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Determinants of Entrepreneurship before and after the Great Recession and economic growth: Evidence from Europe

Name student: Nikolaos Angelidis

Student ID number: 451347

Supervisor: Dijkstra, N.F.S.

Second Accessor: Hessels, S.J.A.

Abstract

The present thesis aims to explore the determinants of entrepreneurship within European Union (EU) countries, before and after the Great Recession. The scope of the thesis is twofold; the major ambition is to identify the determinants that encourage entrepreneurship in EU countries before and after the Great Recession era, and the second is to explore the link between entrepreneurship and growth. In that sense, I suggest the exploration of alternative set of factors (economic, social, and institutional) that form the willingness of individuals to commercialize their ideas, in a sample of EU countries. Furthermore, I employ the methodology suggested by Aparicio et al. (2016) and augmented it with other variables to better determine the factors that force entrepreneurial activities and feed growth. In our empirical analysis, I use an unbalanced panel dataset for European Union countries for the period of 2001-2015. In addition, I break down our analysis for two sub-periods before and after the global financial crisis of 2007-2009, in order to examine the existence of any differentiation among the drivers of both variables.

Contents

I. Introduction

The generic framework that links entrepreneurship and growth is that entrepreneurial activities, from a macroeconomic point of view, contribute to an increase of income, job creation (equals with decrease in the national unemployment rates), empowerment of R&D intensity, and innovation. In recent years and especially after the occurrence of the Great Recession, policy makers give emphasis on the development of entrepreneurial spirit and promotion of education for business support, in order to support the small and medium enterprises (SMEs) and start-ups, that constitute the backbone of economic activity.

Consequently, entrepreneurship is considered as a leading force for both economic growth and prosperity in modern societies. However, entrepreneurship is a multi-dimensional (Gartner, 1985) and complex term, with several alternative meanings from different perspectives. From its origins, the term entrepreneurship is a multi-dimensional concept. This is the reason why many studies try to approach several different aspects of the term and its determinant factors.

The main purpose of the present thesis is to identify the economic, socio-demographic and institutional factors that affect the entrepreneurship behavior of nascent and new entrepreneurs, using data from several official databases. Overall, the present thesis aims to update existing evidence and advances our common understanding of the role of several economic, social or individual-level and institutional factors, which contribute to the entrepreneurial actions. To accomplish this, I record the findings of several academic studies on the factors that seem to affect entrepreneurship within European Union (EU) economies and other country groups. The main findings show a positive and statistically significant relationship between GDP growth, the existing opportunities and capabilities of potential entrepreneurs, education and strong institutions. On the contrary, fear, corruption and high taxation seem to be the major pains of entrepreneurial activities. The most important issue is that many other variables show contradictory results, such as unemployment, inflation, market openness, FDI and market openness.

Further aims to provide evidence on the link between entrepreneurship and growth, before and after the Great Recession, from 2007 to 2009 and EU debt crisis that followed afterwards. The constitution of both entrepreneurial motives, and the measurement of entrepreneurship on growth, generates useful implications for economists and policy makers. Evidence could be used by policy makers in order to improve their decision-making process for legislation and

institutional reforms in order to better support entrepreneurship and boost growth. Finally, the present thesis aims to form based on the results specific recommendations and quantitative insights for European Union policy makers, to improve their future decisions in order to promote entrepreneurship and avoid stagnation in European area.

I.1. Motivation

The emergence of new business and entrepreneurial activities are determined by several factors with positive impact on the intentions and others that work as barriers for such activities. Until today, the research in this topic could be characterized as limited explored, since the existing literature emphasize in specific "push" and "pull" factors for several countries or country-groups.

Motivation theory on entrepreneurial activity distinguish entrepreneurs into two categories; "pull" (pulled by entrepreneurial spirit), who are keen on new ideas and ventures, are willing to initiate new activities and show an intended behavior to bear the risks to do so and "push" who even though they do not show entrepreneurial characteristics but their current position and status with their positions leaves them unsatisfied (pushed to an entrepreneurial activity), like the unemployed, those with low expectations for a "good" wage (Amit and Muller, 2013 and van de Zwan et al., 2016).

The main purpose of this thesis is to determine the main determinants that drive entrepreneurial intentions in EU countries. The originality of the present thesis lays on the set up of a stronger consensus on the determinants of entrepreneurial activity in EU and the impact of entrepreneurship on growth, before and after the global financial crisis and the recession that followed it. The exploration of the determinants and the leading forces that promote entrepreneurship and activate individuals to turn ideas into action is an issue of high importance for governments and policy makers.

As stated above, Entrepreneurship promotes innovation (Ribeiro-Soriano and Galindo-Martín, 2012), R&D expenditure (Czarnitzki and Hottenrott, 2011; Acs, Autio, and Szerb 2014), and economic growth, while reduce unemployment and enhance competitive advantages (Aparicio, Urbano, and Audretsch, 2016). More often (Khanani, 2019), for countries in global landscape.

Thus, the results are of great value from an economic and industrial policy point of view. Especially in the case of EU countries policy makers emphasize in the union competitiveness and innovation. The determination of both individual and environment factors that could boost independent business activities could provide serious insights for policy makers. In addition, these insights are useful for consultancy and advisory services focused on start-ups and SMEs. From academic scope the results of the existing research are based on empirical evidence for countries-specific groups.

As a result, the thesis aims to provide evidence to improve the decision-making process mainly of EU policy makers, for the creation of a friendlier environment where young entrepreneurs could easier commercialize new ideas and access the market. This could be a basis on pro-cyclical actions need to be undertaken when EU countries enter in an economic crisis of in a recessionary era. Finally, the empirics and the conclusions could form a clearer proposition on the economic, social (or individual-level) and institutional factors that had positive or negative impact on entrepreneurship before and after the crisis and how overall entrepreneurial activity attributed in economic growth.

II. Definition of Entrepreneurship

In the present section I aim to provide some general views on the definition and the foundations of entrepreneurship. The information provided in the current section will provide many interest alternative views of a complex and multi-dimensional term of high business and political interest nowadays. The purpose of the current section is to create a more complete understanding of the concept of entrepreneurship, including a comprehensive review of the development of the term and its meaning as proposed in many different fields of the existing research.

In general, the research related to entrepreneurship actually involves all the personal characteristics, activities, thinking and the impact (both economic and social) of the entrepreneurial actions. Its meaning is directly linked with the pair of terms “opportunity” and “risk”. More specifically, Long (1983) notes that the theoretical views of entrepreneurship involves three main themes, firstly, *uncertainty and risk*, along with *complementary managerial competence* and finally *creative opportunism*.

For example, based on Knight (1921) and Drucker (1970) "*entrepreneurship is about taking risk*", while in the mindset of Schumpeter (1965) "*entrepreneurs as individuals who exploit market opportunity through technical and/or organizational innovation*". Most of the proposed definitions deal with the motivation of entrepreneurs to start a business.

Actually, Schumpeter supported a summary of combination of transformative processes for the definition of entrepreneurship, which he considered as a core driver of growth. This transformation process includes five specific occasions a) a new product or service (including improvements in quality), b) a new method for production, c) a new market, d) an alternative source of supply of raw materials or half-manufactured products and e) a new organization of any industry, like the creation of a monopoly position or market alternate (a market organizational structures).

According to the suggestions of more recent and modern definitions, Shane and Venkataraman defined the field of entrepreneurship as, "*the scholarly examination of how, by whom and with what effects opportunities to create future goods and services are discovered, evaluated and exploited'* (2000, p. 218).

In this modern perspective, entrepreneurship concerns as a discovery mission, as any effort to exploit something new, generate opportunities driven from a mindset of change the old and create something new, in terms of services, products, processes, even new markets, given the state of market uncertainties, as presented in Shane and Venkataraman (2000).

Instead, many business-oriented researchers and practitioners try to use more broad definitions. For example, Birch (1979) considers entrepreneurship as a "*process of giving birth to a new business… initiation of change*". The main criticism of traditional economists on the modern definitions of entrepreneurship is that any exclusion of the traditional approaches, including the traditional cornerstones mentions in Long (1983) seem to be incomplete.

III. Literature Review

The theoretical and empirical research on entrepreneurship, its characteristics and the determinants that drive intentions and motives for new ventures and business activities is vast. The related literature suggests several theories and empirical evidence on the determinants of entrepreneurial actions. For example, OECD (OECD, 2006) proposes several alternations have

been proposed for the determinants of entrepreneurship for the six groups of factors: a) regulatory framework, b) market conditions, c) access to finance, d) creation and diffusion of knowledge, e) entrepreneurial capabilities, and f) entrepreneurial culture.

The main motivation of these studies is the seemingly strong relationship between entrepreneurship and economic growth at a national and regional level (Grilo and Thurik, 2004; Coviello and Josph, 2012;). The review of the existing literature has also identified a great range of determinants for taking over an entrepreneurial action, as well as the main factors that contribute to the success of new ventures. The main determinants that will be described in the present section will be implied in the empirical model for testing.

The related literature on entrepreneurial activity and new business activities creation records many different factors as determinants. The great majority of studies (Bosma and Schutjens, 2011; Bosma et al., 2018) highlight that the dynamics of entrepreneurship rate as measured by the TEA (total entrepreneurial activity) differs considerably both among countries and over time, depending on the level of economic development and several other factors that deal with the demographic structure, cultural characteristics and the institutions.

Although the theoretical literature in entrepreneurship is vast, the empirical literature is rare in the related research conducted. There were many published papers that discuss a variety of factors affecting the entrepreneurship, in both developed and developing countries. In an effort to fill the unexplored aspects and unify several contributions in the literature on the relationship between several factors for entrepreneurial spirit promotion and growth this thesis tries to explore the existing theoretical framework and provide quantitative evidence for EU countries. In this sense three broad categories of factors are discussed simultaneously. These include the entrepreneurs' characteristics based on GEM data, the external economic environment and the institutions (Acs and Armington, 2003 and Acs et al., 2014).

The main determinants that promote entrepreneurship could be classified in three major categories:

a) Economic (Begley et al., 2005),
b) Social or individual-level (Fernandes et al., 2012), and
c) Institutional (Begley et al., 2005 and Estrin, 2013).

A general view of the existing literature shows that entrepreneurial activities are subject to a great variety of factors that influence the decisions of entrepreneurs (Bosma and Schutjens,

2011; Aparicio et al., 2016; Roman et al., 2017 among others). Entrepreneurship is a dynamic process, with high level of differentiation between countries, sectors, companies and of course the time. The major layers that drive entrepreneurship are the economic environment, demographic factors, social and cultural characteristics of persons, institutions and the level of development of emerging technologies, innovation and markets. Although in the related literature several categorizations have been proposed especially in the empirical research, these three are the most representative for the exploration of the factors.

This structure of the determinants of entrepreneurial activities is common in the related literature, with limited differentiations. For example, Wennekers et al. (2005) highlights that the nascent entrepreneurship rate is determined by the level of economic development as well as by demographic, cultural, and institutional characteristics, following different layers for his variables. Castano (2015) classified the determinants into economic, social and cultural for a comparison between EU and Latin American countries.

III.1. Economic Determinants

Economic situation within a country enhances a crucial role on the development of entrepreneurship and innovation. Several microeconomic and macroeconomic factors could either generate or discourage entrepreneurial activity. In the great majority of the studies that have been conducted and relate with the impact of economic factors that promote entrepreneurship most of them find strong relationships between specific macroeconomic factors and TEA variable. Some of the core economic variables widely used in the literature are GDP per capita growth rate, unemployment and inflation rates, FDI inflows in the economy, R&D expenditure among others (Bosma and Schutjens, 2011; Czarnitzki and Hottenrott, 2011; Arin et al., 2015; Aparicio et al., 2016; Albulescu and Tămăşilă, 2016; Roman et al, 2017; Dvouletý and Orel, 2019).

