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MANAGERIAL PERFORMANCE DIFFERENCES BETWEEN LABOUR-OWNED AND PARTICIPATORY CAPITALIST FIRMS

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Abstract

This paper tests for differences in the managerial performance of micro and small firms, classified by capital-ownership configuration, be them labour-owned or participatory capitalist firms. Measures of managerial performance comprise indices of economic performance, profitability, financial structure, worker remuneration and solvency. Explanators of these differences include the age of the firm, its economic sector of operations, its capital-ownership configuration and an ordinal measure of strategic risk. The evidence rejects Gibrat's law of proportional effects, in favour of the life cycle hypothesis. It also leads to inconclusive short-term effects and to a non-differential role of the type of capital-ownership configuration in a firm's long-term prospects.

JEL classifications: D21, L11, L26. P13

1. Introduction

The purpose of this paper is to assess the extent to which variations in the managerial performance of labour-managed (LOF) and participatory capitalist (PCF) firms in a region are explainable by differences in their capital-ownership configuration. Jansson (1986) defines LOFs as those firms where workers with open-ended and full-time contracts own at least 50% of their capital, whereas PCFs refer to the traditional stock traded firms. Our model contains elements from several research streams, which form an integral part of the divide between LOFs and PCFs. Included here are components of bankruptcy models, growth difficulties of start-up firms, differences between participatory capitalist and cooperative firms, size differences among firms, as well as managerial growth performance models. The extant literature on differences in managerial performance between LOFs and PCFs is rather inconclusive. Whereas the theoretical literature is quite negative towards the economic survival of the LOFs, the empirical evidence finds substantial similarities in the long-term behaviour of these two types of firms, irrespective of their capital ownership configuration. Recent critical evaluations of this debate appear in Núñez and Moyano (2004), Jones (2007) and Melgarejo (2008).

The empirical evidence presented in this paper rests upon a panel data set of LOFs and PCFs from the region of Navarre, Spain. The rationale for this geographical selection rests upon the saliency of LOFs as alternate ownership form for newly created small firms in Spain and in Navarre and the latter's special circumstances as a regional incubator of new LOF enterprise formation.[1] Further, LOFs operate in Spain under their own legislation, Law 4 of March 24, 1997,[2] designed to promote their growth, which largely explains their rising importance in the economic base of the country (e.g. Millana, 2003; Sarriegui, 2008). In addition, Navarre has the legal taxing ability[3] to regulate the formation of new enterprises and a proven commitment to foster the creation of LOFs. More details on these firms and on the nature of the extant legislation appear in Melgarejo, et al (2007b) and Melgarejo (2008). As a result of such support, from 1994 to 2007 the entrepreneurial density index, the ratio of the number of enterprises per 1000 inhabitants, a measure of social business integration within a given community (e.g. Urbano, 2006), rose from 0.13 to 0.44 in Spain and from 0.48 to 0.88 in Navarre, with the largest increases occurring after the implementation of the aforementioned Law 4 of March 24, 1997. Further, as shown in Figure 1, data from Spain's National Institute of Statistics[4] indicate that Navarre's shares of workers in LOFs and of the number of LOFs themselves over the total workforce and over the total number of enterprises exceeds the equivalent shares in Spain, thereby enhancing LOFs role as a purveyor of employment. In consequence, the firms under study are relatively homogeneous, in the sense that

[1] See Resolución 654 of April 20, 2005, from the Director General of Industry and Commerce in (http://www.observatorioeconomiasocial.es/index.php?pageId=23&id_autonomia=15).

[2] See (http://.boe.es/boe/dias/1997/03/25/pdfs/A09541-09547.pdf)

[3] See (http://www.navarra.es/NR/rdonlyres/DFE1AA66-61F4-4837-BEB7-B3191F23CC22/0/VigorLeySoc090313.pdf)

[4] See (www.ine.es)

all belong to the same sectors of the economy, be them industry or services, and are small (between 10 and 49 workers and between 2 and 10 million Euros in assets and sales) or micro (under 10 workers and under 2 million Euros in assets and sales) in size, as defined by EC (2003). In fact, these types of firms are the quintessential small nascent enterprises, whose role in enhancing competition (e.g. Callejón and Segarra, 1999) is generally considered to be the engine of the economic growth of their region (e.g. Baumol, 2004). Further, the essential difference between them lies in the distinct ownership-configuration attributable to LOFs and to PCFs. Otherwise, both types of firms are subject to similar bankruptcy and growth pressures, without the normal growth fluctuations attributable to variations in the economic base and in the enterprise culture of the various autonomous communities. The end result is a relatively stable business environment, highly conducive to this type of comparative analysis. A fundamental part of the current study is to test whether the differences in ownership configuration account directly for at least part of the differences in managerial performance between PCFs and LOFs or indirectly, through the differential impact on managerial performance of age, economic sector, size and strategic risk profile.

[PLEASE INSERT FIGURE 1 ABOUT HERE]

The organization of the paper is as follows. The next section describes the basic hypotheses of the model, the variables used for testing purposes and their justification on the basis of the extant literature on the subject. Section 3 deals with the functional form of model, the data base and the key estimation issues. The analysis of the results is the topic of section 4. A Concluding Comments section completes the paper.

2. Hypotheses

This section includes the main hypothesis analyzed in the paper and summarizes the theoretical justification for its inclusion in the model. The basic hypothesis of the paper may be stated as follows

Main hypothesis (*MH*): *Growth in a firm's managerial performance is a function*

***MH1**: directly, of the firm's capital-ownership configuration; and*

***MH2**: indirectly, of the impact of its capital-ownership configuration on the firm's age, size, risk profile and set of environmental variables*

*2.1 Direct effects (**MH1**)*

MH1 assesses the extent to which differences in capital-ownership configuration between LOFs and PCFs are directly responsible for fluctuations in a firm's managerial performance. Following recent literature on the use of accounting variables (e.g. Carton and Hofer, 2006; Jarvis, et al, 2006; Melgarejo, 2008), managerial performance is reflected primarily by indicators of economic performance and profitability The Economic Performance measures form the basis for testing the hypotheses that differences in capital-ownership structure account for differences in the

accounting profits and in the cash flows required to run the firm. The Profitability indices serve to test the hypothesis that differences in capital ownership structure yields differences in the operational profitability of LOFs and PCFs. Standardizing these indicators with total assets, investment levels or total sales provide alternate specifications of controlling the size of the firm.

Three other sets of indicators may be impacted upon by the LOF/PCF dichotomy, due to the existing differences in their respective capital-ownership configuration. Whereas they are not usually considered true measures of managerial performance, the way they are impacted upon by the capital-ownership configuration may help explain the corresponding fluctuations in Profitability and/or Economic Performance. For instance, Worker remuneration indicators allow for the testing of whether the LOFs, due to their specific capital configuration, tend to distribute some of the excess profits as labour rents (e.g. Bartlett, et al. 1992). In addition, Financial Structure indices permit the testing of the hypothesis that, because of differences in capital configuration, LOFs have more difficulty than PCFs in raising financing through their own resources or through third parties (Jensen and Meckling, 1979). Finally, Solvency indicators allow for testing whether differences in the capital-ownership structure between the two types of firms impact upon their ability to meet short-term and long-term financial commitments, thus upon the perceived riskiness of the investments in their midst (e.g. Medina, et al. 2000).

*2.2 Indirect effects (**MH2**)*

MH2 allows for the testing of whether the capital-ownership configuration of a particular firm affects the manner in which three categories of factors impact upon managerial performance. This section includes an explanation of the three categories.

2.2.1 The life-cycle and Gibrat growth models

Gibrat's law of Proportionate Effect (e.g. Gibrat, 1933) presents a well-known methodological base to study the relationship between growth and the size of firms. It states that the proportional change in the size of a firm in an industry is the same for all such companies, irrespective of their original size, thereby establishing the independence between a firm's growth and its size. Recent summaries of this literature on the testing of Gibrat's law (e.g. Lotti, et al, 2003; Calvo 2006) provide plenty of examples for and against the law. Klomp, et al (2006) list some 60 empirical papers on the subject, classified on the basis of the type of data collected, the econometric specification and the nature of the main findings. A clear finding of all of these studies is the inability to conclusively support or reject Gibrat's hypothesis that the firm's growth rate is independent neither of its current size nor of its past history. It should also be pointed out that inconclusive results appear in the literature regardless of the type of data utilized, be them cross sectional, time series or panel in nature (e.g. Chu, et al, 2008).

The life-cycle growth model (e.g. Evans, 1987a, 1987b) provides an alternative explanation to Gibrat's law. De Miguel, et al (2006), Lotti (2007) and Cassia and Colombelli (2008) provide recent examples of this type of formulation. According to this hypothesis, firm growth depends

upon size and age and the empirical evidence (e.g. Klomp, et al, 2006) largely supports the proposition than small/micro firms tend to grow faster than their larger-size counterparts.

