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SOCIAL CAPITAL AND THE EQUILIBRIUM NUMBER OF ENTREPRENEURS (*)

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Abstract

Social capital is viewed either as a proprietary asset that serves private interests, including those of entrepreneurs, or as a collective asset that supports trust-based transactions saving on transaction costs both in markets and within the boundaries of firms, and benefiting society as a whole. This paper explains the relative specialization between entrepreneurs and market-governed exchanges as a result of the interaction between social capital that lowers transaction costs, and the scale economies of ability in managerial jobs (Lucas 1978). The main hypothesis formulated in the paper is that higher social capital will benefit the *hierarchy* relatively more than the *market* as a governance mechanism, and therefore in economies with higher social capital, the equilibrium number of entrepreneurs will be lower and their average span of control larger than in economies with lower social capital. The empirical evidence, with data from the Spanish Autonomous Communities, is consistent with this prediction.

Key words: Social capital; entrepreneurship; entrepreneurial skills; occupational choice; self-employment; organization of firms.

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Introduction

The social context of production and exchange affects economic performance at the macro (Guiso, Sapienza and Zingales, 2006) and at the micro (Granovetter, 1985; Burt, 1992) levels. Social Capital (Bourdieu, 1980, 1986; Coleman, 1988; Putnam, 1995) is one element of the social context that determines the transaction costs (Arrow 1974) and thus influences the organization of firms and markets (Adler and Kwon, 2002). Country differences in social capital will then have a direct impact on their respective productivity levels and on productivity growth over time (Knack and Keefer, 1997; Zak and Knack, 2001; Alesina and La Ferrara, 2002; Pérez et al., 2009). However, the question of whether the benefits of trust-supporting social capital occur through more efficient markets and/or through more efficient management of firms, has not been examined in detail. The related issue of how differences in the levels of social capital affect the organization of production, in terms of the equilibrium number of entrepreneurs and/or the average size of firms, also remains unexplored. This paper examines the relationship between social capital and entrepreneurship at the country or region level, and presents empirical evidence on this issue with Spanish data. The analysis goes beyond the effects of networking by individual entrepreneurs on the success of their respective business venture (for a review see Hoang and Antoncic, 2003) and, instead, examines the collective social capital as determinant of the equilibrium number of entrepreneurs in the economy.

One of the explanations of why entrepreneurs and firms exist in market economies has been the non-trivial transaction costs of using the market to coordinate production and exchange (Coase, 1937; Williamson, 1985). Since the firm has its own transaction (management) costs, markets and entrepreneurs will specialize in the direction of resources according to their respective comparative advantage in each situation. A second explanation, much less considered in the literature on the economics of firms, of why some people work as entrepreneurs and others are employed as direct workers, is the scale economies in production that result from placing those who are more able in entrepreneurial jobs, directing the work of others (Lucas 1978). Scale economies of entrepreneurial ability do not eliminate all markets (by placing all workers under the direction of the most able entrepreneur) since the management function of entrepreneurs is subjected to organizational diseconomies from management costs of coordinating and supervising direct workers. These costs are in the form of loss of control and incentive problems (agency costs) in hierarchies that limit the span of control of managers and the size of the firm (Williamson, 1967; Calvo and Wellisz, 1978; Holmstrom, 1979; Rosen, 1982).

The key proposition formulated and tested in this paper is that in social contexts (economies) of higher social capital and higher generalized levels of trust, the number of entrepreneurs directing the work of others will be lower, and their average span of control higher, than in contexts (economies) of lower levels of social capital and lower trust. Higher social capital and more generalized trust in the economy lowers what Coase (1937) identifies as the costs of using the market (marketing costs) and the costs of using the conscious direction of entrepreneurs (management costs) for directing resource allocation in the economy. Then, in terms of transaction costs alone, the relative advantage of entrepreneurs versus markets in the direction of resources remains unchanged when social capital and trust increase, although

the average productivity of the whole economy will increase. The fact that social capital affects the level of transaction costs of the economy is not sufficient to predict that social capital will have an influence on the equilibrium number of entrepreneurs and on their average span of control. To explain the influence we combine the results from two theories: transaction costs economics, and the theory of the size distribution of firms based on labour market equilibrium when individuals make occupational choices between entrepreneurs-managers and employees (Lucas, 1978).

In the Lucas (1978) model, individuals differ in their entrepreneurial skills and choose to work as employees or as entrepreneurs-employers. The choice is determined by the comparison of the pay-offs from the two decisions, salaries and profits, and in the equilibrium there will be a threshold of skills for which a person is indifferent to working as an employee or becoming an entrepreneur. Lucas assumes a production technology where entrepreneurial skills affect the productivity of all inputs under control (scale economies of entrepreneurial skills) so there is incentives to concentrate a proportionally high number of employees under the direction of the most able entrepreneurs. However, the allocation of time and skills across employees is subject to organization diseconomies and diminishing returns, since the allocation of the limited working time of the entrepreneur among employees, to supervise their work and get things done within the firm, is on a one-to-one basis (Rosen, 1982). Higher social capital and higher trust will favour the adoption of forms of work organization with more decentralization and delegation of decision power to direct workers, saving in management time and the cost of entrepreneurs. Under more generalized trust, organizational diseconomies will be lower, indicating that the productivity of entrepreneurial skills will be higher, for the same number of employees, than in economies with lower levels of trust. The occupational choice model of Lucas (1978) predicts a higher threshold of skills for the equilibrium in the number of entrepreneurs and employees of the economy when organizational diseconomies and management costs are lower. This implies a lower number of entrepreneurs and higher average span of control in the equilibrium with high trust than in the equilibrium with low trust.

Occupational choice models do not consider that, in reality, certain self-employed individuals work on their own, and only a fraction of all entrepreneurs hire employees. Moreover, the direction of workers inside the firms is sometimes performed by professional, salaried managers to whom business owners delegate decision power. The study of the relationship between social capital and the number of entrepreneurs will allow for the existence of entrepreneurs who do not hire employees (own account self-employed) and for the existence of employed managers who perform the function of directing employees in the name of the entrepreneurs-business owners. We conjecture that own account self employed do not benefit from the economies of scale of entrepreneurial skills, since they do not hire employees and thus differences in social capital across economies should not be as determinant of differences in own account self-employed as they are for the case of employers. We also conjecture that a higher level of trust will facilitate specialization between ownership and management of firms, so the ratio of managers over entrepreneurs-employers will increase with the level of social capital.

We test the theoretical predictions with data from the 17 Spanish Autonomous Communities (AACC) in the period 1986-2006. Cross-country and time series data on the number of the self-employed separated into those who work alone and those who hire employees, is not readily available in databases of general use such as COMPENDIA (van Stel, 2005). The Spanish official labour statistics follow a unified methodology on the definition of occupation groups and on the collection of occupational data in all AACC that offer substantial advantages compared with data from different countries and different criteria on the definition of the variables, even if such data were available. For example, the US labour statistics exclude from the self-employed those who do business through an incorporated firm. Our occupational data come from the Spanish Employment Survey Statistics (Spanish EPA) and include the number of the self-employed, distinguishing between those hiring employees (*employers*) and those who do not (*own account self-employed*), and the number of salaried workers, split between those in top management positions (*managers)* and the rest *(employees)*[1]. In the context of this paper, entrepreneurs perform management functions and if we want to justify the equilibrium number of entrepreneurs, we must include employers and managers in the same group. We then combine the two into the single group of *directors.* Average span of control is then equal to the ratio between employees (excluding managers) and number of directors. The data on social capital of each AACC and year is from the IVIE (Pérez-García et al. 2006).

We empirically explain the observed values of variables reflecting the organization of production in each region and year (the proportion of directors in total employment, the average span of control, the proportion of own account self-employed and the ratio of managers to employers) as a function of the social capital index, and a list of control variables having to do with industry specialization, education and age of the different occupation groups (self-employed, employees, managers,…). We find that social capital is positively (negatively) associated with the average span of control (proportion of directors), the proportion of own account self-employed is uncorrelated with the level of social capital, and the ratio of managers over employers increases with social capital. The empirical results support the relevance of social capital and the scale economies of entrepreneurial ability in explaining the organization of production.