More specifically, the role of GDP per capita and its dynamics is considered as one of the major factors that drive entrepreneurial actions. GDP per capita is an indicator that represents the average production per citizen within a country. Countries with high GDP per capita are considered as the countries with higher level of development and wealth, thus more attractive

for new ventures. The variation in GDP growth per capita on entrepreneurial activity is not the same in all countries. For example, in poor countries (low GDP per capita), many individuals show a greater tension to turn in new activities due to the lack of other alternatives. On the contrary, in more advanced economies, individuals show more resistance to bearing the risk, unless they foresee great opportunities (Shane, 2008). In addition, another important factor is human capital, as measured mainly by the annual growth of the population in many studies (Bosma and Schutjens, 2011; Arin et al., 2015; Aparicio et al., 2016; Roman et al, 2017). Additionally, many studies also use several other variables to determine the human capital and its quality, like education, training programs for young entrepreneurs, skills «ey ceterra».

Economic development is considered as a leading factor that drive entrepreneurship. The main measure in the related literature is the natural logarithm of real GDP per capita. The support of the impact of GDP per capita is provided under the argument that as the income of the households rises, the demand new goods and services also increases. This leads to the creation of new ventures, as the potential entrepreneurs foresee new opportunities. (Bosma and Schutjens, 2011; Vidal-Suñé and Lopez-Panisello, 2013; Aparicio et al., 2016; Roman et al, 2017;). Thus, a positive relationship between real GDP per capita and TEA is expected. This type of relationship is consistent with the results of the empirical studies mentioned above, while some critique exists from the implementation of alternative methodologies as in the research of Shane (2008) and Arin et al. (2015). Shane (2008) showed that the impact of real GDP per capita growth on entrepreneurship differs depending on the level of development in the various countries. More specifically, he verified the positive relationship for developed countries, while he showed that the correlation is negative for the less developed countries. This means that due to the lower level of income many people are forced to turn into the creation of new ventures. On the contrary, Arin et al. (2015) also found a negative relationship, but it was insignificant.

As far as the impact of other variables in many studies both unemployment and inflation rates seem to be important determinants of TEA. However, their effect on entrepreneurship is not clear in the literature. On the one hand, a high unemployment rate in times of crises and recessions might have a negative impact on new activities, due to the decrease in the demand-side, and the lack of business opportunities. In addition, high inflation could be considered as a risk for entrepreneurs as it increases the macroeconomic volatility and lead to instability (Arin et al., 2015). On the other hand, their impact could also be positive, as the jobless have no alternatives due to high unemployment rates, and they could be motivated to bear the risk of a

new venture to increase their income, even under unsavory market circumstances. From the inflation side, high inflation rates could also be considered as an opportunity for higher revenues, which decreases the discouragement of bearing new risks (Vidal-Suñé and Lopez-Panisello, 2013; Grilo and Thurik, 2004; Bosma and Schutjens, 2011; Aparicio et al., 2016; Roman et al., 2017)

Another factor with twofold impact is considered the FDI (foreign direct investment) could have an impact on the establishment of new businesses in host countries. From an economic perspective, FDI might boost domestic entrepreneurship, as the entrance of foreign entities increase the investment capital and lead to the creation of new ventures as a result of the capital, knowledge and technology transfer and entrepreneurs can identify new opportunities, as the demand in the local market also increases. On the contrary, the increase of the competition leads to negative results in the economy, as many businesses are not able to compete and prices fall which limits the opportunities for high revenues. Therefore, FDI could have either a positive or negative effect, something which is subject for testing in the present empirical implication for EU countries.

In addition, R&D is expected to have positive impact on entrepreneurship across all sectors as innovation and technology contribute as initiatives for corporate or individual entrepreneurship (Bosma et al. 2012; Roman et al., 2017). In addition, Sa and de Pinho (2019) provide evidence that "*fostering entrepreneurship, particularly through government support programs, education and training and favorable entry regulations allow countries to derive benefits from the investment made in R&D, which may be effectively exploited by new and growing firms"*. The same results are expected from the use of further commercial and professional and Physical and services infrastructure, as well as the internal market dynamics and openness, as calculated in GEM.

An alternation of these results is presented in two articles. More specifically, Arin et al. (2015) implied a Bayesian approach in GEM countries and detected that there is little or no evidence for the robustness of the statistical association of many of the macroeconomic variables in fostering entrepreneurship. Their research raises several concerns about model uncertainty in the determination of factors that promote entrepreneurship. Their results show negative relationship between GDP per capita, unemployment, the marginal tax rate on entrepreneurship and a strong relationship between inflation that are significantly correlated with aggregate entrepreneurship (measured with TEA). In their conclusions they support that via the channels of inflation and taxation, governments can promote entrepreneurship mere effectively using

specific targets for inflation, stabilization of tax rates, using the traditional channels of monetary and fiscal policy. In this view the focus on entrepreneurship-specific targets is of lower importance than economic stability itself.

III.2. Social or individual-level Determinants

The great majority of the studies focuses on the existence of a robust relationship between entrepreneurial motivation and the willingness to start a new business activity. The motivations for young entrepreneurs to start their own business might be several, including training, personal motives, the vision for personal wealth creation, the need for independence and necessity (Hessels et al., 2007; Dvouletý and Orel, 2019).

GEM survey reports a series of cultural, educational among several other factors including motivation, status, capabilities for EU countries. The most common variables in the existing literature are the existing opportunities provided from entrepreneurial activity. Individual perception of existing opportunities in the market seem to work as one of the main motives for entrepreneurs. are also expected to have a positive sign and be statistically significant. because people who perceive good business opportunities are more likely to start new businesses (Bosma and Schutjens, 2011; Vidal-Suñé and Lopez-Panisello, 2013).

In addition, the existing capabilities of entrepreneurs seems to be a crucial factor for both the intention and the future success of new activities and ventures. Thus, it could be positively associated with nascent entrepreneurship and total entrepreneurial activity. In logical terms, people with high confidence, advanced skills and knowledge in a specific field and persons capable of foreseeing opportunities tend to choose the risk-return bet of entrepreneurship. In addition, they are more willing to take over new ventures (Roman et al., 2017; Aparicio et al., 2016; Castaño et al., 2016 and Bosma and Schutjens, 2011).

III.3. Institutional Determinants

The institutional determinants in the suggested literature include the regulatory framework of a country, policy decisions and their implementation and finally there are cultural and cognitive factors. In the related economic literature, institutional factors are important elements on the determination of entrepreneurship rates and business activity at a country or group of countries level.

On the one hand, growth theory suggests that strong institutions, contribute across the economic system, providing benefits from accurate institutional arrangements (Acemoglu and Robinson, 2008 and Aparicio et al., 2016) in an automatic process. Structural changes and improvements in the quality of institutions can improve the performance of entrepreneurship for countries. Arin et al. (2015) define institutions using the taxation, inflation as a means of monetary policy, administrative complexity and globalization.

More recently, Aparicio et al. (2016) separate the institutional determinants of entrepreneurial actions in two categories a) the formal and b) the informal factors. The first include the impact of bureaucracy, time-consuming procedures to start a business, the costs that entrepreneurs bear, availability of credit among others. Informal factors deal with the attitudes, perception of corruption, knowledge and education etc. Furthermore, to operationalize these factors, all the possible dimensions and relationships of the entrepreneurial environment need to be taken into consideration (Gnyawali and Fogel, 1994), such as government policies and procedures, socio-economic factors, entrepreneurial and business skills, and financial and non-financial assistance.

From the institutional economics perspective, the legal framework, the formation of regulatory aspects, social and cultural behaviors and their control meaning the cultural and social norms could lead and contribute to economic development. Actually, they also can affect entrepreneurship for the good or bad. More specifically, institutions do contribute to entrepreneurial activities throughout the channel of talent allocation and human capital (Acemoglu et al. 2005), and the generation of either opportunities or obstacles within a society (Baumol, 1990).

III.4. An Examination of the Literature for EU countries

The promotion of entrepreneurship is one of the main objective targets of European Union's cohesion policy (European Commission, 2016) and is linked with the common vision of a robust competitive model. Entrepreneurship is named as a source of growth, wealth and employment within the member states and this is fully accepted by public authorities and stakeholders. Positive contributions of entrepreneurship towards the growth of a country's gross domestic product (GDP) were proven by previous scholars in entrepreneurial studies (for more detail analysis see Thurik, 1995; Berkowitz and DeJong, 2005; Van Praag and Versloot, 2007; Polok et al., 2016; Acs et al., 2016). More specifically, entrepreneurial activities in the EU countries have been examined in a large number of articles, across all the dimensions of the term that were discussed in Section 2, of the present thesis.

The examination of the determinants of entrepreneurship is of high importance across the different countries even across different regions due to the heterogeneity of the growth structure in several areas. The idiosyncratic characteristics differences within the countries create a great complexity in decision-making process for measures that promote entrepreneurship. This is the reason and our motivation to explore the main determinants of entrepreneurship in EU countries.

The related literature shows different measures and methodologies for the exploration of the factors that contribute to entrepreneurship. The main characteristics defined are usually being conducted in the academic literature try to investigate the effect of individual-specific characteristics, variables that are related with the sector, region or the country under examination. It is clearly noticed that the examination of the determinants of entrepreneurs' motivation and more specifically TEA, is of high relevance. The detection and identification of factors that affect entrepreneurship throughout any channel and have either positive or negative impact on it, provide pretty useful insights for policy makers. Based on evidence provided from the quantitative analysis of the relevant factors, they can turn the results into policies with effect on growth. The continuously update of the research is crucial as the factors may vary over time and across countries or country groups. This result is broadly recognized by Koellinger and Thurik (2012).

Grilo and Thurik (2004) used an eclectic framework to integrate the factors that determine the demand and the supply of the entrepreneurship. Explaining entrepreneurship and its motives

via incorporating different streams of literature and spanning different disciplines. In their model, they analyzed the forces of demand and supply for entrepreneurship, in order to define the determinants of engagement, using a logit model, using survey data from the 15 EU member states and 4 other economies. The data sample included 20.000 observations for the two years of 2003 and 2004. The main variables were demographic, the existence of administrative complexities, availability capital and financial support, the risk tolerance of entrepreneurs, the personal preferences and country specific effects. Their results pointed out that the people perception of lack of financial support does not seemed to have impact on entrepreneurial engagement for several levels of business involvement.

In a study far more different from the others where the determinants of entrepreneurship were investigated for a sample of EU cities (Garcia, 2014) it was found that city size, self-employment, and tertiary education have a significant and positive impact. The measure for entrepreneurship used was the number of business creation, following the standard approach of demand-supply forces. The sample was composed of 21 indicators (including the rates of entrepreneurship, institutions and cultural characteristics) for 184 cities in 20 European countries during the years 1999–2010. The results highlighted the impact of educational programs and more specifically the tertiary education as a supply-side factor and core policy to boost entrepreneurial action, the development of entrepreneurial skills and attitudes within EU cities.

The recent contributions investigating the determinants of entrepreneurship on the country or regional level (e.g. Carbonara et al., 2016; Cueto et al., 2015; Dvouletý and Mareš, 2016a and 2016b) illustrate that the topic of determinants of entrepreneurship is still not fully explored and requires further research attention, due to time lags while several issues remain unanswered.

Apparichio et al. (2016) examine the dynamic inter-relationship between the existing institutions, entrepreneurship and its impact on economic growth, which is the major target for policy makers. Their work concludes that institutions might not contribute automatically as the standard logic assumes in growth models. In their analysis, they conclude that opportunity entrepreneurship impacts on economic growth, as an intermediary social mechanism that promotes the productive behavior of individuals, including entrepreneurial activities. The model they use is a three stage least squares method (3SLS) for unbalanced panel data for 43 countries around the globe. The time period of their analysis concerns the years 2004 to 2012. Rusu and Roman (2017), also used a sample of 18 EU countries for a period of 14 years, time-span 2002–2015 and implied three regression models. They found that informal institutions

(like control of corruption, confidence in one's skills and private coverage to obtain credit) have higher positive impact of opportunity entrepreneurship (TEA) on economic growth than other formal institutions.

