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Entrepreneurial ecosystem conditions and gendered national-level entrepreneurial activity: a 14-year panel study of GEM

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Abstract Scholars note the importance of the entrepreneurial ecosystem in promoting new venture activity. Yet to date, limited focus has been given to its impact on female venturing. Accordingly, our study investigates if the entrepreneurial ecosystem influences the prevalence of male and female entrepreneurship over time. We analyze the effect of entrepreneurial ecosystems in 75 countries between 2001 and 2014 on the rates of entrepreneurship for men and women using aggregate data from the Global Entrepreneurship Monitor Adult Population Survey and National Expert Survey. Findings indicate that the prevalence in entrepreneurship is highest for women when the entrepreneurial ecosystem features low barriers to entry, supportive government policy towards entrepreneurship, minimal commercial and legal infrastructure, and a normative culture that supports entrepreneurship. Conversely, we find that prevalence rates for men are highest when there is supportive government policy but weak government programs aimed towards business creation.

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1 Introduction

Entrepreneurial ecosystems are communities consisting of many independent actors (e.g., governments, universities, investors, mentors, service providers, media, and large companies) that can play a key role in the development of and level of entrepreneurial activity for a given geography. The ecosystem includes factors that shape the condition of the system. Factors such as, access to entrepreneurial finance, government support and policies, the presence of government-based entrepreneurship programs, entrepreneurship education, policies conducive to R&D transfer, legal and commercial infrastructure, market dynamics associated with change and openness, ease of entry regulations to start a business, and protection of intellectual property rights. These factors create complex interlinkages among participants that incentivizes them to create an entrepreneurial society. Our study draws on this perspective to expand our understanding of male and female entrepreneurship.

Although knowledge about entrepreneurship has grown, a gender gap is still pervasive (Jennings and Brush 2013) and creates challenges to women's entrepreneurship. Societal, cultural, and ideological barriers can influence and sustain this divide, which ultimately influences a women's propensity to engage in entrepreneurial activity (Carter et al. 2015). Therefore, we question: *how does the entrepreneurial ecosystem influence the prevalence of entrepreneurial activity of both men and women*? Building upon prior research by Levie and Autio (2008), we provide a cross-cultural empirical analysis of entrepreneurship grounded in the entrepreneurial ecosystems framework over time. We examine the Global Entrepreneurship Monitor (GEM) Entrepreneurial Framework Conditions (EFC), on female and male venturing rates in 75 countries from 2001 to 2014 using General Method of Moments (GMM) (Arellano and Bond 1991). Findings show that women's prevalence in entrepreneurship is highest when the entrepreneurial ecosystem features low barriers to entry, supportive government policy towards entrepreneurship, minimal commercial and legal infrastructure, and a normative culture that supports entrepreneurship. Conversely, we find that men tend to engage in entrepreneurship when there is supportive government policy but weak government programs aimed towards business creation. Overall, this study contributes to extant entrepreneurship literature by demonstrating that there are certain global ecosystem factors that differentially influence male and female venturing, while affirming that some universal ecosystem factors impact male and female venturing similarly, and others have no impact at all.

2 Ecosystems in entrepreneurship

The GEM model suggests entrepreneurial activity responds to a different set of environmental factors than established business activity, although both are interrelated (see Fig. 1). We draw on the GEM conceptual model (Reynolds et al. 2005) and focus on the EFC component of the GEM business ecosystem model. This subset of the model captures the conditions (North 1990) that enable or constrain productive entrepreneurship (Baumol 1990). It measures the distinct conditions, or incentive structures, in which productive entrepreneurship (Baumol 1990) can thrive. Effective economic, political, and legal incentive structures channel efforts into productive entrepreneurship (Sobel 2008). Consequently, we believe that country-level entrepreneurial activity is a multifaceted social economic phenomenon where individual capabilities and actions are contextualized (Welter 2011) by institutional incentives. Accordingly, the EFCs capture the entrepreneurial ecosystems of countries and should influence the prevalence rates of entrepreneurial activity for both men and women somewhat differently. This is because research suggests that patriarchy associated with social systems and the processes across incentive structures impose difficulties on productive female venturing activity (Clark Muntean and Ozkazanc-Pan 2015).

2.1 Financial environment

Research on gender-related access to finance considers both demand-side and supply-side factors affecting the availability of monies for female founders (Ahl 2004; Carter et al. 2003). Demand-side arguments cite risk aversion as a factor that lowers a female entrepreneurs' propensity to access external funds (Mittal and Vyas 2011). Yet, Marlow and Patton (2005) find that women tend to have a greater need for credit than men when starting new businesses. Supply-side arguments are concerned with discrimination by financial institutions against female founders (Carter and Shaw 2006). Research finds that both suppliers of finance and business owners believe that there is a shortage of finance from formal sources for women (Hill et al. 2006). Therefore, women may be more strongly affected by the availability or perceived supply of finance than men.

- *H1a: At the national level, the prevalence of entrepreneurship is positively associated with the financial environment supporting entrepreneurship.*
- *H1b: This effect is stronger for women than men.*

2.2 Government policy and support

The incorporation of government policy and support in the ecosystem model reflects broad policy interest towards venturing focused on innovation (Stevenson and Lundstrom 2007). Most innovation-driven economies now have policies promoting new firms (Storey 2003). The GEM model does not measure specific policies; instead it captures governments' general prioritization of entrepreneurship (Levie

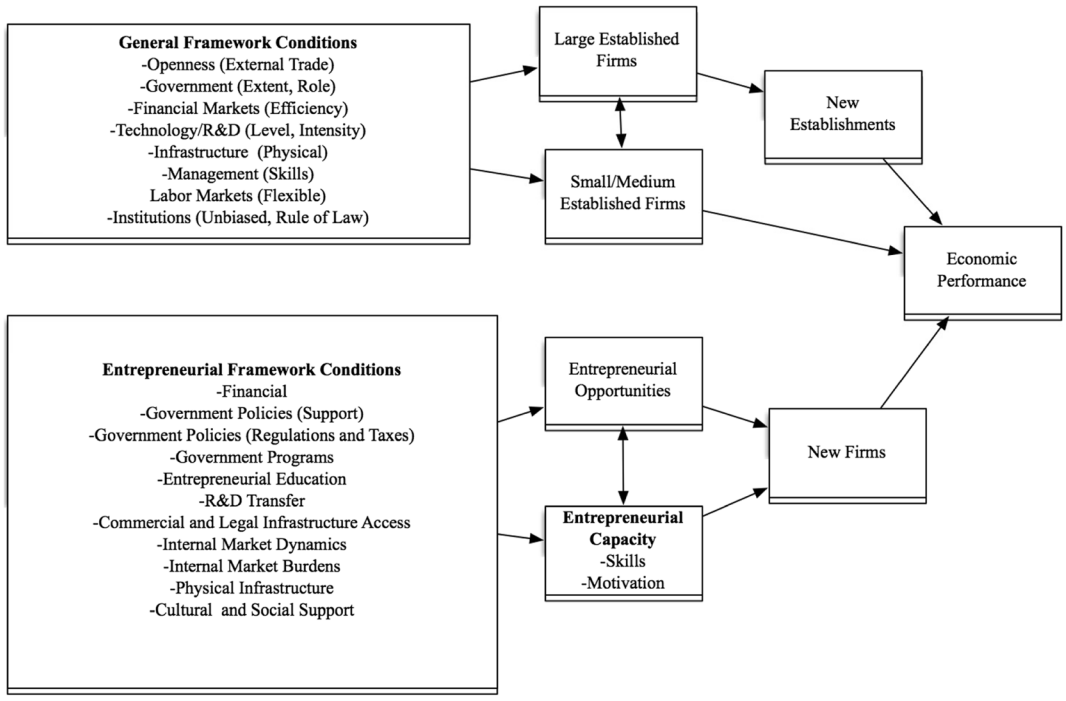

Fig. 1 GEM conceptual model of business ecosystem and economic performance

and Autio 2008), as enhancing the efficiency of the market, providing a context motivating entrepreneurs (Leibenstein 1968), and developing an economy (Acs et al. 2005). Research links government policy to entrepreneurial activity (McMullen et al. 2008), yet other studies find no evidence of governments' policies impacting entrepreneurial activity (Levie and Autio 2008).

Government policy often targets equal occupational opportunity for men and women to venture. In certain societies, gender discrimination plays a considerable role in female occupational segregation (Marlow and Carter 2004). Different societal contexts produce different policy outcomes. Therefore, policy coordination can be even more important than the goal of the specific policy itself: policies that reduce the barriers to women in venturing will likely benefit both men and women. Alvarez et al. (2011) find that government support for women's entrepreneurship positively affected both male and female venturing rates.

- *H2: At the national level, the prevalence of entrepreneurship is positively associated with the government policy supporting entrepreneurship for men and women.*

2.3 Government policy and taxes

Regulations, taxes, and labor market rules are common venturing barriers (Acs et al. 2008). Business regulations that prolong the venturing process can cause entrepreneurs to miss an opportunity (Mullins and Forlani 2005), and compliance with regulations may drive up the costs for entrepreneurs. Properly applied tax policies can provide incentives for firms to innovate and grow (Keuschnigg and Nielsen 2004), yet several studies argue that taxes impose a direct financial cost on organizations (Davidsson and Henrekson 2002), having a negative impact on the level of entrepreneurial activity (Levie and Autio 2008). Progressive tax can intensify entrepreneurship, but it can also have no effect (Keuschnigg and Nielsen 2004). Other studies find that higher tax rates are linked with higher rates of entrepreneurship because venturing creates an opportunity for underreporting income compared to wage employment (Blau 1987). These studies indicate that changes in tax rates over time might explain changes in entrepreneurship rates. We believe that men and women are affected similarly by changes in government regulation and taxes.

