Gendered Laws, Informal Origins, and Subsequent Performance

Marie Hyland
Asif Islam

Abstract

This research explores the relationship between laws that discriminate on the basis of gender and the probability that a female-owned business begins operating in the informal sector. This is achieved by tracing the origins of formal businesses surveyed in the World Bank Enterprise Surveys and merging this with information on the level of legal equality between genders as measured by the Women, Business and the Law database. In addition, the research explores whether starting a business informally has any differential effect on subsequent firm performance depending on the gender of the owner(s). The results show that gender discriminatory laws increase the likelihood that firms with female owners will begin operations in the informal sector; as expected, this does not hold for enterprises that are solely owned by men. Furthermore, the research provides evidence that firms that began operations informally have poorer performance years later—a relationship that exists both for firms with female owners and for firms fully owned by men. The results show notable variation by region.

Gendered Laws, Informal Origins, and Subsequent Performance[1]

Marie Hyland and Asif Islam[2]

1. Introduction

The informal sector provides limited opportunities. It is the home of millions of businesses run by the poor. Many of them are reluctant entrepreneurs. They may exert tremendous effort and make a lot out of little, but the rewards are few. Often, informal businesses are too small in scale to improve livelihoods. Informality is widespread in developing economies, accounting for approximately one-third of GDP and 70 percent of employment (Loayza, 2016; Ohnsorge and Yu, 2021). Informal firms add only 15 percent of the value per employee of formal firms (La Porta and Shleifer, 2014). They do not provide a stable source of income. They are vulnerable to external shocks and poor infrastructure (Islam, 2019). And they rarely become formal. Thus, the choice of starting out in the informal or formal sector may chart the destiny of a business.

Women are well represented in the informal sector. In poorer developing economies, 92 percent of female workers are employed informally, which is higher than the percentage of male workers (87 percent). Further, in a majority of countries (56 percent), the percentage of female workers in informal employment exceeds the percentage of male workers.[3] Over 80 percent of women in non-agricultural jobs in South Asia are in informal employment. The corresponding figures for Sub-Saharan Africa and Latin America and the Caribbean are 74 percent and 54 percent, respectively.[4] In developing economies, the prevalence of self-employment is high; in low and lower-middle income economies, 55 percent of female employees are in self-employment; this compares to 9.7 percent in high-income economies.[5] The self-employed in developing economies can, for the vast majority, be categorized as self-employed without employees or unpaid family workers. As such, this high prevalence of self-employment may be indicative of limited opportunities in the formal sector and, thus, a large informal economy. A key question is what factors determine a woman's choice to engage in the informal versus the formal sector. More specifically, what influences the choice to start a business in the informal or the formal sector. This choice is likely tied to a woman's motivations for starting the business, as well as the economic, cultural, and legal environment in which she finds herself.

Evidence suggests that institutions matter. There has been burgeoning research showing that unequal or discriminatory laws affect the economic status of women, using data from the World Bank's Women

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[3] https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_711798.pdf
[4] https://www.unwomen.org/en/news/in-focus/csw61/women-in-informal-economy
[5] World Development Indicators [accessed: July 2, 2021].

Business and the Law (WBL) database (Hyland et al., 2020, 2021). The WBL database captures inequality in legislation across eight categories – mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pensions. Reforming gender discriminatory laws is associated with increased female labor force participation, business ownership, and may enable women to take up better jobs such as being the top manager of a formal establishment (Amin and Islam, 2015; Islam et al., 2019; Htun et al., 2019). Similar to how firm entry can be restricted through burdensome regulations (Djankov et al., 2002), we hypothesize that burdensome and unequal regulations may restrict entry of women-owned businesses in the formal sector, pushing them into the informal economy.

In this study we explore whether reforming discriminatory laws affects the choice of a female entrepreneur to start a business in the formal or the informal sector. We achieve this by tracing the origins of formal businesses surveyed in the World Bank Enterprise Survey database (WBES). Three important pieces of information are gathered – (i) the start date of the business; (ii) whether the business was formal (registered) at start; and (iii) whether the business is owned by a woman or a man. We match the year of birth of the business to the legal environment in the same year using the WBL database that documents unequal laws over the last 50 years. Piecing these data sources together allows us to estimate whether unequal laws increased the likelihood that a business with female owners would start operating informally vis-à-vis a business entirely owned by men. We further explore whether starting a business informally has any differential effect on subsequent firm performance depending on the gender of the owner(s). We find that discriminatory laws increase the likelihood that firms with female participation in ownership will start an informal business; as anticipated, the relationship does not hold for enterprises that are solely owned by men. The global finding appears to be driven by the association between gendered laws and informality in three regions; specifically, Sub-Saharan Africa, the Middle East and North Africa and South Asia. When looking at the relationship between starting informally and subsequent performance, we find that, in general, there is a penalty associated with starting informally, which exists both for firms with female participation in ownership and for firms fully owned by men.

There are a number of ways that unequal laws as captured by the WBL indicators can influence a woman's decision to engage in the formal or informal sector when undertaking a new entrepreneurial activity. For one, barriers in accessing finance due to direct discrimination or indirect restrictions in accessing assets may prevent women from having sufficient resources to start a business at the scale needed for the formal sector. Any such legal restrictions may force women to opt for small scale activities better suited in the informal sector. More draconian restrictions on women's mobility may force female entrepreneurs into

3

the informal sector so that they remain under the radar and avoid compliance with such oppressive laws. Furthermore, the provision of childcare may play an important role. If such provisions are not available, women may opt for more flexible arrangements in the informal sector instead of the more time intensive demands of starting a formal business. Evidence has shown that women find the informal sector attractive as it offers an easy balance between market and homecare activities (Maloney, 2004). Thus, the overall impact of legal discrimination may be a greater presence of women in the informal sector. Of course, many of the factors described above could lead women to abandon economic activities altogether. Thus, a negative relationship between informality and legal discrimination is not certain and is in need of empirical verification.

The informality that we analyze in the current study is of a particular type. The Enterprise Surveys only consider formal (i.e., registered) firms and, thus, when discussing informality in this context, we consider only those informal firms that eventually managed to become formal. In relation to the entire informal economy, these are likely to be a subset of high-performance informal firms; however, the question of whether they perform at the same level as their counterparts who were formal from the outset is an empirical one. Indeed, the relationship between whether or not a firm started informally and the performance of the business at the time of the survey is under-explored. Ayyagari et al. (2020) find that a firm's size when it begins operations is significant in explaining size and growth over its lifecycle, but do not make any statements whether formal status of the firm at birth matters. There are a number of ways the formal-informal status of firms at birth can have subsequent effects on performance. For one, the rare firms that transitioned from the informal to the formal sector may be extremely productive to have made that transition. And, thus, they may exhibit greater performance after formalizing (Williams et al., 2017; Williams and Kedir, 2017). On the other hand, starting off informally may entail huge opportunity costs in terms of accessing finance and growing at scale. Therefore, by the time a firm formalizes, there may be lost potential that can never be regained over time. Under this scenario, the firm may have lower performance than peers that started formally. Ultimately, the relationship between informal origins and subsequent performance remains an empirical question. This is especially true when it pertains to the gender of a firm's owner. There is acknowledgement that women's engagement in the informal sector is diverse consisting of necessity entrepreneurs engaging in informal activities as a means of survival and opportunity entrepreneurs that are looking to scale up and formalize but are held back (Maloney, 2004; Spring 2009; Williams and Gurtoo, 2011). In this study the firms we explore that began in the informal sector are likely to be opportunity entrepreneurs given that they eventually scaled up sufficiently to

formalize. We, of course, cannot rule out the possibility that some degree of formalization was due to registration drives undertaken by governments.

Exploring the choice of entering the informal sector is important given its omnipotence in developing economies. Informal sector size estimations range widely from 40 to 60 percent in Brazil (Henley and Arabsheibani, 2009), 30 to 33 percent in Tanzania (Bagachwa and Naho, 1995) and 20 percent of net domestic product in India (Chaudhuri, Schneider, and Chattopadhyay, 2006). Schneider, Buehn, and Montenegro (2010) estimate that the average size of the shadow economy as a percentage of official GDP is 25.1 percent in South Asia, 34.7 percent in Latin America and the Caribbean, and 38.4 percent in Sub-Saharan Africa. This is in contrast to 13.5 percent in the OECD. In terms of informal employment, Golub and Hayat (2014) estimate that in low-income Sub-Saharan African economies, the informal sector accounts for 80 to 97 percent of employment. In Bangladesh, 75 percent of firms are unregistered (De Giorgi, Ploenzke, and Rahman 2017). Furthermore, the informal sector may not decrease in size given that informal firms rarely become formal (La Porta and Shleifer 2014). Premature deindustrialization has resulted in a shift of labor toward the informal sector (Rodrik 2016). When the formal sector is unable to absorb rising labor force populations, the informal sector may end up absorbing them. There is much consensus that the informal sector is less productive and more stagnant than the formal sector (La Porta and Shleifer 2014). However, there is still much more to learn about the causes and effects of informality (see Schneider & Enste, 2000 and Ulyssea, 2020 for reviews). In summary, this study contributes to the literature in the following ways. It builds on the strands of literature on informality, discriminatory laws, women's participation in the economy, and firm performance. As of writing, this is, to the best of our knowledge, the first paper to trace the origins of firms and match them to the legal environment at that time to see whether the legal environment has a differential effect depending on the gender of the owner. Furthermore, we are unaware of other studies that have explored the relationship between the formal status of the firm at birth and the performance at the time of survey for women-owned firms relative to men-owned firms.