Prior research has documented the positive influence of the social capital of individual entrepreneurs, which Adler and Kwon (2002) define as "external social capital", in the success of their respective business ventures (Aldrich and Zimmer, 1986; Aldrich, Rosen and Woodward, 1987). This paper, however, examines the much less explored topic of aggregate entrepreneurial activity in economies with different levels of "internal social capital" (Adler and Kwon, 2002). Our research interests are not to predict the success of individual entrepreneurs with more or less individual social capital. Rather, the objective is to explain the equilibrium number of entrepreneurs in the economy and their composition (those who hire employees and those who do not), as well as the relationship between the stock of social capital of the economy and the average span of control. Kwon and Arenius (2010) make the distinction

[1] For a recent work that uses self-employment as a proxy variable for entrepreneurship see Acs et al (2009).

between the effects of social capital on entrepreneurial activities at the individual entrepreneur and at the societal level. They test the hypothesis that, in countries with higher levels of trust, individuals will perceive on average more business opportunities than in countries with lower levels of trust. In addition, more generalized trust will imply a higher proportion of individuals who are willing to provide funds to finance businesses begun by others. Our paper also uses a measure of social capital at the level of a country-region, but the measure of entrepreneurship is not the number of perceived business opportunities but the number of individuals who perform entrepreneurial functions, self-employed and top-level managers. We do not look at entrepreneurial dynamics in terms of perceived opportunities, which may be materialized or not and be successful or not, but rather we examine the effect of differences in social capital as a comparative static exercise in terms of comparing one equilibrium in the number of entrepreneurs versus the other.

Other papers have examined the relationship between levels of trust and the size of firms in a cross section of countries (Laporta et al., 1997), and between levels of trust and the internal organization of firms (in particular, the degree of decentralization) among firms from different countries (Bloom, Sadun and van Reenen, 2009). These papers find that, in countries with higher general trust, larger firms represent a large share of the GDP or have larger size in terms of sample average, and firms in countries with a stronger Rule of Law and higher levels of generalized trust delegate more decision power to local managers. Our paper is different in several ways. First, we use region level data from the same country, Spain, and our dependent variables are the proportion of individuals self-employed and the average span of control of those performing management functions for each region and year, not individual firm data. We assume that observed values of the dependent variables are equilibrium solutions from agents' occupational choices, and we explain them as a function of the characteristics of the region and their changes over time[2].

Second, we introduce into the analysis the possibility of transaction costs of market exchange in addition to management costs of firms. Higher social capital and trust may lower the transaction costs of markets and the management costs of firms, so the net effect of lower transaction costs on the boundaries of the firms and their sizes is ambiguous. Our point is that, for the organization of production and for the size distribution of firms, what matters is the combined effect of transaction costs and scale economies of entrepreneurial ability. Finally, the results of the paper indicate that the group of the self-employed is not homogeneous and the relative number of employers and managers responds to changes in social and cultural norms in a way different from the response observed among own account self-employed. Research on entrepreneurship and economic development has documented a negative association between

[2] Other papers that explain the density of the self-employed across countries and/or for a country over time are: Blau (1987); Blanchflower (2001); Blanchflower, Oswald and Stutzer (2001); Parker and Robson (2004). However, none of these papers consider trust/social capital as explanatory variables, nor do they distinguish between self-employed with and without employees. Other empirical research examines the self-employment decision at the individual level, taking into account personal characteristics of the entrepreneur (education, experience, wealth, preferences for independent work) and, occasionally, the general conditions of the economy (for a review see Dawson, Henley and Latreille, 2009). Our paper does not explain individual decisions but equilibrium self-employment rates for the economy.

self-employment rates and economic development in cross-country data, while treating all self-employed as a homogeneous group[3]. Our results suggest that the relationship between entrepreneurship and economic development in cross-country data can give different results when the entrepreneurs include only employers and managers, than when all self-employed, with and without employees, are considered.

The organization of the rest of the paper is as follows: Section 1 presents the literature review on social capital and entrepreneurship and formulates the main hypotheses to be tested. Section 2 contains the description of the data and the results from testing the hypotheses. The discussion of the results and our conclusions close the paper.

1.-Theory and hypothesis on entrepreneurship and social capital.-

In this section, we present the theoretical arguments justifying the existence of entrepreneurs in the economy, and we examine how the level of social capital is likely to affect the number and characteristics of entrepreneurs.

1.1.-Social capital, transaction costs and entrepreneurship

The term social capital has a variety of meanings (Dasgupta and Serageldin, 1999; Adler and Kwon, 2002). One originates from the definition in Bourdieu (1986, page 248): "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition". This view of social capital is of a personal and private asset that facilitates collaboration and exchange. Input markets, such as financial, labour and intermediate products, are imperfect, so social bonds and networking relationships facilitate exchanges, acting as substitutes for impersonal, legally enforceable market contracts. This “external” social capital (Adler and Kwon, 2002) varies among individuals in the economy and those with larger and more intense networking relationships will presumably obtain greater private benefit. The literature on entrepreneurship recognizes the relevance to individual success of social ties, of social bonds, and of the networking relationships of individual entrepreneurs (Aldrich and Zimmer, 1986; Aldrich, Rosen and Woodward, 1987; Birley, 1985; Ostgaard and Birley, 1994; Brüderl and Preisendörfer, 1998; Honig, 1998; Shane and Cable, 2002; Nicolau and Birley, 2003; Michelacci and Silva, 2007; Vissa and Charcar, 2009).

The other view of social capital is as an “internal” asset (Adler and Kwon, 2002). The approach is rooted in Putnam’s (1995, page 67) definition of social capital as “the features of social organization […] that facilitate coordination and cooperation for mutual benefit”. Coordination and cooperation in business relationships is easier with greater internal social capital because there will be more transactions carried out under implicit contracts and mutual trust, saving transaction costs (Arrow 1974). Therefore, the return

[3] Kuznets (1971); Lucas (1978); Acs, Audretsch and Evans (1994); Iyigun and Owen (1999); Carree et al. (2002); Gollin (2008); Salas-Fumas and Sánchez-Asín (2006). For a general analysis of the relationship between entrepreneurship and growth, see Audretsch et al (2006).

from internal social capital is not in the form of a private benefit for an individual's privileged networking relationships and social bonds, but as a social benefit; since the public good of social capital is a collective asset, available to all in the community, no individual can take an advantage over others. The returns from internal social capital are then in the form of higher productivity and productivity growth for the whole economy (Knack and Keefer, 1997; Zak and Knack, 2001; Alesina and La Ferrara, 2002; Pérez et al., 2009). The literature on entrepreneurship considers "entrepreneurial capital" (Audretsch and Keilbach, 2004; Audretsch et al., 2006; Audretsch and Monsen, 2007), i.e. the economic and social conditions that facilitate entrepreneurial activity, as one component of the internal social capital of the economy. However, the relevance of entrepreneurial capital cannot be isolated from the relevance of social capital as a whole since, according to our analysis, the number of entrepreneurs is jointly determined with the scope of market-governed exchanges.

Our aim in this paper is to explain the equilibrium number of entrepreneurs in the economy, not the success of individual entrepreneurs, so the relevant concept of social capital to use is the internal one. Transaction cost economics explains specialization between markets and entrepreneurs to organize production and exchange in terms of their respective transaction costs (Coase, 1937; Williamson, 1985)[4]. The extension of the Rule of Law, the independence and effectiveness of the Courts, and the good functioning of the Legal System as a whole, all together will determine the overall transaction costs of the economy. The application of the Rule of Law relies on explicit and formal contracts that bind individual behaviour and protect from abuses and opportunistic behaviour of other parties. These contracts are costly to write and enforce, even by fair and efficient Courts, so there are potential gains in the form of lower transaction costs if collaboration and exchange take place under implicit contracts supported by mutual trust (Arrow, 1974; Kreps, 1990).

If higher internal social capital supports generalized trust-based transactions, then transaction costs will be lower for both markets (marketing costs) and entrepreneurs (management costs). Therefore, lower transaction costs from higher internal social capital alone cannot explain differences in the number of entrepreneurs and differences in the average size of firms across countries with different levels of internal social capital. Nevertheless, the transaction costs of using the market to coordinate exchange and collaboration is not the only explanation for the existence of entrepreneurs.

1.2.-Entrepreneurship as an occupational choice.-

Another explanation for the existence of entrepreneurs is the scale economies of ability when the higher skilled direct the work of others. In Lucas' (1978) model of occupational choices, individuals differ in entrepreneurial ability and each chooses between being an employee, earning a market-determined salary, or being an entrepreneur who will hire and manage a group of people and earn a residual profit. A key assumption of the model is that the skill of the entrepreneur is part of the total factor productivity

[4] Coase defines the entrepreneur as "the person or persons who, in a competitive system, take the place of the price mechanism in the direction of resources" (Coase 1937, page 388).

parameter of the production technology, therefore determining the productivity of the whole production team. This property implies scale economies in entrepreneurial ability and the profits of the entrepreneur increase more than proportionally with ability (convex profit function). The demand of employees equals its supply at the market equilibrium solution because there is a level of ability where the market salary equals the profit of the entrepreneur with a similar level of ability. Then, those with higher (lower) ability than the benchmark will choose to be self-employed (employee).