2.2.2 The environmental effects

The second set of indirect effects comprise the environmental effects, designed to position the firms in terms of the sector of the economy they operate in and whether they were created before the 1997 law went into effect. With respect to the economic sector in which each firm operates, most of the empirical tests are based on manufacturing firms, for which Gibrat's law does not generally hold, except for a few sub samples. Some authors (e.g. Audretsch, et al, 2004: Petrunia, 2008) suggest empirically that the results may be different for services, whereas others (e.g. Lotti, 2007) find scant differences. In any case, for Audretsch, et al (2004), the explanation may be theoretical in nature, by providing evidence that the lack of relationship between size and survival is a necessary and sufficient condition for the proposition that the independence between size and growth follows from the proportionality effect, dictated by Gibrat's law. Our study includes firms from both the manufacturing and from services and performs statistical tests for the differences in behaviour between firms from the two economic sectors.

Another factor impacting upon the firm's growth is the 1997 law alluded to earlier. An examination of the data indicates that the older LOFs tend to be mostly reconverted PCFs from the industrial sector, whereas LOFs created after the implementation of the law are more likely to be in the OTHERS category. Such characterization also leads to the hypothesis that post-1997 LOFs are more dynamic and higher-risk than their LOF counterparts from the earlier period. Thus, *L97* aims at testing whether this dichotomy leads to distinct growth characteristics.

2.2.3 The Strategic Risk factor

The last determinant in ***MH2*** comprises the strategic risk factor. Observe that these strategic risk measures do not deal with market risk, since LOFs are non-traded. Rather, these indexes position the firms on a specific quartile of the managerial performance indexes, following the strategic-risk work of Collins and Rueffli (1996). With respect to their nature, an in-depth look at the raw data reveals that the dependent variables for the LOFs are more likely to be located among the best or the worst performers, whereas those for the PCFs tend to be towards the middle. Further analysis of the coefficients of variation, of asymmetry and of kurtosis (results not shown here) tends to confirm this observation. For these reasons, using a variance measure may not be an appropriate measure of risk, because, as Collins and Rueffli (1996: 40) observe, "a simple variance treats loses and gains as symmetrical so that a firm with consistent gains in its returns will be considered as risky as a firm with equally consistent losses." However, if we are to correctly gauge the long term viability of a firm vis a vis its environment, we need measures which asses the firm's location relative to its environment, since the determination of such position is critical to the process of strategic management. For these reasons, we positioned the firms in the sample, on the basis of each measure of managerial performance, into their respective quartiles to produce

indices of strategic risk (e.g.; Grifell-Tatjé and Marqués-Gou, 2005) from accounting data, as in Ruano and Salas (2004), thereby linking each firm's strategic risk with its respective quartile. This approach to risk measurement fulfills the three main conditions outlined by Collins and Rueffli (1996: 10) in defining strategic performance. First, "there exists a reference set of entities", that correspond to our LOFs and PCFs. Second, "there exists a measure of performance of these entities over time", i.e. our dependent variables over the 1994-2004 time-period. Third, "in each time period, the measurement space of this performance can be partitioned into ordered categories"

3. The database, the variables and the specification of the model to be estimated

This section summarizes the nature of the database used in the analysis and discusses the dependent and independent variables, along with the functional form of the model to be estimated

3.1 The database

The data consist of accounting and financial records firms filed, during the 1994-2003 time-period, in the provincial Public Registrar's Office. The data for the PCF firms come from the SABI[5] database and for LOFs, compiled directly by the authors from the Public Registrar's Office. After dropping firms with missing information or with outliers, i.e. with data outside ± 3 standard deviations from the mean, we were left with 248, out of 368, LOFs, all small or micro firms, plus another firm of medium size that was also dropped from the base. Further, all 248 LOFs belong to either the Industrial or Services sectors. The first includes all firms with codes 10-41 of Spain's National Registry of Economic Activities[6], Services are divided into two groups, according to Spain's National Statistical Institute, based upon Eurostat's NACE VI.1 classification system. One group (heretofore CTT), with codes 50-64, comprise the older and more stable firms, belonging to the areas of Commerce, Transportation and Tourism. The second Services group (heretofore OTHERS), with codes 67-93, consists of the more recently created and more volatile firms in Communications, Services and Information Technology. In addition, to control for size and sectorial activity, we selected the 2,723 small or micro PCFs, from Industry and Services that existed in Navarre at some point between 1994 and 2003. Going through the same data pruning process as with the LOFs yielded 1308 usable PCFs. Table 1 presents a breakdown of firms of the resulting database, classified by size, ownership configuration and sectorial activity. Additional details on the generation of the database appear in Melgarejo (2008).

[PLEASE INSERT TABLE 1 ABOUT HERE]

That our database consists of only small or micro firms has some additional advantages and disadvantages. The negative side refers to the type of data available for PCFs and especially for

[5] See (http://www.bvdep.com/SABI.html)
[6] See (http://www.ine.es/inebmenu/mnu_clasifica.htm)

LOFs. The firms under consideration in the present study report simplified financial statements through voluntary compliance (e.g. Argilés and Slof, 2003) and with very loose quality control procedures for their preparation. This problem enhances the well-known difficulties users of accounting information must deal with worldwide (e.g. Maingot and Zegbal, 2006). One example of such difficulties, mentioned in the next subsection as being relevant to the current study, relates to the absence of relevant information on some important financial aspects (e.g. Argilés and Slof, 2003), such as the impossibility to distinguish liabilities that do not carry explicit interest expenses (e.g. some accrued government commitments), from those that do (e.g. bank debts). On the positive side, the advantage of the database being relatively uniform in size is the high likelihood of avoiding the sample censoring problem. This issue arises from the empirical observation that smaller firms are more likely than larger firms to disappear or fold over time. To avoid this problem, the literature has generally followed the approach used by the pioneering work of Simon and Bonini (1958) that eliminated from the sample all firms of size below a "minimum efficient scale". In the current study, we have a natural upper-size constraint, in the sense that, as shown in Table 1, all our firms are either micro or small, thereby increasing the likelihood of homogenizing the size of the data base, as well as maximizing the chances of avoiding the sample censoring problem. Nevertheless in the next section, we present statistical evidence of success in this endeavour.

3.2 The variables of the model

Table 2 lists and defines all variables used in the testing the various hypotheses embedded in ***MH***. The dependent variables all measure different aspects of a firm's managerial performance, such as the firm's economic performance (VA, VA(A), VA(S), *EBITDA*, *EBITDA (A), EBITDA(S)*, its profitability (*ROA, ROI, ROS),* financial structure *(i_o*, *INDEB*), worker remuneration (*ROL, ROLF*) and solvency, be it short-term (*LR*) or long-term (*TS, ZRISK, λRISK*) in nature. Note that i_o is an approximation intended to cover the lack of available data on liabilities with and without explicit interest costs. Further justification of their use, except with respect to *λRISK*, appears in Melgarejo, et al (2007a, 2007b). *ZRISK* and *λRISK* serve to test for differences between LOFs and PCFs with respect to dynamic aspects of long-term solvency. *ZRISK* corresponds to the "z-index" of perceived risk*,* developed by Hannan and Hanweck (1988). It measures the interaction of the income generating capacity, the potential magnitude of return shocks and the level of capital reserves available to absorb sudden shocks, as follows:

$$ZRISK = \left\{\sigma(ROA)/\left[E(ROA) + CAP\right]\right\}^2 \quad (1)$$

In (1), *E(ROA)* and *σ(ROA)* represent the expected and the standard deviation of the firm's return on assets, respectively and *CAP* measures the ratio of equity capital to total assets. Further, λRISK proxies for the solvency margin, the limit of a one-sided confidence interval at the *α*-level of significance, obtained under the assumption that the firm's return on assets is normally distributed. Such margin is quantified as (e.g. García-Marco and Robles-Fernández, 2008)

$$\lambda RISK = E(ROA) + CAP + z_{\alpha}\sigma(ROA) \quad (2)$$

where z_{α} is the standard normal variate at α.

[PLEASE INSERT TABLE 2 ABOUT HERE]

With respect to the independent variables, Table 2 lists the indicators needed to test the four type of hypothesis discussed in the previous section, as well as their measurement. *LOF* is a binary indictor to denote each firm as either labour-owned or participatory capitalist. The table also lists *AGE* as the Life-cycle/Gibrat indicator; the binary variables *(IND, CTT, OTHERS)* representing the sectoral activity of each firm; the binary indicator *L97*, characterising the pre and post 1997-law time periods; and the VYEAR binary variables, each identifying one year of operation. Finally, as defined in Table 2, the strategic risk indexes, R_{kit}, k=1, 2, 3, 4, is assigned the value of 1, if firm i's measure of a particular managerial performance belongs to the kth quartile. An in depth descriptive analysis of the database appears in Melgarejo (2008), where a comprehensive statistical analysis compares the means and the variances of each measure of managerial performance, throughout the entire 1994-2003 time period, with the data classified by capital ownership configuration and sectoral activity. Here, we restrict our analysis of the data to analyze the evolution over time of the mean estimates of the various managerial performance indicators, listed in Table 2 and of the interannual growth rates, depicted graphically in Figures 2 and 3, respectively.