The results derived from this methodology suggest that for this specific group of countries for the years involved, informal institutions have a vital role as well as a greater impact on opportunity entrepreneurship (oppTEA) than formal institutions, which concern the state and policy making. Factors such as control of corruption, confidence in skills and private coverage to obtain credit promote a positive effect of entrepreneurship on growth across the countries in the sample. The results are aligned with the previous findings in the literature, of the existing studies in both growth and entrepreneurship.

In the present thesis a panel data fixed effect model approach is applied, in order to investigate the impact of macroeconomic, individual and business environment factors on the dynamics of entrepreneurial activity. The results highlighted as crucial determinants variables such as inflation, foreign direct investments, access to finance and total tax rate. The study showed that all the factors related to business environment and processes have significant impact on total entrepreneurship rate, including cost of business start-up procedures, time required to start a business and number of procedures needed for establishing a new firm.

In addition, Roman et al. (2017) tested for the identification of some of the main factors rates of nascent entrepreneurship and entrepreneurial intentions that affect the establishment of new businesses in 18 EU member countries (developed and emerging) over a time-span of 2003-2015. In their analysis the implied panel-data estimation techniques, to test the effects and impact for four categories of determinants (economic, demographic, individual, and business environment–related). They also used data from GEM and other mainstream databases, such the World Bank WDI. The findings showed extreme significance for factors from all the categories. Though economic and institutional factors seem to be more impactful than social characteristics and business environment. An additional finding is that the occurrence of the sovereign debt crisis in Europe since 2010 positively affected entrepreneurship, through increased support for new firms by individual country governments and the European Union and the support For SMEs at a pan-European level.

Their results seem to confirm the findings from previous studies about the factors examined significantly affect the intention and decision to become an entrepreneur. The macroeconomy state and demographic characteristics were relevant, including the proxies for GDP per capita,

unemployment, and the population growth which have a positive effect. On the contrary, inflation and the proxy for costs required by new entrepreneurs are negatively associated with the intentions for new activities. All the results are aligned with the common sense and the theoretical background of the related research.

From the brief literature review, for the countries of our sample can be easily noticed that several academic research articles focus in different groups of EU countries for different time spans. Given the differentiations in the structure of the dataset for the analysis. In addition, final dataset might be subject to, either the factors examined or the methodology used. Finally, different empirical methodologies can lead to differentiations in the results. For a more comprehensive analysis of the literature and the effects of variables on TEA, evidence is provided in Appendix 1.

More specifically, the overall review of the selected literature suggests a positive relationship between opportunity TEA and economic growth, as defined by the GDP growth in constant 2010 U.S. dollars per capita (Aparicio et al. 2016; Bosma and Schutjens 2011; Castaño et al. 2015; Klapper et al., 2015; Paniagua and Sapena 2015). Though, in two recent studies, the relationship is defined as negative (Arin et al. 2015; Chowdhury et al. 2015). In addition, the results for unemployment and inflation are also contradictory for several studies. Both positive (Paniagua and Sapena 2015; Sayed and Slimane 2014; Thurik et al. 2008; Sayed and Slimane 2014; Vidal-Suñé and Lopez-Panisello 2013, for inflation) and negative (Arin et al. 2015; Giannetti and Simonov 2004; Vidal-Suñé and Lopez-Panisello 2013, only for unemplyment) impact for inflation and unemployment are evident. The same case stands for R&D transfer, FDI Internal market openness and physical & services infrastructure (see Appendix 1).

Moreover, positive impact appears for variables as population growth (Arin et al. 2015; Bosma and Schutjens 2011; Grilo and Thurik 2004; Lee et al. 2014; Sayed and Slimane 2014; Verheul et al. 2002; Wennekers et al. 2005), Financing for entrepreneurs (Arin et al. 2015; Chowdhury et al. 2015; Herrera-Echeverri et al., 2014; Vidal-Suñé and Lopez-Panisello, 2013), commercial and professional infrastructure (Li, 2019) and Internal market dynamics (Khanani, 2019).

For all social variables included in GEM database the only with negative impact is fear of failure rate (Arenius and Minniti, 2005), while Perceived opportunities and capabilities have a positive impact (Arenius and Minniti, 2005; Bosma and Schutjens, 2011; Vidal-Suñé and Lopez-Panisello, 2013; Aparicio et al., 2016; Castaño et al., 2016;), as well as high Status to Successful

Entrepreneurs (Castaño et al., 2016), cultural and social norms (Giannetti and Simonov, 2004) and basic or post school entrepreneurial education and training (Teixeira et al., 2018).

Finally, as far as the institutions are concerned, it is common sense that high taxation and bureaucracy (Dvouletý, 2017; Klapper and Love 2010; Paniagua and Sapena 2015) and corruption (Avnimelech et al., 2014; Chowdhury et al. 2015) has a negative impact on TEA. Other institutions such as Governmental support and policies and programs (Ribeiro-Soriano, D., & Galindo-Martín, 2012; Akinyemi and Adejumo, 2018) and the quality of regulation and the rule of law have strongly positive effect (Suse and Hachez, 2017; Agostino et al., 2020).

III. Statement of Purpose and Research Questions

Based on the purpose of the present thesis and the theoretical backbone of entrepreneurship and its determinants as described in the standard literature, this section will provide the purpose statement and the main research questions. Our aim is to understand in depth the factors that contribute to entrepreneurship and their impact on it. In this sense, an augmented database on the determinants of entrepreneurship, based on the results and empirical findings of existing literature (see Appendix II). The factors were separated in the three main taxonomies of factors that seem to contribute to entrepreneurship, analyzed and panel data analysis will be implemented. The conceptual framework that describes the relationship between entrepreneurship and its determinants, along with the impact on the final output is described in Figure 1.

The determination of the core variables that contribute in a positive manner to entrepreneurship, is crucial for policy making purposes, thus entrepreneurship and innovation are considered as crucial factors for the overall growth of the economy. For example, the dynamics of entrepreneurial activities that are considered, should be examined and tested for the formation of public policies and the measurement of impact.

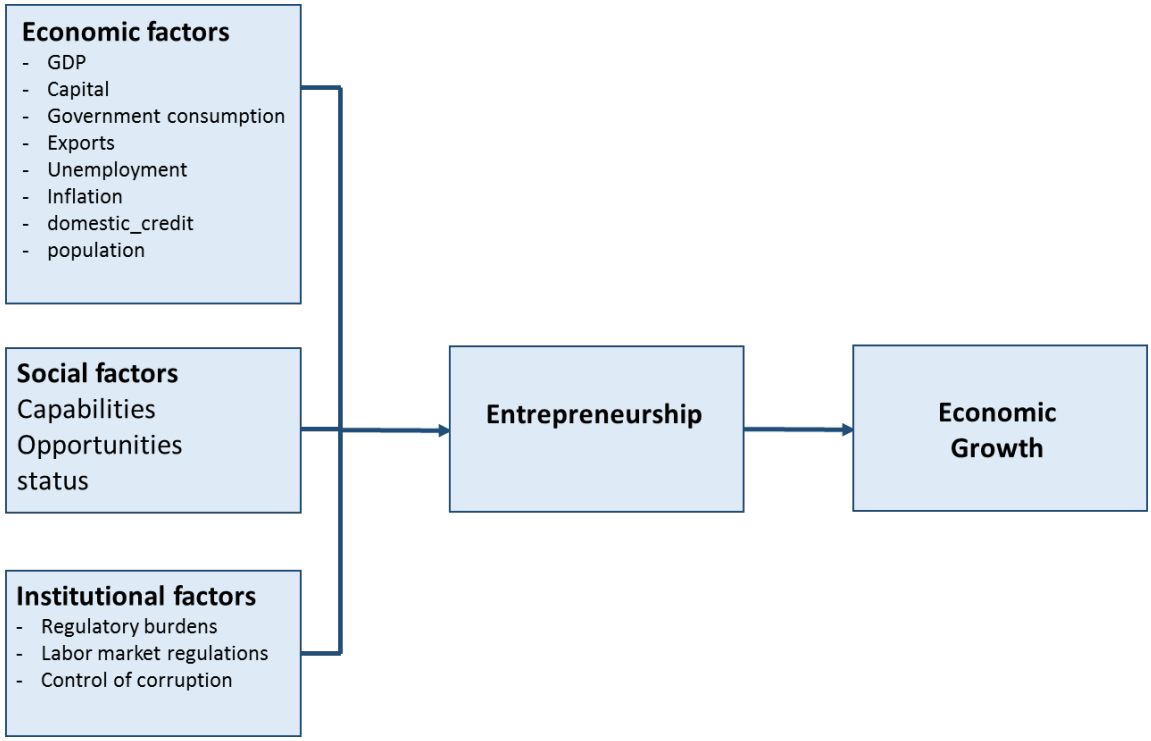

Figure 1: Conceptual framework for the determinants of entrepreneurship and economic growth

As it is described in Figure 1, the main research questions are the following:

- Which factors - economic, social and institutional - need to enhance entrepreneurship
- Which factors boost entrepreneurship during periods of recession and economic expansion?
- Which are the core individual characteristics of EU entrepreneurs and which economic and institutional factors supported it before and after the Great Recessions?
- Does entrepreneurship contribute to economic growth?

The existing link between entrepreneurship and economic growth, as measured in terms of income or per capita GDP in the great majority of the existing studies and entrepreneurship along with innovation are considered as major contributors to national and regional economic growth (Acs, et al., 2016). This result is generally verified for both advanced and emerging economies.

As it is a common ground of agreement that entrepreneurship is a catalyst for the economic progress and society's welfare, the research in this scientific area has retrieved the interest of

many researchers and policy makers. This is the reason why nowadays most policy makers emphasize in entrepreneurship to boost economies performance and create new jobs.

From the current perspective in the EU area, the main focus group the basic economic priority after the EU debt crisis is the recovery of the economy and the boost of growth and employment. With this scope the present study aims to examine the alternative determinants that drive entrepreneurship and throughout this channel the overall economic growth. This generates the need to discuss and test the main determinants of entrepreneurship as a vehicle for wealth and prosperity.

For this purpose, a large series of data will be employed to understand the assessment framework of entrepreneurship and crucial factors that lead to these benefits and increase the Total Entrepreneurial Activity. As a result, the thesis includes the economic, social and institutional conditions for the activities of start-ups, small enterprises and ambitious entrepreneurs.

As far as the individual factors used in this study, I enhance the role of several determinants from the three layers mentioned above. For example, external finance and access to it seems to be an important growth factor for setting up entrepreneurial efforts that promote productivity, wealth and employment, as in Czarnitzki and Hottenrott (2011). The ability of the entrepreneurs to access to finance seems to be a crucial factor for SMEs and start-ups. Access to funding can be turn into one of the major obstacles not only in the beginning of the process but also for the growth of the company and of course the survival. In addition, funding and its terms enhance a great role also for the expansion of business and the created jobs.

IV. Data and Methodology

The dataset formed for the scope of the present thesis retrieved data from several sources. First, cross-country data are collected from the GEM (Global Entrepreneurship Monitor) database, for the variables related to entrepreneurship. The GEM database was initiated in 1999 providing data on entrepreneurship for 10 countries. Reynolds et al., (2005) and Álvarez et al., (2014) provide more information and a holistic survey of the Global Entrepreneurship Monitor (GEM) data set. Our sample was augmented with data from the World Development Indicator (WDI) and Worldwide Government Indicators of the World Bank, OECD Database and Eurostat (European Commission, 2016).

