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Entrepreneurship and Economic Growth: Macroeconomic Analysis and Effects of Social Capital in the EU

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1. Introduction

Measuring the wealth of Nations, the quantification of the factors that determine it, as well as the elements that can contribute to it is an underlying concern in the economy since the first schools of economic thought. In this regard, there have been significant advances in which has been called "growth accounting", the classical factors of production, capital and labor, to the inclusion of human capital, or others that might be included as determinants of investment (entrepreneurship) as well as explanatory factors of what has been called "Solow residual", such as social capital. Since the 1970s in which begins to strengthen the need to "measure" human capital and to include it as a factor of production, it will be several decades until it heals like a real "capital", so that is no longer questionable its effect on development.

One of the essential elements to consider was the human capital. After 1970 it begins to arise as a key element in the development of the economies. For a review of the literature, see Guisán, M.C. & Neira, I., 2006.

From the beginning of the XXI century, extends the inclusion of issues such as trust, governance or corruption, elements which the sociology and psychology had been trying since ancient, but begin to form part of the concern of economists.

All forms of capital may be understood to be assets of varying types that provide benefits and make productive processes more efficient. In this sense, social capital may be interpreted as an agglomeration of corporate, psychological, cultural and institutional assets. These increase the amount (or the probability) of mutually beneficial or co-operative behavior for the people involved and for society in general, Neira, et al., 2009.

The starting hypothesis of the economic theory of entrepreneurship is that the economy is endowed with certain factors, so entrepreneurship contributes to production through a combination of productive factors (capital and labor), and therefore more entrepreneurial resource allocation implies greater production and well-being. This feature is taken as exogenous in the model, and more recent work now seek to identify particular aspects of the contribution factor of entrepreneurship in economic growth. Koo & Kim, 2009, say that R&D policies need to be discussed in the broader context of related regional issues, such as

entrepreneurship, university research, human capital, social capital and industry structures. These are interrelated policy issues that need to be examined in a more comprehensive policy framework.

On the empirical level there are some works that assume the total productivity of production factors with explanatory variables the business dynamic (Callejón & Segarra, 1999); while others used proxies of the business activity (Petrakis, 2004). A set of empirical studies using measures that relate to the production or productivity with the proportion of the self-employment population in the total employed population (Carree et al., 2002). Finally, we must consider recent empirical studies using data from the Global Entrepreneurship Monitor (GEM) repeating for several countries.

In this chapter, there will be a review of the empirical literature, models of economic growth, considering the above mentioned production factors, physical capital, human capital and social capital, innovation and entrepreneurship. After doing this we present results for several European countries taking account two basic ways, the effect that the entrepreneurship generates in the development of the Western economies, as well as factors macro that can be reached to determine it.

In the entrepreneurship studies one of the key aspects is the subject of measurement. In this sense, the business literature on multiple measures of entrepreneurship, focus on the number of new companies, the self-employment population in the total employed population, public and private spending on R & D in GDP of a country or region. It is commonly used indicators provided by the GEM methodology or OECD-EUROSTAT in studies of entrepreneurship. However, there is no consensus among the authors on the most appropriate methodology to be used in the study of the phenomenon of entrepreneurship. Therefore, it is necessary to revise some measures and the methodology used in measuring it.

In this chapter, in addition to analyzing the literature on the subject, we propose different indicators for OECD countries, analyzing their determinants at the macro level, as the effects of the entrepreneurship, along with other factors, such as education or social capital, have in OECD countries.

2. Definition and importance of entrepreneurship

Interest in the study of entrepreneurship re-emerged with greater intensity in the late '70s, with an emphasis on economic theories through empirical findings and theoretical reflections. In empirical terms, it was found that several developed countries, mainly in Europe, launched new initiatives, after years of economic downturn and decline in business creation. On the other hand, widespread theoretical reflections about events that marked the world economy are reflected in national economies. These changes indicate that economic growth was not only sustained in economies of scale or scope, but that the companies had an important role in growth. Thus, Audretsch & Thurik, 2004, concluded that the change in consumption patterns, the rise of more flexible production processes and more competition among small and medium enterprises were striking in the transition from an economy of management to an entrepreneurial economy.

