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Econometric Modeling to Measure the Social and Economic Factors in the Success of Entrepreneurship

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Abstract: The purpose of this research is to develop a theoretical model of the entrepreneurial decision of individuals and to measure the effect of a group of variables on this decision. The effects of variables such as income, age, gender, level of education, and entrepreneurial skills are studied. The results show that innovation and entrepreneurship are linked to the personal characteristics of individuals and the social context in which they develop, thus making it possible to guide social policies for the development of the economy. Logit and probit functions were used to measure the effect of the variables on the entrepreneurship phenomenon. The main findings of this research indicate that the variables with a significant impact on the success of entrepreneurship and innovation are income, age, gender, skill, and the interaction between the opportunity and education variables.

Keywords: entrepreneurship; innovation; country development; data science; econometric modeling



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1. Introduction

Entrepreneurship has been increasingly considered an essential tool for economic growth and innovation across economies, regardless of the stage of economic development. Entrepreneurship is now at the center of many policy questions related to science and technology, sustainability, poverty, human capital, endogenous resources, employment, and regional and comparative advantages, Acs et al. [1].

Entrepreneurial competency (EC) has been examined from various perspectives over the years. Much of the empirical work found a strong association between entrepreneurial competency practices and business performance, Chander et al. [2].

Entrepreneurship has been reviewed in the literature from different points of view. The most frequently cited database is the Global Entrepreneurship Monitor (GEM), which contains survey-based data on entrepreneurship and entrepreneurship ecosystems worldwide. The data collected are presented through a number of business development-related research publications and include opportunities in entrepreneurship development, skills and creativity for business development, as well as the fear of failure Al Mamari et al. [3].

The methodology applied to this research focused on the econometric analysis of the factors that influence the decision-making to start a new business. Econometric analysis was on a binary regression model using probit and logit models to determine the probability that the entrepreneur will or will not start a new business based on a series of individual and environmental characteristics.

The purpose of this research is to develop a theoretical model of the entrepreneurial decision by individuals; and to measure the effect of a group of variables on this decision,

such as income, age, gender, level of education, and entrepreneurial skills for the success of entrepreneurship and innovation.

Through the statistical model, to identify the variables that affect entrepreneurship; allowing to identify these variables, governments and policies may focus on the way to make resources and attention focuses more efficient to achieve economic growth and sustainable enterprises in the countries.

The rest of the paper is organized as follows. Section 2 is the Literature Review of the variables linked with entrepreneurship. Section 3, Materials and Methods, are the methodology to be used. Section 5 reports the results obtained from our investigation, mentioning some indications and recommendations. In Section 4, we provide the conclusions, limitations, and further research of this study.

2. Literature Review

According to Acs et al. [4], entrepreneurship is explained by knowledge base, the exploitation of R&D by traditional operators, and barriers to entrepreneurship; additional factors are risk aversion, legal restrictions, bureaucratic constraints, labor market rigidities, taxes, lack of social acceptance, so on. The literature also includes factors such as culture, traditions and institutions that are more difficult to identify than strictly economic factors, but also play an important role in entrepreneurship.

For Mas-Tur et al. [5], the axes of entrepreneurship are linked to the elements presented by Al Mamari et al. [3], associated with perceived abilities, motivation and a high expectation of job creation. Ref. Prieto-Sánchez and Merino [6] include the variables of personal income and the complexity of the economic system in their study, indicating that individual factors, in combination with economic growth, play a more important role than factors related to entrepreneurial innovation and the level of knowledge intensity associated with a country's export basket.

On the other hand, Beynon et al. [7] define the conditions for the development of entrepreneurship as the combination of regulatory and cultural-cognitive institutions; to these, Darnihamedani and Terjesen [8] add the regulatory efficiency of a country as a differentiating variable, indicating that regulations impose additional costs and risks on the activities of entrepreneurs.

The proposed dimensions of an international business culture consist of orientation towards the international market, international motivation, orientation of international learning, the orientation of international networking with competitors, and targeting of international networks jointly with noncompetitors Dimitratos et al. [9]. According to Fu [10], experiences show that spatial mobility significantly promotes the probability of entering into business based on opportunities, although Patel and Rietveld [11] indicates that globalization negatively impacts the perception of opportunities for entrepreneurship.

For Bloodgood et al. [12], the activities associated with entrepreneurship are related principally to reconnaissance activities; the assessment, legitimation and implementation of opportunities; and feedback. These are used to show the connections with strategic assessment and business renewal that portray entrepreneurship as the integration of business efforts and strategic assessment, in addition to addressing the ability of business enterprises to recognize, explore and/or exploit opportunities Gawell [13]. For Eckhardt and Ciuchta [14], entrepreneurship incorporates the process associated with finding opportunities for success as a multistage evolutionary selection process. Ref. Ziyae and Sadeghi [15] shows that corporate entrepreneurship and strategic entrepreneurship are positively related to firm performance.

The studies conducted by Ali et al. [16] and Jang et al. [17] show that economies with basic institutional conditions (structures and rules that govern business activity), and markets that function efficiently, result in high rates of entrepreneurship and innovative entrepreneurship. Furthermore, the study of Veiga et al. [18] considers the separation between OECD countries and trust in public institutions as factors. For Bergmann and Sternberg [19] the individual and regional variables influence the decision to become self-employed, but

there are considerable differences between incipient opportunity entrepreneurship and incipient necessity entrepreneurship.

Linking entrepreneurship with international development, Chandra et al. [20] indicates that inducing a set of portfolio measures of opportunities for international entrepreneurship such as volume, flow rate, novelty, magnitude and geographic coverage, provides an alternative framework for measuring and predicting entrepreneurial performance. In addition, Eckhardt and Shane [21] points out that the importance of this lies in examining entrepreneurship through an imbalance framework that focuses on the characteristics and existence of business opportunities. According to Khanin et al. [22], the theory of opportunity identification and exploitation Dimov [23], Foss and Klein [24] may yield some predictions about the origins and manifestations of business barriers, as well as their interface in specific environments and contexts.

