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Labour-owned and participatory capitalist firms: different approaches to their financial and operative challenges

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EMPRESAS CUYO CAPITAL ES DE LOS TRABAJADORES Y EMPRESAS CAPITALISTAS PARTICIPATIVAS: DIFERENTES ENFOQUES A SUS DESAFÍOS FINANCIEROS Y OPERATIVOS.

RESUMEN: Este trabajo analiza hasta qué punto las diferencias, en el rendimiento operativo, el crecimiento económico, la eficiencia y la productividad entre las empresas cuyo capital es de los trabajadores (Labour-owned Firms - LOFs) y las empresas capitalistas participativas (participatory capitalist firms - PCFs), se pueden atribuir a sus estructuras distintas de capital y de propiedad, que a la vez reflejan las diferentes maneras de manejar el capital y a sus trabadores, además de la interpretación de la teoría de la función primaria del negocio. El estudio utiliza una variedad de técnicas cuantitativas, que incluyen el análisis de datos de panel, el análisis por envoltura de datos, los modelos fronterizos estocásticos y similares para concluir que muchas de las relaciones planteadas por la teoría económica no corresponden con el rendimiento exitoso de las LOFs. No existen diferencias importantes entre los dos tipos de empresas en cuanto al potencial de crecimiento, el rendimiento operativo o la eficiencia productiva. Otro resultado de interés, es que los indicadores productivos que se utilizan para medir el rendimiento de las empresas en las LOFs, y que también son usados por las compañías de servicios financieros en el análisis de riesgo del negocio, no son completamente adecuados y pueden constituir una amenaza para la sobrevivencia de las empresas.

PALABRAS CLAVES: estructura de propiedad del capital, eficiencia gerencial, rendimiento gerencial, análisis por envoltura de datos, análisis de modelos fronterizos estocásticos, análisis de datos de panel.

ENTREPRISE APPARTENANT AUX TRAVAILLEURS ET ENTREPRISES DE PARTICIPATION CAPITALISTE : APPROCHES DIFFÉRENTES DE LEURS DÉFIS FINANCIER ET DE RENDEMENT.

RÉSUMÉ: Cet article analyse dans quelle mesure les différences de performance d'exploitation, de croissance économique, d'efficacité et de productivité entre entreprises appartenant aux travailleurs (LOF) et entreprises de participation capitaliste (PCF) peuvent être attribués à leurs structures de propriété du capital distinctes, ce qui reflète à la fois leurs différentes manières de gestion du capital et du travail ainsi que leur interprétation de la théorie de la fonction principale de l'entreprise. L'étude utilise une variété de techniques quantitatives, y compris l'analyse de panel de données, l'analyse par l'enveloppement de données, frontières stochastiques et autres afin de conclure que la plupart des relations postulées par la théorie économique ne parviennent pas à expliquer les bonnes performances des LOF. Il n'y a pas de différences substantielles dans le potentiel de croissance, le rendement d'exploitation ou l'efficacité productive entre les deux types d'entreprises. Un autre résultat intéressant est que les indicateurs traditionnels utilisés pour mesurer la performance des entreprises LOF et également utilisé par les sociétés financières d'analyse des risques d'entreprise ne sont pas complètement appropriés et peuvent même menacer la survie des entreprises.

MOTS CLÉS : structure de la propriété du capital, efficacité du management, performance du management, analyse par l'enveloppement des données, analyse de la frontière stochastique de régression, analyse de panel de données.

COOPERATIVAS (LOF) E SOCIEDADES COMERCIAIS (PCF): DIFERENTES PROPOSTAS A RESPEITO DOS SEUS DESAFIOS FINANCEIROS E OPERATIVOS

RESUMO: Este artigo analisa até onde as diferenças no desempenho operativo, no crescimento econômico, na eficiência e na produtividade, que existem entre as LOF e as PCF, podem ser atribuídas às diferentes estruturas de propriedade de capital, que assim mesmo refletem as diferentes formas como são manejados o capital e o trabalho assim como a interpretação da teoria da função principal das empresas. O estudo abrange uma variedade de técnicas quantitativas que incluem a análise de dados de painel, análise envolvente de dados, fronteiras estocásticas e similares para concluir que muitas das relações indicadas pela teoria econômica não estão em consonância com o desempenho exitoso das LOF. Não existem diferenças substanciai no crescimento em potência, no desempenho operativo e tampouco na eficiência produtiva entre os dois tipos de empresas. Outro resultado interessante é aquele dos indicadores tradicionais usados para medir o desempenho nas LOF e que as companhias de serviços financeiros também usam a fim de realizar análises de riscos empresariais, os quais não são completamente apropriados e podem estar ameaçando a supervivência das empresas.

PALAVRAS CHAVE: estrutura de propriedade do capital, eficiência gerencial, desempenho gerencial, análise envolvente de dados, análise de regressão de fronteiras estocásticas, análise de dados de painel.

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ABSTRACT: This paper analyzes the extent to which differences in operating performance, economic growth, efficiency and productivity between labour-owned (LOFs) and participatory capitalist (PCFs) firms can be attributed to their distinct capital-ownership structures, which in turn reflects their different ways of managing capital and labour as well as interpreting primary business function theory. The study uses a variety of quantitative techniques, including panel data analysis, data envelopment analysis, stochastic frontiers and the like to conclude that many of the relationships posited by economic theory fail to correspond with the successful performance of LOFs. There are no substantial differences in growth potential, operating performance or productive efficiency between the two types of firms. Another result of interest is that the traditional indicators used to measure firm performance in LOFs and also used by financial service companies in business risk analysis are not completely appropriate and may be threatening firm survival.

KEY WORDS: capital-ownership structure, managerial efficiency, managerial performance, data envelopment analysis, stochastic regression frontier analysis, panel data analysis.

Introduction*

The overall aim of this paper is to analyze the extent to which differences in operating performance, economic growth, efficiency and productivity between labour-owned (LOFs) and participatory capitalist (PCFs) firms can be attributed to their distinct capital-ownership structures. The core issue is the capital ownership structure of each type of firm in its dual role as a key determinant of the primary objective function of each type of firm and as a major impact player in the development of its corresponding capital and labour policies. Our interest therefore focuses on testing the main hypothesis

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of the traditional economic theory that performance differences between LOFs and PCFs are mainly due to their distinct objective functions and corresponding different ways of managing labour and capital (e.g. Dow, 2001, Melgarejo, et al. 2007a, 2007b).

The empirical evidence presented in this study is drawn from a set of panel data on LOFs and PCFs in the Autonomous Community of Navarra, Spain. The geographical selection reflects the increasing importance of LOFs in Spain, as a result of Law 4 of March 24, 1997, which was devised to encourage their development and particularly in Navarre as in incubator of new LOFs, through its own fiscal measures (e.g. Melgarejo, 2008). Financial data for LOFs were gathered from the Navarra Trade Register, while financial data for the PCFs were drawn from the SABI database. The analysis covers the period 1994-2003. After removing firms with incomplete data or outliers with values more than three standard deviations from the mean (Hair, et al. 2006), we were left with 248 LOFs and 1,308 PCFs. The firms analysed are relatively homogeneous, in that all are small or very small firms (EC, 2003), operating in the same economic sectors, i.e. industry and services, as defined in the Eurostat's NACE VI.1 classification system of economic activity. As a result, all of these firms are subject to similar business growth and risk pressures and devoid of the expected fluctuations in growth due to variations in economic conditions and business culture across autonomous communities.

Before proceeding any further, some definitions are in order to establish a correspondence between the terms used in the economic literature and their legal interpretation under Spanish law. First, the terms "capital ownership structure" and "capital factor" should not be considered synonymous. The former refers to whether the firm is a LOF or a PCF, while the latter is one of the characteristics that differentiate a LOF from a PCF. Second, in terms of characterization of the firms, Spanish LOFs operate under their own legal framework established by the aforementioned Law 4 of March 24, 1997. According to this legislation, the main characteristic of LOFs is that at least 50% of the capital must be owned by the workers on full-time open-ended contracts with the firm. Their holding shares, defined by the above-mentioned law as "Labour class shares", are a direct function of their contribution to capital and labour. This definition concurs with that of Jansson (1986). Alternatively, PCFs correspond to traditional stock-traded firms, where the owners' control of the firm is proportional to their respective share of capital owned. Ben-Ner and Jones (1995) describe in greater detail the nature of different business-ownership structures.

