

Functional dependence and productive dependence of SMEs

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Abstract This article analyzes the quality of business structure from a macroeconomic perspective in the regional context. In addition to “traditional” variables such as innovation, internationalization, or entrepreneurial collaboration, new variables have been introduced: functional dependence and productive dependence. Two different economic territories have been chosen within the Spanish economy: the province of Barcelona (high relative income per capita) and the province of Seville (low relative income per capita). We find it is possible to distinguish two types of firms: a) “product-maker” firms (mainly located in advanced areas) and b) “market-maker” firms (mainly located in less developed areas).

Keywords Entrepreneurship · Functional dependence · Productive dependence · SME · Economic growth

JEL Classifications O10 · R10 · L26

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1 Introduction

Over the last two decades, *entrepreneurship* and its relationship with economic growth have acquired growing importance for policy makers and researchers alike. In the scientific world, four topics have attracted the most attention from researchers: the relation between the number of firms and economic growth (Wennekers and Thurik 1999; Kent 1982; Dubini 1989; Storey 1994), cultural and institutional aspects that affect “entrepreneurship” and the economic growth of a region or particular context (McMillan and Woodruff 2002; Grabher 1993; Garofoli 1994; Feldman and Audretsch 1999; Wennekers and Thurik 1999; Zampetakis and Moustakis 2006), competitiveness amongst firms (Porter 1985), and innovation (Schumpeter 1934, 1959; Fagerberg 1988; Vespargen 1992; Nadiri 1993; Aghion and Howit 1992; Grosman and Helpman 1991; Acs 1992; Carree and Thurik 2003; Audretsch and Thurik 2004; Grabher 1993; Garofoli 1994). In many of these studies, firm characteristics that are relevant to the growth of economies are analyzed individually. However, there is very little research that analyzes both the firm characteristics that make up a particular productive structure and its relation to the level of economic development. This study aims to bridge this gap.

Following this first section, a set of firm characteristics are analyzed that, according to the relevant literature, are considered to be determining factors. The second section analyzes a series of firm characteristics

that, in the relevant literature, are considered to be determining factors for the quality of businesses and for the growth of an economy or a geographical area. Our aim is to show that there are significant differences between firms in economies with a different level of development. With this objective in mind, in the third section, two samples of firms are used to contrast whether there are significant differences between firms in the province of Seville, located in the south of Spain, which has a relatively low level of income, and others located in the province of Barcelona, in the north east of the Iberian peninsular, and which has a relatively high level of income in comparison with other areas of Spain. The empirical analysis allows us to take a deeper look at the behavior of hitherto unconsidered characteristics in firm typologies.

2 Business structure and economic growth

From a macroeconomic point of view, different qualitative characteristics can be underlined in the business world that affect, to a greater or lesser extent, the processes of growth and development of a national, regional, or local economy. In this sense, a series of characteristics can be discerned in the business population as a whole that come together to give us a profile of the productive system.

2.1 Innovation

Innovation is the one business activity that has been most closely related to economic growth. Schumpeter (1934), in his well-known study *The Theory of Economic Development*, likens the entrepreneur to the innovator, in that it is their task to introduce new inventions into productive activity. In his first model, (Mark I), innovations introduced by entrepreneur tip the balance in the economy and lead to a “process of creative destruction,” via which firms that do not adopt the new technologies disappear. In this model, innovation is an exogenous variable, but later on, Schumpeter believed that innovations arise from within the firm due to research activity, i.e. endogenously. This perspective is reflected in his second model (Mark II), conceived in an economic context dominated by large firms. With these contributions, Schumpeter has become one of the essential references for the Theories of Innovation and Economic Growth.

The literature on economic growth has dealt, among others, with four aspects that are of particular interest for this study. The first is that of the relation between innovation and growth, which attracted a good deal of interest following the renowned study by Solow (1957) on economic growth. Since then, for a large number of researchers, innovation is at the forefront of the analysis of economic growth (Fagerberg 1988; Vespargen 1992; Nadiri 1993; Aghion and Howit 1992; Grosman and Helpman 1991). For example, the Theory of Endogenous Growth considers the existence of continuously improving performance based precisely on innovation (Romer 1990). Equally, processes such as the diffusion or spillover of innovation and of knowledge of the economy have also become the source of enormous interest for researchers (Lucas 1988; Audretsch and Thurik 2004). From this new research on the theory of growth, innovation has come to be considered as one of the main functions of firms to bring about economic growth (Acs 1992; Carree and Thurik 2003; Audretsch and Thurik 2004; Grabher 1993; Garofoli 1994).

Another aspect that has been dealt with in numerous studies is the effect of firm size. Despite the fact that in Schumpeter's second model he conceives innovation as occurring at the heart of large firms, in recent years, increasing importance has been given to the role played by small firms in innovation processes (Acs and Audretsch 2003; Rothwell 1986, pp. 116–117).