Andresen et al. [25] construct a model of collaborative business processes in which multiple partners are involved in the identification, training and exploitation of an opportunity. Three interdependent subprocesses are identified: (1) dialogue on the conceptualization of opportunities, (2) the mobilization of resources and (3) the construction of legitimacy; these contribute significantly to our understanding of how people from different organizations become involved in collaborative business processes. For Angulo-Guerrero et al. [26], economic liberalization tends to encourage entrepreneurship opportunities but discourage entrepreneurship enforced by necessity, i.e., the focus is on developing an opportunity. Entrepreneurs in this situation can benefit from improvements in the legal structure and security of property rights, and in the regulation of credit, work and business, while both these aspects, as well as greater freedom to trade internationally, seem to harm entrepreneurship out of necessity. Ref. Anokhin et al. [27] indicates that innovative and arbitration opportunities correlate with business activity rates.

On the other hand, Fuentelsaz et al. [28] indicates that the institutions associated with property rights, commercial freedom, fiscal freedom, labor freedom, financial capital and educational capital show that opportunity entrepreneurship benefits from an improvement of these institutions, while they discourage entrepreneurship of necessity.

For Aparicio et al. [29], opportunity entrepreneurship is identified as one of those mechanisms that impacts economic growth; furthermore, they indicate that informal institutions have a greater impact on opportunity entrepreneurship than formal institutions. González et al. [30] indicates that the discovery of opportunities and the creation of opportunities are mutually exclusive constructions, while credit market regulation stands out as a key element in promoting opportunity-based entrepreneurship in both high-income and emerging countries Barcena-Martin et al. [31]. For Dey [32] entrepreneurship in crisis conditions is not so much a matter of necessity; it is an opportunity to redefine the scope of economic practice with its own rules. Ref. Grilo and Irigoyen [33], shows in their study that in addition to demographic variables such as gender, age and educational level, the set of explanatory variables used includes country-specific effects.

Hu et al. [34] consider that social entrepreneurship implies an aspect of agency (updating opportunities following a process of seeding-growth-conformation dependent on the route) and a structural aspect (institutional, cognitive and integrated structures necessary for the emergence of opportunities).

According to Crane [35], in developed countries female-owned entrepreneurial firms perform similarly to male-owned firms; in developing countries, on the other hand, male-owned firms significantly outperform female-owned firms. Startienė and Remeikienė [36] shows that companies run by men are larger and have existed for longer than those run by women; however, the business establishment fields of men and women are very similar, and Guzman and Kacperczyk [37] show that female-led firms are 63 percentage points less likely than male-led firms to obtain external financing (i.e., venture capital). The most significant part of this gap (65 percent) stems from gender differences in start-up orientation, as women are less likely to found companies that signal growth potential to outside investors.

For Bernat et al. [38], Linardi and Costa [39], the factors that explain both entrepreneurship and the gender gap are: education, risk tolerance, owning one's own car as the main means of transportation, job satisfaction, and parental ownership of the business. According to DO et al. [40], entrepreneurs tend to be older, and young entrepreneurs tend to be better educated. In addition, they indicate that male entrepreneurs tend to have a higher perceived ease of starting a business. Ref. Feldmann et al. [41], incorporate the perspective of family rootedness and the role of culture in occupational choice, developing a view of the gender gap in entrepreneurship, finding that family can serve as a stronger influence than society when the implicit norms of these two levels of culture clash. Ref. Poon et al. [42], indicates that family social capital increases the likelihood of women becoming entrepreneurs, but institutional social capital has the opposite effect. In 1997, Lerner et al. [43] indicated that the extent to which existing theories are useful in the non-OECD context is increasingly important as women in these countries are taking on a greater role in business creation and economic development as a result of radical changes in geopolitical and economic policy worldwide.

However, the residual gap is as high as 35 percent, and much of this gap likely reflects investors' gender preferences. According to statistical discrimination theories, the residual gap decreases significantly when investors have stronger signals of growth for comparable companies run by women and men or when the focal investors appear to be more sophisticated.

According to Assmann and Ehrh [44], in individualistic countries the entrepreneurship of opportunities is greater. Approximately half of the size of this effect is transmitted indirectly, because people in individualistic countries tend to perceive better opportunities and because those nations are more innovative. Ref. Hung and Whittington [45] entrepreneurial firms used framing, aggregation and networking strategies to build legitimacy, mobilize local resources and reach beyond the constraints of their immediate contexts.

3. Materials and Methods

In this section, we will develop the economic model of an agent who may choose to maintain a flow of resources associated with employment, as opposed to the possibility of undertaking and generating resources by entrepreneurial activity.

In addition, we will describe the empirical strategy for estimating the factors that define the entrepreneurship of the economic agent.

This section is composed of three subsections. The economical model is an illustrative and a theoretical approach that allows the use of appropriate analytical and computational tools to model an agent, such as iteration methods for value functions; the estimation methods show the estimation of model parameters; and in the exploratory analysis, we apply the data of the GEM variables in the years studied.

3.1. Economic Model

We consider a representative economic agent who lives for infinite periods of time, has access to the financial market and seeks to maximize the expected utility function in each period through consumption in each period. This theoretical approach allows the use of appropriate analytical and computational tools for the modeling of an agent, such as the value function iteration methods (see [46,47]). This combination is described by the following equation:

$$J(c_t; t^*) = \max_{c_t} E \left\{ \sum_{t=0}^{\infty} \rho^t U(c_t) \right\}, \quad (1)$$

subject to the following restrictions

$$c_t + s_{t+1}(1 - \theta_t) + k_{t+1}\theta_t = (y_t + s_t(1 + i_t))(1 - \theta_t) + (Ak_t^\alpha - k_t\delta)\theta_t, \quad (2)$$

$$k_{t^*} = s_{t^*-1}, \quad (3)$$

$$\theta_t = \begin{cases} 1 & \text{if } t \geq t^* \\ 0 & \text{otherwise,} \end{cases} \quad (4)$$

where $J(\cdot)$ corresponds to the value taken by the sum of the utility values of the agent over time, $U(\cdot)$ corresponds to the utility function of the economic agent, measured for each period t ; ρ corresponds to the intertemporal discount of the economic agent; c_t corresponds to the consumption of the agent in period t ; s_t corresponds to the savings made by the economic agent in financial assets in period t ; k_t corresponds to the investment made by the economic agent for their own entrepreneurship; α is a constant associated with the technology to which the economic agent has access; A corresponds a random variable of the economic agent's entrepreneurial skills; and θ corresponds to a variable associated with the moment in which the economic agent decides to carry out an entrepreneurial activity.

