The impact of the economic crisis on latent and early entrepreneurship in Europe

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Abstract

The recent economic crisis has thrown many European economies into a period of slow growth and high unemployment. While previous research looked at the impact of the crisis on aggregate indicators of entrepreneurship, not much is known about whether and how it affected individual motivations and efforts to become self-employed. This study aims to fill this gap by looking at the impact of the crisis on latent and early entrepreneurship, as well as on the link between the two. We combine individual and country-level data from 25 EU member states from 2006 to 2012. Results of multilevel logistic regressions show that the decrease in entrepreneurial activity in the post-crisis period has been stronger in countries where access to finance for SMEs has been more difficult. Moreover, we show that the high level unemployment generated by the economic crisis has produced a "refugee effect" by pushing into entrepreneurship only those individuals who are not interested in such a career choice.

1 Introduction

The 2008 financial crisis led to the sharpest economic contraction in the history of the European Union (EU). Its effects have been felt across all EU economies, albeit to different extents. In many cases, the impact of the crisis on national labor markets has been reflected in sharp increases in unemployment coupled with declining wages. In this context, boosting entrepreneurship became a priority for governments seeking to restore economic growth and fight unemployment. Several studies over the years have highlighted the importance of entrepreneurship for economic growth (e.g. Agarwal et al. 2007, Baumol & Strom 2007, Leibenstein 1968, Wennekers & Thurik 1999). New companies, especially Small and Medium Enterprises (SMEs), represent the most important source of new employment in the EU, generating more than four million jobs annually (Carmo Farinha et al. 2015, 490). Yet, scholars looking at new firm registrations in recent years have shown that the economic crisis has negatively affected entrepreneurial activity as well (Klapper & Love 2011, Klapper et al. 2015, Paniagua & Sapena 2015, Sannajust 2014). This could imply that European citizens have been discouraged to start new business ventures, depressed by the bleak perspectives brought by by the current economic conditions.

In this article we investigate which of the consequences of the economic crisis have affected individual entrepreneurial choices among EU citizens. Unlike previous studies, which looked at aggregate indicators of entrepreneurship, we explicitly focus on individual attitudes and behaviors. Specifically, we analyze three different constructs: the first is entrepreneurial motivation, namely the preference for self-employment as a career, a concept often called "latent entrepreneurship"; the second is actual entrepreneurial behavior, with a specific focus on individuals taking steps to start a new business, a concept that we define as "early entrepreneurship"; the third construct is motivated entrepreneurial behavior, that is, the probability that latent entrepreneurs put their preferences into practice by actually starting a business. This perspective allows us to investigate different stages of the entrepreneurial process, rather than the outcome only, bringing new insights to the literature on the relationship between entrepreneurship and the crisis. We use repeated cross-sectional survey data from 25 EU countries observed at three points in time, one before (2006) and two after the onset of the economic crisis (2009 and 2012). By employing multilevel logistic regression models, we assess the effect of individual and contextual variables on latent and early entrepreneurship, and on the association between the two.

We find that, in 2009 and 2012, levels of latent and early entrepreneurship are substantially lower than in 2006, suggesting that the crisis had a negative influence of both entrepreneurial motivation and behaviors of EU citizens. Additionally, we find that access to finance for SMEs moderates the impact of the crisis on early entrepreneurship: in countries where credit has been made more easily available to SMEs, citizens were as likely to start a new business after the onset of the crisis as they were before. Finally, we find that higher unemployment rates have pushed into self-employment people who would rather be paid employees, essentially producing more *unmotivated entrepreneurs*. We also show that the positive effect of access to finance on early entrepreneurship is limited to latent entrepreneurs. In other words, access to credit is a significant moderating factor to contain the negative effects of the crisis, and it funnels latent entrepreneurs into acting upon their preferences.

2 Latent and early entrepreneurship in times of crisis

To study how the economic crisis may have affected entrepreneurial attitudes and behaviors of EU citizens we focus on self-employment, "the simplest form of entrepreneurial activity" (Blanchflower et al. 2001, 681). Entrepreneurship is often understood as a process, rather than a state: a sequence of events that ideally bring to the establishment of a new working business, and where individuals can be caught at different stages (Baron 2014). Scholars over the years have proposed different ways to partition this process. For instance, Shane & Venkataraman (2000) talk of a "discovery" phase, when business opportunities are identified, and an "exploitation" phase, when tangible actions are taken to seize such opportunities (see also Davidsson 2006). Reynolds & White (1997) compare the entrepreneurial process to the process of biological creation, and define four stages: in the "conception" stage, new business ideas arise, or business opportunities are perceived as such; in the "gestation" stage, such opportunities are evaluated; in the "infancy" stage, efforts to create a new firm are initiated, or the idea is abandoned; finally, in the "adolescence" stage, the new firm is successfully established (see also Minniti & Naudé 2010, Wagner 2006). Studies looking at new firm registrations, like many of those investigating the impact of the crisis on entrepreneurship so far (e.g. Klapper & Love 2011, Klapper et al. 2015, Paniagua & Sapena 2015), focus on later phases of the entrepreneurial process. Individual-level studies of "nascent entrepreneurship" also look at stages in the process where individuals are already engaged in starting a business (see Arenius & Minniti 2005, Davidsson 2006, Stel et al. 2007, Wagner 2006). However, selection mechanisms may occur at earlier stages of the process as well. As Brixy et al. (2012) point out, if potential entrepreneurs are discouraged to pursue their desired career path, the number of new businesses that can arise in a given context is reduced.

In this paper, we focus on two phases of the entrepreneurial process: a very early one, where individuals have the desire to be self-employed, and a later one, where individuals are in the early stages of an entrepreneurial activity. The first construct is called *latent entrepreneurship*, it reflects people's underlying entrepreneurial spirit (Blanchflower et al. 2001, Grilo & Thurik 2005, Grilo & Irigoyen 2006), and arguably can be placed at the very beginning of the process, even before individuals start planning on their activity (Brixy et al. 2012). The second construct is what we call *early entrepreneurship*, and it captures whether individuals have recently started a new business or are taking steps to do so. Together, these two constructs give us a snapshot of the entrepreneurial potential that is present in a given context, and of its realization in the short-term.¹

Latent and early entrepreneurship also represent two central steps of planned behavior (see Ajzen & Fishbein 2005): the first is an attitude towards a specific action (i.e. to run an own business), and the second is the disclosure of the action itself. Domain-specific attitudes and behaviors are usually highly correlated, with the former supposedly affecting the latter (although the opposite causal direction is also possible, see e.g. Festinger 1957). However, this is not always the case. When people perceive not to have control over their

