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## OWNERSHIP STRUCTURE AND INVENTORY POLICY

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### Abstract

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This paper explores the effect of a firm's ownership structure on its inventory policy. We have argued that the presence of institutional investors like banks as blockholders, reduces a firm's liquidity needs and prevents overinvestment policies. This, in turn, leads to lower inventory levels, especially for small and/or diversified firms. Also, we expect less inventory investment when bank equity financing is compared with bank debt financing. Finally, other components of ownership structure like the number of blockholders prevent overinvestment that may generate excessive inventory accumulation. We have proved these theoretical contentions making use of a database of Spanish manufacturing firms.

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**Keywords:** Inventories, main blockholders, financial institutions.

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## **1/ Introduction**

In a modern corporation, inventory investment is well integrated into a firm's overall investment policy. Although the connection between financing and investment decisions is at the very center of Corporate Finance literature, relatively little attention has been paid to study its relationship with a firm's inventory policy. The main approach relates liquidity constraints to inventory policy (Kashyap, *et al.*, 1994; Hendel, 1996; Carpenter *at al.*, 1998). The basic result is that those financing instruments or environments that constrain firms the most has greater impact on inventory investment. However, the connection between a firm's ownership structure and inventory policy has been totally ignored in this literature. This paper is aimed to fill this gap.

We identify two channels through which ownership structure can affect a firm's inventory policy: The *liquidity channel* and the *control channel*.

The type of blockholder (banks, corporations or individuals) affects a firm's liquidity constraints. Lenders may be more willing to renew their loans to a firm owned by powerful institutional shareholders. Thus, for a firm, especially a small one with low bargaining power, having institutional investors as blockholders would clearly diminish its liquidity needs. This, in turn, should induce a lower inventory level as its need to accumulate cashable assets like inventories to hedge liquidity shocks, is reduced.

The second channel through which blockholders may affect inventory level is the *control channel*. Controlling blockholders, contingent on their number and characteristics, may implement certain types of actions against the remaining shareholders (minority expropriation). These actions generally involve overinvestment to the advantage of main blockholders that, eventually, may affect inventory levels. Under this view, inventory overinvestment is an outcome of a firm's mismanagement (Krautter, 1999). Interestingly, recent literature (Gomes and Novaes, 2001; Bennedsen and Wolfenzon, 2000) has examined these issues. The basic result is that minority shareholders' interests are better protected when the number of blockholders is high. This is so because the higher there number, the more likely there are to have conflicting views to seek private benefits; and the lesser likelihood of agree on particular investment policies. This prevents overinvestment actions like those that lead to intensive inventory accumulation.

Also, the control channel justifies lower inventory investment when a firm is financed with banks' equity instead of bank debt. This is so because the control possibilities available to a bank as a shareholder are superior to those as a lender.

Finally, we expect the connection between ownership and inventories to be especially relevant in a complex corporation. This type of firm requires that Operations Managers determine inventory level in an integrated way taking into account manufacturing, distribution, engineering, technology deployment, marketing and customer services. This is to coordinate a knowledge supply network (Mak and Ramaprasad, 2003). These additional tasks make control more difficult, especially within complex and diversified firms, and give Operations Managers wide scope to behave opportunistically. They can implement empire-building policies that generally lead to inventory overinvestment. Consequently, in this type of firm, the controlling role of blockholders like banks, which monitor efficiently, should be especially visible through the reduction in its inventory level.

We test these theoretical contentions making use of a panel data sample of Spanish manufacturing firms for the period 1996-2000. We find that the results fully confirm our theory. First, the presence of institutional investors like banks or other corporations reduces inventory level in small firms and/or in firms with certain degree of diversification. Second, the number of blockholders shows a negative relationship with a firm's inventory level. Last, a firm that has banks in its ownership structure shows a lower inventory-to-sales ratio than a firm with a significant proportion of bank loans but without such a bank presence.

The remainder of the paper is organized as follows. Section 2 develops the theoretical underpinnings as well as the hypotheses to be tested. In Section 3, the empirical analysis is carried out. The paper ends with some final remarks.

