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ABSTRACT

Entrepreneurship among Low-, Mid- and High-Income Workers in South America: A Fuzzy-Set Analysis*

This paper studies the reasons underlying the entrepreneurial decisions of low-, middle-, and high-income workers in South America. Using data from the GEM APS for the period 2005-2017, we apply fuzzy set Qualitative Comparative Analysis, allowing us to find causal links in the form of necessary conditions linked to entrepreneurship in the sample countries. Results show some differences in the conditions that lead individuals to become entrepreneurs, depending on income levels and gender. However, peer effects, the social perception of entrepreneurship, entrepreneurial skills, and formal education seem decisive in different contexts, although they may operate in both complementary and substitutive ways. The same combination of conditions does not appear to work for all the countries, even when taking into account the gender and income level of workers.

JEL Classification: L26, J22

Keywords: South America, entrepreneurship, income, fsQCA, GEM data

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1. Introduction

In this paper, we analyze the drivers of entrepreneurial intent among low-income, middle-income, and high-income workers, using fuzzy set Qualitative Comparative Analysis (fsQCA) on data from the Global Entrepreneurship Monitor Adult Population Survey (GEM APS) for the period 2005-2017 for South America. Since entrepreneurship is a labor career for workers who do not wish to be employees, but also for those who cannot find an employer (i.e., "necessity-driven" entrepreneurs), income levels may have a moderating effect on entrepreneurial decisions. Furthermore, entrepreneurship is a labor and social phenomenon characterized by high levels of complexity, whereby classical linear and quantitative analyses may provide limited empirical evidence (Coduras et al., 2016). In that context, fsQCA has emerged as a useful statistical tool to study entrepreneurship and other social phenomena (Woodside et al., 2012; Ragin and Stand, 2014; Roig-Tierno et al., 2016).

Entrepreneurship has traditionally been analyzed as a driver of innovation and economic growth (Acs, 1992; Minniti, 2008; Galindo and Mendez, 2013). Furthermore, several dimensions of entrepreneurship have been analyzed in the literature in recent decades, and there have appeared various definitions of and approaches to the study of entrepreneurial behaviors. Among these frameworks, the data and methodology proposed by the Global Entrepreneurship Monitor (GEM) is perhaps the most widespread. The GEM is the "the world's foremost study of entrepreneurship" (http://www.gemconsortium.org), and has studied entrepreneurship in its different dimensions, including global and national contexts, special topics such as gender, policy implications, youth/senior entrepreneurship, developing regions, and microeconomic analyses. (See Bosma et al. (2020) for a recent report of the GEM.) The GEM data are elaborated biennially from two sources: the Adult Population Data (APS), and the National Experts Survey (NES). The objective of the APS micro-data is to provide information about entrepreneurial decisions of individuals, with a focus on individual motivations to establish and entrepreneurial enterprise. The NES data is centered on aggregated conditions related to entrepreneurship, based on questionnaires completed by experts.

Some authors have analyzed entrepreneurship, using fsQCA applied to GEM data, in order to study causal links between entrepreneurship and the factors that may cause

individuals to become entrepreneurs. Coduras et al. (2015) argued that regressions do not show a high explanatory capacity when studying entrepreneurship, and proposed the use of fsQCA, which provided an important framework to further analyze GEM data. Castaño et al. (2016) compared fsQCA and partial least squares in the study of entrepreneurship using GEM and Eurostat data, where both techniques complemented each other, finding that entrepreneurship is a significant channel for job creation and economic growth. Devece et al. (2016) used GEM data to analyze the conditions that drive the growth of new businesses in Spain, and applied fsQCA to identify the characteristics of entrepreneurs. Velilla et al. (2018) also used GEM data to study entrepreneurship among third-age workers, finding that different combinations of conditions can lead such workers to become entrepreneurs, relative to the general population. Other research studying different dimensions of entrepreneurial activity using fuzzy set methods are Beynon et al. (2016), Gieure and Buendía-Martínez (2016), Hernandez-Perlines et al. (2016), Kuckertz et al. (2016), and Núñez-Pomar et al. (2016).

Prior research has also studied the relationship between earnings and entrepreneurship. For instance, Carraher et al. (2003), in a multi-country analysis, found that the structure of income distribution was very particular for entrepreneurs, finding similar results for teachers. Martin et al. (2010) studied the relationship between entrepreneurship, income, and economic growth, and using aggregated data estimated that a better income distribution should improve entrepreneurship outcomes. Conversely, Hamilton (2000) found that self-employment earnings were significantly lower than employees' earnings, as the median self-employed earnings never overtake the employee counterpart's paid job wage, even when estimated with zero experience assigned. Berglann et al. (2010) examined the earnings of entrepreneurs in Norway and found a positive correlation between entrepreneurship and household resources and wealth. Kautonen et al. (2017) investigated how transition from employment to entrepreneurship impacts income and worker quality of life in England. While the authors found that a transition to entrepreneurship was correlated with a better quality of life, it had a negative impact on earnings. Finally, Halvarsson et al. (2018) studied the case of Sweden and found a significant source of inequality arising from entrepreneurship, with a significant proportion of entrepreneurs at the lower end of the income distribution, but also a proportion

contributing to the top end. A recent review of the value of entrepreneurship, relative to non-entrepreneurs, can be found in Van Praag and Versloot (2007).