- *H3: At the national level, the prevalence of entrepreneurship is negatively associated with the government regulation and taxes for men and women.*

2.4 Government programs

Government programs or professional services (e.g., accountants, bankers, lawyers, and/or business consultants) that provide mentorship and assistance can nurture entrepreneurial capacity across economies (Clarysse and Bruneel 2007; Fischer and Reuber 2003). Government can support entrepreneurs with business training programs that provide subsidies, material, and mentorship for new ventures coordinated by chambers of commerce or through publically sponsored incubators and/or accelerators that (Keuschnigg and Nielsen 2004) such programs minimize transaction costs for organizations (Shane and Cable 2002) while enhancing the human capital of founders (Delmar and Shane 2006). Government programs address competence gaps by correcting the failure of the market to cater to such needs. When there is a strong environment supporting entrepreneurship, there should be higher levels of entrepreneurship for men and women.

- *H4: At the national level, the prevalence of entrepreneurship is positively associated with the government programs supporting entrepreneurship for men and women.*

2.5 Education

Education increases the supply of entrepreneurs by providing instrumental skills required to start businesses (Honig 2004), by improving cognitive capability to manage the process of opportunity recognition, assessment, and exploitation (DeTienne and Chandler 2004), and by encouraging venturing as a career option (Peterman and Kennedy 2003). Research finds a positive relationship between entrepreneurial education and/or programs at universities and the perceived attractiveness and feasibility of entrepreneurship (Delmar and Davidsson 2000), with women being more strongly influenced by educational programs than men (Oosterbeek et al. 2010). Overall, studies suggest that female entrepreneurs have less self-confidence in their entrepreneurial abilities; participating in entrepreneurial educational programs can affect a person's confidence in performing a particular task, aiding entrepreneurial intentions and actions (Oosterbeek et al. 2010). Countries having strong educational programs supporting entrepreneurship should coincide with higher rates of venturing for both men and women, and the impact may be more pronounced among women.

- *H5a: At the national level, the prevalence of entrepreneurship is positively associated with the educational programs supporting entrepreneurship for men and women.*
- *H5b: This effect is stronger for women than men.*

2.6 R&D transfer

The "knowledge spill-over theory of entrepreneurship" (Acs et al. 2005) contends that venturing responds to other companies' knowledge investments that have not been "fully commercialize[d], thus generating opportunities for entrepreneurs" (Acs et al. 2008: p. 16). Entrepreneurship exploits knowledge spillovers because new knowledge typically has higher levels of information asymmetry and uncertainty than other economic goods, and alertness and discovery are required to identify opportunities in new knowledge unused by incumbents (Audretsch and Lehmann 2005).

Accordingly, entrepreneurship should be higher in economies where transfer of knowledge by incumbents to entrepreneurs is quick and cheap, compared to countries in which this process is slow and costly. For example, Markman et al. (2004) find that the impact of incentive systems on scientists was negatively related to entrepreneurial activity, but positively related to entrepreneurial activity for university technology transfer office personnel. Moreover, investments in innovation networks commonly focus on male-dominated industries of the economy (e.g., targeting mechanical and technical products rather than human relationships and services). Policy programs aimed at exploiting innovation networks may overlook the gender gap traditionally found in the STEM fields. We believe that the spillover and sharing of knowledge in the local environment will positively affect national entrepreneurship rates for both men and women, and this will more strongly affect men.

- *H6a: At the national level, the prevalence of entrepreneurship is positively associated with the ease of R&D transfer for men and women.*
- *H6b: This effect is stronger for men than women.*

2.7 Commercial and legal infrastructure

Commercial and legal infrastructure includes business services that are crucial for the establishment of new firms. It sets the background for activities related to business creation, such as availability of subcontractors, suppliers, consultants, accounting, advertising, financial banking, and legal services (Levie and Autio 2008). Good access to business services allows entrepreneurs to focus on core competencies, which facilitates operational efficiencies. A lack of legal services can create hurdles to entrepreneurial efforts (Brenner 1992). Likewise, legal systems with friendlier bankruptcy laws positively affect entrepreneurial entry at the national level (Lee et al. 2011). We believe that both men and women are affected similarly by changes in commercial and legal infrastructure.

- *H7: At the national level, the prevalence of entrepreneurship is positively associated with the commercial and legal infrastructure for entrepreneurship for men and women.*

2.8 Internal market dynamics

Market dynamics impact long-run macroeconomic growth (Klepper and Sleeper 2005). Market dynamics captures the speed of market change, also known as market clockspeed (Nadkarni and Narayanan 2007). Clockspeed markets are characterized by a high rate of environmental unpredictability, change, and uncertainty (Dess and Beard 1984). These conditions provide an opportunity for entrepreneurs to earn profits as a return for putting up with uncertainty (Knight 1921). Market change is an important source of entrepreneurial opportunity because it allows individuals to allocate resources in more productive combinations (Casson 1995). In countries where market dynamics are rapidly changing, we should see higher rates of entrepreneurial activity. Little research has investigated gender differences in regards to market clockspeed. We believe market dynamics will similarly impact male and female venturing rates.

- *H8: At the national level, the prevalence of entrepreneurship is positively associated with internal market dynamics for men and women.*

2.9 Internal market burdens

Internal market burdens capture the ease of entry into a market. Findings on market burdens are inconclusive. Research finds market entry barriers are negatively associated with aggregate entrepreneurial activity across economies (Sobel et al. 2007). Other studies find entry barriers influence the distribution of business activity between the formal and the informal economy, rather than the total volume of activity at the national level (van Stel et al. 2007). A high rate of entrepreneurship in a given economy will likely yield a legitimizing positive effect on new market entry (Salimath and Cullen 2010). No clear evidence suggests differences between male and female entrepreneurs for market entry barriers. We believe there is a similar effect for male and female venturing rates at the national level.

- *H9: At the national level, the prevalence of entrepreneurship is positively associated with internal market burdens for men and women.*

2.10 Access to physical infrastructure

Physical infrastructure (transportation, land or operating space, communication services, etc.) is vital to entrepreneurship (Van de Ven 1993). Access to physical infrastructure facilitates entrepreneurship by expediting access to resources (office, equipment, transportation, telecommunications, and basic utilities) (Carter et al. 1996). While availability and access to physical infrastructure may be taken for granted in innovation-driven economies, in factor-driven economies, it can be a major obstacle to launching a new firm (Ghani et al. 2014). Audretsch et al. (2015) find that entrepreneurship is positively associated to certain kinds of infrastructure such as broadband, while other forms such as highways and railroads are not. We believe there is a similar effect for male and female entrepreneurship.

- *H10: At the national level, the prevalence of entrepreneurship is positively associated with access to physical infrastructure for men and women.*

2.11 Social and cultural norms

It is important to differentiate between measures of national culture or universal values (Hofstede 1980; Schwartz 1994; Inglehart 1997; House 1998) versus context-specific attitudes to or beliefs about entrepreneurship itself (Levie and Autio 2008). Specific national values, attitudes, and beliefs about entrepreneurship and its legitimacy can actually change rather quickly (Etzioni 1987), unlike enduring universal values (Inglehart 1997). Societal respect for entrepreneurship (as measured by attitudes towards those who have obtained personal wealth through entrepreneurial actions), as well as positive publicity and media on the topic, can impact an individual's perceptions of the social desirability of and willingness to engage in entrepreneurship (Reynolds 2011).

Researchers link rates of female entrepreneurship in different countries to normative support for entrepreneurship (Baughn et al. 2006). Women are less likely to engage in entrepreneurship in countries with hostile institutional environments (Estrin and Mickiewicz 2011). And women's entrepreneurial activities are more strongly affected by cultural forces than are those of men; studies show that women's entrepreneurial intentions and perceptions are more strongly affected by culture than are men's (Hechavarría et al. 2017; Santos et al. 2016). As such, a potential for prejudice may exist when the dominant societal perspective sees women as not having the prerequisite characteristics necessary to venture (Gupta et al. 2009). If women's businesses are more susceptible to the surrounding societies' values and expectations, norms regarding entrepreneurship may more strongly impact female prevalence rates.

- *H11a: At the national level, the prevalence of entrepreneurship is positively associated with the social and cultural norms supporting entrepreneurship for men and women.*
- *H11b: This effect is stronger for women than men.*

3 Method

We construct our sample from the following country level sources: World Bank Development Indicators, Global Entrepreneurship Monitor (GEM) Adult Population Survey (APS), and GEM National Expert Survey (NES) (see Reynolds et al. 2005). The NES employs a lengthy questionnaire with multiple items per EFCs. GEM's country teams selected national experts in each of the domains, with at least 36 respondents per country per year. Of the four experts in each domain, one was an active entrepreneur; the remaining experts were entrepreneurship academics, government policy-makers, and providers of public and private services to entrepreneurs (e.g., venture capitalists and business angels). Data from the NES is also aggregated to the country level.

