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Breaking barriers and bridging gaps: the influence of entrepreneurship policies on women's entry into entrepreneurship

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Abstract

Purpose – How does the interplay between entrepreneurship policies and both formal and informal gender equality affect women's inclination towards self-employment in contrast to men?

Design/methodology/approach – This study introduces and validates a comprehensive multi-level model underpinned by symbolic interactionism, institutional theory, and the nuances of gendered institutions. Employing innovative analytical techniques and leveraging data from 66 countries, we scrutinize how formal and informal gendered institutional arrangements either inhibit or facilitate an environment favorable to women's entrepreneurial activities.

Findings – Significantly, our research delves into the nuanced effects of specific entrepreneurship policies across diverse nations. While these policies can bridge the gendered resource gap, a profound understanding of broader gender dynamics is crucial for fostering an inclusive entrepreneurial landscape.

Originality/value – Our insights advocate for a more integrated approach to bolster women's participation in entrepreneurship, thus furthering their socio-economic progression.

Keywords Entrepreneurship policy, Institutional theory, Gendered context, Symbolic interactionism, Gender equality

Paper type Research paper

Introduction

In today's global economy, the role of women's entrepreneurship as a catalyst for sustainable development has been elevated to the forefront of socio-economic discourse. As debates surrounding economic advancement, unemployment mitigation, and poverty reduction intensify, the significance of women in entrepreneurship becomes paramount (Afshan *et al.*, 2021; De Vita *et al.*, 2014; Marques *et al.*, 2017). Recognizing the potential of women's entrepreneurship, policymakers worldwide have developed and implemented a range of policies from financial incentives to streamlining administrative processes (Cumming, 2007; Cumming and Fischer, 2012; Phan *et al.*, 2005). Yet, a pronounced gender disparity in entrepreneurship endures across nations, hinting at underlying cultural, historical, and institutional biases against gender entrepreneurial equality (GEM, 2020; Hiller, 2014). This has costly implications: global economies face potential

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losses up to $172tn due to gender disparities (World Bank, 2023), while gender parity in entrepreneurship could infuse $12 trillion into the global economy by 2025 (Woetzel, 2023).

While entrepreneurship policies form a cornerstone of the entrepreneurial ecosystem, they remain under-explored in academic literature (Hechavarría and Ingram, 2019; Spigel *et al.*, 2020). Furthermore, while prior literature on women's entrepreneurship has primarily spotlighted the general conditions of the entrepreneurial landscape, it has largely sidestepped the nuanced, reflexive, and theoretically-grounded understanding of women's specific gendered entrepreneurial context. This "one-size-fits-all" approach not only ignores the fluid and dynamic nature of gender differences but also obscures the historical, political and cultural underpinnings that sustain gendered institutions and shape women's opportunities and life chances (Ahl and Marlow, 2012; Marlow and McAdam, 2013). Moreover, this gender-neutral approach has been implicated in past research failures to untangle the web of challenges and opportunities sculpted by gendered institutions (Johnsen and McMahon, 2005; Pathak *et al.*, 2016). Entrepreneurship inherently intersects with gender dynamics (Ahl, 2006). Despite its importance, a mere 20–22% of entrepreneurship research emphasizes women and gender perspectives (Strawser *et al.*, 2021). The challenges facing women entrepreneurs, like the gender gap and related obstacles, are significant and multifaceted (Strawser *et al.*, 2021).

Navigating this backdrop, this study aims to develop a deeper understanding of the intricate relationship between gender equality, entrepreneurship policies, and their consequent impact on women's entrepreneurial decisions. Central to this exploration is the distinction between formal and informal gender equality. The former focuses on measurable disparities in areas such as the economy, education, and health, while the latter examines ingrained societal norms related to gender roles (Cislaghi and Heise, 2019). Both facets of gender equality, deeply rooted in historical and cultural contexts, play pivotal roles in shaping women's access to entrepreneurial resources and opportunities. Such gendered norms, deeply entrenched in societal discourses, can both limit and guide women's career and entrepreneurial choices (Friedland *et al.*, 1991).

Addressing these gaps, our study integrates symbolic interactionism with institutional theory, strengthening the theoretical foundation of women's entrepreneurship. Our work leans into feminist philosophy, emphasizing the gendered nuances of knowledge and the consequent influence of gendered institutions on entrepreneurial ventures (Butler, 1993; Marlow and McAdam, 2013). By foregrounding these dynamics, our work contributes to the context-sensitive, theoretically-rich approach to women's entrepreneurship (Brush *et al.*, 2009; Jennings and Brush, 2013). To achieve this, we develop a comprehensive multi-level framework of moderated moderation effects for understanding the gendered institutionalization of women's entrepreneurship, integrating country-level institutional formal and informal gender equality aspects with individual-level women's entrepreneurial activity. Our innovative analysis techniques, robust multi-level measure, and compelling data from 66 countries provide a resounding answer to our research question: How do entrepreneurship policies in conjunction with formal and informal gender equality influence the inclination of women towards self-employment compared to men?. Our approach account for nuanced understanding of a moderated moderation effect.

In addressing these questions, we not only extend the bounds of institutional theory and entrepreneurship research but also pave new pathways for understanding women's entrepreneurship on a global scale (Stenholm *et al.*, 2013). A depiction of our research model is presented in Figure 1.

Theoretical background

Symbolic interactionism and Women's entrepreneurship

Symbolic interactionism theory asserts that employment decisions, particularly for women, arise from the interplay between self-choice, institutions, and social life, all of which are

shaped by social interactions (Mead, 1934). Notably, women's responses to an objective are informed by the symbolic significance it holds within a particular social context.

In recent years, scholarly discourse around women's entrepreneurship has pivoted towards the impact of institutional settings, moving away from solely individual sociodemographic factors (e.g. Klyver *et al.*, 2013; Saeed *et al.*, 2015; Goltz *et al.*, 2015; Dheer *et al.*, 2019; Darnihamedani and Terjesen, 2022). Stryker (1980) views entrepreneurship as a self-affirming cycle informed by identity beliefs and symbolic interactionism. Yet, societal constructs and stereotypes, especially those questioning women's business acumen, stand as formidable challenges for women entrepreneurs, shaping external perceptions and impacting their ventures.

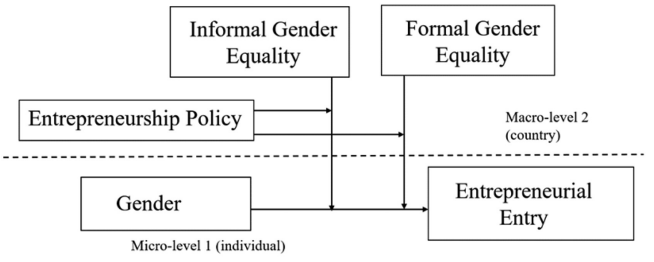
Central to our research is the institutional theory (North, 1990; Baumol, 1990). We adopt Williamson's (2000) framework that segments institutional settings into four hierarchical layers. The top encompasses informal institutions like norms, while the subsequent levels delve into formal regulatory frameworks, governance structures, and resource allocations, respectively. Our contribution to the discourse seeks to illuminate the first two layers of this structure, particularly examining how formal and informal gender equalities are shaped by women's entrepreneurship policies and how these layers might affect their entrepreneurial decisions.

These institutional environments create conditions that either propel or deter individuals from engaging in entrepreneurial endeavors (Mitchell *et al.*, 2007). Such environments can steer perceptions about resource accessibility and societal expectations, making certain endeavors more salient to specific groups (Toh and Leonardelli, 2012; Dheer *et al.*, 2019). Given the considerable institutional challenges women face when considering entrepreneurship, many are deterred from viewing self-employment as a feasible career path (Klyver *et al.*, 2013). Our research aims not only to delve deep into these challenges but also to propose actionable solutions. The insights garnered will be invaluable for policymakers, scholars, and practitioners dedicated to advancing gender equality and championing women in entrepreneurship.

To truly understand the multifaceted influences on women's entrepreneurial pursuits, cross-cultural studies are paramount (Ahl and Nelson, 2015; Henry *et al.*, 2017). Symbolic interactionism theory underscores the importance of a dual analysis – examining both macro and micro-level dynamics. By weaving in formal and informal gender equality elements, alongside entrepreneurship policy into our research framework, we embark on a detailed examination of the varying forces that mold women's entrepreneurial trajectories. Capitalizing on the multilevel analytical prowess of symbolic interactionism theory (Chang, 2004), our research aims to unravel how overarching entrepreneurship policies mesh with gender equality dynamics, influencing grassroots entrepreneurial activities among women.