There are different definitions of entrepreneurship that have evolved over time. According to several authors (Kilby, 1971, Carland et al., 1984; Leite, 2002), the concept of entrepreneurship was first mentioned by Richard Cantillon in the eighteenth century. For him the function of entrepreneurship in the economy was the purchase of services and inputs at a certain price, and its subsequently sale at an unknown price and, therefore, assuming a risk. Later, Jean Baptiste Say offered a broader definition that combined capital, physical resources and manpower in an original and innovative way. For Adam Smith ("father" of the economy), the concept of entrepreneurship is confused with capitalism, whose function was providing the resources for entrepreneurs and capital accumulation. So, Wennekers & Thurik, 1999, mentioned three definitions of entrepreneurship. For example, entrepreneurship may lead to an economic function, a resource allocation or an innovation. Also it may report a particular behavior, it has intrinsic characteristics, it implies the creation of new businesses or the importance of an entrepreneur within a company. For Shane & Venkataraman, 2000, entrepreneurship is a response to economic issues: "How, by whom and with what effect are discovered, evaluated and exploited opportunities to create goods and services in the future." Davidsson et al., 2001, argued that entrepreneurship can be seen as an emergence of new economic activity, which includes imitation and innovation. Henderson, 2002, ultimately sees entrepreneurship as the discovery and development of opportunities for value creation through innovation.

OECD, 2009, said that "Entrepreneurship is a multifaceted concept that manifests itself in many different ways, with the result that various definitions have emerged and no single definition has been generally agreed upon. Several definitions have an essentially theoretical basis and are not concerned with measurement. Another strand of research has largely bypassed the question of definition by "defining" entrepreneurship in terms of a specific empirical measure, such as self-employment or the number of small firms. Not surprisingly, these are measures that are readily available." So, the OECD and Eurostat propose "combine the more conceptual definitions of entrepreneurship with (available) empirical indicators".

Building on the theoretical contributions of Richard Cantillon, Adam Smith, Jean Baptiste Say, Alfred Marshall, Joseph Schumpeter, Israel Kirzner and Frank Knight, among others, the following definitions were established:

- Entrepreneurs are those persons (business owners) who seek to generate value through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.
- Entrepreneurial activity is enterprising human action in pursuit of the generation of value through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.
- Entrepreneurship is the phenomenon associated with entrepreneurial activity."

Therefore several indicators to measure the entrepreneurial activity can be found in the literature (please refer to Godin et al., 2008). We can highlight the Total Entrepreneurial Activity (TEA) from the GEM, that indicates the proportion of individuals who are starting new businesses at the time of the survey; the OECD - Eurostat Entrepreneurship Indicators Programme (EIP), started in 2006 with the objective to "develop internationally comparable data on entrepreneurship and to make international comparisons possible and meaningful"; Kauffman's Index for the USA, which measures the proportion of adults "No owner of a

business" creating a new business each month; Denmark's entrepreneurship index, that also take into account business growth; the Database of Entrepreneurship by the World Bank, that monitors the implementation of new business. One interesting measurement is the net business creation index that also considers the disappearance of businesses. Other measure useful is the number of patents like a proxy of innovation on entrepreneurship. Other measurements are self-employment, creation of small business, expenditure in research and development, investment expenditure, and other indicators related to personal intentions regarding the establishment of a business.

In this work we use as measures of entrepreneurship Total Entrepreneurial Activity (TEA) from GEM database and entry density, the number of newly registered limited liability companies per 1,000 working-age people (those ages 15-64)) derived from World Bank.

3. Definition and importance of social capital

The study of social capital has shown significant growth in recent years. Following the works of the French sociologist Bourdieu, 1986; those of James Coleman, 1988, in sociology of education and, in particular, the work of Robert Putnam, 1993, in the field of political sciences, the term has acquired an important dimension and captured the interest of many researchers.