Limitations in data collection periods, as well as missing data, restricted our sample. We consider the inclusion of a larger number of developing countries an important tradeoff, and still achieve a sample large enough for the empirical analysis. We compile all available country level data from the GEM protocol, which covers 95 countries and comprises 774 observations over the years 2001–2014. Our final sample consists of 403 cases and 75 countries after we exclude countries that participated in only 1 year of the protocol, or have missing data on the NES component of the GEM protocol on a given year (see Appendix 1).[1] Since our data is an unbalanced dynamic longitudinal panel, we control for possible endogeneity and unobserved heterogeneity by using a General Method of Moments (GMM) estimator (Arellano 2003), which analyzes autoregressive-distributed lagged models from unbalanced panels with many cross-sectional units observed for relatively few time periods.

3.1 Dependent variables

New business activity at the population level is measured based on the pooled data of over one million GEM interviews, from the GEM Total Early Stage Entrepreneurial Activity (TEA) index, and then activity is partitioned in prevalence rates for men and women, labeled as Male TEA and Female TEA. We measured entrepreneurship as based on the TEA index, indicating

[1] Not all countries completed both the GEM APS protocol and GEM NES protocol for the same year, which affects the total size of the sample over our 14 year period.

the percentage of the adult working-age population (18–64 years old) by sex in a country who are classified as either nascent or new entrepreneurs among the overall population for a given year.

3.2 Independent variables

We capture the entrepreneurial ecosystem using the following metrics: (1*) financial environment* (access to entrepreneurial finance); (2) *government policy and support* (government support and policies for entrepreneurship); (3) *government policy and taxes* (degree of government bureaucracy and taxation for entrepreneurship); (4) *government programs* (presence of government-based entrepreneurship programs); (5) *entrepreneurial education* (entrepreneurship education in primary and secondary schools, universities, and continuing management education); (6) *R&D transfer* (access and policies conducive to R&D transfer for new growth firms); (7) *commercial infrastructure access* (legal and commercial infrastructure access for new entrepreneurs); (8) *internal market dynamics* (market dynamics associated with change and openness); (9) *internal market burdens* (ease of entry regulations to start a business); (10) *physical infrastructure access and services* (access to utilities and communication for new firms); and (11) *cultural, social norms supportive* (whether normative values support venturing activity). These variables are standardized scales based on responses to multiple items in the NES as listed in the Appendix 2.

3.3 Control variables

Our control variables capture overall economic and social context. We use the WB database for each respective year to control for the country's GDP per capita (purchasing power parity), measured as current US dollars per capita (Acs et al. 2008; van Stel et al. 2007). We also control for the percent of GDP change from year to year, as Percent GDP Change (Reynolds 2011). We control for the percentage of males and females active in the labor force between ages 18–64, labeled *percentage of male labor force* participation and *percentage of female labor force* participation (Reynolds 2011). Finally, we control for the percentage of males and females unemployed in the labor force between ages 18–64, labeled *percentage of male unemployment* and *percentage of female unemployment* (Reynolds 2011).

3.4 Instrumental variables

The size of country's population is likely to impact the supply of individuals that can be active in the labor force, impacting its entrepreneurship rates. We therefore include the size of population, obtained from the WB database and labeled Population in our model. We also use Year dummies in our subsequent models as instruments.

4 Results

Tables 1 and 2 presents our descriptive and bivariate statistics. Collinearity diagnostics for the separate regression equations modeled are calculated using the variance inflation factor (VIF), an indicator of how much of the inflation of the standard error could be caused by collinearity. A VIF of 10 or greater is a cause for concern; within our sample the mean VIF for overall TEA is 3.12, 3.22 for Male TEA, and 3.19 for Female TEA.

Results from the GMM models are presented in Table 3. The program drops the year dummy instrumental variable for 2013 due to multicollinearity. Overall, *government policy and support* positively affects both Male TEA rates ($\beta = 2.733$; $p = .019$) and Female TEA rates ($\beta = 2.515$; $p = .042$). We see an enabling effect for both male and female venturing rates (see Fig. 2). Countries with strong government policy and support for entrepreneurship show a 3.5 times higher prevalence rate of male venturing and a nine times higher prevalence rate of female venturing than countries with weak government policy and support.

Government programs has a negative effect on Male TEA rates ($\beta = -7.209$; $p = .021$). As *government programs* become stronger, male entrepreneurship decreases, while female rates remain unchanged (see Fig. 3). In countries with strong government programs targeting venturing, the male prevalence rate is about 35 times less than in countries with weak government programs targeting entrepreneurship.

Commercial infrastructure access has a negative effect on Female TEA rates ($\beta = -3.413$; $p = .008$). Countries with strong commercial and legal infrastructure have female prevalence rates 12.3 times lower than countries with weak commercial and legal infrastructure (see Fig. 4).

Table 1 Descriptive and bivariate statistics

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Male TEA	13.12	7.89	1									
2. Female TEA	8.60	7.64	.916**	1								
3. GDP per capita PPP	22,863.38	18,727.53	− .447**	− .426**	1							
4. % GDP growth	3.76	4.24	.099*	.102**	− .174**	1						
5. % Male labor force	71.42	7.91	.487**	.482**	− .136**	.124**	1					
6. % Female labor force	50.63	13.26	.250**	.336**	.220**	.035	.209**	1				
7. % Labor force	61.89	9.40	.242**	.303**	.163**	.021	.286**	.544**	1			
8. % Unemployment	8.53	6.16	− .071	− .095*	− .264**	− .152**	− .382**	− .262**	− .225**	1		
9. % Male unemployment	7.96	5.36	− .115**	− .151**	− .247**	− .165**	− .404**	− .292**	− .296**	.872**	1	
10 % Female unemployment	10.12	7.35	− .019	− .074	− .376**	− .157**	− .323**	− .488**	− .357**	.750**	.773**	1
11. Population	69,998,260.51	203,340,024.58	.056	.072	− .024	.198**	.197**	.018	.114**	− .142**	− .134**	− .170**
12. Financial environment	2.59	0.46	− .342**	− .316**	.424**	.081	− .087*	.033	− .092*	− .241**	− .257**	− .294**
13. Government policy and support	2.58	0.47	− .223**	− .191**	.356**	.022	.029	.131**	.014	− .131**	− .148**	− .191**
14. Government policy and taxes	2.39	0.57	− .136**	− .157**	.492**	.021	.136**	.212**	.091*	− .238**	− .230**	− .312**
15. Government programs	2.61	0.46	− .309**	− .282**	.556**	− .023	− .017	.184**	.064	− .212**	− .223**	− .341**
16. Entrepreneurial education	2.31	0.39	− .132**	− .131**	.267**	.160**	.008	.091*	− .039	− .154**	− .138**	− .189**
17. R&D transfer	2.41	0.39	− .424**	− .430**	.625**	− .032	− .062	.066	− .048	− .224**	− .223**	− .333**
18. Commercial and legal infrastructure access	3.09	0.40	− .318**	− .340**	.464**	− .038	− .070	.067	− .051	− .137**	− .120**	− .212**
19. Internal market dynamics	2.94	0.51	.008	− .022	− .103*	.041	.022	.012	.095*	− .046	.016	− .029
20. Internal market burdens	2.62	0.35	− .160**	− .149**	.437**	.015	.050	.228**	.106*	− .275**	− .282**	− .374**
21. Physical infrastructure and services	3.74	0.49	− .291**	− .321**	.534**	− .083*	.032	.149**	.006	− .220**	− .223**	− .312**
22. Cultural, social norms supportive	2.82	0.48	.125**	.127**	.174**	.056	.257**	.199**	.166**	− .253**	− .247**	− .298**

* significant at p≤ .05

** significant at p≤ .01

Table 2 Descriptive and bivariate statistics (continued)

Variable	11	12	13	14	15	16	17	18	19	20	21	22
1. Male TEA												
2. Female TEA												
3. GDP per capita PPP												
4. % GDP growth												
5. % Male labor force												
6. % Female labor force												
7. % Labor force												
8. % Unemployment												
9. % Male unemployment												
10% Female unemployment												
11. Population	1											
12. Financial environment	.065	1										
13. Government policy and support	.040	.578**	1									
14. Government policy and taxes	− .025	.472**	.632**	1								
15. Government programs	− .044	.568**	.700**	.651**	1							
16. Entrepreneurial education	− .106*	.352**	.262**	.329**	.292**	1						
17. R&D transfer	.073	.664**	.586**	.594**	.769**	.356**	1					
18. Commercial and legal infrastructure access	− .094*	.587**	.300**	.449**	.449**	.454**	.596**	1				
19. Internal market dynamics	.248**	− .025	.001	− .033	− .138**	− .065	− .095*	− .223**	1			
20. Internal market burdens	.022	.610**	.456**	.570**	.544**	.365**	.621**	.649**	− .169**	1		
21. Physical infrastructure and services	− .017	.464**	.375**	.587**	.555**	.230**	.631**	.536**	− .111**	.521**	1	
22. Cultural, social norms supportive	.147**	.423**	.318**	.440**	.302**	.359**	.374**	.315**	.073	.464**	.260**	1

Internal market burdens capture the ease of market entry, which positively affects Female TEA rates (β = 4.377; p = .040). The rate of female venturing significantly increases, almost to the same level as male venturing rates, when entry barriers are low (see Fig. 5). Countries with markets that maintain low barriers to entry have a female prevalence rate of venturing almost 21 times higher than in countries that have markets with strong barriers to entry.

