

BOX 3.3 Casting a shadow: Productivity in formal and informal firms

The average informal firm in emerging market and developing economies (EMDEs) is only one-quarter as productive as the average firm operating in the formal sector. Moreover, firms in the formal sector that face informal competition are, on average, only three-quarters as productive as those that do not. This suggests that competition from the informal sector can erode formal firms' market share and resources available to boost productivity where formal firms shoulder the additional cost of regulatory compliance. More effective governance and stronger control of corruption can help mitigate these effects.

The productivity differential between formal and informal firms is well established in the literature (Loayza and Rigolini 2006; Oviedo 2009). However, there is mixed evidence on the impact of a large informal sector on formal firms' productivity. Some studies suggest that the informal and formal sectors operate independently so that there are no productivity spillovers (La Porta and Shleifer 2014). Others report that competition from the informal sector may erode the profitability of firms that operate in the formal sector, which leads to limited resources to enhance firm productivity.¹ The aggregate effect depends on country characteristics.

Against this backdrop, this box documents the productivity gap between formal and informal firms and their interactions. Specifically, it addresses the following questions:

- How large is the productivity differential between formal and informal firms?
- To what extent are formal firms exposed to informal competition?
- How does informal competition affect the productivity of formal firms?

Productivity differential between formal and informal firms

Literature review. The literature documents that informal firms in EMDEs are less productive than formal firms, with a productivity gap ranging between 30 to 216 percent (Perry et al. 2007; La Porta and Shleifer 2008). This productivity gap between informal and formal firms is attributed to modest technological improvements, reliance on unskilled labor, limited economies of scale, and restricted access to services, markets, and funding.² Moreover, labor productivity varies within the informal sector along different dimensions such as firm size

and type of activity (Amin and Huang 2014; Amin and Islam 2015).

Methodology. In this box, the productivity gap between formal and informal firms is estimated using World Bank's Enterprise Survey data collected over a period spanning 2007 to 2014 for a cross-section of 4,036 informal firms and 7,558 formal firms in 18 EMDEs (Annex Table 3.1). Formal firms are those that comply with tax, customs, labor, and licensing regulations and register with the relevant authorities; unregistered firms belong to the informal sector. To estimate the productivity gap, a measure of labor productivity—log annual sales in 2009 U.S. dollars per worker—is regressed on a dummy variable that takes the value 1 for informal firms and 0 otherwise and a set of control variables capturing additional firm characteristics (employment size, time in business, location, sector, country).³

Lower productivity in informal than formal firms. Virtually across the board, firm-level labor productivity is much lower in the informal sector than in the formal sector (Annex Table 3.1).⁴ The productivity differentials vary widely in this sample, from 48 (Côte-d'Ivoire) to 93 percent (Argentina). On average across the whole sample, the productivity of informal firms is only one-quarter of the productivity of formal firms (Figure 3.3.1).

Drivers of productivity gap between informal and formal firms. Firm size, age, location in the capital city and manager experience are associated with significantly larger productivity gaps between informal and formal sectors (Figure 3.3.1, Annex Table 3.2).⁵ Formal firms appear to be better equipped to reap the productivity benefits from size, age, and location than informal firms.

³Commonly used revenue-based measures of productivity may conflate efficiency and price effects. Disentangling efficiency and price effects, by relying on physical productivity measures, may shed new light on productivity patterns, especially at the firm level (Jones and Nordhaus 2008; Cusolito and Maloney 2018).

⁴Exceptions are Democratic Republic of Congo and Cabo Verde possibly due to a low productivity of formal firms.

⁵The results are robust to comparing the coefficient estimates for the informal-firm dummy between a baseline regression including all controls and an alternative regression dropping each dummy one at a time (Annex Table 3.2).

Note: This box was prepared by Mohammad Amin and Cedric Okou.

¹Gonzalez and Lamanna (2007), Heredia et al. (2017), Mendi and Costamagna (2017).

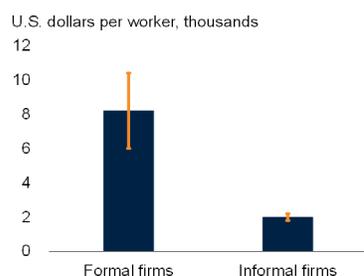
²Jovanovic (1982), Amaral and Quintin (2006), Galiani and Weinschelbaum (2012).