Within this framework, this paper studies the determinants of entrepreneurship in South American countries, using fsQCA, by the income level of individuals. South America is an excellent region in which to analyze entrepreneurship, as its entrepreneurial rates are higher than in developed economies, but there are also significant differences between the rates of individuals who would like to become entrepreneurs, and the current rates of entrepreneurs in these countries (Bartesaghi et al., 2016). It is interesting to determine what drives individuals to establish a start-up, and the contribution of the paper is twofold. First, we provide a study of the determinants of entrepreneurship for low-income, middle-income, and high-income workers, and the differences among these groups. Results reveal that different income conditions the reasons why individuals become entrepreneurs, but also reveal gender differences, as the conditions underlying male and female entrepreneurial decisions seem to differ. Second, we contribute to the literature studying entrepreneurship using fsQCA. To the best of our knowledge, this study represents the first fsQCA analysis of the determinants of entrepreneurship, considering worker income. By comparing the analysis with classical quantitative techniques (e.g., linear regression models), the results suggest that this technique may be very helpful in understanding complex social phenomena and entrepreneurial activity.

The remainder of the paper is organized as follows. Section 2 shows the data used throughout the analysis. Section 3 sets out the empirical strategy, and Section 4 shows the main results. Section 5 concludes.

2. Data and variables

We use data from the GEM Adult Population Survey (APS) for the period 2005-2016. The APS is a database administered and collected every year by GEM with the objective of studying the motivations, attitudes, and actions of individuals in terms of entrepreneurial activity, in an international context. The APS data for the period 2005-2016 contains microdata at the global level, including information for 106 countries in Africa, America,

Asia, Europe, and Oceania, although information for certain countries is restricted to selected years. We drop from the sample those individuals from countries with missing information from six or more waves of the GEM APS data, which eliminates most of the countries in Asia and Oceania, and all African countries. As a consequence, in order to consider only countries within specific regions, we restrict the analysis to the Americas, excluding the United States. That leaves us with the following countries: Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, Jamaica, Mexico, Panama, Peru, and Uruguay.

One of the greatest contributions of GEM to the literature studying entrepreneurship is the identification of entrepreneurs using a consistent and established definition. For instance, GEM defines entrepreneurs as those individuals who are involved in the "Total early-stage Entrepreneurial Activity" (TEA) index. TEA is the most widespread index developed by GEM and represents "the percentage of the working age population both about to start an entrepreneurial activity, and who have started one, from a maximum of three-and-a-half years". (See https://www.gemconsortium.org/wiki/1154 for more information about GEM terminology.) In that context, we follow the definition of the GEM and define entrepreneurs as those individuals who are involved in the TEA. We restrict the sample to individuals between 18 and 64 years old, for whom the sample weight, defined as the "weight for the 18-64 labour force, adjusted to census data" by GEM, is not null. Individuals with missing information in any of the key variables of the analysis are also omitted from the sample, as is usual practice. These restrictions leave a total sample of 241,628 individuals, of whom 48,641 (i.e., 20.13% of the sample) are considered entrepreneurs, according to the TEA index. (See the sample composition, by year, in Table A1 in the Appendix.)

The main variable of our analysis is the entrepreneurial activity in the countries studied, which is measured as the rate, by gender, country, and year, of entrepreneurs over the total population, computed using sample weights. This variable, which is often called the "outcome" in fuzzy set terminology, is then equivalent to the TEA index computed by the GEM, but estimated separately for male and female working-age individuals, using the APS data. The main objective of the analysis is to disentangle the determinants of entrepreneurship, distinguishing by income levels. The GEM APS data classifies individuals in terms of their income level, which is measured as the "annual income of the entire household, including the respondent". Specifically, the GEM distinguishes three groups of

individuals in terms of their income: individuals with low income, individuals with middle income, and individuals with high income. We use this classification, and define the rates of entrepreneurs by gender, income level, country, and year.

Summary statistics of the entrepreneurial rates are shown in Table 1, by gender. Among low-income workers, the average entrepreneurial level is 15.1% for women, and 19.4% for men. For middle-income female workers, the percentage of entrepreneurs is 18.0%, with the difference with respect to their low-income counterparts being highly significant ($p = 0.006$). Among middle-income male workers, 22.2% are entrepreneurs, with the difference with respect to the low-income workers being significant at standard levels ($p = 0.013$). For high-income workers, 19.9% of female and 26.6% of males are entrepreneurs, and the differences with respect to the mid-income population are significant at standard levels ($p = 0.077$ for females, $p = 0.001$ for males), as are the differences with respect to the low-income workers ($p < 0.001$ and $p = 0.006$, respectively). All the differences by gender are highly significant ($p < 0.001$).

