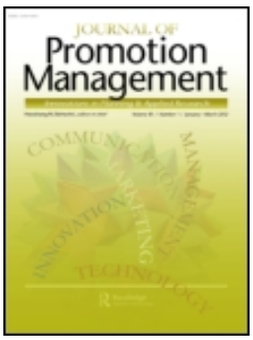

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Do Financial Crises Moderate Entrepreneurial Recipes? A Comparative Fuzzy Analysis

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ABSTRACT
This study performs a fuzzy set qualitative comparative analysis (fsQCA) on entrepreneurial recipes. The research focuses on the moderating role of the 2007 financial crisis on the antecedents of entrepreneurship. Standard regressions analysis proves insufficient to uncover asymmetrical and complex relationships that explain the effect of credit constraints on new business. Empirical results on longitudinal data suggest that the crisis moderated entrepreneurial recipes in Spain. This research contributes to QCA analysis by studying moderation effects on time-series data.

KEYWORDS
crisis, entrepreneurship, fsQCA, longitudinal

Introduction

The creation of new firms is commonly understood as one of the main sources for jobs creation and as the mainspring of economic growth and social progress. Van Praag and Versloot (2007) distinguish four economic benefits of entrepreneurship. First, entrepreneurs and small businesses have a positive impact on job creation. Second, entrepreneurs are essential to innovative processes that bring new ideas and new products or services to the market. The third benefit is that new businesses promote productivity and economic growth. Finally, entrepreneurs and small business owner-managers are an important outlet for people seeking better opportunities as either in terms of achieving a greater income or job satisfaction.

The birth of a new company is the main act of an entrepreneur; without this initiation there is no business. The oldest investigations on entrepreneurship such as Cantillon (1755) and Say (1803) focused on specific traits of entrepreneurs. In 1954, Schumpeter defines the entrepreneur as the pivot around which everything turns, highlighting the importance of entrepreneurship on innovation. In his influential paper, Gartner (1988) urges researchers on entrepreneurship to move away from specifying particular traits of entrepreneurs to a deeper understanding of the

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entrepreneurial process. He proposes an analysis of the context where the entrepreneur is developing.

Scholars are offering different results when analyzing the effects of economic crisis on entrepreneurship (Aghion, Fally, & Scarpetta, 2007; Paniagua & Sapena, 2015b; Shane, 2011; Gil-Pareja, Llorca-Vivero, & Paniagua, 2013; Paniagua & Sapena, 2015a). These studies reveal mixed effects of economic activity, labor market, unemployment, and banking crisis on entrepreneurship. Aghion et al. (2007) state that the access to finance also helps new firms expand successfully. Moreover, although Paniagua and Sapena (2015b) consider that the "relationship between economic crises and business creation is more complex than in other business" (p. 196), previous studies are using symmetric tests to report the "net effects" of variables.

This investigation contributes to a new perspective in the crisis-entrepreneurship link. The present study explains how complexity theory through fuzzy set qualitative comparative analysis (fsQCA) provides a solid ground to analyze the antecedents of entrepreneurship. Entrepreneurial relations are asymmetrical, complex, and equifinal. Equifinality means that there are multiple paths to the same solution. For example, unemployment has multiple effects on entrepreneurship. Standard symmetrical analyses may only respond with exclusive solutions in both ways, negative or positive. The existing data proves these simple correlations are insufficient. Economic theory considers that unemployment hinders business activity (Acemoglu, 2001; Dromel, Kolakez, & Lehmann, 2010). However, recent studies suggest that higher unemployment rates increase the probability that individuals start businesses (Fairlie, 2013). The rate of self-employment in the United States ascended in 2009 to its highest level in more than a decade (Shane, 2011). The literature proposes both positive and negative associations between unemployment and entrepreneurship.

One of the main limitations of QCA studies is the preference for cross sectional data (Ragin, 2009). The advantages of longitudinal research are well known (Greene, 2011). The application of QCA methods to time series data is still in the research agenda of complexity theory. We study the moderation of the 2007 crises in time-series data. Therefore, our study compliments some noteworthy contributions that in the last years seek to incorporate a temporal dimension to QCA (Schneider & Wagemann, 2012; Ragin & Strand, 2008; Hino, 2009; Caren & Panofsky, 2005).

