Business Environment Distortions, Informal Competition, and Firm Stagnation in Peru

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Abstract

This paper examines how business environment distortions and informal competition contribute to the persistence of low-scale formal firms in Peru. Using data from the 2015 National Enterprise Survey, the analysis estimates an ordered probit model with instrumental variables to assess these effects. Results show that limited access to working-capital credit and competition from informal businesses increase the probability of being a micro enterprise by 18 and 16 percentage points (pp), respectively. Likewise, complex tax regulations increase this probability by 10 pp, while inadequate infrastructure and institutional weaknesses raise it by 8 pp. However, simultaneous improvements in credit access, tax simplification, and institutional and infrastructure quality could reduce the share of micro enterprises by 39 pp while increasing the shares of small and medium/large enterprises by 27 and 12 pp, respectively.

Acknowledgements

1.   Introduction

In most developing economies, micro and small enterprises account for a large share of business activity and are considered key engines of employment and poverty reduction (Guigale and Diewny, 2000; Nichter and Goldmark, 2005). Yet their predominance often weighs on aggregate productivity. Evidence from numerous studies points to significant resource misallocation driven by the persistence of small, low-efficiency firms (Leidholm and Mead, 1987; Little, 1987).

This pattern has been documented across several Latin American economies. Pagés (2010) finds that the region's manufacturing sector could almost double its productivity if the share of micro enterprises were reduced to match the firm-size distribution observed in the United States.[1] The issue is especially relevant for Peru, where formal firms are heavily concentrated in smaller segments that tend to exhibit much lower productivity (Céspedes et al., 2014).

The persistence of small-scale firms has been linked to regulatory and institutional constraints. Studies such as Dollar et al. (2005) and Aterido et al. (2011) show that firm performance depends heavily on the quality of the business environment. Tybout (2000) further notes that market failures and policy distortions often impose fixed operating costs, putting smaller firms at a structural disadvantage and limiting their capacity to grow.

Empirical studies suggest that firm growth is constrained by several structural factors: (i) excessive labor regulations (Botero et al., 2004; Besley and Burgess, 2004; Almeida and Carneiro, 2009; Haltiwanger et al., 2014; Micco and Pagés, 2006; Petrin and Sivadasan, 2006; Autor et al., 2007); (ii) heavy tax regulation and weak tax administration (González and Lamanna, 2007; Dabla-Norris et al., 2008; Dabla-Norris and Inchauste, 2007); (iii) limited access to credit (Demirgüç-Kunt and Maksimovic, 1998; Rajan and Zingales, 1998; Beck et al., 2005; Galindo and Micco, 2007); and (iv) inadequate infrastructure and institutional weaknesses (World Bank, 2004, 2006; Aterido et al., 2011).

There is also evidence that excessive tax and labor regulation, together with restricted access to finance, are major drivers of informal competition (González and Lamanna, 2007; Dabla-Norris et al., 2008; Dabla-Norris and Inchauste, 2007)[2]. Theoretical models show that, in the absence of sound regulation and adequate credit, firms tend to operate independently, under- or overinvest, and hire an inefficient mix of temporary and permanent workers. These distortions constrain firms to remain small or, over time, to move into the informal sector. While informality may stem from either voluntary exit or exclusion,[3] these structural constraints largely explain why many firms perceive the costs of formality as exceeding its benefits (Perry et al., 2007; Loayza, 2008).

Despite the valuable insights provided by the international literature, most of these studies rely on World Bank enterprise surveys, which have three key limitations. First, the data cover

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[1]Based on firm-level data for El Salvador and Mexico.

[2]While competition generally drives economic growth, rivalry between formal and informal firms is not necessarily efficient. Informal competition weakens economic performance, as informal businesses often operate outside regulatory and tax frameworks (González and Lamanna, 2007).

[3]Perry et al. (2007) distinguish two forms of informality: voluntary, when economic agents choose informality after weighing the costs and benefits of formality; and involuntary, when agents are excluded because they cannot overcome formal-sector entry barriers.

only registered firms with more than five employees. Second, the surveys are outdated, with the latest rounds conducted in 2009–10. Finally, the samples are not nationally representative, which limits country-level inference.[4]

This study contributes to the literature by examining how business environment distortions—limited access to finance, heavy tax regulation, and institutional and infrastructure weaknesses—and informal competition[5] constrain the growth of formal firms in Peru. The analysis also explores whether firm stagnation persists once the business environment improves. The study examines how these factors shape firms' size distribution by estimating ordered logit and probit models, reflecting the properties of the dependent variable.[6] Since informal competition can transmit the effects of business-environment distortions to firm growth (Dabla-Norris et al., 2008; Dabla-Norris and Inchauste, 2007), the estimation controls for endogeneity through an ordered probit model with instrumental variables (IV–ordered probit), with results compared against baseline estimates. The instrument is a binary indicator equal to 1 when a firm reports intense competition in its main product market and 0 otherwise. A sensitivity analysis then tests how improvements in the business environment—expanded access to credit, simpler taxation, and stronger regional competitiveness through better institutions and infrastructure—affect the likelihood of firms operating at different scales.

Peru is selected as the case study for two main reasons. First, the analysis draws on new data from the 2015 National Enterprise Survey (ENE), published in 2016[7] and jointly produced by the National Institute of Statistics and Informatics (INEI) and the Ministry of Production (PRODUCE). The survey provides detailed information on business environment distortions by firm size[8] and economic sector.[9] According to the data, about 64.7% of all formal production units are classified as micro enterprises, 28.2% as small, and only 7.1% as medium or large. This composition points to structural stagnation among smaller firms, even within the formal sector—the focus of this study. Second, Peru offers a relevant context to examine business-environment distortions in an economy marked by high levels of informal competition[10] and employment. [11]

The results confirm that firm stagnation in Peru is closely linked to market failures and regulatory distortions that affect firms differently depending on their size. Limited access to working-capital credit and competition from informal businesses raise the probability of remai-

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[4]For Peru, the World Bank Enterprise Survey covers only 1,000 firms located in Arequipa, Lima, Trujillo, and Chiclayo.

[5]According to ENE 2015, informal competition is defined as: (i) a firm perceiving informal competition as one of its main growth constraints, and (ii) a firm competing with informal businesses in its main product line.

[6]The dependent variable equals 1 for firms with annual sales up to 150 UITs (micro), 2 for those between 150 and 1,700 UITs (small), and 3 for those above 1,700 UITs (medium/large), following the classification used by PRODUCE.

[7]ENE 2018 and 2019 have not yet been published.

[8]Based on ENE 2015 data, results are disaggregated by firm size: micro, small, and medium/large enterprises.

[9]Economic sectors in this study are grouped into manufacturing, construction, commerce, services, and "other" (water, fishing, electricity, and gas).

[10]According to ENE 2015, 40% of firms identify informal competition as their main constraint to growth.

[11]According to INEI, informal employment accounted for 72.0% and 75.3% of the employed population in 2016 and 2020, respectively.

ning a micro enterprise by 18 and 16 percentage points (pp), respectively. Likewise, complex tax regulations increase this probability by 10 pp, while inadequate infrastructure and institutional weaknesses raise it by 8 pp. Simultaneously implementing reforms to improve the business environment—including access to finance, tax simplification, better infrastructure and institutions, and lower informal competition—could reduce the share of micro enterprises by 39 pp, while raising the shares of small and medium/large enterprises by 27 pp and 12 pp, respectively. The results also show that factors such as owners' educational attainment, business associations, and access to international markets lower the probability of remaining a micro enterprise by 49 pp, suggesting that managerial capabilities also play an important role in firm mobility. Overall, the findings highlight the need to address, in an integrated manner, the structural constraints that limit the growth of formal firms in Peru.

The paper is organized as follows. Section 2 reviews the literature, outlining the main transmission channels through which the business environment and informal competition affect firm performance. Section 3 presents key stylized facts on Peruvian firms. Section 4 describes the data and empirical strategy. Section 5 reports the econometric results, addressing potential endogeneity, and includes a robustness analysis that controls for the presence of informal employment within the formal sector. It also examines whether firm stagnation persists once the business environment improves. Section 6 concludes and discusses the study's main limitations.

2.   Literature Review

The international literature defines the business environment as the set of regulatory, institutional, and market-related factors that shape the conditions under which firms operate by directly influencing their employment, investment, and production decisions (Dollar et al., 2005; Aterido et al., 2011).

