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## Gender, Financial Inclusion, and Entrepreneurship

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*« L'Université de Strasbourg n'entend donner aucune approbation ou improbation aux opinions émises dans les thèses. Ces opinions doivent être considérées comme propres à leurs auteurs. »*



*A mes instituteurs, mes enseignants, mes maîtres de conférences et professeurs. Merci de m'avoir appris à apprendre, et de m'avoir, chacun à votre tour, épaulé, d'étape en étape.*

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# Résumé Long

L'égalité entre les hommes et les femmes n'incarne pas uniquement un enjeu de justice sociale. Les femmes constituent en effet un vivier de croissance encore sous-exploité, notamment dans les pays émergents. En dépit d'une prise de conscience généralisée assortie de politiques publiques ciblées, un déséquilibre genré dans l'accès aux opportunités économiques persiste. Malgré des avancées notables sur le plan éducatif, les femmes demeurent davantage exposées aux discriminations tant dans la sphère privée que professionnelle et politique. Etant donné la centralité du sujet en matière d'impact économique, le nombre restreint d'antécédents de recherche suggère une exploration plus approfondie des éléments sous-jacents à ces progrès ténus.

Visant à enrichir cette littérature, la présente thèse s'intéresse à deux domaines dans lesquels les déséquilibres de genre s'avèrent particulièrement saillants : l'inclusion financière et l'entrepreneuriat. Ces deux axes constituent les premières et secondes sections de ce travail. Le manuscrit comporte un total de sept essais empiriques indépendants, mais thématiquement reliés. L'objectif est double. D'une part, il s'agit de contribuer à la littérature florissante s'intéressant aux tenants et aux aboutissants de l'inclusion économique des femmes. Une première finalité des travaux est d'étudier l'influence réciproque exercée par l'environnement de la femme sur son attitude vis-à-vis des domaines bancaire et entrepreneurial. D'autre part, cette thèse offre un support de réflexion inhérent aux enjeux liés à la mise en œuvre de politiques et de stratégies inclusives à l'échelle de l'entreprise, de la banque et du gouvernement. Plus spécifiquement, cette thèse s'attèle à apporter des éléments de réponses aux questions suivantes. Comment combler le fossé persistant entre les hommes et les femmes en matière d'inclusion financière et d'entrepreneuriat ? Et surtout, pourquoi faut-il le faire ?

La première partie traite des déterminants institutionnels de l'inclusion financière des femmes et de l'influence exercée par cette dernière sur la stabilité bancaire. Elle comporte quatre chapitres. Le Chapitre 1 s'intéresse aux effets de l'égalité des genres face à la loi sur la probabilité qu'une femme dispose d'un compte bancaire. Il montre que les femmes sont plus incluses financièrement si le contexte juridique est plus égalitaire. Cet effet est renforcé par la prééminence de la loi, mais s'avère inexistant dans un contexte de normes sociales hostiles aux femmes. Le Chapitre 2 affine cette approche en considérant l'influence exercée par les

lois antidiscriminatoires sur l'accès au crédit des femmes entrepreneuses. En particulier, il argue que les femmes sont plus à mêmes à formuler une demande d'emprunt si ces dernières sont juridiquement protégées contre la discrimination genrée sur le marché du crédit. Néanmoins, un changement du comportement de la banque à leur égard dans un pays donné n'est observable que si la loi fait l'objet d'une mise en application accrue. Le Chapitre 3 se concentre sur l'accès des femmes entrepreneuses aux crédits bancaires, en s'intéressant cette fois-ci à l'influence exercée par la diversité dans la structure actionnariale de l'entreprise. Il révèle qu'un actionnariat dominé par des femmes réduit considérablement la probabilité que la dirigeante formule une demande de prêt, suggérant un phénomène de transmission de l'aversion au risque entre les parties prenantes de l'entreprise. Le Chapitre 4 clôt cette première section en documentant l'existence d'une corrélation positive entre l'accès au crédit des femmes et la stabilité bancaire, soulignant les bénéfices de la financiarisation féminine.

La seconde partie, articulée autour de trois chapitres, se propose d'une part d'élucider les facteurs sous-jacents de l'entrepreneuriat féminin, et d'autre part d'étudier le comportement des femmes dirigeantes d'entreprises en situation d'incertitude. Le Chapitre 5 s'intéresse à l'influence exercée par les marqueurs de genre dans la langue sur l'attitude des femmes vis-à-vis de l'entrepreneuriat. Une analyse plus fine révèle que c'est l'entrepreneuriat féminin dit « *de nécessité* » et non « *d'opportunité* » qui est en fait encouragé. Le Chapitre 6 s'inscrit également dans la littérature institutionnelle en démontrant comment la représentation des femmes aux plus hautes instances politiques promeut une attitude plus favorable des femmes à l'égard des carrières entrepreneuriales. Plus spécifiquement, une femme à la tête du pouvoir exécutif d'un gouvernement amenuise les attitudes adverses aux femmes entrepreneuses et intensifie la mise en œuvre de politiques favorables aux femmes et à l'entrepreneuriat. Le Chapitre 7 parachève cette seconde section en étudiant le comportement des femmes dirigeantes d'entreprises en situation d'incertitude. Il documente un effet négatif et significatif de l'incertitude économique sur l'investissement des entreprises dirigées par des femmes. Cet effet est particulièrement marqué dans les plus petites firmes où l'influence de l'administrateur est accrue.

**Mots-clés :** Genre ▪ Inégalités ▪ Institutions ▪ Inclusion financière ▪ Entrepreneuriat.

**Codes JEL :** D02 ▪ D04 ▪ D14 ▪ D91 ▪ G30 ▪ G32 ▪ G50 ▪ J16.



# Long Abstract

Equality between men and women is not only a matter of social justice. Women constitute a still underexploited source of growth, particularly in emerging countries. Despite widespread awareness and targeted public policies, a gender imbalance in access to economic opportunities persists. Despite significant progress in education, women remain more exposed to discrimination in the private, professional and political spheres. Given the centrality of the topic and its economic impact, the limited research history suggests further exploration of the elements underlying this tenuous progress.

Aiming to enrich this literature, this thesis focuses on two areas where gender imbalances are particularly salient: financial inclusion and women's entrepreneurship. These two areas constitute the first and second sections of this work. The manuscript includes a total of seven independent but thematically related empirical essays. The objective is twofold. On the one hand, it is to contribute to the burgeoning literature on the ins and outs of women's economic inclusion. A first aim of the work is to study the reciprocal influence of a woman's environment on her attitude towards banking and entrepreneurship. Secondly, this thesis provides a basis for reflection on issues related to the implementation of inclusive policies and strategies at the corporate, banking and government levels. More specifically, this thesis seeks to provide answers to the following questions. How do we close the persistent gender gap in financial inclusion and entrepreneurship? And more importantly, why should it be done?

The first part discusses the institutional determinants of women's financial inclusion and its influence on banking stability. It consists of four chapters. Chapter 1 looks at the effects of gender equality in the law on the likelihood of a woman having a bank account. It shows that women are more financially included if the legal environment is more equal. This effect is reinforced by the pre-eminence of the law, but is absent in a context of social norms hostile to women. Chapter 2 refines this approach by considering the influence of anti-discrimination laws on women entrepreneurs' access to credit. In particular, it argues that women are more likely to apply for loans if they are legally protected from gender discrimination in the credit market. However, a change in bank behaviour toward women in a given country can only be observed if the law is enforced more. Chapter 3 focuses on women entrepreneurs' access to bank credit, this time looking at the influence of diversity in the

ownership structure of the firm. It finds that a female-dominated ownership structure significantly reduces the likelihood that the female manager will apply for a loan, suggesting a transmission of risk aversion among the firm's stakeholders. Chapter 4 closes this first section by documenting the existence of a positive correlation between women's access to credit and banking stability, highlighting the benefits of female financial inclusion.

The second part, articulated around three chapters, proposes on the one hand to elucidate the underlying factors of women's entrepreneurship, and on the other hand to study the behaviour of women business leaders in situations of uncertainty. Chapter 5 examines the influence of gender markers in language on women's attitudes towards entrepreneurship. A more detailed analysis reveals that it is women's entrepreneurship of "*necessity*" rather than "*opportunity*" that is in fact encouraged. Chapter 6 also builds on the institutional literature by demonstrating how women's representation at the highest political levels promotes a more favourable attitude among women towards entrepreneurial careers. Specifically, having a woman in the executive branch of government reduces anti-women entrepreneurial attitudes and increases the implementation of pro-women and pro-entrepreneurial policies. Chapter 7 concludes this second section by examining the behaviour of women business leaders under uncertainty. It documents a significant negative effect of economic uncertainty on investment by women-owned firms. This effect is particularly marked in smaller firms where the influence of the director is increased.

**Keywords:** Gender ▪ Inequality ▪ Institutions ▪ Financial inclusion ▪ Entrepreneurship.

**JEL Codes:** D02 ▪ D04 ▪ D14 ▪ D91 ▪ G30 ▪ G32 ▪ G50 ▪ J16.



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# List of Abbreviations and Acronyms

<i>CAR</i>	Capital Assets Ratio
<i>CEDAW</i>	Convention on the Elimination of All Forms of Discrimination against Women
<i>CEO</i>	Chief Executive Officer
<i>CEPII</i>	Centre d'Etudes Prospectives et d'Informations Internationales
<i>CIA</i>	Central Intelligence Agency
<i>FTR</i>	Future Time Reference
<i>EBIT</i>	Earnings Before Interest and Taxes
<i>EU</i>	European Union
<i>EPU</i>	Economic Policy Uncertainty
<i>ES</i>	Enterprise Surveys
<i>G2SLS</i>	Generalized Two-Stage Least Squares
<i>GDP</i>	Growth Domestic Product
<i>GEM</i>	Global Entrepreneurship Monitor
<i>GII</i>	Gender Inequality Index
<i>GMM</i>	Generalized Method of Moments
<i>IV</i>	Instrumental Variable
<i>LPM</i>	Linear Probability Model
<i>MBA</i>	Master of Business Administration
<i>NACE</i>	Nomenclature Générale des Activités Economiques
<i>OECD</i>	Organization for Economic Co-operation and Development

<i>OLS</i>	Ordinary Least Squares
<i>PSS</i>	Probit Self-Selection
<i>PLAD</i>	Political Leaders' Affiliation Database
<i>ROL</i>	Rule of Law
<i>SD</i>	Standard Deviation
<i>SME</i>	Small and Medium-sized Enterprise
<i>SWH</i>	Sapir-Whorf Hypothesis
<i>TEA</i>	Total Entrepreneurship Activity
<i>USA</i>	United States of America
<i>VDEM</i>	Varieties of Democracy
<i>WALS</i>	World Atlas of Index Structures
<i>WB</i>	World Bank
<i>WBES</i>	World Bank Enterprise Surveys
<i>WBL</i>	Women, Business and the Law
<i>WDI</i>	World Development Indicators
<i>WGI</i>	World Governance Indicators
<i>WVS</i>	World Value Survey



# General Introduction

*“There is no tool for development more effective than women empowerment.”*

Kofi Annan, the seventh Secretary General of the United Nations

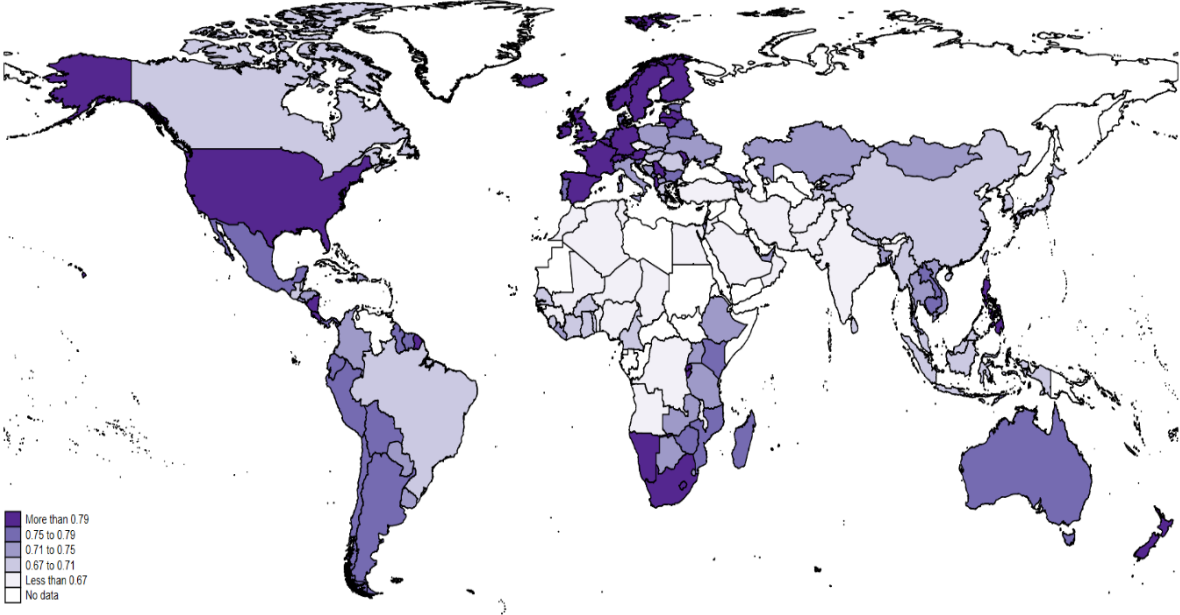
Framing gender equality as a women issue fails to highlight the importance of gender equality for the economic and social progress. Women comprise half of the total population and therefore half of humankind’s economic potential. Despite critical advances towards their empowerment, women and girls continue to suffer discrimination and violence in every part of the world.

Gender equality entails the equal enjoyment by all individuals, regardless of their gender, of equal rights, opportunities, and access to resources and services. According to Holzner et al. (2010), it is defined as a situation where “all human beings are free to develop their personal abilities and make choices without the limitations set by strict gender roles; that the different aspirations and needs of women and men are considered, valued and favoured equally”. Hence, the ultimate goal of gender equality is the non-existence of discrimination on the basis of one’s gender.

There has been an increasing recognition of the importance of gender equality in policy making, and both national and supranational organizations have implemented policies and programs aimed at promoting gender equality. For instance, gender equality has been declared an ineluctable aim in many official documents issued by international organizations, as in the incipit of the first Human Development Report (1990): “People are the real wealth of a nation and inequality amongst genders can no longer be accepted.” Similarly, the 2030 Agenda for Sustainable Development, adopted by the United Nations General Assembly in 2015, includes a dedicated goal for gender equality, Goal 5: Achieve gender equality and empower all women and girls. This goal aims to eliminate all forms of discrimination and violence against women and girls, ensure equal access to education, health care, and economic and political opportunities, and promote women’s leadership and participation in decision-making processes. The United Nations and its member states are working together to achieve this goal by 2030 through a range of programs, policies, and initiatives.

Despite sustained efforts, there is still a long way to go to achieve gender parity and empower all women and girls by 2030. According to the Global Gender Gap Report (2022), progress towards gender equality has been steady but slow. The global gender gap has narrowed by 68.6% in four key areas (health, education, economy and politics) since the first report in 2006. At the current rate of progress, it will still take another 132 years to reach full parity. This represents a slight four-year improvement compared to the 2018 estimate. While the overall trend shows some improvement towards gender equality, the pace of progress is highly heterogeneous across different countries and regions (Figure 0.1). Nordic nations such as Iceland, Norway, Finland, and Sweden have made significant strides in closing the gender gap, with Global Gender Gap scores of 0.87 or higher (with 1 representing perfect equality). In these countries, men and women have a relatively equal distribution of income, resources, and opportunities. The highest gender gaps are observed in the Middle East, Africa, and South Asia. While high-income countries generally tend to score higher on the Global Gender Gap Index than low-income economies, there is still a significant variation in gender equality outcomes within high-income countries. Thus, it is noteworthy that several countries in these regions, including Rwanda, Nicaragua, and Burundi have outperformed the United States in terms of gender equality in 2022.

Figure 0. 1. Global Gender Gap Index in 2022

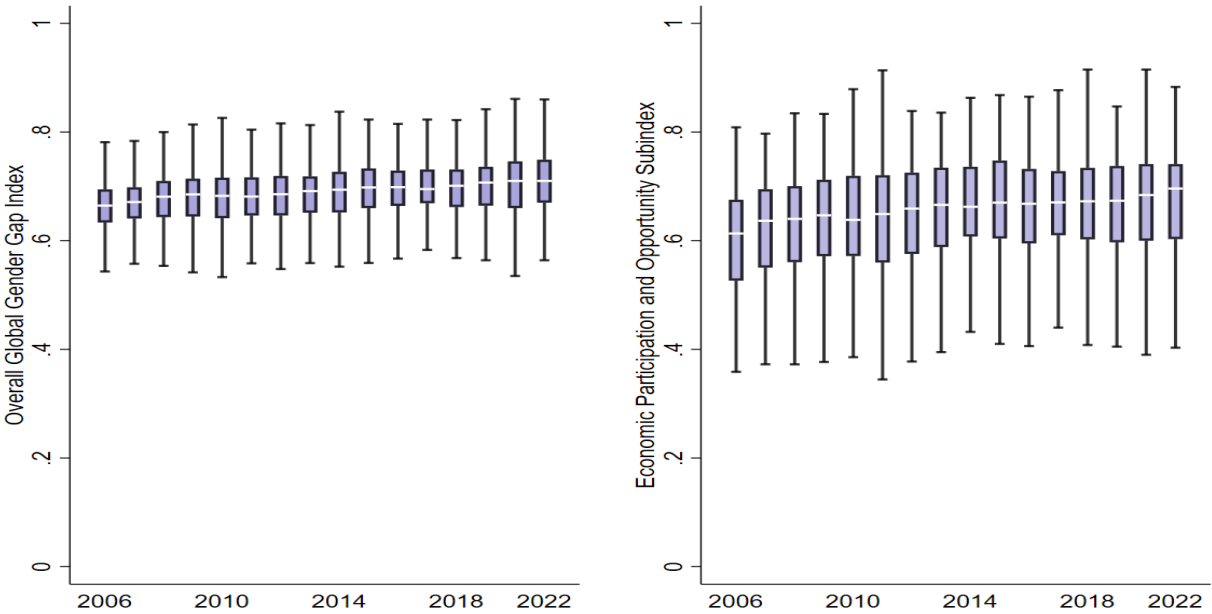


Source: World Economic Forum

Note: The Global Gender Gap Index ranks countries on a scale from 0 to 1, with 1 indicating full gender equality.

The Global Gender Gap Index is constructed using a set of subindexes in four key areas: economic participation and opportunity, educational attainment, health and survival, and political empowerment. Generally, there has been noteworthy progress in narrowing the gender gap in education, with more women gaining access to education and reducing the gender gap in literacy rates. The subindex of Health and Survival has also shown improvement, with a decrease in maternal mortality rates and an increase in life expectancy for women. Conversely, the Political Empowerment Subindex has made the least progress since 2006, with a modest increase of 2.4% globally. The Economic Participation and Opportunity Subindex has shown some improvement over time, albeit at a slow pace. Between 2006 and 2021, the subindex improved by 2.8 percentage points, but the pace of progress has been uneven across countries, with some economies making significant strides while others have stagnated or even regressed. For example, the top-ranked country in this subindex, Iceland, has a score of 0.868, while the lowest-ranked country, Yemen, has a score of only 0.293. The subindex has a standard deviation of 0.162, which is much higher than other subindices.

Figure 0. 2. Comparison between the Global Gender Gap Index and the Economic Participation and Opportunity Subindex



Source: World Economic Forum

Note: The Global Gender Gap Index and the Economic Participation and Opportunity rank countries on a scale from 0 to 1, with 1 indicating full gender equality.

What are the fields that contribute to the variations in the level of Economic Participation and Opportunity across countries? The underlying factors are multifaceted and interrelated. Nonetheless, one area where economic gender inequalities are particularly salient and heterogeneous is in financial inclusion, where women are more likely to be excluded from formal financial services, limiting their economic participation. At the end of the G-20 Summit in 2010, 76 countries signed the Maya Declaration, which pledged to reduce poverty through financial inclusion and move towards universal access to financial services. However, while most of the countries that ratified the declaration have implemented strategies for financial system development and inclusiveness, Demirgüç-Kunt et al. (2022) showed that a financial inclusion gap between men and women persists. More formally, 78% of men have a formal account with the banks and financial institutions whereas only 74% of the female have access to an account. While the gender gap in account ownership has narrowed from 7 to 4 percentage points between 2017 and 2021, there are still significant variations across economies, and some countries like Cote d'Ivoire have witnessed worsening gender gaps. At the regional level, Sub-Saharan Africa and the Middle East and North Africa regions reported the largest gaps of 12 and 13 percentage points, respectively, which are double the developing economy average and three times larger than the global average in 2021. However, in East Asia and Pacific, the gender gap in account ownership is only 3 percentage points, which is relatively insignificant. Therefore, it is still a long way to reach complete gender-neutral financial system.

Women's financial inclusion has been recognized as a critical factor for economic and human development in both developed and developing countries. First, women's access to financial services can improve household income and well-being, particularly in low-income households. A large strand of literature (e.g. Swamy, 2014) suggests that women are more likely to use resources in ways that improve family well-being, especially that of children. Second, Demirgüç-Kunt and Singer (2017) have shown that access to financial services can help individuals and households to build assets, smooth consumption, and manage risk. This is particularly important for women, who often have lower income and less access to resources than men. Third, financial inclusion has been shown to be a key determinant of women's entrepreneurship (Fareed et al., 2017) and more generally their participation in the labour market. Overall, financial tools can have a positive impact in fostering female economic empowerment and equality (Hendriks, 2019), in the sense that financial tools can be



categorized as contextual resources, acting as preconditions for agency and economic achievement.

Gender inequality in entrepreneurship is also a pervasive issue that widely varies across countries. According to the Global Entrepreneurship Monitor (2022), women are less likely to launch their business (on average, 10.4% of women surveyed versus 13.6% of men in 2021). Put differently, women represent two out of every five early-stage entrepreneurs that are active globally. While some countries have made significant progress in promoting women's entrepreneurship, others continue to lag behind. In the Dominican Republic, the startup rate among women is the highest, with 43.7% of women engaging in startup activities compared to 40.1% of men. Conversely, Poland (1.6%) and Norway (1.7%) have the lowest startup rates for women, with only two women entrepreneurs for every five men, resulting in the largest gender gap. The differences in rates of entrepreneurship and gender gaps between countries can be largely attributed to the economic and sectoral makeup of each country. In that sense, women in lower-income countries exhibit a twofold higher tendency to express their intentions to start a business than women residing in high-income countries. The main reason is that women in low-income economies may have limited access to formal employment opportunities and may turn to entrepreneurship as a means of generating income.

Recent literature highlights that entrepreneurial activity does not only lead to a persistent rise in living standards by carrying out innovations and enhancing competition, but it can also reduce income inequality and even promote social fairness and justice (OECD, 2017). Research also suggests that women entrepreneurs are more likely to employ other women and provide them with better working conditions and benefits compared to male-owned firms (Al-Dajani and Marlow, 2010). Moreover, women's entrepreneurship also contributes to gender equality and empowerment by challenging traditional gender roles and promoting women's participation in economic activities (Brush et al., 2018). Overall, Bonnet et al. (2019) found that countries with higher levels of female entrepreneurship had greater economic growth and higher levels of innovation.

All in all, apart from being a societal issue, gender inequality is also a human capital efficiency loss concern. World Bank report "Gender Mainstreaming Strategy" launched in 2001 has been one of the most influential works in establishing a global consensus on the importance of women in economic development. Whereas the direction of the relationship between gender inequality and economic growth remains debatable, this research confirmed the hypothesis that countries that discriminate by gender tend to experience less rapid

economic development and poverty reduction than more egalitarian societies. Thévenon et al. (2012) estimate that fully closing the gender gap over the period 2010-30 would result in an increase of 0.6 percentage points in the annual growth rate of GDP per capita, and lead to an overall increase of 12% in the aggregate GDP of OECD member countries by 2030.

The enduring gender disparities and their associated macroeconomic ramifications prompt a series of inquiries. What are the underlying mechanisms that give rise to these persistent economic gender gaps? To what extent do they impact economic and financial outcomes? Despite the recognition of gender equality and female empowerment as a pivotal objective for economic advancement, gender disparities show little sign of diminishing and remain a significant challenge for both advanced and developing economies. In fact, the inequities between genders appear to be entrenched in cultural, social, and political systems. The primary aim of this thesis is to examine the interrelationships between the institutional framework, the ongoing gender disparities in economic outcomes, and their consequences at both the micro and macro levels. This objective is motivated by a twofold impetus: first, the belief that female economic empowerment carries significant implications for the economy; second, the conviction that understanding the persistent inequities necessitates a comprehensive appraisal of the institutional context with a gender lens.

North's (1991) seminal contribution conceptualizes institutions as the "rules of the game" within a society, or more precisely, as the artificial constraints that shape and regulate human interactions. In essence, institutions encompass a collection of behavioural norms that are humanly devised and govern the interactions among individuals by enabling them to form expectations regarding the behaviour of others. These constraints may be formal in nature, such as constitutions, laws, property rights, charters, and bylaws, or they may be informal, such as customs, taboos, traditions, codes of conduct, and social sanctions (North, 1991). Unlike informal institutions, formal institutions are codified in written form and are enforceable. The notion that institutions exert a direct influence on economic outcomes, for instance, by impacting transaction costs, or an indirect influence via incentivizing investments in human capital, is no longer a contentious issue in the academic literature (Efendic et al., 2011).

Institutions pertaining to gender play a pivotal role in determining women's economic outcomes. The norms governing gender-specific behaviours are usually formalized through laws that establish gender-based regulations pertaining to gender roles within a society. Historically, formalized gender-specific regulations tended to restrict women's options, such

as mandating permission from a senior male figure to travel, work, marry, start a business, or treating genders unequally in matters such as marriage, divorce, inheritance, and access to property and financial services (Hallward-Driemeier et al., 2013). In recent decades, such legal gender disparities have diminished considerably across the globe, albeit some discrepancies persist. One gender-progressive policy is the extension of legal rights to women, with India's 73rd Constitutional Amendment providing a compelling example of this approach by reserving political seats for women. By mandate, one third of seats in the village councils are allocated to women. The most tangible benefit of this policy change on women's welfare has been to close the gap in women's representation; female leaders enact policies that more accurately reflect the policy preferences of their female constituents (Chattopadhyay and Duflo, 2004). Moreover, this reform has started to alter attitudes towards women as leaders (Beaman et al., 2009) and has increased girls' educational attainment (Beaman et al., 2012).

An inherent limitation of legal reforms lies in their interaction with informal institutions, which often results in a low level of enforcement. Despite the legal reform in India that granted women's rights to ancestral land, enforcement remains inconsistent. Likewise, bans on prenatal sex determination, dowry, and child marriage are frequently enforced to a limited extent, primarily due to deeply ingrained social norms (e.g., Nandi and Deolalikar, 2013). These informal institutions are often deeply rooted, long-lasting, and considered fundamental aspects of a country's cultural and/or religious identity. Comparable to the gender differentials found in formal laws, most of these informal institutions have tended to impose greater restrictions on women's activities, limiting their economic opportunities and involvement in public life, while assigning reproductive and caregiving duties to them.

The gender gaps in formal and informal institutions are not only a matter of equity but also have a significant impact on economic outcomes and social welfare. Firstly, institutions governing reproduction have a critical impact on economic development through the well-known effects of demographic change on economic performance, as demonstrated by Bloom and Williamson (1998). Secondly, women's economic opportunities, as demonstrated below, have a substantial impact on overall economic performance.

Beyond the importance of integrating gender issues in policymaking, challenging puzzles still have to be addressed. Despite a burgeoning number of initiatives specifically targeting women's economic participation at the national and supranational levels, large gender gaps in access to entrepreneurship and financial inclusion persist over time. In that

sense, the effect of women-related institutions remains scarce. Why the massive deployment of gendered laws does not necessarily conduct to an improvement in women's economic opportunities? To what extent does the informal institutional context interact with the implementation of these specific policies? What underlying aspects of the culture might explain these various outcomes? The exploration of the impact of gender-related institutional context may provide plausible explanations of these issues and improve our understanding of the process of development.

This dissertation endeavors to enhance our comprehension of the linkages between women's financial inclusion, entrepreneurship, and institutional framework by utilizing nationally representative cross-sectional and panel data at both individual and country levels. While a plethora of literature has examined the effect of various dimensions of female individual characteristics on their behaviour towards economic opportunities, there is limited evidence regarding the impact of both formal and informal institutions on women's access to financial services and entrepreneurship activity. If a country's institutional framework limits women's opportunities to open a bank account or register a business, regardless of their individual characteristics, it may directly and adversely affect their access to financial services and entrepreneurship. Additionally, if the institutional context of a country makes it challenging for women to leave their home or secure a job, it can have negative consequences for their educational attainment, earning potential, and overall economic participation. This dissertation seeks to address this gap by exploring the effect of formal and informal institutions on women's attitudes and access to entrepreneurship and financial services. Furthermore, it aims to provide a more comprehensive understanding of the implications of women's involvement in political and corporate leadership. In particular, we investigate how exposure to role models and to economic policy uncertainty affects respectively women's entrepreneurial and corporate decision making. By exploring these factors, our research sheds light on the influence exerted by political and economic conditions on women's participation and success in leadership roles in the private sphere.

This thesis is a collection of seven standalone chapters distributed into two parts. The first part of the dissertation is structured around four chapters dedicated to women's financial inclusion. A large amount of existing evidence, summarized in the sections above, has looked into the impact of different dimensions of financial inclusion on household welfare and economic growth. Given that financial inclusion has risen into the global policy agenda, this first part strives to provide empirical evidence on how to promote financial inclusion for

female individuals and entrepreneurs by investigating the effects of gender-specific laws. Thus, the first two chapters studies the effect of women-related legal framework on their access to financial services. The third chapter continues in this line of research by considering the role of board composition on women-led firm's access to credit. Keeping in mind women behavioural specificities, this first section adds to the standard line of research on financial vulnerability by investigating the consequences of women's access to credit on the banking system stability in the third chapter. The outline of the rest of the thesis is provided below where I summarize the main motivation, research questions, and outcomes of each of the seven chapters.

The second part of his dissertation deals with the issue of female entrepreneurship and leadership. It aims at providing a better understanding of the influence exerted by formal and informal institutions on women's entrepreneurial attitude. Indeed, whereas a compendium of literature has focused on the determinants of entrepreneurship in general, the gender-specific drivers of business launching remain overlooked. Thus, the first two chapters examine the effect of gender marking in language as information institutions and women's political leadership as a formal one on entrepreneurial attitudes of women. In the same way as in the previous section, the seventh and last chapter of this section studies the effect of CEO gender on the relationship between economic policy uncertainty (EPU) and corporate investment.

Chapter 1<sup>7</sup> is entitled "All You Need Is Law? Gendered Laws and Women's Financial Inclusion" and aims to examine the impact of gender equality laws on women's access to bank accounts. Despite increasing evidence on the importance of affordable and convenient financial services for economic development, there is a limited understanding of the policies that can improve women's financial inclusion. Existing literature mainly focuses on microeconomic drivers of female financial inclusion, such as socio-demographic characteristics, financial literacy, individual preferences, or education, employment, and income levels. However, the influence of institutions, particularly gender-related legislation, remains overlooked in the literature. In 2022, the Women, Business, and the Law Report stated that 2.4 billion women live in countries that do not grant them the same rights as men. For instance, in Equatorial Guinea, women still require their husband's consent to open a bank account due to articles 60 and 1263 of the Código Civil. Discrimination against women, such

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<sup>7</sup> This chapter is co-written with Marie Hyland and has been published as a World Bank Working Paper (2023).

as weak property rights, laws that prohibit equal inheritance, or legal limitations on female-led businesses, may hinder their demand for and access to finance.

This essay aims to answer three research questions: first, does legal gender equality affect women's ownership of bank accounts? Second, what are the channels through which the law may impact financial inclusion? Third, how do informal institutions mediate the relationship between the law and financial inclusion? The study combines the Global Findex dataset with the World Bank's Women, Business, and the Law indicators to test hypotheses on a representative sample of 469,272 individuals living in 148 economies from 2011 to 2021. The results confirm that gendered laws matter for women's financial inclusion. The study demonstrates that greater legal equality reduces the likelihood of women not having an account due to involuntary motives, such as an inability to meet eligibility criteria. Although a stronger rule of law strengthens the efficiency of legal reforms, widespread social norms that discriminate against women negate the beneficial effect of legal equality on women's financial inclusion. Robustness tests ensure the reliability of the results.

This chapter provides a global view of how gender equality in law affects women's access to bank accounts. Ensuring legal equality is the first step in promoting female financial inclusion, but it alone is insufficient. Legal reforms should also specifically incentivize women to participate in the financial market by alleviating bankers' discriminatory behaviour. Women tend to apply less to credit, arguably because they fear being denied. On the supply side, their likelihood of receiving credit is lower than men's. To counteract these biases, policymakers have implemented credit-specific clauses, such as the *Ley de Igualdad de Oportunidades para la Mujer* ratified in Honduras in 2007. In 2022, almost 40% of countries had enacted laws against discrimination in access to credit. Nonetheless, the persistence of gender gaps in credit markets questions the effectiveness of bank-specific legal reforms. Are de jure changes informative about de facto developments in the credit market?

Chapter 2<sup>8</sup>, entitled "Girls Just Wanna Have Funds? The Effect of Women-Friendly Legislation on Female-Led Firms' Access to Credit", addresses concerns about access to credit for female-led businesses. Access to credit is essential for promoting business survival and growth (Coleman and Robb, 2009), but credit grantors are more likely to discriminate against female-led firms. As a result, women-led enterprises tend to start with lower capital

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<sup>8</sup> This chapter is co-written with Jérémie Bertrand and has been published in *International Review of Law and Economics* (2022).

and rely more on personal rather than external finance for follow-on investments. This lack of access to finance limits opportunities for women entrepreneurs to grow their businesses, impeding gender equality and economic growth. Therefore, it is crucial to understand the underlying factors contributing to gender disparities in access to credit.

Extant studies show that corporate structural dissimilarities between male and female-owned businesses, which may affect creditworthiness and riskiness, do not fully explain the persisting gender gap in the credit market (Asiedu et al., 2013). Thus, country-level specific factors – especially institutions – should constitute a missing piece of the puzzle explaining women-led firms' lower access to credit. This chapter aims to explore this black box by addressing three questions: Does lawmaking increase women-led firms' likelihood to apply for a loan? Do anti-discrimination laws necessarily guarantee a change in bankers' behaviour towards female prospects? Which other institutional factors are inferred in the law-credit nexus?

We find that a law protecting women in the credit market weakens female entrepreneurs' discouragement, but it does not affect banks' discriminatory behaviour towards female prospects. Moreover, our results suggest that law enforcement is a *sine qua non* condition to alleviate supply-side discrimination. Our findings are robust to a battery of robustness checks.

This second paper adds to the thin literature investigating the determinants of the demand-side discrimination. Based on the premise that women are more likely to be discouraged in the credit market, our findings suggest that legal protection alleviates women-led firms' fear of loan denial. This behavioural change could be the natural outcome of a change in women's risk preferences, based on the argument that the environment in which women evolve influences their degree of risk aversion towards banking institutions. Women are indeed deemed to have a lower appetite for risk in financial decision-making across a range of activities (Nelson, 2015) that may affect their self-restrictions in terms of credit. In that sense, Naegels et al. (2022) argue that "Future research could investigate the extent to which risk preferences influence the likelihood of being discouraged or the process via which entrepreneurs become discouraged."

Chapter 3<sup>9</sup>, entitled "Just the Two of Us, We Can('T) Make It If We Try: Owner-CEO Gender and Discouragement", follows this direction by investigating how gender diversity in corporate boards affects women-led firms' demand for credit. We posit that a higher share of women in corporate ownership increases female-led firms' discouragement. The underlying argument is that board gender diversity leads to a strong reduction in managers' risk taking. Female board members' cautiousness enhances CEO's risk aversion, thus increasing discouragement. While the research suggests that women are more risk-averse than their male counterparts, an important puzzle in this literature relates to the underlying factors responsible for the observed differences in risk preferences. Does risk preference only reflect inherited gender traits? Is it shaped by the social environment of the individual? Booth et al. (2014) show that social learning significantly affects an individual's decision-making under uncertainty, suggesting that the social environment contributes to shaping gender differences in risk preferences.

In line with this argument, we find that a female-dominated firm's ownership strengthens women-led firms' reluctance to ask for credit. This result is highly relevant for policymaking. All in all, one third of discouraged firms would have received credit if they had applied, with conspicuous negative consequences for their survival and growth (Cole and Sokolyk, 2016). Thus, a higher share of women in a female-led firm ownership may lead them to unnecessarily forgo formal credit. This evidence questions the affirmative action policies in the form of quota regulations on other firm-related outcomes through the enhancement of risk aversion in the corporate board.

The previous three chapters help to dissect the drivers of financial inclusion for women and women-led firms. Each of them investigates how the institutional and social environment for women contributes to shaping their attitudes towards bank services. Adequate supportive lawmaking can help to progressively reducing the persistent gender gap in financial inclusion. While a protective legal framework can alleviate the demand-side constraint, a properly functioning judiciary system is required for law implementation to overcome supply-side discrimination. Furthermore, a female-dominated ownership at the firm level strengthens discouragement among female-led firms, raising questions about the potential spillover effects of gender quotas.

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<sup>9</sup> This chapter is co-written with Jérémie Bertrand and Aurore Burietz and has been published in *Economic Letters* (2022).



On balance, the importance of gender in financial inclusion is increasingly receiving public attention, although several challenges persist. These challenges are not just economic, but also political and societal, as well as specific to the financial sector. Understanding the underlying factors of women's financial inclusion is only one side of the coin in formulating adequate policy recommendations. The other side lies in the effect of women's access to financial services from a bank's perspective.

In Chapters 2 and 3, we argue that women's higher cautiousness may contribute to explaining women-led firms' higher likelihood of discouragement. Interestingly, one may also hypothesize that differences in risk preferences should also be reflected in the relative performance of male and female borrowers. A higher degree of risk aversion of female borrowers may result in loans being less likely to be in arrears because women tend to default less frequently than men do. However, these findings are not conclusive and require further investigation.

Chapter 4<sup>10</sup>, entitled "No Man, No Cry? Gender Equality in Access to Credit and Financial Stability," confirms this hypothesis by demonstrating that a higher share of female borrowers increases financial stability at the bank level. This result is due to the fact that women exhibit higher repayment rates, thus decreasing the likelihood of non-performing loans. Our findings are of particular importance to policymakers who care about financial stability, as they suggest that gender equality in access to credit would not only bring economic benefits through higher women's economic empowerment but also enhance financial stability. In other words, financial regulators should prioritize equal access to credit between genders to promote bank stability.

All chapters in this section consider different perspectives on women's financial inclusion. Firstly, Chapter 1 highlights the beneficial effect of equality in the law on women's account ownership. Subsequently, Chapter 2 documents the impact of anti-discriminatory laws on women-led firms' access to credit. Then, Chapter 3 suggests that gender diversity in ownership increases women-led firms' discouragement. Finally, Chapter 4 provides evidence of the beneficial effect of women's access to credit on bank stability. Given that financial inclusion has risen to the top of the global policy agenda, this first section strives to provide country-specific policy recommendations on how to promote women's financial inclusion.

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<sup>10</sup> This chapter is co-written with Laurent Weill and has been published in *Finance Research Letters* (2022).

Our findings suggest that women's financial exclusion is a cross-cutting issue that may need policy action targeting both formal and informal institutions. In other words, achieving gender equality in financial inclusion involves not only improving how women interact with financial institutions but also tackling obstacles outside the financial system that affect their ability to participate in the economy.

The second section of this dissertation focuses on women's entrepreneurship. Despite the proliferation of research, the population of women entrepreneurs remains vastly overlooked. This is surprising considering women are one of the fastest rising populations of entrepreneurs, and contribute significantly to innovation, job creation and growth around the world. In view of this, this section sought to identify the particular factors that affect women's entrepreneurship. Why do the differences between men and women in entrepreneurship persist? What conditions influence women's entrepreneurship? What determines the proportion of women entrepreneurs in a particular country and what explains the differences between countries and even within countries?

Chapter 5<sup>11</sup> entitled "Is It a Man's Wor(l)d? The Effect of Linguistic Gender Marking on Female Entrepreneurship," investigates the relation between gender marking in language and women's attitudes towards entrepreneurial activity. Institutional theory offers tremendous possibilities for entrepreneurship beyond the early cross-cultural focus, and gender marking in language is particularly germane to entrepreneurship given prior evidence of cross-cultural variation in cognitive scripts associated with venture-creation decisions (Mitchell et al., 2000). The linguistic relativity hypothesis posits that language structure plays a distinct role in coding its speakers' representations of reality. Extant literature arguably supports that gender marking in language may embody inherited attitudes, beliefs and perceptions that also predominate in the business environment. In line with this argument, one may expect that the intensity of gender in a language may reinforce the salience of traditional views of gender roles in the minds of speakers, thereby influencing women's participation in entrepreneurship activities.

Interestingly, we find that the likelihood to enter into entrepreneurship is significantly higher for women living in countries whose language marks female – male distinctions more pervasively. This result may stem from the fact that predominant gender roles in economies

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<sup>11</sup> This chapter is co-written with Francis Osei-Tutu.

with gender-intensive languages may encourage female prospects to consider self-employment due to the discrimination they may face in the paid employment market. Our findings suggest that women are indeed more likely to engage into “necessity” entrepreneurship compared to “opportunity” when the degree of gender marking in language increases.

Bringing in the role of gender marking in language offers an original view on how institutional factors are linked to cultural institutions for enabling female entrepreneurship. Language not only represents women’s cultural reality, it also enacts that reality. Thus, since fewer women than men engage in entrepreneurship, policymakers may appear overly focused on promoting female entrepreneurship by providing support for equal opportunities. However, our findings suggest that such strategies might be counterproductive because, in countries where the dominant language is less gendered, fewer women choose entrepreneurship since they may favour formal employment, which is perceived as less risky.

This first chapter argues that informal institutions are a central feature of women’s attitudes towards entrepreneurial activity. This study makes a meaningful contribution by proposing that language gender marking moderates the impact of other environmental factors. Our results are consistent with the claim that language is an institution that operates as a gendered unconscious bias. The latter is defined by Ely et al. (2011) as “the powerful yet often invisible barriers to women’s advancement that arise from cultural beliefs about gender, as well as workplace structures, practices, and patterns of interaction that inadvertently favour men”. One of the most effective ways of overcoming gendered unconscious bias is to provide women with counterstereotypical role models in order to trigger learning processes whereby they internalize knowledge of roles and act accordingly, which results in gender-congruent aspirations and behaviour. One may therefore argue that exposure to women in position of power may foster female leadership aspirations, thus affecting women’s entrepreneurship.

Chapter 6<sup>12</sup> entitled “You’re the One That She Wants (To Be)? Female Political Leaders and Women’s Entrepreneurial Activity” investigates this hypothesis by considering female political leaders as role models. We consider political leadership for two main reasons. First, there are currently more visible female politicians around the world, providing an opportunity to study how exposure to these role models affects women. Examples of such leaders include

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<sup>12</sup> This chapter is a sole-authored paper.

Katrín Jakobsdóttir in Iceland, Jacinda Arden in New Zealand, Mette Frederiksen in Denmark, and Tsai Ing-wen in Taiwan. Second, political and entrepreneurial leadership share similar characteristics such as decision-making and risk taking, which are important factors in entrepreneurial attitudes (Obschonka and Fisch, 2018). This suggests that there may be a connection between exposure to female political leaders and the development of entrepreneurial aspirations among women. Hence, this paper aims to answer the following questions: does female political representation enhance women's entrepreneurship? What are the mechanisms underlying the role model effect?

Our results reveal that the presence of female political leaders reduces the fear of failure in relation to entrepreneurial activity, and increases the likelihood for women to recognize entrepreneurial opportunities and become self-employed. Having a female role model who is closer in age can have an even more significant impact on the entrepreneurial aspirations of young women. Exposure to female political leaders can also help to challenge and change negative gender stereotypes and social norms that discourage women from pursuing entrepreneurship. Finally, female political leaders are more likely to create policies and initiatives that promote and support female entrepreneurship.

These findings constitute an additional argumentation in favour of the implementation of gender-based quotas. The latter can help challenge and shift negative gender stereotypes and social norms that discourage women from pursuing leadership roles. By increasing women's representation in leadership positions, gender quotas can provide counterexamples to these stereotypes and inspire women to envision themselves in leadership positions. This can help break down barriers and increase opportunities for women in a variety of domains, including entrepreneurship. Therefore, many governments have introduced quotas in the political sphere to promote gender diversity in political and corporate leadership.

Similar policies have been observed in the corporate sphere in order to increase the number of women on boards and in other leadership positions, especially in high-income countries. For instance, the *Frauenquote-Gesetz* (Women's Quota Law) introduced in 2018 requires Austrian large firms to have at least 30% of their supervisory board seats held by women. Such shift in the composition of the leadership team may impact the corporate decision-making process. As highlighted in Chapter 4, companies run by women adopt more conservative strategies than men-led firms. Thus, to the extent that the documented differences in corporate risk taking are driven by female CEOs imposing their preferences on

corporate choices, the efficiency of the capital allocation process could be undermined. In that sense, Faccio et al. (2016) among others argue that companies led by female CEOs are more likely to have lower levels of debt, invest more conservatively, and avoid risky mergers and acquisitions.

Chapter 7<sup>13</sup> entitled “Girls Will Be Girls? The Gendered Effect of Economic Policy Uncertainty on Corporate Investment” concludes this section by investigating the effect of the CEO gender in firm-level investment in the specific context of uncertainty. Investment is a crucial corporate decision that can be influenced by the risk aversion of decision makers, including CEOs. The investment behaviour of firms can differ based on the economic environment and the risk preferences of decision makers. The conventional wisdom is that greater economic policy uncertainty is likely to decrease firm investment, as firms may opt to delay investment decisions. On the other side of the coin, the *growth options* effect posits that uncertain economic conditions, characterized by volatile returns, offer the potential for higher outcomes, albeit with a lower probability compared to stable economic conditions. This increase in potential gains can induce risk-seeking behaviour, leading firms to invest in order to exploit these opportunities. In both cases, women-led firms may have lower investment levels compared to men-led firms in the presence of greater economic policy uncertainty, due to the higher-risk aversion of women.

This chapter’s main finding is that the relationship between CEO gender and corporate investment is influenced by economic policy uncertainty. Specifically, the study shows that economic policy uncertainty has a positive effect on corporate investment, but this effect is weaker for firms with female CEOs. This finding is consistent with the view that women have a higher level of risk aversion. When faced with higher levels of uncertainty, female CEOs increase investment, but to a lesser extent than male CEOs. Additionally, the study finds that these results are more pronounced for small and medium-sized enterprises and microenterprises, where CEO characteristics can have a greater impact on corporate decisions, but not for larger companies.

From a theoretical perspective, our results extend the common understanding of the higher-risk aversion of women by highlighting the gendered effect of economic policy

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<sup>13</sup> This chapter is co-written with Laurent Weill and has been published in *Applied Economics* (2023).

uncertainty on corporate decisions. On the other hand, this study has practical implications as it suggests that female CEOs can help stabilize the economy by reducing the impact of economic policy uncertainty on corporate investment. Overall, this last chapter suggests that gender balance on corporate boards could be achieved by mandatory quotas without policymakers expecting negative effects for firm performance either in the short term or in the longer term.

It is crucial to understand the factors that influence female entrepreneurial activity for policy purposes. This is because, firstly, boosting female firm creation can enhance the economy's productivity by removing obstacles to women's participation, creativity, and skills in the labour force. Secondly, women may have greater aptitude and inclination than men for engaging in groundbreaking ventures that can provide substantial benefits to the economy. Therefore, this second section aims to complement existing literature by highlighting two underlying factors that affect female entrepreneurship. Chapter 5 shows that gender marking in language can have a significant impact on women's entrepreneurship by shaping perceptions, creating barriers, and influencing attitudes towards female entrepreneurs. Chapter 6 suggests that exposure to counterstereotypical role models increases women's likelihood to engage in entrepreneurial activity. Chapter 7 supports that female CEOs are more risk-averse and may invest less in periods of uncertainty, thus enriching the literature about the effect of gender on corporate decision-making.



# Section 1

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Understanding the mechanisms of  
women's financial inclusion







# Chapter 1: All You Need is Law? Gendered Laws and Women's Financial Inclusion<sup>14</sup>

## Abstract

This paper documents the relationship between legal gender equality and the use of financial services using individual-level data from 148 developed and developing economies. The analysis, which combines data from the Global Findex and the Women, Business and the Law databases, highlights the existence of a significant and positive correlation between gender equality in the law and women's access to financial products. The results show that greater legal equality alleviates women's involuntary financial exclusion. Our findings also suggest that prevailing adverse social norms can nullify the beneficial effects of legal equality, and that better implementation of the law can facilitate a stronger relationship between legal frameworks and financial inclusion.

**Keywords:** Law ▪ Gender ▪ Discrimination ▪ Financial inclusion.

**JEL codes:** D14 ▪ G50 ▪ J16 ▪ K38.

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<sup>14</sup> This chapter is co-written with Marie Hyland and has been published as a World Bank Working Paper (2023).

## 1. Introduction

Financial inclusion, understood as access and use of affordable financial services by enterprises and households, has gradually become one of the top priorities of recent development and international policy agendas.<sup>15</sup> This interest derives from the recognition of macro and micro socio-economic benefits of financial inclusion, including economic growth, poverty alleviation, inequality reduction and aggregate consumption smoothing (Beck and Demirguc-Kunt, 2008; Bruhn and Love, 2014; Aslan et al., 2017; Burgess and Pande, 2005; Bhattacharya and Patnaik, 2016 among others).

A cursory view of data on global financial inclusion portrays that there has been significant progress in expanding financial inclusion. The World Bank Global Findex report (2021) suggests that account ownership around the world increased by 50 percent in the 10 years spanning 2011 to 2021. This implies that 76 percent of global adult population in 2021, compared to 51 percent in 2011, have accounts at banks, other financial institutions or mobile money service providers.

However, financial inclusion is not gender-neutral, with large gaps in access between men and women. Worldwide, in 2021, only 74 percent of women have an account at a formal financial institution compared with 78 percent of men. This gender gap of 4 percent in financial access is systematic and persistent (Demirguc-Kunt et al., 2022). Thus, about 740 million women (13 percent of all adults globally and 54 percent of the unbanked) still do not have access to any bank services. These disparities are worrisome for women's empowerment, including their labour force participation (Gonzales et al., 2015), family welfare (Swamy, 2014) and household savings (Dupas et al., 2018).

Given this statistical evidence, it is crucial to shed light on the factors that might explain the cross-country variation in the financial exclusion of women. Extant literature mostly focuses on assessing microeconomic drivers of female financial inclusion, such as socio-demographic characteristics (Zins and Weill, 2016), financial literacy (Grohmann et al.,

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<sup>15</sup> For instance, the foundational document of the global Alliance for Financial Inclusion (AFI), the 2011 Maya Declaration, asserts that all its members (more than 80 economies) "recognize the critical importance of financial inclusion to empowering and transforming the lives of all our people, especially the poor, its role in improving national and global financial stability and integrity and its essential contribution to strong and inclusive growth in developing and emerging market countries."

2018), individual preferences (Beck et al., 2018) or educational levels, employment status and income (Aterido et al., 2013; Ghosh and Vinod, 2017). Nonetheless, country-level factors – and more specifically legal restrictions – may be of utmost importance to understand the exclusion of women from financial institutions. In many economies, women still face an adverse regulatory environment that may exclude them from the formal financial system. For instance, in Equatorial Guinea in 2022, the articles 60 and 1263 of the *Código Civil* imply that a married woman still needs her husband’s consent to open a bank account. Other restrictions, such weak property rights that limit women’s ability to enter contracts in their own name, laws that prohibit equal inheritance to property, or legal limitations on female-led businesses represent just a few examples of such discrimination against women, which may hinder their demand for and access to finance. However, to what degree legal frameworks affect women’s financial inclusion remains an empirical question.

This paper seeks to present new empirical evidence by analysing the mediating role of legal institutions in hindering or facilitating women’s financial inclusion. More specifically, we ask three major questions. Firstly, what does the evidence suggest regarding the effect of legal gender equality on women’s financial inclusion? Secondly, what are the channels through which the law may impact such inclusion? And, thirdly, how do factors related to the environment in which a woman lives – such as social norms and level of legal enforcement – mediate the relationship between the law and financial inclusion? To proceed, we combine the Global Findex dataset, a comparable cross-country survey providing information about the use and reach of financial services – both formal and informal – around the world, with the World Bank’s Women, Business and the Law (WBL) indicators to capture legal equality between men and women. We assess the intensity of gender norms using the *Equality* index provided by the World Value Survey (WVS). Moreover, we measure the degree of law enforcement using the *Rule of Law* indicator from the World Bank’s Worldwide Governance Indicators project.<sup>16</sup> Combining these data sources allows us to test our set of hypotheses on a large and representative sample of 469,272 individuals living in 148 economies around the world for the years 2011, 2014, 2017 and 2021.

We find that women are significantly more likely to have a bank account, to save and to borrow in countries with greater legal equality, even after controlling for a host of individual

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<sup>16</sup> <https://info.worldbank.org/governance/wgi/> [Accessed: November 28, 2022].

and country characteristics. Looking at the specific ways in which equality may increase financial inclusion, we find that greater legal equality reduces the likelihood of a woman not having an account due to involuntary motives, such as an inability to meet eligibility criteria. Looking at how the broader environment mediates the relationship between laws and financial inclusions, we find that while a better regulatory environment strengthens the efficiency of legal reforms, widespread social norms that discriminate against women negate the beneficial effect that legal equality has on women's financial inclusion. We conduct five robustness tests to ensure the reliability of our results.