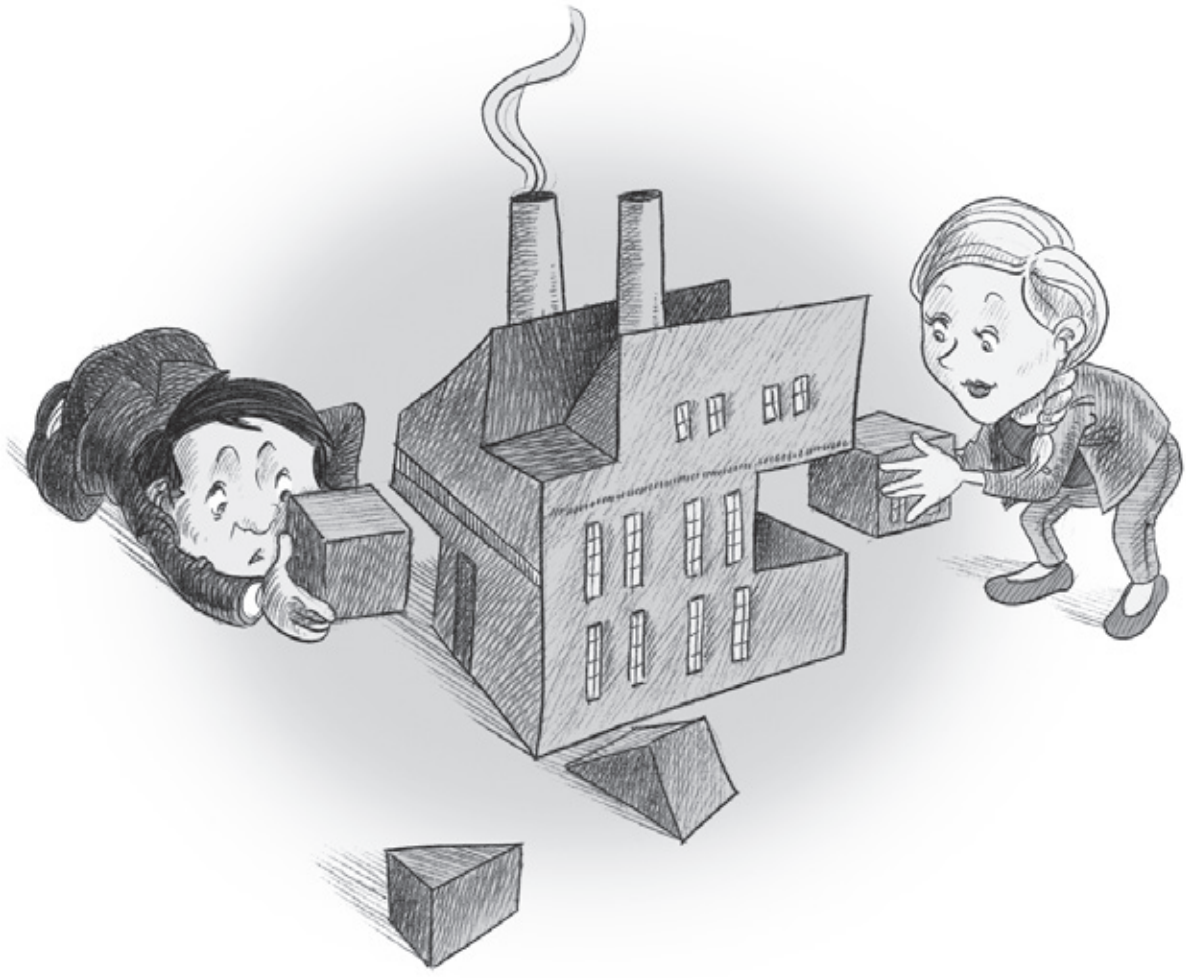
The remainder of the paper is organised as follows: Section II contains a brief review of the main contributions to the literature in the socio-economic context, with a view to explaining behavioural differences between LOFs and PCFs deriving from their objective function, the labour factor and the capital factor. Hypotheses regarding the impact of this capital-ownership dichotomy on the operating performance, efficiency and productivity of the two types of firms under analysis are described and the results presented in sections III, IV and V, respectively. Section VI contains a preliminary analysis of the joint effect of business growth, productive efficiency and firm size. Some concluding comments and suggestions for further research in section VII complete the paper.

Review of the literature

This section is devoted to the key issue being debated in the economic literature: the impact of the capital-ownership structure of a firm on its objective function, labour factor and capital factor. We start with the objective function that was the main focus (Dow, 2001) of the early research (e.g. Domar, 1966; Ireland, 1987; Ireland and Law, 1982; Meade, 1972; Vanek, 1970; Ward, 1958; Bruque, et al., 2002) on economic differences between LOFs and PCFs. According to the economics literature, firms'

TABLE 1. Number of firms in the data base

Number of Enterprises		Before 1994	1994-1997	After 1997	TOTAL
LOF	Industrial	29	27	41	97
	Services - CTT	18	21	55	94
	Others	9	9	39	57
	TOTAL LOFs	56	57	135	248
PCF	Industrial	357	63	121	541
	Services - CTT	331	89	207	627
	Others	60	19	61	140
	TOTAL PCFs	748	171	389	1.308
TOTAL		804	228	524	1.556



objective functions vary according to two main factors. First, even though the common objective function of all firms, regardless of size (Jarvis, et al. 2000), is profit maximisation, small firms focus primarily on survival and stability. Second, the objective function also differs according to the capital ownership structure. The most widely-held view in the early research on the subject was that LOFs' objective function is the maximisation of net income per worker, while that of PCFs is the maximisation of total profits.

Nevertheless, it is the different role played by the labour factor in LOFs and PCFs that gives rise to the main behavioural performance difference between these two types of firms (Monzón, 1989). These differences are primarily related to the size of the labour force, and to output and owner/worker remuneration policies (Melgarejo, et al. 2007c). In terms of size, the number of workers remains virtually unchanged in the short-term, and is thus much less sensitive to changes in market conditions than is the case for a PCF (Robinson, 1967). As far as output is concerned, the variability in the production level of a LOF reflects fluctuations in demand or cost (Dow, 2001). With respect to owner/worker remuneration, economic theory suggests that, without the assumption of perfect elasticity in the labour market, efficiency problems arise when the amount of labour used by LOFs deviates from the optimum level (Bartlett, et al. 1992).

Finally, in relation to the capital factor, the literature shows that one of the main problems faced by LOFs stems from the lack of their own resources for financing operations. This, in turn, increases their reliance on outside financing, something LOFs attempt to avoid, for fear of losing control of their businesses. A potentially harmful outcome of this occurrence is the increasing dependence on outside short-term funding, giving rise to diminishing negotiating powers with outside institutions and serious problems with external capital costs, bank guarantees, etc (Jarvis, et al. 2000; Park, et al. 2004). Thus, social economy firms in general, and LOFs in particular, become more sensitive to the economic cycle and liable to incur higher financial expenses, which have a negative impact on their profit-generating capacity. This may lead firms into a degenerative

process impeding their financial recovery and ultimately increasing their risk of financial and business failure (Medina, et al. 2000).

Differences arising from the objective function, and from the labour and capital factors, obviously have certain implications for LOFs' operating efficiency and competitiveness (Morales, et al. 2003) that distinguish them from PCFs (Chaves and Monzón, 2008). The following sections study the nature of these differences.

