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FINANCIAL STRUCTURE IN ITALIAN BUSINESS GROUPS

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Abstract

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Many studies emphasize the use of business groups to separate ownership and control. Using different proxies, they conclude that such structures permit predatory strategies that harm minority shareholders. This study differs because it develops a new model of leverage that directly measures the degree of expropriation using financial statements and by focusing on the consolidation perimeter. This deepening methodology offers significant advantages as, within the consolidation perimeter, the chain of control is detected by accounting standards, and the sources of data are official statements that can be verified objectively. The paper constructs a mathematical leverage model that relates a group's financial structure to its revenue with respect to majority shareholders, minority shareholders and lenders. Then, the model is applied to analyze 1575 non-finance Italian groups. The results show that in Italy, at least within the consolidation perimeter, minority shareholders' funds are on average significantly fewer and well paid; nonetheless, the greatest debt leverage allows majority shareholders to increase profits and retain earnings. The paper also explores the relationship between the holding company and the group and the likelihood that we can infer the features of the underlying group from those of the holding company, thus producing interesting results.

Keywords: Corporate Ownership, Corporate Control, Expropriation, Minority Shareholders, Financial Statements, Business Groups

1. INTRODUCTION

Historically, based on classic studies by Berle and Means (1932), studies on the governance of large corporations have assumed, for American companies, a prevailing situation in which ownership is fragmentary and, in the absence of large controlling shareholders, that management has control.

In the years that followed, this concept of the separation between "ownership" by many small shareholders and "control" by management was widely found in many studies including Baumol (1959), Penrose (1959), Marris (1964), Williamson (1964), Galbraith (1967), Jensen and Meckling (1976), and Grossman and Hart (1980).

The picture painted by Berle and Means undoubtedly had great influence on later studies; however, a series of empirical results highlights a more complex reality.

In fact, many studies have found modest but significant concentrations of ownership (Eisemberg 1976; Demsetz 1983; Morck, Shleifer and Vishny 1988) that occasionally gain majority-voting rights (Holderness and Sheehan 1988). Managers themselves seem to be increasingly involved as

shareholders of the companies they are managing (Friend and Lang 1988; Larner 1966; Holderness, Kroszner, and Sheehan 1999; Himmelberg, Hubbard, and Palia 1999).

High levels of ownership concentration are also found in businesses worldwide, both in economically developed and underdeveloped nations (La Porta, et al. 1998, 1999).

The traditional contraposition between shareholder-owners and manager-controllers began to move gradually to one of two other categories:

- controlling shareholders, i.e., those (occasionally the managers themselves) who hold sufficient shares to have control of overall corporate resources;

- minority shareholders who, in return for their investment, obtain the right to share in profits but are unable to influence the running of the company.

This separation between ownership and control (control-ownership wedge) has been increasingly studied by academics, with particular attention being paid to so-called "groups with pyramidal structure" (Almeida, and Wolfenzon 2004), in which the holding company directly owns controlling shares in another company that, in turn, holds controlling shares in other companies below it. By

their very nature, these groups tend to emphasize the separation between controlling capital held at the top of the pyramid and minority shareholder capital, which is scattered and fragmented among a host of companies.

1.1. The Outline of the Paper

The study begins by identifying two contrasting points-of-view in this literature as two different frameworks for classifying research performed on business groups: 1) predatory view; 2) synergic view, and by identifying the hypothesis to test (paragraph 2).

Then, I suggest an innovative analytical model (paragraph 3).

In fact, whereas the separation between ownership and control is usually identified by (and its analysis limited to) the ratio between control rights (CR) and cash flow rights (CFR), I concentrate on the separation between:

- the holding company's capital ownership;
- the holding company's capital control, namely, all of the resources invested in the aggregate (capital from the parent company, minority shareholders and lenders) as though it were a single entity.

In short, I investigate the phenomenon of separation between capital owned and capital controlled by the holding company, as found in the group's consolidated financial statements, and I compare it with the holding company's financial structure.

The use of consolidated financial statements is particularly useful and offers important advantages when compared with previous research practices. First, the chain of control is not arbitrarily determined by the researcher but is performed by the groups themselves in accordance with accounting standards in the process of drawing up the balance sheets. Moreover, the data are public, can be verified objectively and are elaborated using explicit accounting standards.

I go on to construct a mathematical model that is able to relate a group's financial structure to its revenue, with respect to the various elements bringing resources—majority shareholders, minority shareholders, and lenders (paragraph 4).

Consequently, I applied this model to compare Italian groups and their own holding companies to verify the picture offered by previous circumstantial research on minority expropriation (predatory view and synergic view) (paragraph 5).

To perform a significant comparison, I focus the analysis on 1575 non-finance groups present in the AIDA database (Italian component of Bureau van Dijk's Amadeus database) in 2014 that, according to their separate and consolidated financial statements, present only positive equity and income for holding companies and majority and minority group shareholders and negative income tax.

I believe that the empirical results are very interesting, and I discuss them in paragraph 5.

In particular, the model highlights an enormous variety of combinations in terms of resources managed and their remuneration (this observation already contradicts the hypothesis of systematic expropriation). Underlying this wide

variety, however, certain trends should be noted, in light of previous research.

On average, the groups make little use of minority shareholders' funds, and their returns tend to be higher than group average returns on investment and majority return on equities.

Therefore, I reject the hypothesis of generalized expropriation to the detriment of minority interests.

However, a group also has higher debt leverage compared with that of his single holding company, and leverage appears to be a key element in building majority wealth (profits and retained earnings), which, however, remains invested in subsidiaries.

Another interesting result is that, on average, a holding appears to pay less tax than subsidiaries do, which could explain the propensity of holdings to create groups.

Correlation analyses highlight a close relationship between holding company and group leverage ratios. These analyses also show that, when holdings tend to be in the form of "pure holding company", they have higher leverage (in this case, minorities also seem well remunerated), and they seem, on average, to dominate groups relatively larger, richer and more profitable in comparison to their own dimensions. Therefore, I can suppose pyramidal structures.

Regression analyses confirm the close bond between holding company leverage ratios and group leverage ratios. Therefore, I conclude that by analyzing each holding's indicator, I can infer the corresponding group indicator and, thus, I can estimate possible group leverage. Conversely, the analyses confirm that it is difficult to fix precise tendencies with respect to the management of minorities, which refutes the hypothesis of systematic expropriation.

Regression analyses also confirm that the higher is the similarity of holding to a pure holding company, the greater is the use of equity leverage, and the analyses confirm the tendency of this type of holding to leave more profits and retained earnings invested in subsidiaries and to dominate more-pyramidal capital structures.

Section 6 summarizes the findings and offers conclusions.

2. HYPOTHESES AND RELATED LITERATURE

Studies on pyramidal groups are often fragmentary and difficult to organize within an integrated descriptive model.

Below, I present the two main lines of thought:

- studies that view groups as fundamentally predatory;
- studies that view groups as fundamentally synergic.

2.1. The Predatory View

As mentioned, the study of the classic agency conflicts between ownership and management has gradually moved to studying management disputes to disputes generated by separation between ownership of capital invested by various categories of investors (primarily minority shareholders and lenders) and control by major shareholders.

In this framework, group majority shareholders, using small investments, can find and wrest control of significant financial resources from minorities. Therefore, according to this view,

Hypothesis 1a: I will have high capital leverage (E_m/E_M). Because the controlling shareholders look to their own interests, they tend to expropriate other investors by transferring resources and revenues outside subsidiaries by involving them in unprofitable projects that, nonetheless, offer various benefits for majority shareholders (see among others Shleifer and Vishny, 1997; La Porta, Silanes and Shleifer, 1999; Claessens and Djankow, 2000; Faccio and Lang, 2002; Lemmon and Lins, 2003).

Transferring wealth between a group's businesses in the pyramid to the advantage of group's vertex is known as "tunneling," and important studies suggest that weak legal protection of investors, typical in a civil law country, is an important determinant in the expropriation of minority shareholders. Then, expropriation is misused by same proxies, particularly by market value measures, even in those countries in which stock markets are underdeveloped. Among these countries, I find Italy and many others countries with a civil law legal origin (see, among others: Johnson, La Porta, Lopez-de-Silanes and Shleifer, 2000; Cheung, Rau and Stouraitis 2006; Cheung, Jing, Rau and Stouraitis 2009).

Although it is true that the most developed financial systems have common law systems, it seems unlikely that all other legal systems should be behind in terms of investor protection (Cheffins 1999; Spaventa 2001). It seems more convincing that Albert's paradigm (Albert 1992) centered, rather than on the expropriation, on the existence of two forms of capitalism: "Rhine capitalism", dominated by banks (stock markets are marginalized) with close relationships between companies and communities, and "Anglo-Saxon capitalism", in which companies are financed by stock exchanges rather than by banks.

However, were the expropriation hypothesis always to be true, the profitability of the group's apex should undoubtedly be higher compared with that of subsidiaries in which minority shareholders are located. Therefore,

Hypothesis 2a:

- holding company total investment profitability (ROA_H) will be systematically higher than group total investment profitability (ROA_G);
- group total investment profitability (ROA_G) will be systematically higher than minority shareholder investment profitability (ROE_m);
- majority shareholder investment profitability (ROE_M) will be systematically higher than minority shareholder investment profitability (ROE_m);

Many authors associate tunneling with an increase in business risk. In fact, the separation between ownership and control isolates in part the top of the pyramid from all consequences of bankruptcy in companies that the top controls financially but that are separate legal entities. Unscrupulous ultimate owners (UO) could therefore undertake risky investments using the activities of companies further down the pyramid (Morck,

Wolfenzon and Yeung, 2004). In short, pyramidal structures would seem to allow manipulation of risks and profits, passing the former on to minority shareholders and taking the latter away from them (Gugler and Yurtoglu, 2003).

Similar predatory behavior can be discerned in debt management; majority shareholders also use debt leverage to amplify controlled resources.

Hypothesis 3: Debt leverage will be high (D_G/E_G)

It is in the apex's interest to increase the ratio between debt and his invested capital. By so doing,

- if debt is concentrated in companies lower down the pyramid, he has more resources under his control and avoids, contemporaneously, additional investments or a weakening of his position of control (by asking for recapitalization underwritten by other partners). The UO, who is less likely to be involved in any bankruptcy situations, is, thus, encouraged to take higher risks (Du and Dai 2004; Shleifer and Visny 1997).

