May. 1997

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Working Paper # 97/2

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FEBRUARY, 97

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DETERMINANTS OF OWNERSHIP STRUCTURE:

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In this paper we investigate the determinants of the ownership structure by examining a sample of publicly traded firms in Spain. We introduce a panel data approach to account for time and cross section variables. We first present the firms' characteristics that are able to explain different levels of ownership concentration, (Demsetz and Lehn, 1985, and Prowse, 1992). Size of firm is introduced as a lagged explanatory variable of ownership concentration. Noise environment imposes difficulties in monitoring these firms, and therefore, higher levels of ownership concentration are required. The existence of a regulator of the activity of the firm requires less control and permits lower levels of ownership concentration. Our results are consistent with previous research. We find negative relation between size and ownership concentration, even if we account for different type of owners like individuals, Spanish firms, foreign investors and financial stockholders. We also find negative relation with firm specific volatility of equity returns, a proxy of noise environment. There is no significant link between regulated firms and ownership concentration.

Our time approach in explaining the determinants of the ownership structure includes the variation of stock market index as a proxy for non firm specific business conditions. We compute a fixed effect model accounting for size, noise environment and stock market evolution. Our tests support the firm specific fixed effects model. As main result we find a not negative relationship between size and ownership concentration for all types of shareholders, except individuals. This evidence suggests that as firm size grows, the significant shareholders increase their participation. The variance of firm returns, only affects the ownership concentration level of foreign investors. These investors also perform in the way the stock market index does: increasing their participation in a growing period and decreasing when the stock prices drop. When accounting for firm specific effect we do not find differences in ownership structure between regulated and non regulated companies.

Keywords: Corporate Governance, Ownership Structure,

JEL classification: G32

This paper is part of a DGCYT funded project, number PB 94-0708. Financial support also was provided by Fundacion Conde de Barcelona. The author is grateful to Vicente Salas, Rezaul Kabir, Luc Renneboog and seminar participants at Tilburg University, and KU Leuven for helpful comments. A preliminary version of this paper has also been presented at XI Jornadas de Economia Industrial; and Dep. Economia Empresa UAB. I am grateful to Raquel Carrasco for her comments. I am indebted to Elias Lopez of CNMV for providing data. The usual disclaimer applies.

1. Introduction

The separation of equity holders from management through the financial markets can generate costs that would affect the returns of firms. Those costs arise from the lack of effective monitoring of managers, which counterbalance free management decisions and the necessary control to prevent abuse of power. These costs are also connected with problems of shareholders' information, free rider behaviour, and their preferences for advantages as liquid markets and diversified portfolios.

The debate on the effects of the separation of ownership and control in large firms has been addressed both theoretically and empirically. The research interest is mainly on the relationship between firm performance and ownership structure. The identification of the problem as we know was introduced by Berle and Means (1932). Theoretical examinations of Jensen and Meckling (1976) and Fama and Jensen (1983) and the empirical approach of Demsetz and Lehn (1985) are widely accepted as the origin of the debate.

Our reference point is the Demsetz and Lehn's research on the causes and consequences of the structure of corporate ownership. There is a wide variation of equity ownership in different companies, which are interested in frequent transfers of shares to provide investors' liquidity. This suggests frequent changes in ownership structure

We also observe that the structure of ownership varies over time. The ownership structure of a given firm is modified through stock exchange operations. The identity of shareholders differs across companies: corporations, individual shareholders, financial companies, institutional shareholders, state owner, and their amount of shares fluctuate over time. Therefore, we address our research in a dynamic way, incorporating a time serial approach to the classical cross sectional view on this topic.

The purpose of this study is in line with the objective of Demsetz and Lehn (1985) and related research: to explore the forces that influence the structure of corporate ownership. The aim is to discuss the advantages and disadvantages of diffuse shareownership. Which variables can explain changes of ownership concentration among companies? Do the benefits or disadvantages change from firm to firm? These were the questions investigated and we also attempt to revisit.

We focus on some other questions too, such as: Do variables explaining ownership concentration change over time? Do they change from one company to another? Which of them explain different degrees of shareownership over time? How does the ownership structure adapt to changes in cyclical economic conditions? When are the advantages of concentration or diffuseness of shareownership revealed?

This paper tries to answer these questions by examining the ownership structure on a sample of listed Spanish companies in the period from 1990 to 1994. The corporate governance system in Spain can be classified as a non-market oriented system. Using the definition of Moerland (1995), network oriented systems, as those in the European community latinic countries, (e.g. France, Italy, Spain), are characterised by family control, financial holding companies, cross-share holdings and state ownership. In contrast to the research of Demsetz and Lehn (1985), Prowse (1992) and Denis and Denis (1994), we test the existence of differences on the causes of ownership structure in a different corporate governance system. We try to answer questions about the characteristics of ownership structure in Spain. Who are the main shareholders? How important is the shareownership of individuals, cross holding companies, financial firms and foreign investors? Which are the differences and similarities of the determinants of ownership structure when we compare these groups? Do they perform in the same way over time?

First we discuss the determinants of ownership structure. In section 3 we formulate a few hypotheses on the influence of these determinants and its structure over time. We present the data, and summary statistics in section 4. The following section describes methodological aspects and the results. The last section presents conclusions.