The rest of the paper is structured as follows: section 2 presents the data and empirical methodology; section 3 presents the empirical findings; a discussion of the findings is presented in section 4. Finally, section 5 concludes.

2. Data and empirical methodology

2.1 Data sources

<u>World Bank Enterprise Surveys</u>

The primary data source used in our analysis is nationally representative firm-level data from the World Bank Enterprise Surveys. The Enterprise Surveys are establishment-level surveys based on face-to-face interviews with firms' owners or top managers. The surveys are designed to provide a representative sample of firms in the nonagricultural, non-extractive formal private economy with five or more employees, and to ensure that the data are comparable across countries and over time. The surveys have high coverage in terms of topics including access to finance, corruption, infrastructure, crime, competition, labor, the business environment, and performance.

The surveys are based on a stratified random sampling; stratified by industry, firm size, and geographic region within a country. Firm size levels are 5-19 (small), 20-99 (medium), and 100+ (large) employees. For most economies, the sector breakdown is manufacturing, retail, and other services; however, for larger economies, certain manufacturing sub-sectors are selected as additional strata, based on their contribution to economic activity. The within-country regional stratification is based on which cities or regions collectively contain the majority of economic activity. Survey weights are calculated and can be applied in order to make inferences about the whole population of firms in a country.[6]

As of February 2021, the surveys had been completed using a global, internationally comparable methodology in 146 countries—we are able to match the firm level data with data on control variables for 141 countries.[7] In some countries, several waves of data collection have taken place; we use the most recent round of data collected for each country. While the Enterprise Surveys focus primarily on firms in developing economies, data have also been collected for several high-income countries and, therefore, our sample spans all regions and income categories.

<u>Women, Business and the Law index</u>

The Women, Business and the Law (WBL) index measures the legal inequalities that a woman faces as she navigates her working life, from the time she enters the workforce through to her retirement. There are 35 individual data points underlying the index, aggregated into the following eight indicators: The *Mobility*

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[6] Additional information on the Enterprise Survey methodology can be found at
https://www.enterprisesurveys.org/en/methodology
[7] The data we use in our analysis were published on February 16, 2021.

indicator examines laws that constrain a woman's freedom of movement. The *Workplace* indicator evaluates laws that may constrain a woman's ability to work. The *Pay* indicator assesses legislation that may affect a woman's pay. The *Marriage* indicator looks at how married men and woman are treated under the law. The *Parenthood* indicator assesses the legislation that may impact a woman's ability to partake in the workforce after having a child. The *Entrepreneurship* indicator examines how legislation may impact a woman's ability to start and run a business. The *Assets* indicator considers how the law may constrain a woman's ability to own and manage assets. Finally, the *Pension* indicator examines how the law may affect the size of a woman's pension upon her retirement. Each indicator is scaled from 0 to 100, where 100 is a perfect score indicating no legal gender discrimination. The aggregate WBL index is an unweighted average of the underlying eight indicators. The WBL data cover the period 1970–2020; according to the most recent data, the global average score is 76.1, indicating that women have, on average, just over three-quarters the rights of men in the areas covered by the index. [8]

Other macro-level variables

In our regressions examining the relationship between legal gender equality and the probability that a firm began informally, we control for income level, rule of law and religion. Income level is measured as real per capita gross domestic product (GDP), from the World Bank's World Development Indicators database.[9] Our measure of the rule of law is from the *Worldwide Governance Indicators* (WGI).[10] This variable captures the perceptions of citizens' confidence in and adherence to rules within their society; it captures the quality of contract enforcement, property rights, policing, the courts, and the likelihood of crime and violence (Kaufmann, Kraay and Mastruzzi, 2010).

Data on religion are from the Pew Research Center (2015). For each country, the data show the percentage of the population that belongs to each of the following religious groups: Islam, Hinduism, Christianity, Judaism, Buddhism, folk religions, other religions, and unaffiliated. The Pew data set projects global religious trends from 2010 to 2050; we use the 2010 values.

2.2 Descriptive statistics

The data displayed in Table 1 shows that, for the average firm in our sample, the WBL index score in the year the firm began operations was 65.9, implying that women had just under two-thirds of the rights of

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[8] A more detailed description of the index is available at https://wbl.worldbank.org/en/methodology and in Hyland, Djankov and Goldberg (2020).
[9] https://datatopics.worldbank.org/world-development-indicators/
[10] http://info.worldbank.org/governance/wgi/

men in the areas covered by the index. Real GDP per capita was approximately 5,700 USD in 2010 values. The average rule of law score for firms in our sample when they began operations was approximately -0.36; this variable, from the *Worldwide Governance Index* data has a maximum possible value 2.5, with a lower bound of -2.5—higher values corresponding to a better outcome. Table 1 also shows that Christianity is the main religion in the majority of countries included in our analysis, followed by Islam.

Turning next to the characteristics of firms in our data when they began operations, approximately 9.3 percent of firms started operations informally (i.e., they are formal enterprises now that were not registered when they began operating). There is enormous variation between countries in this regard, as illustrated by Figure 1. In five countries, more than one-third of firms that are now formal, began informally; these are Uganda, Iraq, Indonesia, Nigeria and the Democratic Republic of Congo. At the other end of the spectrum, there are 19 countries where less than 1 percent of firms began informally. Considering other characteristics of firms at the time they began operations, the average firm employed 18 workers when it started operating, but it is important to highlight that the standard deviation on this variable is high and that the median number of employees at firm commencement was only six. Only 6.4 percent of firms began exporting in the same year that they began operating.

Figure 1 Percentage of firms in each country that began informally
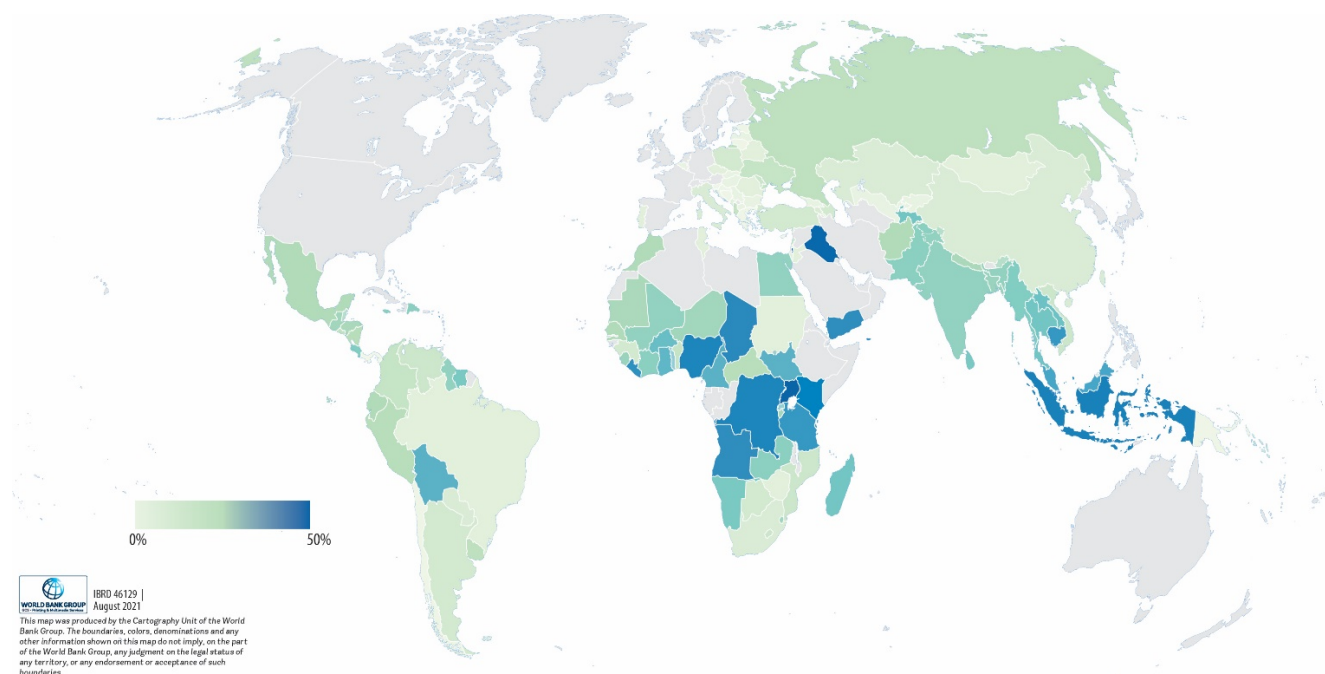
Source: Authors' calculations from Enterprise Survey data. Countries in grey are not included in the data.

Table 1 shows that, at the time of survey, approximately one-third of firms in the sample (32.7 percent) had at least one female owner, and just under 20 percent of firms had a female top manager. The average firm in the sample has been operating for 11 years and employs 32 workers (the median value is 11). Among the firms, 14.5 percent are part of a multi-establishment firm, 31 percent of firms offer formal training to their workforce and 43 percent of firms have a website. The average firm employs a manager who has just over 15 years of experience working in the sector, 11 percent of firms engage in exporting activity and 11 percent also have foreign owners. Almost 90 percent of firms have a checking or savings account, 40 percent of firms invested in fixed assets in the past fiscal year, while 55 percent experienced at least one power outage and 17 percent experienced losses due to crime.