The introduction of social capital in economics is more recent, and the first contributions in this field are known to be those by Helliwell & Putnam, 1995, or Knack & Keefer, 1997. Since the turn of the century, the economic literature has begun to attach importance to this factor as one of the production functions, and -in this sense- its measurement provides one of the key elements to be considered. There are numerous studies confirming the importance of social capital in growth and development (Whiteley, 2000; Zak & Knack, 2001; Grootaert & Narayan, 2004; Tabellini, 2005; Beugelsdijk & Van Schaik, 2005; Roth, 2007; Dinda, 2008; Akçomak & ter Weel, 2008; Neira et al, 2009; Guisán, 2009; Dincer & Uslaner, 2010).

Social capital can be defined as trust, both interpersonal and institutional, and the positive aspects of the networks and social norms that facilitate the creation and maintenance of an adequate social structure, together with other capitals, to lay the foundations to facilitate long-term growth and sustainable development. This definition contains the three dimensions in which social capital is typically divided and they are: trust, networks and social norms. Those will be the elements we suggest as possible determinants for subjective well-being. We use one of these three dimensions because in the literature, several authors establish social capital indicators around these three groups. They are the basic elements and the most commonly used indicators, as we can see in the relevant literature. Grootaert & Van Bastelaer, 2001, p. 23, point out that, after reviewing several studies, they have found that social capital indicators "should be on three types of proxy indicators: membership in local associations and networks, indicators of trust and adherence to norms, and an indicator of collective action." Likewise et al., 2004, p. 4, also claim "that empirical indicators of social capital can be grouped into three broad categories: 1) social networks: relations within and between families and friends (informal sociability); involvement in community and organizational life (e.g. volunteering); public engagement (e.g. voting), 2) social norms: shared civic values, norms and habits of cooperation, and 3) social trust: generalized trust in social institutions and in other people."

Quillian, 2006, describes three types of measures used in empirical studies, similar to those previously mentioned. The first aims to measure social relationships by assessing the number, structure or properties of relationships among individuals. Thus, we can measure the intensity of contact and the frequency of interaction, as well as the characteristics of a whole social network. The second one is based on measuring individuals' beliefs about their relationships with others, where attitude, expectations and trust are the parameters more regularly measured. The third uses measures of membership in certain voluntary organizations and, in general, it is considered an indirect measure of social ties believed to be fostered by voluntary organizations, as direct measures of social ties are unavailable. We shall subsequently use different indicators reflecting these dimensions in order to measure social capital.

In most studies on social capital, one of the main variables used is trust (Knack & Keefer, 1997; Whiteley, 2000; Beugelsdijk & Van Schaik, 2001; Helliwell, 1996). In the absence of other indicators, the OECD (OECD, 2001) believes that "trust may be an acceptable proxy for social capital in the absence of a wider and more comprehensive set of indicators" The variable usually includes different types of trust, from trust in family members, neighbors, people of your country,... Trust is the variable that we select in order to measure social capital in this work.

4. Social capital, entrepreneurship and economic growth

As mentioned above, social capital has an impact on development and growth through various mechanisms. For example, Knowles, 2005, identifies four main groups, which cover the different ways in which social capital helps economic growth. The first refers to "increasing the number of mutually beneficial trades" illustrated with various examples of co-operation based on trust and information. The second major group refers to "the resolution of collective action problems" which states that societies with a high degree of social capital solve the problems of collective action more easily than those with low levels of it. "Reducing monitoring and transaction costs" is another mechanism for social capital to operate with, primarily through trust. Finally, social capital helps to "improve the flow of information" through social groups or networks too.

Also Greve et al., 2006, point out that "social capital has four main effects. 1) getting information; 2) transfer of knowledge, innovation, and diffusion of technology or practices; 3) combining complementary knowledge and helping solving problems; and 4) brokerage." They show other aspects in which social capital helps to increase productivity and helps to foster entrepreneurship: "One is using social relations to mobilize people to contribute to a project. Established social relations contain the necessary trust and knowledge about each other that facilitate communication and enhance cooperation (...). The other is using team members' social capital to augment and complement the knowledge of the team. A network of individuals has a collective knowledge base that possesses more knowledge than that residing within any single individual. Each person's network position, the network structure, and composition of participants determine the degree of shared knowledge and to what extent knowledge can be combined or coordinated among a set of experts." Using the social capital of members of these social networks, the resources of the company or team can be enhanced and complemented, because a community of individuals always gathers more resources than one person alone. It therefore shows the value of social capital as productive

capital depends not only on the number of contacts in these social relations, but also influence indirect contacts that will be reflected in the structure of the network. These contacts tend to be increasingly of a virtual nature and hence the importance of the new variable to analyze social capital.