- if debt is concentrated in the holding company itself or in companies it controls, the UO can finance the purchase of shares necessary to gain control of the lower levels (as, for example, in leveraged buyouts). In this case, the need to repay the debt contracted for buying control stock might result in expropriation of minority shareholders as resources, in the form of dividends, are moved from subsidiaries to holding companies (the so-called "Debt Service Hypothesis"; see Banny, Noret and McGowan, 2010; Bertrand, Mehta and Mullainathan, 2002).

The increased risk should, however, be incorporated in terms of higher cost of debt financing. As Chen and Sterken (1999) note, it is quite plausible that excessive use of debt would increase the likelihood of default for the single business. This action would thus have a negative influence on the cost of credit, with negative consequences for the company's value (Myers 1977; Nandelstadh and Rosenberg, 2003; Margaritis and Psillaki, 2010; Driffield, Mahambare, and Pal, 2001; Purnanandam, 2008; Gilson and Villalonga, 2007).

Hypothesis 4a: The cost of group debt financing (interest rate) is systematically higher than the cost of holding company debt financing

2.2. The Synergic View

Other studies conclude that the group represents an intermediate form between hierarchy and market for overcoming agency costs (Almeida and Wolfenzon, 2004), being a more efficient structure that adds value to its businesses (Leff 1978). Primarily, the group replaces markets when the latter are inefficient (Kanna and Palepu and 1999(a), (b)) and generates risk-opportunity sharing mechanisms (Aoki 2001).

This view is indubitably supported by a certain contradiction in results concerning the use of pyramidal groups as a means for separating ownership from control.

On the one hand, pyramids are very common in countries in which alternative methods are available for separating ownership and control (e.g., the possibility of dual class shares; see, among others, La Porta, Lopez de Silanes and Shleifer 1999). On the other hand, pyramid structures are

often themselves linked by control chains that leave no real space for significant separation of ownership and control. Many studies from very different geographical areas agree on this aspect (among others, see Franks and Mayer, 2002; Lefort and Walker, 1999; Faccio and Lang, 2002; Valadares and Leal, 2000; Bianco, Bianchi, and Enriques, 2001).

In this framework, the group's majority shareholders do not systematically wrest control of significant financial resources from minorities via small investments. Therefore, according to this view,

Hypothesis 1b: Capital leverage (E_m/E_M) is not systematically relevant.

On the question of systematic expropriation of minority shareholders, there is likewise contradictory evidence. According to Faccio, Lang and Young (2001), subsidiaries of pyramid groups in Western Europe on average pay considerably higher dividends than do Asian ones. This point does not contradict the expropriation thesis of La Porta and others, but it places the thesis into context. Controlling shareholders in Asia seem to seek expropriation. In Europe, conversely, they focus on the market value of shares and use the payment of generous dividends to minority shareholders to build their reputation. However, despite anecdotal evidence, there is little direct systematic evidence of the specific transactions through which expropriation actually occurs. Furthermore, most academic studies have attempted to measure expropriation indirectly (see, for example, Bertrand, Mehta, and Mullainathan, 2002; La Porta, Lopez-de-Silanes, Shleifer and Vishny, (LLSV), 2000a, 2002; Claessens, Djankov, Fan, and Lang, 2002; or Faccio, Lang and Young, 2001). Moreover, the literature also offers mixed evidence that minority shareholdings lose value because of specific expropriation actions (see for example, Bae, Kang, and Kim, 2002; or Buysschaert, Deloof and Jegers, 2002). Therefore,

Hypothesis 2b:

- holding company total investment profitability (ROA_h) will not be systematically higher than group total investment profitability (ROA_g);
- group total investment profitability (ROA_g) will not be systematically higher than minority shareholder investment profitability (ROE_m);
- majority shareholder investment profitability (ROE_M) will not be systematically higher than minority shareholder investment profitability (ROE_m).

Concerning the connection between pyramid structure and *debt management*, many studies concentrate on the group ability to create an internal capital market with lower agency costs than the external one has (Barclay and Smith, 1995; Easterwood and Kadapakkam, 1991; Deloof 1998; Stein, 1997; Hoshi et al. 1990; Faccio et al. 2001; Bianco and Nicodano, 2006; Dewaelheyns and Van Hulle, 2010). Therefore,

Hypothesis 3: Debt leverage will be high (D_c/E_c).

It would appear, therefore, that debt management at the group level generally *reduce the cost of debt financing* and, particularly within underdeveloped financial markets, overcomes asymmetric information and disadvantageous agency relationships.

The group's companies, with better access to external credit, can thereby decide to acquire more funding than is needed for their own requirements, at a lower cost than bank credit generated by asymmetric information. They then pass funding on within the group to companies able to guarantee higher operating revenue (Ghatak and Kali, 2001).

Intra-group financing can also influence the amount of external debt, partly because intra-group lending reduces the need for external credit. However, such lending also alters relationships with other external lenders, for example, by weakening their position or increasing their confidence, because the benefits deriving from the bankruptcy of one company in the group are limited compared with the serious negative impact on the reputation of the entire group (Dewaelheyns and Van Hulle 2010; Schiantarelli and Sembenelli 2000; Bianco and Nicodano, 2006). Therefore,

Hypothesis 4b: The cost of group debt financing (interest rate) is not systematically higher than the cost of holding company debt financing.

3. METHODOLOGY

The analysis of pyramidal groups based solely on the separation of controlled and owned voting rights is very common, but incomplete, such an misses fundamental aspects of the financial structure and revenue dynamics. As discussed below, the same pyramidal organization can comprise diverse financial structures, a situation only explained by consideration of a fundamental element: the relationship existing between resources invested by the holding company and those of its subsidiaries.

Let us begin by considering the financial structure of a group in which the capital owned by its parent company, in the role of majority shareholder (UO), is amplified through two different means of financing: by minority shareholders (equity leverage - EL) and by lenders (debt leverage - DL).

The best instrument at hand for the analysis is without doubt the group's consolidated financial statement.

This document offers numerous advantages for detailed research.

First, if the consolidated financial statements have been drawn up according to generally accepted accounting principles (such as IFRS, ITA GAAP or US GAAP), all of the entries are certain to be treated homogeneously. Furthermore, as accounting principles become increasingly uniform at an international level, it is becoming possible to make reliable comparisons between different groups and countries.

Second, the accounting principles underlying the consolidated financial statement require very clearly defined controls of companies included in the document, which must present the group as an economic entity, i.e., as one single company (see for example IFRS 10). This requirement means that this "entity" must be shown only in its external relationships—any intra-group balances, operations, costs and revenues that might distort such a vision must be eliminated.

In the consolidated statement, with respect to the group's equity (E_G), the following must be indicated separately:

- the quota of non-controlling interests (NCI), i.e., that part of a subsidiary's equity that cannot be attributed, either directly or indirectly, to a controlling interest (E_M);
- the quota of controlling interests, i.e., equity owned by the controlling interest (E_C).

3.1. Equity Leverage (EL)

Academics generally call the separation between ownership and control the "equity wedge" and measure it by comparing control rights (CR) with cash flow rights (CFR) (Claessens et al., 2000).

Due to the effect of the pyramidal structure, in which the majority shareholder of a company can, in turn, hold a majority of the capital of another company (Heitor & Wolfenzon, 2006), CFR and CR

can differ (Morck, Wolfenzon & Yeung, 2004), thus creating a wedge between capital owned and capital controlled.

This wedge is important. However,

- the same researcher chooses subjectively the share percentage that permits control;
- this wedge tracks only control relationships rather than patrimonial relationships between parent companies and subsidiaries.

Let us imagine (Figure 1) I have a group comprising four companies—A, B, C and D—in which holding company A controls the others in succession, with a constant percentage of 60%. This 60% makes A the effective controlling (CR) shareholder of B (100%), C (100%) and D (100%). Therefore, if I posit that D returned profits of 100, I calculate that only 21.6 of these profits would go to A (CFR). In fact, only 21.6% of this profit belongs to A (60% of 60% of 60% = 21.6). Consequently, CFR will be 36% for C (60% of 60%) and 60% for B.

Figure 1. Equity leverage – a stylized example

1a				1b				1c			
A		Equity A		A		Equity A		A		Equity A	
Share B (60%)	21.6		21.6	Share B (60%)	6		100	Share B (60%)	60		100
B		Equity B		B		Equity B		B		Equity B	
Share C (60%)	36		36	Share C (60%)	6		10	Share C (60%)	60		100
		- Majority B	21.6	Assets	4		6	Assets	40		60
		- Minority B	14.4			- Majority B	6			- Majority B	60
						- Minority B	4			- Minority B	40
C		Equity C		C		Equity C		C		Equity C	
Share D (60%)	60		60	Share D (60%)	6		10	Share D (60%)	60		100
		- Majority C	36	Assets	4		6	Assets	40		60
		- Minority C	24			- Majority C	6			- Majority C	60
						- Minority C	4			- Minority C	40
D		Equity D		D		Equity D		D		Equity D	
Assets	100		100	Assets	10		10	Assets	100		100
		- Majority D	60			- Majority D	6			- Majority D	60
		- Minority D	40			- Minority D	4			- Minority D	40
A+B+C+D		Majority A		A+B+C+D		Majority A		A+B+C+D		Majority A	
Assets	100		21.6	Assets	112		100	Assets	220		100
		Minority B+C+D	78.4			Minority B+C+D	12			Minority B+C+D	120
total	100	total	100	total	112	total	112	total	220	total	220
$\frac{E_G}{E_M} = \frac{100}{21.6} = 4.63$				$\frac{E_G}{E_M} = \frac{112}{100} = 1.12$				$\frac{E_G}{E_M} = \frac{220}{100} = 2.20$			

Note: Group 1a follows the financial structure shown in Table 1 (part 2) and is therefore a series of empty boxes whose aim is to separate ownership from control. According to this view, leverage (EL) could grow indefinitely, increasing the number of levels or reducing the percentage of control of one company in the next.

Group 1b has the same group control chain and consequently the same values in terms of CR:CFR ratios. A controls 100% of D (CR_{AD}), and if D had profits of 100, 21.6% of these profits would go to A (CFR_{AD}). Thus, the ratio between CR_{AD} and CFR_{AD} remains equal to 4.63. However, the structure of the group is hugely different. Comparing the assets shows that, in this case, D is 10 times smaller than in the previous case, as is the entire subgroup controlled by A. In fact, in this case, the assets controlled with respect to those invested (EL) is equal to 1.12, with minority shareholders contributing only 0.12.