Table 1 Descriptive statistics

	Number of observations	Mean	Standard deviation
Macro-level variables at time of firm birth:			
WBL index at year of firm birth	42,791	65.994	15.892
Real per capita GDP at year of firm birth (2010 constant $)	42,791	5692.290	10456.090
Rule of law at year of firm birth	42,791	-0.357	0.769
Main religion (country level)			
Christianity	42,791	0.634	0.482
Folk Religion	42,791	0.011	0.103
Hinduism	42,791	0.021	0.143
Islam	42,791	0.251	0.433
Judaism	42,791	0.005	0.068
Unaffiliated	42,791	0.023	0.149
Firm characteristics when they commenced operations:			
Began operations informally (Y/N)	42,791	0.093	0.290
Initial number of employees	42,791	18.251	110.478
Exported in first year of operations (Y/N)	42,791	0.064	0.245
Firm characteristics at time of survey:			
Female participation in ownership (Y/N)	43,743	0.327	0.469
Female manager (Y/N)	44,161	0.195	0.396
Age (years)	44,161	11.065	5.518
Number of employees	44,161	31.804	130.462
Part of a multi-establishment firm (Y/N)	44,161	0.145	0.352
Provides formal training (Y/N)	44,161	0.310	0.463
Has a website (Y/N)	44,161	0.434	0.496
Manager's experience in the sector (years)	44,161	15.192	9.360
Exporter (Y/N)	44,161	0.111	0.314
Foreign participation in ownership (Y/N)	44,161	0.111	0.314
Has a checking or savings account (Y/N)	44,161	0.882	0.322

Purchased fixed assets in the last fiscal year (Y/N)	44,161	0.401	0.490
Experienced a power outage in the last fiscal year (Y/N)	44,161	0.550	0.498
Experienced losses due to crime in the last fiscal year (Y/N)	44,161	0.166	0.372
Log of sales	44,161	15.958	3.047
Log of labor productivity	44,009	13.390	2.854

Note: survey weights, which have been rescaled so that each country in the sample is given equal weighting, are applied in the calculation of the means and standard deviations presented here.

2.3 Empirical methodology

Our estimation proceeds in two parts. In the first, we examine the correlation between legal gender equality and the likelihood that firms with and without female participation in ownership began their operations as an informal enterprise. We investigate this by estimating the relationship between the probability that a firm began informally, and the level of legal gender equality faced by entrepreneurs when they started their businesses, controlling for a number of firm and country-specific characteristics:

$$Pr(started\_informally_i) = \Phi(\alpha_0 + \beta \cdot WBL\ index_{c,t} + \gamma \cdot X_i + \delta \cdot Z_{c,t} + \rho \cdot D_s + \tau_t + \varepsilon_i)$$

(1a)

where $started\_informally$ is a dummy variable indicating whether or not firm i began operating as an informal enterprise. The variable $WBL\ index$ is our measure of legal gender equality in country c and year t. The variable X represents a vector of two firm characteristics, namely, the number of employees in the firm when it began operating, as well as whether or not the firm commenced exporting in the same year as it began operating. These firm level variables are included to account for their possible correlation with informality. We hypothesize that, as many informal firms are small, a firm's likelihood of starting informally is decreasing in their initial size. Likewise, we hypothesize that firms that begin exporting in their first year of operations are less likely to begin informally for two reasons: firstly, this outward orientation suggests that the firm's motivation for starting the firm was not as a survival strategy for those with low skills (a posited driver of informality in the developing world; Ulyssea, 2020). Secondly, exporting activity is likely to involve some degree of government bureaucracy and to have fiscal implications—firms that are willing to take this on are more likely to have registered their businesses.

The variable Z represents a vector of country-level control variables. In the first instance, we account for the rule of law in country, c, in the year, t, that a firm began operating. The degree to which laws are respected or enforced may have important implications for whether or not gender-neutral laws are associated with better outcomes for female entrepreneurs. The second country-level variable included in the vector Z is real per capita GDP. This variable is included as both legal gender equality and the size of

10

the informal sector are correlated with a country's level of economic development. Finally, we control for the predominant religion in country c, a variable that is fixed over time. Previous research by Hyland, Djankov and Goldberg (2021) has shown that a country's predominant religion is a significant predictor of the level of legal equality between men and women. A country's main religion also serves as a proxy for culture and social norms, which may be related to a female entrepreneurs' ability to formally register a business.[11] In addition, we control for the sector in which the firm operates (D) and, finally, we include year fixed effects (τ) to account for unobservable effects that are common to all countries but vary by the year in which the firm began operating. The relationship, summarized in equation (1a), is estimated using a probit model. The model is estimated separately for firms with female owners and for those with no female participation in ownership; if gender equality under the law is associated with benefits for female entrepreneurs only, we would expect to see a negative correlation between gender equality and starting informally for firms with female owners, but not for those that are fully owned by men. With respect to potential endogeneity, it seems extremely unlikely that the decisions of entrepreneurs to start an informal business will affect the general legal environment of an economy. However, we cannot rule out the possibility that, at the aggregate, the level of informality may influence the nature of laws.

As an extension of model (1a), we also estimate a version of the model where instead of looking at beginning informally as a binary outcome we consider the number of years for which a firm operated informally once it began operating. This model is summarized in equation (1b):

$$Duration\_informal_i = \alpha_0 + \beta \cdot WBL\ index_{c,t} + \gamma \cdot X_i + \delta \cdot Z_{c,t} + \rho \cdot D_s + \tau_t + \varepsilon_i \quad \text{(1b)}$$

where the dependent variable is the number of years for which a firm operated informally; all other variables are as described above for equation (1a). For firms that were formal from the start—the vast majority of firms, the value of the dependent variable will be zero. As such, we transform the dependent variable using the hyperbolic inverse sine. This transformation can be interpreted as a normal logarithmic transformation, but it takes account of zero values.[12] Equation (1b) is estimated using ordinary least squares (OLS).

In the second part of our estimation process, we estimate the relationship between having started operations informally and firm performance at the time the survey was conducted using the following OLS model:

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[11] The relationship between religion and informality, specifically the role of religious networks in organizing the informal sector, is noted in Golub and Hansen-Lewis (2012) and Mbaye and Benjamin (2015).
[12] Witte, Burger and Ianchovichina (2020).

$$Y_i = \alpha_0 + \beta \cdot started\_informally_i + \gamma Z_i + \delta \cdot D_s + \rho \cdot D_R + \tau_t + \varepsilon_i \qquad (2)$$

where Y represents our measures of firm performance, $started\_informally$ is a dummy variable that is equal to one for firms that were not registered when they began operating. Z is a vector of firm-level control variables. We exploit the richness of the enterprise survey data by including a large set of control variables that the literature has shown to be correlated to firm performance.[13] We control for firm size and age, which numerous authors have shown to be correlated with firm productivity (Biesebroeck 2005 and Haltiwanger, Jarmin, and Miranda 2013). We also proxy for human capital within the firm by controlling for the manager's years of experience in the sector and whether the firm has formal training programs in place for its employees, which should be associated with higher human capital (Kinda, Plane, and Véganzonès-Varoudakis 2015). Physical capital is measured by whether or not the firm purchased fixed assets in the past year. A firm's outward orientation is measured by whether it has foreign participation in ownership and whether it is engaged in exporting activities—research has shown that such factors can expose firms to a more competitive environment and to improved technologies, with associated impacts on productivity (Dimelis and Louri 2002; López 2005; Bernard et al. 2007; Guadalupe, Kuzmina, and Thomas 2012). We control for whether or not a firm has a website—a proxy for internet and telecommunication services that may be associated with increased productivity (Clarke, Qiang, and Xu 2015). Access to finance, which has shown to be associated with firm performance (Rajan and Zingales 1998; Gatti and Love 2008), is proxied by whether a firm has a checking or savings account. Finally, we control for two factors of the business environment that may negatively affect firm performance: experience of power outages (Cole et al. 2018) and exposure to crime (Islam 2013). Finally, because research by Islam et al. 2020 has shown a significant labor productivity gap between female and male managed firms, we control for whether the firm's top manager is female.

Our model, summarized by equation (2), also includes controls for the firm's sector of operation (D_s), the within-country region in which the firm is located (D_R) as well as year-of-survey fixed effects (τ_t). Again, the model is estimated separately for firms with and without female participation in ownership to see if the relationship between informality and performance differs between these types of firms. Given that the start date of firms precedes the time at which performance is evaluated, the concerns of reverse causality are attenuated. While we cannot completely rule out omitted variable bias, we alleviate this concern as much as possible by the wide range of control variables we employ.

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[13] These correlations are discussed in greater detail in Islam, Gaddis and Amin (2020).

3. Results

3.1 Gendered laws and informality

The first relationship we consider is whether firms with female participation in ownership in countries with a higher level of legal equality between men and women are less likely to begin operations informally, controlling for other firm and country characteristics. Table 2 presents the results for the global sample. Column (1) of Table 2 shows that firms with female participation in ownership are less likely to begin operations informally where there is greater legal equality between men and women; however, the coefficient on legal equality is only marginally statistically significant. The results in column (2) show that, for firms fully owned by men, greater legal equality is associated with a higher prevalence of these firms beginning their operations informally. For both firms with and without female participation in ownership, there is no association between a firm's size when it began operations and the probability that it began informally. On the other hand, firms that began exporting in their first year of operations were significantly less likely to have begun informally. Also, for both sets of firms, better rule of law in a country is associated with fewer firms beginning informally. Column (1) shows that, once other characteristics are controlled for, firms with female participation in ownership are more likely to have begun operating informally in countries with a higher level of per capita GDP; this association does not hold for firms without female owners (column (2)). Turning to the association between religion and starting informally, relative to countries where the main religion is Buddhism, most other religions are associated with lower levels informality for firms with female participation in ownership. For firms fully owned by men, a country's main religion is generally not a significant predictor of starting informally. The one exception is Judaism; firms fully owned by men are less likely to begin informally where the main religion is Judaism (in our sample, this is only Israel).