A third area that has drawn the attention of researchers is the type of innovation carried out by firms. Varying typologies have been proposed (Freeman 1975, pp. 255–277; Tidd et al. 1997), from among which we would highlight that of Pavitt due to its relevance for this study. In his first classification, this author distinguished between innovation that is intensive in scale and is dominated by the supplier, and that of specialist suppliers with a scientific basis. Later on, the previous classification would be extended by another type of innovation described as “information intensive.”

Finally, certain research that has related the technological level of countries with their commercial specialization should be mentioned (Soete 1987; Fagerber 1988). From this perspective, authors have attempted to explain what is known as “the Leontieff paradox.” They consider explanatory factors of the commercial specialization of countries via aspects

directly related to technological change, such as education and human capital (Molero 2001, p. 12).

2.2 Level of training

The level of training of employees, owners, and managers of firms is another of the characteristics normally taken into account when analyzing the nature of businesses. From a macroeconomic perspective, the level of training for staff and executives has been directly associated with economic growth in different approaches. Schultz (1971) underlines the fact that the skills possessed by the owner in an attempt to deal with situations of imbalance and positively relate the capacity the firm can offer with the level of training. He suggests investing in education to increase what business owners can offer and achieve greater economic development. Alongside this approach, some studies have attempted to analyze the relation between training and work or professional experience with firm survival and their potential for growth. Often, the empirical analyses carried out have found a positive relation between the level of formal education of the owner and the capacity for firm survival (Storey 1994).

Other authors have linked training with innovation generation and technology transfer (Lundvall 1995; Nonaka and Takeuchi 1995; Manigart et al. 2007). From this perspective, staff training not only enables the generation of new ideas on productive activity, but also the transmission of productive knowledge (spillover). The Theory of Endogenous Growth, which assimilates the level of training with human capital (Lucas 1988; Romer 1990; Wennekens and Thurik 1999), is an example of this approach.

There is empirical evidence to suggest the existence of a positive relation between the level of training and growth of the level of income (GDP), particularly in the case of developing countries (Destinobles 2006).

2.3 Business collaboration

The changes that have occurred in markets and in production during the second half of the 20th century have led to the appearance of new organizational forms that search for efficiency in vertical disintegration and in the flexibility of firms, which has led numerous organizations to reduce their dimension by

externalizing functions. In this context, and within the framework of a high level of dynamism, a large number of SMEs have been created and grouped in spaces where it is easy to exchange information, acquire knowledge, obtain capital or manpower resources, or find cooperation mechanisms with other firms. As Lundvall (1995, p. 51) pointed out, the success of economic market systems is based on information exchange, cooperation, hierarchy, and mutual trust. Cooperation amongst firms has thus come to be considered by a sizeable number of researchers as a necessary (rational) strategy for development in the current economic context (Grabher 1993).

One of the aspects concerning cooperation that has received more attention on the part of researchers is the reasons and conditions that lead firms to establish relationships of cooperation. The following constitute some of the more salient factors: the need to exchange information or knowledge, insufficient management capabilities, insufficient financial resources to develop certain projects, a high degree of uncertainty, the chance to carry out projects that exceed the firm's capabilities, the existence of asymmetric information between moneylenders and business owners (Keasey and Watson 1995; Stiglitz and Weiss 1987; Eisenhardt and Schoonhoven 1996; Ang 1991). The need for the existence of the non-economic factor 'mutual trust' has also been regularly underlined, for collaboration to exist (Granovetter 1992; Fukuyama 1995; Eisenhardt and Schoonhoven 1996).

Collaboration among firms can occur in any number of areas, such as production, commercialization, research, training, etc. and with different actors, such as customers, suppliers, competitors, universities, research centers, etc. It can also take different forms, going from one-off agreements to joint ventures.

One area that has seen widespread collaboration agreements is that of innovation. Some authors have attributed this to the fact that technological advancements require knowledge that firms cannot always easily acquire on their own. One way of obtaining this knowledge is through information exchanges with customers, suppliers, or other firms (Lundvall 1995, p. 9). The complexity of some innovations has led some authors to point out that the impact of cooperation networks and their length of these relationships will increase in the short and medium term. However, not all researchers share this vision (see Freel and Harrison 2006, pp. 292–293).

Finally, it is worthwhile noting that there is empirical evidence on the benefits for firms that have established cooperation agreements, although this does not appear to be sufficient to evaluate the results long term (Wynarczyk and Watson 2005). Among these benefits is the success of innovations introduced whilst cooperation exists (Freel and Harrison 2006) and the positive effects for the growth of firms (Wynarczyk and Watson 2005). Either way, through the success of innovations or business growth, cooperation can be related to economic growth.

