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**PYRAMIDAL GROUPS AND EXTERNAL FINANCE:  
AN EMPIRICAL INVESTIGATION**

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**Abstract**

In Italy an extremely large number of companies is organized as a pyramidal group. As compared to other control structures, pyramidal groups might offer minority shareholders less protection and hence discourage them from holding shares. We evaluate empirically the impact of some variables that proxy the degree of shareholder protection on non controlling equity finance and, in particular, the effect of the degree of group vertical integration. *Ceteris paribus*, vertical integration is associated with lower participation of outside minority shareholders. The paper argues that this finding is due to greater opportunities for the controlling shareholder to transfer resources across the subsidiaries, which reduces the incentives for potential outside equity finance.

## 1. Introduction<sup>1</sup>

Recently a wide discussion has developed on various corporate governance systems across countries and on their relative efficiency. Anglo-Saxon systems are typically opposed to continental systems. The former are characterized by dispersed ownership of large firms, with an important role played by institutional investors, and an active market for corporate control. The latter appear to be characterized by a more active presence of banks in the corporate governance of firms and by cross shareholdings among firms, while a more limited role is played by the market for corporate control.

The Italian system differs from both these cases. On the one side, banks did not play an active role in the corporate governance of firms, partly due to institutional reasons. On the other side, an active market for corporate control did not emerge. Alternative mechanisms of corporate governance developed: among these, families and coalitions, the state and pyramidal groups played a fundamental role and insured, at least until some point, the development and growth of firms. Here we shall concentrate mainly on the effects of the last mode of firm organization and corporate governance.

Pyramidal groups are organizations where a number of companies are controlled by the same entrepreneur (a parent company, a controlling shareholder or coalition) through a chain of ownership relations. Depending on the length of the chain and on the amount of shares owned by the controlling agent at each level of the pyramid, there will be to an extent separation between ownership and control. Whenever there is separation between ownership and control, an agency problem arises. The controlling agent might exploit its position in order to obtain perquisites or other advantages<sup>2</sup>.

This problem may be particularly serious in pyramidal groups since the controlling shareholder's objectives do not necessarily coincide with those of minority shareholders which are linked only to the subsidiaries in which they have invested. The controlling

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<sup>1</sup> We would like to thank, for useful comments and suggestions, P. Sapienza and A. Röell as well as the participants at the conference of the European Corporate Governance Network in Milan, 7-8 March 1997. We alone are responsible for opinions expressed and remaining errors.

<sup>2</sup> See Hart (1993), Milgrom and Roberts (1992).

shareholder's actions in the interest of the entire group may sometimes damage some of the subsidiaries.

This might reduce minority shareholders' participation as compared to an efficient level, if they are not (legally) guaranteed against abuses.

In Italy an extremely large number of companies are organized as pyramidal groups and it is often claimed that Italian corporate law does not provide sufficient safeguards. If this is the case, incentives to supply equity capital to subsidiaries should be higher, the more protected shareholders feel, i.e., when alternative guarantees are present and in particular when the controlling shareholder has fewer opportunities to act in favor of the group at the expense of a subsidiary.

In the paper we empirically test this proposition. In section 2 we briefly describe the relevance of pyramidal groups in Italy. Section 3 outlines the conflicts of interest that arise in pyramidal group organizations. In section 4 some evidence on the transfers of resources within pyramidal groups are discussed. Sections 5 and 6 sketch the model we use to investigate the issue and report the results of the empirical analysis while section 7 concludes.

## **2. Corporate governance in Italy: the role of pyramidal groups**

In Italy, contrary to other countries, separation between ownership and control in the private sector was achieved mainly by means of “implicit rules”. These allowed the entrepreneurs to gain the financial help of other agents on the basis of non formally stated systems of safeguards, mainly based on trust and personal relationships: families and coalitions (especially common among smaller firms) and the diffusion of pyramidal groups. The larger dimensions of firms were also sustained by the extraordinary presence of the state as a business owner (see table 1) <sup>3</sup>. These allowed the development and growth of firms over a rather long period but eventually showed some intrinsic shortcomings. On the one side, family (and coalitions) controlled firms cannot expand beyond certain limits and may induce inefficiencies in control transfers (since they typically take place within the

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<sup>3</sup> See Barca (1995), Bianco, Gola, Signorini (1995), Bianchi, Casavola (1995).

family). On the other side, state owned firms, which experienced an intense period of growth during the 1960s and 70s, met afterwards serious difficulties, possibly linked to a failure of the “political market” to insure a good governance system<sup>4</sup>.

**Table 1: Models of control of Italian manufacturing companies**

Size (employees)	<200	200-499	500-999	>1000
Model of control				
Absolute control	15,7	10,1	9,6	1,6
Family control	34,8	14,2	7,8	2,9
Coalition control	10,7	11	6,2	6,6
Financial supervision	0,2	0,4	0,4	0
Hierarchical group control	32,6	57,4	57,8	65,2
State ownership	3,8	6,2	16,3	23,7
Pseudo-public company	2,2	0,8	1,8	0
Total	100	100	100	100

Source: Bianco, Gola, Signorini (1995).