Group 1c has the same group control chain and consequently the same values in terms of CR:CFR ratios. Here too, A controls 100% of D (CR_{AD}), and if D had profits of 100, 21.6% of these profits would go to A (CFR_{AD}). Thus, the ratio between CR_{AD} and CFR_{AD} remains equal to 4.63. Company D at the base of the pyramid has the same dimensions as group 1a. However, the companies in between are not empty boxes but operating companies, each with their own assets. Moreover, having the same structure, in this case greater investments, will be necessary, both for controlling and minority shareholders. The proportion of assets owned against those invested is equal to 2.20. This value is naturally influenced by the different share in group financing of controlling and minority shareholders. The more the value of assets higher up the pyramid increases, the more EL increases (as does investment from controlling shareholders). By contrast, EL diminishes when investments are made by companies at the base of the pyramid, moving from a situation type 1b (operating assets concentrated at the top) to a type 1c group.

Many studies suggest measuring the difference between ownership and control using the CR/CFR ratio. Thus, in the case of A over D, I would have $100/21.6 = 4.63$. This reasoning would suggest a separation between revenue rights (CFR) and control rights (CR) in the companies situated toward the bottom of the pyramid (Claessens, Djankov and Lang 2000) because the pyramidal structure allows the parent company to assume an amount of control that is disproportionate to the value of its shares in successive businesses down the pyramid (La Porta, et al.).

For the research, it is significant to observe that the same CR/CFR ratio is compatible with very different groups. Figure 1 shows in a stylized example the same CR/CFR ratio ($100/21.6=4.63$) but three very different groups.

In 1 a), capital invested by A is 21.6 in a pyramidal structure. In fact, I have an apparent equity of 217.6 (the sum of the equities of A, B, C and D), and I have equity investments owned by group companies that appear as financial resources for a total of 117.6 but that, as seen, should be eliminated to determine the true capital of the group.

The total capital brought to the group by minority shareholders is equal to 78.4 ($14.4 + 24 + 40$), whereas the capital brought by the holding company is only 21.6. I therefore deduce that the minority brings a majority of the capital. The *equity leverage*, namely, the ratio between group equity controlled by majority shareholders (E_G) and equity owned by them (E_M), will be as follows:

$$\frac{100}{21,6} = \frac{21,6+ 78,4}{21,6} = 1 + \frac{78,4}{21,6} = 4,63$$

This result is only possible because minority shareholders are divided across various assemblies of B, C and D companies, in which a majority of capital and voting rights belongs to companies from the level above, going right up to holding company A.

In other words, the control of a company with less than 100% allows leveraging over minority shareholders, in other words, using capital that is controlled but not owned to control that company's investments (CR) completely.

In 1 b) (Figure 1) capital invested by A is 100, B, C, and D are small, *equity leverage* is 1.12, and CR/CFR ratio remains 4.63.

In 1 c), capital invested by A is 100, as it is also for B, C, and D, *equity leverage* is 2.20, and CR/CFR ratio remains 4.63.

Therefore, traditional evaluation of the separation between CRF and CR is an incomplete indicator of group financial structure. Therefore, in the leverage effect produced by separation within group equity, between capital owned by the holding company and capital controlled by it (Clemens, 1950) I will primarily use *equity leverage*:

$$\text{Equity Leverage} = \frac{\text{controlled equity}}{\text{owned Equity}} \quad (1)$$

In other words, considering all of the equity of the group, I measure what part of the capital is invested by controlling shareholders (including retained earnings) and *how much* is invested by

minority shareholders but is actually controlled by majority shareholders.

Therefore, if, as I said, I call E_G the group's equity controlled by majority shareholders, with E_M being equity owned by them and E_m the equity owned by minority shareholders (and given a group with n companies $E_m = \sum_{x=1}^n E_x$), I obtain:

$$E_G = E_M + E_m \quad (2)$$

Therefore, EL is calculated as follows:

$$\frac{E_G}{E_M} = \frac{E_M + E_m}{E_M} = 1 + \frac{E_m}{E_M} \quad (3)$$

I consider this indicator particularly important to test Hypothesis 1 (H1).

3.2. Debt Leverage (DL)

Considering the entire financial structure of a group, it is clear that the investments controlled by the top of the pyramid (UO) comprise not only minority interest but also capital financed through debt (debt wedge).

Any analysis of this funding - including in the context of a group's economy - must of necessity initially consider some key studies of capital structure, largely deriving from the famous 1958 article by Modigliani and Miller (among others, De Angelo and Masulis, 1980; Jensen and Meckling 1976; Jensen 1986; Myers, 1984; Titman and Wessel, 1988; Rajan and Zingales, 1995; Fama and French, 2002).

However, debt leverage within groups appears to have particular characteristics. The subsidiaries of a business group are separate legal entities that have direct access both to external and to internal financing, the latter occasionally being used to shift risks and resources within the group's structure (see Shin and Stultz 1998; Deloof, 1998; Deloof and Jegers, 1999).

Therefore, decisions concerning a subsidiary's capital structure are more likely the result of a broader trade-off at the group level between the costs and benefits of different sources of finance, such as equity internal debt and external debt (Dewaelheyns and Van Hulle 2010). Groups, by their very nature, can reach higher optimal total leverage levels than can single companies (Manos et al. 2007, Lee et al. 2000; Jung et al. 2009).

If I consider the group a single entity, but external financing is a real debt incurred by the "group as a whole", internal debts are the result of a "circulatory system". In the latter case, resources are:

- raised externally by the group's companies whose superior rating, agency costs, access to capital markets, and so forth permit them to obtain better terms, then,
- redistributed internally toward companies whose superior production efficiency, agency costs, market opportunities, and so forth permit them to derive higher operating revenue.

Here, too, consolidated financial statements are indispensable because they show the effective debt of the group as a whole, i.e., external debt. Although intra-group loans are essential for the

functioning of the whole, they appear as internal transfers that do not affect total real resources.

If external debt increases the group's available resources, then it must widen the gap between capital owned and capital controlled (Dematté 1995, Zattoni 2006):

$$GlobalLeverage = \frac{controlledAssets}{ownedEquity} \quad (4)$$

If TA_G shows the total group resources and D_G its consolidated debt—external debt—then I have the following:

$$TA_G = E_M + E_m + D_G \quad (5)$$

So:

$$\frac{TA_G}{E_M} = 1 + \frac{E_m}{E_M} + \frac{D_G}{E_M}$$

but:

$$\frac{D_G}{E_M} = \frac{E_G}{E_G} \cdot \frac{D_G}{E_M} = \frac{D_G}{E_G} \cdot \frac{E_m + E_M}{E_M} = \frac{D_G}{E_G} \cdot \left(\frac{E_m}{E_M} + 1 \right) = \frac{D_G}{E_G} \cdot \frac{E_m}{E_M} + \frac{D_G}{E_G} \quad (6)$$

else:

$$\frac{TA_G}{E_M} = 1 + \frac{E_m}{E_M} + \frac{D_G}{E_G} \cdot \frac{E_m}{E_M} + \frac{D_G}{E_G}$$

This result is a particularly important indicator for measuring the hypothesis H3.

I can observe that global leverage is calculated by the sum of 1 (constant) plus three other components:

- Equity leverage (EL) previously examined E_m/E_M
- Debt leverage (DL) deriving from the traditional ratio between D_G/E_G
- Mixed leverage (ML), that is, the financial effect of equity leverage on debt leverage ($E_m/E_M \cdot D_G/E_G$).

4. THE MODEL

The next step is to associate the financial structure that majority shareholders are able to control through their own shares with the profit they are able to obtain from the group.

I indicate with " P_M " the group's profit owned by the holding company (according to accounting principles, P_M corresponds to holding profit plus a majority share of subsidiaries' profits minus intercompany profits) and with " E_M " equity owned by the holding company (E_M corresponds to holding equity plus a majority share of subsidiaries' retained earnings). Therefore, in addition to the total group profit rate ($ROE_G = P_G/E_G$), I have two separate ratios:

$$ROE_M = P_M/E_M \quad (7)$$

$$ROE_m = P_m/E_m$$

where, in turn, ROE_m represents average return on equity attributed to minority shareholders in the various companies belonging to the group. In fact, given a group of n companies,

$$ROE_m = \frac{\sum_{x=1}^n P_{mx}}{\sum_{x=1}^n E_{mx}} = \frac{\sum_{x=1}^n ROE_{mx} \cdot E_{mx}}{\sum_{x=1}^n E_{mx}} \quad (8)$$

This indicator is particularly important for measuring the tunneling hypothesis (H2). Therefore, when there is systematic expropriation of minority shareholders, ROE should be significantly less than controlling shareholder return on equity (ROE_m) and thus should confirm the predatory theory. Signs confirming the synergic theorem should derive from the opposite situation. I am aware that I am addressing averages; therefore, when there are numerous, well-remunerated minority shareholders in a company, there might still be a lesser number of poorly remunerated shareholders. The present study intends to build a unitary model for interpreting group dynamics and to test the hypothesis of "systematic expropriation". Therefore, I shall concentrate on the interaction between overall variables. However, there is no reason why this analysis should not be extended to more detailed study of heterogeneous situations within the group itself.

Let us now consider more ratios. If I accept the most common interpretation of EBIT as Earnings Before Interest and Tax, including Operating and Non-Operating Income² (revenue minus expenses), I have the following:

- EBIT (Earnings Before Interest and Taxes) (EBIT)
- (-) Interest Expenses, net (I)
- EBT (Earnings Before Taxes) (EBT)
- (-) Income Tax Expense (T)
- (=) Net Profit (P)

I can therefore calculate, first, the ROA_G . In practice, this ratio can be calculated in many ways. I shall use the following

$$ROA_G = EBIT_G/A_G \quad (9)$$

Here, also, I have an average return. The considerations expressed above also apply here. In addition to corporations investing vast assets with satisfactory returns, there might be, for example, smaller corporations exploring new markets with higher or lower profits but that are in any case useful to the group's economy ("scouting").

If I indicate the total cost of borrowing money as I_G and the total cost of external debt as D_G , I can show the average cost of debt as i_G :

$$i_G = I_G/D_G \quad (10)$$

This result is an average cost. The capacity of minimizing this indicator demonstrates the group's ability to obtain credit using its corporations that, for various reasons, are able to reduce borrowing cost. These funds will then be redirected, in intra-group loans, toward those companies that are able to derive from them more operating revenue.