In our econometric analysis, the use both unbalanced and balanced panel data for a time span from 2001 to 2018, with yearly frequency is implied. In unbalanced panel datasets, individual countries might illustrate different numbers of times and this is our case due to the lack of recorded data in the initial databases used for the estimation of the model. The econometric analysis is conducted in Stata 15.0.

The comparison of both balanced and unbalanced were compared, in order to test their differences. In addition, robustness checks need to be performed (exclude countries with serious lack in available data) and also compare the results. Finally, the robustness of the final results will be subject to tests for time effects (Roman et al., 2017).

The main advantage of panel data is the successful combination of both cross-section and time series data in order to capture the common and individual behavior of country groups for specific time frames. According to Greene (2012): "*The fundamental advantage of a panel data set over a cross section is that it will allow the researcher great flexibility in modeling differences in behavior across individuals*". In addition, the unique advantages of panel data and their wide use in applied social research are (i) data availability, (ii) space for greater complexity in modeling of behavior in comparison with cross-section or time series data, and (iii) challenging methodology (Hsiao, 2013).

Moreover, panel data methodologies provide serious advantages over single cross-section or time series analysis; manage to achieve the consideration of individual-specific heterogeneity. Furthermore, they provide greater data variation, more accurate inference of the estimated parameters, less collinearity between the current values of an explanatory variable and the lagged variables, and more degrees of freedom. In addition, panel data take into consideration

the dynamics of changes across time, enhance model complexity for the better investigation of an agent's behavior, and minimization of the effects of aggregation bias[1] (for a detail analysis of the advantages of panel data models see Gujarati, 2003; Baltagi, 2012; and Hsiao, 2003 and 2013).

The data used, were structured from alternative databases which are described in Appendix 1. The variables were combined into a single panel dataset in order to test the hypotheses developed for EU-27 and United Kingdom. These countries constitute a homogeneous group for the analysis as they belong to the same country-group and this guarantees the homogeneity of our dataset, as in the case of slope heterogeneity, the estimation can be imprecise, for short time periods (Wang et al., 2018). Based on the available data for entrepreneurship, retrieved from the Global Entrepreneurship Monitor (GEM) report 2019/2020, there are available data for all the 27 countries in our sample up to 2018. Malta is the only country from EU-28 that does not provide data to the Global Entrepreneurship Monitor (GEM), as a result the total number of countries in the sample falls to 27.

The dependent variable in our first model, will be the opportunity for entrepreneurial activity in the countries of our sample. The most popular indicator which provides evidence on the motivation and perceptions of ambitious potential entrepreneurs is the "Total Entrepreneurial Activity (TEA)".

Our model is a panel-data linear regression model with individual (country) fixed effects, as depicted. Following the contribution of Roman et al. (2017) and Aparicio et al. (2016) we set an augmented set of factors as potential determinants of TEA, which are presented in Appendix 2, along with the expected impact on TEA. As in Roman et al. (2017), use alternative variables from the three categories defined in the literature review as factors that motivate entrepreneurship. The estimation of the models will be done using econometric software Stata.

More specifically, the model specification is the following:

$$TEA_{i,t} = f(EconF_{it}, SocialF_{i,t}, InstitutionsF_{i,t}, x_{,i,t})$$

[1] Aggregation bias in our case concerns the issue of representativeness between the countries. In fact countries and their specific characteristics are heterogenous. Panel data containing time series observations for a number of countries is a convenient tool for implications of both homogenous and heterogenous data.

Where $EconF_{it}, SocialF_{it}, InstitutionsF_{it}$ are the vectors representing the economic, social and institutional factors, respectively, and x_{it} is the controlling vector (economic growth rate) that influences opportunity entrepreneurship in country *i* at time *t*.

$$TEA_{i,t} = \sum_{j=1}^{j=T} \beta_j X_{j,i,t} + \mu_i + u_{it}$$

where i = 1,2, …, 15 referring to the cross-sectional unit (countries) and t represents a given time period (in years). The dependent variable is defined as TEA_{it} for country i for any given time t, while $X_{j,i,t}$ represents independent variables examined in our empirical implication, as determinants of the tension for entrepreneurship and β_j represents the coefficients of the explanatory variables of the model. Furthermore, u_{it} is the random error term and finally, μ_i represents the individual effect for the countries, which captures the unobserved country effect.

For all the independent variables, I calculated the correlation matrix and checked the correlations across all variables in order to exclude those, which show serious correlation. As a threshold I considered those variables which have correlation meaning larger than 0.8, as proposed by Gujarati and Porter (2009). Mutually strongly correlated variables were excluded from the dataset (see Appendix 4). Moreover, in order to avoid multicollinearity issues in our econometric estimation, computed the variance inflation factors (VIFs) as in Roman et al. (2017) and they resulted to be below the threshold of 0,7.

In our analysis, fixed and random effects regressions were used to control for the average differences across countries in any observable or unobservable predictors, and for the cross-section data. The choice between fixed or random effects was made using the Hausman test. This test is numerically identical with Durbin-Wu-Hausman test (Durbin, 1954; and Wu, 1973; and Hausman, 1978). This is the standard measure to check for the statistical significance of the difference between the coefficient estimates obtained by fixed and random effects, under then null hypothesis (H_0) that fixed effects are inefficient and random effects are efficient and consistent. Hausman test is applied for the evaluation of the consistency of an estimator compared to its alternatives (less efficient estimators), that already were known to be efficient. This test has the formulation of a simple Wald test, when W < critical value then random effects is the preferred estimator. The test will show whether fixed or random effects could be used for

the estimation of the determinants. In general, a large test statistic might be indication that the model is mis-specified.

Based on the methodologies of Aparicio et al. (2016) and Bosma et al. (2018), in this thesis the set of the determinants of entrepreneurship was extend and specify a standard growth model, including economic and social variables, beyond the institutional used in their paper. The estimation method for the model will be OLS (Ordinary Least Squares).

The estimated models for two alternative periods: (a) before the global financial crisis (2004-2009) and (b) after the European debt crisis, 2010-2018. This split will help us to test the robustness of the models in different periods and will provide useful insights on the impact of the determinants of the entrepreneurship before and after the global financial crisis.

The dependent variable was TEA retrieved from the GEM Database, defined as Total Entrepreneurial Activity (TEA) and measured as the percentage of individuals involved in who either claim to be motivated by opportunity or who indicate the main driver for being involved in this opportunity. Our objective is to determine the most important factors and to show what happens in the factors before and after the EU debt crisis.

For the dataset, 23 most common determinants were examined for TEA as recorded from our literature review, using the categorization mentioned in our motivation statement $EconF_{it}, SocialF_{i,t}, InstitutionsF_{i,t}$. In the beginning of the process, the regression estimation inquired of the variables for each category alone and all the variables in the same model. The statistical significance lead as to generate the baseline regression model.

The description of these variables and the expected relationship among them and the nascent entrepreneurship and entrepreneurial intentions rates are listed in Appendix I. At this point, an important notification to be added is that the dependent variable, TEA, is calculated in percentage, thus needed to apply logistic transformation as in Roman et al. (2017) in order to avoid absurd predictions. The formula used for the logistic transformation is the following: $\text{LogitTEA} = \ln\left(\frac{TEA}{100-TEA}\right)$.

In addition, in Appendix 2 it is provided a table with the findings of several published papers on the relationship the table also summarize the findings of the most relevant empirical studies on the determinants of entrepreneurship, with regard to the sign of our selected explanatory variables.

In short, the main economic variables examined are real GDP per capita growth rate and population growth, which is expected to have a positive and significant impact on TEA. Additional variables that also were tested, were the effect of unemployment rate, inflation rate, foreign direct investments (FDI) and R&D transfer, factors with mixed results in the related literature. As a measure for liquidity conditions and constraints in the EU economies I used as a proxy the financing for entrepreneurs. Finally, I extended the economic variables using data for the existence of commercial and professional infrastructure, as well as Physical & services infrastructure, internal market dynamics and openness, as defined in GEM dataset. An in-detail analysis of the variables, their definitions and the expected impact is described in Appendix I.

Furthermore, I also examined the impact of several social and cultural factors, such as the perceived opportunities and perceived capabilities which are expected to have positive impact on TEA. In addition, from the GEM dataset I tested the variables of Fear of failure rate, the Motivational Index, High Status to Successful Entrepreneurs and Cultural and social norms. Finally, as proxies for the impact of education I tested two extra variables basic school entrepreneurial education and training and post school entrepreneurial education and training to test if any of these policies could potentially have impact.

In terms of institutions, I examined the impact of the most popular from the WGI database and GEM dataset. The main institutions examined are control of corruption, regulatory quality, rule of law and taxes and bureaucracy, as well as government support policies and programs to boost entrepreneurship.

In order to estimate the baseline models, I used the three groups of determinants the economic, social and institutional. For the estimation of the baseline model, I used the results of two models (Model1 and Model2). Model1 included only the economic determinants and Model2 included the social and institutional factors. Further I use the statistically significant variables from models 1 and are presented in the table 2. The estimation of the models provides evidence of the determination of TEA from the two major categories for factors. Finally, Model 3 uses the general to specific framework for the determinants of factors for both macroeconomic and business factors. Model 3 denotes the most important factors from the set of all variables selected. Actually, the results are the augmented model of the mostly statistically significant variables from all the set of the variables.

As economic determinants, I considered in our models the level of GDP per capita and its dynamics, unemployment rate, inflation, population, FDI, R&D expenditure, a proxy for access

to finance, commercial and professional infrastructure, the internal market dynamics and openness and the existence of physical and services infrastructure.

As social variables for the evolution and determination of TEA I determined the individual and social factors of entrepreneurs which are proxied by the variables of perceived opportunities and capabilities, the high-status of entrepreneurs within the countries, which are standard in the existing literature. In addition, I extended the model with other variables such as the fear of failure rate, the motivational index and other variables retrieved from GEM Database.

IV. Empirical Results

IV.1. Descriptive Statistics

Appendix 3 summarizes the main descriptive statistics of the variables in our sample for the 27 countries that are being used in our models, as Malta does not participate in the GEM. In the table I provide the descriptive statistics of all the variables including TEA and LogitTEA (after the logarithmic transformation) as well as all the 23 variables collected for our analysis. The descriptive statistics of our sample are provided for all the three-time spans selected for examination, the whole period 2004-2018 and for the two sub-periods before 2010 (before the European debt crisis) and after.

Appendix 3 reports the means, standard deviations and correlation coefficients of the variables used in this study. It is clear from the representation of the data, that the variables collected from the GEM database have more missing variables than the economic and institutions data. This will lead to lower number of observations but satisfying to implement panel data analysis for the time spans selected. This can be noticed by the number of the samples. For the full sample TEA has 288 observations (101 for the 1st period and 187 for the 2nd). The same handles for all the explanatory variables. The number of observations ranges from 186 to 405, with the variables retrieved from GEM database provide the majority of missing data. The dataset is complete mainly for macroeconomic variables, for which all data are available and we have 405 observations.

Across the 27 EU countries included in our sample, the average value of the nascent entrepreneurship rate, was measured with the TEA variable after the lognormal transformation.

Further, Appendix 1 presents the minimum, maximum and average TEA for all the countries in the sample, as well as all the determinant factors.

The majority of the economic determinants among the countries show extreme variations. These variations, like for example the GDP per capita, tends to increase during the European debt crisis that occurs since 2010, with Greece being the first country which agreed to enter the EU support mechanisms.

In addition, Appendix 4 provides the correlation matrix for the period 2004-2018. As the table in Appendix 4 shows, opportunity entrepreneurship is significantly correlated with confidence in one's skills and the economic growth rate. Furthermore, labor productivity, the proxy for economic growth, inflation, financing is significantly correlated with. The negative correlation between opportunity entrepreneurship and economic growth could be explained by development level. In addition, the correlation coefficient between TEA and LogitTEA is 0,977, showing the fact that the transformation does not have significant impact on the variable. The range of correlations ranges across the variables, while some of the independent variables have high correlation coefficients. For example, most institutions like corruption and rule of law of regulatory framework show high correlation. In this case, it is necessary to exclude the variables that have correlations greater than 0.8, in order to deal with the problem of multicollinearity (Gujarati and Porter, 2009).