2.4 Quality and planning

Quality has had a growing importance for firms, governments, and researchers in recent years. It is possible to find numerous definitions of quality in the relevant literature that emphasize the characteristics of products that satisfy customer needs and adjust management and production processes to this end. The concept of total quality has also been defined, which refers to a method that considers the firm's activities in their entirety in an attempt to satisfy customer expectations via economic efficiency. Quality is closely related to research and development insofar as it is related to research activities aimed at finding new production methods, new management techniques, and improvement in production processes and in the products themselves. The introduction of quality processes into firms falls within the framework of a philosophy of continuous improvement, which contemplates, besides the quantitative aspects, other topics of a qualitative, social nature (Jiménez 1996, pp. 55–57). This makes sense for firms when it allows them to improve their competitive advantages and their position in the market.

Within the area of the study of management as a whole, a large body of literature has been produced on quality that covers diverse aspects such as: management strategy, the impact on firms, competitiveness, etc. On the other hand, from the macroeconomic lens, a good number of these studies liken quality to the differentiation of products. Using this approach, quality has been used to combat what some authors consider to be a fault in the Neoclassical Theory of international commerce. It has been argued that the difference in the quality of products explains the notable growth in intra-industrial business among developed countries (Cáceres 2001). As Helpman and

Krugman (1985) pointed out, whilst inter-industrial commerce can be explained from the perspective of the neoclassical theory of commerce (i.e. based on the different factorial attributes among countries), intra-industrial commerce is developed within a framework of imperfect competence, in markets with oligopolistic structures in which the differentiation of products plays an important role. Along the same lines, Greenaway et al. (1994) have distinguished between horizontal commercial flows—when products of similar quality are exchanged- and vertical ones—the exchange of similar products of different quality-. Based on this distinction, they have shown that the former occurs between countries with similar technologies and factorial attributes, while the latter is more common between countries with different factorial attributes and levels of technology. From this perspective, quality can be considered as a relevant factor for economic growth.

With regard to the written planning of business activities, some studies have associated it positively with firm survival or success (Guzmán and Santos 2001). From a macroeconomic point of view, it is likely that this aspect will have consequences for business structure as a whole, although few empirical studies exist that confirm this relation.

2.5 Internationalization of the firm

The degree of firm internationalization is another of the characteristics that is normally considered when analyzing the businesses in an economy. Several theories have attempted to explain the reasons that lead firms to internationalize, although none has yet provided a complete, widely accepted answer as to the reasons for the phenomenon of internationalization. These theories usually consider the existence of imperfect or oligopolistic competitive markets (Caves 1971), though they also introduce other elements into their analysis such as: transaction costs, in the Theory of Internalization (Williamson 1975); innovation, in the Theory of Product Life Cycle (Vernon 1966); or form an eclectic approach, advantages linked to ownership, locality, or internalization (Dunning 1995).

Less attention has been paid, however, to the role played by firm internationalization in the growth of the economy of origin. But if we bear in mind the enormous dimensions this phenomenon has reached

in recent decades, found at the root of globalization in the world economy, (Durán 2000), it is not possible to detach it from the processes in economic growth. Exports and direct investment, two of the three ways in which firms internationalize, are directly related to the formation of demand. The former, because they contribute to creating added demand and the later, because the existence of subsidiaries abroad positively contributes to increasing exports. The third means is via strategic alliances, which can be considered as part of the group of cooperation agreements, previously analyzed.

2.6 Firm size

There has traditionally been a certain consensus around the thinking that large firms made the greatest contribution to economic dynamism in its various facets—value added, innovation, employment, etc. However, since the economic slump in the 1970s, several studies have appeared that bear witness to the growing role of SMEs in the process of economic growth (Birch 1979; Storey 1988). However, despite the increasing role of SMEs assumed in different empirical research, there are certain considerations to bear in mind. Firstly, large firms still occupy a specific dominant position in international commerce, whilst in the context of national economies, they have a lead role in terms of volume of production, as well as in R + D + I activities. It is not fortuitous that the great majority of large multinational companies that dominate the world's largest economies belong to the most advanced economies such as those of the U.S., Japan, and certain European Union members.

In addition, although small and medium-sized firms do play an important and increasing role in the processes of economic growth and the generation of employment, this is due to a greater quantitative volume in comparison with large firms. In this sense, it is also necessary to distinguish between authentic SMEs and microfirms. In most cases, the generation of this type of extremely small firm is motivated by “need”—according to the terminology used by the General Entrepreneurship Monitor (GEM)—i.e. they are a means of survival or a way of earning a living, without any real aspirations for growth as a business organization in terms of employment creation, broadening assets, internationalization, innovation, etc.

Consequently, it is necessary to stress that the more economically advanced regions and countries are characterized by a businesses, not only with a high proportion of large firms, but also with a dense population of authentic SMEs—with a minimum of ten employees (European Commission 2003). On the other hand, less developed economies, whether at a national or regional level, normally show a high degree of business atomization that is reflected in the large number of microfirms.