BOX 3.3 Casting a shadow: Productivity in formal and informal firms (continued)

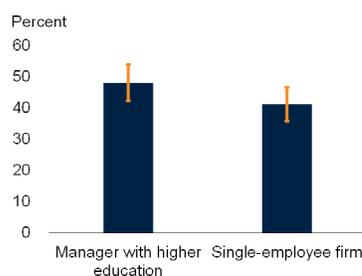
FIGURE 3.3.1 Characteristics of informal firms

Among informal firms, those with managers with higher education and those without any employees other than the owner are significantly more productive. The average informal firm in emerging market and developing economies has only one-quarter of the productivity of the average firm operating in the formal sector. This productivity differential between formal and informal firms is particularly pronounced among larger and older firms that operate in the capital city and are led by experienced managers.

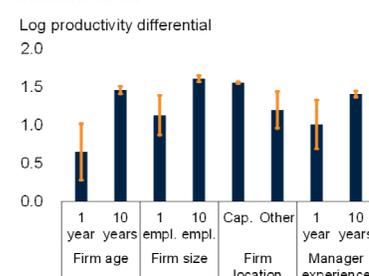
A. Average productivity in formal and informal firms



B. Productivity differential between different types of informal firms



C. Productivity differential between formal and informal firms, by type of informal firms



Source: World Bank.

Notes: World Bank's Enterprise Survey data for 135 countries (2008-18). Labor productivity is proxied by the annual sales in 2009 U.S. dollars per worker. Bars show the estimates with the corresponding ± 2 standard errors shown in whiskers.

A. Labor productivity in the average formal and average informal firm, controlling for firm characteristics (firm size and age, manufacturing sector activity, location in the capital city and country fixed effects) as shown in column (1) in Annex Table 3.2.

B. Cross-country average of percent difference between labor productivity in the median informal firm with a manager with higher education or without any employees other than the owner, and the median informal firm with a manager without higher education or with more employees than the owner. Estimates from Annex Table 3.1.

C. Difference in log of labor productivity between the average formal and average informal firm in each group, as estimated in coefficient estimates of Annex Table 3.2. "Other" stands for "not located in capital city"; "Cap." stands for "located in capital city."

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- Firm age.** As firms grow older, they are either sufficiently productive to survive or they disappear ("selection effect"; Brandt, Van Biesenbroeck, and Zhang 2012). In addition, learning from experience may have taught older firms productivity gains ("learning effect"; Luttmer 2007). These effects appear to be much more pronounced among formal firms than among informal firms. As a result, the productivity differential between formal and informal firms widens as the age of firms increases. Among one-year-old firms, informal firms have about half the productivity of formal firms. Among ten-year-old firms, informal firms have less than one-quarter the productivity of formal firms.
- Firm size.** Larger firms can reap economies of scale that raise their productivity compared to smaller firms. Again, in this sample, this effect appears to be stronger among formal firms than among informal firms. Among firms with one employee, informal firms have just under one-third the productivity of formal firms; among firms with ten employees, informal firms have less than one-quarter the productivity of formal firms.
- Firm location.** Capital cities are typically among countries' largest economic centers and so can offer agglomeration benefits: larger markets, better infrastructure to access markets and operate, a larger pool of workers, greater technology spillovers (Rosenthal and Strange 2004; Duranton and Puga 2004). Again, formal firms appear to be better able to benefit from these locational advantages, but the effect is economically modest (although statistically significant). Among firms operating inside the capital city, informal firms' productivity is 31 percent that of similar formal firms; outside the capital city, informal firms' productivity is 30 percent that of similar formal firms.
- Manager experience.** Managerial ability has been associated with higher productivity, through a variety of channels including hiring decisions and input choices (Fernandes 2008). Again, managerial experience appears to benefit formal firms' productivity more than informal firms' productivity. Among firms managed by managers with one year of experience, informal firms' productivity is just over one-third that of formal firms; among firms with

BOX 3.3 Casting a shadow: Productivity in formal and informal firms (*continued*)

managers with ten years of experience, informal firms' productivity is less than one-quarter that of formal firms.