Lin, 2001, gives us four reasons why social capital influencing outcomes. The first is that "facilitates the flow of information" through the use of social ties that can provide information on opportunities and choices which are should not access for social capital. The second is that "these social ties may exert influence on the agents who play a critical role in decisions". Third "social tie resources, and their acknowledged relationships to the individual, may be conceived by the organization or its agents as certifications of the individual's social credentials", i.e., resources that the organization can use in case of need. Finally "social relations are expect to reinforce the identity and recognition" with which the individual obtains the social recognition that it possesses certain resources and that belongs to a social group that will provide support.

Spellerberg, 2001, said that the "access to social capital can be said to have three key functions: processing information, assessing risks and opportunities and "checking out" situations, individuals and agencies". These three functions are important in the society that we live, because information is a key element for entrepreneurship and growth.

There are several studies that establish a direct link between entrepreneurship and economic growth. For example, Salgado-Banda, 2005, presented a new variable based on patent data as a proxy for productive entrepreneurship and, alternatively, a proxy based on data of self-employment. The main conclusions they obtain were that exist a positive relationship between the proposed measure to productive entrepreneurship and economic growth and the alternative measure based on self-employment appears negatively correlated with economic growth.

Van Stel et al. , 2004, 2005, using the Global Entrepreneurship Monitor (GEM) database at different periods conclude that the effect of the activity entrepreneurship rate on economic growth affects the level of economic development positively. Wennerker et al., 2005, used the country's entrepreneurship level as an independent variable, expressed by the Rate of Embryonic entrepreneurs, defined in the GEM 2002 database on 36 countries. The main conclusion was that the flow of new entrepreneurs tends to decrease with a development level at a certain point, only to grow again from that point (U function). With data from GEM 2008, Bosma et al., 2008, achieve the same conclusions. On the other hand, Wennerkers et al., 2008, provides an alternative analysis of the "income-entrepreneurship" relationship in a group of developed countries. They employ OCDE data and an entrepreneurship rate based on the total proportion between businesses owners and the active population between the years 1972 and 2004. In this case, the graphic is L-shaped in the long term, so the proportion of entrepreneurial activity would not increase according to income levels, instead it would tend to remain stable. Using the GEM 2002 database concerning 37 countries, Wong et al., 2005, start from a Cobb-Douglas production function to explain entrepreneurship and technological innovation as determining factors of growth and concluded that a rapid growth of new enterprises generates job creation in small and medium business in developed countries. M. Martin et al., 2010, examined the relationship between entrepreneurship, income distribution and economic growth by developing the

ideas of Schumpeter and testing them empirically through the GEM database. The main conclusions of the paper are: fiscal policy has a positive effect on investment in different ways: increased public investment and reduces imperfections in the credit market or end up with restrictions that adversely affect investment in physical and human capital and that there is a negative effect of interest rate and the positive effects of public services and the rate of entrepreneurship.

The authors Li et al., 2009, analyzed the impact of entrepreneurship on economic growth using panel data for 29 regions of China in a period of 20 years. Combining the theoretical definition of entrepreneurship with the characteristics of Chinese entrepreneurs, the authors defined two measures: (1) employment ratio of people with jobs or own businesses in total employment (ratio or measure of private employment) and (2) employment ratio owners own business in total employment (ratio or measure of private businesses). Both measures were defined to capture the entrepreneurial spirit. The results suggest a positive impact of entrepreneurship on economic growth, and this result is more robust when the institutional and demographic variables are controlled.