## **2/ Hypotheses to contrast**

We build up our hypotheses relying on two features. First, a firm's financial structure may generate liquidity pressure that a firm anticipates by investing in liquid assets like inventories. This pressure is conditioned by a firm's ownership structure (*liquidity channel*). Second, the type and number of blockholders characterizing a firm's ownership determine collusion among blockholder and/or managers to seek private benefits at the expense of minority shareholders (*control channel*). This generates overinvestment policies that, in turn, are going to determine inventory accumulation.

Liquidity channel: Liquidity pressure may generate stock-outs if a firm does not invest sufficiently in inventories (Pirttilä and Virolainen, 1992). Four factors that ownership structure mediates affect this pressure:

First, the structure of product market. A firm with market power is less prone to accumulate inventories in order to avoid stock-outs (Blazenko and Vandezande, 2003). This is so because this firm can modulate demand by changing prices appropriately. In this way, it can accumulate lower inventories as a reaction to liquidity pressure. Interestingly, the presence of institutional investors increases a firm's market power. This ameliorates the impact of liquidity necessities on inventory investment.

Second, the length of financing. Short-term means higher liquidity pressure. Having blockholder banks, reduces liquidity pressure as it facilitates a firm with low bargaining power (*i. e. a small one*), the renegotiation of its debt. This allows a low level in short-term liquid assets like inventories that are financed by short-term debt (Ferris *et al*, 1998).

Third, the access to different financing instruments. The lower the number of financing alternatives, the higher the financing pressure. A firm with limited access to financing instruments is more willing of using inventories to hedge liquidity shocks (Calomiris *et al*, 1995, focusing on commercial paper). Inventories are used as “buffer” liquid assets. Undoubtedly, the presence of institutional investors, especially banks, may facilitate a firm, especially a small one <sup>1</sup>, to issue financing instruments like commercial paper (Diamond, 1991). This, in turn, will make a small firm less dependent on inventories to buffer its liquidity necessities. In the end, a lower inventory level is expected.

Finally, we should mention that the perceptions' managers of liquidity needs are contingent upon ownership structure. In particular, Wahal and McConell (2000) among others, finds that institutional investors (*i.e.* banks or other corporations) promote long-term managerial vision. This smoothes out managerial reaction to local liquidity shocks which, in turn, reduces a firm's inventory level as Alfaro and Tribó (2003) shows.

In conclusion, liquidity issues suggest that the presence of institutional investors should prevent a firm, especially a small one, from accumulating large inventories.

Control channel: Our basic conjecture is that an excessive accumulation of inventory is a signal of mismanagement (Krautter, 1999). This means that those ownership

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<sup>1</sup> Economies of scale on public issues of financing instruments hinder their availability to a small firm. Thus, the presence of banks is of particular value for such a firm public issues.

structures that prevent collusion among blockholders to mismanage a firm at the expense of minority shareholders, should be accompanied by lower inventory levels. Ferris *et al* (1998) connect a firm's adoption of efficiency-increasing performance plans to inventory shirking. Institutional investors, like banks, promote the adoption of explicit performance plans as part of their monitoring discipline. The outcome is a decrease in inventory level.

Interestingly, the effect of *control* by a certain type of blockholder, like banks, should be more evident in a small firm. This is so because in a large firm there are alternative control mechanisms like financial markets. Thus, we expect a different pattern of inventory investment in a small firm compared with that in a large one. This feature, jointly with those mentioned in the description of the liquidity channel, defines our first hypothesis:

***Hypothesis 1*** *A small firm with banks and/or other institutional investors in its ownership structure accumulates fewer inventories than its counterparts. This may not be the case for a large firm.*

In a complex, diversified firm, those actions through which large blockholders seek their private benefits are easier to hide. Generally these actions involve intensive contracting at above-market prices of different services and/or products from controlling blockholders' private business. For this type of firm, the presence of banks (monitoring specialists), should have great effects by preventing these value-decreasing overinvestment policies. This should be translated into a lower inventory level.