Productivity differentials across informal firms. Labor productivity also differs across different types of informal firms, although the characteristics that are associated with higher labor productivity of informal firms differ across countries.⁶ In two-fifths of countries, informal firms managed by a manager with higher education or without any employees other than the owner are significantly more productive than other informal firms (column (1) in Annex Table 3.2). Other informal firm characteristics, such as operating in the services sector or being a startup, are accompanied by higher productivity in some countries but lower productivity in other countries.

Productivity of formal firms amid high informality

Impact of informal competition on formal firms: Theory. The extent of competition between formal and informal firms depends on the underlying reasons for the existence of informal firms.⁷

Informality as a survival strategy of unproductive firms. Low-productivity firms may be forced into informal operations or, even if they operate formally, employing informal workers because this may reduce their costs (Ulyssea 2018; Boly 2018). Operating in the informal sector and employing informal labor may, therefore, be a survival strategy for less-productive firms that belong to fundamentally different markets (La Porta and Shleifer 2014). "Surviving" informal firms are likely to operate in very different markets and sell different products than formal firms (La Porta and Shleifer 2014). In such circumstances, competition between informal and formal firms and its impact on formal firms may be limited.

Informality as an evasion strategy of productive firms. Some informal firms may be sufficiently productive to survive in

the formal sector yet choose to remain informal to benefit from the cost advantage of noncompliance with (possibly excessive) taxes and regulations (Maloney 2004; de Mel, McKenzie, and Woodruff 2011).⁸ Such informal firms could constitute an untapped potential for a productivity boost (de Soto 1989). On the other hand, they can create aggressive competition with formal firms that do shoulder the additional cost of tax and regulatory compliance. Such informal competition can reduce the profitability necessary for formal firms to invest in productivity-enhancing new technologies or to innovate, especially in a context of weak property rights enforcement.⁹ Alternatively, this very competition could force formal firms to increase productivity or, for the lowest-productivity ones, to exit.¹⁰

Extent of informal-firm competition for formal firms. In the World Bank's nationally representative survey data for 75,137 formal (registered) firms in 135 countries between 2008 and 2018, about 55 percent of formal firms reported facing competition from informal firms.¹¹ The share of informal firms competing against formal firms was about 60 percent in EMDEs, 13 percentage points higher than in advanced economies. The level of competition varied widely across countries, ranging from about 7 percent in Bhutan to 95 percent in Uganda. Smaller firms were significantly more likely to be exposed to informal competition than larger firms but there is little evidence of any other systematic difference between firms that were exposed and those that were not (Figure 3.3.2).

Impact of informal competition on the productivity of formal firms

Methodology. OLS regressions are used to estimate the difference in labor productivity between formal firms that compete against informal firms and those that do not. In the baseline specification, the dependent variable is again

⁸ Such circumstances are likely to be associated with an environment of weak regulatory and tax enforcement (Quintin 2008; Dabla-Norris, Gradstein, and Inchauste 2008; Ulyssea 2010; Benjamin and Mbaye 2012).

⁹ This has been documented for some Latin America countries, India, Poland, Portugal, Russia, and Turkey. For evidence, see Heredia et al. (2017), Perry et al. (2007), Farrell (2004), Capp, Elstrodt, and Jones (2005), Cunha (2006), Gonzalez and Lamanna (2007), Friesen and Wacker (2013), Allen and Schipper (2016), Iriyama, Kishore, and Talukda (2016), and Distinguin, Rugeintwari, and Tacneng (2016).

¹⁰ This has been documented for Egypt, see Ali and Najman (2017); Melitz (2003); Schipper (2016).