[PLEASE INSERT FIGURES 2 AND 3 ABOUT HERE]

Observe how the growth rates in Figure 2 exhibit both positive and negative tendencies, without evidence of a consolidating trend. This suggests the implicit existence of an opportunity cost to growth that leads the owners of both types of firms to adopt slow growth policies, intended to avoid losing control of their respective firms. Such tendency is also corroborated by the oscillations in the corresponding interannual growth rates of Figure 3, where positive and negative fluctuations alternate leading to growth adjustments lagged approximately one year. Contrasting these results with the fluctuations in the indexes of financial structure and solvency, we observe non-decreasing solvency rate movements, in spite of the oscillations in the average cost of debt. Furthermore, an analysis of the composition of the debt side over time suggests the dominance, especially in the case of LOFs, of short-term over long-term debt, thereby leading to the conclusion that for these types of firms growth and financial leverage are largely incompatible. An interesting question for future research is to ascertain to what extent the debt composition of these firms reflects their well known difficulties in accessing capital markets or represents another manifestation of their attempt to maintain control of their firms, even at the expense of growth.

3.3 The functional form of the model for each performance measure

The preceding discussion on **MH** leads to the following functional form of the model for each measure of managerial performance, with $\ln V_t$ being the generic term used to represent each dependent variable:

$$
\begin{aligned}
&\ln V_{it} = [\beta_0 + \Delta\beta_0 LOF_i] + [\alpha_1 + \Delta\alpha_1 LOF_i] LG_{it} + [\alpha_2 + \Delta\alpha_2 LOF_i] EV_{it} + [\alpha_3 + \Delta\alpha_3 LOF_i] SR_{it} + \varepsilon_{it} \\
&\textit{where} \\
&LG_{it} = [\ln V_{it-1}, \ln Age_{it}, \ln^2 V_{it-1}, \ln^2 Age_{it}, \ln V_{it-1} Age_{it}] \\
&EV_{it} = \begin{bmatrix} LOF_i, IND_i, OTHERS_i, IND_i \ln Age_{it}, OTHERS_i \ln Age_{it}, L97_i, \\ V1996_t, V1997_t, V1999_t, V2000_t, V2001_t, V2002_t, V2003_t \end{bmatrix}' \\
&SR_{it} = [R_{1i,t-1}, R_{2i,t-1}, R_{3i,t-1}] \\
&\alpha_1 = [\beta_1, \beta_2, \beta_3, \beta_4, \beta_5]; \\
&\Delta\alpha_1 = [\Delta\beta_1, \Delta\beta_2, \Delta\beta_3, \Delta\beta_4, \Delta\beta_5] \\
&\alpha_2 = [\beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}, \beta_{15}, \beta_{16}, \beta_{17}]; \\
&\Delta\alpha_2 = [\Delta\beta_6, \Delta\beta_7, \Delta\beta_8, \beta_9, \beta_{10}, \Delta\beta_{11}, \Delta\beta_{12}, \Delta\beta_{13}, \Delta\beta_{14}, \Delta\beta_{15}, \Delta\beta_{16}, \Delta\beta_{17}] \\
&\alpha_3 = [\beta_{18}, \beta_{19}, \beta_{20}]; \\
&\Delta\alpha_3 = [\Delta\beta_{18}, \Delta\beta_{19}, \Delta\beta_{20}] \\
&e_{it} = u_i + u_{it}
\end{aligned}
\tag{3}
$$

With the model in (3), it is possible to test the claim that the firm's managerial performance, lnV_{it}, depends upon the magnitude of such variable, lagged one year, the age of the firm, the environmental variables and the strategic risk of the firm. Further, we test whether the effect of these independent variables differs by capital ownership structure. Our interpretation of the coefficients in (3) reflects the presumption that more of V_{it} implies a better chance of managerial performance. This is an appropriate assumption, as far as the nature of the dependent and independent variables is concerned, with the exception of *ZRISK* and *λRISK*, since, in this case, their magnitudes are inversely related to managerial performance. Unless otherwise specifically stated, we base our discussion of the model on the positive relationship. Further, the inclusion of the square terms in the variable vector LG_{it} in (3) follows the empirical evidence that the relationship with respect to these two variables and their dependent counterpart is highly non-linear and negative. In fact, Evans (1987a, 1987b) finds that, for small firms, there is evidence of a log linear relationship between growth and age and size. Following this work, the second-order approximation of this non-linear form appears in the model described in this paper.

Another observation on the measures of managerial performance refers to their computation. Except for *LR* and *TS* for LOFS and *ZRISK* and *λRISK* for both LOFS and PCFs, all variables exhibit non-positive values in a few observations. Obviously, in these cases, it is not possible to compute the corresponding logarithm. When faced with a non-positive value, we perform the min/max normalization of the variable in question, as done with the generation of the deprivation indices, used for the computation of the Human Development Index (http://hdr.undp.org) and with the min-max normalization of the component indicators of the European Innovation Scoreboard

(e.g. Nardo, et al, 2005). Such re-scaling procedure is performed for all the observations, by subtracting each observation from MINV, a value slightly below its minimum observed value and dividing it by the difference between the maximum observed values and MINV. Its use is justified on the grounds that such normalization represents a linear transformation and hence, it does not impact upon the estimation results.

With (3), it is also possible to test the impact of a firm's capital-ownership configuration on each performance measure. To that effect, divide the beta coefficients of (3) in two groups. The first includes the coefficients β_j, j=1,…,20, which measure the effect of the respective independent variable on a particular performance index for PCFs. The second set, $\Delta\beta_j$, j=1,20, represents the differential effect of each independent variable on the appropriate performance index. These differential values, added to its corresponding β_j, j=1,…,20, provide the counterpart effect on the LOFs. Hence, the normal statistical test for the null hypothesis that a particular $\Delta\beta_j=0$, j=1,20, is the vehicle to test for the differential effect, by capital ownership structure, of each independent variable on each performance measure. For example, the strategic risk effect for PCFs is measured by β_{18}, β_{19} and β_{20} and, for the respective quartiles and by ($\beta_{18}+\Delta\beta_{18}$), ($\beta_{19}+\Delta\beta_{19}$) and ($\beta_{20}+\Delta\beta_{20}$), for their LOF counterparts. Consequently, $\Delta\beta_{18}$, $\Delta\beta_{19}$ and $\Delta\beta_{20}$ reflect whether or not the relative effect of the risk quartiles differs in accordance to the firm's capital ownership structure. Observe that R_{4t} is eliminated from each regression to avoid perfect multicollinearity of the four strategic risk variables with the constant term.

4. The empirical evidence

The selection of the estimation procedure requires taking into consideration the nature of the data base, i.e. an unbalanced panel with a very wide cross-sectional base of firms across a few years, with potential heterogeneity across time and across different groups of firms by economic sector and by capital-ownership configuration and with the lagged dependent variable included in the regressors' matrix. This suggests consideration of a dynamic panel data model with lagged-dependent variables, as explanators (e.g. Greene, 2008). The estimation is in first differences in order to eliminate individual random effects, *i.e.* the u_is of (3). We use the Generalized Method of Moments (GMM) estimator of Arellano and Bond (1991), as provided by the xtabond2 routine of STATA10. However, it should be observed that the model in (3) also has three cross-sectional variables, namely LOF_i, IND_i and $OTHERS_i$ that vary across firms, but are not dynamic, since they are constant for each firm across the years. Hence, the estimation in first differences cancels out the effect of these three variables and of the constant term. To avoid such problem we present the standard data panel results, together with Arellano-Bond estimates in Tables 3 and 4, respectively. We divide the discussion on the estimation and interpretation of the parameters listed in Tables 3 and 4, into four parts. The first includes some general observations common to all models. Then, we evaluate the nature of the estimated coefficients in three parts, related to the growth elements (*LG*), the environmental components (EV) and the strategic risk factors (SR), respectively.

[PLEASE INSERT TABLES 3 AND 4 ABOUT HERE]

4.1 General observations

To summarize the extensive amount of output produced by STATA, the following conventions have been used. First, statistical significance for all tests has been set at a p-value not exceeding 0.10. Further, to ease the readability of the results, we have excluded from the upper part of Tables 3 and 4 all coefficient estimates with a p-value exceeding 0.10 and have included next to the remaining coefficient estimates one, two or three asterisks, denoting statistical significance at the 10%, 5% and 1% levels, respectively. Second, in addition to the corresponding static coefficient estimates, Table 3 summarizes the results of a series of statistical tests to be evaluated in this section. For example, we tested the panel data model for random and fixed effects and used the Hausman (1978) test to decide model selection (e.g. Greene, 2008). The p-values that appear in the "Haussman" row of Table 3 are all below the 0.01 range, thereby clearly indicating a preference for the Fixed-effects model over its Random-effects counterpart, for all measures of managerial performance. Further, we tested for heteroskedasticity, i.e. for the existence of size-dependent error terms throughout the observations. The outcome of the White's test (e.g. Calvo, 2006; Evans, 1987b) rejects the hypothesis of heteroskedasticity in all cases. Also, to ensure that the resulting size distribution is homogenous enough to avoid the sample censoring problem, we have also used the inverse Mill´s ratio approach of Heckman (1979), as was recently done by Calvo (2006), and are able to statistically conclude that the hypothesis of the existence of a sample censoring problem can be rejected.