Role of entrepreneurship policy in women's entrepreneurial activity

To catalyze the formation of new entrepreneurial ventures, the establishment of entrepreneurship policies is crucial (Rigby and Ramlogan, 2013). Across the globe, various



Source(s): Authors' own creation

Figure 1.
Research framework

governments have adopted such policies, aiming to invigorate entrepreneurial activity (Henry *et al.*, 2017; Minniti and Nardone, 2007). Specifically, for women entrepreneurs, these policies have the potential to dismantle systemic barriers like limited access to capital, onerous taxes and bureaucracy, lack of expansive networks, and deficiencies in government support programs.

Entrepreneurial success, especially among women, is heavily influenced by the presence of a supportive entrepreneurial ecosystem. Such ecosystems are characterized by reduced barriers to entry, a solid legal and commercial infrastructure, and robust supportive government policies (Hechavarría and Ingram, 2019). An essential pillar of these ecosystems is government policies, which have a direct bearing on entrepreneurs and the decisions they make (Mazzarol, 2014; Stam, 2015; Zhang *et al.*, 2022). Recognized widely for their capability to stimulate job creation, economic development, and international competitiveness, entrepreneurship policies are fundamental instruments for fostering growth in different nations (Hopkins, 2017).

Despite the clear benefits, the intersection of entrepreneurship policy and women's entrepreneurial endeavors has surprisingly remained an under-researched area (Nziku and Struthers, 2018). Current literature reveals a gap in the study of policy factors that influence women's entrepreneurial ventures. For instance, Link and Strong's (2016) analysis discovered that a mere 4% of gender and entrepreneurship literature articles broached the subject of public policy. Similarly, out of 165 studies centered on women's entrepreneurship policy, only 75 delved into the implications of such policies (Foss *et al.*, 2019). This underlines the existing knowledge gap and underpins the need for further exploration in identifying efficient policy measures tailored for the upliftment of women entrepreneurs (Henry *et al.*, 2017). Recognizing and understanding the policy implications for women's entrepreneurship is paramount, ensuring a more inclusive, supportive, and enabling entrepreneurial environment for women (Foss *et al.*, 2019; Zhang *et al.*, 2022).

Entrepreneurship policy, formal gender equality and women's entrepreneurial activity. At the heart of formal gender equality lies the conviction that both genders should be granted equivalent opportunities. Yet, this often exposes persistent gender discrepancies, evident in domains like health, economy, education, and politics. Post World War II, several countries legally recognized women's political rights, yet disparities persist in numerous domains (Ramirez *et al.*, 1997; Paxton *et al.*, 2006). These disparities can be attributed to regulations that guide women's employment choices. Sculpted by societal interactions, these rules can inadvertently reinforce restrictive gender roles (Klyver *et al.*, 2013). However, there's a silver lining: nations advanced in gender empowerment typically provide women enhanced legal protections and equitable professional and academic opportunities (Hosken, 1994).

Researchers have delved into the nexus between women's political empowerment and their engagement in entrepreneurship (Elam and Terjesen, 2010; Goltz *et al.*, 2015). When assessing venture creation, it becomes evident that formal gender equality doesn't always ensure equitable access to resources. This disparity makes launching and sustaining business ventures notably challenging for women in certain societies (Achtenhagen and Welter, 2003; Carter *et al.*, 2003). Furthermore, women's professional choices are complex, influenced by factors such as job timing, effort required, and the nature of job roles (Williams, 2004). While supportive governmental policies can augment women's entrepreneurial involvement (Alvarez *et al.*, 2011), many studies singularly focus on specific countries (e.g. developing – Datta and Gailey, 2012; transitioning – Bui *et al.*, 2018, and developed nations – Welter, 2004), failing to present a global overview of gendered entrepreneurial tendencies (Kelley *et al.*, 2017). Hence, it's imperative for policy formulators to ensure that strategies aren't gender-neutral but are instead customized to specific gender needs, country contexts, and regional nuances within those countries (Acs *et al.*, 2004).

Interestingly, in several welfare states championing formal gender equality, there's an unintentional sidelining of women in the realm of self-employment. Their primary focus is on conventional employment benefits, often neglecting self-employed women's unique challenges. This oversight is highlighted in studies across Denmark, Sweden, and Germany, and supported by political science research (Mandel, 2009). Therefore, given the interaction between entrepreneurship policy, gender equality and its implications on entrepreneurial choices, we propose the following hypothesis:

H1. In countries with a higher level of formal gender equality, the positive impact of the extensiveness of a country's entrepreneurship policies on women's inclinations towards self-employment is anticipated to be lower compared to men's.

This hypothesis postulates that while levels of formal gender equality – embodied by gender-based disparities – are aimed at fostering entrepreneurial activities, their effectiveness in promoting self-employment among women is contingent upon the country's entrepreneurship policies, less than men. This approach exemplifies a moderated moderation effect, where the interplay between formal gender equality and the extensiveness of entrepreneurship policies disproportionately benefits men. Essentially, this hypothesis tests a three-way interaction effect, elucidating how gender and entrepreneurship policies together modify the impact of formal gender equality on the likelihood of entrepreneurial entry among women relative to men.

Entrepreneurship policy, Informal gender equality and women's entrepreneurial activity. *E*ntrepreneurship policy, Informal gender equality, and women's entrepreneurial activity are deeply intertwined, with societal constructs significantly shaping gender roles and behaviors. Predominantly, informal gender equality institutions shape the perception of gender roles, casting women primarily in household roles while reserving the role of the breadwinner for men (Achtenhagen and Welter, 2003; Welter *et al*., 2003; Bianchi *et al*., 2000; Bittman *et al*., 2003). This molding of gender expectations isn't merely restrictive to women's aspirations; it has a cascading impact on the well-being of the broader society (North, 1994; Olson, 2000; Sheridan, 2004).

Gender norms globally, among the most potent unwritten social rules, play a pivotal role in shaping gender behaviors (Cislaghi and Heise, 2019). Such norms erect significant professional barriers for women, curtailing their participation in the labor force (Ford *et al*., 2021; Naldini *et al*., 2016). It's essential to recognize that entrepreneurship is intertwined with gender and societal institutions, with societal status beliefs reinforcing the diminished stature of women in entrepreneurial domains (Ahl and Marlow, 2012; Brush *et al*., 2009; Henry *et al*., 2016; Yousafzai *et al*., 2015).

Despite the formal recognition of gender equality in many countries, gender-role attitudes still deter women from activities beyond domestic confines (Baughn *et al*., 2006; Kantor, 2002; Welter *et al*., 2003). This results in labor market segregation, causing wage disparities and relegating women to lower-status roles or necessity-driven occupations (Marlow, 2002; Blumberg, 2004; Welter *et al*., 2014), resulting in inferior levels of wages, stifling their potential and limiting their impact (Marlow, 2002; Blumberg, 2004).

The societal environment exerts a significant influence on women's professional decisions. Deep-seated stereotypes often unfairly characterize female entrepreneurs as less competent, despite objective evidence to the contrary (Malmström *et al*., 2017). Compounding these challenges, women often grapple with societal expectations that conflict with professional aspirations, especially during motherhood, making the development of entrepreneurial intentions more complex (Krueger *et al*., 2000).

Despite the odds, when women embark on entrepreneurial journeys, they frequently confront the challenge of juggling family and work. Societal norms, particularly in traditional societies, often burden women with household responsibilities, leading to professional-

personal conflicts that could hamper business growth (Gilbert, 1997). This sentiment is echoed in a study on German couples where women's household roles weren't dictated by their control over resources but by prevailing social norms (Grunow *et al.*, 2007). Breaking free from such traditional gender-role expectations is instrumental for bolstering women's entrepreneurial growth and offering them a level playing field (Achtenhagen and Welter, 2003; Baughn *et al.*, 2006).

Considering the discussions above, the normative challenges facing women entrepreneurs arise from sustained gender inequalities. Addressing these differences isn't merely a resource allocation exercise; it's about recognizing that women often face undue pressures and achieve less, even when constraints are removed, indicating that normative concerns play an important role in women entrepreneurs' decision-making processes (Karim *et al.*, 2023). Research has shown that state policies and support have a positive impact on both men's and women's entrepreneurship, but women's entrepreneurship is further influenced by social norms, culture, and ease of access to markets (Hechavarría and Ingram, 2019). Building on this discussion, we propose the following hypothesis:

H2. In contrast, in countries with a higher level of informal gender equality, the positive impact of the extensiveness of a country's entrepreneurship policies on women's inclinations towards self-employment is anticipated to be higher compared to men's.

