Female Ownership of Firms and Regulation Experience

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Abstract

The presence of gender disparity in *de jure* rules across the world is relatively well-known. Many studies show that this disparity is detrimental to female labor participation. Our focus is different in that we examine whether female-owned firms experience elevated time costs and burdens associated with government regulations relative to their male-owned counterparts. In this sense, we are interested in both *de facto* and *de jure* differences in governmental regulation. Using firm-level data and two alternative matching methods, our results suggest that firms with at least one female owner report that senior management spends a larger percentage of their time dealing with regulations. We also find that construction permits take approximately 4-7 days longer to obtain for these same firms. Lastly, we find that female-owned firms perceive labor regulations to be a larger obstacle to business operations. In all cases, these effects tend to be largest in countries with the most disparity in *de jure* rules. However, the gap remains even in the most *de jure* equal countries.

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1 Introduction

The literature concerning gender inequality and economic development is vast.¹ A broad consensus is that reducing gender inequality would yield a massive boost in global development (OECD, 2019). Of particular relevance to this study, is the portion of this literature that focuses on the effects of gender disparities in the legal system on female labor outcomes.² Property rights and the 'rules of the game' are known to be essential to development (North, 1991; Acemoglu and Johnson, 2005), yet many recognize that these rules do not always apply equally across gender (Iqbal et al., 2016; Fike, 2017, 2018). Without property rights, for example, a woman's ability to start a business or even enter the labor force is severely limited. Both Islam et al. (2019) and Hallward-Driemeier and Gajigo (2015) show that reducing these types of legal disparities increase female labor empowerment, a term encompassing both labor participation in general and participation in 'better' jobs.³

While the decision to enter the labor force is important and relatively well-studied, we know comparatively little about the legal barriers women face once the participation decision has been made. Our study explores whether women that already made the decision to own a business face increased burdens associated with governmental rules and regulations. We use data from the *World Bank Enterprise Surveys* (WBES), including over 140,000 firm-level observations across 144 countries. Given this data, our focus is on developing countries where gender inequality is most likely to be pervasive (Jayachandran, 2015). This data includes a breadth of information concerning firm characteristics such as employment size, sales, and sector. It also includes information on the firms' experiences with government regulations and the gender of firm ownership. We use this information

¹See, for example, (Duflo, 2012; Cuberes and Teignier, 2014; Kleven and Landais, 2017; Bertay et al., 2020) for reviews. Goldin (2023) provides an excellent review of the history of gender inequality within the U.S.

²There is also a complementary literature on the effects of specific policies aiming to promote equality such as the Equal Pay Act in the United States (Neumark and Stock, 2006), childcare provision (Powell, 1998), and parental leave laws (Baum, 2003).

³Islam et al. (2019) focuses on female participation defined as management, ownership, and employment. Hallward-Driemeier and Gajigo (2015) focuses on employment in specific occupations.

to assess whether female-owned firms face elevated obstacles relating to governmental regulation.

We also differ from existing studies in that we are not limited to differences in de jurerules and regulations. For example, the Hallward-Driemeier and Gajigo (2015) study focuses on specific family laws in Ethiopia that limit a woman's ability to work outside of the home. However, disparities in the de facto implementation of the law are also important. Cultural factors have been shown to be key determinants of female labor outcomes (Fernandez, 2007; Fernández and Fogli, 2009), educational attainment (Cooray and Potrafke, 2011), and gender inequality (Jayachandran, 2015). Moreover, access to social networks that are important for business operations can be quite different for male- versus female-owned business (Burt, 1998; Lutter, 2015; Neumeyer et al., 2019).⁴ This suggests that even if the de jure laws are identical across gender there could be unequal implementation in practice. Importantly, this inequality can appear even without government officials' explicit knowledge or intention of discrimination. For example, if men have access to exclusive social networks, male-owned firms may know of more efficient strategies in dealing with government.

Our primary outcome of interest is a variable that reports the percentage of time senior management officials spend dealing with government regulations in an average week. Thus, this measure is not dependent on the *de jure* legal structure of a country. In other words, there could be differences in the time spent dealing with regulations even if the regulatory code is identical across genders. A striking feature in the raw data is that this value is significantly higher for firms with female ownership – nearly 12% for female ownership and 10% for males. While a 2% difference may not seem meaningful, note that this weekly gap amounts to a nearly 42-hour difference annually.⁵ Further, that this gap exists even in the relatively exclusive group of firms with female owners is notable. One

⁴There are some exceptions to this. For example, in a study of Viet Nam, Pham and Talavera (2018) find no evidence of discrimination against female entrepreneurs despite being a country heavily dependent on social networks.

⁵This is calculated assuming management works a typical 40-hour work week, though many managers work significantly longer hours than this 40-hour benchmark.

might expect that this group of females is likely to have unobservable characteristics most similar to men. There is evidence that attitudes towards risk aversion, for example, are similar across genders when considering only a subset of the population with a managerial background (Johnson and Powell, 1994; Dwyer et al., 2002).

Of course, these raw differences cannot be interpreted as causal. Given the many differences in female versus male-owned firms, controlling for firm characteristics is paramount. To get more precise estimates, we match on a number of key factors (e.g., informality, sector, management experience, employment, country and year of survey, and firm size) using two alternative methods: Propensity Score Matching and Mahalanobis Distance Matching. Even after matching, we still find a significant gap in the percentage of time spent dealing with government regulations between female- and male-owned firms ranging between 0.5 to 1%.

We also examine a number of other potential outcomes aiming to capture the *time* cost of regulation. The surveys ask a series of questions regarding the length of time (measured in days) it takes the firm to obtain import licenses, operation licenses, and construction permits. The survey also asks how many days on average it takes the firm to clear customs when importing goods. Most indicators show no difference between female-and male-owned firms, but female ownership does increase the number of days it takes to obtain a construction permit significantly – anywhere from 3.8 to 7.4 days.

While these results are suggestive, it is not clear that women view this time cost as an additional burden to their business. For example, female-owned businesses may be more likely to hire senior management positions dedicated to dealing with government regulations. This could inflate the "% of time senior management spends with government regulations" measure, but would not be indicative of discrimination or differential treatment per se. It may also be the case that female-owned businesses are more meticulous when it comes to dealing with regulation. The WBES surveys have additional questions that we can use to more directly assess whether regulation is more burdensome. Specifically, they have a series of questions that ask whether specific factors are perceived as

obstacles to doing business. Three of these factors are relevant here: customs and trade regulation, business licensing and permits, and labor regulations. Of these three factors, we find that labor regulations pose a bigger obstacle to female-owned firms. We find no significant differences in customs and trade regulations or business licensing and permits for male versus female-owned firms overall.

Our final contribution is to test whether these overall differences change depending on the country's *de jure* rules. First, we address the question of whether these gaps are driven largely by firms operating in countries with significant de jure disparities in their legal system using the country's score in a commonly employed Gender Disparity Index (GDI) (World Bank, 2009, 2011; Fike, 2017) as its rank. If gaps exist even in countries that rank among the most equal using this GDI measure, this highlights the importance of *de facto* barriers facing women. Second, we test whether differences in the burdens between female- and male-owned business depend on country's level of economic freedom using the Fraser Institute's Economic Freedom of the World Index (Gwartney et al., 2004, 2021).⁶ This index captures the extent to which an economy adheres to a solid foundation of property rights and is consistent with voluntary exchange. Countries with significant economic freedom likely have more competitive market environments⁷ and thus may experience less taste-based discrimination (Becker, 1957).⁸ Similar theories concerning the effect of competition on corrupt behavior (e.g., Ades and Di Tella, 1999), could imply that officials have less opportunity for biased treatment in competitive environments. Moreover, economic freedom has been shown to improve female outcomes across a variety of areas.⁹ We may therefore expect differences in burdens to be minimal in the most

 $^{^{6}}$ We use the version of this index that is gender adjusted – that is, the version that accounts for the fact that the laws may be unequal (Fike, 2017).

⁷Economic freedom is not a measure of market competition per se, but economically free countries tend to experience more entrepreneurship (Nystr $\sqrt{\partial m}$, 2008; Bj $\sqrt{\Pi rnskovandFoss}$, 2013; Angulo-Guerrero et al., 2017), income growth (Grier and Grier, 2021), and innovation (Zhu and Zhu, 2017). Djankov et al. (2002) find that limited governments have a lighter regulation of entry for start-up firms. As such, it has been used as a proxy for market competition (Emerson, 2006) and some use the term synonymously with 'pro-market' institutions (e.g., Bennett and Nikolaev, 2021).

⁸This theory is more applicable to discrimination in the labor market, but it is possible that reducing discrimination in one realm (i.e., employment) could lead to a reduction in discrimination overall.