Our paper contributes to the literature on women's access to finance along two distinct dimensions. First, this study adds to the literature exploring the economic outcomes of gendered laws. To the best of our knowledge, this is one of the earliest studies to systematically investigate the issue of gender equality in law and its consequences for women's access to financial services. Our findings complement those of Demircug-Kunt et al. (2013), where the focus is restricted to developing economies in 2011. The authors demonstrate that the ability to work, to be the head of a household and to receive inheritance contributes to the likelihood of a woman owning an account. Nonetheless, the data structure does not allow for the identification of any causal relationship between legal frameworks and women's access to financial services. In comparison, we use a sample covering a larger set of countries and capturing a more comprehensive set of questions on financial inclusion based on three waves of data, i.e. 2011, 2014, 2017 and 2021. We also control for a broader range of country characteristics in addition to legal restrictions, such as the level of economic development and, importantly, the prevalence of social norms and the broader regulatory environment. Moreover, we propose, in addition to our OLS results, an instrumental variable approach, which brings us closer to making assertions of causality.

Second, this paper considers an important country-specific factor of access to and use of all financial services, not just credit as done in large parts of the literature. Perrin and Bertrand (2022) show that legal protections are associated with lower levels of reluctance amongst women-led firms to apply for loans or lines of credit, but not associated with the success rates of these applications. Thus, we enrich extant literature about the determinants of gender-based differential access to financial services. We enlarge the scope of financial inclusion beyond the simple access to credit and, furthermore, we consider a wider range of gendered laws in order to capture potential spillover effects beyond those areas of the law that directly target equal financial inclusion.

The remainder of the study continues as follows. Section 2 provides the theoretical backdrop on the link between gendered laws and financial inclusion. Section 3 provides an overview of the variables and the methodology used, followed by a discussion of the results in Section 4. Section 5 presents the robustness checks, while the final section concludes and presents policy implications.

## **2. Hypotheses development**

What drives female financial inclusion is a question that is attracting growing interest. The literature underlines several theoretical reasons explaining the persistent gender gap in access to financial services. First, financial exclusion of women might be explained by statistical discrimination, in the sense that their lower degree of education and involvement in the formal labour market is an obstacle for women to access formal financial services. Thus, Aterido et al. (2013) demonstrate that lower wage, educational attainment and involvement in formal employment contribute to explaining why, *prima facie*, female households tend to be less likely to have access to finance in Sub-Saharan Africa. In the same vein, Grohmann et al. (2018) evidence that financial literacy has a significant influence on women's financial inclusion even after controlling for country-level, institutional and other individual factors.

Second, the lower involvement of women in the formal financial market might reflect taste-based discrimination embodied by traditional gender role distribution in society that leads to misrepresentations about the out-group, i.e. women. Behavioural differences might be important, leading to taste rather than statistical discrimination in credit markets (Beck et al., 2018). Demirgüç-Kunt et al. (2013) show that adverse social norms contribute to explaining part of the variation in the use of financial services between men and women. In the same vein, male heads of households in Kenya are more likely receive formal credit (Johnson, 2004). On another note, gender marking in language creates an unconscious bias that affects women-led businesses' access to microfinance according to country-level data from 115 countries between 1995 and 2015 (Drori et al., 2018).

Beyond the microeconomic statistical- and taste-based discriminatory drivers discussed above, other empirical studies have pointed out the role of institutions and legal barriers in explaining the differences in access to financial services between men and women. A study conducted by Balasubramanian et al. (2019) shows that the land ownership status of women has an effect on their financial inclusion in 148 countries. This finding has been subsequently confirmed by Adegbite and Machethe (2020). They demonstrate that the causes that affect the

gender gap in formal financial services in Nigeria are mostly sociocultural, institutional, legal and regulatory factors. Using a panel of 752 microfinance banks in Nigeria during the period 2011 to 2014, Ogunleye (2017) finds evidence that differential treatment under the law or customs may prevent women from entering into contracts under their own name, including the opening of a bank account. Hence, greater legal equality may decrease both statistical and taste-based discrimination, therefore enhancing women's likelihood to open a formal bank account, to save and to borrow. Women may perceive the law as a path to equal opportunity in financial services such that they expect an equivalent treatment compared to their male counterparts. And, from the supply-side, formal legislation should constrain financial institutions to treat male and female prospective clients equally. This leads to our first hypothesis:

H1: The more women are legally protected, the greater their financial inclusion.

Nonetheless, one may be sceptical about the convergence between *de jure* expectations of gender equality and *de facto* experience in financial services due to other characteristics of the ecosphere in which a woman resides. For example, adverse social norms may inhibit women's demand for financial services compared to men (Johnson, 2004). Research in rural Paraguay shows that women are more knowledgeable about financial institutions and loan requirements when they control a larger share of family assets and when their husbands do not oppose them taking out loans (Fletschner and Mesbah, 2011). Indeed, negative perceptions of women stemming from adverse social norms cause unfavourable attitudes towards them in society – and by extension in banking institutions, which may impede the effectiveness of formal legal institutions. Acemoglu and Jackson (2017) show that when laws are in conflict with social norms, the likelihood of an agent breaking the law is substantially higher. More than that, Bénabou and Tirole (2011) demonstrate that using law to change customs may have the opposite effect than expected, and this is particularly the case for discrimination against women. Therefore, the prominence of traditional gender roles in a society may substantially reduce, if not cancel altogether, the beneficial effect of legal reforms.

There are other factors that may impact the effectiveness of legal equality in improving women's access to finance. For example, Djankov et al. (2008) explain that it is not so much the existence of a law that counts, but its enforcement. The greater the level of legal enforcement, the greater the impact of the legal framework. By the same token, Kube



and Traxler (2011) show the implicit delegation of the enforcement of norms to formal, centralized institutions allows for a significant increase in overall welfare. Hence, in a country with strong institutional capabilities that effectively enforce the laws on the books, a legal framework protecting women should more effectively ensure financial access. Combining our posited mediating effects of social norms and legal enforcement, we propose the following second hypothesis:

H2: Characteristics of the wider ecosphere may impact the strength of the relationship between legal equality and access to finance.

### **3. Data and methodology**

This section provides key elements about the foundations of our study. Section 3.1 introduces the methods used and the dependent variables considered, Section 3.2 documents individual-level controls and Section 3.3. presents country-level variables. Descriptive statistics for all variables are presented in Table 1.1. The sources and descriptions of variables are detailed in Appendix 1.A.

#### **3.1. Methodology**

This research aims to explain female financial inclusion using legal gender equality. Financial inclusion is a broad, multidimensional, and polysemic concept, constantly evolving, constructed, and discussed in the scientific sphere. Thus, literature suggests a wide range of measures of financial inclusion based on characteristics that are symptomatic of the breadth and the depth of access to financial services. To facilitate the discussion, we consider the most basic dimension of access to the financial system suggested by Demirgüç-Kunt and Klapper (2013), i.e. formal account ownership, including mobile money accounts (*Account*). The survey question is “Do you, either by yourself or together with someone else, currently have an account at a bank or another type of formal financial institution?” This is a fundamental measure of financial inclusion as having a bank account is the gateway for the rest of financial services and it allows holding and handling money easier and safer. This is a dummy variable

equal to one if the person responded “yes” and zero otherwise. Thus, we start by testing the outlined hypotheses with a linear probability specification using the following model:<sup>17</sup>

$$P(\text{Account}_{i,t}) = \alpha + \beta * \text{Female}_{i,t} + \gamma * \text{WBL indicators}_{j,t} + \delta * (\text{Female}_{i,t} * \text{WBL indicators}_{j,t}) + \theta * \text{Controls}_{i,j,t} + \varepsilon_{i,j,t}$$

The subscript  $i$  refers to the individual,  $j$  to the country where the individual lives, and  $t$  to year;  $\varepsilon$  is an idiosyncratic error term.  $\text{Female}_{i,t}$  is a dummy variable equal to one if the individual is a woman, and zero otherwise. We separately test the relationship with each of the eight  $\text{WBL indicators}_{j,t}$  plus the aggregated WBL index in order to capture each specific aspect of gendered laws covered by Women Business and the Law. is the interaction variable  $\text{Female}_{i,t} * \text{WBL indicators}_{j,t}$  of interest, because it captures the likelihood of a woman being financially included depending on legal gender equality. Finally,  $\text{Controls}_{i,j,t}$  is a matrix of individual and country-specific control variables, details of which are discussed in the data section below. We control for potential omitted variable bias by including year fixed effects to capture time-specific shocks and country-level fixed effects to control for country characteristics. Standard errors are clustered at the country level, following Abadie et al. (2017). All reported estimations are weighted using individual weights that are provided in the Global Findex database to ensure a national representativeness.

### 3.2. Individual-level variables

Our individual-level variables are extracted from the World Bank's Global Findex database<sup>18</sup>. The survey was conducted by Gallup, Inc., in conjunction with its annual Gallup World Poll Survey. Global Findex covers approximately 150,000 respondents belonging to 144 countries, thus representing more than 97% of the population of the world. Using random selection, roughly 1,000 people of age 15 and above in each economy have been questioned using over 140 languages. Finally, a stratified random sampling technique was used, and a stratum was developed based on population size, geography or both to ensure

<sup>17</sup> Norton et al. (2004) demonstrate that we cannot derive economic magnitude of an interaction term directly in non-linear regressions such as probit models. Because our main variables of interest are interaction terms, we run linear probability models (LPM) in our main estimations in order to permit the interpretation of the coefficients.

<sup>18</sup> The database is freely available at the World Bank website: <https://datatopics.worldbank.org/financialinclusion>.

representativeness. The Global Findex is composed of three waves of data (2011, 2014, 2017 and 2021).

Using variables from the Global Findex database, we control for potential cofounders of financial inclusion at the individual level. First, *Age* is the respondent's age in years and is expected to be positively correlated with financial inclusion (Zins and Weill, 2016). Second, we introduce four dummies to capture if the respondent is in the first income quintile (*Income Q1*), second income quintile (*Income Q2*), third income quintile (*Income Q3*), or fourth income quintile (*Income Q4*), and consider the richest income quintile dummy as the omitted variable. Individuals with higher incomes are more likely to have access to the formal financial system (Aslan et al., 2017). Existing literature shows that individuals with higher levels of education are more likely to have better financial education and to be more financially included (Allen et al, 2016 ; De la Rica et al., 2008). We thus consider two dummies to control for educational attainment, one equal to one if the individual has completed elementary education or less (*Primary or Less*) and another equal one if the respondent completed secondary education and some education beyond secondary education (*Secondary*).

### 3.3. Country-level variables

We consider the eight indicators provided by the World Bank's WBL database that captures laws that may impact women's economic opportunities from their entry into the labour market through to their retirement<sup>19</sup>. Thirty-five legislative issues are aggregated into the following eight indicators, composed of four or five binary questions in each: *Workplace* explores specific barriers to women's opportunities in the labour market, *Pay* targets women's pay equality, *Marriage* assesses legal constraints related to marriage, *Parenthood* focuses on the availability and equality of paid parental leave and the rights of pregnant women, *Entrepreneurship* examines women-specific legal constraints to launching and running a business, *Assets* considers gender differences in property ownership, control, and inheritance and, lastly, *Pension* measures gender equality as it relates to retirement and pensions. Finally, we consider the aggregate *WBL Index*, which is an unweighted average of the aforementioned

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<sup>19</sup> The Women, Business and the Law (WBL) database is freely available at <https://wbl.worldbank.org/en/wbl>.

eight indicators. Each indicator ranges from 0 to 100, where a score of 100 implies that there are no legal inequalities between men and women in the areas covered by the index.

To provide robust estimations about the relationship between female financial inclusion and gender legal framework at the country level, we control for three additional country-level variables following Demirgüç-Kunt and Klapper (2013) recommendations. All these variables are provided by the World Bank Development Indicators.<sup>20</sup> First, we introduce the natural logarithm of GDP per capita (*GDP per Capita*) as economic development is strongly correlated with financial inclusion. Second, as high inflation levels may affect the willingness of the population to hold accounts in formal financial institutions, we consider the natural logarithm of the inflation rate (*Inflation*). Finally, we capture the depth and breadth of the financial sector in an economy using the ratio of deposit money bank assets to GDP (*Deposits*) which is a widely used financial development indicator (Creane et al., 2007).

## 4. Results

### 4.1. Main results

We start our analysis by examining the relationship between legal equality and account ownership in Table 1.2., controlling for year and country fixed effects, as well as the individual and country-specific variables outlined above. We test sequentially the eight WBL indicators and their respective interaction terms with the female dummy variable.

With regard to access to formal finance, the results confirm our first hypothesis that higher legal gender equality is associated with increased female financial inclusion. This is captured by the positive and significant coefficient on the interaction term between *Female* and the aggregate WBL index, as well as all of the WBL indicators, with the exception of pensions (column (8)). Going through the WBL indicators, we see that, first, the coefficient of *Female \* Mobility* is positive and significant in Table 1.2. This is consistent with existing evidence that points to a positive association between laws ensuring women's freedom of movement and several outcomes that are directly related to financial inclusion, including business ownership (Islam et al., 2018) and labour market participation (Hallward-Driemeier

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<sup>20</sup> The World Development Indicators (WDI) dataset is available at: <https://databank.worldbank.org/source/world-development-indicators>.

and Gajigo, 2015). The same argument holds for *Workplace*. Greater legal gender equality in the pursuit of a profession has been found to have a positive effect on female employment (Gonzales et al. 2015, Islam et al. 2018). Thus, alleviating, for instance, restrictions on working outside the home increases the likelihood of a woman being engaged in paid work (Hallward-Driemeier and Gajigo 2015). Column (2) of Table 1.2. confirms that this positive link extends to women's financial inclusion. Similarly, the coefficient of the *Pay* interaction is positive and significant. This result is in line with the study of Islam et al. (2018) who shows that allowing women to work during night hours (captured under the *Pay* indicator) is positively associated with higher levels of responsibility for them. Laws relating to marriage capture a wife's autonomy at home, as well as legislation on domestic violence, divorce and remarriage. It is not surprising to observe a positive and significant coefficient of the variable *Female \* Marriage* in the *Account* specification, since Hallward-Driemeier et al. (2013) demonstrate that legislation allowing a woman to be the head of household is positively correlated with female labour force participation across 98 economies. Evidence concerning the effects of parenthood-related legislation on female outcomes are less clear-cut. For example, in a study of the impacts of paid maternity leave policies in the European Union, Ruhm (1998) finds that while paid leave is associated with higher levels of female employment, excessively long durations of leave are associated with a decline in women's wages. Our results support a beneficial effect of laws related to parenthood for female financial inclusion. Equal treatment in *Entrepreneurship*—i.e. in signing a contract, registering a business, and legally opening a bank account—increases the likelihood for a woman to open a bank account. This same holds true for *Assets*, which captures laws related to women's property ownership and inheritance rights. This positive link is consistent with a compendium of literature that demonstrates that women's legal rights to own and manage property are linked to labour supply, level of income, access to credit, capital formation (e.g., Joireman, 2008; Gonzales et al., 2015; Hallward-Driemeier and Gajigo, 2015). Finally, the coefficient of the *Female \* Pension* interaction is not significant. It may be that there is no detectible relationship here as such laws, which impact a woman's economic well-being at the end of her working life, are applicable at too late a stage in the course of her career. Overall, the positive and significant coefficients of the *Female \* WBL* in all models indicates that legal gender equality has a global positive effect on women's financial inclusion.

The estimated coefficients on the control variables are in the direction expected. First, being a woman significantly dampens the likelihood to be financially included, no matter the

legal framework. In line with Gosh and Vinod (2017), we find that *Age* has a significant positive effect on formal account ownership. We observe that lower levels of income are negatively correlated with access to financial services in line with Demirgüç-Kunt and Klapper (2013). Moreover, being part of the lowest educated segment of the population significantly decrease the likelihood of accessing financial services. Regarding the country-level variables, only *GDP per Capita* has a robust effect on financial inclusion. This might be explained by the cross-sectional structure of our data and the inclusion of country fixed effects that may capture the effect of our macroeconomic controls.

## **4.2. Further estimations**

### **4.2.1. Mediating effect of norms and legal enforcement**

In order to test what the mediating impact of social norms might be on the relationship between legal equality and women's financial inclusion, we use the inverse of the Equality variable (*Negative Attitudes*) provided by the World Values Survey (WVS) in line with Davis and Williamson (2019). Data from the WVS have been used to measure the intensity of gendered social norms by Seguino (2007; 2011), Kenny and Patel (2017) and Klassen (2019), amongst others. The WVS data are collected by a group of social scientists, and they follow set rules and procedures for collecting data. Using in-person interviews, this survey includes information on the values that people find important and their viewpoints regarding different social issues. The data are collected in waves: this is not an issue since the Global Findex is structured in the same way. Thus, we consider the 3-item index measuring a national culture's emphasis on universal freedoms in the domain of gender equality (support of women's equal access to education, jobs and power) available at the country level. We introduce the inverse of this variable in order to capture the intensity of negative norms towards women in each specification.

To test for a mediating impact of negative social norms towards women, we re-estimate our model, including a tripe interaction term that captures the interaction between gendered laws, negative social norms (the variable *Negative Attitudes*) and the *Female* dummy. Each of the variables is also included in the model as two-way interaction terms as well as individual variables. The results provided in Table 1.3. are unambiguous: once social norms are accounted for, the beneficial effect of equality in law for women's financial inclusion is no longer significant. The only exception is the Pension indicator, where the

coefficient of the interaction term between equality in Pension law and the *Female* dummy becomes positive and significant. However, this coefficient is overpowered by the negative and significant coefficient on the Pension by social norms variable (the term *Negative Attitudes \* WBL variable* in the regression), as well as the triple interaction term (*Female \* WBL variable \* Negative Attitudes*). Beyond directly preventing women from accessing financial services, gender norms may also discourage women from pursuing education, from obtaining jobs in the formal market, thus preventing women from having the basic tools necessary to utilize financial resources. This result confirms the claim of Acemoglu and Jackson (2017) who show that conflicting social norms should be considered in the law-making process in the sense that they have the potential to negate the effect of a women-friendly legal framework.

Continuing our testing of H2, we consider legal enforcement as a potential mediating factor between legal equality and women's financial inclusion. To capture legal enforcement, we use the Rule of Law (*ROL*) indicator provided by the World Bank's World Governance Indicators dataset. According to the data description, "Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence."<sup>21</sup> To test our hypothesis, we re-estimate our model with a triple interaction term that captures the interaction between gendered laws, rule of law and the female dummy. Each of the variables is also included in the model as two-way interaction terms as well as individual variables. This is the same approach as was taken above to test the mediating impact of negative social norms.

The results presented in Table 1.4. show that the triple interaction between legal equality, *Female* and legal enforcement a positive and significant effect of legal enforcement on account ownership for *Mobility, Workplace, Pay, Marriage, Entrepreneurship, Assets* and *WBL Index*. This supports H3: rule of law increments increases the likelihood of a woman to be financially included. Our finding extends the claim of La Porta et al. (1997): higher regulatory quality also significantly increases women's financial inclusion. This implies that in order to broaden financial access for women, economies must pursue their efforts to

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<sup>21</sup> <https://info.worldbank.org/governance/wgi/Home/downloadFile?fileName=r1.pdf> [Accessed: November 29<sup>th</sup>, 2022].

improve their governance and institutions, specifically through strengthening the rule of law, including enforcement of financial contracts and financial regulatory oversight.

#### **4.2.3. Investigating the channels**

The Global Findex dataset also includes cross-country data on self-reported reasons for not having a formal account, making it possible to identify specific barriers to financial inclusion. Each respondent can answer whether one or several of the proposed barriers contributes to restricting her/his access to account ownership. More specifically, respondents were asked: "Please tell me whether each of the following is a reason why you, personally, do not have an account at a bank or another type of formal financial institution?". The reasons considered are: *Too Far Away*, *Too Expensive*, *Lack of Documentation*, *Lack of Trust*, *Lack of Money*, *Religious Reasons*, *Family Member Has One*, *Cannot Get One* or *No Need for Financial Services*. Appendix 1.A. provides a more detailed description of each response.

Investigating the motives for financial exclusion is especially relevant for studies focusing on the role of institutional frameworks. Indeed, individuals can either be voluntarily or involuntarily financially excluded (de Koker and Jentsch, 2011). The 2014 Global Financial Development Report (World Bank, 2013) defines voluntary exclusion as the result of religious or cultural impediments, or lack of interest in financial services. In contrast, involuntary exclusion includes lack of trust in the financial system or barriers such as affordability, inappropriate product design and inability to meet eligibility criteria required by the financial institution. Reasons for involuntary financial exclusion include insufficient income, difficult paperwork, distance of financial institutions and/or religion.

The distinction between voluntary and involuntary exclusion is crucial to design effective policies. Since voluntary exclusion cannot be a direct consequence of market failure, little can be done to address it. It is, therefore, noteworthy that only the reasons underlying involuntary exclusion can help to identify barriers to financial inclusion, which can be targeted by appropriate policies – notably laws in our framework. Insofar as women's exclusion is involuntary, legal policies and appropriate strategies must be implemented to ease access to financial services for the affected populations.

Therefore, we perform the estimations using each of the seven motivations aforementioned as dependent variables, by considering the WBL index variable as the explanatory variable of interest. The results are reported in Table 1.5. The coefficients for



*Lack of Documentation* and *Family Member Has One* are significant and negative, whereas we do not observe any beneficial effect of gendered equal laws on other reasons for financial exclusion. However, the likelihood of being financially excluded due to a lack of money increases when gender equality in law increases. This may lie in the fact that worldwide, lack of money is the most common mentioned motive for not having a formal account – cited as the only reason by 30 percent of non-account holders (Demirguc-Kunt et al., 2022). This speaks to the fact that having a formal account is not costless in most parts of the world and that individuals with small or irregular income streams might view an account as an unnecessary expense, given the relatively high cost. This is not a market failure that we would expect could be resolved by greater legal equality for women. Overall, our results suggest that greater legal equality, as captured by the *WBL Index* may be effective in reducing the involuntary financial exclusion through two frequently cited channels.

## **5. Robustness checks**

### **5.1. Additional controls**

If legal frameworks influence women's behaviours towards the financial system, one may argue that other cultural factors may have a similar impact. It is therefore possible that the effects attributed to gendered laws in our main estimations may capture the overall influence of other dimensions of how a society treats women. We thus seek to rule out this possibility by performing additional estimations in which we control for alternative measures of culture.

First, Global Findex reveals that religious belief is one of the top reasons for voluntary financial exclusion, with 6 percent of respondents citing it. By the same token, Demirguc-Kunt et al. (2014) demonstrate that Muslims are significantly less likely than non-Muslims to own a formal account or save at a formal financial institution, mostly due to the fact that conventional financial products violate the Sharia. Moreover, evidence shows that religion-based financial exclusion is disproportionately more prominent among women (Cicchello et al., 2021). As our sample does not allow us to control for respondent's religion, we consider the CIA World Factbook country-level data to create four dummy variables (*Catholic*, *Protestant*, *Muslim* and *Buddhist*), each of which takes the value 1 if the religion represents

more than 50% of the population in the country (highest percentage of practising population) and 0 otherwise. We drop *Buddhist* to avoid perfect collinearity.

Second, Lu et al. (2021) suggest that a country's cultural attributes – particularly its level of individualism – are linked to its inhabitants' financial inclusion. Overall, the effect of culture on the decision-making process of individuals has been widely investigated in the economics and finance literature (Guiso et al., 2006). Therefore, we consider additional cultural dimensions using the six traditional indices provided by Geert Hofstede, namely *Individualism*, *Power Distance*, *Masculinity*, *Long-term Orientation*, *Indulgence* and *Uncertainty Avoidance*. Variables are described in detail in Appendix 1.A.

The reason why additional cultural measures and religion were not included in the main estimations is that they may potentially introduce multicollinearity in our model. Indeed, culture has been shown to exert an influence on the development of laws, especially those related to gender (Bu, 2015).

Table 1.6. reports the results of the regressions with these additional control variables included. We first add them separately in columns (1) and (2) and then jointly in column (3). Interestingly, we find that while the estimated coefficient of *Masculinity* is significantly negative, the estimated coefficients of other Hofstede cultural dimensions are insignificant. With regard to religion, we still observe that the coefficients for interaction terms of interest are positive and significant. We observe that Muslim countries are associated with lower financial inclusion in line with Demirgüç-Kunt et al. (2014). More important for our purpose, the inclusion of these additional variables does not change the interpretation of our results, as the interaction terms remain positively and significantly correlated with financial inclusion in all regressions. Hence, our findings are unlikely to be confounded by other cultural factors.

## **5.2. Alternative dependent variable**

Beyond the simple ownership of bank accounts, Demirgüç-Kunt and Klapper (2013) highlight the importance of considering their usage. The authors explain that 10 percent of account owners in developing countries maintained an inactive account, i.e. “They make neither withdrawals from nor deposits into their account.” Moreover, Aterido et al. (2011) show that the use of financial services also varies significantly between men and women by considering nine Sub-Saharan countries. As suggested by Duflo (2012), women are relatively

less inclined than men to use the account if it was easy for their husbands to get the money out. Thus, one may argue that having an account does allow for women's empowerment, whereas using the account to achieve development goals may be more relevant for accessing economic opportunities. This is particularly relevant in India, where despite the massive growth in ownership, 43 percent of accounts remain inactive, the highest rate in the world according to the 2021 Global Findex report.

Thus, we consider an alternative measure of financial inclusion to capture the frequency of account use. We focus on withdrawals as suggested by Allen et al. (2016), because such operations are actively initiated by account owners while deposits might be initiated by others (for example, employers or governments). Account holders answer the following question: "In a typical month, about how many times is money taken out of your personal account(s)?" Respondents are asked (categorically) if they conducted: (i) 0 withdrawals, (ii) 1–2 withdrawals, (iii) 3–5 withdrawals, or (iv) 6 or more withdrawals on average per month. In line with Allen et al. (2016), we qualified the frequent use of an account using a dummy equal 1 if funds are withdrawn at least three times during a month, and 0 otherwise.

The estimations are reported in Table 1.7. We find that the coefficients of the interaction terms of interest are positive and significant in all estimations when explaining account use. Thus, beyond enhancing the simple ownership of a bank account, a higher equality in law may empower women through greater management of their money.

### **5.3. Addressing endogeneity concerns**

In the main estimations, we assumed that gendered laws are conditionally mean-independent, given the controls included in the initial specification. Nonetheless, even if we were able to rule out the effect of unobserved time-invariant country heterogeneity and time-specific shocks using fixed effects, the decision to implement gendered laws may be highly correlated with unobservable country-level time variant factors that also affect financial inclusion. If this unobserved heterogeneity is not statistically accounted for, its effect will be captured by the variables measuring legal equality and inflate its statistical magnitude. Furthermore, greater access to financial services might induce a greater level of development

in general which may also be reflected in more egalitarian legal frameworks. This endogeneity resulting from simultaneous effects might bias our main estimations.

To address endogeneity concerns, we first utilize instrumental variable estimation of the WBL index using two different variables. The exclusion restriction underlying the use of an instrumental variable implies that it needs to be correlated with our dependent variables of interest, but must not have any direct effects on financial inclusion. Thus, selection of relevant variables is carefully made considering their prior use and reliability demonstrated in extant literature. First, the signature of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) has been used by Perrin and Bertrand (2022) to instrument the implementation of laws against discrimination in the credit market. The CEDAW is an international treaty adopted in 1979 by the United Nations General Assembly in order to eliminate discrimination against women in political and public life. The 99 States Parties committed themselves to being a society that promotes policies, laws, organizations, structures and attitudes that ensure women are guaranteed the same rights as men. Thus, this prior commitment is likely to affect the implementation of gendered laws in the present without direct consequence on financial inclusion. As such, the dummy *CEDAW* can be used as a conventional external instrument. Secondly, if one believes, like Merryman (1985, p. 2), that “The legal tradition relates the legal system to the culture of which it is a partial expression”, then the origin of a country’s legal framework may rely on characteristics of its informal institutions. Thus, unequal legal treatment of women may be the product of a conservative culture of patriarchy and the consolidation of power in men (Cherif, 2010). We capture the cultural dimensions that reflect differences in gender by using an index provided by the World Atlas of Linguistic Structures that indicates the intensity of gender marking in language (*Language*). Grammatical gender marking has been associated with a wide range of women’s economic and social outcomes (see Mavisakalyan and Weber (2018) for a complete survey). Moreover, language’s grammatical structure offers the advantage of being a stable feature inherited from the distant past, therefore ensuring the respect of the exclusion restriction.

The IV regression results are displayed in Table 1.8. The first-stage IV results (column 1) confirm a positive and significant relationship between the WBL index and each of the instruments. The F-statistic for the excluded instruments is significant at the 1% level and well above the minimum recommended level of 10. The over-identification test based on Hansen’s J statistic implies that we cannot reject the null hypothesis that the instruments are

valid. The second-stage IV results (columns (2), (3) and (4)) confirm that general equality in the law is strongly positively associated with women's access to financial products.

We provide additional controls for potential endogeneity using the lagged values of the explanatory variables to provide an additional way to avoid potential endogeneity problems. As our sample is composed of three waves of data, the use of lagged variables leads us to consider only the 2014, the 2017 and the 2021 waves, thus substantially reducing the size of the sample.

The results presented in Table 1.9. indicate that our key finding is preserved: the coefficients for the interaction terms of interest are positive and significant. This provides support to our claims that endogeneity does not drive our results.

#### **5.4. Country-level estimations**

So far, we have performed estimations at the individual level as we link the gender of the individual with her/his level of financial inclusion. We only focused on the beneficial effect of gendered laws on women's financial inclusion. However, one may argue that improvements in gender-related legislation may be part of a global institutional enhancement that could benefit men too. We should therefore verify that the legal framework contributes to decreasing the gender gap in financial inclusion at the national level. To this end, we perform our estimations using the Global Findex country-level data. We measure the gender gap in access to financial services by considering the ratio of the percentage of women having a bank account to the percentage of men with access to formal account (*Female to Male Ratio*). The higher the ratio, the lower the gender gap in account ownership. We alternatively test the influence of each of the eight WBL indicators on our aggregate financial inclusion measure. We include the three country-specific control variables formerly used in the individual-level estimations: the logarithmic value of the GDP per capita (*GDP per Capita*), the share of domestic credit to the private sector (*Domestic Credit*) and the natural logarithm of inflation (*Inflation*).

The results of the country-level regressions are reported in Table 1.10. While our sample size, and, therefore, our statistical power, is much reduced, we find that a greater equality in laws related to freedom of movement (*Mobility*), rights to work (*Workplace*), to own property and inherit assets (*Assets*) all contribute to the reduction of the gender gap in all

estimations. Moreover, the aggregate level of legal equality (captured by *WBL Index*) is associated with a greater financial inclusion for women. Thus, these results provide support for our main findings that, *ceteris paribus*, law is an effective institutional tool to reduce the gender gap in financial inclusion.

### **5.5. Subsample analysis**

Individuals presenting higher socio-economic status have strong motivations and adequate capacity to participate in the formal financial market (Demirgüç-Kunt and Klapper, 2013), making the role of the legal framework less prominent. Therefore, people with higher income are less likely to be affected by a country's women-friendly legal environment in making financial decisions, in the sense that their individual characteristics already allow them to meet the basic requirements to access financial services. Thus, in order to account for such potential heterogeneous effects of the law, we divide our dataset into different subsamples given individuals' level of income.

The results of the subsample analyses are presented in Table 1.11. Columns (1) and (2) corroborate the view that gendered laws exert a greater influence on individuals with lower socio-economic statuses, i.e. lower income.

### **6. Concluding remarks**

Achieving gender equality in financial inclusion is an important way of unlocking resources for economic empowerment and fostering growth, by enhancing access to economic opportunity for a wide segment of society. Despite the notable progress made, women still face several constraints that impede, *inter alia*, their economic opportunities including access to financial services. The constraints that impede women's access to financial services can emanate from both the demand and supply sides. As regards the former, it is possible that women anticipate legal discrimination that would restrict their financial possibilities. They might also encounter difficulties in providing immovable collateral, further exacerbating the challenges. On the supply side, traditional gender roles that may be reflected by adverse legal frameworks may encourage financial service providers to adopt discriminatory behaviours. Thus, law is of particular relevance when investigating the potential drivers of women's financial exclusion.

Our paper supports the claim that ensuring gender equality in the law may be an effective way to increase women's financial inclusion. Nonetheless, adverse social norms mitigate the beneficial effect of legal reforms. Thus, a strong legal enforcement is a necessary condition to create a convergence between *de jure* and *de facto* female empowerment. From the supply side, we find evidence that equality in the law decreases the likelihood that a woman does not open a bank account due to lack of documentation and because a member of the family has already one, thus improving her autonomy. Therefore, laws can address involuntary financial exclusion.

Such findings are highly relevant for those responsible for designing laws and policies. The removal of discriminatory legal provisions, particularly those affecting asset ownership, can have significant direct and indirect consequences on women's financial inclusion. Of course, legal frameworks are just one of the wide range of institutional factors that may affect women's access to financial services. Our results show that norms and effective legal enforcement matter too. But, while norms may be slow to change, undertaking reforms to achieve legal gender equality is actionable in the short term. Furthermore, it has been shown to be associated with a large range of other positive economic outcomes (Roy, 2019)

Our analysis is not without limitations. It does matter who in the household benefits from the financial services. One may argue that beyond access to financial services, women may not have the full control of the use of their bank account – therefore keeping women away from empowerment. However, the data used in this study do not allow us to capture the degree of control that women have over their money. Thus, more research is needed to better understand the beneficial effects of gendered laws in the use of financial services and to identify new products, processes, and technology that can expand and deepen the financial inclusion of women.

**Table 1.1. Descriptive statistics**

This table provides descriptive statistics for the variables used in the study. Panel A displays a test of difference in the mean of our individual-level variables given the value of *Female* (*Men* vs. *Women*). We test the mean difference with a Student t-test. Panel B presents country-level variables. \*, \*\*, and \*\*\* denote a difference significantly different from 0 at the 10%, 5%, and 1% levels, respectively. See Appendix 1.A. for definitions of the variables

Panel A	Men			Women			All	
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Mean Diff. Test	N
<b>Dependent variable</b>								
Account	217,592	0.636	0.481	251,980	0.574	0.495	0.063***	469,272
<b>Individual-level controls</b>								
Primary or Less	217,592	0.302	0.459	251,980	0.350	0.477	-0.048***	469,272
Secondary	217,592	0.518	0.500	251,980	0.484	0.500	0.035***	469,272
Tertiary or More	217,592	0.178	0.382	251,980	0.165	0.371	0.013***	469,272
Income Q1	217,592	0.152	0.359	251,980	0.178	0.383	-0.026***	469,272
Income Q2	217,592	0.165	0.372	251,980	0.188	0.390	-0.022***	469,272
Income Q3	217,592	0.187	0.390	251,980	0.199	0.399	-0.012***	469,272
Income Q4	217,592	0.216	0.411	251,980	0.210	0.407	0.006***	469,272
Income Q5	217,592	0.280	0.449	251,980	0.225	0.418	0.055***	469,272
Age	217,592	41.105	17.421	251,980	41.769	17.679	-0.664***	469,272
<b>Financial exclusion variables</b>								
Too Far Away	113,523	0.329	0.47	143,157	0.325	0.468	-0.020***	256,680
Too Expensive	86,248	0.224	0.417	114,575	0.214	0.41	-0.024***	200,823
Lack of Documentation	85,282	0.203	0.402	112,98	0.185	0.389	-0.017***	198,262
Lack of Trust	86,050	0.073	0.259	114,321	0.063	0.247	-0.039***	200,371
Lack of Money	86,641	0.679	0.467	79,047	0.309	0.462	-0.015***	202,083
Religious Reasons	57,392	0.311	0.463	28,63	0.224	0.417	0.013***	136,439
Cannot Get One	22,395	0.229	0.421	114,099	0.196	0.397	0.027***	51,025
No Need for Financial Services	85,733	0.156	0.363	79,047	0.309	0.462	-0.016***	199,832
<b>Alternative dependent variable</b>								
Withdrawals	32,835	1.709	0.714	33,023	1.702	0.740	-0.007***	65,685
<b>Panel B</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>			
<b>Legal environment variables</b>								
WBL Index	469,272	75.575	17.764	26.25	100			
Mobility	469,272	88.711	23.417	0	100			
Workplace	469,272	80.128	30.109	0	100			
Pay	469,272	60.93	32.323	0	100			
Marriage	469,272	77.951	28.701	0	100			
Parenthood	469,272	57.5545	31.541	0	100			
Entrepreneurship	469,272	85.059	14.759	0	100			
Asset	469,272	84.148	24.07	0	100			
Pension	469,272	70.1167	26.573	0	100			
ROL	469,272	-0.003	0.929	-1.923	2.125			
<b>Macroeconomic variables</b>								
Inflation	469,272	1.205	0.955	-2.922	4.591			
GDP per Capita	469,272	8.644	1.347	5.755	11.582			
Domestic Credit	469,272	59.111	50.529	5.581	402.941			
<b>Cultural and religious variables</b>								
Equality	220,968	0.522	0.131	0.261	0.888			
Catholic	459,464	0.383	0.486	0	1			



Protestant	459,464	0.140	0.347	0	1
Muslim	459,464	0.382	0.486	0	1
Buddhist	459,464	0.095	0.293	0	1
Power Distance	263,315	67.567	20.528	11	104
Individualism	263,315	37.838	20.641	6	91
Masculinity	263,315	48.43	18.249	5	110
Uncertainty Avoidance	263,315	71.385	21.935	13	112
Long Term Orientation	262,954	24.318	3.526	24.318	3.526
Indulgence	258,978	20.527	0	20.527	0
<b>Instruments</b>					
Language	253,888	2.42	1.715	0	4
CEDAW	418,751	0.627	0.484	0	1



**Table 1.3. Social norms**

This table presents the results of the LPM estimations examining the mitigating effect exerted by social norms in the investigation of the link between gendered laws and women's financial inclusion. The dependent variable is *Account*. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mobility	Workplace	Pay	Marriage	Parenthood	Entrepreneurship	Assets	Pension	WBL Index
Female * WBL Indicator * Negative Attitudes	-0.00140 (0.00361)	-0.00347 (0.00276)	-0.000339 (0.00210)	0.000657 (0.00340)	-0.00122 (0.00205)	-0.00311 (0.00454)	-0.00291 (0.00373)	-0.00472* (0.00238)	-0.00191 (0.00368)
Negative Attitudes * Female	0.151 (0.429)	-0.597 (0.403)	-0.0824 (0.368)	-0.695 (0.533)	0.404 (0.364)	0.188 (0.527)	-0.606 (0.873)	0.348 (0.347)	0.909 (0.673)
Negative Attitudes * WBL Indicator	-0.00592 (0.00520)	0.00206 (0.00376)	-0.00598 (0.00427)	0.00396 (0.00604)	-0.0135*** (0.00501)	-0.00731 (0.00613)	0.00292 (0.00959)	-0.0120** (0.00476)	-0.0163** (0.00780)
Female * WBL Indicator	0.00125 (0.00159)	0.00164 (0.00137)	0.000220 (0.00123)	0.000580 (0.00147)	0.000944 (0.00120)	0.00212 (0.00298)	0.00260 (0.00173)	0.00279** (0.00138)	0.00276 (0.00199)
Negative Attitudes	0.297 (0.396)	-0.467 (0.389)	-0.0708 (0.366)	-0.642 (0.536)	0.454 (0.371)	0.350 (0.492)	-0.373 (0.862)	0.549* (0.524)	1.118 (0.707)
Female	-0.135*** (0.0465)	-0.176*** (0.0471)	-0.169*** (0.0522)	-0.122*** (0.0353)	-0.157*** (0.0469)	-0.164*** (0.0465)	-0.110*** (0.0395)	-0.167*** (0.0425)	-0.0905* (0.0485)
WBL indicator	0.00333 (0.00229)	-0.000257 (0.00155)	0.00329* (0.00170)	-0.00387 (0.00333)	0.00795*** (0.00260)	0.00406 (0.00312)	0.00184 (0.00322)	0.00510** (0.00232)	0.00824** (0.00363)
Age	0.00187*** (0.000427)	0.00187*** (0.000428)	0.00187*** (0.000427)	0.00187*** (0.000425)	0.00187*** (0.000428)	0.00187*** (0.000428)	0.00186*** (0.000423)	0.00187*** (0.000429)	0.00186*** (0.000427)
Primary or Less	-0.276*** (0.0175)	-0.276*** (0.0174)	-0.276*** (0.0174)	-0.276*** (0.0174)	-0.276*** (0.0174)	-0.275*** (0.0174)	-0.275*** (0.0174)	-0.276*** (0.0175)	-0.275*** (0.0174)
Secondary	-0.124*** (0.0152)	-0.124*** (0.0151)	-0.124*** (0.0152)	-0.124*** (0.0151)	-0.123*** (0.0151)	-0.123*** (0.0151)	-0.123*** (0.0152)	-0.124*** (0.0152)	-0.123*** (0.0151)
Income Q1	-0.171*** (0.0131)	-0.171*** (0.0131)	-0.171*** (0.0131)	-0.171*** (0.0130)	-0.171*** (0.0131)	-0.171*** (0.0131)	-0.171*** (0.0131)	-0.171*** (0.0131)	-0.172*** (0.0131)
Income Q2	-0.132*** (0.0103)	-0.132*** (0.0104)	-0.132*** (0.0103)	-0.132*** (0.0103)	-0.132*** (0.0103)	-0.132*** (0.0103)	-0.132*** (0.0103)	-0.132*** (0.0103)	-0.132*** (0.0103)
Income Q3	-0.0959*** (0.00787)	-0.0958*** (0.00789)	-0.0958*** (0.00790)	-0.0959*** (0.00786)	-0.0959*** (0.00786)	-0.0958*** (0.00788)	-0.0961*** (0.00786)	-0.0959*** (0.00788)	-0.0961*** (0.00785)
Income Q4	-0.0575*** (0.00631)	-0.0575*** (0.00634)	-0.0574*** (0.00634)	-0.0575*** (0.00632)	-0.0575*** (0.00630)	-0.0575*** (0.00633)	-0.0577*** (0.00630)	-0.0575*** (0.00633)	-0.0576*** (0.00631)
Inflation	-0.00190 (0.00791)	-0.00289 (0.00778)	0.000768 (0.00734)	-0.00129 (0.00716)	0.000207 (0.00685)	-0.000927 (0.00757)	-0.00224 (0.00766)	0.000716 (0.00901)	-0.000877 (0.00746)
GDP per Capita	0.198* (0.118)	0.182 (0.113)	0.177 (0.108)	0.168 (0.108)	0.181* (0.105)	0.185 (0.114)	0.191 (0.115)	0.195* (0.106)	0.203* (0.114)
Domestic Credit	-0.00106 (0.00103)	-0.00109 (0.00103)	-0.000970 (0.000940)	-0.00105 (0.00101)	-0.00109 (0.00104)	-0.00107 (0.000980)	-0.00106 (0.000981)	-0.00139 (0.00101)	-0.00122 (0.000991)
Constant	-1.121 (1.060)	-0.631 (0.989)	-0.864 (0.967)	-0.272 (0.971)	-1.178 (0.922)	-0.984 (1.092)	-0.922 (1.101)	-1.084 (0.912)	-1.447 (1.078)
Observations	222,483	222,483	222,483	222,483	222,483	222,483	222,483	222,483	222,483
Cluster	Country	Country	Country	Country	Country	Country	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.338	0.338	0.338	0.338	0.339	0.338	0.339	0.339	0.339

**Table 1.4. Legal enforcement**

This table presents the results of the LPM estimations examining the mitigating effect exerted by legal enforcement in the investigation of the link between gendered laws and women's financial inclusion. The dependent variable is *Account*. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mobility	Workplace	Pay	Marriage	Parenthood	Entrepreneurship	Assets	Pension	WBL Index
Female * WBL Indicator * ROL	0.000989*** (0.000160)	0.000669*** (0.000217)	0.000373** (0.000171)	0.000794*** (0.000173)	0.000239 (0.000174)	0.000672* (0.000351)	0.000995*** (0.000307)	0.000145 (0.000190)	0.000873*** (0.000236)
ROL * Female	-0.0759*** (0.0154)	-0.0407* (0.0212)	-0.0140 (0.0153)	-0.0550*** (0.0168)	-0.00264 (0.0129)	-0.0451 (0.0333)	-0.0807*** (0.0302)	0.00881 (0.0170)	-0.0680*** (0.0210)
ROL * WBL Indicator	0.00115 (0.00102)	-6.72e-05 (0.000611)	-0.000355 (0.000625)	-0.00120** (0.000577)	-0.00219*** (0.000465)	-0.000653 (0.00148)	0.000431 (0.00146)	-0.000456 (0.000474)	0.00183*** (0.000327)
Female * WBL Indicator	0.00122*** (0.000233)	0.000587** (0.000232)	0.000565*** (0.000156)	0.00107*** (0.000243)	0.000607*** (0.000188)	0.00107*** (0.000396)	0.00154*** (0.000330)	0.000104 (0.000189)	-0.00213 (0.00141)
ROL	-0.0740 (0.0992)	0.0309 (0.0636)	0.0579 (0.0537)	0.118* (0.0602)	0.148*** (0.0440)	0.0817 (0.134)	-0.00833 (0.134)	0.0527 (0.0484)	0.195* (0.114)
Female	-0.163*** (0.0214)	-0.102*** (0.0211)	-0.0883*** (0.0131)	-0.140*** (0.0230)	-0.0870*** (0.0123)	-0.144*** (0.0345)	-0.187*** (0.0315)	-0.0575*** (0.0160)	-0.195*** (0.0268)
WBL indicator	0.00146 (0.000903)	0.000896 (0.000592)	0.000832* (0.000455)	-0.00104 (0.000680)	0.000958 (0.000724)	-0.000740 (0.00120)	0.00238** (0.00120)	-0.00114*** (0.000428)	0.00115 (0.00159)
Age	0.00174*** (0.000256)	0.00174*** (0.000255)	0.00174*** (0.000256)	0.00173*** (0.000255)	0.00174*** (0.000256)	0.00173*** (0.000256)	0.00174*** (0.000254)	0.00174*** (0.000256)	0.00173*** (0.000256)
Primary or Less	-0.264*** (0.0132)	-0.263*** (0.0132)	-0.264*** (0.0131)	-0.263*** (0.0131)	-0.264*** (0.0131)	-0.264*** (0.0132)	-0.263*** (0.0131)	-0.264*** (0.0132)	-0.263*** (0.0132)
Secondary	-0.109*** (0.0108)	-0.109*** (0.0108)	-0.108*** (0.0108)	-0.108*** (0.0107)	-0.109*** (0.0107)	-0.109*** (0.0108)	-0.108*** (0.0108)	-0.109*** (0.0108)	-0.108*** (0.0108)
Income Q1	-0.151*** (0.00872)	-0.151*** (0.00872)	-0.151*** (0.00873)	-0.151*** (0.00873)	-0.151*** (0.00868)	-0.151*** (0.00873)	-0.151*** (0.00873)	-0.151*** (0.00875)	-0.152*** (0.00873)
Income Q2	-0.117*** (0.00707)	-0.117*** (0.00706)	-0.117*** (0.00708)	-0.117*** (0.00709)	-0.117*** (0.00706)	-0.117*** (0.00707)	-0.117*** (0.00710)	-0.117*** (0.00708)	-0.117*** (0.00707)
Income Q3	-0.0874*** (0.00551)	-0.0876*** (0.00552)	-0.0876*** (0.00552)	-0.0878*** (0.00553)	-0.0875*** (0.00550)	-0.0875*** (0.00551)	-0.0878*** (0.00552)	-0.0875*** (0.00552)	-0.0879*** (0.00552)
Income Q4	-0.0527*** (0.00409)	-0.0529*** (0.00410)	-0.0528*** (0.00412)	-0.0530*** (0.00410)	-0.0528*** (0.00409)	-0.0527*** (0.00411)	-0.0530*** (0.00411)	-0.0527*** (0.00410)	-0.0530*** (0.00410)
Inflation	-0.00372 (0.00553)	-0.00273 (0.00517)	-0.00328 (0.00496)	-0.00527 (0.00553)	-0.00512 (0.00492)	-0.00449 (0.00543)	-0.00474 (0.00550)	-0.00385 (0.00555)	-0.00334 (0.00506)
GDP per Capita	0.141* (0.0805)	0.116 (0.0762)	0.120 (0.0761)	0.139* (0.0788)	0.135** (0.0596)	0.135* (0.0807)	0.135* (0.0809)	0.134* (0.0810)	0.124 (0.0756)
Domestic Credit	-0.000269 (0.000456)	-0.000227 (0.000401)	-0.000355 (0.000443)	-0.000252 (0.000463)	-0.000247 (0.000384)	-0.000317 (0.000459)	-0.000438 (0.000438)	-0.000272 (0.000438)	-0.000263 (0.000444)
Constant	-0.655 (0.521)	-0.378 (0.493)	-0.314 (0.498)	-0.354 (0.510)	-0.339 (0.385)	-0.389 (0.531)	-0.581 (0.535)	-0.400 (0.519)	-0.254 (0.530)
Observations	469,272	469,272	469,272	469,272	469,272	469,272	469,272	469,272	469,272
Cluster	Country	Country	Country	Country	Country	Country	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.401	0.401	0.400	0.401	0.401	0.400	0.401	0.400	0.401

**Table 1.5. Investigating the channels**

This table presents the results of the LPM estimations examining the effect of gender equality in law on motives for women's financial exclusion. The dependent variable is *Account*. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1) Too Far Away	(2) Too Expensive	(3) Lack of Documentation	(4) Lack of Trust	(5) Lack of Money	(6) Religious Reasons	(7) Family Member has One	(8) Cannot Get One	(9) No Need for Financial Services
Female * WBL	-0.000161 (0.000216)	-0.000240 (0.000207)	-0.000801* (0.000431)	-0.000180 (0.000156)	0.000639*** (0.000223)	-1.43e-05 (0.000138)	-0.000930*** (0.000330)	-0.000631 (0.000456)	0.000228 (0.000245)
WBL index	0.000723 (0.00197)	-0.000970 (0.00192)	0.00110 (0.00137)	0.000310 (0.00135)	0.00394** (0.00171)	-9.53e-05 (0.000924)	0.00119 (0.00125)	-0.00225*** (0.000260)	0.00256* (0.00144)
Female	9.90e-05 (0.0159)	0.00427 (0.0151)	0.0487 (0.0328)	-0.0105 (0.0111)	-0.0346** (0.0165)	-0.00530 (0.0102)	0.0924*** (0.0246)	0.0458 (0.0337)	-0.0326* (0.0178)
Age	0.000448*** (0.000160)	0.000514*** (0.000160)	-0.00283*** (0.000145)	0.000861*** (0.000156)	0.000686*** (0.000148)	0.000250*** (8.67e-05)	-0.00184*** (0.000194)	-0.00129*** (0.000157)	-0.000317** (0.000138)
Primary or Less	0.0822*** (0.00918)	-0.0568*** (0.0158)	0.0980*** (0.00848)	-0.0201** (0.00770)	0.0499*** (0.00974)	0.0204*** (0.00458)	-0.0465*** (0.00965)	0.0711*** (0.00935)	-0.0162* (0.00924)
Secondary	0.0299*** (0.00749)	-0.0762*** (0.0124)	0.0531*** (0.00718)	-0.0127** (0.00633)	0.0348*** (0.00871)	0.00469 (0.00345)	-0.0193** (0.00741)	0.0359*** (0.00824)	-0.0131 (0.00899)
Income Q1	0.0738*** (0.00663)	0.0398*** (0.00818)	0.0235*** (0.00489)	0.00137 (0.00445)	0.130*** (0.0102)	0.00379 (0.00315)	-0.0955*** (0.00902)	0.0510*** (0.00989)	-0.0420*** (0.00733)
Income Q2	0.0560*** (0.00584)	0.0332*** (0.00731)	0.0217*** (0.00508)	0.00320 (0.00434)	0.114*** (0.00881)	0.00104 (0.00261)	-0.0712*** (0.00700)	0.0329*** (0.0101)	-0.0273*** (0.00604)
Income Q3	0.0403*** (0.00494)	0.0183*** (0.00590)	0.0135*** (0.00448)	0.00360 (0.00421)	0.0911*** (0.00653)	0.000865 (0.00279)	-0.0514*** (0.00556)	0.0282*** (0.00920)	-0.0242*** (0.00543)
Income Q4	0.0220*** (0.00414)	0.00835 (0.00515)	0.00969** (0.00432)	0.000930 (0.00404)	0.0545*** (0.00532)	-0.00126 (0.00251)	-0.0270*** (0.00432)	0.0205*** (0.00720)	-0.0122** (0.00519)
Inflation	-0.00965 (0.0109)	-0.0152 (0.00987)	-0.00605 (0.00664)	0.00392 (0.00603)	-0.00933 (0.00819)	0.00250 (0.00486)	-0.00458 (0.00708)	-0.0868*** (0.00275)	-0.00575 (0.00544)
GDP per Capita	0.0477 (0.0735)	0.0199 (0.0689)	0.0730 (0.0528)	-0.00193 (0.0626)	-0.182* (0.0928)	0.0145 (0.0293)	0.0594 (0.0616)	-0.0996*** (0.00229)	-0.144 (0.0993)
Domestic Credit	0.000973*** (0.000337)	7.12e-05 (0.000483)	0.000585* (0.000352)	0.000437 (0.000459)	0.000261 (0.000394)	0.000256 (0.000198)	0.000484** (0.000243)	0.00630*** (4.51e-05)	-0.000575 (0.000708)
Constant	-0.0309 (0.455)	0.301 (0.435)	-0.188 (0.329)	0.297 (0.392)	1.593*** (0.581)	0.127 (0.181)	-0.152 (0.387)	1.063*** (0.0221)	1.267** (0.627)
Observations	149,123	256,680	200,823	198,262	202,083	200,371	199,832	51,025	136,439
Cluster	Country	Country	Country	Country	Country	Country	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.076	0.106	0.068	0.063	0.081	0.041	0.137	0.088	0.101