2. Determinants of ownership structure

Many factors affecting ownership structure have been proposed since Demsetz and Lehn research until now. We revisit some of them and suggest the introduction of time determinants to this cross sectional view.

2.1 The size of the firm

The consideration of firm size as a determinant of ownership concentration is the basis of the hypothesis that ownership structure will adjust to the size of the firm in a way that maximises the firm's value. As a firm becomes larger, its ownership concentration decreases since the cost of

getting a given fraction of ownership becomes higher. This factor has been studied taking into account how different firm sizes affect ownership concentration on cross section data. Holderness and Sheehan (1988) find that ownership concentration is inversely related to firm size. They also report that firms with individual majority shareholders are usually smaller. Firms with corporate majority shareholders, in contrast, are larger. Demsetz and Lehn (1985) detected that the size of the firm was negatively related to ownership concentration. Similar results are provided by Prowse (1992). Bergstrom and Rydqvist (1990) provide empirical evidence on a sample of Swedish listed corporations: ownership concentration decreases with firm size.

However, the size of firms is not static over time. Consideration of risk aversion suggests that increments in shareownership have to come together with a risk compensating premium. Will this cross-section feature of inverse relation between size and ownership concentration hold over time?

2.2 *The monitoring of owners*

In the context of agency problems, the assumption of inefficiencies in monitoring by the managerial labour market or by the market for the corporate control, leads us to other components to reduce the agency costs.

The term *control potential* of the firm, used by Demsetz & Lehn (1985), refers to the potential gains from an accurate monitoring by shareholders over management behaviour, that is firm performance. The firm environment is the key to evaluate the degree of control over manager's performance. The argument is that firms in noisier environments, where there is instability in prices, technology, market shares, etc. present situations in which it is more difficult to supervise managers' decisions. How noise environments affect ownership structure? The more stable conditions require lower levels of ownership concentration for a given monitoring level. In an inferior stable environment the potential benefits of monitoring come from higher ownership concentration levels.

This argument is specially relevant when a dynamic approach is incorporated. The cyclical movements of the economy over time have periods of higher instability of share prices and sometimes lower degrees of instability. These changes can modify the way ownership structure accommodates the maximum value of the firm.

The panel data approach to the problem allows us to exploit other sources of instability than firm specific ones. Demsetz and Lehn (1985) considered as measures of instability those related to the specific risk of the company as fluctuation of accounting profit rates, or stock market rates. We incorporate other sources of instability, connected to the economy wide events and out of firm control. Fluctuations in the economy can be captured when the approach to the problem takes into account changes along time.

2.3 Other determinants

Other factors such as regulation or ability to influence firm's output were included as explanatory variables of the causes of ownership structure. We can consider the effect on the ownership structure by making differences between regulated and non regulated firms. This is a cross section attribute, since the activity of the firms does not change over time. The presence of a monitoring office imposes control over the management activity, and therefore, we expect wide ownership structures.

3. Hypothesis

The empirical findings of Demsetz and Lehn (1985), Bergstrom and Rydqvist (1990) and Prowse (1992) confirm a negative relation between firm size and ownership concentration. The paper begins by examining if this is also applicable to our data set.

The introduction of the panel data approach of the problem, suggests to consider some effects of the firm size variation over time for the ownership structure. As we expect to find lower level of shareownership in big companies compared to small ones; moreover this behaviour would continue over time when company size increases. The wealth constrain that operates across firms is expected to persist over time.

Hypothesis 1

There should be an inverse relationship between size of the firm and the level of ownership concentration.

The size of companies can be a restriction for some categories of shareholders, but other shareholders can not be constrained by the size of their investment in a given company. The

results of Prowse (1992) suggest this hypothesis. Likewise, Demsetz and Lehn (1985) found higher negative relationship for individual shareholders than for financial ones.

Hypothesis 2

The influence of size on the ownership structure is expected to be higher for individual investors than for holding or financial companies

All measures of environment instability used by Demsetz and Lehn (1985) were positively related to the degree of ownership concentration. Bergstrom and Rydqvist (1990) found that ownership concentration increases with firm-specific risk. In a subsample of Prowse (1992) research, three measures of profit instability were positively and significantly related to ownership concentration.

When the specific risk affecting firms changes, we expect different ownership structures. Even when the conditions of environment stability change over time, there would be a response for each firm as ownership structure adapts to the new situation.

Hypothesis 3

Ownership concentration increases over time when more firm specific instability conditions appear.

Widespread ownership means that shareholders diversify their investments to assume lower financial risk levels. A recession may induce firms to choose a more dispersed ownership structure as a way to lower risk exposure. An increase in the economic activity, associated with less uncertainty, would imply higher ownership concentration ratios[1]. Nevertheless, in the context of separation among owners and managers, the alternative hypothesis would be that recession induce higher ownership concentration to strengthen the internal control needed to reduce costs.

Hypothesis 4

The stage of the economic cycle over ownership concentration of firms reflects the lower risk

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[1] In a different context, Choe, Masulis and Nanda (1993) argue that the preference for use of stock financing corporate acquisitions are influenced by the business cycle conditions. Their arguments are that increases of stock financing are explained by lower adverse selection costs, more promising investment opportunities and less uncertainty.

exposure when the business cycle conditions are negative (dispersion) and higher concentration ratios when favourable opportunities arise.