The income possessed by the economic agent is drawn from two mutually exclusive alternatives. The first alternative is income from employed work, which we represent by y_t , while the second income alternative is income from investment in entrepreneurial activity.

The decision of the economic agent at the appropriate moment to make the decision to start an entrepreneurial activity is defined through the function described below:

$$V(c_t) := \sup\{J(c_t; t^*)\} = \sup_{t^* \geq 0} \{\max_{c_t} E\{\sum_{t=0}^{\infty} \rho^t U(c_t)\}\}. \quad (5)$$

The optimal decision of the economic agent follows the definition obtained from Equation (1) and defines $t^* \geq 0$, such that

$$V(c_t) = J(c_t; t^*). \quad (6)$$

The moment t , at which the economic agent changes direction to the path of entrepreneurship, occurs when the sum of the utility in $t \geq t^*$ for the case of entrepreneurship is greater than the sum of the utility in the case of maintaining a stable job.

Figures 1 and 2 show the evolution over time of the consumption and investment of the economic agent. The model described in the figures considers a CRRA type utility function for its simulation with $U = c_t^{1-\sigma} / (1-\sigma)$, where $\sigma = 2$ corresponds to the risk aversion value, $y_t = 0.1$ for all t , an interest rate $i = 3\%$, a depreciation rate $\delta = 0$, an intertemporal discount value $\rho = 0.97$, and a technological parameter $A = 1.9$ for the case of an individual with high entrepreneurial skills and $A = 1.5$ for the case of an individual with low entrepreneurial skills.

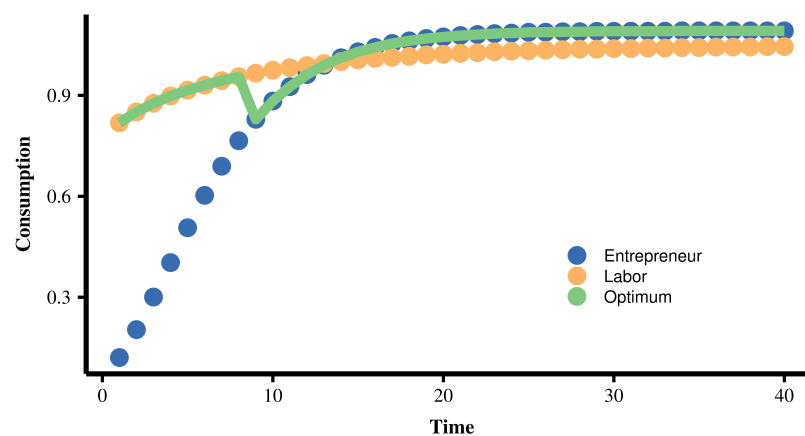


Figure 1. Optimal consumption path of the economic agent.

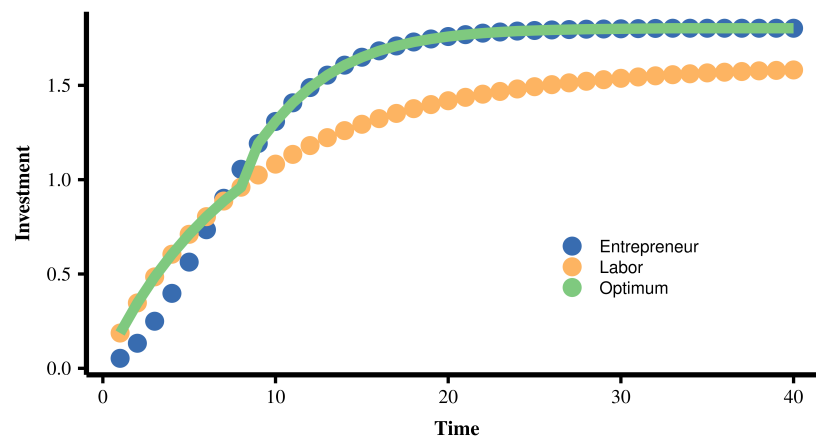


Figure 2. Optimal path of investment.

For the estimation of the trajectory, an optimization process is performed by verifying the highest utility value for each of the possible values of t^* , using a methodology of defining a policy function (see [46,47]). The value of t^* corresponds to the moment at which the utility of the economic agent is maximized and therefore the moment at which the entrepreneur decides to quit their job in order to start a business.

We can observe that it is suboptimal to maintain an investment plan in the capital market over time, because the individual may have a higher level of utility if decides to start an entrepreneurship; likewise, starting entrepreneurial activity with a low level of capital also is suboptimal. Therefore, the optimal path for this economic agent consists of a period of time in which he has a stable income associated with a job; until he can accumulate sufficient capital to be able to start a business.

The moment of changing status from employee to entrepreneur implies a loss in the level of consumption that the economic agent must sacrifice to be able to ensure higher consumption over time as shown in Figure 1.

However, not all individuals in the economy are entrepreneurial, regardless of the level of savings they derive from their work. There is an effect on the production function of entrepreneurship stemming from the skills of the individual. Figure 3 shows that an individual with low entrepreneurial skills is optimally positioned to hold a stable job.

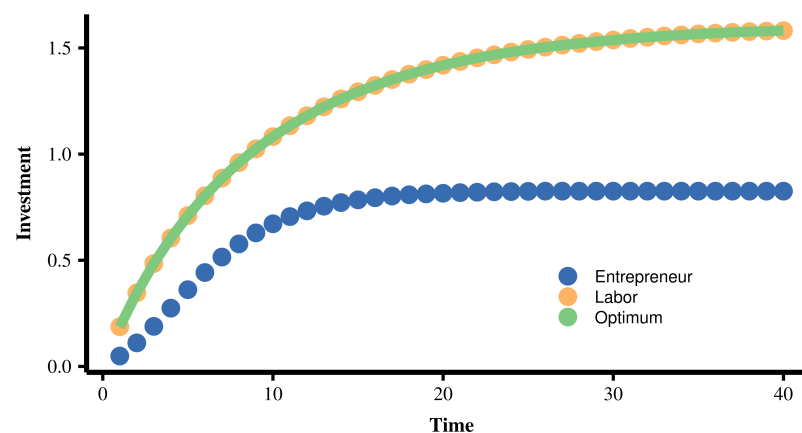


Figure 3. Optimal path of investment for individual with low entrepreneurial skills.