**Table 1.6. Additional controls**

This table presents the results of the LPM estimations examining the effect of gender equality in law on women's financial inclusion. The dependent variable is Account. Hofstede cultural dimensions are considered in column (1). We include religion variables in column (2). Finally, we put both in column (3). This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1)	(2)	(3)
Female * WBL Index	0.00210*** (0.000115)	0.00179*** (0.000290)	0.00210*** (0.000574)
Power Distance	0.101*** (0.00673)		0.0604*** (0.0180)
Individualism	0.0200*** (0.000888)		0.00159 (0.00924)
Masculinity	-0.00861*** (0.000944)		-0.0168*** (0.00613)
Uncertainty Avoidance	-0.0113*** (0.00100)		0.00562** (0.00278)
Long Term Orientation	-0.0100*** (0.00127)		-0.0173*** (0.00437)
Muslim		0.217*** (0.0517)	0.0173 (0.0268)
Catholic		0.216*** (0.0450)	-0.818*** (0.0771)
Protestant		0.254* (0.136)	1.011 (0.641)
Constant	-9.124*** (0.584)	-0.820 (0.595)	-4.293** (1.664)
Observations	238,045	459,464	238,045
Individual controls	Yes	Yes	Yes
Country controls	Yes	Yes	Yes
Cluster	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.370	0.401	0.370

**Table 1.7. Alternative dependent variable**

This table presents the results of the LPM estimations examining the link between gendered laws and women's financial inclusion. The dependent variable is *Withdrawals*. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mobility	Workplace	Pay	Marriage	Parenthood	Entrepreneurship	Assets	Pension	WBL Index
Female * WBL Indicator	0.0278*** (0.0103)	0.00526** (0.00256)	0.00575** (0.00226)	0.00174 (0.00592)	-0.00721 (0.00737)	0.0155*** (0.00517)	0.0369*** (0.00375)	0.0139* (0.00717)	0.0181* (0.0104)
Female	0.0353 (0.0340)	0.0169 (0.0147)	0.0141 (0.0135)	0.0351* (0.0204)	0.0143 (0.0141)	0.0513 (0.0329)	0.0534* (0.0279)	0.00506 (0.0151)	0.0461 (0.0309)
WBL Indicator	-0.00113*** (0.000282)	-0.00117*** (0.000281)	-0.00113*** (0.000282)	-0.00114*** (0.000282)	-0.00114*** (0.000279)	-0.00115*** (0.000281)	-0.00113*** (0.000282)	-0.00113*** (0.000278)	-0.00114*** (0.000281)
Age	0.0415** (0.0192)	0.0443** (0.0193)	0.0414** (0.0192)	0.0421** (0.0192)	0.0421** (0.0194)	0.0406** (0.0191)	0.0409** (0.0192)	0.0400** (0.0192)	0.0423** (0.0191)
Primary or Less	0.0226 (0.0160)	0.0215 (0.0159)	0.0214 (0.0159)	0.0220 (0.0160)	0.0222 (0.0161)	0.0213 (0.0159)	0.0231 (0.0160)	0.0208 (0.0162)	0.0218 (0.0159)
Secondary	0.0328* (0.0168)	0.0325* (0.0168)	0.0332* (0.0168)	0.0336** (0.0169)	0.0337** (0.0169)	0.0334** (0.0168)	0.0321* (0.0168)	0.0323* (0.0171)	0.0334** (0.0167)
Income Q1	0.0141 (0.0114)	0.0142 (0.0115)	0.0150 (0.0115)	0.0150 (0.0115)	0.0156 (0.0115)	0.0147 (0.0114)	0.0137 (0.0115)	0.0139 (0.0114)	0.0148 (0.0115)
Income Q2	-0.00546 (0.00938)	-0.00494 (0.00948)	-0.00439 (0.00940)	-0.00473 (0.00942)	-0.00466 (0.00941)	-0.00454 (0.00942)	-0.00571 (0.00944)	-0.00478 (0.00945)	-0.00468 (0.00942)
Income Q3	-0.0109 (0.00783)	-0.0105 (0.00785)	-0.0102 (0.00781)	-0.0103 (0.00785)	-0.0103 (0.00784)	-0.0102 (0.00784)	-0.0113 (0.00782)	-0.0108 (0.00781)	-0.0103 (0.00784)
Income Q4	0.232*** (0.0643)	0.224*** (0.0637)	0.230*** (0.0644)	0.235*** (0.0681)	0.221*** (0.0679)	0.220*** (0.0646)	0.230*** (0.0647)	0.240*** (0.0575)	0.232*** (0.0651)
Inflation	4.406*** (0.891)	3.886*** (0.943)	4.335*** (0.884)	4.395*** (0.887)	4.377*** (0.893)	4.500*** (0.902)	4.485*** (0.896)	4.314*** (0.872)	4.282*** (0.933)
GDP per Capita	-0.00645* (0.00336)	-0.00565* (0.00332)	-0.00658* (0.00333)	-0.00649* (0.00335)	-0.00651* (0.00346)	-0.00639* (0.00334)	-0.00645* (0.00333)	-0.00632* (0.00327)	-0.00632* (0.00332)
Domestic Credit	0.0353 (0.0340)	0.0169 (0.0147)	0.0141 (0.0135)	0.0351* (0.0204)	0.0143 (0.0141)	0.0513 (0.0329)	0.0534* (0.0279)	0.00506 (0.0151)	0.0461 (0.0309)
Constant	-25.83*** (5.607)	-21.96*** (5.875)	-24.67*** (5.519)	-25.10*** (5.555)	-24.79*** (5.586)	-26.84*** (5.832)	-27.09*** (5.693)	-24.25*** (5.456)	-24.63*** (5.661)
Observations	176,077	176,077	176,077	176,077	176,077	176,077	176,077	176,077	176,077
Cluster	Country	Country	Country	Country	Country	Country	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.377	0.378	0.377	0.377	0.377	0.377	0.379	0.381	0.377

**Table 1.8. Two-stage least-squares regression**

This table presents the results of the generalized two-stage least-squares estimations examining the effect of gender equality in law on women's financial inclusion. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1) First stage	(2) Account
Female * WBL Index		0.00792*** (0.000203)
WBL Index		0.0133*** (0.000203)
Female	0.0350 (0.0305)	-0.490*** (0.0148)
Language	-25.40*** (4.750)	
CEDAW	8.403** (6.448)	
Constant	70.85** (26.79)	-1.068*** (0.0147)
Observations	228,133	228,133
Individual & Country controls	Yes	Yes
Cluster	Country	Country
Country & Year dummies	Yes	Yes
Instruments		Language Gender Marking CEDAW
F-test	203.57***	
Wald test		631.751***



**Table 1.9. Lagged estimations**

This table presents the results of the LPM estimations examining the link between gendered laws and women's financial inclusion. The dependent variable is *Account*. Explanatory legal variables are lagged by 3 years. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mobility	Workplace	Pay	Marriage	Parenthood	Entrepreneurship	Assets	Pension	WBL Index
Female * WBL Indicator	0.00102*** (0.000262)	0.000557*** (0.000192)	0.000692*** (0.000130)	0.000916*** (0.000222)	0.000764*** (0.000152)	0.00129*** (0.000366)	0.00128*** (0.000283)	0.000301 (0.000209)	0.00180*** (0.000283)
Female	-0.140*** (0.0241)	-0.0939*** (0.0166)	-0.0913*** (0.0111)	-0.121*** (0.0204)	-0.0932*** (0.0107)	-0.159*** (0.0318)	-0.157*** (0.0263)	-0.0703*** (0.0176)	-0.186*** (0.0238)
WBL Indicator	0.00175*** (0.000256)	0.00176*** (0.000255)	0.00175*** (0.000256)	0.00174*** (0.000254)	0.00174*** (0.000256)	0.00175*** (0.000257)	0.00173*** (0.000253)	0.00176*** (0.000256)	0.00173*** (0.000256)
Age	-0.264*** (0.0131)	-0.264*** (0.0132)	-0.264*** (0.0132)	-0.263*** (0.0131)	-0.263*** (0.0132)	-0.264*** (0.0132)	-0.263*** (0.0131)	-0.265*** (0.0131)	-0.263*** (0.0132)
Primary or Less	-0.108*** (0.0109)	-0.109*** (0.0109)	-0.108*** (0.0109)	-0.108*** (0.0109)	-0.108*** (0.0109)	-0.108*** (0.0109)	-0.108*** (0.0109)	-0.109*** (0.0109)	-0.108*** (0.0109)
Secondary	-0.151*** (0.00873)	-0.151*** (0.00873)	-0.151*** (0.00874)	-0.151*** (0.00874)	-0.151*** (0.00870)	-0.151*** (0.00874)	-0.151*** (0.00874)	-0.151*** (0.00877)	-0.152*** (0.00873)
Income Q1	-0.117*** (0.00709)	-0.117*** (0.00708)	-0.117*** (0.00708)	-0.117*** (0.00711)	-0.117*** (0.00707)	-0.117*** (0.00709)	-0.117*** (0.00711)	-0.116*** (0.00710)	-0.117*** (0.00708)
Income Q2	-0.0876*** (0.00552)	-0.0876*** (0.00553)	-0.0876*** (0.00553)	-0.0878*** (0.00553)	-0.0876*** (0.00551)	-0.0875*** (0.00552)	-0.0880*** (0.00553)	-0.0874*** (0.00553)	-0.0880*** (0.00553)
Income Q3	-0.0528*** (0.00410)	-0.0529*** (0.00410)	-0.0529*** (0.00412)	-0.0530*** (0.00410)	-0.0530*** (0.00410)	-0.0527*** (0.00412)	-0.0531*** (0.00411)	-0.0528*** (0.00411)	-0.0531*** (0.00411)
Income Q4	-0.00536 (0.00546)	-0.00386 (0.00529)	-0.00483 (0.00517)	-0.00586 (0.00555)	-0.00499 (0.00533)	-0.00554 (0.00540)	-0.00597 (0.00543)	-0.00504 (0.00543)	-0.00435 (0.00518)
Inflation	0.153* (0.0776)	0.133* (0.0753)	0.140* (0.0734)	0.150* (0.0776)	0.140** (0.0704)	0.150* (0.0778)	0.148* (0.0776)	0.152* (0.0776)	0.140* (0.0733)
GDP per Capita	-0.000292 (0.000449)	-0.000235 (0.000405)	-0.000362 (0.000439)	-0.000326 (0.000454)	-0.000341 (0.000459)	-0.000328 (0.000454)	-0.000386 (0.000459)	-0.000270 (0.000433)	-0.000324 (0.000436)
Domestic Credit	-0.140*** (0.0241)	-0.0939*** (0.0166)	-0.0913*** (0.0111)	-0.121*** (0.0204)	-0.0932*** (0.0107)	-0.159*** (0.0318)	-0.157*** (0.0263)	-0.0703*** (0.0176)	-0.186*** (0.0238)
Constant	-0.605 (0.482)	-0.514 (0.470)	-0.521 (0.457)	-0.563 (0.482)	-0.535 (0.445)	-0.543 (0.485)	-0.622 (0.481)	-0.581 (0.482)	-0.550 (0.464)
Observations	319,269	319,269	319,269	319,269	319,269	319,269	319,269	319,269	319,269
Cluster	Country	Country	Country	Country	Country	Country	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.400	0.400	0.400	0.400	0.400	0.399	0.400	0.399	0.400

**Table 1.10. Country-level estimations**

This table presents the results of the estimations examining the link between gendered laws and women's financial inclusion. The dependent variable is *Female to Male Ratio*. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mobility	Workplace	Pay	Marriage	Parenthood	Entrepreneurship	Assets	Pension	WBL Index
WBL Indicator	0.0134*** (0.00177)	0.00481** (0.00154)	-0.000958 (0.00211)	-0.000658 (0.00260)	-0.000658 (0.00260)	0.00274 (0.00386)	0.00806* (0.00720)	-0.00116 (0.00144)	0.0108** (0.00728)
Inflation	-0.00671 (0.0117)	-0.00691 (0.0103)	-0.00809 (0.0110)	-0.00547 (0.0105)	-0.00720 (0.0104)	-0.00735 (0.0105)	-0.00730 (0.0104)	-0.00616 (0.0109)	-0.00671 (0.0117)
GDP per Capita	0.00591 (0.127)	-0.00850 (0.121)	-0.00132 (0.124)	-0.0354 (0.125)	-0.00197 (0.124)	-2.21e-05 (0.124)	-0.000376 (0.124)	-0.0108 (0.125)	0.00591 (0.127)
Domestic Credit	-0.000365 (0.000555)	-0.000555 (0.000552)	-0.000536 (0.000554)	-0.000586 (0.000562)	-0.000563 (0.000547)	-0.000521 (0.000563)	-0.000515 (0.000577)	-0.000533 (0.000547)	-0.000365 (0.000555)
Constant	-1.476 (2.465)	1.182 (2.545)	-0.388 (2.424)	-0.102 (2.465)	0.0196 (2.498)	-0.510 (2.614)	-0.269 (1.827)	-0.225 (2.509)	0.0554 (2.606)
Observations	179	179	179	179	179	179	179	179	179
Number of countries	67	67	67	67	67	67	67	67	67
Individual controls	No	No	No	No	No	No	No	No	No
Country controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Country	Country	Country	Country	Country	Country	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.0833	0.201	0.0334	0.0285	0.0629	0.0361	0.0273	0.0330	0.0712

**Table 1.11. Estimations by level of income**

This table presents the results of the linear probability estimations examining the effect of gender equality in law on women's financial inclusion. The dependent variable is *Account*. This table reports estimated coefficients and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 1.A. contains the variable definitions.

	(1)	(2)	(3)	(4)
	Quintile 1	Quintile 2	Quintile 3	Quintile 4
Income Quintile * Female * WBL	0.000428*** (7.00e-05)	0.000265*** (5.49e-05)	2.39e-05 (5.63e-05)	-2.95e-06 (4.11e-05)
Constant	-0.611 (0.460)	-0.614 (0.461)	-0.617 (0.461)	-0.618 (0.461)
Individual controls	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes
Cluster	Country	Country	Country	Country
Country & Year dummies	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	0.399	0.399	0.399	0.399

## Appendix 1.A. Variable definitions

Variable name	Definition
<b>Dependent variables</b>	
Account	Dummy variable equal to 1 if the respondent has an account with a financial institution, 0 otherwise. <i>Source: Global Findex.</i>
Too Far Away	Dummy variable equal to 1 if the respondent does not have an account because bank is too far away, 0 otherwise. <i>Source: Global Findex.</i>
Too Expensive	Dummy variable equal to 1 if the respondent does not have an account because financial services are too expensive, 0 otherwise. <i>Source: Global Findex.</i>
Lack of Documentation	Dummy variable equal to 1 if the respondent does not have an account due to lack of documentation, 0 otherwise. <i>Source: Global Findex.</i>
Lack of Trust	Dummy variable equal to 1 if the respondent does not have an account due to lack of trust, 0 otherwise. <i>Source: Global Findex.</i>
Lack of Money	Dummy variable equal to 1 if the respondent does not have an account due to lack of money, 0 otherwise. <i>Source: Global Findex.</i>
Religious Reasons	Dummy variable equal to 1 if the respondent does not have an account due to religious reasons, 0 otherwise. <i>Source: Global Findex.</i>
Family	Dummy variable equal to 1 if the respondent does not have an account because a member of the family has one, 0 otherwise. <i>Source: Global Findex.</i>
Cannot Get One	Dummy variable equal to 1 if the respondent does not have an account because he cannot get one, 0 otherwise. <i>Source: Global Findex.</i>
No Need for Financial Services	Dummy equal to 1 if the respondent does not have an account because he does need it, 0 otherwise. <i>Source: Global Findex.</i>
Withdrawals	Dummy variable equal to 1 if respondent reported to have taken money out of their personal account(s) three or more times in a typical month. This includes cash withdrawals, electronic payments or purchases, checks, or any other time money is removed from their account(s) by themselves or others. <i>Source: Global Findex.</i>
Female to Male Ratio	Female to Male Ratio of access to formal account at the country level. <i>Source: Global Findex.</i>
<b>Independent variables</b>	
<b>Individual-level variables</b>	
Female	Dummy variable equal to 1 if the respondent of the firm is a woman, 0 otherwise. <i>Source: Global Findex.</i>
Primary or Less	Dummy that takes the value 1 if the respondent completed elementary education or less (up to 8 years of education), 0 otherwise. <i>Source: Global Findex.</i>
Secondary	Dummy that takes the value 1 if the respondent completed secondary education and some education beyond secondary education (9-15 years of education), 0 otherwise. <i>Source: Global Findex.</i>
Tertiary or More	Dummy that takes the value 1 if the respondent completed four years of education beyond high school and/or received a 4-year college degree, 0 otherwise. <i>Source: Global Findex. (reference variable in estimations)</i>
Income Q1	Dummy that takes the value 1 if the respondent falls in the lowest income quintile of the country, 0 otherwise. <i>Source: Global Findex.</i>
Income Q2	Dummy that takes the value 1 if the respondent falls in the second lowest income quintile of the country, 0 otherwise. <i>Source: Global Findex.</i>
Income Q3	Dummy that takes the value 1 if the respondent falls in the middle-income quintile of the country, 0 otherwise. <i>Source: Global Findex.</i>
Income Q4	Dummy that takes the value 1 if the respondent falls in the second highest income quintile of the country, 0 otherwise. <i>Source: Global Findex.</i>
Income Q5	Dummy that takes the value 1 if the respondent falls in the highest income quintile of the country, 0 otherwise. <i>Source: Global Findex. (reference variable in estimations)</i>
<b>Legal environment variables</b>	
Workplace	Workplace index. <i>Source: Women, Business and the Law.</i>
Pay	Pay index. <i>Source: Women, Business and the Law.</i>
Marriage	Marriage index. <i>Source: Women, Business and the Law.</i>
Parenthood	Parenthood index. <i>Source: Women, Business and the Law.</i>
Entrepreneurship	Entrepreneurship index. <i>Source: Women, Business and the Law.</i>
Assets	Assets index. <i>Source: Women, Business and the Law.</i>
Pension	Pension index. <i>Source: Women, Business and the Law.</i>
WBL Index	Index capturing the legal inequalities between men and women in terms of mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension. The range is 0 to 100, the higher the index, the lower the legal inequalities. <i>Source: Women, Business and the Law.</i>
ROL	Perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. <i>Source: World Development Indicators.</i>

### *Cultural and religious variables*

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Negative Attitudes	Inverse value of the 3-item index measuring a national culture's emphasis on universal freedoms in the domain of gender equality (support of women's equal access to education, jobs and power). <i>Source: World Value Survey.</i>
Masculinity	Masculinity is defined as "a preference in society for achievement, heroism, assertiveness and material rewards for success". <i>Source: Hofstede's website.</i>
Power Distance	The power distance index is defined as "the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally". <i>Source: Hofstede's website.</i>
Individualism	This index explores the "degree to which people in a society are integrated into groups". <i>Source: Hofstede's website.</i>
Uncertainty Avoidance	The uncertainty avoidance index is defined as "a society's tolerance for ambiguity". <i>Source: Hofstede's website.</i>
Long Term Orientation	This dimension associates the connection of the past with the current and future actions/challenges. <i>Source: Hofstede's website.</i>
Indulgence	Indulgence is defined as "a society that allows relatively free gratification of basic and natural human desires related to enjoying life and having fun". <i>Source: Hofstede's website.</i>
Catholic	Dummy variable equals to 1 if more than 50% of the inhabitants of a country are Catholics, 0 otherwise. <i>Source: The World Factbook.</i>
Protestant	Dummy variable equals to 1 if more than 50% of the inhabitants of a country are Protestants, 0 otherwise. <i>Source: The World Factbook.</i>
Muslim	Dummy variable equals to 1 if more than 50% of the inhabitants of a country are Muslims, 0 otherwise. <i>Source: The World Factbook.</i>
Buddhist	Dummy variable equals to 1 if more than 50% of the inhabitants of a country are Buddhists, 0 otherwise. <i>Source: The World Factbook.</i>

### *Macroeconomic variables*

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Inflation	Natural logarithm of the inflation rate. <i>Source: World Development Indicators.</i>
Domestic Credit	Total of financial system deposits, as a share of GDP. <i>Source: World Development Indicators.</i>
GDP per Capita	Natural logarithm of the gross domestic product divided by midyear population. <i>Source: World Development Indicators.</i>

### *Instruments*

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Language	Sum of four grammatical gender variables (Sex-based, Number of genders, Gender pronoun, Gender assignment). Index ranges from 0 (genderless language) to 4 (highly gendered language). <i>Source: World Atlas of Language Structures.</i>
CEDAW	Dummy variable equal to 1 if the country is a signatory to the CEDAW, 0 otherwise. <i>Source: United Nations website.</i>

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# Chapter 2: Girls Just Wanna Have Funds? The Effect of Women-Friendly Legislation on Female-Led Firms' Access to Credit<sup>22</sup>

## Abstract

Does a women-friendly legal environment help women to overcome discrimination in credit markets? By examining antidiscrimination laws and their implications for women-led businesses' access to credit in 124 countries, the current study differentiates an effect on discouragement (i.e. not asking for credit when they need it, demand-side) and an effect on the probability that they obtain credit (supply-side). Legal protections are associated with lower women-led firms' discouragement, but they do not attain more credit. We demonstrate that enforcement efforts dramatically amplify the effect of women-friendly laws on self-restrictions in terms of credit and enable female prospects to access more credit. Women are sensitive to the legal environment in which they operate, while banks need strong incentives to change their behaviour. This effect is notable with regard to rational discouragement and prevails among smaller firms and in high income countries. These results are robust to several tests.

**Keywords:** Banking ▪ Gender ▪ Access to credit ▪ Borrower discouragement.

**JEL Codes:** G21 ▪ J71 ▪ K38.

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<sup>22</sup> This chapter is co-written with Jérémie Bertrand and has been published in *International Review of Law and Economics* (2022).

## 1. Introduction

In the last years, many countries around the world are trying to rebalance the legal difference in treatment between men and women to overcome discrimination, and this in several areas: labour, marriage, parenthood but also entrepreneurship and credit access. For example, Honduras voted the Equal Opportunity for Women Act in 2000. One of the main purposes of these laws is to allow women to have easier access to credit, and thus enabling their economic empowerment. However, despite national and supranational legal initiatives, discrimination in the credit market remains. This raises the crucial question of the effect of the law: do anti-discrimination clauses really have the expected effect on the credit market?

The aim of this paper is twofold: firstly, we shed light on the impact of the law protecting women on the behaviour of women and banks; second, we investigate how the law enforcement impacts this relation.

More precisely, we examine how laws protecting women in the credit market impact (i) their discouragement (demand-side of the credit market) and (ii) their probability to obtain the credit (supply-side). Existing literature suggests that women tend to apply less for credit, arguably discouraged because they fear being denied (e.g. Alesina *et al.*, 2013). On the supply-side, their likelihood of receiving credit is lower than men's (de Andrés *et al.*, 2021).

To address this concern, we use country-level data on gendered legislation from the Women, Business, and the Law indicators (*WBL*)<sup>23</sup> with firm-level creditor and financial data extracted from Enterprise Surveys (*ES*). From these sources, we obtain a vast and representative sample, with variability in both temporal and cross-sectional dimensions, such that it includes 35,777 firms in 124 countries during the years 2010–2020. To quantify the effect of gendered legislation on female borrowers' sense of discouragement and actual loan approval, we consider the legal prohibitions of discrimination by creditors.

The results show that female entrepreneurs' sense of discouragement is weaker in the presence of a women-friendly judicial environment, but they do not necessarily obtain more credit. We thus highlight the fact that while a law protecting women in the credit market seems to have an impact on their behaviour, it does not have an impact on banks' behaviour.



Deeply entrenched social norms still hinder the efficacy of legal reforms, even after controlling for cultural and business environments. However, we also prove that if legislators want to reduce this discrimination, a *sine qua non* condition is to ensure law enforcement: the greater the rule of law, the lower the gendered differential treatment from the bank's perspective if the law includes a clause against discrimination in access to credit. Hence, our paper provides original evidence on the importance of law enforcement in the fight against discrimination.

We confirm the robustness of our results with six tests, in which we (i) control for borrowers' quality, focusing on those who already obtained a bank loan in the credit market, (ii) use alternative measures of gender-specific law, (iii) restrict the sample to respondents who consciously answered the questionnaire, (iv) over-sample some countries to increase internal validity, (v) address the potential for endogeneity bias using an instrumental variable (IV) estimation, and (vi) control for a potential selection bias by running a Heckman (1979) estimation.

Then, through three extensions, we seek further insights. First, we clarify that women's rational discouragement decreases if the legislation includes a female-specific clause, but their emotional discouragement is not affected. In this sense, favourable legislation encourages creditworthy borrowers to submit loan applications. More specifically, women are sensitive to their legal environment, so a gender-equality law may have a stronger effect on their rational rather than emotional perceptions of discouragement. Second, when we split the dataset into two subsamples of larger and smaller firms, we find stronger effects for smaller companies. In smaller entities the CEO exerts stronger influences on decision-making, in line with the CEO effect theory. Third, we also scrutinize the effect of regional economic development: the beneficial effect of gender-specific laws is observable only in high-income countries.

These findings in turn offer two main contributions. First, we advance literature about the effect of the legal framework on economic outcomes by investigating the impact of law on credit market. La Porta et al. (1997) document a positive correlation of the adaptability of the legal system or and the depth of credit markets. Anyangah (2017) similarly shows that better protection of creditor rights leads to an improvement in the terms of credit. To contribute to this stream of literature, we explore and confirm that a gendered legal environment can

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<sup>23</sup> See Hyland et al. (2020), for a complete description of the database.

explain women-owned firms' credit-seeking behaviour. Moreover, our findings are in line with the argument of Djankov et al. (2008) and Fabbri (2010) according to which judicial efficiency should necessarily apply to ensure optimal credit allocation. To the best of our knowledge, no prior research attempts to quantify the effect of an antidiscrimination law on credit market - a critical blind spot, considering how cultural and social norms can overwhelm formal legal frameworks. Second, we add to studies about the macroeconomic determinants of access to credit. In particular, we reveal the impacts of country-specific factors on loan application probability and bankers' decision-making, in line with Asiedu et al.'s (2012) predictions of the relevance of country particularities. Gender-based differences in access to credit widely vary across regions, and Ongena and Popov (2013) have shown that supply-side discrimination becomes exacerbated in countries with more severe inherited cultural gender biases (e.g. Yugoslavian countries) than in those with weaker such historical gender biases (for instance, Ireland). We complement such findings by including the national legal framework as a country-specific determinant of supply-based discrimination against female business owners.

In Section 2, we discuss prior research, which provides the background that motivated our research. Section 3 contains descriptions of the data, empirical method, and variables. After we provide the results in Section 4 and we offer robustness checks in Section 5. Then, we look at additional analysis that can explain our results in Section 6. Finally, we conclude in Section 7.

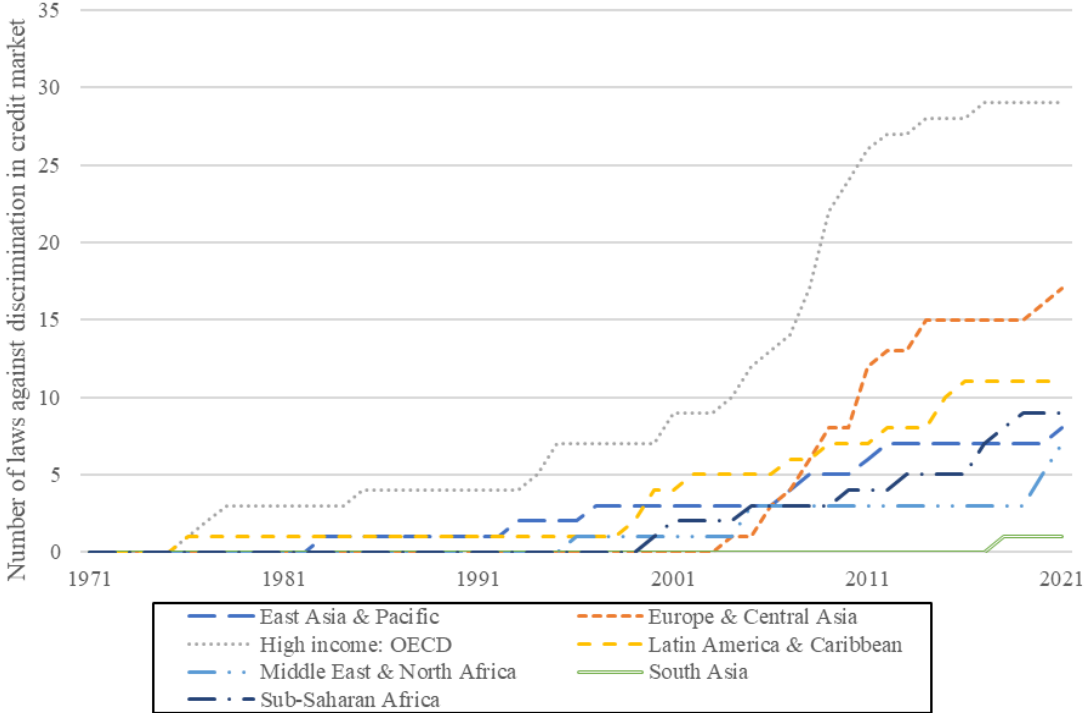
## **2. Theoretical background**

### **2.1. Law against discrimination in credit market**

Substantial advances in terms of anti-discrimination legislation in access to credit have been made in the past five decades. However, as illustrated in Figure 2.1., the pace of reform considerably varies across regions. The enactment of laws against discrimination in access to credit was driven by high-income OECD economies since 1974 when the American Congress passed the Equal Credit Opportunity Act which "Forbids credit discrimination on the basis of race, colour, religion, national origin, sex, marital status, age, or whether [one] receive[s]

income from a public assistance program.”<sup>24</sup> It was later followed by the British Equality Act in 1977. In Latin America, Puerto Rico ratified the Equal Credit Opportunity Act of 1974. It noteworthy to mention the country remained fully subject to congressional authority under the Territory clause of the United States Constitution. South Asia ranks at the bottom of the list with only one law against discrimination in credit market which entered in force in 2019 in the Maldives.

Figure 2. 1. Number of laws by region through time



Source: Women, Business and the Law.

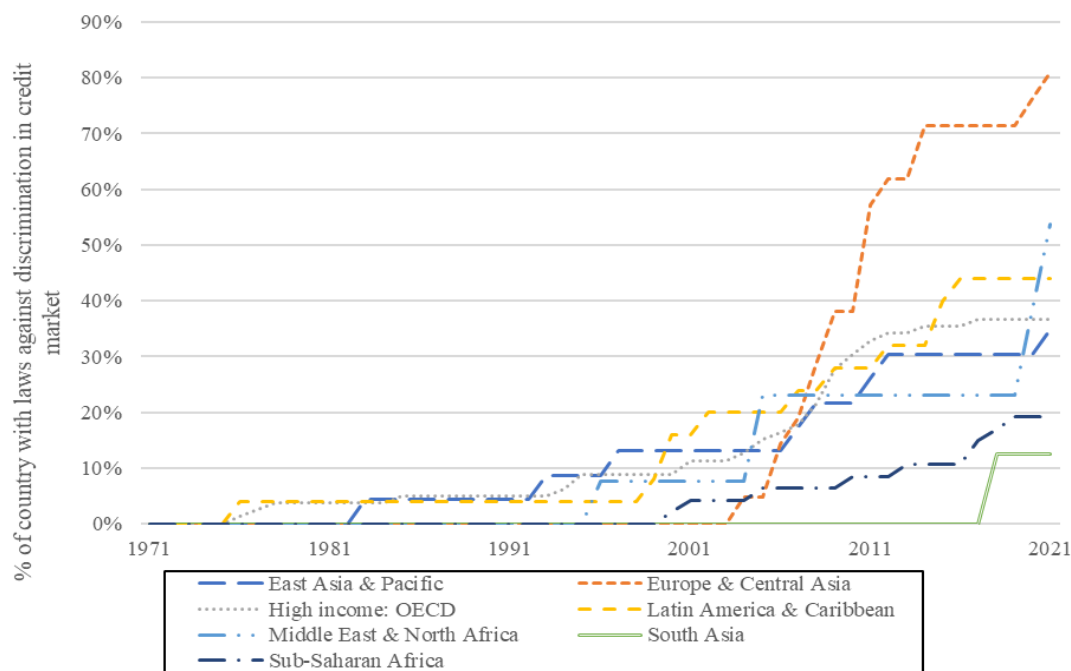
Note: This graph displays the evolution of the number of laws prohibiting gender discrimination in credit market by region over time.

Once we scaled the quantity of laws against discrimination in access to credit by number of countries in each region (Figure 2.2.), European and Central Asia stand out until 2008 with 80% of engaged countries. Such sudden legal impetus for equality relies on many factors among which the establishment of the Charter of Fundamental Rights coinciding with the Treaty of Nice (2000), and European directives setting a more detailed framework for women protection. The Charter states that “Any discrimination based on any ground such as sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political

<sup>24</sup> Federal Trade Commission. "Mortgage Discrimination." [accessed Sept. 17, 2020].

or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation shall be prohibited”. The Middle East and North-African region reached the second position in 2021, since considerable progress has been made – in particular in the aftermath of the 2011 uprisings – following the adoption of constitutional and institutional reforms to strengthen women’s status based on the standards set by the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW). The Latin America and Caribbean region ranks third in 2021: this is not surprising since all the concerned countries have also ratified the CEDAW. Finally, in the same year, less than 20% of Sub-Saharan African and South-Asian countries had implemented anti-discrimination laws. Both regions have the highest number of countries with national laws that discriminate on the basis of gender, as suggested by the Global Campaign for Equal Nationality Rights.<sup>25</sup>

Figure 2. 2. Share of regions with law by region over time



Source: Women, Business and the Law.

Note: This graph displays the share of countries per region with laws prohibiting gender discrimination in credit.

<sup>25</sup> <https://equalnationalityrights.org/> [Accessed: May 3, 2023].

## **2.2. Law and access to credit**

The law and finance view pioneered by La Porta et al. (1997) provides an early argument that the depth of the corporate credit market depends on the certainty of applicable laws and their enforcement. At the country level, substantial literature documents how the size of credit markets depends on creditor rights (La Porta et al., 1998; Djankov et al., 2007; Ullah et al., 2021); Beck et al. (2008) assert that institutional development is the most important characteristic to explaining cross-country variations in financing and obstacles to credit.

From a micro perspective, a sound legal framework should condition the likelihood and terms of credit agreements. For banks, stronger creditor protections lead to lower interest rates (Bae and Goyal, 2009), longer maturity dates (Qian and Strahan, 2007), more concentrated ownership loans (Esty and Megginson, 2003), and lower fees (Kysucky and Norden, 2016) but also demand for more collateral (Qian and Strahan, 2007), because banks seek collateral they can seize more easily in case of default. Overall, high creditor right environments should lower the risk from the bank's perspective.

For borrowers, enhanced regulatory quality also has beneficial effects, by reducing external financing costs and fostering their access to credit. Berger et al. (2011) concur that higher bankruptcy exemption limits reduce the amount of credit available to borrowers. To the best of our knowledge, only Kelley et al. (2022) analyse the effect of gendered law on lenders' attitudes towards female prospects in the non-mortgage fintech lending setting.

Beyond legal rights, Müller (2022) shows that legal efficiency is critical; credit restrictions appear to diminish in more efficient legal systems (i.e. those that score higher on an efficiency index). As Bae and Goyal (2009) explain, strong laws cannot substitute for weak judicial enforcement. Therefore, to stimulate access to credit, both high-quality laws protecting creditors' rights and rigorous law enforcement are required. In the same vein, Moro et al. (2018) cite the beneficial effect of contract enforceability for credit expansion, whereas new legal rights introduced to an existing judicial system, without adapting them to the local context, ultimately were ineffective.

## **2.3. Women-led firms and access to credit**

Insufficient funding is one of the main reasons why small businesses fail (Coleman, 2000), so clarifying why some businesses struggle to access credit is a critical need, and prior

literature has indicated that financial impediments vary across demographic groups. For example, despite increased shares of women-owned firms, they remain more credit-constrained, in formal channels, compared to men-owned firms (Berger and Udell, 2006). In turn, women-led enterprises tend to start up with less capital and rely more heavily on personal rather than external finance, including for their follow-up investments (Coleman and Robb, 2009). On average, women-led firms are also younger and smaller than those maintained by their male counterparts, as well as disproportionately concentrated in competitive industries, such as commerce and service sectors (Coleman, 2007). Yet even after controlling for age, size, and sector, women-owned businesses still suffer reduced access to credit, which might reflect two broad causes.

First, according to a supply-side view (which encompasses both Becker's, 1971 taste-based discrimination and statistical discrimination from Arrow, 1973), bankers' decisions on loan applications and requirements vary for male and female prospects, notwithstanding their similarities in riskiness or creditworthiness. Becker (1971) argues that credit markets discriminate against female-owned businesses by charging higher interest rates and requiring tougher contractual arrangements. However, empirical evidence has not confirmed whether women-led businesses face tighter credit conditions *ceteris paribus*. A plethora of literature demonstrates that female-led companies are more likely to be discriminated against by credit grantors (Agier and Szafarz, 2013; Alesina et al., 2013 among others) and face tightened loan requirements (de Andrés et al., 2021). On the other hand, several pieces of evidence endorse the absence of gender-based discrimination (Bardasi et al., 2011; Aterido et al., 2013, among others).

Second, demand-side arguments stress the fewer credit applications received from women-led businesses, arguably due to their fear of denial (Ongena and Popov, 2016; Moro et al., 2018; Naegels et al., 2021). Research backing these divergences suggests that differences in risk preferences and attitudes between men and women may affect borrowers' approaches to applying for external funding (see Croson and Gneezy, 2009, for a survey about feminine risk aversion). Overall, these so-called discouraged borrowers may exceed, in number the businesses whose loan applications are actually denied (Gama et al., 2017).

Overall then, we find that today's legal environments generally make it easier for women to obtain credit at more attractive conditions, but women continue to experience

discrimination in credit markets. From a demand point of view, they are more discouraged and therefore ask for less credit. From a *supply-side* premise, they obtain less credit, at less advantageous conditions. Considering the evidence established by prior research, and the relevant impacts of gender-based discrimination in credit markets, we thus were motivated to research how legal environments – and more specifically, legal protections for women – influence the discrimination women experience. Because a protective legal environment aims to enhance credit access, we anticipate that women-friendly legal environments help reduce discrimination, on both the demand and supply sides.

## 2.4. Hypotheses

If the effect of law on female borrowers' discouragement might seem unobservable - one may argue that a substantial disjuncture between popular legal awareness and existing judicial framework does not allow any change in the female's behaviour towards banking system.

However, Naegels et al. (2021) demonstrate that women are mainly discouraged due to the environment they evolve in, including the legal environment. Shapira (2016) emphasizes that law influences behaviours either directly through legal sanction, either indirectly by raising reputational concerns. Hence, the inclusion of a legal clause against discrimination in access to credit may decrease the likelihood of discouragement from a female perspective. Women prospects perceive law as a vector of equal opportunity in the credit market such they expect an equivalent treatment compared to their male counterparts. This leads to our first hypothesis:

H1: The presence of a law protecting women in credit reduces their discouragement.

From the supply-side premise, formal legislation supposedly constraints bankers to equally treat male and female prospects. In that sense, the inclusion of a clause prohibiting gendered differential treatment in credit markets should decrease discrimination in loan lending. Our second hypothesis is formalized as follows:

H2: The presence of a law protecting women in credit increases their access to credit.

Nonetheless, one may be sceptical about the convergence between *de jure* expectation of gender equality and *de facto* experience in credit market due to deeply rooted habits. Indeed,

negative perception of women stemming from social norms causes an unfavourable attitude towards them in society – and by extension on loan market that prevails on formal law. Therefore, legal framework does not necessarily guarantee a change in bankers' behaviour towards female prospects. More than that, Aldashev et al. (2012) demonstrate that using law to change customs may have the opposite effect than expected, and this is particularly the case for women discrimination (Zveglic and Van der Meulen Rodgers, 2003). And this is true for both sides affected by the law. This leads to our opposite hypotheses:

H1': The presence of a law protecting women in credit increases their discouragement.

H2': The presence of a law protecting women in credit reduces their access to credit.

To go deeper, Djankov et al. (2008) explain that it is not so much the presence of the law that counts, but its enforcement. The greater the law enforcement, the greater the impact of the legal framework. Hence, in a country with a law protecting women, the discrimination should be lower if the law enforcement is high. This leads to our second set of hypotheses:

H3: In countries with a law protecting women, the higher the law enforcement, the lower the women discouragement.

H4: In countries with a law protecting women, the higher the law enforcement, the higher the women access to credit.

However, in line with previous prediction, if the presence of the law going against the customs can have an effect contrary to what is expected, this is even more important when the enforcement is intensified (Acemoglu and Jackson, 2017). Hence, legal enforcement does not only amplify the expected impact of laws, but also its potential negative effect. This leads to our second set of opposite hypotheses:

H3': In countries with a law protecting women, the higher the law enforcement, the higher the women discouragement.

H4': In countries with a law protecting women, the higher the law enforcement, the lower the women access to credit.

In summary, the introduction of a clause prohibiting discrimination in access to credit may provide contradicting effects in the credit market. Moreover, the degree of law enforcement is



expectedly determining in shaping both female entrepreneurs and bankers' behaviour. It is therefore of prime importance to contribute to this debate by empirically investigate the question.

### **3. Data and methodology**

#### **3.1. Data**

To construct the variables that represent access to credit, we employ ES data, obtained from the World Bank. This survey, conducted since the 1990s and widely used in prior research, gathers firm-level data related to the business environment from owners and top managers. The ES covers a large set of topics, including access to finance, corruption, infrastructure, crime, competition, labour, obstacles to growth, and performance measures. To avoid any identification problems due to the global economic crisis, we focus on surveys from 2010 to 2020, which come from 124 countries (see Appendix 2.A.), and we adopt a standardized cross-country comparison approach. These data include a time dimension, but they represent pooled cross-sectional data (not panel), because different companies are interviewed in each wave.

The ES data set provides precise indicators of whether a company needed, applied for, and obtained credit. We consider all these different steps, such that our research includes companies that needed credit but decided not to apply (i.e. discouraged firms) and those that applied but were denied or rationed. For these two groups, we rely on responses to questions K.16, K.17, and K.20 (see Appendix 2.B. for detailed questions) of the Finance section of the ES.

To assess the quality of the women-friendly legal environment, we draw on the WBL index, provided by the World Bank and based on annual series dating back to 1970. It synthesizes formal laws and regulations related to women's economic abilities in 190 countries, using eight indicators (Mobility, Workplace, Pay, Marriage, Parenthood, Entrepreneurship, Assets, and Pension) that can define women's interactions with national law as they start, progress through, and end their careers.

## 3.2. Econometric specification

In our effort to test our first two sets of hypotheses, we focus on both demand-side (discouragement) and supply-side (probability of obtaining the loan) considerations, with the following probit model:

$$\begin{aligned}
 P(\text{Discouraged}_{i,t} / \text{Fully Obtained}_{i,t}) = & \\
 = & \alpha + \beta * \text{CEO Woman}_{i,t} + \gamma * \text{Law against discrimination in Credit}_{j,t} + \delta \\
 & * (\text{CEO Woman}_{i,t} * \text{Law against discrimination in Credit}_{j,t}) + \theta * \text{Control}_{i,j,t} \\
 & + \varepsilon_{i,j,t} \tag{1}
 \end{aligned}$$

The subscript  $i$  refers to the firm,  $j$  to the country where the firm operates, and  $t$  to year;  $\varepsilon$  is an idiosyncratic error term.

Similarly, we test our second set of predictions using the following specification:

$$\begin{aligned}
 P(\text{Discouraged}_{i,t} / \text{Fully Obtained}_{i,t}) = & \\
 = & \alpha + \beta * \text{CEO Woman}_{i,t} + \gamma * \text{Law against discrimination in Credit}_{j,t} + \delta \\
 & * (\text{CEO Woman}_{i,t} * \text{Law against discrimination in Credit}_{j,t}) + \rho \\
 & * (\text{Rule of Law}_{j,t}) + \varphi * (\text{CEO Woman}_{i,t} * \text{Rule of Law}_{j,t}) + \\
 & * (\text{Law against discrimination in Credit}_{j,t} * \text{Rule of Law}_{j,t}) + \vartheta \\
 & * (\text{CEO Woman}_{i,t} * \text{Law against discrimination in Credit}_{j,t} * \text{Rule of Law}_{j,t}) \\
 & + \theta * \text{Control}_{i,j,t} + \varepsilon_{i,j,t} \tag{2}
 \end{aligned}$$

## 3.3. Variables

### 3.3.1. Dependent variable

The measure of access to credit comprises two dependent variables: *Discouraged* and *Fully Obtained*. To construct the *Discouraged* variable, we use question K.16, pertaining to whether the firm applied for credit in the previous fiscal year.

Discouragement implies that a firm might not apply for credit, despite needing it, so we also include question K.17. Then we apply the definition of a discouraged borrower provided by Chakravarty and Xiang (2013): a firm is discouraged if it needed credit but did not apply, whether because (i) the application procedures were too complex, (ii) the interest rates were

not favourable, (iii) collateral requirements were too high, (iv) the size of the loan and maturity were insufficient (i.e. anticipated rationing), or (v) the companies did not think it (the application) would be approved.<sup>26</sup> Businesses that chose the “no need” or “don’t know” responses are not defined as discouraged and are excluded from the main data set. *Discouraged* equals 1 if the firm does not ask for a loan for other reasons, and 0 otherwise.

For the *Fully Obtained* variable, among firms that applied for a loan, we gather responses to question K.20, which pertains to the application outcome. If their applications were approved fully, we classified the firms as not rationed. In line with extant literature on rationing (e.g. Jaffee and Stiglitz, 1990), firms that received partial funding and those whose applications were rejected are classified as rationed. Thus, *Fully Obtained* equals 1 only if the application was approved in full, and 0 if it was rationed.

### 3.3.2. Gendered law measure

Among the independent variables, *CEO Women* is a dummy variable, equal to 1 if the CEO of the company is a woman at the time of the loan application.

To assess the legal environment, we focus on one question from the WBL: “Does the law prohibit discrimination by creditors on the basis of sex or gender in access to credit?” Using the responses, we can construct the variable *Law Against Discrimination in Credit* which is a dummy variable, equal to 1 if the law prohibits discrimination by creditors based on sex or gender. With this variable, we specifically measure the protections that women receive when they request credit.

Then, to gain a better understanding of how women’s behaviour changes, according to the legal environment, we interact these previous variables (*CEO Woman \* Legal Environment*). If  $\delta$  were to emerge as negative and significant in the Discouraged sample, we would have evidence that female CEOs working in a women-friendly legal environment are less discouraged than their male counterparts, for example.

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<sup>26</sup> A stricter definition of discouragement only includes firms that needed credit, did not apply, but also were creditworthy (e.g., Kon and Storey, 2003). The notion of creditworthiness is difficult to measure in advance though. In the robustness checks, we include only firms with existing lines of credit, which have been identified previously as creditworthy by a bank, to test this stricter definition.

### 3.3.3. Controls

As control variables, we follow previous literature. As indicated by Gama et al. (2017), we control for CEO experience (*Manager Experience*), because the more experienced a CEO is, the better the chances that the company will obtain a loan. Then we control for a vector of firm-specific variables, related to riskiness and creditworthiness. The logarithmic values of size and age correlate with the probability of obtaining credit, and thus with discouragement (Cole and Sokolyk, 2016). We also use the firm's ownership structure (*Sole Ownership*), legal status (*Limited Corp.*) and logarithmic value of total assets (*Size*) in line with Asiedu et al. (2013). With an Obstacle dummy variable, we assess whether the firm considers it difficult to gain access to credit (=1), which likely informs its probability of being discouraged. Moreover, we consider *F.S. Certified*, a dummy variable equal to 1 if the firm has a certified financial statement, which provides a form of hard information that tends to be prominent in the bank – borrower relationships (Berger and Udell, 2006). The variable *Saving Account* provides a proxy for the firm's familiarity with formal financial services. We follow Presbitero et al. (2014) and control for firm internationalization by including dummies for *Export* to identify direct and indirect exporters and *Foreign Ownership* to indicate if the owner is located abroad. The percentage of R&D investment (*R&D*) provides a relevant indicator of riskiness (Riding et al., 2012).

We also consider two macroeconomic variables: rate of inflation (*Inflation*) and ratio of domestic banking credit to gross domestic product (GDP) (*Financial Development*). With these controls, we can mitigate the potential for omitted variable bias in relation to the local economic environment, which shapes both the quantity of credit available and lawmaking.

Then with another set of dummy variables, we control for sector-related characteristics, to capture time-invariant, specific effects of industries. Using the year of application, we control for aggregate shocks. We also add country fixed effect to control for invariant country characteristics that could affect the law. Finally, though no theoretical evidence confirms the relevance of clustering the standard errors, the joint impact of the law

and women's status seems strongly likely to vary across countries (e.g. due to cultural differences). Therefore, we cluster our standard errors by country, to check this possibility.<sup>27</sup>

### 3.4. Descriptive statistics

Table 2.1. contains the descriptive statistics of key variables for the analysis. Notably, a similar proportion of female CEOs appears in Panel A, pertaining to discouraged borrowers, and in Panel B, which reflects the fully obtained analysis. The high number of female CEOs likely stems from the inclusion of many microenterprises in our sample.

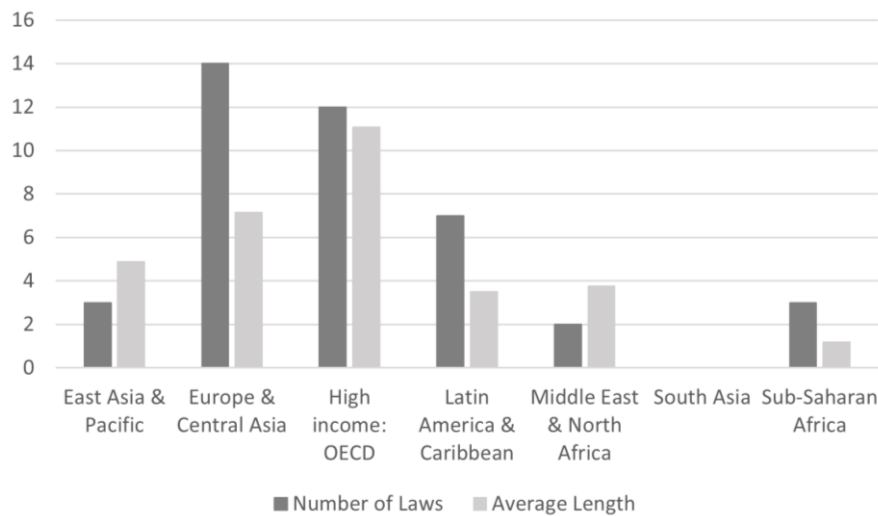
In Panel A, 49.3% of the firms can be defined as discouraged. In line with extant literature, we observe a greater rate of discouragement, compared with applications, among women-led businesses. Yet more applicants come from countries with more women-friendly laws or greater legal efficiency. Among firm characteristics, discouraged firms appear more opaque and have less banking experience. In Panel B, we find that around 80% of loan applicants obtained the full loan amount they requested. On average, women experience a higher probability of being rationed than obtaining full credit. In terms of firm characteristics, higher opacity relates to a lower probability of obtaining credit, consistent with Moro et al. (2018).

Turning to our legal environment, Figure 2.3. below displays both the number of countries with a law against discrimination and the average length since these laws are voted by region in the world in our sample. We can observe that our sample seems consistent with the law development presented above: Europe & Central Asia presents the higher number of laws. However, these laws are quite recent, compared to high-income countries where the number of laws is lower but with a longer length. Interestingly, even if we have some South Asian countries in our sample, none of them have a law protecting women. This is quite normal since only one South Asian country has a law (Maldives since 2019), and unfortunately this country is not in our sample. Regarding the other regions, they all have a low number of countries with a law and only East Asia & Pacific have a law with more than 5 years of existence.

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<sup>27</sup> The results remain unchanged without the clustered standard errors; they are available on request.

Figure 2. 3. Number of laws and average length in 2021 by region



Source: Women, Business and the Law.

Note: This figure displays both the number of countries with a law against discrimination and the average length since these laws are voted by region in the world in our sample.

## 4. Results

### 4.1. Access to credit and women-friendly legal environments

The results of the multivariate probit analysis and linear probability model are discarded in Table 2.2., as Norton et al. (2004) explain, we cannot interpret the effect of an interaction term directly in a non-linear regression. Even if we compute the right marginal effect following their methodology, since the interaction term in our model is central to our research, we also ran linear probability regressions, to see if our results are robust. Columns (1) and (2) suggest that if women are more discouraged than men, this effect can be mitigated if legislation includes a specific law against discrimination in access to credit (the interaction term is negative and significant). In terms of magnitude, the marginal effects in column (1) indicate that women-led firms are 26% more discouraged than men. Hence, these results are in line with H1's prediction: from a demand-side perspective, a favourable legal environment encourages female CEOs to apply for external financing. As explained previously, the effect would come from the fact that women are very sensitive to the legal environment in which they operate in the process to be discouraged. Interestingly, the coefficient of the *Law Against Discrimination in Credit* variable is negative and significant, so men also benefit from the

presence of such laws since they are less discouraged. In the presence of this type of law, men tend to get less credit.

Turning to our third and fourth columns, when we look at the interaction variable, it is always positive but not significant. However, the coefficient of the *Law Against Discrimination in Credit* variable alone is positive and significant. Thus, while a woman-friendly legal environment does not favour women, it advantages men, who obtain more credit. So, a women-friendly legal framework does not alleviate discrimination, regardless of the inclusion of firm- and country-level controls and neither H2 nor H2' are true. This can be explained by Acemoglu and Jackson (2017) who show that creating a law that goes against customs to have negative overall consequences.

Regarding our control variables for *Discouragement*, all are in line with previous literature: the most informationally opaque firms (smallest, sole ownership, without certified financial statements and limited corporations) are more likely to be discouraged (Chakravarty and Xiang, 2013); their anticipation of financing obstacles likely increases their probability to be discouraged. We also find that firms run by owners with less experience are more self-restrained in terms of credit, perhaps due to a lack of self-confidence. Interestingly, *R&D* impacts negatively the probability of being discouraged, which can seem counter-intuitive since high R&D is correlated with high opacity and high risk. However, *R&D* is also correlated with higher need for credit. In terms of need for credit, firms with trade credit are more discouraged because they have access to alternative sources of funding.

Regarding the probability to get a credit, our results hint that firm size, manager experience, and transparency (measured by *F.S. Certified*) are relevant decision-making criteria for loan providers. Familiarity with financial services, captured by *Saving account*, is positively and significantly correlated with the probability of obtaining a loan. Finally, the coefficient of the *R&D* dummy is negative and statistically significant. In line with existing literature, investment in innovative processes contributes to perceptions of idiosyncratic riskiness.