Third, the fixed-effects models of Table 3 also exhibit a very high explanatory power. In fact, the Adjusted-R^2 row indicates that most R^2s (11 out of 17) are in their 0.80s; some (5), in their 0.90s; and only one, in the high 0.70s. This evidence clearly attests to the appropriateness of using these models to explain the variation in the various measures of managerial performance. Fourth, a characteristic or working with an unbalanced panel is that the resulting data base may vary in size along with each measure of managerial performance. The last row of Tables 3 and 4 contains the number of observations used for each model. From analysis not shown in the tables, we note the homogeneity, in terms of size and capital ownership configuration, of the resulting samples of firms across the models. Fifth, it should be observed that the high R^2s of Table 3 are the more remarkable, because many of the estimated variable coefficients are dynamic in nature and Table 3's estimates are still static. Consequently, only the static coefficients, i.e. β_j and $\Delta\beta_j$, j=0,6,7, are analyzed on the basis of Table 3, whereas the examination of all the others rely on the estimates of Table 4, where the Arellano-Bond coefficients are already purged of the time effect.

4.2 Main hypothesis

We test **MH** in two steps. First, we perform an overall Chow test that permits us to determine whether the difference in the capital-ownership configurations between LOFs and PCFs impact significantly upon the managerial performance of the respective firms. This procedure is equivalent

to testing the null hypothesis that all $\Delta\beta_j$s , j=0,20 (j=1,20) for the static (dynamic) version in Table 3 (4), are equal to zero, as against the alternative that at least one $\Delta\beta_j \neq 0$. The p-value of the test for each individual regression appears on the "Chow Test – LOF effect" line in the lower part of Tables 3 and 4. The results plainly reject the null hypothesis for all but the Profitability and the ZRISK equations, thereby concluding that that the differential effect by capital-ownership configuration is unambiguously present, in all but four of the equations. A testable explanation for the lack of significance in the Profitability equations may be the small size of the firms in the database, a characteristic that normally leads to small variations in the profit structure, regardless of the capital-ownership configuration of the firms in question. With respect to ZRISK, lack of statistical significance may provide additional evidence against the traditional economic proposition, obtained through the use of short-term risk indicators, that LOFs tend to exhibit higher risk than their PCF counterparts

An immediate consequence of these Chow tests is to provide backing for the elimination of any further analysis of all $\Delta\beta_j$s for these four equations. In the next three subsections, we evaluate the individual coefficients for the remaining indicators of managerial performance. Nevertheless, one particular coefficient worth mentioning is $\Delta\beta_0$, needed to test for **MH1**. The evidence indicates rejection, in all but five cases, of the null hypothesis that a firm's managerial performance is a function of its capital ownership configuration. Further, of the five cases, only one (in the VA equation) results in a negative effect on managerial performance.

4.3 Growth results

Acceptance of Gibrat's law implies the statistical acceptance of β_1=1, as well as the statistical non-significance of the other coefficients related to *Age* and V_{it-1}. Further, a statistically significant and positive (negative) β_2 indicates that older (younger) firms tend to exhibit a higher levels of managerial performance. Consider the estimated values of the size and Age coefficients, β_i, i=1,5 for PCFs and of (β_1+$\Delta\beta_1$) to (β_5+$\Delta\beta_5$) for LOFs. The results clearly suggest that Gibrat's law does not hold for either type of firm, LOFs or PCFs, using any of the performance measures examined in this paper as dependent variables. Such result conforms to previous evidence related to Spanish manufacturing firms of any size (e.g. Arauzo-Carod and Segarra-Blasco, 2005). Further, in all cases, the evidence indicates that smaller firms grow faster than older ones throughout the period under consideration, for all firms, regardless of their capital-ownership configuration. In addition, evidence of the parabolic nature of the growth model appears through the rejection of the β_3=0 null hypothesis for over half of the managerial measures of performance exhibited in the table.

On the question of whether the age of the firms affects its performance and of whether some of this difference can be attributable to the firm's capital-ownership structure, the evidence suggests that the second-order approximation does not apply to the firms under study in this paper, regardless of their capital-ownership configuration, as β_4, and $\Delta\beta_4$ are statistically insignificant in most cases. On the question of the type of the potential joint interaction between

age and growth (β_5, $\Delta\beta_5$),, the evidence is quite clear and rather overwhelming against Gibrat's law. Further, older firms with higher growth realizations (i.e. β_5>0) are the norm, when statistically significant, with a LOF effect practically nonexistent.

4.4 Results on the environmental variables

The coefficients β_j and $\Delta\beta_j$, j=6-9 deal with the impact of Age and of the type of economic sector on each firm's performance, be it PCF or LOF, respectively, with CTT as the benchmark sector against which we compare the impact of *IND* and of *OTHERS*. The p-values associated with β_6 and $\Delta\beta_6$, in Table 3 all but two exceed 0.1, indicating that there is scant difference in performance between the CTT and the IND economic sectors. The opposite appears to be the case with β_7, for which the evidence clearly indicates that *IND* firms exhibit better performance than their *CTT* counterparts, especially with respect to the main indicators, i.e. those of economic performance and profitability. In most of the other cases, the statistical tests yield p-values over 0.1, thereby leading to the conclusion of statistically insignificant performance differences between the two economic sectors. When Age enters the picture, along with the economic sector and subsequently the capital ownership structure, Table 4 depicts numerically no statistical significance, with a few scattered exceptions, where older firms tend to exhibit lower performance than their newer counterparts.

In addition, the 1997 law, as depicted by β_{10}, has had a strong and mostly negative influence on managerial performance. In addition, to judge by the lack of statistical significance of $\Delta\beta_{10}$ in most regressions, the evidence also indicates scant advantage to either type of firm over the other as a result of the implementation of the law, even if the implementation of the said law appears to have had a detrimental effect on LOFs. Finally, observe that the absence of the *L97* and *LOF L97* estimates for *ZRISK* and *λRISK* is due to the fact that the four years used to derive these dependent variables prevents us from computing the values for the years 1994-1997, also the years for which *L97*=0. With respect to the time coefficients, the p-values of two Chow tests appear at the bottom of Table 4. The p-values of the first test (row "Time Variables β_{14}-β_{20}" of Table 4) suggests rejection of the hypothesis that all $\beta_{j,}=0,$ j=14,20. Further examination of the individual coefficients indicates that, when significant, there is evidence of improvement in managerial performance over time for PCFs. The second Chow test (row "Time Variables $\Delta\beta_{14}$-$\Delta\beta_{20}$" of Table 4) indicates at least no improvement for LOFs and even a decrease in performance when a particular coefficient is statistically significant.

4.5 Strategic risk factors results

The coefficients associated with the quartiles, β_{11}, β_{12} *and* β_{13} in (3), represent the differential effect, in performance of a firm in the first, second or third quartile, respectively, relative to the performance level of a firm in the fourth quartile, used as the reference group. The coefficient estimates are all negative and have p-values under 0.001 for all performance measures included in

Table 4. Hence, the behaviour of the strategic risk coefficients underlies a strong and statistically significant negative influence of a firm's risk category and its survival probability. Their values, relative to the most likely to survive benchmark group 4, also conforms to expectations. The estimates of β_{11} (β_{13}), corresponding to the highest (lowest) risk category, R_1 (R_3) are the most (least) negative, thereby yielding the highest (lowest) likelihood of an eventual demise. Nevertheless, the evidence is mixed when assessing, through the estimates of β_{32}, β_{33} and β_{34}, whether the effect of riskiness on survival differs according to the firm's capital ownership structure. In most cases, the values of these coefficients are negative and statistically significant, with p-values under 0.05. Hence, the impact of strategic risk on the behaviour of these indicators is in general more pronounced and more negative on LOFs than of PCFs.

5. Some Concluding Comments

Regardless of the modern trends towards globalization and of the generally adverse consequences predicted by the traditional economic models, LOFs continue to be an important mode of ownership selected by many new small entrepreneurs throughout the world. And yet, there is a dearth of studies dealing with their managerial performance, especially as compared to those existing for PCFs (e.g. Ghobadian and O'Regan, 2006). Such research scarcity is largely due to reporting problems associated with small and micro firms, especially if LOFs. This paper has attempted to breach this gap, by studying the case of Navarre, a region with a strong tradition of LOFs, for which we have the entire set of LOF financial reports in the hands of the Public Registry office, for the period under consideration.