In the article by Mojica et al., 2009, the connection between entrepreneurship and economic growth is achieved through the adoption by the regional economic growth models of measures of entrepreneurship. Thus, these models capture the influence of the level of entrepreneurship in economic growth while measuring the effects of other factors that have traditionally made the link between entrepreneurship and development. They concluded that there is positive contribution of entrepreneurial activity to economic growth. The regions with the highest number of new business owners and exhibit higher levels of population growth. The growing number of owners and the largest number of jobs in new business demonstrates its positive influence on employment growth..

So, as we can see, social capital and entrepreneurship plays a key role in development. Social capital is an important factor in the disseminating knowledge across the society in general, and business in particular, by to facilitate the flows of information and the transfer of innovation and entrepreneurship affect to economic development increasing the income level or reducing the level of unemployment. Koo & Kim, 2009, they say that R&D policies need to be discussed in the broader context of related regional issues, such as entrepreneurship, university research, human capital, social capital and industry structures. These are interrelated policy issues that need to be examined in a more comprehensive policy framework. They proposed a model of economic growth in which the rate of regional economic growth is a function of the growth rate of economically useful local knowledge, combined with the growth rates of capital and labor. The growth of economically useful local knowledge is a function of R&D, entrepreneurship, university research, human capital, social capital and the industry's structure. Their results indicate that entrepreneurship plays a significant role in regional growth. Moreover, for any given level of industry R&D spending, the level of entrepreneurial activity determines how much benefit a state can garner from its research activity.

Vázquez-Rozas et al., 2010, in order to test the effect of entrepreneurship on economic growth use the ratio of businesses created in each region over the total number of businesses for nine years (2000 to 2008) as a proxy of entrepreneurial capital, with data from Iberian Balance Sheet Analytical System. They estimate a regional panel econometric model, and they find a positive

effect of the entrepreneurship variable on GDP growth, in per capita terms and in absolute values. Also they find that Human capital and social capital are significant.

5. Data

Regarding social capital, our empirical analysis is based on the data from the European Social Survey. In order to maximize statistical efficiency, we pool the data from the four waves of the ESS (ESS Round 1: European Social Survey Round 1 Data , 2002; ESS Round 2: European Social Survey Round 2 Data, 2004; ESS Round 3: European Social Survey Round 3 Data , 2006; ESS Round 4: European Social Survey Round 4 Data, 2008). Due to data availability and comparability, we have chosen the following countries: Austria, Belgium, Switzerland, Germany, Denmark, Estonia, Spain, Finland, France, the United Kingdom, Hungary, Ireland, the Netherlands, Norway, Poland, Portugal, Sweden, Slovenia and Slovakia. For all of these countries there is information, at least, on three waves and for all variables that we have selected.

We shall use variables for one of its three dimensions (trust) because it's an important dimension and it's much related with entrepreneurship and economic growth. Due to the complexity entailed in the calculation of that dimension, we perform a factorial analysis with the different variables available in the survey for each dimension.

DIMENSION	QUESTION ON SURVEY	To measure
TRUST	Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? (0 means you can't be too careful and 10 means that most people can be trusted)	Interpersonal trust
	Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair? (0 means Most people would try to take advantage of me and 10 means Most people would try to be fair)	Social trust
	Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves? (0 means People mostly look out for themselves and 10 means People mostly try to be helpful)	
	Please tell me on a score of 0-10 how much you personally trust each of the institutions... (0 means you do not trust an institution at all and 10 means you have complete trust) ...[country]'s parliament? ...the legal system? ...the police? ...politicians? ...the European Parliament? ...the United Nations?	Institutional trust

Table 1. Selected variables to measure social capital (trust)

These selected variables in order to analyze trust are:

Thus, we have 9 variables that measure several aspects of trust: interpersonal trust, social trust and institutional trust. The variables selected reflect different aspects of trust and measure interpersonal trust, honesty, whether people help each other, trust in various institutions: the country's Parliament, the legal system, the police, politicians, the European Parliament and the United Nations.