⁹For example, labor participation, education, and health (Stroup, 2008, 2011; Fike, 2018; Grier, 2023).

economically free countries.¹⁰

Our results show that the time cost of regulation tends to be most relevant for femaleowned firms in countries with high levels of *de jure* disparities. However, the gap remains even in the most *de jure* equal countries. Results are similar for economic freedom thresholds. Countries with the highest level of economic freedom have the smallest time cost of regulation gap across male- versus female-owned firms, but the gap does still exist even in the most economically free places. Likewise, when examining the discrepancy in firm responses to the more subjective, obstacle focused questions, the gap is largest in highly unequal *de jure* environments. This is true across all three obstacle questions (customs/trade, licensing/permit, and labor). However, here none of the gaps are statistically significant in the most equal countries. Further, there is no clear pattern in the size of the obstacle gap across economic freedom levels.

Overall, our results suggest that if there are significant differences in the burdens associated with regulation across firms, these burdens are higher with female-ownership. We also find that these relative time burdens increase when *de jure* rules are unequal, or when there is less economic freedom. Yet even in the most *de jure* equal environments, we find evidence of elevated time costs for female-owned firms suggesting that some discrimination comes in the form of *de facto* differences in the implementation of the law. Taken together, our results point to discrimination/disparity even after a women decides to own a business. Studying the legal obstacles facing female-owned business specifically could be an important step in reducing gender inequality overall as these are the establishments that are most likely to hire women (Sekkat et al., 2015; Bossler et al., 2020). We hope this research helps shed new light on these issues.

The remainder of this paper is as follows. The following section – Section 2 – reviews related literature concerning female-owned businesses and gender inequality. Section 3 describes the data. Section 4 provides a discussion of the empirical method, results, and various robustness tests. Section 5 concludes.

¹⁰This test is similar in spirit to the analysis of female entrepreneurs in Muravyev et al. (2009).

2 Female-Owned Business and Gender Inequality

Female entrepreneurship has been an increasing focus of international development scholars and practitioners. The potential for expanding the number of female-led firms is seen as an opportunity to boost economic growth and development overall (Brush and Cooper, 2012). As a result, research concerning the particular obstacles that female-owned businesses face has blossomed. Access to finance and financial institutions more generally are commonly cited as a primary deterrent to female-owned businesses (Carter and Marlow, 2006; Aidis and Schillo, 2017; Na and Erogul, 2021; Serwaah and Shneor, 2021). Muravyev et al. (2009), for example, find that female-owned firms are less likely to receive loans relative to their male-owned counterparts. They also find that once a loan is received, the interest rates tend to be higher for females. More relevant to this paper, however, is the idea that disparity in the legal institutional environment could be detrimental to women. While these legal differences could lead to problems in the financial sector, they could also limit a woman's ability to operate a business in many other ways.

The focus of the existing literature concerning legal gender disparity and female labor outcomes is on participation (Gonzales et al., 2015). Hallward-Driemeier and Gajigo (2015) examine three specific changes to family law in Ethiopia that effectively increased female property rights. They find that these changes not only led more women to work but also increased the likelihood of full time work and work in jobs that required more education. Covering a wider sample and a broader set of rules, Islam et al. (2019) use a legal gender disparity index and firm level data, similar to the firm data used in this paper, to show that unequal laws reduce female participation in the workforce, the likelihood that a female will become a top manager, and the likelihood of female ownership. Hyland et al. (2020) provide a more extensive summary of the legal gender disparity index used in Islam et al. (2019) and outline five "stylized facts", one of which is the strong correlation between this measure and a country's female labor force participation rate.

The literature concerning legal gender disparity on female labor outcomes outside of

participation is comparatively scarce. However, there is some suggestive evidence that these disparities can matter even after a woman has already made the labor market decision. Specifically, there is a small, but growing literature concerning corruption and female-owned business. The intuition connecting corruption and gender in general is twofold.¹¹ First, women have been argued to be more risk averse than men and have historically limited access to networks of political power – both factors could yield less corrupt behavior as a result. Second, given limited network access, any corruption than women do engage in may be different in nature relative to men. In this sense, corruption could be an example of where the laws are equal but the nature of their implementation is different.

There is substantial research connecting gender and corruption in the political arena (Dollar et al., 2001; Debski et al., 2018; Forgues-Puccio and Lauw, 2021), but females that own businesses represent a particular subset of the population that must be studied separately. Breen et al. (2017) produced the first estimates relating female-ownership to corruption. Using the World Business Enterprise Surveys, they find that female-owned firms engage in less corruption.¹² However, using a sub-sample of the same data where firm fixed effects could be included, Clarke (2022) finds no difference in corrupt behavior between male and female-owned firms and instead argues that it is the gender of the survey respondent that matters. Similarly, Wellalage et al. (2020) find no difference in corruption incidence between female versus male led firms within Latin America. Though they do find that the payoff to bribes in terms of innovation are higher for female led firms. Building off these three studies, Bologna Pavlik and Bastos (2023) use a broader sample and include both country and time fixed effects to examine the corruption and female-owned firms overall. They also find that this effect is largely

¹¹See Frank et al. (2011), Serra and Wantchekon (2012), Swamy et al. (2001), and Dollar et al. (2001) for discussions of the gender-corruption literature.

¹²Most studies discussed here also examine female-managed firms but given our focus on ownership we summarize only the female ownership results.

¹³These were absent in the Breen et al. (2017) study though they did include several country level controls for robustness.

driven by countries with substantial legal gender disparities.

Corruption is only one of many channels through which governmental action can impact firms. But if corruption is more problematic for female-owned firms, as in Bologna Pavlik and Bastos (2023), this suggests that women could face elevated governmental obstacles even after the participation decision has been made. On the other hand, if corruption occurs less frequently, as in Breen et al. (2017), then perhaps women are less involved in governmental matters more generally. We contribute to this literature by testing whether female-owned firms face different time costs associated with government, a broader and more general measure of costs associated with rules and regulations. We also test if women owned firms report increased obstacles in three areas of regulation: customs/trade, licensing and permits, and labor regulations.

3 Data

3.1 World Business Environment Survey

3.1.1 Main Variables

Our firm level data comes from the World Bank Enterprise Surveys (WBES). This includes over 140,000 firm-level observations across 144 countries stemming from surveys that occurred between the years of 2006 through 2019. In each year, the World Bank interviews a representative set of firms in a given set of countries. While there are countries that are surveyed in multiple years, the firms interviewed in each round are not necessarily the same – regardless, even when they are, we are not able to identify firms. Thus, to be clear, our data does not have a panel structure.

The surveys are extensive and ask the firms many questions pertaining to their characteristics (e.g., sector of operation and number of employees) and their business environment (e.g., regulation and informal competition). Importantly, the survey also asks questions regarding firm ownership. Specifically, the survey asks: "Amongst the owners of the firm, are there any females?" We code the firm as having a female owner when the response is "Yes". It is important to emphasize that this measure of female ownership does not account for the share of ownership. Therefore it is possible that female ownership is only a minority.¹⁴ This is mostly a concern for large firms. We therefore also break our results down into small firms (less than 20 employees) and large firms (100 or greater employees). Dividing the data by firm size also allows us to focus on firms where the owner is also likely top management (small firms) and where management and ownership are more likely to differ (large firms). Importantly, we find little difference in our results when we split the sample this way (see Appendix B). Overall, 33.5% of firms have at least one female amongst ownership. This female ownership indicator is considered our "treatment".

Our primary outcomes of interest are centered on the time costs of regulation. The first, and most general, measure comes from the following question:

In a typical week over the last year, what percentage of total senior management's time was spent on dealing with requirements imposed by government regulations? (By senior management I mean managers, directors, and officers above direct supervisors of production or sales workers.)

This question is of special interest because it captures the sort of regulation that firms have to deal on a daily basis, i.e., in a "typical week". This is also broad enough to include regulation that is relevant for nearly all types of firms: 91.6% of the firms in our sample provide an answer for this question. A simple (unconditional) average shows that while male-owned firms spend 10% of senior management time dealing with regulations, female-owned firms spend 11.9%.

The above question is useful because it is general. But firms have to deal with different types of regulations and focusing on more specific regulations could yield more precise estimates. Furthermore, the above question is answered in percentage terms and therefore

¹⁴The surveys sometimes have a question concerning the share of female ownership, but it is not consistently included and significantly limits our sample.

requires assumptions, such as the number of hours worked in a "typical" week, to get an estimate of the length of time spent dealing with regulation. We therefore use a set of questions that ask the (average) number of days it takes for a firm to clear customs when importing goods and the number of days it takes to obtain an import license, operation license, or construction permit. A limitation of these questions is that not all firms request such licenses frequently. For instance, only 13% of firms requested a construction permit and 22% requested a operation license in the 12 months preceding the survey. We therefore only focus on the sub-sample of firms where these questions are relevant – i.e., the sub-group that engaged in these activities. We also eliminate the top 1% of values here as extreme outliers. For example, for the "days to obtain a construction permit" question, the median answer was 30 days but the top 1% reported that the permit took greater than 700 days to receive. Of the 15,934 firms that applied for a permit, six of these firms reported that it took greater than 1000 days to receive it; one greater than 2000. All summary statistics and results are reported without these extreme values included.

