

The Value of Corporate Control

by

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Università L. Bocconi (1987)

Submitted to the Department of Economics
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Doctor of Philosophy

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Abstract

This thesis studies the value of corporate control and its effect on corporate decision making. In particular the first chapter assumes that control is valuable and analyzes the decision of a firm to go public from a corporate control perspective. A large, possibly majority, shareholder increases the company's ability to extract private benefits in an armslength transaction with a potential buyer. A dispersed ownership increases the ability to free ride on any verifiable improvement implemented by the buyer. The optimal combination between these two elements determines whether a company should be private or public, as well as the insiders' ownership in public companies. The model provides a useful framework to interpret a variety of different empirical facts. It explains the equity carve-out phenomenon, it sheds some new light on IPO underpricing, and it gives an alternative interpretation of the "going private" transactions.

The second chapter estimates the value of control in Italy, by using the prices of differential voting shares quoted on the Milan Stock Exchange. The price difference between voting and nonvoting shares is utilized to measure the value of voting rights and to test a relationship between the market price of voting rights and the structure of ownership. A theoretical model, based upon Shapley and Milnor's (1961) theory of oceanic games, is compared with other measures of ownership concentration. The results suggest the existence of a positive relationship between ownership concentration and value of votes. The high level of voting premium in Italy is at least partially explained by the magnitude of private benefits of control, estimated to be about 30% of the value of the underlying assets. The predictions of the model are also corroborated by a case study of an actual control contest involving a company with multiple classes of common stock.

The third chapter studies the value of voting rights in the 1980s in the U.S. by using a new dataset of public companies that have two classes of common stock traded with differential voting rights, but similar or identical dividend rights. Voting rights have generally a positive value and this value can be attributed to the expected differential payment in case of a control contest. An analysis of dual class company acquisitions confirms this view. The relation between market price of voting rights and structure of ownership is established empirically by using both some case studies

and a panel data analysis. A measure of the distribution of ownership and a proxy for the probability of a change in control can explain 13% of the variability in the voting premium. This regression provides also an estimate of the value of control: about 2% of the value of a company. Controlling for the company size, the voting premium is positively correlated to a measure of private benefits of control, like the top executive salary. On the contrary, the voting premium is negatively correlated with the fraction of superior voting shares held by institutional investors.

The fourth chapter uses Italian data to test the theory of shareholder response to dual class exchange offers proposed by Ruback (1988). Contrary to Ruback's conjecture, outside shareholders are not trapped in a coercive equilibrium in which they are induced to a suboptimal choice of inferior voting shares by a coordination failure. The evidence suggests that the most likely equilibrium is the alternative one in which only a fraction of outside shareholders choose the inferior voting share and the prices of the two classes of stock after the exchange offer are equal.

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*It might have appeared to go unnoticed,
but I thought it all in my heart.
I want you to know I know the truth,
of course I know it,
I will be nothing without you.¹*

to Chiara

¹From *Wind Beneath My Wings* by L. Henley and J. Silbar.

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Contents

Introduction	12
1 Insider Ownership and the Decision to Go Public	18
1.1 The Model and Some Numerical Examples	23
1.1.1 The Framework	23
1.1.2 Example 1: The Bargaining Game	26
1.1.3 Example 2: The Tender Offer Game	29
1.2 The General Solution	32
1.2.1 Case in which majority is retained	33
1.2.2 Case in which majority is not retained	35
1.2.3 Dual Class Stock and Supermajority Rules	40
1.2.4 The Possibility of Retrading	42
1.3 Empirical Evidence	44
1.3.1 Equity Carve-Outs	44
1.3.2 Initial Public Offerings	47
1.4 The Decision to Go Private	49
1.5 Conclusions	53
1.6 Appendix: Extensions of the Model	55
1.6.1 Diversification Gains	55
1.6.2 Robustness to Retrading	56
1.6.3 The Effect of Minimum Sale Provisions	58
2 The Value of the Voting Right	63
2.1 The Institutional Background	67

2.2	Relative Pricing of Differential Voting Shares	69
2.2.1	Relative Pricing if Control Is Valueless	70
2.2.2	Relative Pricing if Control Is Valuable	71
2.2.3	Empirical Specification	77
2.3	Data	82
2.3.1	Summary Statistics	83
2.3.2	Ownership Data	84
2.3.3	Liquidity	86
2.3.4	Shapley Value Computations	86
2.4	Results	87
2.4.1	Empirical Findings	87
2.4.2	Alternative Specifications	89
2.4.3	A Possible Explanation for a Positive Intercept	93
2.5	The Mondadori Control Contest	95
2.6	Conclusions	98
2.7	Appendix A: An Alternative Derivation	100
2.8	Legal Appendix	102
2.8.1	Preferred Shares	102
2.8.2	Savings Shares	102
3	The Value of the Voting Right in the U.S.	116
3.1	Data	120
3.1.1	Sample Procedure	120
3.1.2	Voting Characteristics	123
3.1.3	Sample Description	125
3.2	Does the vote have a positive value?	126
3.3	Change in Control in Dual Class Companies	128
3.3.1	The Theory of Optimal Bids in Dual Class Companies	129
3.3.2	The Empirical Evidence	131
3.4	Case Studies on the Effects of Ownership on the Vote Value	134

3.4.1	Resorts International	136
3.4.2	Wang Laboratories	136
3.4.3	Petroleum Helicopter	138
3.4.4	United Foods	138
3.4.5	Plymouth Rubber	139
3.4.6	Moog Inc.	139
3.5	The Determinants of the Voting Premium	140
3.5.1	Definition of the Voting Premium	141
3.5.2	Summary Statistics	143
3.5.3	Determinants of the Voting Premium	145
3.5.4	Regression Results	149
3.5.5	Sources of Private Benefits	151
3.6	Impact of Institutional Ownership	154
3.6.1	Possible Relationships between Institutional Ownership and Voting Premium	155
3.6.2	Empirical Results	157
3.7	Conclusions	159
4	Shareholder Response to Dual Class Exchange Offers	184
4.1	Ruback's Argument	186
4.2	Empirical Evidence on Differential Takeover Premia	188
4.3	Empirical Evidence on Conversions	190
4.3.1	The Italian Sample	190
4.3.2	Results	194
4.4	Conclusions	196