A key dimension of the business environment examined in empirical studies concerns tax regulation. According to Schneider and Enste (2000), Perry et al. (2007), Dabla-Norris et al. (2008), Pagés (2010), and Aterido et al. (2011), the combination of a complex tax system with limited benefits and weak enforcement mechanisms imposes recurring costs on firms' operations. These conditions distort firms' investment decisions in technology and other productivity-enhancing strategies, as compliance with complex tax obligations reduces the profits available for reinvestment.

Another important dimension of the business environment concerns firms' access to finance. Studies by Cooley and Quadrini (2001), Cabral and Mata (2003), Beck et al. (2005), Fagiolo and Luzzi (2006), Dabla-Norris et al. (2008), and Aterido et al. (2011) document that regulatory imperfections in credit markets can discourage the reallocation of resources from less productive to more productive firms. Since adopting advanced technologies is costly, limited access to credit may force high-potential firms to engage in less efficient, lower-technology activities, constraining both their scale and overall performance.

Institutional conditions are another critical aspect of the business environment. Cumbersome administrative procedures and corruption create uncertainty and discourage firms from investing

(Tybout, 2000; Dabla-Norris et al., 2008). Similar effects arise from weak governance, often reflected in limited rule of law and inefficient judicial processes (Dollar et al., 2005; Aterido et al., 2011).
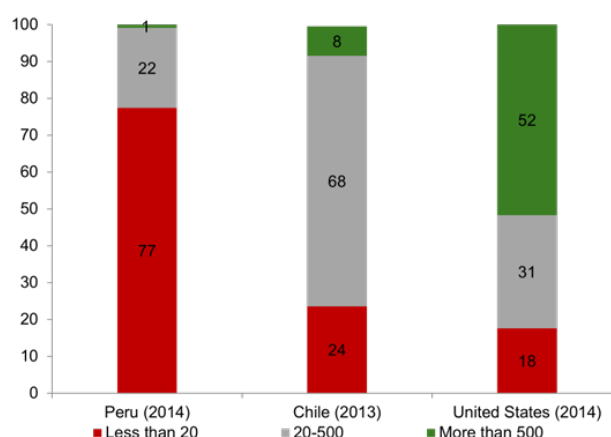
Beyond these regulatory and institutional factors, the business environment is also shaped by the provision of basic infrastructure services, which directly affects the markets and clients that firms can reach. Studies by Tybout (2000), Dollar et al. (2005), Pagés (2010), and Aterido et al. (2011) find that firms often face high costs when providing goods and services in markets with dispersed and fragmented demand, largely due to inadequate transport and communication systems. As a result, many firms remain small and serve only local, low-scale markets, leaving the overall enterprise structure more fragmented simply because of insufficient infrastructure to support connectivity between firms and consumers.

As discussed above, an economy with a sound business environment should allocate productive resources in a way that maximizes firm growth through higher efficiency and productivity. By contrast, a highly distorted business environment can force individuals with limited skills and restricted access to credit to work as self-employed or micro entrepreneurs, operating small-scale, subsistence-type businesses with little growth potential. A complex business environment marked by market failures can also lead entrepreneurs to misallocate capital and labor, constraining the scale of their operations.

Through these channels, firm growth in a distorted regulatory and institutional setting tends to be limited and inefficient, keeping firms small or pushing them into the informal sector. Moreover, a poorly designed business environment can further hinder growth by fostering competition from informal firms (Dabla-Norris et al., 2008). By evading taxes and circumventing regulations, informal firms gain a cost advantage over formal competitors that comply with tax and regulatory obligations. According to Fajnzylber (2007), Levy (2010), Pagés (2010), and Busso et al. (2012), this advantage effectively acts as an implicit subsidy, allowing low-productivity informal businesses to survive, thereby expanding their market share at the expense of formal firms and weighing on overall economic performance.

3. Stylized Facts
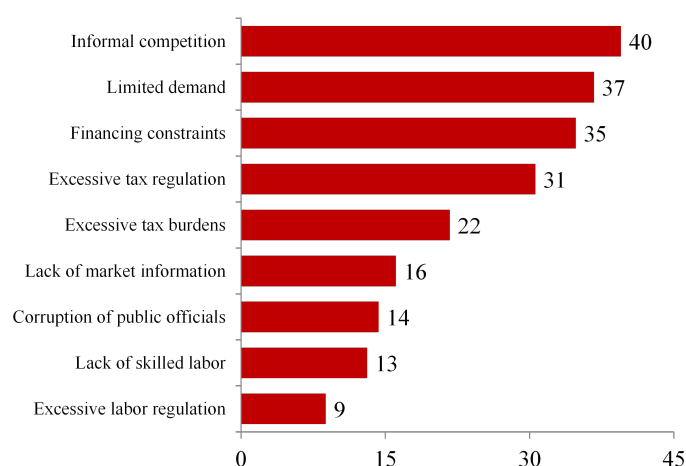
This section provides a brief overview of Peruvian firms and the main business-environment distortions they face. Available data indicate that Peru is characterized by a high degree of firm stagnation and fragmentation. This structure contrasts sharply with economies such as Chile and the United States, where most firms—about 76 % and 82 %, respectively—are medium or large (Figure 1).

Figure 1. Firm distribution by number of workers, selected countries (%)

Source: National Enterprise Survey (ENE) 2015; Third Longitudinal Enterprise Survey (ELE3) 2015; Longitudinal Business Database (LBD) 2015.

This pattern has changed little in recent years (INEI 2013–16). According to ENE 2015, and based on reported annual sales,[12] 64.7 % of all business units are classified as micro, 28.2 % as small, and only 7.1 % as medium or large enterprises. Most firms operate in commerce (47.7 %), services (34.4 %), and manufacturing (13.3 %), while fewer are found in construction (3.9 %) or in water, fishing, electricity, and gas (0.7 %).

The main obstacles to firm growth stem from significant business-environment distortions (Figure 2). About 40 % of firms identify informal competition as their main constraint to expansion.

Figure 2. Main constraints to firm growth, 2014 (%)

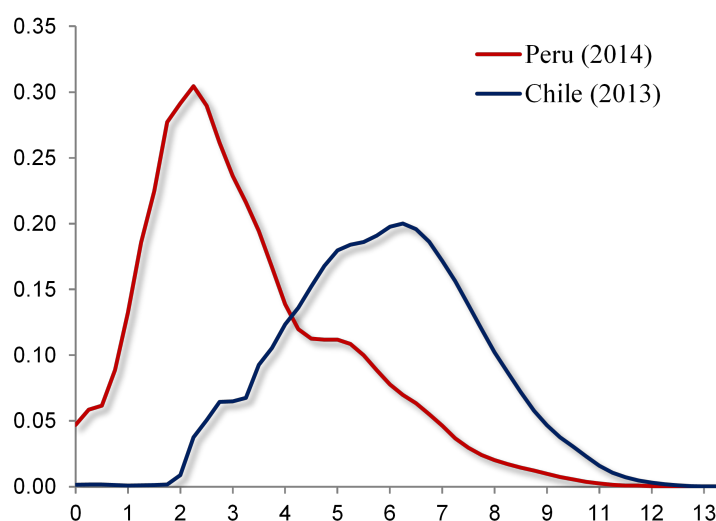*Source:* National Enterprise Survey (ENE) 2015.

This pattern aligns with the high level of informality in the Peruvian economy. In 2015 and

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[12]In this study, firms are classified as micro if annual sales are up to 150 UITs, small if between 150 and 1,700 UITs, and medium/large if above 1,700 UITs.

2016, 73.2 % and 72.0 % of the employed labor force held informal jobs, respectively. According to Perry et al. (2007), Loayza (2008), Rothenberg et al. (Rothenberg et al., 2016), Antón et al. (2012), and the Ministry of Economy and Finance (MEF, 2016), informality is closely associated with several structural features of the economy: (i) firm stagnation; (ii) limited access to external markets; (iii) bottlenecks in public infrastructure and services; (iv) inefficiencies in the allocation of production factors that weaken market competition; and (v) the prevalence of low-productivity jobs, limited incentives for worker training, and greater vulnerability to adverse shocks (Figures 3 and 4).

Figure 3. Peru and Chile: Firm distribution by employment size (%)

Source: National Enterprise Survey (ENE) 2015; Third Longitudinal Enterprise Survey (ELE3) 2015.

Figure 4. Firm distribution and TFP by employment size (%)

Source: Number of workers in logarithms. Total factor productivity (TFP) calculated by Céspedes et al. (2016). Source: National Enterprise Survey (ENE) 2015; Céspedes et al. (2016).