Figure 1 shows the evolution of the entrepreneurial rates, for the female and male population, according to the sample used throughout the analysis.[1] The average rate of entrepreneurs was about 13.7% for males and 10.0% for females in 2005. These magnitudes show a significant increase of 23.3% for males and 19.1% for females in 2016, with the difference between males and females keeping relatively constant within this period (i.e., about 4 percentage points). However, the maximum level of entrepreneurship is reached in 2015 for males, when 26.0% of the working age population was reported to be entrepreneurs, according to the sample. The highest rate of entrepreneurs among females is found in 2012, when 21.2% of the sample was reported to be entrepreneurs.

We consider some variables that are potential predictors of entrepreneurial activity, referred to as "conditions" in fuzzy set terminology. One shortcoming of the empirical approach followed in this analysis is that fsQCA requires a reduced set of conditions (Ragin, 2009). Therefore, we select four key dimensions from the APS data that have been found to be strongly related to entrepreneurship by prior research, namely formal education, peer effects, managerial skills, and the perception of entrepreneurship as a desirable career. As

[1] Entrepreneurship levels, by country and year, are shown in Table A2 in the Appendix.

gender has also been found to be a strong predictor of entrepreneurial intentions, all the empirical analysis is performed separately for women and men (Minniti and Nardone 2007; Minniti, 2009, 2010). Formal education has been found to be a strong determinant of entrepreneurship (Bosma et al., 2004; Brixiova et al., 2015). The APS data allows us to classify individuals in terms of their maximum level of formal education achieved, including individuals with primary education, secondary education, and University education. We then consider University education as one of our four conditions of entrepreneurship, since individuals who have attended University may acquire certain skills that ultimately increase the probability of them becoming entrepreneurs. We also consider whether individuals know other entrepreneurs among their peers, as entrepreneurial behaviors have been found to be connected to the behaviors of peers, suggesting that peer effects may be a strong predictor of entrepreneurial intent (Nicolaou et al. 2008; Zhang et al. 2009; Nicolaou and Shane 2010; Klyver et al., 2012). We consider the (self-reported) entrepreneurial skills of individuals, as these managerial abilities may determine if individuals consider themselves ready to be entrepreneurs, beyond their formal education (Kotsova, 1997; Minniti, 2009; Levie and Autio, 2013). Finally, we define the social perception of entrepreneurship as the self-reported consideration of entrepreneurship as a desirable career (Roskruge et al., 2016). The APS questionnaire items used to define these variables are shown in Table A3 in the Appendix. These four conditions are aggregated at the country level, for males and females and by income levels, using sample weights. Summary statistics of variables are shown in Table 1.

3. Strategy

Fuzzy sets and calibration

Fuzzy sets are variables that measure the fulfilment of a characteristic, or the degree of belonging to a group, in the continuum range (0, 1). (See the introduction and building of the fuzzy set approach in Ragin, 2000). The main advantage of this type of variable, then, is that they are not restricted to a fixed number of categories, as is the case of categorical variables (that is, variables taking natural values from 1 to 10, for instance), and allow us to calibrate for partial fulfilment at different degrees. Therefore, they are useful as accurate modelling tools. (See Ragin (2009) for a review of fuzzy sets.)

This study uses fsQCA and, following Coduras et al. (2016) and Velilla et al. (2018), the calibration of fuzzy sets from the aggregated variables at the country level is based on the approach of Ragin (2007). The direct method consists of the definition of three thresholds for each variable to be transformed to a fuzzy set. The first such threshold is a cross-over point, representing the value of ambiguity, i.e., the point at which a country is neither in nor out of the corresponding category. The second and third thresholds are the full membership and full non-membership values, which characterize whether a country is fully in, or fully out, of a certain category. The selection of these thresholds is not standard, and therefore we consider the same rule for the outcome variable and the four conditions of the analysis. We define, by income level and gender, the cross-over point as the median of the corresponding variable, while full membership and full non-membership are defined as the ninth and first deciles, respectively (see Figure 1 in Velilla et al., 2018). Given the significant differences found in Table 1 regarding the levels of entrepreneurship by gender, and among income levels, it seems more accurate to use different thresholds for each group, rather than the same threshold for all the groups of income levels.

