

Entrepreneurship rates: the fuzzy-set approach

Paulo Ferreira

CEFAGE-UE, IIFA, Universidade de Évora, Largo dos Colegiais 2,
7000 Évora, Portugal

Departamento de Ciência e Tecnologia Animal, Escola Superior
Agrária de Elvas, Instituto Politécnico de Portalegre, Portugal

Telephone: (+351) 266 706 581

Email: pjsf@uevora.pt

Andreia Dionísio

CEFAGE-UE, IIFA, Universidade de Évora, Largo dos Colegiais 2,
7000 Évora, Portugal

Telephone: (+351) 266 706 581

Email: andreia@uevora.pt

Reviewers:

António CALEIRO, Universidade de Évora, Portugal;

Cornel IONESCU, Institute of National Economy, Romania;

Raimi LUKMAN, Yaba College of Technology, Nigeria.

Abstract

A fuzzy-set qualitative comparative analysis is applied to determine the necessary and sufficient conditions for higher entrepreneur rates. Based on Global Entrepreneurship Monitor data, it is shown that the most relevant conditions are Media Attention to Entrepreneurship, as well as Perceived Capabilities and Perceived Opportunities. The non-existence of Fear of Failure is also an important factor in determining higher entrepreneurship rates. When the sample is split, this condition is more important for most developed countries. This can be viewed as relevant information for policymakers to better define their policies to promote entrepreneurship, which is a key to more sustainable growth in countries.

Keywords: fuzzy-set qualitative comparative analysis, Global Entrepreneurship Monitor, necessary conditions, sufficient conditions, entrepreneurship rates

JEL classification: C00, L26, O57

Introduction: entrepreneurship and the Global Entrepreneurship Monitor

The concept of entrepreneurship has been widely used in recent years and from different types of analysis. However, this is not a new concept. Although there is no unanimity about the origin of the concept, one of the first approaches would probably be that adopted by Richard Cantillon

(1755), an 18th century French banker, who called an entrepreneur a person “willing to buy at a certain price and to sell at an uncertain price” (his original *Essai sur la nature du commerce en general* was published in 1755). In his *An inquiry into the nature and causes of the wealth of nations* Adam Smith (1776) also made a reference to entrepreneurs, as economic actors that transform demand in supply. Later, Jean Baptiste Say (1816) identified an entrepreneur as a person who owns a firm and adds value to an economy.

Another important definition cited in the literature is the one by Schumpeter (1934), which links the concept of entrepreneurship with the concept of innovation. He recognizes an entrepreneur as a person who introduces new goods to the market, a new method of production, a new organization of an industry, which opens up a new market or finds a new source of raw material supply. This linkage between entrepreneurship and innovation is also mentioned, for example, by Drucker (1985).

The literature on entrepreneurship also contains other viewpoints. For example, some authors emphasize entrepreneurship as the identification and development of opportunities (see, for example, Kizner, 1973, Shane and Venkataraman, 2000, or Shane, 2003, among others). Other authors highlight the characteristics and the behaviour of entrepreneurs (see, for example, McClelland, 1961). Another approach is to see entrepreneurship as a process of creating new firms: Low and MacMillan (1988) or Gartner (1988) are some of the precursors of this concept. This definition is shared, for example, by the Global Entrepreneurship Monitor (GEM), a study about the level of entrepreneurship in several countries. The GEM is formed of a consortium of universities, which was initiated in 1999, and its most recent version has 2014 data (GEM, 2015).

Indeed, the literature on entrepreneurship is vast. Describing the extent of those studies is beyond our objective, but very interesting reviews about entrepreneurship are found in the work by Audretsch (2003) or Acs and Audretsch (2010).

In this paper, we use a definition of entrepreneurship nearer to that defined in GEM. In this report, the Total Early-stage Entrepreneurial Activity (TEA) is calculated: the “percentage of individuals aged 18-64 who are either a nascent entrepreneur or owner-manager of a new business.” Nascent entrepreneurs are those involved in setting up a business from 0 to 3 months and owner-managers of a new business those who have businesses up to 3.5 years old (see GEM, 2015). The

GEM report also presents indicators related to inclusiveness (gender and age), employment and social activities.