A third mode of firms’ control is represented in Italy by the pyramidal group. An empirical investigation of a representative sample of manufacturing firms with more than 50 employees, showed that almost 55 per cent of manufacturing firms is organized within pyramidal groups (Table 2). The diffusion of this mode of organization is greater among larger companies. But it is also present among small ones: nearly all manufacturing firms with more than 1,000 employees belong to groups (in particular all listed companies do), and so do over 30 per cent of firms with size ranging between 50 and 100 employees (see Barca et al., 1994a and 1994b). The peculiarity of Italy in this respect cannot be properly assessed, since no comparable data are available for other countries, even for those where enterprises are known to be organized in groups. In particular it is quite difficult to establish the real nature of the group structure in different countries. Some indirect evidence may be gained by Franks and Mayer (1994), who show that, among 171 German quoted companies, 27.5% of shares in excess of 25% are held by other German companies; among 155 French quoted companies, 46.8% of shares in excess of 25% is held by other

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<sup>4</sup> See Barca (1994).

French companies. However, this evidence refers only to large quoted companies and does not suggest interpretations on the structure and functions of groups in these countries.

**Table 2: The diffusion of pyramidal groups among manufacturing firms**

*(percentages of firms belonging to a pyramidal group)*

Size (n. employees)	50-99	100-199	200-499	500-999	>1000
All firms	39,3	70,1	84,8	89,4	99,7
Private Italian companies	30,9	63	77,7	82,6	99

Source: Barca et al. (1995).

Various reasons for the diffusion of pyramidal groups have been identified. The main reason for the existence of hierarchical groups is that they enable the owner of only a modest share of capital to control a vast set of assets. By means of a pyramidal ownership structure, a cascading effect is realized and the head of the group controls a wider set of activities than otherwise possible, given its financial capability. Each single firm, though legally independent, is under the direction of the head of the group since the voting rights of the non controlling shareholders are dispersed among many firms, while the voting rights of the head of the group are concentrated at the top of the pyramid.

Among manufacturing firms, it has been estimated that at least 30 per cent of firms belonging to a group are controlled with less than 100 per cent of shares, which might suggest that this factor is at work<sup>5</sup>.

There are other reasons for the existence of pyramidal groups. First of all, the group may represent a device to limit liability. Within a group the autonomy of subsidiary companies allows the parent company to limit its liability as compared with the alternative situation where the companies in the group are organized as divisions of one single large company. Secondly, the group may function as an incentive structure: the substitution of delegated monitoring of divisions within a single company with relationships between

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<sup>5</sup> See Bianco, Gola, Signorini (1995).

individual companies may enrich incentive structures. Introducing a group organization may motivate managers to improve performance more than it reduces the supervision capacity of principals<sup>6</sup>. Thirdly, the group may be used as an “elusive” tool: the organization of an enterprise into multiple companies may allow them to avoid disclosing information to the market and the government. Distinct legal entities may make it easier to keep the identity of products for different markets or market segments separate. The separation into individual companies may also be explicitly aimed at concealing the existence of a unique control. As far as the market is concerned, hiding this information may be aimed at facilitating industrial relations for each company in a group; at increasing the possibility of obtaining credit from banks when the group creditworthiness is lower than that of the sum of each single firm; at reducing the flow of information to other competitors. A group organization may also be used in order to obtain either tax benefits or subsidies. Finally, the group may represent a device for cooperation: a group organization may favor co-operative agreements with external parties. A group structure increases the number of boards of directors where the controlling shareholder may interact with other relevant shareholders, increasing his chances of reaching long term agreements.

### **3. Separation between ownership and control in pyramidal groups**

We showed in the previous section that a pyramidal group often represents a device to exert control. By spreading the voting rights of minority shareholders out over a large number of firms and concentrating those of the entrepreneur at the top of the pyramid, the group structure allows the entrepreneur to obtain control over a vast set of assets. This is the mechanism used by large pyramidal groups in Italy. The separation between ownership and control is particularly evident in those groups which include a listed company.

On the basis of administrative information on shareholdings, the group structures built around listed companies have been investigated in order to evaluate to what extent the

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<sup>6</sup> Alternatively, a group structure may make it easier to share management functions among the members of a controlling family, favouring co-operation and reducing the risk of conflict.

pyramidal group has succeeded in allowing separation between ownership and control<sup>7</sup>. In particular we consider as a measure of separation the ratio of the amount of capital under control over the capital owned.

Considering private non banking firms, the heads of the groups on average control almost 8 units of capital with one unit owned; a much lower degree of separation is found for state controlled groups (see table 3).

The amount of separation obtained through the pyramidal group structure is a measure of the amount of external equity finance that the entrepreneur can attract. We are not concerned here that this figure in Italy might be large or small. Rather we address the issue of whether this separation could be larger. In other words we want to investigate whether the pyramidal group structure is an efficient way to obtain external equity finance.

**Table 3: Separation between ownership and control in listed groups (1993)**

Shareholders	Capital under control in proportion to owned
<b>Non banking private sector</b>	7.9
Individuals and partnerships	3.8
private companies	9.7
other companies	2.2
<b>Non banking public sector</b>	1.2
<b>Banks</b>	1.2
<b>Foreign sector</b>	2.2
<b>TOTAL</b>	5.9

Source: Bianchi, Casavola (1995).

As compared to other situations with separation between ownership and control, a pyramidal group poses in fact more serious agency problems. The interests of the controlling agent are linked to the profitability of the share of the group they own and diverges from those of minority shareholders of subsidiaries, who are interested in the performance of the subsidiary alone. In order to assess the impact of the pyramidal structure on the overall degree of separation we empirically analyze the willingness of

<sup>7</sup> See Barca et al. (1994a), Bianchi, Casavola (1995).



investors to finance firms belonging to a group. We mainly focus on two issues: the position of the single firm in the pyramidal structure and the opportunity of infra group resource transfers.

In general, the controlling agent will be more concerned with profits of higher level firms where her stake is larger. She might try to benefit them by transferring profits from other units more or less indirectly: by means of infra-group sales and purchases at prices which imply transfer of resources; or offering/obtaining trade credit or financial credit at lower or no interest or with a longer term than it would obtain on the market.