Once these three thresholds are defined, the calibration, according to the direct method of Ragin (2007) is as follows. First, for each observation and variable, the raw deviation from the cross-over point is defined. That deviation is then transformed into log odds, as follows. If the deviation is positive, indicating that a variable is greater than the cross-over threshold, we define a multiplying ratio as 3 times the inverse of the difference between the full membership score and the median. If the deviation is negative, the same definition applies, with the absolute value of the difference between the median and the full non-membership threshold. Then, log odds are defined by multiplying deviations and the corresponding ratio. Finally, the degree of membership, or fuzzy set score, is defined as:

$$\text{Degree of membership} = \frac{\exp(\log \text{odd})}{1 + \exp(\log \text{odd})}.$$

Fuzzy set Qualitative Comparative Analysis

Fuzzy set Qualitative Comparative Analysis (fsQCA) is a qualitative technique whose main objective is to find causal links between all the possible combinations of a series of conditions

and an objective variable, often called output in fsQCA terminology (Ragin, 2009, Ragin and Stand, 2014). The main advantage of fsQCA is that it is not based on quantitative tools and, therefore, may provide different results than traditional techniques, such as regression analyses (Woodside et al., 2012). For instance, fsQCA has been applied to the study of entrepreneurial decisions (see Wu, 2016), and prior research has found that it can provide useful results that, otherwise, may be overlooked when relying on quantitative econometric and statistical techniques. However, this study represents, so far, the first analysis of the different determinants of entrepreneurial activity using fsQCA, in terms of workers' income level.

This analysis is based on the sufficient conditions analysis of a given outcome, Y, in terms of a series of conditions, X_k, $k \in \mathbb{N}$, which is the standard and simplest form of fsQCA (Ragin, 2008). The sufficient conditions analysis identifies a series of combinations of the different conditions included in the model that cause the output to be true, in the form of a Truth Table (Quine-McCluskey minimization procedure). The key determination is, then, the selection of a threshold, or cutoff value, to determine the causal conditions identified in the Truth table that are consistent with the data. If $\mathbb{X}$ represents the combination of a series of conditions, then the consistency of $\mathbb{X}$ as a sufficient condition for Y is defined as:

$$\text{Consistency}(\mathbb{X}) = \frac{\sum \min(\mathbb{X}_i, Y_i)}{\sum \mathbb{X}_i},$$

where the sub-index i represents each of the observations in the sample. (See Ragin (2006, 2008) for a detailed description of fsQCA and the sufficient conditions analysis.) The cutoff consistency chosen for the analysis is 0.75 (Ragin, 2009), and the frequency cutoff is set to 5, meaning that solutions must be fulfilled by at least 5 observations.

This analysis applies fsQCA to the topic of entrepreneurship, and studies the following model:

$$\text{Entrepreneurship} = f(\text{univ, peer, skills, social}),$$

where "univ", "peer", "skills", and "social" represent the scores of the corresponding explanatory variables, or conditions (University education, peer effects, entrepreneurial skills, and social perception, respectively). The analysis is replicated by gender, and for low-, middle-, and high-income individuals.

4. Results

Results for female workers

Table 2 shows the different combinations of conditions that lead to high levels of entrepreneurship for female workers, by their income level. Panel A shows the results for low-income female workers, Panel B for middle-income female workers, and Panel C for high-income female workers. The countries satisfying each of the configurations found in Table 2 are shown in Table A4 in the Appendix.

For low-income females, few workers report knowing other entrepreneurs, but a high social perception of entrepreneurship is seen as a desirable labor career, leading to high entrepreneurial rates. This is the case in Argentina, Brazil, Colombia, Ecuador, Guatemala, and Uruguay. Higher numbers of low-income females report having entrepreneurial skills, combined with a good valuation of entrepreneurship as a desirable career, also leading to high entrepreneurial rates in Argentina, Chile, Ecuador, Guatemala, Jamaica, and Peru. Higher numbers still of low-income females have attended University, showing high rates of knowing other entrepreneurs, but with low levels of entrepreneurial skills, and a poor valuation of entrepreneurship also lead to high values of entrepreneurial rates. This is shown to be the case only for Chile, Mexico, Panama, and Peru.

For middle-income females, the first result is analogous to the first result for low-income females, i.e., low levels of peer effects and a high valuation of entrepreneurship, leading to high levels of entrepreneurship among these workers. This configuration is found in Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, and Jamaica. For Argentina, Ecuador, Colombia, Guatemala, Jamaica, Mexico, Panama, and Peru, we find that high levels of peer effects and of entrepreneurial skills lead to high entrepreneurial rates. Finally, countries in which there are few middle-income females with a University education, where entrepreneurship is not well-valued, but where a lot of such women know other entrepreneurs, also show high levels of entrepreneurship. This combination of conditions is found in Argentina, Brazil, Guatemala, Jamaica, Mexico, Peru, and Uruguay.