The GEM report is based on a conceptual framework formed of three components: “individual attributes, which reflect perceptions about opportunities, capabilities to act entrepreneurially, entrepreneurial intentions and fear of failure; social values, which reflect how the society values entrepreneurial behaviour; and entrepreneurship indicators, different forms of entrepreneurial activity along the life cycle of a venture (nascent, new business, established business, share of high ambitious ventures, discontinuation) and motivation for venturing (opportunity vs. necessity based ventures)” (GEM, 2015, p. 27).

The information in the GEM report is obtained using two different tools for collecting data: the Adult Population Survey (APS), which records information about individuals’ attributes, attitudes and activities, and the National Experts Survey (NES), which records experts’ opinions about entrepreneurship and countries’ conditions.

The NES is formed of a set of questions about nine different features of entrepreneurship: entrepreneurial finance, government policy, government entrepreneurship programs, entrepreneurship education, R&D transfer, commercial and legal infrastructure, entry regulation, physical infrastructure and cultural and social norms. Those questions and features are not treated in this paper so for further information, see the original report.

The APS has two main objectives: to evaluate social values regarding entrepreneurship and to assess individual attributes.

Social values are surveyed in the GEM (2015) according to three different dimensions: if people consider starting a new business as a desirable career choice, if entrepreneurship is recognized as commanding a high status and respect and if media attention promotes an increase in entrepreneurship. These social values are important because they can influence people to be or not to be an entrepreneur (see, for example, Hoang and Antoncic, 2003 or Kwon and Arenius, 2010).

The individual attributes analysed in the APS are perception of opportunities, perception of own capabilities to be a successful entrepreneur, fear of failure and entrepreneurial intentions. These questions are enhancers of entrepreneurship, except for fear of failure, which could be seen as limiting entrepreneurial activity (see, for example, Arenius and Minniti, 2005, Koellinger et al., 2007 or Caliendo et al., 2009).

Questions surveyed in the APS are expected to have an influence on peoples choices. In this way, it could be important for political decision-makers to know which factors could be considered more important than others. In this paper, we propose to analyse how the conditions given by the APS could influence entrepreneurship rates, using fuzzy-set qualitative comparative analysis (fsQCA). This methodology, which will be presented in the next section, aims to find out, from a set of conditions to be analysed (APS questions), which ones are necessary and/or sufficient for a given outcome. Our outcome variable is Total Early-stage Entrepreneurial Activity (TEA). All the conditions are explained in Table 1. Besides those seven questions grouped in social values regarding entrepreneurship and individual attributes, we add another question, also provided by APS, which is knowing the start-up entrepreneur rate. This could also be seen as an enhancer of entrepreneurial activity (see, for example, Hoshino, 2013). Summarizing, we can explain our model as $TEA = f(EGCC, HSSE, MAE, PO, PC, FF, EI, KSER)$, $f(.)$ meaning a *function of*.

fsQCA is a qualitative methodology which is gaining importance in the social sciences, because it can be used in complex problems (see, for example, Ragin, 1987, 2000). We can see various applications of QCA to entrepreneurship. For example, Hornaday (1992) uses it in order to arrive at a better definition of entrepreneurship. More recently, Khefacha and Belkacem (2015) and Muñoz and Kibler (2016) use fuzzy sets with two different objectives: the first is to develop an economic-psychological model of factors that influence individuals' intentions to be entrepreneurs for the specific case of Tunisia; the second is to analyse specific conditions that explain the confidence of social entrepreneurs in the UK in managing their businesses.

This study fills a gap in the literature by studying causal conditions that are more important for greater entrepreneurial activity in different countries. This is why we use fsQCA for our data.

The remainder of the paper is organized as follows: in Section 2 we explain the data and methodology used (fsQCA); Section 3 presents the results; Section 4 discusses those results and concludes.