Prowse (1992) identifies that financial institutions are largely responsible for the positive relationship between ownership concentration and profit instability in independent Japanese firms. We are able to determine for different type of shareholders the influence of firm specific return's instability.

The firm belonging to a regulated industry was found by Demsetz and Lehn (1985) as an explanatory variable for lower degrees of ownership concentration. Following their findings we expect similar results. That is, the systematic regulation of a firm by economic authorities or public agencies requires lower level of monitoring by its owners, and therefore permits higher ownership dispersion. Bergstrom and Rydqvist (1990) findings support the hypothesis that the government subsidises the monitoring of management in regulated industries, measured through a dummy variable for financial firms.

Hypothesis 5

The level of ownership concentration should be lower in firms of regulated sectors than non regulated firms.

4. Data description

The available information covers a period that starts in the beginning of 1990 up to the end of 1994, and contains data about companies traded in the Spanish Stock Market. The data contains information on equity ownership structure, equity returns and financial statements reported by the companies to the stock market regulator.

The data on equity ownership structure enables us to identify different shareholders and, furthermore, the stockholder share on equity. The information is collected by the CNMV (Comisión Nacional del Mercado de Valores), which is the institution in charge of monitoring the performance of Spanish stock markets. The Spanish law requires shareholders to report information on every significant amount of shares held (beyond 5%). Also, every significant variation in the equity structure, that is, any additional trade resulting in a variation from the previous situation beyond that 5%, has to be reported. We have also data of board member's ownership even though these are less than 5%.

We are also able to determine the amount of capital in the hand of the largest shareholder, and the evolution of this participation over time. The construction of concentration indexes allows us to add up the shares of the n largest shareholders.

The sample we have is formed by a panel data of 72 non financial companies (except banks). The panel covers 20 quarterly periods ranging from the first in 1990 until the fourth in 1994. The sample selection process started with 238 companies for which data on ownership concentration was available. However, omissions in reporting sells of significant amounts of equities mean that, for some companies, the ownership structure available was not reliable (more than a 100% of shares). These firms were removed. The lack of accounting data for some companies also implied reduce the number of firms in our sample. Finally, when computing the standard error of quarterly returns, low trade frequencies for some companies (less than 10 trading days on a quarter period) suggested to eliminate them. Our final Sample covers 72 companies, which represents 76.7% of the trading volume of Madrid stock exchange and Electronic stock market.

We have constructed a concentration index with the amount of shares held by the five highest shareholders in each company on a quarterly basis[2]. This concentration index is applied to the overall sample ($S5_{it}$), denoting the five highest shareholders. $I5_{it}$ refers to the five largest individual shareholders, $NI5_{it}$ denotes the five highest non individual shareholders. Out of non individual shareholders, we computed the amount of shares held by the five largest Spanish companies, ($SP5_{it}$) and the five largest foreign investors ($FOR5_{it}$). Finally, $F5_{it}$ denotes the five largest financial Spanish companies as shareholder, a definition included in $SP5$. The classification by type of owners has been done according the capacity to indentify differences of owners in our data set. Table 1 shows the firm's ownership concentration used, at the beginning and at the end of our sample period, grouped by industry.

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[2] We use the shares hold by the five largest shareholders in order to homogenize our measure with related research. Alternative measures as *S3* (the amount of shares owned by the three largest shareholders) are highly correlated with *S5*.

TABLE 1.

OWNERSHIP CONCENTRATION (*S5*) BY INDUSTRY

		1990				1994			
Sector	number	mean (%)	min. (%)	max. (%)	STD	mean (%)	min. (%)	max. (%)	STD
Primary, Energy	11	35.84	5.36	93.20	0.313	50.27	7.59	93.20	0.265
Chemical, Cement	11	55.55	0.02	92.68	0.312	67.47	5.95	97.15	0.275
Heavy Industry	12	41.58	8.96	92.60	0.306	54.83	22.39	94.11	0.253
Manufacturing	12	41.39	10.96	83.43	0.221	49.07	0.05	94.22	0.280
Construction	5	40.66	5.76	59.70	0.303	49.93	23.25	71.72	0.178
Commerce	2	37.03	13.03	61.03	0.339	79.79	65.25	94.33	0.206
Transport	4	41.74	16.35	72.79	0.246	50.66	27.77	73.24	0.187
Banks	15	46.30	0.48	87.29	0.317	52.32	5.51	97.77	0.344
Full sample	72	43.61	0.02	93.20	0.284	54.70	0.05	97.77	0.273

The average of ownership concentration among different sectors, ranges from 35% to 55%. All cases show an increase in the level of ownership concentration from the beginning of 1990 to the end of 1994.

This evolution of ownership concentration can also be expressed also changes in the distribution of concentration at the beginning and the end of the period analysed (table 2).

TABLE 2

SAMPLE DISTRIBUTION OVER THE FULL SAMPLE IN 1990 AND 1994

S5	1990	1994
Value	% of companies	
less 25 %	34.78%	20.83%
between 25% and 50%	21.74%	23.61%
between 50% and 75%	27.54%	31.94%
More than 75%	15.94%	23.61%

Table 3 provides summary statistics of ownership concentration, also by different types of investors, and other variables for all companies in the sample period. The comparison of these values with those reported by Prowse (1992) and Demsetz and Lehn (1985) suggests that we

have a higher overall concentration of ownership, significant importance of cross-holding company's participation and an increasing influence of foreign shareowners.