The assumption of scale economies of ability in Lucas' model creates incentives to concentrate a more than proportional number of workers under the direction of those with greater entrepreneurial skills (Lucas, 1978; Calvo and Wellisz, 1979; Rosen, 1981; Murphy et al., 1991). However, the internal organization of firms and the delegation of decision power imply management costs that work in the opposite direction, limiting the span of control of the skilled entrepreneur and the size of the firm. Further theoretical work on hierarchical organizations shows that, since the entrepreneur's time employed in coordinating and supervising direct workers is limited, the span of control will also be limited (Calvo and Wellisz, 1979; Rosen, 1982). Moreover, the loss of control limits the number of organizational layers (Calvo and Wellisz, 1978; Williamson, 1967) and the agency costs limit the delegation of decision power to lower hierarchical levels (Holmstrom, 1979). The equilibrium number of entrepreneurs and the distribution of their respective spans of control are now the result of balancing scale economies of ability with the scale diseconomies of managing direct workers (Rosen, 1982).

In environments of high internal social capital, scale diseconomies of management will be lower because the internal organizational technology of firms will incorporate more decentralization of decision power and less direct supervision of entrepreneurs over direct workers. The costs of delegation arise from conflicts of interest between owners and managers and between managers at different hierarchical levels. In environments where the high level of internal social capital creates an ex-ante disposition to trust others, organizations will be more decentralized and entrepreneurs will save in management time and costs[5]. However, higher internal social capital, in the sense used by Adler and Kwon, will also lower the

[5] Bloom, Sadun and Van Reenen (2009) survey the theoretical models that link the degree of decentralization in organizations and the level of trust. On the one hand, they refer to papers that set a trade-off between the information advantage of the lower level agents, and the higher alignment of the firms' headquarters with the objective of profit maximization (Aghion and Tirole, 1997). For a given informational advantage, decentralization will be efficient in environments of higher congruence of objectives between general management and middle management positions. If higher trust means more congruence of interest, then decentralization will be more likely in social contexts of high trust. On the other hand, they consider repeated relationships between high and low hierarchical levels that lead to decentralization as a way to invest in reputation by the general manager (Baker, Gibbons and Murphy, 1999). Social contexts that create conditions for more stable relationships and repeated interactions among transacting agents will be more favourable for implicit and relational contracts (Putnam, 1995; Glaeser et al, 2000, 2002)

costs of market coordination. Consequently, lower management cost is not sufficient to predict changes in the relative number of entrepreneurs. The new prediction from the occupational choice models is that in economies where scale diseconomies of the management function are less pronounced, then the scale economies of entrepreneurial skills, in the equilibrium, will imply a higher average span of control for the more skilled entrepreneurs and a lower number of entrepreneurs than in economies with more pronounced scale diseconomies.

We then formulate the first hypothesis to test empirically:

H1. *a) The average span of control of an economy increases with the stock of internal social capital.*
b) The proportion of directors (employers and managers) in total employment decreases with the stock of internal social capital of the economy.

Appendix 1 contains an illustration supporting these results for a particular production function of the collaboration between entrepreneurs and employees.

1.3.- Three occupational choices: own account self employed.

The models of occupational choice do not consider the occupational alternative of those self-employed who choose to work alone, that is those who decide to be an own account self-employed, even though the number of self-employed without employees can be as large as the number of employers (Bregger, 1996; Hipple, 2004). Realistically, the total employment of an economy will include the occupational groups of salaried employees, employers, managers and own account self-employed. The existence of own account self-employed also implies that there is not a one-to-one correspondence between changes in the number of entrepreneurs and changes, of the opposite sign, in the average span of control among them.

What determines the decision of the self-employed to hire employees or not is now an open question. An own account self-employed will compare the rents obtained working alone with the rents as salaried employee, and the rents as employer, and will make a choice; in equilibrium, all individuals prefer to be where they are. According to H1, higher social capital reduces the number of employers and/or increases the number of employees in the equilibrium. Higher overall efficiency implies higher salaries and higher profits for the marginal employer. The own account self-employed will also benefit from the generalized reduction in transaction costs of the economy. However, whether the number of own-account self-employed increases or decreases in the new equilibrium with higher social capital is unclear, since the salaries of employees and the profits of employers are both higher. Moreover, since the own account self-employed do not hire employees, they do not benefit from the complementarities between scale economies of ability and organizational efficiency, in situations of higher social capital.

More general models of occupational choices with three alternatives, instead of only the two considered in existing models, will be useful to make more precise predictions about the relationship between the number of own account self employed and the level of social capital. Meanwhile, we suppose that the net

benefits of higher social capital leave unchanged the equilibrium number of self-employed as the reduction in the number of employers compensates for the higher number of employees.

H2.- *The proportion of own account self-employed is unaffected by the internal social capital of the economy.*

Appendix 1 contains an intuitive explanation of this result in the context of the model used to support H1.

1.4.- Entrepreneurs and professional managers

Market incompleteness and imperfections determine that other personal characteristics, apart from entrepreneurial ability, will affect occupational choices. Markets set the prices that help to coordinate decisions on *how much* to produce of existing goods and services, but they do not decide *what* to produce. Schumpeter reserved this role for the individual entrepreneur, defined as "the agent that does new things or does things that are already being done in a different way" (Schumpeter 1947a, page 151)[6]. If the entrepreneur who discovers a market opportunity and decides to exploit it does not have access to the external finance needed to invest in the start-up firm, then only those with sufficient personal wealth will be able to finance the investment. Moreover, if the entrepreneurial risks cannot be properly shared or diversified, then entrepreneurs with risk aversion will face a higher opportunity cost for their business venture; in this situation, the more risk-tolerant will have an advantage in becoming an entrepreneur.

Extensions of occupational models of the Lucas type allow for heterogeneity in individual wealth (Banerjee and Newman, 1993), in access to external financial resources (Blanchflower, Oswald and Stutzer, 2001; Evans and Jovanovic, 1989), and in risk tolerance (Khilstrom and Laffont, 1979; Parker, 2004), all as determinants of the equilibrium number of entrepreneurs[7]. Financial markets are more efficient and developed in social environments of higher trust (Guiso, Sapienza and Zingales, 2004). Therefore, since financial development eases the wealth constraint of those willing to be an entrepreneur,

[6] The Schumpeterian entrepreneur decides what to produce and the process of production; the Coasian entrepreneur complements the market in the direction of resources inside the firms. A closer examination of Schumpeter's writings reveals that he had a view of the functions of the entrepreneur that integrates both the entrepreneurial and managerial functions. Schumpeter (1947a) writes: "evidently it is one thing to set up a concern embodying a new idea and another thing to head the administration of a going concern, however much the two may shade off into each other" (page 151). Furthermore, in his analysis of the theoretical problems of economic growth, Schumpeter (1947b) argues that, since the creative response is the function that better defines the entrepreneur as an economic agent, one way to make creative response part of the list of factors of economic growth is through "its links with «the quality of the human material» and in particular with «the quality of leading personnel»" (page 239). In a similar vein, Coase (1937), although focusing mainly on the coordination function of the entrepreneur, also highlights the distinction between initiative or enterprise and management, in the functions performed by businessmen. For Coase, the former has to do with forecasting and making new contracts (dynamics), while the latter is a reaction to price changes (returning to static equilibrium).

[7] The economics of entrepreneurship includes other aspects of the origin of entrepreneurs and the functions they perform in the economic system, which fall outside the interests of this paper. For a more comprehensive analysis of the theory of the firm, with special attention to the role of the entrepreneur, see Spulber (2009).

it facilitates the portfolio diversification of personal wealth, and lowers the cost of capital for risk-averse investors. Then, the distribution of wealth and/or the distribution of risk tolerance in the population will be less determinant of entrepreneurial activity in social context of high internal social capital. Labour market frictions are also likely to be lower under high social capital conditions (Granovetter, 1974; Montgomery, 1991) and this will benefit entrepreneurial activity and the comparative advantage of those self-employed who hire employees.

The overall implication of this will be that higher internal social capital is expected to facilitate specialization between business owners (employers) and professional managers (employees in management positions) because financial and labour markets will be more efficient in environments of higher social capital. The level of social capital, as well as the extension of the Rule of Law, will determine the contract costs between entrepreneurs as business developers and professional managers. As in any other contract, the costs are lower in environments of higher trust and a well-established Rule of Law (less risk, perceived by the principal, of misappropriation by the agent). In general, social capital will increase the specialization between those who finance the firms and share their economic risks, and those professional managers who take top management positions in strategy and organization.

The way we formulate this hypothesis is in terms of the expected effect of social capital on the number of professional managers in top management positions, relative to the self-employed who hire employees (employers).