We select three dimensions of trust based on the three dimensional approach proposed by Kholyakov, 2009, that says there are three types of trust: "Thick interpersonal trust is the first type of trust people develop in their lives. It is the trust that people have in their family members, relatives, and close friends. Thick interpersonal trust is necessary for developing an optimistic attitude towards others, which makes social interaction possible." The second type is called "Thin Interpersonal Trust is created through interacting with people whom we do not know well and depends on the reputation of either a potential trustee or a trust intermediary. It represents reliance on weak ties and is based on the assumption that another person would reciprocate and comply with our expectations of his or her behavior, as well as with existing formal and ethical rules. Although thin interpersonal trust is always directly associated with high risks – the ever-present possibility of lack of reciprocity, unmet expectations, and uncertainty – it is also able to provide us with more benefits if our trust is reciprocated." Finally, the third type is "Trust in institutions has the potential to encourage voluntary deference to the decisions made by institutions and increase public compliance with existing rules and regulations".

The results obtained after applying the principal component analysis to these variables are two components: one of them is called "institutional trust" and it includes the variables referring to institutional aspects; and the other one is "social trust", covering the three remaining variables (interpersonal trust, honesty, whether people help each other).

Rotated Component Matrix

KMO=0,852	Component	
	Institutional Trust	Social Trust
Trust in the country's Parliament	0,783	
Trust in politicians	0,762	
Trust in the legal system	0,739	
Trust in the European Parliament	0,790	
Trust in the United Nations	0,763	
Trust in the police	0,629	
Honest people		0,797
Interpersonal trust		0,809
Helpful people		0,760
Variance percentage	47,88	14,80

Table 2. Factor loading matrix for the trust dimension

In order to use these variables in empirical approach and subsequent to factorial analysis, the factorial values for each observation are computed. Aggregation on a national level for each wave of survey is achieved by taking the averages of the individual values in the

countries and waves under scrutiny. These values, automatically scaled to unit standard deviation and mean equal to zero, are used for the analysis of the situation of social capital in Europe.

In the next section we use these variables in empirical approach.

6. Empirical approach

Since the appearance of the first works by Solow, 1956, 1957, in which the function of production is related to savings (i.e., capital investment), population growth (i.e., labor) and technological advancement, the number of factors to be considered have increased.

With a similar approach to the aforementioned works that portrays the characteristics of entrepreneurial activity, this paper analyzes the effect of entrepreneurship on growth in European regions. In particular, our model is based on the idea of Audrestsch et al., 2006, and Koo & Kim, 2009, about the importance of adding economically useful local knowledge variables to the classical model of economic growth that only included labor and capital. These variables are: research and development, human capital, entrepreneurship and social capital. In this sense, Westlund, 2006, has launched the hypothesis that stable conditions -of which trust can be regarded as a measure- were of greatest importance for economic growth during the late manufacturing-industrial economy, while the current knowledge economy has a greater need for qualities like entrepreneurship, creativity and tolerance.

The economic growth model is:

$$GDPH_{it} = f(HH_{it}, EC_{it}, HC_{it}, SC_{it}) \quad (1)$$

Dependent variable is Gross Domestic Product per inhabitant (GDPH). Data from Eurostat are quantified in constant Euros prices (year 2000).

SC_{it} represent the variables of social capital cited above (interpersonal trust, social trust derived by PCA and institutional trust derived by PCA).

Selected variables to measure entrepreneurship (EC_{it}) are:

- Gross domestic expenditure on R&D (GDERD) includes expenditure on research and development by business enterprises, higher education institutions, as well as government and private non-profit organizations. This data comes Eurostat and is quantified in constant Euros prices (year 2000)
- Total early-stage Entrepreneurial Activity (TEA) - Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than three months, but not more than 42 months. This data comes from Global Entrepreneurship Monitor (GEM)
- Entry Density (Entry), calculated as the number of newly registered limited-liability firms in the corresponding year as a percentage of the country's working age population (ages 15-65), normalized by 1,000. Data comes from World Bank Group Entrepreneurship Snapshots (WBGES)

The other variables we use in the empirical approach are the next:

HC: Human capital measured by the percentage of the population, aged 25 to 64, which have completed secondary school or better. Data was taken of Eurostat.