Its existence might lead to spurious results, on the parameters' estimation process in our models. This problem rises serious concerns about the non-independence of the independent variables in the econometric model and is more common in regression analysis. Multicollinearity leads to extreme increase in the variance of regression parameters and hence potentially could lead to the wrong identification of relevant predictors and higher R^2. As a result, it is considered as a severe problem in panel data econometrics.

The standard literature suggests that in order to avoid the existence of multicollinearity, the correlation coefficients should be lower than 0,7 (Booth et al., 1994). More specifically, in this case, I choose to follow the rule of Booth et al. (1994) and as a threshold for high correlation, I use the rule of thumb of 0,70. As a result, from the 23 variables examined in our econometric models, I find high correlation coefficients among some specific variables. As a result, I exclude the variables Regulation Quality, Rule of Law, Government Programs, which are highly correlated with the variable of corruption, Corruption and the variable for the Government Support Programs that has high correlation with R&D transfer variable.

IV.2. Analysis of the Empirical Results

The great majority of the empirical literature that explores the determinants of entrepreneurship is based on regression-based models, such as linear regression, probit or logit models and panel data approaches. These methodologies are useful for testing the relationships between the dependent variable and all other factors. In order to test the use statistical significance of the models the main measures are the standard t test or F test for the standard levels of statistical significance (1%, 5% or 10%). Having this in mind I use fixed and random effects regression of TEA on several alternative sets of the factors described in Appendix A. Finally, I recorded 23 alternative variables (for a detail analysis see Appendix I and II), from which five were excluded, due to high correlation. Those factors seem to have potentially important (either positive or negative) impact on entrepreneurship.

The results of our panel data regression analysis are presented in the Tables 2 and 3 for the fixed and random effects models. The results show differentiations in the statistical significance of the variables. In order to choose the method of regression that will be used, I implied the Hausman test (see Table 3). The probability of having a greater X^2 in all models is lower than 0.05 for all the models tested, and lead us to decline the hypothesis of the existence of random effects. Actually, X^2 is a test for the models used to examine the joint null hypothesis that all of the coefficients of the variables excluding the constant term are equal to zero. When the p-value is <0.05 then the fixed effects model is a better choice (Roman et al., 2017). As a result, the regression analysis of our panel data should imply fixed effects. This could be considered as a standard case in the literature as the omitted variables are correlated with the variables in the model, then fixed effects models may provide a means for controlling for omitted variable bias. In a fixed-effects model, subjects serve as their own controls and the effect of the omitted variables, they will also have the same effect in the future.

Logit TEA is the dependent variable, while the estimated models (1)-(3) evaluate the impact of the selected independent variables on the logistic transformation of TEA. First, two separate blocks of regressors (economic, social and institutions) in Models (1) and (2) were introduced

to the models. More specifically, Model 1 includes all macroeconomic determinants and Models 2 includes all other business and institutional factors. Finally, an augmented model (Model 3) was estimated with the statistically significant variables of the Models (1) and (2), with the variables which were statistically significant up to 10% level of significance.

From the results, it is clear that for the whole period 2004-2018 most of the coefficients of our explanatory variables have the expected signs and are statistically significant. Model 3 is composed of eleven statistically significant variables. The most important variables seem to be the GDP per capita, unemployment, population growth, perceived capabilities and the social norms that favor entrepreneurship. In addition, also significant role seems to have the variables of the market dynamics and the infrastructure.

With regard to the rate of inflation, our estimation results show a negative relationship in all models as in Arin et al. (2015). Although the fact that the coefficients are not statistically significant seems that the variation of inflation does not have impact on TEA and that monetary policy might have insignificant impact.

Table 1 Estimation results, fixed effects panel data approach

	Model1		Model2		Model3	
	coef	t-stat	coef	t-stat	coef	t-stat
GDP per capita	2.496***	7.200			1.856***	5.950
Unemployment	0.042***	4.360			0.033***	3.770
Inflation	-0.004	-0.340				
Population	13.543***	2.520			7.254**	1.360
Foreign Direct Investments	-0.005	-2.740				
Financing	-0.135	-1.560				
R&D transfer	0.034**	0.320			-0.003*	-1.730
Commercial and professional infrastructure	0.247*	2.340			0.206*	1.870
Internal market dynamics	0.057	0.940			0.226***	2.470
Internal market openness	0.137	1.330				
Physical and services infrastructure	-0.022	-0.310				
Perceived opportunities			0.005***	2.320	0.004	0.230
Perceived capabilities			0.009	1.480	0.019***	4.580
Fear of failure rate			0.015***	3.260	0.017***	4.900
Motivational Index			-0.011	-0.920	-0.001	-0.390
Status			-0.014***	-2.810		
Cultural and social norms			0.204**	1.790	0.238***	2.870
Basic school entrepreneurial education and training			0.132	1.230		
Post school entrepreneurial education and training			-0.099	-0.990		
Government Programs			0.004	0.060		
Taxation & Bureaucracy			-0.159**	-1.930	-0.003	-0.040
Corruption			0.342**	1.860	-0.175	-1.320
cons_	-29.648***	-8.260	-3.181***	-5.780	-24.213***	-7.550
Countries	27		26		27	

N	249	167	261
R-sq	0.2883	0.2087	0.4172
F-statistic	7,77	9.67	8.80

Notes: Dependent variable: logistic transformation of TEA

*p < 0.1; **p < 0.05; ***p < 0.01

The results are aligned with our literature review and the empirical results of other related research. However, some differentiations that considered relevant should be taken into account due to differentiations in several aspects of the empirical model, such as the time span, the sample of countries and the variables considered in the present thesis. Moreover, the related literature in many cases uses alternative parameters for both the dependent variables (such as the business creation, intention, or opportunity TEA etc.) and for the independent variables.

The value of Test F (F-statistic) which is a simultaneous test of panel data regression describes the significance level of influence of predictor variable to response variable. The F-statistic examines the joint null hypothesis that all the coefficients in the model excluding the constant are zero. The p-value associated with this F-statistic is the chance of observing an F-statistic that much large or larger and is given as 0. Hence, we strongly reject the null hypothesis and conclude that the model as a whole is highly significant.

Table 2: Estimation results, random effects panel data approach

	Model1		Model2		Model3	
	coef	z	coef	z	coef	z
GDP per capita	-0.095	0.055			0.176	1.29
Unemployment	0.000	0.290			0.003	0.40
Inflation	-0.030	0.082				
Population	4.441	0.298			4.898	1.01
Foreign Direct Investments	-0.004	0.206			-0.002	-1.26
Financing	0.000	0.634			-0.185	-1.68
R&D transfer	-0.020	0.261			0.227	2.44
Commercial and professional infrastructure	0.193	0.029				
Internal market dynamics	0.120	0.172				
Internal market openness	0.169	0.000				
Physical and services infrastructure	0.064	0.024				

Perceived opportunities			0.006	2.580	0.003	1.55
Perceived capabilities			0.016	3.210	0.023	5.89
Fear of failure rate			0.012	3.100	0.019	5.39
Motivational Index			-0.015	-1.310		
Status			-0.010	-2.620	0.000	0.12
Cultural and social norms			0.186	1.800	0.305	3.81
Basic school entrepreneurial education and training			0.161	1.620		
Post school entrepreneurial education and training			-0.058	-0.600		
Government Programs			-0.048	-0.650		
Taxation & Bureaucracy			-0.097	-1.330	-0.024	-0.32
Corruption			0.057	0.800	-0.174	0.078
cons_	-3.176	0.880	-3.530	-7.590	-7.056	-5.21
Countries	27		26		27	
N	249		167		239	
R-sq	0.1099		0.3626		0.3176	

Notes: Dependent variable: logistic transformation of TEA

*p < 0.1; **p < 0.05; ***p < 0.01

Table 3: Hausman Test

	Model1	Model2	Model3
$X^2(11)$	44.56	23.99	45.98
Prob>chi2	0.0000	0.0128	0.0000
Test: Ho: difference in coefficients not systematic			

Based on the Hausman test result and the fact that the probability of higher X^2 is lower than the critical value of 0.05 I should consider strongly the fixed effects, in comparison with the random effects. This is the case for all the three models estimated, the one with the economic variables, the one with the social and institutional factors and the final model with all the statistically significant variables of this couple of models.

Table 4 Estimation results, fixed effects panel data approach for 2004-2009

	Model1		Model2		Model3	
	coef	t-stat	coef	t-stat	coef	t-stat
GDP per capita	2.617***	2.260			0.999	1.030
Unemployment	0.049**	1.770			0.019	0.720
Inflation	0.024	0.630				
Population	32.785	1.610			37.507***	2.180
Foreign Direct Investments	-0.007	-0.850			-0.003	-0.480
Financing	-0.150	-0.590				
R&D transfer	0.122	0.380			-0.372	-1.320
Commercial and professional infrastructure	0.151	0.470			0.581***	2.900
Internal market dynamics	0.172	1.050				
Internal market openness	-0.100	-0.300				
Physical and services infrastructure	0.448	1.440				
Perceived opportunities			-0.002	-0.450	-0.005	-0.940
Perceived capabilities			0.027***	3.800	0.024***	2.270
Fear of failure rate			-0.004	-0.640	-0.015	-1.570
Motivational Index			-	-	-	-
Status			0.000	-0.020	0.000	-0.020
Cultural and social norms			-0.024	-0.100	-0.177	-0.810
Basic school entrepreneurial education and training			0.051	0.210		
Post school entrepreneurial education and training			-0.069	-0.310		
Government Programs			-0.246	-1.180		
Taxation & Bureaucracy			-0.368***	2-.180	0.289**	1.650
Corruption			-0.516*	-1.720	-0.781***	-2.130
cons_	-32.770***	-2.780	-3.284***	-3.420	-14.070	-1.420
Countries	20		20		20	
N	71		71		71	
R-sq	0.3352		0.4669		0.6103	
F-statistic	2.48		2.27		4.58	

Notes: Dependent variable: logistic transformation of TEA

*p < 0.1; **p < 0.05; ***p < 0.01

The results in Table 4, show the estimations for the first period tested, before the crisis occurrence, the results seem different from the aggregate for the whole period. Most of the variable are statistically insignificant and the major contribution are the GDP per capita and unemployment, in terms of economic motivation. In addition, from a social and institutional scope, the major seems to be the capabilities, tax and bureaucracy and corruption, with the last to discourage entrepreneurship.

The results are subject to the missing variables during this period, as the GEM dataset provides limited data for all the countries and the sample limits to 20 countries, out of the 27. The reason for the decrease of the number of countries is due to the fact that for the first period 2004-2009, seven countries in our sample did not record data in GEM database and TEA, and there were missing data. These countries were, Bulgaria, Cyprus, Estonia, Lithuania, Luxembourg, Poland (recorded only for the year 2004) and Slovakia.

However, it can be clear that the two major economic determinants remain statistically significant as an evidence of the priorities of economic policy, while other motives and cultural characteristics rise in the literature later as policy instruments to boost entrepreneurship.