List of Figures

2-1	Relative Shapley Value of the Ocean	107
2-2	Plotting of the Pooled Regression	110
2-3	Prices of Mondadori's voting rights before the control contest	114
2-4	Prices of Mondadori's voting rights during the control contest	115
3-1	Voting Premium Resorts Int.	173
3-2	Voting Premium Wang Lab.	173
3-3	Voting Premium Petroleum Helicopters	174
3-4	Voting Premium United Food	174
3-5	Voting Premium Plymouth	175
3-6	Voting Premium Moog	175
4-1	Traditional vs. Mirror Image DCEOs	192

List of Tables

1.1	Example 1	27
1.2	Example 2	30
2.1	Examples of Shapley Values	106
2.2	Summary Statistics	108
2.3	Determinants Voting Premium	109
2.4	Alternative Specifications: Whole Sample	111
2.5	Alternative Specifications: Nonmajority-Owned Companies	112
2.6	Effect of State Ownership on the Voting Premium	113
3.1	Sample Characteristics	164
3.2	Characteristics Dual Class Companies	165
3.3	Companies Delisted	168
3.4	Summary Statistics	169
3.5	Tests on the positive value of the voting right	170
3.6	Market Expectations and Realized Premia	172
3.7	Summary Statistics	176
3.8	Annual Summary Statistics	178
3.9	Determinants of the Voting Premium	180
3.10	Possible Sources of Private Benefits	181
3.11	Institutional Ownership	182
3.12	Effects of Institutional Ownership	183
4.1	Preferences of Nonvoting Shares	199

4.2	Conversion Patterns	200
4.3	Returns of the exchanging strategies	201

Introduction

In recent years a growing consensus among economists indicates that it is impossible to understand the financial structure of a corporation without focusing on the value of control. Informational asymmetries and incentive problems are certainly present in financial markets. However, if these were the only problems, standard contracts could easily take care of them, making irrelevant the capital structure and the ownership structure of a corporation. By starting from these observations Grossman and Hart (1986 and 1988), Hart and Moore (1990a, 1990b, 1991), Hart (1991), Aghion and Bolton (1992), and Harris and Raviv (1988a, 1988b, 1989) focus the theoretical debate in corporate finance on the importance of corporate control.

It is in this stream of literature that this thesis wants to bring its contribution, both theoretical and empirical. The theoretical part is dedicated to explain one of the most important and least studied questions in corporate finance: the choice of whether to remain a private or to become a publicly traded company. Consistently with the stated approach the driving force of the model is the existence of a control value, distinct from the value of the future dividend stream. The value of control is just assumed as parameter of the model. By contrast, the important contribution of the empirical part of this dissertation is to provide some actual estimates of the value of corporate control.

We observe public and private firms at almost all points in the size distribution of firms. Although most private firms are small, we also see large privately-held companies like Mars candy company and Bechtel. This fact alone would be enough to reject the traditional wisdom that considers a firm's decision to go public as a simple stage in the growth process of a corporation. However, additional evidence against this naive view comes from the major wave of the leverage buyouts (LBO) and reversed LBOs experienced by the U.S. economy in the 1980s. The first chapter of this dissertation presents a new theory of the going public decision based on the value of corporate control.

The idea is that when an entrepreneur considers the possibility of going public, he knows that in the future a potential buyer will appear. The entrepreneur's wealth is determined by the amount of surplus he can extract from the buyer if the sale takes place. The entrepreneur can change his amount of surplus by changing the proportion of profit and control he retains. In particular, he can strategically exploit the small shareholders' ability to free ride on any improvement of the company profitability. Selling a minority stake in the company, let's say 20%, to outside shareholders, before facing a negotiation with a potential buyer, the entrepreneur succeeds in extracting part of the buyer surplus through the small shareholders. In addition, he becomes less willing to sell to the buyer at a later date, because now he has full control of the company but he has a claim on only 80% of the company profits. By doing so, the entrepreneur increases his share of surplus. The intuition is fairly straightforward. Selling shares but retaining control makes the incumbent more powerful in any subsequent bargaining with potential buyers. As a result a two-stage sale of a company, where the first sale is to outside shareholders (i.e. going public) may be more profitable than a direct sale.

In initial public offerings of small entrepreneurial firms I expect that also risk aversion and the limited entrepreneurial wealth, explicitly left out of my model, may play an important role. For this reason when I look at the empirical evidence I restrict my attention to initial offerings of portions of a wholly-owned subsidiary of a company that is already public (the so called equity carve-out). Limited wealth or diversification needs are less of an issue if the owner of the company is another company that is already public. Therefore, equity carve-outs are the ideal sample to study the decision to go public from the point of view of corporate control.

The model explains why carve-outs increase the parent company value, why only minority stakes are sold and why differential voting shares are so frequently used in these cases. The very high turnover in control (37%) experienced by carved-out subsidiaries confirms that an eventual sale is an important determinant of carve-outs and IPOs in general. The larger return experienced by companies that sold a subsidiary by carving it out first, confirms the optimality of a two-stage sale.

The model is also applied to the reverse of an IPO: a “going private” transaction. By employing the same framework used to describe the decision to go public, I can identify two different motivations for going private. A firm may want to return to private ownership because it is worth more private than public. In such cases the decision to go public was a mistake in the first place, or the type of potential rival has changed since the company went public. Alternatively, a firm may decide to go private as an optimal step toward an optimal insiders’ ownership. If the insiders’ ownership is too low, then the firm may lose part of its value, because either insiders do not have the right incentives to sell, or they cannot prevent the rival from “stealing” the company with a tender offer. Thus, it is profitable for insiders to move towards the optimal ownership level. However, the optimal way of reaching the optimal level of insiders’ ownership is not the simple open market purchase of some additional stock. In fact, in this way outside shareholders will enjoy for free the increase in the value of the corporation’s stock. On the contrary, by going private first, and then reverting back to public ownership (retaining the optimal amount of voting power), the incumbent management can internalize part of the capital gain produced by an optimal insiders’ ownership.