Cultural, social supportive norms (β = 2.312; p = .05) increase the rate of female venturing significantly (see Fig. 6). In countries with strong cultural and supportive environments encouraging entrepreneurship, female venturing is 8.4 times higher than in countries with weak environments.

4.1 Robustness checks

Drawing on Porter et al. (2002), we categorized countries according to competitiveness across stages of economic development: (1) factor-driven: extractive in nature, (2) efficiency-driven: exhibiting scale-intensity, and (3) innovation-driven: characterized by the production of new and unique goods and services using pioneering methods (Acs et al. 2008; Bosma 2013), to identify whether we can detect subtle variations in ecosystem effects. We create smaller assessment windows according economic prosperity to capture more homogeneous behavior of the data (Table 4).

In innovation-driven economies, *financial environment* apparently has a negative overall effect on Female TEA rates (β = − 0.857; p = .02) (see Table 5). Similarly, the presence of *government programs* apparently negatively affects the Female TEA rates (β = − 0.657; p = .027) as well. Moreover, *entrepreneurial education* has a significant positive impact on the prevalence of male venturing rates (β = 1.710; p = .034), and *commercial and legal infrastructure* also has a positive impact on Male TEA rates (β = .0997; p = .036).

Table 3 Regression models for male and female entrepreneurship rates

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA rate: main effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Entrepreneurship rate 1-year lag	0.737	0.095	0	0.585	0.144	0	0.885	0.12	0	0.698	0.158	0
GDP	0.00E + 00	0.00E + 00	0.321	0.00E + 00	0.00E + 00	0.571	0.00E + 00	0.00E + 00	0.072	0.00E + 00	0.00E + 00	0.199
GDP growth	− 0.023	0.075	0.755	− 0.011	0.058	0.847	− 0.056	0.063	0.379	− 0.036	0.055	0.515
Male unemployment rate	0.05	0.127	0.696	− 0.214	0.172	0.215						
Male labor force rate	0.212	0.125	0.094	0.202	0.154	0.193						
Female unemployment rate							− 0.042	0.087	0.635	− 0.193	0.091	0.038
Female labor force rate							0.073	0.07	0.301	0.082	0.058	0.165
Population	0.00E + 00	0.00E + 00	0.657	0.00E + 00	0.00E + 00	0.005	0.00E + 00	0.00E + 00	0.4	0.00E + 00	0.00E + 00	0.002
Financial environment				− 1.077	2.357	0.649				1.022	1.727	0.556
Government policy and support				2.733	1.61	0.019				2.515	1.217	0.042
Government policy and taxes				0.164	1.524	0.914				− 1.705	1.611	0.293
Government programs				− 7.209	3.062	0.021				− 2.7	2.57	0.297
Entrepreneurial education				1.015	1.564	0.518				− 0.388	1.374	0.778
R&D transfer				2.515	3.109	0.421				− 2.245	2.272	0.326
Commercial and legal infrastructure Access				− 1.471	1.727	0.397				− 3.413	1.258	0.008
Internal market dynamics				0.136	1.225	0.912				− 0.679	0.814	0.407
Internal market burdens				3.478	2.443	0.159				4.377	2.089	0.04
Physical infrastructure and services				− 0.576	1.752	0.743				0.106	1.184	0.929
Cultural, social norms supportive				1.805	1.666	0.282				2.312	1.365	0.05
Year 2001	–	–	–	–	–	–	–	–	–	–	–	–
Year 2002	− 4.486	2.342	0.004	− 4.486	2.342	0.059	− 1.265	0.702	0.076	− 2.231	1.765	0.21
Year 2003	− 3.067	1.241	0.148	− 3.067	1.241	0.016	− 0.511	0.784	0.517	− 1.236	1.037	0.237
Year 2004	− 3.75	1.462	0.244	− 3.75	1.462	0.012	− 0.008	0.731	0.991	− 1.511	1.288	0.245
Year 2005	− 3.425	1.56	0.356	− 3.425	1.56	0.031	− 0.345	0.72	0.634	− 1.936	1.282	0.135
Year 2006	− 4.078	1.527	0.195	− 4.078	1.527	0.009	− 0.251	0.755	0.741	− 1.891	1.243	0.133
Year 2007	− 4.036	1.69	0.392	− 4.036	1.69	0.02	0.322	1.087	0.768	− 1.093	1.432	0.448
Year 2008	− 2.193	1.652	0.986	− 2.193	1.652	0.189	0.084	0.712	0.906	− 0.005	1.639	0.998
Year 2009	− 2.287	1.065	0.07	− 2.287	1.065	0.035	− 0.893	0.669	0.186	− 1.051	0.96	0.277
Year 2010	− 2.519	1.015	0.028	− 2.519	1.015	0.015	− 0.098	0.629	0.877	0.019	0.932	0.984
Year 2011	0.352	0.841	0.146	0.352	0.841	0.677	1.097	0.64	0.091	0.719	0.614	0.245
Year 2012	− 1.58	0.934	0.194	− 1.58	0.934	0.095	− 0.489	0.687	0.479	− 0.782	0.634	0.222

Table 3 (continued)

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA rate: main effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Year 2013	–	–	–	–	–	–	–	–	–	–	–	–
Year 2014	−0.272	0.929	0.77	−0.39	0.896	0.665	0.863	0.747	0.252	0.583	0.75	0.44
Intercept	−10.743	9.019	0.237	−7.632	15.317	0.62	−0.79	2.879	0.785	4.605	6.613	0.488
N	476			403			476			403		
Countries	79			75			79			75		
Wald χ^{2c}	521(18)		0.000	266(29)		0	284(18)		0	384(29)		0.000
Hansen	45.3		0.998	76.62		0.525	51.590		0.085	36.05		1.000
z_1	−3.33		0.001	−2.92		0.003	−2.6		0.009	−2.49		0.013
z_2	1.06		0.291	0.074		0.457	−0.96		0.336	−1.3		0.194
R^2	0.677			0.777			0.791			0.837		
R^2 Δ				0.1						0.046		

z^1 and z^2 are *z* values for Arellano-Bond tests of AR(1) and AR(2) in first differences, respectively

Among efficiency-driven economies, *commercial and legal infrastructure* negatively impacts both Male TEA rates ($\beta = -4.975$; $p = .020$) and Female TEA rates ($\beta = 5.16$; $p = .024$) (see Table 6). Similarly, *internal market dynamics*, which captures industry change, negatively impacts Female TEA ($\beta = -2.415$; $p = .004$). Finally, *physical infrastructure and services* positively impacts both Male TEA ($\beta = 3.474$; $p = .004$) and Female TEA ($\beta = 2.71$; $p = .008$) rates.

Among factor-driven economies, the *financial environment* negatively impacts Male TEA rates ($\beta = -6.990$; $p = .011$) and Female TEA ($\beta = -8.420$; $p = .009$) rates (see Table 7). Furthermore, *cultural, social norms supportive* of entrepreneurship positively impact Male TEA ($\beta = 13.433$; $p = .002$) and Female TEA ($\beta = 8.112$; $p = .036$) rates.[2] Table 4 summarizes findings from our analysis in relation to the hypotheses postulated for the overall sample and sub-samples.

5 Discussion

Our study investigates the effects of national entrepreneurial ecosystems on prevalence rates of male and female venturing. Surprisingly, the majority of results indicate that several ecosystem aspects have no significant impact on rates of male or female entrepreneurial engagement. This is surprising given that prior research argues the importance of ecosystems in increasing entrepreneurial activity. Findings suggest that supportive financial policies, government programs, and educational support have no impact on female and male entrepreneurial prevalence rates. Strikingly, with the predominate gender gap in entrepreneurship favoring men, we discover that there were more ecosystem aspects supporting women than men in our overall sample. This appears to challenge arguments from feminist economics, which contends patriarchy associated with social systems, and processes across entrepreneurial ecosystems can impose difficulties on female venturing activity. This is interesting given that most research has consistently

[2] Due to low case counts, year dummies are excluded in the disaggregated analysis of factor-driven economies, by doing so we ensure we have sufficient degrees of freedom to extrapolate findings form out sub-sample to other factor-driven economies. However, it should be noted that certain S.E. in all the sub-samples are higher than overall sample. This is a function of having fewer cases, and why some relationships are now, no longer significant. This also suggest that the sub-samples maybe misspecified. There are likely unique control variables appropriate for each sub-sample that we are not including. Findings should be interpreted with caution.

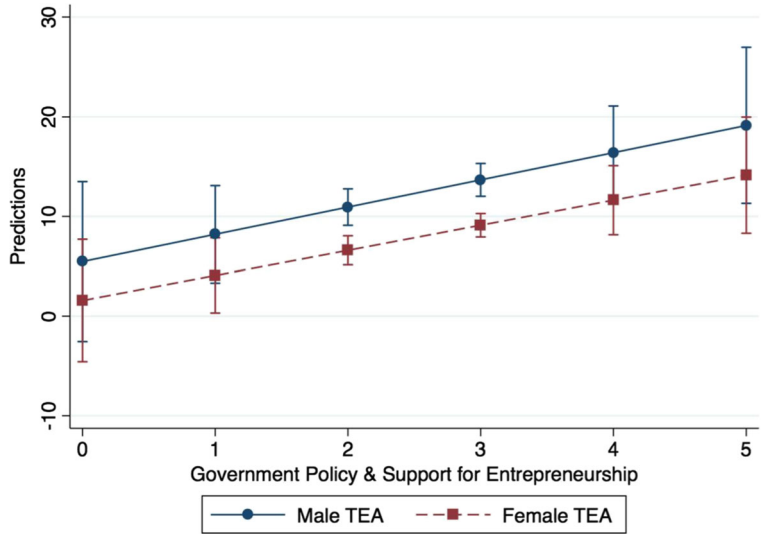

Fig. 2 Predicted rates male and female entrepreneurship by government policy and support

demonstrated a gender gap exists in entrepreneurship (Arenius and Minniti 2005; Reynolds 2011).

