and often less profitable, businesses (Bjorvatn et al., 2025; Delecourt & Fitzpatrick, 2021). Supporting this, Fafchamps et al. (2014) show that female entrepreneurs are more likely than their male counterparts to allocate a portion of cash grants to household expenses. Similarly, Delecourt and Fitzpatrick (2021) provide evidence

that female business owners are significantly more likely to bring their children to work, a practice that is associated with lower business profits.

This paper contributes to the literature by providing a comprehensive analysis of the gender gap in firm performance in Peru, using novel and representative data from both the 2022 Peruvian Informal Sector Enterprise Survey (ISES) for informal firms and the 2023 Enterprise Survey (ES) for formal firms. While much of the existing research focuses exclusively on either formal or informal firms, this study examines both sectors in parallel. The analysis begins by documenting the raw (unadjusted) gender gaps across various firm performance indicators, including sales, profits, and labor productivity. The paper then uses Kitogawa-Blinder-Oaxaca (KBO) decomposition techniques to estimate the adjusted gender gap at the mean, comparing males and females with similar observable characteristics.

Building on the approach of Firpo et al. (2009), we further estimate recentered influence functions (RIF) to assess the adjusted gender gap at different quantiles of the performance distribution. This methodology enables us to study whether female entrepreneurs encounter more pronounced barriers at the bottom of the distribution –a "sticky floor" effect– or at the top – a "glass ceiling" effect –, and to explore the mechanisms underlying these patterns.[1]

Our findings indicate that, on average, female-led informal firms in Peru underperform relative to male-led counterparts, with differences more pronounced for sales and profits. Decomposition of the raw gender gap at the mean shows that approximately two-thirds of this gap is explained by traditional observable characteristics. Among these, the only variable with a statistically significant contribution across all three measures of firm performance –sales, profits, and labor productivity–is the location from which the business operates. Specifically, operating from home accounts for a substantial portion of the gender gap. In the case of profits, this single factor explains 70% of the gap attributable to observable characteristics.

When we extend the decomposition analysis across the distribution of firm performance measures, we find that the adjusted gender gap is both larger and more statistically significant at the bottom of the distribution (i.e., "sticky floor" effect), and reverses in favor of female-led firms at the top of the distribution. Further analysis of individual variables confirms that business location remains the most consistent

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[1]Most previous studies have focused on performance gender gaps at the mean, with limited attention to how gender gaps vary across the distribution; a recent exception is Islam and Amin (2023), who report such gaps for 14 developing economies.

contributor to the gender gap, mainly at the bottom of the distribution. At the first decile, operating from home explains three times the aggregate contribution of all observable variables combined.

Exploring the reasons for operating from home, we observe notable gender differences that underscore the influence of gender norms. Female entrepreneurs are more likely to report security concerns and the need to balance household and entrepreneurial responsibilities as their primary motivations, whereas male entrepreneurs more frequently cite costs savings and a desire to avoid detection by authorities. These contrasting motivations suggest that traditional gender norms –particularly those assigning women a disproportionate share of domestic responsibilities- play a critical role in shaping gender gaps in firm performance.

Our analysis of formal firms offers a contrasting perspective to the patterns observed among informal firms. Among formal firms, as well as among the highest-performing informal firms, gender gaps in performance are not statistically significant. This finding suggests that constraints such as household responsibilities and sectoral segregation may disproportionally affect women entrepreneurs at the lower end of the performance distribution, while selection effects and market dynamics may contribute to the convergence of outcomes at higher levels of firm performance.

The dynamics of firm survival and growth also differ by size. Larger firms are less likely to survive if they are unprofitable or underperform relative to competitors, whereas smaller enterprises may be able to survive despite lower performance. In this context, structural barriers to female entrepreneurship may manifest as a reduction in the share of female-led firms among larger and more successful businesses. For example, women comprise 69% of managers in the bottom decile of the sales distribution among informal firms, but their representation drops to 39% in the top decile. Similarly, within the sample of formal firms, only 22% are led by women. These patterns indicate that, even in the absence of observable performance gaps at the upper end of the distribution, significant barriers to entry and advancement persist for women. Such barriers continue to limit women's participation in the formal sector and among the ranks of the most successful firms.

Although this study does not identify causal relationships, it provides a detailed exploration of gender differences in the determinants of performance gaps across the firm distribution within a middle-income country context. The results underscore the importance of access to care services and the facilitation of sectoral transitions in unlocking

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the growth potential of female-led firms. Moreover, the study provides a stronger empirical foundation for the design of policies aimed at reducing gender-based barriers to entrepreneurship and fostering a more efficient allocation of talent in the economy. By deepening our understanding of these dynamics, the research supports the development of targeted interventions that can foster greater gender equity and enhance overall economic productivity.

The paper is organized into five additional sections. Section 2 provides an overview of informal businesses and entrepreneurs in the ISES sample, with a particular emphasis on gender differences. Section 3 describes the methodological approach used to estimate gender gaps in firm performance, focusing on key indicators such as sales, profits, labor productivity, and employment. Section 4 presents the estimation and analyzes the gender gaps across various measures of informal firm performance, examining both effects at the mean and across the distribution, with and without controls for key determinants of firm performance. This section also compares the main results for informal firms to those observed among formal firms. Finally, Section 5 concludes and discusses the policy implications arising from the study's findings.

2 Characteristics of entrepreneurs and businesses in the sample

This study uses two recent surveys collected by the World Bank in Peru: the 2022 Informal Sector Enterprise Survey (ISES) and the 2023 Enterprise Survey (ES). The Peruvian ISES was conducted with a representative sample of 1,640 informal businesses in Lima and Trujillo, two of the major cities in Peru. The questionnaire covered a variety of topics, including owner demographics, business characteristics and operations (World Bank, 2022).[2] The 2023 Peruvian ES was conducted with a nationally representative sample of 987 formal firms in five major cities (Lima, Arequipa, Trujillo, Chiclayo and Piura). It collected information about the business owner or top manager, as well as detailed business characteristics.[3]

Table 1 describes the characteristics of informal entrepreneurs in the ISES sample, by gender of the owner. We classify a firm as female-led if the main owner -or the majority of

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[2] The survey team used a geographic sampling method, Adaptive Cluster Sampling (ACS). ACS assumes that informal businesses are clustered in certain urban areas, and uses the concentration of informal businesses to determine the probability of selection of primary sampling units (Aga et al., 2022). A business is considered informal if it lacks any registration or license.

[3] The ES sample frame includes private, formal firms with at least five employees. It explicitly excludes firms operating in agriculture, fishing, mining, public utilities, financial intermediation, public administration, education, health and social work (World Bank, 2023).

owners- is female.[4] Female-owned firms represent 60% of the sample. They have similar age (average of 48 years) and education (75% with at least secondary education) to their male counterparts. However, they tend to have less business experience (7.9 years versus. 11.7 years for men), which may be explained by the lower survival rate for businesses run by female entrepreneurs.

Male entrepreneurs are significantly more likely to be the primary income earner of their households (69% versus 48% for female entrepreneurs), which underscores the relevance of traditional gender roles. Interestingly, 60% of both male and female entrepreneurs report being born outside the city where their business is located, indicating possible internal migration to large cities for economic reasons.

Table 2 describes the characteristics of these informal firms, while Table 5 includes summary statistics of their performance (i.e., sales, labor productivity, profits) and employment which are described below. The average firm in the ISES sample has 1.42 workers, including the owner, with 68% of them having no additional employee. The large representation of female-led firms and firms with no employees is a common feature among informal firms in developing countries and consistent with previous studies (Klapper & Parker, 2011).

On average, firms are 6 year old, with female-led businesses being younger (4.4 years versus 8.4 years for male-led firms). Female-led firms have slightly lower hours of operation than male-led firms, but the difference is not statistically significant. In terms of access to finance, 36% of the firms report having had a loan in the year prior to the survey, either for working capital or capital investments. The overwhelming majority of these loans are from informal sources, such as moneylenders or friends/relatives, with only 7% of the firms reporting loans from banks or microfinance institutions. Female-led firms are slightly more likely to access loans from banks and microfinance institutions than their male counterparts, though there is no information on the size of these loans.[5]

The share of female-led firms using digital services (computers, smartphones) is similar to that of male-led firms. Additionally, there are no gender-based differences observed in

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[4]The ISES provides information on the gender of the owner(s), but not on the gender of the firm's manager -likely reflecting the fact that most small informal firms in the sample are managed by their owners. In contrast, the ES includes data on both ownership and management, and then we use the gender of the manager to classify firms as female-led. In 91% of cases, female (majority) ownership coincides with having a female top manager.

[5]The Peruvian microcredit market includes both formal institutions associated to commercial banks (e.g., MiBanco, Compartamos, F. Confianza) or Municipal and Rural Savings and Loan Institutions, and non-regulated microcredit organizations (e.g., Care, Prisma, Adra).

the overall business practice index.[6] However, female-led firms score significantly lower on the marketing practice subindex. This subindex encompasses activities such as monitoring competitors, consulting suppliers about emerging trends, asking customers about their preferences, and using special offers to attract customers. Despite this, female-led firms are more likely than male-led firms to apply buying and stock control practices, as well as financial planning practices, although these differences are not statistically significant.