This hypothesis postulates that while levels of informal gender equality – embodied by societal norms and attitudes that support equitable gender roles – are aimed at fostering entrepreneurial activities, their effectiveness in promoting self-employment among women is contingent upon the country's entrepreneurship policies, more than men. It posits a moderated moderation effect, where the interplay between informal gender equality and the extensiveness of entrepreneurship policies disproportionately benefits women, potentially narrowing or reversing the gender gap in entrepreneurial pursuits. At its core, this hypothesis examines a three-way interaction effect, positing that in settings where informal social frameworks are conducive to gender equality, women are likely to experience enhanced motivational and practical advantages from entrepreneurship-promoting policies.

Method

Data

In this research, a robust analysis was conducted using an extensive dataset from the Global Entrepreneurship Monitor's (GEM) Adult Population Survey (APS). This dataset spans 12 years (2006–2017) and includes a significant sample of 1,107,480 individual respondents across 66 countries, providing a comprehensive and diverse platform to rigorously examine our hypotheses.

To enhance the validity of the theoretical assertions made, the research approach incorporated a multilevel dataset. This dataset is characterized by its depth, capturing both individual (micro-level) and country-specific (macro-level) data. Such an approach aligns with the hierarchical structure of the analytical framework adopted for this study. The micro-level data were anchored by GEM's APS survey, which is renowned for its methodological rigor and provides a representative sample of the population in each participating country (Autio *et al.*, 2013; Reynolds *et al.*, 2005), and has been extensively utilized in diverse empirical studies conducted over the last two decades (e.g. Boudreaux *et al.*, 2019; Raza *et al.*, 2020).

To overcome the "ecological fallacy" issue that often afflicts contextual entrepreneurship research, which advocates for the utilization of unaggregated data (e.g. Autio *et al.*, 2013), we opted for an unaggregated data (individual) approach to measure entrepreneurial entry. We obtained macro-level constructs data from various sources, including Global Gender Gap Index reports (Greig *et al.*, 2006) issued by the World Economic Forum, GEM's National

Expert Survey (NES), Cislaghi *et al.*'s (2022) seminal work, the Human Development Index (HDI), and the World Governance Indicators (WGI) dataset provided by the World Bank.

Measures

Dependent Variable (micro-level). In the context of our preceding exposition on entrepreneurial action, the present study meticulously operationalizes an individual's initiation into entrepreneurial endeavors as the dependent variable, drawing from the rigorous dataset provided by GEM's APS dataset. GEM classifies entrepreneurs into three categories: (1) nascent entrepreneurs, defined as individuals who have embarked on a new venture within the past year but have yet to remunerate wages for over three months; (2) owner-managers of nascent ventures who have engaged in wage payment for a duration extending beyond three months but not surpassing 42 months; and, lastly, (3) owner-managers helming established entities aged beyond the 42-month mark. Given our research focus on unraveling the macro-level external catalysts influencing individual entrepreneurial ventures, our study gravitates towards nascent and new owner-managers, categorizing them under the ambit of "early stage entrepreneurial entry."

The GEM APS survey probes participants regarding their engagement in "TEAYY" early-stage entrepreneurial pursuits. Those identified within the nascent and new entrepreneurial echelons were ascribed a value of 1, while their non-participatory counterparts received a value of 0, resulting in a dichotomous dependent variable, as detailed in Table 1. This methodological approach to gauging entrepreneurial entry, anchored by a singular item, is established in entrepreneurship research (Boudreaux *et al.*, 2019; Schade and Schuhmacher, 2022).

Key explanatory variable (micro-level). We utilized gender as an independent variable to investigate the macro-level institutional factors on entrepreneurial entry. The data was derived from the GEM's APS survey, where females ascribed a value of 2, while males are represented by a value of 1. In our final sample of 1,107,480 respondents, 559,701 (50.5%) were male respondents, and 547,779 (49.5%) were female respondents.

Key Explanatory Variables (macro-level). We sourced data from multiple repositories to encompass three macro-level variables: formal gender equality, informal gender equality, and entrepreneurship policy for the 66 countries featured in our study. This annual data for our explanatory variables spans from 2006 to 2017.

The measure for formal gender equality was derived from reports produced by the World Economic Forum (Greig *et al.*, 2006), which introduced the formal gender equality framework in 2006 to gauge gender-based disparities. This metric of formal gender equality considers four pivotal domains: (1) economic participation and opportunity, (2) political empowerment, (3) educational attainment, and (4) health and survival. These factors collectively scope and significance of gender-based inequities and facilitate tracking their progress in societies globally. Scores range between 0 and 1, where a higher score signifies a smaller gender gap and vice versa. For analytical convenience, this variable was standardized to have a mean of 0 and a standard deviation of 1, allowing us to elucidate its relation to entrepreneurial entry in terms of a unit standard deviation shift in this metric.

Data on informal gender equality was procured from the World Values Survey (WVS) and the European Values Survey (EVS), both of which gathered information via their national affiliates. These sources gathered insights from adult respondents in each of the participating nations (Inglehart *et al.*, 2014; World Values Survey, 2019). Collected in distinct phases, we harnessed six iterations of the WVS and four from the EVS to amass data spanning 1981 through 2014. Informal gender equality gauges job availability for women in relation to men. Specifically, the WVS and EVS surveys posed the question: "When jobs are scarce, should men have more entitlement to a job than women?" with respondents given three choices

Variable (description)	Question in survey*	Source
Financing for entrepreneurs in my country (There is sufficient, funding types available for new and growing firms.)	There is sufficient equity funding available for new and growing firms There is sufficient debt funding available for new and growing firms There are sufficient government subsidies available for new and growing firms There is sufficient funding available from private individuals (other than founders) for new and growing firms There is sufficient venture capitalist funding available for new and growing firms There is sufficient funding available through initial public offerings (IPOs) for new and growing firms	GEM - NES
Government Support and Policies in my country (It reflects the specific entrepreneurship policy conditions targeted towards enhancing the creation of new ventures and fostering entrepreneurial endeavors within a country)	Government policies (e.g. public procurement) consistently favor new firms The support for new and growing firms is a high priority for policy at the national government level The support for new and growing firms is a high priority for policy at the local government level	GEM - NES
Burden of taxes and bureaucracy on entrepreneurship activities in my country (It illustrates the impact of taxes and various regulatory burden faced by entrepreneurs in a country)	New firms can get most of the required permits and licenses in about a week The amount of taxes is *NOT* a burden for new and growing firms Taxes and other government regulations are applied to new and growing firms in a predictable and consistent way Coping with government bureaucracy, regulations, and licensing requirements it is not unduly difficult for new and growing firms	GEM - NES
Government programmes to support entrepreneurship in my country (A wide range of government support such as science parks, incubators, government agencies, and programmes supporting new firms)	A wide range of government assistance for new and growing firms can be obtained through contact with a single agency Science parks and business incubators provide effective support for new and growing firms There are an adequate number of government programs for new and growing businesses The people working for government agencies are competent and effective in supporting new and growing firms Almost anyone who needs help from a government program for a new or growing business can find what they need Government programs aimed at supporting new and growing firms are effective	GEM - NES

Table 1. Main entrepreneurial policy measure

Note(s): **(1–5 Likert scale)* - Completely True (5), Somewhat True (4), Neither True Nor False (3), Somewhat False (2), Completely False (1)
Source(s): Zhang *et al.* (2022)

(a = yes; b = neither; c = no). The dataset was extracted from a recent publication by Cislaghi *et al.* (2022). Given the diverse data origins, z-standardized scores were employed to ensure a consistent mean of 0 and standard deviation of 1.

We derived our Entrepreneurship Policy (EP) data from the GEM's National Expert Surveys (NES), conducted annually from 2006 to 2017 for each country featured in our study. These surveys engaged national experts renowned for their acumen and proficiency in entrepreneurship, including academics, entrepreneurs, administrators, consultants, and policymakers. EP offers an insight into a nation-specific entrepreneurship policy for every year considered. This metric is an amalgamation of four integral aspects extracted from GEM's National Expert Surveys. These are: (1) financial opportunities accessible to entrepreneurs, (2) government entrepreneurial strategies, (3) the influence of taxation and bureaucracy on entrepreneurial endeavors, and (4) state-backed support initiatives for entrepreneurs. Collectively, these components provide an index of the degree of support extended to entrepreneurial activities at a national level within a country. Our application of this metric aligns with its utilization in a recent research paper by Zhang *et al.* (2022), underscoring its pertinence and dependability. Through elucidating the derivation of our EP measure, we endeavor to furnish a thorough comprehension of how our study scrutinizes the effects of policy dimensions on individual entrepreneurial pursuits across diverse national contexts.

Control Variable. Our study employed an array of micro-level and macro-level control variables. The micro-level variables, sourced from GEM's APS for all participant countries from 2006 to 2017 (Goltz *et al.*, 2015; Amoros *et al.*, 2019), helped account for elements impacting entrepreneurial behavior.