The results obtained in this study have some important implications. First, the evidence clearly contradicts the traditional theory and finds that LOFs are not necessarily worse managerial performers than the PCFs and that they seem to be more successful than their PCF counterparts in some of the traditional financial indexes of profitability and solvency. A testable proposition for this change is that the size differences that have characterized the LOFs and PCFs used in past studies may have led researches to inadvertently attribute to differences in capital ownership structure, what should perhaps have been attributable to the differences in firm size. The homogeneity in the size of the firms used in this study may have eliminated the size effect from the analysis. Second, the lack of statistical significance of the LOF Effect, with respect to *ZRISK,* provides overwhelming evidence that the type of capital ownership configuration plays a scant role in explaining fluctuations in a firm's long-term survival prospects. The implication of these results is clear. Whereas most of the short-term indicators paint a rather dim picture of the probability of survival of the LOFs, the evidence of the dynamic long-term indicators of performance assigns similar survival changes in the long run to both types of firms, independently of the capital ownership structure. Hence, such result brings into question the common practice of judging the likelihood of survival through the use of short-term performance measures. It also enhances the need for further research in the development of additional long-term dynamic performance

indicators that provide a more accurate portrayal of a firm's long-term prospects. These results also fall in line with the hypothesis of Núñez-Nickel and Moyano-Fuentes (2004), alluded to earlier, of considering cooperative ownership as an environmental and competitive buffer against alternate organizational forms, such as the PCFs. Third, Gibrat´s law does not appear to apply to LOFs any more than it helps in explaining fluctuations in the performance of the PCFs. Rather, past performance and strategic risks appear to be the most significant factors.

Fourth, that Gibrat's law does not hold for LOFs should not be surprising, given their size and their specific capital-ownership configuration. On the one hand, as stated earlier, all LOFs in Navarre are small or micro. As such, their specific objective is not necessarily related to growth or profit maximization. Rather, survival and maintaining control of the firm have higher priority and neither of these goals necessarily leads to growth, as the evidence presented here amply demonstrates. This also explains to a large extent why small and micro firms are dropped from the samples used in most post-Simon-and-Bonini-(1958) studies on size distribution of firms. On the other hand, given their particular capital-ownership configuration, LOFs, as compared to PCFs, suffer from additional hindrances to growth. The first one is their difficulty in obtaining long-term financing from the capital markets, even though the evidence of this paper implies that both types of firms exhibit similar difficulties. The second is their tendency to favour labour over capital in their distribution of benefits. Neither of these factors is particularly conducive to growth. Fifth, the profitability measures augment once again the importance of dynamic performance measures. It is clear from the results that neither *ROS,* measured by two static indicators that carry scant information about future prospects, nor *ROI,* a profitability index that does not account adequately for the remuneration of the worker/owners of the LOFs, can discriminate between capital configuration structures. Further, *ROA* appears to be the only profitability index to detect the statistically significant impact of the three strategic risk measures.

Sixth and turning to the secondary measures of managerial performance, the evidence on Financial Structure assigns a lesser presence to the LOFs in the higher-risk-indicators categories and in terms of the average cost of debt. This not only leads to the rejection of the Gibrat effect of equally proportional growth prospects for all firms; it also opens up the possibility of different growth rates among the various firms. The evidence indicates that LOFs, smaller in size, but of more recent creation and with lower average costs of debt, do not seem to experience any worse access to financing opportunities than the PCFs. Seventh, the inclusion of strategic risk in situations where there does not exist a generally acceptable measure of a firm's market value accentuates the problem of computing reliable strategic risk measures. The strategic-risk measure of this paper has allowed us to pinpoint the location of each firm across the ordinal risk scale. LOFs appear to belong to the extreme risk categories (R_1 and R_4), whereas PCFs are more likely to fall in the meddle range, (R_2 and R_3). As seen in this paper, such locations have yielded important implications when assessing their impact on managerial performance.

Eighth, with respect to the Worker Remuneration indicators, remuneration does not seem to be related to age nor does the Gibrat's effect appear to play any type of role. A testable explanation of this phenomenon is that higher levels of remuneration appear to be attributable to firms created under the research and development umbrella of the Law 4 of March 24, 1997. Ninth, the evidence on Solvency indicates an alternate explanation to the Gibrat's effect. The least solvent firms appear to be of recent creation, irrespective of the economic sector in which they operate. Tenth, another significant implication of the current study is to highlight the importance of using performance indexes appropriate to the special characteristics of firms with both modes of capital ownership structure. These measures should take into account that the differences in the capital ownership structure convey changes in the systems of remunerating capital and labour. Such changes, in turn, impact upon the generation of financial statements of the LOFs vis á vis those of the PCFs and on the selection of financial ratios for the evaluation of their performance.

Lastly, another crucial inference of this paper relates to suggestions as to the appropriate indexes to use in the evaluation of LOFs which may help users in Navarre and elsewhere to evaluating the managerial performance potential of a LOF. *ROA* may be the adequate index to measure the profitability of operations, especially in the industrial sector, with its normally higher asset base. *EBITDA(A)* is also appropriate, since it includes the cash flow effect and accounts properly for the remuneration of labour in a LOF. ROI may be discarded, because it does not account adequately for the remuneration of labour and so should *EBITDA(S)*, as too volatile. Also, to measure short-term solvency, *LR* is acceptable, whereas log-term solvency requires the dynamic characteristics of *ZRISK* or *λRISK*, over the more static *TS.* In summary, an adroit selection of indexes of measurement on the behaviour of LOFs is necessary will go a long way to provide a fair comparison of the managerial performance of small and micro new firms with different capital ownership structures.

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Table 1: Number of firms in the database by size, ownership configuration and sectoral activity

Number of Enterprises		Micro	Small	Total
LOF	Industrial	87	10	97
	Services-CTT	91	3	94
	Services-OTHERS	57	0	57
	Total	235	13	248
PCF	Industrial	341	200	541
	Services-CTT	497	130	627
	Services-OTHERS	104	36	140
	Total	942	366	1.308
Total		1.177	379	1.556

Table 2: Definition of the dependent and independent variables

DEPENDENT VARIABLES

Economic Performance

VA	Value added = Profits before interest and taxes plus amortization and labour costs
VA(A)	Value Added/Total Assets
VA(S)	Value Added/Total Sales
EBITDA	Earnings before interest, taxes, depreciation and amortization
EBITDA(A)	EBITDA/Total Assets
EBITDA(S)	EBITDA/Total Sales

Profitability

ROA	Return on Assets = (Profits before interest and taxes)/Total Assets=i_aROI+i_oINDEB
ROI	Return on Investment = (Profits before interest expenses and taxes plus interest income)/Total Equity
ROS	Return on Sales =(Profits before interest and taxes)/Total Sales

Financial Structure

i_o	Average Cost of Debt = Interest expenses/ Total Liabilities
INDEB	Indebtedness = Total Liabilities /Total Assets

Worker Remuneration

ROL	= personnel expenditures/profits before taxes
ROLF	= personnel expenditures/(profits before interest and taxes)

Short-term Solvency

LR	Liquidity Ratio = Short-term Assets/Short-term Liabilities

Long-term Solvency

TS	Total solvency=Total Assets/Total Liabilities
ZRISK	Index of perceived risk, defined in (1)
λRISK	Index of solvency margin, defined in (2)

INDEPENDENT VARIABLES

Capital-Ownership configuration: CO

LOF	=1, if labour managed firm; 0, otherwise

Life-cycle/Gibrat growth: LG

Age	= number of years in operation

Environmental variables: EV

IND	=1, the firm belongs to the industrial sector; 0, otherwise
CTT	=1, if the firm belongs to Commerce, Transportation or Tourism; 0, otherwise
OTHERS	=1, if the firm belongs to Information Technologies, Communications or Services to Enterprises; 0, otherwise
VYEAR	=1, if YEAR=1995,…,2003; 0, otherwise
L97	=V1998+V1999+V2000+V2001+V2002+V2003=1, if the firm was formed after 1997; 0, otherwise

Strategic Risk factors: SR

R_{1t}	=1, if the firm belongs to the first quartile of a given dependent variable; 0, otherwise
R_{2t}	=1, if the firm belongs to the second quartile of a given dependent variable; 0, otherwise
R_{3t}	=1, if the firm belongs to the third quartile of a given dependent variable; 0, otherwise
R_{4t}	=1, if the firm belongs to the fourth quartile of a given dependent variable; 0, otherwise