The first motive is more likely to apply to small companies, which went public in a recent past. By contrast, the second motivation seems to fit best the LBOs and reversed LBOs of the 1980s.

Chapter 2 studies the value of corporate control in Italy, by using the prices of differential voting shares quoted on the Milan Stock Exchange. In the mid 1980s nonvoting shares became a widely used instrument in Italy. More than one third of the companies, representing more than half of the total capitalization of the MSE, issued a nonvoting class of shares. Previous studies in other countries have already noticed that superior voting stock trades at a premium with respect to inferior voting stock of the same company. The amazing feature of the Italian context is that on average voting shares trade at a 80% premium with respect to their nonvoting counterpart. This premium exists despite nonvoting stock carries all the rights of the voting stock (except the voting right) and has also some additional dividend rights. Ignoring the

small additional dividend right, the price difference between voting and nonvoting shares is equal to the value of a voting right. Therefore, the only way to explain this price difference is to explain why voting rights are so valuable. Voting rights can be valuable only if they give access to some exclusive benefits not shared by noncontrolling shareholders (private benefits of control). Small investors who daily trade on the market will not probably have direct access to these private benefits, but they can cash their voting rights whenever a competition for control arises. Therefore, if the premium is determined by the value of the voting right there should be a relationship between the premium attached to voting rights and the structure of ownership. This relationship is tested using both a theoretical model, based upon Shapley and Milnor's (1961) theory of oceanic games, and other simple measures of ownership concentration. The results suggest the existence of a positive relationship between ownership concentration and value of votes. The high level of voting premium in Italy is at least partially explained by the magnitude of private benefits of control, estimated to be about 30% of the value of the underlying assets. The predictions of the model are also corroborated by a case study of an actual control contest involving a company with multiple classes of common stock.

Chapter 3 conducts a similar study in the U.S.. The existence of a relationship between premium attached to voting rights and ownership structure is confirmed. In addition, six case studies of dual class companies that experienced a sudden change in the ownership distribution support the existence of such relationship. Voting rights are more valuable when no party has absolute control of a corporation, and when more than one party have a significant voting stake.

In the U.S. dual class companies are more rare than in Italy (they were excluded from the New York Stock Exchange until 1984), and not all of them have both classes contemporaneously traded. Therefore, in contrast to the Italian dataset, the U.S. sample cannot be considered representative of the average American company. However, it is possible to deduce from Grossman and Hart's (1988) model that the companies more likely to issue differential voting shares are those with larger private benefits of control. Therefore, it comes as a surprise that the estimated size of private benefits

in the U.S is only 2% of the value of the company, versus the 30% estimated in the Italian sample. I conjecture that the cause of this discrepancy is a diverse legislation. American corporate law and especially practice is much more attentive to abuse of control power at the expenses of minority shareholders.

Both Chapter 2 and Chapter 3 suggest that small shareholders perceive the value of voting rights. Additional evidence in this sense is provided by Chapter 4. This chapter uses Italian data to test the theory of shareholder response to dual class exchange offers proposed by Ruback (1988). A dual class exchange offer (DCEO) is an offer to all the shareholders of a corporation to exchange shares of common stock with superior voting rights for similar shares of the same company, with inferior voting rights. Inferior voting shares are generally guaranteed a privilege, such as higher dividends, to induce exchanging. Ruback conjectures that outside shareholders are likely to face a prisoner's dilemma. The dividend privilege induces outside shareholders to give up their voting rights by exchanging. However, if outside shareholders were able to coordinate among themselves they would be better off not exchanging. In fact, by exchanging outside shareholders will leave the majority of votes to insiders and lose the premium of a potential takeover. Contrary to Ruback's conjecture, this chapter shows that outside shareholders are not trapped in a coercive equilibrium in which they are induced to a suboptimal choice of inferior voting shares by a coordination failure. The evidence suggests that the most likely equilibrium is the alternative one in which only a fraction of outside shareholders choose the inferior voting share. The fraction of voting shares retained is such that the market value of one voting right is just equal to the value of the additional dividend attributed to nonvoting shares. Also this finding confirms the view that voting rights are valuable, even for small outside shareholders.

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Chapter 1

Insider Ownership and the Decision to Go Public

The choice of whether to remain a private or to become a publicly traded company is one of the most important and least studied questions in corporate finance. The initial public offering (IPO) is frequently the largest equity issue a corporation ever makes. Every year an average of one third of all the funds raised through common equity issues is raised through IPOs. The IPO is also an important channel through which the initial entrepreneur or the venture capitalist gets rewarded for his initial effort. Our understanding of the “going public” process is critical to any attempt both to increase equity financing and to stimulate entrepreneurial and venture capitalist activities. The latter has been stated as an objective in the public policy debate on capital gains tax.

Until the beginning of the 1980s the decision to go public could have been considered a stage in the growth process of a corporation. This simple interpretation cannot hold any longer. In the 1980s the U.S. experienced a major wave of going private transactions among large and mature firms. The result was that, despite a growing economy and a long bull market, in the 1980s the U.S. share in world market capitalization shrunk from 53.3% to 29.9%. Very little is known about why companies choose to revert back to private ownership, and whether this is a temporary or a permanent situation. According to Kaplan (1991) these neo-private companies are

“neither short lived nor permanent.” He estimates that only 50% of large leverage buyouts return public within seven years after the LBO transaction. Furthermore, 7% of the companies in his sample went private again, after having returned to being public.

The only formal model of the choice of whether to be a public or a private firm that I am aware of is provided by Pagano (1985). He focuses on the entrepreneurs’ failure to internalize the positive externality produced by their decision to go public. By floating his firm each entrepreneur increases the other entrepreneurs’ diversification opportunities, but faces an individual floating cost. As a consequence, a small stock market may be trapped in a “bad” equilibrium, in which limited diversification opportunities discourage any single entrepreneur from listing his own firm and diversifying his portfolio. As a result the other entrepreneurs’ diversification opportunities are reduced even further.