One caveat of our analysis is that we do not know the ownership structure of firms when they began operating and, therefore, we are using information on the current owners as a proxy for ownership when the firm began operating. We hypothesize that this likely places a downward bias on our estimates—if some of the firms that we are identifying as having female participation in ownership had, at the time they began operating, no female owners, then by including firms that were fully owned by men when they began operations in this group, we are likely estimating a lower-bound relationship. In order to better understand this potential source of bias, and to test if our hypothesis regarding downward bias is correct, we estimate equation (1) for a sub-sample of young firms. We follow the approach of Criscuolo, Gal and Menon (2014) and define young firms as those that have been in operation for five years or less. We

hypothesize that firms that have been in operation for five years or less are less likely to have changed ownership composition. The model estimations for these young firms are presented in columns (3) and (4) of Table 2. For young firms with female participation in ownership, a higher level of legal gender equality is associated with a decreased probability of starting informally. It is worth noting that the marginal effect is an order of magnitude higher than the same variable in column (1), providing support for our hypothesis of a downward bias in column (1). Column (4) of Table 2 shows no association between legal gender equality and starting informally for young firms with no female participation in ownership.

Table 2 Gendered laws and informality: results for full sample and for young firms

Y = Pr. firm began informally	(1) Female participation	(2) No female participation	(3) Female participation, young (≤ 5 years)	(4) No female participation, young (≤ 5 years)
Legal equality between men and women	-0.001*	0.001**	-0.002**	-0.001
	(0.000)	(0.000)	(0.001)	(0.001)
Firm size at start	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Firm began exporting in its first year of operations	-0.070***	-0.079***	-0.117***	-0.045
	(0.024)	(0.017)	(0.036)	(0.034)
Real GDP per capita in year of origin (constant 2010 US$)	0.021***	-0.007	0.004	0.009
	(0.008)	(0.007)	(0.015)	(0.011)
Rule of Law	-0.028***	-0.042***	-0.002	-0.024*
	(0.010)	(0.009)	(0.016)	(0.014)
Religion (ref cat: Buddhism)				
Christianity	-0.095**	0.003	-0.229**	-0.062
	(0.041)	(0.022)	(0.091)	(0.043)
Folk religion	-0.135***	-0.026		-0.119***
	(0.039)	(0.032)		(0.040)
Hinduism	-0.016	0.015	-0.175	-0.068
	(0.081)	(0.037)	(0.127)	(0.051)
Islam	-0.083*	0.017	-0.256***	-0.029
	(0.043)	(0.024)	(0.094)	(0.048)
Judaism	0.006	-0.076***	0.331	
	(0.146)	(0.024)	(0.291)	
Unaffiliated	-0.150***	-0.010	-0.290***	-0.105**
	(0.039)	(0.032)	(0.091)	(0.047)

Number of observations	12,408	29,645	2,221	5,926

Note: .01 - ***; .05 - **; .1 - *. Marginal effects from the estimation of a probit model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The models also include controls for the region in which the firm is located, the sector in which it operates and the year in which it began operations.

While the global results provide an overview of the aggregate relationship between gendered laws and informality, in reality, there is significant heterogeneity between regions in our sample in terms of informality and legal equality between men and women. The informal economy accounts for 15-20 percent of GDP in advanced economies and 30-35 percent of GDP in emerging economies (Kelmanson et al., 2019); in Latin America and the Caribbean, it has been estimated to account for approximately 40 percent of GDP (OECD, 2018). As noted in Ohnsorge and Yu (2021), the variation in employment share in the informal sector between regions is even larger. Likewise, the prevalence of gendered laws varies significantly from one region to another. Data from the most recent *Women, Business and the Law* report (World Bank, 2021), shows that the average global score on the WBL index was 76.1 points, but the regional average ranges from 95.1 points in OECD high-income economies to 51.5 in the Middle East and North Africa region. These regional differences highlight a need to understand the relationship between gendered laws and informality at a more disaggregated level.

Several interesting patterns emerge from the regionally disaggregated results presented in Table 3. The most prominent result is that, for firms with female participation in ownership, greater equality is only associated with a lower probability of beginning informally in Sub-Saharan Africa, the Middle East and North Africa and in South Asia. In other regions, the relationship is not statistically significant. What is also notable is that it is only in Sub-Saharan Africa that we see a positive relationship between gender equality and informality for firms without female participation in ownership, in most other regions, the association is not significant; the exception is the Middle East and North Africa region where gender equality is associated with lower degrees of informality among all firms, that is, both those with and without female owners.

Table 3 gendered laws and informality: regional-level results

Y = Pr. firm began informally	(1) Sub-Saharan Africa	(2)	(3) East Asia & Pacific	(4)	(5) Europe & Central Asia	(6)	(7) Latin America & Caribbean‡	(8) Middle East & North Africa	(9)	(10) South Asia	(11)
	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	Female participation	No female participation	Female participation	No female participation
WBL index	-0.002***	0.002*	0.000	-0.000	0.000	0.000	0.000	-0.003**	-0.002**	-0.006***	0.002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)
Firm size at start	-0.000	-0.000	-0.000	-0.000*	0.000	0.000**	-0.002	-0.000	-0.000*	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Exporter at start	-0.142***	-0.122***	-0.069	-0.026	-0.006	-0.042***	-0.144**	-0.094	-0.014	-0.080**	-0.140**
	(0.049)	(0.041)	(0.048)	(0.041)	(0.016)	(0.014)	(0.061)	(0.059)	(0.046)	(0.033)	(0.067)
Real GDP per capita	0.038***	-0.013	0.007	-0.147***	0.007	-0.003	-0.027	-0.020	-0.021	0.130**	0.117*
	(0.012)	(0.013)	(0.035)	(0.037)	(0.009)	(0.005)	(0.023)	(0.034)	(0.039)	(0.054)	(0.067)
Rule of Law	-0.044**	-0.048**	-0.035	0.062*	-0.011	-0.008	0.022	-0.060*	-0.109***	0.018	-0.070
	(0.018)	(0.021)	(0.043)	(0.036)	(0.010)	(0.008)	(0.022)	(0.036)	(0.027)	(0.045)	(0.056)
Religion (ref cat: Buddhism)†											
Christianity	0.095***	0.009	-0.098***	-0.054*	0.040*	-0.014					
	(0.035)	(0.029)	(0.035)	(0.029)	(0.022)	(0.015)					
Folk religion			-0.170***	-0.058							
			(0.057)	(0.042)							
Hinduism	0.061	-0.064								0.058	0.103**
	(0.093)	(0.083)								(0.039)	(0.051)
Islam			0.065	0.265***	0.051*	-0.002		-0.285***	-0.035	-0.018	0.138***
			(0.050)	(0.045)	(0.027)	(0.017)		(0.087)	(0.115)	(0.037)	(0.052)
Judaism											
Unaffiliated			-0.179***	-0.018							
			(0.044)	(0.036)							
_N	2,543	7,049	2,686	2,767	3,559	8,460	1,941	339	3,630	673	5,189

Note: .01 - ***; .05 - **; .1 - *. Marginal effects from the estimation of a probit model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The models also include controls for the region in which the firm is located, the sector in which it operates and the year in which it began operations.

† In the regressions for the Middle East and North Africa region, Judaism is the reference category. ‡ Probit model will not converge for the subset of firms in this region without female participation in ownership.

Next, we consider the relationship between legal equality and the length of time for which firms operated informally, the results for the full sample as well as the subgroup of young firms are displayed in Table 4. Column (1) of table 4 shows that, for the full sample, there is no significant relationship between legal equality and the length of time for which firms with female owners operated informally. On the other hand, we find that, similar to the results displayed in Table 2, gender equality increases the length of time for which fully male-owned firms operate informally. For young firms, we see that gender equality is associated with less time operating informally for firms with female owners. For young firms that are fully owned by men, there is no significant relationship between equality and duration of informal operations. Looking at the other firm characteristics, the results show that, in general, larger firms spend less time informally, as do those firms that were exporting when they began operating.

Table 4 Gendered laws and duration of informality: results for full sample and for young firms

Y = Duration of informality (Log inverse sine transformation)	(1) Female participation	(2) No female participation	(3) Female participation, young (≤ 5 years)	(4) No female participation, young (≤ 5 years)
Legal equality between men and women	-0.001	0.002**	-0.003**	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Firm size at start	-0.000***	-0.000**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Exporter at start	-0.066***	-0.039***	-0.041***	-0.016
	(0.013)	(0.014)	(0.012)	(0.019)
Real GDP per capita	0.019	-0.017	0.002	-0.004
	(0.016)	(0.011)	(0.016)	(0.012)
Rule of Law	-0.022	-0.037**	0.009	-0.029
	(0.019)	(0.015)	(0.014)	(0.020)
Religion (ref cat: Buddhism)				
Christianity	-0.120	-0.003	-0.148**	-0.069**
	(0.081)	(0.038)	(0.066)	(0.030)
Folk religion	-0.153*	-0.043	-0.193***	-0.111***
	(0.086)	(0.061)	(0.074)	(0.034)
Hinduism	-0.031	0.033	-0.083	-0.068*
	(0.069)	(0.071)	(0.051)	(0.037)
Islam	-0.094	-0.004	-0.188***	-0.081**
	(0.085)	(0.042)	(0.069)	(0.033)

Judaism	0.144	-0.112*	0.723*	-0.227***
	(0.323)	(0.063)	(0.383)	(0.077)
Unaffiliated	-0.166**	-0.004	-0.196***	-0.064*
	(0.080)	(0.039)	(0.073)	(0.038)
_cons	0.109	0.167	0.357**	0.134
	(0.170)	(0.108)	(0.155)	(0.118)
Number of observations	12,358	29,441	2,325	5,957

Note: .01 - ***; .05 - **; .1 - *. Coefficients from the estimation of an OLS model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The models also include controls for the region in which the firm is located, the sector in which it operates and the year in which it began operations.