2.7 Functional dependence

Another characteristic of businesses that is interesting from the point of view of economic growth is the degree of functional dependence of firms. This is a new concept, whose origins can be found in the Hirschman analysis (1958) in forward and backward chain reactions in productive sectors. However, functional dependence differs from this approach in that it emphasizes dependence among firms—not among productive sectors—depending on their inputs (acquisitions) and outputs (sales) according to whether they occur in local, regional, or national economies or abroad. Antecedents to this concept can also be found in the approaches of value chains (Porter 1985; Gereffi 1999), “value stream” (Womack and Jones 1996), or even in the traditional French concept of “filière” (Aujac 1960). However, unlike these analytical approaches, the aim of functional dependence is not to assess governance or dominance amongst firms.

Functional dependence falls within the framework of territorial analysis and, in this sense, economic literature has only dealt with some of the hypotheses that arise from the closer relations that SMEs usually have with customers and suppliers in the same geographical area, in comparison with large firms (Florio 1996). However, it is also possible that SMEs in less developed regions specialize in functions such as pursuing or broadening markets for introducing products made by firms in other geographical areas. From this standpoint, two types of firms can be distinguished: (A) “Market-maker” firms, located predominantly in less developed regions. (B) “Product-maker” firms located in more economically advanced areas. Of course, throughout a firm's life there may be changes in these profiles. A firm may turn from a “market-maker” condition to a “product-maker” one,

or vice-versa. Nevertheless, from a structural and macroeconomic perspective, the major concern is the statistical presence of this firm's typology within an entrepreneurial structure of a determined territory.

From an empirical point of view and parting from information segmented for each firm on purchasing and sales flows corresponding to the local, regional, national, or international market, it is possible to quantify the relation between the territorial origins of inputs and the territorial destination of outputs. Thus, a maximum value in the functional dependence of a particular firm means that all purchases are carried out in the foreign market and the all sales are made in the local market. Conversely, a minimum value of functional dependence would mean that the firm acquires all its inputs in the local market and targets all its outputs toward international exports.

The most illustrative examples of "market-maker" firms occur in certain specific services such as: car dealers, or distributors of drinks, office material or pharmaceutical products, machinery and tool suppliers, clothing franchises, food franchises, etc. However, functional dependence may exist, to a greater or lesser extent, in other sectors of activity. Such is the case of wholesalers or retailers, of car repair garages or other industrial activities, as there may be firms that are dedicated to, for example, making packaging, labels, or specific designs for introducing a particular product from a large corporation into a designated geographical market.

Logically, when functional dependence reaches a high degree in the overall business structure in comparison to other economies, the region in question shows signs of weakness that have consequences in macroeconomic terms with regard to generating value added, employment, and internal productive articulation.

2.8 Productive dependence

This is another characteristic of firms that has generally received scarce attention on the part of researchers. However, in our view it constitutes an important element for characterizing the productive structure insofar as it expresses the degree of vulnerability of firms at the same time as showing characteristics of inter-firm relations that allow for a better knowledge of the profile of businesses.

The concept of productive dependence refers to what extent the business is concentrated with respect to the number of suppliers, on the one hand, and to the number of customers on the other. A maximum value with regard to suppliers means that all the firm's inputs are concentrated in one sole supplier. On the other hand, a maximum value of productive dependence with regard to customers indicates that all sales are made to just one customer. This would be the case of a firm working exclusively for another in a subcontract agreement.

Logically, excessive productive dependence with regard to suppliers or customers is a symptom of a high level of vulnerability for the firm in question, as the majority of their outputs and inputs are subject to decisions and circumstances outside their control that, in many cases, can put even the firm's survival at risk.

Examining further than the interest of the case of individual firms, from a "macro" approach, excessive, generalized productive dependence shows a weak point in the business. It is very likely that this will mean the existence of an excessive number of firms—frequently small in size—that, either through being subcontracted or used as official distributors, franchises, concessions, etc. give priority to specific circumstances and to policies laid down by a large corporation over their own growth and even survival.

2.9 Hypotheses

Parting from a review of the quantitative and qualitative characteristics presented in the section, we will go on to formulate two hypotheses that we will attempt to contrast:

H1. Differences in the business structure of economies are associated with the relative development of the territories. This is shown in some characteristics of SMEs that are relevant to economic growth.

H2. In relatively less developed regions, the presence of firms that pursue or broaden markets for products made in other countries is greater.

3 Empirical analysis

Our research is focused on small and medium-sized firms (SMEs) due to the fact that the great majority of

businesses in the European Union fall within this category (Ribeiro 2005). In the same way, according to the US Census Bureau (2006), in 2003, 97% of all firms employed less than 500 employees.

3.1 Sample and data collection

To test the hypotheses presented above, data were collected from a questionnaire completed via a face-to-face survey designed for CEOs, business owners, or managing directors. The sample was representative of the economic sectors of the areas analyzed between March and September 2006. CEOs were selected from DIRCE 2005, which provides a list of 444,410 firms for Barcelona and 115,495 for Seville, both places in Spain. Seville, in the region of Andalusia, is one of the least developed areas, relatively speaking. On the other hand, Barcelona is in the region of Catalonia, one of the areas with the highest levels of income in Spain. From this group, we randomly contacted 1000 firms from Barcelona and 300 from Seville. We used Chambers of Commerce reports to confirm that the firms were representative of the total population with regard to data on total revenues and number of employees.

