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Legal Disparities and Gendered Entrepreneurship: The Moderating Roles of Educational and Earnings Gaps

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Abstract

This paper examines whether legal disparities across genders affect gendered opportunity entrepreneurship across countries. Existing studies show that legal inequality influences women's labor market participation, firm ownership, and access to economic opportunities, but little evidence exists on whether entrepreneurship-related legal parity shapes the female-to-male ratio of opportunity-driven (versus necessity-driven) entrepreneurship. Using cross-country panel data from the Global Entrepreneurship Monitor, the Women, Business and the Law database, and World Development Indicators, we find that greater legal parity in entrepreneurship-related laws is associated with a higher female-to-male ratio of opportunity-to-necessity entrepreneurship. We further show that this relationship is moderated by pay-based legal parity, with evidence of a substitution effect: entrepreneurship-related legal equality has a stronger positive association where pay-based legal parity is weaker. For total entrepreneurship, however, the effects are weaker and often negative. We also consider educational parity as a moderator and find similar substitution effects.

JEL Classifications: L26; P48; J16; O43

Keywords: *Gendered Entrepreneurship; Opportunity Entrepreneurship; Legal parity; Formal Institutions; Wage Gap*

1. INTRODUCTION

A growing body of research highlights the importance of gender-equal legal frameworks for economic development and broader measures of societal well-being. Legal disparities in the context of a wide range of factors – employment, pay, marriage, entrepreneurship, asset holding, and others – can have wide implications for gendered outcomes (Dutta, Stivers and Sobel, 2025). One such gender outcome that we focus on is entrepreneurship. Despite constituting roughly half the global population, women remain substantially underrepresented as opportunity entrepreneurs in nearly every region of the world (GEM, 2023). Therefore, it is crucial to understand what legal-institutional factors are at play in driving this underrepresentation.

One of the pioneering papers in regard to legal disparities, Hyland, Djankov, and Goldberg (2020), analyzes the Women, Business and the Law (WBL) database and documents the presence of large and persistent gender inequalities especially in the context of pay and parenthood. They also find legal parity across genders is correlated with higher female labor participation as well as a smaller gender wage gap. Other studies like Perrin and Hyland (2026) stress the importance of legal gender equality in shaping women's financial inclusion. Legal parity, especially in the context of the workforce, has been found to be beneficial for female employment (Gonzales et al. 2015, Islam et al., 2019). In the context of varied gender outcomes, Dutta et al. (2025b) emphasize that legal gender equality must work hand in hand with economic freedom to successfully reduce the gap in gendered outcomes.

The availability of cross-country datasets capturing legal gender disparities over time is relatively recent. The emergence of the Women, Business and the Law (WBL) data has created new opportunities to examine a range of important and policy-relevant questions, contributing significantly to both the economic development literature and the economics of gender. In the context of entrepreneurship, employing firm level data for 94 countries, Islam, Muzi and Amin

(2019) find that legal inequality across genders not only affects women's participation in the private sector workforce but also their likelihood to become top managers and owners of firms. We add to this growing literature on entrepreneurship and legal disparities by asking the simple question – does legal disparity across genders matter in the context of gendered opportunity-based entrepreneurial outcomes? Intuitively, the answer should be in the affirmative, but to the best of our knowledge, no study to date has empirically analyzed this question, especially as it relates to laws related to starting and operating a firm.

Among the components incorporated in the WBL overall index, one area is entrepreneurship. This area specifically assesses "women's ability to start and operate businesses on an equal footing with men" (WBL, 2024). It incorporates factors like the presence of laws (or lack thereof) that prohibit the discrimination of access to credit for women relative to men, laws that encourage gender-responsive public procurement, and laws that require women's representation on public corporate boards. Such laws should be relevant in enhancing and nurturing women's entrepreneurial efforts. We also hypothesize that these laws matter for opportunity entrepreneurship more than necessity-driven entrepreneurship. Opportunity entrepreneurship is motivated by choice rather than by need. Under such circumstances the presence of laws that support women to boost their entrepreneurial efforts becomes necessary. When women are aware that they will be supported by laws as much as men in their entrepreneurial ventures, they should be less likely to shy away from such efforts. We thus expect such laws to boost gendered opportunity entrepreneurship ratios (that is, the ratio of opportunity-to-necessity entrepreneurship) for countries. Other than considering gendered opportunity entrepreneurship ratios, we also consider the gendered total entrepreneurship ratio that includes both necessity-driven and opportunity-driven entrepreneurship. The idea is to see if parity in entrepreneurship-

related laws matters more for one type of entrepreneurship relative to the other. Our hypothesis is that such laws matter more when it comes to women's opportunity-driven entrepreneurship since it is a choice driven activity.

The secondary question we investigate in our paper is that of moderating effects or complementary relationships. Hyland, Djankov, and Goldberg (2020), who analyze the WBL data in their paper, also mention the presence of large and persistent gender inequalities in the context of pay. Laws aimed at mitigating gender wage gaps are specifically incorporated into this area. Such laws along with the entrepreneurship related ones have implications for wage employment versus self-employment choice for individuals across genders. For example, Smyk et al. (2023) argue that labor market inequality can push women into self-employment, although they find this effect is true for men too. Employing US states' data, Bonaparte et al. (2024) find that gender wage gaps affect the opportunity costs of women to become entrepreneurs. In other words, they find when wages for women are low (relative to men), entrepreneurship becomes relatively more attractive.

We test the moderating effect of legal pay parity across genders in the context of the relationship between legal equality for entrepreneurship and gendered opportunity entrepreneurship ratios. Is legal parity needed in both areas – pay and entrepreneurship – to boost participation of females in opportunity-based entrepreneurship? It can also be true that the laws in the different areas act as substitutes – as legal parity in pay improves, wage employment might become more attractive for women, and thus, equality in entrepreneurship-related laws may not matter as much. Finally, while not the primary focus of our analysis, we also consider the role of educational attainment disparity as a moderator. Given the ambiguous relationship between

entrepreneurial outcomes and human capital in the literature, it is important to consider this variable as well.

Employing data from Global Entrepreneurship Monitor (GEM) database and WBL, we empirically investigate these relationships. Our results show that parity in entrepreneurship-related laws enhances the gendered opportunity entrepreneurship ratio, indicating that with greater parity in such laws, more women relative to men pursue opportunity-driven entrepreneurship. At the same time, the moderating analysis indicates that this positive effect is stronger when the pay parity area is weaker, suggesting a substitution effect. Stated differently, entrepreneurship-related legal equality has a stronger positive association where pay parity is weaker. Further, for our results with the overall gendered entrepreneurship ratio, the effects tend to be weaker and in many cases negative, consistent with the argument that stronger legal and labor-market conditions may shift women away from necessity-based entrepreneurship toward formal employment. We also explore educational parity as a moderator and find evidence of similar substitution effects.

Section 2 presents the literature review, our theory, and puts forward our hypotheses. In Section 3, we explain our data, the variables, and the sources from which they are taken. Section 4 presents our empirical specification along with the employed methodology. Benchmark results are presented in Section 5. In Section 6, we present our results with the gendered overall entrepreneurship ratio as the dependent variable. Section 7 clarifies our identification strategies. Finally, in Section 8, we present results with educational disparity as the moderator. Section 9 concludes.

2. LITERATURE REVIEW, THEORY, AND HYPOTHESES

2.1. LITERATURE REVIEW

An extensive literature has explored the barriers faced by female entrepreneurs – barriers can exist in the form of financial constraints relative to male entrepreneurs (Dutta and Mallick, 2023;

Niethammer, 2013; Muravyev et al., 2009) as well as in the form of high market competition and lack of market knowledge (Rudhumbu et al., 2020). Female-owned firms are more concentrated in smaller, less capital-intensive industries with lower average firm sizes (Sabarwal and Terrell, 2008) and women have lower levels of work experience and hours worked in their businesses compared to men (Hundley, 2001). Among the hurdles faced by women entrepreneurs, the one that has the received most attention is the evidence of a gender gap in accessing finance for women-owned or women-led businesses (Dutta and Mallick, 2023; Aristei and Gallo, 2016; Asiedu et al., 2013; Becker–Blease and Sohl, 2007). Factors like motherhood, family position, health, financing, human capital, fertility rates, labor markets, and social entrepreneurship are some of the factors that have been stressed to play a role for female entrepreneurs (Dutta and Mallick, 2023; Williams, 2004; Schindehutte et al., 2003; Carter, 2003; Bird and Brush, 2002; Burke et al., 2002, to mention a few).

When examining the gender gap in entrepreneurship, the literature has mostly considered opportunity-driven and necessity-driven entrepreneurship together. Opportunity-driven entrepreneurship – firm creation motivated by the identification of a promising market opportunity – has implications in terms of outcomes relative to necessity entrepreneurship as emphasized by research. Past data showed that the highest rates of measured entrepreneurial activity often are attached to economically poor or depressed areas. This led to a clear need for a distinction between "opportunity" and "necessity" entrepreneurship[1] (Fairlie and Fossen, 2021; Hay et al., 2002). Choosing or pursuing an attractive business opportunity as a choice over other attractive options

[1] While analyzing self-employment and life satisfaction by gender, Maguire and Winters (2020) for example mentions that opportunity and necessity motives may differ between women and men which their employed data does not capture.

that are available is the idea attached to opportunity entrepreneurship (Fairlie and Fossen, 2021; Hay et al., 2002). In terms of outcomes, the literature has emphasized that this kind of entrepreneurship is usually associated with economic growth and development, and a variety of other positive economic and social outcomes (Acs and Varga, 2005; Bergmann and Sternberg, 2007; Bjørnskov and Foss, 2013; Block et al., 2015). Necessity-driven entrepreneurship – where individuals are typically pushed into self-employment due to adverse situations or lack of job opportunities – is usually present in economically depressed situations and in locations with worse business climates and fewer job opportunities (Deli, 2011, Angulo-Guerrero et al., 2017, Fairlie and Fossen, 2021).