Table 3: Regression results – Fixed Effects model

Coef.	Independent Variables	Economic Performance						Profitability		
		VA	VA(A)	VA(S)	EBITDA	EBITDA (A)	EBITDA (S)	ROA	ROI	ROS
β_0	β_0	5,29 ***	0,09 ***	-0,52 ***	5,35 ***	-1,09 ***	-1,26 ***	-1,16 ***	-0,19 ***	-1,09 ***
β_1	ln $V_{i\,t-1}$	-0,02 ***	0,25 ***	0,29 ***			0,07 ***	-0,08 ***	0,05 ***	
β_2	ln Age_{it}	-0,31 ***	-0,11 ***	0,11 ***	-0,22 ***	-0,05 **			-0,07 **	
β_3	(ln $V_{i\,t-1}$)^2	0,04 ***	0,01 ***	0,01 ***	0,02 ***	-0,01 ***	0,00 ***	-0,02 ***		
β_4	(ln Age_{it})^2	0,05 ***	0,03 ***	-0,01 **		0,01 **		0,01 *	0,02 ***	
β_5	ln $V_{i\,t-1}$*ln Age_{it}	0,01 **	0,04 ***	0,04 ***	0,04 ***		0,01 **			
β_6	IND_I	0,13 ***		0,09 ***						
β_7	$Others_I$	0,14 ***	0,09 ***	0,10 ***	-0,22 **	0,07 *			0,09 *	-0,16 ***
β_8	IND_i*ln Age_{it}	-0,05 ***		-0,04 ***						
β_9	$Others_i$ *ln Age_{it}	-0,05 ***	-0,03 **	-0,02 **	0,09 **	-0,03 *	0,07 ***		-0,05 **	0,06 **
β_{10}	L97	0,11 ***		-0,03 ***	0,28 ***	-0,06 ***		-0,06 ***	-0,13 ***	-0,15 ***
β_{11}	R_{1t}	-1,29 ***	-1,11 ***	-1,16 ***	-2,98 ***	-1,74 ***	-2,26 ***	-2,59 ***	-2,60 ***	-3,11 ***
β_{12}	R_{2t}	-0,71 ***	-0,65 ***	-0,63 ***	-1,45 ***	-0,99 ***	-1,32 ***	-1,57 ***	-1,38 ***	-1,96 ***
β_{13}	R_{3t}	-0,41 ***	-0,39 ***	-0,32 ***	-0,82 ***	-0,58 ***	-0,78 ***	-0,97 ***	-0,71 ***	-1,28 ***
β_{14}	V1996	0,04 ***			0,22 ***		0,08 ***	0,09 ***	-0,10 ***	0,07 ***
β_{15}	V1997	0,08 ***			0,21 ***		0,04 *	0,06 ***	-0,08 ***	
β_{16}	V1999	0,03 ***				0,04 ***		0,04 **	-0,07 ***	0,07 ***
β_{17}	V2000	0,07 ***	-0,04 ***		0,10 ***	0,04 ***	0,03 *		0,09 ***	0,05 **
β_{18}	V2001	0,06 ***	-0,04 ***	0,04 ***	-0,10 ***		0,04 **		-0,09 ***	0,09 ***
β_{19}	V2002	0,08 ***	-0,04 ***	0,05 ***	-0,24 ***			0,04 **	-0,06 ***	
β_{20}	V2003	0,07 ***	-0,05 ***	0,02 **	-0,26 ***	-0,07 ***	-0,03 **	-0,10 ***	-0,18 ***	0,09 ***
$\beta\beta_0$	LOF_i	-0,71 ***	0,24 ***							
$\beta\beta_1$	LOF_i *ln $V_{i\,t-1}$	0,09 ***	0,06 *		0,23 ***	-0,07 *				0,12 ***
$\beta\beta_2$	LOF_i*ln Age_{it}	-0,46 ***	-0,21 ***	0,13 *		0,16 *				
$\beta\beta_3$	LOF_i *(ln $V_{i\,t-1}$)^2	0,01 ***	0,04 ***	0,08 ***	-0,02 ***			0,01 *	0,01 **	0,02 ***
$\beta\beta_4$	LOF_i *(ln Age_{it})^2	0,18 ***	0,06 ***		0,19 ***					
$\beta\beta_5$	LOF_i *ln $V_{i\,t-}$	-0,05 **			-0,05 **	0,05 ***				

	$_1$ln Age $_{it}$	0,03			0,05					
□□$_6$	LOF$_i$*IND$_l$	0,16 ***								
□□$_7$	LOF$_i$*Others$_l$	-0,23 ***		0,16 ***			0,29 ***			
□□$_8$	LOF$_i$*ln Age $_{it}$ * IND $_i$	-0,09 ***		-0,05 *						
□□$_9$	LOF$_i$*ln Age $_{it}$ * Others $_i$			-0,08 **			-0,12 **			
□□$_{10}$	LOF$_i$*L97		-0,07 *							
□□$_{11}$	LOF$_i$*R $_{1t}$	-0,44 ***	-0,14 ***	-0,23 ***		-0,10 ***		-0,17 ***		
□□$_{12}$	LOF$_i$*R $_{2t}$	-0,37 ***	-0,06 **	-0,13 ***		-0,05 **		-0,06 *		
□□$_{13}$	LOF$_i$*R $_{3t}$	-0,23 ***		-0,08 ***		-0,05 *		-0,09 ***		
□□$_{14}$	LOF$_i$*V1996	-0,09 **	-0,07 *							
□□$_{15}$	LOF$_i$*V1997									
□□$_{16}$	LOF$_i$*V1999							-0,11 **	-0,11 *	
□□$_{17}$	LOF$_i$*V2000									
□□$_{18}$	LOF$_i$*V2001	-0,08 **			-0,21 **					
□□$_{19}$	LOF$_i$*V2002	-0,07 *			-0,29 ***	0,07 *				
□□$_{20}$	LOF$_i$*V2003	-0,07 *			-0,23 **					
Chow Test	Time Variables β_{14}-β_{20}	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Time Variables □β_{14}-□β_{20}	0,40	0,16	0,72	0,18	0,09	0,01	0,15	0,67	0,64
	LOF Effect	0,00	0,00	0,01	0,00	0,00	0,01	0,12	0,00	0,59
	Adjusted R^2	0,92	0,86	0,90	0,76	0,83	0,83	0,84	0,82	0,84
	Hausman Test	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	White Test	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Nº Observations	10047	9974	10006	9834	9963	10038	9998	9926	10025

Table 3: Regression results – Fixed effects model (continuation)

Coef.	Independent Variables	Financial Estructure		Worker Remuneration		Solvency			
		i_o	INDEB	ROL	ROLF	LR	TS	ZRISK	□RISK
□$_0$	□$_0$	-2,24***	-0,04***	2,97***	2,50***	0,74***	0,71***	-2,12***	-0,64***
□$_1$	ln V $_{i\,t-1}$	-0,23***	0,16***	0,09***	0,07***	0,14***	0,16***	0,17***	0,16***
□$_2$	ln Age $_{it}$							0,36	0,16***
□$_3$	(ln V $_{i\,t-1}$)^2	-0,05***	-0,04***	-0,01***	-0,02***	-0,01***	0,04***	0,01***	-0,21***
□$_4$	(ln Age $_{it}$)^2	0,03***	0,01***				-0,01***		