To estimate the path of consumption and investment, it is necessary to be able to calculate the policy function of the path of the economic agent who has a stable job, and that of the entrepreneur.

3.2. Estimation Methods

Specification of the variables and the appropriate statistical modelling are necessary to understand the effects that the independent variables have on the entrepreneurial decision of the economic agent. For this case we propose a logistic and probit functions that follow the following definitions:

$$\Pr(y_j \neq 0|x_j) = \frac{\exp(x_j\beta)}{1 + \exp(x_j\beta)}, \quad (7)$$

$$\Pr(y_j \neq 0|x_j) = \Phi(x_j\beta), \quad (8)$$

where $\Pr(\cdot)$ corresponds to the probability that the agent is an entrepreneur or not, y_j is equal to one if the economic agent j is an entrepreneur and zero otherwise, $x_j = (x_{1,j}, x_{2,j}, \dots, x_{n,j})$ is the vector of observed variables for observation j , β is the vector of parameters for each variable of the model which explains the expected change in the probabilities of a marginal change in the variable x_j , and Φ is the standard cumulative normal. The definition of entrepreneurship for this research corresponds to whether the individual is trying to start a new business in the specific year j .

The analysis of these approximations allows us to observe the degree of robustness of the analysis, considering different approximations without the need to make assumptions about the error distribution.

The variables incorporated in the model are as follows:

- $x_{1,j} = \text{Age}_j$, which is the age of individual j .
- $x_{2,j} = \text{Age}^2_j$, which is the age squared of individual j , and is intended to capture the nonlinearity effect of the Age variable.
- $x_{3,j} = \text{Female}_j$, takes a value of one if individual j is female and zero otherwise.
- $x_{5,j} = \text{FamSize}_j$, which is the number of people living in the household of individual j .
- $x_{6,j} = \text{Income}_j$, which is individual j 's income level.
- $x_{7,j} = \text{Equality}_j$ takes a value of one if individual j perceives that equality is desirable in society.
- $x_{8,j} = \text{Educ}_j$ represents the level of education attained by individual j , taking a value of one if the individual has tertiary education.
- $x_{9,j} = \text{Skill}_j$ represents the perception that individual j possesses entrepreneurial skills.
- $x_{10,j} = \text{Opport}_j$ represents the perception by individual j of the existence of opportunities in the short term.
- $x_{11-17,j} = \text{Year}_j$ represents the fixed effect of years 2011, 2012, 2014, 2015, 2016, 2017, 2018, respectively.
- $x_{18-121,j} = \text{Country}_j$ represents the fixed effect of the country to which individual j belongs.

Variables $x_{11-17,j}$ allow controlling for the shocks that may occur in the specific year, allowing to observe the effect of the other relevant variables within the investigation. Similarly, variables $x_{18-121,j}$ allow controlling the impact that each country has on the phenomenon of entrepreneurship and therefore, allows controlling the policies on entrepreneurship carried out by the respective country.

In particular, the Educ, Skill, and Opport variables are directly linked to entrepreneurial skills of the theoretical model and the Income variable can be directly related to their capacity to accumulate the necessary capital before starting their entrepreneurial activity.

To estimate the parameters that define whether the economic agent is an entrepreneur, a logistic and probit model was estimated by maximum likelihood (see Greene [48], Long and Freese [49], so on), based on the following definition:

$$\ln L = \sum_{j \in S} w_j \ln F(x_j\beta) + \sum_{j \notin S} w_j \ln \{1 - F(x_j\beta)\}, \quad (9)$$

$$\ln L = \sum_{j \in S} w_j \ln \Phi(x_j \beta) + \sum_{j \notin S} w_j \ln \{1 - \Phi(x_j \beta)\}, \quad (10)$$

where L is the likelihood function, S is the set of all j 's observations, such that $y_j \neq 0$, $F(x_j \beta) = \exp(x_j \beta) / (1 + \exp(x_j \beta))$ is the logistics function defined in Equation (7), Φ is the standard cumulative normal mentioned in Equation (8), and w_j is the weighting of the different observations.

3.3. Exploratory Analysis

To verify the theoretical approach we provide the details of the data used for the analysis. For this research, we used data from the Global Entrepreneurship Monitor (APS Global Individual Level Data) database for the years 2011, 2012, 2013, 2014, 2015, 2016, 2017 and 2018, as obtained from: <https://www.gemconsortium.org/data/sets?id=aps>, (accessed on 1 April 2022). It is important to mention that the database available at the time of this research corresponds until the year 2018.

A summary of the descriptive statistics of the variables used in this research is presented in Table 1.

Table 1. Descriptive statistics for the whole sample.

Continuous variables			
Variable	Number of respondents	Mean	St. Dev.
Age	1,662,538	40.98	14.54
Hhsize	1,688,940	3.70	2.13
Income	1,377,886	25,425.44	31,795.97
Categorical variables			
Variable	Number of respondents	%	
Entrepreneur	yes	247,287	14.58%
	no	1,449,149	85.42%
Gender	Male	842,904	49.69%
	Female	853,426	50.31%
Equal	yes	879,887	63.92%
	no	496,762	36.08%
Educ	yes	638,343	37.63%
	no	1,058,093	62.37%
Skill	yes	822,190	50.21%
	no	815,297	49.79%
Opport	yes	596,520	41.26%
	no	849,123	58.74%

Based on the descriptive statistics of the sample, the average age of the respondents was 40.98. The number of entrepreneurs in the sample is 14.54%, while the number of men and women in the sample is balanced.

We also note that 41.26% observe an opportunity during the next year that could allow them to become entrepreneurs, while 50.21% declare that they have the skills to generate a new business.