¹Those concerned with conceptual purity may note that this specification puts together nascent and young entrepreneurship, two stages that are conceptually not identical. We believe that this is the most appropriate way to proceed for several reasons. First, we find that looking at nascent entrepreneurship alone would be less substantively interesting, as nascent entrepreneurs can abandon their efforts even before their business is born. As one of the goals of this study is to capture the short-term implications of the crisis for the rise of new entrepreneurs, we find that this is better reflected by looking both at those taking the first steps to start a business, and at those who are in a slightly more advanced stage. Similarly, we do not just look at people who are "self-employed" as current working status as many of them could be running their business for years, hence the short-term nature of the construct would be lost. Finally, we find the wording "taking steps to start a new business", used in many surveys to observe nascent entrepreneurship, to be rather ambiguous and prone to be interpreted in different ways by different respondents, some more and some less involved in actual entrepreneurial activities, with the potential consequence to produce unreliable results.

planned behavior, they may fail to act upon their attitude (Ajzen 1991). Moreover, people may perform actions without having a positive attitude towards it. Some individuals do not choose self-employment because that is their preferred career choice, but because they lack better alternatives (Reynolds et al. 2005). These individuals, often called "necessity" entrepreneurs, have shown, among other things, lower levels of job satisfaction, endurance in their business, and performance (for a recent review, see van der Zwan et al. 2016). Hence, the strength of the correlation between latent and early entrepreneurship is an important indicator as it reflects, on the one hand, the degree to which a society is able to exploit its entrepreneurial potential, and on the other, the degree to which its entrepreneurs are motivated.²

In this framework, the economic crisis may act on individual preferences, by making entrepreneurship look more or less desirable as a career path than the alternatives, as well as on behaviors, by reducing or increasing the obstacles and opportunities that people may encounter. When explaining entrepreneurial behavior, the literature often distinguishes between negative "push" factors and positive "pull" factors (Gilad & Levine 1986). Next to introducing a number of potential financial constraints, which may reduce people's resources forcing them to postpone their business plans, the crisis may also generate "push" factors that may lead more individuals into entrepreneurship. However, these are likely to be unmotivated entrepreneurs, that is, individuals starting a business not to seize an opportunity, but for lack of alternatives.

The literature has not yet reached a consensus regarding the effects of the economic crises on entrepreneurship (Peris-Ortiz et al. 2014). Economic crises may act through different channels, and their effects have been shown to be either positive or negative, depending on the context as well as on the variables and methodologies used to measure

²Two specifications need to be made. First, while we focus on two different stages of the entrepreneurial process, we do not model the process itself. Our perspective is genuinely cross-sectional, as the goal is to take a snapshot at latent and early entrepreneurship, as well as their correlation, in specific places and points in time. Second, we remain agnostic about the causal direction between latent and early entrepreneurship. While it is plausible to expect latent entrepreneurship to be causally prior to early entrepreneurship, people may also be forced into self-employment by external reasons and later develop a positive attitude towards it in order to maintain consistency. While cognitive dissonance is not likely to be a strong factor in this case (as the relatively large amount of paid employees who wish to be self-employed suggests), our data do not allow us to identify clear causal paths.

them. We draw on recent literature (Klapper et al. 2015, Koellinger & Thurik 2011) and focus on two central aspects of the crisis, which should affect both the attractiveness of an entrepreneurial career, and the obstacles that people encounter when trying to pursue such a career. These are *labor market conditions* and *credit availability*. While the effect of these factors on entrepreneurial behavior has been investigated in the past, to our knowledge, nobody tried to investigate their association with latent entrepreneurship, nor with the correlation between latent and early entrepreneurship.

As we noted in the previous section, the 2008 economic crisis translated into high levels of unemployment across Europe. The Mediterranean and East European countries have been particularly affected by high and persistent levels of unemployment, raising the prospects of labor market exclusion, especially among labor market outsiders. For potential and actual entrepreneurs, the rise in unemployment levels had two possible consequences. On the one hand, higher levels of unemployment signaled the unavailability of paid employment, thus making unemployment act as a "push" factor towards an entrepreneurial career. Indeed, some of the literature finds that entrepreneurial activity is higher in periods when unemployment is high (Constant & Zimmermann 2004, Fairlie 2013). This does not necessarily mean that a larger share of people suddenly prefer an entrepreneurial career, but that entrepreneurship can become a necessity due to the unavailability of better options in the labor market (Acs 2006, Deli 2011, Koellinger & Thurik 2011). As Payne (2015) notes, unemployment might indeed lead to an in increase in entrepreneurial activity since individuals will turn to entrepreneurship by necessity. However, the literature discusses the "refugee effect" as an average effect, with no reference to how it varies depending on individual attitudes towards self employment. Finally, other scholars find a negative correlation between unemployment and entrepreneurship (Audretsch & Acs 1994, Blanchflower 2000), as unemployed individuals do not have the resources or the networks to start a business. At the same time, during periods of high unemployment, entrepreneurial activities become riskier because, in the event of a bankruptcy, entry into paid employment is more difficult. Therefore, higher levels of unemployment may also deter individuals from becoming entrepreneurs.

Secondly, the economic crisis has led to a tightening of credit conditions across Europe (Carbo-Valverde et al. 2016). Since many latent entrepreneurs do not posses the financial means to start a business, accessing credit is crucial to finance their business ideas. As

Black & Strahan (2002) note, business creation is tightly connected with swings in banking regulations: the easier banks offer credits, the higher the rate of new business creation. Likewise, Bassetto et al. (2015) find evidence that financial shocks have adverse effects especially on small businesses, both in terms of eroding the wealth of entrepreneurs and reducing their rate of firm growth. Recent evidence on entrepreneurial activity in Europe suggests that restrictions in access to finance have been an important contributor to business destruction. Stricter requirements regarding access to finance resulted in a doubling of credit rejection rates between 2004 and 2008, with SMEs being more likely than larger companies to be refused a bank loan (Sannajust 2014, OECD 2009, Klapper & Love 2011).

These factors are at the same time implications of the crisis and potential moderators of it. For instance, as Klapper et al. (2015) note, entrepreneurship is pro-cyclical especially in countries with deeper credit markets, where entrepreneurs are more dependent on external capital for financing their businesses. Hence, in countries where credit is more easily available, the impact of the crisis on entrepreneurship should be accentuated. Furthermore, the crisis contributed to an increase in the long-term unemployment which had the potential to translate into structural unemployment (ECB 2012) with direct consequences for both the demand and supply side of entrepreneurs. However, since the unemployment status is generally linked with the lack of financial resources for pursuing an entrepreneurial career (for a recent review, see e.g. Payne 2015), early entrepreneurship should be either negatively affected or not affected at all by increases in unemployment levels.