Hence, usually the conflict of interest between minority and controlling shareholders is greater, the more distant is the firm from the top of the pyramid. Also, the risk for the subsidiary's shareholders is higher, the more opportunities the controlling agent has to divert funds and profits from the subsidiary: this is more likely in groups which are vertically integrated<sup>8</sup>. For groups whose activity is diversified in non related industries, instead the situation differs both because the absence of correlation among firms' performance lowers the potentials for conflicts of interest and because the absence of production relations among firms makes funds diversion more difficult<sup>9</sup>.

It may be expected that the pervasiveness of the agency problem induces an inefficient supply of external equity finance to the group. This issue is particularly relevant in the Italian case, where the greater need for shareholder protection within groups is not matched by any special regulation ensuring a higher degree of information disclosure regarding top strategic decisions, and a related obligation to compensate subsidiaries whose interests are sacrificed to those of the group as a whole.

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<sup>8</sup> The absence of formal legal safeguards makes it very difficult to receive court protection against misappropriation or abuses. The burden of the proof for the damages incurred by the subsidiary as a consequence of decisions made by the board (chosen by the controlling parent company) rests on the claimant (the minority shareholders). The absence of legal controls on the relationship between the parent and the subsidiaries makes it almost impossible to offer conclusive evidence. In one case judged by the Court of Milan in July 1991, the claimants (the minority shareholders of a subsidiary) sued the board of directors because the subsidiary had been forced to sell its output to the parent company, which sold it to another subsidiary at twice the price. The Court decided in favour of the parent company and against the claimants, who could not prove exactly the kind of loss the company had incurred. We thank Marino Perassi for suggesting this case to us.

<sup>9</sup> See Barca, Casavola and Perassi (1994).

It is extremely difficult to document transfers of funds within groups which do not correspond to comparable transfers of goods. Some suggestions may come from infra-groups flows of funds. There is by now some evidence on the fact that infra-group transfers are not irrelevant.

A large number of firms belonging to groups appear to obtain and provide funds from and to other companies belonging to the same group (see table 4). These transfers are, at times, quite large.

**Table 4: Use of internal flow of funds**

% of firms using the instrument	1993	1994
Shares in other group companies	66.0	69.6
Financial debt	37.3	34.9
Financial credit	42.3	40.9
Trade debt	36.8	38.8
Trade credit	45.3	47.3
N. firms belonging to groups	8,159	7,534

Source: Centrale dei Bilanci.

For firms belonging to a group the ratio of financial debt obtained through internal channels to total financial debt is approximately 13 per cent, while the share of trade debt is 18 per cent<sup>10</sup>. This evidence shows that there are large opportunities of resource transfers within the group.

Given the opportunity of fund diversion, it might be - for some groups at least - more difficult to raise external capital among investors who might feel not sufficiently protected. This could generate inefficiencies and possibly limits to companies' growth. In the following section, we try to assess the impact of variables which proxy the degree of

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<sup>10</sup> Source: Centrale dei Bilanci.

protection of minority shareholders and the risk of funds' diversion on the demand for shares by non controlling shareholders (outside investors).

#### 4. The demand of minority shares

Since our dataset does not allow us to estimate a structural model as some of the relevant variables are not available, we estimate the relationship between the amount of shares held by non controlling shareholders (henceforth dispersed ownership) and some variables proxying the risk of diversion of funds and asset liquidity.

For a subset of our dataset, for which balance sheet data are available, we test whether the results are robust to the introduction of the other variables.

We consider the following model:

$$DS_{ij} = f(V_i, V_j, SECT_i) + u_{ij}$$

(1)

where  $DS_{ij}$  is the share of company  $i$  (belonging to group  $j$ ) not owned by the group itself or other hierarchical groups. Hence  $DS_{ij}$  is the "dispersed ownership", the share owned by agents without strategic relationships with the controlling shareholder (as might exist, for example, for shares held by other groups).

$DS_{ij}$  is considered a function of firm variables, indexed by  $i$  ( $D_i$ , firm size;  $STOCK_i$ , the legal status of the firm;  $LISTED_i$ , whether the firm is listed;  $INT_i$ , an index of the group vertical integration;  $PARENT_i$ , the share directly held by the parent company) and group variables, indexed by  $j$  ( $DIV_j$ , a diversification index;  $STATE_j$ , state or private ownership), and a sector dummy ( $Sect$ ). Thus we have:

$$DS_{ij} = f(D_i, STOCK_i, LISTED_i, INT_i, PARENT_i, DIV_j, STATE_j, SECT_i) + u_{ij} \quad (2)$$

According to the above considerations we expect the following signs:

$$\frac{\partial DS_{ij}}{\partial D_i} > \text{ or } < 0$$

the sign is ambiguous, since the variable may affect both demand and supply with opposite results. On the supply side, the larger the size, the more binding the limits to the controlling shareholder's financial resources; hence the offer of equity capital to outside investors should be larger. Moreover the larger the size, the lower the controlling shareholder's share needs to be in order to retain control<sup>11</sup>. On the demand side, if the investors feel that investing in a larger company is safer, the sign should be positive as well; however, this effect could be already captured by the variable *LISTED<sub>i</sub>* (see below). On the other hand, the sign may be negative if minority shareholders expect their guarantees to decrease along with the company size<sup>12</sup>. The size of the firm is proxied by either the number of employees (*EMPL<sub>i</sub>*) or by a variable that takes into account both the firm's employees and those of its subsidiaries, being the sum of the firm's employees and those of all the subsidiaries for a share corresponding to the stake held directly or indirectly by the firm (*EMPL\*<sub>i</sub>*). The latter variable also captures the relative importance of the firm within the group.