Table 5 Estimation results, fixed effects panel data approach for 2010-2018

	Model1		Model2		Model3	
	coef	t-stat	coef	t-stat	coef	t-stat
GDP per capita	1.529***	3.130			1.408***	2.770
Unemployment	0.029***	2.190			0.025***	1.950
Inflation	-0.002	-0.150				
Population	5.058	0.860			3.311	0.550
Foreign Direct Investments	-0.001	-0.420			0.000	-0.040
Financing	0.078	0.840				
R&D transfer	-0.169	-1.400			-0.160	-1.260
Commercial and professional infrastructure	0.157	1.500			0.103	1.050
Internal market dynamics	0.052	0.760				
Internal market openness	0.152	1.450				
Physical and services infrastructure	-0.103	-1.380				

Perceived opportunities			0.005***	2.270	0.000	0.030
Perceived capabilities			0.009	1.510	0.012**	1.920
Fear of failure rate			0.014***	3.180	0.018***	4.160
Motivational Index			-	-	-	-
Status			-0.014***	-2.790	-0.003	-0.940
Cultural and social norms			0.198	1.720	0.308***	2.970
Basic school entrepreneurial education and training			0.136	1.270		
Post school entrepreneurial education and training			-0.099	-0.980		
Government Programs			0.009	0.120		
Taxation & Bureaucracy			-0.160*	-1.930	-0.157*	-1.880
Corruption			-0.336	-1.810	0.036	0.200
cons_	-18.928***	-3.680	-3.178	-5.760	-18.636***	-3.540
Countries	27		27		27	
N	178		178		178	
R-sq	0.1488		0.2480		0.2626	
F-statistic	12.54		2.27		8.71	

Notes: Dependent variable: logistic transformation of TEA

*p < 0.1; **p < 0.05; ***p < 0.01

After the crisis occurred the role of institutions, seem to show more weak importance in terms of statistical significance, than before the crisis. This might be a critique and lead to lack of trust against the institutional environment. In addition, the FEARF variable became statistically significant.

In addition, for the period during the crisis, norms and institutional factors as the taxation and bureaucracy, as well as corruption seem to have an increasing and statistical significance on the choice for starting a new entrepreneurial activity. The impact of these variable is consistent with the existing literature, while most of these variables seem insignificant before the crisis. This means that norms that promote entrepreneurship motivate entrepreneurs, while higher taxation during the crisis in most countries, corruption and bureaucracy discourage any attempt for new ventures.

The R^2 for the augmented models is higher than in Models (1) and (2) with factors from all the three categories of the determinants; economic, social and institutional have the expected effects on TEA, according to the literature suggestions. This indicates that entrepreneurship is indeed a multidimensional aspect that demands cross-measures and cross-cutting policies for its promotion. The governments should implement both direct and indirect measures to promote it.

V. Conclusions

The results of our investigation seem to confirm the results of previous theoretical arguments and of course of other empirical studies on the determinants of entrepreneurship in the EU and other countries.

In general, the determinants of entrepreneurial activities have been subject for many countries and country groups. This is also a fact for EU countries, which compose our dataset. Many academic research articles focus on different groups of EU countries for different time spans and the related literature, in order to test the relationship between alternative variables and TEA, given the differentiations in the structure of the dataset for the analysis. In addition, the final dataset might be subject to the factors examined due to multicollinearity and other estimation biases. But also, different empirical methodologies can lead to differentiations in the results. This is something common in economic and social research.

Our results show that all the three categories of factors seem to affect entrepreneurship in EU countries. Although the correlation and statistical significance differentiates overtime and for the different countries examined (as in Castano, 2015; Aparicio et al., 2016).

When I broke down the period into two sub-periods, before and after the European debt crisis, the results showed large differentiations on the determinant factors of entrepreneurship between the countries. The main economic factors that seem to drive entrepreneurship are GDP per capita changes and unemployment. This result is identical in nearly all the related literature, except from Arin et al. (2015) who suggest the high importance of inflation as a core determinant of entrepreneurship. This differentiation might be subject to the different methodologies used in the analysis, as well in the time span. In our results inflation seems to be of minor importance.

As far as the rest of the variables are concerned, the impact of FDI flows seems to be either statistically insignificant or with no impact, while in some cases R&D has a positive impact. Financial conditions also have limited impact at the aggregate level, for all countries. This might be a result of the divergence of the funding tools across the EU countries or the alternative sources used for new activities (as it is known that the majority of start-ups and new entrepreneurs use self-funding resources to start a new venture or seek for financing from venture capitals).

In terms of the social and institutional factors, corruption, taxation and bureaucracy remain points for critical attention from the policy makers, while the mindset and individual characteristics such as opportunities and status, capabilities and fear have an increasing role in the process and the entrepreneurial journey. These results are consistent and verify the proposed theoretical arguments in the related literature.

Regarding the period during the crisis, the values of R^2 are lower nearly in half in comparison with the period before the crisis and the overall. This shows the need to emphasize the research into new variables and methodologies that could explain the tension of individuals to start new ventures and their motives from all the fields of the factors. Further research seems to be the only tool for effective policy making in the area of new business creation and the activation of entrepreneurial spirit, to enhance growth and job creation in EU. According to the results, the traditional policy measures seem to remain effective with the positive and negative impact.

The overall results show that many of the factors examined in this research are statistically significant and affect the intention and decision-making of potential entrepreneurs on the dilemma whether to start a new venture or not. In fact, macroeconomic, demographic, social-individual characteristics and institutions are core factors. From the economic perspective, the major factors are GDP per capita, unemployment, and the population growth rates traditionally, both before and after the crisis.

Regarding domestic credit from financial institutions, used to proxy for access to finance, the findings did not confirm our expectations, because early entrepreneurial activities rely on other funding sources, in particular, the personal funds of potential entrepreneurs. The same exists also for R&D expenditure and FDI flows (which seem to have adverse impact).

Finally, the results showed a positive relationship between the entrepreneurial activity and the economic growth. More specific, the GDP per capita variable had a positive correlation with TEA, something which was expected and supported in most of the related literature with the exception of Arin et al. (2015) and Chowdhury et al. (2015). The results were consistent through our models and statistically significant.

VI. Limitations & Future Research

As far as the examination of a broad issue like the factors that determine entrepreneurial activity across several countries' datasets, there are some specific limitations. The main and serious limitation of the study is that I focus on the theoretical and empirical evidence for specific countries.

Thus, the results and the findings of the methodology and the final model cannot be generalized. This is because the statistically significant variables might change over time and across countries sub-samples. The generalization of the results is quite a difficult subject due to several differentiations in factors across countries and country groups. More specifically, the final models imply for analysing sets of countries with nearly similar characteristics, at specific periods of time.

The positive or negative impact of a determinant under different circumstances and aspects could change. The results before and after the crisis seem to show many differentiations. The determinants of TEA changed both in terms of the variables and in terms of contribution. This implies that a dynamic and evolutionary research is necessary for policy makers for their decision making on which variables they should examine, and the policy measures they need to control in order to boost entrepreneurial activity.

Though the methodological process can work as a benchmark for in-depth future research on relevant topics. In the present thesis nearly, the 50% of the existing variation (using the R^2) of the total entrepreneurship rate, as measured by TEA. This equals that a large proposition of TEA remains uncertain and is subject to other variables. This is explained by the variation of our augmented set of independent variables, thus there are also other factors that could boost or be an obstacle to entrepreneurial activity within EU countries. Another limitation of our study is that there might be other factors besides those analysed in the present thesis probably should be tested in the future. Some future potential extension of the current research should be the analysis of further parameters as determinants, for several country groups and from different time spans.

Another limitation is the existence of reliable data for many categories of the existing studies. In addition, in our study I use GEM database. GEM provide useful information mainly on two specific motives that drive entrepreneurial activities: a) necessity-driven and b) opportunity-

driven entrepreneurship. For more information about the limitations of the use of GEM database (Wagner, 2005 and Bergmann and Sternberg, 2007). In order to overcome these limitations, several other variables such as the business creation.

References

Acs, Z. J., Autio, E., & Szerb, L. (2014). National systems of entrepreneurship: *Measurement issues and policy implications*. Research Policy, *43*(3), 476-494.

Agostino, M., Nifo, A., Trivieri, F., & Vecchione, G. (2020). Rule of law and regulatory quality as drivers of entrepreneurship. *Regional Studies*, *54*(6), 814-826.

Akinyemi, F. O., & Adejumo, O. O. (2018). Government policies and entrepreneurship phases in emerging economies: Nigeria and South Africa. *Journal of Global Entrepreneurship Research*, *8*(1), 35.

Albulescu, C.T. and Tămăşilă, M. (2016), "Exploring the role of FDI in enhancing the entrepreneurial activity in Europe: a panel data analysis", *International Entrepreneurship and Management Journal*, Vol. 12 No. 3, pp. 629-657.

Álvarez, C., Urbano, D., & Amorós, J. E. (2014). GEM research: achievements and challenges. *Small Business Economics*, *42*(3), 445-465.

Amit, R., & Muller, E. (1995). "Push" and "pull" entrepreneurship. *Journal of Small Business & Entrepreneurship*, *12*(4), 64-80.

Aparicio, S., Urbano, D., & Audretsch, D. (2016). Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence. *Technological forecasting and social change*, *102*, 45-61.

Arenius, P., & Minniti, M. (2005). Perceptual variables and nascent entrepreneurship. *Small business economics*, *24*(3), 233-247.

Arin, K. P., Huang, V. Z., Minniti, M., Nandialath, A. M., & Reich, O. F. (2015). Revisiting the determinants of entrepreneurship: A Bayesian approach. *Journal of Management*, *41*(2), 607-631.

Avnimelech, G., Zelekha, Y., & Sharabi, E. (2014). The effect of corruption on entrepreneurship in developed vs non-developed countries. *International Journal of Entrepreneurial Behavior & Research*.

Ayyagari, M., & Kosová, R. (2010). Does FDI facilitate domestic entry? Evidence from the Czech Republic. *Review of International Economics*, *18*(1), 14-29.

Baltagi, B. (2008). Econometric analysis of panel data. *John Wiley & Sons*.

Begley, T. M., Tan, W. L., & Schoch, H. (2005). Politico–economic factors associated with interest in starting a business: A multi–country study. *Entrepreneurship Theory and Practice*, *29*(1), 35-55.

Birch, David L., et al. The job generation process. Vol. 302. Cambridge, MA: *MIT program on neighborhood and regional change*, 1979.

Booth, G. D., Niccolucci, M. J., & Schuster, E. G. (1994). Identifying proxy sets in multiple linear regression: an aid to better coefficient interpretation. Research paper INT (USA).

Bosma, N., & Schutjens, V. (2011). Understanding regional variation in entrepreneurial activity and entrepreneurial attitude in Europe. *The Annals of regional science*, *47*(3), 711-742.

Chowdhury, F., Audretsch, D. B., & Belitski, M. (2015b). Does corruption matter for international entrepreneurship?. *International Entrepreneurship and Management Journal*, *11*(4), 959-980.

Chowdhury, F., Terjesen, S., & Audretsch, D. (2015a). Varieties of entrepreneurship: institutional drivers across entrepreneurial activity and country. *European Journal of Law and Economics*, *40*(1), 121-148.

Czarnitzki, D., & Hottenrott, H. (2011). R&D investment and financing constraints of small and medium-sized firms. *Small Business Economics*, *36*(1), 65-83.

Dvouletý, O. (2017). Determinants of Nordic entrepreneurship. *Journal of Small Business and Enterprise Development*.

Dvouletý, O., & Orel, M. (2019). Entrepreneurial activity and its determinants: Findings from African developing countries. *In Sustainable Entrepreneurship* (pp. 9-24). *Springer*, Cham.

Engle, R. L., Schlaegel, C., & Dimitriadi, N. (2011). Institutions and entrepreneurial intent: A cross-country study. *Journal of Developmental Entrepreneurship*, 16(02), 227-250.

Estrin, S., Korosteleva, J., & Mickiewicz, T. (2013). Which institutions encourage entrepreneurial growth aspirations?. *Journal of business venturing*, *28*(4), 564-580.

European Commission (2016), "Entrepreneurship and small and medium-sized enterprises (SMEs)", available at: http://ec.europa.eu/growth/smes (accessed 22 April 2016).