Firms also cite limited demand (37 %), financing constraints (35 %), excessive tax regulation

(31 %), tax burdens (22 %), weak institutions (14 %), and excessive labor regulation (9 %) as additional factors hindering growth. This pattern is not uncommon among emerging economies (World Bank, 2006). Consistent with Dabla-Norris and Inchauste (2007) and Dabla-Norris et al. (2008), formal firm growth is negatively affected by high taxes, weak tax administration, credit constraints, and institutional weaknesses.

Table 1 summarizes firms' perceptions of the business environment, indicating that Peruvian firms face significant distortions related to taxation, finance, labor regulation, and informal competition. These obstacles vary in intensity across firm sizes and economic sectors.[13]

As expected, regulatory distortions weigh more heavily on micro and small enterprises. About 82.1 % of micro enterprises and 76.3 % of small enterprises report that tax inspections and sanctions by the Tax Authority (SUNAT) are excessive. In addition, more than 60 %, 88 %, and 85 % of micro or small enterprises lack access to financial-system credit for working capital, investment, and consumption (business-related financing), respectively. Informal competition is also a major constraint: 45 % of micro and 33 % of small enterprises identify it as a barrier to growth. This constraint is particularly critical given that more than 78 % of formal firms report competing with informal businesses in their main product or service markets.

A different pattern emerges in labor regulation, where medium/large enterprises report the highest distortions. More than 54 % of these firms consider the requirements imposed by the Ministry of Labor (MTPE) for (i) hiring fixed-term or permanent workers and (ii) complying with social security, health, and other contribution payments to be overly complex. In addition, 64.4 % report that (iii) labor oversight and enforcement by the Labor Inspection Authority (SUNAFIL) are excessive.

Two considerations, however, limit the use of these survey items in the estimations.[14] First, 35 % of micro and 18 % of small enterprises do not use formal labor contracts, which biases responses to the first two items since many firms cannot provide valid answers.[15] Second, SUNAFIL began operations only in 2014—the same year the ENE was conducted—when the agency had few inspectors, primarily focused on medium/large firms.

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[13]Annex 1 presents firms' perceptions of the regulatory framework by economic activity.

[14]Labor regulation indicators are excluded from the estimates reported in Section 5 because the resulting coefficients have unexpected signs. Future ENE rounds are expected to include labor regulatory distortions as determinants of firm stagnation. Full estimation details for each method are available upon request.

[15]This issue can be addressed using a selection-bias correction following Heckman (1979).

Table 1

Peru: Firms' perceptions of the business environment

Variables	ENE 2015 variables	Response	Micro enterprise (64.7%)	Small enterprise (28.2%)	Medium/ Large enterprise (7.1%)
Tax regulations	How would you rate the procedures for complying with your tax obligations (filings, payments, and related requirements)?	Very difficult	39.5%	33.3%	43.9%
		Very easy	60.5%	66.7%	56.1%
	How would you rate tax inspections and enforcement by the tax and municipal authorities?	Excessive	82.1%	76.3%	68.9%
		Insufficient	17.9%	23.7%	30.1%
Labor regulations	Percentage of firms that do not use written labor contracts		38.0%	15.0%	2.0%
	How would you rate the requirements set by the Ministry of Labor for hiring fixed-term and permanent workers, and for severance?	Very difficult	50.7%	56.4%	45.4%
		Very easy	49.3%	43.6%	45.4%
	How would you rate compliance requirements for mandatory social contributions (health, pensions, etc.)?	Very difficult	44.7%	51.6%	62.5%
		Very easy	55.3%	48.4%	37.5%
	How would you rate labor inspections and enforcement by the Labor Inspection Authority (SUNAFIL)?	Excessive	20.5%	29.1%	64.4%
		Insufficient	79.5%	70.9%	35.6%
Credit access	Did the firm use formal credit for working capital?	Yes	24.2%	39.3%	40.8%
		No	75.8%	60.7%	59.2%
	Did the firm use formal credit for fixed-asset investment?	Yes	5.7%	11.9%	14.9%
		No	94.3%	88.1%	85.1%
	Did the firm use personal or consumer credit for business purposes?	Yes	7.7%	14.5%	9.7%
		No	92.3%	85.5%	90.3%
	Is financing one of the three main constraints to firm growth?	Yes	37.3%	28.9%	37.8%
		No	62.7%	71.1%	62.2%
Informal competition	Is informal competition one of the three main constraints to firm growth?	Yes	45.1%	33.0%	16.0%
		No	54.9%	67.0%	84.0%
	For your main product or service, does the firm face informal competitors in the market?	Yes	84.3%	78.6%	65.9%
		No	15.7%	21.4%	34.1%
Institutions	Regional Competitiveness Index – Institutions		63.0%	65.0%	66.0%
Infrastructure	Regional Competitiveness Index – Infrastructure		68.0%	72.0%	74.0%

Note: Darker (lighter) shading denotes higher (lower) regulatory distortion. Firms are classified by annual sales: micro enterprises (up to 150 UIT), small enterprises (150–1,700 UIT), and medium/large enterprises (above 1,700 UIT).
Source: National Enterprise Survey (ENE) 2015.

4. Methodology

4.1 Data

The analysis draws on two primary data sources. The first is ENE 2015, the first nationwide survey of formal firms, which includes information on 19,204 enterprises.[16] The dataset covers firm characteristics (such as business start-up, competition, and associative business culture), organizational and managerial features, product and input management, perceptions of government regulation, and productivity indicators.[17]

The ENE collects information for 18 economic activities[18] classified according to the International Standard Industrial Classification (ISIC). After data cleaning, the survey records just over 3 million jobs—equivalent to 23.4 % of total employment in 2015 (15.9 million, according to INEI).[19]

The second data source consists of indicators on (i) institutional quality, (ii) infrastructure, and (iii) economic performance compiled by the Competitiveness and Formalization Council (CNCF)[20] for the construction of the 2013–14 regional competitiveness index (ICR). The first two indicators are used to capture dimensions of the business environment, while the third serves as a control variable in explaining informal competition.

The institutional indicator is built from regional variables such as: budget execution efficiency at the regional and local government levels; average time to approve smaller (PEN 1 million) and larger (PEN 10 million) investment projects through the National Public Investment System (SNIP); revenue per urban inhabitant; formality rate; share of provincial and district municipalities with ratified administrative procedures (TUPA); average number of management and urban/rural development instruments; compliance rate with the Transparency and Access to Information Law; crime rate; and active or dormant social conflicts by region.

The regional infrastructure indicator draws on variables including road density; share of paved national and departmental roads; flight frequency; share of households with access to piped water, sewerage, electricity, mobile phone lines, and internet; and agricultural infrastructure investment per agricultural worker.

The economic performance indicator includes GDP per capita, the five-year GDP growth rate, the investment rate, financial system penetration, average growth in household consumption, and the share of adequately employed workers. Together, these pillars[21] assess regional performance in strengthening competitiveness and its influence on firm growth in Peru. In addition to the

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[16]The 2010 World Bank Enterprise Survey for Peru includes only 1,000 firms, all located in Lima, Arequipa, Trujillo, and Chiclayo.

[17]Labor productivity and TFP can be calculated only for micro and small enterprises, as ENE data do not include sales information for medium/large enterprises.

[18]Annex 1 reports the descriptive statistics by economic activity.

[19]Only firms that provided complete information are included.

[20]These variables range from 0 to 1, with 1 indicating excellent institutional quality, infrastructure, and economic performance.

[21]Although the ICR (compiled by the CNCF) includes eight pillars—institutional quality, infrastructure, economic performance, health, education, innovation, environment, and sectoral development—only the first three are considered here, as the remaining pillars were not statistically significant due to high intercorrelation.

variables listed in Table 1, the econometric estimations include the control variables summarized in Table 2, which are commonly used in the literature (Little, 1987; Nichter and Goldmark, 2005; Dabla-Norris et al., 2008; Dabla-Norris and Inchauste, 2007; González and Lamanna, 2007; Levy, 2010; Almeida and Carneiro, 2012; Vargas, 2015).