***Hypothesis 2*** *In a diversified firm, the presence of institutional investors like banks should lead to a lower inventory level.*

When considering the number of blockholders, a *bargaining effect* that shapes a firm's investment policy emerges. This effect accounts for the difficulty in reaching agreement among those blockholders that require a firm to follow specific and, in some occasions, divergent policies in order to enjoy particular private benefits of control. These policies, when they are mutually exclusive, act as an implicit protection for the minority and prevent overinvestment. This demonstrates a negative relationship between the number of blockholders and overinvestment inventory policies linked to minority expropriation.

***Hypothesis 3*** *The number of blockholder has a negative effect on inventory level.*

Finally, it is important to emphasize that inventories do not only provide liquidity but they may also serve as collateral in debt contracts (Tribó, 2001). Moreover, a bank-debt financed firm must adhere to a rigid payment scheme (debt contracting) which stimulates

investment in liquid assets like inventories. Apart from that, the aforementioned control role is expected to be stronger for blockholder banks in preventing overinvestment initiatives than for lender banks without ownership. This is our last hypothesis:

***Hypothesis 4*** *A bank-equity financed firm accumulates fewer inventories than a bank-debt financed one.*

### **3/ Empirical Analysis**

#### **3.1. Data and Preliminary Evidence**

We carry out our empirical analysis making use of a sample of Spanish manufacturing firms for the period 1996-2000. This sample is extracted from the SABE database (Sistema de Análisis de Balances de Empresas Españolas). This database is composed of more than 200,000 Spanish firms and it is compiled from the Spanish Company Register by Bureau Van Dijk. It covers companies of all sizes from all economic sectors. We have focused on those firms with information on their ownership and these have been filtered<sup>2</sup>. The final outcome is an unbalanced panel data of 2,783 firms.

To characterize a firm's inventory level, we use the inventory-to-sales ratio (INVSALES). Concerning ownership structure, this is reflected by different variables applied to the ten largest shareholders (firm's blockholders): Banks' stake (BANKOWN), other corporations' stake (CORPOWN) and individuals' stake (INDOWN). We also characterize a firm's control group (CG), which is defined as the coalition of the largest stakeholders that accounts for more than 50% of the stake, with two variables: The stake of this coalition (CGOWN); and the number of blockholders that it comprises (NUMCG). Finally, we incorporate a measure of a shareholders' contestability (CONTESTA), which is defined as the ratio of the stake not owned by the two largest stakeholders to the difference in the stake of the two largest stakeholders. The higher this variable, the more likely it is for the largest blockholder to lose control of the firm.

To avoid spurious correlations, we introduce different controls. First, financing pressure is characterized by the debt to equity ratio (DEQUITY). Second, a firm's profitability is measured by the return-on-assets (ROA) which is the ratio of profits before interest and taxes to the total assets. Third, market structure is given by the herfindahl index

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<sup>2</sup> Financial firms, as well as those that show inconsistencies in their balance sheet are omitted.

(HERFINDAHL)<sup>3</sup>. Fourth, size effects are controlled with a variable (LEMPLOY), which is the number of employees on a log scale. Last, to contrast Hypothesis 4, we use BANKLEND that is the ratio of bank debt to total debt.

To provide preliminary evidence of our theoretical contentions we conduct different tests of mean differences that are shown in Table I.

[INSERT TABLE I ABOUT HERE]

Table 1 shows the proportion of firms with INVENSALLES larger than the mean for the sector and compares this proportion in different scenarios. These are defined by the value of different variables compared to the mean for the sector. In columns two, three and four, we focus on small, large and diversified firms (see the Table for definitions).

We find that, on average, a firm with stakeholdings from banks higher than the mean for the sector does not show lower inventory-to-sales ratio. Interestingly, this ratio is lower when stakeholder banks account for more than 50% (bank-controlled firms). Also, and consistently with Hypothesis 4, lender banks do not generate such an effect on inventories. Concerning other investors: corporations, have a negative effect on inventory accumulation, but individual investors do not.

Finally, control variables show that the more profitable firms adjust better their production in relation to their sales (lower inventory-to-sales ratio).