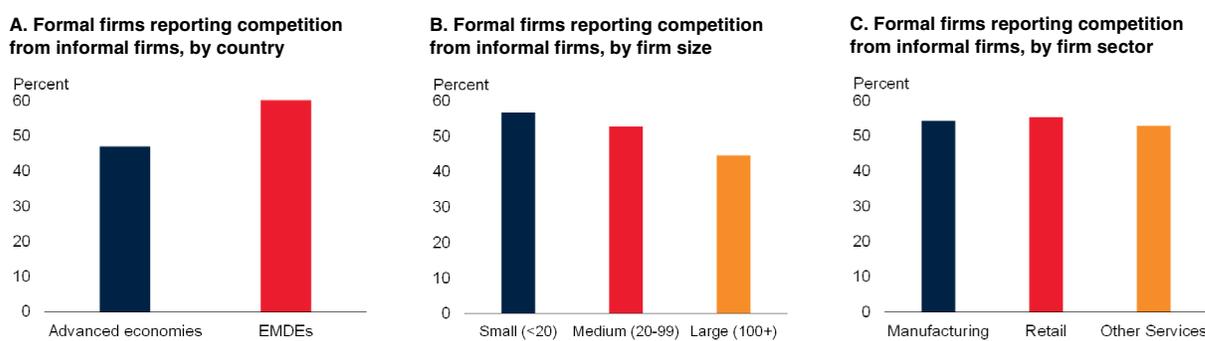
¹¹ In the World Bank's Enterprise Surveys, formal firms are asked the following question: "Does this establishment compete against unregistered or informal firms?"

⁶ Haltiwanger, Lane, and Spletzer (1999), Maloney (2004), |Deininger, Jin, and Sur (2007), de Mel, McKenzie, and Woodruff (2011), Grimm et al. (2012), Amin and Huang (2014), Amin and Islam (2015), Islam (2018).

⁷ This discussion assumes that firms are either formal or informal. In practice, the degree of informality can vary (Perry et al 2007; Ulyssea 2018). At the extensive margin are firms that operate fully informally, in product markets and labor markets. They sell their output informally and employ informal labor. At the intensive margin are firms that operate semi-formally: they sell their output into formal product markets but employ, in part, informal labor, as observed in EMDEs and LICs.

BOX 3.3 Casting a shadow: Productivity in formal and informal firms (continued)**FIGURE 3.3.2 Formal firms facing informal competition**

On average, more than half (55 percent) of formal firms reported facing informal competition. Nearly 60 percent of formal firms in EMDEs were exposed to informal competition whereas 47 percent of formal firms in advanced economies reported facing informal competition. The degree of informal competition reported by formal firms was higher for smaller than larger firms, but comparable across sectors or formal firms' productivity.



Source: World Bank.

Note: World Bank's Enterprise Survey data for 135 countries (2008-18). Figures show the shares of formal firms.

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labor productivity measured by the (log of) annual sales in 2009 U.S. dollars per worker. The main explanatory variable is the informal competition indicator proxied by the proportion of formal firms in a cell that report facing competition from informal firms. A cell is defined as a group of firms of similar size and in the same region and sector.¹²

Productivity gap between formal firms with and without informal competition. Formal firms that face informal competition are, on average, 24 percent less productive than those that do not (Figure 3.3.3; Annex Table 3.3). After controlling for the informal competition, formal firms in the manufacturing and retail industries have higher productivity than those in other services. Older, exporting, and foreign-owned formal firms also have higher productivity even if they face competition from informal firms.

Role of the business climate and development. Economic development and the business climate may substantially

shape the productivity gap between formal firms that face informal competition and those that do not. This is captured in interaction terms between the share of similar formal firms reporting informal competition and indicators of development (the logarithm of per capita GDP), the quality of business climate as proxied by the distance to the frontier in the Doing Business Index, the control of corruption of the World Governance Indicators, and the Business Freedom index of the Economic Freedom indicators (Annex Table 3.3). Higher GDP per capita, better control of corruption, and a business environment that is freer and closer to best-practices dampen the detrimental impact of informal competition on formal firm productivity.