Disaggregating the results by region, Table 5 shows that the most significant results are in Sub-Saharan Africa, the Middle East and North Africa and South Asia, echoing the results displayed in Table 3. More gender equality is associated with less time spent informally for female owned firms in Sub-Saharan Africa and the Middle East and North Africa. For fully male owned firms, gender equality is associated with a longer duration of informal operations in Sub-Saharan Africa and South Asia. The Middle East and North Africa is the only region for which the results show that gender equality is associated with a shorter duration of informality for firms with female owners and for those that are fully owned by men. In general, the results on the duration of informality serve to reinforce those that consider the probability of beginning informally.

Table 5 gendered laws and duration of informality: regional-level results

Y = Duration of informality (Log inverse sine transformation)	(1) Sub-Saharan Africa	(2)	(3) East Asia & Pacific	(4)	(5) Europe & Central Asia	(6)	(7) Latin America & Caribbean‡	(8)	(9) Middle East & North Africa	(10)	(11) South Asia	(12)
	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation
Legal equality between men and women	-0.003*	0.004**	0.002	0.000	0.001	0.001*	0.002	-0.000	-0.005**	-0.002**	-0.006	0.013***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.012)	(0.005)
Firm size at start	-0.000***	-0.000***	-0.000	-0.000***	-0.000	0.000	-0.000	-0.000	-0.000	-0.000**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exporter at start	-0.122***	-0.096***	-0.083**	-0.029	-0.026**	-0.023***	-0.099***	-0.075**	-0.180	0.028	-0.054	-0.054
	(0.036)	(0.031)	(0.041)	(0.072)	(0.012)	(0.008)	(0.030)	(0.038)	(0.110)	(0.045)	(0.042)	(0.082)
Real GDP per capita	0.028	-0.036*	-0.083	-0.217***	0.011	-0.010	-0.046*	-0.074**	0.068	-0.029	-0.124	-0.090
	(0.036)	(0.019)	(0.073)	(0.061)	(0.013)	(0.009)	(0.025)	(0.036)	(0.084)	(0.059)	(0.269)	(0.119)
Rule of Law	-0.018	-0.065*	-0.022	0.079	-0.019	0.007	0.041	0.005	-0.116	-0.122***	0.153	-0.126
	(0.046)	(0.034)	(0.066)	(0.066)	(0.017)	(0.014)	(0.029)	(0.026)	(0.080)	(0.046)	(0.208)	(0.081)
Religion (ref cat: Buddhism)†												
Christianity	0.085*	0.013	-0.111	-0.075*	0.006	0.004			-0.454	-0.001		
	(0.045)	(0.046)	(0.086)	(0.045)	(0.009)	(0.022)			(0.293)	(0.056)		
Folk religion			-0.210**	-0.133*								
			(0.106)	(0.077)								
Hinduism	-0.043	-0.023									-0.118	0.028
	(0.098)	(0.103)									(0.225)	(0.054)
Islam			0.351**	0.374***	0.034	0.029			-0.552*	-0.192	-0.163	0.134
			(0.149)	(0.090)	(0.022)	(0.028)			(0.320)	(0.140)	(0.145)	(0.104)
Judaism												
Unaffiliated			-0.183**	-0.102**								
			(0.077)	(0.050)								
_N	2,525	6,895	2,726	2,769	3,804	8,555	1,972	2,426	501	3,698	830	5,098

Note: .01 - ***; .05 - **; .1 - *. Coefficients from the estimation of an OLS model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The models also include controls for the region in which the firm is located, the sector in which it operates and the year in which it began operations.

† In the regressions for the Middle East and North Africa region, Judaism is the reference category. ‡ Probit model will not converge for the subset of firms in this region without female participation in ownership.

3.2 Starting informally and subsequent performance

Having a documented a link between gendered laws and firms' probability of starting operations informally, next, we investigate the relationship between starting informally and performance metrics at the firm level. The firm-level consequences of informality have been widely discussed in the literature. Ulyssea (2020) notes that informality can have negative effects on firm productivity, investment decisions and access to capital. On the other hand, Bruhn and McKenzie (2014) find that the perceived benefits of formalization may be low for small-scale enterprises. Compounding this equivocality, we are not considering firms that remained informal, but rather those that transitioned from informality to becoming formally registered businesses. So, on the one hand, if informal firms are less productive, the traits that make them so may persist even after they formalize, in which case we would expect to see a negative relationship between starting informally and performance at the time of survey. On the other hand, there may be a selection issue at play, whereby only the most productive of those firms that began informally survive, in which case we may see no relation, or—in the extreme case—a positive relation, between starting informally and subsequent performance.

We consider three measures of firm performance: turnover, labor productivity and exporting status. We focus on those groups of firms where we found a relationship between gendered laws and informality: the full sample, young firms, as well as firms located in Sub-Saharan Africa, in the Middle East and North Africa region, and in South Asia.

Considering the first metric of performance, the results presented in Table 6 show that, controlling for other factors, sales are lower in firms that began their operations informally. Based on the aggregate sample (columns (1) and (2) of Table 6), the penalty associated with beginning operations informally is not statistically different for firms with female owners relative to fully male-owned firms. The order of magnitude of the coefficient is similar for young firms (columns (3) and (4)) but the statistical significance is much lower—perhaps partially due to the decline in sample size—and the relationship is no longer significant for firms with female participation in ownership. This general pattern holds for firms in Sub-Saharan Africa and the Middle East and North Africa—firms that began operations informally have lower sales at the time of the survey, with the relationship being more robust for firms that are fully owned by men. The picture differs for firms in South Asia; here, there is no performance penalty associated with starting informally for firms that have no female participation in ownership; but, for firms with at least one female owner, sales are significantly lower for those firms that began operations informally.

Table 6 Starting informally and subsequent performance: turnover

Y = Log (sales)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All firms		Young firms		Sub-Saharan Africa		Middle East and North Africa		South Asia	
	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation
Began operating informally	-0.181**	-0.229***	-0.165	-0.235*	-0.264*	-0.365***	-0.357	-0.356***	-0.665***	0.042
	(0.088)	(0.062)	(0.273)	(0.125)	(0.156)	(0.093)	(0.306)	(0.117)	(0.173)	(0.139)
Female top manager Y/N	-0.097*	-0.029	-0.371**	-0.186	-0.142	-0.142	-0.432***	-0.349	-0.173	0.666*
	(0.050)	(0.081)	(0.149)	(0.142)	(0.133)	(0.173)	(0.164)	(0.224)	(0.115)	(0.355)
Log of age of firm	0.129***	0.097***	0.118	0.105	0.214**	0.157**	0.061	-0.103	0.085	-0.016
	(0.045)	(0.032)	(0.164)	(0.093)	(0.085)	(0.067)	(0.199)	(0.085)	(0.106)	(0.104)
Log of size	0.969***	0.970***	0.901***	0.977***	0.918***	0.933***	0.709***	0.888***	0.977***	0.982***
	(0.027)	(0.021)	(0.104)	(0.047)	(0.056)	(0.042)	(0.114)	(0.055)	(0.102)	(0.052)
Part of a larger firm Y/N	0.276***	0.122**	0.488**	0.209	0.224	0.201*	0.242	0.008	0.135	0.098
	(0.081)	(0.059)	(0.239)	(0.129)	(0.171)	(0.107)	(0.346)	(0.148)	(0.162)	(0.096)
Offers formal training Y/N	0.259***	0.091**	0.181	0.135	0.300***	0.150*	0.229	-0.103	-0.132	0.027
	(0.054)	(0.041)	(0.152)	(0.096)	(0.110)	(0.089)	(0.205)	(0.123)	(0.197)	(0.112)
Top manager experience in sector (years)	0.002	0.001	0.019*	0.000	0.017***	0.003	0.003	0.015***	0.008	0.003
	(0.003)	(0.002)	(0.010)	(0.006)	(0.006)	(0.005)	(0.008)	(0.006)	(0.011)	(0.004)
Direct exports 10% or more of sales Y/N	0.050	0.328***	-0.018	0.457***	0.074	0.200	0.069	0.272*	0.121	0.416**
	(0.076)	(0.053)	(0.324)	(0.140)	(0.172)	(0.122)	(0.319)	(0.139)	(0.210)	(0.165)
Foreign ownership Y/N	0.312***	0.402***	0.363**	0.411***	0.434***	0.571***	0.382	-0.122	-0.400	-0.171
	(0.083)	(0.059)	(0.183)	(0.117)	(0.161)	(0.100)	(0.461)	(0.204)	(0.799)	(0.427)
Has checking or savings account Y/N	0.260***	0.293***	0.437**	0.393***	0.234	0.351***	-0.352	0.383***	0.396	0.051