Results demonstrate countries with the highest levels of participation for women feature low barriers to entry, supportive government policy towards entrepreneurship, minimal commercial and legal infrastructure, and a normative culture that supports entrepreneurship. Findings also show that low barriers to entry and cultural norms are the most important factors to increase venture creation among women globally. For men, supportive government policy and weak government programs towards business creation are the most important factors to increase levels of participation. Other significant findings are counterintuitive, such as nations that have a limited commercial and legal structure actually encourage engagement for women. This particular finding, arguably, seems to reinforce feminist economic arguments claiming patriarchy in institutional systems favors male venturing activity. The legal treatment of women can restrict the supply of female entrepreneurs (Klapper and Parker 2011). For instance, a Middle Eastern woman may perceive getting her husband's or father's permission to get a passport or co-sign a loan as a serious business obstacle (Chamlou et al. 2008). Therefore, women in patriarchal societies with formalized legal and commercial infrastructure might be less inclined to engage in venturing because they perceive unfair legal treatment and gender discrimination.

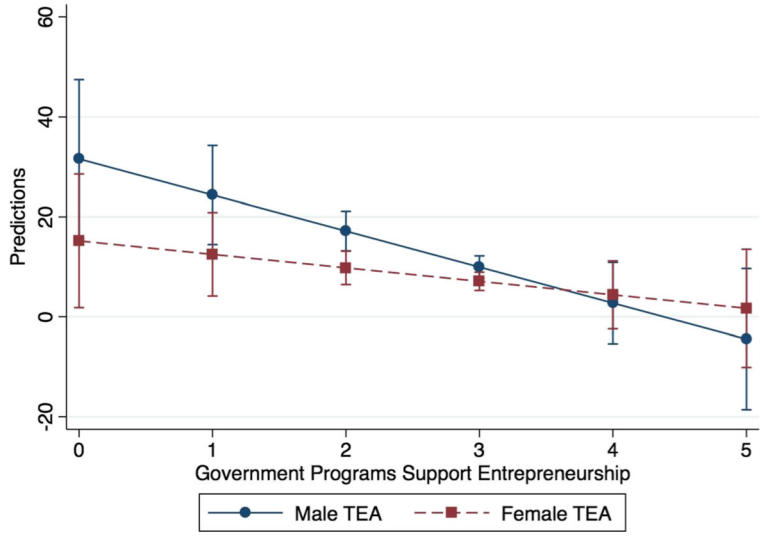

Fig. 3 Predicted rates male and female entrepreneurship by government programs

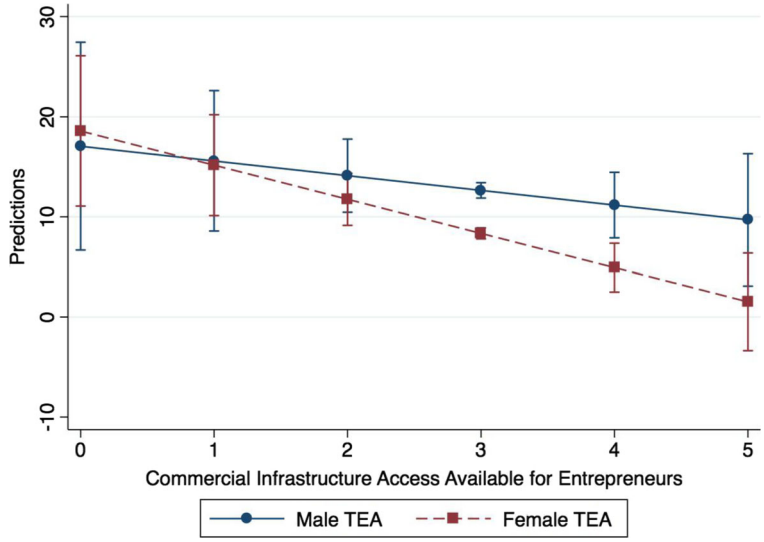

Fig. 4 Predicted rates male and female entrepreneurship by commercial infrastructure access

However, the veracity of our findings might vary upon a country's stage of economic prosperity. As mentioned, in both the overall and sub-samples examining the ecosystem by economic stages, we find that one of the most substantial factors driving venture creation are societal norms for both males and females, but the relative effect varied. In the overall sample, the impact was statistically significant only for women, but in the factor-driven subset, men were more strongly influenced than women. Thus, social norms play a complicated role in overall venturing rates of both men and women. It may be the case that in factor-driven economies, social norms associated with hegemonic masculinity and patriarchy are more prevalent than in other stages of economic development, and yield this effect (Hechavarria and Ingram 2016). As a result, our evidence both reinforces and contradicts the breadth of research finding that women's entrepreneurial activities are indeed more affected by cultural forces than men's (Estrin and Mickiewicz 2011).

Second, a vast body of literature highlights the importance of access to finance in entrepreneurship; instead, we find no evidence that the financial environment influences either male or female venturing rates. There are likely many factors impacting this non-significant finding, and in some cases negative, relationship. It could be that subjective supply-side measures might not adequately capture the effectiveness of an

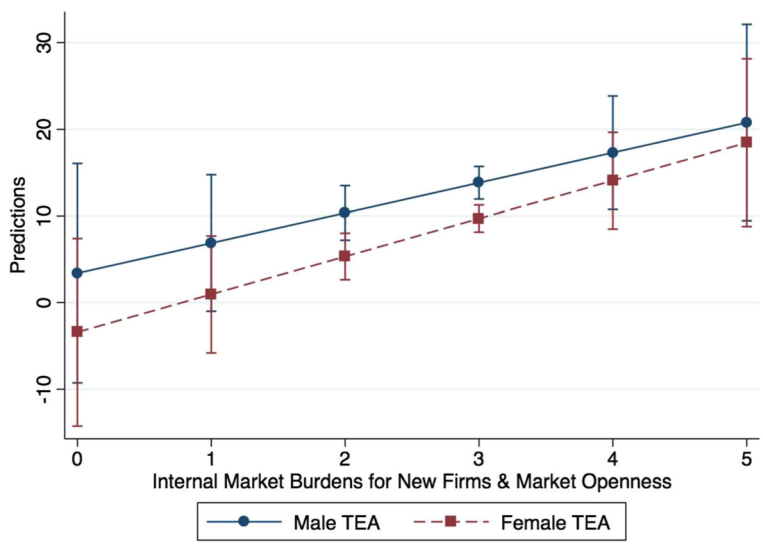

Fig. 5 Predicted rates male and female entrepreneurship by internal market burdens

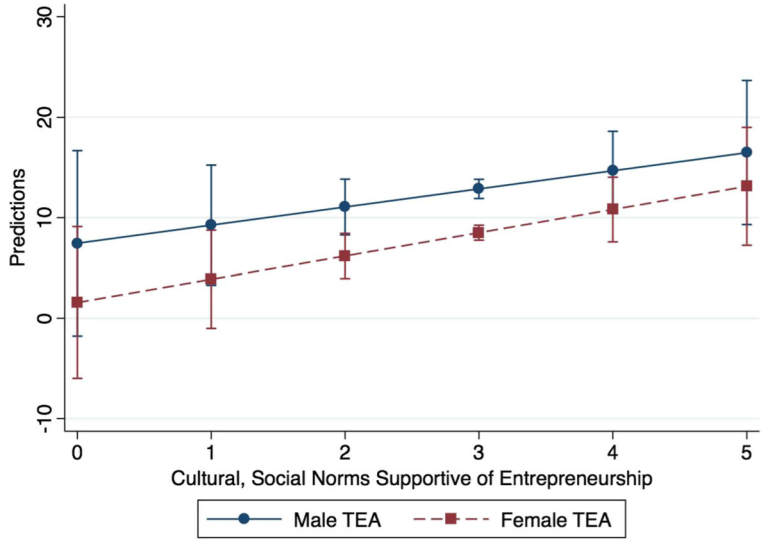

Fig. 6 Predicted rates male and female entrepreneurship by cultural, social norms supportive

ecosystem when compared to more objective measures, such as the actual amount of monies received by entrepreneurs at the national level. Shockingly, we also find that perceived ease of access to financing actually hinders the prevalence of female activity in the innovation-driven economies. This likely occurs because of the supply side financial discrimination experienced by female entrepreneurs (Carter et al. 2003). Findings also show this effect on both men and women in factor-driven economies. This maybe due to information asymmetries, moral hazard risks, and adverse selection costs, which can reduce financiers' incentives to lend in uncertain environments. Research affirms that perception of risk reduces lending to low-income entrepreneurs in factor-driven economies (Jones et al. 2003).