TABLE 3.

SUMMARY STATISTIC FOR 72 FIRMS AND 20 PERIODS (1990-1994) IN SAMPLE

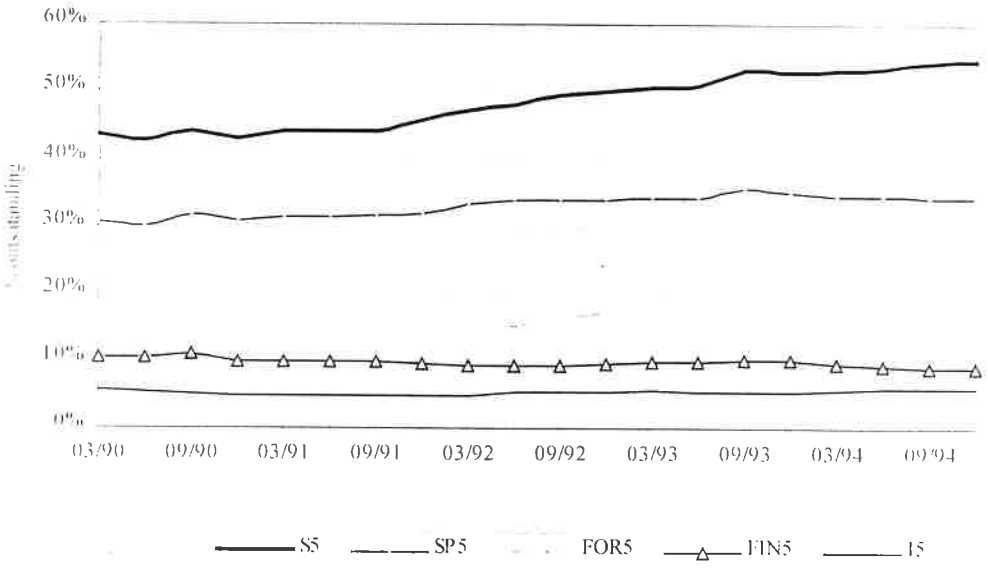
(*SALES* and *ASSETS* in millions Pts.)

Series	Mean	Std Error	Minimum	Maximum
S5	0.482	0.284	0.002	0.978
I5	0.053	0.102	0	0.474
NI5	0.455	0.306	0	0.978
SP5	0.329	0.305	0	0.932
FOR5	0.153	0.274	0	0.978
F5	0.098	0.221	0	0.924
ASSET	170.51	485.89	0.255	3411.64
SALES	126.48	237.52	0.073556	3156.87
RESIDVAR	0.001007	0.003423	0.00001	0.06669
STDQUART	0.0240	0.0219	0	0.29964
REGULATED	0.291	0.454	0	1.00
INDEXM	-0.00381	0.1342	-0.29219	0.28954

The evolution of ownership concentration for the 1990-1994 period is characterised by an increase in the *S5* measure. This can be explained by the ownership of non individual investors in which the group of foreign investors (*FOR5*) is most important. Certainly, during this period there has been a growth in foreign investment, which is reflected by the amount of significant foreign participation in the ownership of Spanish companies included in our sample (Figure 1).

FIGURE 1.

EVOLUTION OF OWNERSHIP CONCENTRATION FOR 72 SPANISH FIRMS. PERIOD 1990-1994



To account for the size of a company, we use two measures: one is the net book value of assets ($ASSET_{it}$), taken from the information reported by the companies to the CNMV. The second measure of firm size is the quarterly amount of sales, ($SALES_{it}$), information also released by the companies to the Stock Market regulator (CNMV).

The stability of the environment in which firms operate is quantified in two ways. Both are firm specific and based on the daily stock return of equity. $STDQUART_{it}$ is the standard deviation of daily returns computed on a quarterly basis. $RESIDVAR_{it}$ is determined by computing the variance of the residuals of a market model[3]. The variance of residuals is computed every three month and is used as a measure of volatility, a proxy of the environment stability.

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[3] A market model $r_{it} = \alpha + \beta r_{mt} + e_t$, explains r_{it}, the daily (t) stock return of company i, in terms of r_{mt}, the stock return of the market, computed over the Madrid Stock Index. The residuals $\hat{e}_t = r_{it} - \hat{\alpha} - \hat{\beta} r_{mt}$ account for the specific return of the company i not explained by the market behavior

We introduce a dummy variable $REGULATED_i$ with value of one for bank and public utility firms, which are under control of the regulators: the Spanish Central Bank for the bank activity and price and investment regulations for the public utilities.

The ownership structure adaptation to changes in the market conditions is computed through the evolution of the Madrid stock exchange index, $INDEXM_t$. Table 4 summarises these variables grouped by different ownership structures, firm size, environment stability, economic cycle and regulation.

TABLE 4.

DESCRIPTION OF VARIABLES.