3 Descriptive evidence

To observe latent and early entrepreneurship at the individual level we use repeated cross-sectional data from the "Flash Eurobarometer on entrepreneurship" collected in 2006, 2009 and 2012.³ The three waves offer a good opportunity to observe European countries before

³The first wave of the data was collected in January 2007 (hence we assume that the data refer to 2006), the second between December 2009 and January 2010, and the third between June and August 2012. Regarding country selection, we focus on EU25: Bulgaria and Romania have been excluded from the analyses in order to have a consistent sample between pre and post-crisis period, as the two countries joined the EU in 2007 and were not part of the Eurobarometer survey prior to that year. This is a cautious strategy to avoid the suspicion that observing those two countries only in the post-crisis period may bias the results. Note, however, that replicating the analyses using all 27 member states (with Bulgaria and Romania missing in 2006)

and during the crisis, as well as in its aftermath, when some economies headed towards recovery and others remained in recession. We measure latent entrepreneurship using a dichotomous survey item where people are asked, if they could choose freely, whether they would pick self-employment or paid employment as a source of income.⁴ This choice is consistent with previous literature looking at the same construct (e.g. Blanchflower et al. 2001, Gohmann 2012, Grilo & Thurik 2005, Grilo & Irigoyen 2006). To operationalize early entrepreneurship, we use two different survey items. First, all respondents are asked whether they ever started a business. Then, the respondents stating that they did, and those stating that they are doing it at the moment of the interview, are asked about their current situation. From this follow-up question, we select the respondents who are "currently taking steps to start a new business", and those who "have started or taken over a business in the last three years which is still operating today": together, these two categories capture the individuals who are at the beginning of their entrepreneurial activity.

Figure 1 shows the average values of latent and early entrepreneurship in the countries in our sample between 2006 and 2012. Unsurprisingly, latent entrepreneurs are everywhere more frequent than early entrepreneurs. More interesting are the patterns within and between countries. First of all, the data show that latent entrepreneurs have dropped in most of the countries in our sample in the post-crisis period. In some cases, like Ireland and Malta, the decrease has been steady over the three time points observed. In others, like Finland, Sweden, Spain or United Kingdom, the frequency of latent entrepreneurs has remained stable or even increased between 2006 and 2009, and dropped significantly between 2009 and 2012. Other countries, such as Hungary, Belgium and Slovakia, seem to have been affected very little or not at all by the economic downturn. In sum, although paths have been diverse, the years between 2006 and 2012 have brought a decline of latent entrepreneurship among all EU countries. Early entrepreneurship, on the other hand, follows a more steady pattern. Variance over time is minimal, albeit in some cases significant. In countries like Germany, Greece and Sweden, the share of individuals running or

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produces nearly identical results. In total the data include 75 country/year units. Survey samples range from a minimum of 500 respondents to a maximum of 1029. The median number of respondents per survey is 511 in 2006, 520 in 2009, and 1001 in 2012. For further details, see European Commission (2008, 2011, 2013).

⁴See Appendix A for the wording of the questions. See Appendix B for the summary statistics of all the variables used in the analyses.

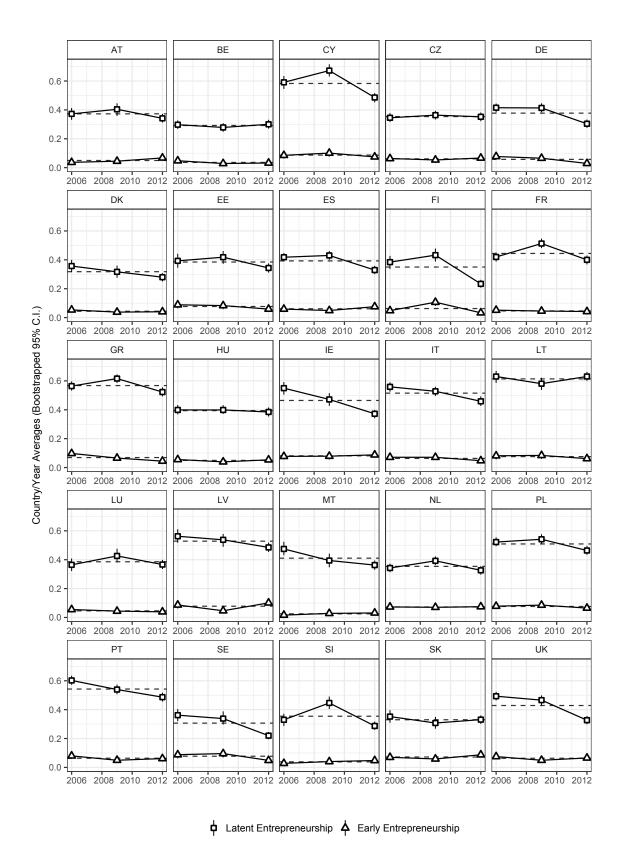


Figure 1: Share of Latent and Early Entrepreneurs in EU countries, 2006–2012. Dashed lines are country averages over the time period observed. Source: Eurobarometer

starting new businesses dropped significantly between 2006 and 2012. However, in other places, like Austria and Slovenia, it increased. In some other countries, the situation went back in 2012 to the same levels of 2006 after either an increase (Finland) or a drop (Latvia) in 2009. Overall, patterns are less clear for this variable than for the previous one.

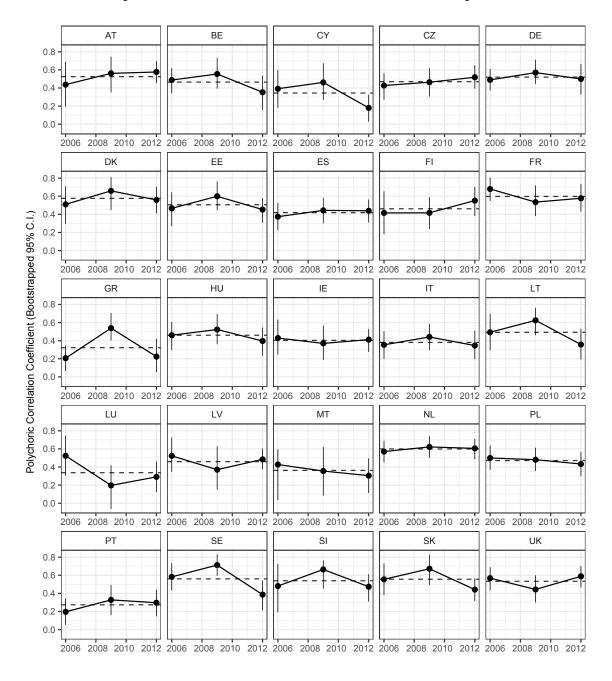


Figure 2: Correlation between Latent and Early Entrepreneurship in EU countries, 2006–2012. Dashed lines are country averages over the time period observed. Source: Eurobarometer

Figure 2 shows the correlation between latent and early entrepreneurship over the same

time period.⁵ The figure shows little variation over time in most of the countries, with some exceptions. In Greece, the correlation is much stronger in 2009 than in 2006 and 2012, indicating a stronger association between latent and early entrepreneurship right after the onset of the financial crisis. In Luxembourg, the correlation becomes weaker after 2006, albeit not significantly. In Sweden, and to a smaller extent in Cyprus and Lithuania, the correlation drops in 2012. Variance between countries appears to be limited as well, although in a few cases, like Portugal, the correlations is clearly weaker than in most of the other countries.