- **Development.** The sample is split into those countries with per capita income in the highest quartile in the sample and those in the lowest quartile in the sample. Formal firms that face informal competition in the average country with the highest per capita incomes are only 14 percentage point less productive than formal firms that do not face such competition. In contrast, on average in countries in the lowest quartile of per capita incomes, formal firms facing informal competition are 30 percent less productive than those firms that do not face such competition.
- **Control of corruption.** Again, the sample is split into those countries in the quartile of countries with the

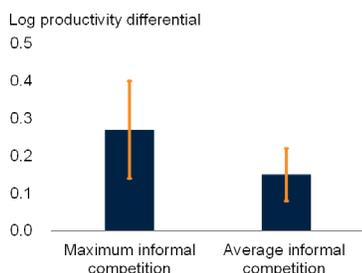
¹² As a caveat, the informal competition faced by a specific firm may also be driven by its productivity, thus generating endogeneity concerns. To address possible endogeneity issue, we use the proportion of formal firms facing informal competition in a group of firms of similar size in the same region and sector (a "cell") rather than a firm dummy. A cell proportion should be much less correlated with the productivity of a specific firm, and therefore, should be more robust to endogeneity concerns.

BOX 3.3 Casting a shadow: Productivity in formal and informal firms (continued)

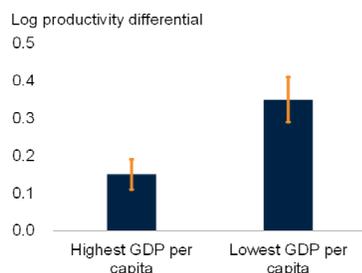
FIGURE 3.3.3 Productivity of formal firms facing informal competition

On average, formal firms that face informal competition have only three-quarters of the productivity of firms that do not face informal competition, after controlling for firm characteristics. Better business climates and governance and more economic development can narrow this productivity differential.

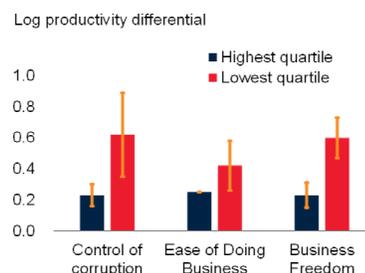
A. Productivity differential of formal firms with and without informal competition, by intensity



B. Productivity differential of formal firms with average informal competition and without, conditional on level of development



C. Productivity differential of formal firms with average informal competition and without, by business climate indicator



Source: World Bank.

Note: Based on coefficient estimates from Annex Table 3.3, which shows results from an OLS regression with labor productivity as the dependent variable, as proxied by annual sales (in 2009 U.S. dollars, in thousands, logs) per worker, in a sample of World Bank's Enterprise Survey data collected during 2007-14 for 4,036 informal firms and 7,558 formal firms in 18 countries. Bars show the estimates with the corresponding +/- 2 standard errors shown in whiskers.

A. Log productivity differential between formal firms facing informal competition and formal firms not facing informal competition. Maximum informal competition assumes that all firms in a cell face informal competition. Average informal competition assumes that 55 percent of firms in a cell face informal competition.

B-C. Log productivity differential between formal firms facing informal competition and formal firms not facing informal competition, conditional on development and institutional quality. It is assumed that 55 percent of firms in a cell face informal competition. Each bar conditions on the GDP per capita (B), control of corruption (C), ease of Doing Business (C), or Business Freedom index (C) of the median country in the top ("highest quartile") or bottom ("lowest quartile") quarter of countries in terms of GDP per capita, control of corruption, ease of Doing Business, or Business Freedom index.

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strongest control of corruption and those in the quartile with the weakest control of corruption. In countries with the strongest control of corruption, on average, formal firms that face informal competition are only 22 percentage point less productive than formal firms that do not face such competition, whereas in the countries with the weakest control of corruption, this differential grows to 35 percent.

- **Ease of Doing Business.** Similarly, the productivity differential between formal firms that face informal competition and those that do not might halve (to 21 percent) if a country like Angola (in the quartile of countries with the most difficult business climates) were to improve its business climate to the level of a country like the Former Yugoslav Republic of

Macedonia (among the countries with the most conducive business climates).

Conclusion

The productivity gap between informal and formal firms is substantial in EMDEs, averaging 75 percent in a sample of 18 EMDEs between 2007-14. Competition from informal firms also appears to weigh on the productivity of exposed formal firms: the productivity of formal firms that compete with informal firms is only three-quarters that of formal firms that do not compete with informal firms, after controlling for other firm characteristics. Improvements in the business climate, and economic development more broadly, can mitigate some of these negative productivity spillovers from informal to formal firms.