Table 1.
Adult Population
Survey (APS).
Source: GEM
(2015)

Adult Population Survey		
Social values towards entrepreneurship	Entrepreneurship as a good career choice (EGCC)	Percentage of 18-64 population who agree with the statement that in their country, most people consider starting a business as a desirable career choice
	High status to successful entrepreneurs (HSSE)	Percentage of 18-64 population who agree with the statement that in their country, successful entrepreneurs receive high status
	Media attention for entrepreneurship (MAE)	Percentage of 18-64 population who agree with the statement that in their country, you will often see stories in the public media about successful new businesses
Individual attributes	Perceived opportunities (PO)	Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who see good opportunities to start a firm in the area where they live
	Perceived capabilities (PC)	Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who believe they have the required skills and knowledge to start a business
	Fear of failure (FF)	Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who indicate that fear of failure would prevent them from setting up a business
	Entrepreneurial intention (EI)	Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who are latent entrepreneurs and who intend to start a business within three years
Other factor	Know Startup Entrepreneur Rate (KSER)	Percentage of 18-64 population who personally know someone who started a business in the past two years

Data and methodology

In this paper, we use data from the last report of the GEM (2015). In this report, Total Early-Stage Entrepreneurial Activity is calculated for 2014. According to the report, more than 206000 individuals were surveyed

across 73 countries. However, not all countries have information for all the indicators we need. In fact, all indicators were only available for 62 countries. The list of countries used in this work appears in Table 2.

Table 2.
Countries used
in our analysis

Angola	China	Greece	Kosovo	Qatar	Taiwan
Argentina	Colombia	Guatemala	Lithuania	Romania	Thailand
Australia	Costa Rica	Hungary	Luxembourg	Russia	Trinidad and Tobago
Barbados	Croatia	India	Malaysia	Singapore	United Kingdom
Belgium	Ecuador	Indonesia	Mexico	Slovakia	United States
Belize	El Salvador	Iran	Netherlands	Slovenia	Uruguay
Bolivia	Estonia	Ireland	Peru	South Africa	Vietnam
Bosnia and Herzegovina	Finland	Italy	Philippines	Spain	
Botswana	France	Jamaica	Poland	Suriname	
Canada	Georgia	Japan	Portugal	Sweden	
Chile	Germany	Kazakhstan	Puerto Rico	Switzerland	

The main objective of this paper is to analyze entrepreneurship rates using fuzzy-set qualitative comparative analysis (fsQCA). The main objective of this methodology is to account for individual outcomes (or effects) and the patterns (conditions) that cause those outcomes (see, for example, Wagemann and Schneider 2010). This qualitative methodology opposes quantitative ones, whose main objective is to find cause-effect relations between dependent and independent variables. As referred to by Vis (2012), “fsQCA fits the causes-of-effects approach most because this approach aims to reveal the minimal (combinations of) conditions bringing about a particular outcome in specific cases.” In fact, fsQCA is

just one of the alternatives when working with qualitative comparative analysis. It can be used with only binary data (the original approach, called crisp set QCA – csQCA) and also with multi-value data (using categorical variables with more than two values). For more information see, for example, Ragin (2008).

Introduced in the literature by Ragin (1987), qualitative comparative analysis has since been developed (see, for example, Ragin, 2008). Used mainly in social sciences such as Sociology, in recent years it has also been used in Economics and Management. For example, we can find studies about countries' economic performance (Vis et al., 2007) or about export performance (Schneider et al., 2010). As far as we know, besides the studies referred to in the introduction, no published work uses fsQCA to study entrepreneurship as we do.

Since we want to study the conditions for having better innovation results, instead of estimating this, fsQCA seems to be the most suitable methodology and approach. In fact, fsQCA does not make a pure cause-effect analysis. Furthermore, fsQCA is also able to analyze different combinations of conditions in a problem (Ragin, 2008). Another important issue is that this methodology is also well suited to cases of small or medium-sized samples, as we have here (see, for example, Vis, 2012).