The literature on gendered entrepreneurship in the context of opportunity-driven self-employment is relatively small. A recent study by Chen, Lee, and Alymkulova (2022) finds that the gender gap in opportunity-driven entrepreneurship is partly explained by differences in human and social capital and access to networks. This interpretation is broadly consistent with the GEM 2022/2023 Global Entrepreneurship Report (GEM, 2023), which shows that women remain active in entrepreneurial entry across countries but continue to face disadvantages in growth-oriented entrepreneurship and in access to the resources often needed to pursue larger opportunity-based ventures. In this context, Boudreaux and Nikolaev (2018) argue that the gender gap in opportunity-based entrepreneurship is more pronounced in low-quality institutional environments and narrows where institutional quality, particularly the quality of the regulatory environment, is stronger. By identifying institutional quality as a moderating factor, their study suggests that gender disparities in opportunity-based entrepreneurship are conditioned not only by individual resources but also by the broader regulatory and institutional environment. We add to this literature by examining the role of legal parity in entrepreneurship for the gendered opportunity entrepreneurship ratio.

As stated earlier, access to legal institutions across genders matters for a variety of outcomes. A growing literature shows that gendered access to legal institutions shapes women's economic outcomes by affecting their ability to work, own and inherit property, enter contracts, access finance, register businesses, and participate in entrepreneurial activity. Hyland, Djankov, and Goldberg (2020) show that more gender-equal laws are associated with higher female labor[2] force participation and smaller gender wage gaps. Extending this line of inquiry, Hyland, Djankov, and Goldberg (2021) examine whether gendered laws matter for broader dimensions of women's economic empowerment and emphasize that formal legal restrictions can constrain women's participation in economic activity even when individual resources are present. Similarly, Demirgüç-Kunt, Klapper, and Singer (2013) link legal discrimination to gender gaps in financial inclusion, showing that women's access to accounts, savings, and credit is shaped not only by income and education but also by the legal environment governing women's economic rights.

Country-level and institutional studies further show that legal rights over property, inheritance, and marital assets are central to women's economic agency. Hallward-Driemeier, Hasan, and Rusu (2013) document long-run changes in women's legal capacity and property rights across countries, showing that reforms affecting women's ability to own property, sign legal documents, and exercise legal rights are associated with improvements in employment, education, and health outcomes. In Ethiopia, Hallward-Driemeier and Gajigo (2015) find that family-law reform strengthened women's rights within marriage and increased women's movement into paid, full-time, non-home-based, and more skill-intensive work. Evidence from India similarly shows that inheritance-law reforms improved women's access to assets and altered the intergenerational

[2] Formal legal rights can also operate alongside social conditions that can shape women's economic participation. Using Japanese panel data, Tashiro and Lo (2020) find an inverse association between adherence to social norms and women's labor force participation

transmission of resources (Deininger, Goyal, and Nagarajan, 2013).

Recent studies have connected these legal-institutional channels more directly to entrepreneurship, firm ownership, and women's participation in business leadership. Islam, Muzi, and Amin (2019), using firm-level data across 94 economies, show that unequal laws are associated with lower women's participation in the private-sector workforce and a lower likelihood that women become firm owners or top managers. Ashraf, Delfino, and Glaeser (2019) make a closely related argument in the context of female entrepreneurship and rule of law, showing that women's entry into entrepreneurship depends not only on formal legal protection but also on informal bargaining power. O'Reilly and Sheehan (2025) provide even more direct evidence by examining women's property-rights equality and entrepreneurial activity using property-rights data from the Economic Freedom of the World project and entrepreneurship data from the Global Entrepreneurship Monitor; they find that stronger protection of women's property rights is associated with higher female entrepreneurship relative to male entrepreneurship. Together, these studies suggest that women's entrepreneurial activity is shaped not only by individual resources or preferences but also by whether women can rely on legal institutions to protect contracts, property, credit access, and business activity on terms comparable to men.

A related set of studies identifies mechanisms through which legal gender equality may affect women's economic agency and entrepreneurial capacity. Hyland (2023) shows that discriminatory legal environments are associated with discriminatory firm behavior in the Democratic Republic of Congo, and that firms that do not impose discriminatory restrictions have more women employees and managers. Perrin and Hyland (2026) show that legal gender equality is positively associated with women's financial inclusion, using Global Findex and the WBL data, while also emphasizing that social norms and implementation condition this relationship. Behr and

Xi (2026) similarly review barriers to female entrepreneurship and provide stylized evidence that removing legal and regulatory barriers is associated with stronger women's entrepreneurship and labor-market participation. These studies provide an important foundation for expecting entrepreneurship-related legal parity to matter for gendered opportunity entrepreneurship, since opportunity-driven business entry often depends on the ability to own assets[3], access finance, enter contracts, and operate firms under predictable and nondiscriminatory legal rules.

2.2. THEORY

These insights can be organized within a simple occupational-choice framework. A woman allocates her labor across three options: wage employment, opportunity-driven entrepreneurship, and necessity-driven entrepreneurship. She selects the option offering the highest expected net return. Entrepreneurship-related legal parity, which grants women the same rights as men to register a business, sign contracts, access credit, and open bank accounts, lowers the fixed costs and financing costs of founding and growing a venture. Because these costs bind more so on the resource-intensive ventures that characterize opportunity entrepreneurship, rather than on the subsistence-driven activity that characterizes necessity entrepreneurship, reducing them should raise opportunity entrepreneurship relative to necessity entrepreneurship and thus increase the female-to-male opportunity-to-necessity ratio.

Pay-related legal parity, by contrast, operates on the wage-based employment alternative: by raising women's relative returns to paid work, it increases the opportunity cost of entrepreneurship of either type. This yields a clear prediction about how the two domains interact. If pay-related legal parity strengthens the outside option of wage employment, its presence should weaken, rather than reinforce, the marginal effect of entrepreneurship-related legal parity,

[3] Related evidence from sub-Saharan Africa shows that mobile money access can increase business formalization, particularly among previously unbanked entrepreneurs (Malkova, 2026).

implying a substitution rather than a complementary relationship. The same logic implies that entrepreneurship-related legal parity should have a weaker (possibly negative) association with total entrepreneurship, because improved legal and labor-market conditions can draw women out of necessity entrepreneurship and into wage employment even as they encourage opportunity-driven entrepreneurial entry.

The pay gap also introduces a distinct but related mechanism through economy-wide discrimination. If a large female earnings penalty in wage-based employment reflects pervasive market discrimination, then that same discrimination also suppresses the returns women can expect as entrepreneurs, since the customers, investors, and suppliers they must transact with operate in the same discriminatory environment. Legal reform that eliminates formal barriers to entry therefore yields smaller increases in opportunity entrepreneurship when the earnings gap is large, because informal market discrimination constitutes a binding second constraint that changes to the law does not address.

Taken together, the literature and our theory suggests that gender disparities in entrepreneurship are shaped not only by individual-level differences in resources, preferences, and constraints, but also by the broader legal environment within which women make labor-market and self-employment decisions. If women face legal restrictions in starting or operating businesses, accessing credit, signing contracts, or participating in economic activity on the same terms as men, then their ability to pursue opportunity-driven entrepreneurship is likely to be constrained. This should matter especially for opportunity entrepreneurship, which is more likely to depend on the ability to identify, finance, and expand a business opportunity rather than simply enter self-employment out of necessity. Greater legal parity in entrepreneurship-related laws should therefore improve the female-to-male ratio of opportunity-to-necessity entrepreneurship, but not

necessarily the female-to-male ratio of total entrepreneurship.

2.3. HYPOTHESES

To summarize the above, we expect legal parity to shift the composition of women's entrepreneurship toward opportunity-driven endeavors rather than merely raise its overall level. We therefore have our first hypothesis as follows.

Hypothesis 1: Greater legal parity in entrepreneurship-related laws is associated with a higher female-to-male ratio of opportunity- to-necessity entrepreneurship.

At the same time, the effect of entrepreneurship-related legal parity may depend on the broader legal environment affecting women's wage employment opportunities. Pay parity laws can alter the relative attractiveness of wage employment versus self-employment. On the one hand, legal parity in pay may complement entrepreneurship-related legal equality by improving women's broader economic position, increasing their labor-market attachment, and strengthening their ability to accumulate resources that can support entrepreneurial activity. On the other hand, pay parity may act as a substitute. If improvements in pay-related laws make wage employment more attractive for women, then the marginal effect of entrepreneurship-related legal parity on opportunity entrepreneurship may be weaker in countries where pay parity is stronger. Given this ambiguity, we test whether pay parity moderates the relationship between entrepreneurship-related legal parity and gendered opportunity entrepreneurship. We therefore have our second hypothesis as follows.

Hypothesis 2: Pay parity moderates the relationship between entrepreneurship-related legal parity and the female-to-male ratio of opportunity-to-necessity entrepreneurship.