We also find that government programs significantly decrease male venturing rates in our full sample, and among innovation-driven economies, significantly decreases female venturing rates. Thus, questions arise about why government programs, touted to support start-ups, are not actually achieving their aim? It is possible there are inefficiencies in implementation of short-term government programs (Minniti 2008). Also because support programs targeted at underrepresented groups, like females, are less effective than programs that support diverse context-driven objectives delivered at multiple levels (national, regional, and local) (Walker and Joyner 1999). Yet, important questions arise surrounding why government programs are negatively impacting male venturing. One reason might be that male start-ups are stymied by bureaucracy associated with governmental support programs, whereby better alternatives now exist via institutional investors and accelerators that can offer more levels and speedier assistance than governments. Research consistently finds that men dominate entrepreneurial activity; yet many of the current government programs are aimed towards women. But, in innovation-driven economies, women are negatively impacted by this factor. It is imperative that future questions challenge the efficacy of government programs to uncover what is driving these dynamics, and take corrective actions aimed at delivering initiatives that support *any person* who wishes to engage in startup activity.

Arguably, the entrepreneurial ecosystem approach helps us understand how formal and informal institutions can impact prevalence rates of entrepreneurial activity. Our work suggests that globally, women benefit more from many of the ecosystem factors than men. Yet, depending upon the phase of economic development, men might actually benefit more. This leads us to possible implications for policy that can be a key in narrowing the global gender gap in entrepreneurship. We think that policy should focus on informal institutions such as culture and norms to support both men and women, and formal intuitions that reduce entry barriers. Norms take the longest to change, but can have the most valuable long-term effect on promoting gender-balanced entrepreneurship (Reynolds 2012). Conversely, reducing entry barriers can be quicker to implement, but might not have such an enduring effect.

Table 4 Summary of findings

Hypothesis	Overall sample		Innovation-driven		Efficiency-driven		Factor-Driven	
	Male TEA	Female TEA	Male TEA	Female TEA	Male TEA	Female TEA	Male TEA	Female TEA
H1a: At the national level, the prevalence of entrepreneurship is positively associated with the financial environment supporting entrepreneurship for men and women.	No support	No support	No support	Contrary support	No support	No support	Contrary Support	Contrary Support
H1b: This effect is stronger for women than men.	No support	No support	Contrary support	Contrary support	No support	No support	Contrary Support	Contrary Support
H2: At the national level, the prevalence of entrepreneurship is positively associated with the government policy supporting entrepreneurship for men and women.	Yes support	Yes support	No support	No support	No support	No support	No Support	No Support
H3: At the national level, the prevalence of entrepreneurship is negatively associated with the government regulation and taxes for men and women.	No support	No support	No support	No support	No support	No support	No support	No support
H4: At the national level, the prevalence of entrepreneurship is positively associated with the government programs supporting entrepreneurship for men and women.	No support	No support	Contrary support	Contrary support	No support	No support	No support	No support
H5a: At the national level, the prevalence of entrepreneurship is positively associated with the educational programs supporting entrepreneurship for men and women.	No support	No support	Yes support	No support	No support	No support	No Support	No Support
H5b: This effect is stronger for women than men.	No support	No support	Contrary support	No support	No support	No support	No Support	No Support
H6a: At the national level, the prevalence of entrepreneurship is positively associated with the ease of R&D transfer for men and women.	No support	No support	No support	No support	No support	No support	No support	No support
H6b: This effect is stronger for men than women.	No support	No support	No support	No support	No support	No support	No support	No support
H7: At the national level, the prevalence of entrepreneurship is positively associated with the commercial and legal infrastructure for entrepreneurship for men and women.	No support	Contrary support	Yes support	No support	Contrary support	Contrary support	No support	No support
H8: At the national level, the prevalence of entrepreneurship is positively associated with internal market dynamics for men and women.	No support	No support	No support	No support	No support	Contrary support	No Support	No Support
H9: At the national level, the prevalence of entrepreneurship is positively associated	No support	Yes support	No support	No support	No support	No support	No support	No support

Table 4 (continued)

Hypothesis	Overall sample		Innovation-driven		Efficiency-driven		Factor-Driven	
	Male TEA	Female TEA	Male TEA	Female TEA	Male TEA	Female TEA	Male TEA	Female TEA
with internal market burdens for men and women.								
H10: At the national level, the prevalence of entrepreneurship is positively associated with access to physical infrastructure for men and women.	No support	No support	No support	No support	Yes support	Yes support	No support	No support
H11a: At the national level, the prevalence of entrepreneurship is positively associated with the social and cultural norms supporting entrepreneurship for men and women.	No support	Yes support	No support	No support	No support	No support	Yes support	Yes support
H11b: This effect is stronger for women than men.	Yes support	Yes support	No support	No support	No support	No support	Contrary support	Contrary support

6 Limitations and recommendations for further research

Our analysis on entrepreneurial ecosystems is only at the national level because data on ecosystem factors was not available sub-regionally for most of our sample. Correspondingly, we are unable to investigate variation at the sub-national scale. Future research should aim at further standardizing ecosystem self-reported metrics to assess and compare regional ecosystems within larger economies. It would be useful to identify if sub-regional entrepreneurial ecosystem studies could replicate our findings among countries in the GEM program that collect data at this level (e.g. Spain, Chile, Germany), and further probe issues related to response bias, as well as further specifying sub-samples to identify unique issues related to factor-driven, efficiency-driven, and innovation-driven economies.

We also recognize the problem of ecological fallacy (Robinson 1950), wherein researchers interpret and deduce inferences about individuals based on the group data (Terjesen et al. 2016). Although we assume that the ecosystem guides individuals' decisions about participating, we can only claim that the ecosystem facilitates and/or constrains venturing rates and not individual behavior. We also acknowledge that neither males nor females necessarily behave as homogenous groups. Any entrepreneur's motivations and career satisfiers may vary according to life stage and family situation (DeMartino and Barbato 2003; Eddleston and Powell 2008). A richer gender theory of venturing needs to scrutinize the ecosystem factors and multiplicity of context (Welter 2011) on venturing rates and individual behavior. Future studies would benefit by embracing an intersectional perspective, and study how multiple factors like ethnicity and religion influence the gendering of new venture activity.

In response to our findings, we further outline areas for future research:

1. Government policy: how, and if, policies targeted towards business creation vary across entrepreneurial ecosystems, and which policies seem most useful
2. Government programs: how particular kinds of programs affect business creation
3. Regulations and taxes: identifying more objective measures of regulations and taxes targeted towards business creation across entrepreneurial ecosystems

Table 5 Innovation-driven economies sub-sample regression models

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA Rate: Main Effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Entrepreneurship rate 1-year lag	0.958	0.051	0	1.846	0.537	0.001	0.829	0.038	0	3.078	1.19	0.01
GDP	0	0	0.025	0	0	0.184	0	0	0.072	0	0	0.224
GDP growth	0.01	0.047	0.827	0.105	0.251	0.674	− 0.023	0.032	0.379	0.187	0.449	0.677
Male unemployment rate	− 0.021	0.039	0.586	− 0.522	0.328	0.112						
Male labor force rate	0.1	0.029	0.001	0.052	0.277	0.851						
Female unemployment rate							0.007	0.025	0.79	− 1.514	0.764	0.048
Female labor force rate							0.027	0.015	0.076	− 1.106	0.544	0.042
Population	− 1.31E-09	1.97E-09	0.506	3.31E-09	1.98E-08	0.867	1.58E-09	1.35E-09	0.24	− 1.64E-07	6.69E-08	0.02
Financial environment				0.624	4.171	0.106				− 0.857	0.656	0.02
Government policy and support				1.101	3.811	0.709				0.53	0.948	0.202
Government policy and taxes				− 2.073	3.174	0.941				1.335	0.572	0.581
Government programs				0.480	3.829	0.968				− 0.657	0.835	0.027
Entrepreneurial education				1.471	5.16	0.034				0.505	0.766	0.438
R&D transfer				− 2.880	5.587	0.714				1.318	0.953	0.515
Commercial and legal infrastructure Access				0.997	6.014	0.036				− 1.025	1.036	0.178
Internal market dynamics				0.828	3.119	0.486				− 0.081	0.408	0.331
Internal Market Burdens				− 0.960	4.589	0.833				− 1.468	0.766	0.844
Physical infrastructure and services				2.897	3.177	0.403				− 0.267	0.736	0.066
Cultural, social norms supportive				− 2.219	3.662	0.746				− 0.102	0.557	0.72
Year 2001	− 0.594	0.71	0.403	− 9.28	7.376	0.819	− 1.323	0.514	0.015	− 1.587	24.838	0.856
Year 2002	0.427	0.707	0.546	− 4.132	2.634	0.095	− 1.08	0.384	0.009	− 13.042	7.595	0.086
Year 2003	0.631	0.664	0.342	− 4.501	2.699	0.034	− 0.573	0.41	0.173	− 17.776	9.399	0.059
Year 2004	1.232	0.684	0.072	− 2.955	2.367	0.004	− 0.416	0.436	0.348	− 34.157	14.028	0.015
Year 2005	−3.425	2.165	0.114	− 3.425	2.165	0.114	− 0.67	0.432	0.131	− 1.936	1.282	0.123
Year 2006	−2.673	1.53	0.081	− 2.673	1.53	0.081	− 0.331	0.572	0.568	− 1.891	1.243	0.231
Year 2007	0.619	0.71	0.384	− 1.211	2.441	0.62	0.045	0.288	0.876	− 1.093	1.432	0.448
Year 2008	1.507	0.735	0.04	1.239	2.158	0.566	0.088	0.309	0.777	− 0.005	1.639	0.009
Year 2009	0.268	0.867	0.757	− 0.667	0.894	0.456	− 0.203	0.153	0.194	− 1.051	0.96	0.1