Fernandes, P. O., Ferreira, J., Fernandes, C., de Leiria, A., & Pólo IV–Edifício Ernesto Cruz, C. (2012, September). Entrepreneurial attitudes and perceptions in a cross-country setting: evidence from GEM data. In Proceedings of the 7th European Conference on Innovation and Entrepreneurship: ECIE (p. 198). *Academic Conferences Limited*.

García, A. B. (2014). Analyzing the determinants of entrepreneurship in European cities. *Small Business Economics*, 42(1), 77-98.

Giannetti, M., & Simonov, A. (2004). On the determinants of entrepreneurial activity: Social norms, economic environment and individual characteristics. *Swedish Economic Policy Review*, *11*(2), 269-313.

Gnyawali, D. R., & Fogel, D. S. (1994). Environments for entrepreneurship development: key dimensions and research implications. *Entrepreneurship theory and practice*, *18*(4), 43-62.

Greene, William (2012). Econometric Analysis (7th ed.). *Pearson*. pp. 234–237. ISBN 978-0-273-75356-8.

Grilo, I. and Thurik, R., (2004). Determinants of Entrepreneurship in Europe. *ERIM Report Series* Reference No. ERS-2004-106-ORG. https://ssrn.com/abstract=636815

Grilo, I., & Irigoyen, J. M. (2006). Entrepreneurship in the EU: to wish and not to be. *Small Business Economics*, *26*(4), 305-318.

Hessels, J., Van Gelderen, M., & Thurik, R. (2008). Entrepreneurial aspirations, motivations, and their drivers. *Small business economics*, *31*(3), 323-339.

Khanani, K. S. (2019). Entrepreneurial Ecosystem, Entrepreneurial Activity and Economic Performance. *Business Innovation and Entrepreneurship Journal*, *1*(3), 210-220.

Klapper, L., Love, I., & Randall, D. (2015). New firm registration and the business cycle. *International Entrepreneurship and Management Journal*, *11*(2), 287-306.

Koellinger, P. D., & Roy Thurik, A. (2012). Entrepreneurship and the business cycle. *Review of Economics and Statistics*, *94*(4), 1143-1156.

Kock, N., & Lynn, G. (2012). Lateral collinearity and misleading results in variance-based SEM: *An illustration and recommendations. Journal of the Association for information Systems*, 13(7).

Kuckertz, A., Berger, E. S., & Allmendinger, M. (2015). What drives entrepreneurship? A configurational analysis of the determinants of entrepreneurship in innovation-driven economies. *A Configurational Analysis of the Determinants of Entrepreneurship in Innovation-Driven Economies*, 273-288.

Li, T. (2019). Engagement in international entrepreneurship: interactive effects of resource-based factors and institutional environments. *Journal of Global Entrepreneurship Research*, *9*(1), 1-17.

Long, W. (1983). The meaning of entrepreneurship. *American Journal of small business*, *8*(2), 47-59.

Paniagua, J., & Sapena, J. (2015). Do credit constraints reduce foreign jobs? A note on foreign direct employment. *Applied Economics Letters*, *22*(3), 195-198.

Reynolds, P., Bosma, N., Autio, E., Hunt, S., De Bono, N., Servais, I., ... & Chin, N. (2005). Global entrepreneurship monitor: Data collection design and implementation 1998–2003. *Small Business Economics*, *24*(3), 205-231.

Ribeiro-Soriano, D., & Galindo-Martín, M. Á. (2012). Government policies to support entrepreneurship. *Entrepreneurship & Regional Development*, *24*(9-10), 861-864.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, 94(5), 1002-1037.

Sá, E. S., & de Pinho, J. C. M. (2019). Effect of entrepreneurial framework conditions on R&D transfer to new and growing firms: The case of European Union innovation-driven countries. *Technological Forecasting and Social Change*, 141, 47-58.

Shane, S. and Venkataraman, S. (2000). "The promise of entrepreneurship as a field of research". *Academy of Management Review*, 25(1), 217-226, 218.

Suse, A., & Hachez, N. (2017). Identification and assessment of the legal implications of an entrepreneurial reform agenda. *FIRES Report*, 6.

Teixeira, S. J., Casteleiro, C. M. L., Rodrigues, R. G., & Guerra, M. D. (2018). Entrepreneurial intentions and entrepreneurship in European countries. *International Journal of Innovation Science*.

van der Zwan, P., Thurik, R., Verheul, I., & Hessels, J. (2016). Factors influencing the entrepreneurial engagement of opportunity and necessity entrepreneurs. *Eurasian Business Review*, *6*(3), 273-295.

Wang, W., Phillips, P. C., & Su, L. (2018). Homogeneity pursuit in panel data models: Theory and application. *Journal of Applied Econometrics*, 33(6), 797-815.

Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data. *MIT press*.

Appendixes

Appendix 1: Data sources and variables description

Symbol	Variable	Description	Source
Dependent Variable			
TEA	Opportunity Entrepreneurship	% of individuals involved in Total Entrepreneurial Activity (TEA) who (i) claim to be driven by opportunity as opposed to finding no other option for work; and (ii) who indicate the main driver for being involved in this opportunity is being independent or increasing their income, rather than just maintaining their income	GEM Database
Independent Variables			
Economic			
GDPG	Economic growth	GDP growth in constant 2010 U.S. dollars per capita.	World Bank - WDI
UNEMP	Unemployment rate	Unemployment, annual average as % of active population	Eurostat
INFL	Inflation rate	% change of consumer price index is usually calculated on the basis of periodic surveys of consumer prices. Other price indices are derived implicitly from indexes of current and constant price series.	World Bank - WDI
POPUL	Population	Population growth	World Bank - WDI
FDI	Foreign direct investments	Flows towards an economy are cross-border investments made by the residents of an economy that hold control (>10%) or a significant degree of influence on the management of an enterprise that is resident of another economy as % of GDP.	World Bank - WDI
FINAN	Financing for entrepreneurs	The availability of financial resources in € equity and € debt or small and medium enterprises (including grants and subsidies)	GEM-NES Database
R&DT	R&D transfer	The extent to which national research and development will lead to new commercial opportunities and is available to SMEs	GEM-NES Database
CPINFR	Commercial and professional infrastructure	The presence of property rights, commercial, accounting and other legal and assessment services and institutions that support or promote SMEs	GEM-NES Database
IMDYN	Internal market dynamics	The level of change in markets from year to year	GEM-NES Database
IMOPEN	Internal market openness	The extent to which new firms are free to enter existing markets	GEM-NES Database

PSINFR	Physical and services infrastructure	Ease of access to physical resources € communication, utilities, transportation, land or space" at a price that does not discriminate against SMEs	GEM-NES Database
Social and Individual			
OPPORT	Perceived opportunities	% of 18-64 population who see good opportunities to start a firm in the area where they live	GEM-APS Database
CAPAB	Perceived capabilities	% of 18-64 population who believe they have the required skills and knowledge to start a business	GEM-APS Database
FEARF	Fear of failure rate	% of 18-64 population perceiving good opportunities to start a business who indicate that fear of failure would prevent them from setting up a business	GEM-APS Database
MOTIV	Motivational Index	% of those involved in TEA that are improvement-driven opportunity motivated, divided by the percentage of TEA that is necessity-motivated	GEM-APS Database
STATUS	High Status to Successful Entrepreneurs	% of 18-64 population who agree with the statement that in their country successful entrepreneurs receive high status.	GEM-APS Database
CSNORM	Cultural and social norms	The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income	GEM-NES Database
SCHOOLT	Basic school entrepreneurial education and training	The extent to which training in creating or managing SMEs is incorporated within the education and training system at primary and secondary levels	GEM-NES Database
POSSCH	Post school entrepreneurial education and training	The extent to which training in creating or managing SMEs is incorporated within the education and training system in higher education such as vocational, college, business schools, etc.	GEM-NES Database
Institutions			
GOVSP	Governmental support and policies	The extent to which public policies support entrepreneurship - entrepreneurship as a relevant economic issue	GEM-NES Database
GOV	Governmental programs	The presence and quality of programs directly assisting SMEs at all levels of government	GEM-NES Database
TAXBUR	Taxes and bureaucracy	The extent to which public policies support entrepreneurship - taxes or regulations are either size-neutral or encourage new and SMEs	GEM-NES Database
CORRUP	Control of Corruption	Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including	World Bank - WGI

		both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests	
REGQUAL	Regulatory Quality	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	World Bank - WGI
RULLAW	Rule of Law	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	World Bank - WGI

Sources: Global Entrepreneurship Monitor (GEM). http://www.gemconsortium.org/; WDI. World Development Indicators (WDI) by World Bank. http://databank.worldbank.org/data/home.aspx; WGI. Worldwide Governance Indicators (WGI) by World Bank. http://info.worldbank.org/governance/wgi/index.asp.

Note: The definitions presented in the table were retrieved from the official databases used as sources.

Appendix 2: Expected Relationship of the Determinants and related Literature

Variable	Expected Relationship	Related Literature
Independent Variables		
Economic Variables		
GDPG Economic growth	+ In the majority of studies - -	Aparicio et al. 2016; Bosma and Schutjens 2011; Castaño et al. 2015; Klapper et al., 2015; Paniagua and Sapena 2015; **Negative:** Arin et al. 2015; Chowdhury et al. 2015
UNEMP Unemployment rate	-/+	Paniagua and Sapena 2015; Sayed and Slimane 2014; Thurik et al. 2008; **Negative:** Arin et al. 2015; Giannetti and Simonov 2004; Vidal-Suñé and Lopez-Panisello 2013
INFL Inflation rate	-/+	Sayed and Slimane 2014; Vidal-Suñé and Lopez-Panisello 2013 **Negative**: Arin et al. 2015
POPUL Population growth	+	Arin et al. 2015; Bosma and Schutjens 2011; Grilo and Thurik 2004; Lee et al. 2014; Sayed and Slimane 2014; Verheul et al. 2002; Wennekers et al. 2005
FDI Foreign direct investments	-/+	Ayyagari and Kosová, 2010; Herrera-Echeverri et al.,2014 **Negative**: Arin et al., 2015; Chowdhury et al., 2015
FINAN Financing for entrepreneurs	+	Arin et al. 2015; Chowdhury et al. 2015; Herrera-Echeverri et al., 2014; Vidal-Suñé and Lopez-Panisello, 2013
R&DT R&D transfer	-/+	Czarnitzki and Hottenrott, 2011; Roman et al., 2017
CPINFR Commercial and professional infrastructure	+	Li, 2019
IMDYN Internal market dynamics	+	Khanani, 2019
IMOPEN Internal market openness	-/+	Khanani, 2019

PSINFR Physical & services infrastructure	-/+	Li, 2019
Social Variables		
OPPORT Perceived opportunities	+	Arenius and Minniti, 2005; Bosma and Schutjens (2011); Vidal-Suñé and Lopez-Panisello (2013); Aparicio et al. (2016); Castaño et al. (2016);
CAPAB Perceived capabilities	+	Arenius and Minniti, 2005; Bosma and Schutjens, 2011; Vidal-Suñé and Lopez-Panisello, 2013; Aparicio et al., 2016; Castaño et al., 2016;
FEARF Fear of failure rate	-	Arenius and Minniti, 2005
STATUS High Status to Successful Entrepreneurs	+	Castaño et al., 2016
CSNORM Cultural and social norms	+	Giannetti and Simonov, 2004
SCHOOLT Basic school entrepreneurial education and training	+	Teixeira et al., 2018
POSSCH Post school entrepreneurial education and training	+	Teixeira et al., 2018
Institutions		
GOVSP Governmental support and policies	+	Ribeiro-Soriano and Galindo-Martín, 2012;
GOV Governmental programs	+	Ribeiro-Soriano, D., & Galindo-Martín, 2012; Akinyemi and Adejumo, 2018.
TAXBUR Taxes and bureaucracy	-	Dvouletý, 2017; Klapper and Love 2010; Paniagua and Sapena 2015
CORRUP Control of Corruption	-	Avnimelech et al., 2014; Chowdhury et al. 2015
REGQUAL Regulatory Quality	+	Suse and Hachez, 2017; Agostino et al., 2020
RULLAW Rule of Law	+	Suse and Hachez, 2017; Agostino et al., 2020