## **4.2. Effects of rule of law**

Turning to our second set of hypotheses, we consider the impact of the efficiency of the legal system, through the rule of law, in our results. As explained previously, we expect the

law enforcement to accentuate the effect of the law on both demand- and supply-side discrimination. To test this hypothesis, we reestimate our regression model after adding two interaction terms that include the gendered law variables, the CEO's gender, and our law efficiency measure (*Rule of Law*) provided by the World Bank. Columns (5) to (8) from Table 2.2. presents the results for the enforcement analysis for respectively *Discouraged* and *Fully Obtained*.

First, we can observe the negative and significant coefficients for *CEO Female \* Law Against Discrimination in Credit \* Rule of Law*. Hence, the higher the rule of law, the lower the probability that women are discouraged in the presence of the law. Law enforceability appears to diminish demand-side discrimination, supporting H3.

Turning to our second depend variable, the coefficient for *CEO Female \* Law Against Discrimination in Credit \* Rule of Law* is positive and significant. Hence, the higher the rule of law, the higher the probability to obtain credit for women in the presence of the law. This support our H4 hypothesis: rule of law increments increase the proportion of loans granted to female applicants by banking institutions when the law is voted. For instance, the 1975 Sex Discrimination Act – which renders unlawful sex discrimination on the ground of bank services among others – enables a female CEO to lodge a complaint to a county court (in Wales and England) or in a sheriff court (in Scotland) alleging violations of her rights to equal treatment in credit allocation. Thereupon, the definition of the fault (whether it constitutes a discrimination or not) is at the discretion of the judge. United Kingdom presents the specificity of having one of the highest Rule of Law index of the sample (it oscillates between 1.6 in 2010 and 1.5 in 2019 with a 0.1 standard deviation). Following our results, one may therefore argue that credit market discrimination is less pronounced in the United Kingdom than in other regions. This allegation has been supported by several empirical evidence demonstrating that gender has no effect on the likelihood to obtain a credit in this country (Munnell et al., 1996; Deku and Kara; 2013). These findings are notable, especially for policymakers, since it proves the importance of the law enforcement when trying to change customs.



## **5. Robustness checks**

### **5.1. Alternative measure of women-friendly legal environment**

Several alternative measures can reflect women-friendly legal environments. We use three, capturing the expansion of gendered law in different countries: a dummy for the presence of quotas for women on corporate boards (*Quota for Women on Board*), the length of time since the law was voted in the country (*Length of the Law*), and the WBL index (*WBL Index*), which ranges between 0 and 100, such that a higher value implies lower legal inequalities between men and women. The comparison of the results in Table 2.3., which provides the findings attained with the alternative legal variables, indicates that they remain the same for all alternative variables. That is, women's sense of discouragement is less important in countries with women-friendly laws, but the probability of obtaining a loan is not affected.

### **5.2. Alternative measure of discouragement**

Kon and Storey's (2003) stricter definition of discouragement only includes creditworthy borrowers who arguably could get loans that they need but who do not apply. A non-creditworthy prospect who does not apply would be rational, so this firm is not classified as discouraged. Accordingly, we adopt Petersen and Rajan's (1994) reasoning and focus on firms that possess an existing line of credit with some financial institution; firms with existing credit already have demonstrated their ability to repay their loans, so they likely are creditworthy. When we replicate the initial analysis, including only borrowers with a line of credit, we address 35,777 firms that need credit and 7,787 that request loan. We observe in Table 2.4. columns (1) and (2) that our results are in line with the main findings: in a women-friendly legal environment, women tend to be less discouraged (column (1)) but do not receive more credit (column (2)).

### **5.3. Alternative control variables**

To test the sensitivity of our main results, we control for additional country-level variable, directly related to women's behaviour or the legal environment. They do not appear in the main estimations because these values are missing for several countries. Yet cultural factors shape women's behaviour (Ongena and Popov, 2013), such that in a more gender-biased or

male-oriented country, we might expect to observe a higher degree of discrimination. Therefore, we include the Gender Inequality Index (*GII*), created by the United Nations Development Program to capture inequalities, as a control. Higher values on this index indicate more intense disparities between men and women. As the results in Table 2.4. columns (3) and (4) reveal, regardless of these specifications, the results remain the same as in the main analysis.

#### **5.4. Truthful respondents**

To ensure the quality of the data, the ES includes a question about how truthful the respondent is: *Truthful*, *Somewhat Truthful*, or *Not Truthful*. Therefore, to check the quality of our results, we adopt a similar logic and run our analysis only with respondents who identify as *Truthful* in their answers. Table 2.4. columns (5) and (6) display the results, obtained from a sample of 45,888 truthful respondents that need credit and 7,360 that ask for it. The results again remain unchanged.

#### **5.5. Alternative sample construction**

Another sample bias that might influence our results reflects the representativeness of the different countries included in our study. If one or more of these countries are overrepresented in the sample of borrowers, it may drive the results. Therefore, we removed all countries that account for more than 5% of the observations from the sample.<sup>28</sup> This criterion refers to three countries: India (almost 10% of the sample), Egypt (6%), and Russia (5%). As Table 2.4. columns (9) and (10) shows, the estimations still remain consistent with the main results, in terms of both discouragement (column (7)) and rationing (column (8)).

#### **5.6. Instrumental variable analysis**

The model may suffer from reverse causality concerns, because even though no endogeneity exists with regard to gender (gender is unlikely to change as a function of discouragement or credit likelihood), it might arise between the dependent variables and the women-friendly legal environment measures. That is, depending on the probability that

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<sup>28</sup> We also run the test with a 3% threshold, but the results remain the same; they are available on request.

women business owners might be discouraged or fail to obtain credit, legislators may be more or less likely to enact new laws to protect them. Moreover, our model can suffer from omitted variable bias, in particular due to the cultural dimension that may affect both sides of the equation. Therefore, we perform an instrumental variable (IV) regression. Many economic and legal studies identify the legal origins of a country as a good instrument for similar assessments (La Porta et al., 1998). However, the presence of laws against discrimination in a credit market is very recent, so the legal origin or system might have a more minor role in this case (Bradford et al., 2021). Therefore, we search another instrument and decide to use (i) the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) signature. The CEDAW, created in 1979 by the United Nations, aims to eliminate discrimination against women, and signing on signals a country's strong commitment to fight against such discrimination. Thus, this prior commitment likely affects the implementation of laws today; and (ii) the index indicating intensity of gender marking in language (Güvercin, 2019), to take into account the cultural aspect of the decision process. Language's grammatical structure offers the advantage to be a stable feature inherited from the distant past, unbiased by present social, political and economic forces.

The results for the IV analysis in Table 2.5. columns (1) and (2) indicate that, regardless of the specification, the exogeneity test is not significant; the additional IVs are exogenous. The high and significant F-test also indicates that our instruments are relevant. The results remain the same for both discouragement and the probability of obtaining credit.

## 5.7. Self-selection

Finally, our sample is subject to a potential self-selection bias, in that it consists of firms that need or ask for credit (Cole and Sokolyk, 2016). Therefore, we use Heckman's (1979) methodology to estimate the probability that a firm needs credit, then calculate the inverse Mills ratio ( $\lambda_1$ ) as a selection factor that we include in the *Discouraged* equation. We apply the same procedure and exclusion variables used by Léon (2015), who presents these variables in more detail. In a Heckman procedure, exclusion variables are included in the selection equation, so to be relevant, they must influence the need for loans but not directly affect borrower discouragement or loan approval. We use the following exclusion variables: (i) perceived constraints due to an inadequately educated, (ii) the natural logarithm of firm sales, and (iii) a dummy variable equal to 1 if the firm applied to obtain a construction-related permit and 0 otherwise. Following Cole and Sokolyk (2016), we also control for a potential

self-selection bias related to firms' assessments of their probability of obtaining credit (after removing discouraged firms). That is, in accordance with our *Discouraged* analysis, we construct new Mills ratios ( $\lambda_2$ ) that we include in the *Fully Obtained* equation. To sum up, we follow the following pattern:

Figure 2. 4. Self-selection process (Cole and Sokolyk, 2016)

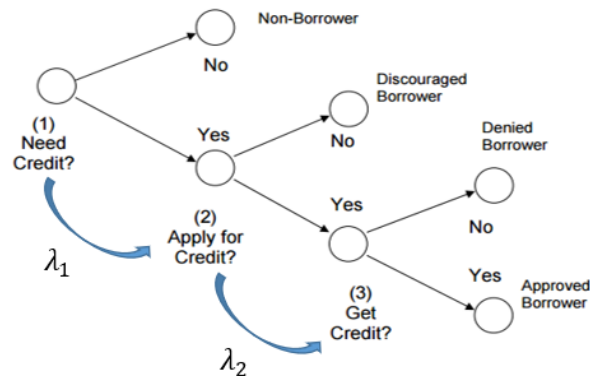


Table 2.5. columns (3) to (5) display our results. Column (3) refers to the probability of needing credit; column (4) pertains to the probability of being discouraged, including  $\lambda_1$ . Then column (5) involves the probability of obtaining full credit, so they include  $\lambda_2$ . The results remain stable. Furthermore, and interestingly, the Mills ratio  $\lambda_1$  is negative and significant, indicating the likely existence of a self-selection problem.

## 6. Going further with discouragement

In this section, we present in-depth analyses of discouragement, based on research extensions in which we attempt to clarify some details of the effects that we find.

### 6.1. Emotional versus rational discouragement

In our main analysis, we estimated discouragement using a definition by Chakravarty and Xiang (2013), which encompasses two broad categories of reasons for discouragement: (i) factual hindrances, such as complex application procedures, unfavourable interest rates, excessive collateral requirements, or insufficient loan size and maturity, or (ii) anticipated denial or rejection of the loan application. The former reasons are more rational in their basis, whereas the latter is an emotional prediction that leads to discouragement. Interestingly, Naegels et al. (2021) demonstrate that women are more discouraged for rational reasons than for emotional ones. They show that most women are discouraged not because of the fear of

not getting it, but because they perceive the environment in which they evolve (including the legal one) as not favourable.

Thus, in line with this paper, when the legal environment changes, we should observe a greater impact on rational discouragement than emotional discouragement.

Therefore, we reestimate the initial model separately for:

- *Rational discouragement*, a dummy variable that equals 1 if the reason invoked is that the application procedures are complex, interest rates are unfavourable, collateral requirements are excessive, or loan size and maturity are insufficient, and 0 otherwise, and
- *Emotional discouragement*, a dummy variable that equals 1 if the firm decides not to apply for fear that the application will be rejected), and 0 otherwise.

The results in Table 2.6. columns (1) and (2) reveal negative and significant coefficients for *CEO Female \* Law Against Discrimination in Credit* only for *Rational* discouragement (column (2)) confirming that female borrowers are less likely to suffer rational discouragement in countries with stronger women-friendly legislation. In contrast, these effects are not statistically significant in relation to emotional discouragement. Hence, this result is in line with Naegels et al. (2021), since women perceived their legal environment as an obstacle to obtain credit, when this latter is favourable to them, discouragement decreases.

## **6.2. Gender effects by firm size**

The CEO effect may differ in smaller firms, relative to those effects observed in large firms. As Quigley et al. (2021) note, the most salient discrepancy between small and large firms is the degree of monitoring and oversight they face. Thus, a priori, the flexibility that smaller businesses enjoy may increase the influence of the CEO, which is limited by regulatory constraints imposed on larger companies. The CEO's personal traits and demographic characteristics, including gender, in turn may have a stronger influence on decision-making by smaller firms, so it is crucial to investigate how the legal environment influences female borrowers' sense of discouragement across firms of different sizes.

To this end, we rerun our main estimation by splitting the sample by size. Whereas no consensus exists regarding the appropriate firm size classification at an international scale, the ES stratifies its data based on firm size into three groups: small firms with fewer than 5

employees, medium firms with 5–99 employees, and large firms with more than 100 employees. Therefore, we merge small and medium firms, to match European and U.S. definitions of small and medium-sized enterprises, which we compared to large firms.

The estimation results are in Table 2.6. columns (3) and (4). We find a negative and significant effect of *CEO Female \* Law Against Discrimination in Credit on Discouraged* only for smaller firms in the column (3)). None of the other coefficients are statistically significant. That is, smaller, women-led firms are less likely to be discouraged in the presence of an antidiscrimination legal clause, whereas the same effect is not observable for larger firms, which aligns with the CEO effect argument.

### 6.3. Differential effects by country-level income

In recent years, concern for the inability to obtain a loan or to find credit at terms that suit the needs of entrepreneurs has received a lot of attention from the research sphere. More specifically, the level of financial development, controlled by the level of income, is of prime importance to determine credit granting.

Using the ES, Chakravarty and Xiang (2013) find that women-owned firms' sense of discouragement is more prevalent in low-income countries, whereas Bardasi et al. (2011) find that such businesses in Central Asia and Europe are more likely to be discouraged, but an opposite relationship arises among sub-Saharan African firms. Moreover, credit availability might be fostered in high-income countries, due to the effectiveness of their financial regulations and institutions (Djankov et al., 2007). To account for cross-country heterogeneity, we therefore split the data set into three subsamples: *High-Income*, *Middle-Income*, and *Low-Income* countries, in line with the World Bank's 2021–2022 classification.<sup>29</sup>

The estimation results in Table 2.6. columns (5) to (7) indicate a mitigating effect of gendered legislation on female borrowers' discouragement in developed countries only. Perhaps the marginal beneficial effect derived from a women-friendly legal clause is greater in wealthier countries than in developing ones. Due to the powerful information asymmetry that tends to occur in low-income countries, antidiscrimination laws might exert weaker

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<sup>29</sup> The distribution by income types is available at <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

effects in the latter. Lower financial development, as reflected by the poor bank branch penetration in lower-income countries, might also reduce these influences. Another potential explanation is that media coverage is more prominent in high-income countries, such the magnitude of reputational sanctions is greater in those economies (Shapira, 2016).

## 7. Conclusion

To establish the effect of laws on women-led businesses' access to credit, we draw on a large dataset of 35,777 firms, covering 124 countries from 2010 to 2020. Our results indicate that women-led firms are more likely to apply for a loan if legislation includes an antidiscrimination clause - even after controlling for cultural and credit environments. This can be explained by the fact that women are sensitive to their legal environment when they take financial decision, including discouragement. However, differential treatment persists on the supply side in the sense that banks do not provide more credit to women in the presence of the law. Women still end up being unnecessarily credit-constrained by formal banking institutions. To ensure the desired effect of the law in terms of access to credit, a country must have a high rule of law, i.e., a significant enforcement mechanism. Interestingly, the enforcement mechanism also plays a significant role when looking at women discouragement. Else, these findings indicate that the presence of the women-friendly law reduces women discouragement whatever the law enforcement, but this enforcement is a *sine qua non* condition for them to obtain more credit. This also corroborates prior evidence (Ullah et al., 2021) that indicates that legal efficiency mitigates women-led businesses' discouragement.

To gain more precise insights, we also determine that gender-equality laws soften rational discouragement, so female CEOs' self-rationing exists rational reasons, which is in line with Naegels et al. (2021). Consistent with prior theory, the CEO effect arises only for smaller firms and in developed countries.

These findings have considerable implications for policymakers and legislators. Anti-discrimination lawmaking is a key tool to foster women-owned firms' willingness to apply for a loan, which tends to be lower than the willingness displayed by male owners (Bardasi et al., 2011; Aterido et al., 2013). But such *de jure* efforts to address gender discrimination do not prompt parallel *de facto* changes on the supply side. Legal enforcement thus represents a necessary but seemingly not sufficient tactic to reduce gender gaps in women-led firms' credit access.

The results raise additional questions about the impact of the legal environment on individual behaviour. Culture appears to exert a powerful influence on business owners' decisions, perhaps especially women's ones, and it is intrinsically linked to the law of the land. Thus, a promising route for research might be to address explicitly how culture moderates the link between women's financial choices and behaviours and the legal environment in which they operate their businesses.



**Table 2.1. Descriptive statistics**

This table provides descriptive statistics for the variables used in the study. It displays a test of difference in the mean of all independent and control variables, given the value of *Discouraged* (*Applicant* vs. *Discouraged*) and *Fully Obtained* (*Rationed* vs. *Fully Obtained*). We test the mean difference with a Student t-test. Statistics are reported in parentheses. \*, \*\*, and \*\*\* denote a significant difference from 0 at the 10%, 5%, and 1% levels, respectively. Appendix 2.C. contains the variable definitions.

	Panel A: Discouraged Analysis						Panel B: Fully Obtained Analysis					
	Mean	Std. Dev.	Applicant	Discouraged	Mean Diff. Test	N	Mean	Std. Dev.	Rationed	Fully Obtained	Mean Diff. Test	N
<i>Dependent variables</i>												
Discouraged	0.493	0.500				35,777						
Fully Obtained							0.806	0.395				9,787
<i>Independent variables</i>												
CEO Female	0.152	0.359	0.144	0.160	-0.016***	35,777	0.158	0.365				9,787
<i>Legal environment</i>												
Law Against Discrimination in Credit	0.324	0.468	0.393	0.253	0.140***	35,777	0.498	0.500	0.163	0.157	0.005	9,787
Length Law	3.233	5.416	4.002	2.441	1.561***	35,777	5.789	6.719	0.404	0.520	-0.116***	9,787
WBL Index	73.693	14.544	76.725	70.574	6.151***	35,777	77.857	15.980	4.582	6.079	-1.497***	9,787
Legislative Quotas Women	2.891	7.902	2.139	3.739	-1.600***	14,790	2.118	7.160	73.133	78.991	-5.858***	7,837
Quotas for Women on Board	0.350	3.380	0.277	0.433	-0.155**	14,527	0.277	3.011	3.388	1.820	1.568***	7,741
Rule of Law	-0.352	0.593	-0.262	-0.445	0.183***	35,644	-0.214	0.622	0.383	0.252	0.131	9,747
Getting Credit Score	68.906	18.026	68.582	69.239	-0.657***	35,777	66.358	18.408	-0.356	-0.180	-0.176***	9,787
<i>Firm characteristics</i>												
Manager Experience	19.018	15.445	20.832	17.151	3.681***	35,777	21.680	23.227	66.389	66.351	0.037	9,787
Log(Size)	3.418	1.396	3.785	3.039	0.746***	35,777	3.781	1.441	19.397	22.228	-2.832***	9,787
Log(Age)	2.868	0.962	2.947	2.786	0.161***	35,777	2.979	0.948	3.412	3.870	-0.458***	9,787
Sole Ownership	0.471	0.499	0.380	0.564	-0.185***	35,777	0.368	0.482	2.876	3.003	-0.127***	9,787
Limited Corp.	0.108	0.310	0.104	0.112	-0.009**	35,777	0.139	0.346	0.410	0.358	0.052***	9,787
Obstacle	0.305	0.460	0.257	0.354	-0.097***	35,777	0.235	0.424	0.137	0.140	-0.002	9,787
F.S. Certified	0.504	0.500	0.585	0.420	0.165***	35,777	0.574	0.494	0.429	0.188	0.241***	9,787
R&D	0.219	0.413	0.284	0.152	0.132***	35,777	0.224	0.417	0.508	0.590	-0.082***	9,787
Saving Account	0.889	0.314	0.927	0.850	0.076***	35,777	0.925	0.264	0.215	0.226	-0.011	9,787
Export	0.997	0.058	0.997	0.997	-0.000	35,777	0.997	0.058	0.889	0.933	-0.045***	9,787
Foreign Own.	0.077	0.266	0.094	0.059	0.035***	35,777	0.098	0.298	0.998	0.996	0.002	9,787
Trade Credit	13.427	23.058	15.374	11.424	3.950***	35,777	14.926	23.879	0.095	0.099	-0.004	9,787
<i>Cultural variables</i>												
GII	0.390	0.152	0.358	0.424	-0.066***	33,665	0.326	0.147	46.398	48.188	-1.790**	9,493
<i>Macroeconomic variables</i>												
Inflation	6.329	7.541	6.191	6.471	-0.279***	35,777	5.314	6.164	0.361	0.318	0.043***	9,787
Financial Development	43.272	26.183	45.468	41.013	4.455***	35,777	49.73	27.648	5.637	5.236	0.401*	9,787
<i>Instruments</i>												
Civil Law	0.922	0.268	0.936	0.900	0.036***	35,777	0.909	0.288	46.899	50.410	-3.511***	9,787
English Origin	0.078	0.268	0.064	0.100	-0.036***	35,777	0.091	0.288	0.896	0.912	-0.016	9,787

French Origin	0.706	0.456	0.717	0.689	0.028***	35,777	0.657	0.475	0.104	0.088	0.016	9,787
German Origin	0.216	0.412	0.219	0.212	0.008	35,777	0.252	0.434	0.658	0.657	0.001	9,787
CEDAW	0.646	0.478	0.645	0.647	-0.001	35,777	0.618	0.486	0.583	0.626	-0.043***	9,787

**Table 2.2. Main estimations**

This table reports coefficients and *p*-values (in brackets). In odd columns we use probit regressions, while in even columns linear probability model, both at the firm level. The dependent variable is *Discouraged* in columns (1), (2), (5) and (6) and *Fully Obtained* in columns (3), (4), (7) and (8). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 2.C. contains the variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Discouraged	Discouraged	Fully Obtained	Fully Obtained	Discouraged	Discouraged	Fully Obtained	Fully Obtained
CEO Female * Law Against Discrimination in Credit	-0.002** (0.014)	-0.040*** (0.009)	0.027 (0.765)	0.010 (0.651)	0.024 (0.643)	0.007 (0.671)	0.030 (0.766)	0.015 (0.587)
CEO Female * Law Against Discrimination in Credit * Rule of Law					-0.114** (0.034)	-0.039*** (0.001)	0.051* (0.054)	0.004** (0.026)
CEO Female	0.031** (0.027)	0.011** (0.027)	0.065 (0.296)	0.013 (0.459)	0.028 (0.452)	0.006 (0.611)	0.027 (0.733)	0.003 (0.886)
Law Against Discrimination in Credit	-0.078 (0.323)	-0.027 (0.252)	-1.553 (0.126)	-0.637** (0.027)	-0.003 (0.983)	-0.000 (0.992)	-0.557 (0.178)	-0.191* (0.054)
Rule of Law					-0.657*** (0.000)	-0.176*** (0.000)	0.461 (0.191)	0.202** (0.043)
CEO Female * Rule of Law					-0.004 (0.951)	-0.011 (0.512)	-0.113 (0.390)	-0.026 (0.526)
Law Against Discrimination in Credit * Rule of Law					0.197 (0.233)	0.062 (0.236)	0.212*** (0.003)	0.202*** (0.003)
Manager Experience	-0.006*** (0.000)	-0.000** (0.037)	0.007*** (0.000)	0.000 (0.212)	-0.005*** (0.000)	-0.000** (0.044)	0.006*** (0.000)	0.000 (0.201)
Log(Size)	-0.195*** (0.000)	-0.060*** (0.000)	0.119*** (0.000)	0.029*** (0.000)	-0.200*** (0.000)	-0.059*** (0.000)	0.126*** (0.000)	0.029*** (0.000)
Log(Age)	0.018** (0.028)	-0.004 (0.129)	-0.005 (0.796)	0.006 (0.261)	0.020** (0.016)	-0.004 (0.131)	-0.006 (0.733)	0.005 (0.301)
Sole Ownership	0.123*** (0.000)	0.033*** (0.000)	0.008 (0.820)	-0.000 (0.989)	0.126*** (0.000)	0.033*** (0.000)	0.012 (0.739)	0.000 (0.995)
Limited Corp.	0.145*** (0.000)	0.016** (0.046)	-0.010 (0.822)	0.003 (0.782)	0.120*** (0.000)	0.018** (0.030)	0.007 (0.886)	0.003 (0.797)
Obstacle	0.217*** (0.000)	0.045*** (0.000)	-0.651*** (0.000)	-0.174*** (0.000)	0.202*** (0.000)	0.045*** (0.000)	-0.644*** (0.000)	-0.176*** (0.000)
F.S. Certified	-0.285*** (0.000)	-0.096*** (0.000)	0.093*** (0.007)	0.011** (0.021)	-0.272*** (0.000)	-0.097*** (0.000)	0.083** (0.017)	0.012 (0.182)
Saving Account	-0.237*** (0.000)	-0.060*** (0.000)	0.146** (0.012)	0.029** (0.013)	-0.212*** (0.000)	-0.061*** (0.000)	0.103* (0.081)	0.025 (0.181)
Export	0.190 (0.127)	0.050 (0.168)	-0.235 (0.434)	-0.047 (0.433)	0.214* (0.087)	0.050 (0.168)	-0.270 (0.367)	-0.045 (0.447)
Foreign Own.	0.054* (0.054)	0.019** (0.019)	-0.074 (0.074)	-0.005 (0.005)	0.057* (0.057)	0.018** (0.018)	-0.081 (0.081)	-0.006 (0.006)

	(0.064)	(0.026)	(0.172)	(0.691)	(0.051)	(0.042)	(0.135)	(0.634)
Trade Credit	0.000	0.000*	-0.000	-0.000	0.001**	0.000*	-0.001	-0.000
	(0.689)	(0.059)	(0.573)	(0.162)	(0.026)	(0.066)	(0.186)	(0.172)
R&D	-0.254***	-0.070***	-0.101***	-0.015	-0.262***	-0.070***	-0.100**	-0.015
	(0.000)	(0.000)	(0.010)	(0.130)	(0.000)	(0.000)	(0.011)	(0.127)
Inflation	0.001	0.014***	0.003	-0.007	0.002	0.014***	0.004	0.065***
	(0.301)	(0.000)	(0.333)	(0.871)	(0.128)	(0.000)	(0.187)	(0.000)
Financial Development	-0.005***	0.001*	0.003***	0.056***	-0.002***	0.000	0.003***	0.041***
	(0.000)	(0.091)	(0.000)	(0.000)	(0.000)	(0.649)	(0.002)	(0.000)
Constant	0.397	0.556***	-0.902	0.447	0.216	0.504***	-1.668	0.106
	(0.129)	(0.000)	(0.580)	(0.296)	(0.417)	(0.000)	(0.151)	(0.726)
Observations	35,777	35,777	9,787	9,787	35,644	35,644	9,747	9,747
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Sector, Year & Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>		0.294		0.151		0.295		0.153
Adjusted R <sup>2</sup>		0.291		0.140		0.292		0.141
Pseudo-R <sup>2</sup>	0.244		0.150		0.245		0.152	

**Table 2.3. Alternative measures of women-friendly legal environment**

This table reports coefficients and *p*-values (in brackets). All models are probit regressions at the firm level. The dependent variable is *Discouraged* in columns (1) to (4) and *Fully Obtained* in columns (5) to (8). These results reflect alternative measures of women-friendly legal environment. All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 2.C. contains the variable definitions.

	Discouraged				Fully Obtained			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CEO Female * Quotas for Women on Board	-0.005** (0.028)				0.015 (0.467)			
CEO Female * Legislative Quotas Women		-0.001*** (0.009)				0.001 (0.942)		
CEO Female * Length of the law			-0.008** (0.045)				0.003 (0.622)	
CEO Female * WBL Index				-0.002** (0.011)				-0.002 (0.420)
CEO Female	0.082*** (0.002)	0.071** (0.020)	0.061** (0.024)	0.038* (0.056)	0.003 (0.989)	0.073*** (0.003)	0.022 (0.692)	0.092*** (0.002)
Quotas for Women on Board	0.044*** (0.000)				-0.055*** (0.001)			
Legislative Quotas Women		0.323*** (0.000)				-0.058 (0.545)		
Length of the law			-0.014 (0.168)				-0.054 (0.198)	
WBL Index				0.007 (0.222)				-0.128 (0.203)
Constant	1.425*** (0.001)	-5.681*** (0.001)	0.384 (0.126)	-0.305 (0.588)	-1.226* (0.075)	0.047 (0.985)	-1.958* (0.083)	6.271 (0.392)
Observations	14,527	14,527	35,777	35,777	7,737	7,737	9,767	9,767
Control variables	All	All	All	All	All	All	All	All
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Pseudo-R <sup>2</sup>	0.240	0.239	0.244	0.244	0.155	0.155	0.150	0.150

**Table 2.4. Line of credit, control variables, truthful and sample**

This table reports coefficients and *p*-values (in brackets). All models are probit regressions at the firm level. The dependent variable is *Discouraged* in odd columns and *Fully Obtained* in even columns. Columns (1) and (2) includes results involving firms that already have obtained a line of credit. In columns (3) to (6) control for alternative control variables: in columns (3) and (5) we control for the cultural environment using *Masculinity* and *GII*, in columns (4) and (6) for the legal and informational environment with *Getting Credit Score*. Columns (7) and (8) provide results for firms with truthful answers. Columns (9) and (10) results refer to an alternative sample, achieved by removing the three countries that each represent more than 5% of the sample (India, Egypt, and Russia). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 2.C. contains the variable definitions.

	Line of credit		GII		Truthful answers		Alternative sample	
	(1) Discouraged	(2) Fully Obtained	(3) Discouraged	(4) Fully Obtained	(5) Discouraged	(6) Fully Obtained	(7) Discouraged	(8) Fully Obtained
CEO Female * Law Against Discrimination in Credit	-0.044** (0.026)	-0.071 (0.524)	-0.139** (0.023)	-0.070 (0.581)	-0.030* (0.054)	0.116 (0.281)	-0.027*** (0.007)	0.035 (0.699)
CEO Female	0.069** (0.041)	-0.143* (0.071)	0.011 (0.775)	0.047 (0.620)	0.039* (0.056)	0.005 (0.950)	0.000 (0.997)	0.052 (0.429)
Law Against Discrimination in Credit	0.003 (0.981)	-3.549*** (0.000)	0.050 (0.627)	-0.839 (0.184)	-0.027 (0.804)	-0.676 (0.640)	-0.092 (0.249)	-0.149 (0.721)
GII			-11.215*** (0.000)	-7.415*** (0.000)				
Constant	-1.025** (0.029)	9.866*** (0.000)	3.793*** (0.000)	3.210** (0.013)	0.114 (0.731)	-2.916 (0.232)	-0.206 (0.519)	-2.182*** (0.008)
Observations	18,088	7,915	19,482	4,963	21,748	7,308	29,258	9,312
Control variables	All	All	All	All	All	All	All	All
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Pseudo-R <sup>2</sup>	0.233	0.123	0.273	0.175	0.225	0.166	0.246	0.146

**Table 2.5. IV and Heckman analysis**

This table reports coefficients and *p*-values (in brackets). All models are probit regressions at the firm level. Columns (1) and (2) report the results of an IV regression in which legal origin, type of law, and CEDAW signature are used as instruments for *Law Against Discrimination in Credit* and *Clause Against Discrimination in Constitution*. The exogeneity test (J-test) and relevance test (F-test) appear at the bottom of each column. The dependent variable is *Discouraged* in column (1) and *Fully Obtained* in column (2). Columns (3) to (5) report the results of a selection model in two steps. In column (3), we estimate the probability to need credit (Need), using the exclusion variables *Log(Sales)*, *Construction*, *WK*, and *country dummies*. In columns (4) and (5), we estimate the probability to be *Discouraged* after controlling for the Mills ratio estimated in column (3). In column (5), we estimate the probability to fully obtain (*Fully Obtained*) credit after controlling for the Mills ratio estimated in column (4). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 2.C. contains the variable definitions.

	(1)	(2)	(3)	(4)	(5)
	Discouraged	Fully Obtained	Need	Discouraged	Fully Obtained
CEO Female * Law Against Discrimination in Credit	-0.041*** (0.000)	0.008 (0.643)		-0.043*** (0.001)	0.078 (0.353)
CEO Female	-0.004 (0.732)	0.004 (0.856)	-0.010 (0.458)	0.078*** (0.003)	0.001 (0.987)
Law Against Discrimination in Credit	-0.028*** (0.000)	0.002 (0.732)		-0.289*** (0.000)	0.297*** (0.000)
$\lambda_1$				-0.132*** (0.004)	
$\lambda_2$					-0.449 (0.192)
Log(Sales)			-0.001 (0.661)		
Construction			0.210*** (0.000)		
WK			0.122*** (0.000)		
Constant	0.255*** (0.000)	0.428*** (0.000)	-0.565*** (0.000)	0.826*** (0.000)	-0.050 (0.926)
Observations	35,777	9,787	76,236	35,777	9,787
Control variables	All	All	All	All	All
Cluster	Country	Country	Country	Country	Country
R <sup>2</sup>	0.282	0.249	0.101	0.177	0.090
Instruments	Language Gender Marking CEDAW				
Exogeneity (J-stat)	0.484 (0.675)	0.893 (0.210)			
Relevance (F-stat)	112.76 (0.000)	84.36 (0.000)			

**Table 2.6. Going further with discouragement**

This table reports coefficients and *p*-values (in brackets). All models are probit regressions at the firm level. The dependent variable is *Discouraged* in all the specifications, excepted for the first section where the explained variable is *Discouragement (Emotional)* in column (1) and *Discouragement (Rational)* in column (2). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 2.C. contains the variable definitions.

	Type of Discouragement		Firm Size		Country Income		
	(1) Emotional	(2) Rational	(3) Small & Medium Discouraged	(4) Large Discouraged	(5) Low Discouraged	(6) Medium Discouraged	(7) High Discouraged
CEO Female * Law Against Discrimination in Credit	0.067 (0.435)	-0.058** (0.019)	-0.040** (0.031)	0.081 (0.450)	-0.015 (0.934)	-0.095 (0.538)	-0.116** (0.011)
CEO Female	0.003 (0.952)	0.086*** (0.001)	0.047 (0.106)	0.149** (0.016)	0.039 (0.858)	-0.136 (0.140)	0.118*** (0.000)
Law Against Discrimination in Credit	-0.326*** (0.000)	-0.277*** (0.000)	-0.282*** (0.000)	-0.318*** (0.000)	-0.222 (0.194)	-0.150* (0.082)	-0.173*** (0.000)
Constant	-1.696*** (0.000)	-1.062*** (0.000)	0.699*** (0.000)	1.005** (0.018)	1.870*** (0.002)	0.265 (0.595)	0.502*** (0.003)
Observations	35,777	35,777	28,124	7,641	3,811	2,100	29,779
Control variables	All	All	All	All	All	All	All
Cluster	Country	Country	Country	Country	Country	Country	Country
Observations	35,777	35,777	28,124	7,641	3,811	2,100	29,779
Pseudo-R <sup>2</sup>	0.194	0.176	0.142	0.218	0.147	0.145	0.176



## Appendix 2.A. Sample of countries

Country	Years	Country	Years	Country	Years
Afghanistan	2014	Grenada	2010	Papua New Guinea	2015
Albania	2013; 2019	Guatemala	2010; 2017	Paraguay	2010; 2017
Antigua and Barbuda	2010	Guinea	2016	Peru	2010; 2017
Argentina	2010; 2017	Guyana	2010	Philippines	2015
Armenia	2013; 2020	Honduras	2010; 2016	Poland	2013; 2019
Azerbaijan	2013; 2019	Hungary	2013; 2019	Portugal	2019
Bahamas	2010	India	2014	Romania	2013; 2019
Bangladesh	2013	Indonesia	2015	Russia	2012; 2019
Barbados	2010	Israel	2013	Rwanda	2011; 2019
Belarus	2013; 2018	Italy	2019	Senegal	2014
Belize	2010	Jamaica	2010	Serbia	2013; 2019
Benin	2016	Jordan	2013; 2019	Sierra Leone	2017
Bhutan	2015	Kazakhstan	2013; 2019	Slovak Republic	2013; 2019
Bolivia	2010; 2017	Kenya	2013; 2018	Slovenia	2013; 2019
Bosnia and Herzegovina	2013; 2019	Kosovo	2013; 2019	Solomon Islands	2015
Bulgaria	2013; 2019	Kyrgyz Republic	2013; 2019	South Sudan	2014
Burundi	2014	Lao PDR	2016; 2018	Sri Lanka	2011
Cambodia	2016	Latvia	2013; 2019	St Kitts and Nevis	2010
Cameroon	2016	Lebanon	2013; 2019	St Lucia	2010
Central African Republic	2011	Lesotho	2016	St Vincent and Grenadine	2010
Chad	2018	Liberia	2017	Sudan	2014
Chile	2010	Lithuania	2013; 2019	Suriname	2010; 2018
Colombia	2010; 2017	Malawi	2014	Tajikistan	2013; 2019
Costa Rica	2010	Malaysia	2015	Tanzania	2013
Croatia	2013; 2019	Mali	2016	Thailand	2016
Cyprus	2019	Malta	2019	Timor-Leste	2015
Czech Republic	2013; 2019	Mauritania	2014	Togo	2016
Côte d'Ivoire	2016	Mexico	2010	Trinidad and Tobago	2010
DRC	2013	Moldova	2013 ; 2019	Tunisia	2013; 2020
Djibouti	2013	Mongolia	2013; 2019	Turkey	2013; 2019
Dominica	2010	Montenegro	2013; 2019	Uganda	2013
Dominican Republic	2010; 2016	Morocco	2013; 2019	Ukraine	2013; 2019
Ecuador	2010; 2017	Mozambique	2018	Uruguay	2010; 2017
Egypt	2013; 2016; 2020	Myanmar	2014 ; 2016	Uzbekistan	2013; 2019
El Salvador	2010 ; 2016	Namibia	2014	Venezuela	2010
Estonia	2013; 2019	Nepal	2013	Vietnam	2015
Eswatini	2016	Nicaragua	2010; 2016	West Bank and Gaza	2013; 2019
Ethiopia	2011; 2015	Niger	2017	Yemen	2013
Gambia	2018	Nigeria	2014	Zambia	2013; 2019
Georgia	2013; 2019	North Macedonia	2013; 2019	Zimbabwe	2011; 2016
Ghana	2013	Pakistan	2013		
Greece	2018	Panama	2010		

## Appendix 2.B. Detailed questions from Enterprise Surveys

K.16. Referring again to the last fiscal year [year], did this establishment apply for any lines of credit or loans?

- Yes.
- No.
- Don't know (spontaneous).

K.17. What was the main reason why this establishment did not apply for any line of credit or loan?

- No need for a loan, establishment had sufficient capital.
- Application procedures were complex.
- Interest rates were not favourable.
- Collateral requirements were too high.
- Size of loan and maturity were insufficient.
- Did not think it would be approved.
- Other.
- Don't know (spontaneous).

*K.20. Referring only to this most recent application for a line of credit or loan, what was the outcome of that application?*

- Application was approved in full.
- Application was approved in part.
- Application was rejected.
- Application was withdrawn.
- Application still in process.
- Don't know (spontaneous).

## Appendix 2.C. Variable definitions

Variable name	Definition
<b><i>Dependent variables</i></b>	
Discouraged	Dummy variable equals to 1 if the firm is discouraged (i.e., decides not to apply), 0 if it applied for credit.
Discouraged (Emotional)	Dummy variable equals to 1 if the firm decided not to apply because of emotional reasons (application would be rejected), 0 otherwise.
Discouraged (Rational)	Dummy variable equals to 1 if the firm decided not to apply because of rational reasons (application procedures are complex, interest rates are unfavourable, collateral requirements are excessive, loan size and maturity are insufficient), 0 otherwise.
Fully Obtained	Dummy variable equals to 1 if the firm fully obtains the requested loan, 0 if it is rationed.
<b><i>Independent variables</i></b>	
CEO Female	Dummy variable equal to 1 if the manager of the firm is a woman, 0 otherwise.
<b><i>Legal environment variables</i></b>	
Law Against Discrimination in Credit	Dummy variable equal to 1 if the law prohibits discrimination by creditors on the basis of sex or gender in access to credit, 0 otherwise.
WBL Index	Index capturing the legal inequalities between men and women in terms of mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension. The range is 0 to 100, the higher the index, the lower the legal inequalities.
Legislative Quotas Women	Legislative quotas (reserved seats) for female representatives in national parliament.
Quotas for Women on Board	Quotas for women on corporate boards.
Length of the Law	Length of time since the law against discrimination in credit market was voted.
Rule of Law	Perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Getting Credit Score	Degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders, as well as the depth of credit information; the higher the index, the easier access to credit should be.
<b><i>Cultural variables</i></b>	
Masculinity	Hofstede's measure of masculinity, or preference in society for achievement, heroism, assertiveness, and material rewards for success.
GII	Gender Inequality Index (GII), created by the UN Development Program, which measures inequalities in three human development aspects: reproductive health, empowerment, and economic status. The higher the value, the greater the disparities between men and women.
<b><i>Firm characteristics</i></b>	
Manager Experience	Manager experience (in years).
Log(Size)	Natural logarithm of firm total assets.
Log(Age)	Natural logarithm of firm age.
Sole Ownership	Dummy variable equal to 1 if the firm has only one owner, 0 if it has more.
Limited Corp.	Dummy variable equal to 1 if the firm is a limited corporation, 0 otherwise.
Obstacle	Dummy variable equal to 1 if the firm considers that access to finance is a "Major Obstacle" or a "Very Severe Obstacle", 0 otherwise.
F.S. Certified	Dummy variable equal to 1 if the firm's annual financial statements are checked or certified by an external auditor.
R&D	Dummy variable equal to 1 if the firm spent on formal R&D activities, 0 otherwise.
Saving Account	Dummy variable equal to 1 if firms have a checking or savings account, 0 otherwise.
Export	Dummy variable equal to 1 if firm is a direct exporter (i.e., more than 10% exports in its sales), 0 otherwise.
Foreign Own.	Dummy that equals 1 if firms have a foreign owner, 0 otherwise.
Trade Credit	Proportion of total annual purchases of material inputs purchased on credit.
<b><i>Macroeconomic variables</i></b>	
Inflation	Rate of inflation.
Financial Development	Domestic banking credit to the private sector, as a share of GDP.
<b><i>Instruments</i></b>	
Civil Law	Dummy variable equals to 1 if the law in the country is a civil law, 0 if it's a common law.
English Origin	Dummy variable equals to 1 if the law in the country is an English origin law, 0 otherwise.
French Origin	Dummy variable equals to 1 if the law in the country is in a French origin law, 0 otherwise.
German Origin	Dummy variable equals to 1 if the law in the country is a German origin law, 0 otherwise.



# Chapter 3: Just the Two of Us, We Can('T) Make It If We Try: Owner-CEO Gender and Discouragement<sup>30</sup>

## Abstract

Literature points out that women are more discouraged compared to their male counterparts to apply for a loan. However, little is known about the influence exerted by a feminine business environment for women-led firms. Using a dataset of 8,966 firms from 96 countries, we find that discouragement prevails among female-led firms with a higher share of female owners. These results challenge the international trend to promote gender diversity.

**Keywords:** Gender ▪ Access to credit ▪ Borrower discouragement.

**JEL Codes:** G21 ▪ G34 ▪ J16.

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<sup>30</sup> This chapter is co-written with Jérémie Bertrand and Aurore Burietz and has been published in *Economic Letters* (2022).

## 1. Introduction

Achieving gender equality in corporate leadership and governance processes contributes to driving women empowerment. However, despite a growing number of women-led firms, several studies reveal that female entrepreneurs still experience more difficulties in doing business and raising external funding than their male counterparts (e.g. Asiedu et al., 2013). Moreover, Ongena and Popov (2016) among others show that female CEOs exhibit more reluctance to apply for a loan, i.e. higher discouragement, arguably due to their fear of denial (see Naegels et al., 2021). Research backing these divergences suggests that these differences in preferences arise for females' greater risk aversion (see Croson and Gneezy, 2009). However, little is known about how the corporate environment of the female CEO, more precisely the firm ownership, shapes her attitude towards loan providers.

Harjoto et al. (2018) demonstrate that board diversity, including gender, results in higher risk aversion, mainly due to women intrinsic risk aversion. Following this result, Chatjuthamard et al. (2021) document that board gender diversity leads to a reduction in the manager's risk taking, in the sense that female directors' risk aversion exacerbates CEO's risk aversion. Similarly, Barber and Odean (2001) show that female leaders are less confident in their own ability than men such they are more likely to be influenced by corporate environment.

Drawing on these insights, we expect that risk aversion can be transmitted from the women on board to the CEO. As such, the presence of a woman on the board can lead to an increase in discouragement by exacerbating the CEO's risk aversion. Moreover, if the CEO is also a woman, this can dramatically increase the discouragement observed.

We posit that a higher share of female ownership increases the likelihood of being discouraged in general and exacerbate the female-led firm's discouragement. We test these hypotheses with a pooled cross-sectional dataset of 8,966 firms from 96 countries between 2009 and 2019.

Our results suggest that discouragement is reinforced by women in the ownership only if the CEO is a female. These findings contribute to the literature in multiple respects. First, we add to the literature about corporate board diversity by suggesting a novel channel whereby women affect corporate decision-making. Second, we identify a distinct moderating

mechanism that effectively heightens the prominence of female-owned enterprises' discouragement.

The paper proceeds as follows. In section 2, the methodology and the data employed are explained. Section 3 presents the results. Finally, the article ends with relevant conclusions.

## 2. Data and methodology

We use firm-level data from the World Bank Enterprise Surveys. This dataset includes different waves of single-country surveys covering a broad range of business environment topics including access to credit. The survey targets registered firms with at least five employees. The final sample consists of 8,966 firms from 96 countries from 2009 to 2019.

Discouragement implies that a firm might not apply for credit, despite needing it. We construct the dummy variable *Discouraged* following Rostamkalaei et al. (2020). We classify a firm as discouraged (*Discouraged* = 1) if it needed credit but did not apply either because (i) application procedures were too complex; (ii) interest rates were too high; (iii) collateral requirements were too high; (iv) rationing was anticipated, (v) fear of being denied or (vi) Others. Firms that did apply for a loan are classified as non-discouraged (*Discouraged* = 0).

To test our hypothesis, we run a regression with *Discouraged* as dependent variable, the CEO gender (*Female CEO*), the percentage of female in the firm ownership (*Female Ownership*) and their interaction as key independent variables, and a set of control variables and fixed effects.<sup>31</sup> Table 3.1. displays the list of variables with their definition and descriptive statistics. Since *Discouraged* is a binary variable, we use probit model and standard errors are clustered by country.

## 3. Results

Table 3.2. displays our results.<sup>32</sup> In column 1, *Female CEO* is positive and significant highlighting that women CEOs are more discouraged than men, while *Female Ownership* is not significant, so female on board doesn't condition the probability to be discouraged. In

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<sup>31</sup> We test several combinations of fixed effects; all results are the same and available.

column 2, the interaction term between *Female CEO* and *Female Ownership* is positive and significant such when the CEO is a woman, the probability to be discouraged increases with the percentage of women in the ownership structure. An increase by 1% of women in the board expands by 0.1% the probability for the female leader to be discouraged. As such, in companies owned and managed entirely by women, this probability increases by 10%. This conclusion is reinforced with the insignificant albeit negative coefficient for the variable *Female CEO* standing alone, which can be interpreted as a woman CEO not being discouraged when there are no women in the ownership (i.e., *Female Ownership* = 0). Hence, we confirm that the ownership structure of a firm significantly impacts the decision-making process of the female CEO. Going further, we contribute to the debate on gender behavioural bias by showing that women discouragement appears to be significant when the firm's ownership is more women-oriented. As such, we shed light on the importance to consider the board composition of a firm when studying gender differences.

We run several robustness tests to check the validity of our results (columns (3) to (6)). First, Kon and Storey (2003) provide a stricter definition of discouraged borrowers where individuals must be creditworthy. We follow Petersen and Rajan (1994) and restrict our sample to firms with an existing line of credit, signalling that a bank already analyses their creditworthiness (column (3)). Second, the Enterprise Surveys contains a question about the truthfulness of their respondent. To ensure the quality of our results, we restrict our sample to respondents considered as truthful by the survey (column (4)). In column (5), we control for a potential self-selection issue, using Probit Self-Selection (PSS) model (Léon, 2015). Finally, we remove the sole ownership firms to ensure that our results are not biased by the presence of companies where the CEO is also the unique owner (column (6)). We observe that our interaction term remains positive and significant in all specifications, reinforcing our conclusions.

## 4. Conclusion

This paper investigates the influence of women owners on the discouragement and more precisely when the CEO is also a woman. Our estimations suggest that the presence of women

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<sup>32</sup> For the sake of brevity, we do not display all control variables. Full results are available upon request.



in the ownership of a firm leads to women CEOs' discouragement only. In line with the literature, we speculate that women in the ownership convey a part of their risk aversion to the CEO, which leads to a higher discouragement if the CEO is herself already risk averse. Our results challenge the policies implemented in several EU countries to promote gender equality in the business environment. Motivated by the observation that women are dramatically marginalized in top leadership positions, these countries are calling for greater female representation in the boardroom (Adams and Funk, 2012). In this paper, we provide new insights on the potential consequences it may have on firms' management.

**Table 3.1. Definition and descriptive statistics of variables**

<b>Variable name</b>	<b>Definition</b>	<b>Mean</b>	<b>Std. Dev.</b>
<i>Dependent variables</i>			
Discouraged	=1 if the firm needed credit and refused to apply for a bank credit, 0 if the firm needed credit and apply.	0.418	0.493
<i>Independent variables</i>			
<i>Firm characteristics</i>			
Female CEO	=1 if the firm's top manager is a woman, 0 otherwise.	0.356	0.479
Female Ownership	Percentage of the firm owned by women.	46.557	36.195
Log(Size)	Logarithm of the number of permanent full-time employees.	3.550	1.433
Log(Age)	Logarithm of the firm age in years.	2.985	0.867
Manager Experience	Manager experience in years.	20.740	23.901
Sole Ownership	=1 if the firm has only one owner, 0 if it has more.	0.287	0.452
Limited Corp.	=1 if the firm is a limited corporation, 0 otherwise.	0.154	0.361
Obstacle	=1 if the firm considers that access to finance is a "Major Obstacle" or a "Very Severe Obstacle", 0 otherwise.	0.276	0.447
Certified	=1 if the firm's annual financial statements are checked or certified by an external auditor.	0.542	0.498
Saving Account	=1 if firm has a checking or savings account, 0 otherwise.	0.915	0.278
Export	=1 if firm is a direct exporter (i.e., more than 10% exports in its sales), 0 otherwise.	0.998	0.049
Foreign own.	=1 if firm has a foreign owner, 0 otherwise.	0.074	0.262
<i>Macroeconomic variables</i>			
Inflation	Rate of inflation.	5.696	7.565
Financial Development	Domestic banking credit to the private sector, as a share of GDP.	48.313	30.604
Rule of law	Index to measure perceptions of the extent to which people have confidence in and abide by the rules of society.	-0.269	0.573
GII	Gender Inequality Index that measures inequalities in human development aspects.	0.365	0.151
WBL Index	Index capturing the legal inequalities between men and women.	76.713	14.202

**Table 3.2. Estimations**

This table presents the results of the regressions. The dependent variable is *Discouraged*. P-values are reported in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels.

	Main	Truthful	Line of Credit	PSS	W/O Sole	
	(1)	(2)	(3)	(4)	(5)	(6)
Female CEO *Female Ownership		0.002** (0.045)	0.004*** (0.001)	0.001*** (0.001)	0.002** (0.045)	0.002** (0.045)
Female CEO	0.026** (0.025)	-0.031 (0.638)	-0.124 (0.106)	-0.006 (0.948)	-0.048 (0.469)	-0.006 (0.932)
Female Ownership	0.000 (0.813)	-0.001 (0.380)	-0.001* (0.086)	0.001 (0.170)	-0.001 (0.387)	-0.002* (0.062)
Constant	0.707*** (0.000)	0.904* (0.097)	1.379** (0.021)	-0.205 (0.795)	-1.395 (0.223)	1.958*** (0.002)
Observations	8,966	8,966	6,763	5,356	8,874	6,476
Control variables	All	All	All	All	All	All
Cluster	Country	Country	Country	Country	Country	Country
Sector, Year & Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R <sup>2</sup>	0.285	0.235	0.242	0.188	-	0.236
Marginal effect		0.001**				



# Chapter 4: No Man, No Cry? Gender Equality in Access to Credit and Financial Stability<sup>33</sup>

## Abstract

Literature has found that women outperform men in terms of loan repayment. We can therefore question whether more gender equality in access to credit fosters financial stability. We test this hypothesis using cross-country data on financial inclusion from the World Bank's Global Findex database and bank-level data on financial stability. We perform regressions at the bank level to check the existence of a relation between the female-to-male ratio of access to credit and financial stability. We find evidence of a negative relation between the gender gap in access to credit and financial stability. Therefore, our findings support the view that enhancing access to credit for women relative to men is beneficial for financial stability.

**Keywords:** Financial inclusion ▪ Access to credit ▪ Financial stability ▪ Gender equality.

**JEL Codes:** G21 ▪ G34 ▪ J16.

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<sup>33</sup> This chapter is co-written with Laurent Weill and has been published in Finance Research Letters (2022).

## 1. Introduction

A major issue on the agenda of financial inclusion is the gender gap. Namely financial inclusion, understood as the access and use of formal financial services, widely differs between men and women worldwide. The latest wave of Global Findex data surveyed in 2017 has shown a seven-point gender gap with 72 percent of men having a bank account in comparison to only 65 percent of women. This seven-point gender gap is furthermore persistent over time since the first wave of the Global Findex database done in 2011 (Demirgüç-Kunt et al., 2018).

The gender gap in financial inclusion raises concerns because of its economic implications in terms of gender inequality. Financial inclusion allows individuals to build savings (Allen et al., 2016), to increase investment (Ellis et al., 2010), to enable them to tide over unforeseen events such disease or unemployment (Collins et al., 2009) and to foster the establishment of businesses (González, 2020). As a consequence, the gender gap in financial inclusion is a major obstacle for women empowerment by restricting the ability of women to play an economic role (Swamy, 2014; Holloway, Rouse and Niazi, 2017).

The difference in access to credit between genders can also exert a prominent impact on financial stability, in the sense that lower gender gap in access to credit can foster financial stability. Indeed literature supports the view that women outperform men in terms of loan repayment. A large set of studies has found evidence for a higher repayment rate of loans for women relative to men (Hulme, 1991; Sharma and Zeller; Kevane and Wydick, 2001; D'Espallier et al., 2011). A 2007 report from the World Bank summarizes this view by emphasizing that “experience has shown that repayment is higher among female borrowers, mostly due to more conservative investments and lower moral hazard risk” (World Bank, 2007, p. 124).