Modelling the impact of a firm's ownership structure on its operating performance

Bearing in mind that the economic literature reports differences in firms' objective function according to their capital ownership structure, this section will be devoted to testing whether these differences have an impact on the operating performance of LOF's and PCFs. The model used is portrayed graphically in the upper half of Figure 1 and the description of all variables used, in Table 2. Following Carton and Hofer (2006), the variables used to measure operating performance include indicators for financial performance, profitability, financial structure, wage remuneration and solvency. Of these, only the lesser-known *ZRISK* and λ*RISK*, the indices of perceived risk and of solvency margin, respectively, deserve further consideration. They can be defined as follows:

$$ZRISK = \left\{\sigma(ROA)/\left[E(ROA) + CAP\right]\right\}^2$$
$$\lambda RISK = E(ROA) + CAP + z_\alpha \sigma(ROA) \qquad (1)$$

where *E(ROA)* and σ*(ROA)* are the mean and the standard deviation, respectively of the firm's *ROA*; *CAP* represents the ratio of equity capital to total assets; and z_α measures the standard normal variate at α. *ZRISK* (Hannan and Hanweck, 1998) proxies for the interaction of the income-generating capacity, the potential magnitude of return shocks and the level of capital reserves available to absorb sudden shocks. Alternately, the solvency margin, λ*RISK* (García-Marco and Robles-Fernández, 2008), represents the limit of a one-sided confidence interval at the α-level of statistical significance, obtained under the assumption that the firm's *ROA* is normally distributed.

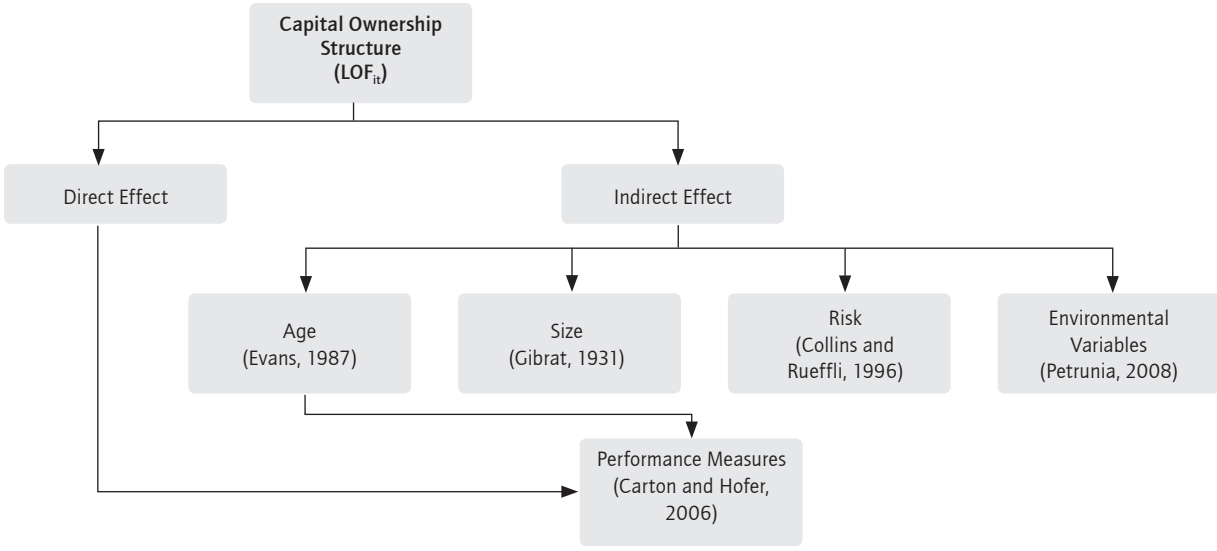
$$\begin{aligned}\ln V_{it} &= (\beta_0 + \Delta\beta_0 LOF_i) + (\beta_1 + \Delta\beta_1 LOF_i)\ln V_{it-1} + (\beta_2 + \Delta\beta_2 LOF_i)\ln Age_{it} \\ &+(\beta_3 + \Delta\beta_3 LOF_i)\ln^2 V_{1,t-1} + (\beta_4 + \Delta\beta_4 LOF_i)\ln^2 Age_{it} + (\beta_5 + \Delta\beta_5 LOF_i)\ln V_{it-1} Age_{it} \\ &+(\beta_6 + \Delta\beta_6 LOF_i) IND_i + (\beta_7 + \Delta\beta_7 LOF_i) Others_i + (\beta_8 + \Delta\beta_8 LOF_i) IND_i \ln Age_{it} \\ &+(\beta_9 + \Delta\beta_9 LOF_i) Others_i \ln Age_{it} + (\beta_{10} + \Delta\beta_{10} LOF_i) L97_t + (\beta_{11} + \Delta\beta_{11} LOF_i) R_{1it} \\ &+(\beta_{12} + \Delta\beta_{12} LOF_i) R_{2it} + (\beta_{13} + \Delta\beta_{13} LOF_i) R_{3it} + (\beta_{14} + \Delta\beta_{14} LOF_i) V96_t \\ &+(\beta_{15} + \Delta\beta_{15} LOF_i) V97_t + (\beta_{16} + \Delta\beta_{16} LOF_i) V99_t + (\beta_{17} + \Delta\beta_{17} LOF_i) V00_t \\ &+(\beta_{18} + \Delta\beta_{18} LOF_i) V01_t + (\beta_{19} + \Delta\beta_{19} LOF_i) V02_t + (\beta_{20} + \Delta\beta_{20} LOF_i) V03_t + \varepsilon_{it}\end{aligned}$$

Figure 1 depicts the impact of the capital-ownership structure, modelled in two different ways. The first represents a direct effect from LOF_{it} on the various measures of operating performance, illustrated on the left-side of Figure 1. The second is an indirect impact, hypothesized to be dependent upon (i) the size of the firms, through Gibrat's proportionate growth model (Gibrat, 1931); (ii) their age,

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
VAA	Value Added/Total Assets
VAS	Value Added/Total Sales
EBITDA	Earnings before interest, taxes, depreciation and amortization
EBITDAA	EBITDA/Total Assets
EBITDAS	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)
λ*RISK*	Index of solvency margin, defined in (1)
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	=V98+V99+V00+V01+V02+V03=1, if the firm was formed after 1997; 0, otherwise
Strategic Risk factors: SR	
R_{1t}	=1, if the firm belongs to the ith quartile of a given dependent variable, i=1,2,3,4; 0, otherwise

FIGURE 1. Modelling the impact of the firm's ownership structure on its operating performance



using the life-cycle model proposed by Evans (1987a, b); the strategic risk component of Collins and Rueffli (1996); and (iv) a set of environmental variables (e.g. Petrunia, 2008) that include the economic sector to which the firm belongs, the year of operation, and the 1997 law on LOFs. Further details on the rationale for the use, estimation and definition of these variables, as well as a compilation of the existing literature on the various hypotheses, appear in Melgarejo (2008).

The equation that describes the above model appears in the bottom half of Figure 1, where the concepts of direct and indirect effect are defined. The first term represents the direct effect, independent of the elements included in Table 2 and, as depicted in Figure 1, is a function of the specific firm's capital-ownership configuration. Its value is β_0, if PCF (LOF_i=0) or $\beta_0+\Delta\beta_0$, if LOF (LOF_i=1). The relative magnitude of $\Delta\beta_0$ reveals which effect is the strongest; testing the null hypothesis that $\Delta\beta_0$=0 determines whether LOFs and PCFs show signs of any differential impact upon the corresponding measure of operating performance. The indirect effects are tested in a similar way, in relation to all the equation variables, with the null hypotheses $\Delta\beta_i$=*0, i=1,...,20*, determining whether the capital-ownership configuration of the firms in question causes each explicator to exhibit a differential impact on each performance measure.

The estimation procedure centres on the panel data model, widely used for this type of cress-sectional/time-series data structure (Green, 2008). Fixed effects and random effects estimation procedures were applied on each of the dependent variables, and Hausman's test (Green, 2008) was used to decide which of the two models was more appropriate. In all cases, the test favoured the fixed-effects model, with a p-value under 0.01. Therefore, only the results obtained from the fixed effects model are shown in Table 3.