Table 5 (continued)

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA Rate: Main Effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Year 2010	0.013	0.732	0.986	1.921	1.098	0.08	1.519	0.344	0	0.019	0.932	0.103
Year 2011	2.636	0.736	0	2.498	1.768	0.158	0.964	0.301	0.003	0.719	0.614	0.068
Year 2012	1.09	0.76	0.152	2.824	1.671	0.091	1.537	0.339	0	− 0.782	0.634	0.051
Year 2013	1.38	0.736	0.061	–	–	–	–	~	~	–	–	–
Year 2014	0.848	0.748	0.257	2.959	1.718	0.085	1.443	0.403	0.252	0.583	0.75	0.333
Intercept	− 4.12	2.046	0.061	− 1.8	0.046	0.094	− 0.644	0.931	0.073	− 0.81	2.816	0.774
N	268			210			268			210		
Countries	31			31			31			31		
Wald X^{2c}	639(20)		0	593(29)		0	688(20)		0	617(29)		0
Hansen	45.3		0.98	172.82		0.636	10.94		0.98	36.05		1
z_1	− 0.979		0.001	− 0.92		0.357	− 3.81		0	− 0.85		0.396
z_2	0.63		0.526	− 0.44		0.05	0.05		0.962	− 0.34		0.735
R^2	0.735			0.767			0.761			0.774		
R^2 Δ				0.033						0.014		

z^1 and z^2 are z values for Arellano-Bond tests of AR(1) and AR(2) in first differences, respectively

Table 6 Efficiency-driven economies sub-sample regression models

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA rate: main effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Entrepreneurship rate 1-year lag	0.704	0.056	0.000	0.614	0.066	0.000	0.123	0.089	0.000	0.670	0.064	0.000
GDP	0.000	0.000	0.025	0.000	0.000	0.356	0.000	0.000	0.072	0.000	0.000	0.048
GDP growth	− 0.113	0.100	0.827	0.052	0.093	0.575	− 0.070	0.046	0.379	− 0.285	0.110	0.009
Male unemployment rate	− 0.029	0.077	0.586	− 0.042	0.085	0.620						
Male labor force rate	0.140	0.055	0.001	0.087	0.060	0.148						
Female Unemployment rate							− 0.113	0.116	0.790	− 0.059	0.048	0.216
Female labor force rate							0.290	0.087	0.076	0.049	0.041	0.227
Population	− 2.11E-07	1.01E-07	0.000	0.000	0.000	0.573	2.61E-08	6.50E-08	0.240	1.83E-09	2.16E-09	0.396
Financial environment				− 1.553	1.559	0.319				1.740	1.302	0.181
Government policy and support				1.343	1.365	0.325				− 0.691	1.076	0.520
Government policy and taxes				− 2.221	1.398	0.112				− 0.431	1.108	0.697
Government programs				− 1.105	1.921	0.565				− 0.570	1.514	0.707
Entrepreneurial education				0.120	1.387	0.931				0.424	1.101	0.700
R&D transfer				1.129	2.344	0.630				− 0.966	1.916	0.614
Commercial and legal infrastructure access				− 4.975	2.133	0.020				− 4.015	1.777	0.024
Internal market dynamics				− 1.305	0.944	0.167				− 2.415	0.850	0.004
Internal market burdens				0.842	1.916	0.660				− 1.198	1.515	0.429
Physical infrastructure and services				3.474	1.207	0.004				2.710	1.015	0.008
Cultural, social norms supportive				0.224	1.408	0.874				1.897	1.155	0.100
Year 2001	− 4.981	1.514	0.403	− 2.923	4.383	0.505	− 1.506	1.055	0.015	3.429	− 0.140	0.887
Year 2002	− 4.154	3.772	0.546	− 0.916	2.055	0.656	− 1.582	1.362	0.009	1.469	1.070	0.286
Year 2003	− 5.796	1.287	0.342	− 1.004	2.380	0.673	− 2.542	0.709	0.173	− 17.776	9.399	0.059
Year 2004	− 7.835	1.993	0.072	− 3.584	2.074	0.084	−3.474	0.765	0.348	−34.157	14.028	0.015
Year 2005	− 6.273	1.955	0.114	− 0.546	1.943	0.779	− 2.813	1.201	0.131	− 1.936	1.282	0.123
Year 2006	− 3.878	1.229	0.081	− 0.759	1.947	0.697	− 0.749	0.946	0.568	1.223	1.441	0.396
Year 2007	− 3.835	1.532	0.384	− 0.373	1.427	0.794	− 0.418	0.926	0.876	1.050	1.306	0.421
Year 2008	− 3.986	1.359	0.040	2.895	1.770	0.102	− 1.432	0.890	0.777	5.038	1.899	0.008
Year 2009	− 3.316	1.108	0.757	− 0.133	1.603	0.934	− 0.319	0.820	0.194	− 1.051	0.960	0.954

Table 6 (continued)

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA rate: main effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Year 2010	− 0.515	1.140	0.986	3.575	1.582	0.024	− 0.152	0.778	0.000	− 0.055	0.942	0.006
Year 2011	− 1.494	0.988	0.000	1.510	1.583	0.340	− 1.394	0.491	0.003	2.641	0.959	0.063
Year 2012	0.856	0.799	0.152	2.824	1.671	0.091	0.138	0.031	0.000	1.762	0.948	0.051
Year 2013	–	–	–	–	–	–	–	–	–	–	–	–
Year 2014	0.848	0.748	0.257	2.959	1.718	0.085	0.445	0.823	0.252	0.583	0.750	0.333
Intercept	6.446	1.809	0.972	7.715	8.455	0.910	1.424	2.396	0.552	10.550	6.292	0.094
N	170			152			170			152		
Countries	28			28			28			28		
Wald X^{2c}	383 (20)		0.000	400(29)		0.000	548(20)		0.000	568(29)		0.000
Hansen	89.150		0.780	52.790		0.069	51.590		0.085	65.660		0.931
z_1	− 1.380		0.169	− 0.920		0.354	− 2.280		0.023	− 2.450		0.014
z_2	0.310		0.757	− 0.930		0.839	− 0.260		0.791	− 0.170		0.862
R^2	0.731			0.767			0.801			0.848		
R^2 Δ				0.036						0.047		

z^1 and z^2 are *z* values for Arellano-Bond tests of AR(1) and AR(2) in first differences, respectively

Table 7 Factor-driven economies sub-sample regression models

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA rate: main effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Entrepreneurship rate 1-year lag	−0.640	0.279	0.041	0.436	0.125	0.000	0.786	0.121	0.000	0.735	0.114	0.000
GDP	0.000	0.001	0.961	0.000	0.000	0.813	0.000	0.000	0.766	0.000	0.000	0.932
GDP growth	−0.113	0.283	0.696	−0.253	0.186	0.174	−0.023	0.210	0.913	−0.104	0.206	0.613
Male unemployment rate	2.878	1.932	0.162	0.000	0.197	1.000						
Male labor force rate	1.362	3.199	0.678	0.273	0.206	0.186						
Female Unemployment rate							0.028	0.150	0.855	−0.114	0.195	0.557
Female labor force rate							0.058	0.063	0.356	−0.012	0.073	0.871
Population	2.66E-07	1.54E-07	0.109	−5.06E-09	3.24E-09	0.118	−3.11E-10	3.30E-09	0.925	−1.36E-09	3.44E-09	0.694
Financial environment				−6.990	2.758	0.011				−8.420	3.204	0.009
Government policy and support				−0.285	3.157	0.928				3.515	3.574	0.325
Government policy and taxes				−2.775	3.160	0.380				0.258	3.234	0.936
Government programs				−4.744	3.737	0.204				−1.363	4.079	0.738
Entrepreneurial education				−4.229	3.437	0.219				1.730	3.224	0.591
R&D transfer				1.153	4.164	0.782				−1.230	5.095	0.809
Commercial and legal infrastructure access				0.298	1.877	0.874				−1.453	1.901	0.445
Internal market dynamics				1.513	0.985	0.124				0.289	1.181	0.807
Internal market burdens				2.244	3.570	0.530				−0.302	4.053	0.941
Physical infrastructure and services				−2.185	1.894	0.249				1.123	2.008	0.576
Cultural, social norms supportive				13.433	4.377	0.002				8.112	3.866	0.036
Year 2001	–	–	–	–	–	–	–	–	–	–	–	–
Year 2002	–	–	–	–	–	–	–	–	–	–	–	–
Year 2003	–	–	–	–	–	–	–	–	–	–	–	–
Year 2004	–	–	–	–	–	–	–	–	–	–	–	–
Year 2005	–	–	–	–	–	–	–	–	–	–	–	–
Year 2006	–	–	–	–	–	–	–	–	–	–	–	–
Year 2007	–	–	–	–	–	–	–	–	–	–	–	–
Year 2008	–	–	–	–	–	–	–	–	–	–	–	–
Year 2009	–	–	–	–	–	–	–	–	–	–	–	–
Year 2010	–	–	–	–	–	–	–	–	–	–	–	–
Year 2011	–	–	–	–	–	–	–	–	–	–	–	–
Year 2012	–	–	–	–	–	–	–	–	–	–	–	–

Table 7 (continued)