Finally, t_G is taxation (T_G) on earnings before taxes (EBT_G):

$$t_G = T_G/EBT_G \quad (11)$$

Again, I have an average cost because t_G represents the sum of taxes on the sum EBT.

² In Italy, this value is often associated with the MON (net operating margin) or RO (operating revenue), but the concept is not the same. In addition to components of operating revenue, EBIT includes costs and revenues from additional sources (e.g., residential real estate for a manufacturing company) and revenues from so-called active asset management.

This variable is influenced by a number of factors that produce a different index from one group to another.

To begin with, I should emphasize that a group consists of separate legal entities that are often also separate for taxation purposes. The same EBT might be distributed differently among corporations or, within a different corporation, might have a different composition.

Furthermore, given the same EBT, some corporations could be making a profit and some, a loss, but not all countries allow offsetting profits against losses. In the latter case, it might be

$$ROE_M = \left[ROA_G + \frac{D_G}{E_G} (ROA_G - i_G) + \frac{E_m}{E_M} \left(ROA_G - ROE_m \frac{1}{1-t_G} \right) + \frac{E_m D_G}{E_M E_G} (ROA_G - i_G) \right] \cdot (1-t_G) \quad (12)$$

In synthesis, I can maintain that the holding company's revenue ROE_M is calculated by the sum of

- Return On Asset ROA_G
- Debt Leverage Effect (DLE)

$$\frac{D_G}{E_G} (ROA_G - i_G) \quad (13)$$

calculated by the product of debt leverage (D_G/E_G) and debt cost gap. This is an important indicator to test the group's role in risk management and to reduce the cost of external financing (debt) (H4):

- Equity Leverage Effect (ELE)

$$\frac{E_m}{E_M} \left(ROA_G - ROE_m \frac{1}{1-t_G} \right) \quad (14)$$

calculated by the product of equity leverage (E_m/E_M)

expected that a need to reduce the effect of taxation might lead to tunneling directed not against minority shareholders but rather to redistribute taxable amounts when fiscal law does not allow profit/loss compensation.

Finally, groups tend by their very nature to be cross-border. Therefore, another possible motive of differentiation in t_G is the localization of corporations in countries with varying tax laws.

By developing the mathematical process, I can set up a single equation for the various components outlined (see Appendix 1):

and share cost gap, i.e., the difference between ROA_G and the group average returns on equity invested by minority shareholders, realigned ($1/(1-t_G)$) to consider the non-tax-deductible nature of dividends. I also believe that this indicator is very important for measuring the tunneling hypothesis (H2):

- Mixed Leverage Effect (MLE)

$$\frac{E_m D_G}{E_M E_G} (ROA_G - i_G) \quad (15)$$

calculated by the product of equity leverage, debt leverage and debt cost gap

- Tax Effects

$$(1-t_G) \quad (16)$$

Therefore, if I compare group leverage with holding leverage, I have the following:

$$\begin{aligned} \text{group } ROE_M &= \left[ROA_G + \frac{D_G}{E_G} (ROA_G - i_G) + \frac{E_m}{E_M} \left(ROA_G - ROE_m \frac{1}{1-t_G} \right) + \frac{E_m D_G}{E_M E_G} (ROA_G - i_G) \right] \cdot (1-t_G) \\ \text{holding } ROE_H &= \left[ROA_H + \frac{D_H}{E_H} (ROA_H - i_H) \dots \dots \dots \right] \cdot (1-t_H) \end{aligned} \quad (17)$$

ROA Debt Lev. Effect (DLE) Equity Lev. Effect (ELE) Mixed Lev. Effect (MLE) Tax Effect

where: M= majority; m= minority; G= group; H=holding.

I also consider other ratios to capture the relationship between a holding company and its groups to highlight their dimensions and to verify the pyramidal structure underlying holdings. Therefore, I also consider:

- Profits (P_M/P_H);
- Equities (E_M/E_H);
- Assets (A_G/A_H);
- Debts (D_G/D_H);
- Employers (emp_G/emp_H).

For holding company, I also calculate the following:

• Investment in subsidiaries over assets (ISb_H/A_H); this indicator is important to understand whether the holding company manages only share activities (pure holding company) or has other

assets and manages operational activities (operating holding company).

- Sum of credits and debt loan to subsidiaries on investment in subsidiaries (CD_H/ISb_H) to estimate the degree of financial integration.
- Number of registered subsidiaries (Sub_H).
- Legal form (two dummy variables: "SpaVsSrl" and "SpaVsOthers"; thus, when holding is a "Spa", both indicators =0; when holding is a Srl, "SpaVsSrl" =1 and "SpaVsOthers" = 0; conversely, "SpaVsSrl" =0 and "SpaVsOthers" = 1 when holding has another legal form) and listing on the stock exchange (dummy variable "List"= 1 when holding is listed). (See Appendix 2).

I use sample data of 1,575 non-finance groups present in the AIDA database (Italian component of

Bureau van Dijk's Amadeus database) in 2014 that, according to their separate *and* consolidated financial statements, present only positive equity *and* income for a holding company *and* majority *and* minority group shareholders *and* negative income tax (gain) to:

1) *Compare* the holding company and its own group to test the predatory and synergic hypotheses.

2) *Correlate* the holding company's ratios between them, the group's ratios between them and the holding company's and group's ratios between them to verify the theoretical and empirical relationships.

3) *Evaluate whether it is possible to infer group features from holding features using least squares regression models.*

$$\text{Group features} = \beta_0 + \beta_1 \text{ROA}_H + \beta_2 i + \beta_3 (D_H/E_H) + \beta_4 \text{DLE}_H + \beta_5 (1-t_H) + \beta_6 (\text{ISb}_H/A_H) + \beta_7 \text{CD}_H/A_H + \beta_8 (\text{SpaVsSrl}) + \beta_9 (\text{SpaVsOth}) + \beta_{10} \text{List} + \beta_{11} \text{Sub}_H + \beta_{12} \text{LnA}_H + \beta_{13} \text{emp}_H + \varepsilon \quad (18)$$

The group features that I consider are the group leverage ratios (10 indicators), rise of profits (P_M/P_H), equities (E_M/E_H), assets (A_G/A_H) and employees ($\text{emp}_G/\text{emp}_H$).

5. EMPIRICAL RESULTS

Table 1 and Table 2 show the values of EM and PM. EM is the group majority equity owned by the holding company and corresponds to holding equity plus the majority share of subsidiary retained

earnings. The group majority profit P_M is group profit owned by the holding company and corresponds to holding profit plus the majority share of subsidiary profits minus intercompany profits. Therefore, comparing E_M and E_H highlights the tendency of a holding company to attract or, instead, to leave gains in subsidiaries in the form of retained earnings. A comparison between P_M and P_H highlights the tendency of a holding company to attract or not to attract a group's profit from subsidiaries.

Table of abbreviations

$A_{G,H}$	Total assets (group and holding company)
CD_H	Sum of credits and debts of holding companies vs. subsidiaries
$D_{G,H}$	Debts (group and holding company)
$DLE_{G,H}$	Debt leverage effect ($D/E*(ROA-i)$) (group and holding company)
ELE_G	Equity leverage effect ($E_M/E_H*(ROA-ROE_m^t)$) (group)
$E_{M,m,H}$	Equities (group majority or minority shareholders and holding company)
$\text{emp}_{G,H}$	Employees (group and holding company)
$i_{G,H}$	Interest rate (interest/debts) (group and holding company)
ISb_H	Investments in share or stake in subsidiaries
Listed Spa	Number; only S.p.As can be listed on Italian stock exchanges
LnA	Total assets (natural logarithm)
MLE_G	Mixed leverage effect ($D/E*E_m/E_M*(ROA-i)$) (group)
Others	Includes: Sapa (Società in accomandita per azioni) a hybrid form of an Italian company (fairly uncommon) partially limited by shares that involves two different categories of shareholders, some with and some without limited liability ("accomandanti" are standard shareholders who have limited liability when managing shareholders; "accomandatari" are shareholders who have full liability). "Società cooperative" (or 'coop') is a particular Italian business organization owned and run by individuals for their mutual benefit and "società consortili".
$P_{M,H}$	Profits (group majority shareholders and holding companies)
$ROA_{G,H}$	Return on assets (Ebit/A) (group and holding company)
$ROE_{M,m,H}$	Return on equity (P/E) (group majority or minority shareholders and holding company)
ROE_m^t	Returns on equity invested by minority shareholders, realigned to consider the non-tax-deductible nature of dividends ($P/E * 1/(1-t)$)
Spa	Società per azioni: Italian limited liability companies whose capital is divided into shares (called 'azioni') and whose members (shareholders) are only liable for its debts within the limits of the capital stock. The minimum required starting capital for an S.p.A. is € 120,000.
Srl	(Società a responsabilità limitata): Italian limited liability company whose capital is divided into stakes (called 'quote') and whose members are only liable for its debts within the limits of the company assets. The minimum required starting capital for an S.r.l. is € 10,000.
sub_H	Number of subsidiaries
$t_{G,H}$	Tax rate (tax/earnings before taxes) (group and holding company)

Table 1. Holding

Legal form	N.
Spa	1,118
Srl	363
Others	93
Listed Spa	71

Table 2. Group & Holding

Ratio	Mean		Median		Std.		Data sample =1.575	
	Group	Holding	Group	Holding	Group	Holding	WilcoxonZ	Sign.
$A_{GH}/1,000$	452,475	274,746	80,880	50,609	4,792,602	2,635,107	-33.65	**
$D_{GH}/1,000$	305,896	159,475	46,203	24,213	4,117,602	1,946,410	-33.36	**
$E_{MH}/1,000$	136,606	116,845	27,645	22,129	1,121,084	1,081,452	-24.30	**
$E_m/1,000$	10,849		156		112,889			
$P_{MH}/1,000$	9,682	7,084	2,055	1,437	49,556	34,392	-18.95	**
$P_m/1,000$	1,198	7,084	14		16,120			
emp_{GH}	922	411	237	84	4,686	3,775	-32.49	**
sub_H		10.72		6		16.77		
ISb_H/A_H		0.25		0.13		0.28		

Note: **=sign<0.01

E_M and P_M are, on average, higher than holding equity E_H and profit P_H . The increase is not on average very high, but it is statistically significant (Wilcoxon Z test) and provides us a preliminary indication consistent with **H1b**; the majority appear not to systematically expropriate the subsidiaries; rather, they leave part of their wealth invested in the

body of the group. However, the group minority equity E_m is small; thus, the interest in expropriating group members is also small.