This study is structured as follows: The theoretical framework section offers an overview of the literature on entrepreneurship and financial crises; the next section is the method section; followed by the results, and the final section highlights the main conclusions.

Theoretical framework: Seed, soil, and fertilizers

Academic literature on entrepreneurship has focused on the impact of particular entrepreneurial traits to explain successful business initiatives. Kaiser (1990)

divides the studies into three complementary and inseparable characteristics describing entrepreneurship. He identified three traits: innovation, risk taker, and resource allocation. Cantillon (1755) and Knight (1921) define the entrepreneur as a risk-taker speculator, and their role as bearers of risk and uncertainty, while Schumpeter (1934) highlights the entrepreneur's role as a creator of change rather than simply responding to it.

These characteristics determine changes in environment, and for this reason Kirzner (1983) proposes the figure of the "alert entrepreneur." The concept describes the capacity of discovering and exploring new business opportunities. In this vein, Baumol (1968) emphasize on the importance of rewards on the entrepreneurial activity. Schultz (1975, 1980) is also giving credit to the importance of rewards and how these rewards are related to disequilibria and then to opportunities.

In social psychology, the so-called "fundamental attribution error" refers to the observer's bias (Ross, 1977) when interpreting and explaining the behavior of another person. It refers to the underestimation of the context and to the pressures that can cause a different behavior of others, or problems in ascribing a person's deeds to individual strengths or weaknesses. Thus, from a behavioral perspective, entrepreneur's traits could be an ancillary part of the complex process of new venture creation. The notion of opportunity is one of the key concepts in entrepreneurship theory, as an entrepreneur perceives an opportunity that others do not perceive. Gartner (1988) emphasizes that entrepreneurial behavior is determined by external factors. This approach is highlighted by contributions from economic theory, such as the studies by Kirzner (1983) and Baumol (1968).

Casson (2014) states that entrepreneurship phenomena is a result of conducive economic conditions and identifies different factors that encourage or discourage entrepreneurship. For Drucker (1985), an entrepreneur always searches for a change. Once identifying the opportunity, he responds and tries to explore it. The author underlines that even innovations with modest intellectual pretensions may turn into gigantic, highly profitable businesses. As Lee (1991) states: "No matter how fertile the seeds of entrepreneurship, they wither without the proper economic soil. In order for entrepreneurship to germinate, take root, and yield the fruit of economic progress it has to be nourished by the right mixture of freedom and accountability, a mixture that can only be provided by a free market economy" (p. 50).

"Seed and Soil Theory" is a useful theory for understanding the way in which entrepreneurs interact with the environment. The model is widely accepted in medicine and it used to explain the pathogenesis of metastasis as a complex process integrated by a series of sequential, interrelated steps. For example, when analyzing cancer, the outcome of the process is dependent on both the intrinsic properties of tumor cells and the response of the host. This hypothesis was first stated by Paget (1889): "When a plant goes to seed, its seeds are carried in all directions; but they can only live and grow if they fall on congenial soil" (p. 571). Stephen Paget's hypothesis suggests that the sites where metastases occur are defined not only by the tumor cell understood as "seed" but also the microenvironment of

the secondary metastatic being the "soil." Literature highlights the influence of environment on entrepreneurial activities (Baumol, 1996). Rent-seeking behavior was first introduced by Tullock (1967) but coined by Krueger (1974), and it refers to socially costly pursuit of wealth transfers (Tollison, 1982). However, rent-seeking must be distinguished from entrepreneurial creation of rents.

Financial constraints are another variable that influence entrepreneurial activity. During the Great Depression of 1927, entrepreneurs were facing little capital availability, so Knight (1921) claimed that entrepreneurs must finance themselves and bear the risk of failure. However, Schumpeter (1934) believed that capital markets should take over the financial risks for the entrepreneur whose role would be solely to identify business opportunities.

Market conditions

The literature considers that market conditions (e.g., domestic demand, administrative costs, labor demand) as antecedents of entrepreneurial activity (see, for instance, Wennekers & Thurik, 1999 or more recently Acs, Audretsch, Braunerhjelm, & Carlsson, 2011). The first tenants relate to market conditions:

T1a-b: Business survival is associated with entrepreneurship. The number of new business is positively associated with entrepreneurship. The number of default business is negatively associated with entrepreneurship.