Lastly, we also consider firm perspectives on regulation obstacles. The surveys ask firms whether a series of 15 factors constitute an obstacle to their operations. Three of these topics are explicitly related to regulation (labor regulation, customs and trade regulation, and business licensing and permits). Each question follows an identical structure where the respondent must rank the respective topic as a *very severe*, *major*, *moderate*, *minor*, or *no obstacle*. We code these answers from 0 (*no obstacle*) to 4 (*very severe*). These responses are more subjective than the time based measures from above, but could also be informative in examining whether the associated time costs are truly a burden. While nearly all firms answer these questions, regulations relating to customs/trade, labor, and licensing/permits are only relevant to a subset of firms. Thus, as above, we focus only on the subset of firms for which these factors are most likely to matter. For customs/trade obstacles, we consider only firms that have exported or imported goods in the past year. For business licensing and permits, we consider only firms that applied for a construction or operation permit in the past year. And, lastly, for labor regulations we consider firms with greater than 21 employees – the median value of employees – which essentially corresponds to the World Bank's definition of medium and large firms.

3.1.2 Covariates

The WBES provides a detailed set of firm characteristics that allows us to compare firms that are similar along many dimensions. This is essential to our identification strategy as female business ownership does not occur randomly. Rather, it is likely that firms of a specific size and/or in a certain sector are more prone to have female leadership. We highlight three key characteristics.

First, a large literature has recognized that women are more likely to operate in the informal sector (see, e.g., Malta et al., 2019; Mazumdar, 1976; Berniell et al., 2021).¹⁵ The WBES has a survey question asking the firm if the firm was formally registered when beginning operations. We create a dummy variable from this response equal to 1 if the firm began informally and 0 otherwise; this is included as a covariate in all specifications. In our sample, the share of female- versus male-owned firms that began informal is quite similar (9.51% vs. 10.58%). Nevertheless, this is an important control as firms operating in formal and informal setting face different regulatory challenges.

Second, it is well-known that women self-select into specific sectors of the economy. The WBES provides 42 classifications of industries or sectors. Because there are several overlaps in these classifications (e.g. "Services" and "Other Services"), we group them into seven main sectors: Services, Retail, & Wholesale, Manufacturing, Mining & Petrochemical, Food & Hospitality, Logistics, and Construction.¹⁶ The share of firms in sectors such as Manufacturing or Services is roughly even among firms that have a female owner and those that do not. However, female-owned firms are over-represented in Retail and Wholesale (20% of female-owned firms versus 17% of male-owned), and the share of female-owned firms in the Construction sector is half of their male-counterparts: 0.61%

 $^{^{15}}$ In South Asia, over 80 % of women in non-agricultural jobs are in informal employment; in sub-Saharan Africa this number is 74 %; and in Latin America and the Caribbean it is 54 % – see UNWomen (2015).

¹⁶Table A1 in Appendix A provides a comprehensive list of all sectors and our reclassification.

versus 1.21%.

Third, firm size is likely an important covariate. In a sample of female-owned firms in Latin America, Bruhn (2009) finds that female-owned firms tend to be smaller in size (employment, sales, etc.) than male-owned firms. Our sample differs in that firms with female ownership are slightly larger in terms of employment.¹⁷ Nevertheless, firms of different sizes face different barriers to operations and thus firm size is a key covariate. We include both a set of firm size dummies (small, medium, and large) and the number of employees as covariates. A firm is considered small if it has less than 20 employees; medium with at least 20 and up to 100 employees; and large with 100 employees or more.

Lastly, given that our focus is on how firms deal with regulations and that femaleversus male-owned firms could also differ according to their experience levels we also include covariates for the experience level of the "top manager" and for the age of the firm (both variables measured in years). Interestingly, firms with female ownership tend to have more experienced managers and are older in the sample.

3.2 The Gender Disparity Index

In addition to testing for aggregate differences in regulatory burdens between femaleand male-owned firms, we also test if any existing differences change depending on the country's *de jure* legal equality. To do so, we rely on the Gender Disparity Index (GDI), which uses data from the World Bank's "*Women, Business, and the Law Report*" and intends to capture "the degree to which women around the world have the same legal rights as men" (Fike, 2018, p.2).

The index ranges from 1.00 (no legal gender disparity – i.e., a woman enjoys the same legal rights as a man) to 0.00 (legal gender disparity in each of the variables used in the Gender Disparity Index) and is derived from seven broad categories of rights.¹⁸ It

¹⁷Note that our estimate of employees considers only full time or "permanent" employees; this ignores temporary workers. We use full time employment as this is what the World Bank uses to categorize firms according to firm size (small, medium, or large).

¹⁸The categories are Freedom of Movement, Contracting Freedom, Property Rights, Business Freedom, Financial Rights, Legal Status, and Freedom to Work, and each category contains a series of questions,

is available from 1970 to 2022. Importantly, since the GDI is derived from formal legal and regulatory codes, factors such as social norms, religious customs, and other informal rules are not captured by this measure.

3.3 The Economic Freedom of the World Index

As a final test, we also split the sample according to the country's economic freedom score using the Fraser Institute's *Economic Freedom of the World* Index (Gwartney et al., 2021), which provides a proxy for the formal economic environment of the country. It is comprised of 70 different variables¹⁹ grouped in five main areas: Size of Government, Legal System and Property Rights, Sound Money, Freedom to Trade Internationally, and Regulation. Each country's score is a simple (unweighted) average of these five areas, normalized from 0 to 10, with higher values meaning more economic freedom. It is available yearly for 165 countries from 2000 and later, and available in 5-year increments before that.

We also rely on a correction proposed by Fike (2017), which uses the Gender Disparity Index (GDI) discussed above to adjust area 2 (Legal System and Property Rights) of the EFW. Intuitively, the adjustment penalizes the countries proportionally to their gender disparity, as this means that women only enjoy a fraction of the level of property rights suggested by the unadjusted score.²⁰ As Fike (2017) shows, since 1995 most countries with the highest gender disparities, and thus suffering the largest adjustments in EFW, are located in the Middle East and North Africa regions. In 2015, the five most unequal countries dropped 22 to 23 positions in the EFW ranking after the gender adjustment.²¹

A potential concern with using the overall EFW index is that the gender adjustment applies only to one of its five components. However, this component – property rights

such as "Can a woman open a bank account in the same way as a man?".

¹⁹All of such variables are obtained from third parties such as International Country Risk Guide, the Global Competitiveness Report, and the World Bank,Äôs Doing Business project, which mitigates any potential biases of the researchers which countries are more economic free.

²⁰The adjustment factor is given by $AdjArea2 = \frac{Area2 + Area2 \times GDI}{2}$.

²¹These countries are Qatar, Saudi Arabia, United Arab Émirates, Bahrain, and Jordan.

and the legal system – is often argued to be the most integral in determining economic growth and development (North, 1991; Acemoglu and Johnson, 2005; Besley and Ghatak, 2010; Bolen and Sobel, 2020). Moreover, as discussed in Hallward-Driemeier and Gajigo (2015), most *de jure* legal disparities come in the form of property rights differences and not differences in the general regulatory code. Thus, economic freedom adjusted for property rights differences is likely to be fairly representative of the overall economic environment faced by both men and women in the country.

3.4 Separating GDI and EFW into Quartiles

For both GDI and EFW we separate our sample into four quartiles ranked from most unequal/most unfree to most equal/most free: (1) most disparity (GDI); least economic freedom (EFW), (2) medium/highest disparity; medium/lowest economic freedom, (3) medium/lowest disparity; medium/highest economic freedom, and (4) least disparity; most economic freedom. How we do so, however, requires some discussion.

Our sample is mostly limited to developing countries. These countries tend to have less economic freedom and more gender disparity than the global average. Therefore, developing quartiles using only the values of economic freedom or gender disparity in our sample of countries could be misleading. We therefore opt to assign quartiles based on the country's ranking according to full set of countries for which EFW and GDI scores are available. This way, if a country ranks in the "most free" quartile, for example, this implies that the country is among the most free in the *world* and not just in the sample.

Countries included in our dataset are included in different years from 2006-2019. Both the GDI and EFW are available for every year covered. We use the quartile assignment for the year covered in the survey. This means that if a country is surveyed multiple times (i.e., in multiple years) and experienced significant changes in their GDI/EFW ranking, each survey-year could potentially be assigned to a different quartile within our data.

4 Empirical Strategy and Results

4.1 Matching Methods

Our identification strategy relies on matching firms that are similar across several observable characteristics, but one has a female owner (treated) while the other one does not (control). We aim to estimate the Average Treatment Effect on the Treated (ATET) of having a female owner on the regulatory burdens firms face.