Among high-income female workers, our results show four possible configurations that lead to high levels of entrepreneurship. The first corresponds to low levels of peer effects but a high social valuation of entrepreneurship. This configuration is found in Argentina, Brazil, Chile, Colombia, Ecuador, and Guatemala, and was also a result for middle and low-income females. These conditions operate for all the income levels among females in Argentina, Brazil, Colombia, Ecuador and Guatemala. This suggests that, despite the different income levels, this particular set of conditions applies. The second configuration, a high percentages of women having attended University, with a high valuation of entrepreneurial skills, is the case of Argentina, Chile, Colombia, Ecuador, Jamaica, Mexico, Panama, Peru, and Uruguay. The third set of conditions, high percentages of women having attended University, and a good valuation of entrepreneurship, also leads to high rates of entrepreneurship in Brazil, Chile, Colombia, Ecuador, Jamaica, Panama, and Peru. Finally, in Chile, Colombia, Ecuador, Guatemala, Jamaica, and Peru, high levels of entrepreneurship are achieved through high levels of skills and a good valuation of entrepreneurship as a desirable career.

Results for male workers

The sufficient conditions for male workers, by income level, are shown in Table 3. For low-income males (Panel A), a high percentage attended University and have a good valuation of their skills, leading to high entrepreneurial rates in Argentina, Chile, Colombia, Jamaica, Mexico, Peru and Uruguay. The second configuration that leads to high entrepreneurial rates is a combination of peer effects and a high valuation of entrepreneurial skills. This is found to be the case of Argentina, Chile, Colombia, Guatemala, Jamaica, Panama and Peru. The third combination reveals that high entrepreneurial rates exist in countries with low percentages of low-income males attending University, and where peer effects and the social valuation of entrepreneurship are both strong. Brazil, Chile, Colombia, Ecuador, Guatemala and Uruguay satisfy this configuration. The last set of conditions that lead to high entrepreneurial rates is a strong presence of peer effects and social valuation of entrepreneurship, combined with high rates of low-income workers having attended University. This is the case of Argentina, Brazil, Chile, Colombia, Jamaica and Peru. Interestingly, in Brazil, Chile, and Colombia, the combination of peer effects and the social

perception of entrepreneurship appears to be a strong determinant of entrepreneurship, regardless of whether the percentage of low-income workers with University education is strong or not.

Results for middle-income males are shown in Panel B of Table 3. The first set of results shows that low values of peer effects, combined with a high perception of entrepreneurship among the middle-income population, lead to high entrepreneurial rates for these male workers. This is reported in Argentina, Brazil, Chile, Colombia, Ecuador and Guatemala. The second sret of sufficient conditions for high values of entrepreneurship among the middle-income male population is high levels of self-reported entrepreneurial skills and a good social valuation of entrepreneurship. This case is satisfied by Argentina, Colombia, Ecuador, Guatemala, Jamaica, and Peru. The last set of conditions for middle-income males is the combination of high peer effects and a high self-valuation of skills, combined with low rates of middle-income workers with University education. This third configuration appears in Colombia, Ecuador, Guatemala, Jamaica, Mexico, Peru, and Uruguay.

Finally, Panel C of Table 3 shows the three different configurations that lead to high entrepreneurial rates for high-income male workers. Good entrepreneurial skills and a high valuation of entrepreneurship among high-income males lead to high entrepreneurial rates in Chile, Colombia, Ecuador, Guatemala, Jamaica, and Peru. When the social perception of entrepreneurship is low, but there are high rates of high-income males with University education, and peer effects are strong, then high entrepreneurial rates follow in Chile, Mexico, Panama, and Uruguay. The last combination of conditions is a low percentage of high-income males with a University degree, but strong peer effects and a good social valuation of entrepreneurship. This configuration is found in Argentina, Brazil, Colombia, Guatemala, Jamaica, Panama, and Peru.

Discussion of results

The results shown in Tables 2 and 3 show significant differences in the determinants of high entrepreneurial rates in the analyzed countries. For instance, for male workers, we could not find any configuration of conditions leading to a high outcome that prevails simultaneously for low-, middle-, and high-income workers. Contrarily, low peer effects but a good social

valuation of entrepreneurship is a configuration that leads to high entrepreneurial rates among females, regardless of their income level. For example, Argentina, Brazil, Colombia, Ecuador, and Guatemala satisfy that configuration for all income levels, suggesting some degree of homogeneity in the determinants of entrepreneurship across income levels for female workers, but not for male workers.

When focusing on which countries satisfy which configurations, we find that all the countries satisfy at least one of the different configurations found, for each income-level studied, and for males and females. The only exception is Panama, for male workers, as this country does not appear in any configuration among the middle-income population. This result suggests that either different determinants operate for male middle-income workers, or entrepreneurial levels are consistently low for this sample. Furthermore, as Panama is found to operate in 3 configurations for males, further research should take this result as a benchmark and determine whether other conditions, in terms of different variables, may lead to high entrepreneurial rates in Panama and other countries.