	(0.088)	(0.061)	(0.188)	(0.099)	(0.165)	(0.096)	(0.409)	(0.136)	(0.362)	(0.099)
Purchased fixed assets Y/N	0.170***	0.139***	0.083	0.052	0.101	0.199***	0.182	0.302***	-0.035	0.195**
	(0.049)	(0.037)	(0.140)	(0.083)	(0.112)	(0.077)	(0.197)	(0.107)	(0.158)	(0.081)
Experienced power outage Y/N	0.151**	0.111**	0.303*	0.053	0.256	0.264**	-0.257	-0.117	-0.321**	-0.113
	(0.067)	(0.044)	(0.169)	(0.100)	(0.218)	(0.105)	(0.232)	(0.091)	(0.129)	(0.109)
Experienced losses due to crime Y/N	0.109*	-0.018	0.329**	-0.184*	0.125	0.024	0.098	-0.098	-0.427*	-0.152
	(0.059)	(0.050)	(0.151)	(0.102)	(0.116)	(0.082)	(0.184)	(0.217)	(0.220)	(0.186)
Website Y/N	0.227***	0.351***	0.131	0.397***	0.441***	0.482***	0.081	0.064	0.442**	0.170
	(0.058)	(0.040)	(0.152)	(0.099)	(0.139)	(0.078)	(0.180)	(0.093)	(0.180)	(0.125)
_cons	15.187***	15.087***	17.099***	15.565***	9.735***	10.313***	12.099***	11.953***	12.834***	13.272***
	(0.358)	(0.241)	(0.802)	(0.547)	(0.568)	(0.504)	(1.020)	(0.410)	(1.487)	(0.850)
_N	13,009	30,506	1,899	5,087	2,469	6,729	535	3,926	897	5,552
Adjusted R2	0.833	0.797	0.827	0.804	0.778	0.749	0.870	0.838	0.825	0.601

Note: .01 - ***; .05 - **; .1 - *. Coefficients from the estimation of an OLS model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The model also includes controls for the within-country region in which the firm is located, the sector in which it operates and the year in which the survey was carried out.

Table 7 presents the results when performance is measured in terms of the labor productivity of a firm's workforce. The results presented in Table 7 are similar to those presented in Table 6: on aggregate, firms that began operating informally have lower labor productivity at the time of the survey relative to those that were formally registered from the start, and the relationship stronger for firms that are owned entirely by men. Based on the full sample (columns (1) and (2) of table 7), firms with female owners that began informally have a level of labor productivity that is about 15 percent lower at the time of the survey. For firms without a female owner, the productivity penalty is approximately 23 percent. Once again, the only exception is firms in South Asia (column (9) of table 7); in this region, the performance penalty associated with starting informally only holds for firms with a female owner—of the subsamples we investigate, the negative correlation is strongest for this group of firms.

The last indicator of performance we investigate is firms' exporting status. Table 8 shows that, based on the aggregate sample, firms with female participation in ownership that began informally are significantly less likely to be engaged in exporting activity at the time of the survey (column (1)). This correlation is not significant for male firms (column (2)), nor does it hold in any of the subsamples that we test (columns (3) to (10)). Table A1 of the appendix shows that the aggregate correlation for firms with female owners is driven by results in the regions not displayed in Table 6; specifically, in East Asia and Pacific, Europe and Central Asia and Latin America and the Caribbean, firms with female owners that began informally are much less likely to be engaged in exporting at the time of the survey.

Table 7 Starting informally and subsequent performance: labor productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All firms		Young firms		Sub-Saharan Africa		Middle East and North Africa		South Asia	
Y = Log (sales per worker)	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation
Began operating informally	-0.144*	-0.225***	-0.053	-0.243*	-0.271	-0.347***	-0.258	-0.350***	-0.660***	0.031
	(0.084)	(0.061)	(0.252)	(0.125)	(0.165)	(0.090)	(0.303)	(0.117)	(0.169)	(0.140)
Female top manager Y/N	-0.104**	-0.021	-0.413***	-0.169	-0.128	-0.124	-0.465***	-0.244	-0.220*	0.611*
	(0.051)	(0.082)	(0.144)	(0.147)	(0.139)	(0.177)	(0.161)	(0.272)	(0.118)	(0.357)
Log of age of firm	0.117**	0.083***	0.112	0.094	0.222**	0.144**	0.061	-0.083	0.056	-0.023
	(0.045)	(0.032)	(0.166)	(0.094)	(0.089)	(0.066)	(0.192)	(0.088)	(0.092)	(0.106)
Log of size	0.009	0.005	0.013	0.021	-0.027	-0.003	-0.288**	-0.096*	-0.009	0.015
	(0.026)	(0.022)	(0.088)	(0.046)	(0.060)	(0.044)	(0.113)	(0.058)	(0.105)	(0.060)
Part of a larger firm Y/N	0.267***	0.121**	0.455**	0.216*	0.197	0.183*	0.231	-0.012	0.098	0.063
	(0.081)	(0.061)	(0.231)	(0.130)	(0.170)	(0.110)	(0.353)	(0.148)	(0.161)	(0.098)
Offers formal training Y/N	0.257***	0.088**	0.172	0.140	0.291***	0.137	0.249	-0.100	-0.155	0.015
	(0.053)	(0.041)	(0.145)	(0.094)	(0.112)	(0.089)	(0.196)	(0.124)	(0.206)	(0.124)
Top manager experience in sector (years)	0.002	0.001	0.018*	0.001	0.015**	0.004	0.002	0.015***	0.008	0.003
	(0.003)	(0.002)	(0.010)	(0.006)	(0.006)	(0.005)	(0.008)	(0.006)	(0.011)	(0.004)
Direct exports 10% or more of sales Y/N	0.066	0.333***	0.013	0.479***	0.098	0.233*	0.094	0.250*	0.098	0.369**
	(0.075)	(0.053)	(0.306)	(0.142)	(0.179)	(0.122)	(0.310)	(0.138)	(0.214)	(0.167)
Foreign ownership Y/N	0.283***	0.372***	0.309*	0.383***	0.396**	0.520***	0.364	-0.067	-0.410	-0.201
	(0.082)	(0.060)	(0.180)	(0.116)	(0.163)	(0.102)	(0.464)	(0.215)	(0.786)	(0.433)
Has checking or savings account Y/N	0.276***	0.283***	0.466**	0.381***	0.230	0.329***	-0.347	0.374***	0.456	0.061
	(0.089)	(0.061)	(0.192)	(0.101)	(0.167)	(0.096)	(0.421)	(0.137)	(0.372)	(0.097)
Purchased fixed assets Y/N	0.172***	0.145***	0.077	0.043	0.149	0.200***	0.182	0.313***	0.025	0.196**
	(0.049)	(0.038)	(0.140)	(0.083)	(0.112)	(0.076)	(0.197)	(0.109)	(0.153)	(0.086)

Experienced power outage Y/N	0.137**	0.100**	0.213	0.061	0.234	0.243**	-0.254	-0.118	-0.297**	-0.114
	(0.065)	(0.044)	(0.163)	(0.099)	(0.214)	(0.104)	(0.228)	(0.094)	(0.127)	(0.111)
Experienced losses due to crime Y/N	0.128**	0.003	0.330**	-0.185*	0.144	0.057	0.092	-0.113	-0.360	-0.111
	(0.059)	(0.050)	(0.145)	(0.103)	(0.118)	(0.083)	(0.185)	(0.219)	(0.241)	(0.179)
Website Y/N	0.217***	0.349***	0.083	0.397***	0.440***	0.486***	0.085	0.056	0.477***	0.187
	(0.058)	(0.040)	(0.144)	(0.100)	(0.139)	(0.079)	(0.174)	(0.094)	(0.180)	(0.128)
_cons	15.119***	15.088***	16.862***	15.482***	9.799***	10.211***	12.197***	11.906***	13.253***	13.461***
	(0.359)	(0.232)	(0.791)	(0.537)	(0.570)	(0.522)	(1.033)	(0.418)	(1.478)	(0.837)
_N	12,970	30,398	1,893	5,082	2,454	6,697	531	3,902	895	5,525
Adjusted R2	0.812	0.768	0.808	0.784	0.735	0.705	0.862	0.831	0.435	0.270

Note: .01 - ***; .05 - **; .1 - *. Coefficients from the estimation of an OLS model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The model also includes controls for the within-country region in which the firm is located, the sector in which it operates and the year in which the survey was carried out.