Table 2

Peru: Control variables included in the model

Variables	ENE 2015 variables	Response	Micro enterprise (64.7 %)	Small enterprise (28.2 %)	Medium/ Large enterprise (7.1 %)
Associativity	In 2014 did the firm belong to any business association or group?	Yes	6.9 %	10.7 %	18.7 %
		No	93.1 %	89.3 %	81.3 %
Firm age	Firm age (2014 minus start year)	–	10	13	15
Firm size	Average log of number of workers	–	1	2	4
Skilled workers	Share of skilled workers in total employment	–	48.6 %	52,9 %	69.8 %
Export status	In 2014 did the firm export?	Yes	2.4 %	6.3 %	12.5 %
		No	97.6 %	93.7 %	87.5 %
Accounting records	In 2014 did the firm keep accounting records (books or personal notes)?	Yes	97.4 %	99.9 %	99.9 %
		No	2.6 %	0.1 %	0.1 %
Tax benefits	In 2014 did the firm receive tax benefits?	Yes	5.2 %	9.6 %	23.5 %
		No	94.8 %	90.4 %	76.5 %
Gender	Gender of the firm's principal decision-maker	Male	70.5 %	72.5 %	79.6 %
		Female	29.5 %	27.5 %	20.4 %
Owner's education	Educational attainment of the firm owner	Tertiary education	60.6 %	82.9 %	94.7 %
		No tertiary education	39.4 %	17.1 %	5.3 %
Demand constraints	Is limited demand one of the three main constraints to firm growth?	Yes	38.2 %	33.2 %	35.2 %
		No	61.8 %	66.8 %	64.8 %

Source: National Enterprise Survey (ENE) 2015.

Empirical Strategy

To estimate the effect of business environment distortions on firm stagnation, the analysis uses an ordered dependent variable Y_i, which, based on firms' 2014 sales, takes three values: (i) 1 for micro enterprises (sales up to 150 UIT); (ii) 2 for small enterprises (sales between 150 and 1,700 UIT); and (iii) 3 for medium/large enterprises (sales above 1,700 UIT). The observed variable Y_i, conditional on the regressors W_i, is derived from a latent variable Y_i^* representing

the firm's underlying level of economic performance or sales:

$$Y_i^* = W_i'\beta + \varepsilon_{1i} \tag{1}$$

where W_i includes explanatory variables capturing regulatory distortions (tax T and labor L), financial constraints (credit C), institutional quality (I), infrastructure conditions (G), and informal competition (CI). Control variables (X) are listed in Tables 1 and 2. The parameter vector β is to be estimated, and ε_{1i} denotes the error term. Given threshold parameters $\alpha_1 < \alpha_2$, the observed firm category is defined as:

$$Y = \begin{cases} 1 & \text{if } Y_i^* < \alpha_1 \quad \text{(micro enterprise)}, \\ 2 & \text{if } \alpha_1 \le Y_i^* \le \alpha_2 \quad \text{(small enterprise)}, \\ 3 & \text{if } Y_i^* > \alpha_2 \quad \text{(medium/large enterprise)}. \end{cases}$$

Since the intervals between threshold values are not assumed to be uniform, a linear regression model would be inappropriate. Based on the definitions above, the probability of a firm belonging to a given category is specified as:

$$\Pr(Y = 1 \mid W_i) = \Pr(Y_i^* < \alpha_1 \mid W_i) = F(\alpha_1 - W_i'\beta) \tag{2}$$

$$\Pr(Y = 2 \mid W_i) = \Pr(\alpha_1 \le Y_i^* \le \alpha_2 \mid W_i) = F(\alpha_2 - W_i'\beta) - F(\alpha_1 - W_i'\beta) \tag{3}$$

$$\Pr(Y = 3 \mid W_i) = \Pr(Y_i^* > \alpha_2 \mid W_i) = 1 - F(\alpha_2 - W_i'\beta) \tag{4}$$

In equations (2)–(4), $F(\cdot)$ denotes the cumulative distribution function, assumed to follow either the standard Normal, $\Phi(\cdot; W_i'\beta)$, or the logistic, $\Lambda(\cdot; W_i'\beta)$, leading to the ordered probit or ordered logit model, respectively. The ordered specification exploits the hierarchical structure of firm categories and estimates marginal effects across levels, avoiding the asymmetry and truncation issues inherent in sales measured in monetary units (Greene, 2018; Long and Freese, 2014). For all probabilities to be positive, the condition $0 < \alpha_1 < \alpha_2$ must hold. These threshold parameters are estimated jointly with β, allowing computation of predicted probabilities for each firm category.[22] Statistically significant estimates of the thresholds (α_1, α_2) indicate that the categories are meaningfully ordered.

The parameter vectors α_1, α_2, and β are estimated by maximum likelihood. The contribution of each observation i to the log-likelihood function is given by:

$$\begin{aligned} \ln L_i(\alpha_1, \alpha_2, \beta) = \ & 1\{Y_i = 1\} \ln[F(\alpha_1 - W_i'\beta)] \\ & + 1\{Y_i = 2\} \ln[F(\alpha_2 - W_i'\beta) - F(\alpha_1 - W_i'\beta)] \\ & + 1\{Y_i = 3\} \ln[1 - F(\alpha_2 - W_i'\beta)] \end{aligned} \tag{5}$$

As in the binary case, the coefficients have no direct interpretation apart from their role within the density function. Their signs, however, indicate whether a variable increases or decreases

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[22]The probabilities across all four categories must sum to 1 for any given set of explanatory variables.

the probability of being in the highest category,[23] and the opposite for the lowest one. For intermediate categories, the direction of the effect cannot be determined *a priori*. As in other discrete choice models, the focus lies on marginal effects rather than on the coefficients themselves. Since marginal effects across all categories must sum to zero, a change in any explanatory variable redistributes probability mass among them.

Consistent estimation of the coefficients in expression (5) is possible only in the absence of endogeneity. However, as suggested by Dabla-Norris and Inchauste (2007), informal competition represents an important channel through which regulatory distortions can affect firm growth. Therefore, it is appropriate to estimate an ordered model with instrumental variables, where informal competition (CI) is specified as follows:

$$CI_i^* = \theta[Z_i, W_i] + \varepsilon_i \tag{6}$$

CI is a binary variable that takes the value 1 if informal competition is reported as a constraint to growth and formal firms compete with informal ones in their main product market, and 0 otherwise. CI_i is the corresponding latent variable associated with the probit model. Here, θ denotes the parameters to be estimated, including θ_1, α_2, and β. Assuming that the sample is independent and identically distributed, the log-likelihood function can be written as:

$$\ln L_i(\alpha_1, \alpha_2, \beta) = 1\{C_i = 1\}\ln[\theta(Z_i)] + (1 - C_i)\ln(1 - \theta(Z_i)) \tag{7}$$

The instrumental-variable ordered model jointly estimates expressions (5) and (7). In this case, Z_i is the exclusion instrument, which must be correlated with informal competition and, by construction, with the latent variable Y_i^* representing the underlying level of firm performance or sales. No direct correlation with the observed categorical variable Y_i is required, since the latter is a discretized version of Y_i^* (Roodman, 2009). Based on the available ENE data, the instrument used is a binary variable equal to 1 if the firm reports high competition in its main product market and 0 otherwise.

The vector Z_{2i} includes exogenous controls for whether the firm exports, whether it has access to formal credit, and the ICR.[24] These variables enter the first-stage regression predicting CI and are chosen based on data availability and the guidance of González and Lamanna (2007),[25] to mitigate potential bias from omitted variables (Vargas, 2015).

The validity and relevance of the instruments were empirically verified. The variable capturing high competition in firms' main markets shows a significant correlation with the endogenous variable of informal competition, confirming its relevance. Export status and access to formal credit reflect firms' degree of integration into the formal market and their financial capacity—factors

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[23]A positive coefficient indicates a positive relationship with the highest category and a negative one with the lowest.

[24]Based on (i) per capita income, (ii) average GDP growth over the past five years, (iii) investment rate, (iv) financial system penetration, (v) average household consumption growth over the past three years, and (vi) the regional share of adequate employment (CNCF).

[25]González and Lamanna (2007) model firms' likelihood of reporting informal competition among their top three growth constraints, using variables for credit access, export status, country and industry fixed effects, and capacity utilization as a proxy for productivity. The latter does not show the expected negative sign.

that shape perceptions of competition but do not directly affect performance once other covariates are controlled for. The ICR, constructed from indicators of infrastructure, human capital, and institutional quality, represents a structural factor exogenous to firms' microeconomic environment. The instruments' joint significance and exclusion validity were also confirmed through the overidentification test.