This preliminary investigation suggests that the economic crisis affected individual entrepreneurial attitudes and behaviors negatively, although with considerable variation across countries. Variation over time seems to be strong with respect to latent entrepreneurship, weaker with respect to early entrepreneurship, and very limited with respect to the correlation between the two. To have a better assessment of how these constructs changed as a function of the economic crisis and the factors related to it, controlling for potential confounders, in the next part of the study we analyze them in a multivariate setting.

4 Multilevel models of latent and early entrepreneurship

We use multilevel logistic regressions to investigate how different factors related to the crisis affect individual entrepreneurial behavior. Based on the theoretical discussion, we focus on three key contextual predictors: (1) one indicator identifying the *post-crisis* period, (2) one indicator for the *unemployment rate*, and one for (3) SMEs' access to credit. Our analyses are divided in two parts. In the first part, we look at the direct effect of the three predictors on latent and early entrepreneurship in two separate sets of models. Moreover, we look at how unemployment and access to credit moderate the effect of the post-crisis indicator on the two dependent variables. In the second part, we look at the effect of latent entrepreneurship on early entrepreneurship, and how this effect is moderated by the post-crisis dummy, unemployment rate, and access to credit. In other words, the first part focuses on the effect of the crisis on latent and early entrepreneurship, while the second

⁵Since both variables are dichotomous, we used polychoric correlations instead of the more common Pearson product-moment correlations. Polychoric correlations assume a linear latent trait that is observed with ordinal items. Values are interpreted in the same way as linear correlation coefficients.

part focuses on the effect of the crisis on the link between the two.

4.1 Part 1: random intercept models

We specify a set of three-level hierarchical models, where intercepts vary between country/year groups (level-2) and between countries (level-3). In formal terms, our data consist of N individuals nested in J countries, observed on K years. We estimate the probability to observe the outcome Y = 1 in the two response variables for an individual i observed in country j and year k. In the first part of the analyses, the model is specified as follows:

$$\log \operatorname{it}(P[Y_{i(j,k)} = 1]) = \alpha_0 + \alpha_j + \alpha_{(j,k)} + \beta X_i + \epsilon_i$$
$$\alpha_{(j,k)} \sim N(\gamma Z_{(j,k)}, \sigma_{(j,k)})$$
$$\alpha_j \sim N(0, \sigma_j)$$

Where the first equation predicts the individual-level outcome, the second equation defines the distribution of the level-2 intercepts, and the third defines the distribution of the level-3 intercepts. α_0 is the intercept for the whole sample, $\alpha_{(j,k)}$ are the intercepts of each level-2 unit, and α_j are the intercepts for each level-3 unit; X is a matrix of individual-level control variables with the related vector of fixed coefficients β ; Z is a matrix of level-2 variables, with the related vector of fixed coefficients γ ; ϵ is the vector of individual-level residual errors; $\sigma_{(j,k)}$ is the residual variance of the random intercepts at level-2, and σ_j is the residual variance of the random intercepts at level-3.

Regarding individual-level predictors, we include a number of control variables that we expect from previous literature to be associated with entrepreneurship. One is *gender*, which we include as a dummy variable taking value 1 if the respondent is female and 0 if the respondent is male. We expect this variable to have a negative effect on both preference for self-employment and the probability to start a business (Minniti & Naudé 2010). We also include the *age* of the respondent in years. Age has been shown to be negatively associated to latent and early entrepreneurship, so we expect this indicator to have a negative effect on both our dependent variables (Blanchflower et al. 2001, Lévesque & Minniti 2006). A third predictor captures the *intergenerational association* of entrepreneurship, observing whether the parents of the respondent are themselves self-employed. Given the importance of the family in influencing a person's career path, both in terms of work values

and resources, we expect a strong and positive effect of this variable on both our indicators (Lindquist et al. 2015). We code the variable as ordinal, with a value of 0 if neither of the respondent's parents are self-employed, 1 if one parent is self-employed, and 2 if both parents are self-employed. Other two control variables focus on respondents' education. We identify as low educated the respondents who left school at age 15 or earlier, and as *highly educated* those who left school at age 20 or later. Based on previous literature (Blanchflower 2000, Jiménez et al. 2015), we expect education to have a U-shaped relationship with entrepreneurship, with both low and highly educated people being more likely to become self-employed with respect to people with "middle" education (the reference category). We also include a dummy variable indicating whether the respondents live in a rural area, where market opportunities are reduced and therefore self-employment may be an inevitable choice (see Faggio & Silva 2014). Since European countries differ considerably with each other in degrees of urbanization, including this variable at the individual level allows us to control for the cross-country variation that is due to sample composition with respect of area of residence. Additionally, we include two predictors only in the models for latent entrepreneurship: one is a dummy variable identifying respondents who are still in education, the other is a dummy variable indicating whether the respondent is unemployed.⁶

At level-2, we include three predictors that are central to our argument, and two control variables. The first is a dummy variable for the *post-crisis period*, which takes the value of 0 in 2006 and the value of 1 in 2009 and 2012. The goal of this indicator is to reflect the change in context that citizens had to to face due to the crisis. Conceptually, the recession can be regarded as a feature of the environment (social, political, economic, etc.) where people develop their preferences and make their choices, and which concerns all individuals belonging to the same context. People observed in 2012, about four years after the financial crisis hit the markets, share a set of common beliefs regarding the risks, costs, and

⁶We exclude these two variables from the models for early entrepreneurship because being a student or being unemployed excludes *a priori* that a person is an early entrepreneur. Moreover, we exclude students from the sample in the models for early entrepreneurship, but we keep unemployed people. We do so because the exclusion from the labor market of these two groups are likely to be generated by two different processes, the former exogenous (e.g. still going to school) while the latter endogenous to the market itself (i.e. not finding a job and/or not setting up an own business). In other words, the zero-outcomes observed on students can be regarded as *structural*, while the zero-outcomes observed on unemployed people can be regarded as *random*—and thus, potentially affected by the predictors in the model.

opportunities of starting a business that are arguably different from those of individuals observed in 2006 or 2007. These beliefs are affected by a number of factors, like media reports and politicians' remarks (e.g. Matsusaka & Sbordone 1995, Starr 2012, Wood et al. 2005). The most effective way to capture all these factors at once is to compare the same contexts before and after the economic crisis has manifested itself.