Age: Historically, age has been viewed as pivotal to entrepreneurial undertakings (Levesque and Minniti, 2006). Notably, younger individuals often exhibit a higher propensity towards entrepreneurial activities (Amoros *et al.*, 2019).

Education Level: This is intrinsically tied to entrepreneurial entry (Allen *et al.*, 2008). Entrepreneurs with advanced education are typically more adept at discerning opportunities (Kwon and Arenius, 2010). For our analysis, education was categorized into five tiers: no education (0), some education (1), primary education (2), secondary education (3), and graduate level (4).

Socioeconomic Status: Represented via household income, it stands as a significant determinant of entrepreneurial inclination (Arenius and Minniti, 2005). We segmented this into three brackets: lower income (1), middle income (2), and higher income (3).

Moreover, we incorporated the following three attitude-oriented variables linked with entrepreneurial ventures (Goltz *et al.*, 2015).

Social Capital: Gauged by whether respondents knew someone who had launched a business in the preceding two years (1 = yes, 0 = no). This factor exemplifies a positive correlation with entrepreneurial pursuits (Kwon and Arenius, 2010).

Self-efficacy: A reflection of requisite entrepreneurial knowledge and skills, determined by asking respondents whether they had the necessary knowledge, skills, and experience to start a business (1 = yes, 0 = no).

Fear of Failure: This pertains to apprehensions and self-doubt during entrepreneurial endeavors (Autio *et al.*, 2013), assessed by asking respondents whether fear of failure prevented them from starting a venture (1 = yes, 0 = no).

On the macro front, we factored in two variables that have been recognized as pivotal for entrepreneurial activities (Goltz *et al.*, 2015). GDP per capita PPP, affecting entrepreneurial behavior at the macro level, was obtained from World Governance Indicators of the World Bank, w (Stel *et al.*, 2005). Human Development Index (HDI), a combined measure of various elements such as education, well-being, life expectancy, standard of living, literacy, and quality of life, was obtained from a UNDP report.

Findings

Empirical multilevel analysis

To account for the wider context of macro-level effects in which individuals operate, we measured entrepreneurial entry at the individual-level, rather than relying on aggregated data. The hierarchical nature of our data, with individuals mapped to specific regions, warrants the use of multilevel modeling, an approach found appropriate when data possesses such a structure (Goltz *et al.*, 2015; Amoros *et al.*, 2019). Recognizing the risks associated with ecological fallacy (Robinson, 1950) and to prevent erroneous estimations, we adopted multilevel modeling. This allowed for variability in effects at the macro level (Hox *et al.*, 2018). Our analysis was conducted using hierarchical linear modeling combined with mixed-effects logistic regression, factoring in the study's hierarchical setup and the binary nature of the entrepreneurial entry dependent variable (Klyver *et al.*, 2013; Schade and Schuhmacher, 2022). The efficacy of multilevel approaches in elucidating macro-level institutional environments alongside micro-level entrepreneurial behaviors has been underscored in prior research (Autio *et al.*, 2013; Amoros *et al.*, 2019), affirming its relevance for GEM data analysis. We also ensured the validity of our research design by examining an estimated model focusing solely on the country-year effect to confirm the significance of the random intercepts for entrepreneurial entry (Amoros *et al.*, 2019).

The indispensability of multilevel modeling at the micro-level becomes evident when the Intra-Class Correlation (ICC) identifies pronounced disparities at the state level in micro-variables (Hofmann *et al.*, 2000; Peterson *et al.*, 2012; Autio *et al.*, 2013; Boudreaux *et al.*, 2019). We ran a baseline model devoid of controls or predictors for entrepreneurial entry to verify the appropriateness of a multilevel modeling approach for our study. The ICC, commonly employed in cross-country investigations, measures the fraction of total variance attributed to the macro-level component (Peterson and Castro, 2006). It was employed to assess the variance in the dependent variable, entrepreneurial entry, spanning multiple countries. Our findings showed that an 11.3% variance in entrepreneurial entry is attributable to differences between countries, thereby substantiating the choice of multilevel analysis over ordinary least squares (OLS) regression as being more fitting for our study (see Table 2).

Descriptive statistics, a pairwise correlation matrix, and a multicollinearity test for macro and micro-level predictors, controls, and the dependent variable are presented in Table 3. Our research model integrates both macro and micro variables, necessitating a multicollinearity examination. Based on our assessment, shown in Table 3, the highest VIF score observed was 4.69 for GDP per capita PPP, while the lowest tolerance score was 0.21, also for GDP per capita PPP. Given that no VIF score surpassed 10 and tolerance remained above 0.1, multicollinearity does not pose a concern for this study (Estrin *et al.*, 2022).

Table 4 displays the results from our mixed-effects multilevel logistic regression analysis, which explores the study's hypotheses regarding the moderated moderation effects of gender, formal and informal gender equality, and entrepreneurship policies on entrepreneurial activity. To rigorously test our hypotheses, we adopted a three-step testing strategy, as suggested by Hmieleski *et al.* (2013) and Cheraghi *et al.* (2019). In the first step, only macro and micro-level control variables were incorporated (Model 1). In the second step, all predictor variables were introduced (Model 2). For the third step, each model was enriched by including one interaction term at a time (Models 3–4). Finally, Model 5 was enhanced by integrating all two-way and three-way interaction terms.

Furthermore, Table 5 showcases the mixed-effects multilevel logistic regression analysis performed on separate samples for men and women.

Hypothesis 1: In Table 4, Model 3, a significant negative moderated moderation effect of gender, entrepreneurship policy, and formal gender equality on entrepreneurial entry is observed (H1: $\beta = -0.05, p < 0.001$). This result suggests that in societies with high levels of entrepreneurship policies combined with high levels of formal gender equality, the gender

Country	*N*	%EE	FGE	IGE	EP
1. Algeria	5,904	8.52	0.6	1.24	4.59
2. Argentina	10,770	17.21	0.72	1.65	3.63
3. Australia	7,843	13.32	0.73	1.25	3.88
4. Austria	9,049	9.21	0.73	1.29	4.68
5. Belgium	9,219	5.52	0.75	1.07	4.41
6. Bosnia And Herzegovina	689	4.06	0.7	1.3	3.83
7. Brazil	41,830	17.25	0.69	1.21	3.62
8. Bulgaria	3,576	4.39	0.73	1.1	3.86
9. Burkina Faso	5,985	31.04	0.65	1.36	4.67
10. Canada	8,499	15.35	0.75	0.92	4.53
11. Chile	49,649	22.81	0.69	1.67	4.68
12. China	22,393	14.28	0.68	1.1	4.4
13. Colombia	43,335	21.71	0.7	1.3	4.35
14. Croatia	15,692	9.22	0.7	1.06	3.43
15. Cyprus	2,916	9.67	0.68	1.68	3.96
16. Czech Republic	7,226	8.15	0.68	1.31	3.64
17. Denmark	13,077	5.16	0.76	0.48	4.86
18. Ecuador	15,177	28.74	0.73	1.53	3.78
19. Egypt	10,525	11.54	0.6	0.72	3.53
20. Estonia	8,127	14.56	0.72	1.4	4.66
21. Ethiopia	2,868	13.28	0.62	0.99	4.99
22. Finland	16,044	7.11	0.83	0.85	4.92
23. France	10,572	5.27	0.72	0.84	5.19
24. Georgia	2,657	8.02	0.68	1.55	5.23
25. Germany	33,686	6.60	0.76	1.16	4.82
26. Ghana	5,134	32.94	0.68	1.36	4.12
27. Greece	17,187	7.45	0.68	1.41	3.54
28. Guatemala	14,312	19.95	0.65	1.5	3.28
29. Hungary	14,380	8.11	0.67	0.91	3.46
30. Iceland	4,498	14.70	0.81	0.57	5.03
31. India	19,046	9.29	0.66	0.99	4.3
32. Indonesia	20,982	17.89	0.67	1.13	4.72
33. Iran	22,830	13.64	0.59	0.76	3.43
34. Ireland	15,342	8.82	0.78	1.55	4.63
35. Italy	11,619	4.64	0.69	1.03	3.77
36. Japan	4,724	4.53	0.66	0.85	4.11
37. Jordan	1766	8.15	0.6	1.04	3.81
38. Kazakhstan	5,578	13.66	0.71	1.23	4.66
39. Latvia	12,266	12.09	0.75	1.31	4.21
40. Lithuania	6,156	10.67	0.72	1.39	3.97
41. Luxembourg	6,364	9.29	0.73	1.11	5.39
42. Macedonia	7,983	8.12	0.7	1.37	4.21
43. Mexico	22,506	14.55	0.68	1.08	4.72
44. Morocco	5,646	7.07	0.6	1.39	3.91
45. Netherlands	15,831	10.44	0.76	1.07	4.82
46. Nigeria	6,045	38.78	0.63	1.05	3.61
47. Norway	12,065	8.05	0.84	0.62	4.41
48. Peru	17,532	28.90	0.69	1.49	3.77
49. Poland	12,476	9.34	0.71	1.74	4.12
50. Portugal	8,655	8.39	0.72	1.4	4.27
51. Romania	7,059	9.32	0.69	1.38	3.76
52. Russia	13,137	4.38	0.7	1.07	3.78
53. Slovakia	10,744	11.53	0.68	1.47	3.83
54. Slovenia	15,568	6.38	0.73	1.35	4.03