β_5	ln $V_{i\,t-1}$*ln Age_{it}	0,03***	0,08***			0,07***	0,08***	0,03***	0,10***
β_6	IND_I					-0,03*			
β_7	$Others_I$			0,23***					0,21***
β_8	IND_i*ln Age_{it}					0,01*			
β_9	$Others_i$ *ln Age_{it}			-0,12***					-0,06***
β_{10}	L97	-0,32***	-0,02***		0,08***		0,02***		
β_{11}	R_{1t}	-2,22***	-0,67***	-3,95***	-3,17***	-0,96***	-0,67***	-4,72***	
β_{12}	R_{2t}	-1,07***	-0,32***	-2,41***	-1,89***	-0,63***	-0,51***	-2,96***	-0,02***
β_{13}	R_{3t}	-0,59***	-0,16***	-1,45***	-1,15***	-0,43***	-0,34***	-1,74***	
β_{14}	V1996	0,06***	-0,02***			0,03***	0,02***		
β_{15}	V1997	-0,07***	-0,02**	0,31***	0,09***		0,02**		
β_{16}	V1999	-0,16***	-0,02***	0,19***	-0,10***	0,02**	0,02***	0,36***	
β_{17}	V2000	-0,28***	-0,01**	0,09***	0,04*		0,01	0,32***	
β_{18}	V2001	-0,22***	-0,02***	0,22***	-0,23***		0,02***	0,27***	
β_{19}	V2002	-0,18***	-0,03***	0,07***		0,02**	0,03***	0,26***	
β_{20}	V2003	-0,30***	-0,03***		-0,08***	0,04***	0,03***	0,29***	
$\beta\beta_0$	LOF_i	0,46**				0,12**	0,20***		
$\beta\beta_1$	LOF_i *ln $V_{i\,t-1}$	0,35***	0,17***	-0,07**	-0,06**		0,06		0,21***
$\beta\beta_2$	LOF_i*ln Age_{it}					0,11*			
$\beta\beta_3$	LOF_i *(ln $V_{i\,t-1}$)^2	0,05***	0,09***	0,01**	0,02***	0,01***	-0,09***	0,01**	-0,05***
$\beta\beta_4$	LOF_i *(ln Age_{it})^2								
$\beta\beta_5$	LOF_i *ln $V_{i\,t-1}$ln Age_{it}	0,03**	-0,04***			-0,05***	-0,04***		-0,08**
$\beta\beta_6$	LOF_i*IND_I					0,10**			-0,18*
$\beta\beta_7$	LOF_i*$Others_I$				0,24*				-0,82***
$\beta\beta_8$	LOF_i*ln Age_{it} * IND_i					-0,06***			0,09**
$\beta\beta_9$	LOF_i*ln Age_{it} * $Others_i$				-0,14*				0,42***
$\beta\beta_{10}$	LOF_i*L97								
$\beta\beta_{11}$	LOF_i*R_{1t}	-0,26***	-0,15***	-0,32***	-0,39***	-0,38***	-0,26***		
$\beta\beta_{12}$	LOF_i*R_{2t}		-0,03**	-0,22***	-0,21***	-0,23***	-0,21***		
$\beta\beta_{13}$	LOF_i*R_{3t}			-0,17***	-0,20***	-0,19***	-0,17***		
$\beta\beta_{14}$	LOF_i*V1996								
$\beta\beta_{15}$	LOF_i*V1997								
$\beta\beta_{16}$	LOF_i*V1999			0,33***					
$\beta\beta_{17}$	LOF_i*V2000			0,34***					
$\beta\beta_{18}$	LOF_i*V2001	-0,10*		0,41***	-0,17**				
$\beta\beta_{19}$	LOF_i*V2002	-0,10*		0,41***		-0,06**			
$\beta\beta_{20}$	LOF_i*V2003			0,38***					
Chow Test	Time Variables β_{14}-β_{20}	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,35
	Time Variables $\beta\beta_{14}$-$\beta\beta_{20}$	0,42	0,05	0,01	0,04	0,88	0,20	0,77	0,48
	LOF Effect	0,00	0,00	0,00	0,00	0,00	0,00	0,31	0,06
	Adjusted R^2	0,86	0,90	0,86	0,83	0,84	0,90	0,84	0,93
	Hausman Test	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	White Test	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Nº Observations	9773	9951	9850	9869	9896	9953	5763	5740

*, **, ***, significant at 10, 5 and 1%, respectively

Table 4: Regression results – Arellano and Bond dynamic panel data model

Coef.	Independent Variables	Economic Performance						Profitability		
		VA	VA(A)	VA(S)	EBITDA	EBITDA (A)	EBITDA (S)	ROA	ROI	ROS
β_0	β_0									
β_1	ln $V_{i\,t-1}$	0,07***	0,14***	0,19***	0,08**	-0,05*		-0,07**		
β_2	ln Age_{it}		-0,24***		0,64***			-0,21*		-0,31**
β_3	(ln $V_{i\,t-1}$)^2	0,01	0,00***	0,00***	-0,02**			-0,01***		
β_4	(ln Age_{it})^2	0,05*	0,11***		-0,28***					
β_5	ln $V_{i\,t-1}$*ln Age_{it}	-0,03***		-0,02*			0,01*			
β_6	IND_I									
β_7	$Others_I$									
β_8	IND_i*ln Age_{it}	0,09***			0,17**		0,14***			0,09*
β_9	$Others_i$*ln Age_{it}	0,13***			0,26**	-0,13**			0,14*	0,32***
β_{10}	L97	-0,13***	-0,10***		-0,45***			-0,09**	-0,08**	-0,19***
β_{11}	R_{1t}	-1,18***	-1,05***	-1,13***	-2,80***	-1,66***	-2,26***	-2,64***	-2,47***	-3,19***
β_{12}	R_{2t}	-0,70***	-0,64***	-0,70***	-1,37***	-0,97***	-1,40***	-1,65***	-1,31***	-2,09***
β_{13}	R_{3t}	-0,35***	-0,32***	-0,35***	-0,66***	-0,55***	-0,77***	-0,99***	-0,59***	-1,28***
β_{14}	V1996	0,05***			0,28***		0,08***	-0,08***	-0,07***	-0,06**
β_{15}	V1997	0,09***	-0,06***		0,32***				-0,06*	
β_{16}	V1999	0,06***	-0,03***		0,14***	0,04***			-0,06**	-0,06**
β_{17}	V2000	0,10***	-0,08***	-0,02**	0,28***	0,05**	0,04*		-0,09***	
β_{18}	V2001	0,12***	-0,12***	-0,05***	0,17***		-0,05*		-0,08*	
β_{19}	V2002	0,14***	-0,14***	-0,07***						
β_{20}	V2003	0,15***	-0,17***	-0,05**				-0,15***	-0,17***	
$\gamma\beta_0$	LOF_i									
$\gamma\beta_1$	LOF_i *ln $V_{i\,t-1}$		-0,17**		0,38***					0,23**
$\gamma\beta_2$	LOF_i*ln Age_{it}	-1,14***	-0,73***		-3,03***					
$\gamma\beta_3$	LOF_i *(ln $V_{i\,t-1}$)^2	0,03***	0,02***							
$\gamma\beta_4$	LOF_i *(ln Age_{it})^2	0,63***	0,36***		2,08***					
$\gamma\beta_5$	LOF_i *ln $V_{i\,t-1}$ln Age_{it}				-0,27***					
$\gamma\beta_6$	LOF_i*IND_I									
$\gamma\beta_7$	LOF_i*$Others_I$									
$\gamma\beta_8$	LOF_i*ln Age_{it} * IND_i	-0,17***			-0,46**					
$\gamma\beta_9$	LOF_i*ln Age_{it} * $Others_i$		0,17**			0,21**				-0,42***
$\gamma\beta_{10}$	LOF_i*L97	-0,50***	-0,34***		-1,35***					
$\gamma\beta_{11}$	LOF_i*R_{1t}	0,28***	-0,20***			-0,09**	0,11*	-0,15***		

□□12	LOF_i*R_{2t}	0,21**		0,08*						
□□13	LOF_i*R_{3t}									
□□14	LOF_i*V1996	-0,21***	-0,17***		-0,46***					
□□15	LOF_i*V1997	-0,35***	-0,22***		-0,88***					
□□16	LOF_i*V1999	-0,18***	-0,13***		-0,54***					
□□17	LOF_i*V2000	-0,32***	-0,20***		-1,00***					
□□18	LOF_i*V2001	-0,52***	-0,27**		-1,58***					
□□19	LOF_i*V2002	-0,70***	-0,41***		-2,12***					
□□20	LOF_i*V2003	-0,87***	-0,50***		-2,51***					
Chow Test	Time Variables β_{14}-β_{20}	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Time Variables □β_{14}-□β_{20}	0,00	0,00	0,78	0,01	0,05	0,01	0,17	0,49	0,65
	LOF Effect	0,00	0,00	0,02	0,00	0,01	0,01	0,27	0,70	0,22
	Nº Observations	10047	9974	10006	9834	9963	10038	9998	9926	10025

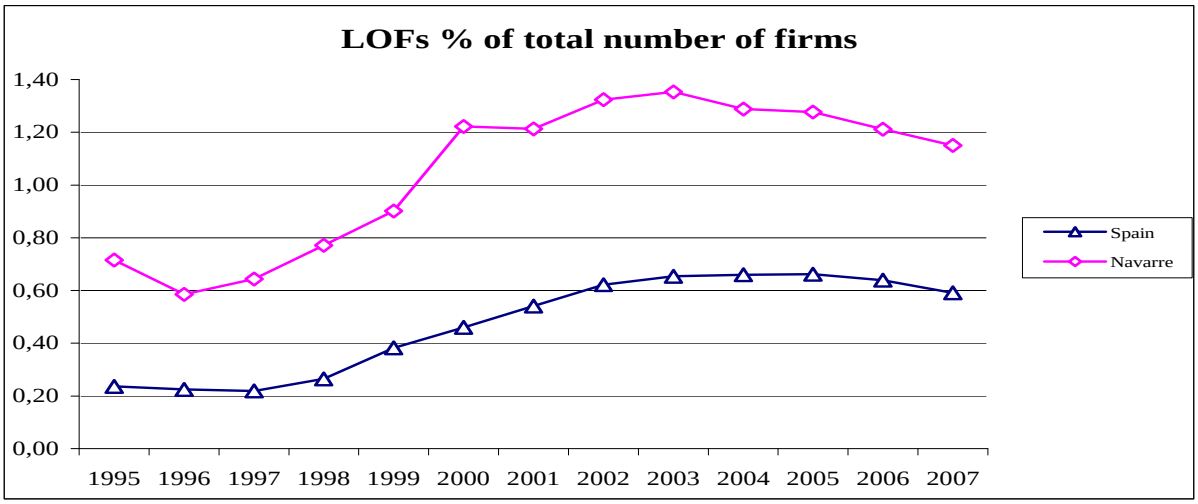
Table 4: Regression results – Arellano and Bond dynamic panel data model (continuation)