Conversely, comparing the rise of debt from holding to group (D_{GH}), it is clearly the group that, on average, finances the increased investments from the holding to the group (A_{GH}).

Table 3. Group/Holding

Ratio	Mean	Median	Std.	Sample groups
A_G/A_H	2.47	1.30	3.47	1575
D_G/D_H	70.76	1.40	785.70	1575
E_M/E_H	1.67	1.09	8.67	1575
E_m/E_H	0.21	0.01	1.02	1575
P_M/P_H	6.29	1.22	39.83	1575
emp_G/emp_H	27.83	1.56	182.7	1322

Table 3 presents the same comparison for each group holding by using ratios. I can observe the great

variability in D_G/D_H due to the effect of debt leverage and equity leverage between group and holding:

$$\frac{E_G}{E_H} = \frac{E_M}{E_H} + \frac{E_m}{E_H} \quad \frac{D_G}{D_H} = \frac{E_G}{E_H} \cdot \frac{E_G}{E_H} \quad \frac{A_G}{A_H} = \frac{1 + \frac{D_G}{E_G}}{1 + \frac{D_H}{E_H}} \cdot \frac{E_G}{E_H} \quad (19)$$

Table 4. Leverage

Ratio	Mean		Median		Std.		Data sample =1.575	
	Group	Holding	Group	Holding	Group	Holding	WilcoxonZ	Sign.
ROE_{MH}	9.59%	9.31%	7.86%	6.40%	7.53%	8.98%	-6.26	**
ROA_{GH}	7.04%	6.98%	5.69%	5.00%	4.78%	6.30%	-7.65	**
D_{GH}/E_{GH}	2.83	2.10	1.74	1.13	4.1	3.48	-22.01	**
ROA_{GH}	7.08%	6.98%	5.59%	5.00%	4.78%	6.30%	-7.65	**
i_{GH}	1.59%	1.68%	1.41%	1.20%	1.21%	2.79%	-6.21	**
$(ROA_{GH} - i_{GH})$	5.46%	5.36%	3.95%	3.20%	5.00%	6.94%	-6.56	**
DLE_{GH}	9.80%	6.62%	6.82%	3.70%	10.29%	8.60%	-22.94	**
E_m/E_M	0.1		0.01		0.28			
ROA_G	7.04%		5.69%		4.78%		-12.48	**
ROE_m	27.77%		7.32%		165.25%			
$(ROA_G - ROE_m)$	-20.71%		-2.24		164.19%			
ELE_G	-1.48%		-0.01%		10.85%			
D_G/E_G	2.83		1.74		4.1			
E_m/E_M	0.10		0.01		0.28			
ROA_G	7.08%		5.59%		4.78%			
i_G	1.59%		1.41%		1.21%			
MLE_G	1.05%		0.03%		8.01%			
$1-t_{GH}$	56%	64%	60%	66%	17%	24%	-17.97	**

M=majority; m=minority; G=group; H=holding $ROE_m^* = ROE_m (1/1-t)$ **=sign<0.01

Table 4 compares group leverage and holding company leverage.

Because ROE equals the ratio between profit (P) and equity (E),

-ROE_H compare only head-family profit (P_H) and equity (E_H)

-ROE_M compare majority interest exhibited in a group's consolidated financial statement, namely, group profits owned by majority shareholders (P_M) and group equity owned by majority shareholders (E_M).

I can observe that for both the mean and the median, majority shareholder group ROE_M (9.59%) is slightly higher (but statistically significant) than holding ROE_H (9.31%) and that distributions are positively skewed (however, high standard deviations for many indicators show various types of equilibriums).

Moreover, group ROA_G is slightly higher than holding ROA_H (mean, 7.04% and 6.98%; median 5.69% and 5.00%). This point also seems to contradict the hypothesis of expropriation (H2) to the detriment of minority interests. In fact, as attested by previous studies, tunneling should lead to an increase in ROA_H holding, which should be greater than the average of the group ROE_M.

Group debt leverage (D_G/E_G = 2.83) is remarkably higher than holding debt leverage (D_H/E_H = 2.10) and suggests that groups are better able to call on external financing than are the holding individual companies. I must also consider that groups overlap equities of single firms and that group debt leverage is consequently higher than the mean of group single firms, based on an illusory equity.

Interest rate (i_{G,H}) is comparable. The risk, therefore, does not appear to be systematically higher in the layers underlying the group's holding company. Therefore, the hypothesis of an increased risk of the group with respect to the holding (H4) is not supported. The debt leverage effect (DLE=D/E•(ROA-i)) is very important (more than minority expropriation) in making up a majority

shareholders group's returns (DLE_G= 9,80%; DLE_H=6,62%).

Equity leverage E_m/E_M (mean=0.1; median 0.01) shows that the contribution of minority shareholders to a majority global leverage (TA_G/E_M= 1 + (D_G/E_G) + (E_m/E_M) + (E_m/E_M × D_G/E_G)) is not substantial. This point contradicts the predatory view (H2).

Moreover, remuneration ROE_m appears to contradict the predatory view (H2). The mean value is 27.77%, considerably higher than ROA_G (7.08%) and ROE_M (9.59%). Therefore, the minority shareholder equities are few and very well remunerated (ROE_m), and the difference with group ROA_G is relevant and statistically significant.

Low equity leverage (EL) causes the negative equity leverage effect (ELE= E_m/E_M (ROA_G-ROE_m)) to be feeble (-1.48%); the effect is partially balanced by the mixed leverage effect (MLE= D_G/E_G E_m/E_M (ROA_G-i_G) = 1.05)

Another interesting result is that the tax effect ratio (1-t) shows a lower value for groups than for holdings (respectively, 56% and 64%, so t_G=44%, t_H=36%). Therefore, on average, holdings seem to pay less tax than do subsidiaries. This result could explain the propensity on the part of holdings to create groups.

However, this distribution leads us to conclude that the group structure so common in Italy is not due to a need to gather resources from minority shareholders, much less to a desire for large-scale expropriation. I can only speculate concerning other reasons such as reduction or containment of the risk of bankruptcy for the entire entity or an attempt to optimize dimensions or legal firm localization to obtain benefits (e.g., in terms of labor relations and taxation).

Correlation tables highlight a close relationship between holding company (Table 5), group (Table 6) and holding company-group leverage ratios (Table 7, left upper quadrant). Therefore, construction of majority shareholder profitability (ROE_M and ROE_H) seems particularly associated with ROA and the debt leverage effect (DLE).

Table 5. Holding-Holding

		Holding company													
		ROE _H	ROA _H	i _H	D _H /E _H	DLE _H	1-t _H	ISb _H /A _H	CD _H /A _H	Sub _H	LnA _H	emp _H			
Holding company	ROE _H	1	.716**	-.097**	0.004	.552**	.305**	-.057**	0.027	-.023	-.023	0.033			
			0	0	0.806	0	0	0.001	0.158	0.177	0.222	0.051			
	ROA _H	.716**	1	-0.014	-.152**	.363**	.259**	-0.031	-0.001	-0.013	-0.02	.036*			
		0		0.4	0	0	0	0.072	0.945	0.443	0.276	0.038			
	i _H	-.097**	-0.014	1	.166**	-.060**	-.131**	-0.01	.096**	.089**	.128**	.087**			
		0	0.4		0	0	0	0.563	0	0	0	0			
	D _H /E _H	0.004	-.152**	.166**	1	.396**	-.377**	-.341**	.112**	-0.009	.115**	.293**			
		0.806	0	0		0	0	0	0	0.61	0	0			
	DLE _H	.552**	.363**	-.060**	.396**	1	-.078**	-.283**	.051**	-.048**	0.035	0.057	.241**		
		0	0	0	0		0	0	0.007	0.006	0.057	0			
	1-t _H	.305**	.259**	-.131**	-.377**	-.078**	1	.346**	0.019	.059**	-.064**	-.287**			
		0	0	0	0	0		0	0.321	0.001	0.001	0			
ISb _H /A _H	-.057**	-0.031	-0.01	-.341**	-.283**	.346**	1	.096**	.133**	-.135**	-.329**				
	0.001	0.072	0.563	0	0	0		0	0	0	0				
CD _H /A _H	0.027	-0.001	.096**	.112**	.051**	0.019	-.096**	1	.254**	.058**	0.02				
	0.158	0.945	0	0	0.007	0.321	0		0	0.005	0.304				
Sub _H	-0.023	-0.013	.089**	-0.009	-.048**	.059**	.133**	.254**	1	.334**	.196**				
	0.177	0.443	0	0.61	0.006	0.001	0	0		0	0				
LnA _H	-0.023	-0.02	.128**	.115**	0.035	-.064**	-.135**	.058**	.334**	1	.485**				
	0.222	0.276	0	0	0.057	0.001	0	0.005	0		0				
emp _H	0.033	.036*	.087**	.293**	.241**	-.287**	-.329**	0.02	.196**	.485**	1				
	0.051	0.038	0	0	0	0	0	0.304	0	0					

Note: Tau_b di Kendall; Data sample 1575; sign<0.01=**; sign <0.05=* (2-tailed).