Of those firms contacted, 650 agreed to participate in the study, 515 from Barcelona and 135 from Seville. The average given by the replies from CEOs came out at: 8.32 million euros total revenue and 16 employees in 2005. To test whether the 650 respondents were representative of the population, we compared the mean total revenues and the mean number of employees of the respondents with the population. Differences were not significant (total revenues, $Z = 1.38$, $p < .12$; number of employees, $Z = 1.04$, $p < .16$).

We used the Kolmogorov–Smirnov test and Heckman selection models to assess sample representativeness. The test determines whether the distribution of a single variable is different for respondents and non-respondents. Results showed that respondents were not significantly different from non-respondents on any of the continuous variable measures with archival data, including measures of total revenue and number of employees. We used Heckman selection models to conduct a multivariate test of sample selection bias (Heckman and Borjas 1980). The selection equation in these models estimated the likelihood of responding to the survey

and included all the independent variables measured with archival data as well as variables that described survey characteristics. The hypothesized results were not significantly different from those presented in the tables, and the selection parameters were not statistically significant, further suggesting that non-response bias did not affect our results.

Although the relatively large sample of firms that we obtained provided considerable statistical power for testing our hypotheses, we used several remedial approaches to reduce informant bias and random error associated with the key informant data collection technique. For a reliability check, we randomly re-surveyed CEO in a 10 percent sampling of the initial 65 firms. Then, these firms were comparable in total revenues and number of employees to all the other firms in our sample. We used the Kolmogorov–Smirnov test to assess whether significant differences existed in the response to distributions of both replies (Siegel and Castellan 1988). We then assessed reliability by comparing responses at scale (mean differences and correlations) levels, following the suggestions of Jones et al. (1983). As expected, our analysis confirmed a reasonable level of agreement between both responses, with correlations ranging from .62 to .73 ($p < .001$), indicating no systematic bias in the direction or magnitude of the CEO responses.

Twenty randomly selected CEOs were used for a pilot study, and the data collected were not included in the subsequent analyses, though feedback was used from the pilot study to improve the content and appearance of the survey instrument (Table 1).

3.2 Methodology

To carry out the analysis the following characteristics have been considered:

- *Formal collaboration and informal collaboration with other firms*, these two characteristics reflect the existence or otherwise of collaboration agreements between firms.
- *Managerial graduate employees* show the percentage of managers that possess university qualifications.
- *Non-managerial graduate employees* indicate the percentage of non-managerial employees with university qualifications.

Table 1 Provincial and regional economic data

	GDPpc (2003) (€)	Activity rate (2006) (%)	Unemployment rate (2006) (%)	Firms/100 inhab. (2006) (%)
Seville	13,820	57.5	12.9	6.1
Barcelona	19,900	62.0	6.6	8.3
Andalusia	13,850	55.3	12.7	6.1
Catalonia	21,600	62.3	6.7	8.1

Source: Instituto Nacional de Estadística

- *R + D activities* refers to whether the firm has carried out R + D activities in the past 3 years.
- *Patent* indicates whether the firm has registered a patent within the last 3 years. This characteristic and the previous one attempt to measure the innovative activity of firms.
- *Certificate of quality* expresses whether the firm has developed actions toward improving its quality or not.
- *Written planning* reflects whether the firm annually plans its activity in writing or otherwise.
- *Exports* are a quantitative variable that indicates the percentage of sales that the firm targets outside the country of origin. Here, the aim is to assess the degree of internationalization of the firm.
- *Size* indicates the dimensions of the firm measured using the number of employees.
- *Functional dependence, productive dependence of sales, and productive dependence of purchases*; see the previous section for how to interpret these variables.

Functional dependence has been calculated based on an index (IDF) that considers the reply given by respondents to ten questions in which they had to indicate the percentage of sales and purchases that their company approximately carries out in local markets, in the rest of the province, in the rest of the region, the rest of Spain, and abroad. This index increases when purchases increase in relation to the distance from the input markets (local, provincial, regional, national, and foreign) and is reduced as sales increase in relation to the proximity of output markets. The mathematical expression is as follows:

$$IDF = \sum P_i \cdot W_i + \sum S_j \cdot W_j$$

where P_i , % of purchases in each of the five possible markets; S_j , % of sales in each of the five possible markets; W_i , weight given to sales according to their origin, using the following values:

- Local market: -2
- Rest of the provincial market: -1
- Rest of the regional market: 0
- Rest of the Spanish market: 1
- Foreign market: 2

W_j = weight given to sales according to their destination, using the following values:

- Local market: 2
- Rest of the provincial market: 1
- Rest of the regional market: 0
- Rest of the Spanish market: -1
- Foreign market: -2

Equally, productive dependence of purchases and sales has been calculated through indices. For the first calculation (IDPC), replies were analyzed from respondents to the four questions on percentage of purchases that the firm makes from its main supplier, two main suppliers, five main suppliers or ten main suppliers. The index of productive dependence (IDPV) has been calculated in a similar way by considering the percentage of sales for the same groups of customers. The resulting mathematical expressions are as follows:

$$IDPC = \sum P_i$$

$$IDPV = \sum S_j$$

where P_i , % of purchases in each of the possible markets; S_j , % of sales in each of the possible markets.