The results found for the evaluation of firm performance gains in LOFs and PCFs have important implications and conceptual considerations. First, the fixed-effects models of Table 3 show a substantial degree of explanatory power, judging by the very high adjusted-R^2 values. This evidence clearly attests to the appropriateness of using these models to explain the variation in various measures of managerial performance. Second, the evidence does not support the traditional theory regarding the issue. In fact, in terms of growth, LOFs perform no worse than PCFs and smaller firms grow faster that big ones, independently of their capital-ownership structure. Third, in the absence of market values, it is necessary to include other risk measures, such as strategic risk and other dynamic risk measures (ZRISK and λRISK). LOFS tend to position themselves more often in the extreme risk categories, whereas PCFs are more prominent in the middle quartiles. But there is mixed evidence at best to demonstrate that a firm's long-term survival potential is tied to its capital-ownership structure. Fourth, the impact of the environmental factors varies according to the particular variable. For example, the 1997 Law produces a strong and positive impact for LOFs on most of the performance measures. However, neither the age of the firm nor the economic sector in which it operates are impacted by its capital ownership configuration, even though younger firms tend to exhibit higher levels of operating performance than their older counterparts.

TABLE 3. Regression results – Fixed Effects model

Coef.	Independent Variables	Economic Performance												Profitability					
		VA		*VAA*		*VAS*		*EBITDA*		*EBITDAA*		*EBITDAS*		*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}	V96	0,04	***					0,22	***			0,08	***	0,09	***	-0,10	***	0,07	***
β_{15}	V97	0,08	***					0,21	***			0,04	*	0,06	***	-0,08	***		
β_{16}	V99	0,03	***							0,04	***			0,04	**	-0,07	***	0,07	***
β_{17}	V00	0,07	***	-0,04	***			0,10	***	0,04	***	0,03	*			0,09	***	0,05	**
β_{18}	V01	0,06	***	-0,04	***	0,04	***	-0,10	***			0,04	**			-0,09	***	0,09	***
β_{19}	V02	0,08	***	-0,04	***	0,05	***	-0,24	***					0,04	**	-0,06	***		
β_{20}	V03	0,07	***	-0,05	***	0,02	**	-0,26	***	-0,07	***	-0,03	**	-0,10	***	-0,18	***	0,09	***
$\Delta\beta_0$	LOF_i	-0,71	***	0,24	***														
$\Delta\beta_1$	LOF_i *ln $V_{i\,t-1}$	0,09	***	0,06	*			0,23	***	-0,07	*							0,12	***
$\Delta\beta_2$	LOF_i*ln Age_{it}	-0,46	***	-0,21	***	0,13	*			0,16	*								
$\Delta\beta_3$	LOF_i *(ln $V_{i\,t-1}$)^2	0,01	***	0,04	***	0,08	***	-0,02	***					0,01	*	0,01	**	0,02	***
$\Delta\beta_4$	LOF_i *(ln Age_{it})^2	0,18	***	0,06	***			0,19	***										
$\Delta\beta_5$	LOF_i *ln $V_{i\,t-1}$ln Age_{it}	-0,03	**					-0,05	**	0,05	***								
$\Delta\beta_6$	LOF_i*IND_I	0,16	***																
$\Delta\beta_7$	LOF_i*$Others_I$	-0,23	***			0,16	***					0,29	***						
$\Delta\beta_8$	LOF_i*ln Age_{it} * IND_i	-0,09	***			-0,05	*												
$\Delta\beta_9$	LOF_i*ln Age_{it} * $Others_i$					-0,08	**					-0,12	**						
$\Delta\beta_{10}$	LOF_i*L97			-0,07	*														
$\Delta\beta_{11}$	LOF_i*R_{1t}	0,44	***	-0,14	***	-0,23	***			-0,10	***			-0,17	***				
$\Delta\beta_{12}$	LOF_i*R_{2t}	0,37	***	-0,06	**	-0,13	***			-0,05	**			-0,06	*				
$\Delta\beta_{13}$	LOF_i*R_{3t}	0,23	***			-0,08	***			-0,05	*			-0,09	***				
$\Delta\beta_{14}$	LOF_i*V96	-0,09	**	-0,07	*														
$\Delta\beta_{15}$	LOF_i*V97																		
$\Delta\beta_{16}$	LOF_i*V99													0,11	**	-0,11	*		
$\Delta\beta_{17}$	LOF_i*V00																		
$\Delta\beta_{18}$	LOF_i*V01	-0,08	**					-0,21	**										
$\Delta\beta_{19}$	LOF_i*V02	-0,07	*					-0,29	***	0,07	*								
$\Delta\beta_{20}$	LOF_i*V03	-0,07	*					-0,23	**										
Adjusted R^2		0,92		0,86		0,90		0,76		0,83		0,83		0,84		0,82		0,84	
Hausman Test (p-value)		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	

*, **, ***, significant at 10.5 and 1%, respectively.

TABLE 3. Regression results – Fixed effects model (continuation)

Coef.	Independent Variables	Financial Structure				Worker Remuneration				Solvency							
		i_o		*INDEB*		*ROL*		*ROLF*		*LR*		*TS*		*ZRISK*		λ*RISK*	
β_0	β_0	-2,24	***	-0,04	***	2,97	***	2,50	***	0,74	***	0,71	***	-2,12	***	-0,64	***
β_1	ln $V_{i\,t-1}$	-0,23	***	0,16	***	0,09	***	0,07	***	0,14	***	0,16	***	0,17	***	0,16	***
β_2	ln Age_{it}													0,36		0,16	***
β_3	(ln $V_{i\,t-1}$)^2	-0,05	***	-0,04	***	-0,01	***	-0,02	***	-0,01	***	0,04	***	0,01	***	-0,21	***
β_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}	V96	0,06	***	-0,02	***					0,03	***	0,02	***				
β_{15}	V97	-0,07	***	-0,02	**	0,31	***	0,09	***			0,02	**				
β_{16}	V99	-0,16	***	-0,02	***	0,19	***	-0,10	***	0,02	**	0,02	***	0,36	***		
β_{17}	V00	-0,28	***	-0,01	**	0,09	***	0,04	*			0,01		0,32	***		
β_{18}	V01	-0,22	***	-0,02	***	0,22	***	-0,23	***			0,02	***	0,27	***		
β_{19}	V02	-0,18	***	-0,03	***	0,07	***			0,02	**	0,03	***	0,26	***		
β_{20}	V03	-0,30	***	-0,03	***			-0,08	***	0,04	***	0,03	***	0,29	***		
$\Delta\beta_0$	LOF_i	0,46	**							0,12	**	0,20	***				
$\Delta\beta_1$	LOF_i *ln $V_{i\,t-1}$	0,35	***	0,17	***	-0,07	**	-0,06	**			0,06				0,21	***
$\Delta\beta_2$	LOF_i*ln Age_{it}									0,11	*						
$\Delta\beta_3$	LOF_i *(ln $V_{i\,t-1}$)^2	0,05	***	0,09	***	0,01	**	0,02	***	0,01	***	-0,09	***	0,01	**	-0,05	***
$\Delta\beta_4$	LOF_i *(ln Age_{it})^2																
$\Delta\beta_5$	LOF_i *ln $V_{i\,t-1}$ln Age_{it}	0,03	**	-0,04	***					-0,05	***	-0,04	***			-0,08	**
$\Delta\beta_6$	LOF_i*IND_I									0,10	**					-0,18	*
$\Delta\beta_7$	LOF_i*$Others_I$							0,24	*							-0,82	***
$\Delta\beta_8$	LOF_i*ln Age_{it} * IND_i									-0,06	***					0,09	**
$\Delta\beta_9$	LOF_i*ln Age_{it} *$Others_i$							-0,14	*							0,42	***
$\Delta\beta_{10}$	LOF_i*L97																
$\Delta\beta_{11}$	LOF_i*R_{1t}	-0,26	***	-0,15	***	-0,32	***	-0,39	***	-0,38	***	-0,26	***				
$\Delta\beta_{12}$	LOF_i*R_{2t}			-0,03	**	-0,22	***	-0,21	***	-0,23	***	-0,21	***				
$\Delta\beta_{13}$	LOF_i*R_{3t}					-0,17	***	-0,20	***	-0,19	***	-0,17	***				
$\Delta\beta_{14}$	LOF_i*V96																
$\Delta\beta_{15}$	LOF_i*V97																
$\Delta\beta_{16}$	LOF_i*V99					0,33	***										
$\Delta\beta_{17}$	LOF_i*V00					0,34	***										
$\Delta\beta_{18}$	LOF_i*V01	-0,10	*			0,41	***	-0,17	**								
$\Delta\beta_{19}$	LOF_i*V02	-0,10	*			0,41	***			-0,06	**						
$\Delta\beta_{20}$	LOF_i*V03					0,38	***										
Adjusted R^2		0,86		0,90		0,86		0,83		0,84		0,90		0,84		0,93	
Hausman Test (p-value)		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.