H3.- *The number of managers relative to the number of employers increases with the social capital of the economy.*

2.- Methodology .-

2.1.- Data sources and variables

In this section, we test hypotheses *H1* to *H3* with panel data from Spanish Autonomous Communities (AACC) in the period 1984-2005. One important advantage is that data collection was done with a homogeneous methodology and with the same definition of the variables for all the regions and over time. The dependent variables are constructed with occupation data extracted from the Economically Active Population Survey (Encuesta de Población Activa –EPA). The survey provides separate data on the number of self-employed, distinguishing between *employers* (self-employed with employees) and *own account self-employed* (self-employed with no employees); it also provides data on the number of salaried workers. EPA distinguishes, in this last group, between *managers* and the rest (*employees*)[8]. According to

[8] The Methodology report of the Spanish official Statistical Office indicates that number of employers includes all business owners ("empresarios"), independently of whether they are hired by their firms as salaried employees or not. The own account self-employed include only what the official statistics call "trabajadores independientes" (independent workers); the members of cooperatives and non-paid family workers that are considered self-employed by the occupation statistics are included in the group of employees. The EPA presents separate information on the numbers of people occupied in 18 occupation

the terms used throughout this paper, we define the variable *directors* as the sum of employers and managers.

The dependent variables for the test of *H1* are defined as follows: *Proportion of directors* (*Sd)* = Employers + managers/Total Employment, and *Span of Control (SoC)* = Employees/ Directors. The dependent variable in *H2* is *Proportion of own account self-employed* (*Soa*) = Own Account Self-employed/Total employment. Finally, the dependent variable in *H3* is *Ratio of managers over employers* (*MR*) = Managers/Employers.

The explanatory variable *Social Capital* (*SC*), for each AACC and year, is the index of social capital elaborated by the IVIE (Instituto Valenciano de Investigaciones Económicas) available at http://www.ivie.es/banco/ksocial.php. A detailed explanation of the foundations and methodology of this social capital index appears in Pérez-García et al. (2006, 2009)[9]. How to measure the stock of social capital of a country is open to debate. The most widely used measure in cross-country empirical studies is taken from the World Values Survey by counting the number of persons who respond "yes" to the question on whether most people can be trusted or not, and using this number, in relative terms, as an aggregate proxy for the level of generalized trust of the country. Other proxies of social capital include associative density (Putnam, 1995), electoral turnout, and blood donation (Guiso, Sapienza and Zingales, 2004). Critics of these measures of social capital highlight the limitations of the aggregation procedure (Glaeser et al., 2000; Sabatini, 2007) as well as the confusion between what is social capital, and what are its consequences (Sabatini 2007).

The IVIE measure of social capital adopts the interdisciplinary definition of the concept by the Social Capital Interest Group of the University of Michigan: "*social capital is the result of social relationships and consists of the expectation of benefits derived from preferential treatment between individuals or groups"*. From this definition, the sources of social capital in Perez et al (2006, 2009) are the "social interactions" that can alter the expectations of benefits, since, depending on such interactions, the mutual treatment among individuals and groups will be different (in the way predicted by repeated game theory or by cultural effects). As proposed by Glaeser et al, (2000) and Glaeser, Laibson and Sacerdote (2002), the IVIE index of social capital is elaborated under the assumption that the social interactions that matter most in the formation of expectations about future favourable behaviour are economic relations, i.e. relationships among agents who collaborate in production and exchange.

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categories, including "directores y jefes de empresas o explotaciones agrarias" (managers and heads of firms and agricultural businesses) and "directores y jefes de emmpresas no agrarias y altos funcionarios" (managers and heads of non-agricultural firms and high government officials). The number of managers, in this paper, is calculated as the sum of people occupied in these two sections.

[9] Arribas, Pérez and Tortosa-Auxina (2006) use estimates of social capital from the same methodology to study financial integration within the Euro countries, and Pastor and Tortosa-Auxina (2008) use estimates of social capital for OECD countries to explain the performance of financial systems in those countries. More recently Minguélez et al (2011) use the IVIE social capital index as explanatory variable of the returns from investing on R&D across Spanish AACC.

The important contribution of Perez et al (2006, 2009) is in identifying the observable variables used as proxies for the theoretical constructs determining the economic costs and values of the investments in social capital by individuals, and the variable used to aggregate such decisions in a community measure of capital. In this respect, they justify the use of different variables as proxies for their social capital estimation. Thus, they use bank loans over GDP as the proxy of the degree of connectivity of individual networks. They also argue that the marginal cost of investment in social capital is inversely related to the percentage of working age population with secondary education. Finally, they use the unemployment rate of the economy as the proxy variable for the depreciation rate of social capital.

The observed proportions of directors and averages of span of control can vary across AACC and over time for reasons other than the stock of social capital. Therefore, the empirical model incorporates *control variables* (*cv*) to account for these other factors. The control variables include the quality of human capital of the working population (approximated by the average number of years of education and by the average age of each occupational group), the industry specialization of the AACC, the unemployment rate, time events, and region dummies.

The human capital of self-employed, managers and employees controls for the quality of labour inputs; we assume that human capital increases with years of formal education and with the average age (experience) of each occupation group. A higher quality of labour inputs is likely to affect the productivity of employees and managers and consequently, in equilibrium, the salaries and profits of the entrepreneurs who determine the cut-off point in occupational choices will move in the same direction. For this reason, the net effect of the human capital variable on the number of employees and on the average span of control is undetermined. Delegation of decision power to direct workers requires that the workers have the skills needed to work autonomously. The education and experience of workers can create favourable conditions for decentralized organization of work and larger span of control. In any case, whether these effects occur or not is an empirical question.

The organization of work and the production technology is likely to be different in manufacturing and services and in construction or agriculture. To control for the possible effects of these differences in the observed variation in self-employment rates across AACC, we add as explanatory variables the proportion of people employed in Industry, in Construction, in Services, and in Agriculture and Forestry, in each AACC and year. The *Unemployment rate* (*Ur*) controls for motivations to become self-employed different from discovering a profitable business opportunity; for example, because of the impossibility of finding a salaried job; it also accounts for the phase of the business cycle in each region and time period. The region dummies control for unobserved specific effects of each AACC that remain time-invariant and may correlate with some of the other explanatory variables. For example, there may be permanent differences in wealth and cultural values among AACC that correlate with social capital and affect occupational decisions.

The time variables control for macroeconomic conditions common to all AACC that can vary over time. Spain joined the EMU zone in 1999 and since then the monetary and financial conditions of the economy have changed substantially. More capital available, lower interest rates, and wealth effects from higher market value of long-lived assets, will change the entrepreneurial conditions of the economy. However, the effects of these changes on the endogenous variables of our model are difficult to predict. For example, more funds available at a lower cost may contribute to higher investment and growth of existing firms, but it can also facilitate the entry of new entrepreneurs and creation of firms. The effects of the euro on the results of the estimation of empirical models are then an empirical question. For this purpose, we define the variable *Euro* that takes the value of 1 for years 1999 to 2005 and zero otherwise.

2.2.- Descriptive statistics on the dependent and explanatory variables.-

Table 1 shows the time evolution (for selected years) in the averages across regions of total employment and its components: employees, employers, managers, and own account self-employed, together with the average span of control. The table also shows the percentages of each occupational class over total employment. The absolute and relative numbers of own account self-employed are decreasing over time, while the relative number of employers and managers is increasing over time, especially since 1990. The net result has been a decrease (increase) in the proportion of self-employed (directors): from 24 (4.5%) in 1980 to 22 (4.3%) in 1990 and 14 (6.7%) in 2005. The span of control decreases in the first part of the period (from 15.6 in 1980 to 11.2 in 1995) and it increases in the last ten years (12 in 2005). In 1980, there was one manager for every four employers but the number of managers has been increasing over time at a faster rate than the number of employers so in 2005 the number of employees per manager declined to 2.6.

The first two columns of Table 2 show the descriptive statistics of the Social Capital (SC) Index variable. The variable takes the value of 1 in 1983, and year-by-year changes are referred to the base value. The SC index is particularly high in the final years of the sample, but the time evolution of the variable is not monotonically increasing (the stock of social capital decreased in the early nineties and rose again since then). The variability of the stock of social capital across Spanish regions is rather high (Pérez et al, 2006) and the regional dispersion of social capital averages changes with the economic cycle: The coefficient of variation is higher in 1995 (0.62), the end of a recession period, and lower in year 2005 (0.36), when the economy is expanding for several years.

The remaining columns in Table 2 contain the descriptive statistics of the economic specialization variables and the unemployment rates. The industrial specialization of the Spanish economy has experienced important changes over time. In 1980, one out of five occupied persons was working in Primary industries (Agriculture and Fishery) and, in year 2005, the figure is one out of seventeen. In the Service industries, the number of occupied people increased from 43.36% in 1980 to 64.56% in 2006. Self-employment ratios have been traditionally higher in the Primary industries than in other industries (especially for own account self-employed) so the time evolution of self-employment ratios shown in

Table 1 is explained, in part, by the relative decline of employment in the Primary sector[10]. Table 2 also shows the high volatility of the unemployment rate in the 25-year period, with a maximum above 20% in the mid-1990s and a minimum below 10% ten years later.