LT: level of employment (all persons who worked at least one hour for pay or profit during the reference week or were temporarily absent from such work). Data was taken of Eurostat.

POP: population (The inhabitants of a given area on 1 January of the year in question). Data was taken of Eurostat.

Estimation Procedure

The analysis of the determinants of growth and convergence of regions implies the possibility of raising a dynamic model that takes into consideration the need to employ instrumental variables to avoid the problems of endogeneity. This implies the need to use alternatives to OLS estimates, the estimation of model (1) GMM by Arellano and Bond being the most appropriate

$$y_{it} = \alpha y_{i,t-1} + \beta' x_{it}^* + \eta_i + v_{it} = \delta' x_{it} + \eta_i + v_{it} \quad (2)$$

Where x_{it} and the v_{it} are not serially correlated. We contrast this hypothesis using the m2 statistic tests to compensate for the lack of second-order serial correlation in the first-difference residuals. Tests of specification are applicable in the same context. One of them is a Sargan test for over-identifying restrictions (cf. Sargan (1958, 1988)).

Arellano and Bond (1991) suggest that a random sample of N individual time series (y_1, \dots, Y_T) is available. T is small and N is large. The v_i are assumed to have finite moments and in particular $E(v_it) = E(v_itv_jt) = 0$ for $t \neq s$. That is, we assume a lack of serial correlations but not necessarily independence over time. With these assumptions, values of y falling two or more periods behind are valid instruments in the equations in first differences.

Table 3 results correspond to the estimate of a panel data model with fixed effects, correcting the heteroskedasticity using cross-section weights. Initial GDP per capita has been included in order to evaluate the conditional convergence in the sample analyzed.

The results of table 3 show us that the entrepreneurship variables have a positive and significant effect in GDP growth. Regarding social capital variables are significant the institutional and interpersonal trust, but no social trust. The estimation (1) analyzes the relationship between GDP per capita and use as variable of entrepreneurship entry density and as variable of social capital the interpersonal trust. We can see that human capital, social capital and entrepreneurship are positive and significant, so these variables have an influence in GDP per capita. The estimation (2) use as variable of entrepreneurship Total early-stage Entrepreneurial Activity and the other variables are the same as the previous estimation. The effect of TEA is also positive and significant, but smaller than the entry density. Estimations 3 and 4 used as a variable of social capital the institutional trust and other variables used above. Again, the result indicates that both the institutional trust as the two variables of entrepreneurship have a positive and significant influence in GDP per capita. The estimations 5 and 6 are used more explanatory variables that they include the effect of employment and Gross domestic expenditure on R&D. In this case the variables that measure entrepreneurship (TEA) and the employment are not significant. It is possible that part of the effect of tea is seen reflected in the new variable

that includes investment in R & D. Finally, in the estimation (7) a new variable of social capital is included, social trust, together with institutional trust. Social trust is not significant, as well as the employment. The other variables retain their significant and its positive effect on GDP per capita.

So, in brief, Total early-stage Entrepreneurial Activity (TEA) has a positive and significant effect when the variables of social capital reflects the institutional and interpersonal trust. The Gross domestic expenditure on R&D (GDERD) has an important and positive effect in GDP growth. Finally the third of variables we choose in order to measure the entrepreneurship, Entry Density (Entry), has a positive and significant effect too.

These results confirm the importance of entrepreneurship and social capital in the economic growth.

Dependent variable	Log (GDP/POP)						
(2002-2008)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total pool (unbalanced) observations	34	28	28	36	26	26	34
Log (GDP/POP) ₋₁	0.438***	0.540***	0.522***	0.541***	0.821***	0.791***	0.217***
Log(K/POP)	0.127**	0.079**	0.156**	0.149**	0.123***	0.127***	0.169***
Log (L/POP)					0.023	0.033	0.002
EC: LOG (GDERD)					0.043**	0.046**	0.172***
EC: Entry	0.013***			0.007***			0.006***
EC: TEA		0.005***	0.002***		0.0008	0.0005	
HC	0.003*	0.003*	0.003*	0.003*	0.003***	0.003***	0.003***
SC : Interpersonal trust	0.450***	0.440***					
SC: Institutional trust PCA			0.079***	0.078***	0.068***	0.068***	0.075***
SC: Social trust PCA						0.017	-0.008
Sargan test ^a		0.193	0.02	0.299	0.101	0.344	0.27
Serial Correlation ^b	0.12	0.69	0.83	0.206	0.591	0.627	0.020