Why a better loan performance for women relative to men? A first explanation deals with the observation of differences in risk aversion across genders. Empirical and experimental literature supports lower risk aversion of women in financial decisions (Barber and Odean 2001; Agnew, Balduzzi and Sunden, 2003; Croson and Gneezy, 2009; Charness and Gneezy, 2012). The lower risk aversion of women in financial decisions has been observed in various settings like trading behaviour (Barber and Odean 2001), investment (Charness and Gneezy, 2012), and bank loans granted by loan officers (Beck, Behr and

Güttler, 2009). In the case of loans, women obtaining loans would be less inclined to adopt a moral hazard behaviour. This interpretation is supported by the fact that they invest more in businesses associated with easier repayment than men (Todd, 1996; Agier and Szafarz, 2013). The lower risk-taking behaviour of women would then contribute to making them more able to repay their loans.

A second explanation proposed by the literature is based on the fact that women are more influenced by social pressure. Microfinance institutions generally prefer granting loans to women<sup>34</sup> because they are more influenced by peer pressure in credit groups and are more affected by the interventions of loan officers (e.g. Goetz and Gupta, 1996; Rahman, 2001). As a consequence, women would be more reluctant to face the costs associated with the absence of loan repayment than men.

Surprisingly, the hypothesis that lower gender gap in access to credit would foster financial stability has never been investigated before to the best of our knowledge. This paper aims to fill this loophole in the literature by investigating whether the gender gap in access to credit affects financial stability.

To this end, we perform a cross-country analysis by combining country-level data on financial inclusion and bank-level data for financial stability. We use data on financial inclusion from the Global Findex database to compute the female-to-male ratio of access to credit. We utilize bank-level data from BankFocus database to measure financial stability. We thus perform estimations at the bank level on a sample of 1,762 banks from 145 countries to check whether the gender gap in access to credit affects financial stability.

We find evidence that the gender gap in access to credit exerts a detrimental influence on financial stability. Therefore, our findings support the view that enhancing access to credit for women relative to men brings economic benefits through greater financial stability. They accord with the view that women outperform men in terms of loan repayment.

Our paper contributes to two debates in the literature. First, we contribute to the debate on the gender gap in financial inclusion by addressing its consequences. The literature on the gender gap in financial inclusion has widely investigated its prevalence (Zins and Weill,

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<sup>34</sup> For instance, Grameen Bank granted about 95% of its loans to women in 2018.

2016; Kairiza, Kiprono and Magadzire, 2017) and its causes (Demirgüç-Kunt, Klapper, and Singer, 2013; Ghosh and Vinod, 2017; Beck, Behr, and Madestam, 2018). The effects of this gender gap have been mainly considered through the benefits of financial inclusion. We complement this literature by providing empirical evidence on how gender differences in access to credit can influence financial stability. Second, we improve our understanding of what shapes financial stability. A huge literature has been developed to identify the determinants of financial stability not only at the bank level but also at the country level like political institutions (Ashraf, 2017) or economic policy uncertainty (Phan et al., 2021). We augment this literature by emphasizing the role of the gender gap in access to credit.

The remainder of the paper proceeds as follows. Section 2 describes the data and methodology. Section 3 reports the estimations. Section 4 concludes.

## **2. Data and methodology**

### **2.1. Data**

To study whether the gender gap in access to credit affects financial stability, we need to collect data on financial inclusion and bank-level characteristics.

For financial inclusion, we use the World Bank's Global Findex. We consider the three waves of this database for 2011, 2014, and 2017. This dataset provides information on financial inclusion indicators covering around 150,000 people for each wave in 145 countries. It is obtained thanks to surveys realized by Gallup, Inc. on the entire civilian, noninstitutionalized population aged 15 and above.

In this database, access to credit refers to the fact that the individual borrowed from a financial institution in the past 12 months. We then use this information at the individual level. Our measure of the gender gap in access to credit is then the ratio of the percentage of women with access to credit to the percentage of men with access to formal credit (*Female to Male Ratio*). Even if they can be a source of funding for households, we do not include informal loans as they do not directly affect financial stability. The higher the ratio, the lower the gender gap in access to formal credit. A ratio equal to one indicates the absence of any gender gap in access to credit, while a ratio close to zero means an extremely high gender gap.



All bank-level data come from BankFocus, a global database of banks' financial statements around the world. Since we have only data for the gender gap in access to credit for 2011, 2014, and 2017, we consider bank-level variables only for these three years so that financial stability is computed for the same year than information available for access to credit.

The explanatory variable of primary concern is the measure for financial stability. We use the Z-score as the indicator for financial stability in line with the literature (e.g., Laeven and Levine, 2009; Berger, Klapper and Turk-Ariss, 2009). It measures insolvency risk for a bank in the sense that a higher Z-score is associated a lower probability of insolvency. More formally, the Z-score represents the probability that the value of its assets becomes lower than its debt. The Z-score is computed as follows:

$$Z\text{-score}_{i,t} = [\text{ROA}_i + \text{CAR}_i]_t / [\sigma(\text{ROA}_i)]$$

where *ROA* is the Return On Assets, *CAR* is the Capital Asset Ratio which is measured as the ratio of equity to assets, and  $\sigma(\text{ROA})$  is the standard deviation of ROA calculated over the 2009-2019 period. As suggested by Laeven and Levine (2009), we take the natural log of the Z-score since the Z-score is a highly skewed measure. In the rest of the paper, we will refer to the logged Z-score as *Z-score*.

We adopt a set of control variables based on former literature (e.g. Berger, Klapper and Turk-Ariss, 2009; Ashraf, 2017; Osei-Tutu and Weill, 2021). We consider four bank-specific control variables. We take in account bank size measured as the natural logarithm of total assets (*Size*). We also control for the structure of assets with the loans to assets ratio (*Loans to Assets*) and for the structure of funding with the ratio of deposits to assets (*Deposits to Assets*). Finally, we include the cost to income ratio (*Cost to Income*).

We also use five country-level control variables. We control for business cycles with annual GDP growth (*GDP Growth*). Level of economic development is taken into account with the logarithm of GDP per capita (*GDP per Capita*). The logarithmic value of the inflation rate (*Inflation*) is also considered as inflation can affect financial stability. In line with the literature showing the impact of bank concentration on financial stability (e.g., Berger, Klapper and Turk-Ariss, 2009), we include the market share of the top three banks in terms of assets (*Bank Concentration*). We obtain these variables from World Development

Indicators from the World Bank. Finally, we account for institutional quality with the rule of law index (*Rule of Law*) from World Governance Indicators from the World Bank.

We apply the following selection criteria in our bank sample: (i) we consider only countries for which the data set do not present any missing data, (ii) we discard banks that had information for fewer than the three years reviewed by Global Findex and (iii) we only take into consideration non-consolidated commercial banks. Finally, our database covers 1,762 banks in 145 countries for a total of 3,389 observations.

All bank-level variables are winsorized at 1%, top and bottom, to get rid of extreme observations. The definition of all variables is reported in the Appendix 4.A. Table 4.1 displays the descriptive statistics of the variables used in the empirical analysis that follows.

## 2.2. Methodology

Subsequently, to formally verify the link between financial stability and female financial inclusion, we estimate the following equation by running panel estimations with fixed effects:

$$Z\text{-score}_{i,j,t} = \beta_0 + \beta_1 \text{Female to Male Ratio}_{i,t} + \beta_2 \text{Bank controls}_{i,t} \\ + \beta_3 \text{Country controls}_{k,t} + \varepsilon_{i,k,t}$$

where *Z-score* is the measure of risk taking for financial stability; *Female to Male Ratio* is the female-to-male ratio of access to credit; *Bank Controls* is the set of bank-specific control variables (*Size*, *Loans to Assets*, *Debt to Assets*, *Cost to Income*); *Country Controls* is the set of country-specific control variables (*GDP per Capita*, *GDP growth*, *Inflation*, *Rule of Law*, *Bank Concentration*), and  $\varepsilon$  is a random error term. Subscript *i* refers to bank, subscript *k* to country and finally subscript *t* to year.

We test our hypothesis by running panel estimations with fixed effects to recognize the cross-sectional and time series elements, while controlling for time-invariant country-specific heterogeneity.

### 3. Results

We investigate the impact of the gender gap in access to credit on financial stability. We perform four estimations to consider several sets of control variables and test the sensitivity of the results. Table 4.2. reports the estimations. In column (1), we consider only *Female to Male Ratio* in the set of explaining variables. In columns (2) to (4), we add bank-level control variables, country-level control variables, and all control variables.

We find that *Female to Male Ratio* is positively related to financial stability in all estimations. The estimated coefficient is significant and positive with all specifications. Therefore, our main conclusion is that the gender gap in access to credit has a negative influence on financial stability. This conclusion is in line with our hypothesis that lower gender gap in access to credit fosters financial stability. We interpret this finding by the fact that women outperform men in terms of loan repayment, and thus reducing the gap in access to credit between genders favours financial stability.

Thus, our findings are of particular importance to policymakers caring about financial stability. They suggest that gender equality in access to credit would enhance financial stability in addition to economic benefits through higher women's economic empowerment. In other words, financial regulators should care about equal access to credit between genders to promote financial stability.

With respect to the bank-level control variables, we find a significantly negative coefficient for *Size*, suggesting that larger banks are associated with lower financial stability. This finding is in line with the "*too-big-to-fail effect*" according to which larger banks adopt riskier behaviour. Like Osei-Tutu and Weill (2021), we observe a significantly positive coefficient for *Loans to Assets* and a significantly negative coefficient for *Deposits to Assets*, which means that higher share of loans and lower share of deposits in total assets diminish financial stability. When considering the country-level control variables, we find that *Bank Concentration* is significantly positive, which is in line with the view that greater bank concentration is beneficial for financial stability (Beck, Demirgüç-Kunt and Levine, 2006; Berger, Klapper and Turk-Ariss, 2009). The other country-level controls are not significant.

#### 4. Robustness checks

We have found in the main estimations that greater gender gap in access to credit is associated with lower financial stability. We can question whether this finding is confirmed with robustness tests.

First, we use alternative measures for financial stability. We now consider three other indicators than the initial Z-score which are all related to insolvency risk or credit risk, in line with the fact that our hypothesis is based on the gender differences in loan performance.

We first consider two alternative computations of Z-score: the Z-score without log transformation (*Pure Z-score*), the Z-score scaled with the 3-years standard deviation of ROA (*Alternative Z-score*) and finally the 3-years standard deviation of ROA (*SD ROA*). The latter is associated with higher credit risk.

The results are reported in Table 4.3. We first find that *Female to Male Ratio* is positively and significantly related to the two alternative measures of Z-score, *Alternative Z-score* and *Pure Z-score*. Therefore, we also observe a positive relation of the *Female to Male Ratio* with financial stability when considering different computations of the Z-score. We then observe a significantly negative coefficient for *Female to Male Ratio* with *SD ROA*. Hence these results tend to corroborate those obtained in the main estimations.

Second, we take into account endogeneity. A potential concern is that financial stability could drive the gender gap in access to credit. A more stable banking system may increase the amount of granted loans and can contribute to reducing the gender gap in access to credit by facilitating access to credit to all individuals. We address the potential endogeneity concern by re-estimating our main specification using an instrumental variable (IV) approach.

To this end, we implement a random effect IV estimator through a Generalized Two-Stage Least squares Estimator (G2SLS) following the methodology established by Balestra and Varadharajan-Krishnakumar (1987). Our choice to adopt G2SLS instead of Generalized Method of Moments (GMM) hinges on the following argument developed by Erickson (2001): “The main advantage of GMM is its well-known covariance matrix formula rather than its efficiency with respect to 2SLS [...] the difference between GMM and 2SLS estimates is likely to be small.” Hence, the main difference between both approaches is only

in the computational simplicity of the variance-covariance matrix. We control for conditionally heteroskedastic errors by using robust estimators.

This approach implies the use of a variable related to the female-to-male ratio of access to credit but not related to financial stability. As an instrument, we consider the proportion of women of working age currently engaged in any formal activity to produce goods or provide services for pay or profit given International Labour Organization estimations. Deléchat et al. (2018) demonstrate that individuals receiving wages are more likely to observe a higher intensity in financial services use. By the same token, Fungáčová and Weill (2015) argue that education and income level are determining in terms of formal accounts and formal credit access in China. These findings are consistently extended by Tuesta et al (2015) and Sarma and Pais (2011): from a global perspective, income – both at individual and at country level – and employment are positively correlated with the degree of financial inclusion. Hence, we can legitimately assume that the share of women enrolled in the labour market is likely to affect inclusive financial development of a country.

The second-stage results are displayed in Table 4.4. From the G2SLS regression, we find a significantly positive relationship between the female-to-male ratio in access to credit and financial stability. In other words, we still observe that reducing the gender gap in access to credit is beneficial for financial stability.

## **5. Conclusion**

In this paper, we examine the impact of the gender gap in access to credit on financial stability in a cross-country analysis. Our key finding is the detrimental impact of the gender gap in access to credit on financial stability. We therefore support the view that increasing access to credit for women relative to men is beneficial for financial stability. We explain this conclusion by the higher loan repayment rate of women relative to men. This conclusion is robust to the use of alternative indicators of financial stability and to the estimation with instrumental variable to take into account endogeneity.

This work has important policy implications. Our conclusion suggests that increasing gender equality in access to credit is not only beneficial for women's economic empowerment because of the spillover effects on growth and poverty mitigation. It also brings economic benefits in terms of financial stability. As a consequence, issues related to equal access to

credit should not be ignored by regulators concerned with financial stability. Thus, promoting gender equality in access to credit might be added at the agenda of authorities to promote more stable banking systems.

Our research is an initial step towards understanding the effects of the gender gap in access to credit on financial stability. Since lower financial stability is a determinant of banking crises, a natural question that emerges is to know whether more female-inclusive banking systems are associated with a lower occurrence of banking crises. We let this question for further research.

**Table 4.1. Descriptive statistics**

This table provides descriptive statistics for the variables used in the study.

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Std Dev.</b>	<b>Min</b>	<b>Max</b>
<b><i>Dependent variables</i></b>					
Z-score	2,525	3.1238	1.004	0.678	4.7022
Pure Z-score	2,525	33.6465	26.997	0.096	101.9291
Alternative Z-score	1,627	3.6275	1.120	1.124	5.6087
SD ROA	1,627	0.6460	0.918	0.030	4.1487
<b><i>Country-level variables</i></b>					
Female to Male Ratio	2,525	0.8521	0.1798	0.1103	1.4166
Rule of Law	2,525	0.2783	0.9341	-1.7855	2.1297
Bank Concentration	2,525	0.5304	0.1965	0.226	1
GDP Growth	2,525	0.036	0.0281	-0.0655	0.2668
GDP per Capita	2,525	2.1835	0.1396	1.782	2.4461
Inflation	2,525	1.1990	0.9487	-1.9616	3.6959
<b><i>Bank-level controls</i></b>					
Loans to Assets	2,525	0.5303	0.2184	0.0877	0.8766
Deposits to Assets	2,525	0.6214	0.2351	0.0773	0.8984
Size	2,525	13.2268	1.8434	9.8548	16.4939
Cost to Income	2,525	0.6027	0.1956	0.2671	1.275
<b><i>Instrumental variable</i></b>					
Employment	2,525	0.5092	0.126	0.0778	0.8352

**Table 4.2. Main estimations**

This table presents the results of OLS regressions examining the relation between the female-to-male ratio of access to credit and financial stability. The dependent variable is *Z-score*. Definitions of variables are provided in the Appendix A2. Robust standard errors controlling for heteroscedasticity are reported within parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)
Female to Male Ratio	0.251** (0.108)	0.276*** (0.0970)	0.218* (0.115)	0.239** (0.103)
Rule of Law			-0.125 (0.135)	-0.145 (0.113)
Bank Concentration			0.0276 (0.142)	-0.126 (0.122)
GDP Growth			0.616 (1.307)	3.188*** (1.160)
GDP per Capita			-0.462* (0.266)	-0.0573 (0.271)
Inflation			-0.0281 (0.0370)	-0.0542* (0.0317)
Loans to Assets		0.173 (0.186)		0.242 (0.186)
Deposits to Assets		-0.231 (0.210)		-0.313 (0.206)
Size		-0.318*** (0.0533)		-0.331*** (0.0641)
Cost to Income		-2.506*** (0.202)		-2.562*** (0.199)
Constant	2.910*** (0.0918)	8.661*** (0.737)	7.075*** (2.372)	9.441*** (2.089)
Observations	2,525	2,525	2,525	2,525
Cluster	Bank	Bank	Bank	Bank
Year dummies	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.005	0.263	0.011	0.276
Year dummies	Yes	Yes	Yes	Yes



**Table 4.3. Alternative measures of financial stability**

This table presents the results of OLS regressions investigating the relation between the female-to-male ratio of access to credit and financial stability. We check the robustness of our results by considering alternative measures of financial stability. Definitions of variables are provided in the Appendix A2. Robust standard errors controlling for heteroscedasticity are reported within parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1) Pure Z-score	(2) Alternative Z-score	(3) SD ROA
Female to Male Ratio	3.238* (2.264)	0.306** (0.0306)	-0.554* (0.241)
Rule of Law	4.923 (3.321)	0.266 (0.611)	-0.413 (0.268)
Bank Concentration	-6.707** (3.398)	0.0175 (0.640)	-0.362 (0.263)
GDP Growth	-44.35*** (3.391)	-2.368*** (0.661)	-0.325 (0.279)
GDP per Capita	-6.001*** (1.269)	-0.287 (0.229)	0.0178 (0.0933)
Inflation	-2.264 (2.438)	-0.378 (0.502)	0.150 (0.181)
Loans to Assets	-4.074* (2.444)	0.692* (0.386)	-0.350** (0.176)
Deposits to Assets	42.51** (20.65)	6.078 (4.145)	1.972 (2.730)
Size	-93.33** (44.63)	16.96** (7.172)	-5.332** (2.701)
Cost to Income	-1.745*** (0.623)	-0.0193 (0.0802)	-0.0213 (0.0309)
Constant	345.1*** (91.05)	-28.91** (14.54)	12.89** (5.471)
Observations	2,525	1,627	1,627
Cluster	Bank	Bank	Bank
Year dummies	Yes	Yes	Yes
R <sup>2</sup>	0.228	0.089	0.050

**Table 4.4. IV estimation**

This table presents the results of G2SLS regression using IV to examine the relation between the female-to-male ratio of access to credit and financial stability. Definitions of other variables are provided in the Appendix A2. Column (1) displays the first-stage regression results while column (2) reports the second-stage regression results. Regarding weak identification, we use the Kleibergen-Paap F-test, with H0: the estimated equation is weakly identified (i.e. the smallest canonical correlation between the linear combinations of the independent variables and the instrument is zero). The corresponding test statistic indicates that the null hypothesis is rejected at the 1% significance level. Robust standard errors controlling for heteroscedasticity are reported within parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1) Female to Male Ratio	(2) Z-score
Female to Male Ratio		0.779** (0.331)
Employment	0.4663*** (0.0368)	
Rule of Law	-0.0093 (0.0064)	0.0890*** (0.0321)
Bank Concentration	0.1445** (0.0196)	0.328*** (0.119)
GDP Growth	-0.7563*** (0.1666)	3.659*** (0.795)
GDP per Capita	0.0359*** (0.0055)	-0.0882*** (0.0257)
Inflation	0.0240*** (0.0048)	-0.107*** (0.0262)
Loans to Assets	0.0497 (0.0141)	0.307*** (0.0885)
Deposits to Assets	0.0027 (0.0131)	0.377*** (0.0797)
Size	0.0332 (0.0179)	-1.886*** (0.103)
Cost to Income	-0.0059** (0.0019)	0.0387*** (0.0122)
Constant	0.3986*** (0.0672)	3.301*** (0.410)
Observations	2,525	2,525
R <sup>2</sup>	0.106	0.200
Underidentification test (Kleibergen–Paap rk LM statistic)		108.56***

## **Appendix 4.A. List of countries**

Afghanistan, Albania, Algeria, Angola, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Democratic Republic of the Congo, Denmark, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, France, Gabon, Germany, Ghana, Greece, Guatemala, Guinea, Haiti, Hong Kong, Hungary, India, Indonesia, Iraq, Ireland, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kosovo, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Luxembourg, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Niger, Nigeria, North Macedonia, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Rwanda, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Tajikistan, Tanzania, Thailand, Togo, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, USA, Uruguay, Vietnam, Zambia, Zimbabwe.

## Appendix 4.B. Variable definitions

Variable name	Definition and source
<b><i>Dependent variables</i></b>	
Z-score	Measure of bank risk taking: $Z\text{-score} = (ROA + CAR) / \delta(ROA)$ , where ROA is the return on assets, CAR is the ratio of equity to total assets, and $\delta(ROA)$ , is the standard deviation of return on assets computed over the whole period of the study. <i>Source: BankFocus.</i>
Pure Z-Score	Exponential value of Z-score. <i>Source: BankFocus.</i>
Alternative Z-Score	Another measure of bank risk taking: $Z\text{-score} = (ROA + CAR) / SD\ ROA$ , where ROA is the return on assets, CAR is the ratio of equity to total assets, and SD ROA is the 3-years standard deviation of ROA. <i>Source: BankFocus.</i>
SD ROA	3-years standard deviation of ROA. <i>Source: BankFocus.</i>
<b><i>Independent variables</i></b>	
<b><i>Variable of interest</i></b>	
Female to Male Ratio	Female-to-male ratio of access to credit. <i>Source: Global Findex.</i>
<b><i>Bank-level controls</i></b>	
Size	Logarithm of total assets. <i>Source: BankFocus.</i>
Loans to Assets	Ratio of loans to total assets. <i>Source: BankFocus.</i>
Deposits to Assets	Ratio of deposits to total assets. <i>Source: BankFocus.</i>
<b><i>Macroeconomic variables</i></b>	
GDP per Capita	Log of real gross domestic product per capita. <i>Source: World Development Indicators.</i>
GDP Growth	Annual percentage growth rate of GDP at market prices based on constant local currency. <i>Source: World Development Indicators.</i>
Inflation	Annual percentage change in consumer prices in a country. <i>Source: World Development Indicators.</i>
Rule of Law	Rule of Law index. <i>Source: World Governance Indicators.</i>
Bank Concentration	Market share in total assets of the top three banks. <i>Source: World Development Indicators.</i>
<b><i>Instruments</i></b>	
Employment	Proportion of women in working age currently engaged in any formal activity to produce goods or provide services for pay or profit. <i>Source: International Labour Organization.</i>



## Section 2

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# The ins and outs of female leadership







# Chapter 5: Is It a Man's Wor(l)d? The Effect of Linguistic Gender Marking on Female Entrepreneurship<sup>35</sup>

## Abstract

Some languages require speakers to grammatically attend to and mark gender, whereas others do not. Recent studies document that this linguistic distinction is associated with gender differences in economic outcomes. In this paper, we investigate the relation between gender marking in language and women's attitudes towards entrepreneurial activity. Using survey data from 384,393 individuals in 48 countries during the period 2001-2018, we find that the intensity of linguistic gender marking in a language is positively related to women's entry into entrepreneurship. This effect is driven by necessity-based entrepreneurial motivations: high prevalence of sex-based discrimination in the labour market in countries with gender-intensive languages lead women to enter into entrepreneurship. Our results are robust to a battery of sensitivity tests.

**Keywords:** Female entrepreneurship ▪ Language ▪ Institutional theory.

**JEL Codes:** G21 ▪ G34 ▪ J16.

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<sup>35</sup> This chapter is co-written with Francis Osei-Tutu.

*“We are inclined to think of language simply as a technique of expression, and not to realize that language first of all is a classification and arrangement of the stream of sensory experience which results in a certain world-order, a certain segment of the world that is easily expressible by the type of symbolic means that language employs.”* Whorf (1956, p. 55)

## **1. Introduction**

Female entrepreneurship is widely acknowledged as a key driver of sustainable economic development and employment creation, with high impacts on social exclusion and poverty alleviation (Langowitz and Minniti, 2007). However, despite efforts by policymakers worldwide to empower women and to explore their leadership potential, there is still a significantly lower proportion of women related to men who pursue an entrepreneurship career (Berger and Kuckertz, 2016). For instance, the 2020/21 Women's Entrepreneurship Report provided by Global Entrepreneurship Monitor (GEM) documents that female entrepreneurship represents over three quarters of that of men. Such discrepancies have led to the emergence of a large literature on female entrepreneurship, focusing primarily on disparities in the individual-level characteristics (Acs et al., 2011).

Nonetheless, a nascent strand of literature argues that culture is of prime importance to explain women's entry into entrepreneurship (Hechavarria et al., 2019). As part of institutional theory, the cultural environment has been shown to exert influence on one's attitude towards entrepreneurial activity - ultimately determining his/her decision to pursue such a career path<sup>36</sup>. In contrast to studies that consider only individualistic, resource-based and rationalistic perspectives of entrepreneurship, prevailing values, rules, expectations and material infrastructure in countries simultaneously provide individuals with entrepreneurial opportunities and set boundaries for their actions (Su et al., 2017). In this regard, research on women's entrepreneurship determinants has gradually moved away from an emphasis on individual socio-demographic factors towards a focus on the role of institutions providing mixed results (Estrin and Mickiewicz, 2011; Yousafzai et al., 2015; Goltz et al., 2015; Lee and Marvel, 2014). These inconsistencies suggest that unexplored complexities may infer in the relationship between institutions and women's entrepreneurial behaviours, therefore calling for more investigations.

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<sup>36</sup> See Bruton et al. (2010) for a complete survey of the literature.

Until now, one overlooked informal institutional factor is gender marking in language (Terjesen et al., 2016) as several long-lasting cross-country divergences in labour market dynamics may be attributable to divergences in linguistic structures (Drori et al., 2018; Hicks et al., 2015; Santacreu-Vasut et al., 2013). Languages differ in the extent to which it requires speakers to mark and attend to grammatical gender. For example, some languages can employ a noun assignment based on gender with the masculine or feminine categorization of nouns as in French (“le/ la”), which does not exist in English. Other languages such as Finnish and Swahili do not systematically mark gender distinctions. Such linguistic features can influence individuals’ thought as gendered languages constantly call attention to gender distinctions by discriminating between feminine and masculine nouns and pronouns. Restated in economic parlance, as a repository of aspects of the societal “common culture”, linguistic structure acts as a constraint on cultural change that affects individuals’ economic choices. Thus, language is particularly germane to entrepreneurship given prior evidence of cross-cultural variation in cognitive scripts associated with venture-creation decisions (Mitchell et al., 2000) but also because gender marking in language has been shown to be stable over time and inherited from the distant past (Wichmann and Holman, 2009), and therefore exogenous to contemporaneous values and beliefs. Previous research has demonstrated the importance of the style of verbal communication on several entrepreneur-related factors (e.g. Anglin et al., 2018; Moss et al., 2018; Parhankangas and Renko, 2017) but the relationship between linguistic structures and female entrepreneurship remains fuzzy.

In this paper, we investigate the potency of language in explaining women’s entrepreneurial attitudes through the lens of gender marking. Our main argument lies in Derrida’s (1979) claim: to perform in the creation of new rules or values, i.e. “*citation is prior to intention*”. Thus, female prospects may lie on gender-related pre-existing values (i.e. *citation*) to formalize their entrepreneurial entry decision (i.e. *intention*). We thus hypothesize that gendered linguistic structures is a part of the citation realm that might widen the gender gap in entrepreneurial activity when gender marking is intensive. We evaluate our hypothesis using a unique multiple-source sample of 384,393 individuals in 48 countries encompassing a total of 23 languages. We obtain two important results. First, we find that greater gender differentiation in language structure is associated with significantly higher levels of female entrepreneurial activity. This effect is persistent even after considering additional cultural variables, and alternative sampling and alternative measure of language gender intensity. Second, we delve deeper to explore potential explanations for the positive relationship

between language gender marking and female entrepreneurship. We find that the positive effect is driven by necessity-based entrepreneurship. Due to the high prevalence of sex-based discrimination in the labour market in countries with highly gendered languages, women become entrepreneurs because of unemployment situations or dissatisfaction with their previous jobs. We do not find evidence that women venture into entrepreneurship for opportunity-based reasons.

The takeaways from this exercise are several. First, we enrich existing literature about the effects of the institutional framework on women's entrepreneurial activity by investigating an original country-level factor that might influence females' attitudes towards self-employment. To explain cross-national variance in female entrepreneurship, studies have emphasized the importance of formal institutions, such as the legal framework (Estrin and Mickiewicz, 2011), education systems (Hechavarría and Ingram, 2019), and banking systems (Marlow and Patton, 2005). Other studies have focused on informal institutions, such as social norms (Baughn et al., 2006), perceived capabilities (Elam and Terjesen, 2010), and perceived opportunities (Verheul et al., 2006). Moreover, Ahl (2006) emphasized the need for entrepreneurship research to explore gender beyond the mainstream Anglo-Saxon context and called for more international comparative studies.

Second, as a critical component of informal institutions, and a basic tool and core channel for individuals' cognitive information processing (Boroditsky, 2011), language structures may determine individual decision-making under uncertain situations (Chen, 2013). However, since such institutional influence occurs below the surface of conscious collaborations, research emphasizing the role of formal institutions (e.g. government regulations) has missed this subtle effect. We shed new light on the nexus of institutions and female entrepreneurship by shifting our attention to the hidden yet pervasive influence of an informal institution: gender marking in language.

This leads to the third contribution. We obtain results at odds with Hechavarría et al. (2018) findings by showing that gender marking in a language increases women's entrepreneurship *ceteris paribus*. Nonetheless, by introducing the distinction between opportunity and necessity entrepreneurship as a way to link the inner processes of individuals to the institutional context, we shade the allegation that the existence of broader societal bias automatically and equally reproduces gender disparities in entrepreneurial activity across all geographic regions. We therefore advance previous discussions on the institution-entrepreneurship nexus by introducing the distinction between opportunity and necessity

entrepreneurship as a way in which to link the inner processes of individuals to the informal institutional context.

The subsequent sections of this paper are organized as follows. Section 2 presents a literature review, while Section 3 specifies the methods used. Section 4 summarizes the results obtained that are subject to a battery of robustness checks displayed in Section 5. Lastly, Section 6 includes a discussion and our conclusions.

## **2. Background**

### **2.1. Gender marking in language**

A language possesses a gender system if it has classes of nouns that require inflectional agreement with other elements in the sentence. Grammatically, languages can be classified into three gender-related groups: grammatical gender languages, natural gender languages, and genderless languages (for overview of definitions and classification of grammatical gender across language families, see Stahlberg et al. (2007)). *Grammatical gender languages* assign and morphologically mark gender not only to animate nouns (which have biological sex -e.g. man, woman), but also to inanimate nouns (e.g. dream, book). For example, “la lune” (the moon) in French carries feminine grammatical gender. In this way, gender is a function of the language that is constantly made salient.

English (a West Germanic language), and Northern Germanic (or Scandinavian) languages, belong to what are called *natural gender languages*. Nouns are not grammatically marked such that discussion of gender can often be avoided, especially for inanimate objects (e.g. the neighbour). However, personal pronouns (i.e. he, she) do serve to demarcate gender, and gender-neutral discussions can be difficult when talking about individual persons.

Finally, some languages, called *genderless languages*, are characterized by their complete lack of grammatical gender distinction in the noun system. Genderless languages generally belong to the Uralic (Finnish), Turkic (Turkish), Iranian (Persian), Sinitic (Chinese), and Bantu (Swahili) language families, along with some others. Finnish, for example, have no gender-differentiated pronouns, instead using “hän”, which has no gender distinction and requires the listener to use context such as the subject’s name in order to determine whether the subject is male or female.

## 2.2. Grammatical gender and linguistic relativity

The *linguistic relativity hypothesis*, also referred to as the *Sapir-Whorf hypothesis* (SWH), posits that language structure plays a distinct role in coding its speakers' representations of reality (Sapir, 1921; Whorf, 1956). Originally, in its Whorfian strongest formulation, the relationship between language and thought was assumed to be deterministic, such that language acts as a mould of cognitive processes. Nonetheless, contemporary studies embraced Slobin's (1996) "*thinking for speaking*" argument, which stipulates that the set of obligatory grammatical categories of language determines which aspects of experience must necessarily be expressed by the speaker. Thus, as stated by Hunt and Agnoli, (1991), "Language differentially favours some thought processes over others". For example, in one of its laboratory experiments, Boroditsky et al. (2003) asked speakers of German and Spanish to describe a bridge. German speakers used stereotypically feminine adjectives like "beautiful, elegant, fragile, peaceful, pretty, and slender", whereas Spanish speakers viewed bridges as "big, dangerous, long, strong, sturdy, and towering". This differential perception of a same object may rely on the fact that "bridge" in German ("*die brücke*") is grammatically feminine while it is a masculine noun ("*el puente*") in Spanish. Other expressions were tested during that experiment. The authors concluded that there are prevailing tendencies across different language groups to ascribe features to objects based on their grammatical gender.

The presence of female-male distinctions in language may reflect cultural variations in gender roles, which are reinforced by the cognitive impact of gendered grammar on speakers' representation of reality (Boroditsky, 2009; Vitevitch et al., 2013). Falck et al. (2012) hold that language is the best measurable indicator of cultural differences and provides empirical evidence that dialects portray culture in a way that is persistent over time and has a causal effect on economic behaviour. Indeed, by reflecting inherited attitudes and beliefs, linguistic structure directly influences speakers' cognitive processes and perceptions and reconstruction of the social environment (see Lehman et al. (2004) for a survey). The need – or not – to make reference to gender in language may affect individuals' credences, their preferences and their saliences. In that sense, Johansson (2005) suggests that evolutionary pressures related to tool making, reproduction and the division of labour explain languages' origins.<sup>37</sup> Thus, the need

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<sup>37</sup> As noted by Wichmann and Holman (2009), linguistic features are persistent and have remained stable for long time.

to make reference to gender in language may act as a marker for traditional gender roles and norms. In environments where the linguistic structures are less gendered, individuals may not have gendered prejudices about certain professions and positions (van der Velde et al., 2015). By contrast, in a society where the dominant language requires extensive gender distinctions, individuals may suffer from a gender-biased perception of the reality.

### **2.3. Language gender marking and female entrepreneurship**

The pervasiveness of male/female distinction in language creates and maintain structural differences throughout gender-related socioeconomic outcomes, especially in the labour force. Mavisakalyan (2015), for example, shows that speakers of gendered languages are more likely to express support for giving men preferential access to jobs. In the same vein, Givati and Troiano (2012) demonstrate that countries with gender-intensive languages present shorter maternity leaves and greater tolerance for gender-based discrimination. Similarly, these countries exhibit higher estimates of gender wage gap (van der Velde et al., 2015). At the firm level, grammatical gender appears to have negative implications for female participation in corporate leadership positions (Santacreu-Vasut et al., 2014).

These studies clearly indicate that gender marking in language may embody inherited attitudes, beliefs and perceptions that also predominate in the business environment. Rooted perceptions concerning females' role also affect how a society perceived the legitimacy for entrepreneurship by women. Based on a sample of 2,361 microfinance organizations operating in 115 countries between 1995 and 2015, Drori et al. (2018) show that microfinance institutions are less supportive for female entrepreneurs in societies with a higher degree of grammatical gender marking in their main language. At the country level, Hechavarría et al. (2018) demonstrate that sex-based systems and gender-differentiated pronouns are associated with a higher gender gap in early-stage entrepreneurial activity.

Thus, one may argue that individuals who speak languages with gendered linguistic structures are more likely to act in line with traditional gender roles (Santacreu-Vasut et al., 2014). For example, Hicks et al. (2015) show that female-male distinction in language is a strong predictor of the household tasks that women and men engage in. Indeed, the most commonly shared traditional role is that men provide for themselves and their families with wages earned through work outside the household, including entrepreneurship, while women

take care of the household work. Thus, the ideal entrepreneur is predominantly described as stereotypically masculine (Ahl, 2006) and characterized by agentic features such as competitiveness and need for achievement or risk taking (Gupta et al., 2009). In that sense, some authors have proposed a “think entrepreneur, think male” paradigm to recognize the association between entrepreneurial activity and masculine traits (Eddleston et al., 2016). In line with Slobin's (1996) “*thinking for speaking*” argument, entrepreneurship is an activity generally presented in masculine terms such an individual may develop the perception that this work is gendered. We therefore argue that the intensity of gender in a language may reinforce the salience of traditional views of gender roles in the minds of speakers, thereby influencing women's participation in entrepreneurship activities. Formally:

H1a: Women entrepreneurship is lower in countries where the dominant language has more gendered linguistic structures.

As stated before, grammatical gender marking may allow capturing a country's culture and gender roles. In that sense, anecdotal evidence in women's entrepreneurship literature shows that in countries providing a female supportive environment, only women's employment is integrated whereas women's self-employment involves acts of institutional disintegration (Klyver et al., 2013). In that sense, Acs et al. (1994) demonstrate that self-employment decreases with an increase in female labour participation. Similarly, women have lower entrepreneurship rates than men, and thus as their share of the labour force increases, their overall rate of self-employment decreases (Audretsch et al., 2002). Entry into entrepreneurship might be the last resort for women who are unable to find paid employment because traditional gender roles may force women to start a business to achieve work and family balance (Heilman and Chen, 2003). Thus, predominant gender roles in countries with gender-intensive languages may encourage female prospects to consider self-employment due to the discrimination they may face in the paid employment market. An alternative interpretation of the *SWH* would imply that women speaking highly gender-marked languages are more likely to be forced to consider entrepreneurial careers such that:

H1b: Women entrepreneurship will be higher in countries where the dominant language has more gendered linguistic structures.



### 3. Data and methodology

To examine whether language gender marking influences women's entrepreneurship, our study draws on three datasets. First, we extract data on entrepreneurship from the Global Entrepreneurship Monitor adult population survey (GEM population survey). Second, we capture the pervasiveness of female-male distinctions in language grammatical rules using data provided by the World Atlas of Language Structures (WALS: Dryer and Haspelmath, 2013). WALS provides information on 525 structural linguistic features compiled by a team of 55 authors from published materials and other sources of cross-linguistic data. Third, we control for country-level potential cofounders of entrepreneurship using the World Bank Development indicators. All variables are described in Appendix 5.A.

#### 3.1. Entrepreneurship data

We rely on the GEM survey for information on entrepreneurship. This dataset is obtained from nationally representative surveys and comprises repeated cross-sectional random sample of at least 2,000 employable people in several countries for each year. While this survey is standardized to allow for cross-country comparison, there are small variations in sampling methods due to country variation in accessibility and availability of respondents.<sup>38</sup> GEM is one of only two available international comparative datasets on entrepreneurship; the other is World Bank Group Entrepreneurship Survey. As noted by Acs et al. (2008), the fact that the World Bank database focuses on registered companies only, while GEM captures all entrepreneurial activity. GEM thus matches our theoretical framework in that we concentrate on individual occupational choice, without focusing on the issue of registration.

Our dependent variable is the GEM population survey's Total Entrepreneurial Activity (*TEA*). This binary variable captures whether an individual aged 18–64 is either a nascent entrepreneur (i.e., involved in setting up a business but who has not paid salaries, wages, or any other payments to the owners for more than three months) or an owner-manager of a new business (i.e. owned and managed an existing business that has paid salaries, wages or any other payments to the owners for more than 3 months but not more than 42 months).

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<sup>38</sup> For a detailed description of the sampling criteria, see Reynolds et al. (2005).

### 3.1. Measuring the intensity of gender in languages

To examine the intensity of gender marking in a language, we employ the World Atlas of Linguistic Structures (WALS: Dryer and Haspelmath, 2013). Following existing studies (e.g., Santacreu-Vasut et al., 2014; Osei-Tutu and Weill, 2021), we consider the four variables that are related to gender in this database to measure gender distinctions in a country's dominant language.<sup>39</sup> Each variable reflects a different aspect of gender intensity in a language.

The first variable is sex-based. The grammatical gender system employed in some languages is based on biological sex (female versus male distinctions), whereas others are not. For example, in Danish, a non-sex-based language, the gender system is based on the distinction between human and non-human. Other non-sex-based languages include Swedish and Japanese where gender systems are based on the distinction between animate and inanimate. We construct *Sex-Based* as a dummy equal to one if a language has Sex-based gender system and zero otherwise.

The second variable takes into account the number of genders present in a language. English has three genders (feminine, masculine, and neuter), the Nigeria Fula has about twenty genders, whereas other languages such as Spanish and Arabic have only two genders (masculine v feminine). We build *Number of Genders*, as a dummy equal to one if the language has exactly two genders, and zero otherwise.<sup>40</sup>

We next consider the rules for gender assignment in a language. Assignment of genders may depend on the semantic (meaning) or formal (form or shape of the noun) rules. As explained by Corbett, (2013), "The meaning of a noun is sufficient to determine its gender, for all or almost all nouns' in languages that assign gender based on the semantic assignment system (e.g. English assigns a neuter gender to a word like "table")." However, other languages assign gender based on both the semantic and formal reasons, where the neuter gender is not necessarily assigned to the nouns that are not sex differentiable. To capture this

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<sup>39</sup> The dominant language is defined as the language spoken by the majority population in a country, following Britannica (2010).

<sup>40</sup> Languages such as English, which feature three genders display a weaker form of sex-based gender distinctions because some objects are neither classified as masculine nor feminine. Thus, gender marking is less intense in these languages than in languages which have exactly two genders ("masculine" versus "feminine").

assignment rule, we create *Gender Assignment* equals one if a language assigns gender both on semantic and formal rules, and zero otherwise.

The fourth variable considers the presence of gendered personal pronouns in languages. For instance, English has sex-based distinctions only in third-person pronouns (he/she/it). Languages that normally have gender distinctions in the first-person pronouns also have gender-specific pronouns in the second- or third-person, or both (Greenberg, 1963). We introduce *Gender Pronoun* as a dummy equal to one if a language distinguishes gender in the third-person pronoun and also in the first- and/or second-person pronouns, and zero otherwise.

To consider the pervasiveness of gender marking for each language, we finally build the variable *Aggregate Gender Intensity (AGI)* as the sum of all the four grammatical gender variables that we have described above. AGI reflects the overall intensity of gender distinctions in a language with values ranging from 0 to 4: where a value of 4 reflects a highly gendered language and 0 for gender-neutral language. To better understand, let us explain the AGI for one of the languages in one sample, English. The AGI for English is 1: its gender system is based on sex-based distinctions (*Sex-Based* = 1), has three genders (*Number of Genders* = 0), assigns gender on semantic grounds (*Gender Assignment* = 0), and distinguishes gender only in the third-person pronouns (*Gender Pronoun* = 0).

### 3.2. Empirical strategy

To formally investigate whether gender marking in language influences women's entrepreneurial behaviour, we estimate the following model specification:

$$TEA_{ik} = \alpha + \beta_1 GM + \beta_2 Female + \beta_3 (Female * GM_k) + \delta X_{ik} + \tau C_k + \eta + \varepsilon_{ik}$$

where  $TEA_{i,k}$  indicates whether the respondent is involved in the Total Early-stage entrepreneurial Activity; *Female* is a dummy variable indicating whether the respondent is a female; *GM* represents the language gender marking variables.

X represents a set of individual level controls variables. We first include *Age* in our model. Moreover, Davidsson and Honig (2003) identify a significant positive relationship between education and entrepreneurship. Thus, we consider *Education* as a dummy equal one

if the respondent has a post-secondary or higher education attainment, and zero otherwise. *Opportunity* captures a personal assessment of the existence of entrepreneurial opportunities. We include *Fear of Failure* to take into account the extent to which fear of failure affects the behaviour of a person with respect to starting a business. Familiarity ties with vicarious entrepreneurs have been shown to affect the entrepreneurial intentions of individuals as role models may for example help by providing information, which alleviates both uncertainty and the cost of starting the business (Arienus and Minniti, 2005). Therefore, we control for whether the potential nascent entrepreneur knows any other entrepreneurs (*Know Other*).

In addition to the aforementioned individual-level characteristics, we follow the literature in controlling for a number of macroeconomic level factors ( $C_k$ ) that might affect entrepreneurial entry. Wennekers et al. (2005) document a positive relationship between entrepreneurial activity and economic development, that we control by including the logarithm of GDP per capita (*GDP per Capita*) and *GDP Growth*. To take into account the level of financial development, we include *Domestic Credit* measured as the domestic banking credit to the private sector as a share of GDP. We finally control for the inflation rate (*Inflation*).

We include a set of fixed effects ( $\eta$ ) to control for unobserved heterogeneity. Languages may evolve from common ancestors or a parental language. Inclusion of dummies for language family origin controls for that fact a language may descend from a proto-language. We also include continent fixed effects to soak up continent-level heterogeneity (for example, different geographic contexts could impact entrepreneurial levels) as well as the fact that languages within a continent may share similar components and characteristics.

The main equation is estimated using a probit model. Probit models extend the principles of generalized linear models to better treat the case of dichotomous dependent variables; as it is the case for yes/no dependent variables by allowing the study of a mixture of categorical and continuous independent variables with respect to a categorical dependent variable. Technically, the probit technique substitutes the usual OLS estimation with a maximum likelihood estimation of a link function for the dependent variable. In all estimations, we present the marginal effects to facilitate the interpretation of both statistical and economic significance. We cluster the standard errors at the country level to account for the autocorrelation within countries. Descriptive and bivariate statistics are displayed in Table 5.1.

## 4. Results

### 4.1. Main estimations

The results of our analysis are presented in Table 5.2. In column (1), we add only *Gender Intensity* (capturing the intensity with which languages mark gender) in the model, with the set of fixed effects (continent and language family). We observe that the coefficient on *Gender Intensity* is statistically insignificant. This finding is important, because it indicates that among the respondents, those speaking languages that are highly gendered do not significantly differ from those that do not mark gender, in terms of their likelihood to become entrepreneurs. Column (2) replaces *Gender Intensity* with *Female*. We find that women have a lower likelihood to become entrepreneurs: on average, women are about 21 percentage points less likely compared to men to enter entrepreneurship. We include *Gender Intensity*, *Female*, and their interaction term in column (3). We find significantly positive coefficient on the interaction term, suggesting that women speaking highly gendered languages are more likely to become entrepreneurs. Column (4) adds all the individual-level and country-level control variables in addition to our main variables. After controlling for a wide range of individual and country-level characteristics, the estimates still reveal that the intensity of gender marking in language plays an important role in women's entrepreneurship decision. Women speaking languages that frequently mark genders have a higher probability to become entrepreneurs. Economically, the effect is substantial: moving from a language with no gender marking to one with all four gender marking features is associated with about 8 percentage points increase in a woman's likelihood to venture into entrepreneurship.

The estimates provide evidence that gender-intensive languages foster women's entrepreneurship. In Table 5.3., we replicate the estimations for each of the distinct grammatical gender variables. Columns (1)-(4) present the results respectively for *Number of Genders*, *Sex-Based*, *Gender Pronoun*, and *Gender Assignment*. We obtain significantly positive coefficients for each linguistic feature (except the positive but insignificant coefficients in column (4)), suggesting that women in countries with highly gendered languages have a higher probability to become entrepreneurs. This finding shows that the observed effect of grammatical gender on women's entrepreneurship is less likely to be driven by other country-specific characteristics.

Overall, we find that language gender marking affects women's attitudes towards entrepreneurship. The likelihood to enter into entrepreneurship is significantly higher living in countries whose language marks female – male distinctions more pervasively. These results, therefore, corroborate the *preference theory* presented in H1b, i.e., once women have choices, they prefer one that corresponds to their priorities, and due to higher risk aversion, fewer women than men choose entrepreneurship.

Regarding the control variables, we find that *Age* is found to be negatively and associated with TEA in line with Levesque and Minniti (2006). As suggested by Millan et al. (2014), education is positively correlated with entry into entrepreneurship. The coefficient of *Know Other* is positive, confirming role models' argument that role models are positively and significantly related to women's propensity to start businesses regardless of motivation.

## **4.2. Additional culture measures**

Inglehart (1997) defines culture as the “set of basic common values which contributes to shaping people's behaviour in a society.” A plethora of literature shows that cultural differences between countries influence the decision to become self-employed: a supportive culture would lead to social legitimation, making the entrepreneurial career more valued and socially recognized in that culture, thus creating a favourable institutional environment. If linguistic structures, as part of informal institutions, influence female entrepreneurship, then other cultural dimensions may also affect entry into entrepreneurship (see Hayton et al. (2002) for a survey). Thus, despite the inclusion of relevant firm and country-level countries as well as a set of fixed effects, our model may be driven by other cultural factors. We address this concern by controlling for alternative indicators of national culture. The results are presented in Table 5.3.<sup>41</sup>

### **4.2.1. Strong FTR**

If grammatical gender marking in language shapes women's entrepreneurial behaviour, then it is consequently possible that other linguistic structures may as well have a

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<sup>41</sup> Because we observe similar results across all language indices, we report results for the Gender Intensity in this and subsequent sections for simplicity. Results for the other language grammatical gender indices are available upon request.

similar impact (even if we control for the evolution of languages in our analysis). To test whether our reported findings are not explained by broader linguistic differences, we control for the presence of future tense marking in language. A growing body of literature documents that speakers of languages that grammatically distinguish between future and present events (e.g. English) have a less future oriented behaviour, compared to languages that do not require this distinction (e.g. Chen, 2013; Mavisakalyan, Tarverdi, and Weber, 2018). We therefore include *Strong FTR* (a dummy equal to one if a language is classified as strong Future Time Reference language, and zero otherwise) in our model with data from Chen (2013).

Results in column (1) show that other linguistic structures do not drive our results. We still find that gender marking in language is positively related to female entrepreneurship. Additionally, we observe insignificant coefficient on *Strong FTR*.

#### **4.2.2 Religion**

Since the seminal work of Weber (1905), several studies document that the beliefs and values propagated by religion encourage business venturing (Galbraith, 2007; Henley, 2017). For example, Zelekha et al. (2014) demonstrate that Jews have the highest entrepreneurship tendency, followed by Hindus, Protestants, Orthodoxies, Buddhists, Catholics, and Muslims the least. In order to test if religion does not drive our results, we introduce dummy variables in our model that capture whether the majority of the inhabitants in a country are Catholics (*Catholic*), Muslims (*Muslim*), Buddhists (*Buddhist*) or Protestants (*Protestant*). Data come from the CIA World Factbook.

The results are represented in column (2). We observe that our results still hold after introducing religion dummies. Thus, religion does not drive our reported findings. Interestingly, we find that *Catholics*, *Protestants* and *Buddhism* fosters the propensity for entrepreneurship.

#### **4.2.3 Hofstede cultural dimensions**

Hofstede (1980) characterizes national culture into 6 dimensions. The classifications of culture by Hofstede have widely been used as a reference in a large number of studies to understand the influence of culture on entrepreneurial activities. For instance, Tiessen (1997) shows that the individualism-collectivism cultural dimension is related to an individual's

entrepreneurial propensity. To control for the impact of other cultural measures, we focus on four dimensions: *Individualism*, *Uncertainty Avoidance*, *Power Distance* and *Masculinity*.

As shown in column (3), the results remain consistent, even after controlling for these cultural characteristics. Female entrepreneurship is significantly higher in countries with a highly gendered language.

#### **4.2.4 Legal origins**

In the past couple of decades, social scientists have produced a considerable body of theoretical and empirical research suggesting that the historical origins of a country's legal system and regulatory policies can affect a broad range of developmental outcomes (e.g. see La Porta et al. (2008)). Previous research suggests a strong correlation between legal origins and three broad categories of variables that are critical to entrepreneurship: (i) financial institutions and the development of capital markets, (ii) government regulations and policies, and (iii) judicial institutions.

To take into account the set of legal institution that could be correlated with entrepreneurship decisions, we control in our model for whether a country has English legal origin and French legal origin. Data come from La Porta et al. (2008). The results are displayed in column (4). Our result still confirms the positive impact of language gender marking on women's entrepreneurship.

### **4.3. Examining entrepreneurial motivations**

So far, we have documented that women speaking highly gendered language are more likely to become entrepreneurs. In this section, we delve deeper to understand this finding by studying the motivations to start new businesses.

An important aspect when investigating female entrepreneurship is the distinction between necessity and opportunity entrepreneurship. Reynolds et al. (2002) make an explicit dichotomy between opportunity-based and necessity-based entrepreneurship as contextual motivations. First, necessity entrepreneurs become self-employed because other employment options are either inexistent or unsatisfactory. These entrepreneurs are thus pushed into entrepreneurship due to situations of unemployment or dissatisfaction with their previous



jobs. In contrast, opportunity entrepreneurs choose to start their ventures by taking advantage of a perceived entrepreneurial opportunity. Opportunity entrepreneurs start a business more out of choice and usually in an area of their expertise.

We argue that women speaking gender-intensive languages are disproportionately more likely than men to report a necessity motive due to the prevalence of deeply rooted traditional gender-based norms that may significantly restrict their employment opportunities (Minniti and Arenius, 2003; Mavisakalyan, 2015). Since such women face highly discriminatory attitudes and less likely to enter the labour force, they may be pushed into entrepreneurship. Therefore, we expect that women in countries with gender-intensive languages may report higher rates of necessity-based entrepreneurship. If our hypothesis is valid, then, on the other hand, we do not expect language gender marking to explain women's entry into opportunity-based entrepreneurs or even have a negative impact.

To test this argument, we rely on survey questions in the GEM dataset. To distinguish between necessity and opportunity-driven entrepreneurship, GEM asks respondents the following questions: "Are you involved in this start-up to take advantage of a business opportunity or because you have no better choices for work?" Then the respondents are also asked: "Which one of the following, do you feel, is the most important motive for pursuing this opportunity: to have greater independence and freedom in your working life; to increase your personal income; or just to maintain your personal income?". Following existing studies, we classify a respondent as an opportunity entrepreneur (*TEA Opportunity*) if she/he responds that the most important motive is to take advantage of a business opportunity and also that the most important motive is to have greater independence and freedom or to increase personal income.

We replace *TEA* by these two other dependent variables, i.e. *TEA Opportunity* and *TEA Necessity*. The estimation results are displayed in Table 5.5. Column (1) studies the impact of language gender marking on women's likelihood to become necessity entrepreneurs. As expected, we observe significantly positive coefficient, suggesting that women speaking gender-intensive languages are more likely to be involved in necessity-based entrepreneurship. In the next column, we look at the likelihood to become opportunity entrepreneurs for women speaking gender intensive languages. We find a nonsignificant coefficient, suggesting that the presence of gender in language is not influenced women's involvement in opportunity-driven entrepreneurship.