The location of firms reveals large gender-based differences. A notably higher proportion of female-led firms operate from the household, a trend previously identified by Bruhn (2009) as common in Latin America. As shown in Table 2, 56% of the firms operate from a fixed premise, with 82% of these situated within the owner's household. The share that operate from home is 54% for female-led firms and 35% for male-led firms. Entrepreneurs who choose to operate from home report security concerns and the convenience of balancing work with family responsibilities as primary reasons for this decision, as presented in Table 3. Female entrepreneurs are more likely to highlight security and household responsibilities as key factors, whereas male entrepreneurs tend to emphasize lower costs and reduced likelihood of detection by tax authorities as the most significant factors for their decision.

Finally, the majority of the informal firms in the sample operate in the retail sector (76%). The proportion is even higher among female entrepreneurs, reaching 85%. Female entrepreneurs concentrate in commercialization of fresh and processed products, street food vending, and restaurant operations. In contrast, male entrepreneurs concentrate in services (31%), such as repairing computers, household appliances, and motor vehicles.

Table 4 presents summary statistics of the formal firms in the 2023 Peruvian ES. The proportion of firms run by female managers is only 22%.[7] This figure is much lower than the 60% of female owners/managers in the sample of informal firms. The other important difference with the sample of informal firms described above is the distribution across economic sectors. Most informal firms in the ISES sample operate in retail (76%), with a larger share (85%) for female-led firms. In contrast, the majority of formal firms in the ES concentrate in services (61%), followed by manufacturing (24%), and only then retail (16%). The large differences by gender in sectoral composition observed in the ISES for informal firms is no longer present among formal firms in the ES. There are still some

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[6]See Appendix A for the details on how the business practice index is constructed.

[7]The proportion of firms with a female owner or a majority of women in the owner's group, is similarly low, only 18%, and in 91% of the cases, the definition based on the gender of the owner(s) coincides with that using the gender of the top manager.

important gender differences, with 18% for female led-firms versus 25% for male-led firms in manufacturing, and 21% of female-led firms versus 14% of male led firms in retail, but these differences are not statistically significant. In the next sections we study whether there are gender gaps in firm performance for both informal and formal firms.

3   The gender gap in firm performance: Methodology

While gender gaps in wages for workers have been broadly studied, those in firm performance are relatively understudied. In the labor literature, the gender wage gap refers to the observed difference in earnings between men and women, which can arise from a combination of factors, including differences in education, experience, occupation, industry, discrimination, and social norms (Blau & Kahn, 2017). We extend the definition of the gender gap to analyze disparities in firm performance, specifically focusing on differences in sales, profits, productivity, and employment between firms owned or managed by men versus those owned or managed by women. Recognizing that these gaps may stem from differences in characteristics of the entrepreneurs or their sectoral choices, it is crucial to refine our analysis to compare the performance of similar firms. The literature offers various econometric techniques to achieve this comparison. This section clarifies the quantitative approach we use to estimate the gender gap.

3.1   Gender gap: Adjusted and unadjusted

The simplest quantitative approach to estimate the unadjusted gender gap is to compute the average difference in the variable of interest between women and men. Specifically, if Y is the outcome of interest, the gender gap is obtained as follows: $\Delta_A = \overline{Y}_f - \overline{Y}_m$. The relative gap is established in proportion to the level of variable Y for men: $\Delta_r = \frac{\Delta_A}{\overline{Y}_m}$. A negative value for the absolute gap indicates that the average value of the variable is lower for women compared to men. The relative gap quantifies this difference as a proportion of the average level for men. The absolute gap can be estimated econometrically using the following expression:

$$Y_i = \alpha_0 + \alpha_1 \cdot G_i + \varepsilon_i \tag{1}$$

where Y_i is the value of variable Y for firm i, and G_i is a dummy variable taking the value of one if the business is led by a woman.[8] The estimation of equation (1) adjusts for the error structure, ε_i, corresponding to the survey sample design. The ordinary least squares estimate of the parameter α_1 and its standard errors provide an estimate for the

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[8]See footnote 4 for our definition of women-led firm.

gender gap and allows us to test whether that gap is statistically different from zero at conventional significance levels.

We use the specification in (1) to estimate gender gaps across key measures of firm performance, including sales, profits, and labor productivity.[9] The estimated gender gap could be a result of gender differences in the characteristics of entrepreneurs, as well as of differences in the way such characteristics are remunerated in the market. We use the Kitagawa-Blinder-Oaxaca decomposition of the gender gap to understand the relevance of these two factors.

3.2 Kitagawa-Blinder-Oaxaca (KBO) decomposition of the gender gap at the mean

We use the KBO decomposition to separate differences in firm performance between male and female entrepreneurs into those due to differences in the characteristics of entrepreneurs and those due to how these characteristics are remunerated in the market. The procedure relies on estimating a Mincerian-type regression for outcome (Y) on observed characteristics (X) by gender (g) of the entrepreneur:

$$Y_{ig} = \beta_g \cdot X_{ig} + \varepsilon_{ig} \tag{2}$$

In Equation (3) we plug in the estimates of β:

$$\overline{y}_f - \overline{y}_m = \hat{\beta}_m \cdot \left(\overline{X}_f - \overline{X}_m\right) + (\hat{\beta}_f - \hat{\beta}_m) \cdot \overline{X}_f \tag{3}$$

$\hat{\beta}_m \cdot \left(\overline{X}_f - \overline{X}_m\right)$ is the part of the gender gap explained by observed characteristics, using the estimated returns for males as weights, while $(\hat{\beta}_f - \hat{\beta}_m) \cdot \overline{X}_f$ is the unexplained part of the gap. The unexplained component of the gap is referred to as the adjusted gap, and is closer to the notion of a gender gap that compares men to women of similar characteristics (Blau & Kahn, 2017). Using Equation (3), we compute the contribution of each observable variable to the gap and we test whether it is statistically different from zero.

The estimated gender gap can be affected by the set of controls included in (3). The wage gap literature has reached a consensus on the key characteristics to include (i.e., age, experience, education, as well as region, industry, and occupation). While there is no similar consensus for firm gender gaps, we follow the recent study by Islam and

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[9]Labor productivity is defined as the ratio between sales and number of employees including the owner. We winsorize continuous variables at the 1% top and bottom levels to restrict the influence of outliers.

Amin (2023) that analyzes the gender productivity gap in informal firms for 14 developing economies. We include owner/manager characteristics, business characteristics, including location and sector of the business, and whether the business is in a sector that is male or female dominated.

3.3 The adjusted gender gap across the distribution of performance

The analysis of the adjusted gap at the mean, obtained with equation (3), is useful for explaining average outcome differences between male and female entrepreneurs of similar characteristics. However, it is possible that the magnitude of this gap varies significantly along the distribution of each outcome, i.e., gender differences in firm performance may be different at the bottom of the outcome distribution than at the top of the distribution. It would be possible to use conditional quantile regressions to estimate expressions equivalent to equation (3) (Koenker & Bassett Jr, 1978). However, such regressions would estimate performance quantiles for each gender based on the distribution of characteristics within each group. Given that men and women often have different distributions of these characteristics, the same quantile may correspond to varying performance levels across the two groups. Measuring the adjusted gender gap requires comparing males and females of similar characteristics at each quantile. A meaningful decomposition of performance gaps requires constructing a counterfactual performance distribution, wherein female characteristics are evaluated within the framework of male performance structures (Chernozhukov et al., 2013).

There are several methodologies available for decomposing the gender gaps across the outcome distribution. Chernozhukov et al. (2013) and Machado and Mata (2005) propose creating a counterfactual outcome distribution in which women's characteristics are remunerated similarly to men's, or vice versa. Alternatively, Firpo et al. (2009) developed a method that approximates the impact of changes in the distribution of characteristics on unconditional quantiles by using regressions on recentered influence functions (RIF). We follow this approach to decompose the gender gap in business performance across its distribution, due to its computational simplicity and for comparability with Islam and Amin (2023), which also uses the RIF approach.

The RIF can be conceptualized as the contribution of each individual observation to the statistic of interest, in this context, the unconditional quantile of the outcome distribution.

$$RIF\left(Y; q_\theta, F_Y\right) = q_\theta + \frac{\theta - \mathbf{1}\{Y \leq q_\theta\}}{f_Y(q_\theta)} \tag{4}$$

where q_θ is the θ-th quantile of the unconditional distribution F_Y of outcome Y, $f_Y(q_\theta)$ is its probability density function, and $1\{Y \leq q_\theta\}$ is an indicator function that takes the value of 1 if the outcome Y is less than or equal to the θ-th quantile.[10]

In the spirit of the KBO decomposition, we estimate a Mincerian-type equation for each gender and quantile, using the RIF of the θ-th quantile as the dependent variable. Formally, we represent this through the following equation:

$$RIF\left(Y_{ig}; q_\theta, F_{Y|G=g}\right) = \beta_g^\theta \cdot X_{ig} + \varepsilon_{ig}^\theta \tag{5}$$

where $RIF\left(Y_{ig}; q_\theta, F_{Y|G=g}\right)$ is the value of the RIF of the θ-th quantile for individual i of gender g with outcome Y_{ig}, given the distribution of the outcome $F_{Y|G=g}$ for gender g; X_{ig} are the characteristics of individual i of gender g; β_g^θ is the coefficient vector for gender g, and ε_{ig}^θ is the error term. We estimate this equation using a standard least squares regression. We can then decompose the gap in the θ-th quantile using equation (6):

$$\hat{q}_\theta(F_{Y|G=f}) - \hat{q}_\theta(F_{Y|G=m}) = \hat{\beta}_m^\theta \cdot \left(\overline{X}_f - \overline{X}_m\right) + \left(\hat{\beta}_f^\theta - \hat{\beta}_m^\theta\right) \cdot \overline{X}_f \tag{6}$$

where $\hat{\beta}_m^\theta \cdot \left(\overline{X}_f - \overline{X}_m\right)$ is the explained part of the gap, and $\left(\hat{\beta}_f^\theta - \hat{\beta}_m^\theta\right) \cdot \overline{X}_f$ is the unexplained part. The explained contribution of the j-th covariate to the gap is obtained from the same expression as the aggregate explained part by taking only the j-th element of the coefficient vector and the mean covariate vector (Fortin et al., 2011).