### 3.2. Methods and Results

To extend the previous analysis, we rely on regression techniques and we take advantage of the panel data structure of our sample. Our basic specification is as follows:

$$INVENSALLES_{it} = \alpha + \beta_1 BANKOWN_{it} + \beta_2 CORPOWN_{it} + \beta_3 INDOWN_{it} + \beta_4 NUMCG_{it} + \beta_5 CGOWN_{it} + \beta_6 CONTESTA_{it} + \beta_7 LEMPLOY_{it} + \beta_8 ROA + \beta_9 DEQUITY_{it} + \beta_{10} HERFINDAHL_{it} + u_i + \psi_t + \varepsilon_{it} \quad (1)$$

Where  $u_i$  accounts for the unobservable heterogeneity,  $\psi_t$  is a temporal error term, and  $\varepsilon_{it}$  is a white-noise error term.

We recognize the possibility that  $u_i$  may be correlated with a firm's ownership structure (*fixed-effects*). To investigate whether this is the case, we conduct Hausman Tests

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<sup>3</sup> This is the square root of the sum for all the firms in a sector of their sales market share to the square.

in each specification <sup>4</sup>. Additionally, for those specifications where fixed effects are not shown, we have conducted a second Hausman test. This compares random-effect estimations (consistent but less efficient) with cross-section regressions (efficient but may not be consistent). This second test shows that there are no systematic differences between the coefficients of both estimations. Thus, we stick to the simple regression estimation in these cases (columns 1 and 2 of Table 2).

**[INSERT TABLE II ABOUT HERE]**

Table 2 shows four estimations. In column 1 there is the cross-section regression for the whole sample, whereas in columns 2 and 3 we restrict the sample to small (LEMPLOY<4) and large firms (LEMPLOY>4). Finally, column 4 shows the results for diversified firms (those whose main activities are in more than one sector). Hausman test reveals that estimations in columns 3 and 4 should be made using fixed-effects techniques, while those of columns 1 and 2 should be simple regressions. Also, we have addressed a multicollinearity problem between CORPOWN and INDOWN variables. We use as an instrument of INDOWN, the residual term of an estimation following specification (1), but with INDOWN as dependent variable (orthogonalization).

We find that there is a clear negative relationship between the presence of institutional investor (banks or corporations) and its inventory-to-sales ratio. Moreover, this is particularly true for small firms and/or diversified ones, but not for large firms. This conforms to Hypotheses 1 and 2. Also, banks show larger effects than other corporations on inventory reduction. This reflects that banks are especially able to provide liquidity and/or prevent overinvestment policies (control role). Additionally, we have obtained that the presence of individual investors does not stimulate inventory disinvestment.

Once we focus on other dimensions of a firm's ownership structure, we do observe a negative relationship between the number of blockholders in the controlling group and a firm's inventory level. This is especially clear for diversified firms where minority expropriating possibilities are higher. This fully conforms to Hypothesis 3.

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<sup>4</sup> The Hausman test studies whether systematic differences exist between those coefficients of the fixed-effect estimation and those of the random-effects estimations. If there are systematic differences, the only consistent estimator is the fixed-effects one. If not, the best alternative to use is the random-effect estimation.



Finally, a low level of inventory-to-sales is shown in highly profitable firms and/or large ones and/or with high market power. These firms have more instruments, apart from inventories, of hedging liquidity shocks.

*Bank equity financing versus bank debt financing.*

To investigate Hypothesis 4, we conduct a multinomial logit estimation on specification (1) but without including BANKOWN, as it is integrated in dependent variable V. This variable takes 8 values that are defined in the following table:

**[INSERT TABLE III ABOUT HERE]**

Variable V encompasses all the events resulting from the combination of major inventory changes with significant changes in a firm's bank financing (whether equity or debt). By proceeding in that way, we can isolate the effects of changes in banks' stakes with those in banks' loans.

From the multinomial logit specification, we can compute the probability of different results for V ((we denote  $P_i = \text{PROB}(V=i)$ ). From  $P_i$  we can obtain conditional probabilities of major changes in inventory-to-sales ratio contingent on significant changes in banks' stake, in one case, and in banks' loans, in the other. In particular,  $\text{Prob}(\text{DINV}=1/\text{DBANK}=1\&\text{DBLOAN}=0) = P_6 / (P_2 + P_6)$   $\text{Prob}(\text{DINV}=1/ \text{DBANK}=0\&\text{DBLOAN}=1) = P_5 / (P_1 + P_5)$ ; and so on, for other marginal probabilities. Also, in order to better separate the effects due to changes in bank equity from those due to changes in bank debt, we have focused on those firms where their debtholder banks are not shareholders.