Tables 3 and 4 present descriptive information on the human capital variables, years of formal education, and age. In 1980, an occupied person had, on average, 5.72 years of formal education and in 2005 it is almost double at 11.23. The starting levels and the time evolution of the number of years of formal education are different across occupational groups. Managers have the higher educational levels during the whole period and are the group with the lower increment in this number over time. The own account self-employed is the occupational group with the lower number of years of formal education but it is also the group where this number shows the greatest increase over time. In 1980, the average years of formal education in the group of employers was higher than the same average in the total employment, but ten years later, in 1990, the average years of formal education in the group of employers is lower than the average in the other two groups. The differences have maintained similar proportions since then[11].

Employees (excluding managers) are the younger group with an age around 37, relatively stable over time (Table 4). Managers have an age of around 42 on average and this has been rather stable since 1985. The self-employed, with and without employees, are the groups with greater age on average (around 44 years)[12].

2.3.- Empirical model and hypothesis testing

This section presents the results from the estimation of the empirical models formulated to test hypotheses *H1* to *H3*.

Empirical model.-

[10] According to the Spanish Economically Active Population Survey (EPA) the number of entrepreneurs in Primary industries was 558.1 thousand in 1994 and 363.5 thousand in 2006.

[11] In 1980 educational opportunities in Spain were still very much conditioned by where individuals lived (rural or urban areas) and by their family status. This can explain that, on average, the own account self-employed, with a high concentration in the Farm and Fishery industries, had the lower number of years of formal education. The comparatively higher level of formal education of employers and managers in the first years of the period, suggests that employers and managers came mainly from urban and middle upper class families. The dynamics during the 25-year period, with important social and economic changes in Spain, give a different picture. The new cohorts of employers have had, on average, a lower number of years of formal education than the new cohorts of employees (especially in the period 1980-1990). Consequently, the average level of education of employers (and managers), relative to the education level of employees, has been decreasing over time. On the other hand, the average education level of own account self-employed relative to all other occupational groups increases over time (for example, relative to the education level of employers it goes from 0.63 in 1980 to 0.86 in 2005).

[12] The average age in occupation groups of salaried workers, managers and non-managers, shows lower values in year 1995 than in other years. The explanation is that in the early 1990s the Spanish economy went through a severe economic downturn with many jobs lost. These jobs were probably occupied by relatively older individuals who were progressively replaced by younger ones as the recovery began in 1994.

We assume that the observed values of the dependent variables are realizations of the variable in a lengthy and complex adjustment process towards equilibrium. Let *Y** be the equilibrium value of the variable and let Y_t be the current value of the variable in year *t*; where *Y* can be, respectively, the average span of control (H1a), the proportion of directors (H1b), the proportion of own account self-employed (H2) and the ratio of managers over employers (H3). We write:

$$Y_t - Y_{t-1} = \delta(Y^* - Y_{t-1}) \qquad [1]$$

where δ is a positive parameter that depends on the costs of adjustment (non-observable). The equilibrium value *Y** is assumed to be a function of the stock of Social Capital (*SC*) and of the control variables, *cv*: *Y*(SC, cv)*. Substituting in [1] and arranging the terms

$$Y_t = (1-\delta)Y_{t-1} + \delta Y^*(SC, cv) \qquad [2]$$

The $Y^*(\,)$ is assumed to be a linear function of the *SC*, the control variables (human capital, production specialization, unemployment rate, Euro, and region dummies) and a stochastic error term. The explanatory variables of years of education and age are included in the regression in logs. Since all the dependent variables are the result of occupational and specialization decisions of agents in the economy, we assume the same explanatory variables for each dependent variable. The full general empirical model is then the following:

$$\begin{aligned} Y_{it} &= \alpha_0 + \alpha_1 y_{it-1} + \alpha_2 SoC_{it} + \Sigma_j \beta_j LnYearsEdu_{jit} + \Sigma_j \varphi_j LnAge_{jit} + \\ &+ \Sigma_k \mu_k SectorEsp_{kit} + \phi Ur_{it} + \gamma Euro + \eta_i + \varepsilon_{it} \end{aligned} \qquad [3]$$

The sub-index *i* refers to AACC, *t* indicates time period, *j* is the occupation group (employees, managers, employers and own account self employed), *k* is the index of specialization (industry, services and construction; the primary sector being excluded to avoid collinear variables), η_i is a dummy variable that takes the value 1 if the observation belongs to $AACC_i$ and zero otherwise, and ε_{it} is the random error term.

3.- Empirical results

Determinants of the proportion of directors and of average span of control (H1).-

The dependent variable, the proportion of directors (*Sd)*, is truncated between zero and one. In the econometric estimation, this variable is replaced by its logistic transformation, $Ln\ (Sd_t/[1-Sd_t])$ so the transformed variable is defined from minus to plus infinity. Therefore, in the first estimation, the dependent variable in [3] is $Y_{it}= Ln\ (Sd_{it}/[1-Sd_{it}])$. The other dependent variable in *H1* is the average span of control, *SC*, which is expressed in logs to facilitate the comparison of the results with those obtained in the estimation of the proportion of directors, $Y_{it}=LnSC_{it}$.

The results of the estimation (by OLS with standard errors robust to heteroskedasticity and adjusted for 18 clusters, AACC) appear in Table 5. The empirical models have high explanatory power with R^2 values of 0.844 and 0.789. The coefficient of the lagged dependent variable is positive and statistically significant in both equations, thus confirming the time persistence of the dependent variable. The estimated coefficient of the social capital variable is negative when the dependent variable is the proportion of directors and positive when the dependent variable is the span of control, both significantly different from zero, as predicted by *H1*.

The values of the respective estimated coefficients for the social capital variable are -0.012 and 0.011, so the semi-elasticity (the dependent variable is in logs) of the proportion of directors (average span of control) to the social capital index is -1.2% (1.1%)[13]. The estimated parameters shown in Table 5 give the short-term effect on the values of the dependent variable for changes in the respective explanatory one. The long-term effects are equal to the short-term effects divided by the adjustment coefficient δ; this coefficient is equal to one minus the estimated coefficient of the lagged dependent variable. Therefore, the estimated long-term semi-elasticity values for the social capital variable are -1.2/(1-0.385) = -2.0% and -1.1/(1-0.390) = -1.8%, respectively, indicating that one unit change in the value of the social capital variable will imply a long term change in the equilibrium proportion of directors (span of control) of -2% (-1.8%). An Autonomous Community with a value of the social capital index with one standard deviation equal to 4.3 above the mean of the sample will have an equilibrium value for the proportion of directors of 8.6% (4.3 x 2%) lower than the AACC situated in the mean of the sample. In the case of span of control, the Community with the same social capital standard deviation above the sample mean will have an equilibrium value of 7.8% (4.3 x 1.8%) higher than the average span of control of the Community with a social capital value equal to the sample mean.

The estimated coefficients of the variables years of formal education of occupational groups and unemployment rate are not statistically significant in the estimations. The positive and significant coefficient of the variable occupation in the *Services* sector in the first model implies that regions with relatively higher specialization in this sector will have a higher proportion of directors at equilibrium. On the other hand, the positive and significant coefficient of the variable *Industry* in the second estimation implies that regions with higher relative Industry specialization will have higher average span of control at equilibrium. The explanation of these results may be that, in the Services sector, the production technology is less capital intensive, the production processes are less structured, and outputs are more difficult to measure, so entrepreneurs spend more time on the direction of workers. In the industry sector, production technologies are, in general, more capital intensive and entrepreneurs can substitute capital for labour, so the equilibrium average span of control will be higher.

[13] This similarity in the estimated absolute values of the coefficients of the variables social capital and proportion of directors suggests that one dependent variable moves very closely with the inverse of the other; however, this is not necessarily the case, since the own account self-employed enter into the calculation of the proportion of directors (denominator) but not in the calculation of the span of control.

The average age of employees has a positive effect on the proportion of directors, and a negative effect on the average span of control, both statistically significant. Management of younger employees appears to consume less of the entrepreneur's time than managing old ones and in regions where employees are younger the equilibrium proportion of directors (span of control) will be lower (higher) than in regions with older employees. Finally, the Euro variable has a positive and marginally statistically significant coefficient ($p<12\%$) in column 2. The value of the estimated coefficient implies that, in the Euro period, the average span of control is 4.2% higher than the value in the pre-Euro period (the average span of control for the whole sample period is 12). One possible explanation of this result is that the improved financial conditions of entrepreneurs and firms brought about by the Euro increased the equilibrium capital to labour ratio of the Spanish economy, so firms with the same output use more capital and less labour in production.