It is important to mention that fsQCA is able to capture the existence of necessary and sufficient conditions. Necessary conditions are measured by “consistency”, which measures the degree to which each case corresponds to a set-theoretic relationship given by a solution. In other words, we want to know what proportion of cases is consistent with a given outcome. We use a measure of consistency introduced by Ragin (2006) which penalizes severe inconsistencies. To analyze sufficient conditions, we use the truth table algorithm (see, for example, Ragin, 2008). This is an algorithm that groups causal conditions in core and peripheral causes.

While in regressions we normally use data directly from the source, in fsQCA we need a process called calibration (Ragin 2008). According to Ragin (2000), a fuzzy-set is “a fine-grained, continuous measure that has been carefully calibrated using substantive and theoretical knowledge relevant to set membership”. In this calibration process, the researcher establishes, for each condition and for the outcome, the *fully in* set (which means that the variable should have the value of 1), the *fully out* set (0) and also a crossover point (0.5), which means that the

observation in *neither in nor out* the set. This calibration serves to rescale conditions in an interval ranging from 0 to 1.

The number of fuzzy sets defined can vary. In this study we chose three sets for each condition and outcome. Data calibration was based on a percentile approach. According to Ragin (2008), this approach is suitable when we have continuous data. The basic intuition behind the calibration is rescaling an interval variable defining cutting points: the “fully in” set (1), the “fully out” set (0) and the “neither in nor out” crossover point (0.5). As mentioned, since we applied the percentile approach, the “fully in” was defined as the 95th percentile, the “fully out” as the 5th percentile and the “neither in nor out” point was defined by the 50th percentile. The same criterion was used for all conditions and for the outcome because the original variables are of the same nature: they are rates (for more information about those rates, see GEM, 2015). We used the current version of the fs/QCA software package (2.5). In this context, the transformation of variables is perfectly automatic.

Results

We start our analysis by testing which causal conditions, and their negations, can be considered a necessary condition for countries having higher entrepreneurship rates. No conditions exceed the threshold of 0.90, but, as seen in Table 3, some conditions have a consistency greater than 0.8, which is considered the minimum level of consistency for solutions to be accepted (see, for example, Fiss, 2011): (i) Perceived Capabilities (with a consistency level of 0.8843), (ii) Entrepreneurial Intention (0.8427), and Media Attention to Entrepreneurship (0.8011). Besides this, Entrepreneurship as a Good Career Choice, Perceived Opportunities and negation of Fear of Failure have values close to 0.8 (although smaller than the minimal value considered, it is close to 0.8). This value is also coherent with other theoretical approaches, such as Ragin, 2006, 2008).

These results make sense and are in line with the literature. For example, if a potential entrepreneur feels he has the capabilities to be a successful entrepreneur, he will probably go ahead with his decision (associated with his own intention). The fact that entrepreneurship has a good image in the media also plays an important role in entrepreneurs' decisions. And of course, fear of failure will influence those decisions

(see, for example, studies by Cacciotti and Hayton, 2015 or Stephan et al., 2015).

Table 3.
Necessary
conditions for
higher
entrepreneurship
rates

Condition	Consistency	Coverage
PC	0.8843	0.7768
~PC	0.4715	0.4415
PO	0.7698	0.7169
~PO	0.5470	0.4829
FF	0.5715	0.5738
~FF	0.7690	0.6354
EI	0.8427	0.8409
~EI	0.5089	0.4226
KSER	0.7196	0.6706
~KSER	0.5936	0.5237
EGCC	0.7840	0.7065
~EGCC	0.5342	0.4870
HSSE	0.7214	0.6360
~HSSE	0.5765	0.5377
MAE	0.8011	0.6928
~MAE	0.4758	0.4531

With fsQCA we can analyze conditions to verify an outcome but also the negation of that outcome. In other words, and in this specific case, conditions whereby countries have lower entrepreneurship rates. The results are documented in Table 4. Considering the consistency level of 0.8, the non-existence of Entrepreneurial Intention is the main necessary condition for lower entrepreneurship rates. Besides this, only the non-existence of perceived capabilities has a consistency level near 0.8.