In our analysis of Table 2, conditioned for a sample that considers only those individuals who are entrepreneurs, we observe that the average age of 37.30 is lower than the average age of the entire sample.

Table 2. Descriptive statistics for the entrepreneurs sample.

Continuous variables			
Variable	Number of respondents	Mean	St. Dev.
Age	241,082	37.30	12.40
Hhsize	241,898	4.29	2.63
Income	211,796	28,325.97	32,476.6
Categorical variables			
Variable	Number of respondents	%	
Gender	Male	141,430	57.20%
	Female	105,834	42.80%
Equal	yes	126,958	62.86%
	no	75,021	37.14%
Educ	yes	94,626	38.27%
	no	152,661	61.73%
Skill	yes	192,411	80.09%
	no	47,819	19.91%
Opport	yes	141,940	63.64%
	no	81,097	36.36%

Another important element is that the proportion of male entrepreneurs, equal to 57.20%, is higher than the proportion in the entire sample, indicating that males have a greater predisposition to entrepreneurship than females.

The statement of entrepreneurship skills shows an important change, with 80.09% of entrepreneurs reporting skills, compared to 50.21% of the full sample. A similar effect can be observed when comparing recognition of entrepreneurial opportunities, where 63.64% of entrepreneurs report opportunities, as opposed to 41.26% in the full sample.

4. Results

The present research is designed to achieve the objectives established: to obtain and determine which variables affect the entrepreneurship phenomenon, controlling for the fixed effect that can occur for each year and country in the sample. Thus, the empirical results are consistent with theoretical models that claim that the comparative advantages of individuals can affect the decision on entrepreneurship and innovation.

Binary logit and probit regressions are used to predict the probability of category membership in a dependent variable based on discrete independent variables. Binary logit and probit regressions use maximum likelihood estimation to evaluate the probability of discrete membership. This type of model allows us to characterize the probability associated with a respondent's decision regarding a particular discrete choice, which is conditional on the values of the explanatory variables. The distribution functions that characterize the explanatory variables are often not linear. Once the binary regression model had been constructed, the parameters were used to predict the probability of an event occurring compared to the reference category.

For each of the logit and probit regressions, two different models are established to carry out a more in-depth analysis of the impacts of the independent variables selected. Model 1 and Model 3 for the logit and probit regression models, respectively, use the independent variables Age, Age2, Female, FamSize, Income, Equal, and Educ, while Model 2 and Model 4 for the logit and probit regression models, respectively, uses Age, Age2, Female, FamSize, Income, Equal, Educ, Skill and Opport, in addition to the interactions of Skill and Educ, and Opport with Educ. Model 2 and Model 4 allow us to observe the specific effect of variables such as Skill and Opport, and how they are related to the

education variable. Additionally, for each model, the fixed effect of the year and country is defined by a series of dummies, which allows controlling the impact of the relevant variables under study.

Table 3, related to the regression of the logit models, shows the independent variables of the models in the first column; the second and fourth columns show the estimation of the parameters; finally, the third and fifth columns show the estimation of the marginal effect, which allows the results to be interpreted directly as probabilities. The values of the dummies associated with the fixed effect of year and specific country have been omitted for greater clarity of the variables under study.

Table 3. Parameter estimate and the corresponding p -value (in parenthesis) of the logit model and the value of the marginal effect of the variable (ME).

	Model 1		Model 2	
	β Coefficient	ME	β Coefficient	ME
Age	0.119 *** (0.000)	0.0216	0.0897 *** (0.000)	0.0158
Age2	−0.00157 *** (0.000)	−0.0003	−0.00124 *** (0.000)	−0.0002
Female	−0.332 *** (0.000)	−0.0607	−0.214 ** (0.019)	−0.0377
FamSize	0.0134 (0.566)	0.0024	0.0148 (0.549)	0.0026
Income $\times 10^3$	0.0029 ** (0.032)	0.0005	0.0024 * (0.091)	0.0004
Equal	−0.277 *** (0.002)	−0.0517	−0.281 *** (0.004)	−0.0505
Educ	0.201 * (0.057)	0.0376	−0.434 (0.106)	0.0214
Skill			1.123 *** (0.000)	0.1986
Skill \times Educ			0.288 (0.239)	0.2347
Opport			0.0139 (0.910)	0.0234
Opport \times Educ			0.451 ** (0.038)	0.0805
Constant	−3.614 *** (0.000)		−3.746 *** (0.000)	
N	961020		823542	

p -values in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The variables Age, Age2, Female, Income, and Equal are observed as significant variables for Models 1 and 2 of the logistic regression. On the other hand, the variable Educ is significant only for Model 1, while Skill and the interaction of Opport with Educ are significant for Model 2.

Similarly, Table 4, related to the regression of the probit models, shows the independent variables of the models in the first column; the second and fourth columns show the estimation of the parameters; finally, the third and fifth columns show the estimation of the marginal effect. The values of the dummies associated with the fixed effect of year and specific country have been omitted for greater clarity of the variables under study.

Table 4. Parameter estimate and the corresponding *p*-value (in parenthesis) of the probit model and the value of the marginal effect of the variable (ME).

	Model 3		Model 4	
	β Coefficient	ME	β Coefficient	ME
Age	0.0701 *** (0.000)	0.0216	0.0546 *** (0.000)	0.0163
Age2	−0.000928 *** (0.000)	−0.0002	−0.000747 *** (0.000)	−0.0002
Female	−0.193 *** (0.000)	−0.0597	−0.128 ** (0.015)	−0.0384
FamSize	0.00785 (0.570)	0.0024	0.00842 (0.561)	0.0025
Income × 10 ³	0.00173 ** (0.029)	5.34×10^{-4}	0.00140 * (0.095)	4.19×10^{-4}
Equal	−0.161 ** (0.003)	−0.0505	−0.165 *** (0.004)	−0.0501
Educ	0.126 ** (0.047)	0.0396	−0.253 * (0.084)	0.0246
Skill			0.636 *** (0.000)	0.1959
Skill × Educ			0.191 (0.162)	0.2374
Opport			0.00746 (0.915)	0.0224
Opport × Educ			0.262 ** (0.039)	0.0795
Constant	−2.145 *** (0.000)		−2.232 *** (0.000)	
N	961020		823542	

p-values in parentheses, * *p* < 0.10, ** *p* < 0.05, *** *p* < 0.01.