We employ two matching methods: Propensity Score Matching (PSM) and Mahalanobis Distance Matching (MDM). PSM first estimates a logistic regression that predicts the probability of receiving treatment (the probability of having at least one female owner) based on a set of covariates. The treated firm is then matched to a control firm (or a set of control firms) that has a similar propensity score ,Äì,Äì i.e., a similar probability of treatment ,Äì,Äì but the control ultimately does not have any female owners. In contrast, the MDM approach matches treated firms with control firms by minimizing the distance between covariate vectors using the Mahalanobis distance metric. In other words, MDM is more of a direct matching approach.

In both cases, we use nearest neighbor matching. More specifically, the treated firm is matched to its first nearest neighbor. We also match the treated firm to the average of its two nearest neighbors and also its three nearest neighbors. The ATET is then calculated by comparing the value of the outcome of interest in the treated firm to the average value of its closest matches. For PSM, standard errors are obtained by bootstrapping with 250 replications; for MDM, we use Abadie and Imbens (2011) bias-corrected standard errors.

In all specifications we include indicators for firm size, the number of employees, the age of the firm, the experience of the top manager, an indicator of whether the firm began informally, and a set of sector fixed effects as covariates. We also always include a set of indicators for the country and year of the survey, similar to fixed effects in regressions. For PSM, we are able to force exact matches on the country, year, and sector. In this sense, we are controlling for unobservable country specific factors that might impact regulatory

burden differences across female- versus male-owned firms.

4.2 Time Cost of Regulation

We begin the discussion of our results with time cost estimates of the regulatory burden. As shown in Table 3, female-owned firms report that their senior managers spend a larger percentage of time dealing with regulations than firms without any female ownership. This effect is consistent across nearest neighbor specifications and across both matching methods. On average, firms with female ownership report that the percent of time senior managers spend dealing with regulations is 0.610 - 0.688 higher than male-owned firms. Assuming a 40-hour work week, this would amount to an extra 30 minutes weekly. We also find that female ownership is associated with a significant increase in the number of days it takes to obtain a construction permit – between 3.8 and 7.4 days. This effect is also consistent across nearest neighbor specifications and matching methods. There are no significant differences for the other three outcomes.²²

We are also interested if any existing difference uncovered in Table 3 holds even in countries with *de jure* equality. Recall that our time cost measures are not limited to *de jure* differences in regulations. It could be the case that countries that are highly equal in the law remain unequal in practical implementation. This could be due, for example, to explicit discrimination practices or it could be because women and men have access to different social networks important to business operations. Table 4 presents the results after breaking the sample down into four groups using the country's Gender Disparity Index: (1) highest quartile of inequality, i.e., most gender disparity, (2) medium/highest quartile of inequality, i.e., least gender disparity. For brevity, we report these results using the only two significantly different outcomes from Table 3: (1) the % of time dealing with regulations and (2) days to obtain a construction permit. We also only report results

 $^{^{22}}$ We also test the robustness of these results by looking at small versus large firms separately. These results are relegated to Appendix B and are largely unchanged. The only exception is that the effect on the days to obtain a construction permit is less robust, likely due to a smaller number of observations.

using the three nearest neighbors; results using all nearest neighbor specifications are available in Appendix C^{23}

Starting with the "% of time" outcome, the magnitude of the ATET is largest when de jure gender disparity is at its worst (most unequal in the law) (see Table 4). Thus, unsurprisingly, the burden of regulation is higher for female-owned business in countries that have significant de jure legal disparities. Likewise, the burden is smallest in the most de jure equal countries. However, the relationship is not linear. The gap is slightly larger in the third quartile (medium/lowest gender disparity) than it is in the second quartile (medium/highest gender disparity), suggesting that de jure rules do not always predict discrimination in practice. Moreover, while the gap is the smallest in the most equal countries, it is still present and statistically significant.

The results are similar but less robust for the construction permit outcome. In all cases of significance, the burden is larger for female-owned firms when *de jure* disparity is higher. In addition, while insignificant, the gap in the most *de jure* equal countries is still positive but is the smallest in magnitude. However, the size of the gap in the most *de jure* unequal countries is not the largest and is also insignificant. Thus, as above, it seems that while *de jure* rules are important in predicting the relative burden women face, implementation of the law also matters.

Overall, these results suggest that female-owned businesses do face an elevated time cost of regulation. These firms report spending a larger percentage of their senior management's time dealing with regulation and also report that construction permits take longer to obtain. These effects amount to approximately 30 minutes per week in regard to dealing with general regulation and 3-7 extra days in waiting for a construction permit. How costly do women view these effects? Do female-owned firms believe regulations are more burdensome? We address this question more directly in the following section.

²³Split sample results for all outcomes are available upon request.

4.3 Regulation Obstacles

Table 5 reports the effect of female ownership on three potential regulatory obstacles of doing business: (1) customs & trade regulations, (2) business licensing & permits, and (3) labor regulations. While there is no significance overall for the first two indicators, we do find strong evidence that female-owned firms view labor regulations as significantly more problematic. The size of this effect, however, is relatively small: an increase between 0.022 and 0.031 on a scale of 0 to 4. However, as above, these are simply average effects across the full sample and the size could substantially change depending on the country studied.

Similar to the preceding section, we test whether these gaps change depending on the country's Gender Disparity Index. As shown in Table 6, the effect is always largest when gender disparity is most extreme.²⁴ Moreover, the effects in these most *de jure* unequal countries are statistically significant in all but one specification – for customs & trade regulations in the MDM case. We also see that the gap tends to become negative – implying that the burden is smaller for women – in the most *de jure* equal countries. However, this latter finding is only significant in one case (customs & trade regulation) and is positive in one instance.

While we also have some non-linearities – in that the size of the effect doesn't consistently fall as we move from most unequal to least – these patterns suggest again that de *jure* disparity is a crucial predictor of the relative burden that female-owned businesses face. However, when looking at obstacles as opposed to time costs, we find little evidence of *de facto* inequality in the most *de jure* equal countries.

4.4 The Role of Economic Freedom

Our final contribution is to test whether the relative regulatory burden in female versus male-owned firms changes depending on the general economic environment. As men-

²⁴Similar to Table 4, these results are presented for only the third nearest neighbor. Full results available in Appendix C.

tioned in the introductory section, the classic Becker (1957) idea is that there is less room for taste based discrimination in competitive environments. This theory is most applicable to labor markets, but nevertheless could have important spillovers onto governmental discrimination of female-owned business. For example, if corruption is more limited in competitive environments due to a lack of monopoly rents (Ades and Di Tella, 1999), government officials could have less room for gender bias in how they treat firms. Economically free countries have relatively open markets and tend to experience more entrepreneurial activity, which is potentially indicative of increased market competition. Moreover, economic freedom in general has been shown to be an important predictor of the well-being of women.

Similar to our analysis of global disparity quartiles, we separate our sample into four groups: (1) least economic freedom, (2) medium/lowest economic freedom, (3) medium/highest economic freedom, and (4) most economic freedom. These results are summarized in Table 7 for our main time cost of regulation outcomes, and in Table 8 for the obstacle measures. Again, we only present results using the third nearest neighbor for brevity. Full results are available in Appendix C.

The striking pattern in Table 7 is that the time cost of regulation is largest when economic freedom is lacking. In other words, the relative (time) burden for female-owned firms is largest when the economic environment is not consistent with the principles of economic freedom. These are the environments that likely face the least amount of market competition. However, as above, these effects are not linear in that the size of the regulatory burden does not consistently fall as economic freedom rises. Nevertheless, the general pattern is that having more economic freedom does tend to reduce the relative burden of regulation on female-owned firms.

The obstacle results of Table 8 are less clear. For "Customs & Trade Regulations", the pattern seems to imply that the burden is larger when economic freedom is lacking but none of the effects are statistically significant. Yet for "Licensing & Permit Regulations" the opposite is true. However, in this latter case, nearly all coefficients are negative and

are only significant in the least economically free countries; and only for one of the two matching methods. Lastly, for labor regulations, there is some evidence that the burden might actually be larger in more economically free countries. However, this effect is not robust across matching methods. Taken together, it seems that while economic freedom might be an important predictor of the time cost of regulation discrepancy, it is less important in predicting the relative burden overall.

5 Conclusion

Gender inequality has been a major focus of development economics over the past twenty years. One area that has become a primary concern is that of legal disparity. If a country's laws do not apply equally across gender, we cannot expect women to have the same opportunities as men. Much of the literature thus far has focused on the effect of these legal disparities on labor participation – with more unequal laws, women are less likely to work and are less likely to work in "better" jobs (Hallward-Driemeier and Gajigo, 2015; Islam et al., 2019).