As well as necessary conditions, fsQCA also identifies the sufficient conditions for a given outcome, i.e., the conditions which, when verified, will imply that an outcome will always be obtained. The results of those conditions are presented in Table 5 (due to space constraints, we present only the intermediate solution). Note that total coverage, referring to the joint importance of all causal paths, is 0.9747, indicating that the greatest part of the outcome is covered by the causal paths indicated. The raw coverage ranges from 0.4658 to 0.8011, although some conditions have unique coverage levels equal (or near) to zero.

Table 4. Necessary conditions for lower entrepreneurship rates	Condition	Consistency	Coverage
	PC	0.5056	0.5358
	~PC	0.7894	0.8917
	PO	0.5145	0.5781
	~PO	0.7481	0.7967
	FF	0.6342	0.7681
	~FF	0.6481	0.6460
	EI	0.4236	0.5099
	~EI	0.8678	0.8694
	KSER	0.5525	0.6212
	~KSER	0.7071	0.7526
	EGCC	0.5336	0.5802
	~EGCC	0.7301	0.8031
	HSSE	0.5891	0.6266
	~HSSE	0.6578	0.7401
	MAE	0.5239	0.5466
	~MAE	0.7056	0.8106

According to the results obtained, Media Attention to Entrepreneurship with a unique coverage of 0.0413, is the most important sufficient condition. This is an important conclusion, because policy-makers should pay more attention to how well successful entrepreneurial cases are presented in the Media. In fact, in some countries, TV programs promote entrepreneurship.

The second empirically important causal path, with a unique coverage rate of 0.0182, is Perceived Opportunities. It is also important because it shows the importance of having citizens who are interested in, and informed about business opportunities.

The remaining sufficient conditions are combinations of different conditions, with lower levels of coverage. Above 0.01 level, we only have a condition combining Knowing the Start-up Entrepreneur Rate with the negation of Fear of Failure and Perceived Capabilities.

Table 5.
Sufficient
conditions for a
better
entrepreneurship
rate

Intermediate solution	Raw coverage	Unique coverage	Consistency
MAE	0.8011	0.0413	0.6928
PO	0.7698	0.0182	0.7169
HSSE*EDCC	0.6359	0.0021	0.7693
HSSE*KSER	0.5651	0.0000	0.7519
EDCC*KSER	0.6242	0.0014	0.8212
EDCC*EI	0.7121	0.0100	0.8529
KSER*~FF*PC	0.5591	0.0164	0.8153
HSSE*EI*~FF*PC	0.4658	0.0096	0.9548
Solution coverage: 0.9747			
Solution consistency: 0.5986			

The previous analysis was made for the whole database of 62 different countries. However, the GEM report recognizes different groups of countries, according to their level of development. So it is possible to find factor-driven economies (seven countries in this research), efficiency-driven economies (twenty nine) and innovation-driven economies (twenty six). The list of these countries can be found in the original report.

We performed the same analysis, using fsQCA, for each group. Results for factor-driven economies are presented in Tables 6 and 7, showing that both Perceived Capabilities and Perceived Opportunities are strong necessary conditions for higher entrepreneurship rates. Other necessary conditions are Entrepreneurial Intention and the High Status of Successful Entrepreneurs. All of these conditions have consistency levels higher than 0.8.

Regarding sufficient conditions, we find a combination of two conditions: Media Attention to entrepreneurship and Knowing the Start-up Entrepreneur Rate are, jointly, conditions for better entrepreneurship rates, with a consistency of over 0.8.

The second group of countries is formed of efficiency-driven economies, and the results are presented in Tables 8 and 9. Entrepreneurial Intention is the necessary condition with the highest consistency (0.8676). With consistency levels near 0.8, it is seen that Perceived Opportunities (0.7890), Perceived Capabilities (0.7706) and Media Attention (0.7610) can also be considered as necessary conditions. The fact that Perceived Opportunities has a higher consistency than Perceived Capabilities is interesting, because the

literature states that most developed countries have higher entrepreneurship rates driven by opportunities, while less developed countries have higher entrepreneurship rates driven by necessity (see, for example, GEM 2015 or Stephan et al., 2015, among others).