The results shown in Table A4 in the Appendix provide suggestive evidence about countries where the conditions used in this analysis are more important. For instance, Chile, Guatemala, Jamaica, and Peru satisfy 7 of the 10 conditions that form the results for males, and also 7 out of 10 conditions among females. Colombia satisfies 9 conditions for the male results, and 7 conditions in the results for females; and Argentina satisfies 7 conditions among females, and 6 conditions among males. This suggests that the conditions studied are relevant in the same countries, though through different channels, depending on the gender of individuals and on their income. Similarly, the countries that appear to be the least promising for males are the same countries that appear to be the least promising for females (Mexico, Panama, and Uruguay). Further research is required to study what, if anything, drives entrepreneurship in these countries.

Finally, Table 4 shows the equivalent analysis studied quantitatively through OLS regressions. Results are scarce in such analysis, suggesting that the main predictor of entrepreneurial activity at the country level is the level of entrepreneurial skills, regardless of the group of workers being studied, with the remaining explanatory variables being not statistically significant in general terms. These estimates contrast sharply with the fsQCA

results, indicating that this qualitative analysis may be very useful in analyzing complex processes such as entrepreneurship, as they may reveal results and patterns that otherwise could be underestimated using traditional quantitative techniques, such as linear regressions.

6. Conclusions

This paper studies the determinants of entrepreneurship in South American countries, using fsQCA applied to the GEM data, depending upon individual income levels. The results of the analysis reveal that there are differences in the conditions that lead individuals to become entrepreneurs. We also find gender differences, as the same combinations do not operate for males and females at the same time. Peer effects, the social perception of entrepreneurship, and entrepreneurial skills all seem to be decisive when determining entrepreneurial intent. However, these conditions operate in both complementary and substitutive ways, and the same combination of conditions appears not to work in all the countries, even when taking into account the gender and income level of workers.

The analysis has certain limitations. First, fsQCA is a qualitative technique, and therefore does not allow us to quantify the different relationships and causal links. Second, fsQCA allows us to study only a limited number of conditions simultaneously. Furthermore, the sample does not cover all the periods for each of the countries, and therefore may be unbalanced. Despite these limitations, however, the results of this analysis can be important for planners and policy makers in South American countries in terms of identifying those individuals who aim to become - or who are - entrepreneurs and understand what drives their entrepreneurial intent in the different countries analyzed. In a region where there is a significant difference between the rate of individuals who would like to be entrepreneurs, and the rate of those who are currently entrepreneurs (Bartesaghi et al., 2016), governments and researchers should understand why those individuals who want to become entrepreneurs do not do so. Although there appear to be no global recipes to promote entrepreneurship, such promotion would seem to be a desirable measure. Promoting specific training to develop managerial skills may also be beneficial, especially for low-income workers, and peer effects also seem to encourage workers to become entrepreneurs. However, our results suggest that

some of these processes may be complemented or even substituted by others, and thus countries should search for the most efficient combinations in their particular scenarios.

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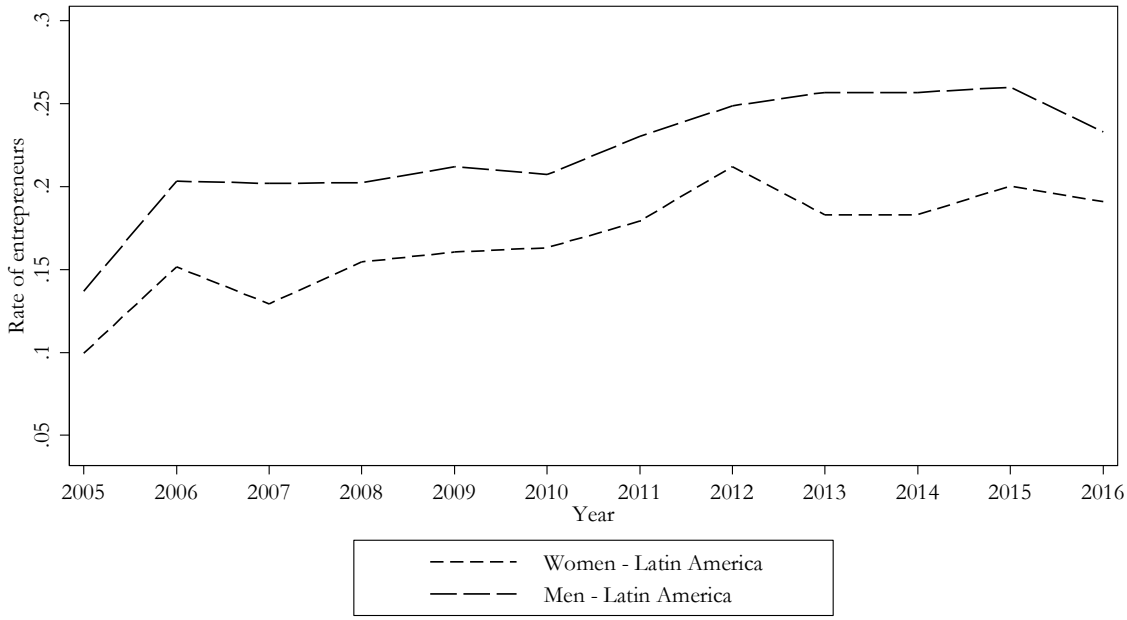
Figure 1: Evolution of entrepreneurial rates



Note: The sample is taken from the GEM APS 2005-2016 data.