Determinants of proportion of own account self-employed and of the ratio of managers to employers (H2 and H3).-

The dependent variable, proportion of own account self-employed, is also truncated from zero to one; for this reason, in the estimation of model [3] to test H2, the variable proportion of own account self-employed is again replaced by its logistic transformation: $Y_{it}=Ln\ (Soa_{it}/(1-Soa_{it}))$.The results of the estimation appear in the first column of Table 6. The explanatory power of the model is high ($R^2 = 0.98$), as is the time persistence of the dependent variable (coefficient of the lagged dependent variable is high and statistically significant). The estimated coefficient of the social capital variable is not statistically significant, as predicted in H2.

The estimated coefficients for the control variables give negative values for the specialization variables so the proportion of own account self-employed is higher in regions with a higher proportion of individuals employed in the Primary sector (Farm and Fishery) excluded from the regression. Higher unemployment rates are associated with higher levels of own account self-employed, confirming that some self-employed may choose this occupation by necessity, not opportunity. Higher human capital of employers and managers implies lower own account self-employed ratios (the estimated coefficients of the age and education variables are negative and statistically significant). Finally, in the period when Spain has been a member of the Euro zone, the ratio of own account self-employed has been lower on average than in prior years, but the difference is only marginally statistically significant.

The pattern of econometric results, namely the high explanatory power of the model and the persistence of the dependent variable is similar when the dependent variable is the ratio Managers/Employers (second column in Table 6). The model is a test for H4. The results give a positive and significant effect of social capital on the value of the ratio of managers over employers, which is consistent with the hypothesis. Among the control variables, the only (marginally) statistically significant coefficient is the unemployment rate (*Ur*) with a positive value (*p value <12 %*). The positive effect of *Ur* in the

substitution of managers in place of employers may reflect the fact that the latter feel more pressure to professionalize the management of the firm in periods when macroeconomic conditions are less favourable, with restructuring of firms and employee lay-offs. The Euro has had no statistically significant effect at all on the relative substitution of employers by professional managers.

Explaining the AACC fixed effects.-

All the models in Tables 5 and 6 include AACC fixed effects (estimated coefficients not reported). The values of these coefficients give the permanent differences in the values of the respective dependent variable among AACC, controlling for the remaining explanatory variables. It is relevant to examine the factors that may lie behind such permanent differences. For this purpose, we explain the estimated coefficients for the 18 AACC in the four estimations with two explanatory variables (one at a time): the average productivity of the respective AACC and the average level of formal education, both in year1983, the last year before the sample period used in the estimation.

The productivity level, in logs, *Ln Prod83*, is a measure of the wealth of the region and we expect that, because of financial market imperfections, the initial level of wealth permanently conditions the future equilibrium values of self-employment ratios, the organization of firms, and the delegation of decision power. Productivity is equal to the GDP of the AACC divided by total employment in the region. The education level, *KHn*, is the average number of years of formal education of all workers in AACC in logs, *Ln KHn83*. The variable accounts for differences in the level of general skills of the working population at the start of the period, so we test whether these differences permanently condition the equilibrium values of the endogenous variables of the model.

The results appear in Table 7. The estimated coefficient of the *Ln Prod83* variable is statistically significant, of positive sign, only in the regression of fixed coefficients from the model explaining the ratio of managers over employers (last column). The coefficient of the variable *Ln KHn83* is negative and statistically significant in column one, proportion of directors, and positive and significant in column four, managers over employers. The persistence of the differences in the average spans of control and own account self-employed ratios among AACC are independent of productivity and human capital at the beginning of the period. The result of no correlation between initial productivity levels and long-term persistent differences in self-employment ratios suggests that wealth level effects do not seem to condition the long-term equilibrium from occupational choices in Spanish AACC. On the other hand, the educational levels of the working population imply permanent differences in the equilibrium number of directors (negative correlation), and in the ratio of managers over employers (positive correlation). Higher levels of human capital, and presumably higher productivity in all occupations, reduce the equilibrium long-term ratio of entrepreneurs and contribute to specialization between employers and managers.

4.- Discussion and conclusion

This paper provides supportive empirical evidence that, first, the level of social capital, as an internal asset of the economy, can be a substitute for entrepreneurs as managers; second, can contribute to more efficient management functions (higher average span of control), and, third, can facilitate the substitution of business owners by professional managers. Higher trust saves on contracting costs in transactions within and between firms. If specialization between entrepreneurs and employees were determined only for the existence of transaction costs, then differences in social capital would have no effect on the organization of production (the relative importance of markets or Coasian entrepreneurs as directors of resources). Our empirical results show that social capital matters, and that it favours firms over markets (higher span of control and fewer entrepreneurs); they also suggest that the organization of production responds to the scale economies of entrepreneurial ability that justify more skilled individuals directing the work of those who are less able. In consequence, our results yield sound arguments to affirm that organizational efficiency and entrepreneurial ability are complements in the profit function of firms. Then, this paper introduces the hitherto overlooked link between the internal organization of firms and the equilibrium number of entrepreneurs of an economy.

These results have implications for the determinants of efficient resource allocation of an economy, and for the growth in productive efficiency over time. Social contexts with higher generalized levels of trust as an internal collective asset will take more advantage of the scale economies of ability by concentrating larger amounts of resources, including employees, under the direction of more able entrepreneurs as managers. These benefits from scale economies of ability are, in addition to the social benefits of higher generalized trust itself, due to the lower transaction costs of relational contracts compared with those of explicit contracts. But the social context also affects the time entrepreneurs who hire employees spend in supervising and directing their work and therefore the productivity of the supervision function of entrepreneurs as managers. Social contexts with higher social capital that facilitate efficient decentralization of decisions and lower organizational diseconomies (in what Coase, 1937, referred to as "management costs") will contribute to higher average span of control of those who choose to be entrepreneurs in the economy, and will increase the gains from specialization between entrepreneurs and salaried employees. The gains also extend to the benefits from professionalism in the management function since, in environments of higher trust employers-business owners are more likely to delegate the management function to professional managers, thus completing the specialization between ownership and control.

The importance of the internal organization of firms as a comparative advantage may not be the same across industries and over time. Research shows that the benefits of decentralization of decision-making increase with the use of information technology (IT), and that decentralization and IT together imply high productivity gains (Brynjolfsson et al, 1994; Bresnahan, Brynjolffson and Hitt, 2002; Bloom, Sadun and van Reenen, 2009). Therefore, economies with higher social capital will be in a better position to invest and grow in activities that are relatively intensive in IT-related assets. These firms will have stronger incentives to make IT investment more productive, combining the investment with more decentralized organization designs. In countries open to foreign competition, the social context has clear implications

for the competitive position of firms and of the economy as a whole. In closed economies, all firms face the same social context and therefore this context will not be an advantage/ disadvantage for any. In economies open to external competition, the firms in the social-economic context that facilitate the adoption of more efficient and effective organizational design will have a comparative advantage, relative to those operating in economies endowed with lower social capital. The observed trend towards flatter hierarchies and larger average span of control has been associated, among other things, with increased competition (Rajan and Wulf, 2006).

This paper also documents that the average level of formal education of the working population of the economy can be a long-term determinant of permanent differences in the density of entrepreneurs-managers and in the average span of control across regions. We find that higher levels of formal education are associated with lower density of entrepreneurs, large average span of control, and more managers relative to employers. However, we find no evidence that average productivity at the start of the period conditions permanent differences in the rates of entrepreneurs and in the average span of control. Average productivity is a proxy of the personal wealth of those in each region, so the empirical evidence does not support the hypothesis that financial constraints condition the long-term equilibrium values of the endogenous variables. Since the permanent differences among regions (fixed effects) are estimated controlling for the social capital index, it may be that the level of social capital also controls for the development of financial markets in each region (Guiso, Sapienza and Zingales, 2004).

The results of the paper indicate that social capital is a substitute for entrepreneurs as those self-employed who direct the work of others and earn a residual rent (profit). At first glance, these results may appear contradictory with those of Kwon and Arenius (2010) who found that in countries with more social capital there are relatively more individuals perceiving business opportunities. However, notice that our paper explains the number of individuals who make the occupational choice of becoming an entrepreneur, in the labour market equilibrium, while Kwon and Arenius model the proportion of individuals who may discover a business opportunity; these individuals may or may not be self-employed with employees. Even if one assumes that the individuals who perceive the opportunity will be self-employed, the number is not a good proxy for the equilibrium number of self-employed in the economy, since there are dynamic effects to consider. If more individuals perceive a business opportunity and become self-employed then there will be fewer individuals working as employees so salaries will be expected to increase and the attractiveness of the opportunity will be lower relative to continued working as employee. Besides, some existing entrepreneurs may prefer to work as employees when salaries go up. Modelling the dynamics of opportunity discoveries with the filtering out of the market process, until reaching the equilibrium from occupational choices, would be an interesting topic of future research.