4 The gender gap in the performance of Peruvian firms

In this section, we apply the methodology described in Section 3 to analyze the gender gaps in firm performance of informal and formal firms.

4.1 The raw gender gap in the performance of informal firms

We begin by analyzing the raw gender gaps across four key indicators: sales, labor productivity, profits, and the number of workers. Table 5 presents the mean values for the entire sample (Column 2) and disaggregated by the gender of the firm's owner (Columns

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[10]The average of the RIF of the θ quantile associated with each individual is equal to the θ quantile ($E\left[RIF\{y; q_\theta, F_Y\}\right] = q_\theta(F_Y)$).

3 and 4). It then shows the difference in means between male-led and female-led firms (Column 5) and the ratio of this difference to the mean of male-led firms (Column 6). For sales and labor productivity, the table also includes these variables following a logarithmic transformation. The table shows that sales and profits are lower for female-led firms than male-led firms, thought the difference is statistically significant only for profits. Profits for female-led firms are 36% lower than those of male-led firms, while sales are 15% lower. The log-sales indicator reveals a statistically significant gender gap against female-led firms, amounting to 0.39 log points. This suggests that distributional patterns may account for the observed difference, despite the fact that our sales indicator in levels is winsorized at 1%. For labor productivity (sales per worker) we see no significant gender gaps in levels, but statistically significant gaps against women for the logarithmic transformation.

Table 5 further illustrates that female-led firms exhibit poorer performance in generating employment, particularly in hiring remunerated non-relatives. However, it is noteworthy that they employ more female workers (as documented by Chiplunkar and Goldberg, 2024). Within our sample of informal firms, the average number of workers is 1.42, and, as described above, in 68% of these firms, the sole worker is the owner. Female-led firms employ 11% fewer workers compared to male-led firms, with the gender gap widening to 23% when considering workers outside the household and 25% when focusing on paid workers. Conversely, female-led firms have a workforce composition that includes 38% more women, although these figures include the owner if she works for the firm.[11]

Figure 1 presents the density functions of sales, labor productivity and profits. It shows that the distributions of log sales and log labor productivity for male-led firms are similar in shape but are positioned to the right of those for female-led firms. This indicates a performance advantage for male-led firms. The profit distribution for male-led firms shows more mass on both sides of the zero-profit point, whereas the distribution for female-led firms has significantly more mass concentrated around the zero-profit point. This distribution includes 85 negative values and 433 zeroes, predominantly concentrated among female-led firms.[12] Among female-led firms, 53 report losses and 267 report zero profits, compared to 32 and 166, respectively, among male-led firms. These findings confirm the performance advantage of male-led firms.

The analysis of the gender gaps in firm performance has not received as much attention

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[11]All employment indicators include the owner if she works in the business. We cannot exclude the owner because we cannot separately identify whether the owner is listed as part of the firm's workforce.

[12]These figures should be kept in mind when analyzing the gender gap across the profit distribution.

as the analysis of wage gaps.[13] In the context of firm performance, a recent example is Islam and Amin (2023), who analyze the gender gap in labor productivity for informal firms in 14 countries, reporting an average raw gender gap of 0.17 log points – considerably smaller than the 0.29 log points found in this study. However, they report an average gap of 0.486 log points for the three Latin American countries in their sample (Argentina, Guatemala, and Peru), which is significantly larger than the gap reported here; though they do not report the specific gap for Peru.

4.2 The raw gender gap across the distribution of informal firms

The raw gender gaps at the mean, as reported in Table 5, indicate that differences in sales and labor productivity are not significantly different from zero. However, significant differences do appear when we study the log transformation of these variables. This prompts the question of whether gaps vary across the distribution of firms. To explore this, we first use a quantile regression approach to estimate the relative gender gap at various points of the distribution for each outcome. In line with the methodology used by Islam and Amin (2023), we analyze not only the relative gender gap, expressed as a proportion of the performance indicator of male-led firms, but also the log version. This log transformation provides additional flexibility in the analysis, particularly when incorporating controls for variables that are common determinants of the outcomes.

Differences in the raw relative gender gap across the distribution of firms tend to be more pronounced among smaller firms, particularly when looking at monthly sales and labor productivity, as illustrated in Figure 2. For sales, the gender gap is 50% at the bottom of the distribution (10th quantile), but it decreases to 35% at the top of the distribution (90th quintile). At the median, the raw gender gap stands at 22%. Regarding labor productivity, the raw gender gap is 20% at the bottom of the distribution, while it approaches zero at the top. Overall, there is evidence of a "sticky floor" effect for both indicators of firm performance, suggesting that female entrepreneurs face stronger barriers at the bottom of the distribution. However, this evidence is less conclusive for the labor productivity indicator due to a large standard deviation at the bottom of the distribution. The log-version of the labor productivity indicator corroborates the presence of the "sticky floor" effect, with no indication of a "glass ceiling" effect.[14]

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[13]For a recent review of the theoretical and empirical literature on wage gender gaps in the US, see Blau and Kahn (2017); for Latin America and the Caribbean, see Urquidi and Chalup (2023); and for one of the most recent analyses of the gender wage gap in Peru, see Vaccaro et al. (2022).

[14]The terms "sticky floor" and "glass ceiling" effects originate from labor literature that investigates the factors contributing to the wage gender gap (Blau & Kahn, 2017). The "sticky floor" effect refers to the

The profit gender gap exhibits a different pattern at the bottom of the distribution but stabilizes after the median.[15] As illustrated in the third panel of Figure 2, the profit gender gap fluctuates around 50% from the median through the upper part of the profit distribution. At the bottom of the distribution, profits are zero for both genders.

4.3 KBO decomposition at the mean and across the distribution of informal firms

We begin by presenting the results of the KBO decomposition at the mean, following the methodology outlined in section 3.2. The model used to determine firm performance includes characteristics of both the entrepreneur and the firm, consistent with the approach in Islam and Amin (2023). Specifically, we include the entrepreneur's age, education, and work experience—both as an entrepreneur and as an employee—as well as their role as a household income earner and whether they have a recent migration background. Additionally, we include dummies for firm's sector (manufacturing, retail, or services), location, and an index for business practices in marketing, stock control, record-keeping and financial planning. We also control for the use of credit.[16]

Table 6 presents the results of applying the KBO decomposition to the gender gaps at the mean for the three key indicators of firm performance: sales, labor productivity and profits. The top panel in Table 6 reproduces the figures from Table 5, while the bottom panel provides the decomposition. The first row displays the aggregated contribution of observable variables, revealing that a significant portion of the raw gender gap reported in Table 5 is explained by these variables, particularly in the case of sales and profits. For monthly sales, observable characteristics (explained part) account for 61% of the gender gap, and this contribution increases to 72% in the case of profits. The unexplained component, which represents the adjusted gender gap, allows for a comparison between male and female entrepreneurs with similar characteristics and relatively comparable contexts and practices. The unexplained part of the gap for sales and profits (or adjusted gap) is smaller, but still against women. For labor productivity, observable variables

tendency for gender gaps to expand at the lower end of the wage distribution. This phenomenon is often associated with structural barriers that confine women to low-paying positions with limited opportunities for upward mobility. In contrast, the "glass ceiling" effect describes the widening of gender gaps at the upper end of the distribution, highlighting obstacles that impede women's progression to top-level, high-paying roles. Both effects capture not only individual-level barriers but also workplace dynamics that obscure the productivity losses linked to gender-based constraints and decisions.

[15]It is important to note the high concentration of the profit variable at zero, accounting for 26%. This concentration hinders the generation of meaningful data for the lowest deciles.

[16]See Appendix A for a detailed description of the variables included in the analysis and details on the construction of the business practice index.

contribute to explain the gender gap against female entrepreneurs and the unexplained part favors them (i.e., the unexplained part is positive instead of negative).

When examining the individual contributions to the gender gap, we focus on statistically significant variables. The first key finding is the substantial and consistent contribution of the business location. Specifically, the variable indicating whether the business operates within the household—coded as a dummy equal to one, has a positive and statistically significant contribution to the gender gap across all three firm performance measures. As shown in Table 2, female entrepreneurs are more likely to run their businesses from home, likely reflecting the need to balance economic activities with domestic responsibilities. For sales, operating within the household accounts for 40% of the raw gender gap—slightly more than the combined contribution of all other observables (38%). For profits, this variable accounts for approximately 70% of the explained gap. Beyond this, no other variable has a substantial individual contribution across all measures of firm performance. Sector-specific experience of the entrepreneur significantly contributes to the gender gap in sales, though it is not statistically significant for labor productivity or profits.