Appendix 3: Descriptive Statistics of Variables

Period: 2004-2018

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variable					
TEA	288	69.236	27.045	18.800	193.800
LogitTEA	288	-26.707	0.4121	-39.549	-14.255
Independent Variables					
Economic					
GDPG	405	19.463	38.405	-142.688	239.855
GDPpercapita	405	332,110.30	214,355.50	51,940.860	1,119,683.00
lnGDPpc	405	102.048	0.6629	85.553	116.260
UNEMP	405	88.568	43.193	22.433	274.662
INFL	405	21.535	21.790	-44.781	154.023
FDI	405	97.590	278.266	-583.229	2,801.318
POPUL	390	0.002	0.008	-0.023	0.029
FINAN	261	26.371	0.3547	16.500	37.200
RDT	261	24.930	0.3218	17.000	32.300
CPINFR	261	31.717	0.3097	22.400	39.000
IMDYN	261	28.990	0.4212	18.400	41.500
IMOPEN	261	27.072	0.3669	18.200	37.300
PSINFR	261	38.546	0.4324	21.000	48.200
Social					
OPPORT	288	341.302	144.857	28.500	815.600
CAPAB	288	429.828	74.361	145.800	606.700
FEARF	288	375.600	73.282	151.200	615.800
MOTIV	186	31.276	23.104	0.6200	118.000
STATUS	276	673.963	107.811	130.600	895.500
CSNORM	261	26.000	0.4176	16.200	40.100
SCHOOLT	261	20.714	0.3905	13.200	34.300
POSSCH	261	27.736	0.3005	20.500	37.200
Institutions					
GOVSP	261	25.751	0.4747	15.000	39.600
GOV	261	27.536	0.4925	17.200	37.500
TAXBUR	261	23.934	0.5461	13.400	37.700
CORRUP	405	10.269	0.7993	-0.2959	24.700
REGQUAL	405	11.918	0.4427	0.1484	20.474
RULLAW	405	11.130	0.6164	-0.1747	21.003

Note: Period 2004 till 2018 yearly data

Period: 2004-2010

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variable					
TEA	101	5.495	1.767	1.880	10.510
LogitTEA	101	-2.896	0.346	-3.955	-2.142
Independent Variables					
Economic					
GDPG	162	2.075	4.940	-14.269	12.919
GDPpercapita	162	32380.92	21226.23	5194.09	111968.30
lnGDPpc	162	10.165	0.696	8.555	11.626
UNEMP	162	7.739	3.089	3.654	19.073
INFL	162	3.195	2.603	-4.478	15.402
FDI	162	10.036	23.517	-58.323	249.108
POPUL	147	0.003	0.009	-0.017	0.029
FINAN	79	2.693	0.349	1.800	3.720
RDT	79	2.507	0.313	1.880	3.220
CPINFR	79	3.247	0.289	2.590	3.820
IMDYN	79	2.747	0.407	1.840	3.870
IMOPEN	79	2.761	0.321	2.080	3.460
PSINFR	79	3.763	0.439	2.760	4.640
Social					
OPPORT	101	32.749	13.123	2.850	70.590
CAPAB	101	42.016	8.897	14.580	60.670
FEARF	101	35.432	7.649	15.120	53.860
MOTIV	-	-	-	-	-
STATUS	101	68.038	10.624	34.470	89.550
CSNORM	79	2.608	0.317	1.740	3.580
SCHOOLT	79	2.141	0.301	1.500	2.930
POSSCH	79	2.761	0.258	2.120	3.350
Institutions					
GOVSP	79	2.650	0.479	1.650	3.670
GOV	79	2.779	0.445	2.010	3.710
TAXBUR	79	2.399	0.516	1.470	3.320
CORRUP	162	1.058	0.796	-0.296	2.470
REGQUAL	162	1.222	0.397	0.164	1.925
RULLAW	162	1.101	0.620	-0.175	2.014

Period: 2010-2018

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variable					
TEA	187	7.695	2.811	2.350	19.380
LogitTEA	187	-2.549	0.394	-3.727	-1.426
Independent Variables					
Economic					
GDPG	243	1.860	2.893	-8.998	23.986
GDPpercapita	243	33764.44	21599.85	6809.90	110701.90
lnGDPpc	243	10.231	0.640	8.826	11.615
UNEMP	243	9.602	4.838	2.243	27.466
INFL	243	1.459	1.486	-2.097	6.091
FDI	243	9.574	30.408	-41.508	280.132
POPUL	243	0.002	0.008	-0.023	0.024
FINAN	182	2.613	0.355	1.650	3.650
RDT	182	2.487	0.326	1.700	3.230
CPINFR	182	3.139	0.313	2.240	3.900
IMDYN	182	2.965	0.411	2.130	4.150
IMOPEN	182	2.684	0.384	1.820	3.730
PSINFR	182	3.894	0.424	2.100	4.820
Social					
OPPORT	187	34.876	15.153	10.870	81.560
CAPAB	187	43.505	6.479	29.110	60.220
FEARF	187	38.710	6.901	20.890	61.580
MOTIV	185	3.134	2.315	0.620	11.800
STATUS	175	67.026	10.884	13.060	86.530
CSNORM	182	2.597	0.455	1.620	4.010
SCHOOLT	182	2.041	0.421	1.320	3.430
POSSCH	182	2.779	0.318	2.050	3.720
Institutions					
GOVSP	182	2.542	0.471	1.500	3.960
GOV	182	2.743	0.513	1.720	3.750
TAXBUR	182	2.391	0.560	1.340	3.770
CORRUP	243	1.006	0.803	-0.267	2.405
REGQUAL	243	1.172	0.471	0.148	2.047
RULLAW	243	1.121	0.615	-0.112	2.100

Appendix 4: Correlation Matrix of Variables

	TEA	logit	GDPG	GDPper~a	lnGDPpc	UNEMP	INFL	FDIinf~s	POPUL	FINAN	RDT	CPINFR	IMDYN	IMOPEN	PSINFR	OPPORT	CAPAB	FEARF
TEA	1.000																	
logit	0.977	1.000																
GDPG	0.291	0.281	1.000															
GDPpercapita	-0.120	-0.084	-0.020	1.000														
lnGDPpc	-0.231	-0.200	-0.098	0.934	1.000													
UNEMP	-0.157	-0.143	-0.254	-0.301	-0.233	1.000												
INFL	0.038	0.026	-0.223	-0.058	-0.061	-0.165	1.000											
FDIinflows	0.110	0.140	0.361	0.294	0.256	-0.093	-0.158	1.000										
POPUL	-0.124	-0.093	-0.047	0.834	0.800	-0.371	0.034	0.273	1.000									
FINAN	0.229	0.213	0.365	0.220	0.235	-0.625	-0.055	0.068	0.158	1.000								
RDT	0.027	0.025	-0.008	0.638	0.640	-0.318	-0.022	0.234	0.436	0.474	1.000							
CPINFR	0.309	0.292	0.124	0.358	0.325	-0.342	0.004	0.237	0.182	0.508	0.568	1.000						
IMDYN	0.018	0.047	-0.035	-0.330	-0.310	-0.045	0.039	-0.225	-0.207	0.053	-0.202	-0.302	1.000					
IMOPEN	0.342	0.328	0.157	0.490	0.475	-0.493	0.030	0.271	0.419	0.599	0.699	0.679	-0.170	1.000				
PSINFR	0.244	0.241	0.094	0.177	0.178	-0.307	-0.005	0.136	0.110	0.476	0.291	0.519	-0.028	0.379	1.000			
OPPORT	0.217	0.222	0.237	0.521	0.502	-0.577	-0.005	0.115	0.488	0.534	0.452	0.338	0.077	0.523	0.435	1.000		
CAPAB	0.365	0.386	0.083	-0.310	-0.326	0.216	0.023	0.031	-0.176	-0.248	-0.350	-0.249	0.070	-0.116	-0.089	-0.231	1.000	
FEARF	-0.034	-0.029	-0.111	0.090	0.092	0.321	-0.233	0.087	0.059	-0.224	0.071	-0.060	-0.001	-0.045	-0.308	-0.110	-0.207	1.000
MOTIV	-0.007	-0.002	-0.039	0.515	0.520	-0.428	0.050	0.102	0.473	0.336	0.409	0.286	0.062	0.378	0.443	0.670	-0.215	-0.150
STATUS	-0.218	-0.214	-0.002	0.400	0.435	-0.357	0.104	0.113	0.381	0.174	0.361	0.246	-0.185	0.292	0.034	0.270	-0.280	-0.035
CSNORM	0.399	0.375	0.162	0.293	0.317	-0.277	0.032	0.190	0.184	0.528	0.616	0.497	0.048	0.694	0.333	0.561	-0.077	-0.041
SCHOOLT	0.437	0.425	0.055	0.239	0.227	-0.273	0.030	0.138	0.105	0.457	0.544	0.533	-0.037	0.646	0.321	0.476	-0.070	-0.167
POSSCH	0.316	0.284	0.050	0.338	0.324	-0.296	0.065	0.176	0.185	0.456	0.651	0.620	-0.262	0.582	0.381	0.323	-0.147	-0.045
GOVSP	0.044	0.047	0.096	0.563	0.571	-0.345	0.013	0.158	0.430	0.525	0.712	0.516	-0.051	0.573	0.359	0.481	-0.220	0.000

GOV	0.083	0.080	0.133	0.630	0.620	-0.371	-0.005	0.172	0.419	0.526	0.768	0.539	-0.190	0.637	0.368	0.466	-0.179	-0.146
TAXBUR	0.183	0.160	0.092	0.505	0.464	-0.386	0.039	0.282	0.378	0.445	0.690	0.555	-0.213	0.649	0.437	0.467	-0.201	-0.173
CORRUP	-0.036	-0.003	0.006	0.760	0.813	-0.470	0.027	0.187	0.646	0.479	0.662	0.475	-0.128	0.607	0.450	0.687	-0.266	-0.195
REGQUAL	0.157	0.168	0.083	0.675	0.701	-0.509	0.086	0.219	0.573	0.532	0.621	0.565	-0.144	0.718	0.439	0.704	-0.277	-0.167
RULLAW	0.003	0.039	-0.022	0.734	**0.810**	-0.410	0.044	0.187	0.611	0.454	0.664	0.518	-0.172	0.633	0.440	0.627	-0.229	-0.181

	MOTIV	STATUS	CSNORM	SCHOOLT	POSSCH	GOVSP	GOV	TAXBUR	CORRUP	REGQUAL	RULLAW
MOTIV	1.000										
STATUS	0.261	1.000									
CSNORM	0.384	0.255	1.000								
SCHOOLT	0.412	0.110	0.754	1.000							
POSSCH	0.322	0.146	0.530	0.653	1.000						
GOVSP	0.376	0.339	0.515	0.434	0.575	1.000					
GOV	0.369	0.248	0.533	0.389	0.536	0.755	1.000				
TAXBUR	0.401	0.365	0.656	0.567	0.553	0.663	0.670	1.000			
CORRUP	0.603	0.453	0.536	0.431	0.362	0.686	**0.732**	0.656	1.000		
REGQUAL	0.555	0.456	0.697	0.539	0.419	0.614	0.679	0.712	**0.904**	1.000	
RULLAW	0.552	0.440	0.562	0.459	0.393	0.668	0.739	0.638	**0.969**	**0.915**	1.000