* significant at 1%, ** at 5%, *** at 10%.

a: p-value of Sargan's test for over-identifying restrictions

b: p-value of test for second-order serial correlation in the residual of the differenced equation

Table 3. Results

7. Conclusions

In this work we analyze the relationship between entrepreneurship, social capital and economic growth. At the aggregate level, both theoretical and empirical studies acknowledge the need to extend the economic growth model adding variables like R&D expenditure, industrial structure, , university research, social capital and entrepreneurship.

Entrepreneurship and social capital have been considered as key elements in economic growth but still remaining the problem of how they are measured. The empirical applications at an aggregate level do not always use the same variables to measure the factors of entrepreneurship and social capital, as studies of regional or national level depends largely on the basis of available data.

There is not a unique indicator that reflects the multidimensional aspects of social capital, but trust is an acceptable proxy variable. Using the European Social Survey, we have selected different types of trust and we carry a PCA analysis in order to obtain new variables we use in empirical analysis. Two new variables have been obtained "institutional trust" and "social trust". The values are aggregate on a national level and wave, and scaled to unit standard deviation and mean equal to zero to be used for the empirical analysis. These variables, together with interpersonal trust, are used in econometric model.

Entrepreneurship is a factor related to aspects of personal motivation and the development of business initiatives and the socioeconomic environment. The difficulty of obtaining a good proxy at the aggregate level is observed by reviewing the empirical literature.

Regarding entrepreneurship we are aware of the difficulty involved in measuring many of the components of entrepreneurship, but we use different variables that reflect different aspects of these components: Gross domestic expenditure on R&D, Total early-stage Entrepreneurial Activity and Entry Density.

Most of the empirical findings point to a highly positive relation either in countries or regions and in this paper our main conclusions are consistent with this background.

We have confirmed the positive and significant relationship between entrepreneurship, social capital and economic growth.

The effect of "interpersonal trust" and "institutional trust" are more important than "social trust". So, it would be necessary that the public policies invest in these types of trust in order to promote economic growth. Increasing trust in institutions is fundamental to economic growth, it provides an improvement of the socioeconomic environment, which is essential to promote risk-taking by economic agents

It is also essential that the government invest in research and development, because public spending on research and development is shown as an important element in economic growth.

Finally, it is necessary to facilitate the creation of new businesses since the two measures that reflect this activity (Total early-stage Entrepreneurial Activity and Entry Density) also show a positive relationship with economic growth.

We will continue working on this line to take into account the other two dimensions of social capital and other measures of entrepreneurship. We believe that social networks and social norms may also be important for entrepreneurship and economic growth and we hope to develop in the future more tests in order to confirm this relationship.

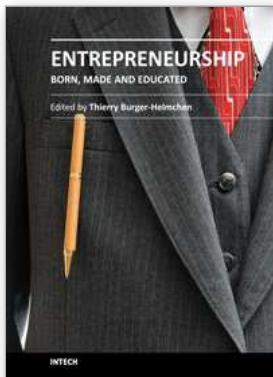
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Entrepreneurship has a tremendous impact on the economic development of a country. As can be expected, many public policies foster the development of self-entrepreneurship in times of unemployment, praise the creation of firms and consider the willingness to start new ventures as a sign of good fortune. Are those behaviours inherent to a human being, to his genetic code, his psychology or can students, younger children or even adults be taught to become entrepreneurs? What should be the position of universities, of policy makers and how much does it matter for a country? This book presents several articles, following different research approaches to answer those difficult questions. The researchers explore in particular the psychology of entrepreneurship, the role of academia and the macroeconomic impact of entrepreneurship.

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