Figure 3 presents the estimated gender gap in log sales and labor productivity across their distributions, using the method proposed by Firpo et al. (2009). The left panel in Figure 3 shows a predominantly negative gender gap in log sales, although it is not statistically significant. Additionally, no discernible pattern is observed across the distribution. Conversely, the adjusted gender gap in log labor productivity provides some evidence of a "sticky floor" effect, while clearly lacking a "glass ceiling" effect, aligning with the findings in Islam and Amin (2023).[17]

As previously discussed, the "sticky floor" effect refers to the tendency for female entrepreneurs to face stronger barriers at the lower end of the performance distribution. These constraints may arise from the need to balance entrepreneurial activities with traditional roles as wives, mothers, and caregivers. This interpretation aligns with the significant role of business location in explaining the gender gap in productivity at the mean, as shown in (Table 6). It is plausible that such barriers become less binding at the upper end of the distribution, where women managing larger firms may find ways to mitigate or overcome these limitations. This hypothesis is supported by the observed

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[17]Islam and Amin (2023) report evidence from various countries, indicating a larger gender gap at the bottom of the log labor productivity distribution. They estimate a gender gap of 0.227 log points at the bottom 10th quantile and of 0.104 log points at the 90th quantile. In contrast, the ISES sample analyzed here shows a gender gap of 0.45 log points at the bottom, which becomes a gap in favor of women of 0.04 log points at the top of the distribution.

decline in the contribution of business location to the gender gap decomposition across the labor productivity distribution as illustrated in Table 7.[18]

More broadly, the factors contributing to gender gaps in firm performance appear less relevant among larger firms. These firms are more likely to be located in urban areas, operate outside small-scale retail, have managers with access to business training or technical assistance, and are less likely to be family-run. This may help explain why gender gaps in firm productivity are less pronounced at the upper end of the productivity distribution. However, this pattern should not be interpreted as evidence that women are better integrated among larger firms; rather, they are significantly underrepresented in this segment.

Figure 4 plots the proportion of female managers across the firm performance distribution. In the bottom decile of the sales distribution, women account for 69% of managers, but this share declines to 39% in the top decile. In the profit distribution, the proportion of female managers remains stable at 60% across the first four deciles, peaks at 84% in decile 6, and then declines to 35% in the top decile. The pattern for labor productivity is more volatile: women comprise 63% of managers in both the first and tenth deciles. Nonetheless, the overall downward trend becomes clearer when comparing quintiles—female representation falls from 75% in the bottom quintile to 55% in the top quintile.

In summary, although gender gaps diminish as firms grow, the proportion of female managers declines among higher-performing firms. This pattern suggests that internal firm dynamics may limit women's advancement to top managerial positions consistent with Kremer et al. (2018).

Our finding of "sticky floor" effects raises an important question: why are female-led firms, which may consistently fail to adopt profit-maximizing business practices, not driven out of the market by competitive pressures? To address this, it is necessary to consider market distortions that limit the ability of competitive forces to eliminate less competitive firms in certain markets. Kremer et al. (2018) highlight several factors that restrict competition in developing countries, underscoring the importance of behavioral factors in explaining firm productivity. We argue that these factors are also relevant in explaining productivity differences based on the gender of the manager.

First, the lack of separation between household and firm economics, a classic issue

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[18]Notice that Figure 3 plots the aggregate contribution of the unexplained component of the gender gap for labor productivity.

in development economics, means that production decisions in family-run firms are often shaped by household dynamics. A female-led firm may continue to operate despite being less productive or profitable than competitors because it enhances the woman's bargaining power within the household. This, in turn, may yield broader benefits, such as increased influence over decisions related to investments in human capital.

Second, high transportation costs may grant a degree of local monopoly power on some firms, especially in rural areas, reducing the threat of competition. Additionally, as prices are often set by manufacturers, price competition among retail firms is limited. Finally, micro-firm managers—particularly women—often lack access to business training, making optimal decision-making more difficult (Jayachandran, 2021). Collectively, these factors may help explain why less productive female-managed firms survive despite lower profitability.

4.4 Gender gaps in the performance of Peruvian formal firms

Figure 5 compares the sample from the ISES survey on informal firms with that of the formal firms survey, highlighting that the formal firms sample includes significantly larger firms. The common support between the two survey samples is minimal. For sales, the lowest percentile of the formal firms sample aligns with the 99th percentile of the informal firms survey. Conversely, the top 99th percentile of the informal firms sample corresponds to the lowest 1st percentile of the formal firms sample. The common support is slightly larger for labor productivity. In this case, the lowest percentile of the formal firms survey sample matches the 70th percentile of the informal firms survey, while the top 99th percentile of the informal firms sample corresponds to the lowest 8th percentile of the formal firms sample.

Table 4, described in Section 3, has already highlighted key characteristics of the formal firms in the sample. One notable statistic is the proportion of firms led by female managers, which stands at only 22%.[19] This contrasts sharply with the presence of female managers in the sample of informal firms, where the figure reached 60%. However, Figure 4 has already shown that this proportion is much smaller among larger informal firms, approximately 40%.

Another important distinction between the sample of formal and that of informal firms is their distribution across economic sectors. As shown in Table 2, most informal

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[19]The data enables the identification of the gender of both the top manager and owner(s), a detail not commonly captured in firm surveys (Bruhn, 2009) The proportion of firms with a female owner, or a majority of women in the ownership group, is also low, at just 18%.

firms operate in retail (76%), particularly those run by female microentrepreneurs (85%), with very few in manufacturing (5%). In contrast, Table 4 shows that formal firms are primarily concentrated in services (61%), with 24% in manufacturing and only 16% in retail. Crucially, for the scope of this study, among formal firms there are no significant differences in sector distribution based on the gender of the top manager.[20]

Another important finding is that the performance of formal firms does not exhibit significant differences based on the gender of the top manager. As shown in Table 8, there are no statistically significant gender differences in mean sales, labor productivity, and profits. These patterns contrast with those identified in the sample of informal firms (Table 5). Not only are the differences for formal firms not significant, but the estimated differences suggest that female-led firms actually sell more and are more productive and profitable. However, it is noteworthy that male-led firms employ 15 more workers on average than their female-led counterparts, and this difference is statistically significant.

Applying the analysis from Section 3 to the sample of formal firms reveals that while the gender gap in sales and labor productivity is generally favorable to female-led firms, across most of the distribution, the gap is not statistically significant once we adjust for observable characteristics, except at specific quantiles (Figure 6). For log-sales, some differences around the middle of the distribution are significant at the 95% confidence level. For log-labor productivity, again the gender differences are in general not statistically significant. Overall, we interpret these findings as additional evidence that there is no gender gap in firm performance for larger firms.

5   Summary of results and policy implications

This paper estimates gender gaps in the performance of informal and formal firms in Peru using two recent surveys. We find that, on average, informal female-led firms exhibit lower sales, profits and productivity than their male-led counterparts. Two key insights emerge from the analysis.

First, the evidence points to a "sticky floor" effect in Peru, rather than a "glass-ceiling." Gender gaps in performance are widest at the bottom of the distribution among informal firms, but these gaps narrow, and occasionally reverse, at the top and among formal firms. This pattern may reflect the influence of household constraints

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[20]This does not imply that certain economic sub-sectors may not exclude female top managers. Indeed, 37% of firms in retail and 33% in garment manufacturing are led by female managers. However, no female top managers are observed in sectors such as leather, paper, basic metals, furniture manufacturing, or IT services.

and sectoral segregation at lower performance levels, while selection effects and market dynamics contribute to convergence at the top.

Second, home-based production emerges as a critical driver of the gender gap in firm performance. Informal female entrepreneurs in Peru are 19 percentage points more likely than their male counterparts to operate from their homes, often citing caregiving responsibilities and safety concerns as primary reasons for this choice. This single characteristic accounts for nearly 70 percent of the raw profit gender gap among informal firms. These findings underscore the role of traditional gender norms and household responsibilities in shaping women's entrepreneurial outcomes. Once observable characteristics, especially business location and sector, are accounted for, the adjusted gaps shrink considerably and, in the case of productivity, even reverse in favor of women at the top of the distribution.

We hypothesize that barriers such as business location become less binding at the upper end of the distribution, as women managing larger firms may have found ways to overcome these constraints. More broadly, the structural and contextual factors that disadvantage female entrepreneurs are likely less prevalent among larger firms. These firms are more likely to be located in urban areas, operate outside low-margin retail, have managers who have accessed business training, and are less likely to be family-run. These characteristics may help explain why gender gaps in firm productivity are less pronounced at the top of the distribution. However, this convergence should not be interpreted as evidence of improved gender integration among larger firms. In fact, women remain underrepresented in this group. This pattern suggests that while barriers may diminish for those who reach the top, significant obstacles continue to limit women's advancement into higher-performing firms.