(*continued*)

Table 2.
Sample description

Country	*N*	%EE	FGE	IGE	EP
55. South Africa	21,247	8.50	0.75	0.89	3.89
56. Spain	186,752	6.06	0.74	1.14	4.33
57. Sweden	13,051	7.55	0.81	0.7	4.15
58. Switzerland	14,297	7.28	0.76	0.99	5.29
59. Thailand	18,627	17.67	0.7	1.44	4.28
60. Trinidad and Tobago	6,050	17.16	0.72	1.67	4.01
61. Tunisia	1955	9.67	0.63	1.19	4.18
62. Turkey	38,741	10.78	0.6	1.14	4.55
63. United Kingdom	73,073	8.08	0.74	0.87	4.66
64. United States	21,197	13.38	0.73	1.04	4.38
65. Uruguay	13,140	15.34	0.69	1.62	4.39
66. Zambia	4,611	41.18	0.63	1.45	3.87

Note(s): *N* = complete observations from each country participating in this study; %EE = Average score of Entrepreneurial Entry (Source: APS GEM, 2006–2017); FGE = Formal Gender Equality (Global Gender Gap Index, 2006–2017); IGE = Informal Gender Equality (Source: Cislaghi *et al.*, 2022); EP = Entrepreneurship Policy (GEM NES, 2006–2017)

Source(s): Author's own elaboration

Table 2.

gap in entrepreneurial entry becomes more pronounced. The interaction indicates that as these levels increase, the negative association between being a woman and engaging in entrepreneurial activity decreases.

Further exploration through separate analyses for women and men is conducted. In Table 5, focusing on women (Model 1), a significant positive relationship is found between the combined effects of formal gender equality and entrepreneurship policy on women's entrepreneurial entry ($\beta = 0.04$, $p < 0.001$). For men (Model 3), this relationship also remains positive, but with a slightly higher coefficient ($\beta = 0.06$, $p < 0.001$). These coefficients represent the predicted change in entrepreneurial entry rates for each gender corresponding to an increase in the combined level of entrepreneurship policies and formal gender equality.

The results indicate that while both men and women benefit from increased levels of entrepreneurship policies and formal gender equality, the effect is slightly more pronounced for men. This difference in effect sizes aligns with the negative three-way interaction observed in Table 4, supporting Hypothesis 1. These findings underscore that although entrepreneurial activity for both genders is positively influenced by these factors, men tend to benefit slightly more from the increase in these combined levels.

Hypothesis 2: In Table 4, Model 4, a significant positive moderated moderation effect of gender, entrepreneurship policy, and informal gender equality on entrepreneurial entry is observed (H2: $\beta = 0.03$, $p < 0.001$). This finding suggests that in environments where entrepreneurship policies are robust and informal gender equality is pronounced, the conditions for entrepreneurship become more favorable for women relative to men. Specifically, it highlights that the synergistic effect of elevated entrepreneurship policies and enhanced informal gender equality contributes more significantly to increasing women's propensity for entrepreneurship than it does for men. This nuanced understanding underscores the differential impact that a combination of supportive entrepreneurship policies and informal gender equality has on empowering women's entrepreneurial endeavors.

Further investigation of this three-way interaction was conducted through separate analyses for men and women. Analyzing women's data in Table 5, Model 2, reveals a significant positive relationship between informal gender equality and entrepreneurship policy on women's entrepreneurial entry ($\beta = 0.07$, $p < 0.001$). This implies that women are

Table 3. Correlation matrix, descriptive statistics and multicollinearity test

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Individual-level variables													
1. Entrepreneurial Entry	1.00												
2. Gender	−0.06**	1.0											
3. Age	−0.08**	0.01**	1.00										
4. Education	0.01**	−0.02**	−0.08**	1.00									
5. Household Income	0.06**	−0.09**	−0.02**	0.26**	1.00								
6. Social Capital	0.19**	−0.08**	−0.11**	0.08**	0.12**	1.00							
7. Self-efficacy	0.24**	−0.13**	−0.02**	0.07**	0.11**	0.24**	1.00						
8. Fear of Failure	−0.10**	0.08**	0.01**	−0.01**	−0.04**	−0.05**	−0.16**	1.00					
Country-level variables													
9. Human Development Index	−0.13**	0.00**	0.19**	0.29**	0.01**	−0.11**	−0.11**	0.07**	1.00				
10. GDP per capita PPP	−0.12**	0.00	0.17**	0.26**	0.00**	−0.08**	−0.10**	0.05**	0.85**	1.00			
11. Formal Gender Equality	−0.08**	0.03**	0.14**	0.17**	0.03**	−0.05**	−0.08**	0.04**	0.65**	0.66**	1.00		
12. Informal Gender Equality	0.10**	0.010**	−0.05**	−0.09**	0.04**	0.03**	0.10**	0.00	−0.20**	−0.32**	−0.20**	1.00	
13. Entrepreneurship Policy	−0.03**	−0.01**	0.06**	0.12**	−0.02**	0.01**	−0.03**	−0.02**	0.29**	0.43**	0.32**	−0.12**	1.00
Descriptive Statistics													
Mean	0.12	1.49	40.33	2.09	2.04	0.38	0.52	0.41	0.82	30,462.32	0.71	1.17	4.29
Std. Dev	0.32	0.50	12.81	1.08	0.82	0.49	0.50	0.49	0.10	16,909.45	0.05	0.26	0.54
Min	0	1	18	0	1	0	0	0	0.41	1437.38	0.58	0.48	2.92
Max	1	2	64	4	3	1	1	1	0.96	116,283.70	0.85	1.74	5.80
Multicollinearity Test													
VIF		1.03	1.07	1.22	1.1	1.1	1.13	1.04	4.19	4.69	1.9	1.15	1.27
Tolerance		0.97	0.94	0.82	0.91	0.91	0.89	0.96	0.24	0.21	0.53	0.87	0.79

Note(s): $N = 1{,}107{,}480$ individual level observations; 468 country-level observations; Significant at $^{*}p < 0.05$; $^{**}p < 0$; Variance inflation factor (VIF) value higher than 10 indicate multicollinearity is concern among variables; Tolerance value lower than 0.1 alerts multicollinearity is concern; Collinearity is not a concern for our study

Source(s): Author's own elaboration

Table 4.
Mixed-effects multilevel logistic regression on entrepreneurial entry

	Model 1	Model 2	Model 3	Model 4	Model 5
Individual level control variables					
Age	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)
Education	0.03*** (0.00)	0.03*** (0.00)	0.03*** (0.00)	0.04*** (0.00)	0.04*** (0.00)
Household Income	0.09*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)
Social Capital	0.82*** (0.01)	0.82*** (0.01)	0.82*** (0.01)	0.82*** (0.01)	0.82*** (0.01)
Self-efficacy	1.47** (0.01)	1.45*** (0.01)	1.44*** (0.01)	1.44*** (0.01)	1.44*** (0.01)
Fear of Failure	−0.37*** (0.01)	−0.36*** (0.01)	−0.37*** (0.01)	−0.37*** (0.01)	−0.37*** (0.01)
Country level control variables					
Human Development Index	0.27*** (0.04)	0.16*** (0.04)	0.25*** (0.04)	0.10*** (0.04)	0.19*** (0.04)
GDP Per Capita PPP	0.47*** (0.04)	0.39*** (0.04)	0.36*** (0.04)	0.39*** (0.04)	0.36*** (0.04)
Individual level main variable					
Gender		−0.18*** (0.01)	−0.17*** (0.01)	−0.21*** (0.01)	−0.20*** (0.01)
Country level main variables					
Formal Gender Equality		0.09*** (0.01)	0.10*** (0.01)	0.10*** (0.01)	0.10*** (0.01)
Informal Gender Equality		0.31** (0.10)	0.33** (0.10)	0.22** (0.10)	0.25** (0.10)
Entrepreneurship Policy		0.04*** (0.01)	0.06*** (0.01)	0.01 (0.01)	0.01 (0.01)
Two-way Interaction Terms					
Formal Gender Equality X Entrepreneurship Policy			0.11*** (0.01)		0.09*** (0.01)
Gender X			−0.00 (0.01)		−0.00 (0.01)
Formal Gender Equality					
Gender X			0.01 (0.01)	0.01 (0.01)	0.00 (0.01)
Entrepreneurship Policy					
Informal Gender Equality X Entrepreneurship Policy				0.11*** (0.01)	0.11*** (0.01)
Gender X				0.06*** (0.01)	0.05*** (0.01)
Informal Gender Equality					
Three-way Interaction Terms					
Gender X Formal Gender Equality X Entrepreneurship Policy (H1)			−0.05*** (0.01)		−0.02*** (0.01)
Gender X Informal Gender Equality X Entrepreneurship Policy (H2)				0.03*** (0.01)	0.03*** (0.01)