We complement this literature by studying whether governmental regulation is more burdensome for female-owned firms relative to their male-owned counterparts. We make two primary contributions. First, we examine the potential disparate effects of the law beyond the labor participation decision. If female-owned firms face elevated burdens related to government, this is an important obstacle to consider when thinking about the barriers facing female entrepreneurs. Second, we are not limited to *de jure* inequalities in the law. Even in the most *de jure* equal countries, there is still the potential for disparity in the *de facto* implementation of the law.

We use firm level data from the World Bank's Enterprise Surveys (WBES) to test whether female-owned firms face increased time costs and burdens associated with governmental regulation relative to their matched male-owned counterparts. Our empirical strategy relies on matching female-owned firms with male-owned counterparts that are similar across a number of important dimensions including firm size, employment levels, sector, experience, informality, age of firm, country, and the year of survey. We also narrow the sample to examine only firms that are similar enough to be affected by the same regulations.

Our results suggest that female-owned firms face increased time costs associated with regulations. These firms report that their senior management spends a larger percentage of their (weekly) time dealing with government regulations. These firms also report that it takes longer to obtain a construction permit and that labor regulations are more problematic for their operations. In all cases, these effects become large in magnitude when *de jure* disparity is highest. For example, in the most gender unequal countries, female-owned firms spend approximately 1.33 percentage points more of their time dealing with regulations. This gap is only 0.58 percentage points in the most *de jure* equal countries. However, even in this latter case, the gap is statistically significant and meaningful enough to account for approximately 30 minutes per week.

We also find that the economic environment is an important predictor of regulatory burden gaps in terms of time, but not necessarily obstacles. In countries with the highest levels of economic freedom, the difference between the percent of time senior management spends dealing with government regulation in female- versus male-owned is smaller in magnitude. We also see that the gap in the days for which it takes the firm to obtain a construction permit is significantly larger in countries that lack economic freedom. Results are much more mixed when looking at regulatory obstacles.

Despite the strong evidence of an increased time cost, there is less evidence that women view these regulations as true obstacles outside of the most *de jure* unequal countries. This highlights the need for further research in this area. Elevated time costs are not indicative of discrimination per se. On the one hand, they could suggest that women are discriminated against and that officials are treating them differently. On the other hand, it could suggest that there are learning costs in dealing with regulation and perhaps that women simply prefer to allocate more time to the task. However, regardless of the underlying reason, these results show that women exert more resources dealing with regulation than men. We hope our results encourage further research on the regulatory obstacles facing female led firms specifically.

Disclosure Statement

The authors report there are no competing interests to declare.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Tables and Figures

Table 1: Summary statistics of main variables broken down by male versus female firm ownership.

Firm Ownership	Fe	male	Μ	Male		
-	Mean	St. Dev.	Mean	St. Dev.		
Time Cost of Regulation						
Time Spent Dealing with Regulation	11.908	19.348	10.033	17.959		
Average Days to Clear Imports	10.867	15.683	10.500	15.027		
Days to Obtain an Import License	17.860	26.638	16.529	25.492		
Days to Obtain Construction Permit	67.479	98.165	60.648	89.813		
Days to Obtain Operation License	22.787	35.610	22.084	34.240		
Obstacles						
Customs & Trade Regulation	0.948	1.203	0.984	1.208		
Business Licensing & Permits	1.012	1.193	1.068	1.198		
Labor Regulations	1.012	1.164	0.985	1.129		

Firm Ownership	Fei	nale	M	ale
-	Mean	St. Dev.	Mean	St. Dev.
Small Firm (<20 Employees)	0.452	0.498	0.479	0.500
Medium Firm (20-99 Employees)	0.338	0.473	0.336	0.473
Large Firm $(\geq 100 Employees)$	0.209	0.406	0.185	0.388
# of Employees	127.716	1481.551	114.100	5410.556
Age of Firm (Years)	20.142	26.423	17.998	26.857
Top Manager Experience (Years)	18.712	11.611	17.290	11.023
Ever Informal?	0.096	0.295	0.106	0.308
Construction Sector	0.006	0.078	0.012	0.109
Food & Hospitality Sector	0.012	0.108	0.010	0.101
Logistics Sector	0.007	0.082	0.009	0.092
Manufacturing Sector	0.484	0.500	0.494	0.500
Mining & Petrochemical Sector	0.049	0.215	0.059	0.236
Retail & Wholesale Sector	0.202	0.401	0.169	0.374
Service Sector	0.241	0.428	0.247	0.431

Table 2: Summary statistics of firm characteristics broken down by male versus female firm ownership.

Unless otherwise specified, the mean value should be interpreted as the percentage of firms satisfying the relevant characteristic.

Panel A. Propensity Score Matching					
Nearest Neighbor	<u>8</u> 1	2	3	Obs.	
% Time Spent Dealing with Regulations	0.622***	0.610***	0.656***	131.788	
Average Days to Clear Imports	0.330	0.238	0.140	25.211	
Days to Obtain an Import License	-0.753	-0.718	-0.516	14,314	
Days to Obtain Construction Permit	7.433***	4.989**	5.174***	14,626	
Days to Obtain Operation License	0.429	0.033	-0.251	$29,\!451$	
Panel B: Mahalanobis Distance Ma	tching				
Nearest Neighbor	1	2	3	Obs.	
% Time Spent Dealing with Regulations	0.672^{***}	0.685***	0.688***	131,788	
Average Days to Clear Imports	-0.192	0.073	0.066	25,222	
Days to Obtain an Import License	-0.211	-0.586	-0.693	14,322	
Days to Obtain Construction Permit	4.875^{**}	3.815^{**}	4.578^{**}	$14,\!641$	
Days to Obtain Operation License	-0.030	-0.156	-0.008	29,459	

Table 3: Estimated ATET of female ownership on the time cost of regulation.

Notes: We match on firm size, age of the firm, log number of employees, top manager experience, and whether the firm has operated informally. For PSM, we force exact matches on country, sector, and year. These three indicators are included as covariates in Mahalanobis. For PSM, standard errors obtained by bootstrapping with 250 replications. For Mahalanobis, we use Abadie and Imbens (2011) robust standard errors. For all variables except for "% of time dealing with regulations" the top 1% of values were dropped as extreme outliers.

Table 4: Estimated ATET of female ownership on the time cost of regulation by quartiles
of legal gender disparity scores (GDI); all matches according to $k = 3$.

Panel A: Propensity Score Matching				
		Outcomes		
Quartile	% Time	Construction Permit		
Highest Gender Disparity (Most Discrimination)	1.333**	4.027		
Medium/Highest Gender Disparity	0.643^{**}	10.922^{**}		
Medium/Lowest Gender Disparity	0.720^{***}	6.271^{*}		
Lowest Gender Disparity (Least Discrimination)	0.583^{**}	2.946		
Panel B: Mahalanobis Distance Matching				
	Outcomes			
Quartile	% Time	Construction Permit		
Highest Gender Disparity (Most Discrimination)	1.392**	6.330		
Medium/Highest Gender Disparity	0.699^{***}	9.505^{**}		
Medium/Lowest Gender Disparity	0.979^{***}	4.733		
Lowest Gender Disparity (Least Discrimination)	0.226	1.231		

Notes: We match on firm size, age of the firm, log number of employees, top manager experience, and whether the firm has operated informally. For PSM, we force exact matches on country, sector, and year. These three indicators are included as covariates in Mahalanobis. For PSM, standard errors obtained by bootstrapping with 250 replications. For Mahalanobis, we use Abadie and Imbens (2011) robust standard errors. For all variables except for "% of time dealing with regulations" the top 1% of values were dropped as extreme outliers.

Panel A: Propensity Score Matching					
Nearest Neighbor	1	2	3	Obs.	
Customs & Trade Obstacles	-0.002	-0.014	-0.010	32,408	
Business Licensing & Permits	-0.027	-0.017	-0.021	$38,\!077$	
Labor Regulations	0.024^{*}	0.025^{**}	0.022^{*}	70,222	
Panel B: Mahalanobis Dista	nce Matching	S			
Nearest Neighbor	1	2	3	Obs.	
Customs & Trade Obstacles	-0.011	-0.016	-0.016	32,417	
Business Licensing & Permits	-0.011	-0.008	-0.008	38,078	
Labor Regulations	0.031^{***}	0.021^{*}	0.023^{**}	$70,\!257$	

Table 5: Estimated ATET of female ownership on reported regulation obstacles.

Table 6: Estimated ATET of female ownership on the reported obstacles of regulation by quartiles of legal gender disparity scores (GDI); all matches according to k = 3.