Table 6.
Necessary
conditions for
higher
entrepreneurship
rates (factor-
driven economies)

Condition	Consistency	Coverage
PC	0.9178	0.8568
~PC	0.4082	0.4822
PO	0.8548	0.8691
~PO	0.3973	0.4252
FF	0.6438	0.6300
~FF	0.6603	0.7370
EI	0.8356	0.9531
~EI	0.4740	0.4553
KSER	0.6493	0.7822
~KSER	0.5562	0.5113
EGCC	0.6904	0.7613
~EGCC	0.4904	0.4851
HSSE	0.8247	0.8113
~HSSE	0.4630	0.5137
MAE	0.6411	0.6686
~MAE	0.5315	0.5543

Table 7.
Sufficient
conditions for
better
entrepreneurship
rates (factor-driven
economies)

Intermediate solution	Raw coverage	Unique coverage	Consistency
MAE*KSER	0.5342	0.5342	0.8442
Solution coverage: 0.5342			
Solution consistency: 0.8442			

Regarding sufficient conditions, the absence of fear of failure is the most important condition (with a raw coverage of 0.6044 and a unique coverage of 0.1125), while the combination of Media Attention, High Status, Entrepreneurship as a Good Career Choice and Entrepreneurial Intention are the other sufficient conditions.

Table 8.
Necessary
conditions for
higher
entrepreneurship
rates (efficiency-
driven economies)

Condition	Consistency	Coverage
PC	0.7706	0.7454
~PC	0.5618	0.5114
PO	0.7890	0.7583
~PO	0.5243	0.4801
FF	0.6125	0.5753
~FF	0.6044	0.5661
EI	0.8676	0.8269
~EI	0.4963	0.4582
KSER	0.6147	0.6401
~KSER	0.6199	0.5289
EGCC	0.7390	0.6713
~EGCC	0.5390	0.5225
HSSE	0.6471	0.6007
~HSSE	0.5838	0.5533
MAE	0.7610	0.6787
~MAE	0.5000	0.4946

Table 9.
Sufficient
conditions for
better
entrepreneurship
rates (efficiency-
driven economies)

Intermediate solution	Raw coverage	Unique coverage	Consistency
~FF	0.6044	0.1125	0.5661
MAE*HSSE*EGCC*EI	0.5353	0.0360	0.9032
Solution coverage: 0.8360			
Solution consistency: 0.5962			

Finally, we applied the fsQCA to innovation-driven economies, and the results are presented in Tables 10 and 11. For these countries, the only necessary condition above the 0.8 level is Perceived Opportunities (consistency of 0.8019). Other conditions have similar consistency levels: Perceived Capabilities (0.7929), the absence of fear of failure (0.7792) and Media Attention to Entrepreneurship (0.7639). For these countries, the absence of fear of failure is an important path, while this is not so for the other groups of countries. This could be related to the fact that entrepreneurship through opportunity is more important than entrepreneurship through necessity. In this context, potential entrepreneurs are more rational about the possibility of their businesses failing.

Regarding sufficient conditions, we find three different paths. First, Entrepreneurial Intention is a sufficient condition for better entrepreneurship rates (with a raw coverage of 0.7091). Second, a combination of Media Attention with the absence of Knowing the Start-up Entrepreneurship Rate. A third condition is composed of Entrepreneurship as a Good Career Choice, Knowing the Start-up Entrepreneurship rate and Perceived Opportunities. These results are not very different from the other groups of countries.