(*continued*)

	Model 1	Model 2	Model 3	Model 4	Model 5
Random part estimates					
Variance of intercept	0.99 (0.09)	0.85 (0.08)	0.88 (0.08)	0.80 (0.07)	0.83 (0.08)
Number of observations	1,107,480	1,107,480	1,107,480	1,107,480	1,107,480
Number of group (countries)	66	66	66	66	66
Model fit statistics					
Degree of freedom (variables)	8	12	16	16	19
Chi-square	65,453	66,120	66,218	66,302	66,373
Prob > Chi-square	***	***	***	***	***
Log likelihood	−340,911	−340,459	−340,404	−340,347	−340,303
LR test for goodness of fit	***	***	***	***	***

Note(s): Standard errors were reported in parentheses. All models were reported in beta coefficient. All significances are reported at two-tailed test, ***$p < 0.001$, **$p < 0.01$, * < p 0.05, + < p 0.1
Source(s): Author's own elaboration

Table 4.

	Entrepreneurial entry (female) Model 1	Model 2	Entrepreneurial entry (male) Model 3	Model 4
Individual level control variables				
Age	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)
Education	0.03*** (0.01)	0.03*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
Household Income	0.05*** (0.01)	0.05*** (0.01)	0.10*** (0.01)	0.10*** (0.01)
Social Capital	0.82*** (0.01)	0.82*** (0.01)	0.81*** (0.01)	0.81*** (0.01)
Self-efficacy	1.49*** (0.02)	1.49*** (0.02)	1.39*** (0.02)	1.39*** (0.02)
Fear of Failure	−0.37*** (0.01)	−0.37*** (0.01)	−0.37*** (0.01)	−0.37*** (0.01)
Country level control variables				
Human Development Index	0.08 (0.06)	0.05 (0.06)	0.31*** (0.05)	0.14** (0.05)
GDP Per Capita PPP	0.25*** (0.06)	0.28*** (0.06)	0.30*** (0.05)	0.33*** (0.05)
Country level main variables				
Formal Gender Equality	0.11*** (0.02)	0.12*** (0.02)	0.09*** (0.01)	0.09*** (0.01)
Informal Gender Equality	0.30** (0.09)	0.28*** (0.10)	0.31** (0.10)	0.28** (0.09)
Entrepreneurship Policy	0.05*** (0.01)	0.01 (0.01)	0.04*** (0.01)	0.01 (0.01)
Interaction Terms				
Formal Gender Equality X Entrepreneurship Policy	0.04*** (0.01)		0.06*** (0.01)	
Informal Gender Equality X Entrepreneurship Policy		0.07*** (0.01)		0.05*** (0.01)
Random part estimates				
Variance of intercept	0.74 (0.08)	0.69 (0.07)	0.84 (0.08)	0.74 (0.07)
Number of observations	547,779	547,779	559,701	547,801
Number of group (country)	66	66	66	66
Model fit statistics				
Degree of freedom	12	12	12	12
Chi-square	29,185	29,213	33,509	33,514
Prob > Chi-square	***	***	***	***
Log likelihood	−146,196	−146,179	193,682	−193,678
LR test for goodness of fit	***	***	***	***

Table 5. Mixed-effects multilevel logistic regression on women's and men's entrepreneurial entry

Note(s): Standard errors were reported in parentheses. All models were reported in beta coefficient. All significances are reported at two-tailed test, ***$p < 0.001$, **$p < 0.01$, * < p 0.05, + < p 0.1
Source(s): Author's own elaboration

more inclined to start entrepreneurial ventures in contexts where informal gender equality and entrepreneurship policies are robust. Conversely, the analysis of men's data (Table 5, Model 4) shows a positive association as well ($\beta = 0.05$, $p < 0.001$), but with a slightly lesser magnitude.

The analysis reveals that, within contexts characterized by robust entrepreneurship policies and strong informal gender equality, the influence on the inclination towards entrepreneurship demonstrates a greater magnitude of change for women ($\beta = 0.07$) compared to men ($\beta = 0.05$). This distinction indicates that women's entrepreneurial engagement responds more significantly to enhancements in these conditions. It is crucial to underline that the coefficients elucidate the degree of change in entrepreneurial participation for each gender as the combined intensity of entrepreneurship policy and informal gender equality elevates, rather than comparing the overall rates of entrepreneurial activity between genders. Consequently, this nuanced interpretation reinforces the validation of Hypothesis 2, highlighting the differential impact of supportive ecosystems on fostering women's entrepreneurial ventures compared to men's.

Additional analysis and robustness checks

To strengthen the robustness of our primary results and further our theory-testing, we carried out four additional analyses.

First, in an effort to refine our theory testing, we engaged in a systematic self-reflection of our main findings (Anderson *et al.*, 2019). In this endeavor, we undertook a mixed-effect multilevel logistic regression analysis. While employing the same macro-level and micro-level predictors, controls, and dependent variable as our main study, we shifted our focus to the period from 2006 to 2013, rather than from 2006 to 2017. This analysis, which encompassed 675,360 individual observations across 59 countries, yielded results that align with our principal findings (as displayed in Table 6: Models 1 and 2).

Next, we examined the sensitivity of our primary results when excluding the country with the most substantial number of observations from our main dataset (Lihn and Bjørnskov, 2017). Our analysis identified Spain as having the highest number of observations (see Table 2). To assess the resilience of our results, we excluded Spain and carried out a multilevel logistic regression analysis on a dataset spanning from 2006 to 2017, which consisted of 920,728 individual observations from 65 countries. Remarkably, the findings from this adjusted dataset remain in harmony with our primary conclusions (see Table 6: Models 3 and 4).

Thirdly, to further authenticate our main findings, we conducted a multilevel logistic regression analysis exclusively for OECD countries. This analysis maintained the same control and predictor variables related to entrepreneurial entry. It's pertinent to note that Colombia and Lithuania were omitted from the OECD countries' analysis, given their accession to the OECD in 2018 and 2020, respectively, while our study's timeframe extends from 2006 to 2017. The insights gleaned from this focused analysis are in congruence with our primary outcomes (refer to Table 6: Models 5 and 6). This scrutiny lends added resilience to our overarching conclusions.

Finally, while our main analysis emphasized entrepreneurship policy, drawing inspiration from relevant literature, we formulated an alternative measure for entrepreneurship policy, utilizing data from the Ease of Doing Business – World Bank Dataset and the Global Competitiveness Report of World Economic Freedom. These alternative measures are detailed in Table 7. To further test the robustness of our findings, we performed a mixed-effect multilevel logistic regression analysis using alternative measures of entrepreneurship policy instead of our main measure, including all predictors and control variables. The findings from this analysis are consistent with our main results (Table 6: Model 7 and 8), which provides robustness to our analysis. In addition to these analysis and robustness checks, we conducted further tests to reinforce our main findings. These results are detailed in the online appendices, providing support for our main results.

Discussion

Entrepreneurship, inherently nuanced by societal fabric, extends far beyond business creation – it is interwoven with cultural, political, and socio-economic contours (Bruton and Ahlstrom, 2003). While previous studies have ventured into understanding the influences on women's entrepreneurial activity, our study bridges a distinct gap. It delineates the interaction between national entrepreneurial policies and gendered contexts, focusing on both formal and informal gender equality across 66 countries.

Our findings highlight that while national-level policies indeed shape women's entrepreneurial decisions, their efficacy is significantly modulated by the prevailing gender contexts (Brush *et al.*, 2009). Specifically, in environments where entrepreneurial policies and formal gender equality are robust, such policies promote women's entrepreneurial activity, albeit not as much as they promote men's entrepreneurial activity.