The findings have important policy implications. Expanding access to affordable, quality childcare and promoting a more equitable distribution of unpaid care work can help women transition out of home-based, low-productivity businesses. Addressing structural barriers—such as limited access to finance, mentorship, and networks—is also essential for supporting the growth of high-potential female-led firms. Moreover, land titling and formalization policies may help overcome real estate constraints that limit business expansion, particularly in informal urban settlements. Programs that facilitate women's ownership and control of productive assets, combined with efforts to reduce legal and cultural barriers to property rights, can further empower women entrepreneurs and support business growth.

Ultimately, these results provide a stronger empirical foundation for the development of gender-sensitive entrepreneurship policies. Tailored interventions that address the specific constraints faced by women at different stages of the firm lifecycle are essential not only for advancing gender equity, but also for promoting a more efficient and inclusive allocation of talent within the economy.

References

Aga, G., Francis, D., Jolevski, F., Rodriguez Meza, J., & Wimpey, J. S. (2022). *Surveying informal businesses: Methodology and applications*. The World Bank.

Allison, L., Liu, Y., Murtinu, S., & Wei, Z. (2023). Gender and firm performance around the world: The roles of finance, technology and labor. *Journal of Business Research*, *154*, 113322.

Asiedu, E., Lambon-Quayefio, M., Truffa, F., & Wong, A. (2023). *Female entrepreneurship and professional networks* (PEDL Working Paper).

Bardasi, E., Sabarwal, S., & Terrell, K. (2011). How do female entrepreneurs perform? evidence from three developing regions. *Small Business Economics*, *37*, 417–441.

Bernhardt, A., Field, E., Pande, R., & Rigol, N. (2019). Household matters: Revisiting the returns to capital among female microentrepreneurs. *American Economic Review: Insights*, *1*(2), 141–160.

Bjorvatn, K., Ferris, D., Gulesci, S., Nasgowitz, A., Somville, V., & Vandewalle, L. (2025). Childcare, labor supply, and business development: Experimental evidence from uganda. *American Economic Journal: Applied Economics*, *17*(2), 75–101. https://doi.org/10.1257/app.20230227

Blau, F. D., & Kahn, L. M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of economic literature*, *55*(3), 789–865.

Bruhn, M. (2009, November 1). *Female-owned firms in latin america: Characteristics, performance, and obstacles to growth* (Policy Research Working Paper No. 5122). World Bank.

Campos, F., Coleman, R., Conconi, A., Donald, A., Gassier, M., Goldstein, M., Hernandez, Z., Mikulski, J., Milazzo, A., Paryavi, M., et al. (2019). *Profiting from parity: Unlocking the potential of women's business in africa*. World Bank Group. https://doi.org/10.1596/31421

Chernozhukov, V., Fernández-Val, I., & Melly, B. (2013). Inference on counterfactual distributions. *Econometrica*, *81*(6), 2205–2268.

Chiplunkar, G., & Goldberg, P. (2024). Aggregate implications of barriers to female entrepreneurship. *Econometrica*, 1801–1835.

Delecourt, S., & Fitzpatrick, A. (2021). Childcare matters: Female business owners and the baby-profit gap. *Management Science*, *67*(7), 4455–4474.

Fafchamps, M., McKenzie, D., Quinn, S., & Woodruff, C. (2014). Microenterprise growth and the flypaper effect: Evidence from a randomized experiment in ghana. *Journal of development Economics*, *106*, 211–226.

Firpo, S. P., Fortin, N. M., & Lemieux, T. (2009). Unconditional quantile regressions. *Econometrica, 77*(3), 953–973.

Fortin, N., Lemieux, T., & Firpo, S. (2011). Decomposition methods in economics. In *Handbook of labor economics* (pp. 1–102, Vol. 4). Elsevier.

Friedson-Ridenour, S., & Pierotti, R. (2019). Competing priorities: Women's microenterprises and household relationships. *World Development*, 53–62.

Hardy, M., & Kagy, G. (2018). Mind the (profit) gap: Why are female enterprise owners earning less than men? *AEA Papers and Proceedings, 108*, 252–255.

Islam, A. M., & Amin, M. (2023). The gender labor productivity gap across informal firms. *World Development, 167*, 106229.

Jayachandran, S. (2021). Microentrepreneurship in developing countries. *Handbook of labor, human resources and population economics*, 1–31.

Karlan, D., & Valdivia, M. (2011). Teaching entrepreneurship: Impact of business training on microfinance clients and institutions. *The Review of Economics and Statistics, 93*(2), 510–527.

Klapper, L. F., & Parker, S. C. (2011). Gender and the business environment for new firm creation. *The World Bank Research Observer, 26*(2), 237–257.

Kling, J. R., Liebman, J. B., & Katz, L. F. (2007). Experimental analysis of neighborhood effects. *Econometrica, 75*(1), 83–119.

Koenker, R., & Bassett Jr, G. (1978). Regression quantiles. *Econometrica: journal of the Econometric Society*, 33–50.

Kremer, M., Rao, G., & Schilbach, F. (2018). Behavioral development economics. In B. D. Bernheim, S. DellaVigna, & D. Laibson (Eds.), *Handbook of behavioral economics: Applications and foundations 1* (pp. 345–458, Vol. 2). North-Holland.

La Porta, R., & Shleifer, A. (2014). Informality and development. *Journal of economic perspectives, 28*(3), 109–126.

Love, I., Carranza, E., & Dhakal, C. (2023). *Female entrepreneurship: A new taxonomy of drivers* (Working Paper No. 23-04). University of Hawaii at Manoa.

Machado, J. A., & Mata, J. (2005). Counterfactual decomposition of changes in wage distributions using quantile regression. *Journal of applied Econometrics, 20*(4), 445–465.

McKenzie, D., & Woodruff, C. (2017). Business practices in small firms in developing countries [Publisher: INFORMS]. *Management Science, 63*(9), 2967–2981.

Schoar, A. (2010). The divide between subsistence and transformational entrepreneurship. *Innovation policy and the economy, 10*(1), 57–81.

Siegrist, F. (2025). *Supporting women entrepreneurs in developing countries: What works?* (Technical Note). We-Fi, World Bank Group.

Ubfal, D. (2024). Supporting women-led businesses: Narrative review of recent causal evidence. *The World Bank Research Observer.*

Urquidi, M., & Chalup, M. (2023). *The gender earnings gap in latin america and the caribbean: An analysis of its components* (Technical Note No. IDB-TN-2650). Inter-American Development Bank.

Vaccaro, G., Basurto, M. P., Beltrán, A., & Montoya, M. (2022). The gender wage gap in peru: Drivers, evolution, and heterogeneities. *Social inclusion, 10*(1), 19–34.

World Bank. (2021). *Breaking barriers: Female entrepreneurs who cross over to male-dominated sectors.* World Bank Group. Washington DC. https://doi.org/10.1596/36940

World Bank. (2022). *Informal Sector Enterprise Surveys - Peru 2022.* World Bank Group. Washington DC. Retrieved June 11, 2024, from https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/informal-enterprise-survey/Peru%202022_Informal%20Sector%20Enterprise%20Surveys_Profile%20of%20Cities_English.pdf

World Bank. (2023). *Enterprise surveys - Peru 2023.* World Bank Group. Washington DC. Retrieved June 11, 2024, from https://espanol.enterprisesurveys.org/content/dam/enterprisesurveys/documents/country/Peru-2023.pdf

Figure 1: Distribution of firm performance indicators

Note: Each graph displays the kernel-estimated probability density function of the specified indicator for each subsample of firms. Densities are evaluated at the same values across subsamples. Vertical dashed lines mark the 10th and 90th percentiles of the distributions for female- and male-managed informal firms. Estimates are based on the ISES sample.

Figure 2: Gender gap by quantile – ISES 2022

Note: For outcomes defined in USD, we report the relative gender gap, defined as the difference between the n-th quantiles of female- and male-managed firms divided by the n-th quantile of male-managed firms. Standard errors are estimated using the delta method to account for uncertainty in both the numerator and denominator. For log-transformed indicators, we report the simple difference in n-th quantiles between female- and male-managed firms. Estimates are based on the ISES sample. Shaded areas denote 95% confidence intervals.

Figure 3: Adjusted gender gap by quantile – Sales and labor productivity of informal firms

Note: The adjusted gender gap corresponds to the unexplained component from the RIF decomposition at each quantile of the distributions for female- and male-managed informal firms. Estimates are based on the ISES sample. Shaded areas denote 95% confidence intervals.

Figure 4: Female managers across the performance distribution of informal firms

Note: Each graph reports the share of informal firms managed by a woman within each interval, where intervals correspond to deciles based on the specified indicator. Estimates are based on the ISES sample. Shaded areas denote 95% confidence intervals.

Figure 5: Distribution of firm performance indicators – ES 2023 vs ISES 2022

Note: Each graph displays the kernel-estimated probability density function of the specified indicator for firms in the World Bank Enterprise Survey (ES) and the Informal Sector Enterprise Survey (ISES).

Figure 6: Adjusted gender gap by quantile – Sales and labor productivity of formal firms

Note: The adjusted gender gap corresponds to the unexplained component from the RIF decomposition at each quantile of the distributions for female- and male-managed formal firms. Estimates are based on the ES sample. Shaded areas denote 95% confidence intervals.