Ownership Structure	*Size*	*Environment Stability*	*Market Conditions*	*Regulation*
$S5_{it}$ the amount of shares in hands of the 5 largest shareholders every quarter	$ASSET_{it}$ Quarterly data reported by companies. Book net value of assets	$RESIDVAR_{it}$ market model estimation: $r_{it} = \alpha + \beta r_{mt} + e_t$ residuals: $\hat{e}_t = r_{it} - \hat{\alpha} - \hat{\beta} r_{mt}$ quarterly variance of daily residuals	$INDEXM_t$ Quarterly return of stock index of Madrid	$REGULATED_i$ Dummy variable that takes into consideration if the company is a bank or a public utility.
$I5_{it}$ $NI5_{it}$ $SP5_{it}$ $FOR5_{it}$ $F5_{it}$ Individuals, Non Individuals, Spanish Corporations, Foreigners and Financial	$SALES_{it}$ Quarterly amount of sales reported by companies	$STDQUART_{it}$ standard deviation of quarterly returns on a daily basis	$DUMMIES_t$ Quarterly dummies	

5. Methodology and results

Looking at shareholders risk aversion behaviour, and considering firms specific uncertainty, shareholders' decision on the amount of investment in a given corporation is nontrivial. The value maximising behaviour on one side and the potential control of the firm to reduce the

agency costs on the other side, drive shareholders of the companies to different levels of implication. This means we should use the ownership concentration as a dependent variable.

The model we estimate explains the ownership structure of companies for the set of variables revised, and how they behave over time.

Ownership Structure = f(Size, Environment Stability, Economic Cycle, Regulation)

The relation between firm size and ownership structure is presented as "an endogenous outcome of competitive selection in which various cost advantages and disadvantages are balanced to arrive at an equilibrium organisation of the firm" (Demsetz, 1983, pp.384) rather than a test over the convergence of interest hypothesis against the entrenchment hypothesis (Mork, Shleifer and Vishny, 1988). Salas and Galve (1995) explain differences in efficiency between family and non-family controlled firms by introducing firm size as an endogenous variable. They argue that the binomial size-return relationship between owner controlled and manager controlled firms differs. This is supported by Jensen and Meckling (1979) who consider the ownership structure of the firm as a part of the production function. Following this explanation, we use the size as two periods lagged independent variable.

As a first approach we estimate the pooled model. We run an OLS regression, computing robust estimates of the standard errors that allow for a general variance-covariance matrix as in White (1980)[4]. The regressions are presented as a partial pooled models for each of five years of study. These estimations assume that parameters take common values to all firms for all time periods.

By splitting our sample in five subsamples we test the hypothesis formulated above as a priori expectations. The aim is also to compare our results with those reported by cross sectional studies. This first approach to capture possible cross-sectional differences in the parameters between years is confirmed by the value of the chow test (F value = 153.46) of time structural stability in those five years. That is, we reject the null hypothesis that the parameters of the different regressions are the same for 5 subsamples.

These results, reported in table 5, are in line with the findings of Demsetz and Lehn (1985), Bergstrom and Rydqvist (1990), Prowse (1992), and Denis and Denis (1994). There is a negative

[4] We also test the existence of serial correlation through a LM test. For more detail on a LM test in fixed effect models, see Baltagi (1995), pp.93.

and significant coefficient associated to the size of companies, and a positive relationship between our measure of noise environment and the level of ownership concentration. This happens for all five subsample periods, but in some of them the coefficients are not significant. We do not find any significant difference in results between regulated and non regulated companies. The increasing value of the intercept reflects the gorwth of ownersip concentration during our period of analysis. Similar results, not reported here, are obtained when alternative measures for size or environment stability are used.

TABLE 5.

REGRESSION RESULTS FOR OWNERSHIP CONCENTRATION (*S5*). PARTIAL POOLED MODELS.

$$S5_{it} = \alpha + \beta_1 \log(ASSET_{it-2}) + \beta_2 RESIDVAR_{it} + \beta_3 REGULATED_i + u_{it}$$

(Standard errors in parentheses)

	1990	1991	1992	1993	1994
Intercept	0.55***	0.49***	0.51***	0.66***	0.74
	(0.06)	(0.05)	(0.05)	(0.03)	(0.05)
ASSET	-0.0183	-0.0206*	-0.0122	-0.0478***	-0.0592
	(0.0167)	(0.0110)	(0.0112)	(0.0082)	(0.0086)
RESIDVAR	14.09	30.02**	6.5	6.11***	16.27
	(29.92)	(11.85)	(14.48)	(1.73)	(39.22)
REGULATED	-0.058	-0.035	-0.042	0.025	-0.007
	(0.060)	(0.043)	(0.046)	(0.037)	(0.038)
N	122	213	219	226	198
R^2	0.7348	0.7023	0.7278	0.8057	0.8137

*** Significant at 1% level
** Significant at 5% level
* Significant at 10 % level

We examine the results of the regression of ownership concentration by type of shareholders in table 6. First column refers to the pooled model for the total sample. The objective is to identify the existence of differences among shareholders, and their influence explaining the combined *S5* measure. As a main difference with the results reported by Prowse, we find a significant coefficient associated to the size of the company, which implies wealth constraint in their equity investments. The influence of the firm specific stability affects the combined measure of

ownership concentration (*S5*) and with negative value the measure of five largest financial shareholders (*F5*). These results suggest that financial shareholders do not benefit from exerting control over firms in unstable environments.