Table 6. Group-Group

		Group									
		ROE _M	ROA _G	i _G	D _G /E _G	DLE _G	1-t _G	ROE _M	E _G /E _M	ELE _G	MLE _G
Group	ROE _M	1	.625**	-.107**	-0.016	.605**	.389**	.054**	-0.012	0.015	.105**
			0	0	0.332	0	0	0.002	0.496	0.386	0
	ROA _G	.625**	1	-.038*	-.268**	.345**	.361**	.097**	0.009	-0.015	.084**
		0		0.024	0	0	0	0	0.593	0.381	0
	i _G	-.107**	-.038*	1	.207**	-.062**	-.118**	-0.004	.052**	-0.018	0.021
		0	0.024		0	0	0	0.838	0.003	0.304	0.221
	D _G /E _G	-0.016	-.268**	.207**	1	.316**	-.293**	-0.006	0.019	-.053**	.073**
		0.332	0	0		0	0	0.75	0.284	0.002	0
	DLE _G	.605**	.345**	-.062**	.316**	1	.063**	.089**	0.008	-.065**	.152**
		0	0	0	0		0	0	0.637	0	0
	1-t _G	.389**	.361**	-.118**	-.293**	.063**	1	0.011	0.025	0.026	.050**
		0	0	0	0	0		0.544	0.162	0.135	0.004
	ROE _M	.054**	.097**	-0.004	-0.006	.089**	0.011	1	.450**	-.550**	.495**
		0.002	0	0.838	0.75	0	0.544		0	0	0
E _M /E _M	-0.012	0.009	.052**	0.019	0.008	0.025	.450**	1	-.567**	.846**	
	0.496	0.593	0.003	0.284	0.637	0.162	0		0	0	
ELE _G	0.015	-0.015	-0.018	-.053**	-.065**	0.026	-.550**	-.567**	1	-.574**	
	0.386	0.381	0.304	0.002	0	0.135	0	0		0	
MLE _G	.105**	.084**	0.021	.073**	.152**	.050**	.495**	.846**	-.574**	1	
	0	0	0.221	0	0	0.004	0	0	0		

Note: Tau_b di Kendall; Data sample 1575; sign<0.01=**, sign <0.05=* (2-tailed)

Table 7. Holding-Group

		Holding company										
		ROE _M	ROA _G	i _G	D _G /E _G	DLE _G	1-t _G	ISb _H /A _H	CD _H /A _H	Sub _H	LnA _H	emp _H
Group	ROE _M	.578**	.468**	-.086**	0.005	.419**	.188**	-0.016	.053**	-0.008	-.061**	0.001
		0	0	0	0.763	0	0	0.357	0.005	0.626	0.001	0.955
	ROA _G	.481**	.600**	-.040*	-.189**	.243**	.224**	.042*	0.03	0.026	-0.03	-0.004
		0	0	0.019	0	0	0	0.013	0.113	0.128	0.105	0.801
	i _G	-.125**	-.060**	.572**	.133**	-.099**	-.083**	.070**	.096**	.089**	.066**	0.019
		0	0	0	0	0	0	0	0	0	0	0.259
	D _G /E _G	-.066**	-.203**	.167**	.586**	.194**	-.230**	-.076**	.093**	-0.031	-.057**	.037**
		0	0	0	0	0	0	0	0	0.071	0.002	0.031
	DLE _G	.413**	.273**	-.035*	.247**	.532**	0.006	-.050**	.083**	-0.029	-.109**	0.03
		0	0	0.041	0	0	0.73	0.003	0	0.092	0	0.077
	1-t _G	.271**	.257**	-.093**	-.197**	.064**	.360**	0.032	-0.007	.049**	.051**	-.034*
		0	0	0	0	0	0	0.057	0.704	0.004	0.006	0.045
	ROE _M	.035*	.045*	0.016	-.052**	-0.012	.073**	.064**	.099**	.191**	-0.017	-0.025
		0.049	0.011	0.359	0.003	0.493	0	0	0	0	0.385	0.168
	E _M /E _M	-0.032	-0.028	0.016	-.107**	-.116**	.141**	.231**	.080**	.162**	-.113**	-.171**
		0.07	0.109	0.365	0	0	0	0	0	0	0	0
	ELE _G	0.024	0.032	-0.011	.056**	.071**	-.098**	-.130**	-0.038	-.128**	.080**	.110**
		0.167	0.066	0.527	0.001	0	0	0	0.051	0	0	0
	MLE _G	.047**	0.029	-0.006	-.053**	-0.01	.134**	.199**	.102**	.164**	-.121**	-.139**
		0.008	0.099	0.752	0.002	0.563	0	0	0	0	0	0
P _M /P _H	-.249**	-.214**	-0.018	-.078**	-.213**	-.062**	.155**	.059**	0.009	-.154**	-.169**	
	0	0	0.291	0	0	0	0	0.002	0.593	0	0	
E _M /E _H	.067**	.064**	-.104**	-.160**	-.066**	.206**	.193**	.092**	0.021	-.221**	-.228**	
	0	0	0	0	0	0	0	0	0.22	0	0	
D _G /D _H	-.055**	-0.015	-.047**	-.413**	-.321**	.337**	.552**	.073**	.046**	-.279**	-.444**	
	0.001	0.384	0.006	0	0	0	0	0	0.008	0	0	
A _G /A _H	-0.024	-0.009	-.044**	-.300**	-.241**	.317**	.511**	.127**	.049**	-.310**	-.424**	
	0.16	0.613	0.01	0	0	0	0	0	0.004	0	0	
emp _G /emp _H	-0.027	-0.014	.042*	-.201**	-.174**	.241**	.398**	.250**	.158**	-.068**	-.273**	
	0.142	0.437	0.026	0	0	0	0	0	0	0.001	0	

Note: Tau_b di Kendall; Data sample 1575 (except emp_G/emp_H 1322); sign<0.01=**, sign <0.05=* (2-tailed)

The debt leverage (D/E) correlations in Table 5 and 6 are interesting. I observe that the increase of D/E is associated with the reduction of ROA and the increase in interest and is consistent with the Modigliani-Miller model. However, despite this double variation, the difference between "ROA" and "i" remains positive, and I observe an increase in the debt leverage effect (DLE).

For holding companies (Table 5), I also observe that the higher is the similarity with pure holding companies (high ISb_H/A_H ratio), the lower is their

debt leverage (D_H/E_H), debt leverage effect (DLE_H) and taxation (higher 1-t_H), the more are subsidiaries (Sub_H) and the less are their investments (LnA_H) and employees (emp_H). Holding companies that have more subsidiaries (Sub_H) have more intercompany loans and debts (CD_H/A_H), investments (LnA_H) and employees (emp_H); holding companies that have higher investments (LnA_H) have higher interest rate (i_H), debt leverage (D_H/E_H), subsidiaries (Sub_H) and more employees (emp_H).

For groups (Table 6), I observe similar results for debt-leverage effects (DLE_G) but also the feeble

equity leverage effect (ELE_c) in the construction of majority shareholder profitability (ROE_m) (H2).

I can verify that the higher is equity leverage (E_m/E_m) the higher is minority shareholder profitability (ROE_m) and so the lower is equity leverage effect (ELE_c). Evidently this contradicts the predatory view (H2). However, the mixed-leverage effect (MLE_c) is higher because of the combined effect of debt leverage (D_c/E_c) and equity leverage (ELE_c).

The relationship between holding companies and groups (Table 7) highlights other interesting correlations, in addition to the above-mentioned high correlations between holding company and group leverage ratios (left upper quadrant).

More-indebted holding companies (left middle quadrant; higher D_H/E_H) own groups with lower equity leverage (E_m/E_m).

Furthermore, the most-profitable holding companies (left lower quadrant; ROE_H, ROA_H, DLE_H) tend to attract profits from subsidiaries (low P_M/P_H), and more indebted holding companies (higher D_H/E_H) tend to dominate groups in which the pyramidal structure of investment is less pronounced (lower A_c/A_H and emp_c/emp_H).

The right upper quadrant shows, in particular, that smaller holding companies (lower LnA_H) present a higher group debt-leverage effect (DLE_c).

Right middle quadrant indicators show an interesting correlation concerning equity leverage effect (ELE_c) and, consequently, for the holding companies and groups that employ minority shareholders in their structure. Therefore, I observe that holdings tending toward the form of

pure holding companies (high ISb_H/A_H ratio) have higher equity leverage (E_m/E_m) and that this is consistent with the stylized example of pyramidal structure 1a of Figure 1. Minorities seem well remunerated (ROE_m>ROA_c ⇒ negative ELE_c) (H2). Moreover, number of subsidiaries (Sub_H) appears to have a negative effect on ELE_c. Conversely, the correlation between a holding's employees and ELE_c is positive. MLE_c's values condense too many variables and opposite movements; therefore, I refer to the regression analysis.

The right lower quadrant displays others interesting relationships about holding companies and group structure. Positive correlations between ISb_H/A_H ratio values and P_M/P_H, E_m/E_m, D_c/D_H, A_c/A_H, emp_c/emp_H lead us to believe that pure holding companies seem, on average, to dominate relatively larger groups (A_c/A_H; Emp_c/Emp_H, which is also consistent with the stylized example of pyramidal structure 1a in Table 1) that are richer (E_m/E_m) and more profitable (P_M/P_H) in comparison to their own dimensions. Therefore, I can suppose pyramidal structures. Conversely, larger holding companies (LnA_H and emp_H) seem to dominate small groups in comparison to their own dimensions.

The final analysis I propose is to estimate a model to trace from the characteristics of the holding company the characteristics of the controlled group. Tables 8 and 9 report the results of ordinary least squares regressions (Note: I test other model, but ROA_c-ROE_m not significant (R² 0.230; sign 0,981), ROE_m-ROE_m not significant (R² 0.004; sign 0.966).