Table 1: Key characteristics of informal entrepreneurs, by gender of the top manager

	Obs.	Mean	Male	Female	Difference in means F-M
Gender of the top manager			0.40	0.60	
			(0.03)	(0.03)	
Age of owner	1632	47.79	48.64	47.23	−1.40
		(0.89)	(1.53)	(1.09)	(1.89)
Education (level completed)					
Up to primary school	1609	0.25	0.25	0.26	0.00
		(0.03)	(0.04)	(0.04)	(0.06)
Secondary school	1609	0.63	0.62	0.63	0.01
		(0.03)	(0.05)	(0.04)	(0.06)
Higher education	1609	0.12	0.13	0.11	−0.02
		(0.02)	(0.03)	(0.02)	(0.04)
Years of experience in the activity (owner)	1595	9.44	11.74	7.93	−3.81**
		(0.73)	(1.21)	(0.87)	(1.48)
Prior occupation as employee	1640	0.43	0.48	0.40	−0.08
		(0.03)	(0.05)	(0.04)	(0.06)
Prior occupation in same activity	1640	0.18	0.22	0.16	−0.07
		(0.03)	(0.04)	(0.03)	(0.05)
Owner is primary income earner	1640	0.57	0.69	0.48	−0.21***
		(0.03)	(0.04)	(0.04)	(0.06)
Owner is migrant	1640	0.60	0.61	0.59	−0.03
		(0.03)	(0.05)	(0.04)	(0.06)

Note: Respondents were directly asked whether or not they are the primary income earners in their household. We consider the owner to be a migrant if they moved into the city within the 5 years preceding the survey. Estimates are based on the ISES sample. Significance levels: *** 1%, ** 5%, * 10%. Standard errors adjusted by sample design are reported in parentheses.

Table 2: Key characteristics of informal firms, by gender of the top manager

	Obs.	Mean	Male	Female	Difference in means F-M
Single worker firm	1640	0.68	0.64	0.72	0.08
		(0.03)	(0.05)	(0.04)	(0.06)
Age of business	1598	5.99	8.44	4.37	−4.07***
		(0.48)	(0.92)	(0.45)	(1.02)
Weekly hours of normal operation	1580	47.83	50.38	46.08	−4.31
		(1.83)	(2.48)	(2.48)	(3.43)
Use of credit (last year)	1635	0.36	0.34	0.37	0.03
		(0.03)	(0.05)	(0.04)	(0.06)
Banks	1635	0.07	0.05	0.08	0.04
		(0.02)	(0.02)	(0.02)	(0.03)
Microfinance institutions	1635	0.05	0.02	0.07	0.05**
		(0.01)	(0.01)	(0.02)	(0.02)
Moneylenders/relatives	1635	0.31	0.32	0.30	−0.02
		(0.03)	(0.05)	(0.04)	(0.06)
Use of digital devices					
Computers	1640	0.07	0.07	0.07	0.00
		(0.02)	(0.02)	(0.02)	(0.03)
Computers or smartphone	1640	0.53	0.53	0.54	0.01
		(0.03)	(0.05)	(0.04)	(0.06)
Business working location					
Fixed premises = 1	1640	0.56	0.46	0.63	0.16**
		(0.03)	(0.05)	(0.04)	(0.06)
Within household premises = 1	1640	0.46	0.35	0.54	0.19***
		(0.03)	(0.05)	(0.04)	(0.07)
Business practices index	1428	0.00	0.04	−0.03	−0.07
		(0.07)	(0.11)	(0.09)	(0.14)
Marketing practices index	1616	−0.00	0.13	−0.08	−0.21*
		(0.06)	(0.09)	(0.08)	(0.12)
Buying and stock control practices index	1573	−0.00	−0.04	0.03	0.07
		(0.07)	(0.09)	(0.09)	(0.13)
Costing and record-keeping practices index	1595	0.00	0.05	−0.03	−0.08
		(0.07)	(0.11)	(0.08)	(0.13)
Financial planning practices index	1512	0.00	−0.03	0.02	0.05
		(0.07)	(0.11)	(0.09)	(0.14)
Business sector					
Manufacturing	1640	0.05	0.07	0.04	−0.03
		(0.02)	(0.03)	(0.02)	(0.03)
Retail	1640	0.76	0.62	0.85	0.24***
		(0.03)	(0.05)	(0.03)	(0.06)
Services	1640	0.19	0.31	0.11	−0.21***
		(0.03)	(0.05)	(0.03)	(0.06)

Note: Use of credit refers to credit obtained for daily operations and fixed capital within the last year. For the elaboration of the business practices index, only 13 of the 26 practices defined by McKenzie and Woodruff (2017) were used due to data limitations; see the appendix for more details on its elaboration. Significance levels: *** 1%, ** 5%, * 10%. Standard errors adjusted by sample design in parentheses.

Table 3: Main reasons to operate the business from a household premise, by gender of the top manager

	Obs.	Mean	Male	Female	Difference in means F-M
Reasons why business is located at household:					
Lower cost	513	0.82	0.86	0.81	−0.05
		(0.04)	(0.07)	(0.05)	(0.09)
Easy management of family responsibilities along with work	513	0.92	0.89	0.94	0.05
		(0.03)	(0.06)	(0.03)	(0.07)
More security	513	0.87	0.85	0.88	0.03
		(0.04)	(0.07)	(0.05)	(0.09)
Less chance of being identified by tax authorities	513	0.32	0.38	0.30	−0.08
		(0.05)	(0.09)	(0.06)	(0.10)

Note: Respondents directly reported the reasons for conducting their business within their household in the form of 4 yes/no answers corresponding to each of the categories displayed on the table. Significance levels: *** 1%, ** 5%, * 10%. Standard errors adjusted by sample design in parentheses.

Table 4: Key characteristics of formal firms, by gender of the top manager

	Obs.	Mean	Male	Female	Difference in means F-M
Gender	987		0.78	0.22	
			(0.05)	(0.05)	
The owner is the Top Manager (yes=1)	987	0.77	0.78	0.72	−0.06
		(0.04)	(0.04)	(0.11)	(0.12)
Years of experience in the sector (Top manager)	980	24.96	26.58	19.36	−7.22***
		(1.12)	(1.26)	(1.47)	(1.93)
Sole proprietorship firm	987	0.05	0.02	0.15	0.13
		(0.02)	(0.01)	(0.10)	(0.10)
Shareholding company	987	0.75	0.76	0.69	−0.07
		(0.04)	(0.05)	(0.10)	(0.11)
Age of business	985	22.47	23.15	20.12	−3.03
		(1.40)	(1.58)	(3.06)	(3.48)
Business sector					
Manufacturing	987	0.24	0.25	0.18	−0.07
		(0.02)	(0.03)	(0.05)	(0.07)
Retail	987	0.16	0.14	0.21	0.07
		(0.04)	(0.05)	(0.10)	(0.11)
Services	987	0.61	0.60	0.61	0.00
		(0.04)	(0.05)	(0.11)	(0.12)

Note: Forms of firm propriety other than the ones mentioned in the table (sole proprietorship or shareholding) include partnerships and other spontaneous answers. Gender indicated is with respect to the top manager. Estimations are based on the ES sample. Significance levels: *** 1 percent, ** 5 percent, * 10 percent. Standard errors adjusted by sample design in parentheses.

Table 5: Gender gap - Informal firms' performance

	Obs.	Mean	Male	Female	Difference in means F-M	Ratio
Last month's total sales						
USD	1296	371.28	407.25	345.05	−62.20	−0.15
		(33.86)	(36.30)	(51.78)	(62.56)	(0.15)
Log	1281	5.35	5.57	5.19	−0.39**	−
		(0.09)	(0.11)	(0.13)	(0.17)	
Last month's labor productivity						
USD	1294	290.08	288.86	290.95	2.08	0.01
		(28.21)	(23.19)	(45.17)	(50.37)	(0.17)
Log	1280	5.10	5.27	4.98	−0.29*	−
		(0.08)	(0.10)	(0.12)	(0.16)	
Last month's profits/loss (USD)	1404	113.80	143.90	92.75	−51.15**	−0.36***
		(11.63)	(19.74)	(13.94)	(24.04)	(0.13)
Number of workers	1637	1.42	1.52	1.36	−0.17	−0.11*
		(0.05)	(0.09)	(0.05)	(0.10)	(0.06)
Number of paid workers	1622	0.76	0.90	0.68	−0.22*	−0.25**
		(0.06)	(0.12)	(0.05)	(0.13)	(0.12)
Number of female workers	1606	0.91	0.50	1.18	0.68***	1.38***
		(0.05)	(0.07)	(0.05)	(0.08)	(0.34)
Number of workers who are not relatives	1625	0.72	0.83	0.64	−0.19**	−0.23**
		(0.04)	(0.08)	(0.05)	(0.09)	(0.09)

Note: Last month's total sales, profits/loss and labor productivity are winsorized at 1%. Labor productivity is calculated as in Islam and Amin (2023) by taking the total sales of the firm in the last month and dividing it by the total number of workers (paid, unpaid, and the owner if applicable). The number of workers reported in the table was calculated excluding the business owner(s). Significance levels: *** 1%, ** 5%, * 10%. Standard errors adjusted by sample design in parentheses.