3. DATA, SOURCES, AND SUMMARY STATISTICS

3.1. SOURCES AND OUR SAMPLE

Our data is compiled from multiple sources. The three main data sources are the Global Entrepreneurship Monitor (GEM) database, the Women, Business and the Law (WBL) database, and the World Development Indicators (WDI) online, 2024 database. GEM is an international research initiative launched in 1999 by Babson College and London Business School to measure and compare entrepreneurial activity, attitudes, and ecosystems across countries. It is the world's most comprehensive study of entrepreneurship, covering more than 100 economies (GEM, 2023). GEM is a popular database for empirical cross country panel studies on entrepreneurship. Developed by the World Bank Group, WBL provides detailed, comparable data on laws and regulations that affect women's economic opportunities across 190 economies (World Bank, 2024). The dataset measures how legal frameworks relate to women's participation in the workforce and entrepreneurship in multiple areas. Finally, WDI provides variables related to multiple development indicators of countries.

Our original sample covers 109 countries over the period 2001 to 2022. Yet, GEM data availability is heavily unbalanced, meaning that not every year is covered for every country. For some countries we have the entire sample period availability while for many we have data for only 1-2 years. For our benchmark regressions, we have 74 countries with about 3.85 observations per country. Our main variable of interest – gendered opportunity to necessity entrepreneurship ratio – has less data availability compared to some other variables from the GEM database. For our regressions with the gendered overall entrepreneurship ratio, the number of countries covered rises to 93 with about 8.36 observations per country. The full set of summary statistics are presented in Appendix 1.

3.2. VARIABLES

Our dependent variable of interest comes from GEM and is the gendered ratio of opportunity-to-necessity entrepreneurship. Specifically, it measures the percentage of female early-stage entrepreneurs (TEA) who report being driven by opportunity, defined as pursuing a business to gain independence or increase income, relative to those doing so out of necessity, defined as lack of better employment options. This ratio is then compared to the same ratio for male entrepreneurs. Because the measure is derived from survey-based population estimates, it captures relative propensities rather than deterministic outcomes. A value of 1 indicates that women and men are equally motivated by opportunity when starting a business. Ratios below 1 indicate that women are comparatively more necessity-driven than men, while ratios above 1 suggest that women are more often opportunity-driven. The mean value is 0.93, suggesting that women are somewhat less likely than men to start a business primarily out of opportunity rather than necessity. The variable ranges from 0.51 to 1.36. Based on sample averages, countries such as Qatar, Hong Kong, Israel, Algeria, Madagascar, and Malaysia have values above 1, while Bosnia and Herzegovina, Malawi, Jordan, Belgium, Senegal, and Namibia are among the countries with the lowest values.

Our main independent variable comes from the WBL database. We use the Entrepreneurship indicator, which evaluates the extent to which legal systems enable or restrict women's ability to start and operate businesses. The measure captures whether women have the same legal rights as men in four areas: 1) whether the law allows women to register businesses, sign contracts, and open bank accounts; 2) whether the law prohibits gender-based discrimination in access to credit; 3) whether the law prescribes a gender quota for corporate boards; and 4) whether the law includes gender-responsive procurement provisions for public procurement. These four equally weighted questions are used to construct the indicator, with each assigned a value of 1 if the law grants women equal rights and 0 otherwise. The final indicator ranges from 0 to 100, with 100 indicating

full parity. In our sample, the variable ranges from 50 to 100, with an average of 86.4. Countries such as Cameroon and Pakistan have the lowest scores. The variable is ordered and takes the values 50, 75, or 100. Many countries score 75, indicating legal parity in some categories but not all. Our secondary variable of interest is the WBL pay indicator, which assesses laws related to pay discrimination against women relative to men and also captures occupational segregation laws. This variable also ranges from 0 to 100, with higher values indicating stronger legal guarantees of pay parity across genders. We create a dummy variable equal to 1 for values above 50 and 0 otherwise.

For control variables, we include gender parity in education, which may be an important determinant of our outcome variable. The specific WDI measure we use is the ratio of the female gross enrollment rate to the male gross enrollment rate at the secondary level. A gender parity index value of 1 indicates parity, meaning girls and boys are equally likely to be enrolled in secondary education. Values below 1 suggest that girls are underrepresented relative to boys, while values above 1 indicate higher enrollment rates for girls. Since the broader economic environment may also affect entrepreneurial activity, we control for GDP per capita in constant terms, GDP growth, and female labor-force participation, all of which are known to influence female entrepreneurship (Ribes-Giner et al., 2018).

4. EMPIRICAL METHODOLOGY AND SPECIFICATIONS

4.1. BENCHMARK SPECIFICATION

To empirically investigate how legal disparities affect gendered opportunity to necessity entrepreneurship, we estimate the following model:

$$Gen(\frac{Opp}{Nec})_{it} = \alpha_0 + \alpha_1 Ent(WBL)_{it} + \alpha_2 \text{Paydummy}_{\text{it}} + \alpha_3 \text{Controls}_{\text{it}} + \mu_i + \rho_t + \epsilon_{it} \quad (1),$$

where $Gen(\frac{Opp}{Nec})_{it}$ denotes the gendered ratio of opportunity-to-necessity entrepreneurship (female-to-male ratio) in country i at time t. $Ent(WBL)_{it}$ is our key explanatory variable, measuring the Entrepreneurship sub-index from the Women, Business and the Law (WBL) database that captures the degree of legal parity in women's ability to start and operate a business.

Our other variable of interest is the pay dummy. As clarified earlier, pay dummy is a dummy variable that equals 1 when the Pay sub-index of WBL exceeds 50 (signifying higher pay parity) and 0 otherwise. Controls are GPI for secondary school enrollment, GDP per capita (in constant terms), GDP growth, and labor force participation rate of females. μ_i and $\rho_t$are country and time fixed effects respectively. ϵ_{it} is the random error term.

4.2. MODERATING EFFECT – EMPIRICAL ANALYSIS

The relationship between legal parity across genders and gendered opportunity to necessity entrepreneurship may vary depending on broader institutional and structural factors that shape women's economic opportunities. Equal access to entrepreneurship-related legal rights may not generate uniform effects across all countries. Instead, the impact of these reforms is likely to depend on complementary conditions such as pay parity. To capture this heterogeneity, we introduce the moderating variable - the Pay (WBL) dummy. Our empirical specification is as follows:

$$(Gen\frac{Opp}{Nec})_{it} = \alpha_0 + \alpha_1 Ent(WBL)_{it} + \alpha_2 \text{Paydummy}_{\text{it}} + \alpha_3(\text{Ent} * \text{Paydummy})_{\text{it}} + \alpha_4 \text{Controls}_{\text{it}} + \mu_i + \rho_t + \epsilon_{it} \quad (2)$$

α_1 is the direct effect of *Ent(WBL)* on gendered opportunity-necessity entrepreneurship. α_3 captures how the effect of *Ent(WBL)* varies with pay-based legal disparity. Specifically, a positive and significant coefficient suggests complementarity, meaning that countries with greater equality in pay experience a stronger positive relationship between entrepreneurship law parity and

gendered opportunity to necessity entrepreneurship. Women are likely to be opportunity-driven entrepreneurs on par with men when they can enjoy legal parity in entrepreneurship-related laws as well as pay-related laws. A negative coefficient would imply a substitution effect, whereby improvements in pay parity reduce the marginal impact of legal parity reforms. It should be noted that the interpretation and statistical significance of coefficients become more complex in the presence of an interaction term. The interaction and its constituent variables jointly produce a combined effect that may differ in magnitude and significance from the individual effects of each variable. Moreover, the statistical significance of this combined effect depends on the value of the conditioning variable (Berry, Golder, and Milton, 2012; Brambor, Clark, and Golder, 2006; Braumoeller, 2004; Dutta et al., 2025a, Hainmueller, Mummolo, and Xu, 2019).

4.3. ESTIMATION MODELS

Ordinary Least Squares (OLS), random effect (RE) and mixed effect (ME) are our benchmark estimation models. OLS pools all observations across countries and years and estimates an average association without explicitly accounting for unobserved heterogeneity. RE estimates account for unobserved heterogeneity by introducing country-specific effects assumed to be randomly distributed and uncorrelated with the explanatory variables. This approach allows the inclusion of both within-country and between-country variation. Finally, mixed effect models, also often known as multilevel or hierarchical models, incorporate both fixed and random effect components by incorporating both fixed parameters (common to all countries) and random components (country-specific deviations). This way, unobserved country-level heterogeneity can be accounted for while still recognizing that the effect of legal parity may vary across nations.

As part of robustness analysis, we also consider the education variable as the moderator. We discuss this in more detail in subsequent sections.

5. RESULTS

5.1. BENCHMARK RESULTS

In Table 1, we present our first set of benchmark results based on Equation 1. The considered dependent variable is the female-to-male ratio of opportunity-to-neccesity entrepreneurship considered from the GEM database. Our independent variable of interest is a measure of parity in accessing laws as they relate to entrepreneurship. For example, it captures aspects like if a female has the same right to registering a business relative to a male or not. Three empirical models – OLS, Random Effect, and Mixed Effect – are considered. As we can see across the

[Insert Table 1 about here]

models, greater parity in accessing laws is associated with a higher ratio of female to male opportunity-based entrepreneurship. When women have equal rights to things like registering a business, opening a bank account, accessing credit, or signing a contract, as a male, they can take more risks and pursue opportunity-driven ventures rather than being confined to necessity-based activities. Opportunity-based ventures that depend on identifying market opportunities and expanding them directly hinge on legal rights. Once women have the same access to such rights as men, they can pursue the same balance of risk and reward as men.