**[INSERT TABLE IV ABOUT HERE]**

Table 4 shows that a firm with a banks' stake higher than the mean for the sector is less likely to increase its inventory ratio above the mean value for the sector than a firm without such a stake. The same can be said when focusing on bank loans. But, interestingly, when we compare both effects (bank equity financing with bank debt financing), we do observe that the former effect is larger than the latter (lower probability of a high inventory-to-sales ratio when banks' stakes are large than when banks' loans are: 1.220 versus 7.522). This conforms to Hypothesis 4.

#### **4/ Conclusions**

This paper shows the relevance of a firm's ownership structure on its definition of inventory policy. We have found that a firm with institutional investors (banks and other corporations) as blockholders shows lower inventory accumulation when compared with its counterparts who do not have such investors. We have explained this result in terms of the provision of liquidity as well as the tight control exercised by these types of blockholders, especially in small firms and/or diversified ones. Also, by comparing bank equity financing with bank debt financing, we have argued that the control possibilities available to a bank as a shareholder are superior to those as a lender. This justifies the reduced probability of a firm overinvesting in inventories in the former case, in comparison with the latter. Finally, we have identified the number of blockholders as a relevant parameter of a firm's ownership structure that affects its inventory policy. This is so because the higher this number, the greater difficulty in reaching agreements among different blockholders so as to pursue overinvestment policies to seek private benefits. This reduction in overinvestment should be translated into a lower inventory level. We have proved these contentions making use of a database of Spanish manufacturing firms for the period 1996-2000.

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**Table 1: Contingency Analysis**

		SMALL <sup>1</sup>	LARGE <sup>1</sup>	DIVERSIFIED <sup>1</sup>
	INVENSALES> Mean <sup>3</sup>	INVENSALES> Mean <sup>3</sup>	INVENSALES> Mean <sup>3</sup>	INVENSALES> Mean <sup>3</sup>
BANKOWN> Mean <sup>3</sup>	9.96%	9.52%	8.43%	12.90%
BANKOWN<= Mean <sup>3</sup>	10.44%	11.58%	5.40%	11.74%
Pearson <sup>2</sup>	0.80	0.68	0.23	0.84
BANKOWN> 50%	4.04%	0%	3.03%	7.14%
BANKOWN<= 50%	10.48%	11.63%	5.52%	11.80%
Pearson <sup>2</sup>	0.037**	0.114*	0.532	0.59
CORPOWN> Mean <sup>3</sup>	9.87%	10.25%	4.48%	11.58%
CORPOWN<= Mean <sup>3</sup>	11.21%	12.76%	6.81%	12.07%
Pearson <sup>2</sup>	0.019**	0.052**	0.007***	0.759
INDOWN> Mean <sup>3</sup>	10.23%	11.84%	4.8%	10.83%
INDOWN <= Mean <sup>3</sup>	10.6%	11.05%	6.25%	12.49%
Pearson <sup>2</sup>	0.519	0.556	0.087*	0.289
NUMCG> Mean <sup>3</sup>	10.06%	11.91%	7.24%	12.77%
NUMCG<= Mean <sup>3</sup>	10.50%	11.44%	5.19%	11.57%
Pearson <sup>2</sup>	0.561	0.768	0.085*	0.568
BANKLEND> Mean <sup>3</sup>	9.58%	12.05%	7.79%	16.48%
BANKLEND<= Mean <sup>3</sup>	10.50%	11.45%	4.98%	11.21%
Pearson <sup>2</sup>	0.371	0.74	0.01***	0.04**
ROA> Mean <sup>3</sup>	7.06%	10.59%	4.29%	9.68%
ROA<= Mean <sup>3</sup>	13.10%	12.74%	7.56%	13.71%
Pearson <sup>2</sup>	0.000***	0.098***	0.000***	0.009***

<sup>1</sup> Small Firms means that LEMPLOY<4, large firms have LEMPLOY>4 and, diversified firms are those whose main activities are in more than one sector.  
<sup>2</sup> Pearson Test. The null hypothesis is that both percentages of firms are statistically independents.  
\*90% significant, \*\* 95% significant, \*\*\* 99% significant.  
<sup>3</sup> Mean values for the corresponding sector and year.