The conventional wisdom suggests a simple trade-off between the costs and benefits of going public. On the cost side, there are the registration and underwriting costs (on average 14% of the funds raised, according to Ritter 1987), the underpricing cost (on average 15%, Ritter 1987), the annual disclosure costs and the well-known agency problems (Jensen and Meckling 1976). On the benefit side, there are diversification, the possibility of equity financing beyond the initial entrepreneur’s limited wealth, a less costly access to the capital market, an increased liquidity of the company’s shares and some outside monitoring (Holmström and Tirole 1990).

The above ingredients are certainly important to understanding the public vs. private choice, but they do not provide the whole picture. First of all, most of the costs are costs of moving to public ownership. Therefore, these factors are more powerful in explaining a once-for-all switch from private to public, rather than a back-and-forth movement. Traditional models can explain the discrete choice to go public, but they cannot explain the level of public ownership. One of the unique features of this model is that it jointly determines whether a firm should go public and how much equity insiders should retain in a public firm. Secondly, with traditional models it is hard to explain why public companies may want to float their subsidiaries. On

the contrary, this paper gives an answer to that question. Thirdly, there are stylized facts that are difficult to interpret with a simple trade-off story. Ritter (1984) reports that IPOs are more frequent in periods when IPO underpricing is particularly severe, that is to say that more firms go public when it is more costly to do so!¹

The purpose of this paper is to model the private vs. public choice along the corporate control dimension. I do not dismiss the fact that the other factors mentioned above can influence

the choice to go public. However, I consider corporate control an important and previously unexplored aspect of the problem. Furthermore, the model will focus on the essence of the going public process, i.e., the distribution of a company's shares among a large number of small outside investors.

I shall show how going public with a fraction of the company may enhance the value of the remaining part, if control is a valuable asset, making the initial entrepreneur better off. The intuition is fairly straightforward. Selling shares but retaining control makes the incumbent more powerful in any subsequent bargaining with potential buyers. Similar reasoning is advanced by the *Wall Street Journal* (3/22/1991) while commenting on the offerings of minority equity stakes of private firms by LBO funds:

By offering only a slice of the ownership instead of 100% the fund managers keep the option of selling the rest of the company at a higher price sometime in the future, either to a corporate buyer or through additional public stock offerings.

The notion that a two-stage sale is more profitable than a unique sale contrasts with the basic notion that value is additive (i.e., two shares are worth twice as much as one share). The introduction of a control value allows me to derive the above mentioned effect in a fully rational setting.

Section 1.1 describes the models and the main assumptions. When an entrepreneur considers the possibility of going public, he knows that in the future a potential buyer

¹This is puzzling as long as I maintain the standard assumption of a perfectly elastic demand for stocks. For evidence against it see Shleifer (1986).

will appear. The entrepreneur's wealth is determined by the amount of surplus he can extract from the buyer if the sale takes place. The entrepreneur can change his amount of surplus by changing the proportion of profit and control he retains. In particular, he can strategically exploit the small shareholders' ability to free ride on any improvement of the company profitability. Selling a minority stake in the company, let's say 20%, to outside shareholders, before facing a negotiation with a potential buyer, the entrepreneur succeeds in extracting part of the buyer surplus through the small shareholders. In addition, he becomes less willing to sell to the buyer at a later date, because now he has full control of the company but he has a claim on only 80% of the company profits. By doing so, the entrepreneur increases his share of surplus. This mechanism is illustrated through two examples at the end of the section.

Section 1.2 analyzes formally the examples presented in section 1.1. The entrepreneur wants to increase as much as he can his share of surplus by employing outside shareholders. However, if he chooses to retain a stake too small, he will lose the incentive to sell control to a superior buyer later on. This will decrease the value of the company and the wealth of the entrepreneur himself. The solution of the initial entrepreneur maximization problem determines the optimal insider ownership. At the end of the section an example illustrates the robustness of the equilibrium to the possibilities of further sales by the incumbent after the IPO.

While I consider the value of control to be an important and previously unexplored determinant of the decision to go public, I do not dismiss others (diversification, limited entrepreneur's wealth and agency costs) that are important too. In the Appendix, I show that the previous results are substantially unchanged if I introduce diversification gains, in the form of a tax on the equity stake retained by the entrepreneur. However, diversification gains destroy the robustness of the equilibrium when the entrepreneur is allowed to sell additional shares after the IPO. This nonrobustness is inherent to models in which the insiders' ownership acts as a signal or as a commitment. However, if the subsequent sales can only take place in discrete blocks, then I show that the proposed equilibrium can exist, even in the presence of retrading.

Section 1.3 analyzes how the model's predictions fit the stylized facts of the "going public" process. I apply the framework of earlier sections to the initial offering of portions of a wholly-owned subsidiary (the so called equity carve-out), and to the IPO underpricing puzzle. The model explains why carve-outs increase the parent company value, why only minority stakes are sold and why differential voting shares are so frequently used in these cases. The very high turnover in control (37%) experienced by carved-out subsidiaries confirms that an eventual sale is an important determinant of carve-outs and IPOs in general. The larger return experienced by companies that sold a subsidiary by carving it out first, confirms the optimality of a two-stage sale.

The model sheds some new light on the IPO underpricing puzzle, explaining the supply side of the phenomenon. The initial entrepreneur is interested not just in selling a portion of his firm, but in distributing this portion among small shareholders, to use their ability to free ride. He is prepared to pay a price in terms of underpricing to reach this goal.