Table 1: Summary statistics

	Women		Men	
	Mean	S.D.	Mean	S.D.
LOW INCOME				
Entrepreneurship	0.151	0.072	0.194	0.075
University ed.	0.059	0.053	0.075	0.059
Peer effects	0.301	0.107	0.384	0.100
Entrep. skills	0.507	0.123	0.615	0.112
Social perception	0.602	0.219	0.612	0.214
MIDDLE INCOME				
Entrepreneurship	0.180	0.083	0.222	0.090
University ed.	0.087	0.087	0.074	0.083
Peer effects	0.372	0.101	0.439	0.107
Entrep. skills	0.577	0.125	0.658	0.113
Social perception	0.617	0.216	0.639	0.216
HIGH INCOME				
Entrepreneurship	0.199	0.076	0.266	0.094
University ed.	0.249	0.154	0.245	0.157
Peer effects	0.442	0.095	0.542	0.090
Entrep. skills	0.609	0.105	0.709	0.102
Social perception	0.599	0.217	0.620	0.211
N. Countries	111		111	

Note: The sample is taken from the GEM APS 2005-2016 data. Variables are aggregated at the country level, by year, using sample weights.

Table 2: Complex solutions - Female workers

CONDITIONS	Coverage	Consistency
A) LOW-INCOME POPULATION		
~Peer * social	0.442	0.747
Skills * social	0.545	0.789
Univ * peer * ~skills * ~social	0.232	0.758
Overall	0.705	0.728
B) MIDDLE-INCOME POPULATION		
~Peer * social	0.468	0.701
Peer * skills	0.565	0.773
~Univ * peer * ~social	0.345	0.781
Overall	0.828	0.696
C) HIGH-INCOME POPULATION		
~Peer * social	0.445	0.759
Univ * skills	0.536	0.787
Univ * social	0.503	0.799
Skills * social	0.628	0.786
Overall	0.820	0.711

Note: The sample is taken from the GEM APS 2005-2016 data. Solutions correspond to the "Complex Solution" (Quine-McCluskey algorithm), fsQCA software (Ragin and Stand, 2014). Consistency cutoff: 0.75.

Table 3: Complex solutions - Male workers

CONDITIONS	Coverage	Consistency
A) LOW-INCOME POPULATION		
Univ * skills	0.508	0.839
Peer * skills	0.537	0.756
~Univ * peer * social	0.341	0.834
Univ * peer * social	0.364	0.815
Overall	0.802	0.755
B) MIDDLE-INCOME POPULATION		
~Peer * social	0.423	0.731
Skills * social	0.615	0.768
~Univ * peer * skills	0.412	0.780
Overall	0.728	0.704
C) HIGH-INCOME POPULATION		
Skills * social	0.631	0.817
Univ * peer * ~social	0.303	0.776
~Univ * peer * social	0.329	0.756
Overall	0.734	0.759

Note: The sample is taken from the GEM APS 2005-2016 data. Solutions correspond to the "Complex Solution" (Quine-McCluskey algorithm), fsQCA software (Ragin and Stand, 2014). Consistency cutoff: 0.75.

Table 4: OLS estimates

	Low-income		Mid-income		High-income	
	Women	Men	Women	Men	Women	Men
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
University ed.	0.015	0.102	-0.036	0.061	0.053	0.111**
	(0.094)	(0.096)	(0.092)	(0.104)	(0.040)	(0.044)
Peer effects	0.030	-0.048	0.084	-0.047	0.021	-0.093
	(0.126)	(0.105)	(0.133)	(0.105)	(0.153)	(0.103)
Entrep. skills	0.313**	0.369***	0.330**	0.434***	0.359**	0.495***
	(0.114)	(0.107)	(0.106)	(0.122)	(0.130)	(0.122)
Social perception	0.011	0.031	0.017	0.022	0.068*	0.053
	(0.032)	(0.032)	(0.034)	(0.041)	(0.031)	(0.036)
Constant	-0.024	-0.042	-0.049	-0.062	-0.082	-0.094
	(0.033)	(0.042)	(0.044)	(0.059)	(0.053)	(0.062)
N. Observations	111	111	111	111	111	111
R-squared	0.325	0.332	0.331	0.310	0.365	0.384

Note: The sample is taken from the GEM APS 2005-2016 data. Standard errors, clustered at the country level, shown in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix A: Additional tables

Table A1: Countries in the sample, by year

COUNTRY	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Argentina	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brazil	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chile	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Colombia	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ecuador	-	-	-	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
Guatemala	-	-	-	-	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes
Jamaica	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes
Mexico	Yes	Yes	-	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panama	-	-	-	-	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
Peru	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Uruguay	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The sample is taken from the GEM APS 2005-2016 data.