$$\frac{\partial DS_{ij}}{\partial STOCK_i} > 0$$

this variable is a proxy for the liquidity of the assets held. When the company is a S.p.A. (a joint stock company), the investor is able to sell his assets more easily, since shares are more liquid than non-share participation in limited companies that are not joint stock companies. The variable used is a dummy (*STOCK<sub>i</sub>*) which takes value 1 if the firm is a joint stock company and 0 otherwise. a dummy variable for the legal status of the firm, which can be either a joint stock company (*STOCK<sub>i</sub> = 1*) or not (*STOCK<sub>i</sub> = 0*);

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11 Since each non controlling shareholder can only supply a limited fraction of a larger equity capital.

12 Without formal legal safeguards, non controlling shareholders have only fiduciary guarantees, mainly through a personal relationship with the controlling shareholder, which is easier to maintain in smaller firms.

$$\frac{\Delta DS_{ij}}{\Delta LISTED_i} > 0$$

this variable also proxies the assets' liquidity. Moreover, listed companies are subject to stricter transparency regulations, and in hierarchical groups they are usually located in the highest levels of the "control chain" where the controlling shareholder has a larger stake. The variable used is a dummy signaling whether the firm is listed ( $LISTED_i = 1$ ).

$$\frac{\Delta DS_{ij}}{\Delta PARENT_i} > 0$$

the greater the stake that is directly owned by the parent company (at the top of the group), the lower its incentives to divert resources, indirectly reinforcing minority shareholders guarantees. The variable used is a dummy ( $PARENT_i$ ) which takes value 1 if the controlling individual or coalition owns directly shares of the firm;

$$\frac{\Delta DS_{ij}}{\Delta INT_i} < 0$$

The more vertically integrated is the firm in the group, the greater the risk of resource diversion. The vertical integration index is based on the Italian input-output tables and describes the degree of relatedness between each firm and the other firms of the same group. We have used three different indices of integration:  $INTBA_{ij}$ , which measures backward integration,  $INTFO_{ij}$ , which measures forward integration<sup>13</sup> and finally a dummy variable  $INT_{ij}$  which takes value 1 when both indices are greater than their average value in the sample, and 0 otherwise<sup>14</sup>.

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13 In the Appendix the method used to construct the indices is described in detail.

14 The average value is calculated on the subset of non financial firms only; financial firms, due to the way input-output tables are built, appear highly integrated with all the other sectors, thus artificially increasing the sample mean.

$$\frac{\nabla DS_{ij}}{\nabla DIV_j} > 0$$

If the group's activities are less interrelated (i.e. the group is a conglomerate) the risk of cross-subsidization across firms<sup>15</sup> should be lower. Conglomerate diversification has been proxied by: the Berry index ( $BERRY_j$ ), the diversification ratio ( $DR_j$ ) and the number of industries active in each group ( $NUM_j$ )<sup>16</sup>.

$$\frac{\nabla DS_{ij}}{\nabla STATE_j} > \text{or} < 0$$

When the firm is state-owned the financial resource constraint is less binding; on the demand side, however, it is unclear whether investors feel more or less protected. The variable used is a dummy for the type of ownership of the group (if the group is state owned  $STATE_i = 1$  and if it is private  $STATE_i = 0$ );

$SECT_i$ : there are no reasons to expect a specific sign. There might be a secondary effect through the possibility that industries with larger fixed capital might have a higher leverage. Moreover there might be differences between financial and non financial companies. Investing in the former might offer more guarantees if these are the subholdings, closer to the top of the group. The variable used is a dummy describing whether the firm belongs to the banking or financial sectors ( $FINANCIAL_i = 1$ ).

From Table 5, where some simple descriptive statistics are reported, we see that minority shareholdings are on average quite small in the Italian hierarchical groups. Dispersed ownership,  $DS$ , is on average 12 per cent, while group ownership (the

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15 However it is rather difficult to build a diversification variable which exclude vertical integration effects.

16 A more detailed description of the indices is provided in the Appendix.

proportion of shares belonging directly or indirectly to the parent company) is around 86 per cent.

**Table 5: The variables of the model: descriptive statistics**

		MEAN	STD DEV.	MEDIAN
<i>DS</i>	(%)	12.09	17.72	0.01
<i>group ownership</i>	(%)	86.69	19.05	99.99
<i>employees</i>		614.38	3,876.83	48.00
<i>group employees</i>		51,610.60	88,602.90	7,976.00
<i>EMPL*</i>		1,127.17	6,513.38	82.00
<i>BERRY</i>		0.55	0.29	0.63
<i>DR</i>		0.42	0.26	0.43
<i>NUM</i>		22.25	18.79	13.00
<i>INTBA</i>		0.26	0.25	0.16
<i>INTFO</i>		0.26	0.27	0.14

## 5. The results

The empirical analysis is carried out using a dataset extracted from the Banca d'Italia-Consob (the Stock Exchange Commission) data base; data refer to January 1, 1993. The data base supplies information about ownership structure of listed firms and about all firms linked to them<sup>17</sup>. For a subset of firms, variables concerning the size of the firm and its economic activity code (ATECO81 at the three digit level) are also available. Our analysis focuses on this subset. It includes 1,495 firms belonging to 135 groups (11 firms per group on average); 228 firms belong to state owned groups and 212 are listed companies. Our firms are mainly concentrated in the service sector and in financial and insurance activities (see the Appendix).