T1c: Domestic demand is positively associated with entrepreneurship.

Unemployment

Scholars have documented both a negative (Paniagua & Sapena, 2015b) and a positive (Fairlie, 2013; Parker, 2004; Shane, 2011; Thurik, Carree, van Stel, & Audretsch, 2008) effect of unemployment on entrepreneurship. Andersson and Wadensjö (2007) explained these mixed results by limiting the conditions in which unemployed individuals succeed in new business endeavors. The labor force, job, and social mobility are also considered as limiting factors for entrepreneurship (Bianchi, 2010; Wang, 2012).

The second tenants relate to labor and entrepreneurship:

T2a: Unemployment is negatively associated with entrepreneurship.

T2b: Employment (labor force) is positively associated with entrepreneurship.

Financial crises

Financial crises moderate economic outlook. Capital fuels the economy and is a necessary condition to start a new business. Financial constraints tend to exclude entrepreneurs with scant funds (Evans & Jovanovic, 1989). Domestic credit is

reduced during and after banking crises (Gourinchas & Obstfeld, 2012; Schularick & Taylor, 2012), increasing the economic contraction of financially weak sectors (Kroszner, Laeven, & Klingebiel, 2007).

The literature establishes a direct link between credit constraints and entrepreneurship (Beck & Demirguc-Kunt, 2006; Black & Strahan, 2002; Carpenter & Petersen, 2002; Holtz-Eakin, Joulfaian, & Rosen, 1994; Paniagua & Sapena, 2015b; Parker & van Praag, 2006). Thus the last tenants are:

T3a: Credit constraints are negatively associated with entrepreneurship.

Financial crises may have an indirect effect on entrepreneurship; that is, credit constraints may affect the way antecedents combine on the entrepreneurial outcome. Laeven and Valencia (2013) report that a significant amount of public effort and funds are deviated to the financial sector. Therefore, nascent entrepreneurs face additional limitations during these periods. Several authors explain that institutional aid is important for new business creation (Holtz-Eakin, 2000; Lelarge, Sraer, & Thesmar, 2010; Millán, Congregado, & Román, 2014). Additionally, financial crises have an effect on market conditions (Acemoglu, 2001; Dromel et al., 2010) and employment (Paniagua & Sapena, 2015a). Therefore:

T3b: Credit constraints moderate the recipes of entrepreneurship.

Data and method

The data for this investigation was obtained from the Harmonized Business Demographics provided by the Spanish Statistics Institute (INE, 2015). Table 1 reports the variables used in the study, the summary statistics and the correlation matrix. The data period spans from year 1999 to 2014. This assures a representative sample for the financial crisis starting in 2007. New, Default, and Living Business are divided by each year's population to isolate demographic effects over time. In addition, data regarding market conditions (GDP growth, unemployment, and population) was obtained from the European Commission AMECO database.

Figure 1 depicts these variables. The vertical line in 2007 represents the beginning of the financial crisis. Spain is a paradigmatic case in the Great Recession. The GDP,

Table 1. Definition of variables.

	Outcome						Antecedents conditions					
	Symbol	mean	*SD*	min	max	*N*	D	L	U	G	E	R
New Business	N	8.13	.82	6.97	9.50	1.000						
Default Business	D	7.23	1.12	5.70	8.69	−0.819***	1.000					
Living Business	L	61.05	3.55	54.59	66.05	−0.105	0.237	1.000				
Unemployment	U	15.13	6.30	8.20	26.1	−0.864***	0.883***	0.180	1.000			
GDP	G	1.95	1.29	.39	3.63	0.560*	−0.706**	−0.779***	−0.741**	1.000		
Labor	E	1.79	1.66	1.00	3.72	0.779***	−0.848***	−0.179	−0.920***	0.712**	1.000	
Crisis	R	.50	.51	0	1.00	−0.494	0.684**	0.727**	0.682**	−0.926***	−0.652**	1

Note. $N = 16$. $^{*}p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$.