The variables Age, Age2, Female, Income, Equal, and Educ are observed as significant variables for Models 1 and 2 of the probit regression. On the other hand, the variable Educ is significant only for Model 1, while Skill and the interaction of Opport with Educ are significant for Model 2.

The results presented for the models studied show that the age of the individuals is an important study variable. Higher age implies an increase in the probability that an individual will try to start a new business, but it has nonlinear characteristics that are confirmed by the results in Tables 3 and 4, where the Age2 variable is found to be significant.

Education is observed to have mixed effects. In the logit model, it is significant only for Model 1, while in the probit model, it is significant in both Model 1 and Model 2, although only weakly in the latter case. In principle, we observe that the higher the level of education, the greater the probability to try to start a new business; however, the results in Model 2, for both logit and probit, indicate that there may be variables that interact or are related to each other.

5. Discussion

According to the literature review in Section 2, the incident variables in entrepreneurship can be knowledge, motivation skills, the efficiency of countries, globalization, opportunities, regulations, gender, and age.

One of the variables considered was the income factor, following what was specified by Prieto-Sánchez and Merino [6], Bernat et al. [38], Linardi and Costa [39], the income factor indicates that the higher a person's income level is, the greater the probability to try to start a new business. This result shows that people must be able to save before becoming entrepreneurs, and partly explains the age factor, assuming that productive capacities increase with age, which is one of the variables considered by Grilo and Irigoyen [33] at

decreasing rates. The theoretical model shows that to become an entrepreneur, individuals must make a sacrifice in their consumption, which is possible only if the individual reaches a minimum level of resources to subsist.

On the other hand, the variable Equal, which represents whether equality is recognized by society as a positive characteristic, which, according to Assmann and Ehrl [44], Hung and Whittington [45], was considered for analysis, but decreases the probability to try to start a new business. From this, we can assume that the more competitive society is, the greater the tendency of citizens to become entrepreneurs.

We observe that the higher the level of education, the greater the probability to try to start a new business, how is it mentioned by Grilo and Irigoyen [33]; however, the results in Model 2, for both logit and probit, indicate that there may be variables that interact or are related to each other one of them is, for example, the skills.

The variable Opport, as cited by Eckhardt and Shane [21], Assmann and Ehrl [44] interacts significantly with education, indicating that education has a positive effect on the probability to try to start a new business if combined with entrepreneurial opportunity. This shows that education makes it possible to generate a state that is more prone to entrepreneurship, but it requires opportunities to arise within society for this decision to be taken; thus an educational strategy to increase the probability of entrepreneurship must be accompanied by strategies to encourage an economic system favorable to entrepreneurship.

The effect of entrepreneurial ability is significant, as in the investigations of Al Mamari et al. [3], Mas-Tur et al. [5], with a positive sign for both the logit and probit models. These results confirm the results observed from the theoretical model.

The gender variable shows that women tend to be less likely to try to start a new business. Similar results are reported in other studies cited above (Guzman and Kacperczyk [37]), confirming the gender bias in entrepreneurship.

However, an element that opens another line of discussion is the nonsignificance of education for ability. The ability effect allows us to identify individuals who are more likely to try to start a new business, but this ability is not altered by their level of education.

Then, the education has an important effect on elements that allow trying to start a new business, such as higher income levels and the ability to observe new business opportunities; however, people who possess entrepreneurial skills are more capable of taking advantage of individual and environmental conditions to start an entrepreneurial activity.

Different studies in entrepreneurship have identified that a positive entrepreneurial attitude and willingness to start a business influence future entrepreneurial intention. There is a growing interest in understanding the factors that determine the desirability of entrepreneurship, through the analysis of variables such as: income, age, gender, skill, and the interaction between the variables opportunity and education. That is how this study addressed the question of what factors determine the desirability of entrepreneurship and how these different factors affect the desire to become an entrepreneur. The results presented suggest that a good understanding of individuals' social environment and their need for skills and capabilities may lead to greater entrepreneurial efficacy, which is fundamental to sustaining economic growth.

6. Conclusions

In this research, entrepreneurship is reviewed and analyzed from different points of view, and we determine which variables affect the entrepreneurship phenomenon, such as income, age, gender, skill, and the interaction between the variables opportunity and education. To do this, we develop the economic model of an agent who may choose to keep a flow of resources associated with employment, as opposed to the possibility of undertaking and generating resources by entrepreneurship; we assumed a representative economic agent who lives for an infinite period of time, has access to the financial market and seeks to maximize the expected utility function in each period through consumption in each period.

The research shows that skill is necessary for entrepreneurship as described in the theoretical model, in addition to generating the two variables education and opportunity

simultaneously, as a means to create sustainable entrepreneurship. We also corroborated the negative bias found with women with respect to the creation of enterprises, as observed in other studies.

Theoretical research and empirical results, from econometric modeling, indicate that to create sustainable entrepreneurship, agents require time to accumulate the capital necessary to invest in the creation of entrepreneurship.

On the other hand, some limitations of the research are found in the disaggregation of the information from each of the countries of the sample; for example, it could be interesting to analyze members' firms and their survival rates, allowing a better understanding of how natural evolution works in emerging and transition economies. Additionally, further research is needed to determine which sectors benefit more from innovation, in particular in emerging countries. It would be interesting to know which sectors create the most business jobs, why these are the most profitable sectors and the impact of the geographical location of each emerging country in the study. An analysis of institutions in emerging countries also is very important.

This research provides a novel platform for future studies to advance cross-cultural innovation/entrepreneurship research through more nuanced theorizing, a greater focus on articulating and measuring theoretical mechanisms, and robust methodology. Differences between countries' cultural frameworks and cultural approaches (values versus practices/norms) could help explain the heterogeneous reality of the countries analyzed in this research.