Table 6: KBO Decomposition of informal firms' performance at the mean

	Total sales (USD)		Labor productivity (USD)		Profits/loss (USD)	
Mean Male	407.25		288.86		143.92	
	(36.57)		(24.67)		(19.40)	
Mean Female	345.08		290.97		92.79	
	(48.14)		(41.74)		(13.10)	
Difference average (F-M)	−62.17		2.11		−51.13**	
	(59.73)		(47.99)		(23.29)	

	Explained Part	Unexplained Part	Explained Part	Unexplained Part	Explained Part	Unexplained Part
Aggregated contribution	−37.84	−24.33	−11.65	13.75	−36.93*	−14.20
	(46.91)	(64.63)	(30.90)	(48.12)	(20.85)	(23.08)
Individual contributions						
Age	31.37**	−248.77	20.46*	−209.09	1.47	−21.82
	(13.87)	(161.95)	(10.50)	(143.95)	(3.14)	(56.14)
Education (level completed)						
Up to primary school	9.11	−0.84	4.90	−17.68	1.30	−13.22
	(9.13)	(20.58)	(4.90)	(18.09)	(3.58)	(11.68)
Higher education	3.01	24.72	2.06	24.58	0.06	−4.80
	(5.13)	(34.27)	(3.75)	(27.61)	(0.98)	(6.10)
Years of experience in the activity	−28.55*	49.75	−21.68	45.69	−7.78	−15.83
	(16.44)	(52.73)	(13.52)	(44.60)	(8.67)	(17.98)
Prior occupation as employee	−9.34	−17.46	−6.79	−3.81	−0.83	−12.51
	(9.51)	(41.10)	(7.05)	(32.17)	(2.32)	(15.55)
Prior occupation in the same activity	−2.68	11.08	1.38	16.16	1.13	9.96
	(10.99)	(21.33)	(5.75)	(19.55)	(5.19)	(12.38)
Owner is primary income earner	11.61	93.13*	1.67	67.19*	4.16	19.94
	(14.52)	(48.25)	(9.61)	(38.33)	(8.29)	(20.01)
Owner is migrant	2.15	49.52	6.73	66.86	0.58	−0.77
	(4.58)	(61.42)	(7.16)	(51.39)	(1.78)	(26.99)
Use of credit						
Banks	2.90	−30.21	3.97	−24.64	−3.70	−2.42
	(6.41)	(18.84)	(8.11)	(16.90)	(4.12)	(6.84)
Microfinance institutions	−1.59	3.61	−4.78	8.97	−0.28	3.49
	(8.91)	(13.99)	(7.64)	(12.58)	(3.12)	(5.07)
Moneylenders/relatives	−4.09	−67.56*	−0.92	−41.10	0.60	8.92
	(6.50)	(35.43)	(2.58)	(27.78)	(2.00)	(16.63)
Business working location	−40.35**	−13.91	−33.14**	−23.57	−25.55**	32.50
	(19.26)	(53.41)	(16.05)	(45.84)	(11.58)	(23.42)
Business practices index	8.65	0.86	3.98	−4.33	−1.56	−6.32
	(10.66)	(10.85)	(7.40)	(9.53)	(4.64)	(7.03)
Business sector						
Manufacturing	−9.14	−1.05	0.18	9.40	2.51	9.64
	(13.16)	(14.02)	(1.86)	(10.12)	(4.93)	(7.61)
Retail	46.63	117.03	8.67	201.84	−8.30	24.54
	(52.82)	(196.48)	(20.87)	(132.48)	(21.26)	(83.01)
Dominance of sectors						
Male dominated	−33.91	−5.76	4.92	2.02	−25.08	−13.18
	(51.52)	(13.52)	(22.39)	(9.58)	(20.64)	(9.29)
Female dominated	−23.61	133.90	−3.24	78.44	24.34**	−51.85
	(27.65)	(98.76)	(21.06)	(82.23)	(12.27)	(37.41)
Constant		−122.37		−183.19		19.54
		(249.03)		(210.21)		(111.02)

Note: See subsection 3.2 for a detailed explanation of the Kitagawa-Blinder-Oaxaca (KBO) decomposition. Last month's total sales, profits/loss and labor productivity are winsorized at 1%. Labor productivity is calculated as in Islam and Amin (2023) by taking the total sales of the firm in the last month and dividing it by the total number of workers (paid, unpaid, and the owner if applicable). The following categories were taken as the base point: Education (level completed) = Secondary school, Business sector = Services, Dominance of sectors = Neutral. Estimations are based on the ISES sample. Significance levels: *** 1%, ** 5%, * 10%. Standard errors adjusted by sample design in parentheses.

Table 7: Decomposition of the log labor productivity gap of informal firms across the distribution

	10th Quantile		25th Quantile		50th Quantile		75th Quantile		90th Quantile	
	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained
Aggregate contribution	−0.10	−0.47	0.04	−0.62***	−0.12	−0.23	0.05	−0.30*	0.02	0.12
	(0.29)	(0.37)	(0.17)	(0.21)	(0.14)	(0.16)	(0.14)	(0.17)	(0.13)	(0.21)
Individual contributions										
Age of owner	−0.06	−2.62**	0.10*	−0.49	0.09**	−0.45	0.11**	−0.47	0.02	−1.02
	(0.13)	(1.31)	(0.05)	(0.65)	(0.04)	(0.44)	(0.05)	(0.46)	(0.04)	(0.74)
Education (level completed)										
Up to primary school	−0.07	−0.16	0.08	−0.08	0.07	−0.06	0.03	−0.17**	0.05	−0.01
	(0.05)	(0.19)	(0.05)	(0.10)	(0.04)	(0.07)	(0.04)	(0.07)	(0.04)	(0.07)
Higher education	0.02	−0.02	0.00	−0.02	−0.00	0.00	−0.00	0.00	0.01	0.05
	(0.04)	(0.13)	(0.01)	(0.05)	(0.01)	(0.05)	(0.01)	(0.05)	(0.01)	(0.07)
Years of experience in the activity	0.21	0.54*	−0.06	0.09	−0.08*	−0.03	−0.11*	−0.05	−0.06	0.20
	(0.16)	(0.32)	(0.08)	(0.15)	(0.04)	(0.09)	(0.06)	(0.10)	(0.04)	(0.12)
Prior occupation as employee	−0.06	0.07	−0.03	−0.35**	−0.03	−0.32***	−0.01	−0.12	−0.04	−0.04
	(0.07)	(0.27)	(0.03)	(0.15)	(0.03)	(0.12)	(0.02)	(0.12)	(0.04)	(0.14)
Prior occupation in same activity	0.11	0.08	0.03	0.08	0.01	0.04	0.04	0.08	0.00	0.02
	(0.10)	(0.14)	(0.03)	(0.06)	(0.02)	(0.04)	(0.03)	(0.05)	(0.02)	(0.06)
Owner is primary income earner	0.14	0.41	0.11*	0.46**	0.06	0.17	0.02	0.15	−0.02	0.12
	(0.11)	(0.31)	(0.06)	(0.18)	(0.04)	(0.13)	(0.05)	(0.15)	(0.04)	(0.16)
Owner is migrant	0.06	−0.01	−0.00	−0.09	0.05	0.02	0.03	−0.02	0.03	0.28
	(0.07)	(0.33)	(0.02)	(0.18)	(0.03)	(0.14)	(0.03)	(0.17)	(0.03)	(0.19)
Use of credit										
Banks	−0.01	−0.00	−0.03	−0.08	−0.04*	−0.02	−0.02	−0.06	−0.01	−0.04
	(0.06)	(0.10)	(0.02)	(0.05)	(0.03)	(0.03)	(0.02)	(0.04)	(0.02)	(0.07)
Microfinance institutions	−0.02	0.11	0.01	0.09**	−0.02	0.11**	−0.00	0.05	−0.00	−0.03
	(0.06)	(0.09)	(0.02)	(0.04)	(0.02)	(0.05)	(0.02)	(0.04)	(0.03)	(0.05)
Moneylenders/relatives	−0.03	−0.27	−0.01	−0.04	−0.02	−0.29***	−0.01	−0.12	0.01	−0.15
	(0.06)	(0.21)	(0.03)	(0.09)	(0.05)	(0.09)	(0.03)	(0.10)	(0.02)	(0.11)
Business working location	−0.33**	0.42	−0.22**	0.03	−0.12**	−0.29**	−0.06	−0.06	−0.08*	−0.03
(within household premises = 1)	(0.17)	(0.35)	(0.10)	(0.18)	(0.06)	(0.14)	(0.05)	(0.16)	(0.04)	(0.19)
Business practices index	0.03	−0.07	0.02	0.02	0.00	0.01	−0.00	−0.07	0.03	−0.02
	(0.08)	(0.11)	(0.03)	(0.06)	(0.01)	(0.05)	(0.02)	(0.04)	(0.04)	(0.04)
Business sector										
Manufacturing	0.00	0.10	0.00	0.07	0.00	−0.03	0.00	0.06	0.00	0.05
	(0.01)	(0.08)	(0.01)	(0.05)	(0.03)	(0.03)	(0.01)	(0.05)	(0.02)	(0.06)
Retail	−0.42**	2.93***	−0.19*	1.67***	−0.12	0.26	−0.08	1.09**	−0.09	1.36**
	(0.20)	(0.97)	(0.10)	(0.60)	(0.08)	(0.40)	(0.11)	(0.50)	(0.10)	(0.65)
Dominance of sectors										
Male dominated	0.05	−0.12	0.09	−0.01	0.08	−0.05	0.12	−0.00	0.15	0.02
	(0.19)	(0.09)	(0.10)	(0.04)	(0.08)	(0.03)	(0.11)	(0.03)	(0.11)	(0.05)
Female dominated	0.27	−1.03**	0.14**	−0.36	−0.05	0.29	0.01	−0.22	0.01	−0.15
	(0.18)	(0.48)	(0.07)	(0.27)	(0.05)	(0.23)	(0.07)	(0.25)	(0.06)	(0.41)
Constant	−	−0.81	−	−1.62*	−	0.39	−	−0.38	−	−0.48
		(1.60)		(0.94)		(0.63)		(0.77)		(1.14)

Note: See subsection 3.3 for a detailed explanation of the decomposition of the gender gap for different quantiles using recentered influence functions (RIF). The following categories were taken as the base point: Education (level completed) = Secondary school, Business sector = Services, Dominance of sectors = Neutral. Significance levels: *** 1 percent, ** 5 percent, * 10 percent. Standard errors adjusted by sample design in parenthesis.