The system of equations defined by (5) and (7) is estimated using the conditional mixed process (CMP) estimator, which applies instrumental variables within an ordered probit framework. The CMP estimator is suitable for two types of models: (i) those with a recursive data-generating process, and (ii) those with simultaneous equations in which valid instruments allow the system to be expressed recursively, as in two-stage least squares estimation. The CMP estimates parameters by maximum likelihood under the assumption of a multivariate normal distribution. This approach accounts for the potential endogeneity of an endogenous variable that is discrete rather than continuous (Roodman, 2009; Vargas, 2015). The following section presents the results of the econometric estimations.

5.   Results

The analysis proceeds in six stages. In the first stage, the best specification for estimating equation (5) is selected using an ordered logit model. The selection criteria are: (i) coefficient signs consistent with economic theory; (ii) statistical significance at the 5 % level; (iii) satisfactory goodness of fit; and (iv) predicted probabilities that approximate the empirical distribution of firms by sales size (64.7 % micro, 28.2 % small, and 7.1 % medium/large).

In the second stage, the preferred specification from the previous step is re-estimated using an ordered probit model. The ordered logit and ordered probit results are compared using the Hausman test. If the null hypothesis of coefficient equality is rejected at the 95 % confidence level, the ordered logit model is retained as the preferred specification.

In the third stage, the best specification identified in the previous step is used to jointly estimate equations (5) and (7) through the CMP estimator, which applies instrumental variables within an ordered probit framework. This approach accounts for the potential endogeneity of informal competition (CI), a binary rather than continuous variable.

The fourth stage compares results from: (i) estimating only equation (5), based on the model selected in stage two, and (ii) jointly estimating (5) and (7) using the IV–ordered probit specification. If the null hypothesis of exogeneity cannot be rejected,[26] estimating only (5) yields consistent estimators. If exogeneity is rejected, joint estimation of (5) and (7) provides more appropriate results.

In the fifth stage, marginal effects from the preferred model are presented to identify which business-environment distortions most strongly explain firm stagnation and whether the effects differ across types of distortions. Finally, in the sixth stage, changes in the probabilities of a firm being micro, small, or medium/large are simulated based on improvements in business environment conditions.

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[26]This test assesses the presence of endogeneity when estimating equation (5) alone.

Selecting the Best Model

To identify the most suitable specification for equation (5), six nested models are estimated using an ordered probit framework. The final specification is then compared with an ordered logit model. Table 3 indicates that Model 1 is discarded because the coefficient associated with the ICR (infrastructure) is negative. This occurs because the regional fixed effects—Coast, Highlands, and Jungle—are correlated with regional infrastructure development at 0.78, –0.52, and –0.49, respectively. Model 2 is also excluded, as the coefficient for access to credit for fixed–asset investment is negative, contrary to expectations. This result is inconsistent with the notion that working capital—typically associated with lower default ratios—is the key driver of firm growth.

Similarly, Model 3 is excluded because the coefficient associated with consumer credit is negative. While this may seem counterintuitive, it likely reflects that such financing constrains the allocation of resources toward productive business activities. Model 4 is also discarded because the coefficient on firm age is statistically indistinguishable from zero. This occurs because other control variables absorb its effect through correlation, including tax benefits (0.10), firm size (0.35), export status (0.16), and managers' educational attainment (0.12).

Model 5 is also excluded, as including fixed effects by economic activity does not improve the robustness of the dependent variable's predictability. It should be noted that the competitiveness indicators already incorporate regional fixed effects that may not be fully captured by other variables. Therefore, Model 6 is selected as the preferred specification to explain the determinants of firm stagnation.

The selection of this model is based on both theoretical and empirical criteria.[27] First, it includes the full set of regulatory, institutional quality, infrastructure, and informal competition variables, all with expected signs and statistically significant even at the 1% level. Second, it fits the observed firm-size distribution performance, classifying 64.4% of firms as micro, 28.2% as small, and 7.1% as medium/large. The selected specification (Model 6) is then estimated using both ordered logit and ordered probit models. To compare the two, the classical Hausman (1978) test is applied, contrasting the estimated coefficient vectors and their variance–covariance matrices under the null hypothesis of parameter equality. The test compares two estimators that are both consistent under the null hypothesis, but only one—typically the probit—is efficient. Under the alternative, however, this efficient estimator becomes inconsistent (Long and Freese, 2014; Greene, 2018).

Results in columns 2 and 3 of Table 4 show that both estimation methods yield coefficients with the expected signs and strong statistical significance, except for the share of skilled workers in the ordered probit model. Nevertheless, the Hausman test rejects the null hypothesis of parameter equality at the 95% confidence level, suggesting that the ordered logit model provides a more appropriate and robust specification for explaining firms' sales performance.[28]

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[27]The Akaike and Bayesian information criteria (AIC and BIC, respectively) confirm that Model 6 offers a good balance between fit and parsimony, supporting its selection as the final specification.

[28]Coefficient equality was also verified, yielding consistent results.

Table 3

Best ordered logit specification explaining firm stagnation

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Tax regulations						
Difficulty paying taxes	−0.16***	−0.17***	−0.07***	−0.08***	−0.08***	−0.12***
Intensity of Tax Authority audits	−0.52***	−0.51***	−0.45***	−0.44***	−0.46***	−0.46***
Credit access						
Working-capital credit	0.61***	0.61***	0.62***	0.60***	0.60***	0.60***
Fixed-investment credit	−0.10***	−0.10***				
Consumer credit	−0.06***	−0.06***	−0.02**			
Financing as a growth constraint	−0.45***	−0.44***	−0.36***	−0.37***	−0.37***	−0.38***
Informal competition						
Informal competition as a growth constraint	−0.73***	−0.72***	−0.63***	−0.63***	−0.62***	−0.55***
Competition from informal firms	−0.13***	−0.14***	−0.07***	−0.07***	−0.08***	−0.07***
Institutions						
RCI – institutions	2.77***	1.60***	1.55***	1.52***	1.57***	1.33***
Infrastructure						
RCI – infrastructure	−0.55***	1.18***	1.63***	1.62***	1.65***	1.59***
Controls						
Accounting records	3.64***	3.59***	3.87***	3.87***	3.89***	3.81***
Tax benefits	0.22***	0.23***	0.23***	0.23***	0.22***	0.26***
Export status	0.76***	0.77***	0.89***	0.89***	0.88***	0.81***
Owner's education	0.78***	0.77***	0.84***	0.84***	0.85***	0.86***
Associativity	0.13***	0.12***	0.09***	0.09***	0.13***	0.07***
Firm age	0.00***	0.00***	0.00***	0.00***		
Firm size	1.23***	1.23***	1.33***	1.33***	1.34***	1.20***
Skilled workers	−0.09***	−0.08***	0.36***	0.36***	0.36***	0.07***
Demand constraints	−0.30***	−0.28***	−0.22***	−0.22***	−0.21***	−0.22***
Manager's gender	0.24***	0.25***	0.22***	0.22***	0.21***	0.16***
Industry dummies (15)	Yes***	Yes***	Yes***	Yes***	Yes***	No
Region dummies (3)	Yes***	No	Yes***	No	No	No
Observations	187,606	187,606	187,606	187,606	187,606	187,606
Threshold 1	8.61***	8.55***	8.90***	8.87***	8.91***	8.82***
Threshold 2	11.72***	11.65***	11.97***	11.94***	11.98***	11.85***
LR Chi^2 (joint significance)	48,999	48,873	50,092	49,695	48,728	47,935
Pseudo R^2	0.296	0.295	0.285	0.285	0.285	0.278
Robustness: predictive accuracy						
% of firms with Sales=1	64.48 %	64.48 %	64.50 %	64.50 %	64.49 %	64.44 %
% of firms with Sales=2	28.36 %	28.37 %	28.40 %	28.40 %	28.40 %	28.43 %
% of firms with Sales=3	7.15 %	7.14 %	7.10 %	7.09 %	7.10 %	7.13 %

Note: Estimates include robust standard errors. Asterisks denote statistical significance (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Source: National Enterprise Survey (ENE) 2015.