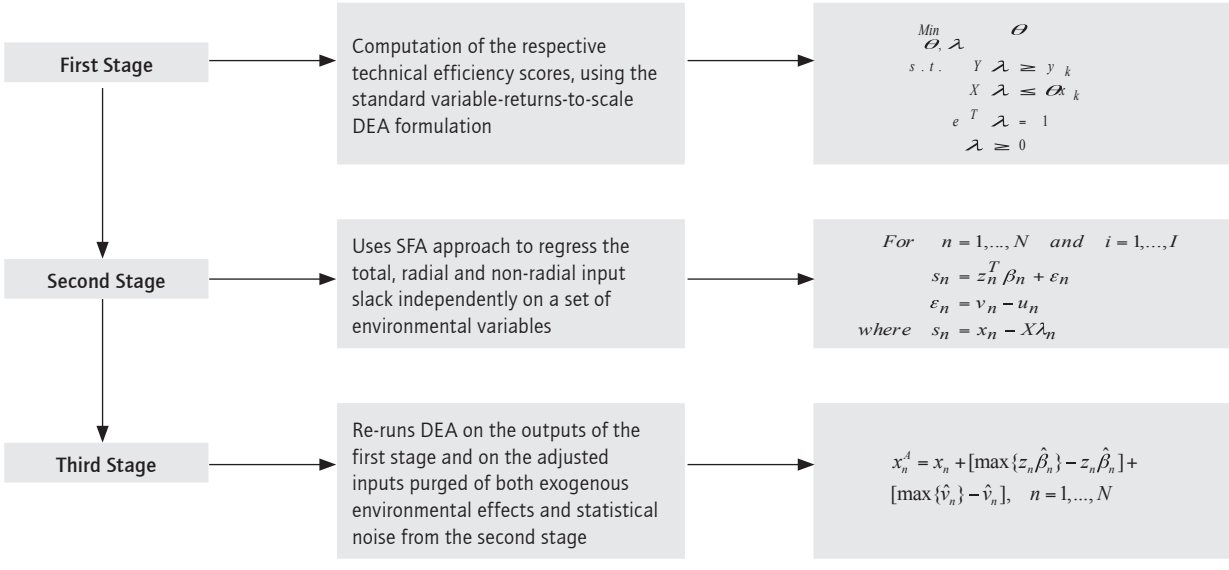
The impact of the firm's ownership structure on operating efficiency

To further explore capital/labour factor differences between LOFs and PCFs, we assess the extent to which technical efficiency variations between LOFs and PCFs are due to differences in capital ownership structure. To differentiate the two terms, observe the following definitions. An economic unit "is said to be fully efficient, if and only if it is not possible to improve any input or output without worsening some other input or output." [Cooper, et. al., 2000: 45]. In other words, technical efficiency measures the ability of each firm to transform the minimum possible number of units of its own resources into the maximum possible levels of outputs. Our review of the literature reveals very few empirical studies comparing the efficiency of LOFs and PCFs, even though the importance of technical efficiency on the growth of firms is well established (e.g. Callejón and Segarra, 1999; Arauzo and Segarra, 2005). The main papers include Sexton and Iskow (1993), the meta-analysis made by Doucouliagos (1997), Salazar and Galve (2007) and the recent paper by Maletta and Sena (2008), all of which find scant differences between the two types of firms. The literature attributes the lack of research on the efficiency of LOFs to their small size (Taymaz, 2005; Fritsch, et al. 2006; Taymaz and Köksal, 2006) and to differences in their capital ownership structure (Dow, 2003; Park et al. 2004).

The methodological basis for this analysis consists of the three-stage DEA-SFA (Data Envelopment Analysis / Stochastic Frontier Analysis) model of Fried, et al. (2002). With this approach, it is possible to separate three sources of variation in firm performance: statistical noise, environmental factors and pure inefficiency. Figure 2 summarizes this three-step decomposition approach. In the first stage, technical efficiency scores are calculated applying the DEA method using input minimization with variable returns to scale. Outputs and inputs for this stage were selected based on related research (e.g. Ahuja and Majumdar, 1998). The only output is Value Added, defined as profits before interest and taxes, plus amortization and labour costs. There are three inputs: Fixed Assets (FA) as a proxy for capital; Labour, measured as the number of employees in each firm; and the Solvency Margin, λRISK of (1), as a proxy for each firm's risk exposure. The second stage consists of a stochastic frontier analysis, in which the first-stage efficiency indicators, used as dependent variables, are decomposed in three parts. One relates to the set of uncontrollable inputs otherwise denoted as environmental variables, used here as the independent variables. The latter include *Age, LOF, IND*, defined in Table 2 and *SIZE*, which takes a value of 1 if the firm in question is a micro firm and 0 otherwise. Another component, the v_is in Figure 2, represents the statistical noise and the third, the u_is, corresponds to the pure managerial efficiencies of interest in this section. Finally, in the third stage, DEA is rerun using the output from stage 1 and inputs adjusted for environmental effects and statistical noise of the second stage. This process yields a set of pure efficiency measures, devoid of the pernicious effects of statistical noise and environmental factors.

Figure 3 graphically depicts the efficiency comparisons between Stage 1 and Stage 3, from 1997 to 2003, while Table 4 numerically justifies the use of Stage 2. From these and the more comprehensive numerical results in Melgarejo, et al. (2008), our analysis of the empirical evidence

FIGURE 2. The three–stage DEA–SFA Model



may be summarized as follows. First, the evidence clearly indicates that the decomposition has led to statistically higher efficiency scores in the final stage. The increase in efficiency provides indirect validation of the three-stage decomposition model, as it unmistakably shows the substantial degree of underestimation in efficiency that occurs if the impact of the environmental variables and of uncertainty has not been taken out. Separating the firms according to capital-ownership structure does not lead to statistically significant differences in underestimation.