In section 1.4 the model is also applied to the reverse of an IPO: a "going private" transaction. By employing the same framework used to describe the decision to go public, I can identify two different motivations for going private. A firm may want to return to private ownership because it is worth more private than public. In such cases the decision to go public was a mistake in the first place, or the type of potential rival has changed since the company went public. These are more likely firms with a high insiders' ownership, that face a rival very capable of diluting the minority property right after a change in control. Alternatively, a firm may decide to go private as an optimal step toward an optimal insiders' ownership. If the insiders' ownership is too low, then the firm may lose part of its value, because either insiders do not have the right incentives to sell, or they cannot prevent the rival from "stealing" the company with a tender offer. Thus, it is profitable for insiders to move towards the optimal ownership level. However, the optimal way of reaching the optimal level of insiders' ownership is not the simple open market purchase of some additional stock. In fact, in this way outside shareholders will enjoy for free the increase in the value of the corporation's stock. On the contrary, by going private first, and

then reverting back to public ownership (retaining the optimal amount of voting power), the incumbent management can internalize part of the capital gain produced by an optimal insiders' ownership. This type of public-to-private transaction is more likely to occur among companies with a diffused ownership, and to be challenged by other bidders. Furthermore, this type of transaction is expected to be reversed soon afterwards.

The concluding section summarizes the findings and suggests several directions for future research.

1.1 The Model and Some Numerical Examples

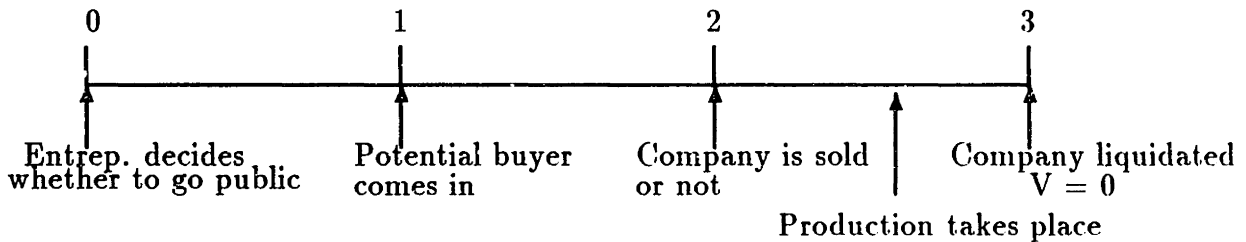
I describe the model, the timing and the fundamental assumptions. After that, I present two numerical examples that illustrate the intuitions of the model. The game is substantially different when the entrepreneur retains the majority of votes. Therefore, the first example shows the bargaining game that takes place in this case, while the second one describes the tender offer game that takes place when the incumbent retains a minority stake.

1.1.1 The Framework

An entrepreneur is the sole owner of a company. At time 0 he considers whether to go public or to remain private. If he decides to go public he should determine which fraction ϕ of the company he wants to retain afterwards. In the real world even start-up companies are rarely 100% owned by one individual. In most of the cases either a venture capitalist or relatives and friends provide part of the initial equity financing. However, those initial investors are generally directly involved in the company, sitting on the board of directors and sharing management responsibilities (and perquisites). They are also generally protected by an implicit or explicit contract that prevents one party from selling his stake without other parties' consent, both before and after the IPO. Therefore, for the purpose of the model these different owners can legitimately

be considered as a single owner.²

There are two important facts that influence the owner's decision. The income produced by the company consists of an observable and verifiable component v^i and by an observable but nonverifiable component B^i , that, following the literature, I will call private benefits. When the incumbent sells shares to outside shareholders, he can only claim to give them a fraction of the verifiable income the company will produce in the future. Only the person who is in control of the company can enjoy B^i . At time 1, an individual or a corporation interested in buying the company arrives. This potential buyer, "rival," has different valuations of the company (v^r and B^r).³ To make the problem interesting I will assume that the total valuation of the rival is bigger than the total valuation of the incumbent (i.e., $B^r + v^r > B^i + v^i$).⁴



Without loss of generality I assume that no production activity takes place between date 0 and date 2, that the company is worthless after time 3 and that the (risk-free) interest rate is zero. At time 2 the bargaining between the incumbent and the rival takes place. Depending on the stake retained by the incumbent the bargaining can take two forms. If the incumbent maintains the majority of the votes the

²There are other situations that are meant to be captured by this model. One is the relationship between an LBO fund (like KKR) and previously acquired companies (like RJR Nabisco or Duracell). Another one is the relationship between a parent company and its wholly owned subsidiary. This last case is different from the previous two because value maximizing behavior by a single owner is not a legitimate assumption if the parent company is a public company with diffuse ownership. To include this case I assume that the management of the public company is pushed towards value maximization by a disciplinary takeover threat.

³The possibility of a dilution of minority property rights is not explicitly modeled, but it is subsumed in the difference of security and private benefits of the two parties.

⁴A similar analysis can be made for the case $B^r + v^r < B^i + v^i$. In this case the initial entrepreneur wants to structure the corporation so that the rival will never prevail. What makes the case less interesting is that going public is never strictly better than remaining private.

only way for the rival to prevail is to buy out the incumbent. The price at which they transact will be a weighted average of the two reservation prices, where the weight $\psi \in [0, 1]$ is supposed to capture the incumbent's bargaining power. If the incumbent does not have the majority of the votes the rival can either make a hostile bid for the company or bargain directly with the incumbent. It is assumed that after the IPO the entrepreneur retains control of the company unless he releases it willingly to someone who buys his stake, or loses it in a control contest in which the rival obtains more than 50% of the votes. The rival's choice of the way to prevail will be determined by the relative cost of the two strategies.

The acquisition of control by buying shares from outside shareholders requires a formal tender offer. In the basic model only unrestricted and unconditional tender offers are allowed.⁵ In the tender offer subgame I assume that outside shareholders are atomistic, i.e., they do not perceive themselves as pivotal in the tender offer outcome. This is the context in which Grossman and Hart (1980) proved that outside shareholders are able to free ride on the improvement implemented by a rival. It is an extreme assumption that approximates the case of small individual shareholders.⁶ This is consistent with the fact that individual investors are, by far, the most important buyers in IPOs.⁷ A recent study by Barclay and Holderness (1991) gives empirical foundation to this assumption. They show that block trading followed by a change in control produces a 22% market adjusted return in the following year.⁸ By contrast, block trading that does not lead to a change in control produces a -6.6% market adjusted return. This difference proves that is not the information released by block trading, but the changes implemented by the new controlling shareholder that matter, and that outside shareholders capture a significant proportion of these gains (or losses). Similarly, I assume that all the tender offers are made to succeed

⁵A tender offer is unrestricted when it is for 100% of the shares. It is unconditional if the price offered does not depend on any event, in particular on the number of shares tendered.