The dependent variable (the share of dispersed ownership for each firm considered) is proxied by the sum of the residual holdings not declared to Consob and the

<sup>17</sup> The data base is outlined in the Appendix. For a more detailed description of the Banca d'Italia-Consob data base, see Barca et al. (1994a).

stakes disclosed by investors<sup>18</sup>. We use a logistic transformation to convert our bounded dependent variable into an unbounded one (see Leech and Leahy, 1991):

$$LQ_{ij} = \log\left(\frac{DS_{ij}}{100 - DS_{ij}}\right)$$

for  $0 < DS_{ij} < 100$ <sup>19</sup> the dependent variable assumes values between  $-\infty$  and  $+\infty$ <sup>20</sup>.

In another specification the dependent variable, analyzed by means of a probit equation, is a dummy which takes value 1 when *DS* is greater than its mean (median) in the considered sample and 0 otherwise.

The estimated equation is:

$$LQ_{ij} = a + b_1 LISTED_i + b_2 EMPL_i + b_3 PARENT_i + b_4 STATE_i + b_5 STOCK_i + b_6 FINANCIAL_i + b_7 INT_{IJ} + b_8 BERRY_J + e_{IJ} \quad (3)$$

The results of our estimates are summarized in the following table:

**Table 6: OLS Estimates (Dependent variable: LQ)**

	1	2	3	4	5
<b>INTERCEPT</b>	-7.02*** (-15.52)	-7.45* (-19.52)	-7.22* (-17.78)	-7.13* (-16.35)	-6.96* (-14.76)
<b>LISTED</b>	7.18*** (21.52)	7.24* (22.18)	7.53* (20.93)		

18 Our definition of investors includes institutional investors, individuals and independent firms (not belonging to groups).

19 In our data set there are no firms whose ownership is widely dispersed: *DS<sub>ij</sub>* never assumes values equal to 100; moreover the case in which *DS<sub>ij</sub>* = 0 is approximated with *DS<sub>ij</sub>* = 0,001.

20 The transformed variable is the logarithm of the ratio of dispersed ownership to the sum of the controlling group's (*CS<sub>ij</sub>*) and other groups' (*OGS<sub>ij</sub>*) shares:

$$\log\left(\frac{DS_{ij}}{CS_{ij} + OGS_{ij}}\right).$$



<b>EMPL*</b>	-0.24*** (-2.96)	-0.24* (-2.98)	-0.27* (-2.98)	-0.31* (-3.01)	-0.31* (-2.71)
<b>PARENT</b>	1.34*** (2.91)	1.46* (3.15)	2.01* (3.71)	2.66* (3.81)	2.95* (4.38)
<b>STATE</b>	0.34 (0.74)	0.22 (0.51)			
<b>STOCK</b>	0.58 (1.26)	0.62 (1.75)	0.38 (1.04)	0.39 (1.05)	0.15 (0.37)
<b>FINANCIAL</b>	1.04*** (2.80)	1.16* (3.08)	1.00* (2.43)	1.19* (2.40)	
<b>INT</b>	-0.83*** (-2.55)	-0.90* (-2.79)	-0.85* (-2.47)	-0.98* (-2.49)	-1.15* (-2.62)
<b>BERRY</b>	-0.77 (-1.50)				
adjusted <b>R</b> <sup>2</sup>	0.19	0.19	0.20	0.04	0.04
<b>F</b> <sub>0</sub> (degrees of freedom)	44.71 (8;1438)	50.77 (7;1439)	51.48 (6;1222)	9.87 (5;1061)	9.15 (4; 880)

In parentheses t statistics, adjusted for heteroskedasticity as in White (1980). Parameters significant at the 1% level are asterisked. Equation 1 includes all the variables considered; equation 2 excludes the Berry index; equation 3 is estimated for the subset of non state owned firms; equation 4 is estimated for the subset of non state owned and unlisted firms; equation 5 is estimated for the subset of the non state owned, unlisted, non financial firms.

Table 6 presents the different specifications. We first (column 1) consider a general equation including all the variables for the whole sample, and later (column 2 to 5) drop the variable proxying for diversification, as it is highly correlated with the proxies for integration.

We then estimate this model for three subsets of the sample. We first (column 3) exclude state owned firms for which the issue of dispersed ownership plausibly has a different nature (as state owned groups do not really need to raise external funds as risk capital); secondly (column 4) we exclude listed companies, for which the variables considered are (theoretically) less important in explaining dispersed ownership. Finally (column 5), we also drop financial firms for which the proxies for integration may in fact measure a qualitatively different relationship than the one captured for the productive firms.

Given the characteristics of Italian hierarchical groups as described above, it is possible, without any loss of generality, to proxy the share of dispersed ownership with a

dummy  $DS^*$  which takes value 1 when  $DS$  is greater than its mean (median) value and 0 otherwise. The dependent variable becomes then a binary variable which can be described as follows:

$$\mathbf{Prob}(DS^* = 1) = F(\mathbf{b}'X)$$

$$\mathbf{Prob}(DS^* = 0) = 1 - F(\mathbf{b}'X)$$

(4)

where  $X$  is the vector of independent variables used in the OLS regressions of table 6. We estimate equation 4 with two probit equations (tables 7 and 8).