Table 10.
Necessary
conditions for
higher
entrepreneurship
rates (innovation-
driven economies)

Condition	Consistency	Coverage
PC	0.7929	0.8066
~PC	0.5375	0.4833
PO	0.8019	0.7053
~PO	0.5544	0.5040
FF	0.5286	0.5182
~FF	0.7792	0.7249
EI	0.7091	0.7774
~EI	0.5979	0.5055
KSER	0.6374	0.5988
~KSER	0.6277	0.6091
EGCC	0.7583	0.6945
~EGCC	0.5165	0.5149
HSSE	0.6543	0.6232
~HSSE	0.6712	0.6423
MAE	0.7639	0.7166
~MAE	0.4488	0.4362

Table 11.
Sufficient
conditions for
better
entrepreneurship
rates (innovation-
driven economies)

Intermediate solution	Raw coverage	Unique coverage	Consistency
EI	0.7091	0.0363	0.7774
MAE*~KSER	0.5536	0.0105	0.8534
EGCC*KSER*PO	0.4972	0.0113	0.8968
Solution coverage: 0.9267			
Solution consistency: 0.6651			

Conclusions

GEM is considered an excellent framework to compile information about entrepreneurship and is also excellent to give information for policymakers about entrepreneurship. Using fsQCA, we can identify the main conditions for better entrepreneurship rates, according to the Adult Population Survey.

When evaluating the whole sample, the results indicate that Perceived Capabilities, Entrepreneurial Intention, Media Attention to Entrepreneurship, Entrepreneurship as a Good Career Choice and the non-existence of Fear of Failure are the significant necessary conditions to attain higher levels of entrepreneurship. If we join to this information Media Attention to Entrepreneurship and Perceived Opportunities as the sufficient conditions to have more entrepreneurs, we can define media attention as an essential condition for our outcome. In fact, this is important in order to inform citizens about some advantages of entrepreneurship.

Moreover, the perception of capabilities and opportunities are also important conditions. Our results show the importance policymakers should give to promoting the dissemination of information and education about entrepreneurship, which is also essential for people to trust in their capabilities (see, for example, Chien-Yun and Duen-Huang, 2015).

When we analyse the same conditions but splitting the sample in the three sub-groups of countries (factor-driven, efficiency-driven and innovation-driven economies), some conditions have different behaviors. For factor-driven economies, Perceived Capabilities are more important than Perceived Opportunities, while in the other two groups of countries it is the contrary. This could be related with the fact that in more developed countries, entrepreneurship through opportunity is more important than entrepreneurship through necessity. This fact could also be the reason for the importance of the absence of fear of failure in innovation-driven economies.

Further work in this area could include analysis of different indicators of GEM, namely differences between levels of male and female entrepreneurship, differences between regions or between nascent and already implemented firms.

Acknowledgements

The authors would like to acknowledge financial support from Fundação para a Ciência e a Tecnologia (grant UID/ECO/04007/2013) and FEDER/COMPETE (POCI-01-0145-FEDER-007659)

References

- Acs, Z., & Audretsch, D. (2010). *Handbook of Entrepreneurship Research*. New York: Springer.
- Arenius, P., & Minniti, M. (2005). Perceptual variables and nascent entrepreneurship. *Small Business Economics*, **24(3)**, 233–247.
- Audretsch, D. (2003). Entrepreneurship: a survey of the literature. *European Directorate-General European Commission*. Retrieved May 25, from <http://ec.europa.eu/DocsRoom/documents/2977>.
- Cacciotti, G., & Hayton, J. (2015). Fear and entrepreneurship: A review and research agenda. *International Journal of Management Reviews*, **17**, 165–190.
- Caliendo, M., Fossen, F., & Kritikos, A. (2009). Risk attitudes of nascent entrepreneurs—new evidence from an experimentally validated survey. *Small Business Economics*, **32**, 153-167.
- Cantillon, R. (1755). *Essai sur la nature du commerce en général*. London: Fetcher Gyler. Also edited in an English version, with other material, by Henry Higgs, C.B., London: MacMillan (1931).
- Chien-Yun, D., & Duen-Huang, H. (2015). Causal complexities to evaluate the effectiveness of remedial instruction. *Journal of Business Research*, **68(4)**, 894–899.
- Drucker, P. (1985). *Innovation and Entrepreneurship*. New York: Harper Collins.
- Fiss, P. (2011). Building better causal theories: a fuzzy set approach to typologies in organization research. *Academy of Management Journal*, **54(2)**, 393–420.
- Gartner, W. (1988). Who is an Entrepreneur? Is the Wrong Question. *American Journal of Small Business*, **12(4)**, 11–32
- GEM. (2015). *Global Entrepreneurship Monitor – 2014 Global Report*. Retrieved February 24, from <http://www.gemconsortium.org/report>.
- Hoang, H., & Antoncic, B. (2003). Network-based research in entrepreneurship: a critical review. *Journal of Business Venturing*, **18(2)**, 165–187.