Table 8. Holding company. Part I β coefficients

		HOLDING COMPANY																
β coefficients		cost	ROA _H	i _H	D _H /E _H	DLE _H	1-t _H	ISb _H /A _H	CD _H /A _H	SpaVsSRL	SpaVsOth	List	Sub _H	LnA _H	emp _H	MODEL		
1	ROE _m	β	0**	0.347**	0.005	-0.064**	0.559**	0.125**	0.071**	0.039*	-0.021	-0.012	0.025	0.007	-0.054*	0.006	R ²	0.576
		t-stat	2.737	17.205	0.293	-3.155	26.739	5.9	3.335	2.269	-1.171	-0.713	1.381	0.318	-2.559	0.336	F	161.02**
2	ROA _c	β	0**	0.664**	0.007	-0.153**	0.172**	0.002	0.028	-0.005	-0.034	-0.05**	0.022	0.005	0.028	-0.017	R ²	0.59
		t-stat	2.636	33.466	0.438	-7.622	8.34	0.1	1.359	-0.316	-1.875	-2.982	1.252	0.254	1.359	-1.018	F	170.82**
3	i _c	β	0**	-0.05	0.37**	0.052	-0.072*	-0.128**	0.107**	0.043	0.012	-0.07**	0.002	0.075**	0.08**	-0.042	R ²	0.203
		t-stat	2.842	-1.812	16.108	1.861	-2.496	-4.391	3.656	1.839	0.472	-2.991	0.095	2.677	2.784	-1.753	F	30.191**
4	D _c /E _c	β	0**	-0.029	0.011	0.871**	-0.009	-0.016	0.152**	0.029*	0.016	0.001	-0.004	-0.004	-0.061**	0.06**	R ²	0.729
		t-stat	3.949	-1.769	0.849	53.418	-0.53	-0.953	8.964	2.096	1.067	0.054	-0.275	-0.268	-3.647	4.336	F	319.4**
5	DLE _c	Beta	0**	0.049*	0.058**	0.139**	0.692**	-0.062**	0.228**	0.072**	0.001	-0.018	0.01	0.029	-0.135**	0.024	R ²	0.568
		t-stat	6.781	2.425	3.405	6.752	32.773	-2.875	10.627	4.174	0.038	-1.053	0.548	1.408	-6.347	1.368	F	156.31**
6	1-t _c	β	0**	0.072**	-0.012	-0.095**	0.049	0.594**	-0.227**	-0.043*	-0.047*	0.039	0.013	0.037	0.039	-0.02	R ²	0.354
		t-stat	6.514	2.905	-0.602	-3.765	1.888	22.697	-8.653	-2.025	-2.066	1.861	0.61	1.477	1.503	-0.923	F	65.18**
7	ROE _m	β	0	-0.023	0.011	0.01	0.007	0.013	0.01	0.019	-0.017	-0.026	-0.007	0.003	0.022	-0.009	R ²	0.003
		t-stat	-0.155	-0.747	0.424	0.311	0.211	0.388	0.32	0.707	-0.616	-1.006	-0.243	0.085	0.672	-0.33	F	0.322
8	E _m /E _m	β	0**	-0.012	0.057*	0.115**	-0.034	0.05	0.263**	-0.071**	0.05	-0.008	-0.039	0.178**	-0.17**	0.01	R ²	0.159
		t-stat	4.778	-0.428	2.411	3.998	-1.16	1.683	8.773	-2.929	1.954	-0.332	-1.548	6.174	-5.728	0.405	F	22.48**
9	ELE _c	β	0**	-0.066*	-0.074**	-0.24**	0.021	0.022	-0.089**	0.019	0.026	0.029	0.002	-0.077*	0.106**	0.003	R ²	0.063
		t-stat	-2.706	-2.211	-2.953	-7.904	0.677	0.705	-28.24	0.735	0.958	1.123	0.067	-2.538	3.388	0.131	F	7.99**
10	MLE _c	β	0*	0.073*	0.05*	0.236**	0	-0.024	0.125**	-0.025	-0.014	-0.021	-0.002	0.068*	-0.103**	-0.002	R ²	0.066
		t-stat	2.462	2.438	2.013	7.797	0.001	-0.756	3.952	-0.992	-0.507	-0.817	-0.066	2.246	-3.287	-0.082	F	8.341**
11	P _M /P _H	β	0**	-0.036	-0.017	-0.061*	0.013	-0.273**	0.297**	0.003	-0.003	-0.001	0.02	-0.027	-0.019	-0.004	R ²	0.094
		t-stat	3.346	-1.208	-0.683	-2.033	0.439	-8.791	9.551	0.109	-0.126	-0.039	0.781	-0.893	-0.629	-0.166	F	12.31**
12	E _m /E _H	β	0**	0.147**	-0.024	0.087**	-0.06*	0.064*	0.222**	0.114**	0.11**	-0.004	-0.021	0.15**	-0.319**	0.047*	R ²	0.278
		t-stat	13.813	5.57	-1.086	3.263	-2.206	2.311	8.012	5.072	4.585	-0.176	-0.919	5.612	-11.593	2.087	F	45.71**
13	A _c /A _H	β	0**	0.069**	0.001	0.062*	-0.106**	0.062*	0.306**	-0.037	0.106**	-0.009	-0.038	0.256**	-0.367**	0.048*	R ²	0.37
		t-stat	13.827	2.814	0.036	2.498	-4.166	2.392	11.807	-1.745	4.768	-0.444	-1.769	10.281	-14.286	2.283	F	69.984**
14	emp _c	β	0	-0.066*	0	0.012	0.018	0.085**	0.282**	-0.063*	0.062*	-0.012	0.017	0.054	0.002	-0.012	R ²	0.117
		t-stat	-1.013	-1.983	0.005	0.362	0.507	2.68	9.093	-2.306	2.236	-0.43	0.606	1.622	0.049	-0.439	F	13.199**

for all models: degrees of freedom df=1,553 (except emp_c/emp_H df=1,332) sign<0.01=**; sign<0.05=*

Table 9. Holding company. Part II b coefficient

		HOLDING COMPANY															MODEL		
b coefficients		cost	ROA _H	i _H	D _H /E _H	DLE _H	1-t _H	ISb _H /A _H	CD _H /A _H	SpaVsSRL	SpaVsOth	List	Sub _H	LnA _H	emp _H				
GROUP	1	ROE _M	B	3.704**	0.414**	0.013	-0.139**	0.491**	3.965**	1.917**	1.822*	-0.386	-0.388	0.892	0.003	-0.301*	0.012	S.E.Es	0.049
			S.E.	1.353	0.024	0.045	0.044	0.018	0.672	0.575	0.803	0.33	0.544	0.646	0.009	0.118	0.035	Drb-Wats	1.969
	2	ROA _G	B	2.221**	0.502**	0.012	-0.208**	0.095**	0.042	0.486	-0.158	-0.385	-1.01**	0.504	0.001	0.1	-0.022	S.E.Es	0.03
			S.E.	0.843	0.015	0.028	0.027	0.011	0.418	0.358	0.5	0.205	0.339	0.402	0.006	0.073	0.021	Drb-Wats	2.007
	3	i _G	B	0.846**	-0.01	0.161**	0.018	-0.01*	-0.649**	0.462**	0.325	0.034	-0.358**	0.013	0.005**	0.072**	-0.013	S.E.Es	0.01
			S.E.	0.298	0.005	0.01	0.01	0.004	0.148	0.126	0.177	0.073	0.12	0.142	0.002	0.026	0.008	Drb-Wats	2.048
	4	D _G /E _G	B	2.335**	-0.019	0.017	1.024**	-0.004	-0.28	2.25**	0.735*	0.154	0.013	-0.078	-0.001	-0.187**	0.065**	S.E.Es	2.157
			S.E.	0.591	0.011	0.02	0.019	0.008	0.294	0.251	0.351	0.144	0.238	0.282	0.004	0.051	0.015	Drb-Wats	2.035
	5	DLE _G	B	12.624**	0.08*	0.213**	0.408**	0.828**	-2.657**	8.4**	4.609**	0.017	-0.789	0.487	0.018	-1.027**	0.065	S.E.Es	0.067
			S.E.	1.862	0.033	0.062	0.06	0.025	0.924	0.79	1.104	0.453	0.749	0.889	0.013	0.162	0.048	Drb-Wats	1.917
	6	1-t _G	B	0.252**	0.002**	-0.001	-0.005**	0.001	0.435**	-0.142**	-0.046*	-0.019*	0.029	0.011	0	0.005	-0.001	S.E.Es	0.141
			S.E.	0.039	0.001	0.001	0.001	0.001	0.019	0.016	0.023	0.009	0.016	0.018	0	0.003	0.001	Drb-Wats	1.999
	7	ROE _M	B	-7.011	-0.602	0.645	0.457	0.129	8.73	6.152	18.998	-6.798	-18.325	-5.257	0.026	2.648	-0.382	S.E.Es	1.653
			S.E.	45.322	0.806	1.52	1.47	0.615	22.505	19.243	26.881	11.04	18.223	21.64	0.308	3.94	1.156	Drb-Wats	2.007
8	E _M /E _H	B	0.335**	-0.001	0.006*	0.009**	-0.001	0.059	0.261**	-0.122**	0.033	-0.009	-0.052	0.003**	-0.035**	0.001	S.E.Es	0.256	
		S.E.	0.07	0.001	0.002	0.002	0.001	0.035	0.03	0.042	0.017	0.028	0.034	0	0.006	0.002	Drb-Wats	2.059	
9	ELE _G	B	-7.818**	-0.114*	-0.286**	-0.741**	0.027	10.11	-3.464**	1.26	0.674	1.305	0.092	-0.05*	0.851**	0.01	S.E.Es	0.105	
		S.E.	2.889	0.033	0.097	0.094	0.039	14.35	1.227	1.713	0.704	1.162	1.379	0.02	0.251	0.074	Drb-Wats	1.978	
10	MLE _G	B	5.248*	0.092*	0.144*	0.539**	0.0002	-0.8	3.577**	-1.254	-0.263	-0.7	-0.068	0.033*	-0.609**	-0.004	S.E.Es	0.077	
		S.E.	2.132	0.038	0.072	0.069	0.029	1.059	0.905	1.264	0.519	0.857	1.018	0.015	0.185	0.054	Drb-Wats	1.998	
11	P _M /P _H	B	33.769**	-0.217	-0.231	-0.666*	0.06	-44.055**	40.928**	0.654	-0.31	-0.16	3762	-0.061	-0.552	-0.043	S.E.Es	36.822	
		S.E.	10.092	0.18	0.338	0.327	0.137	5.011	4.285	5.986	2.458	4.058	4.819	0.069	0.067	0.258	Drb-Wats	1.982	
12	E _M /E _H	B	3.307**	0.024**	-0.009	0.025**	-0.007*	0.275**	0.815**	0.72**	0.267**	-0.017	-0.105	0.009**	-0.241**	0.013*	S.E.Es	0.873	
		S.E.	0.239	0.004	0.008	0.008	0.003	0.119	0.102	0.142	0.058	0.096	0.114	0.002	0.021	0.006	Drb-Wats	1.976	
13	A _G /A _H	B	10.464**	0.038**	0.001	0.061*	-0.043**	0.899*	3.794**	-0.783	0.879**	-0.135	-0.639	0.053**	-0.94**	0.044*	S.E.Es	2.762	
		S.E.	0.757	0.013	0.025	0.025	0.01	0.376	0.321	0.449	0.184	0.304	0.361	0.005	0.066	0.019	Drb-Wats	2.039	
14	emp _G	B	-52.687	-2.2*	0.015	0.577	0.358	68.829**	233.25**	-72.851*	29.916*	-8.684	13.852	0.577	0.225	-0.534	S.E.Es	173.026	
		S.E.	52.018	1.11	3201	1.596	0.706	25.683	25.652	31.587	13.377	20.19	22.839	0.356	4.562	1.217	Drb-Wats	2.029	

for all models: degrees of freedom df=1,553 (except emp_G/emp_H df=1,332) sign<0.01=**; sign<0.05=*

A group's economy appears to be significantly influenced by its parent company's economy.