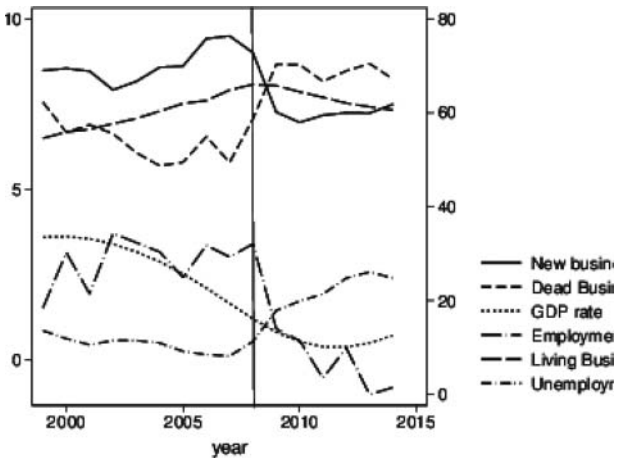

Figure 1. Variable evolution.

new business, and employment fell to unprecedented figures. According to Laeven and Valencia (2013), Spain is the country with the longest event of banking crises.

MRA vs QCA

Business studies use QCA as a tool to compliment previous inconsistent complex results (Fiss, 2007; Hsu, Woodside, & Marshall, 2013; Ketchen & Palmer, 1999; Pajunen, 2008; Rey-Martí, Porcar, & Mas-Tur, 2015; Woodside, 2013, 2014). Multiple regression analysis (MRA) implicitly assumes a symmetrical relationship between variables. MRA uncovers the mean effect of a variable on a target or dependent variable. The magnitude and sign of the effect of the variable are the main outcomes of regression analysis. However, MRA has limitations when the relationships are asymmetrical and complex (Woodside, 2013). Asymmetrical relationships are often present in most real-life contexts and only rarely symmetrical (Ragin, 2009). Relationships between variables can be nonlinear with abrupt switches occurring; therefore, in specific circumstances, the same "cause" can produce different effects (Urry, 2005). Armstrong (2012) advocates against the use of MRA in complex situations. This perspective suggests that high values of X are sufficient but not necessary for high values of Y (i.e., high values of Y occur both with low and high values of X). Alternatively, high values of X can be necessary but not sufficient for high values of Y (i.e., high values of Y occur only with high values of X).

QCA is well-suited for the study entrepreneurship (Krivokapíc-Skoko, 2005). This method is particularly attractive for the study due to the limited number of observations in the sample (Fiss, 2011; Lijphart, 1971). The study uses the fuzzy routine developed for STATA[1] by Longest and Vaisey (2008). This command allows standardized calibration of variables and crisp grouping of fuzzy variables,[2] which is relevant to test T3b.

QCA is popular for cross-section data research. Longitudinal studies using QCA analysis are scarce (Schneider & Wagemann, 2012; Ragin & Strand, 2008; Hino,

Table 2. MRA result.

	(1)	(2)	(3)
Default Business (D)	−0.181	−0.208	−0.130
	(0.16)	(0.17)	(0.47)
Living Business (L)	−0.374***	−0.373***	−0.374
	(0.09)	(0.10)	(0.32)
Unemployment (U)	−0.267***	−0.264***	−0.148
	(0.05)	(0.07)	(0.16)
GPD (G)	−1.605***	−1.469**	−1.981
	(0.36)	(0.49)	(1.19)
Labor Force (E)	0.102	0.095	−0.020
	(0.14)	(0.14)	(0.17)
Crisis (R)	0.362		
	(0.35)		
D*R	0.336		
	(1.21)		
L*R	−0.090		
	(0.11)		
U*R	−0.047		
	(0.21)		
G*R	2.001*		
	(0.85)		
E*R	0.343		
	(0.25)		
Constant	39.287***	38.951***	39.096
	(7.00)	(8.17)	(25.83)
Observations	16	16	16
R^2	0.879	0.886	0.961

Note. Robust standard errors in parentheses. *p < 0.10. **p < 0.05. ***p < 0.01.

2009; Caren & Panofsky, 2005). Our approach is to use each year as the basic unit of analysis. The crisis is a dummy variable that moderates the relationship with entrepreneurship before and after the crisis.