This finding indicates that the high prevalence of gender stereotypes in the labour market in countries with gender-intensive languages push women into entrepreneurship. Such women become entrepreneurs out of necessity and not driven by opportunity.

These results provide additional support for H1b: we find that an adverse institutional factor embodied by language gender marking constraints women to be self-employed in the absence of a more favourable job opportunity.

## 5. Robustness checks

In this section, we complete our analysis with another round of sensitivity tests. Results are presented in Table 5.6.

*Excluding English-speaking countries:* Majority of the individuals surveyed in the sample are located in English-speaking countries. Therefore, our results may be driven by the over-representation of English speakers (38% of the sample). To show that our results are not based due to the over-representation of English speakers in our sample, we estimate the model by excluding English speakers from our sample. Column (1) in Table 5.6. provides evidence that English-speaking countries do not drive our results: language gender marking increases female entrepreneurship.

*Alternative gender intensity measure:* Recall that our measure of gender intensity is the sum of all the four grammatical gender variables. This variable may suffer from a potential linearity bias as it is built by summing the individual gender indicators. To address this concern, we now compute Gender Intensity based on a principal component factor analysis of the four individual language indices (*Number of Genders*, *Gender Assignment*, *Gender Pronouns*, and *Sex-Based* indexes). This new estimation is displayed in column (2). Our key finding is preserved. We still find that grammatical gender marking contributes to enhancing female entrepreneurship.

## 6. Conclusion

Women represent a large pool of untapped entrepreneurial talent that could spur innovation, job creation, and economic growth worldwide. Thus, understanding the factors of female underrepresentation at the helm of new business ventures is a first step to devising adequate policies that help bridge the entrepreneurial gender gap. Existing research has

widely explored the role of organizational and institutional factors in enabling women to launch their businesses. Nevertheless, despite growing evidence about the effects of linguistic structures on several economic outcomes, the influence exerted by language gender marking effects on entrepreneurial behaviours has been overlooked. This paper aims to fill this gap by investigating how language, as a cultural institution, may moderate the attitude of women towards entrepreneurship.

Indeed, extant literature suggests that language affects individuals' perception at the subconscious level and that it is historically embedded. In this paper, we reveal how language gender marking, a feature of language that is increasingly becoming a focus of study about gender inequalities, affects women's attitude towards entrepreneurial activity. To do this, we undertook a large-scale empirical analysis based on the study of 384,393 individuals located in 48 countries between 2001 and 2018. We demonstrate that sex-based gender systems in languages result in higher women's involvement in entrepreneurship in conflict with some previous evidence (e.g. Hechavarría et al. (2018)). Nevertheless, these results are not unprecedented. Klyver et al. (2013) find that national-level gender equality negatively impacts women's self-employment choices compared to that of men. In countries where women face discrimination in the labour market (i.e. countries where the dominant language is highly gender marked), women's entry into self-employment may be easier than overcoming barriers to entering formal sector jobs (Minniti and Arenius, 2003). For instance, Mroczkowski (1997) argues that Polish women launched their ventures to avoid unemployment resulting from the post-communist transformation. All in all, our findings corroborate the argument that language not only represents women's cultural reality but also influences their perception of economic opportunities.

Bringing in the role of gender marking in language offers an original view on how institutional factors are linked to cultural institutions for enabling female entrepreneurship (Bruton et al., 2010). Since fewer women than men engage in entrepreneurship, policymakers appear overly focused on promoting female entrepreneurship by providing support for equal opportunities. However, our findings suggest that such strategies might be counterproductive because, in countries where the dominant language is less gendered, fewer women choose entrepreneurship since they may favour formal employment which is less risky.

Some countries are implementing efforts to intentionally alter gender in language. For instance, feminists have long argued that this gendered glaring bias in French puts women at a

disadvantage, such policymakers should encourage gender-neutral language. Thus, as it stands, many nouns for professions in French have only a masculine form. Proponents of inclusive writing believe this puts women at a disadvantage, and they hope to either introduce feminine versions of professional nouns or create a neutral pronoun. Scholars who study gender and culture's effect on entrepreneurial perceptions and intentions may examine the effect of such movements for gender neutrality in language to check whether they lead to a change in women's attitudes towards entrepreneurship.

Our research is not without limitations. We used languages at the national level, which may lead to an excessive moyennization of the latter. This was not only a matter of convenience but also a reflection of the role that institutions play in diffusing and reinforcing language and other cultural correlates at the national scale. However, in countries where language diversity is high, subnational languages and regional dialects may need to be considered. While we perform sensitivity analysis by excluding English-speaking countries, future research could directly survey individuals to control for country multilingualism.

**Table 5.1. Descriptive statistics**

This table provides descriptive statistics for the variables used in the study. Panel A displays a test of difference in the mean of our individual-level variables given the value of *Female* (*Men* vs. *Women*). We test the mean difference with a Student t-test. Panel B presents country-level variables. \*, \*\*, and \*\*\* denote a difference significantly different from 0 at the 10%, 5%, and 1% levels, respectively. See Appendix 5.A. for definitions of the variables

Panel A	Men			Women			All	
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Mean Diff. Test	N
<b>Dependent variables</b>								
TEA	192,932	0.184	0.387	191,461	0.138	0.345	0.046***	384,393
TEA Opportunity	192,932	0.132	0.339	191,461	0.088	0.284	0.044***	384,393
TEA Necessity	192,932	0.046	0.210	191,461	0.045	0.208	0.001	384,393
<b>Individual-level controls</b>								
Age	192,932	38.656	13.928	191,461	39.285	14.003	-0.629***	384,393
Education	192,932	0.697	0.460	191,461	0.657	0.475	0.040***	384,393
Employed	192,932	0.766	0.423	191,461	0.522	0.500	0.244***	384,393
Fear of Failure	192,932	0.333	0.471	191,461	0.396	0.489	-0.063***	384,393
Opportunity Perception	192,932	0.469	0.499	191,461	0.428	0.495	0.041***	384,393
Know Other	192,932	0.461	0.498	191,461	0.372	0.483	0.089***	384,393
<b>Panel B</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>			
<b>Linguistic structure variables</b>								
Number of Genders	384,393	0.634	0.482	0	1			
Sex-Based	384,393	0.758	0.428	0	1			
Gender Pronoun	384,393	0.566	0.496	0	1			
Gender Assignment	384,393	0.700	0.458	0	1			
Gender Intensity	384,393	2.659	1.698	0	4			
<b>Macroeconomic variables</b>								
Domestic Credit	384,393	63.892	38.411	14.886	217.641			
GDP Growth	384,393	4.204	3.329	-10.149	14.231			
GDP per Capita	384,393	9188.995	6267.834	780.606	36680.32			
Inflation	384,393	4.308	3.482	-1.736	22.023			
<b>Cultural and religious variables</b>								
Catholic	384,393	0.436	0.392	0.001	0.943			
Protestant	384,393	0.045	0.076	0	0.289			
Muslim	384,393	0.129	0.295	0	0.983			
Buddhist	384,393	0.044	0.167	0	0.853			
Individualism	375,938	30.105	17.731	6	80			
Masculinity	382,671	50.47	17.288	9	88			
Uncertainty Avoidance	375,938	74.774	23.766	13	112			
Long Term Orientation	324,071	39.341	22.094	6.801	87.406			
Legor_uk	384,393	0.158	0.365	0	1			
Legor_fr	384,393	0.695	0.460	0	1			
Strong FTR	384,393	0.932	0.252	0	1			

**Table 5.2. Main results**

This table presents the results of the probit estimations examining the link between linguistic structures and the gender gap in entrepreneurship. The dependent variable is *TEA*. This table reports estimated marginal effects and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 5.A. contains the variable definitions.

	(1)	(2)	(3)	(4)
Female * Gender Intensity			0.0581*** (0.010)	0.017*** (0.005)
Gender Intensity	-0.001 (0.015)			0.005 (0.016)
Female		-0.213*** (0.008)		-0.052*** (0.014)
Age				-0.005*** (0.000)
Education				0.027*** (0.01)
Employed				0.714*** (0.019)
Fear of Failure				-0.190*** (0.009)
Opportunity Perception				0.310*** (0.012)
Know Other				0.436*** (0.012)
Domestic Credit				0.000 (0.000)
GDP Growth				-0.006 (0.005)
GDP per Capita				-1.87e-05*** (2.51e-06)
Inflation				-0.002 (0.004)
Constant	-1.272*** (0.079)	-1.188*** (0.054)	-1.444*** (0.089)	-1.823*** (0.115)
Observations	384,393	384,393	364,120	364,120
Cluster	Country	Country	Country	Country
Continent & Family dummies	Yes	Yes	Yes	Yes
Pseudo-R <sup>2</sup>	0.0244	0.0298	0.121	0.121
Log-Likelihood	-165504	-164581	-143466	-143466

**Table 5.3. Linguistic features and entrepreneurship**

This table presents the results of the probit estimations examining the link between linguistic structures and the gender gap in entrepreneurship. The dependent variable is *TEA*. This table reports estimated marginal effects and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 5.A. contains the variable definitions.

	(1)	(2)	(3)	(4)
Female * Number of Genders	0.119*** (0.03)			
Female * Sex-Based		0.051* (0.031)		
Female * Gender Pronoun			0.068* (0.035)	
Female * Gender Assignment				0.025 (0.029)
Number of Genders	-0.017 (0.047)			
Sex-Based		0.159*** (0.053)		
Gender Pronoun			0.128*** (0.037)	
Gender Assignment				4.44e-05 (0.062)
Female	-0.101*** (0.022)	-0.065*** (0.024)	-0.0621* (0.033)	-0.029 (0.024)
Age	-0.005*** (0.004)	-0.005*** (0.000)	-0.006*** (0.000)	-0.005*** (0.000)
Female	-0.101*** (0.022)	-0.065*** (0.024)	-0.062* (0.033)	-0.029 (0.024)
Education	0.063*** (0.014)	0.051*** (0.013)	0.056*** (0.016)	0.030** (0.014)
Employed	0.711*** (0.028)	0.711*** (0.029)	0.699*** (0.027)	0.715*** (0.025)
Fear of Failure	-0.206*** (0.01)	-0.208*** (0.01)	-0.201*** (0.01)	-0.188*** (0.013)
Opportunity Perception	0.311*** (0.014)	0.313*** (0.014)	0.304*** (0.015)	0.306*** (0.018)
Know Other	0.429*** (0.017)	0.432*** (0.017)	0.429*** (0.017)	0.434*** (0.019)
Domestic Credit	0.001* (0.001)	0.001* (0.001)	0.001 (0.001)	0.001 (0.001)
GDP Growth	-0.006 (0.004)	-0.003 (0.004)	-0.008** (0.004)	-0.004 (0.005)
GDP per Capita	-0.295*** (0.031)	-0.258*** (0.028)	-0.272*** (0.031)	-0.207*** (0.036)
Inflation	-0.003 (0.005)	-0.003 (0.005)	0.002 (0.005)	-0.002 (0.005)
Observations	384,393	384,393	384,393	384,393
Cluster	Country	Country	Country	Country
Continent & Family dummies	Yes	Yes	Yes	Yes
Pseudo-R <sup>2</sup>	0.141	0.142	0.142	0.123
Log-Likelihood	-209464	-209364	-198982	-148754

**Table 5.4. Alternative culture measures**

This table presents the results of the probit estimations examining the link between linguistic structures and the gender gap in entrepreneurship considering legal origins. The dependent variable is *TEA*. This table reports estimated marginal effects and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 5.A. contains the variable definitions.

	(1)	(2)	(3)	(4)
Female * Gender Intensity	0.017** (0.007)	0.016** (0.007)	0.013* (0.007)	0.016** (0.007)
Gender Intensity	0.009 (0.024)	0.089*** (0.02)	-0.135** (0.068)	0.051*** (0.02)
Female	-0.051** (0.021)	-0.049** (0.021)	-0.057** (0.024)	-0.049** (0.021)
Strong FTR	-0.030 (0.144)			
Catholic		0.374*** (0.076)		
Protestant		2.064*** (0.269)		
Muslim		-0.020 (0.094)		
Buddhist		18.36* (10.09)		
Masculinity			-0.007** (0.003)	
Individualism			-1.13e-05 (0.002)	
Uncertainty Avoidance			-0.007*** (0.003)	
Long Term Orientation			-0.006 (0.005)	
Legor_uk				-0.427*** (0.102)
Legor_fr				-0.515*** (0.061)
Observations	364,120	364,120	305,520	364,120
Cluster	Country	Country	Country	Country
Controls	All	All	All	All
Family dummies	Yes	Yes	Yes	Yes
Pseudo-R <sup>2</sup>	0.122	0.124	0.132	0.142
Log-Likelihood	-143361	-142967	-116580	-164251



**Table 5.5. Entrepreneurial intentions**

This table presents the results of the probit estimations examining the link between linguistic structures and the gender gap in entrepreneurship. The dependent variable is *TEA Necessity* in column (1) and *TEA Opportunity* in column (2). This table reports estimated marginal effects and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 5.A. contains the variable definitions.

	(1) Necessity	(2) Opportunity
Female * Gender Intensity	0.034*** (0.007)	0.006 (0.007)
Gender Intensity	-0.043** (0.019)	0.030 (0.024)
Female	0.01 (0.02)	-0.080*** (0.021)
Female * Gender Intensity	0.034*** (0.007)	0.006 (0.007)
Age	-0.001 (0.000)	-0.007*** (0.000)
Education	-0.166*** (0.014)	0.143*** (0.015)
Employed	0.475*** (0.028)	0.681*** (0.023)
Fear of Failure	-0.036*** (0.017)	-0.221*** (0.013)
Opportunity Perception	0.103*** (0.019)	0.335*** (0.017)
Know Other	0.207*** (0.018)	0.441*** (0.017)
Domestic Credit	0.002** (0.001)	0.001 (0.001)
GDP Growth	0.0003 (0.001)	-0.001 (0.005)
GDP per Capita	-0.305*** (0.046)	-0.148*** (0.038)
Inflation	0.004 (0.004)	-0.003 (0.006)
Observations	364,120	364,120
Cluster	Country	Country
Continent & Family dummies	Yes	Yes
Pseudo-R <sup>2</sup>	0.0539	0.128
Log-Likelihood	-65290	-112030

**Table 5.6. Robustness checks**

This table presents the results of the probit estimations examining the link between linguistic structures and the gender gap in entrepreneurship. The dependent variable is *TEA*. This table reports estimated marginal effects and standard errors (in parentheses). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively. Appendix 5.A. contains the variable definitions.

	(1) Excluding English-speaking countries	(2) Principal component analysis
Female * Gender Intensity	0.019*** (0.007)	0.049*** (0.013)
Gender Intensity	0.011 (0.037)	-0.005*** (0.000)
Female	-0.057** (0.023)	-0.026** (0.013)
Age	-0.005*** (0.000)	0.024 (0.035)
Education	0.0371** (0.013)	0.036** (0.014)
Employed	0.716*** (0.026)	0.718*** (0.025)
Fear of Failure	-0.192*** (0.013)	-0.188*** (0.013)
Opportunity Perception	0.312*** (0.019)	0.306*** (0.018)
Know Other	0.445*** (0.02)	0.434*** (0.019)
Domestic Credit	0.001 (0.001)	0.001* (0.001)
GDP Growth	-0.006 (0.006)	-0.005 (0.005)
GDP per Capita	-0.224*** (0.036)	-1.976*** (0.330)
Inflation	-0.001 (0.007)	0.002 (0.005)
Observations	349,230	384,393
Cluster	Country	Country
Continent & Family dummies	Yes	Yes
Pseudo-R <sup>2</sup>	0.142	0.124
Log-Likelihood	-164251	-148687

## Appendix 5.A. Variable definitions

Variable name	Definition and source
<b>Dependent variables</b>	
TEA	Dummy equals 1 if the respondent is involved in the Total Early-stage entrepreneurial Activity. <i>Source: Global Entrepreneurship Monitor.</i>
TEA Opportunity	Dummy equals 1 if the respondent is a female involved in the Total Early-stage entrepreneurial Activity by Opportunity. <i>Source: Global Entrepreneurship Monitor.</i>
TEA Necessity	Dummy equals 1 if the respondent is a female involved in the Total Early-stage entrepreneurial Activity by Necessity. <i>Source: Global Entrepreneurship Monitor.</i>
<b>Independent variables</b>	
<i>Individual-level variables</i>	
Age	Respondent exact age. <i>Source: Global Entrepreneurship Monitor.</i>
Female	Dummy variable equals 1 if the respondent of the firm is a woman, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Education	Dummy equals 1 if the respondent has a post-secondary or higher education attainment, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Employed	Dummy equals 1 if the respondent is either full or part-time employed, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Fear of Failure	Dummy equals 1 if the respondent believes that the fear of failure would prevent him/her from launching a business, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Opportunity Perception	Dummy equals 1 if the respondent sees good opportunities for starting a business in the next 6 months, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Know Other	Dummy equals 1 if the respondent personally knows other entrepreneurs, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
<i>Linguistic variables</i>	
Number of Genders	Dummy equals 1 if the language has exactly two genders, zero otherwise. <i>Source: World Atlas of Language Structures.</i>
Sex-Based	Dummy equals 1 if the language has a sex-based gender system, zero otherwise. <i>Source: World Atlas of Language Structures.</i>
Gender Pronoun	Dummy equals 1 if a language distinguishes gender in the third, first and/or second person pronouns, zero otherwise. <i>Source: World Atlas of Languages Structures.</i>
Gender Assignment	Dummy equals 1 if a language assigns gender on both semantic and formal grounds, zero otherwise. <i>Source: World Atlas of Languages Structures</i>
Gender Intensity	Sum of Number of Genders, Sex-Based, Gender Pronoun, and Gender Assignment. <i>Source: World Atlas of Languages Structures.</i>
Strong FTR	Dummy equals 1 if a language is classified as a Strong FTR language, 0 otherwise. <i>Source: Chen (2013).</i>
<i>Cultural and religious variables</i>	
Masculinity	Masculinity is defined as “a preference in society for achievement, heroism, assertiveness and material rewards for success”. <i>Source: Hofstede’s website.</i>
Individualism	This index explores the “degree to which people in a society are integrated into groups”. <i>Source: Hofstede’s website.</i>
Uncertainty Avoidance	The uncertainty avoidance index is defined as “a society’s tolerance for ambiguity”. <i>Source: Hofstede’s website.</i>
Long Term Orientation	This dimension associates the connection of the past with the current and future actions/challenges. <i>Source: Hofstede’s website.</i>
Catholic	Dummy variable equals 1 if more than 50% of the inhabitants in a country are Catholics, 0 otherwise. <i>Source: The World Factbook.</i>
Protestant	Dummy variable equals 1 if more than 50% of the inhabitants in a country are Protestants, 0 otherwise. <i>Source: The World Factbook.</i>
Muslim	Dummy variable equals 1 if more than 50% of the inhabitants in a country are Muslims, 0 otherwise. <i>Source: The World Factbook.</i>
Buddhist	Dummy equals 1 if more than 50% of the inhabitants in a country are Buddhists, 0 otherwise. <i>Source: The World Factbook.</i>
Legor_uk	Dummy equals 1 if a country has English legal origins. <i>Source: La Porta et al. (2008).</i>
Legor_fr	Dummy equals 1 if a country has French legal origins. <i>Source: La Porta et al. (2008).</i>

*Macroeconomic variables*

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Inflation	Inflation rate. <i>Source: World Development Indicators.</i>
Domestic Credit	Domestic banking credit to the private sector, as a share of GDP. <i>Source: World Development Indicators.</i>
GDP Growth	Percentage of GDP growth. <i>Source: World Development Indicators.</i>
GDP per Capita	Gross domestic product divided by midyear population. <i>Source: World Development Indicators.</i>

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# Chapter 6: You're the One That She Wants (To Be)? Female Political Leaders and Women's Entrepreneurial Activity<sup>42</sup>

## Abstract

This paper addresses the effects of female political role models on shaping women's entrepreneurial activity and perceptions. Using a recursive bivariate probit with an instrument, our findings reveal that the presence of female political leaders reduces the fear of failure towards entrepreneurial activity and increases the likelihood for a woman to recognize the existence of entrepreneurial opportunities, and to be self-employed. This effect is reinforced if the age difference between the potential female entrepreneur and her role model is lower. Furthermore, we demonstrate that exposure to a female leader positively influences entrepreneurial perception and activity by altering adverse gendered social norms. It also allows improving entrepreneurship-friendly policymaking for women.

**Keywords:** Entrepreneurship ▪ Gender ▪ Leadership ▪ Role model.

**JEL Codes:** O12 ▪ C93 ▪ J16.

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<sup>42</sup> This chapter is a sole-authored paper.

## 1. Introduction

Despite notable progress during the past few decades, women remain underrepresented at the top of firms around the world. Currently, the potential of female entrepreneurs remains an untapped resource in many economies, whereas the importance of women's entrepreneurial activity for economic development is widely acknowledged. According to the Global Entrepreneurship Monitor (GEM) 2021/2022 Women's Entrepreneurship Report, women constituted only two out of every five early-stage entrepreneurs that are active globally in 2021. Nonetheless, a "full-potential" scenario—in which women and men participate equally in labour market activity - would contribute to 26 percent – or \$28 trillion – to annual global GDP by 2025 (Woetzel et al., 2015). A compendium of literature highlights the positive impact of female entrepreneurs on economic growth and development (Langowitz and Minniti, 2007). Moreover, a considerable impact of women-led businesses in terms of bringing a more innovative environment and higher prospects of firm survival has been outlined (Weber and Zulehner, 2010).

Why is gender equality far from being achieved in entrepreneurship? Stereotypes against women, defined as "Social judgments of individual group members that lead people to judge group members consistently, and in an exaggerated way, with group expectations" (Lee and James 2007, p. 229), often unconsciously arise in the male community and are difficult to avoid. For instance, when men interact with and evaluate women, they have a generalized tendency to perceive women as less competent than men (De Pater et al., 2010), more unpredictable (Brescoll, 2016), and less authoritative (Hacker, 1951). Gender bias and stereotypes are more pronounced and grounded in the common belief in male-dominated contexts like entrepreneurship (Acs et al., 2011; Bardasi et al., 2011). In fact, shared cultural beliefs that entrepreneurship is associated with masculine traits (Bruni et al., 2004) often contribute to discouraging women for becoming entrepreneurs.

A possible route to hinder such detrimental effects of stereotypes is to expose women to a counterstereotypic model of their counterparts: women who succeeded, thus counteracting traditional gender role beliefs. This strategy has proven to be successful in traditionally masculine domains such as math and science, in which role models tend to have positive effects on women's self-related cognitions and performance (Marx and Roman, 2002). Role models can change the reference point of prevailing norms and revise individual aspirations



and expectations, which can, in turn, affect economic outcomes (Akerlof and Kranton, 2000). At the same time, their longer-term impact on creating role models (Beaman et al., 2009) may be equally or even more important as such role model effects can explain part of female leadership reservation on rates of breastfeeding and immunization as well as higher child survival (Bhalotra and Clots-Figueras, 2014). Indeed, exposure to female leaders acting as role models triggers higher school enrolment by adolescent girls, especially those from poorer and less- educated households (O’Connell, 2018). In that sense, research from social psychology demonstrates that it narrows gender gaps (Beaman et al., 2012), improves female labour force participation (Iyer et al., 2012), and raises girls’ educational attainment and aspiration (Nixon and Robinson, 1999). Changes in beliefs regarding gender roles and greater voice by women are argued to be central reasons for the increased survival of higher-birth-order girls where local seats were reserved for women (Kalsi, 2017).

In that sense, research has documented the value of credible and attractive role models in encouraging entrepreneurship (Radu and Redien-Collot, 2013; Scherer et al., 1989). Integrating role models into entrepreneurship programs and support initiatives can help combat stereotypes and trigger change. Existing findings demonstrate that female politicians can arouse admiration and inspiration by highlighting mechanisms through which women’s descriptive representation is connected to symbolic representation (Franceschet and Piscopo, 2008; Mendelberg et al., 2014). An increased presence of female parliamentarians has been linked with a rise in women’s trust in formal institutions and a greater political engagement, suggesting that women’s presence in the political sphere benefits the gender diversity at the head of the state (Beaman et al., 2009; Beaman et al., 2012; Campbell and Wolbrecht, 2006; Wolbrecht and Campbell, 2007).

This phenomenon may operate through two main channels: first, women leaders are more likely to invest in infrastructure for public goods that women express a preference for (Chattopadhyay and Duflo, 2004), thus increasing their economic empowerment. The easier availability of these public goods could affect women’s entrepreneurship through greater convenience and/or time savings. Women leaders may encourage greater involvement in entrepreneurship if they can affect physical safety (Iyer et al., 2012). Second, they may also serve as local role models (Beaman et al., 2012), hence changing societal attitudes about the suitability of certain jobs for women and thereby influencing their education and professional decision. Departing from female politicians’ direct impacts, scholars have increasingly realized that women in politics “stand as symbols for other women” in “enhancing their

identification with the system and their ability to have influence within it" (Burrell, 2004). For instance, extant evidence demonstrates that an increase in women's political representation leads to a rise in women's education and occupation aspirations (Beaman et al., 2012), improved perception of women in leadership roles and weakening of gender stereotypes (Beaman et al., 2009), changes in gender-discriminatory behaviour (Kalsi, 2017), and provision of public goods favourable to women (Chattopadhyay and Duflo, 2004), all of which can stimulate women's entrepreneurship.

However, thus far, the effect of political role models remains under-explored in the entrepreneurship literature (Bosma et al., 2012). Although little evidence demonstrates how female politicians serve as role models in inspiring women to participate in the labour market (Priyanka, 2020), this paper stands out by focusing on female political leaders acting as game changers as part of the influence of women's entrepreneurial activity. It is built on the postulation that exposure to female political leadership will conduct women to embody counterstereotypic gender role attitudes, less negative self-perceptions, and greater leadership aspirations. This empowering effect is crucial in societies where women are infrequently confronted with women in leadership positions. The central hypothesis of this paper is whether the presence of visible female role models can break sexist assumptions about women's self-perception of their entrepreneurial abilities and push them to launch their businesses.

We consider political leadership for two main reasons. First, the current political context increasingly affords visibility for female politicians (e.g. Katrín Jakobsdóttir in Iceland, Jacinda Arden in New-Zealand, Mette Frederiksen in Denmark, Tsai Ing-wen in Taiwan); thus providing more material to investigate how such exposure affects women. Second, political and entrepreneurial leadership have been shown to share similar characteristics (e.g. decision-making, risk-taking) that are strongly linked to entrepreneurial attitude (Obschonka and Fisch, 2018).

We based our analysis on a representative and large sample of 814,232 women located in 54 countries. Using a recursive bivariate probit with an instrument, we find, both cross-sectionally and over time, that the presence of visible female role models does in fact increase the propensity for women to be self-employed. We provide further evidence that this role model effect is reinforced by status homophily (captured by the age difference between the political leader and the respondent) which increases the role identification phenomenon. In

other words, the higher the resemblance between a woman and a female political leader, the greater the likelihood for her to launch her venture. We further examine and discuss two pathways that could affect women's self-employment, namely a societal attitude effect or policy channel, recognizing that multiple channels could be at work simultaneously. Based on social learning theory, role models can be seen as being key catalysts for shifts in individual attitudes and, potentially, social norms. Through their positions, actions, and practices, influential role models such as political leaders may persuade people to adopt new attitudes and norms. In that sense, we evidence that women's representation at higher political echelon improves the normative context for female entrepreneurship. Second, plausible policy roles include the direct creation of economic opportunities and the provision of preferred public goods for women. Consistent with this argument, we find that having a female politician in power increases the probability of women engaging in entrepreneurial activity through the spectrum of greater educational and legal equality between men and women.

Our paper contributes to two strands of literature. Most directly, our work connects to prior studies linking female political leadership and women's economic empowerment. To the best of our knowledge, we are the first in this literature to quantify the entrepreneurship effects in a cross-country perspective using a probit model with instrumental variable to control for endogeneity. The work of Priyanka (2020) focused on the effect of electing women to state legislatures in India on women selecting into wage employment as adults. We extend this finding by considering the specific role model effect of national women leaders on women's entrepreneurship as a career choice. Second, we enrich existing literature about the presence of role models for starting up a business for women. We do so by applying theoretical knowledge about role models from other disciplines to the field of entrepreneurship. We go beyond only considering women's involvement in entrepreneurial activity and consider two perceptual dimensions affecting entrepreneurial attitudes.

The remaining of the paper is organized as follows. In Section 2, we discuss the background of our research question. Section 3 describes the data, the empirical method and the variables. Section 4 provides estimation results, and section 5 presents the robustness checks. Section 6 concludes the paper.

## **2. Literature background**

### **2.1. Role models and venture creation**

Role models may be defined as “Individuals whose behaviours, personal styles, and specific attributes are emulated by others” (Shapiro et al., 1978, p. 52). Role models play an important role in identity construction and are vital for the successful development of young professionals. In the entrepreneurial context, role models help translate imagined possibilities of “who could I become” and “what could I accomplish” into enacted reality (Radu and Loue, 2008). A distinction can be made between real life – direct role models (parents, mentors, older siblings) – and symbolic or more distant role models, such as high-profile entrepreneurs or politicians. Role models should be successful individuals who are similar, in one way or another, to potential entrepreneurs – whether they live in the same community, or they have they share personal characteristics such as age, gender, and profession (Krueger and Brazeal, 1994) so that potential entrepreneurs can easily identify with them. It is for this reason that role models are particularly important for underrepresented groups in different areas of the labour market.

Exposure to role models has been studied in recent years, primarily in the context of career choices or general business behaviour, focusing on the unique effects of role models on specific careers and in general motivation in the pursuit of career objectives (Gibson, 2003). For example, modelling has been linked to vocational choices and to women's choices to select male-dominated occupations (Greene and Stitt-Gohdes, 1997). The relationship between role models and career choices is grounded in several theoretical and psychological mechanisms. The first is that role models provide a good referent for social comparisons and, as such, will exert influence. Specifically, individuals look at role models and compare their own profiles and experiences to those of the role models. This kind of comparison is associated with an evaluation of their own abilities, motives, and possible actions, such that they often find in the role model an image of what they could achieve in the future (Buunk et al., 2007). Social comparisons may be particularly relevant in contexts of career choice-making as a result of the high ambivalence and uncertainty that individuals experience, which will likely prompt them to rely more on social comparison referents as a means for clarifying and evaluating their options. Additionally, role models may be the source of information and support. Specifically, through observation of role models, individuals can learn not only of

their possibilities, but also of how things can be done, where resources can be obtained, or of factors leading to success and failure (Scherer et al., 1989). All in all, role models are thus the source of vicarious learning, can provide encouragement and support, and constitute one of the contextual factors that influence career choices.

In the context of entrepreneurship, Scherer et al. (1989) suggested that through observations of models, individuals formulate perceptions that affect expectations and self-efficacy belief, showing an effect of modelling on intention to become entrepreneurs. In another study, Krueger (1993) explored the relationship between prior entrepreneurial exposure and entrepreneurial career intention and found that the breadth of entrepreneurial experience was associated with perceptions of feasibility, whereas the positiveness of the exposure was associated with perceptions of desirability of the career choice. While some research has provided general support for the positive relationship between modelling and entrepreneurial career choices or success (e.g., Krueger, 1993), other studies have failed to yield consistent results (e.g., Churchill et al., 1987), suggesting the possibility of intervening variables or that current conceptualizations of the relationship may be somewhat deficient or limited. Notably, the effects of role models have been depicted as ongoing and dynamic, such that over time, the roles and functions associated with the interaction between individuals and their role models change (Gibson, 2003). Life-stage approaches to the effects of exposure to role models suggest that the effect, at least in the early stages, is profound and shapes one's self-concept, a notion that has been echoed by some entrepreneurship researchers (Scherer et al., 1989). To the extent that modelling affects the self-concept, provides both professional and emotional feedback, and may occur over a long period of time, the literature supports that exposure to role models has a positive effect on entrepreneurial career intention.

## **2.2. Gender and professional role models**

Research has suggested that women are particularly susceptible to the negative effects of perceptions of career barriers and that such perceptions can limit career options (Rivera et al., 2007). For example, Simpson et al. (2004) found that female MBA graduates perceived greater career barriers associated with the existence of networks, prejudice, and negative attitudes; and Perrone et al. (2001) found general gender-based differences in the type of factors associated with career barriers. Notably, the moderating effect of gender is consistent with theoretical perspectives on gender-based socialization (e.g. social role theory; Eagly,

1987), with sociological explanations of the effects of sex-role socialization (e.g. Dryler, 1998), and with predictions from feminist theories (e.g. Cron et al., 2006) which suggest that women are often presented with different opportunities as a result of existing social and political systems. Those theories further argue that the social context associated with gender-based socialization creates a variety of norms and expectations that reinforce gender-based stereotypes. For example, social role theory (Eagly, 1987) argues that women and men have traditionally been assigned different social and economic roles. Men's roles have been characterized by agentic attributes, such as being independent, masterful, goal-oriented, and instrumental; while women's roles are characterized by communal attributes, such as being helpful, nurturing, friendly, and unselfish. Such social norms have led to the emergence and reinforcement of gender-based expectations for gender-stereotypical roles. Consequently, men and women become more attracted to "gender-appropriate" occupations, are presented with career opportunities that are consistent with normatively appropriate roles, and tend to develop skills consistent with such occupations.

Furthermore, because of the internalization of those norms, individuals tend to perceive the pursuit of non-stereotypical occupations as more likely to consist of barriers and less likely to lead to success. Extending the research on gender effects on career choice to entrepreneurial career choice, it appears that pre-venture contexts present men with more opportunities than women, and that cultural norms enhance feelings of entrepreneurial competence in men more than in women (Scherer et al., 1990). Past research in the fields of psychology and management has focused on gender issues in entrepreneurship, and while some studies found little or no differences between men and women (e.g. Kalleberg and Leicht, 1991), other studies found substantial differences, which may explain potential different preferences in entrepreneurial intent between men and women (see Brush, 1992). For example, researchers found gender differences in managerial-related behaviours including entrepreneurship, such as goal preferences (Chaganti and Parasuraman, 1996), strategies and preferences for making financial decisions (Orser et al., 2006), in risk-taking (Charness and Gneezy, 2012), or in overall confidence in financial decisions (Barber and Odean, 2001).

### **2.3. Gender, role model and entrepreneurship**

Studies investigating early-stage entrepreneurship found a gender gap in risk taking and innovation such that males ranked higher on those two traits (Mueller, 2004); and in the reasons for becoming entrepreneurs such that women cited career dissatisfaction and the

potential for flexibility associated with entrepreneurship as their motives, while men cited money as a motive (Cromie, 1987). Other studies noting gender differences found that although males and females demonstrated equal deficiencies in knowledge of entrepreneurship, women were more likely to acknowledge the deficiencies and to rank themselves as being more in need of training, and less likely to want to start a business (Jones and Tullous, 2002). Indeed, Schiller and Crewson (1997), who studied antecedents of successful entrepreneurship, commented that their findings suggest a “higher level of self-assurance is required for women to take the entrepreneurial plunge”. Accordingly, it is argued that in the absence of factors that encourage agentic behaviours such as the presence of a role model, women may be less inclined to pursue certain careers, even though they may have relevant training and education to be successful. In congruence with social role theory, since men are more likely to gravitate towards career choices with agentic attributes regardless, they are less likely to be affected by the existence of role models in forming the intention to choose entrepreneurship as a career. Women, on the other hand, are less likely to choose male-typical careers in the absence of specific triggers or encouragement mechanisms.

Thus, the existence of political role models is particularly important for women in their career choice, as they represent potential role models to observe and emulate. Prior research in the management field demonstrates how women’s presence in positions of power positively affects both the social construction of gender definition and the processes that create gender identity at work (Ely, 1994). If a comparable role model is identified, women might be inspired to emulate those attributes, resulting in a behavioural change. For example, a young management trainee in a large multinational revealed how an unmarried and childless woman in her workplace could not be her role model (a suitable comparison), as she personally wanted to have a family in the future (Eriksson-Zetterquist and Styhre, 2008). But, while having same-sex role models is important, women face additional difficulty in entrepreneurship. They often have to act to “smooth out” potential inconsistencies between the characteristics of their female role models and those of the “normative entrepreneur” embodying agentic characteristics (Kelan and Mah, 2014), but increased visibility of female counterstereotypic role models is a relevant policy to shape social norms on gendered attitudes (Jayachandran, 2015), making women’s role-modelling process easier.

All in all, this literature led us to hypothesize that the visibility of female role models may be crucial to inspiring empowering effects for women. Put differently, visible female leader

role models may serve as evidence to enlarge women's optimism about their capacity to complete leadership tasks – including entrepreneurship.

### **3. Data and methodology**

#### **3.1. Data**

We are interested in the relationship between female political leaders and women's entrepreneurial activity, which requires the use of a large number of highly comparable observations. These observations should also be available for several countries and several years with different characteristics so as to be representative of a variety of political contexts. The data set provided by the GEM project is exceptionally well suited for this purpose. GEM data used in this article were collected during the 2002–2018 period. While this survey is standardized to allow for cross-country comparison, there are small variations in sampling methods due to country variations in accessibility and availability of respondents.<sup>43</sup> For our purposes, complete data were available for 54 countries. In each country, a standardized survey was administered to a representative sample of at least 2,000 adults (18–64 years old) yielding a final cross-country total of 814,232 female individuals for whom complete data were available for our purposes.

To identify country-specific leader chronologies, we rely on the latest iteration of the Political Leaders' Affiliation Database (PLAD) (Dreher et al., 2020). The PLAD dataset documents comprehensive information about the effective head of state given Goemans et al. (2009) definition in 177 countries around the world from 1989 to 2020. A total of 1,109 leaders are covered in PLAD. In PLAD, we collect data on national leaders' gender, birth dates, as well as their dates of entry and dates of exit from office. The name and country of female political leaders are described in Appendix 6.A. Finally, our country-level controls are provided by the World Bank Development and Doing Business Indicators.

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<sup>43</sup> For a detailed description of the sampling criteria, see Reynolds et al. (2005).



### 3.2. Econometric specification

A central challenge when investigating the link between the gender of political leaders and women's entrepreneurial activity is that the key variable *Gender of Leader* may be endogenous due to some unobservable factors (especially discriminatory attitudes and gendered cultural norms) that may affect female entrepreneurial activity simultaneously or reverse causality. Indeed, a supporting cultural environment has been shown to foster both female entrepreneurship (Baughn et al., 2006) and women's access to power (Jacob et al., 2014). To address this potential endogeneity concern, one strategy is to implement a recursive bivariate probit model (Maddala, 1983; Roodman, 2011). Recursive bivariate probit model accounts for endogeneity by simultaneously estimating female entrepreneurship and women's political leadership while incorporating a dummy equal to one if there is a female political leader in neighbouring countries, and zero otherwise in the *Gender of Leader* equation. The advantages of using the recursive bivariate probit model are threefold. First, such model enables us to estimate the impact of a binary treatment variable on a binary outcome variable. Second, the drivers of female entrepreneurship and the determinants of female political leaders are jointly estimated. Third, beyond controlling for unobservable heterogeneity, the model allows correcting for self-selection bias. Thus, assuming that our binary dependent and independent variables are each determined by latent linear models with jointly normal error terms, our model can be specified as follows:

$$\begin{cases} Y_1^* = \beta_1 X_1 + \varepsilon_1, \\ Y_2^* = \beta_2 X_2 + \gamma Y_1^* + \varepsilon_2, \end{cases}$$

$Y_1^*$  and  $Y_2^*$  respectively represent the presence of a female political leader and the entrepreneurship propensity or attitude of women described in the next subsection.  $X_1$  and  $X_2$  are vectors of country and individual-level explanatory variables described in section 3.3.2 (variable definitions are available in Appendix A). The error terms  $\varepsilon_1$  and  $\varepsilon_2$  are assumed to be distributed bivariate normal, with a conditional tetrachoric coefficient of correlation  $\rho > 0$ . Such endogeneity in recursive bivariate probit does not affect the likelihood of the model (Greene, 1998).<sup>44</sup> In order for the parameters to be consistently estimated, an explanatory

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<sup>44</sup> Wald test are available upon request.

variable must appear in  $Y_1^*$  that does not appear in  $Y_2^*$ . Following this approach, we exclude a regressor in  $Y_2^*$  that affects the gender of the political leader but does not affect women's entrepreneurial behaviour. Indeed, Wilde (2000) argues that an exclusion restriction is not required to identify the parameters in recursive bivariate probit model, since  $Y_1^*$  and  $Y_2^*$  contain at least one varying explanatory variable. Nonetheless, such identification by functional form heavily relies on the assumption of bivariate normality. As mentioned by Mourifié and Méango (2014), since we are not able to check for such statement, exclusion restrictions are often imposed to improve the identification of the model. For this reason, we conduct the instrumental variable-recursive bivariate probit estimations (IV-recursive bivariate probit) by instrumenting the gender of the national political leader by a dummy equal to one if there is a female political leader in neighbouring countries, and zero otherwise. This variable is supposedly positively correlated with the gender of local political leader and is plausibly not itself correlated with the error term in the entrepreneurship equation (see subsection 3.3.2. for a detailed justification).

### **3.3. Variables**

#### **3.3.1. Dependent variables**

Our main dependent variable is the GEM population survey's Total Entrepreneurial Activity (*TEA*). This binary variable captures whether an individual aged 18–64 is either a nascent entrepreneur (i.e. involved in setting up a business but who has not paid salaries, wages, or any other payments to the owners for more than three months) or an owner-manager of a new business (i.e. owned and managed an existing business that has paid salaries, wages or any other payments to the owners for more than 3 months but not more than 42 months). We also consider opportunity-driven early-stage entrepreneurship (*TEA Opportunity*) as a second dependent variable. Whereas necessity-driven entrepreneurs are constrained to start businesses because they have no other job opportunities and need a source of income, opportunity-driven entrepreneurs choose to launch their venture based on the perception that there is a business opportunity that has not yet been taken advantage of (or has been taken advantage of only incompletely) by existing companies (Reynolds et al., 2005). Thus, the latter are driven by the aspiration to launch their own business, be their own employer, and develop their own products (Austin and Nauta, 2016) and are, consequently, much more likely to be affected by the modelling effect. Moreover, opportunity-motivated

entrepreneurship has been identified as having a greater potential for economic growth and new job creation via high-growth business creation, which is relevant to public policy (Estrin et al., 2013).

Furthermore, Langowitz and Minniti (2007) suggest that perceptions explain an important part of the divergence in entrepreneurial attitudes across genders since men tend to regard themselves in a more optimistic light and, as a result, are more likely to start new businesses. Beyond pure involvement in entrepreneurial activity, one may argue that the presence of a role model may exert an influence on women's decision-making processes. Perceptions of themselves and their environment, especially through opportunity recognition and risk tolerance, play a greater role in women's entrepreneurial propensity relative to their male counterparts (Eckhardt and Shane, 2003; Jianakoplos and Bernasek, 1998). Thus, we account for this perceptual dimension by including two subjective variables in our estimations. First, opportunity recognition has been highlighted as the most distinctive and fundamental entrepreneurial behaviour (Eckhardt and Shane, 2003). Thus, we consider *Opportunity Perception* as a dummy equal to one if the respondent agrees with the following statement: "In the next six months, will there be good opportunities for starting a business in the area where you live?", and zero otherwise. Second, Wagner (2007) demonstrates that fear of failure is indeed an important determinant of the difference in the rate of new venture creation between men and women. We therefore include a dummy *Fear of Failure* equal to one if the respondent provides a positive answer to the following question: "Would fear of failure prevent you from starting a business?", and zero otherwise.

### **3.3.2. Instrument**

Our instrument should have two properties: first, it must be a non-weak predictor of the gender of national political leaders. Second, the instrument should not be correlated with  $Y_1^*$ . We therefore instrument the gender of the national political leader using a dummy equal to one if at least one neighbouring country currently has a woman as a political leader (*Close Female Leader*). Neighbours of a country are identified as the countries that share common borders with a given country. This variable was constructed by combining the CEPII Gravity database (Conte et al., 2022) to capture adjoining countries and the PLAD (Dreher et al., 2020).

This approach is common: regional variables are often used as instruments for endogenous explanatory variables appearing in level equations (Wooldridge, 2002, p. 89). Sharing common borders is of prime importance for political purposes. Individuals living in a given country are more likely to interact with the citizens of their country's geographical neighbours as compared with the citizens of other countries. Such social interactions with geographical neighbours are eased by lower transportation costs and inhabitants from adjoining countries are more likely to share cultural and ethnic features. A plethora of literature has shown that social interactions play an important role in shaping political opinions (see for example Baldassarri and Bearman, 2007; Iversen and Soskice, 2015). Thus, the political climate in adjoining countries is likely to affect the political atmosphere in a given country through the well-known "neighbourhood effect". This effect has been widely acknowledged in different areas of social and political science, including convergences in policymaking, diffusion of civil war and corruption contagion (see, for example, Case et al., 1993 or Goel and Saunoris, 2014). Therefore, we assume that our instrument meets relevance criteria since a woman in power in a neighbouring country is likely to affect female political leadership in a given country.

The second condition for the instrument validity is that it should not be correlated with the entrepreneurial behaviours of women. If the proximity of a female political leader is correlated with female entrepreneurial activity, other than through its impact on the gender of the local political leader then plausibly this arises only via its correlation with the supranational cultural environment. Given the fact that we include a large number of covariates at the country level, and country-fixed effects, then *Close Female Leader* is unlikely to be a component of the error term in the  $Y_1^*$  equation, thus satisfying exogeneity condition.

### 3.3.3. Controls

We control for an array of ten control variables. First, we include *Age* in our model in line with Azoulay et al. (2020). Moreover, Davidsson and Honig (2003) identify a significant positive relationship between education and entrepreneurship. Thus, we consider *Education* as a dummy equal one if the respondent has a post-secondary or higher education attainment, and zero otherwise. We also include *Employed* as a dummy variable equal to one if the respondent is either full or part-time employed, and zero otherwise in line with Estrin et al. (2013). Familiarity ties with vicarious entrepreneurs have been shown to affect the

entrepreneurial intentions of individuals as role models may for example help by providing information, which alleviates both uncertainty and the cost of starting the business (Arienus and Minniti, 2005). Therefore, we control for whether the potential nascent entrepreneur knows any other entrepreneurs (*Know Other*).

In addition to the aforementioned individual-level characteristics, we follow the literature in controlling for a number of macroeconomic-level factors that might affect entrepreneurial entry. Wennekers et al. (2005) document a positive relationship between entrepreneurial activity and economic development, which we control by including the logarithm of GDP per Capita (*GDP per Capita*) and *GDP Growth*. To take into account the level of financial development, we include *Domestic Credit* measured as the domestic banking credit to the private sector as a share of GDP. We control for the inflation rate (*Inflation*) to account for the country's level of development. Finally, we follow Goltz et al. (2015) and consider *Rule of Law* and *Starting a Business* as a control for the institutional environment.

We then add a set of dummy variables to capture country time-invariant specific effects across economies, and the year to control for aggregate shocks. Finally, there is no theoretical evidence about the relevance to cluster our standard errors. However, the joint impact of the Gender of Leader and women's entrepreneurship can intuitively vary across countries (due, among others, to cultural differences). Hence, we cluster our standard errors by country to check this possibility.<sup>45</sup> Descriptive statistics are displayed in Table 6.1.

## **4. Results**

### **4.1. Main estimations**

Our first set of analyses explored the predictions for the relationship between exposure to role models and entrepreneurial activity choice. The results are presented in Table 6.2. First-stage estimations are presented in columns (1), (3), (5) and (7).

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<sup>45</sup> Results remain strictly the same without clustered standard errors and are available upon request.

The positive relationship between *Gender of Leader* and *TEA* in column (2) corroborates our theoretical argument that a women's political leader acts as a role model and contributes to increase women's entrepreneurial activity. The positive sign of the *Gender of Leader* in column (4) confirms the hypothesis that role model effect fosters women's involvement in entrepreneurial activity *by choice* – and not by constraint. Focusing on subjective dependent variables, exposure to female political leaders alleviates the social stigma linked to entrepreneurial failure among women (column (6)) and increase opportunity recognition likelihood (column (8)). All in all, our results support our main hypothesis, i.e. that a female political leader operates as a role model for women in a country and lead them to exhibit higher entrepreneurial likelihood and more optimistic attitudes towards entrepreneurship.

Concerning the control variables in columns (2), (4) and (8), the coefficients of *Age* is found to be negatively and associated with our entrepreneurial variables in line with Azoulay et al. (2020). Similar to Millan et al. (2014), *Education* is positively correlated with the entry into entrepreneurship. The coefficient of *Know Other* is positive, confirming that exposure to other entrepreneurs is positively and significantly related to women's propensity to start businesses regardless of motivation. We find a positive correlation between *Employed* and our entrepreneurial variables in line with the study of Peroni et al. (2016). Except for column (4), a higher share of domestic credit facilitates women's entrepreneurship as well as *Starting a Business* and *Rule of Law* as documented by Wennekers et al. (2005) and Goltz et al. (2015). *Inflation* only exhibits a positive and significant coefficient in column (8), whereas *GDP Growth* and *GDP per Capita* are positive and significant in columns (2), (4) and (8). All the signs are logically inverted in column (6), because the *Fear of Failure* dummy reflects the level of apprehension of the respondent.

## **4.2. The reinforcing effect of homophily**

Role identification theory suggests that a higher degree of similarity between the political leader and the potential entrepreneur is expected to increase the role model effect, even if the role model occupies a (more) desirable position. Resemblance contributes to the individual perceiving the behaviour of the role model as compatible with the own (perceived) behavioural opportunities i.e. "I can do anything (s)he can". Such "love of the same" has been shown to shape individuals' social undertakings, the attitudes and norms that they form, and the interpersonal associations that they experience especially in the entrepreneurial context

(Bosma et al., 2012). This phenomenon, called homophily, can be understood as the tendency of individuals to associate and interact with similar counterparts, guides many relationships (McPherson et al., 2001). In that sense, one may argue that role model effect is likely to be reinforced if the degree of shared characteristics between role models and the exposed subject is higher.

In this study, we chose to focus on status homophily which encompasses sociodemographic dimensions that stratify society, in opposition to value homophily which includes internal states presumed to shape individual orientation towards entrepreneurial activity due to measurement concerns. Status homophily can be defined as either ascribed or inherited traits, like gender or age, or acquired or achieved traits, such as geographical location (Huang et al., 2013). Although race and ethnicity are part of the identification process, data limitation conducts us to investigate the effect of age homophily between the respondent and the political leader. To proceed, we include *Age Difference* which is the absolute number of years between the age of the respondent and the one of the political leaders. The variable of interest is therefore the interaction term *Gender of Leader \* Age Difference*.

Estimation results are displayed in Table 6.3. In line with our expectation, we found that beyond gender, a higher similarity in age between entrepreneurs and their role model facilitate identification. Prior research included the degree of similarity in terms of demographic aspects such gender and ethnicity (Ruef et al., 2003), and business-related aspects (Bosma et al., 2012). Based on this, we provide novel evidence to include age difference into the fit between aspiring entrepreneurs and their role model.

## **5. Discussion of mechanisms**

### **5.1. The role of social norms**

Prevailing social norms induce female entrepreneurs to choose socially acceptable sectors and can impact their perceptions about what they are capable of. In particular, Baughn et al. (2006) demonstrate that specific normative support for women's entrepreneurship appears to be a more immediate critical determinant of the proportion of new female-led start-ups than are more general entrepreneurial norms. Such finding is in line with Henry and

Kennedy's (2003) claim about women's entrepreneurship in Ireland. Irish very conservative view towards women contributes to undermining its ability to augment its stock of female entrepreneurs. Beyond pure entrepreneurial decision-making, adverse social norms also constraint educational opportunities and access to finance and network, affecting initial conditions for female-led enterprises and influencing intra-household choices that constrain entrepreneurial decisions (Gupta et al., 2019).

Sex-role stereotyping occurs when men are more respected in a certain domain because they embody the masculine traits that are deemed valued or required for a given activity. This phenomenon is particularly observable in contexts where men are more likely than women to occupy leadership positions (Markussen and Røed, 2017). In line with this observation, one may argue that greater female representativeness in political leadership positions may conduct to an increase in women's entrepreneurship activity through the reduction of gender-based prevailing bias against female entrepreneurship. The study of Beaman et al. (2009) is particularly germane to support this argument. Authors have conducted field experiments on the effects of the introduction of reserved seats for women in certain districts in India on the perception of female leaders (one third of the seats were randomly reserved for women from the 1990s). After 10 years of quotas, they observe that women were more likely to stand and win in areas that had reserved seats in the previous two elections, and that mandated exposure can improve the perception of women leaders' effectiveness.

To verify the effect of women's political leaders on societal attitudes towards female entrepreneurship, we considered four measures of gendered social norms provided by the GEM National Expert Survey in line with Hechavarría and Ingram (2019). At least 36 national experts in 37 countries<sup>46</sup> provided their perceived assessments of the local entrepreneurial context on a scale from one to five, with (1) corresponding to strong disagreement and (5) strong agreement. A score of (3) should be therefore read as the neutral point. First, we consider *Women Opportunity* to capture the share of respondent who agrees with the statement that, in their country, "Men and women get equally exposed to good opportunities to start a business." Second, *Women Self-Employment* measures the share of

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<sup>46</sup> The participating countries are Argentina, Australia, Belgium, Brazil, Chile, Colombia, Croatia, Czech Republic, Denmark, Finland, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Italy, Jamaica, Latvia, Malaysia, Mexico, Netherlands, Norway, Peru, Philippines, Russia, Singapore, Slovenia, South Africa, Spain, Thailand, Turkey, United Arab Emirates, United Kingdom, Uruguay, USA.



respondent who agrees with the statement that, in their countries, “Women are encouraged to be self-employed or start a new business”. Third, *Women Skills* reflects the share of respondent who agrees with the statement that, in their countries, “Men and women are equally able to start a business.” Finally, *Women Acceptable* should be understood as the share of respondent who agrees with the statement that, in their countries, “Starting a business is a socially acceptable career option for a woman good career.” It is noteworthy to mention that limitations in data collection periods, as well as missing data, strongly restricted the size sample. For this reason, and in order to account for the non-binary nature of our dependent variables, we consider two-stage least squares instrumental variable estimations at the country level instead of recursive bivariate probit model to continue to control for possible endogeneity and unobserved heterogeneity.