The statistical techniques used for analysis were the chi-squared test, to observe the behavior of the quantitative variables, and the ANOVA test for the variables expressed in scale. All the qualitative variables are dichotomous.

3.3 Findings

Table 2 shows the results of the Chi-squared test and the percentage of firms from Seville and Barcelona

Table 2 Chi-squared tests

Variable	% Seville	% Barcelona	Value	Sig.
Formal collaboration	22.0	18.5	1.165	0.281
Informal collaboration	13.8	14.9	0.008	0.928
R + D activities	14.5	28.0	17.730	0.000
Patent	4.3	11.2	11.352	0.001
Certificate of quality	21.0	66.0	131.824	0.000
Written planning	51.5	55.7	7.407	0.006

that possess each of the qualitative characteristics analyzed. As can be seen, there are statistically significant differences between the firms, except for collaboration agreements. There is no explanation for this last fact, although it might be related to greater functional and productive dependence of purchases shown by firms in Seville as we will see further on.

For the activities that represent innovation, that, as we have seen in the previous section, are positively associated with economic growth, the percentage of firms in Barcelona is far superior to those in Seville, related to carrying out of R + D activities or obtaining patents. A similar situation occurs with certificates of quality, which only exist in 21% of cases for firms surveyed in Andalusia as opposed to 66% of Catalan firms. On the other hand, the distance is somewhat less with regard to written planning, although it is equally important from a statistical point of view.

The analysis of the variables of scale is shown in Table 4, but we will first examine size, the information for which does not come from the survey. Table 3, shows a group of firms according to size, created with data from the DIRCE (INE). As can be seen, firm size is greater in Barcelona and Catalonia than in Seville and Andalusia, respectively. The differences are more noticeable when we look at

Table 3 Firms according to size (%)

	1–9	10–499	>499	Total
Seville	86.71	12.9	0.08	100
Barcelona	86.18	13.74	0.15	100
Andalusia	88.60	11.34	0.05	100
Catalonia	86.70	13.19	0.12	100

Source: Adapted from the DIRCE, 2007

large firms, who play a much more prominent role in the Catalan businesses, and microfirms are more commonly represented in Andalusia. These observations confirm what was pointed out in relation to firm size in the analysis made in the previous section: a relatively less developed economy shows a higher degree of business atomization, with a larger presence of microfirms.

Coming back to the information from the samples, the use of ANOVA when there are only two relevant groups, in our case Seville and Barcelona, is equivalent to using an average *t*-test. The normality of the quantitative variables that appear in Table 4 was also contrasted, as was the equality of variances. The analysis of the verification of data proved to be acceptable. Table 4 shows that, for the six characteristics, shown therein, significant differences are clearly shown between firms in Seville and Barcelona, except for managerial graduate employees, although as can be seen from the average figures, (Fig. 1), the average level of training is somewhat superior for Catalan managers. Moreover, the other variable that, along with this one, represents the level of training, non-managerial graduate employees, there are differences between firms in the two provinces, giving a level of significance of 0.01, with average values being higher in Barcelona (Fig. 1). Therefore, it can be stated that the average level of training for staff in firms in the Catalan province is significantly greater than it is for staff in firms in the province of Seville. At the same time, the export variable that we consider to be representative of the degree of firm internationalization also has higher average values in Catalan firms (Fig. 1).

As they are new concepts, we will pay more attention to examine the other three characteristics to interpret their effects on the economy. Despite the fact that, in relation to functional dependence, Seville shows higher average levels (Fig. 2), which is a reflection of the acquisition of inputs from closer markets (local, provincial, regional) in businesses in Andalusia, they carry less weight than the same markets do in the case of Barcelona. In other words, the knock-on effect of firms in Seville on the productive structure in which they work is less than in Catalan firms. This fact is important as it clearly shows that the contribution of the business structure in Barcelona to local, provincial, or regional economic growth, in the face of increases in demand for

Table 4 ANOVA

		Sum of squares	Gl	Quadratic average	<i>F</i>	Sig.
Managerial graduate employees	Inter-groups	.044	1	.044	.011	.917
	Intra-groups	2653.994	648	4.096		
	Total	2654.038	649			
Non-managerial graduate employees	Inter-groups	12.148	1	12.148	5.488	.019
	Intra-groups	1434.266	648	2.213		
	Total	1446.414	649			
% Foreign sales	Inter-groups	186.662	1	186.662	77.273	.000
	Intra-groups	1565.314	648	2.416		
	Total	1751.975	649			
Functional dependence	Inter-groups	69.162	1	69.162	47.459	.000
	Intra-groups	941.419	646	1.457		
	Total	1010.582	647			
Productive dependence purchases	Inter-groups	44.158	1	44.158	46.188	.000
	Intra-groups	619.528	648	956		
	Total	663.686	649			
Productive dependence sales	Inter-groups	8249.078	1	8249.078	2336.919	.000
	Intra-groups	2287.371	648	3.530		
	Total	10536.449	649			

goods and services, is greater than that of firms in Seville.