Table 8 Starting informally and subsequent performance: exporting status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All firms		Young firms		Sub-Saharan Africa		Middle East and North Africa		South Asia	
Y = Pr. firm is an exporter	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation
Began operating informally	-0.069***	-0.003	-0.043	0.031	0.008	0.006	-0.090	0.021	0.042	0.012
	(0.025)	(0.014)	(0.073)	(0.035)	(0.028)	(0.019)	(0.111)	(0.038)	(0.049)	(0.018)
Female top manager Y/N	-0.016	-0.003	-0.041	-0.041	0.003	-0.010	0.010	-0.084	0.000	0.006
	(0.012)	(0.012)	(0.045)	(0.034)	(0.020)	(0.014)	(0.047)	(0.053)	(0.018)	(0.012)
Log of age of firm	-0.013	-0.004	-0.041	-0.017	0.020	-0.005	-0.006	-0.022	0.058***	-0.001
	(0.012)	(0.005)	(0.038)	(0.017)	(0.016)	(0.008)	(0.034)	(0.021)	(0.018)	(0.010)
Log of size	0.016***	0.029***	0.015	0.037***	0.010	0.021***	0.072***	0.054***	0.048***	0.032***
	(0.005)	(0.003)	(0.012)	(0.007)	(0.009)	(0.005)	(0.023)	(0.012)	(0.007)	(0.004)
Part of a larger firm Y/N	-0.006	0.010	-0.069*	-0.017	-0.015	0.019	-0.026	-0.068	-0.049*	-0.003
	(0.016)	(0.009)	(0.041)	(0.021)	(0.028)	(0.013)	(0.042)	(0.046)	(0.025)	(0.009)

Offers formal training Y/N	0.007	0.009	0.034	-0.019	-0.022	0.022**	-0.107**	0.001	0.001	0.002
	(0.011)	(0.007)	(0.029)	(0.017)	(0.021)	(0.011)	(0.047)	(0.022)	(0.022)	(0.011)
Top manager experience in sector (years)	0.000	0.000	-0.001	-0.000	-0.001	-0.000	0.000	0.002	0.001	-0.001*
	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Foreign ownership Y/N	0.079***	0.066***	0.060*	0.084***	0.082***	0.033***	0.104	0.167***	0.095**	0.039*
	(0.015)	(0.009)	(0.031)	(0.017)	(0.025)	(0.012)	(0.070)	(0.028)	(0.038)	(0.023)
Has checking or savings account Y/N	-0.025	0.022*	-0.045	0.031	0.015	0.027	0.211**	-0.000	0.103**	0.018
	(0.028)	(0.013)	(0.057)	(0.030)	(0.047)	(0.018)	(0.086)	(0.037)	(0.045)	(0.018)
Purchased fixed assets Y/N	0.028**	0.013*	0.023	0.012	0.037	0.004	0.019	-0.032	0.018	0.020*
	(0.012)	(0.007)	(0.026)	(0.017)	(0.025)	(0.012)	(0.041)	(0.022)	(0.023)	(0.012)
Experienced power outage Y/N	0.009	0.014*	-0.105**	0.036**	0.023	0.005	0.014	0.017	0.038	0.005
	(0.013)	(0.008)	(0.044)	(0.017)	(0.027)	(0.017)	(0.038)	(0.032)	(0.023)	(0.013)
Experienced losses due to crime Y/N	-0.026*	-0.003	-0.053	-0.049*	0.001	0.013	-0.108	0.031	0.002	0.013
	(0.015)	(0.011)	(0.036)	(0.029)	(0.022)	(0.014)	(0.069)	(0.050)	(0.029)	(0.025)
Website Y/N	0.033***	0.044***	0.027	0.033**	0.021	0.036***	0.140***	0.076***	0.029	0.054***
	(0.011)	(0.007)	(0.029)	(0.016)	(0.017)	(0.012)	(0.050)	(0.020)	(0.024)	(0.000)
_N	12,831	31,754	1,103	3,934	2,364	7,231	419	3,757	788	5,628

Note: .01 - ***; .05 - **; .1 - *. Marginal effects from the estimation of a probit model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The model also includes controls for the within-country region in which the firm is located, the sector in which it operates and the year in which the survey was carried out.

4. Discussion

The results presented in Tables 2 and 3 show the relationship between the level of legal gender discrimination and the probability that firms with and without female owners began operations informally. On aggregate, the results suggest that firms with female owners are less likely to have begun operations informally when the legal framework treats men and women more equally. In contrast, legal equality is associated with an increased probability of beginning informally for firms that are fully owned by men. Similarly, the results presented in Table 4 show that legal equality is associated with a longer period of informality for firms that are fully owned by men. These are unexpected findings, which appear to result from the pooling of data from highly heterogeneous regions. When the results are disaggregated by region, a more nuanced picture emerges.

For firms with female owners in Sub-Saharan Africa, the probability of beginning operations informally is decreasing in the level of legal equality between genders at the time the firm began operations. The marginal effect is approximately -0.002 suggesting that a single point increase in the index is associated with a 0.2 percent reduction in the probability that a firm with female participation in ownership would begin operations informally. Over the past decade, the index has increased by an average of 8 percentage points in Sub-Saharan Africa; according to our model, this would be associated with a 1.6 percentage point decrease in the proportion of female owned firms that began informally. This effect may appear small, but it is meaningful—the enterprise survey data show that, in this region, on average, 13.6 percent of formal firms with a female owner began operating informally. Furthermore, we would not expect the magnitude of the effect to be large given that legal equality in the areas covered by the WBL index is only one of the many factors that may shape a female entrepreneur's decision to begin operations informally.

For firms in Sub-Saharan Africa that are entirely owned by men, an increase in legal equality is associated with a marginally higher probability that the firm would begin operations informally. This coefficient may suggest that, in this region, there is some degree of crowding out that happens when more female-owned firms are in a position to begin operating as formal enterprises. To try to understand this unexpected relationship, we disaggregate the WBL index into two broad areas of the law. As noted in section 2.1, there are 35 data points underlying the WBL index; 18 of these are collected through the administration of a survey on family law, 14 are based on labor laws and the remaining three relate to laws on violence against women. As laws on violence only comprise three of the 35 data points, we allocate two of these data points (those that relate to sexual harassment in the workplace) into the broader area of labor law, and one (specifically, the data point assessing domestic violence laws) to the area of family. Column (1) of

table 9 shows that, for firms with female owners in Sub-Saharan Africa, it is improvements in the area of family law that are associated with a reduction in the probability of beginning operations informally. Family law covers legislations that impacts a woman's freedom of movement, ability to access credit, to manage assets and to register a business. Column (2) of the same table shows that the positive association between legal gender equality and starting informally for male firms is driven by labor laws. This suggests that, when the labor code becomes more gender neutral, men may be opting into informal enterprises in response to increasing competition in the labor market. These reflections represent our hypotheses, a full understanding of the association between gender equality and informality for male-owned firms in this region merits further in-depth analysis, which would present a fruitful area for future research.

Table 9 Disaggregated gendered laws and informality: Sub-Saharan Africa, the Middle East and North Africa and South Asia

	(1)	(2)	(3)	(4)	(5)	(6)
	Sub-Saharan Africa		Middle East and North Africa		South Asia	
Y = Pr. firm began informally	Female ownership	No female ownership	Female ownership	No female ownership	Female ownership	No female ownership
Family code	-0.002***	0.001	-0.007***	-0.003**	-0.003***	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
Labor law	-0.000	0.001*	0.004***	0.000	-0.004***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Firm size at start	-0.150***	-0.124***	-0.087*	-0.006	-0.080**	-0.139**
	(0.051)	(0.041)	(0.052)	(0.047)	(0.034)	(0.067)
Firm began exporting in its first year of operations	0.038***	-0.012	0.051	-0.018	0.161***	0.121*
	(0.012)	(0.014)	(0.052)	(0.043)	(0.057)	(0.069)
Real GDP per capita in year of origin (constant 2010 US$)	-0.049***	-0.049**	-0.020	-0.099***	0.010	-0.064
	(0.018)	(0.020)	(0.032)	(0.026)	(0.047)	(0.054)
Rule of Law	-0.002***	0.001	-0.007***	-0.003**	-0.003***	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
Religion (ref cat: Buddhism)						
Christianity	0.102***	0.015				
	(0.037)	(0.030)				
Folk religion						
Hinduism	0.089	-0.046			0.072*	0.104*
	(0.096)	(0.083)			(0.038)	(0.056)
Islam			-0.121	-0.059	-0.021	0.136***

					(0.130)	(0.112)	(0.037)	(0.052)

Judaism

Unaffiliated

_N	2,543	7,049	339	3,630	673	5,189

Note: .01 - ***; .05 - **; .1 - *. Marginal effects from the estimation of a probit model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The models also include controls for the region in which the firm is located, the sector in which it operates and the year in which it began operations.

Turning next to firms in the Middle East and North Africa region, columns (8) and (9) of table 3 show that gender equality is associated with a reduction in the probability of beginning operations informally both for firms with female owners and for firms that are fully owned by men—the marginal effects are -0.003 and -0.002 for female and male owned firms respectively. Thus, it would appear that the relationship between informal enterprises is slightly stronger in this region, relative to Sub-Saharan Africa. In general, advancements in gender equality have progressed more slowly in the Middle East and North Africa relative to other regions. This is particularly true in the first three decades covered by the WBL index (1970-2000) where the index only increased by 4.7 points in the region, compared to a global average increase of 14.9 points in the same period. Today, the average score in the Middle East and North Africa region is 51.5 points, compared to 76.1 points globally. Because gender discrimination is relatively high in this region, a levelling of the legal playing field between men and women may have wider benefits for the business environment and, thus, may facilitate formal registration for all enterprises, regardless of the gender of the owner. While we are unaware of a literature on the benefits of gender equal laws for male firms, research by Hyland, Islam and Muzi (2020) shows that, in the Democratic Republic of Congo, firms that do not limit the tasks or shifts their female employees can work perform better in terms of sales and productivity. This points towards the potential benefits of gender equality for all firms, regardless of the gender of the owner.

Turning next to firms in South Asia, a region where—as with Sub-Saharan Africa—informality is notoriously high, legal equality between men and women is associated with a reduction in the probability that firms with female owners begin operating informally. For firms that are entirely owned by men, the level of legal gender equality is not associated with their probability of beginning operations informally. In South Asia, progress in the areas covered by the WBL index lags that of all other regions. In the first three decades covered by the index, the region's score advanced by only 2.5 points. Despite many

improvements in the past two decades, the average score in the region in 2021 is 63.7—below only that of the Middle East and North Africa region. Despite the below average level of gender equality in this region, the result for female owned firms is positive and suggests that, while the level of legal equality is lagging, progress in the areas covered by the WBL index is associated with better outcomes for female entrepreneurs.