The WBL index in the Entrepreneurship category is measured in 25-point increments. Thus, for example, if a country provides equal access in terms of registering a property to women relative to men, and women do not have rights in the remaining sub-categories, then the index will rise from 0 to 25 points. If the Entrepreneurship (WBL) index rises by 25 points, the female-to-male ratio in opportunity-to-necessity entrepreneurship increases by about 0.05 (25×0.002). This would mean if the gendered opportunity ratio were at 0.80, the ratio would increase to 0.85 based on a corresponding increase in rights. The only other controls added for these specifications are

our other independent variable of interest – the pay dummy – and the gender parity index in secondary enrollment.

Interestingly, we find that laws that guarantee parity in the pay category lower the opportunity entrepreneurship ratio. The variable is a dummy with 1 implying greater pay parity. Countries with relatively better pay-based legal equality have, on average, a 0.024–0.031 lower female-to-male ratio in opportunity-to-necessity entrepreneurship. The probable reason might be once pay-based equality laws improve, formal employment can become a lucrative option as well. But the variable is only significant for the OLS specification.

In Table 2, we re-run the same specifications, but we add controls other than the aforementioned variables. The controls added are GDP growth, GDP per capita, and female labor force participation. Our key variable of interest – the Entrepreneurship index in the WBL category – retains

[Insert Table 2 about here]

its sign and significance. The magnitude is smaller than Table 1. For a 25-point increase in the Entrepreneurship index, the gendered opportunity entrepreneurship rises by (25 × 0.001) 0.025. This means that if women are at 80% of men's opportunity entrepreneurship rate, the ratio rises to 0.825 with an increase in the Entrepreneurship index. Thus, overall findings show that legal parity for laws relating to entrepreneurship continues to have a positive and significant effect. The pay dummy only remains significant for OLS. Gender Parity Index in secondary enrollment is not significant for either table. Overall, our initial results show that legal parity for entrepreneurship laws can help women pursue opportunity entrepreneurship and, thus, can improve the gender ratio.

5.2. MODERATING EFFECTS

Our next set of results delve into investigating Equation (2). The moderating factor, as mentioned earlier, is the pay dummy variable. To remind our readers, the pay dummy captures parity in laws related to pay across genders. The dummy is assigned 1 for scores higher than 50, 0 otherwise. We want to see if this pay dummy moderates the relationship between entrepreneurship law parity across genders and the opportunity entrepreneurship ratio. In other words, does parity in entrepreneurship laws need to work with parity in laws related to pay to improve the gendered opportunity entrepreneurship ratio?

The results are presented in Table 3. The results show that the entrepreneurship legal access variable (WBL) remains positive and significant across all models, confirming that lower disparity

[Insert Table 3 about here]

in laws across genders consistently correspond to higher female-to-male ratios in opportunity-to-necessity entrepreneurship. The interaction term of Entrepreneurship (WBL) and pay dummy is not significant. But we want to remind our readers that in the presence of interaction terms, the effect of the main explanatory variable is conditional on the value of the moderating variable and therefore cannot be inferred directly from the reported coefficients. The appropriate approach is to calculate and interpret marginal effects across the observed range of the moderator (Berry et al., 2012; Brambor et al., 2006; Braumoeller, 2004; Dutta et al., 2025a; Hainmueller et al., 2019). Accordingly, we present the marginal effects in the table as well. We estimate the partial derivative $\frac{\partial GenOppEnt_{it}}{\partial Laws_{it}}$ for both values of the pay dummy. As we can see from the results, less disparity across gender for entrepreneurship laws always correspond to enhanced female to male opportunity entrepreneurship ratios. Yet, the impact is the strongest when the laws related to pay parity are weak. Thus, our results suggest a substitution effect among these laws to some extent. Greater equal access to legal institutions related to entrepreneurship for women along with men help them

in their opportunity entrepreneurship ventures more when laws regarding pay parity are not present. As such pay laws improve, the marginal effect of entrepreneurship (WBL) index remains positive but is less pronounced. Our interpretation of these results is that, when wage-based employment is greatly restricted for women, it becomes more beneficial to have laws that give females equal opportunity to establish a firm and therefore pursue opportunity-driven entrepreneurship.

We illustrate the same in Figure 1. The marginal effects or the partial derivative is plotted for both values of the pay dummy for all specifications. The figures show not only the estimated partial derivative but also the 95% confidence intervals. If zero falls within this confidence interval, the estimate is not significantly different from zero when evaluated at that level of the pay dummy. The same conclusions are reflected in the figure.

[Insert Figure 1 about here]

6. GENDERED TOTAL ENTREPRENEURSHIP

Our next set of results re-runs Equation (2) for the gendered total entrepreneurship ratio. We consider the ratio of females to males engaged in total entrepreneurial activity (TEA) as the outcome variable. Specifically, the variable measures the female to male TEA ratio that captures the relative participation of women compared to men in early-stage entrepreneurial activity within a given population (typically adults aged 18–64). Thus, the early-stage entrepreneurial activity includes both necessity and opportunity-driven entrepreneurship. As mentioned earlier, we want to compare how legal disparity across genders applies to entrepreneurship for opportunity versus total (and thereby, necessity-based) entrepreneurship. To do this, we want to compare the magnitudes across our different dependent variables. Additionally, we want to see if the effects of the moderating factors differ across the dependent variables as well.

In Table 4, we present the results for all the estimation models. Our results show that Entrepreneurship (WBL) maintains a positive and statistically significant relationship with

[Insert Table 4 about here]

gendered entrepreneurship across all models. This implies that when women operate under more equitable legal environments related to starting, owning, and operating a firm, their likelihood of engaging in entrepreneurship (both necessity- and opportunity-driven) rises relative to men. Yet, similar to before, we must interpret the results with caution in the presence of interaction terms. We need to compare the estimates $\frac{\partial GenEnt_{it}}{\partial Laws_{it}}$ for both values of the pay dummy to meaningfully analyze the results. For the OLS specification, we find that $\frac{\partial GenEnt_{it}}{\partial Laws_{it}}$ is negative across both values of the dummy. This implies that entrepreneurship-based legal disparity and pay-based legal disparity act as substitutes across genders. Under a high pay-based legal disparity for the OLS estimates, given that Entrepreneurship (WBL) rises by 25 points, the estimates show a 2.5 percentage point decrease in the female-to-male entrepreneurship ratio. When pay-based legal disparity falls (pay dummy = 1), the estimate is about a 12.5 percentage point decrease in the female-to-male entrepreneurship ratio. The marginal effects for random effect and mixed effect are similar except $\frac{\partial GenEnt_{it}}{\partial Laws_{it}}$ is positive and significant under high disparity (pay dummy = 0).

The marginal effects across Table 3 and 4, both considering pay-based legal disparity as the moderator, lead us to slightly different conclusions. Marginal effects, as revealed in Table 3, remain positive across both pay dummies. This mean that women continue to pursue opportunity-driven entrepreneurship versus necessity entrepreneurship relatively more than men even when pay-based legal equality improves. This indicates that greater legal access for women encourages more female participation in opportunity-driven entrepreneurship, especially in countries with larger pay gaps. In Table 4, the direction of marginal effect remains the same relative to Table 3.

This means that $\frac{\partial GenEnt_{it}}{\partial Laws_{it}}$ goes from positive to negative, or from negative to more negative, as the pay dummy goes from 0 to 1. The difference is that for the gendered total entrepreneurship results in Table 4, the marginal estimates are sometimes negative, and they become more negative when the pay dummy is one. This might be due to necessity entrepreneurship driving the results. As women's legal access improves, female participation in total entrepreneurship—particularly necessity-based firms—declines relative to men. The likely interpretation is that better legal and pay conditions draw women toward formal employment rather than necessity-based entrepreneurship as a survival strategy. Similar to before, we present the marginal effects in Figure 2. The steeper slopes convey that the marginal effects get more negative when laws related to pay equity improve.

[Insert Figure 2 about here]

7. IDENTIFICATION

Our results have suggested that gender laws related to parity in entrepreneurship matters and that pay parity laws related to gender and entrepreneurship ones likely act as substitutes in the context of gendered entrepreneurial outcomes – more strongly for necessity entrepreneurship relative to opportunity entrepreneurship. Yet, our results are suggestive of strong correlations so far and not causal relationships. As we know for cross-country panel studies involving institutional variables, establishing identification can be challenging due to lack of external instruments that are credible. In the subsequent sections, we aim to establish identification by mitigating omitted variable bias, considering internal instruments via System GMM models, and employing matching models.

7.1. OMITTED VARIABLE BIAS

Our first set of results towards establishing identification aims at mitigating omitted variable bias. Although we have included a wide set of controls, there are other cross-country variables that can

affect entrepreneurial outcomes. Overall labor market conditions can affect entrepreneurship as well as self-employment rates (Blanchflower, 2000). Instead of controlling for female LFPR, we instead include overall LFPR.

We also include urban population growth as an additional control. The literature points out that cities are capable of shaping entrepreneurship through agglomeration forces such as density, input sharing, and knowledge spillovers (Glaeser, Rosenthal, and Strange, 2010). Larger market size can also enhance entrepreneurial incentives (Sato, Tabuchi, and Yamamoto, 2012). More recent studies show that dense and diverse urban environments strengthen knowledge spillovers that in turn contribute to higher-quality entrepreneurship (Tavassoli, Obschonka, and Audretsch, 2021). Finally, we also control for income inequality (GINI) and poverty ratios. Employing US state data, Aghion et al. (2019) show that the 1 percent income share in a state is positively and significantly related to the state's rate of innovation. But this is not true when other measures of income inequality that do not incorporate top incomes are considered.