Table 6.4. discards the results of the above regression. Positive and significant coefficients for both *Women Opportunity*, *Women Self-Employment*, and *Women Acceptable* variables presented in columns (1), (2) and (4) suggest that female political leaders reinforce supportive normative context for female entrepreneurs. This finding is highly attention-grabbing for policymakers as women’s representativity at the highest political level is a fundamental cornerstone regarding societal attitudes towards female entrepreneurship.

## **5.2. Investigating the policy channel**

Whereas the pioneering work of Downs (1957) suggests that the preferences of the politician should not impact policy outcomes, a large body of literature has pointed out divergences in policymaking along political leaders’ personal characteristics. Indeed, due to the absence of entire policy commitment, the identity of the political decision maker affects policy determination, as increasing the political representation of a group would increase its influence in policy (Besley and Coate, 1997). Thus, if politicians cannot commit to implementing a given set of policies once in power, the gender of a politician would matter for policy making.

This claim has been empirically evidenced by several papers analysing the introduction of gender-based quotas in the context of local governments in India. Such policies have for instance conducted to an increase in investment in infrastructure acclaimed by women (Chattopadhyay and Duflo, 2004) and a rise in crime documentation against

women (Iyer et al. 2012). It has been shown that women political leaders lay more emphasis on women's specific issues (abortion, equal opportunity) and child welfare issues (such as child support), while their male counterparts tend to concentrate on business and economic policy (Berkman and O'Connor, 1993; Clots-Figueras, 2012).

In line with this literature, we investigate the beneficial effect exerted by female political leaders on women's entrepreneurial activity through the policy spectrum. We first consider improvements in legal gender equality by considering the Women, Business and the Law index (*WBL Index*) provided by the World Bank. The study of Jung (2022) provides empirical evidence that a female political leader plays a crucial role in shaping legal equality between men and women. Congruently, a supportive gendered legal framework is associated with higher female entrepreneurial activity (Hyland et al., 2020). Second, we consider improvements in educational equality (*Education Equality*) captured by VDEM to assess the extent to which high-quality basic education is guaranteed to all. Whereas the presence of a female political leader has been associated with positive outcomes in education (Clots-Figueras, 2012), higher educational attainment itself has been shown to enhance managerial ability, which in turn increases the probability of entrepreneurship (Lucas, 1978). We create our interaction terms by multiplying *Gender of Leader* with the first differences of our two variables of interest, i.e. *WBL Index* and *Education Equality* to capture the effect of policy improvements associated with female political leaders.

The results displayed in Table 6.5. provide support for the policy channel argument. If the political leader is a woman, then improvements in legal gender and educational equality exert a positive influence on women's likelihood to launch their businesses, to engage in opportunity entrepreneurship, to perceive business opportunities, and finally decrease their fear of failure.

## **6. Robustness Checks**

### **6.1. Alternative measure of female political leadership**

We first ensure the robustness of our findings using alternative measures of women's political participation. First, in line with Wolbrecht and Campbell (2007), we use the share of women in parliaments (*Seats Women*) as an alternative dependent variable. As the country's

premier lawmaking body, parliaments are the central political institutions of any ostensibly democratic nation. Beyond exerting influential political positions, women's presence in parliaments provides a public and visible face for female entrepreneurs. Second, we utilize the women's political empowerment index (*Women Political Empowerment*) proposed by the Varieties of Democracy (VDEM)<sup>47</sup> as suggested by Voeten (2021). VDEM defines women's political empowerment as "A process of increasing capacity for women, leading to greater choice, agency, and participation in societal decision-making". It is understood incorporating three equally weighted dimensions: fundamental civil liberties, women's open discussion of political issues and participation in civil society organizations, and the descriptive representation of women in formal political positions. Lower scores demonstrate worse women's political empowerment, while higher scores indicate advancing women's political empowerment. Third, we consider the women's political participation index (*Women Political Participation*) also developed by the VDEM Institute in line with Liu and Banaszak (2017). The latter is formed by aggregating the average of the indicators for lower chamber female legislators and power distributed by gender. Thus, a score of 1 indicates a perfectly equal political representation of women in political institutions.

In Table 6.6., we then replicate our initial analysis using alternative dependent variables. We can observe that our results are in line with our main results: the greater the women's political representation, the higher the likelihood for a woman to launch her own business.

## **6.2. Alternative model specification**

Whereas our preferred specifications remain probit because it allows for non-linearity, we re-estimate our estimations using linear probability models (LPM) as suggested by Wooldridge (2002, p. 455). LPM results in unbiased and consistent estimates when certain conditions are met and after robust standard errors have been added to the model to account for the heteroskedasticity arising from the classical ordinary least squares estimation of a dummy variable (Horrace and Oaxaca 2006), but it does not constrain the predicted value to range between zero and one, unlike in binary response models such as the probit one. The main advantage of the LPM model over other maximum likelihood techniques is that it

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<sup>47</sup> V-DEM data are freely available: <https://www.v-dem.net/data/the-v-dem-dataset/>.

increases the computation speed substantially while producing consistent results, particularly for large datasets because the central limit theorem relaxes the need to model non-normal errors.

The estimates for our complete LPM with fixed effects and heteroscedasticity-consistent robust standard errors are reported in Table 6.7. The pattern of results found in the previous model substantially holds and all of our hypotheses remain supported.

### **6.3. Alternative sample construction**

Another bias that can impact our results may come from the sample on which we work, and mainly on the representativeness of the different countries that are in our study. Indeed, one can argue that one or more countries are overrepresented in our study which may drive our results. Thus, we eliminated Spain from the sample as it had the highest number of respondents in the sample (12.5% of the sample).

Table 6.8. shows our results with this new sample. We can observe that our estimations remain consistent with the main results.

### **6.4. Lagged estimations**

We provide additional controls for potential endogeneity using the lagged values of the explanatory variables to provide an additional way to avoid potential endogeneity problems. Due to the cross-sectional nature of individual-level covariates, we only lagged country-level variables.

The results presented in Table 6.9. indicate that our key finding is preserved: the coefficients of the *Gender of Leader* variables are positive and significant. This provides support to our claims that endogeneity does not drive our results.

## **7. Conclusion**

To counteract the scarcity of women in leadership positions, policymakers have introduced gender-based quotas in the political sphere. With little known concerning the behavioural response to mandated political positions for women, this paper breaks new ground by proposing novel evidence to explore entrepreneurial and behavioural responses to

female political leaders. Apart from conceptual studies establishing a link between role models and entrepreneurial intentions, empirical investigations on the importance of political role models for female entrepreneurs are limited and there is still little knowledge of which mechanisms underlines feminine role models.

Thus, this paper is among the first to provide evidence of the effect of female political leadership on individual-level self-employment for women by exploiting a large and comprehensive dataset of 814,232 individuals in 54 countries. The results show that exposure to female politicians leads to an increase in the likelihood of women selecting self-employment as a career choice. Role model exposure also improves women's attitudes towards entrepreneurial activity. We demonstrate that a greater number of shared individual characteristics facilitates the identification process, thus reinforcing the role model effect. Moreover, the evidence presented in this paper supports both a policy and normative effect of politician role models in affecting women's self-employment.

Our analysis speaks to the representation literature by suggesting that female politicians do function as true role models, inspiring women to engage in leadership positions themselves. This linkage is primordial given that many long-term gains and entrenchment of the empowerment benefits from political reservations can be aided by better economic opportunities that grow in parallel with a political voice. Thus, increasing the representation of women in political governance can improve gender equality in entrepreneurship. This study provides additional support for quotas that are viewed as being successful in increasing women's participation in policy making. Women, it appears, also lead by example.

**Table 6.1A. Descriptive statistics of country-level variables**

This table displays summary statistics of country-level variables. Appendix 6.B. contains the variable definitions.

	N	Mean	Std. Dev.	Max	Min
<b>Country-level variables</b>					
Gender of Leader	814,232	0.065	0.294	1	0
Close Female Leader	814,232	0.144	0.194	1	0
Domestic Credit	814,232	98.281	50.943	304.575	0.181
GDP Growth	814,232	2.695	3.209	25.176	-14.248
GDP per Capita	814,232	9.789	1.011	11.593	5.914
Inflation	814,232	0.03	0.035	0.49	- 0.038
Starting a Business	814,232	81.41	10.727	98.2	23.8
Rule of Law	814,232	0.805	0.905	2.13	-1.367
<b>Homophily</b>					
Age Difference	814,232	6.795	7.492	38	0
<b>Social norms</b>					
Women Opportunity	247	3.096	1.337	5	1
Women Self-Employment	203	3.061	1.564	5	1
Women Skills	247	3.756	2.075	5	1
Women Acceptable	203	3.523	2.977	5	1
<b>Policy channel</b>					
Educational Equality	813,986	1.482	1.32	3.649	-3.342
WBL index	806,227	82.599	14.852	100	26.25
<b>Alternative independent variables</b>					
Seats Women	667,546	24.299	11.168	63.75	0
Women Political Empowerment	672,373	0.857	0.138	0.967	0.033
Women Political Participation	672,373	0.914	0.136	1	0.045

**Table 6.1B. Descriptive statistics of individual-level variables**

This table displays t-test of individual-level variables. It displays a test of difference in the mean of all independent and control variables, given the value of TEA (*Non-Entrepreneurs* vs. *Entrepreneurs*). We test the mean difference with a student t-test. Statistics are reported in parentheses. \*, \*\*, and \*\*\* denote a significant difference from 0 at the 10%, 5%, and 1% levels, respectively. Appendix C contains the variable definitions.

	Non-Entrepreneurs		Entrepreneurs		Difference
	Mean	Std. Dev.	Mean	Standard errors	
Age	42.901	15.073	37.766	11.798	4.731***
Education	0.691	0.462	0.698	0.459	-0.027***
Fear of Failure	0.429	0.495	0.293	0.455	0.135***
Opportunity Perception	0.333	0.471	0.611	0.488	-0.260***
Know Other	0.304	0.460	0.608	0.488	-0.302***

**Table 6.2. Main estimations**

This table reports marginal effects and standard errors (in brackets). All models are recursive bivariate probit regressions at the firm level. The dependent variable of first-stage estimations is *Gender of Leader*. The dependent variables of second-stage estimations are respectively *TEA*, *TEA Opportunity*, *Fear of Failure* and *Opportunity Perception* in columns (2), (4), (6) and (8). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables.

	(1) Gender of Leader	(2) TEA	(3) Gender of Leader	(4) TEA Opportunity	(5) Gender of Leader	(6) Fear of Failure	(7) Gender of Leader	(8) Opportunity Perception
Gender of Leader		0.174*** (0.0291)		0.128*** (0.0335)		-0.179*** (0.0227)		0.322*** (0.0220)
Age		-0.00550*** (0.000166)		-0.00679*** (0.000188)		-0.00309*** (0.000105)		-0.00259*** (0.000118)
Education		0.00981* (0.00503)		0.0689*** (0.00577)		-0.0663*** (0.00329)		0.0665*** (0.00365)
Employed		0.725*** (0.00530)		0.694*** (0.00605)		-0.0136*** (0.00301)		0.134*** (0.00335)
Know Other		0.513*** (0.00436)		0.516*** (0.00487)		-0.0740*** (0.00310)		0.497*** (0.00338)
Share of Domestic Credit	-0.0106*** (6.78e-05)	0.000267*** (7.42e-05)	-0.0106*** (6.76e-05)	5.72e-05 (8.23e-05)	-0.0106*** (6.90e-05)	0.000373*** (5.57e-05)	-0.0104*** (7.46e-05)	0.00131*** (5.72e-05)
GDP Growth	-0.0896*** (0.000630)	0.0132*** (0.000912)	-0.0896*** (0.000631)	0.0145*** (0.00102)	-0.0906*** (0.000642)	-0.0184*** (0.000681)	-0.0928*** (0.000680)	0.0390*** (0.000746)
GDP per Capita	-0.251*** (0.00421)	0.177*** (0.00446)	-0.252*** (0.00420)	0.129*** (0.00506)	-0.254*** (0.00427)	0.0743*** (0.00336)	-0.252*** (0.00448)	0.0821*** (0.00363)
Inflation	2.450*** (0.0500)	0.0275 (0.0636)	2.450*** (0.0500)	-0.111 (0.0732)	2.467*** (0.0510)	-1.594*** (0.0544)	2.540*** (0.0539)	1.510*** (0.0540)
Starting a Business	-0.00864*** (0.000206)	2.07e-06 (0.000247)	-0.00864*** (0.000207)	-0.000127 (0.000276)	-0.00892*** (0.000210)	-0.00745*** (0.000174)	-0.00919*** (0.000225)	0.00423*** (0.000192)
Rule of Law	0.972*** (0.00594)	0.110*** (0.00653)	0.972*** (0.00594)	0.102*** (0.00736)	0.975*** (0.00603)	0.00730 (0.00496)	0.957*** (0.00632)	0.0426*** (0.00510)
Constant	2.849*** (0.0386)	0.284*** (0.0455)	2.851*** (0.0386)	0.919*** (0.0513)	2.914*** (0.0393)	0.106*** (0.0342)	2.931*** (0.0411)	0.265*** (0.0366)
Observations	814,232	814,232	813,529	813,529	784,395	784,395	678,478	678,478
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-Likelihood	-442626	-442626	-396608	-396608	-763002	-763002	-622753	-622753
$\phi$	0.000807	0.000807	-0.00165	-0.00165	0.0930	0.0930	-0.105	-0.105

**Table 6.3. The effect of homophily**

This table reports marginal effects and standard errors (in brackets). All models are recursive bivariate probit regressions at the firm level. The dependent variable of first-stage estimations is *Gender of Leader*. The dependent variables of second-stage estimations are respectively *TEA*, *TEA Opportunity*, *Fear of Failure* and *Opportunity Perception* in columns (2), (4), (6) and (8). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables.

	(1) Gender of Leader	(2) TEA	(3) Gender of Leader	(4) TEA Opportunity	(5) Gender of Leader	(6) Fear of Failure	(7) Gender of Leader	(8) Opportunity Perception
Gender of Leader		0.174*** (0.0291)		0.128*** (0.0335)		-0.179*** (0.0227)		0.322*** (0.0220)
Age Difference		-0.000316 (0.000244)		-0.00122*** (0.000288)		-0.00471*** (0.000164)		0.00478*** (0.000182)
Gender of Leader * Age Difference		0.00217*** (0.000504)		0.00180*** (0.000571)		-0.00499*** (0.000359)		0.00330*** (0.000393)
Age		-0.00550*** (0.000166)		-0.00679*** (0.000188)		-0.00309*** (0.000105)		-0.00259*** (0.000118)
Education		0.00981* (0.00503)		0.0689*** (0.00577)		-0.0663*** (0.00329)		0.0665*** (0.00365)
Employed		0.725*** (0.00530)		0.694*** (0.00605)		-0.0136*** (0.00301)		0.134*** (0.00335)
Know Other		0.513*** (0.00436)		0.516*** (0.00487)		-0.0740*** (0.00310)		0.497*** (0.00338)
Domestic Credit	-0.0106*** (6.78e-05)	0.000267*** (7.42e-05)	-0.0106*** (6.76e-05)	5.72e-05 (8.23e-05)	-0.0106*** (6.90e-05)	0.000373*** (5.57e-05)	-0.0104*** (7.46e-05)	0.00131*** (5.72e-05)
GDP Growth	-0.0896*** (0.000630)	0.0132*** (0.000912)	-0.0896*** (0.000631)	0.0145*** (0.00102)	-0.0906*** (0.000642)	-0.0184*** (0.000681)	-0.0928*** (0.000680)	0.0390*** (0.000746)
GDP per Capita	-0.251*** (0.00421)	0.177*** (0.00446)	-0.252*** (0.00420)	0.129*** (0.00506)	-0.254*** (0.00427)	0.0743*** (0.00336)	-0.252*** (0.00448)	0.0821*** (0.00363)
Inflation	2.450*** (0.0500)	0.0275 (0.0636)	2.450*** (0.0500)	-0.111 (0.0732)	2.467*** (0.0510)	-1.594*** (0.0544)	2.540*** (0.0539)	1.510*** (0.0540)
Starting a Business	-0.00864*** (0.000206)	2.07e-06 (0.000247)	-0.00864*** (0.000207)	-0.000127 (0.000276)	-0.00892*** (0.000210)	-0.00745*** (0.000174)	-0.00919*** (0.000225)	0.00423*** (0.000192)
Rule of Law	0.972*** (0.00594)	0.110*** (0.00653)	0.972*** (0.00594)	0.102*** (0.00736)	0.975*** (0.00603)	0.00730 (0.00496)	0.957*** (0.00632)	0.0426*** (0.00510)
Constant	2.849*** (0.0386)	0.284*** (0.0455)	2.851*** (0.0386)	0.919*** (0.0513)	2.914*** (0.0393)	0.106*** (0.0342)	2.931*** (0.0411)	0.265*** (0.0366)
Observations	814,232	814,232	813,529	813,529	784,395	784,395	678,478	678,478
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-Likelihood	-442626	-442626	-396608	-396608	-763002	-763002	-622753	-622753
$\varphi$	0.000807	0.000807	-0.00165	-0.00165	0.0930	0.0930	-0.105	-0.105



**Table 6.4. The role of social norms**

This table reports coefficients and standard errors (in brackets). All models are two-stage least squares instrumental variable estimations at the country level. The dependent variables are *Women Opportunity*, *Women Self-Employment*, *Women Skills* and *Women Acceptable* respectively in columns (1), (2), (3) and (4). All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables.

	(1) Women Opportunity	(2) Women Self-Employment	(3) Women Skills	(4) Women Acceptable
Gender of Leader	0.0980* (0.0772)	0.0987* (0.0900)	-0.160 (0.125)	0.384*** (0.0870)
Domestic Credit	0.000139 (0.00104)	0.00103 (0.00115)	-7.87 e-05 (0.00134)	0.00103 (0.00113)
GDP Growth	0.0131 (0.00832)	0.0170* (0.00929)	0.0297** (0.0138)	0.00809 (0.00895)
GDP per Capita	-0.168** (0.0819)	-0.169* (0.0880)	-0.0523 (0.0994)	-0.0643 (0.0887)
Inflation	-2.255** (0.908)	-1.166 (1.011)	-2.025 (1.311)	-1.512 (0.994)
Starting a business	-0.00110 (0.00337)	0.000474 (0.00424)	-0.00350 (0.00477)	0.00255 (0.00414)
Rule of Law	0.347*** (0.103)	0.211* (0.111)	0.233* (0.122)	0.116 (0.112)
Constant	4.428*** (0.741)	4.383*** (0.830)	4.228*** (0.930)	3.712*** (0.831)
Observations	247	203	247	203
Cluster	Country	Country	Country	Country
Year dummies	Yes	Yes	Yes	Yes
Pseudo-R <sup>2</sup>	0.187	0.342	0.830	0.150

**Table 6.5. Investigating the policy channel**

This table reports marginal effects and standard errors (in brackets). All models are recursive bivariate probit regressions at the firm level. The dependent variables of second-stage estimations are respectively *TEA*, *TEA Opportunity*, *Fear of Failure* and *Opportunity Perception* in columns (1) and (5), (2) and (6), (3) and (7), and (4) and (8). First-stage estimations are available upon request. All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables.

	<i>Equality in law</i>				<i>Educational attainment</i>			
	(1) TEA	(2) TEA Opportunity	(3) Fear of Failure	(4) Opportunity Perception	(5) TEA	(6) TEA Opportunity	(7) Fear of Failure	(8) Opportunity Perception
Gender of Leader	0.220*** (0.0561)	0.905*** (0.0627)	-0.815*** (0.0457)	0.882*** (0.0472)	0.412*** (0.0305)	0.250*** (0.0372)	-0.194*** (0.0242)	0.468*** (0.0234)
Gender of Leader *	0.0134*** (0.000606)	0.0100*** (0.000677)	-0.00789*** (0.000463)	0.00719*** (0.000499)				
Gender of Leader * Education Equality					0.114*** (0.00514)	0.0721*** (0.00557)	-0.00698* (0.00364)	0.0647*** (0.00400)
WBL index	0.961*** (0.00589)	0.962*** (0.00589)	0.965*** (0.00598)	0.948*** (0.00626)				
Education Equality					0.973*** (0.00594)	0.962*** (0.00588)	0.975*** (0.00603)	0.957*** (0.00633)
Age	-0.00538*** (0.000167)	-0.00669*** (0.000189)	-0.00317*** (0.000105)	-0.00244*** (0.000119)	-0.00552*** (0.000166)	-0.00620*** (0.000189)	-0.00309*** (0.000105)	-0.00261*** (0.000118)
Education	-0.00609 (0.00504)	0.0716*** (0.00578)	-0.0692*** (0.00330)	0.0700*** (0.00366)	-0.00725 (0.00503)	0.0783*** (0.00580)	-0.0666*** (0.00329)	0.0680*** (0.00364)
Employed	0.725*** (0.00531)	0.694*** (0.00606)	-0.0143*** (0.00302)	0.135*** (0.00337)	0.723*** (0.00530)	0.692*** (0.00607)	-0.0135*** (0.00300)	0.134*** (0.00335)
Know Other	0.511*** (0.00437)	0.515*** (0.00489)	-0.0737*** (0.00312)	0.495*** (0.00339)	0.513*** (0.00436)	0.513*** (0.00490)	-0.0740*** (0.00310)	0.496*** (0.00338)
Domestic Credit	-0.000597*** (7.67e-05)	-0.000196** (8.55e-05)	0.000577*** (5.60e-05)	-0.00154*** (5.81e-05)	-0.000268*** (7.27e-05)	-0.000102 (8.38e-05)	0.000371*** (5.57e-05)	-0.00128*** (5.72e-05)
GDP Growth	0.0134*** (0.000929)	0.0147*** (0.00104)	-0.0177*** (0.000691)	0.0386*** (0.000762)	0.0161*** (0.000902)	0.0126*** (0.00106)	-0.0186*** (0.000688)	0.0406*** (0.000754)
GDP per Capita	-0.170*** (0.00444)	-0.124*** (0.00505)	0.0722*** (0.00338)	-0.0804*** (0.00365)	-0.158*** (0.00450)	-0.108*** (0.00512)	0.0733*** (0.00341)	-0.0715*** (0.00368)
Inflation	-0.0992 (0.0656)	-0.213*** (0.0756)	-1.511*** (0.0543)	1.457*** (0.0541)	-0.224*** (0.0666)	-0.551*** (0.0800)	-1.581*** (0.0550)	1.394*** (0.0542)
Starting a Business	0.000114 (0.000253)	5.10e-05 (0.000282)	-0.00772*** (0.000177)	0.00476*** (0.000196)	0.000652*** (0.000249)	0.00114*** (0.000280)	-0.00747*** (0.000175)	0.00452*** (0.000193)
Rule of Law	-0.0956*** (0.00659)	-0.0919*** (0.00746)	-0.0138*** (0.00494)	0.0480*** (0.00512)	-0.125*** (0.00637)	-0.104*** (0.00738)	-0.00667 (0.00499)	0.0335*** (0.00511)
Constant	-0.352*** (0.0454)	-0.969*** (0.0513)	-0.0785** (0.0343)	-0.308*** (0.0368)	-0.518*** (0.0461)	-0.851*** (0.0540)	-0.0954*** (0.0351)	-0.397*** (0.0374)
Observations	806,227	806,227	777,834	672,526	813,986	806,473	784,833	678,878
Cluster	Country	Country	Country	Country	Country	Country	Country	Country
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-Likelihood	-439927	-394821	-757366	-618447	-442214	-394773	-763418	-622967
$\phi$	0.0349	0.0263	0.0757	-0.0811	-0.0471	-0.0277	0.0950	-0.131

**Table 6.6. Alternative measures of women's political leadership**

This table reports marginal effects and standard errors (in brackets). All models are recursive bivariate probit regressions at the firm level. The dependent variable of second-stage estimations is *TEA*. First-stage estimations are available upon request. All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables.

	(1)	(3)	(3)
Seats Women	0.0378*** (0.00624)		
Political Empowerment		0.921*** (0.163)	
Political Participation			0.259*** (0.224)
Age	-0.00555*** (0.000199)	-0.00570*** (0.000200)	-0.00583*** (0.000209)
Education	-0.0911*** (0.0135)	-0.0135** (0.00552)	-0.00600 (0.00583)
Employed	0.730*** (0.00586)	0.715*** (0.00567)	0.709*** (0.00596)
Know Other	0.460*** (0.00733)	0.428*** (0.00481)	0.424*** (0.00492)
Domestic Credit	0.000538*** (0.000171)	-0.000214*** (7.44e-05)	-0.000554*** (7.32e-05)
GDP Growth	-0.0149*** (0.00322)	0.0132*** (0.00199)	0.0130*** (0.00197)
GDP per Capita	-0.0795*** (0.0160)	-0.156*** (0.00533)	-0.158*** (0.00517)
Inflation	-1.501*** (0.249)	0.816*** (0.177)	0.737*** (0.165)
Starting a Business	-0.0101*** (0.00145)	-0.00129*** (0.000293)	-0.00129*** (0.000293)
Rule of Law	0.0194 (0.0176)	-0.155*** (0.0155)	-0.137*** (0.0126)
Constant	0.577*** (0.142)	-1.199*** (0.180)	-1.520*** (0.236)
Observations	667,546	672,373	672,373
Cluster	Country	Country	Country
Year dummies	Yes	Yes	Yes
Log-Likelihood	-139927	-194821	-157366
$\phi$	0.0585	0.0915	0.0709

**Table 6.7. Alternative model specification**

This table reports marginal effects and standard errors (in brackets). All estimations are IV linear probability models at the firm level. The dependent variables of second-stage estimations are respectively *TEA*, *TEA Opportunity*, *Fear of Failure* and *Opportunity Perception* in columns (1), (2), (3) and (4). First-stage estimations are available upon request. All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables.

	(1) TEA	(2) TEA Opportunity	(3) Fear of Failure	(4) Opportunity Perception
Gender of Leader	0.0237*** (0.00111)	0.0121*** (0.000935)	-0.00411** (0.00192)	0.0461*** (0.00200)
Age	-0.000386*** (1.88e-05)	-0.000394*** (1.59e-05)	-0.00121*** (4.06e-05)	-0.000897*** (4.16e-05)
Education	-0.00581*** (0.000673)	0.00404*** (0.000555)	-0.0261*** (0.00128)	0.0222*** (0.00127)
Employed	0.0900*** (0.000597)	0.0622*** (0.000494)	-0.00549*** (0.00117)	0.0479*** (0.00118)
Know Other	0.0820*** (0.000740)	0.0632*** (0.000638)	-0.0291*** (0.00121)	0.186*** (0.00126)
Share of Domestic Credit	-1.56 e-05* (8.68e-06)	2.34e-05*** (7.47e-06)	0.000252*** (1.64e-05)	-0.000546*** (1.65e-05)
GDP Growth	0.00178*** (0.000131)	0.00156*** (0.000112)	-0.00639*** (0.000238)	0.0130*** (0.000248)
GDP per Capita	-0.0357*** (0.000836)	-0.0197*** (0.000714)	0.0314*** (0.00123)	-0.0340*** (0.00130)
Inflation	0.0142 (0.0120)	-0.0171* (0.00976)	-0.646*** (0.0190)	0.588*** (0.0188)
Starting a business	6.81e-05* (3.68e-05)	7.08e-06 (3.12e-05)	-0.00289*** (6.77e-05)	0.00143*** (6.81e-05)
Rule of Law	-0.00992*** (0.000977)	-0.00797*** (0.000830)	-0.0116*** (0.00148)	0.0252*** (0.00156)
Constant	0.358*** (0.00792)	0.199*** (0.00678)	0.421*** (0.0121)	0.456*** (0.0127)
Observations	814,232	814,232	785,070	679,084
R <sup>2</sup>	0.078	0.053	0.013	0.071
Cluster	Country	Country	Country	Country
Year dummies	Yes	Yes	Yes	Yes

**Table 6.8. Alternative sample**

This table reports marginal effects and standard errors (in brackets). All estimations are recursive bivariate probit regressions at the firm level. The sample do not include Spain which is overrepresented. The dependent variables of second-stage estimations are respectively *TEA*, *TEA Opportunity*, *Fear of Failure* and *Opportunity Perception* in columns (1), (2), (3) and (4). First-stage estimations are available upon request. All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables.

	(1) TEA	(2) TEA Opportunity	(3) Fear of Failure	(4) Opportunity Perception
Gender of Leader	0.159*** (0.0370)	0.0917** (0.0427)	-0.255*** (0.0264)	0.275*** (0.0275)
Age	-0.00558*** (0.000174)	-0.00688*** (0.000198)	-0.00282*** (0.000113)	-0.00282*** (0.000126)
Education	-0.0311*** (0.00544)	0.0600*** (0.00626)	-0.0352*** (0.00371)	0.0446*** (0.00403)
Employed	0.705*** (0.00566)	0.665*** (0.00643)	0.0104*** (0.00336)	0.136*** (0.00368)
Know Other	0.517*** (0.00469)	0.525*** (0.00524)	-0.0761*** (0.00344)	0.529*** (0.00372)
Share of Domestic Credit	0.000510*** (7.41e-05)	0.000712*** (8.21e-05)	-0.000336*** (5.50e-05)	-0.000149*** (5.73e-05)
GDP Growth	0.00952*** (0.000992)	0.0102*** (0.00112)	-0.0188*** (0.000747)	0.0311*** (0.000799)
GDP per Capita	-0.164*** (0.00447)	-0.118*** (0.00506)	0.0590*** (0.00337)	-0.0577*** (0.00362)
Inflation	-0.0771 (0.0637)	-0.260*** (0.0738)	-1.454*** (0.0542)	1.098*** (0.0538)
Starting a business	-0.00371*** (0.000307)	-0.00329*** (0.000345)	-0.00375*** (0.000234)	-0.000789*** (0.000249)
Rule of Law	-0.109*** (0.00697)	-0.0986*** (0.00793)	0.00416 (0.00524)	0.0363*** (0.00546)
Constant	-0.116** (0.0507)	-0.782*** (0.0576)	-0.258*** (0.0384)	-0.209*** (0.0404)
Observations	659,117	659,117	635,087	553,595
Cluster	Country	Country	Country	Country
Year dummies	Yes	Yes	Yes	Yes
Log-Likelihood	-354456	-543533	-435355	364444
$\varphi$	0.0435	0.0515	0.0453	0.0545

**Table 6.9. Lagged estimations**

This table reports marginal effects and standard errors (in brackets). All estimations are recursive bivariate probit regressions at the firm level. All the variables are lagged by three years. The dependent variables of second-stage estimations are respectively *TEA*, *TEA Opportunity*, *Fear of Failure* and *Opportunity Perception* in columns (1), (2), (3) and (4). First-stage estimations are available upon request. All models have variance robust to heteroscedasticity and clustered at the country level. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1% level respectively. See Appendix 6.B. for the definitions of the variables

	(1) TEA	(2) TEA Opportunity	(3) Fear of Failure	(4) Opportunity Perception
Gender of Leader	0.174*** (0.0291)	0.128*** (0.0335)	-0.179*** (0.0227)	0.322*** (0.0220)
Age	-0.00550*** (0.000166)	-0.00679*** (0.000188)	-0.00309*** (0.000105)	-0.00259*** (0.000118)
Education	-0.00964* (0.00503)	0.0689*** (0.00577)	-0.0663*** (0.00329)	0.0665*** (0.00365)
Employed	0.724*** (0.00530)	0.694*** (0.00605)	-0.0136*** (0.00301)	0.134*** (0.00335)
Know Other	0.513*** (0.00436)	0.516*** (0.00487)	-0.0740*** (0.00310)	0.497*** (0.00338)
Share of Domestic Credit	-0.000269*** (7.42e-05)	5.72e-05 (8.23e-05)	0.000373*** (5.57e-05)	-0.00131*** (5.72e-05)
GDP Growth	0.0132*** (0.000912)	0.0145*** (0.00102)	-0.0184*** (0.000681)	0.0390*** (0.000746)
GDP per Capita	-0.177*** (0.00446)	-0.129*** (0.00506)	0.0743*** (0.00336)	-0.0821*** (0.00363)
Inflation	0.0267 (0.0636)	-0.111 (0.0732)	-1.594*** (0.0544)	1.510*** (0.0540)
Starting a business	-6.55 e-06 (0.000247)	-0.000127 (0.000276)	-0.00745*** (0.000174)	0.00423*** (0.000192)
Rule of Law	-0.110*** (0.00653)	-0.102*** (0.00736)	-0.00730 (0.00496)	0.0426*** (0.00510)
Constant	-0.284*** (0.0455)	-0.919*** (0.0513)	-0.106*** (0.0342)	-0.265*** (0.0366)
Observations	509,417	459,158	575,087	453,595
Cluster	Country	Country	Country	Country
Year dummies	Yes	Yes	Yes	Yes
Log-Likelihood	-354456	-343533	-335355	364445
$\varphi$	0.0435	0.0515	0.0453	0.0545

## Appendix 6.A. Female political leaders

Country	Leader's name	Mandate
Argentina	Fernandez de Kirchner	(2007-2015)
Bangladesh	Hasina Wazed	(1996-2001); (2009-.)
Belgium	Sophie Wilmes	(2019-2020)
Bolivia	Jeanine Anez	(2019-2020)
Brazil	Dilma Rousseff	(2011-2016)
Chile	Michelle Bachelet	(2006-2010); (2014-2018)
Costa Rica	Laura Chinchilla Miranda	(2010-2014)
Croatia	Kolinda Grabar-Kitarovic	(2015-2020)
Denmark	Helle Thorning-Schmidt	(2011-2015)
Finland	Tarja Halonen	(2000-2012)
Georgia	Salomé Zourabichvili	(2018-.)
Germany	Angela Merkel	(2005-2021)
Iceland	Jóhanna Sigurdardottir	(2009-2013)
Indonesia	Megawati Sukarnoputri	(2001-2004)
Jamaica	Portia Simpson-Miller	(2006-2007); (2012-2016)
Latvia	Lamdota Straujuma	(2014-2016)
Liberia	Ellen Johnson Sirleaf	(2006-2018)
Lithuania	Dalia Grybauskaite	(2009-2019)
Malawi	Joyce Hilda Banda	(2012-2014)
Moldavia	Zinaida Greceanii	(2008-2009)
New Zealand	Helen Clark	(1999-2008)
New Zealand	Jacinda Ardern	(2017-2023)
Norway	Erna Solberg	(2013-2021)
Panama	Mireya Moscoso	(1999-2004)
Philippines	Gloria Macapagal-Arroyo	(2001-2010)
Serbia	Ana Brnabić	(2017-2020)
Sri Lanka	Chandrika Kumaratunga	(1994-2005)
Slovakia	Iveta Radicova	(2010-2012)
Slovenia	Alenka Bratušek	(2013-2014)
South Korea	Park Geun-hye	(2013-2017)
Switzerland	Micheline Calmy-Rey	2011
Switzerland	Doris Leuthard	(2010-2010)
Switzerland	Eveline Widmer-Schlumpf	2012
Switzerland	Simonetta Sommaruga	2020
Switzerland	Doris Leuthard	(2016-2017)
Taiwan	Tsai Ing-Wen	(2016-.)
Tchad	Catherine Samba-Panza	(2014-2016)
Thailand	Yingluck Shinawatra	(2011-2014)
Trinidad and Tobago	Kamla Persad-Bissessar	(2010-2015)
United Kingdom	Theresa May	(2016-2019)

## Appendix 6.B. Variable definitions

Variable name	Definition and source
<b>Dependent variables</b>	
TEA	Dummy equals 1 if the respondent is involved in the Total Early-stage entrepreneurial Activity. <i>Source: Global Entrepreneurship Monitor.</i>
TEA Opportunity	Dummy equals 1 if the respondent is a female involved in the Total Early-stage entrepreneurial Activity by Opportunity. <i>Source: Global Entrepreneurship Monitor.</i>
Fear of Failure	Dummy equals 1 if the respondent believes that the fear of failure would prevent him/her from launching a business, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Opportunity Perception	Dummy equals 1 if the respondent sees good opportunities for starting a business in the next 6 months, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
<b>Independent variables</b>	
<i>Individual-level variables</i>	
Age	Respondent's exact age. <i>Source: Global Entrepreneurship Monitor.</i>
Education	Dummy equals 1 if the respondent has a post-secondary or higher education attainment, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Employed	Dummy equals 1 if the respondent is either full or part-time employed, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
Know Other	Dummy equals 1 if the respondent personally knows other entrepreneurs, 0 otherwise. <i>Source: Global Entrepreneurship Monitor.</i>
<i>Political variables</i>	
Gender of Leader	Dummy equals 1 if the actual political leader is a woman. <i>Source: Political Leaders' Affiliation Database.</i>
Close Female Leader	Dummy equals 1 if there is at least one woman as a political leader in neighbouring countries. <i>Source: Political Leaders' Affiliation Database.</i>
Seats Women	Proportion of seats held by women in national parliaments. <i>Source: World Development Indicators.</i>
Political Empowerment	Index of women's political empowerment. <i>Source: Varieties of Democracy.</i>
Political Participation	Index of women political participation index. <i>Source: Varieties of Democracy.</i>
<i>Macroeconomic variables</i>	
Inflation	Inflation rate. <i>Source: World Development Indicators.</i>
Domestic Credit	Domestic banking credit to the private sector, as a share of GDP. <i>Source: World Development Indicators.</i>
GDP per Capita	Gross domestic product divided by midyear population. <i>Source: World Development Indicators.</i>
GDP Growth	Annual GDP growth. <i>Source: World Development Indicators.</i>
Starting a Business	The score for starting a business is the simple average of the scores for each of the component indicators: the procedures, time and cost for an entrepreneur to start and formally operate a business, as well as the paid-in minimum capital requirement. <i>Source: World Development Indicators.</i>
Rule of Law	It captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. <i>Source: World Development Indicators.</i>







# Chapter 7: Girls Will Be Girls? The Gendered Effect of Economic Policy Uncertainty on Corporate Investment<sup>48</sup>

## Abstract

We examine the effect of CEO gender on the relation between economic policy uncertainty (EPU) and corporate investment. Using the newspaper-based EPU index developed by Baker, Bloom, and Davis (2016), we perform an empirical investigation on firm-level data of more than 38,000 firms from eight European countries for 2010-2019. We find evidence that higher EPU is associated with higher corporate investment. However, we show that this beneficial effect of economic policy uncertainty is lower when the firm CEO is a woman. We explain this finding by the higher risk aversion of women relative to men. Our main results are robust to a battery of sensitivity tests. Our work contributes to the debate on the impact of EPU on firm corporate decisions by bringing upfront the influence of CEO gender.

**Keywords:** Economic policy uncertainty ▪ Firm investment ▪ CEO gender.

**JEL Codes:** G30, G32, J16.

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<sup>48</sup> This chapter is co-written with Laurent Weill and has been published in *Applied Economics* (2023).

## 1. Introduction

Encouraging gender equality in executive positions has become the core of political debates over the last decades in the Western world. It has led to the implementation of gender-based quotas for large firms increasing women's presence on corporate boards (de Cabo et al., 2019) in a large number of European countries.<sup>49</sup>

Beyond societal implications, the strong impetus for gender-balanced governance raises questions about its economic impact. In this regard, literature provides equivocal findings. On the one hand, some works have provided evidence of economic benefits associated with female top managers. Among others, firms with a higher share of women in top management have been shown to be more profitable and to have higher stock returns (Krishnan and Parsons, 2008), but also to have lower agency costs (Jurkus and Woodard, 2011). On the other hand, several studies conclude to the absence of any significant effect of executive female representation on firm performance (Campbell and Mínguez-Vera, 2008; Adams and Ferreira, 2009; Kirsh, 2018; Dupatti et al., 2020).<sup>50</sup>

From a theoretical perspective, the different behaviour of women in top management positions has been explained by behavioural features affecting preferences, especially stronger risk aversion (Bertrand, 2011; Croson and Gneezy, 2009). Women demonstrate a more emotion-based reasoning, which directly sways their risk-taking behaviour. By contrast, men tend to be overconfident compared with women, and as a result, are more likely to take risks. De facto, risks may be perceived as threats by female decision makers.

A natural question that emerges is the influence of the CEO gender on firm investment strategies in presence of uncertainty. Namely, investment is a key corporate decision affected by risk aversion of decision makers. Managers take corporate investment decisions based on the economic environment and their preferences. Differences in risk aversion can thus lead to differences in investment behaviour in presence of economic policy uncertainty. Against this backdrop, the objective of this paper is to examine how CEO gender affects firm investment

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<sup>49</sup> At the European Union level, the European Commission enacted the Strategy for Equality between Women and Men 2010-2015 in 2010. In 2017, it adopted the Act on Equality between Women and Men in Supervisory Boards stipulating "there must be at least 30% women on the supervisory boards of publicly traded companies and companies with more than 1 000 employees" (European Commission, 2017, p. 24).

<sup>50</sup> In a meta-analysis of 170 studies, Post and Bryon (2015) find a positive effect of women's leadership on firm financial performance for 100 works, whereas the impact is not significant in 70 studies.

in the presence of economic policy uncertainty. The unpredictability associated with possible changes in government policy or global economic conditions is expected to have gender-disaggregated implications for firm investment strategies.

Theoretical literature on the relation between economic policy uncertainty and corporate investment contributes to establishing the hypotheses about the influence of the CEO gender on this relation. The general view considers that higher economic policy uncertainty should reduce firm investment. It gives incentives for firms to delay investment projects. The underlying intuition of this so-called *wait-and-see* effect is simple: if an unpredictable environment can potentially result in an undesirable outcome from a firm's perspective, the option value of waiting to invest increases and the firm may rationally postpone investment until some or all of the uncertainty elements are resolved (Bernanke, 1983; Bloom, 2009). The *wait-and-see* effect has been explained by risk aversion (Nakamura, 1999) and investment's degree of irreversibility (Bernanke, 1983; Dixit and Pindyck, 2012). A set of works empirically corroborate this view (Gulen and Ion, 2016; Cerda et al., 2018; Chen et al., 2019).

An alternative view assumes that greater economic policy uncertainty favours investment. It relies on two effects as explained by Bloom (2014). On the one hand, the *growth options effect* considers that volatile returns caused by uncertainty allow for higher outcomes, although with a lower probability than in a "normal" world where volatility is less important. This increase in potential gains, by generating risk-seeking attitudes, creates incentives for firms to invest. On the other hand, the *Oi-Hartman-Abel effect* considers that higher uncertainty increases investment because firms expand to exploit good outcomes while they contract to insure against bad outcomes, making them more risk loving (Oi, 1961; Hartman, 1972; Abel, 1983). Wu et al. (2019) have found empirical support for this view by showing that economic policy uncertainty helps to promote investment in Australia.

While both views suggest opposing impacts of uncertainty on investment, they converge on the influence of risk aversion of decision makers on the relation. The *wait-and-see effect* assumes that uncertainty dampens investment, with a higher reduction for risk-averse managers. The *growth options* and the *Oi-Hartman-Abel effects* suggest that uncertainty fosters investment with a higher increase for risk-loving managers. Thus, the higher risk aversion of women leads to the hypothesis that investment is lower for women-led firms in presence of greater economic policy uncertainty.

We test this hypothesis on a large sample of firms from eight European countries extracted from Amadeus database covering the period 2010-2019. Following recent literature (Gulen and Ion, 2016; Chen et al., 2019; Wu et al., 2020), we employ the newspaper-based economic policy uncertainty (EPU) index developed by Baker et al. (2016). We perform regressions of corporate investment on a set of variables including *EPU* and *CEO Gender* at the firm level. Our dataset includes firms of all sizes with a huge majority of small and non-listed companies in line with the population of companies. It brings a major benefit for our analysis since it has been shown that CEOs of small and non-listed firms have a greater impact on decision-making, for good or for ill, than do their public firm counterparts (Quigley et al., 2021).

We face two key challenges in our investigation. First, we require information on the gender of CEO for a large sample of companies. We solve this issue with the Amadeus database providing detailed information on CEO gender for a huge number of companies of all sizes all around Europe. Second, the identification requires high variation in economic policy uncertainty across firm level observations. Our sample has two key advantages in this respect. On the one hand, we benefit from a cross-country sample providing more variation in EPU than single-country samples commonly adopted in former papers on the economic policy uncertainty-investment nexus (Gulen and Ion, 2016; Cerda et al., 2018; Wu et al., 2020). On the other hand, the period of study is characterized by high variability concerning both temporal and cross-sectional dimensions. The 2010-2019 decade has been accompanied with many disparities across years and countries in European countries.

By way of preview, the main finding of this paper is that corporate investment is affected by the interplay between economic policy uncertainty and CEO gender. Specifically, we find that economic policy uncertainty enhances corporate investment, but this positive impact is reduced for firms with female CEO. This finding accords with the view of higher risk aversion of women. Facing higher uncertainty, female CEOs increase investment but with a lower degree than male CEOs. Additionally, we find that these results are observed for small and medium enterprises and for microenterprises, i.e. firms for which CEO characteristics can affect the most corporate decisions, but not for large companies. Finally, the analysis of the non-linearity shows that an increase in uncertainty is associated with a greater corporate investment for female-led firms, up to a certain threshold. Our main results hold when we apply a battery of robustness tests.

Our paper contributes to two debates in the literature. First, we contribute to the literature exploring the economic implications of CEO gender. A large set of works has investigated how CEO gender affects firm performance. Our work departs significantly from this literature by considering whether it exerts an impact on corporate decisions that is conditional to the economic environment, thereby affecting firm performance.

Second, we augment the literature on economic policy uncertainty and corporate investment in two ways. On the one hand, we provide an original behavioural contribution to this strand of literature by documenting the influence of CEO gender on this relation. On the other hand, we perform a cross-country approach on a large sample of firms from all sizes. Using the economic policy uncertainty measures proposed by Baker, Bloom and Davis (2016), a handful of works has investigated how economic policy uncertainty can affect corporate investment at the firm level (Baker et al., 2016; Cerda et al., 2018; Chen et al., 2019; Gulen and Ion, 2016; Wu et al., 2020). However, they all adopt a single-country framework. In contrast to these single-country studies, our cross-country approach exploits country-level differences in economic policy uncertainty across firms. We have therefore variation in economic policy uncertainty through time and through space in our sample. In addition, former works focus on listed firms. By considering non-listed firms in our analysis, we have a much broader sample of firms that is not restricted to listed firms for which available information is much larger because of their listed status and their large size. We can therefore exploit firm-level differences in exposure to certain aspects of economic policy.

The paper is organized as follows. In Section 2, we provide explanations about the measurement of economic policy uncertainty in Europe. Section 3 presents data and variables. Section 4 reports empirical results. In Section 5, we present robustness checks. Final section concludes the study.

## **2. Measuring economic policy uncertainty in Europe**

Uncertainty is not a sharply outlined concept. Literature proposed several proxies to measure economic policy uncertainty. A first strand of works has considered that uncertainty faced by the individual firm can be represented by stock price volatility (Baum, Caglayan and Talavera, 2008; Bloom, 2009; Panousi and Papanikolaou, 2012). A second strand of studies have utilized elections as a measure of uncertainty (Julio and Yook, 2012; Pastor and

Veronesi, 2012; Jens, 2017). Alternative proxies can also have been used like volatility of unforecastable components of several time series suggested by Jurado, Ludvigson and Ng (2015).

Although these measures all find acceptance in literature, they have been criticized since they do not cover the whole spectrum of uncertainty. For instance, as mentioned by Gulen and Ion (2016), using elections as an indicator variable implies the assumption that policy uncertainty does not change during non-election years. Moreover, Bloom (2014) argued that an uncertainty proxy should be a mixture of risk and economic uncertainty. Baker, Bloom and Davis (2016) stated the fact that market volatility index pertains to uncertainty only about equity returns. All these efforts guide the search for a wider measure of uncertainty that captures all these factors. Lastly, most economic policy uncertainty indices are not cross-country comparable. For instance, the EPU measure proposed by Leduc and Liu (2016) is only covering the US. Furthermore, Tobback et al. (2018) attempt to develop an EPU index for Belgium using, among others, support vector machine classification. However, their initiative to regularly publish index updates fell short due to data scraping issues.

In order to fill this gap, Baker et al. (2016) have developed an EPU index, for the United States first, and for several other countries including major European countries subsequently. On the one hand, the U.S. EPU index is built out of three components: (i) the first component treats newspaper coverage policy-related economic uncertainty in major newspapers, i.e. the frequency of references to policy uncertainty in leading newspapers; (ii) the second element reflects the number of federal tax code provisions that have to expire in the next 10 years as well as a proxy of risk; and (iii) the third component reflects disagreements among forecasters about inflation and government purchases.<sup>51</sup> On the other hand, European countries' EPU indices are built using exclusively the first component. Both second and third components are not used in the case of Eurozone countries because they capture a U.S.-specific source of EPU. To do so, Baker et al. (2016) select articles from major newspapers and scan for three groups of words related to economy, uncertainty and economic policy. There should be at least one word from each group in the article for the article to be counted as an indicator of EPU. In this study, we only consider the newspaper-based index available for several

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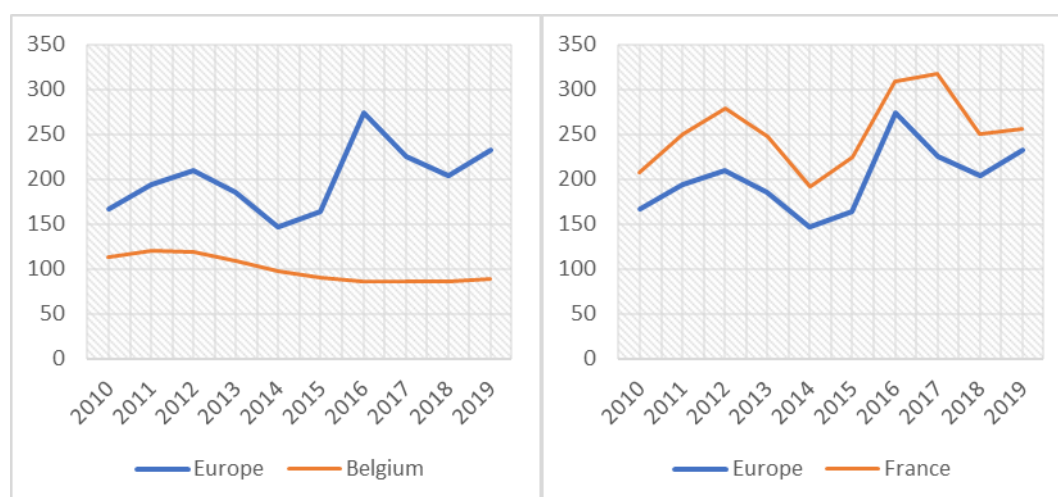
<sup>51</sup> More details about the author's methodology can be found in <https://www.policyuncertainty.com/>.

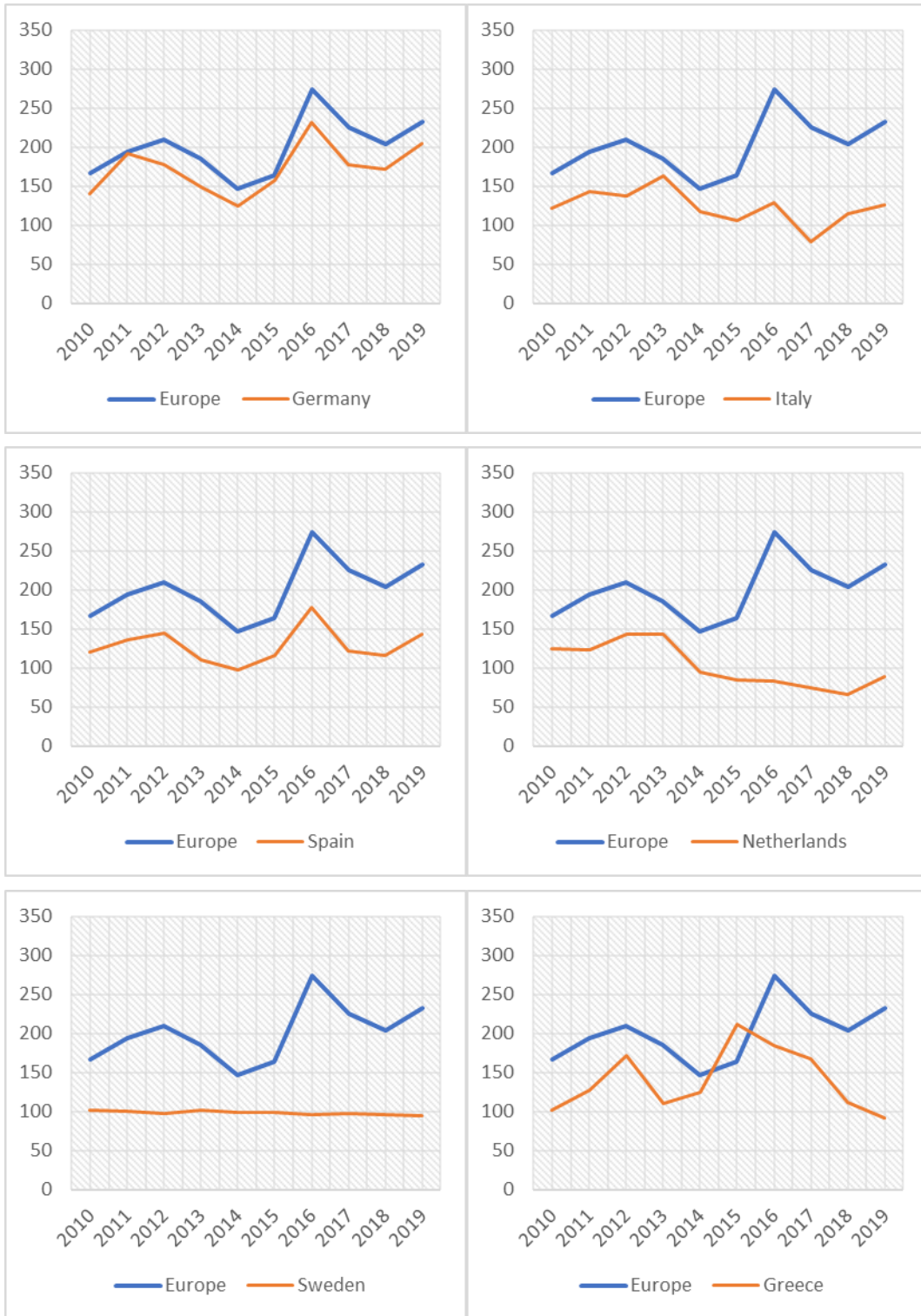


European economies, because this index has several advantages over other extant uncertainty measures.