**Table 7: Probit estimates**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>INTERCEPT</b>	-0.564*** (19.59)	-0.630*** (41.77)	-0.609*** (34.32)	-0.469*** (20.63)	-0.389*** (12.43)
<b>LISTED</b>	1.998*** (196.14)	2.004*** (198.37)	2.243*** (166.50)		
<b>EMPL*</b>	-0.037* (3.21)	-0.038* (3.41)	-0.036 (2.40)	-0.047** (3.95)	-0.052** (4.27)
<b>PARENT</b>	0.303** (5.43)	0.323*** (6.42)	0.590*** (17.20)	0.682*** (20.58)	0.568*** (10.19)
<b>STATE</b>	0.107 (0.92)	0.088 (0.66)			
<b>STOCK</b>	0.089 (0.92)	0.094 (1.03)	0.011 (0.01)	0.139 (0.02)	-0.013 (0.015)
<b>FINANCIAL</b>	0.212** (3.74)	0.230** (4.61)	0.166 (2.33)	0.169 (1.94)	
<b>INT</b>	-0.167* (3.33)	-0.178** (3.86)	-0.179* (3.21)	-0.235** (5.25)	-0.323*** (7.40)
<b>BERRY</b>	-0.118 (0.63)				
pseudo <b>R</b> <sup>2</sup>	0.51	0.51	0.53	0.38	0.37
N. observations	1385	1385	1177	1016	856

The dependent variable is a dummy which takes value 1 if **DS** is larger than the mean value in the considered sample and 0 otherwise. In parentheses  $\chi^2$  statistics. \*\*\* means that parameter is significant at the 1% level, \*\* at the 5% level, \* at the 10% level. Equation 1 includes all the variables considered; equation 2 excludes the Berry index; equation 3 is estimated for the subset of non state owned firms; equation 4 is estimated for the subset of non state owned and unlisted firms; equation 5 is estimated for the subset of the non state owned, unlisted, non financial firms.

**Table 8: Probit estimates**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>INTERCEPT</b>	-0.035 (0.08)	-0.241*** (6.74)	-0.223** (5.19)	-0.223** (5.19)	-0.175* (2.81)
<b>LISTED</b>	5.345 (0.00)	5.35 (0.00)	5.346 (0.00)		
<b>EMPL*</b>	-0.023 (1.37)	-0.026 (1.68)	-0.018 (0.67)	-0.018 (0.66)	-0.021 (0.80)
<b>PARENT</b>	0.503*** (11.88)	0.570*** (15.80)	0.708*** (20.58)	0.708*** (20.58)	0.695*** (14.48)
<b>STATE</b>	0.161 (2.07)	0.107 (0.96)			
<b>STOCK</b>	0.131 (2.34)	0.145* (2.86)	0.093 (1.09)	0.093 (1.09)	0.048 (0.249)
<b>FINANCIAL</b>	0.241** (4.73)	0.291*** (7.21)	0.285*** (6.08)	0.285*** (6.08)	
<b>INT</b>	-0.178** (4.04)	-0.212*** (5.90)	-0.202** (4.63)	-0.202** (4.63)	-0.224** (4.47)
<b>BERRY</b>	-0.365*** (6.19)				
pseudo <b>R</b> <sup>2</sup>	0.82	0.81	0.81	0.40	0.40
N. observations	1385	1385	1177	1016	856

The dependent variable is a dummy which takes value 1 if **DS** is larger than the median value in the considered sample and 0 otherwise. In parentheses  $\chi^2$  statistics. \*\*\* means that parameter is significant at the 1% level, \*\* at the 5% level, \* at the 10% level. Equation 1 includes all the variables considered; equation 2 excludes the Berry index; equation 3 is estimated for the subset of non state owned firms; equation 4 is estimated for the subset of non state owned and unlisted firms; equation 5 is estimated for the subset of the non state owned, unlisted, non financial firms.

The main conclusions we draw on the basis of our estimates are as follows.

Vertical integration (**INT**) always appears with the expected sign and is statistically significant in all the subsets. The absolute value of the coefficient is however higher when excluding financial and listed companies for which the magnitude of dispersed ownership should depend on variables not included in the model. The negative sign of the coefficient is consistent with investors' perception of greater risk of conflict of interest when the

degree of integration is higher<sup>21</sup>. When we consider the two indices of vertical integration separately<sup>22</sup> the sign of the coefficients is negative, but they are statistically significant only for the subsets which exclude listed companies.

In order to exclude the possibility that integration may act as a proxy for other unobserved variables such as growth perspectives or expected dividends that may affect dispersed ownership, we evaluate such relationships in a smaller sample. For a subsample (of about 200 firms) the availability of balance sheet information enables us to investigate the relationship between vertical integration and growth opportunities (measured as the rate of growth of profits or average profits in the previous four years) and between vertical integration and dividends. No significant correlation among these variable is observed, nor are they significant when included in the regression equation; the same is true for a leverage variable.

Diversification as measured by the Berry index (*BERRY*) is not significant in the specification where integration is also included<sup>23</sup>; similar results are obtained when using the diversification ratio (*DR*) or the number of different products (*NUM*). This results from the (positive and statistically significant) correlation between the diversification variables and the vertical integration variable, which is explained by the well known difficulties in measuring conglomerate diversification. Among Italian hierarchical groups, after all, only a few can be considered true conglomerates. It has to be noticed that in the second probit equation (table 9) the diversification index is instead significant, but has the same sign as *INT*.

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21 On the other hand, more vertically integrated firms may originate from break-ups of former multidivisional organisations. Unfortunately detailed information on the occurrence of these events is not available in the data set; however a considerable number of break-ups, made profitable by a change in the fiscal regime, occurred well before (in the early 80s') the time period which is analysed in the paper.

22 Results for INTBA and INTFO are not reported in the table, but are available from the authors.

23 It is, instead, negative and significant when integration variables are not included. This may in part be due to the fact that the indicators considered do not capture a real diversification effect.