We present the results in Table 5. Columns (1) to (4) consider the gendered opportunity-to-necessity entrepreneurship ratio. Gendered overall entrepreneurship is considered in columns (5) to (8). The

[Insert Table 5 about here]

coefficient of entrepreneurship legal parity variable is positive and significant for all specifications. The pay dummy is not significant for any of the specifications. The interaction term, similar to our previous findings, is negative for all specifications but only significant in columns (5) to (8). Yet, to fully interpret the results we need to estimate the marginal effects. We do not report the marginal effects keeping space constraints in mind – instead we present the margin plots which present the marginal estimates via graphs. In Figure 3, we present the marginal plots based on specifications

(1) and (3), and (5) and (7). Overall, the marginal estimates along with the downward-sloping margin plots point us

[Insert Figure 3 about here]

to a substitution effect between legal equality in entrepreneurship and pay. This echoes our previous findings. As pay parity laws improve, entrepreneurial-related legal parity plays less of a role in boosting gendered opportunity entrepreneurship or gendered overall entrepreneurship. Another thing to note is that, similar to our previous findings, marginal effects are negative and significant for gendered total entrepreneurship, indicating that as pay parity improves, the female-to-male entrepreneurship ratio might go down since fewer women are pushed into necessity entrepreneurship.

7.2. REVERSE CAUSALITY

For our results, the direction of causality seems more likely to run from laws to gendered entrepreneurial outcomes. Although changes in gendered entrepreneurial outcomes may eventually affect laws, such effects should take time. Nonetheless, we do not ignore this possibility and address it using internal instruments. While Instrumental Variable (IV) estimation is an ideal approach for endogeneity arising from reverse causality, finding credible and truly external instruments is extremely challenging (Farhadi et al., 2015; Persson and Tabellini, 2006). Moreover, inefficient instruments can exacerbate bias relative to OLS estimates (Murray, 2006). System GMM helps address this concern by generating instruments under the assumptions that past values of the regressors are not affected by current-period shocks in the error term and do not directly affect current values of the dependent variable (Hauk and Wacziarg, 2009). Additional requirements include the absence of second-order serial correlation and the validity of over-identifying restrictions. Accordingly, we report p-values for both the Hansen test and the second-

order Arellano–Bond test alongside our findings. To avoid instrument proliferation, which can weaken instrument strength (Staiger and Stock, 1997), we keep the number of instruments below the number of countries and use the "collapse" option in Stata to limit the instrument count. We apply the two-step GMM estimator for greater efficiency and implement Windmeijer's (2005) finite-sample correction to prevent downward bias in standard errors in small samples (Bond et al., 2001).

[Insert Table 6 about here]

We present the results in Table 6. For our System GMM specifications, we only control for log of GDP per capita and GDP growth. System GMM specifications establish identification, as mentioned, by generating internal instruments via moment conditions. Given it is a dynamic panel, lags are involved. The data availability for gendered opportunity entrepreneurship, as we know, is constrained. We lose further observations when lags are considered. Thus, we include controls that have the maximum data availability. For example, the gender parity index for educational enrollment has sparse availability of data. We find that the interaction between entrepreneurship legal parity variable and pay dummy is positive for both dependent variables. It is only significant for the gendered opportunity-to-necessity ratio in the column (1) specification.

7.3. SAMPLE SELECTION BIAS

Measures from GEM are based on people who respond to surveys that are being carried out in the countries. Of course, missing data issues are taken into account when experts compile the data and construct the variables. Yet, the problem of sample selection bias still remains. This is mainly because the information on opportunity-driven entrepreneurs among males and females is only based on observed data and, thus, it is non-random. For example, more motivated individuals might respond more to the surveys. Thus, we have identification issues because of this. We resort

to an Inverse Probability Weights (IPW) model to take this into account. In other words, IPW is used when treatment assignment (or sample inclusion) is systematically related to observed covariates. By weighting each observation by the inverse of its probability of being treated (or selected), IPW reweights the sample to resemble a population in which treatment or selection is independent of those observed characteristics (Rosenbaum and Rubin, 1983; Hirano, Imbens, and Ridder, 2003). IPW can also be applied to sample selection problems such as attrition, survey nonresponse, or missing data issues, all of which can be true for our case. In these cases, IPW can be used to construct weights based on the probability of being observed, thereby reducing bias due to nonrandom sample inclusion (Wooldridge, 2002). The other model we employ is nearest neighbor matching. It is a popularly employed matching model where each treated unit is matched to one or more untreated units with similar covariates or propensity scores, creating a more comparable control group and reducing bias from observed confounders (Rosenbaum and Rubin, 1983; Abadie and Imbens, 2006; Stuart, 2010). The method works by calculating a distance measure, such as propensity-score distance or Mahalanobis distance, and pairing each treated unit with the closest control unit.

The results are presented in Table 7. In Table 7A, we consider treated observations as those countries that have an above average entrepreneurship legal parity score (i.e., an Entrepreneurship (WBL) value above the mean). We run both models with and without controls since we lose some observations as we add controls. We find the impacts are mostly similar and statistically significant. Countries in the treated group are between 4 and 5 percent more likely to have higher female-to-male opportunity (relative to necessity) entrepreneurship relative to ones in the control group. In Table 7B, we re-run the same models but instead consider different cohorts of treatment

and control groups. The treatment cohorts considered are countries with above average Entrepreneurship (WBL) along with either 1) above-average Pay (WBL) scores or, estimated

[Insert Table 7 about here]

separately, 2) below-average Pay (WBL) scores. For each cohort, we rerun the models from Table 7A. The findings confirm our previous results. Legal parity in entrepreneurship matters more for gendered opportunity-to-necessity entrepreneurship when pay-based legal parity is poor.[4]

8. FURTHER ANALYSIS – DISPARITY IN EDUCATIONAL ATTAINMENT

Our final set of results considers disparity in educational attainment across genders. While it is beyond the scope of this paper to be able to consider a full analysis, we still bring in the role of educational disparity as a moderator. In other words, instead of considering pay parity as a moderator, we now consider gap in educational attainment as the factor. The main reason for this is the ambiguous finding in the literature when it comes to investigating the relationship between entrepreneurship and human capital. Many studies have emphasized that human capital matters for entrepreneurial success (Cassar, 2006; Van der Sluis et al., 2005; Bosma et al., 2004). Education may improve managerial and opportunity-recognition skills, increasing entrepreneurial propensity, but higher educational attainment may also steer individuals into lucrative paid employment instead (Lucas, 1978). Thus, the net effect is an empirical question, and the evidence is mixed: some studies find negative or insignificant relationships (Van der Sluis et al., 2008), while others find positive effects in the United States and negative effects in Europe (Blanchflower, 2004). Some studies like Dutta and Sobel (2018) have shown the relationship to be non-linear.

[4] For the nearest neighbor matching models, we assess covariate balance to make sure pretreatment differences have been reduced (Austin, 2011; Caliendo and Kopeinig, 2008). These results are unreported but available upon request.

In Table 8, we present the results. The specific education variable considered is – gender parity index (GPI) for secondary enrollment. It is the ratio of females enrolled in secondary education divided by the male counterpart. We interact this variable with the Entrepreneurship (WBL)

[Insert Table 8 about here]

index. From the results we find that the interaction term is negative and significant for all specifications, suggesting a substitution effect. This is similar to our results with the Pay (WBL) variable as the moderator. Entrepreneurship (WBL) index is positive and significant for all columns.

Again, to properly interpret the net effect, we estimate the marginal effect $\frac{\partial GenOppEnt_{it}}{\partial Laws_{it}}$ for minimum and maximum values of secondary enrollment GPI. $\frac{\partial GenOppEnt_{it}}{\partial Laws_{it}}$ is positive and significant for all the specifications when GPI in secondary enrollment is at its minimum. When education disparity is high (girls are much less likely to be enrolled in secondary education compared to boys), improvements in legal access to entrepreneurship-related laws have a stronger positive impact on women's opportunity-to-necessity entrepreneurship. Under such conditions, reforms that allow women to access the same legal institutions related to entrepreneurship as men provide critical opportunities and give them the boost to be involved in opportunity entrepreneurship, because the education system is not yet fully equal. Conversely, when education disparity is low (gender parity in education is achieved), the added benefit of legal access reforms is smaller. As women gain parity in education, opportunities for them are greater and formal employment becomes more lucrative. Also, at that stage, women already have the educational foundation to pursue entrepreneurship, so legal equality does not provide as strong of an additional boost. This interpretation highlights a substitution effect between education and legal reforms. The marginal

effect suggests that policies in one domain are most impactful when the other domain lags behind. In Table 9, we rerun specifications from Table 8 but consider the gendered total entrepreneurship ratio as the dependent variable. We again present the marginal effects in the table. Our conclusions remain similar.

[Insert Table 9 about here]

9. CONCLUSION

Our objective in this paper is to examine whether gender disparities in legal access matter for gendered entrepreneurial outcomes, especially opportunity-driven entrepreneurship. We focus on the entrepreneurship component of the Women, Business and the Law index, which captures whether women have equal legal rights in areas directly relevant to starting and operating a firm, including registering a business, accessing credit, opening bank accounts, and signing contracts. Our central conjecture is that legal parity in these areas matters more for opportunity entrepreneurship than for total entrepreneurship, because opportunity entrepreneurship is more closely tied to identifying, pursuing, and expanding market opportunities.