This paper highlights the relevance of distinguishing between those who choose to be employers and those who decide to be own account self-employed in entrepreneurship studies, where the number of entrepreneurs is set equal to the number of the self-employed. We find that each class of self-employed responds differently to the determinants of the equilibrium number of entrepreneurs in the economy, in

line with the theory predictions. Lucas (1978) type models, which explain the equilibrium number of self-employed from occupational choices, do not formally consider the occupational choice of becoming an own account self-employed, so it would be of interest to generalize Lucas' results in a setting where individuals have access to three occupational choices.

The empirical results of the paper are limited to one single country and, even though the variability in the social capital index among AACC is rather high, it will be important to replicate the results with panel data from multiple countries. This extension faces at this point the important limitation that cross-country data on the self-employed, separated into self-employed with and without employees, are not readily available and our analysis proves that the distinction is very relevant since the two types of self-employed seem to respond to different economic and social forces in different ways. The availability of cross-country data on each group of self-employed will also make it possible to evaluate the robustness of our results to proxy variables of social capital drawn from other sources, such as the World Values Survey.

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TABLE 1. Absolute ([1]) and relative data on occupation groups and average span of control: 1980-2005

Year	Total (N)	Employees		Employers		Managers		Own account self-employed		Span of Control
		No.	% on N	No.	% on N	No.	% on N	No.	% on N	
1980	11,493.5	7,996.4	69.57%	409.2	3.56%	102.0	0.89%	2,350.6	20.45%	15.65
1985	10,637.5	7,286.3	68.50%	339.3	3.19%	114.0	1.07%	2,278.4	21.42%	16.07
1990	12,519.1	9,153.7	73.12%	516.1	4.12%	142.6	1.14%	2,220.2	17.73%	13.90
1995	12,098.6	8,844.1	73.10%	586.4	4.85%	204.9	1.69%	1.902.0	15.72%	11.18
2000	15,022.7	11,777.1	78.40%	748.8	4.98%	251.5	1.67%	1,705.1	11.35%	11.77
2005	18,404.7	14,709.4	79.92%	886.4	4.82%	339.7	1.85%	1,676.7	9.11%	12.00

([1]) In thousands
SOURCE: INE (The Spanish National Statistics Institute).

TABLE-2. Mean and standard deviation of social capital, productive specialization and unemployment rates: 1980-2005

Year	Social Capital Index		% IND		% CON		% SERV		UR	
	Mean	σ	Mean	σ	Mean	σ	Mean	σ	Mean	σ
1980	---	---	26.41%	9.78	9.21%	1.52	43.36%	8.42	10.30%	3.26
1985	0,78	0.25	24.18%	10.03	7.87%	1.53	48.40%	14.70	19.95%	5.34
1990	1,80	0.48	21.98%	9.40	9.91%	2.01	55.81%	12.79	16.23%	6.81
1995	1,49	0.93	19.87%	8.72	9.70%	1.99	60.80%	11.67	21.62%	5.04
2000	4,55	2.33	19.42%	8.63	11.45%	2.53	61.61%	11.48	13.35%	5.07
2005	11,90	4.32	17.18%	6.46	12.30%	2.19	64.56%	6.82	9.36%	2.80

KEY: Social Capital Index, 1983=1. %*IND* =Percentage of those employed in Industry. %*CON* = Percentage of those employed in Construction sector. %*SERV* = Percentage of those employed in Services sector. *UR* = Unemployment Rate. σ = Standard deviation
SOURCE: Social Capital from IVIE; INE (The Spanish National Statistics Institute) and own elaboration

TABLE 3. Average number of years of formal education for each occupational group: 1980-2005

Year	All employed	Employees	Employers	Managers	Own account self employed
1980	5.72	6.09	6.27	11.57	3.96
1985	6.74	7.31	6.97	11.76	4.49
1990	7.97	8.45	7.39	12.90	5.41
1995	9.15	9.58	8.38	13.52	6.29
2000	10.30	10.53	9.27	14.10	7.66
2005	11.23	11.35	10.36	14.61	8.92

SOURCE: INE (The Spanish National Statistics Institute)

TABLE-4. Average age of each occupational group: 1980-2005

Year	All employed	Employees	Employers	Managers	Own account self employed
1980	38.8	37.3	45.6	44.3	44.5
1985	38.8	37.4	45.6	42.4	44.9
1990	37.0	35.7	44.5	39.5	43.4
1995	37.9	37.0	43.7	42.1	43.6
2000	37.5	36.8	43.2	43.2	44.0
2005	38.2	37.6	43.8	42.4	44.5

SOURCE: INE (The Spanish National Statistics Institute)

Table 5.- Determinants of the proportion Directors (employers and managers) over Total Employment and determinants of Average Span of Control (H1). Spanish AACC 1984-2005

	Dependent Variables			
	Proportion of directors (logistic transformation)		***Average Span of Control (logs)***	
	Coefficient	*S. E.*	*Coefficient*	*S. E.*
Lagged Dependent	0.385***	0.069	0.390***	0.064
Social Capital	-0.012***	0.004	0.011**	0.004
Age in Logs				
Employees	1.082*	0.526	-1.099**	0.539
Managers	0.119	0.131	-0.084	0.121
Employers	-0.184	0.298	0.304	0.188
OASE	-0.218	0.196	0.217	0.188
Years Education in Logs				
Employees	0.547	0.353	-0.570	0.367
Managers	0.104	0.111	-0.068	0.114
Employers	0.056	0.149	-0.029	0.148
OASE	-0.119	0.238	0.128	0.243
Economic Specialization[+]				
Industry	-0.016	0.413	0.911*	0.488
Services	0.946*	0.534	-0.114	0.518
Construction	-0.748	0.971	0.002	0.859
Unemployment Rate	-0.178	0.238	0.109	0.249
Euro	-0.024	0.023	0.042	0.026
AACC dummies	YES		YES	
Adjusted R^2	0.844		0.782	
Observations	390		390	

+ Omitted % Employed in Primary sector.
*** p<0.01, ** p<0.05, *p<0.10. Robust Standard Errors adjusted for 18 AACC clusters.

Table 6.- Determinants of the proportion of Own account self-employed over Employment (H 2) and determinants of Managers over Employers (H 3). Spanish AACC 1984-2006

	Dependent Variables			
	Share of own account self-employed (logistic transformation)		***Managers over employers***	
	Coefficient	*S. E.*	*Coefficient*	*S. E.*
Lagged Dependent	0.548***	0.040	0.389***	0.078
Social Capital	-0.0017	0.002	0.005**	0.002
Age in Logs				
Employees	0.023	0.233	0.204	0.187
Managers	-0.135*	0.072	-0.039	0.043
Employers	-0.455**	0.166	0.306	0.210
OASE	0.069	0.116	0.100	0.092
Years Education in Logs				
Employees	-0.237	0.228	0.048	0.152
Managers	-0.190**	0.073	-0.040	0.046
Employers	-0.078	0.099	0.064	0.066
OASE	-0.089	0.123	0.053	0.084
Economic Specialization[+]				
Industry	-1.010***	0.216	-0.207	0.306
Services	-1.183***	0.328	-0.247	0.231
Construction	-0.856	0.577	-0.713	0.505
Unemployment Rate	0.668***	0.147	0.304	0.197
Euro	-0.043	0.029	0.007	0.015
AACC dummies	YES		YES	
Adjusted R^2	0.980		0.835	
Observations	390		390	

+ Omitted % Employed in Primary sector.
*** p<0.01, ** p<0.05, *p<0.10. Robust Standard Errors adjusted for 18 AACC clusters.

Table 7.- Explaining the estimated coefficients of AACC fixed effects (18 observations) as a function of productivity and education levels of the respective eighteen AACC in 1983 (last year before the sample period of estimations in Tables 5 and 6).

Explanatory Variable	Proportion of directors	Span of control	OASE	Managers/Employers
Ln Prod 83	-0.096 (0.145)	0.062 (2.02)	-0.113 (0.136)	0.238*** (0.063)
R^2	0.00	0.00	0.00	0.454
Ln KHn 83	-0.695** (0.250)	6.720 (3.850)	-0.137 (0.289)	0.650*** (0.075)
R^2	0.30	0.11	0.00	0.820

Standard errors between brackets.
*** p<0.01, ** p<0.05, *p<0.10.

Appendix 1.- An illustration of the equilibrium number of entrepreneurs in a model of occupational choices (Lucas, 1978).

Consider an economy where the entrepreneurial ability of the working population, r, is uniformly distributed in the range [0, 1]. The total working population is set equal to one by assumption.

The level of output Q from the joint production of an entrepreneur of ability r together with A direct workers is given by

$$Q = \theta r A^{\alpha}$$

The parameter θ is a positive total factor productivity component of the production technology that measures the overall efficiency of the economy, including the relative intensity of capital used in production, the level of technological development, and the level of institutional development. The parameter α, between zero and one, captures the characteristics of the internal organization of production of firms. Higher values of this parameter are interpreted as evidence of lower organizational diseconomies and lower management costs, for example because the organization of work involves more delegation of decision power and less supervision time for the same level of effort from workers.