Results

Table 2 reports standard MRA results. The first column analyzes market conditions and unemployment. Column 2 shows the results of the direct effect of the crisis. The third column reports the moderating effects of the crisis on the remaining variables. Although the *R*2 show acceptable values (higher that 0.80), the results are counter-intuitive. The outcomes show that GDP has a negative net effect on unemployment and the crisis dummy has no effect on entrepreneurship. Furthermore, it can be noticed that in column 3 there is no significant variable, except the interaction between GDP and crisis. These results invite us to use QCA analyses.

Table 3 reports the results of the fsQCA analysis. The procedure uses the Quine–McCluskey algorithm (Ragin, 1989) to logically reduce the configurations. The sample is divided in two groups, one before 2007 and the other one after 2007. The configuration's mean of the outcome is weighted by the membership in each configuration. This value is tested and reported against the mean as weighted by the maximum value of the other configurations. There are performed standard

Table 3. QCA results.

Path	Set	Raw coverage	Unique coverage	Solution consistency	Weighted means	Frequency cutoff
1- Before crisis	d*l*u*G*E*r	0.458	0.458	0.932	0.627	1.0
2- After crisis	d*L*u*E*R	0.171	0.171	0.872	0.685	1.0

Note. Total coverage = 0.629; Solution consistency = 0.915.

tests between each configuration's *y* consistency (inclusion in *y*) versus its *n* consistency (inclusion in not-*y*, or 1-*y*) and discard those not significant (to 0.1 level). Finally, Ragin (2006) suggests that 0.80 is low bound for a high score in the outcome. Therefore, we discard any solution with a *y* consistency lower than 0.800.

Figure 2 shows the X-Y plot of the final reduced solution:

$$N = d*l*u*G*E*r + d*L*u*E*R = d*u*E*(l*G*r + L*R) \quad (1)$$

According to the aforementioned solution there are two pathways to entrepreneurship (first row for before the crisis and second after crisis). Low default rate, low unemployment, and high labor force rates are necessary conditions regardless of the crisis.

The first path reveals that without credit constraints (before the crisis), the combination of a strong demand (G) and a weak value of business living rate is necessary. This solution has a consistency of 0.932 and coverage of 0.458. The results are in line with the economic intuition as strong GDP is often associated with noncrisis periods.

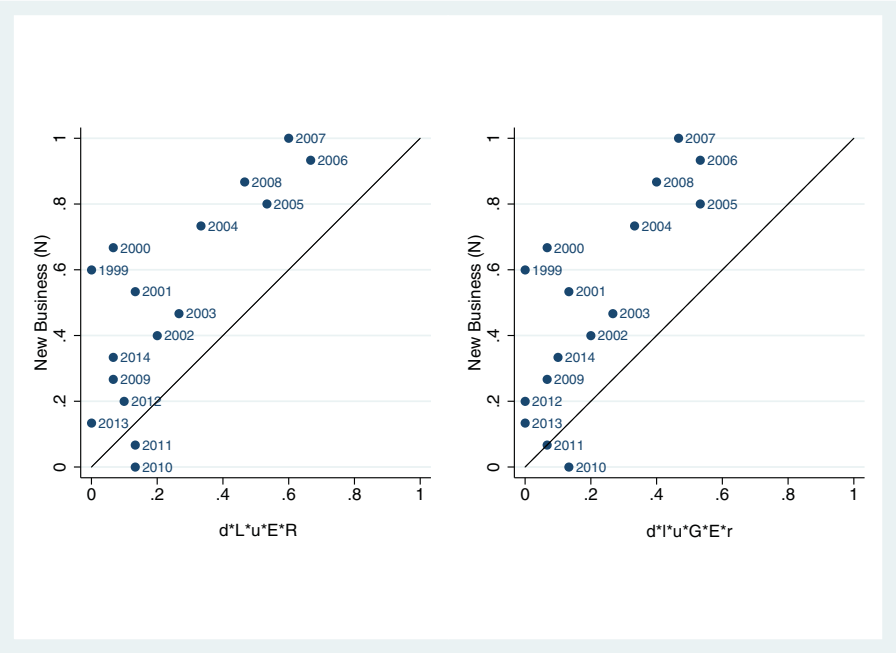

Figure 2. Solution plot.