Our results broadly support this conjecture. Across benchmark specifications, greater entrepreneurship-related legal parity is associated with a higher female-to-male ratio of opportunity-to-necessity entrepreneurship. Thus, when women have more equal access to the legal institutions needed to start and operate businesses, they are more likely to pursue opportunity-driven rather than necessity-driven entrepreneurship relative to men. This finding is robust across OLS, random effects, and mixed effects specifications, and remains after controlling for economic development, GDP growth, female labor-force participation, and gender parity in secondary enrollment. The results suggest that legal institutions are not merely background conditions but directly relate to the gender composition of opportunity-driven entrepreneurial activity.

We also explore whether this effect depends on other forms of gender inequality. The findings suggest that pay-based legal parity and entrepreneurship-related legal parity operate partly as substitutes. The positive association between entrepreneurship-related legal parity and women's opportunity-to-necessity entrepreneurship is strongest where pay-related legal parity is weaker; as pay-related legal parity improves, its marginal effect becomes smaller. A similar pattern appears with educational parity: entrepreneurship-related legal parity has its strongest association where gender gaps in secondary enrollment are larger. These findings suggest that legal reforms in one area may matter most when other institutional or structural supports for women remain weak.

The results for overall entrepreneurship are more nuanced. When the dependent variable combines opportunity- and necessity-driven entrepreneurship, the effects are weaker and often negative once pay-related legal parity is considered. This distinction is important: a decline in women's total entrepreneurship relative to men need not imply that legal parity harms women's economic activity. Instead, better legal and labor-market conditions may reduce women's reliance on necessity entrepreneurship by making formal employment or higher-quality opportunity entrepreneurship more attractive. Thus, our findings reinforce the importance of distinguishing entrepreneurship as a growth-oriented choice from entrepreneurship as a response to economic constraint.

Several limitations should be acknowledged. First, the WBL entrepreneurship sub-index is measured at the country level and masks within-country variation in the enforcement and salience of business laws. Second, the GEM opportunity-versus-necessity measure relies on entrepreneurs' self-reported motivations at entry, which may introduce measurement error if individuals retrospectively reinterpret necessity-driven entry as opportunity-driven. Third, the sample is

limited to countries appearing in both WBL and GEM, which may disproportionately exclude lower-income economies with weaker survey infrastructure and limit generalizability.

Despite these limitations, the policy implications are twofold. First, in countries with greater gender parity in education and pay, laws aimed at increasing entrepreneurship-related legal parity may have limited effects, especially for opportunity-driven entrepreneurship. Second, where education and pay inequalities remain strong, equal legal access to entrepreneurial activity may have substantial effects. Allowing women to sign contracts, open bank accounts, register businesses, and access credit without gender-based discrimination can improve gender equality in entrepreneurship when equality is lacking elsewhere.

Future work should examine whether the relationship between pay-related and entrepreneurship-related legal parity extends to firm survival and growth, outcomes requiring longitudinal data not yet widely available cross-nationally. Recent Women, Business, and Law data also allow future extensions, including supportive frameworks such as government programs and services, survey data on perceptions of government enforcement, and other moderators. As the World Bank continues to produce annual reports and expand the data, it will allow richer analysis and additional empirical methods.

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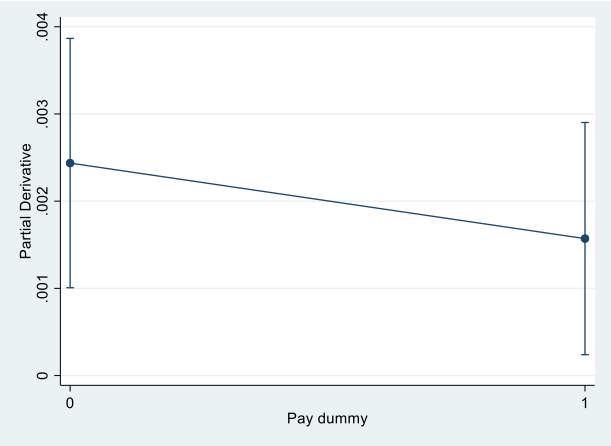
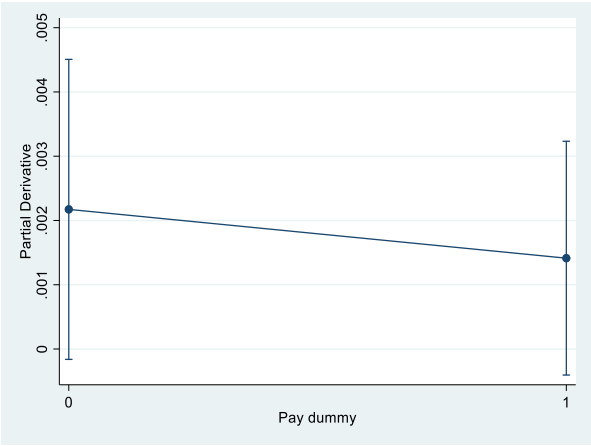
Figure 1: Margin plots: Gendered Opportunity Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Pay (WBL)

OLS



Random Effect



Mixed Effect

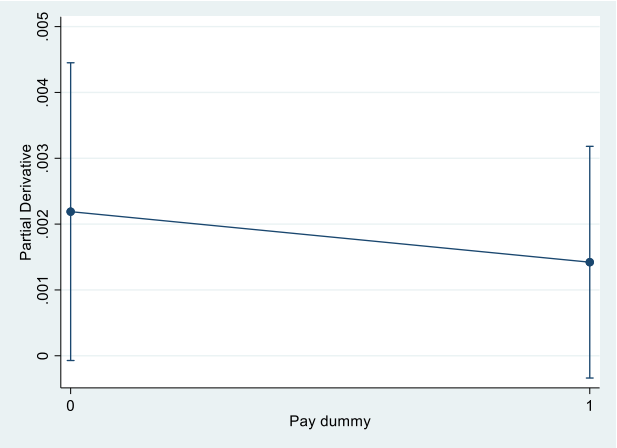
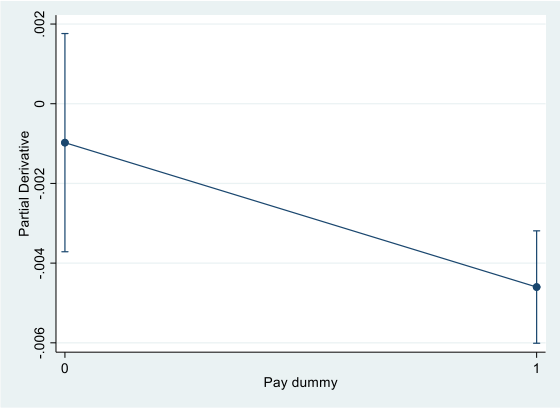
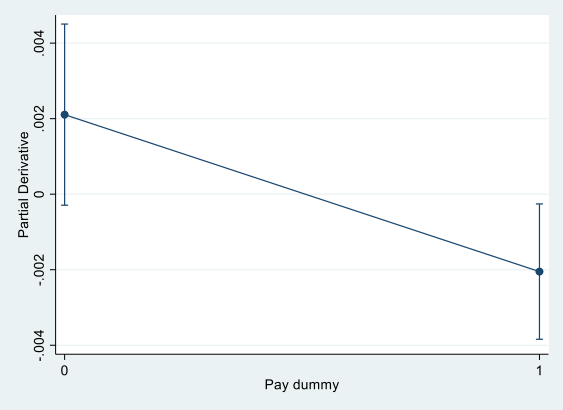


Figure 2: Margin plots: Gendered Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Pay (WBL)

OLS



Random Effect



Mixed Effect

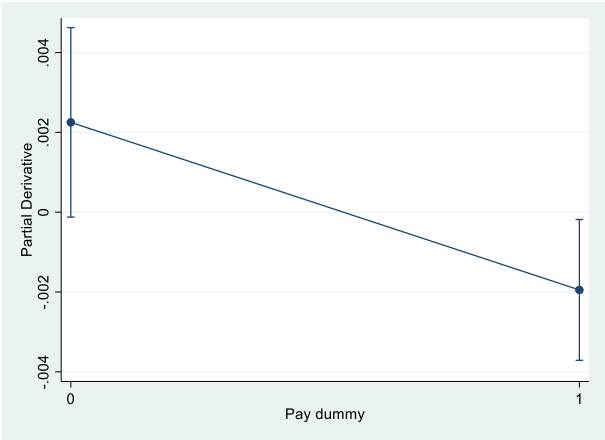
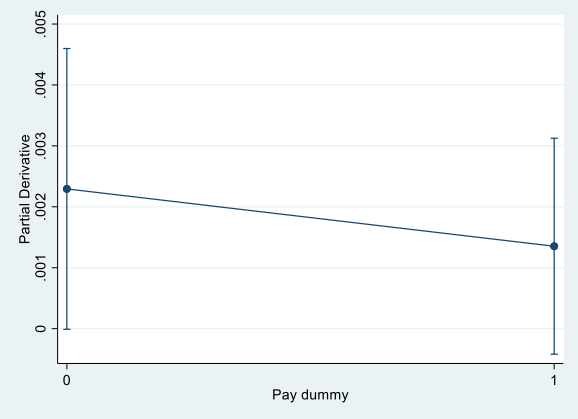


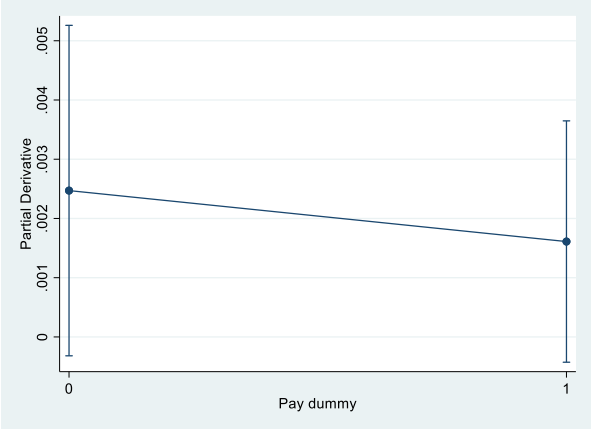
Figure 3: Margin plots: Gendered Opportunity Entrepreneurship, Gendered Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Pay (WBL)

Note: (A) and (B) consider specifications from columns (1) and (3) from Table 5. (C) and (D) consider specifications from columns (5) and (7) from Table 5.