**Table 2. Regressions on INVENSALES**

	All (Regression) <sup>1</sup>	Small (Regression) <sup>1</sup>	Large (Fixed-effect) <sup>1</sup>	Diversified (Fixed-effect) <sup>1</sup>
BANKOWN	-0.015*** (4.57)	-0.035*** (5.76)	-0.010 (0.58)	-0.121*** (2.54)
CORPOWN	-0.010** (3.77)	-0.020** (3.58)	-0.000 (0.11)	-0.041*** (4.02)
INDOWN	0.060* (1.44)	0.007* (0.72)	0.019*** (4.47)	0.028** (1.79)
NUMCG	-0.091* (1.61)	-0.165* (1.65)	0.045 (0.65)	-0.974*** (3.2)
CGOWN	-0.005* (0.75)	-0.018 (1.43)	0.026*** (3.01)	0.019 (0.44)
CONTESTA	-0.186 (0.23)	-2.11* (1.62)	0.634 (0.78)	5.409** (1.83)
LEMPLOY	-0.893*** (8.16)	-1.550*** (4.02)	-0.122 (0.38)	0.205 (0.26)
ROA	-3.874*** (4.00)	-6.615*** (3.10)	-0.037 (0.04)	0.625 (0.19)
DEQUITY x 100 <sup>3</sup>	0.023 (1.08)	0.060 (0.47)	-0.000 (0.02)	-0.782 (0.36)
HERFINDAHL	-0.007** (1.99)	-0.900 (1.10)	0.028 (1.36)	-0.087** (2.43)
Constant	6.826*** (4.57)	9.700*** (5.46)	0.323 (0.13)	0.988 (0.16)
<b>Number of observations</b>	5248	2419	2829	904
<b>R2</b>	2.64%	2.95%	6.00%	19.68%
<b>Hausman Test</b> <sup>2</sup>	24.71 (0.133)	21.78 (0.151)	44.08 (0.000)	31.05 (0.055)
<b>Hausman Test</b> <sup>2</sup>	17.72 (0.606)	21.18 (0.387)		
<b>Fitness of the Model Test (F test)</b>	7.15 (0.000)	5.92 (0.000)	4.49 (0.000)	4.01 (0.000)
<sup>1</sup> T- statistics in parentheses. Include sector and temporal dummy variables.				
* 90% significant, ** 95% significant, *** 99% significant.				
<sup>2</sup> See the text				
<sup>3</sup> The coefficients are multiplied by 100				

**Table 3. Definition of dependent variable V**

<b>Variable V</b>	<b>DINV=1<sup>1</sup></b>	<b>DBANK=1<sup>1</sup></b>	<b>DBLOAN=1<sup>1</sup></b>
V=7	1	1	1
V=6	1	1	0
V=5	1	0	1
V=4	1	0	0
V=3	0	1	1
V=2	0	1	0
V=1	0	0	1
V=0	0	0	0

<sup>1</sup> DINV=1 (0) if INVENSALLES > (<=) Mean; DBANK=1 (0) if BANKOWN > (=) Mean; and DBLOAN=1 (0) if BANKLEND > (<=) Mean, where Mean is the mean value for the corresponding sector and year

**Table 4. Multinomial Logit Analysis**

	Prob (DINV=1) condit. to	T-test of means <sup>1</sup>
DBANK=1&DBLOAN=0	1.220	46.054 (0.000)
DBANK=0&DBLOAN=0	8.088	
DBANK=0&DBLOAN=1	7.522	5.133 (0.000)
DBANK=0&DBLOAN=0	8.088	
DBANK=1&DBLOAN=0	1.220	37.595 (0.000)
DBANK=0&DBLOAN=1	7.522	

<sup>1</sup>T- statistics in parentheses.