When the concentration ratio of foreign investors is analysed, we find a negative and significant coefficient associated with the *REGULATED* variable. This means that their positions are strongest in non regulated firms. Inversely, Spanish financial institutions concentrate their ownership on regulated firms rather than in non regulated firms. This can be explained by the fact that banks are included among the regulated industries.

TABLE 6.

REGRESSION RESULTS FOR OWNERSHIP CLASSIFIED BY TYPE OF SHAREHOLDERS POOLED MODELS

$$Type shareholders_{it} = \alpha + \beta_1 \log(ASSET_{it-2}) + \beta_2 RESIDVAR_{it} + \beta_3 REGULATED_i + u_{it}$$

N= 978. (Standard errors in parentheses)

	S5	*I5*	*SP5*	*FOR5*	*F5*
Intercept	0.59***	0.1***	0.37***	0.2***	0.22
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
ASSET	-0.033***	-0.015***	-0.0118**	-0.0062	-0.0501
	(0.0047)	(0.0015)	(0.0055)	(0.0044)	(0.0047)
RESIDVAR	7.53***	0.71	3.07	10.36	-3.69
	(1.77)	(1.13)	(4.72)	(7.04)	(1.86)
REGULATED	-0.01	0	0.02	-0.1***	0.12*
	(0.02)	(0.00)	(0.02)	(0.02)	(0.02)
N	978	978	978	978	978
R^2	0.754	0.301	0.554	0.271	0.323

*** Significant at 1% level
** Significant at 5% level
* Significant at 10 % level

To test whether the parameters explaining the ownership structure stays constant across all firms, we perform an analysis of covariance, following Hsiao (1986). We run an OLS estimation for

each company (the unrestricted model) and test the homogeneity of regression coefficients among companies[5]. When the *S5* ownership concentration measure is analysed[6], the Chow test presents an F value equal to 184.1, which allows us to reject the null hypothesis of homogeneous coefficients between companies, and accept the alternative hypothesis of a different behaviour.

To allow the variation of the coefficients of the model across individuals through the intercept values, two specifications can be done: a random effect model and a fixed effect model. The estimation of the model through the LSDV technique is used to take into account the main firm regularities, considering that they can be correlated with firm specific omitted variables.

After accounting for heteroskedasticity[7], the series have been also weighted for the missing values. The weights are computed by creating a series containing for each firm the value

$$\sqrt{\frac{T_i}{T_i - 1}}$$

where T_i is the number of periods for which firm *i* is observed. Then, a weighted least squares regression is performed[8].

The introduction of the firm specific effect is based on the assumption that the effect of firms specific omitted variables remain constant along time for a given firm, but vary across firms. The variable *REGULATED* has been removed from previous model specifications to account for firm specific effects. Differences between regulated and non regulated companies are assumed to be captured by the intercept. The proxy used to capture the environment stability is now *STDQUART* instead of *RESIDVAR* used in cross section models. The reason is that in the market model specification the assumption is error constant variance Estimating the error T

We test the null hypothesis of $\beta_1 = \beta_2 = \cdots = \beta_N$. The acceptance of this hypothesis would mean that the pooled model presented above is the right specification.

We find similar result for the other types of shareowners defined.

As pointed out by Baltagi (1995, pp.74), assuming homoskedastic disturbances when heterokedasticity is present will still result in consistent estimates of the regression coefficient, but these estimates will not be efficient. Also the standard error of these estimates will be biased unless one computes robust standard errors correcting for the possible presence of heterokedasticity. We computed robusterrors according to White (1980).

For more details on incomplete panel data see M. Verbeek and T. Nijman. (1992)

times just would introduce variation due error estimation. Including these error terms in the fixed effect model would mean cross section variation and time stability.

We assume in the fixed effect model that the firm specific effect is fixed and constant over time rather than a random variable[9]. The significant values of the Hausman test justify this specification, except for the individual shareholders type model (*I5*). The results of the fixed effect model (firm effects) are shown in table 7.

The test to verify the presence of individual effects, that is, to test the null hypothesis, $H_0: \alpha_1 = \alpha_2 = \cdots = \alpha_N = \alpha$, we follow the Ballestra (1992) specifications, and the F value of the proposed test does not allow accept the null hypothesis. (See table 7).

TABLE 7.

REGRESSION RESULTS FOR OWNERSHIP CLASSIFIED BY TYPE OF OWNERS FIXED EFFECT MODELS

$$Type\ shareholders_{it} = \alpha_i + \beta_1 \log(ASSET_{it-2}) + \beta_2 RESIDVAR + \beta_3 INDEXM_{t-2} + u_{it}$$

N= 1005. (Standard errors in parentheses)

	S5	*I5*	*SP5*	*FOR5*	*F5*
ISSET	0.07492***	-0,01054**	0,00052	0,09489***	-0,01637
	(0.0151)	(0.0046)	(0.0148)	(0.0170)	(0,0131)
STDQUART	0.23	0,15*	-0.24	0,43**	-0,1
	(0,18)	(0,09)	(0.21)	(0,19)	(0,06)
INDEXM	0.045*	0.006	0.01	0,055**	-0,006
	(0.025)	(0,006)	(0.028)	(0,027)	(0,015)
R^2	0.063606	0.030207	0,002252	0.105868	0,01215
Individual Effects (F value)	153,80916	136,5291	132,5617	100,4185	212,3366
Hausman	168,3***	10,6*	2,1	168,3***	59,8***

[9] In fact, what the fixed effect model does is to specify that the disturbance of a one way error component model, $u_{it} = \mu_i + v_{it}$, has a fixed parameter μ_i, time invariant which account for any individual specific effect not included in the regression, and a remainder disturbance v_{it}, independent and identically distributed $(0, \sigma_v^2)$.