PUCP

Table 4

Determinants of firm stagnation: ordered logit (*probit*) vs. IV-ordered *probit*

Variables	Ordered Logit	Ordered Probit	IV-Ordered Probit
Tax regulations			
Difficulty paying taxes	−0.12***	−0.07***	−0.03***
Intensity of Tax Authority audits	−0.46***	−0.25***	−0.24***
Credit access			
Working-capital credit	0.60***	0.31***	0.48***
Financing as a growth constraint	−0.38***	−0.22***	−0.15***
Informal competition			
Informal competition as a growth constraint	−0.55***	−0.33***	–
Competition from informal firms	−0.07***	−0.07***	–
Informal competition as growth constraint and competition from informal firms	–	–	−0.47***
Institutions			
RCI – institutions	1.33***	0.76***	0.98***
Infrastructure			
RCI – infrastructure	1.59***	0.83***	1.33***
Controls			
Accounting records	3.81***	1.83***	2.29***
Tax benefits	0.26***	0.15***	0.55***
Export status	0.81***	0.48***	0.44***
Owner's education	0.86***	0.49***	0.71***
Associativity	0.07***	0.07***	0.22***
Firm size	1.20***	0.67***	
Skilled workers	0.07***	0.01***	0.13***
Demand constraints	−0.22***	−0.14***	−0.13***
Manager's gender	0.16***	0.09***	0.06***
Observations	187,606	187,606	187,674
Threshold 1	8.82***	4.57***	4.62***
Threshold 2	11.85***	6.25***	5.90***
Probabilidad Ho: athrho=0			0.04
Pseudo R^2	0.278	0.278	
LR Chi^2 (joint significance)	47,935	55,881	29,067
Pseudo R^2	0.278	0.278	
Robustness: predictive accuracy			
% of firms with Sales=1	64.69 %	64.54 %	64.42 %
% of firms with Sales=2	28.20 %	28.53 %	28.39 %
% of firms with Sales=3	7.11 %	7.12 %	7.20 %
Hausman test	**Probability = 0.000**		

Note: Estimates include robust standard errors. Asterisks denote statistical significance (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). In the IV-ordered *probit* estimation, informal competition is instrumented using a binary variable equal to 1 if the firm reports high competition in its main product market, and 0 otherwise. Control variables—including (i) access to formal credit, (ii) export status, and (iii) the ICR—are statistically significant at the 5 % level.
Source: National Enterprise Survey (ENE) 2015.

Since the ordered logit model may suffer from endogeneity—given that informal competition can itself be affected by regulatory distortions—the CMP estimator is employed. This approach jointly estimates equations (5) and (7) using an IV–ordered probit specification, under the following considerations:

- The logarithm of the number of employees was tested in preliminary models but excluded from the final specification due to collinearity and informational redundancy. The variance inflation factor (VIF) exceeded 10 for variables also capturing firm size—such as export status, access to credit, and the ICR. Its inclusion inflated standard errors and reduced coefficient precision. Accordingly, it was dropped to preserve model parsimony and stability without materially affecting information on firm scale.

- Since two variables were initially related to informal competition and few instruments were available, a single indicator of informal competition was constructed by combining both. The resulting binary variable equals 1 if informal competition is reported as a growth constraint *and* the firm faces informal rivals in its main product market, and 0 otherwise.

- The instrument used is a binary variable equal to 1 if the firm reports high competition in its main product market, and 0 otherwise. This variable satisfies the relevance condition (significant correlation of 0.15 with the endogenous regressor at the 5 % level) and the exogeneity condition (insignificant correlation of 0.01 with firm sales at the 10 % level).

- The estimation of informal competition includes the following control variables: (i) a dummy for access to international markets, (ii) a dummy for access to formal credit, and (iii) the ICR. These controls are selected based on data availability and prior literature on the determinants of informal competition (González and Lamanna, 2007), to mitigate potential omitted-variable bias (Vargas, 2015).

Results are presented in the last column of Table 4. The estimated parameters are statistically significant—even at the 1 % level—with expected signs and strong predictive power for the dependent variable. The null hypothesis of exogeneity is rejected at the 5 % level ($p = 0.04$), confirming that joint estimation of equations (5) and (7) using the IV–ordered probit model yields the most appropriate specification.

Marginal Effects

The coefficients reported in Table 4 indicate only the direction of each variable's impact on the probability of belonging to the highest category (medium/large enterprises). The probability of being in the lowest category (micro enterprises) moves in the opposite direction, while the effect on the intermediate category (small enterprises) cannot be determined a priori and must therefore be assessed through the marginal effects. Accordingly, Table 5 presents the marginal effects estimated from the IV–ordered probit model.

Tax regulatory complexity increases the likelihood of a firm being a micro enterprise by 10 pp, while reducing the probabilities of being small and medium/large by 8 pp and 2 pp, respectively.

Limited access to working-capital credit and broader financial constraints increase the probability of being a micro enterprise by 23 pp and lower the probabilities of being small and medium/large by 17 pp and 6 pp, respectively. Similarly, when informal competition is reported as a key growth constraint—and firms compete directly with informal businesses in their main product or service market—the probability of being a micro enterprise rises by 16 pp, while the probabilities of being small and medium/large fall by 13 pp and 3 pp, respectively. A one-standard-deviation decline in institutional and infrastructure competitiveness also raises the probability of being a micro enterprise by 8 pp and reduces the probabilities of being small and medium/large by 6 pp and 2 pp, respectively.

Table 5

Marginal effects: IV-ordered *probit*

Variables	Micro enterprise	Small enterprise	Medium/Large enterprise
Tax regulations			
Difficulty paying taxes	0.01***	−0.01***	−0.00***
Intensity of Tax Authority audits	0.09***	−0.07***	−0.02***
Credit access			
Working-capital credit	−0.18***	−0.13***	0.05***
Financing as a growth constraint	0.05***	−0.04***	−0.01***
Informal competition			
Informal competition as a growth constraint and Competition from informal firms	0.16***	−0.13***	−0.03***
Institutions[1]			
RCI – institutions	−0.02***	0.01***	0.01***
Infrastructure[1]			
RCI – infrastructure	−0.06***	0.05***	0.01***
Controls			
Accounting records	−0.33***	0.29***	0.04***
Tax benefits	−0.21***	0.14***	0.07***
Owner's education	−0.24***	0.18***	0.06***
Export status	−0.17***	0.11***	0.06***
Associativity	−0.08***	0.06***	0.02***
Demand constraints	0.05***	−0.04***	−0.01***
Skilled workers	−0.05	0.04	0.01
Manager's gender	−0.02***	0.02***	0.00***

Note: Estimates include robust standard errors. Asterisks denote statistical significance (*p<0.1, **p<0.05, ***p<0.01).

[1] Since the ICRs range from 0 to 1, the marginal effects (ME) are adjusted using each variable's standard deviation: ME × sd(ICR), where sd(ICR) is the standard deviation of the regional competitiveness index. The standard deviations for institutional and infrastructure competitiveness are 0.055 and 0.132, respectively.

Source: National Enterprise Survey (ENE) 2015.

Managerial capabilities—reflected in higher educational attainment of firm owners, stronger business networks, and access to international markets—reduce the probability of remaining a micro enterprise by 49 pp. This finding highlights the importance of management quality as a driver of firm growth, influencing the adoption of new production methods and designs and

enhancing firms' capacity to adapt to uncertainty and volatility (Kanis et al., 2004; Bloom et al., 2013; Gennaioli et al., 2013; Akcigit et al., 2015).

The results show that regulatory distortions have heterogeneous effects on firm stagnation. The main factors preventing firms from moving beyond the micro or small category are: (i) limited access to credit, (ii) aggressive tax inspections by SUNAT, and (iii) informal competition. The latter affects formal firms through several channels. First, by operating outside tax and labor regulations, informal businesses can offer lower prices, creating unfair competition that compresses profit margins in the formal sector (Levy, 2010; Perry et al., 2007). Second, these practices constrain the growth of formal firms by limiting their market share, particularly in commerce and services, where informality is most prevalent (Fajnzylber, 2007; La Porta and Shleifer, 2014). Third, informal competition creates disincentives for scaling up, as transitioning fully into formality entails additional costs not faced by informal rivals (Loayza, 2008; Dabla-Norris et al., 2008). This dynamic perpetuates a fragmented business structure characterized by low investment, weak innovation, and poor productivity performance (Pagés, 2010; Busso et al., 2012).

The econometric results suggest plausible causal links between a dominant informal environment and the structural stagnation of formal firms, underscoring the need for policy interventions aimed at reducing these distortions. Strengthening institutions and improving regional infrastructure emerge as the most critical factors enabling firms to transition into the medium or large category. It is worth noting that estimates obtained from the IV-ordered probit differ from those produced by the ordered logit model. Annex 2 indicates that the marginal effects from the latter are biased and exhibit virtually no impact on the probability of a firm being medium or large.