Panel A: Propensity Score Matching			
		Outcomes	
Quartile	Customs/Trade	Licensing/Permit	Labor Reg.
Highest Gender Disparity (Most Discrimination)	0.106*	0.138***	0.142***
Medium/Highest Gender Disparity	-0.043	-0.030	0.017
Medium/Lowest Gender Disparity	0.063*	-0.006	0.020
Lowest Gender Disparity (Least Discrimination)	-0.045	-0.020	0.021
Panel B: Mahalanobis Distance Matching			
		Outcomes	
Quartile	Customs/Trade	Licensing/Permit	Labor Reg.
Highest Gender Disparity (Most Discrimination)	0.079	0.195***	0.106***
Medium/Highest Gender Disparity	-0.038	-0.017	0.017
Medium/Lowest Gender Disparity	0.064^{*}	-0.002	0.041^{**}
Lowest Gender Disparity (Least Discrimination)	-0.066**	-0.019	-0.007

Panel A: Propensity Score Matching			
	Outcomes		
Quartile	% Time	Construction Permit	
Lowest Economic Freedom (Lowest EFW Score)	1.146^{***}	11.294***	
Medium/Lowest Economic Freedom	0.546^{*}	0.981	
Medium/Highest Economic Freedom	0.976^{***}	5.506	
Highest Economic Freedom (Highest EFW Score)	0.513	-0.062	
Panel B: Mahalanobis Distance Matching			
	Outcomes		
Quartile	% Time	Construction Permit	
Lowest Economic Freedom (Lowest EFW Score)	1.254^{***}	14.327***	
Medium/Lowest Economic Freedom	0.278	-0.835	

Table 7: Estimated ATET of female ownership on the time cost of regulation by quartiles of overall gender adjusted economic freedom; all matches according to k = 3.

Notes: We match on firm size, age of the firm, log number of employees, top manager experience, and whether the firm has operated informally. For PSM, we force exact matches on country, sector, and year. These three indicators are included as covariates in Mahalanobis. For PSM, standard errors obtained by bootstrapping with 250 replications. For Mahalanobis, we use Abadie and Imbens robust standard errors. For all variables except for "% of time dealing with regulations" the top 1% of values were dropped as extreme outliers.

Medium/Highest Economic Freedom

Highest Economic Freedom (Highest EFW Score)

0.858***

0.740**

5.503

0.768

Table 8:	Estimated	ATET	of female	ownership	on the	e reported	obstacles	of re	egulation	by	quartiles	of	overall	gender	adjusted
economic	freedom; al	l match	les accordi	ng to $k = 3$	3.										

Panel A: Propensity Score Matching			
		Outcomes	
Quartile	Customs/Trade	Licensing/Permit	Labor Reg.
Lowest Economic Freedom (Lowest EFW Score)	0.044	-0.063*	-0.001
Medium/Lowest Economic Freedom	-0.018	-0.028	0.055^{**}
Medium/Highest Economic Freedom	0.029	0.015	0.015
Highest Economic Freedom (Highest EFW Score)	-0.012	-0.025	0.071^{**}
Panel B: Mahalanobis Distance Matching			
		Outcomes	
Quartile	Customs/Trade	Licensing/Permit	Labor Reg.
Lowest Economic Freedom (Lowest EFW Score)	0.009	-0.037	0.013
Medium/Lowest Economic Freedom	-0.013	-0.033	0.042^{*}
Medium/Highest Economic Freedom	0.003	0.027	0.011
Highest Economic Freedom (Highest EFW Score)	-0.041	-0.005	0.037

Appendices

A Data Definitions

Table A1:	Aggregated	Stratification	Sector	Classifications

Group	Original
Services	Services; Other Services; Services of Motor Vehicles;
	Other Services Panel; IT & IT Services
Retail & Wholesale (R&W)	Retail; Retail Panel;
	Wholesale; Wholesale & Retail;
	Wholesale of Agri Inputs & Equipment;
	Services of Motor Vehicles/Wholesale/Retail
Manufacturing	Manufacturing; Other Manufacturing;
	Garments; Wood Products;
	Manufacturing Panel; Leather Products;
	Furniture; Wood Products & Furniture;
	Food; Fabricated Metal Products;
	Textiles; Textiles & Garments;
	Machinery & Equipment;
	Rubber & Plastic Equipment;
	Basic Metals/Fab. Metals/Machinery & Equip.;
	Motor Vehicles; Wood products; Furniture;
	Paper & Publishing; Machinery & Equipment;
	Electronics & Vehicles;
	Motor Vehicles & Transport Equip.;
	Printing & Publishing; Electronics;
	Electronics & Communications Equip.;
	Metals, Machinery, Computer & Electronics
Mining & Petrochemical	Mining Related Manufacturing; Non-Metallic Mineral
	Products; Chemicals & Chemical Products;
	Chemicals, Plastics & Rubber;
	Petroleum products, Plastics & Rubber
Food & Hospitality	Hotels & Restaurants; Hospitality & Tourism
Logistics	Transport, Storage, & Communications; Transport.
Construction	Construction

B Small versus Large Firm Results

Table B1: Estimated ATET of female ownership on the time cost of regulation for small firms.

Panel A: Propensity Score Matching	<u>o</u> r			
Nearest Neighbor	1	2	3	Obs.
% Time Spent Dealing with Regulations	0.679***	0.676***	0.647***	62,150
Average Days to Clear Imports	0.429	0.552	0.618	6,046
Days to Obtain an Import License	0.083	-0.004	-0.573	$4,\!187$
Days to Obtain Construction Permit	3.766	2.375	1.813	3,858
Days to Obtain Operation License	0.750	0.875	0.719	13,202
Panel B: Mahalanobis Distance Mat	tching			
Nearest Neighbor	1	2	3	Obs.
% Time Spent Dealing with Regulations	0.438**	0.552^{***}	0.572^{***}	62,150
Average Days to Clear Imports	0.725	0.751	0.629	6,071
Days to Obtain an Import License	0.802	0.524	0.100	4,220
Days to Obtain Construction Permit	1.994	1.582	-0.048	3,946
Days to Obtain Operation License	0.275	-0.027	-0.073	13,241

Notes: We match on firm size, age of the firm, log number of employees, top manager experience, and whether the firm has operated informally. For PSM, we force exact matches on country, sector, and year. These three indicators are included as covariates in Mahalanobis. For PSM, standard errors obtained by bootstrapping with 250 replications. For Mahalanobis, we use Abadie and Imbens (2011) robust standard errors. For all variables except for "% of time dealing with regulations" the top 1% of values were dropped as extreme outliers.

Panel A: Propensity Score Matching	r S			
Nearest Neighbor	1	2	3	Obs.
% Time Spent Dealing with Regulations	1.054^{***}	0.898**	0.883***	25,040
Average Days to Clear Imports	-0.532	-0.265	-0.271	9,868
Days to Obtain an Import License	0.924	1.204	0.928	4,930
Days to Obtain Construction Permit	5.970	6.229	7.432**	$5,\!139$
Days to Obtain Operation License	2.027	1.580	1.688	6,121
Panel B: Mahalanobis Distance Mat	ching			
Nearest Neighbor	1	2	3	Obs.
% Time Spent Dealing with Regulations	0.696**	0.754^{**}	0.682**	25,062
Average Days to Clear Imports	-0.677	-0.371	-0.307	9,893
Days to Obtain an Import License	1.374	1.675	0.662	4,969
Days to Obtain Construction Permit	5.933	4.013	3.911	$5,\!188$
Days to Obtain Operation License	1.547	0.973	0.990	$6,\!158$

Table B2: Estimated ATET of female ownership on the time cost of regulation for large firms.

Notes: We match on firm size, age of the firm, log number of employees, top manager experience, and whether the firm has operated informally. For PSM, we force exact matches on country, sector, and year. These three indicators are included as covariates in Mahalanobis. For PSM, standard errors obtained by bootstrapping with 250 replications. For Mahalanobis, we use Abadie and Imbens (2011) robust standard errors. For all variables except for "% of time dealing with regulations" the top 1% of values were dropped as extreme outliers.

C All Nearest Neighbor Results for Quartile Specifications

Table C1: Estimated ATET of female ownership on the "% Time Spent Dealing with Regulations" variable by quartile of legal gender disparity index (GDI).