Table 8: Gender gap in the performance of formal firms, by gender of the top manager

	Obs.	Mean	Male	Female	Difference in means F-M	Ratio
Total sales of the last fiscal year						
USD (thousands)	939	3761.21	3832.02	3524.29	−307.73	−0.08
		(333.63)	(390.75)	(659.65)	(762.96)	(0.20)
Log	939	13.93	13.85	14.18	0.32	−
		(0.13)	(0.15)	(0.28)	(0.33)	
Labor productivity of the last fiscal year						
USD (thousands)	939	116.30	98.58	175.60	77.02	0.78
		(17.91)	(16.86)	(49.34)	(52.87)	(0.60)
Log	939	10.99	10.89	11.35	0.47	−
		(0.12)	(0.14)	(0.30)	(0.34)	
Profits/loss of the last fiscal year (USD, thousands)	875	2603.34	2511.21	2882.28	371.07	0.15
		(311.78)	(333.75)	(682.18)	(753.44)	(0.31)
Number of workers	987	42.29	46.53	27.61	−18.91***	−0.41***
		(2.59)	(3.70)	(3.55)	(6.00)	(0.10)
Number of female workers	978	10.88	11.62	8.33	−3.29*	−0.28*
		(0.80)	(1.09)	(1.30)	(1.92)	(0.15)

Note: Gender indicated is that of the Top Manager. Last month's total sales, profits/losses, labor productivity, and number of workers are winsorized at 1%. Profits/losses were calculated based on the difference between sales and costs. Costs included costs of labor, electricity, raw materials, intermediate goods used in production in the case of manufacturing firms, and costs of finished products and materials purchased to resell in case of retail firms. Labor productivity is calculated as in Islam & Amin (2023) by taking the total sales of the firm in the last month and dividing it by the total number of workers (paid, unpaid, and the owner if applicable). The number of workers reported in the table was calculated excluding the top manager. Estimations are based on the ES sample. Significance levels: *** 1 percent, ** 5 percent, * 10 percent. Standard errors adjusted by sample design in parenthesis.

Appendix A: The Business Practices Index

The construction of the business practices index follows Kling et al. (2007) and Karlan and Valdivia (2011). The summary measure is usually referred to as the mean standardized outcome. Defining a family of outcomes, the standardization is done using mean and variance for the full sample. The summary measure is the unweighted average of all standardized outcomes of a family.[21] We use 13 of the 26 practices defined by McKenzie and Woodruff (2017), based on their availability in the ISES 2022.

Marketing Practices: coded as 1 for each of the following that the business has done in the last 3 months:

- M2: Visited at least one of its competitor's businesses to see what products its competitors have available for sale.
- M3: Asked existing customers whether there are any other products the customers would like the business to sell or produce.
- M4: Talked with at least one former customer to find out why former customers have stopped buying from this business.
- M5: Asked a supplier about which products are selling well in this business' industry.
- M6: Attracted customers with a special offer.

Buying and Stock Control Practices: coded as 1 for each of the following:

- B1: Attempted to negotiate with a supplier for a lower price on raw material.
- B3: The business does not run out of stock monthly or more.

Costing and Record-Keeping Practices: coded as 1 if business:

- R1: Keeps written business records.
- R7: Has a written budget, which states how much is owed each month for rent, electricity, equipment maintenance, transport, advertising, and other indirect costs to business.

Financial Planning Practices: coded as 1 for each of the following:

- F2: Has a target set for sales over the next year.
- F3: Compares their sales achieved to their target at least monthly.
- F4: Has a budget of the likely costs their business will have to face over the next year.
- F5: Has an annual profit and loss statement.

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[21]If needed, variables are re-defined so that a larger value is always better for the business.
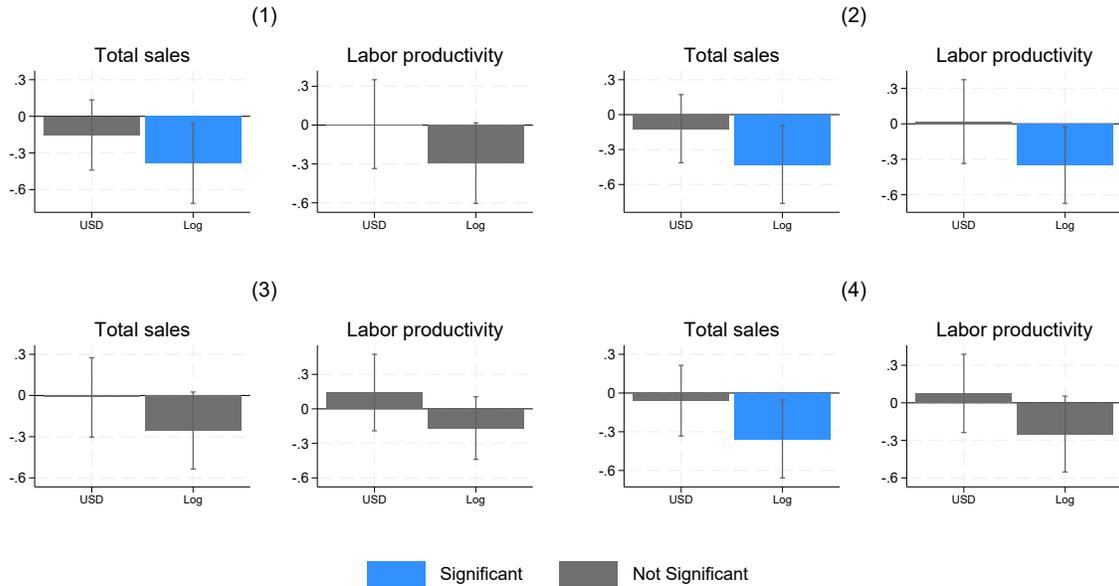
Appendix B: Controlled gap with different specifications

Table B1: Gender gap in the performance of informal firms with controls

	(1)		(2)		(3)		(4)	
	USD	Log	USD	Log	USD	Log	USD	Log
Last month's total sales	−0.15	−0.39**	−0.12	−0.43**	−0.01	−0.26*	−0.06	−0.36**
	(0.15)	(0.17)	(0.15)	(0.17)	(0.15)	(0.14)	(0.14)	(0.15)
Last month's labor productivity	0.01	−0.29*	0.02	−0.35**	0.14	−0.17	0.08	−0.25
	(0.17)	(0.16)	(0.18)	(0.16)	(0.17)	(0.14)	(0.16)	(0.15)

Note: For outcomes in USD, we report the relative gender gap, defined as the covariate-adjusted mean difference between female- and male-managed firms divided by the mean for male-managed firms. Covariates are de-meaned with respect to male-managed firms, so that the intercept represents their mean, enabling the use of the delta method to estimate standard errors for the relative gap. For log-transformed indicators, we report the covariate-adjusted mean difference. Estimates are based on the ISES sample. Each pair of columns represents a specification as follows: (1) Gender gap without controls, (2) Gender gap controlled by demographic characteristics, (3) Gender gap: controls in (2) + business practices, use of credit and business working location (fixed premises = 1), (4) Gender gap: controls in (3) + business sector. Significance levels: *** 1 percent, ** 5 percent, * 10 percent. Standard errors adjusted by sample design in parenthesis.

Figure B1: Different specifications of the gender performance gap among informal firms

(1): Gender gap without controls
(2): Gender gap controlled by demographic characteristics
(3): Gender gap: controls in (2) + business practices, use of credit and business working location (fixed premises = 1)
(4): Gender gap: controls in (3) + business sector

Note: For outcomes in USD, we report the relative gender gap, defined as the covariate-adjusted mean difference between female- and male-managed firms divided by the mean for male-managed firms. Covariates are de-meaned with respect to male-managed firms, so that the intercept represents their mean, enabling the use of the delta method to estimate standard errors for the relative gap. For log-transformed indicators, we report the covariate-adjusted mean difference. Estimates are based on the ISES sample. Shaded areas denote 95% confidence intervals.