Table 4. QCA holdout results.

Set	Raw coverage	Unique coverage	Solution consistency
		Before 2007[a]	
d*u*E*l*G	0.620	0.620	0.934
		After 2007[b]	
d*u*E*L	0.535	0.535	0.910

Note. [a]Total coverage = 0.620; Solution consistency = 0.934; [b]Total coverage = 0.535; Solution consistency = 0.910.

However, during a crisis (R), living enterprises are a necessary condition. Additionally, the second path reveals that nondefaulted business, nonunemployment, and labor force are necessary conditions for entrepreneurial outcome. This solution has a consistency of 0.872 and coverage of 0.171.

The results show clearly how the crises changed entrepreneurial recipes. The only additional condition for high entrepreneurial rate is that businesses survive. Demand (GDP) is no longer a condition for the creation of new business. Prior to the crisis, entrepreneurship was related to creative destruction (low living rate). After the crisis, entrepreneurship is about surviving.

To test for predictive validity, the sample was split into two periods (Gigerenzer & Brighton, 2009; Wu, Yeh, & Woodside, 2014). Table 4 reports the results. The solution before the crisis:

$$d * u * E * (l * G), \tag{2}$$

and after the crisis:

$$d * u * E * (L), \tag{3}$$

are in line with the result obtained from the whole set.

The results confirm all research tenants. The 2007 crisis moderates the recipes that lead to entrepreneurship.

Conclusions, limitations, and future research

The present research contributes to a new perspective on the antecedents of entrepreneurial incentives and business creation. In particular, the study explores the link between crisis and entrepreneurship. The approach highlights how complexity theory through fuzzy set qualitative comparative analysis (fsQCA) provides a solid ground to analyze the antecedents of business creation. The results are revealing in that entrepreneurial relations are asymmetrical, complex, and equifinal.

This research analyzes how credit constraints alter the recipes of entrepreneurship. After the financial crisis, the entrepreneurial recipes shifted from a creative destruction model to a survival road-map. These findings are relevant for the field of entrepreneurship, as it opens a new and exciting stream of research. The results are also relevant for policy-makers interested in the best suited policies to foster entrepreneurship and employment.

According to the results, there are two pathways leading to business creation. One road includes nondefaulted business, nonunemployment, and labor force as necessary conditions for business creation. This result is supported by the combination of a strong demand (G) and a weak value of business living rate. During a crisis (R), living enterprises are also needed. The second road shows that during noncrisis times the combination of a strong demand (G) and a weak value of business living rate is necessary. These results are in line with economic intuition as strong GDP is associated with noncrisis periods.

The results of this research highlight the advantages of QCA over MRA for complex relationships. The results obtained with MRA were counter-intuitive. QCA allows several paths to a desired outcome. This is relevant for entrepreneurship. Our results show that there are two paths toward entrepreneurship: creative destruction (before crisis) and survival (during the crisis). Credit constraints moderate both paths. The combination of a strong demand (G) and a weak value of business living rate (creative destruction) are necessary during normal times. However, during a crisis living enterprises are a necessary condition.

Our results shed some light on the best suited policies to foster entrepreneurship. Without credit constraints policy should focus on incentives toward creative destruction. During a crisis, policy-makers should provide instruments to increase the survival of firms (e.g., increase credit availability).

Although the analysis focuses on the Spanish case, the results offer a generalization to any medium-sized economy under the effects of a financial crisis. However, the Spanish economy is a particularly relevant case due to the severity of the economic crisis after a period of financial exuberance. In order to test the outcomes of this investigation, future studies can be replicated by using the QCA methodology for other countries or regions.

This research contributes to extend the reach of QCA analysis by studying moderation effects on longitudinal data. The main limitation of this study is the use of single country data. Further studies that extend this approach (for example using panel data) are certainly welcome and encouraged.

Notes

1. Software for QCA also includes Charles Ragin and Sean Davey's (2009) fs/QCA and Lasse Cronqvist's (2011) Tosmana. A particularly interesting alternative is the QCA package for the R environment, the only existing software alternative that covers the full range of core procedures.
2. Stata automatically calibrate the variables using the mean and standard deviation of each variable.

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