Regulatory Framework Improvements

Based on the marginal effects estimated in the previous subsection, this section presents the probabilities of firms belonging to each size segment under alternative regulatory scenarios. Two counterfactual cases are proposed relative to the current (neutral) situation:
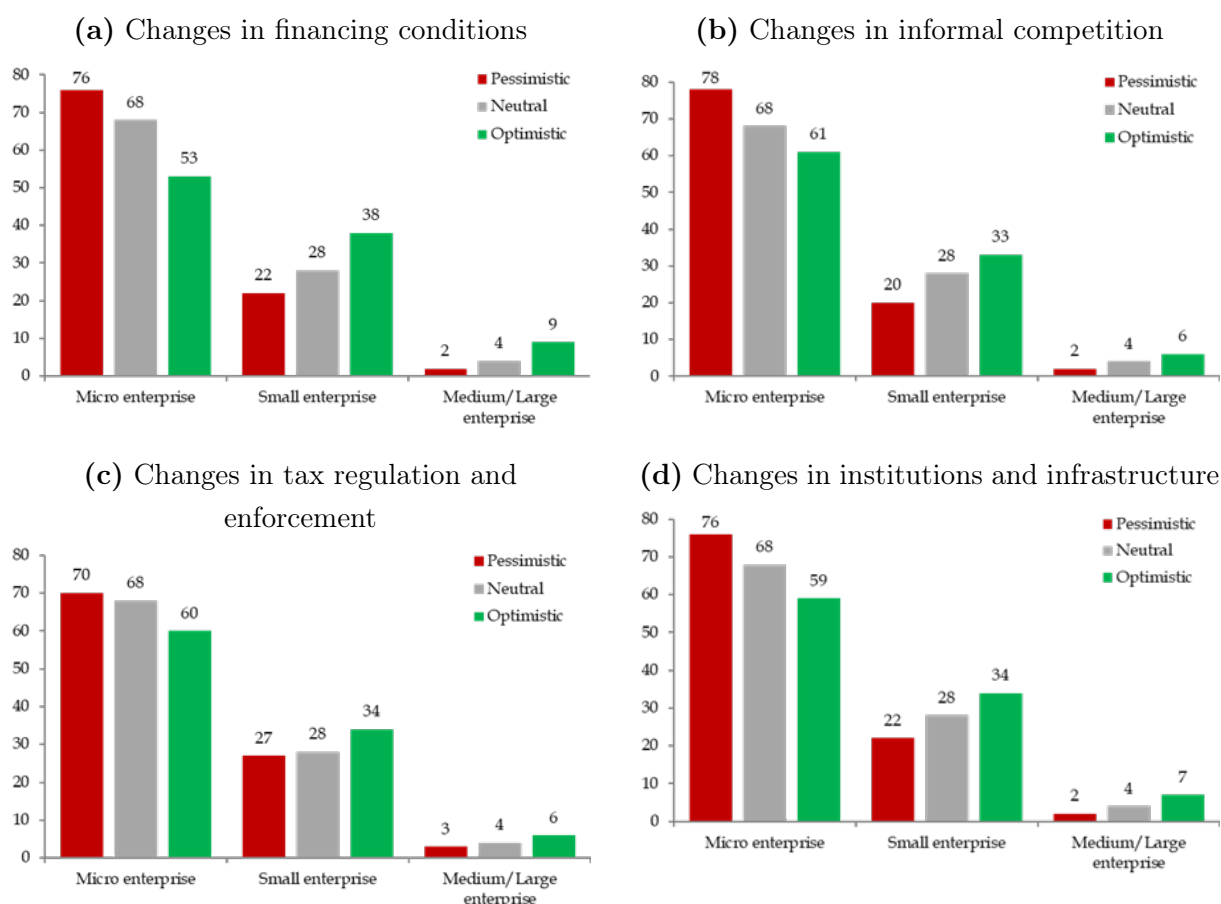
- **Pessimistic scenario**: The probability of firm size classification is calculated under the following conditions: (i) no firm has access to credit; (ii) all firms consider the tax system excessively regulated; (iii) all firms identify informal competition as their main constraint to growth and compete directly with informal businesses; and (iv) institutional and infrastructure indices deteriorate to their minimum observed levels (0.54 and 0.59, respectively).

- **Optimistic scenario**: The probability of firm size classification is calculated assuming that, among firms previously reporting tax-regulation issues: (i) all gain access to credit; (ii) the tax framework becomes more business-friendly; (iii) informal competition is no longer perceived as the main growth constraint; and (iv) institutional and infrastructure indices improve to 0.74 and 0.79, respectively.

Under an optimistic "credit revolution" scenario (Figure 1), the probability of a firm remaining micro falls by 15 pp (from 68 % to 53 %), while the probabilities of being small or medium/large rise by 10 pp (from 28 % to 38 %) and 5 pp (from 4 % to 9 %), respectively.

Similar patterns emerge when shifting from the neutral (current) scenario to a more optimistic one driven by lower informal competition and a business-friendlier tax and inspection regime. When informal competition declines, the likelihood of remaining a micro enterprise falls by 7 pp (from 68 % to 61 %), while the probabilities of being small and medium/large rise by 5 pp (from 28 % to 33 %) and 2 pp (from 4 % to 6 %), respectively. Under a more supportive tax and enforcement framework, the probability of being a micro enterprise drops by 8 pp (from 68 % to 60 %), with corresponding increases of 6 pp (from 28 % to 34 %) and 2 pp (from 4 % to 6 %) for small and medium/large enterprises.

Improvements in institutional quality and infrastructure—moving from the neutral to the optimistic scenario—reduce the likelihood of a firm remaining micro by 8 pp (from 68 % to 60 %), while increasing the probabilities of being small and medium/large by 6 pp (from 28 % to 34 %) and slightly over 2 pp (from 4 % to 6 %), respectively.

Figure 5. Probability of firm size by regulatory improvement (%)

(a) Changes in financing conditions

(b) Changes in informal competition

(c) Changes in tax regulation and enforcement

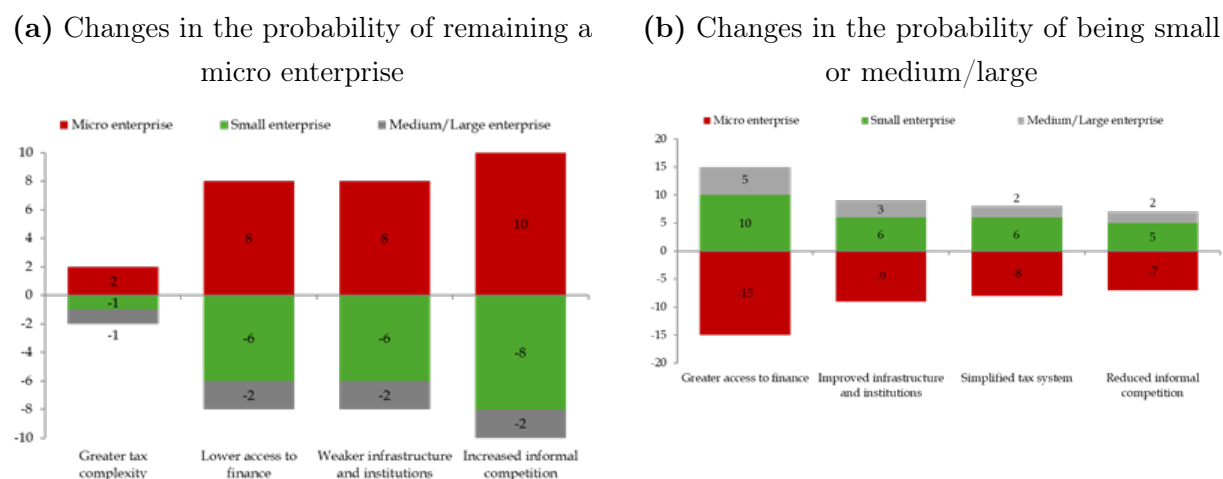**(d)** Changes in institutions and infrastructure

Note: For the ICR, the neutral scenario reflects the average values of the infrastructure (0.69) and institutional (0.64) components. All estimates are statistically significant at the 5 % level.

Source: Authors' calculations.

Taken together, improvements across the business environment—namely, (i) access to credit, (ii) reduced informal competition, (iii) a more efficient tax system, and (iv) stronger institutions

and infrastructure—lower the probability of firms remaining micro by 37 pp, while raising the probabilities of being small and medium/large by 26 pp and 11 pp, respectively (Figure 2).

Figure 6. Probability of firm size under alternative regulatory scenarios (%)

(a) Changes in the probability of remaining a micro enterprise

(b) Changes in the probability of being small or medium/large

Note: All estimates are statistically significant at the 5 % level.

Source: Authors' calculations.