While we document a decline in informality among female entrepreneurs as the level of discrimination they face declines, it is not possible to determine the precise mechanism with the data available. However, the literature suggests several possible routes through which increased rights for women may make it easier for female entrepreneurs to register their businesses from the outset. The first relates to property rights. Several studies have shown that granting women rights to own and manage property is related to their participation in the labor force (Hallward-Driemeier, Hasan, and Rusu, 2013; Gonzales et al., 2015; Heath and Tan, 2018), property ownership and investment behavior (Combs 2005, 2006; Ali, Deininger, and Goldstein, 2014), as well as educational attainment (Deininger et al. 2013, 2018; Roy, 2015) and bargaining power (Mishra and Sam, 2016; Harari, 2018). There is also some evidence that property rights are associated with greater access to credit (Persha et al., 2017; Santos et al., 2014). More education, better access to credit, increased bargaining power may all facilitate female entrepreneurs formally registering their businesses from the outset rather than choosing to operate in the shadows.

Laws that allow women to access credit on equal terms, to sign contracts and to register businesses in the same way as men, which are all captured under the WBL *Entrepreneurship* indicator, are also likely to have implications for the formal registration of businesses. Islam et al. (2018) show that legislation mandating equal access to credit and equalizing laws on business registration are positively associated with female business ownership. The literature also points to the fact that legal restrictions on women's mobility may also impact their entrepreneurship. For example, Demirguc-Kunt et al. (2013) find that where women are restricted in their ability to choose where to live (captured under the *Mobility* indicator), their access to formal banking services is lower relative to men. Islam et al. (ibid) find that legal restrictions on women's ability to travel is negatively correlated with business ownership.

It is worth highlighting that each of these types of laws—property rights legislation, entrepreneurial rights and mobility and fall within the area of family law, as captured by WBL, and the results presented in Table 9 show that positive reforms to family law are most consistently associated with a reduced likelihood that firms with female owners will begin operating informally.

It is also worth noting that, beyond any direct link between laws and formality, legal reform may also exert influence on the social norms that may have historically blocked women out of the private sector. Aldashev et al. (2012) discuss how changes to formal laws can have a "magnet" effect, thereby, drawing informal laws in the same positive direction as legal reforms. Laws facilitating female entrepreneurship may also provide a useful backstop mechanism to women who wish to establish formal enterprises in the face of informal laws that would prevent them from doing so.

In the second part of our analysis, we consider the relationship between starting informally and subsequent firm performance. The results displayed in tables 6 to 8 suggest that, holding other observable characteristics fixed, firms that began operations informally have lower sales, lower labor productivity and, for firms with female owners are less likely to be engaged in exporting activity. We find no evidence that firms that began informally and survived through to the time of the survey possess a higher level of productivity that allowed them to formalize and survive. Overall, it seems that the negative relationship between beginning informally and subsequent performance is more robust for firms that are fully owned by men; however, the coefficients between this group of firms and those firms with female participation in ownership is not generally statistically significant. The one exception is firms in South Asia; in this region, it appears that beginning informally is only associated with lower performance for firms with female owners. Informality is notoriously high in South Asia—over 90 percent of businesses in the region are informal (Bussolo et al., 2020). In this region, the Enterprise Survey data a show much lower prevalence of firms that began informally with female owners relative to firms that are fully owned by men. We know from ILO data that women are more likely than men to be engaged in the informal economy in the region; the fact that we see fewer of them formalizing (and, thus, represented in the Enterprise Survey data) suggests that there are characteristics associated with these firms that make them both less likely to formalize and less productive if they manage to do so. Obtaining a deeper understanding of the gender and informal entrepreneurship in the region would be an interesting avenue for further research but is beyond the scope of this study.

5. Conclusion

In this paper we show that a legal environment that discriminates against women as employees and entrepreneurs is positively associated with the probability that a firm with female participation in ownership began operating as an informal enterprise. The association is strongest for firms in South Asia, but also holds for firms in Sub-Saharan Africa and in the Middle East and North Africa. We also document a similar, although less strong, relationship between legal equality and the duration for which firms

operated informally. We are considering a particular type of informality in our analysis as the firms we study are those rare firms that managed to make the transition from the informal to the formal economy. As such, beginning informally should not, *a priori*, be considered a negative outcome. Indeed, it could be considered positive relative to the alternative of not engaging in entrepreneurial activity at all. However, our results do suggest that beginning informally and transitioning to the formal sector may be a suboptimal outcome relative to commencing operations in the formal sector. The data suggest that beginning operations as an informal enterprise has long term negative consequences for the productivity of firms. With the exception of firms in South Asia, the penalty associated with beginning informally is no larger for firms with female owners relative to those without.

The finding that a history of informality at the firm level has long term implications for firms' productivity provides support for reforming the discriminatory laws that make it harder for women to begin enterprises in the formal sector. However, the implications extend well beyond firm level outcomes. Research by Ohnsorge and Yu (2021) highlights that countries with high levels of informality have lower government revenue and lack the fiscal resources to support economic activity. This is likely to have important implications for countries' ability to encourage a robust recovery from the COVID-19 crisis. The authors note that while, historically, a larger informal sector may have dampened economic downturns, it can also inhibit recoveries. Informality may also perpetuate discrimination against women. Ohnsorge and Yu (ibid) note that in countries where the informal economy is larger, women receive fewer years of education and there is a higher prevalence of unmet family planning needs.

Our findings point to one lever governments could use to reduce the prevalence of informality. While equality under the law is just one factor that may influence a female entrepreneur's choice of registering her enterprise, it is one that is actionable in the short term and one that may be associated with a wider range of positive outcomes.

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Appendix - additional results

The results displayed in Table 8 showed that, on aggregate, having begun operations as an informal firm is associated with a reduced probability of subsequently exporting; however, there was no significant relationship in the three regions presented (Sub-Saharan Africa, the Middle East and North Africa and South Asia). Therefore, here, we expand the analysis to consider the three remaining regions in the sample: East Asia and the Pacific, Europe and Central Asia, and Latin America and the Caribbean. While we did not find any evidence of a significant relationship between gendered laws and informal origins in these regions, Table A1 below shows that beginning operations as an informal firm is associated with a lower probability of becoming an exporter in the future, particularly for firms that have female participation in ownership.

Table A1 Starting informally and subsequent exporting status

	(1)	(2)	(3)	(4)	(5)	(6)
	East Asia and Pacific		Europe and Central Asia		Latin America and the Caribbean	
Y = Pr. Firm is an exporter	Female participation	No female participation	Female participation	No female participation	Female participation	No female participation
Began operating informally	-0.133***	-0.003	-0.084**	0.001	-0.119**	-0.082***
	(0.038)	(0.021)	(0.042)	(0.032)	(0.055)	(0.029)
Female top manager Y/N	-0.022	0.076***	-0.017	0.005	-0.032	-0.056
	(0.027)	(0.024)	(0.017)	(0.022)	(0.027)	(0.036)
Log of age of firm	-0.021	0.014	-0.012	-0.013	-0.033	-0.001
	(0.019)	(0.014)	(0.015)	(0.009)	(0.022)	(0.015)
Log of size	-0.001	0.018*	0.023***	0.031***	0.013	0.035***
	(0.009)	(0.010)	(0.007)	(0.005)	(0.011)	(0.009)
Part of a larger firm Y/N	0.073**	0.088***	-0.008	0.006	-0.017	-0.019
	(0.030)	(0.022)	(0.025)	(0.018)	(0.033)	(0.026)
Offers formal training Y/N	0.041	0.029	0.016	0.003	0.027	-0.009
	(0.026)	(0.027)	(0.017)	(0.012)	(0.021)	(0.014)
Top manager experience in sector (yr)	0.002**	0.002	0.001**	0.000	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Foreign ownership Y/N	0.074**	0.108***	0.094***	0.080***	0.048*	0.080***
	(0.032)	(0.020)	(0.021)	(0.016)	(0.027)	(0.021)
Has checking or savings account Y/N	-0.036	0.031	0.009	0.003	-0.017	0.006
	(0.034)	(0.024)	(0.039)	(0.030)	(0.050)	(0.026)
Purchased fixed assets Y/N	-0.006	0.042*	0.029	0.020*	0.034	0.019
	(0.019)	(0.024)	(0.018)	(0.012)	(0.026)	(0.015)
Experienced power outage Y/N	0.014	-0.045**	0.009	0.015	-0.002	0.064***
	(0.027)	(0.021)	(0.017)	(0.013)	(0.025)	(0.022)
Experienced losses due to crime Y/N	-0.065*	-0.010	-0.008	-0.011	-0.026	-0.032
	(0.036)	(0.025)	(0.024)	(0.018)	(0.025)	(0.025)
Website Y/N	0.011	0.002	0.072***	0.069***	0.012	0.040**
	(0.030)	(0.019)	(0.019)	(0.012)	(0.020)	(0.017)

_N	2,860	2,873	4,114	9,336	2,159	2,658

Note: .01 - ***; .05 - **; .1 - *. Marginal effects from the estimation of a probit model are reported. Standard errors are clustered at the level of the strata; rescaled weights are applied in the regressions. The model also includes controls for the within-country region in which the firm is located, the sector in which it operates and the year in which the survey was carried out.