The second contextual variable that we include in the model is logged *unemployment* rate, taken from World Bank (2013). The third is the "SME Access to Finance" (SMAF) index, which measures how easy the access to finance is for SMEs in a given country at a certain point in time. The index is made of two sub-indexes measuring, respectively, the access to debt and equity finance (see Appendix A for a description of the index). Lower values of the index indicate worse conditions for SMEs to access credit, while higher values indicate better conditions.⁷

The two level-2 control variables that we include are *GDP growth* compared to the previous year, and the *Effective Average Tax Rate* on labor. Following previous literature we include GDP growth (we take the indicator from IMF 2015) on our models since economic growth can impact both the demand for goods and services generated by current entrepreneurs as well as the available market opportunities for new entrepreneurs (Wennekers et al. 2005). Tax levels are also likely to exert influence on individual decisions regarding entrepreneurship since they impact directly the pay-offs that individuals can extract by choosing this path (see Baliamoune-Lutz 2015, for a review). We take the *Effective Average Tax Rate* (EATR) variable from the DG Taxation and Customs Union (2016) Tazation Trends Report.

All predictors discussed here are included in both sets of models, with the exception of student and unemployment status at the individual level, which are included only in the models for latent entrepreneurship. Our theoretical interest is on the main effects on the two dependent variables of the post-crisis dummy, unemployment rate, and the SMAF index. Moreover, we look at the interaction effect between the post-crisis dummy and the other two indicators, to see whether unemployment and access to credit moderate the

⁷Two important remarks regarding the indicator are necessary. First, the time series provided for the index starts in 2007, i.e. slightly after the EB data were collected. We believe that this is not a problem for the purposes of our analysis since, first, our data were too collected in January 2007, and second, there is no reason to expect such a great change within 1 year in the pre-crisis period. Moreover, in the original data the values of the index are normalized with respect to the EU average in 2007, which takes value 100.

impact of the crisis on entrepreneurial attitudes and behaviors.

4.2 Results of random intercept models

	37 1114	77 1 1 0 4	37 1104
	Model 1A	Model 2A	Model 3A
Intercept	-0.03	-0.01	-0.03
	(0.10)	(0.10)	(0.10)
Gender (Female)	-0.51***	-0.51***	-0.51***
	(0.02)	(0.02)	(0.02)
Age	-0.08***	-0.08***	-0.08***
	(0.01)	(0.01)	(0.01)
Parents Self-Employed	0.27***	0.27***	0.27***
	(0.01)	(0.01)	(0.01)
Low Education	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)
High Education	0.05^{*}	0.05^{*}	0.05^{*}
	(0.02)	(0.02)	(0.02)
Still in Education	0.33***	0.33***	0.33***
	(0.04)	(0.04)	(0.04)
Lives in rural area	0.07^{***}	0.07***	0.07***
	(0.02)	(0.02)	(0.02)
Unemployed	0.04^{\dagger}	0.04^{\dagger}	0.04^{\dagger}
	(0.02)	(0.02)	(0.02)
GDP Growth	-0.13****	-0.13***	-0.13****
	(0.04)	(0.04)	(0.04)
Effective Average Tax Rate	-0.05	-0.05	-0.05
	(0.07)	(0.07)	(0.07)
Unemployment Rate (log)	-0.11^*	-0.05	-0.11^*
	(0.04)	(0.06)	(0.05)
SMAF Index	0.01	0.00	0.01
	(0.05)	(0.05)	(0.08)
Post-crisis	-0.27^{**}	-0.29^{***}	-0.27^{**}
	(0.08)	(0.08)	(0.09)
Unemployment:Post-crisis		-0.08	
		(0.06)	
SMAF:Post-crisis			-0.00
			(0.07)
AIC	71548.66	71549.19	71550.66
BIC	71691.34	71700.79	71702.26
Log Likelihood	-35758.33	-35757.59	-35758.33
N İndividual	55133	55133	55133
N Country:Year	75	75	75
N Country	25	25	25
Var Intercept Country:Year	0.03	0.03	0.03
Var Intercept Country	0.16	0.17	0.16
***n < 0.001 **n < 0.01 *n < 0.05 †	0 1		

^{***}p < 0.001, **p < 0.01, *p < 0.05, †p < 0.1

Table 1: Multilevel models for Latent Entrepreneurship

Table 1 reports the results of four multilevel models of latent entrepreneurship.⁸ Generally speaking, individual predictors affect the outcome in the expected direction. Both being

⁸All models have been estimated with Restricted Maximum Likelihood, using the package 1me4 version 1.1-12 for R version 3.3.2. To simplify the comparability of the effects of the different variables, all the continuous indicators in the model have been centered around the grand mean and standardized, so the

a female and being older have a negative effect on the probability to prefer self-employment over paid employment. Moreover, having parents who are self-employed correlates positively with the probability that respondents prefer self-employment themselves. Results do not provide support for a U-shaped effect of education on latent entrepreneurship: low educated people do not differ significantly from people of middle education with respect to the outcome. On the other hand, being highly educated correlates positively and significantly with latent entrepreneurship, and the same is true for being currently in education. Living in a rural area also has a positive and significant effect on the outcome, confirming that in regions where market opportunities are reduced, self-employment is a more attractive career opportunity. Finally, being unemployed has only a weak positive effect on latent entrepreneurship.

Looking at the contextual predictors, we find that both GDP growth and unemployment rate have a negative and significant effect on latent entrepreneurship. The difference in sign between individual-level and contextual-level unemployment suggests an interesting pattern at work. While unemployed people are (slightly) more likely to be latent entrepreneurs, people living in countries characterized by high unemployment are less likely to be so. Therefore, on the one hand, contexts characterized by high unemployment tend to depress the entrepreneurial attitudes of citizens, while on the other hand, when citizens are unemployed themselves, they seem to look at self-employment as a possibility to improve their situation. The coefficient of the post-crisis dummy is negative and significant, confirming the pattern previously suggested by Figure 1: the contextual change brought by by the economic crisis is associated with a reduced tendency to prefer self-employment over paid employment as a career path. Finally, none of the interaction effects is statistically significant, suggesting that this association is not moderated by unemployment rates or credit availability.

Moving to the models for early entrepreneurship, we find a negative and significant effect of both being a female and being older, as well as a positive significant effect of having parents that are self-employed, confirming prior expectations. In these models too, we do not find a U-shaped effect of education, but rather a linear one: lower-educated people are less likely than middle educated people to be early entrepreneurs, while highly-

-

coefficients indicate the change in the linear predictor associated to a shift of one standard deviation away from the mean.