⁶See Holmström and Nalebuff (1988).

⁷Weiss (1989) estimates that in the first quarter after an IPO individuals own more than 88% of the shares offered. This compares with an average of 56% of all the equities outstanding.

⁸This figure is obtained averaging the market adjusted return for the 41 companies that were eventually acquired (33.4%) and for the 45 companies that changed controlling shareholders, but remained public (11.2%).

with probability one.

In order to focus only on the value of control, I assume that everybody is risk neutral, that the two contestants are not liquidity constrained and that all of the valuation parameters are common knowledge.

I also initially assume that the initial entrepreneur cannot diverge from the one share-one vote rule and is prevented by law from imposing super majority rules. At the end of section 1.2.3 I will discuss how the results are modified if these assumptions are dropped.

1.1.2 Example 1: The Bargaining Game

This example illustrates the optimality of a two-stage sale. For notational simplicity I assume that in the bargaining the two parties evenly split the surplus from trade (i.e., the bargaining power of the incumbent is equal to $1/2$).

The initial entrepreneur is able to produce \$100 of verifiable income if he runs the company between periods 2 and 3. In doing that he can reap \$40 in terms of private benefits. The potential buyer, who arrives at time 1, is able to produce \$140 in terms of verifiable income, while extracting only \$10 of private benefits. The entrepreneur's total valuation of the company ($B^i + v^i$) is equal to \$140, while the potential buyer's is \$150. Therefore, there are \$10 of potential gains from trade. If the entrepreneur keeps the company private at time 0, the bargaining at time 2 will be over the whole company.⁹ Given the stated assumptions on the bargaining process, at time 2 the entrepreneur will sell the company at \$145, i.e., his reservation price (\$140) plus the amount of gain from trade he is able to extract from the buyer ($\frac{1}{2} * 10$).

Now assume that at time zero the entrepreneur sells 10% of the company to outside investors. In this perfect foresight world, outside shareholders are prepared to pay for 10% of the shares only 10% of the verifiable income produced by whoever will run the company between times 2 and 3. Therefore, in order to compute the proceeds

⁹This does not imply that the buyer needs to buy 100% of the company, but that the entrepreneur, owning all the company, takes into account the value of 100% of the shares in the bargaining at time 2. Given the symmetry in information it is irrelevant if the rival pays the incumbent in cash or in company stock.

of the IPO I should determine first who will prevail at time 2. Note that it is not guaranteed that the rival will prevail at time 2. In fact, the entrepreneur arrives at time 2 with the entire control value but only 90% of the security value. Therefore, a transaction can take place only if the incumbent valuation of his stake (not that of the entire company) is less than or equal to the buyer valuation for that stake, i.e., $B^i + \phi v^i \leq B^r + \phi v^r$, where ϕ is the stake retained by the entrepreneur. This condition is satisfied for $\phi = 0.9$. In fact, the seller reservation price for the 90% stake is \$130, while the buyer's one is \$136. The potential gains from trade is \$6. The entrepreneur, selling the majority stake at $t=2$, gets his reservation value plus one half of the trade surplus. This adds up to \$133. Given that he still has an incentive to sell at time 2, the outside investors will value their shares according to the rival's cash flow, i.e., $\$0.1 * 140 = \14 . Therefore, the total proceeds of the sale are \$147, strictly more than the \$145 he would have obtained maintaining the firm private.

Incumbent Valuation	Buyer Valuation	Incumbent wealth if $\phi = 1$	Incumbent wealth if $\phi = 0.9$	Incumbent wealth if $\phi = 0.75$
$B^i = 40$ $v^i = 100$	$B^r = 10$ $v^r = 140$	145	147	150

Table 1.1: Example 1

A two-stage sale allows the incumbent to extract more surplus from the buyer. Through the IPO the initial owner cashes out a portion of the trade surplus, without having to share it in the bargaining. At time 2 the two parties will bargain over the remaining surplus, and the entrepreneur will get a constant fraction of it (in this case 1/2). Therefore, by selling in the IPO the incumbent profits through using strategically the outside shareholders' ability to free ride on the rival improvements. Small outside shareholders cannot be brought into the bargaining game because they are dispersed, and they have no incentives to enter it because they can free ride. The IPO credibly commits the entrepreneur to exclude a fraction of the company profits from his valuation. In this sense insiders' ownership, even if it is spread

among different people, differs from outsiders' ownership. Even if insiders did not bind themselves to a joint sale, the entrepreneur cannot obtain a better price by claiming that he is not linked to them in any way, because his claim would not be credible.

The natural subsequent question raised by this model is whether the proposed insider's ownership is an optimal stake for the entrepreneur to retain at time zero. This question will be properly answered in section 1.2. However, I present here the intuition of why this is not the case. If the incumbent sells ϵ more shares at date zero, then his reservation value is

$$(0.9 - \epsilon) 100 + 40 = 130 - 100 \epsilon, \quad (1.1)$$

and the buyer's reservation value is

$$(0.9 - \epsilon) 140 + 10 = 136 - 140 \epsilon. \quad (1.2)$$

The gain from trade is $\$(6 - 40 \epsilon)$. Therefore, the incumbent receives

$$130 - 100 \epsilon + \frac{1}{2}(6 - 40 \epsilon) = 133 - 120 \epsilon \quad (1.3)$$

dollars from the sale of his 90% stake at time 2. The proceeds from the IPO are $\$(14 + 140 \epsilon)$. Therefore, the total proceeds of the entrepreneur are $\$(147 + 20 \epsilon)$, more than the \$147 obtained selling only 10% at time zero.