Second, the data in Table 4 suggest that the second-stage appears to have successfully decomposed the efficiency estimates into the desired three parts. The p-values indicate that the estimated coefficients of the environmental variables are statistically significantly different than zero,

FIGURE 3. Comparative evaluation of the efficiency scores: geometric means

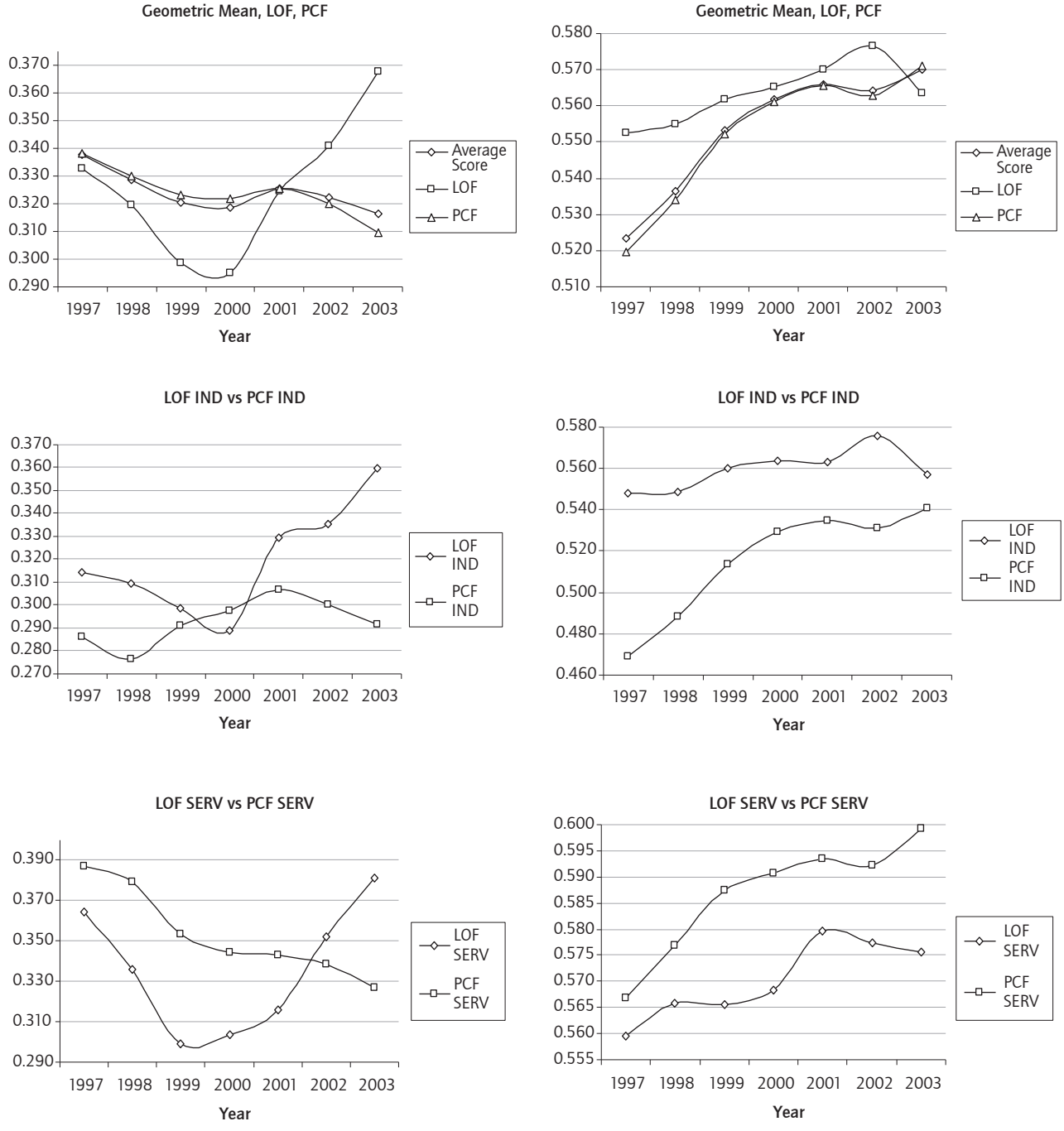


TABLE 4. Stage 2 Stochastic Frontier regression results

Variable	Slack-λ RISK		Slack-Fixed Assets		Slack-Employment	
	coef.	*p-value*	*coef.*	*p-value*	*coef.*	*p-value*
Constant	0.56	0.00	953.06	0.00	25.42	0.00
Age	0.01	0.00	17.98	0.00	0.28	0.00
LOF	0.07	0.00	100.04	0.00	-2.63	0.01
IND	0.00	0.86	80.27	0.00	8.57	0.00
Size	0.02	0.23	-599.32	0.00	-6.72	0.00
Lambda	3.67	0.00	2.59	0.00	4.45	0.00
Sigma (u)	0.37	0.00	651.09	0.00	20.29	0.00
Log-likelihood function	1650.28		-17556.45		-7883.74	

for practically any significance level. The only exceptions are IND and SIZE for the *Slack-λ-RISK* variable. Also the statistical significance of Lambda and Sigma for all slack variables suggests that a high proportion of the variability can be attributed to technical inefficiency, which helps to justify Stage 3 results.

Third, the Stage 3 evidence in Figure 3 reveals that the efficiency scores exhibit very low values and wide dispersion, especially among PCFs, even when the trend reverses in 2003. Fourth, these increases are relatively smaller at the lower end of the efficiency scale than at the higher echelons, with a corresponding impact on the skew of efficiency distribution. Fifth, even if the average LOF is more efficient than its average PCF counterpart, in both the industrial and service sectors and overall, the hypothesis that the average firm, be it LOF or PCF, is equally efficient cannot be rejected. Sixth, from data not presented here (Melgarejo, 2008), there are very few firms of either type on the efficiency frontier. Nevertheless, there are more efficient PCFs, especially in the last three years. In fact, no LOF from the service sector appears on the frontier.

An important implication of this evidence is that the preponderance of low efficiency levels, together with the presence of very few firms on the frontier, has negative effects on the long-term survival chances of this type of firm. It is in line with the high bankruptcy rates normally exhibited by LOFs, as well as the serious competitive problems affecting even the surviving enterprises, due to their small size. It also highlights the need for public policies that would reinforce their efficiency level. Furthermore, the type of correctives needed calls for strengthening investment policies on fixed assets and reinforcing capitalization programs aimed at improving the financial structure of LOFs and particularly their debt portfolio (e.g. Sexton and Iskow, 1993; Maleta and Sena, 2008). The main objective of such programs is to lower the high opportunity costs incurred by LOFs, as a result of their excessive levels of risk aversion and their corresponding extreme reluctance to acquire external financing, for fear of losing control of their organizations. Assuaging these fears is likely to lead towards the implementation of financial regulation polices aimed at encouraging banks to handle riskier loans.

The impact of the firm's ownership structure on productivity

This section assesses the impact of the firm's capital-ownership structure on its productivity by means of the Malmquist Productivity Index (MPI), a performance indicator used to measure total factor productivity (TFP) changes over the 1994-2003 time period under study in this paper. Based upon the definition of efficiency in the previous section, we can now characterize Productivity as the rate at which an economy transforms its inputs into outputs, regardless of the efficiency of that transformation.

The MPI's computational unit of interest is the distance function, developed by Shephard (1970) as an alternate descriptor of production technology. Its popularity stems from interest in the estimation of technical efficiencies for cases where price information is not available or the standard microeconomic assumptions related to cost and revenue functions do not hold (e.g. Coelli et. al., 2005). The starting point for developing the expression for the MPI is a production technology characterised, for each period t =1,2,...,T, by (i) an input vector, $X^t \varepsilon R^N$, and an output vector, $Y^t \varepsilon R^N$; (ii) the set of all feasible inputs and outputs, as defined by the graph, GR^t, of the production technology, which in turn defines $P^t(x^t)$, the production possibility set, which is closed, bounded, convex and satisfies the assumption of strong disposability of inputs and outputs and where

$$GR^t = \{(x^t, y^t) : x^t \text{ can produce } y^t\}$$
$$P^t(x^t) = \{y^t : (x^t, y^t) \in GR^t\}, \quad t = 1, 2, \ldots T \qquad (2)$$

and (iii) an output-oriented distance function, which represents the technology defined in (2) as follows:

$$D_r^t(x^t, y^t) = \min\{\theta : (y^t/\theta) \in P^t(x^t)\} = [\max\{\theta : (\theta y^t) \in P^t(x^t)\}]^{-1} \le 1, \quad t = 1, 2, ..., T; \quad r = c, v \tag{3}$$

where a subscript of *r=c* denotes computations of the output distance function under constant returns to scale (CRS), whereas *r=v* implies that no scale restriction has been imposed and hence a variable returns to scale (VRS) technology is feasible. The first right-hand side (RHS) of (3) depicts Shephard's (1970) output distance function, as being representative of the technology defined in (2). The second RHS of (3) links this function to Farrell's (1957) index of technical efficiency and thus to its estimation through DEA methodology (e.g. Coelli, et al., 2005). $D_r^t(x^t,y^t)=1$ if y^t is located at the frontier or outer isoquant border of $P^t(x^t)$. The DEA formulation is also straightforward (e.g. Coelli, *et al.*, 2005):

$$[D_r^t(x^t, y^t)]^{-1} = \text{Max}\,\theta, \text{ for each } r = c, v; \; n = 1, 2, \ldots, S; \; t = 1, 2, \ldots, \; \theta \in (0,1] \quad \text{subject to Stage 3 constraints from Figure 2} \tag{4}$$