-2.52***
(0.09)
-0.64***
(0.04)
-0.77^{***}
(0.02)
0.28***
(0.03)
-0.31^{***}
(0.07)
0.33***
(0.04)
-0.03
(0.04)
-0.07
(0.05)
-0.15**
(0.05)
0.07
(0.04)
-0.07
(0.08)
-0.36***
(0.10)
0.22**
(0.08)
22408.15
22541.50
11189.08
53623
75 25
25
0.04
0.02

***p < 0.001, **p < 0.01, *p < 0.05, †p < 0.1

Table 2: Multilevel models for Early Entrepreneurship

educated people are more likely to be so. Looking at the contextual-level predictors, the average effective tax rate has a negative effect on early entrepreneurship, suggesting that, on average, higher taxes are detrimental to entrepreneurial behaviors. The SMAF index has a positive effect, albeit barely significant. This finding makes sense in comparison with the results of the models for latent entrepreneurship: whereas the latter construct captures a general attitude towards entrepreneurial activities that reflects broader aspirations and motivations, early entrepreneurship reflects the conditions of entrepreneurs engaged in the early stages of a new businesses. Early entrepreneurs are thus more likely to be influenced by immediate economic conditions that can directly impact the success of their initiatives, such as changes in the interest rates on loans, the willingness of banks to financially support

businesses, or the likelihood of success of loan applications. Finally, the post-crisis dummy has a negative effect on early entrepreneurship, confirming that the crisis had a negative impact on both psychological and behavioral dimensions of entrepreneurship.

Looking at the interaction effects, only the SMAF index significantly moderates the effect of the post-crisis dummy. This suggests that the factor that most influences citizens' early entrepreneurial activities in times of crisis is access to finance. To better understand the interaction effect, Figure 3 shows the predicted probability of early entrepreneurship before and after the crisis, along the range of the SMAF index. Overall, the probability to start a business is fairly low, with the average estimated value hardly exceeding 10%. This was already visible in Figure 1, and it does not come as a surprise: self-employment is a very risky activity, and not everyone is willing to undertake it. However, what is important to note is that after the crisis, the average probability drops to around 4-5%, about half as much, only in the countries scoring low on the SMAF index. These are mostly Central-Eastern and Southern European countries, such as Hungary, Latvia, and Spain in 2009, or Greece, Portugal, and Cyprus in 2012. For countries scoring high in the index, like Sweden, Germany, Austria, and France, there is no significant difference between the pre and post-crisis period, meaning that the impact of the crisis has been limited.

To be sure, the values shown in Figure 3 reflect an average effect, holding everything else equal. Other factors might have dampened entrepreneurial activity in these countries as a consequence of the crisis. However, overall, our result underlines the importance of access to finance in determining citizens' entrepreneurial choices. In line with behavioral models of entrepreneurial supply, our findings show that early entrepreneurs' activities are primarily influenced by the cost of capital. The credit constraints that emerged as a result of the crisis hindered the development of new businesses since entrepreneurs found it difficult to access finance and therefore refrained from carrying out their projects. The figure also shows that this was not the case in all EU countries but that EU economies are polarized on the SMAF dimension. Changes in access to finance have negatively affected to a much larger extent the behavior of entrepreneurs from countries that have fared worse in SMAF ratings prior to the economic crisis. This demonstrates that the very different banking conditions that entrepreneurs face in the EU have a strong impact on their behaviour

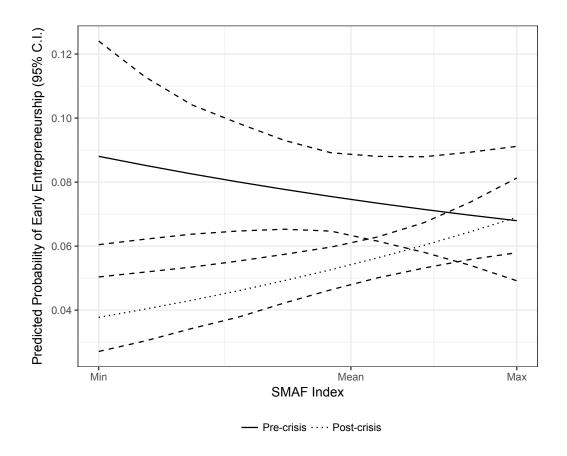


Figure 3: Predicted probability of early entrepreneurship and SME access to finance. Predictions are based on the results of Model 3B reported in Table 2, and have been calculated holding all the other variables constant at value 0 (corresponding to the mean for continuous indicators)

4.3 Part 2: random slopes of latent entrepreneurship

In this part, we look at the association between latent and early entrepreneurship, and how this association is moderated by the three main contextual predictors discussed above: the post-crisis dummy, the unemployment rate, and the SMAF index. To do so, we estimate a set of models for early entrepreneurship that are almost identical to those reported in Table 2. The only difference is that we add latent entrepreneurship as a predictor, and we set its effect to vary across level-2 units. The new model is specified as follows:

$$\begin{split} \log & \mathrm{it} \big(P \big[Y_{i(j,k)} = 1 \big] \big) = \alpha_0 + \alpha_j + \alpha_{(j,k)} + \lambda_0 + \lambda_{(j,k)} + \beta X_i + \epsilon_i \\ \\ & \alpha_{(j,k)} \sim N(\gamma Z_{(j,k)}, \sigma_{(j,k)}) \\ \\ & \lambda_{(j,k)} \sim N(\theta W_{(j,k)}, \rho_{(j,k)}) \\ \\ & \alpha_j \sim N(0, \sigma_j) \end{split}$$

Where the outcome is the probability to observe Y=1 in early entrepreneurship; λ_0 is the main effect of latent entrepreneurship, and $\lambda_{(j,k)}$ is its random component varying across level-2 units; the variation of $\lambda_{(j,k)}$ is explained by a matrix of contextual level predictors W associated to a vector of fixed coefficients θ ; $\rho_{(j,k)}$ is the residual variance of the random effects of latent entrepreneurship. All the other terms are identical to those discussed in the previous section.

4.4 Results of random slopes models

Looking at Table 3, the first thing to notice is that all individual-level predictors retain the effects that we observed in Table 2, suggesting that their impact on early entrepreneurship is largely independent from latent entrepreneurship. This is not the case for the contextual-level predictors. The effect of the post-crisis dummy is reduced, suggesting that the negative impact of the crisis on early entrepreneurship is to a certain extent mediated by a decrease of latent entrepreneurs. A similar reduction, albeit to a smaller degree, happens to the coefficient of the effective average tax rate—which, however, has no significant effect on latent entrepreneurship. The SMAF index, on the other hand, has now a stronger and highly significant positive coefficient, suggesting a suppression effect of latent entrepreneurship. The latter indicator has a very strong effect on early entrepreneurship. This comes as no surprise, given the high correlations shown in Figure 2. However, the variance of the random effect across level-2 units is also very large, substantially larger than the variance of the intercepts at both level-2 and level-3.