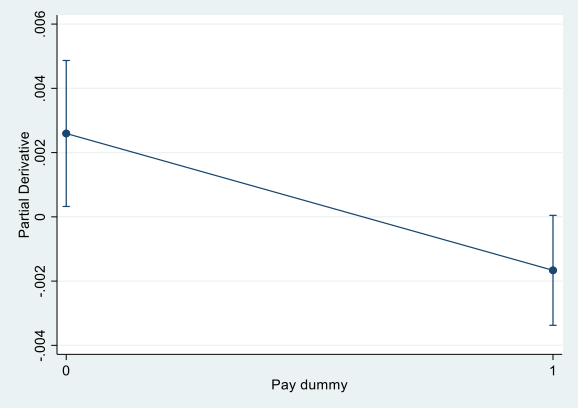
(A)



(B)



(C)



(D)

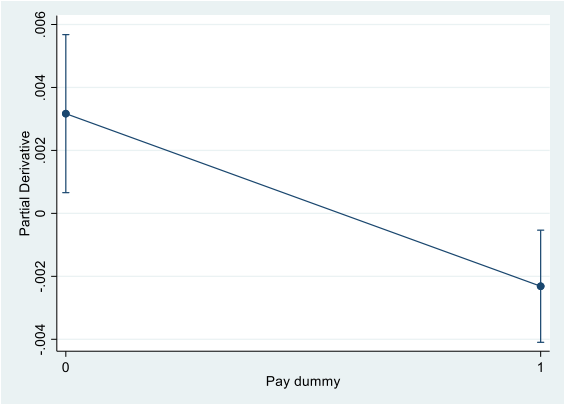


Table 1: Gendered Opportunity Entrepreneurship and Accessing Laws (Ent.)

OLS, Random Effect and Mixed Effect Regressions are considered. The dependent variable is the ratio of percentage of females who are involved in opportunity entrepreneurship and equivalent percentage of male entrepreneurs considered from the GEM database. Entrepreneurship (WBL) is the difference in accessing legal institutions between males and females in the entrepreneurship sub-category of the Women, Business and Law (WBL) index. Pay (WBL) is a dummy assigned 1 for scores above 50 in the pay subcategory of WBL index. Secondary Enroll. (GPI) refers to gender parity index for secondary enrollment. Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

	(1) OLS	(2) Random Effect	(3) Mixed Effect
Entrep (WBL)	0.002***	0.002**	0.002**
	(0.001)	(0.001)	(0.001)
Pay (WBL)	-0.031**	-0.026	-0.024
	(0.015)	(0.020)	(0.020)
Secondary Enroll. (GPI)	-0.004	-0.016	-0.018
	(0.115)	(0.140)	(0.143)
Year F. E.	Yes	Yes	Yes
Constant	0.772***	0.800***	0.806***
	(0.124)	(0.150)	(0.153)
Observations	285	285	285
R-squared	0.048	0.047	---
Wald Chi-sq.	---	---	10.05
Number of countries	74	74	74

Table 2: Gendered Opportunity Entrepreneurship and Accessing Laws (Ent.) – Adding Controls

OLS, Random Effect and Mixed Effect Regressions are considered. The dependent variable is the ratio of percentage of females who are involved in opportunity entrepreneurship and equivalent percentage of male entrepreneurs considered from the GEM database. Entrepreneurship (WBL) is the difference in accessing legal institutions between males and females in the entrepreneurship sub-category of the Women, Business and Law (WBL) index. Pay (WBL) is a dummy assigned 1 for scores above 50 in the pay subcategory of WBL index. Secondary Enroll. (GPI) refers to gender parity index for secondary enrollment. The controls added are GDP growth, GDP per capita, and labor force participation rate of females. Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)
Entrep (WBL)	0.001***	0.001**	0.001**
	(0.001)	(0.001)	(0.001)
Pay (WBL)	-0.036**	-0.033	-0.033*
	(0.014)	(0.020)	(0.020)
Secondary Enroll. (GPI)	0.0134	0.00292	0.00298
	(0.114)	(0.137)	(0.134)
GDP growth	0.005**	0.004*	0.004*
	(0.002)	(0.002)	(0.002)
GDP p.c.(constant)	0.0001***	0.0001***	0.0001***
	(0.00001)	(0.00001)	(0.00001)
LFPR (female)	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Year F. E.	Yes	Yes	Yes
Constant	0.789***	0.815***	0.815***
	(0.120)	(0.147)	(0.144)
Observations	285	285	285
R-squared	0.109	0.108	---
Wald Chi-sq	---	---	24.57***
Number of Countries	74	74	74

Table 3: Gendered Opportunity Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Pay (WBL)

OLS, Random Effect and Mixed Effect Regressions are considered. The dependent variable is the ratio of percentage of females who are involved in opportunity entrepreneurship and equivalent percentage of male entrepreneurs considered from the GEM database. Entrepreneurship (WBL) is the difference in accessing legal institutions between males and females in the entrepreneurship sub-category of the Women, Business and Law (WBL) index. Pay (WBL) is a dummy assigned 1 for scores above 50 in the pay subcategory of WBL index. Secondary Enroll. (GPI) refers to gender parity index for secondary enrollment. We interact Entrep (WBL) and Pay (WBL). The controls added are GDP growth, GDP per capita, and labor force participation rate of females. Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)
Entrep (WBL)	0.002***	0.00217*	0.002*
	(0.001)	(0.001)	(0.001)
Pay (WBL)	0.035	0.030	0.031
	(0.085)	(0.128)	(0.124)
Entrep.*Pay	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Secondary Enroll. (GPI)	0.010	0.0003	0.001
	(0.115)	(0.138)	(0.134)
GDP growth	0.005**	0.004	0.004*
	(0.002)	(0.002)	(0.002)
GDP p.c.(constant)	0.0001***	0.0001***	0.0001***
	(0.00001)	(0.00001)	(0.00001)
LFPR (female)	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Year F. E.	Yes	Yes	Yes
Constant	0.746***	0.778***	0.776***
	(0.124)	(0.166)	(0.161)
Observations	285	285	285
R-squared	0.111	---	---
Wald Chi-Sq.	---	---	25.02**
Number of Countries	74	74	74
$\frac{\partial GenOppEnt_{it}}{\partial Ent_{it}}$			
Pay dummy = 0	0.002***	0.002***	0.002***
	(0.001)	(0.001)	(0.001)
Pay dummy = 1	0.001***	0.001***	0.001***
	(0.001)	(0.001)	(0.001)

Table 4: Gendered Total Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Pay (WBL)

OLS, Random Effect and Mixed Effect Regressions are considered. The dependent variable is the ratio of percentage of females who are involved in entrepreneurship (necessity plus opportunity) and equivalent percentage of male entrepreneurs considered from the GEM database. Entrepreneurship (WBL) is the difference in accessing legal institutions between males and females in the entrepreneurship sub-category of the Women, Business and Law (WBL) index. Pay (WBL) is a dummy assigned 1 for scores above 50 in the pay subcategory of WBL index. Secondary Enroll. (GPI) refers to gender parity index for secondary enrollment. We interact Entrep (WBL) and Pay (WBL). The controls added are GDP growth, GDP per capita, and labor force participation rate of females. Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

	(1) OLS	(2) R.E.	(3) Mixed Effect
Entrep (WBL)	0.002***	0.002*	0.002*
	(0.001)	(0.001)	(0.001)
Pay (WBL) dummy	0.035	0.0305	0.031
	(0.085)	(0.128)	(0.124)
Entrep (WBL)*Pay dummy	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Enroll secondary(gender parity)	0.010	0.0003	0.0009
	(0.115)	(0.138)	(0.134)
GDP growth	0.005**	0.00444	0.004*
	(0.002)	(0.002)	(0.002)
GDP p.c. (constant)	0.000001***	0.000001***	0.000001***
	(0.0000002)	(0.0000003)	(0.0000003)
LFPR (female)	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Year F.E.	Yes	Yes	Yes
Constant	0.746***	0.778***	0.776***
	(0.124)	(0.166)	(0.161)
Observations	285	285	285
R-squared	0.111	0.208	---
Wald Chi-sq.	---	---	128.87***
Number of countries	74	74	74
$\frac{\partial GenEnt_{it}}{\partial Laws_{it}}$			
Pay dummy = 0	-0.001***	0.002*	0.002*
	(0.001)	(0.001)	(0.001)
Pay dummy = 1	-0.005***	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)

Table 5: Gendered Opportunity-Necessity Entrepreneurship, Gendered Total Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Pay (WBL)