Once the procedure for computing the distance functions has been established, the methodology of this paper calls for computation of the Generalized Malmquist Productivity Index (GMPI) of Grifell-Tatjé and Lovell (2000). The GMPI uses $D_r^t(x^t,y^t)$ as the basic unit of measurement (i) for estimating the productivity change between year t and t+1, under any returns-to-scale technology, be it VRS (r=v) or CRS (r=c); and (ii) for its decomposition into three factors: technical efficiency change (TEF), technical change (TCHT) and a scale effect (RES). The first factor, TEF, measures the extent to which the firm in question is able to move up, i.e. catch up, to the level of its more productive rivals, thereby reflecting how far away it is from the efficiency frontier. TEF ranges in value from <1, 0, >1, signalling the extent to which a period of decline, stagnation or growth, respectively, from year t to year t+1, can be attributed to decreases, no change, or increases, respectively, in technical efficiency. The second factor, TCH, measures to what extent the firm's innovative capabilities are able to contribute to changes in productivity over time. Thus, its value reveals the extent to which a period of decline, stagnation or growth, respectively, from year t to year t+1, can be attributed to technical progress, be it negative (TCH<1), no change (TCH=0), or positive (TCH>1). The third, RES, measures the effect on productivity of the economies of scale exhibited by the firm in question, through a comparison of productivity changes from a given year to the next under CRS and under VRS. The product of TCH and TEF gives the MPI, which has been shown (e.g. Coelli, et al., 2005) not to accurately reflect productivity change under non-constant returns to scale. The GMPI solves this problem through computation of the scale effect, RES. The expressions for the GMPI and for its various components are given next (e.g. Coelli, et al., 2005):

$$\begin{aligned} GMPI^t(x^t, y^t, x^{t+1}, y^{t+1}) &= MPI^t(x^t, y^t, x^{t+1}, y^{t+1}) RES^t(x^t, y^t, x^{t+1}) \\ MPI^t(x^t, y^t, x^{t+1}, y^{t+1}) &= D^t(x^{t+1}, y^{t+1}) / D^t(x^t, y^t) \\ &= TEF^t(x^t, y^t, x^{t+1}, y^{t+1}) TCH^t(x^{t+1}, y^{t+1}) \\ RES^t(x^t, y^t, x^{t+1}) &= \frac{D_c^t(x^{t+1}, y^t) / D^t(x^{t+1}, y^t)}{D_c^t(x^t, y^t) / D^t(x^t, y^t)} \\ TEF^t(x^t, y^t, x^{t+1}, y^{t+1}) &= D^{t+1}(x^{t+1}, y^{t+1}) / D^t(x^t, y^t) \\ TCH^t(x^{t+1}, y^{t+1}) &= D^t(x^{t+1}, y^{t+1}) / D^{t+1}(x^{t+1}, y^{t+1}) \end{aligned} \tag{5}$$

A graphic representation of the productivity changes throughout the 1994-2003 period under study appears in Figure 4. It contains one graph with the GMPI and its three components, for each of the years from 1998 to 2003 and four others, with each of the five productivity indices, GMPI, MPI, TEF, TCH and RES. According to the first graph, the GMPI fluctuations indicate an overall decrease (GMPI<1), from 1999 to 2001, in the average annual productivity growth rate of all firms, regardless of their capital-ownership configuration, followed by a slight expansionary period (GMPI>1) from 2001 to 2003. Such changes clearly follow the same pattern as the average firm's scale efficiency (RES). Furthermore, observe that the substantial rises in GMPI due to the improvement in innovative capabilities (TCH) that has occurred since 1999 have almost been cancelled out by corresponding decreases in the catching up efforts (TEF) of the average firm and by the scant effort made by most of the firms, after 1999, to move towards the efficiency frontier (TEF). In fact, the LOF/PCF comparison in the average TEF rates indicates a step backward in that goal for both types of firms, especially after 2000. Consistent with the evidence from section IV, the regression is slightly less pronounced for PCFs, which helps explain the higher (lower) number of efficient PCFs (LOFs) and the lower (higher) rate of very inefficient PCFs (LOFs).

The joint effect: Firm growth/size vs. Efficiency

The current study has so far analyzed whether differences in the capital ownership configuration have a separate and differential effect on the growth (hence on the size) and on the efficiency/productivity of LOFs and PCFs. In this section we examine whether a joint effect is also present. The rationale for such an endeavour is simple. Even if the literature does not normally focus on growth as a primary business objective, it does so as a way to achieve other goals, by internally promoting higher returns regarding production factors, increasing efficiency or responding to a competitive environment that requires firms of all sizes to

expand in order to sustain future competitiveness (Canals, 2000). The likely or expected outcome of these efforts is to ensure the firm's organizational survival over time, by avoiding unforeseen circumstances and risks (Bueno, et al. 1991). Moreover, profit and growth are, if possible, even more closely interrelated for small firms, because most of the profit will remain in the firm in the form of self funding. It is in this case, as noted by Penrose (1995), that profit and growth may be treated as equivalent goals. Furthermore, some authors (e.g. Whetten, 1987) also assume efficiency to be the equivalent of firm growth, namely a means for increasing their size.

FIGURE 4. Comparative evaluation of the Generalized Malmquist Index and its decomposition