	Male TEA rate: control			Male TEA rate: main effects			Female TEA rate: control			Female TEA rate: main effects		
	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value	Coefficient	S.E.	*p* value
Year 2013	–	–	–	–	–	–	–	–	–	–	–	–
Year 2014	–	–	–	–	–	–	–	–	–	–	–	–
Intercept	−0.056	15.964	0.997	−9.843	22.502	0.662	1.173	4.573	1.173	4.573	14.982	0.817
N	38			38			38			38		
Countries	15			15			15			15		
Wald χ^{2c}	36(6)		0.000	134(17)		0.000	61(6)		0.000	283(17)		0.000
Hansen	20.040		0.170	29.430		0.000	38.890		0.384	34.060		0.931
z_1	−0.300		0.060	−0.300		0.764	0.100		0.921	0.230		0.818
z_2	−0.180		0.169	−0.180		0.860	0.020		0.986	−0.130		0.897
R^2	0.654			0.871			0.778			0.898		
R^2 Δ				0.217						0.121		

z^1 and z^2 are *z* values for Arellano-Bond tests of AR(1) and AR(2) in first differences, respectively

4. Non-governmental support: how new ventures perform after turning to accelerators or investors compared to those that turned to government programs for help launching their ventures
5. Research and development transfer: finding ways to more objectively measure R&D transfer to examine its impact across entrepreneurial ecosystems
6. Infrastructure and cultural constraints: why women are detoured by formalized commercial and legal support (using qualitative casework)
7. Infrastructure in efficiency-driven economies: why kinds of physical infrastructure differently affect male and female venturing
8. Markets: whether clockspeed markets may have some advantages for men and women pursuing innovative high-growth ventures at different stages of economic development
9. Internal market burdens: why ease of access to markets or low entry barriers impact female entrepreneurs and not male entrepreneurs, and what the effects are of difficulty for women to obtaining financing

7 Conclusion

Little research has investigated the intersection of the entrepreneurial ecosystem and gender. This study responds to this issue by exploring how different facets of the ecosystem influence entrepreneurial activity for men and women globally. In doing so, this study highlights which ecosystem factors enhance or stymie entrepreneurial activity. We found that both men and women are positively impacted by government policy and support, yet women, not men, are positively impacted by ease of entry into a market (internal market burdens) and cultural and social supportive norms. We also find that that supporting government programs actually inhibit male venturing activity and that the commercial and legal infrastructure stymies female venturing activity. Overall, this study empirically extends the discussion about the importance of the entrepreneurial ecosystem in fostering entrepreneurial activity, while calling attention to the differential impact of informal and formal environmental conditions on national level entrepreneurial activity among men and women.

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Appendix 1. Countries and number of years used in the analysis

Country	Number of years
Algeria	2
Angola	2
Argentina	11
Austria	5
Barbados	3
Belgium	9
Bosnia and Herzegovina	6
Botswana	1
Brazil	12
Canada	4
Chile	10
China	6
Colombia	7
Croatia	12
Denmark	8
Dominican Republic	1
Ecuador	5
Estonia	2
Finland	12
France	6
Gahanna	1
Germany	10
Greece	11
Guatemala	3
Hong Kong	1
Hungary	8
Iceland	7
India	2
Iran	5
Ireland	10
Israel	2
Italy	8
Jamaica	4
Japan	4
Latvia	7
Lithuania	3
Macedonia	1
Malawi	1
Malaysia	5
Mexico	5
Namibia	1
Netherlands	9
New Zealand	3
Nigeria	2
Norway	12
Pakistan	2
Panama	3
Peru	8
Philippines	1
Poland	3
Portugal	4
Romania	3
Russia	8
Saudi Arabia	1
Serbia	2
Singapore	7
Slovakia	3
Slovenia	12
South Africa	12
South Korea	5
Spain	12
Sweden	5
Switzerland	8
Taiwan	4
Thailand	4
Trinidad and Tobago	4
Tunisia	1
Turkey	6
Uganda	4
United Arab Emirates	1
United Kingdom	10
United States	12
Uruguay	7
West Bank Gaza Strip	1
Zambia	1

Appendix 2. List of items used to measure entrepreneurial ecosystems

Dimension	Variable	Description
Financial environment	A01	In my country, there is sufficient equity funding available for new and growing firms
Financial environment	A02	In my country, there is sufficient debt funding available for new and growing firms
Financial environment	A03	In my country, there are sufficient government subsidies available for new and growing firms
Financial environment	A04	In my country, there is sufficient funding available from private individuals (other than founders) for new and growing firms
Financial environment	A05	In my country, there is sufficient venture capitalist funding available for new and growing firms
Financial environment	A06	In my country, there is sufficient funding available through initial public offerings (IPOs) for new and growing firms
Government policy and support	B01	In my country, government policies (e.g., public procurement) consistently favor new firms
Government policy and support	B02	In my country, the support for new and growing firms is a high priority for policy at the national government level
Government policy and support	B03	In my country, the support for new and growing firms is a high priority for policy at the local government level
Government policy and taxes	B04	In my country, new firms can get most of the required permits and licenses in about a week
Government policy and taxes	B05	In my country, new firms can get most of the required permits and licenses in about a week
Government policy and taxes	B06	In my country, taxes and other government regulations are applied to new and growing firms in a predictable and consistent way
Government policy and taxes	B07	In my country, coping with government bureaucracy, regulations and licensing requirements is not unduly difficult for new and growing firms
Government programs	C01	In my country, a wide range of government assistance for new and growing firms can be obtained through contact with a single agency
Government programs	C02	In my country, science parks and business incubators provide effective support for new and growing firms
Government programs	C03	In my country, there are an adequate number of government programs for new and growing businesses
Government programs	C04	In my country, the people working for government agencies are competent and effective in supporting new and growing firms
Government programs	C05	In my country, almost anyone who needs help from a government program for a new or growing business can find what they need
Government programs	C06	In my country, government programs aimed at supporting new and growing firms are effective

Entrepreneurial education	D01	In my country, teaching in primary and secondary education encourages creativity, self-sufficiency and personal initiative
Entrepreneurial education	D02	In my country, teaching in primary and secondary education provides adequate instruction in market economic principles
Entrepreneurial education	D03	In my country, teaching in primary and secondary education provides adequate attention to entrepreneurship and new firm creation
Entrepreneurial education	D04	In my country, colleges and universities provide good and adequate preparation for starting up and growing new firms
Entrepreneurial education	D05	In my country, the level of business and management education provides good and adequate preparation for starting up and growing new firms
Entrepreneurial education	D06	In my country, the vocational, professional and continuing education systems provide good and adequate preparation for starting up and growing new firms
R&D transfer	E01	In my country, new technology, science, and other knowledge are efficiently transferred from universities and public research centers to new and growing firms
R&D transfer	E02	In my country, new and growing firms have just as much access to new research and technology as large, established firms
R&D transfer	E03	In my country, new and growing firms can afford the latest technology
R&D transfer	E04	In my country, there are adequate government subsidies for new and growing firms to acquire new technology
R&D transfer	E05	In my country, the science and technology base efficiently supports the creation of world-class new technology-based ventures in at least one area
R&D transfer	E06	In my country, there is good support available for engineers and scientists to have their ideas commercialized through new and growing firms
Commercial infrastructure access	F01	In my country, there are enough subcontractors, suppliers and consultants to support new and growing firms
Commercial infrastructure access	F02	In my country, new and growing firms can afford the cost of using subcontractors, suppliers and consultants
Commercial infrastructure access	F03	In my country, it is easy for new and growing firms to get good subcontractors, suppliers and consultants
Commercial infrastructure access	F04	In my country, it is easy for new and growing firms to get good, professional legal and accounting services
Commercial infrastructure access	F05	In my country, it is easy for new and growing firms to get good banking services (checking accounts, foreign exchange transactions, letters of credit and the like)
Internal market dynamics	G01	In my country, the markets for consumer goods and services change dramatically from year to year

Internal market dynamics	G02	In my country, the markets for business-to-business goods and services change dramatically from year to year
Internal market burdens	G03	In my country, new and growing firms can easily enter new markets
Internal market burdens	G04	In my country, the new and growing firms can afford the cost of market entry
Internal market burdens	G05	In my country, new and growing firms can enter markets without being unfairly blocked by established firms
Internal market burdens	G06	In my country, the anti-trust legislation is effective and well enforced
Physical infrastructure and services	H01	In my country, the physical infrastructure (roads, utilities, communications, waste disposal) provides good support for new and growing firms
Physical infrastructure and services	H02	In my country, it is not too expensive for a new or growing firm to get good access to communications (phone, Internet, etc.)
Physical infrastructure and services	H03	In my country, a new or growing firm can get good access to communications (telephone, Internet, etc.) in about a week
Physical infrastructure and services	H04	In my country, new and growing firms can afford the cost of basic utilities (gas, water, electricity, sewer)
Physical infrastructure and services	H05	In my country, new or growing firms can get good access to utilities (gas, water, electricity, sewer) in about a month
Cultural, social norms supportive	I01	In my country, the national culture is highly supportive of individual success achieved through own personal efforts
Cultural, social norms supportive	I02	In my country, the national culture emphasizes self-sufficiency, autonomy and personal initiative
Cultural, social norms supportive	I03	In my country, the national culture encourages entrepreneurial risk-taking
Cultural, social norms supportive	I04	In my country, the national culture encourages creativity and innovativeness
Cultural, social norms supportive	I05	In my country, the national culture emphasizes the responsibility that the individual (rather than the collective) has in managing his or her own life

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