Table A2: Entrepreneurship rates, by country and year

COUNTRY	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Argentina	0.104	0.115	0.138	0.165	0.183	0.139	0.244	0.220	0.190	0.191	0.214	0.183
Brazil	0.119	0.127	0.123	0.146	0.175	0.201	0.177	0.183	0.197	0.197	0.239	0.217
Chile	0.116	0.123	0.126	0.141	0.172	0.189	0.260	0.247	0.274	0.274	0.281	0.260
Colombia	-	0.232	0.229	0.269	0.244	0.228	0.226	0.220	0.255	0.255	0.243	0.306
Ecuador	-	-	-	0.194	0.191	0.239	-	0.288	0.385	0.385	0.370	0.338
Guatemala	-	-	-	-	0.188	0.178	0.206	-	0.134	0.134	0.194	0.219
Jamaica	0.185	0.205	-	0.158	0.255	0.123	0.148	0.508	0.147	0.147	-	0.110
Mexico	0.064	0.054	-	0.121	-	0.118	0.117	0.139	0.155	0.155	0.211	0.102
Panama	-	-	-	-	0.100	-	0.216	0.097	0.226	0.226	0.149	0.146
Peru	-	0.423	0.244	0.268	0.217	0.292	0.244	0.217	0.271	0.271	0.227	0.271
Uruguay	-	0.137	0.132	0.137	0.134	0.132	0.203	0.182	0.173	0.173	0.158	0.173

Note: The sample is taken from the GEM APS 2005-2016 data. Entrepreneurship is measured according to the participation in the TEA.

Table A3: Variables and survey questions

VARIABLE	SURVEY QUESTION
Entrepreneurship	"Involved in Total early-stage Entrepreneurial Activity"
University ed.	-
Peer effects	"Do you know someone personally who started a business in the past 2 years?"
Entrep. skills	"Do you have the knowledge, skill and experience required to start a new business?"
Social perception	"In my country, most people consider starting a new business a desirable career."

Note: The sample is taken from the GEM APS 2005-2016 data.

Table A4: Complex solutions - Countries satisfying the conditions

FEMALE WORKERS	COUNTRIES
A) LOW-INCOME POPULATION	
~Peer * social	Argentina, Brazil, Colombia, Ecuador, Guatemala, Uruguay
Skills * social	Argentina, Chile, Ecuador, Guatemala, Jamaica, Peru
Univ * peer * ~skills * ~social	Chile, Mexico, Panama, Peru
B) MIDDLE-INCOME POPULATION	
~Peer * social	Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, Jamaica
Peer * skills	Argentina, Ecuador, Colombia, Guatemala, Jamaica, Mexico, Panama, Peru
~Univ * peer * ~social	Argentina, Brazil, Guatemala, Jamaica, Mexico, Peru, Uruguay
C) HIGH-INCOME POPULATION	
~Peer * social	Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala
Univ * skills	Argentina, Chile, Colombia, Ecuador, Jamaica, Mexico, Panama, Peru, Uruguay
Univ * social	Brazil, Chile, Colombia, Ecuador, Jamaica, Panama, Peru
Skills * social	Chile, Colombia, Ecuador, Guatemala, Jamaica, Peru
MALE WORKERS	COUNTRIES
A) LOW-INCOME POPULATION	
Univ * skills	Argentina, Chile, Colombia, Jamaica, Mexico, Peru, Uruguay
Peer * skills	Argentina, Chile, Colombia, Guatemala, Jamaica, Panama, Peru
~Univ * peer * social	Brazil, Chile, Colombia, Ecuador, Guatemala, Uruguay
Univ * peer * social	Argentina, Brazil, Chile, Colombia, Jamaica, Peru
B) MIDDLE-INCOME POPULATION	
~Peer * social	Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala
Skills * social	Argentina, Colombia, Ecuador, Guatemala, Jamaica, Peru
~Univ * peer * skills	Colombia, Ecuador, Guatemala, Jamaica, Mexico, Peru, Uruguay
C) HIGH-INCOME POPULATION	
Skills * social	Chile, Colombia, Ecuador, Guatemala, Jamaica, Peru
Univ * peer * ~social	Chile, Mexico, Panama, Uruguay
~Univ * peer * social	Argentina, Brazil, Colombia, Guatemala, Jamaica, Panama, Peru

Note: The sample is taken from the GEM APS 2005-2016 data. Solutions correspond to the "Complex Solution" (Quine-McCluskey algorithm), fsQCA software (Ragin and Stand, 2014). Consistency cutoff: 0.75.