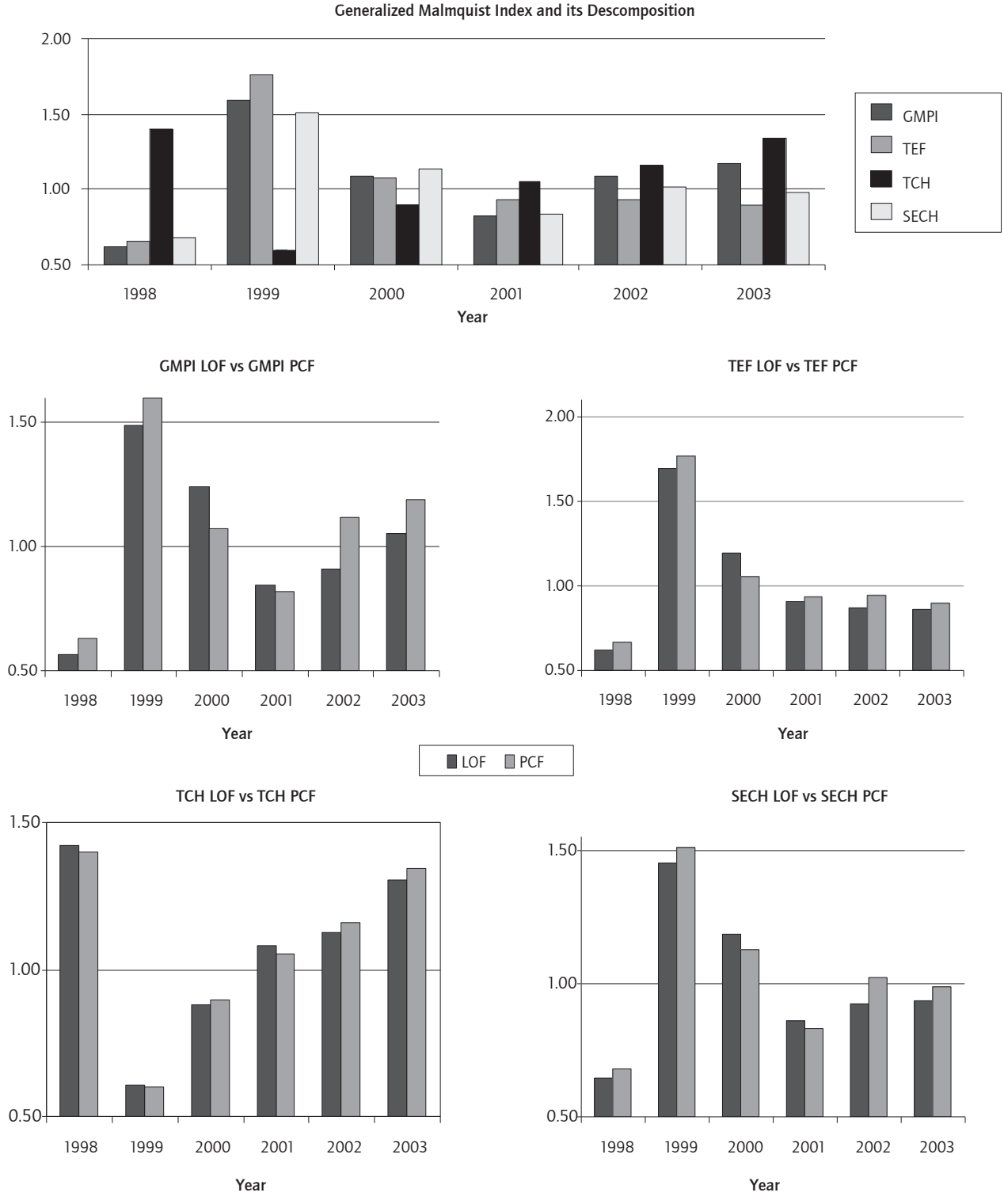


TABLE 5. Efficiency vs. Growth (Spearman Correlation)

	1998	1999	2000	2001	2002	2003
LOF	-0.09	-0.17	-0.13	-0.15	0.08	-0.04
PCF	0.05	0.09	0.06	0.01	0.09	0.13*
LOF IND	-0.01	-0.19	-0.35	-0.19	0.17	-0.17
PCF IND	-0.02	0.11	-0.03	0.08	0.07	0.06*
LOF SERV	-0.36	-0.03	0.09	-0.11	-0.21	-0.08
PCF SERV	0.13	0.12	0.13	-0.04	0.07	0.19*
LOF Micro	-0.04	-0.14	-0.08	-0.20	0.12	-0.02
PCF Micro	0.06	0.12*	0.14*	-0.03	0.08	0.08
LOF Micro IND	0.06	-0.11	-0.28	-0.28	0.20	-0.16
PCF Micro IND	-0.12	0.19*	0.08	0.04	0.00	0.00
LOF Micro SERV	-0.28	-0.09	0.09	-0.12	-0.15	-0.11
PCF Micro SERV	0.22*	0.12	0.19*	-0.09	0.11	0.12
PCF Small IND	0.19	0.03	-0.22	0.20	0.23	0.16
PCF Small SERV	0.03	0.24	0.16	0.30	0.00	0.56*

* Significant at 5%

We have carried out preliminary statistical tests of the existence of this size-growth-productivity relationship, by taking Spearman's coefficient of correlation between the rankings obtained by Value Added, a financial performance indicator, used in the growth and productive efficiency analysis in sections III and IV, respectively. Table 5 lists the correlation coefficients between the two sets of rankings of firms grouped by capital ownership structure, sector and size. The results from the Spearman correlation coefficients show that there is no relationship between variables, insofar as the correlation coefficients for the period 1998 to 2003 are very low, suggesting the existence of only weak dependence, if any, between the variables. Logically, the p-values for the null hypothesis of zero correlation are above 0.05, thus rejecting the hypothesis of mutual dependence. Some exceptions are found for PCFs, but with a very low correlation coefficient. In view of the above, we are led to conclude that, in LOFs and PCFs alike, firm growth is not directly related to efficiency levels or firm size. In short, this reasoning should lead to the formulation of more solidly grounded working hypotheses for use in confirmatory research to test the relationship between firms' ownership structure, size, growth and efficiency.

Some concluding comments and avenues for further research

The main conclusion of this study consists in rejecting many of the relationships posited by economic theory with respect to the impact of capital-ownership configuration on operative performance, on growth and on efficiency/productivity, as these hypotheses do not correspond to the successful performance of LOFs in Navarra. In fact, LOFs can be said to be in a more favourable competitive position than PCFs and are an obvious option as a legal structure for collective entrepreneurs in a Social Economy context. The evidence on productivity suggests an expansionary period at the end of the time period under consideration, due primarily to the increasing innovative capabilities of the firm, but hampered by the substantial difficulties both LOFs and PCFs experience in reaching the efficiency frontier, even though the scale factor shows signs of becoming a positive influence on productivity.

Our research indicates several avenues for further research that may lead to testable propositions in support of our main finding. The first avenue lies in improving the selection of performance indicators more in tune with the specific firm characteristics that accompany the two types of capital ownership, thereby placing greater emphasis on long-term considerations. These indicators should take into account that differences in capital ownership structure bring about changes in capital and labour remuneration systems, which, in turn, have an impact on the performance reports generated by LOFs versus those for PCFs and on the selection of financial indicators of firm performance. Thus, the empirical evidence leads us to believe that the traditional indicators used to measure firm performance in LOFs and also used by financial service companies in business risk analysis are not completely accurate and may be threatening firm survival. That same evidence also leads us to conclude that the more appropriate indicators of firm performance in LOFs include ROA, EBITDAA, LR, ZRISK and IRISK.

A second possibility for further research is the attempt to disentangle the impact of size from that of organizational structure. The evidence indicates that small size is an obstacle to growth and competitiveness, regardless of the

type of capital ownership structure. However, despite the lack of evidence of capital ownership structure playing a major role in growth and efficiency performance, it is nevertheless true that LOFs and PCFs need to improve their growth and efficiency levels. Our preliminary attempt to look into this size/organizational structure dichotomy has been primarily hampered by the difficulty of finding a sufficiently large sample of medium and large LOFs. In the case of Navarre, this is an impossible task, since we have found only two medium-size LOFs and none of larger size.

Another interesting research opportunity, closely related to the previous one, is the possibility for deeper analysis of the high variability of firm performance levels that characterizes the small and micro firms of this study with the aim of determining the extent to which such variability reflects only uncertainty and not risk, and the role played in this characterization by differences in the capital ownership configuration.

Further research prospects centre on explaining why differences in the capital ownership structure of LOFs and PCFs do not play a very significant role in their performance efficiency. Nuñez-Nickel and Moyano-Fuentes (2004) attribute such results to the cooperative nature of LOFs serving as a competitive buffer against business practices of firms with alternate organizational structures. Furthermore, the trend towards low efficiency levels, few efficient firms and high disparity in efficiency appears to be the norm for firms of this size (e.g. Roca and Sala, 2005). This leads us back to the issue of exploring the extent to which small size or different capital-ownership structures are responsible for this state of affairs. In addition, a testable explanation as to why there are fewer LOFs than PCFs on the efficiency frontier may stem from the fact that LOFs' policies towards fluctuations in Value Added are reflected in changes in personnel expenses, rather than through changes in the labour force, whereas PCFs behave in exactly the opposite manner. As a result, a substantial majority of any LOF labour force is composed of worker-owners, who cannot legally be fired. Thus, modifications in the labour force composition of LOFs occur only through adjusting the number of non-owners, a relatively insignificant adjustment, which does not normally suffice to explain the more substantial changes in output. On the contrary, PCFs can and do fire workers, in response to decreases in VA and thus use their resources somewhat more efficiently than LOFs. In fact, this line of thought hints at the possibility that their objective function may lead LOFs further away from the efficiency frontier, thereby further hampering their growth prospects. Nevertheless, their small size still causes both types of firms to be quite inefficient, which again raises the prospects of small size vs. organizational structure as explicators of such behaviour. The study of these and other issues justifies additional research.

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