- Ferreira P, Dionísio A. 2016. Entrepreneurship rates: the fuzzy-set approach. *Eastern European Business and Economics Journal* **2(2)**: 111-128.
-
- Hornaday, R. (1992). Thinking About Entrepreneurship: A Fuzzy Set Approach. *Journal of Small Business Management*, **30(4)**, 12–23.
- Khefacha, I., & Belkacem, L. (2015). Modeling entrepreneurial decision-making process using concepts from fuzzy set theory. *Journal of Global Entrepreneurship Research*, **5(13)**.
- Kirzner, I. (1973). *Competition and Entrepreneurship*. Chicago: University of Chicago Press.
- Koellinger, P., Minniti, M., & Schade, C. (2007). ‘I think I can, I think I can’: overconfidence and entrepreneurial behaviour. *Journal of Economic Psychology*, **28(4)**, 502–527.
- Kwon, S., & Arenius, P. (2010). Nations of entrepreneurs: A social capital perspective. *Journal of Business Venturing*, **25(3)**, 315–330.
- Low, M., & MacMillan, I. (1988). Entrepreneurship: Past research and future challenges. *Journal of Management*, **14(2)**, 139–161.
- Hoshino, M. (2013). Relationship between Entrepreneurial Indicators among Innovation-Driven Economies and Its Implications for Japan. *Journal of business and economics*, **93(3)**, 21–38.
- McClelland, D. (1961). *The achieving society*. Princeton, New Jersey: Van Nostrand.
- Muñoz, P., & Kibler, E. (2016). Institutional complexity and social entrepreneurship: A fuzzy-set approach. *Journal of Business Research*, **69(4)**, 1314–1318.
- Ragin, C. (1987). *The Comparative Method: Moving beyond Qualitative and Quantitative Strategies*. Berkeley: University of California Press.
- Ragin, C. (2000). *Fuzzy-set social science*. Chicago: The University of Chicago Press.
- Ragin, C. (2006). Set relations in social research: Evaluating their consistency and courage. *Political Analysis*, **14**, 291–310.
- Ragin, C. (2008). *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: The University of Chicago Press.
- Say, J. (1816). *Treatise on Political Economy*. Sherwood, Neely and Jones, London.
- Schneider, M., Schulze-Bentrop, C., & Paunescu, M. (2010). Mapping the institutional capital of high-tech firms: A fuzzy-set analysis of capitalist variety and export performance. *Journal of International Business Studies*, **41**, 246–266.
- Schumpeter, J. (1934). *The theory of economic development*. Harvard: Harvard University Press.

- Shane, S. (2003). *A General Theory of Entrepreneurship*. Cheltenham, UK:: Edward Elgar Publishing.
- Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research. *The Academy of Management Review*, **25(1)**, 217-226.
- Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations*. London.
- Stephan, U., Hart, M., & Cord-Christian, D. (2015). *Understanding motivations for entrepreneurship: A review of recent research evidence*. Birmingham: Enterprise Research Centre.
- Vis, B. (2012). The Comparative Advantages of fsQCA and Regression Analysis for Moderately Large-N Analyses. *Sociological Methods & Research*, **41(1)**, 168–198.
- Vis, B., Woldendorp, J., & Keman, H. (2007). Do miracles exist? Analyzing economic performance comparatively. *Journal of Business Research*, **60**, 531–538.
- Wagemann, C., & Schneider, C. (2010). Qualitative Comparative Analysis (QCA) and Fuzzy-sets: Agenda for a Research Approach and a Data Analysis Technique. *Comparative Sociology*, **9**, 376–96.