This trick is not endless. The entrepreneur can at most extract all of the surplus from the rival. In this numerical example the buyer reservation value for the whole company is \$150. Therefore, the entrepreneur succeeds in extracting the entire surplus by selling 25% of the shares in the IPO. In fact, $\phi = 0.75$ solves the equation $B^i + \phi v^i = B^r + \phi v^r$. Selling 25% first and 75% at time 2, the entrepreneur obtains \$150. At the same time a stake equal to 75% is the minimum stake retained by the entrepreneur that still gives him the incentive to sell at time $t=2$. If the entrepreneur sells a larger fraction at date zero, his valuation for that stake becomes larger than that of the rival, so no trade can take place at time 2. Expecting that, outside investors are not

prepared to pay more than v^i per share (because they know that the entrepreneur will manage the company). This implies that if the entrepreneur sells more than 25% of the shares in an IPO his total wealth (value of the company plus proceeds from the sale) drops to \$140, i.e., $B^i + v^i$.

1.1.3 Example 2: The Tender Offer Game

This example shows the different nature of the game when the incumbent retains a minority stake. Moving from a stake of 50% to one of $(50 - \epsilon)\%$ the incumbent loses the ability to extract part of the buyer private benefits. When the incumbent does not retain a majority control the buyer has the option to overcome him through a tender offer to outside shareholders. Outside shareholders are a powerful device for extracting security benefits from a buyer (because they can free ride), but they are very poor in bargaining over private benefits, because outside shareholders do not directly value them.¹⁰ This aspect modifies the result obtained in the previous example. The choice of a stake that equates the incumbent valuation with the rival valuation, i.e., solves $B^i + \phi v^i = B^r + \phi v^r$, is not optimal if the solution falls in the $[0, 0.5)$ range.

In order to show this I will slightly modify the previous example. The valuation parameters of the incumbent are the same, so is the total rival valuation. The only change is that his verifiable income component is now \$115 and his private benefits are \$35. Here the stake that equates the incumbent valuation with the rival valuation, is $33\frac{1}{3}\%$. Assume that the entrepreneur retains just that stake.

In this case the rival can get control by buying out the incumbent or by making a tender offer to outside shareholders. The rival can make an unconditional tender offer just above $B^i + v^i$, i.e., \$140, for all the shares of the company. In the next section I will prove that this is the rival's optimal strategy. The incumbent cannot resist such

¹⁰Outside shareholders are small and dispersed. They will never succeed in taking over the company and enjoying the private benefits. However, they can value them if there is more than one potential rival. In fact, if there is perfect competition in the market for control it does not matter who will face the rival. However, given the existence of private benefits of control the market will hardly be competitive. The paper takes the other extreme in which there is only one rival. The effect will remain, although weaker, with many rivals.

Incumbent Valuation	Buyer Valuation	Incumbent wealth if $\phi = \frac{1}{3}$	Incumbent wealth if $\phi = 0.5$
$B^i = 40$	$B^r = 35$	$131\frac{2}{3}$	148.75
$v^i = 100$	$v^r = 115$		

Table 1.2: Example 2

a strategy with a counteroffer, because the whole company is worth only \$140 to him. Outside shareholders will tender anyway (because they receive \$140 per share more than the \$115 they will otherwise receive). With a $33\frac{1}{3}\%$ stake the incumbent is not decisive, so he prefers to tender for the same reason. Therefore, the rival can get the company by paying slightly above \$140. However, given that he has this option, he can do even better.

The tender offer option modifies both the incumbent and the buyer reservation value in the bargaining. In a tender offer the incumbent receives $\$46\frac{2}{3}$ (i.e., $33\frac{1}{3}\%$ of the price paid for all the company, that is \$140). Therefore, his outside reservation in the bargaining has dropped from $\$73\frac{1}{3}$ ($B^i + \phi v^i$) to $\$46\frac{2}{3}$. The buyer reservation value changes too. He is able to buy the company with a tender offer at \$140. By buying the whole company with a tender offer the rival gets a utility of \$10, i.e., his valuation of the company (\$150) less the price paid (\$140). Therefore, in direct bargaining with the incumbent he is prepared to pay up to a price P that makes him indifferent between buying directly or making a tender offer, i.e.,

$$10 = 35 + \frac{1}{3} * 115 - \frac{1}{3} * P. \quad (1.4)$$

The l.h.s. is the utility from the tender offer. The r.h.s. is the utility from buying the $33\frac{1}{3}\%$ stake from the incumbent. This is given by the private benefits obtained controlling the company (\$35) plus the security benefits to which is entitled the stake purchased ($\frac{1}{3} * 115$) minus the cost of that stake ($\frac{1}{3} * P$). This equation yields a per share price P equal to \$190. In this case, the buyer is ready to pay an extra premium to the incumbent provided he relinquishes control in a friendly manner. This extra

premium is not an additional extraction of surplus. The rival will still pay \$140 (\$190 for $33\frac{1}{3}\%$ of the shares and his security benefits, \$115, for the remaining two thirds). Therefore, the extra premium is not extracted from the buyer but subtracted from outside shareholders.

The premium subtracted from outside shareholders is equal to $\frac{2}{3}(140 - 115) = \$16\frac{2}{3}$. Given the assumption of equal bargaining power, the two parties will split this gain evenly, so the incumbent will receive $\frac{1}{3} * 140 + \frac{1}{2}16\frac{2}{3} = \55 for his $33\frac{1}{3}\%$ stake. The proceeds of the IPO are $\frac{2}{3}*115 = \$76\frac{2}{3}$. Therefore, the total revenues for the incumbent are $\$131\frac{2}{3}$. This is less than what he could have obtained maintaining the firm private (\$145) or retaining just 50% of the shares (\$148.75).