Finally and from the point of view of managerial implications, regional differences in the experience of globalization can have marked effects on perceptions about entrepreneurship. The local context, individual networks, and general support for entrepreneurship could further influence the reporting of perceptions. Hence, future studies may want to draw on multilevel data to further assess richer interactions across macrolevel, mesolevel, and microlevel factors driving entrepreneurship.

On the other hand, future studies could be directed towards improving the measurement of technical innovations, and the possibility of including this parameter in the theoretical models should be considered. An in-depth study also would be helpful for observing in more detail the commerce of economies in regions with a high level of entrepreneurship; nevertheless, this general approach gives interesting results. Future research should focus on a comparative analysis of the impact of the variables on a country-by-country basis for OECD economies.

Future studies could be related to improving the measure for technical innovations and considering the possibility of including the parameter in the theoretical models. The study also can be deepened to see in more detail the commerce of the region with relevant entrepreneurship economies, but this general approach gives interesting results. Moreover, future research should focus on a comparative analysis of the impact of variables on a country-by-country basis for the case of OECD economies.

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References

1. Acs, Z.J.; Desai, S.; Klapper, L.F. What does “entrepreneurship” data really show? *Small Bus. Econ.* **2008**, *31*, 265–281. [\[CrossRef\]](#)
2. Chander, N.; Siow, M.L.; Ramachandran, S.; Kunasekaran, P.; Rathakrishnan, T. Conceptualizing inclusive learning and development: A framework towards entrepreneurial competency practices for sustainability. *Sustainability* **2020**, *12*, 6905. [\[CrossRef\]](#)
3. Al Mamari, F.; Mondal, S.; Al Shukaili, A.; Kassim, N.M. Effect of self-perceived cognitive factors on entrepreneurship development activities: An empirical study from Oman global entrepreneurship monitor survey. *J. Public Aff.* **2020**, *22*, e2363. [\[CrossRef\]](#)
4. Acs, Z.J.; Braunerhjelm, P.; Audretsch, D.B.; Carlsson, B. The knowledge spillover theory of entrepreneurship. *Small Bus. Econ.* **2009**, *32*, 15–30. [\[CrossRef\]](#)
5. Mas-Tur, A.; Guijarro, M.; Carrilero, A. What Type of Entrepreneurship Leads to Sustainable Development? A Configurational Approach. *Soc. Indic. Res.* **2021**, *157*, 29–42. [\[CrossRef\]](#)
6. Prieto-Sánchez, C.J.; Merino, F. Incidence of cultural, economic, and environmental factors in the emergence of born-global companies in Latin America. *Glob. Strategy J.* **2021**, *12*, 245–272. [\[CrossRef\]](#)
7. Beynon, M.; Battisti, M.; Jones, P.; Pickernell, D. How institutions matter in the context of business exit: a country comparison using GEM data and fsQCA. *Br. J. Manag.* **2021**, *32*, 832–851. [\[CrossRef\]](#)
8. Darnihamedani, P.; Terjesen, S. Male and female entrepreneurs’ employment growth ambitions: the contingent role of regulatory efficiency. *Small Bus. Econ.* **2020**, *58*, 185–204. [\[CrossRef\]](#)
9. Dimitratos, P.; Voudouris, I.; Plakoyiannaki, E.; Nakos, G. International entrepreneurial culture—Toward a comprehensive opportunity-based operationalization of international entrepreneurship. *Int. Bus. Rev.* **2012**, *21*, 708–721. [\[CrossRef\]](#)
10. Fu, W. Spatial mobility and opportunity-driven entrepreneurship: The evidence from China labor-force dynamics survey. *J. Technol. Transf.* **2020**, *45*, 1324–1342. [\[CrossRef\]](#)
11. Patel, P.C.; Rietveld, C.A. Does globalization affect perceptions about entrepreneurship? The role of economic development. *Small Bus. Econ.* **2021**, *58*, 1545–1562. [\[CrossRef\]](#)
12. Bloodgood, J.M.; Hornsby, J.S.; Burkemper, A.C.; Sarooghi, H. A system dynamics perspective of corporate entrepreneurship. *Small Bus. Econ.* **2015**, *45*, 383–402. [\[CrossRef\]](#)
13. Gawell, M. Social entrepreneurship: Action grounded in needs, opportunities and/or perceived necessities? *VOLUNTAS Int. J. Volunt. Nonprofit Organ.* **2013**, *24*, 1071–1090. [\[CrossRef\]](#)
14. Eckhardt, J.T.; Ciuchta, M.P. Selected variation: The population-level implications of multistage selection in entrepreneurship. *Strateg. Entrep. J.* **2008**, *2*, 209–224. [\[CrossRef\]](#)
15. Ziyae, B.; Sadeghi, H. Exploring the relationship between corporate entrepreneurship and firm performance: the mediating effect of strategic entrepreneurship. *Balt. J. Manag.* **2020**, *16*, 113–133. [\[CrossRef\]](#)
16. Ali, A.; Kelley, D.J.; Levie, J. Market-driven entrepreneurship and institutions. *J. Bus. Res.* **2020**, *113*, 117–128. [\[CrossRef\]](#)
17. Jang, Y.; Lee, W.J.; Hadley, B. Interactive effects of business environment assessment and institutional programs on opportunity entrepreneurship. *Sustainability* **2020**, *12*, 5280. [\[CrossRef\]](#)
18. Veiga, P.M.; Teixeira, S.J.; Figueiredo, R.; Fernandes, C.I. Entrepreneurship, innovation and competitiveness: A public institution love triangle. *Socio-Econ. Plan. Sci.* **2020**, *72*, 100863. [\[CrossRef\]](#)
19. Bergmann, H.; Sternberg, R. The changing face of entrepreneurship in Germany. *Small Bus. Econ.* **2007**, *28*, 205–221. [\[CrossRef\]](#)
20. Chandra, Y.; Styles, C.; Wilkinson, I.F. Opportunity portfolio: Moving beyond single opportunity explanations in international entrepreneurship research. *Asia Pac. J. Manag.* **2015**, *32*, 199–228. [\[CrossRef\]](#)
21. Eckhardt, J.T.; Shane, S.A. Opportunities and entrepreneurship. *J. Manag.* **2003**, *29*, 333–349.
22. Khanin, D.; Rosenfield, R.; Mahto, R.V.; Singhal, C. Barriers to entrepreneurship: opportunity recognition vs. opportunity pursuit. *Rev. Manag. Sci.* **2021**, *16*, 1147–1167. [\[CrossRef\]](#)
23. Dimov, D. Opportunities, language, and time. *Acad. Manag. Perspect.* **2020**, *34*, 333–351. [\[CrossRef\]](#)
24. Foss, N.J.; Klein, P.G. Entrepreneurial opportunities: who needs them? *Acad. Manag. Perspect.* **2020**, *34*, 366–377. [\[CrossRef\]](#)
25. Andresen, E.; Lundberg, H.; Wincent, J. Processes in collaborative entrepreneurship: a longitudinal case study of how multiple actors exploit a radically new opportunity. *Int. Entrep. Manag. J.* **2014**, *10*, 713–726. [\[CrossRef\]](#)
26. Angulo-Guerrero, M.J.; Pérez-Moreno, S.; Abad-Guerrero, I.M. How economic freedom affects opportunity and necessity entrepreneurship in the OECD countries. *J. Bus. Res.* **2017**, *73*, 30–37. [\[CrossRef\]](#)
27. Anokhin, S.; Wincent, J.; Autio, E. Operationalizing opportunities in entrepreneurship research: use of data envelopment analysis. *Small Bus. Econ.* **2011**, *37*, 39–57. [\[CrossRef\]](#)
28. Fuentelsaz, L.; González, C.; Maícas, J.P.; Montero, J. How different formal institutions affect opportunity and necessity entrepreneurship. *BRQ Bus. Res. Q.* **2015**, *18*, 246–258. [\[CrossRef\]](#)
29. Aparicio, S.; Urbano, D.; Audretsch, D. Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence. *Technol. Forecast. Soc. Chang.* **2016**, *102*, 45–61. [\[CrossRef\]](#)
30. González, M.F.; Husted, B.W.; Aigner, D.J. Opportunity discovery and creation in social entrepreneurship: An exploratory study in Mexico. *J. Bus. Res.* **2017**, *81*, 212–220. [\[CrossRef\]](#)
31. Barcena-Martin, E.; Medina-Claros, S.; Perez-Moreno, S. Economic regulation, opportunity-driven entrepreneurship and gender gap: emerging versus high-income economies. *Int. J. Entrep. Behav. Res.* **2021**, *27*, 1311–1328. [\[CrossRef\]](#)