The key assumption in our analysis is that the parameter α will vary across economies as a function of the level of social capital/generalized level of trust of each. Economies with higher social capital will be able to implement work organization practices that produce more output for the same total factor productivity parameter, the same entrepreneurial skills, and the same number of employees, than economies with lower levels of trust. The production function captures this situation with a value of the parameter α that is increasing with the level of social capital.

If the entrepreneur can hire workers at salary w, the profit-maximizing number of employees for an entrepreneur of ability r is the solution to the problem:

$$Max_A \theta r A^{\alpha} - wA$$

The solution is $A^* = \left(\frac{\alpha \theta r}{w} \right)^{\frac{1}{1-\alpha}}$ and the maximum profit is $B^* = (1-\alpha)\theta r \left(\frac{\alpha \theta r}{w} \right)^{\frac{\alpha}{1-\alpha}}$.

An individual with ability r can earn the profit B^* if an entrepreneur, and a salary w if an employee. Therefore, there will be a level of ability r^* at which an individual will be indifferent to working as an entrepreneur or as an employee: $B^*=w(r^*)$. The equilibrium salary is then $w(r^*) = (1-\alpha)^{1-\alpha} \alpha^{\alpha} \theta r^*$.

Substituting back into the profit function, $B^* = \theta (1-\alpha)^{1-\alpha} \alpha^{\alpha} r^{*\frac{-\alpha}{1-\alpha}} r^{\frac{1}{1-\alpha}}$.

The second equilibrium condition is that demand of employees is equal to supply:

$$\int_{r^*}^{1} A(r) dr = \int_{0}^{r^*} dr$$

Where $A(r) = \left(\frac{\alpha\theta r}{w(r^*)} \right)^{\frac{1}{1-\alpha}}$. Solving for the value of r^*, $r^* = \left(\frac{\alpha}{2} \right)^{\frac{1-\alpha}{2-\alpha}}$.

Individuals with entrepreneurial ability lower than $r^* = \left(\frac{\alpha}{2} \right)^{\frac{1-\alpha}{2-\alpha}}$ will choose to work as employees and those with entrepreneurial ability higher than r^* will choose to be entrepreneurs. Since the number of all occupied persons is equal to 1 and these people are in the range of skills from 0 to 1, in the equilibrium there will be $r^* = \left(\frac{\alpha}{2} \right)^{\frac{1-\alpha}{2-\alpha}}$ employees and $1 - r^* = 1 - \left(\frac{\alpha}{2} \right)^{\frac{1-\alpha}{2-\alpha}}$ entrepreneurs. The average span of control or employees per entrepreneur is equal to $r^*/(1-r^*)$.

Notice that the equilibrium number of employees and entrepreneurs is independent of the total factor productivity parameter θ. Higher overall productive efficiency in the economy implies higher equilibrium salary and higher profits, but it leaves the number of individuals in each occupation, and the average span of control (size of the firm), unchanged. On the other hand, the number of entrepreneurs and the average span of control, in the equilibrium, decrease with the parameter of organizational design α.

Substituting the equilibrium value of r^* in the profit function, we obtain, for values of r above r^*: $B^*(r) = \theta 2^{\frac{\alpha}{2-\alpha}} (1-\alpha)^{1-\alpha} \alpha^{\frac{\alpha(1-\alpha)}{2-\alpha}} r^{\frac{1}{1-\alpha}}$. And the equilibrium salary is $w(r^*) = (1-\alpha)^{1-\alpha} \alpha^{\alpha} \theta \left(\frac{\alpha}{2} \right)^{\frac{1-\alpha}{2-\alpha}}$

The profit function is increasing and convex in ability r (since α is less than one). This is the consequence of the scale economies of ability: the contribution to the profit of the firm of entrepreneurial skills increases more than proportionally with the level of skills. Since entrepreneurs with higher skills also manage a larger number of employees from $A(r^*)$, this explains the empirical evidence where compensation of entrepreneurs-mangers increases more than proportionally with the size of the firm.

The elasticity of profit with respect to skills r is equal to $1/(1- \alpha)$, increasing with α. Therefore, the relative contribution to profits from higher entrepreneurial skills is greater in economies with internal organization of firms that function with lower organizational diseconomies. This result implies that scale economies of entrepreneurial skills and internal organization of firms with lower organizational diseconomies are complementary in the profit function of firms.

Consider the comparison of the equilibrium results between two economies with different levels of social capital and therefore different levels of generalized trust in business and employment relationships. The economy with higher social capital will have higher overall productive efficiency, θ, and thus the levels

of output, salaries, and profits will be higher than in the economy with lower social capital. If social capital enters into the model only through the parameter θ then the two economies would have the same proportion of entrepreneurs and the same average span of control. However, if social capital also affects the internal organization and functioning of firms in the way described, then the two economies will also differ in terms of organizational diseconomies, differences in values of parameter α, and with a higher value of the parameter in the economy with higher social capital. The economy with higher social capital and higher organizational efficiency will also have a higher average span of control and a lower number of entrepreneurs.

The equilibrium solutions in the two economies with different social capital and different organizational efficiency appear in Figure 1.

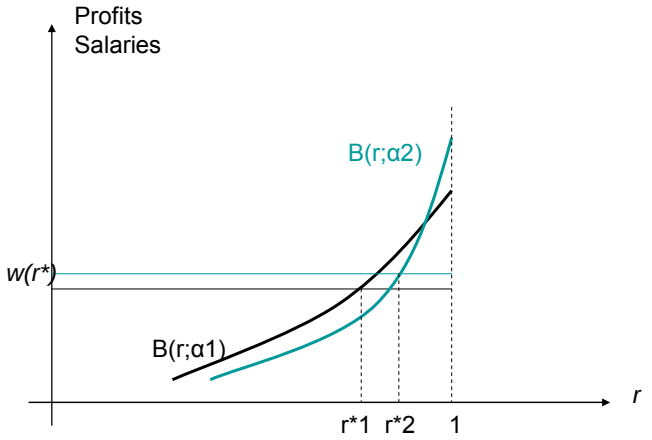

Figure 1.- Market equilibrium in a model of occupational choices with two different values of the organizational parameter, α1< α2

The equilibrium with blue lines is the one with higher value of the elasticity parameter α; the representation of the equilibrium takes into account that higher values of this parameter imply higher equilibrium salary, together with the complementarities between entrepreneurial skills and organizational efficiency.

Three occupational choices.-

In reality, individuals hold occupations as employees, employers and own account self-employed. That is, entrepreneurs (self-employed) can hire employees or work alone. The extension of the market equilibrium to economies with three occupational choices is pending, so we here present intuitive and preliminary results. Figure 2 is an extension of Figure 1 to the case where the own account self-employed obtains a rent from work that is an increasing function of the respective entrepreneurial ability, represented in Figure 2 by the dotted line. The letter **e** represents the level of entrepreneurial skills to which an

individual is indifferent between working as an employee and working as own account self-employed. The letter **E** represents the level of skills to which an entrepreneur is indifferent between hiring employees or not. Those with ability between **e** and **E** will prefer to work as own account self-employed.

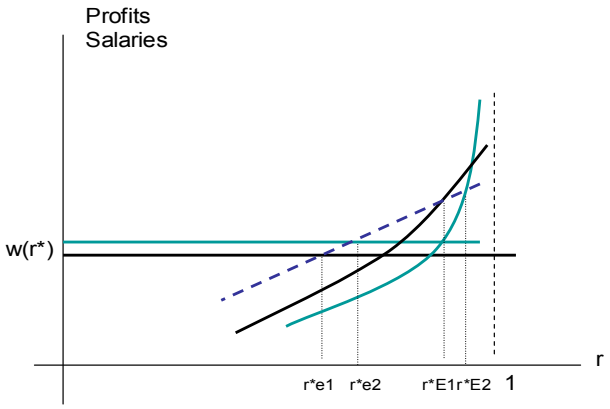

Figure 2.- Equilibrium for two levels of organizational efficiency when individuals can choose to be own account self employed.

The dotted line remains unchanged in the two situations of different social capital, since the rents of the own account self-employed do not directly depend on the organizational efficiency parameter. The higher salary in equilibrium with higher operational efficiency, green line, indicates own account self-employed. We can see that, in the equilibrium with higher organizational efficiency (lighter lines), there are those who shift from being own account self-employed to employees (r*e2 –r*e1); but also those who were employers in the situation of lower organizational efficiency shift to being own account self-employed in the high efficiency case (r*E2 –r*E1). The net effect is unclear, so in the formulation of the hypothesis we indicate that own account self-employment rates will be unrelated to the level of organizational capital.

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