Table 6.
Robustness check for Mixed-effects multilevel logistic regression on entrepreneurial entry

	2006–2013		Data excluding Spain		OECD countries		Alternative measure of entrepreneurship policy	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Individual level control variables								
Age	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)	−0.02*** (0.00)	−0.02*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)
Education	0.04*** (0.00)	0.04*** (0.00)	0.03*** (0.00)	0.03*** (0.00)	0.07*** (0.00)	0.07*** (0.00)	0.05*** (0.00)	0.05*** (0.00)
Household Income	0.09*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.07*** (0.01)	0.07*** (0.01)	0.9*** (0.01)	0.9*** (0.01)
Social Capital	0.76*** (0.01)	0.76*** (0.01)	0.82*** (0.01)	0.82*** (0.01)	0.95*** (0.01)	0.95*** (0.01)	0.83*** (0.01)	0.83*** (0.01)
Self-efficacy	1.43*** (0.01)	1.44*** (0.01)	1.39*** (0.01)	1.39*** (0.01)	1.69*** (0.01)	1.69*** (0.01)	1.46*** (0.01)	1.46*** (0.01)
Fear of Failure	−0.37*** (0.01)	−0.37*** (0.01)	−0.34*** (0.01)	−0.34*** (0.01)	−0.48*** (0.01)	−0.48*** (0.01)	−0.39*** (0.01)	−0.39*** (0.01)
Country level control variables								
Human Development Index	0.06 (0.07)	−0.17** (0.06)	0.29*** (0.07)	0.17*** (0.07)	0.35*** (0.07)	0.21** (0.06)	0.29*** (0.07)	0.21*** (0.05)
GDP Per Capita PPP	0.32*** (0.04)	0.33*** (0.04)	0.25*** (0.04)	0.26*** (0.04)	0.26*** (0.04)	0.27*** (0.04)	0.54*** (0.04)	0.61*** (0.04)
Individual level main variable								
Gender	−0.19*** (0.01)	−0.23*** (0.01)	−0.17*** (0.01)	−0.21*** (0.01)	−0.27*** (0.01)	−0.26*** (0.01)	−0.17*** (0.01)	−0.24*** (0.01)
Country level main variables								
Formal Gender Equality	0.2 (0.02)	0.04* (0.02)	0.10** (0.02)	0.11** (0.02)	0.08** (0.02)	0.13*** (0.02)	0.06** (0.02)	0.10** (0.02)
Informal Gender Equality	0.33** (0.10)	0.19* (0.08)	0.30** (0.10)	0.19* (0.09)	0.20* (0.10)	0.22* (0.10)	0.43*** (0.12)	0.31*** (0.12)
Entrepreneurship Policy	0.17*** (0.01)	0.10*** (0.02)	0.05*** (0.01)	0.02* (0.01)	0.02 (0.01)	0.03+ (0.01)	0.08** (0.03)	−0.01 (0.03)
Two-way Interaction Terms								
Formal Gender Equality X Entrepreneurship Policy	0.08*** (0.01)		0.10*** (0.01)		0.06** (0.01)		0.19*** (0.02)	

(*continued*)

Table 6.

	2006–2013		Data excluding Spain		OECD countries		Alternative measure of entrepreneurship policy	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Gender X Formal Gender Equality	0.01 (0.01)		0.00 (0.00)		0.02+ (0.01)		0.03*** (0.01)	
Gender X Entrepreneurship Policy	−0.03** (0.01)	0.00 (0.01)	−0.02* (0.01)	0.01 (0.01)	0.05*** (0.01)	0.05*** (0.01)	−0.04** (0.01)	0.00 (0.01)
Informal Gender Equality X Entrepreneurship Policy		0.14*** (0.01)		0.12*** (0.01)		0.01 (0.01)		0.08*** (0.02)
Gender X Informal Gender Equality		0.07*** (0.01)		0.06*** (0.01)		−0.03* (0.01)		0.07*** (0.01)
Three-way Interaction Terms								
Gender X Formal Gender Equality X Entrepreneurship Policy	−0.02** (0.01)		−0.05*** (0.01)		−0.01 (0.01)		−0.09*** (0.01)	
Gender X Informal Gender Equality X Entrepreneurship Policy		0.04*** (0.01)		0.03*** (0.01)		0.02+ (0.01)		0.02** (0.01)
Random part estimates								
Variance of intercept	0.76 (0.09)	0.63 (0.07)	0.82 (0.08)	0.74 (0.07)	0.60 (0.08)	0.58 (0.08)	1.05 (0.10)	1.05 (0.10)
Number of observations	675,360	675,360	920,728	920,728	666,327	666,327	831,858	831,858
Number of group (countries)	59	59	65	65	31	31	63	63

(*continued*)

Table 6.

	2006–2013		Data excluding Spain		OECD countries		Alternative measure of entrepreneurship policy	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Model fit statistics								
Degree of freedom (variables)	16	16	16	16	16	16	16	16
Chi-square	37,259	37,371	57,862	58,003	40,429	40,433	50,668	50,673
Prob > Chi-square	***	***	***	***	***	***	***	***
Log likelihood	−204,827	−204,751	−303,437	−303,351	−161,033	−161,034	−250,797	−250,798
LR test for goodness of fit	***	***	***	***	***	***	***	***

Note(s): Standard errors were reported in parentheses. All models were reported in beta coefficient. All significances are reported at two-tailed test, ***$p < 0.001$, **$p < 0.01$, * < p 0.05, + < p 0.1

Source(s): Author's own elaboration

Sub dimensions *Description*	Questions
Venture capital availability (Stenholm *et al.*, 2013; Murdock, 2012; WEF – GCR) *Availability of venture capital indicates how easy it is for entrepreneurs with innovative but risky projects to find venture capital*	In your country, how easy is it for start-up entrepreneurs with innovative but risky projects to obtain equity funding? [1 = extremely difficult; 7 = extremely easy]
Starting a Business (Van Stel *et al.*, 2007; EDB – WBDB, category Starting a Business) *It assesses the procedures, time, and cost associated with establishing a commercial or industrial enterprise employing up to 50 individuals, along with start-up capital equivalent to 10 times the per-capita gross national income of the economy*	*Procedures* - The number of different procedures that a start-up has to comply with in order to obtain a legal status, i.e. to start operating as a legal entity. A procedure is defined as any interaction of the company founder with external parties (government agencies, lawyers, auditors, notaries) *Time* - The time it takes to obtain legal status to operate a firm, in calendar days. Time captures the median duration that incorporation lawyers indicate is necessary to complete all necessary procedures *Cost* - The cost of obtaining legal status to operate a firm as a percentage of per capita income. It includes all identifiable official expenses (fees, costs of procedures and forms, photocopies, fiscal stamps, legal and notary charges, etc.) *Minimum capital* - The paid-in minimum capital requirement reflects the amount that the entrepreneur needs to deposit in a bank before registration starts. This variable is measured as a percentage of per capita income. (For details: https://archive.doingbusiness.org/en/methodology/starting-a-business).
Burden of taxes (Kantis *et al.*, 2020 EDB - WBDB) *The taxes and mandatory contributions that a firm must have paid or withheld in a given year, as well as the administrative burden of paying taxes and contributions*	*Payments (number per year)* - The tax payments indicator captures the total taxes and contributions paid, payment method, payment and filing frequency, and involved agencies. It encompasses company-withheld taxes like sales tax, VAT, and employee labor taxes. These are collected by the company for tax agencies and, while not impacting the company's income statements, they heighten the administrative compliance load and are counted in the tax payments measure *Time (hours per year)* - Time is recorded in hours annually, measuring the duration to prepare, file, and pay three key tax types: corporate income tax, value added or sales tax, and labor taxes, inclusive of payroll taxes and social contributions. Preparation entails collecting data to compute and calculate payable tax. If separate books or calculations are required for taxes, the associated time is counted only when standard accounting doesn't meet tax requirements. Filing time covers the completion and submission of tax returns, while payment time accounts for online or in-person payments, incorporating any in-person waiting delays *Total tax and contribution rate (% of profit)* - The total tax and contribution rate indicates the taxes and mandatory contributions a business shoulders in its second operational year, represented as a commercial profit percentage. This amount encompasses all taxes and contributions, considering allowable deductions and exemptions. Exclusions include taxes like personal income tax held by the company or remitted taxes not carried by the business, such as VAT. The inclusive taxes span five categories: corporate income tax, employer-paid social contributions and labor taxes (covering all mandatory contributions, even those to private entities like pension funds), property taxes, turnover taxes, and other levies like municipal fees and vehicle taxes (For details: https://archive.doingbusiness.org/en/methodology/paying-taxes)
Government procurement of advanced tech products (Porter and Stern, 2001; WEF - GCR) *As main tool of government innovation policy it measures government purchasing decisions to foster technological innovation*	In your country, to what extent do government purchasing decisions foster innovation? [1 = not at all; 7 = to a great extent] weighted average

Source(s): Author's own elaboration

Table 7. Alternative entrepreneurship policy measure

Conversely, when these policies are combined with strong informal gender equality, a more positive outcome for women in entrepreneurship is observed. This delineates the intricate interaction between national entrepreneurial policies and gendered contexts. The nuanced dynamics between formal gender equality, informal gender equality, and entrepreneurship policies underscore the complex relationship that influences women's entrepreneurship. It suggests that while formal gender equality and supportive entrepreneurship policies provide foundational support, it is the nuanced interplay with informal gender equality that significantly shapes entrepreneurial inclinations (Mead, 1934; Blumer, 1969). This emphasizes the importance of a comprehensive perspective on gender dynamics in policy formulation.