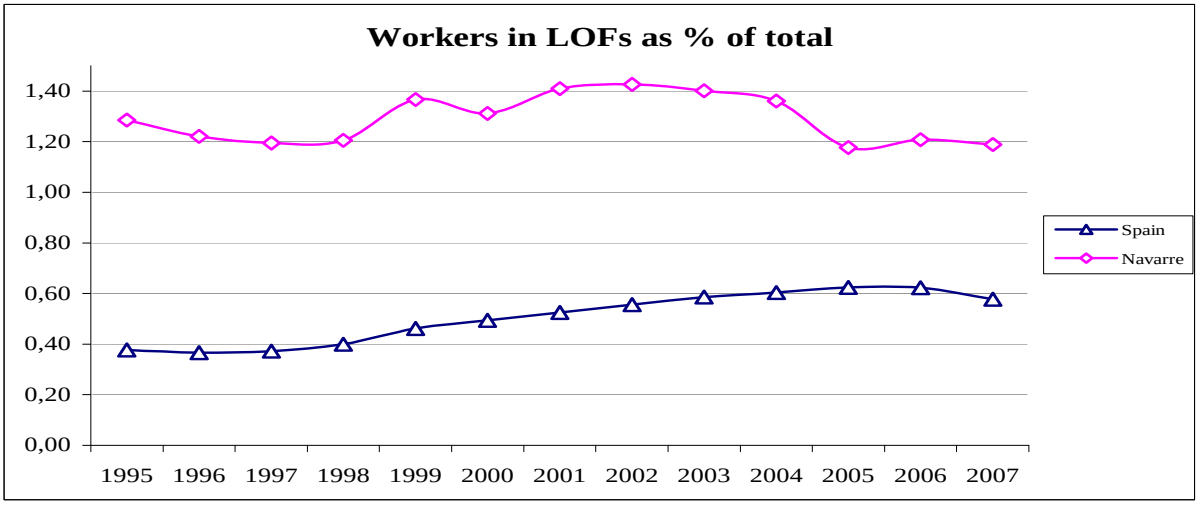
Coef.	Independent Variables	Financial Estructure		Worker Remuneration		Solvency			
		i_o	INDEB	ROL	ROLF	LR	TS	ZRISK	□RISK
□0	□								
□1	ln $V_{i\,t-1}$	-0,17***	0,11***			0,17***	0,12***		0,17***
□2	ln Age_{it}		-0,10***				0,09***		
□3	(ln $V_{i\,t-1}$)^2	-0,03***			0,02***	-0,03***		0,01***	-0,23***
□4	(ln Age_{it})^2		0,05***			-0,05**	-0,05***		
□5	ln $V_{i\,t-1}$*ln Age_{it}		0,04***			-0,03**	0,04***	0,11***	
□6	IND_I								
□7	$Others_i$								
□8	IND_i*ln Age_{it}				0,15***	0,05***			-0,07***
□9	$Others_i$ *ln Age_{it}	-0,25***	0,06***		0,18*		-0,06***		-0,06*
□10	L97	-0,38***	-0,07***		0,09*	0,07***	0,07***		
□11	R_{1t}	-2,07***	-0,62***	-3,89***	-3,11***	-0,93***	-0,61***	-4,50***	-0,01*
□12	R_{2t}	-1,03***	-0,32***	-2,33***	-1,87***	-0,63***	-0,48***	-2,95***	
□13	R_{3t}	-0,51***	-0,13***	-1,32***	-1,06***	-0,38***	-0,30***	-1,56***	-0,01***
□14	V1996	0,05**	-0,03***			0,04***	0,03***		
□15	V1997	-0,09***	-0,05***	0,31***	0,09**	0,05***	0,05***		
□16	V1999	-0,20***	-0,04***	0,15***	-0,09*	0,04***	0,03***	0,33***	
□17	V2000	-0,33***	-0,05***			0,05***	0,05***	0,30***	
□18	V2001	-0,26***	-0,07***	0,17***	-0,23***	0,06***	0,07***		
□19	V2002	-0,23***	-0,10***			0,09***	0,10***		
□20	V2003	-0,36***	-0,11***			0,13***	0,11***		

β_0	LOF_i								
β_1	LOF_i *ln $V_{i\,t-1}$	0,28**	0,16**			-0,12**	0,15***		
β_2	LOF_i*ln Age_{it}		0,41***	-1,23**			-0,24***		
β_3	LOF_i *(ln $V_{i\,t-1}$)^2	0,04***				0,02***		-0,03***	
β_4	LOF_i *(ln Age_{it})^2		-0,27***	0,88**			0,17***		
β_5	LOF_i *ln $V_{i\,t-1}$ln Age_{it}		-0,18***				-0,22***		-0,11***
β_6	LOF_i*IND_I								
β_7	LOF_i*$Others_I$								
β_8	LOF_i*ln Age_{it} * IND_i		-0,15***				0,12***		0,26***
β_9	LOF_i*ln Age_{it} * $Others_i$	0,44***	-0,12***				0,08*		0,31***
β_{10}	LOF_i*L97		0,25***	-0,89***			-0,16***		
β_{11}	LOF_i*R_{1t}	-0,23***	-0,16***	-0,33***	-0,53***	-0,31***	-0,25***		
β_{12}	LOF_i*R_{2t}		-0,07***	-0,23***	-0,29***	-0,25***	-0,15***		
β_{13}	LOF_i*R_{3t}		-0,06***	-0,17**	-0,24***	-0,17***	-0,11***		0,02*
β_{14}	LOF_i*V1996		0,10***				-0,07***		
β_{15}	LOF_i*V1997		0,15***				-0,09**		
β_{16}	LOF_i*V1999		0,09***				-0,04*		
β_{17}	LOF_i*V2000		0,17***				-0,08**		
β_{18}	LOF_i*V2001		0,24***				-0,12**		
β_{19}	LOF_i*V2002		0,31***				-0,16**		
β_{20}	LOF_i*V2003		0,39***	-1,02*			-0,21**		
Chow Test	Time Variables β_{14}-β_{20}	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,16
	Time Variables β_{14}-β_{20}	0,59	0,01	0,00	0,07	0,94	0,32	0,94	0,08
	LOF Effect	0,00	0,00	0,00	0,00	0,00	0,00	0,12	0,00
	Nº Observations	9773	9951	9850	9869	9896	9953	5763	5740

*, **, ***, significant at 10, 5 and 1%, respectively

Figure 1: The importance of LOFs in Spain and in Navarra





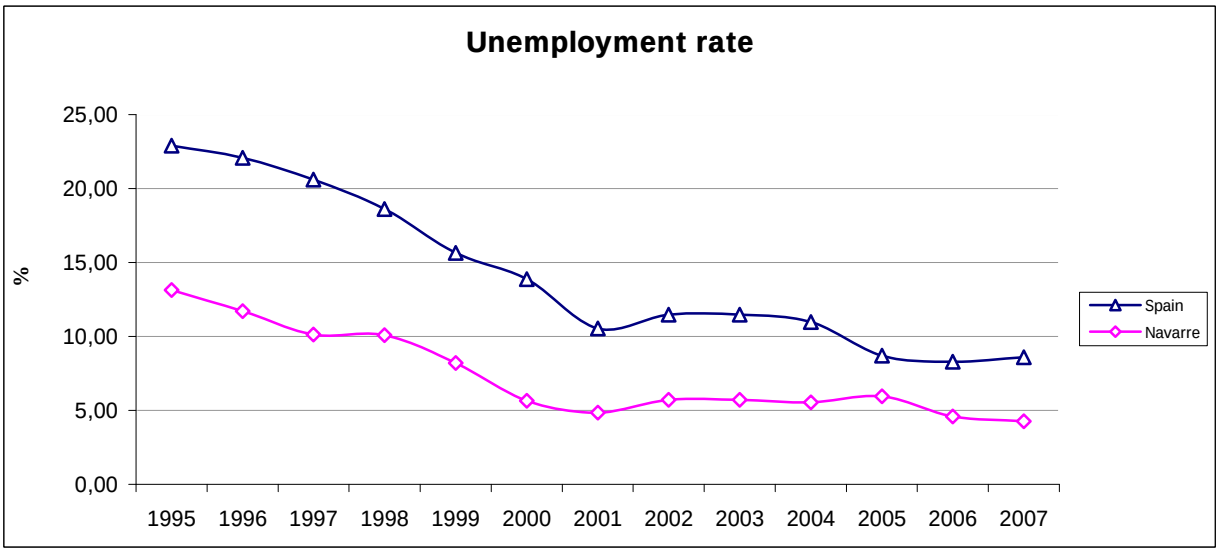


Figure 2: Measures of managerial performance over time

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Figure 3: Interannual growth rates