32. Dey, P. Destituent entrepreneurship: disobeying sovereign rule, prefiguring post-capitalist reality. *Entrep. Reg. Dev.* **2016**, *28*, 563–579. [[CrossRef](#)]
33. Grilo, I.; Irigoyen, J.M. Entrepreneurship in the EU: To wish and not to be. *Small Bus. Econ.* **2006**, *26*, 305–318. [[CrossRef](#)]
34. Hu, X.; Marlow, S.; Zimmermann, A.; Martin, L.; Frank, R. Understanding opportunities in social entrepreneurship: A critical realist abstraction. *Entrep. Theory Pract.* **2020**, *44*, 1032–1056. [[CrossRef](#)]
35. Crane, S.R. Entrepreneurship and economic growth: does gender matter? *Int. J. Gen. Entrep.* **2021**, *14*, 3–25. [[CrossRef](#)]
36. Startienė, G.; Remeikienė, R. Gender gap in entrepreneurship. *Eng. Econ.* **2008**, *60*, 95–103.
37. Guzman, J.; Kacperczyk, A.O. Gender gap in entrepreneurship. *Res. Policy* **2019**, *48*, 1666–1680. [[CrossRef](#)]
38. Bernat, L.F.; Lambardi, G.; Palacios, P. Determinants of the entrepreneurial gender gap in Latin America. *Small Bus. Econ.* **2017**, *48*, 727–752. [[CrossRef](#)]
39. Linardi, M.A.; Costa, J. Appraising the role of age among senior entrepreneurial intentions. European analysis based on HDI. *J. Entrep. Emerg. Econ.* **2021**, *in press*. [[CrossRef](#)]
40. Huang, Q. Examining the Influence of Age and Gender on Entrepreneurship in Vietnam. *J. Asian Financ. Econ. Bus.* **2020**, *7*, 193–199.
41. Feldmann, M.; Lukes, M.; Uhlaner, L. Disentangling succession and entrepreneurship gender gaps: gender norms, culture, and family. *Small Bus. Econ.* **2020**, *58*, 997–1013. [[CrossRef](#)]
42. Poon, J.P.; Thai, D.T.; Naybor, D. Social capital and female entrepreneurship in rural regions: Evidence from Vietnam. *Appl. Geogr.* **2012**, *35*, 308–315. [[CrossRef](#)]
43. Lerner, M.; Brush, C.; Hisrich, R. Israeli women entrepreneurs: An examination of factors affecting performance. *J. Bus. Ventur.* **1997**, *12*, 315–339. [[CrossRef](#)]
44. Assmann, D.; Ehrl, P. Individualistic culture and entrepreneurial opportunities. *J. Econ. Behav. Organ.* **2021**, *188*, 1248–1268. [[CrossRef](#)]
45. Hung, S.C.; Whittington, R. Agency in national innovation systems: Institutional entrepreneurship and the professionalization of Taiwanese IT. *Res. Policy* **2011**, *40*, 526–538. [[CrossRef](#)]
46. Cabrera-Paniagua, D.; Rubilar-Torrealba, R. A novel artificial autonomous system for supporting investment decisions using a Big Five model approach. *Eng. Appl. Artif. Intell.* **2021**, *98*, 104107. [[CrossRef](#)]
47. Christiano, L.J. Solving the stochastic growth model by linear-quadratic approximation and by value-function iteration. *J. Bus. Econ. Stat.* **1990**, *8*, 23–26.
48. Greene, W.H. *Econometric Analysis*; Pearson: London, UK, 2018.
49. Long, J.S.; Freese, J. *Regression Models for Categorical Dependent Variables Using Stata*; Stata Press: College Station, TX, USA, 2006; Volume 7.