Our research contributes to the symbolic interactionism discourse by extending the understanding of how societal norms and perceptions interact with policy frameworks to influence entrepreneurial activities. While formal gender equality has been established as beneficial for women entrepreneurs, our study reveals how specific policies can accentuate or temper this relationship, suggesting that entrepreneurship policies, entangled with gender dynamics, can either heighten or assuage the challenges faced by women entrepreneurs (Ahl, 2006; Ahl and Marlow, 2012). Furthermore, the study illuminates how environments with robust entrepreneurial policies, when coupled with informal gender equality, offer a more encouraging picture for women in entrepreneurship. This highlights the critical role of societal norms and perceptions in shaping entrepreneurial opportunities, underlining the need for not just policy initiatives but also the transformation of societal attitudes towards gender roles in entrepreneurship.

This vantage point furnishes fresh insights into not just the challenges women entrepreneurs face but also how these challenges are sculpted by the intricate interplay of policy and gender contexts.

Previous research has outlined numerous challenges women entrepreneurs confront – from gender-role biases to limitations in accessing resources (Heilman *et al.*, 1988; Henry and Kennedy, 2003; Woldie and Adersua, 2004). These barriers, as our study highlights, don't function in isolation. Entrepreneurial policies, entangled with gender dynamics, can either heighten or assuage these challenges (Kolvereid *et al.*, 1993). The distinct contribution of our work lies in illuminating this interaction.

The prominence of formal gender equality institutions on women's entrepreneurial activity underscores the importance of crafting and reinforcing gendered institutional support (Calás *et al.*, 2009). Feminist critique caution that without challenging patriarchal societies, women entrepreneurs are likely to continue facing challenges in competing with their male counterparts (Calás *et al.*, 2009). Even in highly developed countries, as long as gender bias is ingrained in the entrepreneurial landscape, which values men over women, female entrepreneurs will encounter significant institutional, social, and political barriers to starting businesses (Ahl, 2006; Calás *et al.*, 2009). The empowerment and protection of women's rights are essential aspects of the post-2015 agenda (UN Task Report, 2012). Therefore, the global development agenda should prioritize enhancing the social status of women by promoting their greater and more equitable representation in the power structure of institutional hierarchy, as well as ensuring their social, political, and economic empowerment. Such empowerment can positively impact economic growth and generate social change that can alter gender inequalities, discrimination, and unequal developmental progress between women and men (Htun and Weldon, 2011).

To achieve greater levels of productive women's entrepreneurial activity, it is critical for researchers and policymakers to develop a better understanding of how to generate gendered institutional support for women entrepreneurs. This approach aligns with the post-2015 agenda of empowering women and girls and protecting their rights, which is essential for achieving social change and altering gender inequalities and discrimination (Htun and

Weldon, 2011; UN Task Report, 2012). Ultimately, promoting women's economic empowerment can have a positive impact on economic growth and development, as well as on the lives of women and their communities.

This study contributes to the entrepreneurship research agenda by exploring how gender, as a social construct, interacts with the process of entrepreneurship. Specifically, we apply the symbolic interactionism discourse to examine the differentiated, multifaceted, and diverse influence of gender characterization on both men and women in the broader field of entrepreneurial activities, behavior, and ambitions (Ahl, 2006; Ahl and Marlow, 2012). By doing so, we move beyond the conventional focus on women entrepreneurs to a more comprehensive understanding of the gendered institutional support needed to promote women's entrepreneurship.

Implications

This study offers an intricate analysis of how institutional arrangements, deeply rooted in gender equality, influence women's entrepreneurial activity. This insight significantly enriches the current literature and provides crucial guidelines for policymakers aiming to foster a nurturing environment for women entrepreneurs, irrespective of the country's development stage.

A primary takeaway from our study is the paramount importance of promoting gender equality. Policymakers should ardently champion policies that bolster gender equality in both formal and informal realms. Our findings highlight that gender equality initiatives can be pivotal in shaping women's entrepreneurial endeavors. This becomes even more significant in nations where formal gender equality might be compromised. In such contexts, strategies that directly advocate for women's entrepreneurship should be introduced and heavily supported.

Moreover, understanding the nuanced interplay between gender equality and entrepreneurship policies emerges as a core consideration. Policymakers must be attuned to this dynamic, ensuring that they craft policies that optimize the positive correlation between informal gender equality and women's entrepreneurial aspirations. This is particularly critical in environments where the foundation of entrepreneurial policies might be less robust.

While our research primarily delves into women's entrepreneurship, it's worth noting that the findings may also be pertinent to men's entrepreneurial ventures. The relationship between policies and gendered institutions could have ramifications for men's entrepreneurship that either mirror or differ from those observed for women. For instance, entrepreneurial policies, such as easing regulatory constraints or offering financial support, might resonate just as strongly with men's entrepreneurial aspirations.

Furthermore, the complex interplay of entrepreneurial policies with gendered institutions offers a compelling avenue for future exploration. It would be beneficial for upcoming research to investigate how men's entrepreneurial responses might align with or deviate from those of women, especially in contexts with pronounced gender imbalances. We advocate for future studies to juxtapose men's and women's entrepreneurial trajectories within this framework. This endeavor can provide a holistic understanding of gendered influences on entrepreneurship, and subsequently guide the development of more comprehensive, gender-sensitive policies that stimulate entrepreneurial growth across the board.

Limitations and future research

While our study sheds light on several aspects of women's entrepreneurial activity (WEA) and gender equality institutions, it comes with certain limitations that, in turn, open avenues for future research. Owing to the cross-sectional nature of our dataset, we couldn't establish a definitive causal relationship between gender equality institutions and WEA. Although we

postulate that WEA emerges from enhanced women's empowerment and diminishing traditional gender-role attitudes, an alternate hypothesis, grounded in North (1990), suggests a possible virtuous circle wherein WEA promotes women's empowerment and diminishes these traditional attitudes. To thoroughly decipher these intricate causal connections between women's societal standing and entrepreneurship-propelled economic prosperity, future researchers should utilize longitudinal cross-country examinations, gender-segregated panel datasets, versatile methodologies, and robust multi-level models (as suggested by Brush *et al.*, 2019).

Building on our findings of gendered normative institutions' direct and indirect effects, upcoming research adopting a gendered lens can delve into the intricate interplays among various gendered institutions, including economic, cognitive, and regulatory, in tandem with national cultures. It might be enlightening to probe if specific religions (like Christianity, Islam, Judaism, Hinduism, etc.) inherently foster more traditional gender-role perspectives.

Our focus remained predominantly on women's entrepreneurial activity, with a sideline evaluation of opportunity-based entrepreneurial ventures. It would be worth venturing into how predictor variables influence other entrepreneurial variants, such as growth-oriented, innovation-driven, international, technology-based ventures, and various entrepreneurial phases like nascent, new, and established ones (Acs *et al.*, 2018). A promising avenue would be to study the quality of entrepreneurship affected significantly by gender, a domain which can provide comprehensive insights into not just women's entry maneuvers but their broader entrepreneurial engagements as well (Brush *et al.*, 2019).

Finally, our robustness checks, as presented in Table 6, offer intriguing insights for future research directions. The role of non-OECD countries in our sample, for instance, presents a compelling area for further exploration. Investigating the disparities in formal/informal gender equality levels between OECD and non-OECD countries, or considering levels of economic development (developed versus developing countries), could yield valuable contributions to the existing body of knowledge on gender and entrepreneurship.

Conclusion

Our expansive research across 66 countries underscores the profound influence of gender dynamics and entrepreneurship policies on women's entrepreneurial endeavors. Notably, in nations that prioritize entrepreneurship policies coupled with formal gender equality, women's inclination towards self-employment is anticipated to be less pronounced in comparison to men. Conversely, in regions where entrepreneurship policies intersect with informal gender equality, women demonstrate a heightened inclination towards self-employment relative to their male counterparts. These findings spotlight the intricate balance and interplay between formal and informal gendered structures in influencing entrepreneurial behavior. Beyond facilitating entry, our insights emphasize the importance of fostering an environment conducive to women's sustained success and evolution within the entrepreneurial landscape. As we move forward, this study beckons policymakers and academia to deeply contemplate the multifaceted nature of gender dynamics, thus paving the way for a more equitable entrepreneurial future.

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Appendix

The Appendix for this article can be found online.

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