Panel A: Propensity Score Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	0.466	1.292*	1.333**	12,232
Medium/Highest Gender Disparity	0.682**	0.746^{**}	0.643^{**}	33,185
Medium/Lowest Gender Disparity	0.837^{***}	0.788^{***}	0.720***	34,155
Lowest Gender Disparity (Least Discrimination)	0.803**	0.631^{**}	0.583^{**}	31,153
Panel B: Mahalanobis Distance Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	1.089	1.483**	1.392**	12,232
Medium/Highest Gender Disparity	0.774^{**}	0.816***	0.699^{***}	33,185
Medium/Lowest Gender Disparity	0.939^{***}	0.984^{***}	0.979^{***}	34,155
Lowest Gender Disparity (Least Discrimination)	0.419	0.256	0.226	31,153

Panel A: Propensity Score Matching							
Quartile	NN1	NN2	NN3	Obs.			
Lowest Economic Freedom	1.152^{***}	1.194^{***}	1.146^{***}	$36,\!475$			
Medium/Lowest Economic Freedom	0.651^{*}	0.504	0.546^{*}	$35,\!019$			
Medium/Highest Economic Freedom	0.885^{***}	0.912^{***}	0.976^{***}	34,784			
Highest Economic Freedom	0.211	0.378	0.513	$15,\!804$			
Panel B: Mahalanobis Distance M	Iatching						
Quartile	NN1	NN2	NN3	Obs.			
Lowest Economic Freedom	1.457^{***}	1.229^{***}	1.254^{***}	36,475			
Medium/Lowest Economic Freedom	0.304	0.342	0.278	$35,\!019$			
Medium/Highest Economic Freedom	0.810^{***}	0.825^{***}	0.858^{***}	34,784			
Highest Economic Freedom	0.783^{**}	0.955^{***}	0.740^{**}	$15,\!804$			

Table C2: Estimated ATET of female ownership on the "% Time Spent Dealing with Regulations" variable by quartile of gender adjusted EFW.

Panel A: Propensity Score Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	8.796*	6.547	4.027	1,051
Medium/Highest Gender Disparity	7.763	8.898**	10.922**	$3,\!251$
Medium/Lowest Gender Disparity	9.002**	7.599^{**}	6.271^{*}	4,263
Lowest Gender Disparity (Least Discrimination)	3.379	1.545	2.946	4,185
Panel B: Mahalanobis Distance Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	6.992	5.964	6.330	1,055
Medium/Highest Gender Disparity	9.977**	10.102**	9.505**	$3,\!251$
Medium/Lowest Gender Disparity	6.509^{*}	4.020	4.733	4,263
Lowest Gender Disparity (Least Discrimination)	-0.702	0.152	1.231	4,185

Table C3: Estimated ATET of female ownership on the "Days to Obtain Construction Permit" variable by quartile of legal gender disparity index (GDI).

Panel A: Propensity Score Matching							
Quartile	NN1	NN2	NN3	Obs.			
Lowest Economic Freedom	10.057^{**}	11.827***	11.294***	2,754			
Medium/Lowest Economic Freedom	0.405	1.378	0.981	$3,\!824$			
Medium/Highest Economic Freedom	6.858^{*}	5.500	5.506	$4,\!187$			
Highest Economic Freedom	0.667	0.317	-0.062	2,551			
Panel B: Mahalanobis Distance M	/latching						
Quartile	NN1	NN2	NN3	Obs.			
Lowest Economic Freedom	12.977***	12.438^{***}	14.327***	2,754			
Medium/Lowest Economic Freedom	0.752	-2.298	-0.835	3,860			
Medium/Highest Economic Freedom	6.258^{*}	5.801^{*}	5.503	$4,\!187$			
Highest Economic Freedom	-3.691	0.046	0.768	2,551			

Table C4: Estimated ATET of female ownership on the "Days to Obtain Construction Permit" variable by quartile of gender adjusted EFW.

Panel A: Propensity Score Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	0.120*	0.105^{*}	0.106^{*}	3,502
Medium/Highest Gender Disparity	-0.045	-0.041	-0.043	6,794
Medium/Lowest Gender Disparity	0.116^{***}	0.067^{*}	0.063^{*}	8,547
Lowest Gender Disparity (Least Discrimination)	-0.063*	-0.049	-0.045	9,220
Panel B: Mahalanobis Distance Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	0.082	0.085	0.079	3,502
Medium/Highest Gender Disparity	-0.042	-0.029	-0.038	6,794
Medium/Lowest Gender Disparity	0.043	0.047	0.064^{*}	8,547
Lowest Gender Disparity (Least Discrimination)	-0.071**	-0.068**	-0.066**	9,220

Table C5: Estimated ATET of female ownership on the "*Customs & Trade Regulations*" variable by quartile of legal gender disparity index (GDI).

Panel A: Propensity Score Matching							
Quartile	NN1	NN2	NN3	Obs.			
Lowest Economic Freedom	0.023	0.041	0.044	7,092			
Medium/Lowest Economic Freedom	-0.063	-0.030	-0.018	7,826			
Medium/Highest Economic Freedom	0.027	0.021	0.029	9,797			
Highest Economic Freedom	0.014	-0.014	-0.012	4,644			
Panel B: Mahalanobis Distance M	Iatching						
Quartile	NN1	NN2	NN3	Obs.			
Lowest Economic Freedom	0.038	0.019	0.009	7,101			
Medium/Lowest Economic Freedom	-0.014	-0.006	-0.013	7,831			
Medium/Highest Economic Freedom	0.012	0.003	0.003	9,797			
Highest Economic Freedom	-0.046	-0.028	-0.041	4,644			

Table C6: Estimated ATET of female ownership on the "*Customs & Trade Regulations*" variable by quartile of gender adjusted EFW.

Panel A: Propensity Score Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	0.153***	0.148***	0.138***	3,457
Medium/Highest Gender Disparity	-0.001	-0.023	-0.030	10,421
Medium/Lowest Gender Disparity	0.019	0.012	-0.006	$9,\!435$
Lowest Gender Disparity (Least Discrimination)	-0.043	-0.026	-0.020	8,211
Panel B: Mahalanobis Distance Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	0.150***	0.171***	0.195***	3,462
Medium/Highest Gender Disparity	-0.033	-0.022	-0.017	10,421
Medium/Lowest Gender Disparity	-0.004	-0.001	-0.002	$9,\!435$
Lowest Gender Disparity (Least Discrimination)	-0.035	-0.016	-0.019	8,211

Table C7: Estimated ATET of female ownership on the "*Licensing & Permit Regulations*" variable by quartile of legal gender disparity index (GDI).

Panel A: Propensity Score Matching						
Quartile	NN1	NN2	NN3	Obs.		
Lowest Economic Freedom	-0.073*	-0.060*	-0.063*	8,796		
Medium/Lowest Economic Freedom	-0.006	-0.043	-0.028	9,801		
Medium/Highest Economic Freedom	0.030	0.024	0.015	10,660		
Highest Economic Freedom	-0.001	-0.026	-0.025	$4,\!107$		
Panel B: Mahalanobis Distance M	Iatching					
Quartile	NN1	NN2	NN3	Obs.		
Lowest Economic Freedom	-0.050	-0.042	-0.037	8,797		
Medium/Lowest Economic Freedom	-0.062*	-0.037	-0.033	9,822		
Medium/Highest Economic Freedom	0.052	0.035	0.027	10,660		
Highest Economic Freedom	-0.005	-0.004	-0.005	4,107		

Table C8: Estimated ATET of female ownership on the "*Licensing & Permit Regulations*" variable by quartile of gender adjusted EFW.

Table C9: Estimated ATET of female ownership on the "*Labor Regulations*" variable by quartile of legal gender disparity index (GDI).

Panel A: Propensity Score Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	0.159***	0.148***	0.142***	6,119
Medium/Highest Gender Disparity	0.036	0.020	0.017	18,607
Medium/Lowest Gender Disparity	0.007	0.018	0.020	$18,\!695$
Lowest Gender Disparity (Least Discrimination)	0.009	0.017	0.021	16,725
Panel B: Mahalanobis Distance Matching				
Quartile	NN1	NN2	NN3	Obs.
Highest Gender Disparity (Most Discrimination)	0.097^{**}	0.093***	0.106***	6,133
Medium/Highest Gender Disparity	0.045^{*}	0.013	0.017	18,607
Medium/Lowest Gender Disparity	0.050^{**}	0.046^{**}	0.041**	18,695
Lowest Gender Disparity (Least Discrimination)	-0.011	-0.009	-0.007	16,725

Panel A: Propensity Score Matching						
Quartile	NN1	NN2	NN3	Obs.		
Lowest Economic Freedom	0.007	0.002	-0.001	21,089		
Medium/Lowest Economic Freedom	0.047^{*}	0.052^{**}	0.055^{**}	$18,\!079$		
Medium/Highest Economic Freedom	0.023	0.005	0.015	$18,\!577$		
Highest Economic Freedom	0.051	0.060^{*}	0.071^{**}	$8,\!678$		
Panel B: Mahalanobis Distance M	atching					
Quartile	NN1	NN2	NN3	Obs.		
Lowest Economic Freedom	0.021	0.005	0.013	21,104		
Medium/Lowest Economic Freedom	0.055^{**}	0.050^{**}	0.042^{**}	$18,\!079$		
Medium/Highest Economic Freedom	0.015	0.007	0.011	$18,\!578$		
Highest Economic Freedom	0.014	0.029	0.037	$8,\!678$		

Table C10: Estimated ATET of female ownership on the "*Labor Regulations*" variable by quartile of gender adjusted EFW.