• *Regr. 1* ROE_M (R² 0.576); *Regr. 2* ROA_G (R² 0.590); *Regr. 3* i_G (R² 0.203); *Regr. 4* D_G/E_G (R² 0.729); *Regr. 5* DLE_G (R² 0.568); and *Regr. 6* (1-t_G) (R² 0.354) confirm the close bond between holding company leverage ratios and group leverage ratios. Therefore, by analyzing each holding's indicator (ROA_H, i_H, DLE_H, 1-t_H—and hence ROE_H, excluded to reduce collinearity), I can infer the corresponding group's indicator and thus estimate possible group leverage.

• *Regr. 7* (R² 0.003 not-significant); *Regr. 9* (R² 0.063) and *Regr. 10* (R² 0.066) conversely confirm that is difficult to fix precise tendencies with respect to the management of minorities. This refutes the hypothesis of systematic expropriation (H2). *Regr. 8* (R² 0.159) confirm, however, that the greater is the similarity with pure holding companies (high ISb_H/A_H ratio), the greater is the use of equity leverage (E_M/E_H).

• *Regr. 11* (R² 0.094) and *Regr. 12* (R² 0.278) confirm the tendency of pure holding companies (high ISb_H/A_H ratio) to leave more profit (P_M/P_H) and more retained earnings (E_M/E_H) invested in subsidiaries (and this tendency contradicts the expropriation hypothesis H2). *Regr. 13* (R² 0.370) and *Regr. 14* (R² 0.117) also confirm that that holdings tending toward the form of pure holding companies tend to dominate more-pyramidal capital structures. This result is consistent with stylized example of pyramidal structure 1a of Figure 1 but does not mean that there are expropriations (in fact, ELE_G is negative).

6. CONCLUSIONS

The study contributes to the debate on business groups and pursues the topic from several points of view.

First, the study organizes the literature into two opposing views, predatory and synergic, and bases its structure on this division. However, it differs from previous research by suggesting a new

analytical methodology to test the likelihood of these two views.

Although separation between ownership and control is typically identified with (and its analysis limited to) the ratio between control rights (CR) and cash flow rights (CFR), I concentrated instead on the separation between “what” holding company owns and controls (assets, equity, and debt).

This method, in addition to its own relevance, has an advantage over the methods used in the majority of previously conducted studies of allowing the use of consolidated financial statements. Both the financial data used and the process of defining the control chain are therefore public, can be verified objectively and were elaborated using converging accounting standards.

Agency problems could lead to earnings management and bias the financial statement information, which would certainly have implications for results using the earnings data. In fact, in accordance with agency theory, when managers have control (Berle and Gardiner 1968), they seek to maximize their utility by altering accounting information in order to expropriate owners by earning management. However this is typical in Anglo-Saxon capitalism, which is characterized by large corporations in which ownership is fragmentary,

Instead, in Renan capitalism (Italy belongs to these countries), which is characterized by ownership concentration, research suggests that it is the majority shareholders who expropriate minority shareholders through predatory strategies known as tunneling. In this context, by scrutinizing management activity, the large block-holders of shares seem to inhibit earnings management and improve credibility of a firm's financial statements (among others, Dechow et al. 1996, Ghazalat et al. 2017).

So, I proceeded to construct a solid mathematical model able to relate a group's financial structure to its revenue with respect to the

various elements contributing resources: majority shareholders, minority shareholders, and lenders.

Furthermore, this model can also be easily used for comparisons over time and between other groups and firms.

Then, I applied this model to compare the Italian groups and their own holding companies to verify the picture offered by previous circumstantial research on minority expropriation (predatory view and synergic view).

This approach produced interesting results.

Contradicting predatory view, the majority, at least within the consolidation perimeter, appears not to systematically expropriate subsidiaries.

Minority equities are few (thus, interest in expropriating them is minimal), and the majorities leave part of their wealth invested in the body of their group.

Minority return on equity is, on average, considerably higher than majority return on equity and group operating profits.

Therefore, in summary, if minority shareholder equities are few and very well-remunerated, this analysis leads us to reject the hypothesis of expropriation to the detriment of minority interests.

However, groups tend to have higher debt leverage than single holding companies, which is a key element in building profits and retaining earnings. These profits and earnings, however, remain invested in the subsidiaries.

I also observed that group and holding interest rates are comparable, showing that risk is uniform overall and does not support the hypothesis of an increased risk to the group with respect to the holding.

Another interesting result is that, on average, holdings appear to pay less tax than subsidiaries. This could explain the propensity on the part of the holdings to create groups.

This distribution leads us to conclude that the group structure, so common in Italy, is not motivated by a will to gather resources from minority shareholders and is much less the result of a desire for large-scale expropriation. I can only speculate on other reasons, such as reduction or containment of risk of bankruptcy for the entire entity or an attempt to optimize dimensions or legal firm localization to obtain benefits (e.g., in terms of labor relations and taxation).

The model highlights also an enormous variety of combinations in terms of managed resources and their remuneration. Hence, there may be different situations, both within a single group and between groups of groups belonging to business sectors (Bradley, Jarrell and Kim, 1984), that can be further explored using the proposed model discussed in the paper.

Correlation analyses highlight a close relationship between holding company leverage ratios, groups and holding company-groups.

I also observe that, when holdings tend toward the form of pure holding companies, they have higher leverage (in this case, minorities also seem well remunerated) and they seem, on average, to dominate relatively larger, richer and more profitable groups in comparison to their own dimensions; therefore, I can assume pyramidal structures.

Regression analyses confirm the close bond between holding company leverage ratios and group leverage ratios. Therefore, I conclude that by analyzing each holding's indicator, I can infer the corresponding group's indicator and thus estimate possible group leverage. Conversely, these indicators confirm that it is difficult to fix precise tendencies with respect to the management of minorities. This result refutes the hypothesis of systematic expropriation.

Regression analyses also confirm that the higher the similarity of a holding is to pure holding companies, the greater the use of equity leverage is, and the analyses restate the tendency of this type of holding to leave more profits and retained earnings invested in subsidiaries and to dominate more pyramidal capital structures.

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APPENDIX 1³

$$\begin{aligned}
(*)EBIT_G &= P_G + I_G + T_G & (**)\text{if } T_G &= t_G(EBIT_G - I_G) = t_G(P_M + P_m + T_G) \\
EBIT_G &= P_M + P_m + I_G + T_G & T_G &= t_G(P_M + P_m + T_G) \\
EBIT_G &= P_M + P_m \frac{t_G}{1-t_G} + P_m + P_m \frac{t_G}{1-t_G} + I_G & T_G - t_G T_G &= t_G(P_M + P_m) \\
EBIT_G &= P_M \left(1 + \frac{t_G}{1-t_G}\right) + P_m \left(1 + \frac{t_G}{1-t_G}\right) + I_G & T_G &= \frac{t_G}{1-t_G}(P_M + P_m) \\
EBIT_G &= P_M \frac{1}{1-t_G} + P_m \frac{1}{1-t_G} + I_G \\
\frac{EBIT_G}{TA_G} &= \frac{P_M}{TA_G} \frac{1}{1-t_G} + \frac{P_m}{TA_G} \frac{1}{1-t_G} + \frac{I_G}{TA_G} \\
ROA_G &= ROE_M \frac{E_M}{TA_G} \frac{1}{1-t_G} + ROE_m \frac{E_m}{TA_G} \frac{1}{1-t_G} + i_G \frac{D_G}{TA_G} \\
ROE_M \frac{E_M}{TA_G} \frac{1}{1-t_G} &= ROA_G - ROE_m \frac{E_m}{TA_G} \frac{1}{1-t_G} - i_G \frac{D_G}{TA_G} + s_G \\
ROE_M &= \left[ROA_G \frac{TA_G}{E_M} - ROE_m \frac{E_m}{TA_G} \frac{1}{1-t_G} - i_G \frac{D_G}{TA_G} \frac{TA_G}{E_M} + \right] \cdot (1-t_G) \\
ROE_M &= \left[ROA_G \frac{TA_G}{E_M} - ROE_m \frac{E_m}{E_M} \frac{1}{1-t_G} - i_G \frac{D_G}{E_M} + \right] \cdot (1-t_G) \\
ROE_M &= \left[ROA_G \frac{D_G + E_M + E_m}{E_M} - ROE_m \frac{E_m}{E_M} \frac{1}{1-t_G} - i_G \frac{D_G}{E_M} + \right] \cdot (1-t_G) \\
ROE_M &= \left[ROA_G + \frac{E_m}{E_M} \left(ROA_G - ROE_m \frac{1}{1-t_G} \right) + \frac{D_G}{E_M} (ROA_G - i_G) + \right] \cdot (1-t_G) \\
\text{but } \frac{D_G}{E_M} &= \frac{D_G}{E_G} \frac{E_G}{E_M} + \frac{D_G}{E_G}
\end{aligned}$$

$$ROE_M = \left[ROA_G + \frac{E_m}{E_M} \left(ROA_G - ROE_m \frac{1}{1-t_G} \right) + \frac{E_m}{E_M} \frac{D_G}{E_G} (ROA_G - i_G) + \frac{D_G}{E_G} (ROA_G - i_G) + \right] \cdot (1-t_G)$$

APPENDIX 2

Italian legal forms for limited liability companies (“società di capitali”) are arranged as follows:

- Spa (Società per azioni): Italian limited liability companies whose capital is divided into shares (called ‘azioni’) and whose members (shareholders) are only liable for its debts within the limits of the capital stock. The minimum required starting capital for an S.p.A. is € 120,000. The shares, which can be offered to the general public, can be transferred by endorsement or bought and sold on a stock exchange. Only S.p.As can be listed on a stock exchange).

- Srl (Società a responsabilità limitata): an Italian limited liability company whose capital is divided into stakes (called ‘quote’) and whose members are only liable for its debts within the limits of the company assets. The minimum required starting capital for an S.r.l. is € 10,000. The S.r.l. is the more common type of corporation because it can be easier to run; it is characterized by perfect autonomy of the assets, as in an S.p.A., but at the same time, its organizational flexibility and the existence of personal stakes (and not shares) make it more similar to a partnership.

Others: I have arranged Sapa (Società in accomandita per azioni), a hybrid form of an Italian company (fairly uncommon) partially limited by shares that involve two different categories of shareholders, some with and some without limited liability (“accomandanti”, standard shareholders who have limited liability when managing shareholders, “accomandatari” shareholders who have full liability); “società cooperative” (or ‘coop’), a particular Italian business organization owned and run by individuals for their mutual benefit, and “società consortili”.

³ (*) Where “P” is Profit, “I” is Interest expenses, “S” is Extraordinary revenue and expenses, “T” is Tax expenses, “TA” is Total Assets, “D” is Debts, “E” is Equity.