Looking at the interaction effects, there is no evidence of a change in the strength of association between latent and early entrepreneurship from the pre-crisis to the post-crisis period. This was already suggested by Figure 2, and confirmed by the multivariate models. On the other hand, both the unemployment rate and the SMAF index show significant coefficients, and suggest interesting patterns. Looking at Model 3C, the interaction term between latent entrepreneurship and the unemployment rate is negative, however the main effect of the unemployment rate becomes positive and significant. This suggests that a higher unemployment rate increases the likelihood to start a business for people who are *not latent entrepreneurs*. This effect is plotted in Figure 4. Latent entrepreneurs have higher chances to become early entrepreneurs, regardless of the level of unemployment in their country. For the others, however, the probability grows from less than 2% to 4%. This

	Model 1C	Model 2C	Model 3C	Model 4C
Intercept	-3.61^{***}	-3.56***	-3.62***	-3.59***
	(0.10)	(0.12)	(0.10)	(0.10)
Latent Entrepreneurship	1.67***	1.59***	1.67***	1.64***
	(0.07)	(0.11)	(0.06)	(0.06)
Gender (Female)	-0.47***	-0.47***	-0.47^{***}	-0.47***
	(0.04)	(0.04)	(0.04)	(0.04)
Age	-0.74***	-0.74***	-0.74^{***}	-0.74***
	(0.02)	(0.02)	(0.02)	(0.02)
Parents Self-Employed	0.20***	0.20***	0.20***	0.20^{***}
1	(0.03)	(0.03)	(0.03)	(0.03)
Low Education	-0.33***	-0.33^{***}	-0.33***	-0.33***
TT 1 T 1	(0.07)	(0.07)	(0.07)	(0.07)
High Education	0.34***	0.34***	0.34***	0.34***
Ti in	(0.04)	(0.04)	(0.04)	(0.04)
Lives in rural area	-0.05	-0.05	-0.05	-0.05
CDD Crosseth	(0.04)	(0.04)	(0.04)	(0.04)
GDP Growth	-0.01	-0.01	-0.01	-0.01
Effective Average Tev Date	$(0.05) \\ -0.12^*$	(0.05) -0.12^*	(0.04) -0.12^*	$(0.05) \\ -0.12^*$
Effective Average Tax Rate	-0.12 (0.05)	-0.12 (0.05)	-0.12 (0.05)	-0.12 (0.05)
Post-crisis	-0.22^*	-0.29^*	-0.22^*	-0.21^*
POST-CHSIS	-0.22 (0.10)	-0.29 (0.13)	-0.22 (0.09)	-0.21 (0.09)
Unemployment Rate (log)	0.10)	0.13)	0.15**	0.04
onemployment reace (log)	(0.04)	(0.04)	(0.06)	(0.04)
SMAF Index	0.13**	0.12^{**}	0.13^{**}	-0.04
own index	(0.05)	(0.05)	(0.05)	(0.06)
Post-crisis:Latent Entrepreneurship	(0.03)	0.11	(0.03)	(0.00)
1 ost chois. Latent Entrepreneursing		(0.14)		
Unemployment:Latent Entrepreneurship		(0.1 1)	-0.15**	
			(0.06)	
SMAF:Latent Entrepreneurship			(3.33)	0.22^{***}
r				(0.06)
AIC	19964.12	19965.53	19959.77	19953.46
BIC	20114.17	20124.40	20118.64	20112.33
Log Likelihood	-9965.06	-9964.76	-9961.88	-9958.73
N Individual	50320	50320	50320	50320
N Country:Year	75	75	75	75
N Country	25	25	25	25
Var Intercept Country:Year	0.09	0.09	0.08	0.07
Var Slope Country:Year	0.14	0.14	0.11	0.09
Var Intercept Country	0.04	0.04	0.04	0.04

***p < 0.001, **p < 0.01, *p < 0.05, †p < 0.1

Table 3: Multilevel models for Early Entrepreneurship

finding has one important implication. It suggests that the "push" effect exerted by contextual unemployment does not operate by activating latent entrepreneurs. This means that, first, the source of potential innovators that a country may have remains untouched, and second, that those who are drawn into self-employment lack the motivation to do so. Being entrepreneurs by necessity, and not by choice, implies that these people may be less committed and less satisfied by their activity, as previous literature suggests (e.g. van der Zwan et al. 2016).

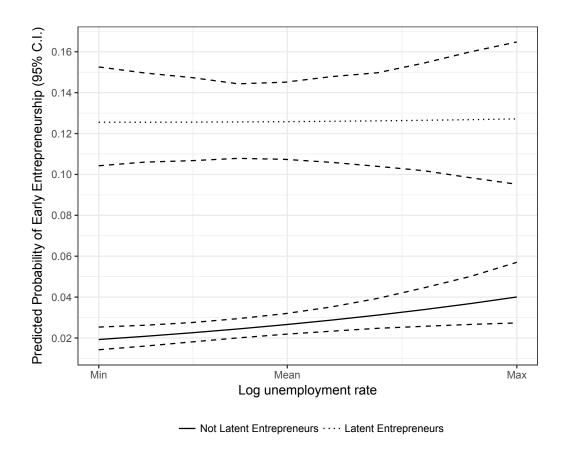


Figure 4: Predicted probability of early entrepreneurship and unemployment rate. Predictions are based on the results of Model 3C reported in Table 3, and have been calculated holding all the other variables constant at value 0 (corresponding to the mean for continuous indicators)

Looking at the interaction effect between latent entrepreneurship and the SMAF index, the picture is different. As Model 4C shows, the main effect of the SMAF index becomes negative, while the interaction effect is positive and rather strong. In other words, as Figure5 shows, the effect of access to credit on early entrepreneurship is there *only* for latent entrepreneurs. This finding shows that access to finance plays a key role in the early stages of the entrepreneurial process, and helps people take the crucial step between attitudes and behavior that lies at the basis of business creation. Together with the results of the models of latent entrepreneurship discussed in the previous section, this finding suggests that better access to finance does nothing to increase the entrepreneurial spirit of a country, nor does it push people who are not latent entrepreneurs into starting a business. In other words, access to finance is just a facilitator of a mechanism that originates elsewhere.

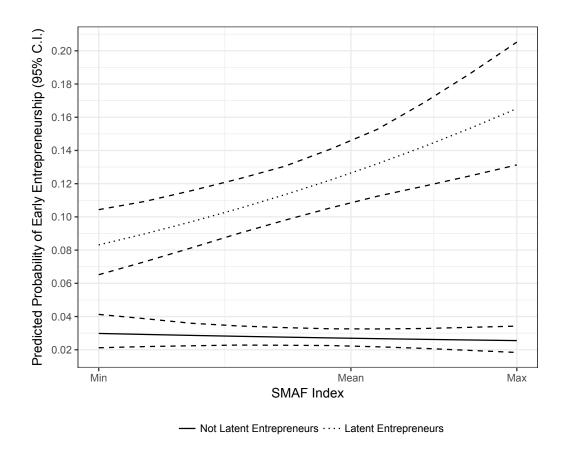


Figure 5: Predicted probability of early entrepreneurship and unemployment rate. Predictions are based on the results of Model 4C reported in Table 3, and have been calculated holding all the other variables constant at value 0 (corresponding to the mean for continuous indicators)