Table C11: Country List and Selected Variables

Country	Survey Years	Female Owner	GDI	Adj. EFW	Ν	Country	Survey Years	Female Owner	GDI	Adj. EFW	N
Afghanistan	2008, 2014	0.028			945	Lesotho	2009, 2016	0.389	0.91	6.36	301
Albania	2007, 2013, 2019	0.164	1.00	7.52	1041	Liberia	2009, 2017	0.302	1.00	6.49	301
Angola	2006	0.243	0.88	4.93	785	Lithuania	2009, 2013, 2019	0.413	1.00	7.87	904
Antigua & Barbuda	2010	0.185	0.00	F 00	151	Malawi	2014	0.300	0.88	5.96	673
Argentina	2006, 2010, 2017	0.417	0.88	5.88	2817	Malaysia Mal:	2015	0.391	0.65	7.29	1000
Azerbaijan	2009, 2013	0.290	1.00	6.00	734 005	Malta	2007, 2010	0.167	0.50	2.83	242
Bahamas	2009, 2013, 2019	0.103	1.00	7.49	150	Mauritania	2019	0.450	0.94	1.99	242
Bangladesh	2007 2013	0.193	0.76	6.04	2797	Mexico	2006, 2014	0.253	1.00	6.88	2673
Barbados	2010	0.405	0.88	6.44	150	Micronesia	2009	0.864	1100	0.00	68
Belarus	2008, 2013, 2018	0.483	0.88	6.69	1233	Moldova	2009, 2013, 2019	0.524	0.90	6.85	1083
Belize	2010	0.267	0.88	6.42	150	Mongolia	2009, 2013, 2019	0.491	1.00	7.25	1082
Benin	2016	0.336	0.76	6.11	300	Montenegro	2009, 2013, 2019	0.251	0.82	7.36	416
Bhutan	2009, 2015	0.380	0.94	6.94	503	Morocco	2013, 2019	0.211	0.76	6.51	1503
Bolivia	2006, 2010, 2017	0.531	0.88	6.35	1146	Mozambique	2007, 2018	0.272	0.82	5.95	917
Bosnia and Herzegovina	2009, 2013, 2019	0.306	0.84	6.71	1083	Myanmar	2014, 2016	0.267	0.88	5.72	1239
Botswana	2006	0.455	0.88	7.00	609	Namibia	2006, 2014	0.400	0.94	6.58	907
Brazil	2009	0.548	1.00	6.54	1802	Nepal	2009, 2013	0.256	0.82	6.47	850
Bulgaria	2007, 2009, 2013, 2019	0.388	0.96	7.55	2368	Nicaragua	2006, 2010, 2016	0.428	0.93	7.22	907
Burundi	2006, 2014	0.348	0.82	5.79	427	Niger	2017	0.131	0.47	5.62	301
Cambodia	2016	0.425	1.00	7.10	796	Nigeria North Magadapia	2007, 2014	0.190	0.88	0.48	4543
Control African Bon	2010	0.505	0.47	5.09	124	Pakistan	2009, 2013, 2019	0.004	0.94	1.29	2100
Chad	2011	0.314	0.70	5.32	202	Panama	2007, 2013	0.094	0.05	0.60 7.50	2100
Chile	2018 2010	0.137	0.55	7.82	1683	Papua New Guinea	2000, 2010	0.290	0.94	6.14	65
China	2000, 2010	0.608	0.82	6.07	2554	Paraguay	2015 2010 2017	0.402	0.81	7.04	999
Colombia	2006, 2010, 2017	0.537	0.90	6.62	2782	Peru	2006, 2010, 2017 2006, 2010, 2017	0.397	0.97	7.77	2448
Congo	2009	0.275	0.59	4.53	151	Philippines	2009, 2015	0.673	0.77	7.03	2332
Costa Rica	2010	0.359	0.88	7.32	448	Poland	2009, 2013, 2019	0.411	0.95	7.19	2239
Croatia	2007, 2013, 2019	0.346	0.92	6.95	1397	Portugal	2019	0.443	1.00	7.79	1062
Cyprus	2019	0.458	0.88	7.82	240	Romania	2009, 2013, 2019	0.422		7.76	1895
Czech Republic	2009, 2013, 2019	0.313	0.99	7.76	1006	Russia	2009, 2012, 2019	0.324	0.88	6.50	6547
Cote D'Ivoire	2016	0.248	0.66	5.74	887	Rwanda	2006, 2011, 2019	0.355		6.92	813
Dem. Rep. Congo	2006, 2013	0.174	0.35	5.31	1228	St. Lucia	2010	0.327			150
Djibouti	2013	0.217	0.65		266	St. Vincent & the Grenadines	2010	0.755			153
Dominica	2010	0.380			150	Samoa	2009	0.796			109
Dominican Rep.	2010, 2016	0.314	1.00	7.46	715	Senegal	2007, 2014	0.189	0.65	5.83	861
Ecuador	2006, 2010, 2017	0.442	1.00	6.33	1074	Serbia	2009, 2013, 2019	0.340	1.00	6.89	1109
Egypt	2013, 2016	0.232	0.41	5.29	4590	Sierra Leone	2009, 2017	0.181	0.94	6.11	302
El Salvador	2006, 2010, 2016	0.395	1.00	7.44	1443	Slovakia	2009, 2013, 2019	0.340	0.98	7.00	972
Estoma	2009, 2013, 2019	0.429	0.45	7.99	900 456	Solomon Jelande	2009, 2013, 2019	0.437	0.94	1.25	954
Eswatiin	2000, 2010	0.364	0.45	5.97	1402	South Africa	2013	0.479	1.00	6.95	813
Fiji	2011, 2013	0.504	0.88	6.88	164	South Sudan	2007	0.217	1.00	0.35	738
Gabon	2009	0.269	0.41	5.63	179	Sri Lanka	2011	0.322	0.88	6.49	610
Gambia	2006. 2018	0.214	0.88	7.12	325	St. Kitts & Nevis	2010	0.593	0.00	0.10	149
Georgia	2008, 2013, 2019	0.333	0.92	8.00	1313	Sudan	2014	0.082	0.29		662
Ghana	2007, 2013	0.376	0.94	6.83	1214	Suriname	2010, 2018	0.291	0.94	6.48	385
Greece	2018	0.523	1.00	7.06	600	Sweden	2014	0.462	1.00	7.93	600
Grenada	2010	0.573			153	Tajikistan	2008, 2013, 2019	0.283	0.84	6.24	1071
Guatemala	2006, 2010, 2017	0.315	0.94	7.53	1210	Tanzania	2006, 2013	0.250	0.88	6.54	1232
Guinea	2006, 2016	0.201	0.61	5.76	373	Thailand	2016	0.657	0.94	6.79	839
Guinea Bissau	2006	0.189	0.41	4.93	159	Timor-Leste	2009, 2015	0.514	0.78	6.39	276
Guyana	2010	0.591	0.94	6.49	165	Togo	2016	0.275	0.88	5.80	305
Honduras	2006, 2010, 2016	0.421	0.87	7.18	909	Tonga	2009	0.653			150
Hungary	2009, 2013, 2019	0.480	0.99	7.51	1404	Trinidad & Tobago	2010	0.439	0.94	7.07	370
India	2014	0.147	0.82	6.14	8077	Tunisia	2013	0.531	0.71	0.14 6.79	592 4150
Indonesia	2009, 2015	0.321	0.82	0.82	2499	Iurkey	2008, 2013, 2019	0.271	0.94	0.78	4159
Iraq	2011	0.009	0.41	7 43	183	Uganda	2006, 2013 2019	0.315	0.70	7.14	3100
Italy	2013	0.213	1.00	7.43	760	Uruguay	2006, 2010, 2017	0.403	0.82	7 31	1335
Jamaica	2010	0.389	1.00	7.16	371	Uzbekistan	2008 2013 2019	0.319	0.04	1.01	1880
Jordan	2013, 2019	0,190	0.88	7,31	1157	Vanuatu	2009	0.516			128
Kazakhstan	2009, 2013, 2019	0.322	1.00	7.21	2590	Venezuela	2010	0.327	1.00	4.18	549
Kenya	2007, 2013, 2018	0.429	0.85	7.03	2435	Vietnam	2009, 2015	0.508	0.88	5.96	2049
Kosovo	2009, 2013, 2019	0.102			743	West Bank & Gaza	2013, 2019	0.120			798
Kyrgyzstan	2009, 2013, 2019	0.516	0.88	6.93	865	Yemen	2010, 2013	0.078	0.41	6.15	830
Laos	2009, 2012, 2016, 2018	0.361	1.00	6.55	1330	Zambia	2007, 2013, 2019	0.417	0.90	7.07	1639
Latvia	2009, 2013, 2019	0.447	1.00	7.90	966	Zimbabwe	2011, 2016	0.511	1.00	5.34	1199
Lebanon	2013, 2019	0.249	0.82	6.89	1093						