Mixed Effect Regressions are considered. The dependent variable in columns (1) to (4) is gendered opportunity versus necessity entrepreneurship ratio. In columns (5) to (8), the dependent variable is gendered entrepreneurship ratio. We interact Entrep (WBL) and Pay (WBL). The additional controls added are LFPR, urban population growth, GINI, and poverty headcount ratio. Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Opp-Nec Entrepreneurship				Entrepreneurship			
Entrep (WBL)	0.002*	0.002*	0.002*	0.002*	0.002**	0.002**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Pay (WBL)	0.040	0.041	0.051	0.038	0.364***	0.367***	0.481***	0.496***
	(0.124)	(0.124)	(0.142)	(0.137)	(0.119)	(0.120)	(0.131)	(0.137)
Entrep.*Pay	-0.001	-0.001	-0.001	-0.001	-0.004***	-0.004***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Sec. Enroll. (GPI)	-0.0213	-0.015	-0.083	-0.147	0.136	0.143	0.194	0.355**
	(0.133)	(0.135)	(0.159)	(0.158)	(0.138)	(0.139)	(0.161)	(0.170)
Benchmark controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LFPR	0.001	---	---	---	0.011***	---	---	---
	(0.001)				(0.001)			
Urban pop. growth	---	0.001	0.009	0.018	---	0.0200**	0.040***	0.038***
		(0.007)	(0.010)	(0.011)		(0.009)	(0.009)	(0.011)
GINI	---	---	0.0001	---	---	---	0.007***	---
			(0.001)				(0.001)	
Poverty ratio	---	---		-0.003	---	---	---	0.004*
				(0.002)				(0.002)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.703***	0.746***	0.755***	0.829***	-0.400**	-0.0673	-0.624***	-0.530**
	(0.176)	(0.173)	(0.208)	(0.205)	(0.189)	(0.169)	(0.202)	(0.212)
Observations	285	285	231	231	778	778	595	595
Number of countries	74	74	62	62	93	93	74	74
Wald Chi-sq.	24.13***	23.57**	26.79**	30.85***	177.9***	176.4***	209.9***	167.97***

Table 6: Gendered Opportunity-Necessity Entrepreneurship, Gendered Total Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Pay (WBL)

System GMM specifications are considered. The dependent variable in column (1) is gendered opportunity versus necessity entrepreneurship ratio. In column (2), the dependent variable is gendered entrepreneurship ratio. We interact Entrep (WBL) and Pay (WBL). Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

	(1) Gendered Opportunity Entrepreneurship	(2) Gendered Entrepreneurship
Ent. (lag)	-0.474***	0.013
	(0.048)	(0.052)
Entrep (WBL)	-0.009***	0.003
	(0.002)	(0.004)
Pay (WBL)	0.857	0.238
	(0.556)	(0.507)
Entrep.*Pay	0.005***	0.0001
	(0.001)	(0.005)
GDP growth	0.000***	0.000
	(0.000)	(0.000)
GDP p.c.(constant)	0.004	0.003
	(0.003)	(0.002)
Year F.E.	Yes	Yes
Constant	0.517	0.981***
	(0.471)	(0.244)
Observations	240	792
Number of Countries	70	86
Second order correlation (p)	0.100	0.357
Number of countries	56	84
Sargan test(chi-sq.)	41.87	32.85
Hansen test (chi-sq.)	48.97	37.77

Table 7A: Matching Models

Two matching methods are utilized: Inverse Probability Weighting (IPW) and Nearest-Neighbor Matching. The dependent variable is the female-to-male opportunity-to-necessity entrepreneurship ratio. Average Treatment Effect of the Treated (ATET) values are reported. The treatment group includes countries with above-average Entrep (WBL) values, while the control group includes countries with below-average Entrep (WBL) values. We report specifications both without controls and with our benchmark controls. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Matching Model	**No controls**	**With controls**
	(1)	(2)
IPW	0.036**	0.036*
	(0.014)	(0.020)
Nearest-Neighbor	0.036**	0.050***
	(0.014)	(0.019)
Treated number of observations	351	285

Table 7B: Matching Models – Moderating Effect of Pay (WBL)

Two matching methods are utilized: Inverse Probability Weighting (IPW) and Nearest-Neighbor Matching. The dependent variable is the female-to-male opportunity-to-necessity entrepreneurship ratio.Average Treatment Effect of the Treated (ATET) values are reported. The treatment group in the first column (Pay = 1) includes countries with above-average Entrep (WBL) values and above-average Pay (WBL), while the control group includes countries with below-average values for either category. The treatment group in the second column (Pay = 0) includes countries with above-average Entrep (WBL) values and below-average Pay (WBL), while the control group includes all other countries (i.e., those with either below-average Entrep or above-average Pay). Benchmark controls are included in all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Matching Model	**Pay = 1**	**Pay = 0**
	(1)	(2)
IPW	0.081	0.088***
	(0.065)	(0.023)
Nearest-Neighbor	0.033	0.121**
	(0.021)	(0.047)
Treated number of observations	186	99

Table 8: Gendered Opportunity Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Education Disparity

OLS, Random Effect and Mixed Effect Regressions are considered. The dependent variable is the ratio of percentage of females who are involved in opportunity entrepreneurship and equivalent percentage of male entrepreneurs considered from the GEM database. Entrepreneurship (WBL) is the difference in accessing legal institutions between males and females in the entrepreneurship sub-category of the Women, Business and Law (WBL) index. Pay (WBL) is a dummy assigned 1 for scores above 50 in the pay subcategory of WBL index. Secondary Enroll. (GPI) refer to gender parity index for secondary enrollment. We interact Entrep (WBL) and Secondary Enroll. (GPI). The controls added are GDP growth, GDP per capita, and labor force participation rate of females. Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)
Entrep (WBL)	0.013**	0.015*	0.015*
	(0.006)	(0.008)	(0.008)
Secondary Enroll. (GPI)	1.052*	1.180	1.176
	(0.568)	(0.735)	(0.715)
Entrep.*Sec. Enroll.	-0.012*	-0.013	-0.013*
	(0.006)	(0.008)	(0.008)
Pay (WBL)	-0.034**	-0.030	-0.030
	(0.014)	(0.020)	(0.020)
GDP growth	0.005**	0.004*	0.004*
	(0.002)	(0.002)	(0.002)
GDP p.c.(constant)	0.0001***	0.0001***	0.0001***
	(0.00001)	(0.00001)	(0.00001)
LFPR (female)	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Year F. E.	Yes	Yes	Yes
Constant	-0.240	-0.350	-0.347
	(0.562)	(0.730)	(0.710)
Observations	285	285	285
R-squared	0.117	0.116	---
Wald Chi-Sq.	---	---	27.62***
Number of Countries	74	74	74
$\frac{\partial GenOppEnt_{it}}{\partial Ent_{it}}$			
Sec. Enroll. Min.	0.006***	0.006***	0.006***
	(0.002)	(0.003)	(0.003)
Sec. Enroll. Max.	-0.0003	-0.001	-0.001
	(0.001)	(0.002)	(0.002)

Table 9: Gendered Entrepreneurship and Accessing Laws (Ent.) – Moderating effect of Education Disparity

OLS, Random Effect and Mixed Effect Regressions are considered. The dependent variable is the ratio of percentage of females who are involved in entrepreneurship (necessity and opportunity) and equivalent percentage of male entrepreneurs considered from the GEM database. Entrepreneurship (WBL) is the difference in accessing legal institutions between males and females in the entrepreneurship sub-category of the Women, Business and Law (WBL) index. Pay (WBL) is a dummy assigned 1 for scores above 50 in the pay subcategory of WBL index. Secondary Enroll. (GPI) refer to gender parity index for secondary enrollment. We interact Entrep (WBL) and Secondary Enroll. (GPI). The controls added are GDP growth, GDP per capita, and labor force participation rate of females. Year fixed effects are considered for all specifications. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

	(1) OLS	(2) R.E.	(3) Mixed Effect
Entrep (WBL)	0.011	-0.004	-0.005
	(0.009)	(0.009)	(0.008)
Secondary Enroll. (GPI)	1.529*	-0.203	-0.265
	(0.801)	(0.715)	(0.714)
Entrep.*Sec. Enroll.	-0.014	0.004	0.004
	(0.009)	(0.008)	(0.008)
Pay (WBL)	0.027	-0.005	-0.004
	(0.019)	(0.023)	(0.023)
GDP growth	0.006***	0.002	0.002
	(0.002)	(0.002)	(0.002)
GDP p.c.(constant)	-0.00001***	-0.00001***	-0.00001***
	(0.0000001)	(0.0000001)	(0.0000001)
LFPR (female)	0.005***	0.006***	0.007***
	(0.001)	(0.001)	(0.002)
Year F. E.	Yes	Yes	Yes
Constant	-0.920	0.608	0.655
	(0.811)	(0.724)	(0.724)
Observations	778	778	778
R-squared	0.244	0.197	---
Wald Chi-Sq.	---	---	120.86***
Number of Countries	93	93	93
$\frac{\partial GenEnt_{it}}{\partial Laws_{it}}$			
Sec. Enroll. Min.	0.006***	0.006***	0.006***
	(0.002)	(0.003)	(0.003)
Sec. Enroll. Max.	-0.0003	-0.001	-0.001
	(0.001)	(0.002)	(0.002)

Appendix 1: Summary Statistics

	Obs.	Mean	S.D.	Min	Max
Gen. Opp. Ent.	351	0.928	0.11	0.51	1.36
Gen. Ent.	1,040	0.647	0.217	0.05	1.69
Entrep (WBL)	1,040	86.418	12.886	50	100
Pay (WBL)	1,040	0.607	0.488	0	1
Sec. Enroll. (GPI)	783	1.012	0.062	0.678	1.263
GDP growth	1,039	2.746	3.744	-17.997	24.475
GDP p.c.	1,034	24478.59	21717.15	467.655	110425.9
LFPR (fem)	1,039	41.821	8.313	12.872	51.945