To better gauge the potential impact of regulatory improvements, Table 6 reports simulated firm transitions across size categories under three counterfactual scenarios: (i) neutral to pessimistic, (ii) neutral to intermediate, and (iii) neutral to optimistic. Under improved financing conditions—moving from the neutral to the optimistic scenario—the share of micro firms would decline, equivalent to about 19,000 firms shifting into the small category and 9,000 into the medium/large group.

Similar reallocations are observed under (i) significant reductions in informal competition, (ii) more efficient tax regulation and enforcement, and (iii) stronger regional competitiveness. When conditions shift from the neutral to the optimistic scenario, a decline in informal competition corresponds to roughly 9,000 firms moving from micro to small and 3,000 to medium/large. A more streamlined tax and inspection framework is associated with about 10,000 micro firms transitioning to small and 4,000 to medium/large, while stronger regional competitiveness translates into approximately 11,000 firms shifting from micro to small and 4,000 to medium/large.

Table 6

Firm reallocation across size categories under changes in the business environment
(thousands of firms)

	Neutral to Pessimistic			Neutral to Optimistic		
	Micro enterprise	Small enterprise	Medium/Large enterprise	Micro enterprise	Small enterprise	Medium/Large enterprise
Changes in financing conditions	15	-12	-3	-28	19	9
Changes in infrastructure and institutions	15	-12	-3	-15	11	4
Changes in tax regulations	4	-3	-1	-14	10	4
Changes in informal competition	19	-15	-4	-12	9	3

Note: All estimates are statistically significant at the 5 % level.
Source: Authors' calculations.

6. Conclusions

This paper is the first to use firm-level data to assess the determinants of business fragmentation and stagnation in Peru, placing the microeconomic drivers of firm performance at the center of the policy and research agenda.

The findings show that market failures and regulatory distortions have significant effects on firm stagnation. Limited access to credit and competition from informal businesses are the main factors keeping firms in the lower sales segments. Additional constraints stem from the complexity of the tax system and from weak institutional and infrastructure conditions at the regional level.

Specifically, limited access to working capital and competition from informal firms increase the likelihood of a firm remaining micro by 18 pp and 16 pp, respectively. The complexity of the tax regime adds 10 pp to this probability, while inadequate infrastructure and institutional weaknesses contribute a further 8 pp, reinforcing the concentration of firms in the smallest size segment.

Accordingly, improvements in the business environment—through (i) greater access to credit, (ii) stronger institutions and infrastructure, (iii) a simpler tax system, and (iv) reduced informal competition—could lower the prevalence of micro enterprises by 39 pp and raise the shares of small and medium/large enterprises by 27 pp and 12 pp, respectively. The policy analysis underscores that substantial shifts in firm-size distribution can only be achieved through simultaneous, coordinated reforms across different dimensions of the business environment.

The estimates also indicate that managerial capabilities can partly offset the effects of a distorted business environment. Higher educational attainment of firm owners, stronger business networks, and access to international markets reduce the probability of a firm remaining micro by 49 pp and increase the likelihood of being in the upper size segment by 14 pp.

An important area for future research is to assess how labor regulations affect firm stagnation using upcoming ENE rounds. This was not feasible in this study for two reasons. First, 35 % of micro and 18 % of small enterprises do not use formal labor contracts, which biases responses to questions on labor regulation. Second, SUNAFIL began operations only in 2014—the year ENE 2015 was conducted—when the agency had few inspectors, primarily focused on medium/large

firms.

Finally, future studies should examine how Peru's highly fragmented firm structure affects aggregate productivity levels. The main empirical limitation for such analysis lies in the lack of data to estimate productivity among firms in the highest sales segment, as those with annual revenues above 1,700 UITs (Tax Units) did not report financial information in ENE 2015.

Appendix

Table A1

Firms' perceptions of the business environment by economic sector

Variables	ENE 2015 variables	Response	Manufacturing (13.3%)	Construction (3.9%)	Trade (47.7%)	Services (34.4%)	Utilities & Fishing (0.7%)
Tax regulations	How would you rate the procedures for complying with your tax obligations (filings, payments, and related requirements)?	Very difficult	41.4%	35.5%	35.5%	40.7%	33.9%
	How would you rate tax inspections and enforcement by the tax and municipal authorities?	Very easy Excessive	58.6% 76.5%	64.5% 83.1%	64.5% 78.2%	59.3% 82.4%	66.1% 70.7%
	Percentage of firms that do not use written labor contracts	Insufficient	23.5% 18.3%	16.9% 16.4%	21.8% 35.5%	17.6% 25.1%	29.3% 17.3%
Labor regulations	How would you rate the requirements set by the Ministry of Labor for hiring fixed-term and permanent workers, and for severance?	Very difficult	64.9%	56.4%	48.8%	52.8%	44.4%
	How would you rate compliance requirements for mandatory social contributions (health, pensions, etc.)?	Very easy Very difficult	35.1% 50.7%	43.6% 49.1%	51.2% 40.1%	47.2% 57.5%	55.6% 45.6%
	How would you rate labor inspections and enforcement by the Labor Inspection Authority (SUNAFIL)?	Very easy Excessive	49.3% 29.2%	50.9% 37.1%	59.9% 18.5%	42.5% 33.8%	54.4% 37.3%
		Insufficient	70.8%	62.9%	81.5%	66.2%	62.7%
Credit access	Did the firm use formal credit for working capital?	Yes	41.9%	37.1%	30.7%	22.4%	29.1%
	Did the firm use formal credit for fixed-asset investment?	No Yes	58.1% 11.2%	62.9% 10.7%	69.3% 8.7%	77.6% 5.8%	70.9% 6.2%
	Did the firm use personal or consumer credit for business purposes?	No Yes	88.8% 11.6%	90.3% 9.7%	87.9% 12.1%	94.2% 5.8%	93.8% 7.5%
	Is financing one of the three main constraints to firm growth?	No Yes	88.4% 34.4%	90.3% 39.8%	87.9% 32.9%	94.2% 37.6%	92.5% 34.5%
		No	65.6%	60.2%	67.1%	62.4%	65.5%
Informal competition	Is informal competition one of the three main constraints to firm growth?	Yes	34.3%	29.9%	51.0%	26.9%	39.5%
	For your main product or service, does the firm face informal competitors in the market?	No Yes	65.7% 86.9%	70.1% 78.3%	49.0% 87.2%	73.1% 71.9%	60.5% 67.8%
		No	13.1%	21.7%	12.8%	28.1%	32.2%
Institutions	Regional Competitiveness Index – Institutions		0.65	0.59	0.64	0.64	0.62
Infrastructure	Regional Competitiveness Index – Infrastructure		0.73	0.60	0.69	0.70	0.68

Table A2

Marginal effects: ordered logit model

Variables	Micro enterprise	Small enterprise	Medium and large enterprise
Tax regulatory framework			
Difficulty paying taxes	0.02***	-0.02***	-0.00***
Aggressiveness of SUNAT inspections	0.10***	-0.09***	-0.01***
Access to credit			
Access to credit for working capital	-0.13***	0.12***	0.01***
Financing as a growth constraint	0.08***	-0.07***	-0.01***
Informal competition			
Informal competition as a growth constraint	0.11***	-0.10***	-0.01***
Competes with informal firms	0.02***	-0.01***	-0.01***
Competitiveness 1/			
ICR Institutions 2013/2014	-0.02***	0.01***	0.00***
ICR Infrastructure 2013/2014	-0.04***	0.04***	0.00***
Controls			
Business associativity	-0.02***	0.02***	0.01***
Firm size	-0.26***	0.23***	0.02***
Educational level of workers	-0.01***	0.01***	0.00***
Access to external markets	-0.19***	0.17***	0.02***
Uses accounting books	-0.01***	0.01***	0.00***
Access to tax benefits	-0.06***	0.05***	0.01***
Gender of principal decision-maker	0.02***	-0.02***	-0.00***
Leader's educational level	-0.17***	0.15***	0.02***
Demand constraints	0.05***	-0.04***	-0.01***

Note: Estimates include robust standard errors. Asterisks denote statistical significance (*p<0.1, **p<0.05, ***p<0.01).

1/ Since the ICRs range from 0 to 1, the marginal effects (ME) are adjusted using each variable's standard deviation:

ME × sd(ICR), where sd(ICR) is the standard deviation of the regional competitiveness index. The standard deviations

for institutional and infrastructure competitiveness are 0.055 and 0.132, respectively.

Source: National Business Survey (ENE) 2015.

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