Productive dependence for purchases shows higher average values for firms in Seville. Interpreting these results leads us to point out that there is a greater tendency to concentrate the acquisition of inputs to a few suppliers in firms in Andalusia than in productive units in the Catalan province. However, productive dependence for sales reaches higher levels for firms in Barcelona (Fig. 2), i.e. the respondent firms in Catalonia tend to concentrate sales to a larger extent than firms in Seville. This fact might indicate that in the businesses in Barcelona, there is a greater percentage of firms aimed at the sale of intermediate products than in Seville, where the presence of firms dedicated to the commercialization of final products would be relatively larger. In this sense, this greater diversification of sales in Seville is coherent with the greater functional dependence of firms in Seville, where there is a larger proportion of the so-called “market-maker” firms.

Considering the observations made on the two previous variables, productive dependence and functional dependence together, our second original hypothesis appears to be confirmed, which states the following: in relatively less developed regions,

the presence of firms that pursue or broaden markets for products made in other countries is significantly higher. At the same time, the analysis carried out on the other variables dealt with in this section confirms the first hypothesis we formulated: there are statistically significant differences in the business structure of economies with a different level of development, which are shown in firm characteristics that are relevant for economic growth and development.

4 Conclusions and considerations for future research

In this study, we firstly established a theoretical framework on the characteristics of firms that, considered from a macroeconomic perspective, are relevant for explaining the growth of economies. In the analysis, two new concepts have been introduced for characterizing firms: functional dependence and productive dependence. Subsequently, using this theoretical framework, two hypotheses were formulated that have been empirically contrasted using two samples of firms from the provinces of Seville and Barcelona. From the empirical analysis, certain

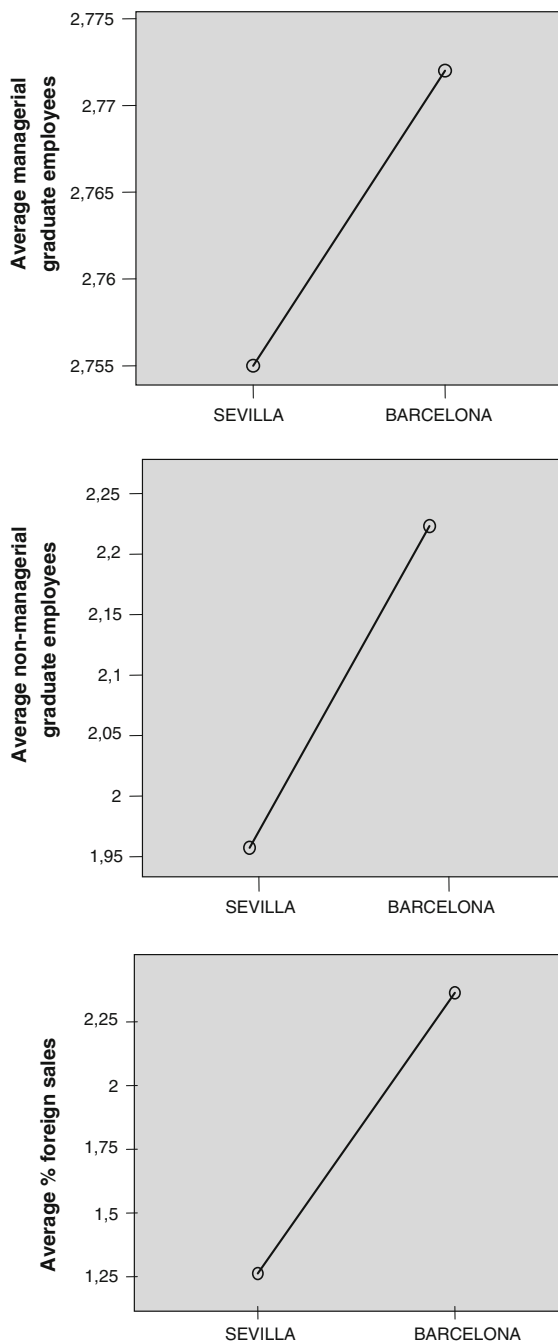


Fig. 1 Showing averages

conclusions can be drawn that we believe to be of interest.