The dummy variable for listed companies (*LISTED*) has the expected sign and is always statistically significant (equations 1, 2 and 3). The result is somewhat obvious as listed companies have the largest dispersed ownership (on average 31,04 per cent versus 9,45 for the rest of the sample). If we estimate the model for the listed companies only, however, none of the variables considered is significant with the exception of the dummy which identifies state ownership, which has a negative impact. As previously mentioned, an analysis of ownership dispersion for listed companies would require the introduction of a different set of explanatory variables (market to book ratio; dividend policy, etc.).

The dummy indicating a share directly owned by the head of the group (*PARENT*), as well as the dummy variable indicating a financial firm (*FINANCIAL*), appear with a positive sign and are always significant. When the head of the group directly owns shares in the firm, outsider investors might feel more protected against potential abuse; the same holds for financial firms, since these are usually subholdings of the group.

The dummy which identifies a joint stock company (*STOCK*) is significant only in some of the specifications (equation 2, that includes state-owned, listed and financial firms); as a consequence of the design of Italian company law, shares in a joint stock company represent a more liquid investment than stakes in other types of limited liability companies.

Firm size (*EMPL\**) has a significant negative sign in the first two equations. The relationship is always negative and statistically significant for unlisted companies; for the listed companies there is no effect. The result is robust to different definitions of size<sup>24</sup>; The relationship cannot be explained by a supply effect (which should instead be positive) and may be interpreted as a sign of lack of safeguards for minority shareholders, who may feel that their ability to intervene in supervising the company is reduced when the company is larger.

## 6. Concluding remarks and proposals

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<sup>24</sup> Only results for the variable *EMPL\** are reported in the table. We also run some regressions using a size variable based on firm's net worth, which has a negative and significant coefficient (but which might result from a spurious correlation with the dependent variable).

In the paper we test to what extent the degree of protection of minority shareholders can explain dispersed ownership. As is well known, in the context of pyramidal groups only a small fraction of total ownership is dispersed. This may reflect supply factors which limit the firm's demand for risk capital, such as the possibility of raising funds in alternative ways or the fear of losing control. However there is little doubt that the absence of adequate means of shareholder protection plays an important role. We attempt here to identify the sensitivity of the demand for dispersed shares to the protection regime as it is perceived by outside investors. There appears to exist a significant correlation between variables proxying for shareholder safeguards and dispersed ownership. In particular the existence of explicit protection mechanisms (such as the ones specified for a joint stock holding company or the ones connected to the listing on the stock market) seems to be relevant.

As the theory suggests, the potential for conflict of interest between the controlling shareholder (individual or coalition) and the minority shareholders in any single company of a group appears larger, the more the group is vertically integrated. In this case the absence of formal safeguards for minority shareholders reduce dispersed ownership. We also find a negative effect of firm size, suggesting that, other things equal, investors perceive themselves to be more at risk when holding shares in larger firms. This effect should be further investigated by taking into account supply factors. A useful extension of the analysis would be to consider firms' performance. This might give further insights into the determination of share ownership patterns.

These results also suggest that demand factors play a role in explaining the limited involvement of investors in companies' ownership. Some proposals have been recently advanced (see Rossi, 1995; Barca, 1995) in order to reduce these problems. They include - as a minimal solution - greater disclosure requirements over who is in control and over the entire structure of the group; the availability of a group prospect, more detailed than consolidated balance sheets, showing in detail all the information which are relevant to assess the effects of a unique leadership by the top of the pyramid (and in particular infra-group operations). Rossi (1995) also proposes to prevent listed firms from being part of a pyramidal group (in particular to be controlled by other companies).

Suggestions also come from other countries' regulation which, as in the case of the US, explicitly state that transactions among companies in a group must be on fair

terms<sup>25</sup> and impose disclosure requirements on large transactions. Further obligations concern self-interested conduct by the parent<sup>26</sup>.

In the German case, regulation is even stronger in that groups of firms must fall within the categories of “contractual groups” or “de facto groups”. In the former case the group becomes nearly a single company, in that the parent has a right to all profits and is responsible for all the losses, and minority shareholders of subsidiaries are compensated with a guaranteed dividend. In the latter case, the parent company has more limited rights and minority shareholders are more protected from abuses.

Given the role played in Italy by pyramidal groups in insuring some separation between ownership and control it would probably be inefficient to constrain them too strongly. However a greater transparency on infra-group operations and stronger fiduciary duties for directors enforced by a more penetrating role of auditing firms would help in reducing the peculiar agency problem of groups in Italy.

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<sup>25</sup> The subsidiaries may start a derivative action against the parent and in general the burden of proof is on the parent.

<sup>26</sup> Limitations on a controlling shareholder’s use of its position, property or information of partly owned subsidiaries for controlling shareholder’s own benefit. See Eisenberg (1995).



## APPENDIX

## Sector distribution in the sample

SECTORS	N. FIRMS
sect1: agriculture	16
sect2: energy	19
sect3: minerals, metals	26
sect4: non ferrous minerals and mineral products	57
sect5: chemical products	75
sect6: metal products	62
sect7: agricultural and industrial machinery	53
sect8: office machinery	50
sect9: electrical appliances	98
sect10: transportation equipment	34
sect11: food, beverages and tobacco products	41
sect12: textile, leather products and clothing	63
sect13: paper industry	62
sect14: rubber industry	36
sect15: other industries	7
sect16: building industry	71
sect17: services	426
sect18: financial services	299
Total number of firms	1,495

Variables identifying shares with voting rights

In the data base derived from the Banca d'Italia-Consob experimental archive on shareholdings for the years 1988-1993, the distribution of voting rights is not always known. Shareholders' identities are known only when the amount of shares they hold is above a threshold determined by law (notification is compulsory whenever an agent holds, directly or indirectly, 2 per cent of the voting rights of a listed company or whenever a listed company holds, directly or indirectly, more than 10 per cent of an unlisted firm). In the data base, it is then possible to identify the total amount of shares belonging to agents that have been identified by law (*DIS*) and the amount of shares belonging to hierarchical

groups, the so-called control ownership ( $CS$ ). The variable is calculated using algorithms that establish links between firms and groups.