A first advantage of the EPU index is that it allows for international time and cross-country simile compared to other indices. Hence, considering the EPU index ensures national comparability as the same methodology is used for 22 countries over at least 20 years. Second, the EPU index covers both the intensity and persistency of movements in policy-related economic uncertainty events. Figure 7.1. displays the quarterly EPU index both for Europe and for the countries studied, respectively Belgium, France, Germany, Italy, Spain, the Netherlands, Sweden and Greece over our sample period. Swedish and Belgian indices exhibit a dampened volatility relative to other surveyed countries. It fluctuates around consistently high levels from 2011 to early 2013, a period characterized by recurring sovereign debt and banking crises in the Eurozone. In 2016, the Brexit announcement in the UK has opened a Pandora's box, ushering in a new period of uncertainty. Except for Sweden and Belgium, the EPU index is shown to raise in the same year, thus reflecting the general turmoil caused by the political watershed. Interestingly, significant cross-country EPU transmissions are observable during the post-referendum period. Moreover, the EPU index also deals with country-specific patterns: for instance, the dramatic rise observed in Spain at the end of 2017 corroborates with the Catalan unilateral declaration of independence. At the European scale, the recent pattern of the EPU index shows that the current levels of economic policy uncertainty are at slightly high levels compared to the past, suggesting a growing persistent concern. All in all, this index is consistent with the ups and downs in the level of economic activity of the eight countries covered in this study.

Figure 7.1. Newspaper-based EPU index from 2010 to 2019





**Source:** Baker, Bloom and Davis (2016).

**Note:** This figure displays the evolution of the Economic Policy Uncertainty index over time.

### 3. Data and methodology

The sample data come from three sources. Firm-level data are gathered from the Amadeus database maintained by Bureau van Dijk. Amadeus contains financial information on over 7 million firms across 38 European countries. Data are collected by 35 information providers across Europe, generally the office of the Registrar of Companies, and are standardized. We combine the latter with the EPU monthly index data available for European countries available online. EPU indices for France, Germany, Italy, Spain and Sweden are provided by Baker et al. (2016). The same methodology is used for Greece (Fountas et al., 2018), Netherlands (Kroese et al., 2015), Belgium (Algaba et al., 2020). Since monthly financial statement information are not available, we conduct our analysis of corporate investment based on annual data. Thus, we calculate the annual EPU value as the yearly average of monthly data (*EPU Mean*).<sup>52</sup> Lastly, country-level variables are extracted from the World Development Indicators database from the World Bank.

The number of firms included in the Amadeus database varies across countries: in our sample, Spain and Italy were overrepresented compared to other countries. To deal with this selection bias, firms were selected using a sampling design that stratifies companies by sector and by size. Hence, three elements were used in the sample stratification: industry classification (2-digit level NACE codes provided by Amadeus), firm size (classification employed by the European Commission in microenterprises, small and medium enterprises, and large companies<sup>53</sup>), and country. The data have been cleaned for outliers<sup>54</sup> and missing observations (especially CEO gender). Thus, we obtain a fairly broad dataset including 38,173 European firms from eight economies. The choice of countries is driven by the availability of both firm-level information and the EPU index. About 39.69% of firms are from Italy, 30.22% and 20.12% respectively from Spain and France, and the remainder are from Greece, Netherlands, Belgium, Germany and Sweden. Firm-year observations with female CEOs represent 22.30% of our sample. Regarding firms' size, most entities are small: 58.62% of the firms are microenterprises whereas 38.39% are classified as small and medium enterprises

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<sup>52</sup> Several prior studies also adopted the annual arithmetic mean of EPU index to investigate investment under uncertainty (e.g., Wu et al., 2020; Chen et al., 2019).

<sup>53</sup> For further details, see <https://ec.europa.eu/eurostat/web/structural-business-statistics/structural-business-statistics/sme>.

<sup>54</sup> Note that firm-level variables have been winsorized at the 1st and 99th percentiles to reduce the potential impact of outliers.

and only 3.01% as large firms. Regarding time dimension, our analysis spans the 2010-2019 period as Amadeus includes up to 10 years of information per company.

In the estimations, the dependent variable is a measure of investment. As suggested by Becker and Sivadasan (2010), investment is measured as *Gross Investment*, defined as the sum of fixed assets and depreciation for year  $t$  minus fixed assets in year  $t-1$ , all scaled by total assets in year  $t-1$ . As aforementioned, we employ *EPU Mean* to measure economic policy uncertainty. *CEO Gender* is estimated by a dummy equal to one if the CEO is a woman in year  $t$  and zero otherwise. Our explanatory variable of interest is the interaction term between *CEO Gender* and *EPU Mean*, denoted as *EPU Mean \* CEO Gender*. A statistically significant negative coefficient for *EPU Mean \* CEO Gender* indicates that an increase in uncertainty reduces the firm-level investment for a female CEO.

Hence, we estimate the following model:

$$Gross\ Investment_{i,t} = \alpha_i + \tau_k + \theta_j + \beta_1 CEO\ Gender_{i,t-1} + \beta_2 EPU_{k,t-1} + \beta_3 CEO\ Gender_{i,t-1} * EPU_{k,t-1} + \beta_4 firm\ controls_{i,t-1} + \beta_5 country\ controls_{k,t-1} + \varepsilon_{i,t}$$

The subscript  $i$  refers to firm, subscript  $j$  to industry, subscript  $k$  to country and finally subscript  $t$  to year.  $\varepsilon_{i,t}$  is the idiosyncratic error term.

Based on prior research on the determinants of firm investment (Gebauer et al., 2018, Wu et al., 2020), we control for an array of five firm-specific variables. In particular, we include *Firm Size* (natural logarithm of total assets), *Profitability* (return on assets), *Leverage* (total debt over total assets), *Growth Opportunity* (sales growth) and *Tangibility* (fixed assets scaled by total assets).

Since the *EPU* index may capture not only policy-related uncertainty but also fundamental economic volatility, we consider a set of country-specific controls to alleviate endogeneity concerns. In line with Chen et al. (2019), the latter contains *GDP Growth* (real GDP growth) and *Inflation* (natural logarithm of inflation rate measured by the consumer price index).

As it takes time for investment decisions to materialize, we lag all endogenous variables by one year allowing us to distinguish the causal effect of uncertainty. To deal with a potential heterogeneity bias, we use fixed effect regression. We control for the country fixed

effects ( $\tau_k$ ) to capture time-invariant specific effects across countries. Industry fixed effects ( $\theta_j$ ) and year fixed effects ( $\alpha_t$ ) capture respectively unobservable industry heterogeneity and aggregate shocks. As EPU varies at the country level and not at the firm level, we use country fixed effects rather than firm ones. Standard errors are clustered at the firm level to control for cross-sectional correlation. Definition of variables is summarized in the Appendix.

Panel A of Table 7.1. displays summary statistics of variables used in our study. The mean value for *Gross Investment* is 3.67%. *EPU* ranges between 78.22 and 317.12 with a standard deviation of 60.59, demonstrating considerable variation around the sample mean value as mentioned above. We observe that 22.23% of CEOs are women in our sample, which is in line with the fact that our sample includes a large number of non-listed firms.

Panel B of Table 7.1. reports univariate correlations. Results suggest that correlation coefficients are below the serious multicollinearity threshold of 0.7 set by Kervin (1992). We can point out that *Gross Investment* has a positive correlation with *EPU Mean* and a negative correlation with CEO gender.

## 4. Results

### 4.1 Main estimations

Table 7.2. reports the main estimations. We perform several estimations. The first model considers only *EPU Mean*, *CEO Gender* and control variables (column (1)). The second model considers only the three variables of interest (*EPU Mean*, *CEO Gender*, *EPU Mean \* CEO Gender*) (column (2)). The third and fourth models respectively add firm-level (column (3)) and country-level control variables (column (4)). Finally, the fifth model includes all control variables in addition to the three variables of interest, and is our preferred specification. Several findings emerge.

First, we observe that women-led firms have lower investment than men-led firms. *CEO Gender* has a significantly negative coefficient in all estimations. The effect on corporate investment of a female CEO is economically significant: the presence of a female CEO lowers the firm-level investment by 1.174% in our preferred specification.

Second, we find that economic policy uncertainty exerts a positive impact on corporate investment. The coefficient of *EPU Mean* is significantly positive in all estimations. Therefore, we find evidence in favour of the *growth options* and the *Oi-Hartman-Abel effects*. This finding is consistent with what Wu et al. (2020) have found for Australia. It, however, differs from the conclusion all obtained in single-country samples of listed firms from Gulen and Ion (2016) and Chen et al. (2019) for US firms and Cerda et al. (2018) for Chile. Economically, a one standard deviation rise in *EPU Mean* is associated with a rise in investment of 0.0073 percentage points in our preferred specification.

Third, we find that the presence of a female CEO reduces the beneficial impact of economic policy uncertainty on corporate investment. The coefficient of *EPU Mean \* CEO Gender* is negative and significant for each specification. Thus, this finding supports our initial hypothesis that the presence of a female CEO leads to lower firm investment in presence of uncertainty relative to the presence of a male CEO. We explain this conclusion by the higher risk aversion of women relative to men. Women are more reluctant to increase investment than men are in the presence of higher uncertainty.

Furthermore, this result also provides additional support to the *growth options* and the *Oi-Hartman-Abel effects* according to which uncertainty is associated with higher investment. Namely, the full effect of *EPU Mean* is still positive even for female-led firms in the sense that the negative coefficient of the interaction term is not high enough to turn the positive impact of *EPU Mean* in a negative one for female-led firms. Hence, the growth options effect is supported for all firms whatever the gender of the CEO.

Regarding firm-level controls, the significantly negative coefficient for *Size* implies that small firms have higher investment rates than large firms, consistent with Gebauer et al. (2018). Interestingly, *Tangibility* has a negative and significant effect on investment, which accords with the result from Gebauer et al. (2018) for European firms. We find a positive and significant relationship between *Profitability*, *Growth Opportunity* and firm investment in line with existing literature. Finally, none of the coefficients on *Leverage* is significant.

The estimated coefficients of the country-level variables have the expected sign. *GDP Growth*, which is an aggregate proxy for investment opportunities, is positively and significantly associated with investment, while *Inflation* has a significant and positive sign in line with Wu et al. (2020).

## 4.2. Non-linearity

Our main estimations have considered a linear relationship between economic policy uncertainty and corporate investment. However, we can question the existence of a non-linear relationship. *Ceteris paribus*, the prospect theory developed by Kahneman and Tversky (1979) suggests that losses have more emotional impact than an equivalent amount of gains. Thus, as mentioned by Chen et al. (2019), decision-makers might be risk-seeking until a certain level of uncertainty above which they engage in a more risk-averse behaviour. From an empirical perspective, Bo and Lensin (2005) find that the effect of uncertainty on investment is non-linear on a panel of Dutch firms: until a certain threshold, an increase in uncertainty has a positive effect on investment. Chen et al. (2019) also find support for a non-linear relation between uncertainty and investment with a U-shaped form for USA listed firms. A non-linear effect can differ for male and female-led firms: Sehrish et al. (2018) found that female investors are more likely to be affected by prospect theory.

To address the potential non-linear relation, we augment the model by including the quadratic term for *EPU Mean*. Since we care about the impact of gender on the relation between EPU and corporate investment, we redo the estimations separately by splitting the sample between firm-year observations with female CEOs and those with male CEOs. We can then examine and compare the coefficients of *EPU Mean* and *EPU Mean*<sup>2</sup> between both types of observations.

Table 7.3. reports these estimations with respectively the one for male-led firms and the one for female-led firms in columns (1) and (2). For male CEOs, we observe a significantly positive coefficient for *EPU Mean* while *EPU Mean*<sup>2</sup> is not significant. In other words, these findings show that the relation is positive but non-linear for men-led firms. For female CEOs, *EPU Mean* is significantly negative coefficient while *EPU Mean*<sup>2</sup> is significantly positive. These findings support the existence of a non-linear and U-shaped relation between uncertainty and investment if the CEO is a woman.

The threshold value of EPU above which female CEOs are more willing to invest is equal to 148.77. This value is slightly below the sample mean, i.e. 153.66, but is higher than the minimal value of the sample (78.22). Thus, an increase in uncertainty is associated with higher corporate investment for female-led firms up to a certain EPU level. After this

threshold, female CEOs dampen firm investment. Non-linearity once again suggests that CEO gender has a differential effect on firm decision-making.

### **4.3. Estimations by firm size**

Our main results show that the effect of uncertainty on corporate investment is influenced by CEO gender. We further investigate whether this gendered effect varies with the size of the firm. The analysis by firm size is of utmost interest from two perspectives. First, it contributes to the identification of the core effect of the paper, i.e. the effect of gender on the EPU-investment relation. Indeed, the CEO characteristics play a stronger role on corporate decisions in smaller firms. It results from the higher involvement of CEOs in firm activities in smaller firms. It also comes from the fact that CEOs of small firms are free from the burdens associated with the performance metric of share price characterizing public firms and other efforts aimed at managing investor expectations (Zahra and Pearce, 1989). Furthermore, in the case of large firms, the strongest regulation and oversight can inhibit the CEO effect. Hence, scrutinizing the effect of uncertainty on female-led smaller companies allows for better identification of the impact of CEO personal traits (Quigley et al., 2021).

Second, it brings relevant findings to understand the differences in the determinants of corporate investment across types of firms. It is of importance to know whether firm investment has the same sensitivity to EPU and to other factors whatever firm size to assess the influence of policies favouring firm investment on different types of firms.

We re-estimate the regression by considering separately the following groups of firms: micro companies, small and medium enterprises (SMEs), and large companies. We follow the European Commission classification by defining microenterprises as firms with real total assets below 2 million euros each year, SMEs as firms with real total assets below 43 million euros each year, and large firms as the remaining ones.

The results are reported in Table 7.4. We find that the interaction term between *EPU Mean* and *CEO Gender* is significantly negative for microenterprises and SMEs, while it is not significant for large firms. Additionally, the coefficient of *EPU Mean* is significantly positive for microenterprises and SMEs but not significant for large firms.



Therefore, these results mean that our two key results – the positive impact of economic policy uncertainty on corporate investment, which is lower for female-led firms – are only observed for microenterprises and SMEs. The interplay between *CEO Gender* and uncertainty is not significant for large firms. This conclusion provides additional support to our key finding of a gendered effect of uncertainty on corporate investment, since CEO characteristics exert a greater influence on corporate decisions in smaller firms.

## **5. Robustness tests**

### **5.1. Alternative model specification**

One of the main challenges of our estimation strategy is to properly control for aggregate confounders of policy uncertainty that might cause omitted variable bias. Corporate investment also possibly relies on unobserved or hidden investment opportunities that are only partly controlled by *Sales Growth* at the firm level and by *GDP Growth* at the country level, both lagged by one year to minimize reverse causality concerns. Furthermore, another main empirical concern is the possible endogeneity problem: corporate investment could potentially affect economic uncertainty, thereby impacting the EPU index. In order to alleviate omitted variable and endogeneity biases, we employ the dynamic panel system Generalized Method of Moments (GMM hereafter) method developed by Arellano and Bover (1995) and Blundell and Bond (1998). The system GMM estimator improves the efficiency of the first difference GMM estimator by introducing equations in both levels and differences. Thus, we consider lagged levels as instrumental variables for the equations in first differences and lagged differences as instruments for the levels equations. As suggested by Roodman (2009), system GMM is particularly consistent for panels with small T and large N, e.g. few periods and many individuals like ours compared to two-step least square estimations.

The reason why we do not consider system GMM in the main specification is the following. The dynamics of the model and its transformation to first differences imply that the sample is conditional to observing the outcome for at least three consecutive periods. Thus, a trade-off arises between the lag distance used to generate internal instruments and the size of the sample considered for our estimation. As our sample only covers the 2010-2019 period, we choose to keep the largest T as possible for our main demonstration.

The results of the system GMM estimations are presented in Table 7.5.<sup>55</sup> Two lags are used as the instrument set. The coefficients of *CEO Gender* and *EPU Mean* remain statistically significant at the 1% level, consistently with our main estimation. Focusing on our main variable of interest, the estimator of the interplay between *CEO Gender* and *EPU Mean* is still negative and significant. Hence, these results corroborate those obtained in the main estimations.

## **5.2. Alternative measures for firm investment**

Up to this point, we have used the *Gross Investment* measure for firm investment following among others Becker and Sivadasan (2010). We redo the estimations with two alternative measures. First, we consider *Alternative Investment* defined as the change in the real capital stock plus depreciation divided by the level of the real capital stock (proxied by tangible fixed assets), in line with Konings et al. (2003). Normalizing by capital stock allows considering firm size effect. Indeed, the propensity of investment in fixed assets tends to be higher for large firms as they have a greater output capability, allowing them to smooth the cost of capital over time. Second, we use *Investment Relative to Industry* which is measured by the ratio of *Gross Investment* to the median *Gross Investment* in the industry of the firm. We consider to this end the NACE section to define the industry of the firm. With this indicator, we take into account differences across industries and thus provide a relative measure of investment.

We provide the results for both alternative measures of firm investment in columns (1) and (2) of Table 7.6. We find again a significant and negative coefficient for *EPU Mean \* CEO Gender*, which confirms our key finding that in presence of higher economic policy uncertainty investment is lower in female-led firms than in male-led firms. Therefore, these results provide additional support for our key finding.

## **5.3. Alternative measures of economic policy uncertainty**

In the main estimations, we have measured economic policy uncertainty with the annual arithmetic mean of the monthly EPU index. We want now to check whether our results are

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<sup>55</sup> We utilize the system GMM estimation module provided by Stata, *xtabond2* proposed by Roodman (2009) for econometric estimation.

robust to the use of alternative measures for economic policy uncertainty. In line with Wu et al. (2020), we rerun our estimations using the median and geometric mean of the Baker et al. (2016) EPU index. In comparison with the arithmetic mean, the median and the geometric mean are more robust to outliers, which is of importance since the EPU index exhibits high variability among our sample.

Table 7.7. reports the estimations. We observe a significantly negative coefficient for the interaction term between the economic policy uncertainty measure and *CEO Gender* and a significantly positive coefficient for the EPU measure for both alternative measures of economic policy uncertainty. Hence, these results confirm that our key findings are robust to the use of alternative computations of economic policy uncertainty

#### **5.4. Effect of longer time-lag uncertainty**

Our main estimations indicate that an increase in economic policy uncertainty has a lower beneficial effect on investment for female-led firms the following year. Our specification has indeed considered a one-year lag for the explaining variables.

We can question whether uncertainty affects corporate investment over longer horizons, thus suggesting a hysteresis effect. Regarding the gendered effect, we may expect that the effect of uncertainty lasts longer for women than for men since female reasoning has been shown to be more emotion-based. We therefore redo our estimations by lagging alternatively all explaining variables with 2 years, 3 years, and 4 years rather than 1 year.

Table 7.8. presents the estimations. We find out that economic policy uncertainty exerts the same gendered impact after two years than after one year: *EPU Mean* \* *CEO Gender* is significantly negative while *EPU Mean* is significantly negative in contradiction with our main results. However, the effect of economic policy uncertainty vanishes after two years. Thus, these estimations do not support the view of a long-term influence of economic policy uncertainty on investment and especially of a differentiated effect of this uncertainty conditional to CEO gender.

## 5.5. Alternative dataset of firms with no change in CEO

We have performed all estimations by considering all firms of the dataset mixing thus firms with change in CEO over the period and firms with no change in CEO. A potential criticism deals with the fact that economic changes can affect both the likelihood of female CEO hirings as well as investment. A first answer to this criticism is the fact that the vast majority of the firms of the sample (about 89%) have the same CEO for the whole period of study, revealing that no change of CEO takes place before any change in corporate decisions. It accords with the fact that we mostly consider small firms in our dataset, meaning companies with strong links between management and ownership. A second answer is to provide the estimations for companies with no change of CEO over the period to check if our findings stand. We present these estimations in column (3) of Table 7.9.

We find again a significantly negative coefficient for *EPU Mean \* CEO Gender*. Hence our conclusion that investment is lower in female-led firms than in male-led firms in presence of higher economic policy uncertainty is also observed for firms with no change in CEO over the period of the study.

## 6. Conclusion

This study examines the influence of CEO gender on the relation between economic policy uncertainty and corporate investment. To this end, we perform an empirical investigation on firm-level data of more than 38,000 firms from eight European countries for the 2010-2019 period. To capture the overall level of policy uncertainty in the economy, we employ the newspaper-based EPU index developed by Baker et al. (2016).

We first find evidence that higher economic policy uncertainty is associated with higher corporate investment. However, we show that this beneficial effect of economic policy uncertainty is reduced when the firm CEO is a woman. Namely, an increase in economic policy uncertainty leads to higher firm investment, but the rise in investment is lower for women-led companies. We explain this finding by the higher risk aversion of women relative to men. In presence of higher economic policy uncertainty, women are more reluctant to increase investment than men.

The analysis by firm size reveals that this effect is observed for microenterprises and SMEs but not for large companies. This additional result supports our key finding about the influence of CEO gender since the influence of the CEO on corporate decisions is more prominent in small companies.

The implications of our findings are twofold. First, European policymakers should be aware of the beneficial effects of economic policy uncertainty for investment. In opposition to the common view that firms become cautious and reduce investment with high uncertainty, European firms tend to increase investment when the degree of economic policy uncertainty rises. In other words, there is no motive associated with favouring investment to reduce economic policy uncertainty in Europe. Second and foremost, a higher share of female CEOs in a country contributes to reducing the beneficial effect exerted by uncertainty on corporate investment. In other words, greater EPU benefits less to countries with higher presence of women CEOs. The higher presence of women CEOs contributes therefore to reduce the impact of changes in economic policy uncertainty on corporate investment and through that exerts a moderating effect.

Our research is thus an initial step towards understanding how CEO gender affects the consequences of greater economic policy uncertainty. It would notably be of particular interest to investigate whether CEO gender affects the relation between economic policy uncertainty and firm performance. We let this question for further research.

**Table 7.1. Descriptive statistics and correlation matrix**

This table provides descriptive statistics in Panel A and correlation matrix in Panel B for the variables used in the estimations. Definitions of variables are reported in the Appendix 7.A.

<b>Panel A. Descriptive statistics</b>										
<i>Dependent variable</i>	<i>N</i>	<i>Mean</i>	<i>Std Dev.</i>	<i>Min</i>	<i>Max</i>					
Gross Investment	319,441	0.0368	0.0834	-0.2569	0.6154					
<i>Firm-level controls</i>										
CEO Gender	319,441	0.223	0.4163	0	1					
EPU Mean	319,441	153.6562	60.589	78.2164	317.1186					
Size	319,441	7.3549	1.5894	0.6931	16.3816					
Profitability	319,441	0.0478	0.1094	-0.3364	0.4582					
Leverage	319,441	0.1082	0.185	0.0003	1					
Growth Opportunity	319,441	0.1656	1.3207	-1	21.6763					
Tangibility	319,441	0.2443	0.2689	0	0.9818					
<i>Country-level variables</i>										
GDP Growth	319,441	0.0102	0.0175	-0.0298	0.0393					
Inflation	319,441	-0.1288	0.459	-1.1304	0.6726					
<b>Panel B. Correlation matrix</b>										
	Gross Investment	EPU Mean	CEO Gender	Size	Leverage	Growth Opportunity	Tangibility	Profitability	Inflation	GDP Growth
Gross Investment	1.0000									
EPU Mean	0.0230	1.0000								
CEO Gender	-0.0071	-0.0601	1.0000							
Size	0.0195	0.2141	-0.0453	1.0000						
Leverage	0.0104	-0.1398	0.0302	-0.6837	1.0000					
Growth Opportunity	0.0565	-0.0095	-0.0118	0.0043	0.0191	1.0000				
Tangibility	0.1406	-0.1292	0.0552	0.0919	-0.0914	-0.0102	1.0000			
Profitability	0.0421	0.0679	-0.0152	-0.0285	-0.0680	0.0366	-0.1260	1.0000		
Inflation	0.0242	-0.1365	-0.0041	-0.0338	0.1140	0.0322	0.0466	0.0175	1.0000	
GDP Growth	0.0083	0.0547	0.0150	0.1300	-0.1626	-0.0125	-0.0402	0.0537	-0.2654	1.0000

**Table 7.2. Main estimations**

This table presents the results of fixed-effect regressions examining the relation between economic policy uncertainty, CEO gender and investment. The dependent variable is *Gross Investment*. All firm and country characteristics are lagged one year relative to the dependent variable to mitigate endogeneity concerns. Definitions of variables are provided in the Appendix 7.A. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
EPU Mean * CEO Gender		-0.000594*	-0.000585*	-0.000595*	-0.000586**
		(0.000259)	(0.000440)	(0.000342)	(0.000521)
EPU Mean	0.00184***	0.00220***	0.00177***	0.00212***	0.00169**
	(0.000661)	(0.000690)	(0.000680)	(0.000691)	(0.000681)
CEO Gender	-0.150***	-0.125	-0.218**	-0.134	-0.227**
	(0.0350)	(0.0949)	(0.0936)	(0.0951)	(0.0937)
Size	0.153***		0.153***		0.153***
	(0.0135)		(0.0135)		(0.0135)
Leverage	2.120***		2.121***		2.119***
	(0.111)		(0.111)		(0.111)
Growth Opportunity	0.372***		0.373***		0.372***
	(0.0109)		(0.0109)		(0.0109)
Tangibility	5.464***		5.463***		5.464***
	(0.0623)		(0.0623)		(0.0623)
Profitability	0.0408***		0.0410***		0.0408***
	(0.00135)		(0.00135)		(0.00135)
GDP Growth	0.177***			0.211***	0.177***
	(0.0471)			(0.0478)	(0.0471)
Inflation	0.0618***			0.0669***	0.0631***
	(0.0231)			(0.0235)	(0.0232)
Constant	8.832***	6.130***	2.446***	15.06***	8.858***
	(0.863)	(0.180)	(0.223)	(0.816)	(0.863)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	98,862	98,862	98,862	98,862	98,862
R <sup>2</sup>	0.056	0.029	0.056	0.029	0.056
Number of id	38,173	38,173	38,173	38,173	38,173

**Table 7.3. Testing non-linearity**

This table presents the results of fixed-effect regressions examining the relation between economic policy uncertainty, CEO gender and investment. The dependent variable is *Gross Investment*. All firm and country characteristics are lagged one year relative to the dependent variable to mitigate endogeneity concerns. Definitions of variables are provided in the Appendix 7.A. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1) Male CEO	(2) Female CEO
EPU Mean	0.00837* (0.00755)	-0.00482* (0.0134)
EPU Mean <sup>2</sup>	0.000099 (1.20e-05)	0.0000162* (2.47e-05)
Size	-4.138*** (0.216)	-4.604*** (0.658)
Leverage	34.04 (21.53)	11.38 (17.17)
Growth Opportunity	0.0959** (0.0379)	0.0610 (0.116)
Tangibility	-19.62*** (1.050)	-22.95*** (2.231)
Profitability	0.0424*** (0.00540)	0.0264* (0.0140)
Inflation	0.0705 (0.170)	0.206 (0.366)
GDP Growth	-0.224* (0.135)	0.516* (0.286)
Constant	40.96*** (3.481)	52.94*** (6.229)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Country fixed effects	Yes	Yes
Observations	78,780	18,202
R <sup>2</sup>	0.055	0.068
Number of id	30,298	8,685



**Table 7.4. Estimations by firm size**

This table presents the results of fixed-effect regressions examining the relation between economic policy uncertainty, CEO gender and investment. The dependent variable is *Gross Investment*. All firm and country characteristics are lagged one year relative to the dependent variable to mitigate endogeneity concerns. Definitions of variables are provided in the Appendix 7.A. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1) Microenterprises	(2) SMEs	(3) Large firms
EPU Mean * CEO Gender	-0.00313* (0.00168)	-0.00383** (0.00166)	0.00812 (0.00546)
EPU Mean	0.00275** (0.00121)	0.000277 (0.00143)	-0.00258 (0.00540)
CEO Gender	-0.784** (0.372)	-0.780** (0.377)	-1.664 (1.176)
Size	3.505*** (0.165)	4.928*** (0.292)	5.475*** (1.045)
Leverage	0.0345*** (0.00547)	0.449** (0.203)	3.816 (8.313)
Growth Opportunity	0.307*** (0.0395)	0.355*** (0.0504)	0.367*** (0.114)
Tangibility	26.33*** (0.587)	23.93*** (0.821)	15.63*** (2.028)
Profitability	0.0107*** (0.00395)	0.0180*** (0.00690)	0.119*** (0.0283)
Inflation	0.311*** (0.0766)	0.0913 (0.0942)	0.189 (0.321)
GDP Growth	0.141*** (0.0365)	0.0891** (0.0385)	0.0606 (0.156)
Constant	-20.13*** (4.321)	-38.96*** (3.109)	-61.69*** (12.40)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Observations	42,187	47,548	4,771
R <sup>2</sup>	0.077	0.051	0.026
Number of id	21,354	15,632	1,473

**Table 7.5. Generalized Method of Moments**

This table presents the results of system GMM regressions examining the relation between economic policy uncertainty, CEO gender and investment. The dependent variable is *Gross Investment*. All firm and country characteristics are lagged one year relative to the dependent variable to mitigate endogeneity concerns. Definitions of variables are provided in the Appendix 7.A. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)
EPU Mean * CEO Gender	-0.00838* (0.00412)
EPU Mean	4.187*** (0.299)
CEO Gender	-0.649* (0.838)
Lagged investment	0.594*** (0.182)
Size	-0.257*** (0.0297)
Leverage	24.34*** (8.624)
Growth Opportunity	-0.251*** (0.0864)
Tangibility	-3.584** (1.735)
Profitability	0.0302*** (0.00442)
Inflation	0.231** (0.114)
GDP Growth	0.112*** (0.0337)
Constant	-0.257*** (0.0297)
Year fixed effects	Yes
Industry fixed effects	Yes
Country fixed effects	Yes
Observations	86,322
Number of id	32,014

**Table 7.6. Alternative measures for firm investment**

This table presents the results of fixed-effect regressions examining the relation between economic policy uncertainty, CEO gender and investment. In specification (1), the dependent variable is *Alternative investment* defined as the change in the real capital stock plus depreciation divided by the level of the real capital stock (proxied by tangible fixed assets). In specification (2), the dependent variable is *Investment* relative to industry defined as *Gross Investment / Median Gross Investment in the Industry*.

	(1) Alternative Investment	(2) Investment Relative to Industry
EPU Mean * CEO Gender	-0.00668*** (0.00215)	-0.00243** (0.00109)
EPU Mean	0.000453* (0.00418)	0.00591*** (0.00208)
CEO Gender	-1.632** (0.658)	-0.766** (0.319)
Size	-2.765*** (0.532)	-1.702*** (0.105)
Leverage	-29.18 (23.75)	-6.406 (8.883)
Growth Opportunity	-0.0171 (0.0326)	0.0542** (0.0211)
Tangibility	-9.430*** (1.832)	-8.867*** (0.485)
Profitability	0.0104 (0.00640)	0.0239*** (0.00270)
Inflation	-0.0830 (0.148)	0.210** (0.0891)
GDP Growth	-0.0653 (0.100)	-0.138* (0.0735)
Constant	27.85*** (4.433)	17.03*** (0.889)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Country fixed effects	Yes	Yes
Observations	98,571	98,862
R <sup>2</sup>	0.077	0.031
Number of id	38,058	38,173

**Table 7.7. Alternative measures of economic policy uncertainty**

This table presents the results of fixed-effect regressions examining the relation between economic policy uncertainty, CEO Gender and investment. The dependent variable is *Gross Investment*. Definitions of variables are provided in the Appendix 7.A. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)
	EPU Geometric Mean	EPU Median
EPU * CEO Gender	-0.00454** (0.00192)	-0.00387* (0.00217)
EPU	0.0104*** (0.00394)	0.00761** (0.00328)
CEO Gender	-1.271** (0.541)	-1.068* (0.578)
Size	-4.071*** (0.195)	-4.070*** (0.195)
Leverage	1.124 (17.95)	1.100 (17.96)
Growth Opportunity	0.0933*** (0.0337)	0.0932*** (0.0337)
Tangibility	-19.01*** (0.899)	-19.01*** (0.898)
Profitability	0.0409*** (0.00496)	0.0408*** (0.00496)
Inflation	0.214 (0.151)	0.120 (0.139)
GDP Growth	-0.166 (0.119)	-0.137 (0.115)
Constant	46.90*** (2.089)	47.18*** (2.092)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Country fixed effects	Yes	Yes
Observations	98,862	98,862
R <sup>2</sup>	0.054	0.054
Number of id	38,173	38,173

**Table 7.8. Effect of longer time-lag uncertainty**

This table presents the results of fixed-effect regressions examining the persistency of uncertainty. The dependent variable is *Gross Investment*. In specifications marked (1) it leads two periods, and so forth until (3). Except EPU Mean, all firm and country characteristics are lagged one year relative to the dependent variable to mitigate endogeneity concerns. Definitions of variables are provided in the Appendix 7.A. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1) <i>Year<sub>t-2</sub></i>	(2) <i>Year<sub>t-3</sub></i>	(3) <i>Year<sub>t-4</sub></i>
EPU Mean * CEO Gender	-0.00392* (0.00201)	0.00508 (0.00331)	-0.00135 (0.00376)
EPU Mean	-0.00223 (0.00400)	0.0167** (0.00684)	-0.00242 (0.0266)
CEO Gender	-0.605* (0.542)	-1.175 (0.771)	-0.0593 (0.899)
Size	-4.109*** (0.190)	-2.493*** (0.217)	-0.711*** (0.231)
Leverage	-18.34** (8.575)	-13.32 (8.941)	10.81 (12.60)
Growth Opportunity	0.0276 (0.0338)	-0.0342 (0.0434)	-0.0414 (0.0469)
Tangibility	-18.28*** (0.797)	-10.22*** (0.954)	0.960 (1.094)
Profitability	0.0220*** (0.00493)	0.00723 (0.00547)	0.00446 (0.00684)
Inflation	0.180 (0.229)	-0.234 (0.242)	-0.577* (0.323)
GDP Growth	-0.0367 (0.0463)	0.0448 (0.0847)	0.163 (0.665)
Constant	43.33*** (3.016)	28.33*** (3.222)	17.20*** (5.308)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Observations	86,523	68,026	49,803
R <sup>2</sup>	0.047	0.015	0.002
Number of id	37,000	31,529	23,735

**Table 7.9. Alternative sample**

This table presents the results of fixed-effect regressions examining the relation between economic policy uncertainty, CEO gender and investment. The dependent variable is *Gross Investment*. In specification (1), the sample is only composed of firm-year observations with the same CEO. All firm and country characteristics are lagged one year relative to the dependent variable to mitigate endogeneity concerns. Definitions of variables are provided in the Appendix 7.A. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively

	(1) No change in CEO
EPU Mean * CEO Gender	-0.00201* (0.00136)
EPU Mean	0.00116* (0.000889)
CEO Gender	-0.565 (0.391)
Size	3.357*** (0.112)
Leverage	0.0401*** (0.00521)
Growth Opportunity	0.341*** (0.0306)
Tangibility	24.14*** (0.451)
Profitability	0.0146*** (0.00344)
Inflation	0.254*** (0.0578)
GDP Growth	0.136*** (0.0256)
Constant	-23.50*** (2.667)
Year fixed effects	Yes
Industry fixed effects	Yes
Country fixed effects	Yes
Observations	87,722
R <sup>2</sup>	0.081
Number of id	35,827

## Appendix 7.A. Variable definitions

Variable	Definition and source
<b><i>Dependent variables</i></b>	
Gross Investment	(Fixed assets – Lagged fixed assets + Depreciation) / Total assets. <i>Source: Amadeus.</i>
Alternative Investment	(Fixed assets – Depreciation – Lagged fixed assets – Lagged depreciation) / Tangible fixed assets. <i>Source: Amadeus.</i>
Investment Relative to Industry	Gross Investment / Median Gross Investment of the industry (NACE section). <i>Source: own computations with Amadeus data.</i>
<b><i>Independent variables</i></b>	
<b><i>Firm level variables</i></b>	
Size	Natural logarithm of firm total assets in million USD. <i>Source: Amadeus</i>
Leverage	Ratio of debt to total assets. <i>Source: Amadeus.</i>
Growth Opportunity	(Sales – Lagged sales) / Lagged sales. <i>Source: Amadeus.</i>
Tangibility	Tangible fixed assets scaled by total assets. <i>Source: Amadeus.</i>
Profitability	EBIT scaled by total assets. <i>Source: Amadeus.</i>
CEO Gender	Dummy variable equal to 1 if the CEO is a woman and 0 otherwise. <i>Source: Amadeus.</i>
<b><i>Country level variables</i></b>	
Inflation	Natural logarithm of inflation rate measured by the consumer price index. <i>Source: World Bank Development indicators.</i>
GDP Growth	Real GDP Growth. <i>Source: World Bank Development indicators.</i>
EPU Mean	Average national EPU index. <i>Source: Baker, Bloom and Davis (2016), Fountas et al. (2018), Kroese et al. (2015), Algaba et al. (2020).</i>
EPU Geometric Mean	Geometric mean of national EPU index. <i>Source: Baker, Bloom and Davis (2016) among others.</i>
EPU Median	Median of national EPU index. <i>Source: Baker, Bloom and Davis (2016) among others.</i>





## General Conclusion

Since the adoption of the International Convention on the Elimination of all Forms of Discrimination Against Women in 1979, nations have endeavoured to diminish gender inequality across various domains, including education, health, employment, political representation, societal norms, and legal rights. The United Nations Millennium Development Goals reinforced this global objective by committing to attain gender equality and promote the empowerment of women and girls. Hence, the issue of women's empowerment has emerged as a central concern for policymakers, as it is associated with a wide range of economic, social, and political challenges.

Nevertheless, the persistence of gender inequalities raises significant questions regarding the factors driving change and the efficacy of policies aimed at addressing gender inequality. Despite considerable research efforts, identifying the underlying factors contributing to the persistence of inequality and their relative significance is the subject of intense debate. Addressing this gap, this thesis has two main objectives.

First, it aims to evaluate the determinants of women's empowerment through financial inclusion and entrepreneurship. The research confirms that both formal and informal institutions affect women's access to economic opportunities. Hence, the particular organization of society, including gender-specific legislation, social norms, gender marking in language, and women's political representation, are influential aspects of gender equality's contribution to economic growth. Second, this thesis provides an original view of the benefits resulting from women's access to economic opportunities, highlighting the impact of female empowerment on bank stability and firm-level investment. We show that improving involvement in financial inclusion and corporate leadership has strong implications in terms of financial and corporate outcomes.

Part 1 provides additional grounds for the promotion of women's financial inclusion, by exploring the ins and outs of women's access to financial services. Chapter 1 examines the impact of gender equality laws on women's access to bank accounts. The study finds that legal equality positively affects women's financial inclusion, but social norms that discriminate against women negate the beneficial effect of legal equality. The chapter suggests that legal reforms should specifically incentivize women to participate in the financial market

and counteract biases on the supply side. The study combines the Global Findex dataset with the World Bank's Women, Business, and the Law indicators to test hypotheses on a representative sample of individuals from 148 economies. The results suggest that legal reforms alone are insufficient, and de jure changes may not be informative about de facto developments in the credit market.

Chapter 2 documents the impact of women-friendly legislation on female-led firms' access to credit. Although women-led enterprises tend to face more difficulties in obtaining credit than male-led firms, the differences in corporate structure between male and female-led businesses do not fully explain this gender gap. Therefore, this chapter examines the effect of institutional factors, particularly legislation, on female entrepreneurs' access to credit. The study finds that laws protecting women in the credit market can alleviate women-led firms' fear of loan denial but may not necessarily affect banks' discriminatory behaviour towards female prospects. Furthermore, the enforcement of such laws is critical in mitigating supply-side discrimination. Overall, this chapter contributes to understanding the determinants of demand-side discrimination and highlights the importance of legal protection for female entrepreneurs in the credit market.

Chapter 3 investigates how gender diversity in corporate boards affects women-led firms' demand for credit. The research suggests that board gender diversity leads to a strong reduction in managers' risk-taking, and female board members' cautiousness enhances CEO's risk aversion, thus increasing discouragement. The chapter finds that a female-dominated firm's ownership strengthens women-led firms' reluctance to ask for credit, which may lead them to unnecessarily forgo formal credit. This evidence questions affirmative action policies in the form of quota regulations on other firm-related outcomes through the enhancement of risk aversion in the corporate board.

Chapter 4 explores the impact of gender equality in access to credit on financial stability at the bank level. The chapter finds that a higher share of female borrowers can increase financial stability due to their higher repayment rates, which decreases the likelihood of non-performing loans. The chapter suggests that financial regulators should prioritize equal access to credit between genders to promote bank stability and highlights the importance of gender equality in access to credit not just for women's economic empowerment but also for enhancing financial stability.

Part 2 employs a comparable approach, but with a specific emphasis on entrepreneurship among women. Chapter 5 shed light on the relationship between linguistic gender marking and women's attitudes towards entrepreneurship. The study finds that women living in countries with more pervasive gender marking in language are more likely to enter into entrepreneurship, potentially due to discrimination they may face in the paid employment market. This suggests that women are more likely to engage in "*necessity*" entrepreneurship compared to "*opportunity*" when the degree of gender marking in language increases. Policymakers may need to consider how institutional factors are linked to cultural institutions for enabling female entrepreneurship, and strategies promoting equal opportunities may be counterproductive in countries where the dominant language is less gendered.

Chapter 6 examines the impact of female political leaders as role models on women's attitudes towards entrepreneurship. The study finds that exposure to female political leaders reduces the fear of failure, increases the likelihood of recognizing entrepreneurial opportunities and becoming self-employed, and challenges negative gender stereotypes that discourage women from pursuing entrepreneurship. The study also suggests that gender-based quotas can help shift negative gender stereotypes and encourage women to envision themselves in leadership positions, including entrepreneurship.

Chapter 7 investigates the effect of economic policy uncertainty on corporate investment depending on CEO gender. The study finds that economic policy uncertainty has a weaker effect on investment in firms with female CEOs, which is consistent with the higher risk aversion of women. These findings have implications for achieving gender balance on corporate boards and suggest that mandatory quotas may not have negative effects on firm performance.

All in all, this dissertation highlights the crucial role of institutions in promoting women's access to financial services and entrepreneurship. Both formal and informal institutions have a significant impact on women's economic participation as they shape their attitudes and behaviours. Thus, this study contributes to a more comprehensive understanding of how institutions influence women's economic participation through their mechanisms. It also investigates the output of women's empowerment *via* their access to credit and their entrepreneurial activity. Here, this dissertation contributes on five main strands of literature.

First, it enriches literature about the determinant of female financial inclusion. While there is a growing body of literature on women's financial inclusion, the determinants of women's financial inclusion are not yet fully understood. Most existing studies have identified individual-level factors such as education, income, and age as important determinants, while others have highlighted the role of financial sector infrastructure and cultural norms. However, a little is known about the impact of institutional factors on women's access to financial services. Therefore, this thesis deepens existing understanding of the determinants of women's financial inclusion by investigating the interplay between gendered laws, social norms and law enforcement. It suggests that policies promoting financial inclusion should be tailored to the specific needs and constraints faced by women, taking into account the gendered aspects of financial inclusion.

Second, this thesis adds to the burgeoning literature about the effects of women's financial inclusion. There is some evidence that suggests that financial inclusion in general has an impact on bank stability, but the extent and direction of this impact is not yet fully understood and remains a topic of ongoing research and debate among economists and policymakers. Some studies have found that expanding financial inclusion can lead to increased stability by reducing the likelihood of bank runs and improving overall economic resilience. Other studies, however, have pointed to potential risks associated with expanding access to credit and other financial services, such as increased borrower indebtedness and financial instability in the case of widespread default. Hence, this work contributes to the understanding of the complex interactions between financial inclusion and bank stability, showing that the gender diversity in the credit portfolio is determinant in the potential impact of financial inclusion on bank stability. Therefore, it puts into perspective the need for a greater integration of gender into bank policymaking.

Third, this thesis adds to the burgeoning literature on the drivers of women's entrepreneurial activity. The literature has identified various individual and contextual factors that may affect women's entrepreneurial activity, including personal characteristics, social networks, cultural norms, access to finance, and familial constraints. However, there is still a need for further research to develop a more comprehensive understanding of the complex interplay of these factors and how they influence women's entrepreneurial activity in different contexts. Our work attempts to reduce this literature gap by investigating the impact of language gender marking as a cultural factor, and exposure to female role models as a psychological element in shaping women's entrepreneurial activity. Our results suggest that

attitudes towards entrepreneurship activity are not gender-neutral such that policymakers should consider the context in which women are operating, including the formal and informal institutions to create an enabling environment that supports women's entrepreneurship participation.

Fourth, this work enriches literature about the effects of female leadership on corporate decision-making. There is ongoing research on the impact of female corporate leadership. While some studies suggest that having more women in leadership positions can lead to positive outcomes such as better financial performance, improved innovation, and increased diversity, other studies have found mixed results or no significant impact. However, the specific effect of female leadership on corporate investment remains inconclusive. Our work suggests that the uncertainty context plays a key role in determining how female risk aversion affects investment for women-led forms. Thus, policymakers could consider promoting greater gender diversity in corporate leadership as a means to reduce the impact of uncertainty on investment decisions.

Fifth, this thesis contributes to the literature about the effects of institutions in women's access to economic opportunities. While both formal and informal institutions are likely to affect women's empowerment, the specific ways in which they do so can vary significantly depending on the context. Our work highlights the need for policymakers to focus on improving the institutional frameworks that are crucial in enabling women's economic participation. This requires ensuring that the legal and regulatory frameworks are gender-sensitive, but insufficient. Efforts to promote women's economic participation should also include initiatives aimed at changing societal attitudes towards women's roles in the economy. Such efforts may involve providing education and training to women to enhance their skills and knowledge, creating role models and networks to support female entrepreneurship and financial inclusion, and promoting gender diversity in leadership positions to challenge gender stereotypes and promote equal opportunities for women.

Although this dissertation aims to address the research question concerning the ins and outs of women's economic empowerment, further investigations are warranted to enhance our understanding of this enduring association. Notably, three aspects merit consideration.

From an econometric standpoint, the micro analyses conducted in this thesis are based on cross-sectional data, which implies that causality cannot be fully inferred except for

Chapter 7. While cross-sectional data can provide valuable insights into the distribution and characteristics of financial inclusion, longitudinal research designs would allow for a more robust investigation of the patterns characterizing the relationships studied, as well as the effects of policies aimed at promoting financial inclusion. However, publicly available longitudinal datasets on financial behavior are scarce, which underscores the need for more data collection efforts in this field. Moreover, the Global Findex dataset used in this study does not distinguish between individual and joint accounts, which could underestimate gender disparities in financial inclusion. Women who reported having an individual account, a joint account, or both were categorized under the same "account ownership" category, which does not reflect the different levels of control and decision-making power that women may have over their finances in different account ownership structures. Thus, the data limitations do not allow for a proper investigation of the extent to which women are able to manage their bank accounts effectively. While the findings of this thesis provide important insights into the state of financial inclusion and gender disparities in access to entrepreneurship, caution should be taken in interpreting the results given the limitations of the data and research design. Future research efforts should prioritize longitudinal studies that differentiate between individual and joint accounts to provide more nuanced insights into the gender dynamics of financial inclusion.

From a methodological standpoint, the quantitative research used in this dissertation does not fully reflect individual-specific behaviours. This limitation can hinder a more profound exploration of the dynamics surrounding financial inclusion and entrepreneurship. Qualitative research techniques, such as interviews and focus groups, can facilitate a more in-depth exploration of the complex subjective social, cultural, and economic factors that influence women's economic participation. By using qualitative research techniques, researchers can gather data on the behavioural and psychological motivators that govern women's economic participation, providing a more nuanced understanding of the barriers and opportunities that women face in accessing financial services and starting and growing businesses. For example, qualitative research can shed light on the social and cultural norms that influence women's decision-making around financial matters, as well as the institutional and regulatory barriers that limit their access to financial services. Therefore, future research efforts should consider utilizing a mixed-method approach that incorporates qualitative research techniques to complement the quantitative analyses. This approach can provide a more comprehensive and contextualized understanding of the experiences of women in

relation to financial inclusion and entrepreneurship, and thus inform the development of more effective policies and programs to promote gender equality in these areas.

From a theoretical standpoint, informal mechanisms, such as rotating savings and credit associations (ROSCAs) and microfinance institutions (MFIs), have emerged as important sources of financial services for individuals who are excluded from formal financial systems, including women. Therefore, a deeper comprehension of the factors motivating individuals to interact with the informal sector is imperative to inform the development of strategies that aim to increase both the availability of formal banking products and entrepreneurship to vulnerable groups, such as women. The existing literature suggests that social and cultural factors, including trust and social networks, play a significant role in shaping individuals' decision-making around financial matters and their willingness to interact with formal and informal financial institutions. Future research efforts should, therefore, focus on investigating the social and cultural factors that influence women's engagement with informal mechanisms and the extent to which informal mechanisms can promote financial inclusion and entrepreneurship. This research can inform the development of policies and programs that leverage the strengths of both formal and informal mechanisms to improve financial inclusion and entrepreneurship among women.





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## Gender, Financial Inclusion, and Entrepreneurship

### Résumé

La présente thèse s'intéresse à deux domaines dans lesquels les déséquilibres de genre s'avèrent particulièrement saillants : l'inclusion financière et l'entrepreneuriat. Ces deux axes constituent les premières et secondes sections de ce travail. Le manuscrit comporte un total de sept essais empiriques indépendants, mais thématiquement reliés. L'objectif est double. D'une part, il s'agit de contribuer à la littérature florissante s'intéressant aux tenants et aux aboutissants de l'inclusion économique des femmes. Une première finalité des travaux est d'étudier l'influence réciproque exercée par l'environnement de la femme sur son attitude vis-à-vis des domaines bancaire et entrepreneurial. D'autre part, cette thèse offre un support de réflexion inhérent aux enjeux liés à la mise en œuvre de politiques et de stratégies inclusives à l'échelle de l'entreprise, de la banque et du gouvernement. La première partie traite des déterminants institutionnels de l'inclusion financière des femmes et de l'influence exercée par cette dernière sur la stabilité bancaire. Elle comporte quatre chapitres. Le Chapitre 1 s'intéresse aux effets de l'égalité des genres face à la loi sur la probabilité qu'une femme dispose d'un compte bancaire. Il montre que les femmes sont plus incluses financièrement si le contexte juridique est plus égalitaire. Le Chapitre 2 affine cette approche en considérant l'influence exercée par les lois antidiscriminatoires sur l'accès au crédit des femmes entrepreneuses. Le Chapitre 3 se concentre sur l'accès des femmes entrepreneuses aux crédits bancaires, en s'intéressant cette fois-ci à l'influence exercée par la diversité dans la structure actionnariale de l'entreprise. Le Chapitre 4 clôt cette première section en documentant l'existence d'une corrélation positive entre l'accès au crédit des femmes et la stabilité bancaire, soulignant les bénéfices de la financiarisation féminine. La seconde partie, articulée autour de trois chapitres, se propose d'une part d'élucider les facteurs sous-jacents de l'entrepreneuriat féminin, et d'autre part d'étudier le comportement des femmes dirigeantes d'entreprises. Le Chapitre 5 s'intéresse à l'influence exercée par les marqueurs de genre dans la langue sur l'attitude des femmes vis-à-vis de l'entrepreneuriat. Le Chapitre 6 s'inscrit également dans la littérature institutionnelle en démontrant comment la représentation des femmes aux plus hautes instances politiques promeut une attitude plus favorable des femmes à l'égard des carrières entrepreneuriales. Le Chapitre 7 parachève cette seconde section en étudiant le comportement des femmes dirigeantes d'entreprises en situation d'incertitude.

**Mots-clés :** Genre ▪ Inégalités ▪ Institutions ▪ Inclusion financière ▪ Entrepreneuriat.

### Summary

This thesis focuses on two areas where gender imbalances are particularly salient: financial inclusion and entrepreneurship. These two areas constitute the first and second sections of this work. The manuscript includes a total of seven independent but thematically related empirical essays. The objective is twofold. On the one hand, it is to contribute to the burgeoning literature on the ins and outs of women's economic inclusion. A first aim of the work is to study the reciprocal influence of a woman's environment on her attitude towards banking and entrepreneurship. Secondly, this thesis provides a basis for reflection on issues related to the implementation of inclusive policies and strategies at the corporate, banking and government levels. The first part discusses the institutional determinants of women's financial inclusion and its influence on banking stability. It consists of four chapters. Chapter 1 looks at the effects of gender equality in the law on the likelihood of a woman having a bank account. It shows that women are more financially included if the legal environment is more equal. Chapter 2 refines this approach by considering the influence of anti-discrimination laws on women entrepreneurs' access to credit. Chapter 3 focuses on women entrepreneurs' access to bank credit, this time looking at the influence of diversity in the ownership structure of the firm. Chapter 4 closes this first section by documenting the existence of a positive correlation between women's access to credit and banking stability, highlighting the benefits of female financial inclusion. The second part, articulated around three chapters, proposes on the one hand to elucidate the underlying factors of women's entrepreneurship, and on the other hand to study the behaviour of women corporate leaders. Chapter 5 examines the influence of gender markers in language on women's attitudes towards entrepreneurship. Chapter 6 also builds on the institutional literature by demonstrating how women's representation at the highest political levels promotes a more favorable attitude among women towards entrepreneurial careers. Chapter 7 concludes this second section by examining the behaviour of female CEOs under uncertainty.

**Keywords:** Gender ▪ Inequality ▪ Institutions ▪ Financial inclusion ▪ Entrepreneurship.