*** Significant at 1% level
** Significant at 5% level
* Significant at 10 % level

The specification of a fixed effect model on our data presents important differences with the previous evidence on the pooled model. The ownership concentration level grows as the size of company increases (except for the individual shareholders)[10]. This result suggests that once we enforce the model to capture individual effects, through different intercepts for each company, the influence of size variable over the ownership structure cannot be explained in terms financial risk aversion of shareholders. Moreover, based on the Spanish data set, the answer of significant, non individual, shareholders to firm size changes is to reinforce previous positions.

This behaviour may be explained by the existence of control rents or strategic considerations, mainly among Spanish corporations (*SP5*) and foreign investors (*FOR5*). This assertion is also supported by the negative value associated with the asset coefficient of the individual shareholdings (*I5*) equation.

This positive relationship implies that significant shareholders choose to reduce agency costs, by increasing the control over management. The objective of maintaining control, via higher supervision, makes possible larger companies. A way to increase control is through take-over bids: 12 of 72 companies in the sample were involved in formal take-overs. The average difference in bidders' ownership participation before and after the offer was a 25.23% of shares of the target company. The adaptation of the ownership structure that maximises firm's value includes not only significant shareowners, but all investors. Jensen and Meckling (1976) consider how the manager's ownership of large proportion of shares in a company (our proxy is ownership concentration) is a guarantee of correct decisions as a residual claimant of the firm, and as a "informational device for investors". The signalling process is considered also by Leland and Pyle (1977), who consider a signal of profitable behaviour an increase in the ownership of controlling shareholders, guaranteed by the risk of their decisions. Burkart, Gromb and Panunzi (1996) show how monitoring of managers is only done if a single shareholder or a

[10] Bianco, Gola and Sinorini (1995) find a "contrary to intuition" greater concentration of ownership in large firms. They also find that this positive correlation disappears when consider only individuals as shareowners. This evidence is from their correlation indices. Our case is different: we have negative simple correlation coefficients among measures of ownership and firm's size (ranging form -0.06 to -0.2), and our model gives as result positive coefficients.

coalition of them become large enough to internalize the costs of corporate control. Their model explains how situations where only marginal returns greater than marginal monitoring costs, can be associated to increases in initial stakes.

At this point it is important to remark how the fixed effect model explains one of the problems mentioned by Demsetz and Lehn (1985). From the regression of ownership concentration for 41 dummy variables, one for each two digit industry, and the usual measures of environment stability, they found only that four industries exhibited statistical significance. They assert

> *This absence of significance is puzzling to us, but its implications may be important to industrial organization studies. What the data seem to be saying is that firms are significantly different, even within traditional industry classifications, and that many individual firms may constitute quasi industries in and of themselves in regard to ownership concentration.* (Demsetz and Lehn, 1985, pp. 1176)

their intuition was in the sense of existence of firm specific effects. A panel data specification introducing firm specific effects, as our results show, helps in explaining these relationships.

The coefficient associated to the "potential control", measured with a proxy of noise conditions in which the company moves, is not significant, exception for the *FOR5* equation. In this case take the expected sign. In firms where foreign investors have significant participation, higher variation of equity returns is positively related with ownership concentration, in order to strength controls over the management of resources.

To test the hypothesis of adaptation of the ownership structure to the non firm specific conditons, we introduce the *INDEXM* variable. To avoid problems of endogenous variables this is computed with a lag of two periods. There is evidence of the impact of the cyclical movement on the ownership structure. This influence is significant for the *S5* measure of ownership concentration, which is explained by the effect over the ownership concentration of foreign investors (*FOR5*). There is a positive relation which implies that growth on the stock market is followed by ownership concentration of foreign investors and, in declining periods, the tendency is toward a decrease in the participation of the *FOR5*.

This finding is reinforced by an additional specification of the model. We estimate a fixed effect model regressing the different types of ownership concentration indexes against the variables

ASSET, *STDQUART* and dummy variables for 19 periods covered in our sample[11]. These results, reported in table 8, show significant positive values for the size variable and similar qualitative results to those reported in table 7 for the variable *STDQUART*.

Table 8.

Regression results for ownership classified by type of owners

Fixed (individual and time) Effect Models

$$Type\ shareholders_{it} = \alpha_i + \gamma_t + \beta_1 \log(ASSET_{it-2}) + \beta_2 STDQUART + u_{it}$$

	S5	*I5*	*SP5*	*FOR5*	*F5*
Asset	0.045***	-0.017***	-0,018	0.074***	-0.014
	(0.015)	(0.005)	(0.015)	(0.017)	(0.013)
Stdquart	0.118	0.134	-0.317	0.356**	-0.109*
	(0.165)	(0.087)	(0.210)	(0.172)	(0.064)
R^2	0.1476	0.0819	0.0378	0.1407	0.0263

We plot on figure 2 the value of time dummies introduced in the model for non-individual shareholders[12]. We also plot, on a second axis scale, the return of the Madrid Stock Index (The variable *INDEXM* used in previous regressions). This evidences a cyclical adaptation of the foreign investors, through significant participation, to changes in the stock market, aligned with the low risk exposure assumption. This figure shows that there is a distinctive pattern in the values of the dummy coefficients for *SP5*, *F5* and *FOR5*.