5 Conclusions

In this paper we investigated the effects of the global financial crisis of 2008 and the following economic recession on European citizens' entrepreneurial attitudes and behaviors. We assessed the impact of the 2008 economic crisis by comparing the same countries before and after, and we also looked at two indicators through which the crisis has expressed itself, namely higher unemployment and restricted access to credit. In general, we found that the crisis had a negative impact on European citizens' entrepreneurial attitudes and behaviors. After the crisis, the number of "latent entrepreneurs" dropped in most of the countries in our analysis, and so did the number of individuals at the early stages of a new business. This stark picture suggests that the recession not only brought economic stagnation, but also undermined one of the most important means to overcome it. However, we also observed some substantial variation across EU countries in the way the crisis af-

fected early entrepreneurial activities, and we found that such a variation can be partially explained by access to finance. In countries where people willing to start a new business faced better borrowing conditions, the recession did not have a significant negative effect on early entrepreneurship. This finding is consistent with literature looking at aggregate indicators of entrepreneurship, like rates of new firm registrations (Klapper et al. 2015, Paniagua & Sapena 2015). However, focusing on individual-level data allowed us to look at the moderating effect of latent entrepreneurship, showing that the positive effect of credit availability on start-up behavior is limited to those who have a positive attitude towards self-employment. Thus, credit availability helps societies draw from the reservoir of potential entrepreneurship at their disposal, and aids citizens who wish to become entrepreneurs to put their preferences into practice. Hence, a very effective way for governments to help citizens in their entrepreneurial intents is to prioritize regulations favoring access to credit.

Our analysis also provides further evidence that helps us understand the functioning of the "push" effect of unemployment on entrepreneurship. Specifically, we find a negative effect of unemployment rate on latent entrepreneurship, suggesting that contexts characterized by higher unemployment depress the entrepreneurial spirit of the citizens. Moreover, while we find a significant "push" effect of unemployment into entrepreneurship, this only affects individuals who are not latent entrepreneurs. In other words, unemployment may as well create more entrepreneurs, but these are mostly unmotivated entrepreneurs. Therefore, our finding provides a better specification of the "refugee effect" generated by high levels of unemployment. This has important implications for policies designed to promote entrepreneurship as a response to the crisis, since, necessity entrepreneurs are believed to be less prepared, have fewer skills but also be less committed to sustain a personal business.

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Appendix A Variables Description

A.1 SMAF Index

According to the description by European Commission (2012) the SMAF index is composed by two sub-indexes, one called "Debt finance sub-index" and the other "Equity finance sub-index". In total, the two components of the index capture 14 indicators, divided as follows:

1. Debt finance sub-index

- % of firms using bank loans
- Interest rates on loans up to 250,000 €
- Interest rates for overdrafts
- % of firms using bank overdraft, credit line or credit card overdrafts
- % of firms using leasing or hire purchase or factoring
- % of companies not applying for bank loans because of possible rejection
- % of firms "applied but did not get everything requested"
- Rejected loan applications and unacceptable loan offers
- Willingness of banks to provide a loan (% of respondents who indicated a deterioration)

2. Equity finance sub-index

- Total venture capital investment in thousands of € (% of GDP)
- Number of venture capital beneficiary SMEs (scaled by GDP)
- Total volumes invested by business angels in thousands of € (% of GDP)
- Number of deals where business angels invested (% of GDP)
- % of firms feeling confident to talk about financing with equity investors or venture capital firms

The sources reported are European Central Bank (ECB) for debt; European Venture Capital Association (EVCA) and European Business Angel Network (EBAN) for equity; EC and ECB's Survey on the Access to Finance of SMEs (SAFE).

A.2 Question Wording Eurobarometer

We report here the question wordings of the variables utilized here coming from the 2012 Eurobarometer questionnaire on entrepreneurship. The goal of this section is to provide an example of how the individual-level constructs of interest were measured. For more details, see European Commission (2008, 2011, 2013).

Preference for self-employment (Latent entrepreneurship)

- Q1: If you could choose between different kinds of jobs, would you prefer to be...
- 1) An employee
- 2) Self-employed
- 3) None (DO NOT READ OUT)
- 4) DK (DO NOT READ OUT)

Starting a business (Early entrepreneurship)

- Q13: Have you ever started a business, taken over one or are you taking steps to start one?
- 1) Yes, you started/took over a business
- 2) Yes, you are taking steps to start/take over a business
- 3) No
- 4) DK (DO NOT READ OUT)
 - Q14b: How would you describe your situation?
- 1) You are currently taking steps to start a new business
- 2) You have started or taken over a business in the last three years which is still operating today
- 3) You started or took over a business more than three years ago and it?s still operating
- 4) You once started a business, but currently you are no longer an entrepreneur since that business has failed
- 5) You once started a business, but currently you are no longer an entrepreneur since that business was sold, transferred or closed
- 6) DK (DO NOT READ OUT)

Controls

- D2: Gender ("Gender (Female)")
- 1) Male
- 2) Female
 - *D1: How old are you?* ("Age")

D4: How old were you when you stopped full-time education? ("Education")

D5a: As far as your current occupation is concerned, would you say you are self-employed, an employee, a manual worker or would you say that you are without a professional activity? ("Unemployed")

- 1) Self-employed
- 2) Employee
- 3) Manual worker
- 4) Without a professional activity
- 5) Refusal (DO NOT READ OUT)

D7: Could you tell me the occupations of your parents? Are or were they self-employed, white- collar employees in the private sector, blue-collar employees in the private sector, civil servants or not in paid employment? ("Parents Self-Employed" – asked for both mother and father)

- 1) Self employed
- 2) White collar employee in the private sector
- 3) Blue collar employee in the private sector
- 4) Civil servants
- 5) Not in paid employment
- 6) Other
- 7) DK (DO NOT READ OUT)

Appendix B Descriptive Statistics

Table 4: Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Latent Entrepreneurship	58,314	0.419	0.493	0	1
Early Entrepreneurship	61,059	0.061	0.239	0	1
Gender (Female)	62,343	0.597	0.491	0	1
Age	62,111	0.004	0.999	-1.973	2.871
Parents Self-Employed	59,906	0.359	0.638	0	2
Low Education	61,898	0.167	0.373	0	1
High Education	61,595	0.335	0.472	0	1
Still in Education	61,595	0.071	0.258	0	1
Lives in rural area	62,042	0.350	0.477	0	1
Unemployed	62,174	0.492	0.500	0	1
GDP Growth	62,343	0.009	0.871	-3.219	2.083
Unemployment Rate (log)	62,343	0.076	1.012	-2.131	2.762
Effective Average Tax Rate	62,343	0.183	0.954	-1.634	2.110
SMAF Index	62,343	0.071	0.999	-2.489	1.756
Post-crisis	62,343	0.701	0.458	0	1