Firstly, there are qualitative and quantitative differences between the firms located in areas with a relatively different level of development. These

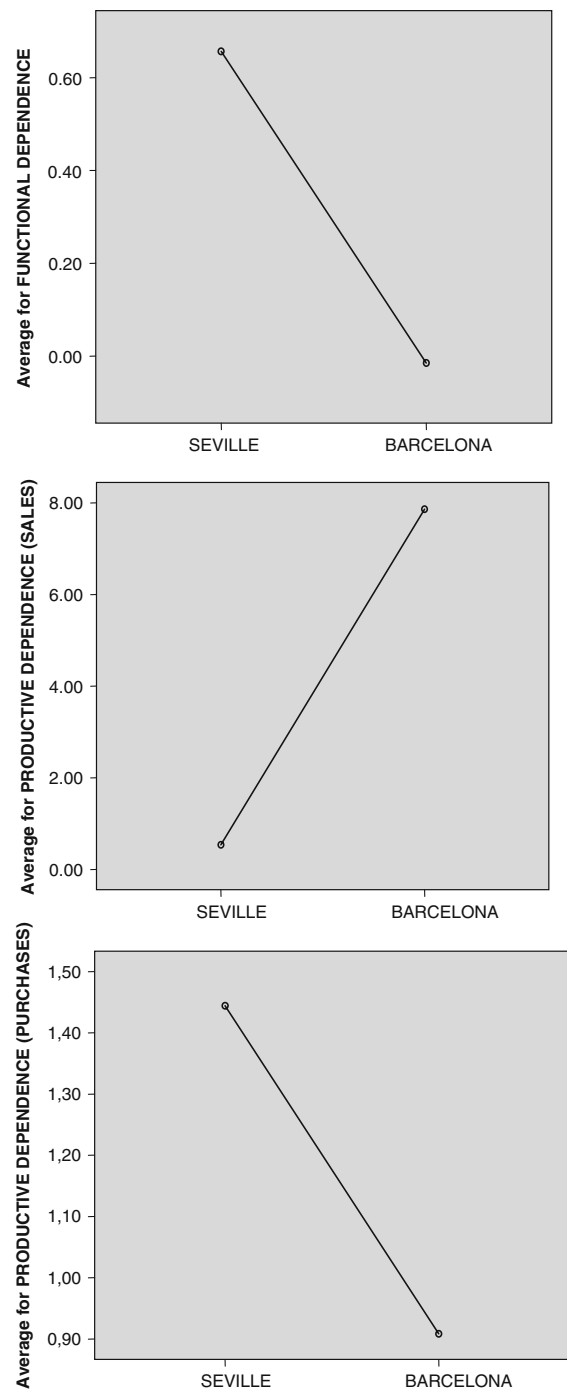


Fig. 2 Averages

differences are shown in characteristics that, considered from a macroeconomic perspective, have an effect on the growth of economies. In this study, it has been clearly shown that the following aspects can

be found among these characteristics: degree of innovation, activities to improve quality, training, written action plans, productive dependence, functional dependence, degree of firm internationalization, and firm size.

On another note, the new concepts that have been introduced into the analysis, functional dependence and productive dependence, have served to clearly show two facts: (a) firms in less developed economies show greater levels of functional dependence, which translates into less of a knock-on effect on the productive structure in the face of increases in demand; (b) in less economically developed regions, there is a significantly greater presence of firms that pursue or broaden markets for products made in other economies. In these regions, what we can call “market-maker” firms carry greater relative weight. These are firms that specialize in distribution without transformation, as opposed to “product-maker” firms, whose presence is greater in more economically advanced regions. The contribution to economic growth and employment in the different economies where these types of firm can be found must, perforce, be different.

The fact that “formal collaboration” has a greater presence in Seville than in Barcelona in relative terms may be due, precisely, to the greater relevance of “market-maker” firms, where the formal links with “product-maker” firms are much more patent. This is the case, for example, of: distribution contracts, commercial representation, or car dealers. However this is merely a coherent possibility, which would have to be confirmed with more empirical information.

Of course, economic growth depends on a number of variables of different natures such as, among others, productivity, technology, human capital, investment, or economic policy. However, within a structural economic framework, entrepreneurial tissue represents a key factor that has a great influence on the economic behavior of a specific territory. The characteristics of the firms and the relationships between them may help to explain different evolutions of economies from a development perspective as it is shown in the empirical analysis. In this sense, the main objective of this paper has been accomplished.

These conclusions lead us to make the following considerations in relation to future research. Firstly, one of the topics that have aroused the interest of researchers in *entrepreneurship* has been economic

growth. However, in this field of analysis, little attention has been paid to the typology of firms and the characteristics of the businesses as an explanatory factor in the growth of economies. The analysis contained herein clearly shows that this perspective of *entrepreneurship* can contribute to improving our knowledge of the role placed by firms in generating wealth.

Secondly, expanding on the comment above, this analysis also shows that the new concepts that have been considered; functional dependence and productive dependence, contemplate aspects of the nature of businesses that generally, have received scarce attention from researchers. As these are new concepts there is still room to add and improve on what has been said hitherto. Moreover, its definitive acceptance depends on whether future research confirms that it effectively makes sense to take these aspects into consideration when analyzing the business structure of an economy or explaining the role of firms in economic growth.

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