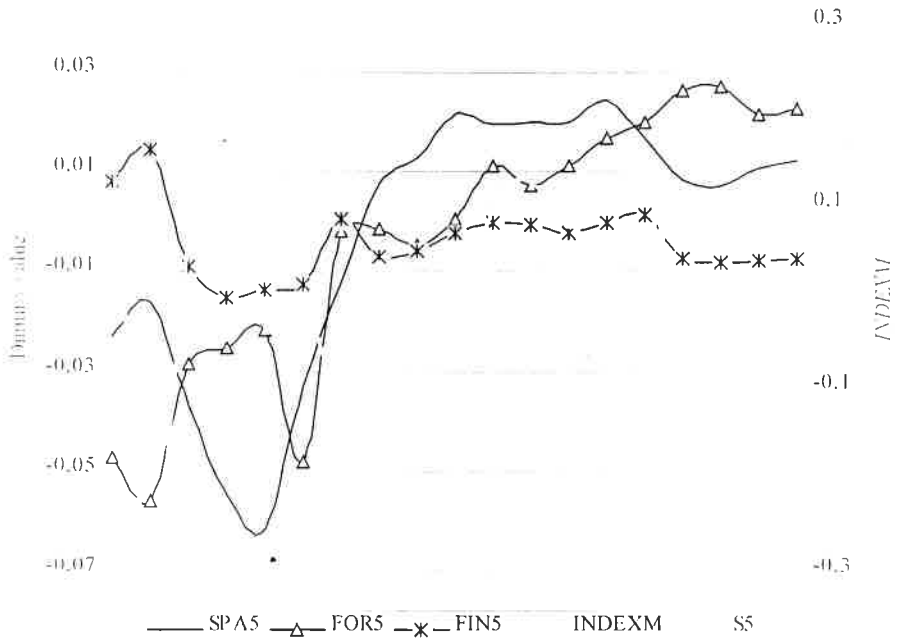
[11] In fact, this specification is a fixed effect model with both, individual and time specific effects.

[12] The values of time dummies for the 15 specifications are close to zero and not significant for most periods at the standard significance levels.

FIGURE 2.

TIME DUMMIES BY (γ_t) OWNER'S TYPE ON A INDIVIDUAL FIXED EFFECT MODEL.

$$Type\ shareholders_{it} = \alpha_i + \gamma_t + \beta_1 \log(ASSET_{it-2}) + \beta_2 STDQUART + u_{it}$$



Finally, for the fixed effect model presented in table 7 we account for differences between regulated and non regulated companies. By recovering the 72 intercepts of the models we split them in two groups: 21 companies regulate and 51 non regulated. We compute a simple test of difference of means between both groups, and find no statistically significant differences.

6. Conclusions

In this paper we further investigate the determinants of the ownership structure by examining a sample of publicly traded firms in Spain. We introduce a panel data approach to account for time and cross section variables. We first present the firm's characteristics that are able to explain different levels of ownership concentration. These are drawn from previous research (Demsetz and Lehn, 1985, and Prowse, 1992) which empirically explained the causes of ownership structure on cross-section samples. Size of firm is introduced as a lagged explanatory variable of

ownership concentration. Larger firms are associated with lower level of ownership concentration, because investment required to achieve a given stake of equity is higher. Noise environment imposes difficulties in monitoring these firms. As a consequence, higher levels of ownership concentration are required. The existence of a regulator of the activity of the firm requires less control and permits higher levels of ownership diffuseness. Our results are consistent with previous research. We find negative relation between size and ownership concentration, even if we account for different type of owners such as individuals, Spanish firms, foreign investors and financial stockholders. We also find negative relation with firm specific equity return volatility, a proxy of noise environment. There is no significant link between regulated firms and ownership concentration, apart from measures of ownership concentrations of foreign and financial investors These hypotheses are also tested by dividing the pooled model into five year subsamples. Similar results are obtained.

These cross sectional and pooled approaches, similar to those performed in previous research, have made possible to explain which factors influence ownership structure at a given point in time. Moreover, repeating this analysis in different periods we observe how these influences on the ownership structure change over time. The panel dada approach used in this paper allows us estimate which factors explaining ownership structure of firms in one period, also explain in another period.

Our time approach in explaining the determinants of the ownership structure includes the variation of stock market index as a proxy for the cyclical non firm specific conditions. We compute a fixed effect model accounting for size, noise environment and stock index evolution. We find the existence of firm specific fixed effects. Also there is a positive relationship between size and ownership concentration for all type of Shareholders. This evidence suggests that as firm size grows, those shareholders who have significant participation maintain, and increase their positions. The variance of firm returns, discounted for the market effect, only affects ownership concentration level of foreign investors. These investors also perform in the way the stock index does: increasing their participation in a growing period and decreasing when the stock prices drop. When accounting for firm specific effect we also do not find differences in ownership structure between regulated and non regulated companies.

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