In this paper we use information on holdings on January 1 1993 to construct some variables concerning the type of ownership and the characteristics of the shareholders.

The dependent variable ( $DS$ ) represents dispersed ownership. This is approximated by the sum of the "not-notified" holdings ( $NDIS = 100 - DIS$ ) and holdings of agents not belonging to any identified group ( $INV$ ). It should be noted, however, that the "not-notified" holdings variable over-estimates dispersed ownership as some secondary linkages, which may be significant but are below the threshold mentioned above, are not captured in the data base.

The amount of shares notified by investors ( $INV$ ) is constructed by splitting the residual notified holdings ( $DIS - DS$ ) into those held by subsidiaries of other hierarchical groups ( $OGS$ ) and those held by investors ( $INV$ ). The following identity gives total voting shares as a sum of the previous variables:

$$(1) \quad 100 = NDIS + CS + OGS + INV.$$

Dispersed ownership is defined as

$$DS = NDIS + INV = 100 - CS - OGS.$$

The variable used in the econometric estimation is a transformation of  $DS$ : the logarithm of  $(DS / (100 - DS))$ . This is equal to

$$(2) \quad LOG \left[ \frac{DS}{CS + OGS} \right]$$

The variable is the ratio of dispersed ownership, i.e. shares held for portfolio investment purposes, to the sum of the controlling group and other groups' ownership. The latter has been separated out from the dispersed ownership share, since it identifies shareholders

whose holdings in other groups are more justified by strategic reasons than by portfolio decisions.

### Vertical integration indices

The vertical integration indices used in the econometric analysis are constructed from the input-output tables of the Italian economy in 1985 for 92 sectors. The tables<sup>27</sup> represent the flow of intermediate sales of domestic production at ex fabrica prices net of value added taxes.

For the *INTBA* index, the starting point is the technical coefficient matrix where each element represents the amount of inputs from industry *i* to industry *j*. For the *INTFO* index, the matrix of intermediate inputs is normalized by row, using as a factor of normalization the final output of the row under consideration. Hence the index represents the amount of output of industry *i* that is delivered to all other sectors.

We obtain in this way two matrices containing the direct relations among sectors. These relations are then defined for each group by constructing two  $N \times N$  matrices one for each index, where  $N$  is the number of sectors, in our case 92. In both matrices the coefficients of the sectors which are not present in the group under consideration are set equal to zero. The same is done for all the elements along the principal diagonal, which refer to the amount of its own output used by each sector. For each group it has been necessary to relate the economic activities of each single firm, specified in our data base with the standard classification at three digits of the National Institute of Statistics (ATECO81), to the NACE-CLIO classification with 92 branches.

The index *INTBA* for a firm, whose main activity is in sector *j* and belongs to group *g*, is the sum of all coefficients different from zero of the corresponding column:

$$INTBA_{gj} = \sum_{i=1}^{92} a_{ij}$$

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<sup>27</sup> We chose the 1985 tables instead of the most recent ones, constructed for 1988 for 44 sectors, because of the greater level of disaggregation.

where  $a_{ij}$  are the technical coefficients. The index represents the amount of inputs that a firm could obtain from other firms in the same group. This index describes backward vertical integration.

The index *INTFO* for a firm, whose main activity is in sector  $i$  and belongs to group  $g$ , is defined as the sum of the coefficients different from zero of the corresponding row:

$$INTFO_{gi} = \sum_{j=1}^{92} a_{ij}^*$$

where  $a_{ij}^*$  are the normalized coefficients for each row. In this case the index describes forward vertical integration as it indicates the amount of output that could be used by all the other firms in the same group.

The summarizing dummy variable (which takes into account both the indices) is then defined as follows:

$$INT_i = 1 \text{ if } INTBA_{gi} > \frac{1}{I} \sum_{i=1}^I INTBA_{gi} \text{ and } INTFO_{gi} > \frac{1}{I} \sum_{i=1}^I INTFO_{gi}$$

$$INT_i = 0 \text{ otherwise}^{28}.$$

### Diversification variables

For each group we define the following diversification variables:

a) the Berry index,

$$BERRY = 1 - \sum_i \left( \frac{x_i}{x} \right)^2$$

where  $\frac{x_i}{x}$  is the amount of product  $i$ , defined using the ATECO81 classification at the three digits level, divided by the total production of the group<sup>29</sup>. Because of the lack of a variable

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28  $I$  represents the number of all the non financial firms of the sample.

which measures sales, we compute the ratio by using the number of employees. Unfortunately, the diversification index contains some errors since the variable relating to the ATECO81 classification is available only for some firms. The coverage index (number of firms with the code/number of firms in the group) is on average equal to 34 per cent. Therefore it is not possible to say in advance if the Berry index over- or under-estimates the level of diversification of each group;

b) the diversification ratio:

$$\mathbf{DR = 1 - \text{share of the main product}}$$

c) the number of products,

$$\mathbf{NUM = \text{number of different economic codes at 3 digits in the group}}$$

in this case the diversification is underestimated.

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