Note that at time 2 there is always room for an agreement between the incumbent and the rival, which avoids a tender offer. The incumbent receives a premium on his shares and the rival saves part of the premium he should have

paid to outside shareholders. However, the real loser is the entrepreneur himself, who, at time zero, cannot sell shares above \$115 (the rival's security benefits). The important point is that at the time of the IPO the entrepreneur cannot credibly commit he will refuse a direct transaction with the rival at time 2. The absence of a commitment technology is very costly for the entrepreneur when he wants to retain a minority of shares. His wealth drops from \$140 (total proceeds under commitment) to $\$131\frac{2}{3}$ (total proceeds in the absence of a commitment). In fact, if the entrepreneur could credibly commit to refuse a direct transaction at time 2, then outside shareholders would also receive \$140 per share. Therefore, even if he retained a minority position, the entrepreneur could sell his shares in the IPO for \$140 instead of \$115.¹¹ The existence of a commitment technology, thus, can only reduce the value loss of going below 50%, but cannot eliminate it. In fact, with an insider stake below 50% the incumbent can never extract any private benefit from the raider. This loss of bargaining power if the company is not majority controlled can explain the pressure for antitakeover amendments and differential voting shares (I return to this issue in

¹¹In this case takeover legislation can play an important role. A rule that mandates a buyback of all the outstanding shares after any change in control, even if privately negotiated, will provide this commitment technology.

section 1.2.3). In the example the optimal ownership level under one share-one vote is 50%. In general, whenever the total value of the firm for the incumbent is larger than the rival's security benefits ($B^i + v^i > v^r$), the optimal insiders' ownership is greater than or equal to 50%. By contrast, when this condition is not met, it may be optimal for the incumbent to relinquish control. The intuition is that when the security benefits are the most important components of the rival's valuation, then outside shareholders are the most powerful device to extract them. In a world with no private benefits, in which the initial entrepreneur faces the possibility that a more efficient management team will arrive, the optimal ownership structure is a dispersed one. In such a situation a superior rival will just walk inside the company and start to manage it. In this case outside shareholders will be able to enjoy the whole surplus of the improved management. All of these cases are reviewed formally in the next section.

1.2 The General Solution

The nature of the game is substantially different depending on whether the incumbent retains control or not, as I have shown in the numerical examples. Therefore, in the following analysis I will look separately at the optimal insider ownership when it is constrained to be greater than or equal to 50%, and when it is constrained to be less than that. Thereafter, I will compare the maxima in the two regions. This is a legitimate procedure only if there is a maximum in both regions.

The only problem arises at 50%, where the value of the firm can be discontinuous. The situation in which both parties have 50% of the votes has not yet been specified. I assume that in this situation the incumbent will prevail (let's say that in the case of a tie the chairman's vote counts for two). Then the interval $[0.5, 1]$ turns out to be compact. In some cases a maximum does not exist in the $[0, 0.5]$ interval. However, I can perform the comparison with the upper limit, and a maximum in the whole region always exists.

1.2.1 Case in which majority is retained

This section analyzes the optimal majority insiders' ownership, i.e., the optimal choice of ϕ in the $[0.5,1]$ interval. Under the maintained assumption that $B^i + v^i < B^r + v^r$, the first best implies a transfer of control of the company from the entrepreneur to the rival at time 2. Therefore, the entrepreneur, who at time zero internalizes all costs and benefits of his choice, wants to commit himself to sell the company at date 2. In the absence of a commitment technology, the incumbent can only maintain a stake sufficiently large that he has the incentive to sell at date 2. This is expressed by the following constraint:

$$B^i + \phi v^i \leq B^r + \phi v^r. \quad (1.5)$$

This constraint guarantees that at time 2 the rival's valuation of the incumbent's stake is bigger than or equal to the incumbent's valuation of that stake.

The entrepreneur objective function is maximizing his total wealth. This is equivalent to maximizing the value of the firm at time zero. The total value of the firm at time zero is given by the proceeds from the IPO $((1 - \phi)v^r)$ and by the price for the control block that the incumbent succeeds to obtain at time 2 $((1 - \psi)[B^i + \phi v^i] + \psi[B^r + \phi v^r])$. Therefore, the entrepreneur objective function is

$$\max_{\phi \in [0.5,1]} V = (1 - \psi)[B^i + \phi v^i] + \psi[B^r + \phi v^r] + (1 - \phi)v^r, \quad (1.6)$$

s.t. (1.5).¹²

Result 1 *If the incumbent is more efficient than the rival ($v^i > v^r$), then the company is worth more private ($\phi = 1$). The maximum value of the company is $(1 - \psi)[B^i + v^i] + \psi[B^r + v^r]$.*

¹²More formally the value of the firm is equal to expression (1.6) for $B^i + \phi v^i \leq B^r + \phi v^r$, and $B^i + v^i$ otherwise. In fact, if constraint (1.5) is violated, then the company will never be sold to the rival. Noting that for $\phi = 1$ expression (1.6) is bigger than or equal to $B^i + v^i$, I can restrict my search for the maximum in the area in which constraint (1.5) is satisfied.

Proof: $\frac{\partial V}{\partial \phi} = (1 - \psi)(v^i - v^r) > 0$. Therefore, $\phi = 1$ (private company) is optimal.

In this case outsiders' ability to free ride is not only useless but harmful. Outsiders risk being trapped with a less efficient (in terms of verifiable income) rival. It is better that the incumbent arrives at the bargain considering the verifiable income of all the shares, because this reduces the bargaining power of the rival.

Result 2 *If the incumbent is less efficient than the rival ($v^i < v^r$) and has smaller private benefits ($B^i \leq B^r$), then the company is worth more public and the optimal majority insider ownership is 0.5. The maximum value of the company is $(1 - \psi)[B^i + 0.5v^i] + \psi[B^r + 0.5v^r] + 0.5v^r$.*

Proof: $\frac{\partial V}{\partial \phi} = (1 - \psi)(v^i - v^r) < 0$. The condition $B^i \leq B^r$ assures that the constraint is never binding, therefore the optimal ϕ is the smallest feasible (i.e., 0.5).

In this case the incoming rival is so superior that the problem of committing to sell does not arise. The optimal strategy is maximizing the surplus extraction using outside shareholders as much as possible in this region (selling 50%). Later on, I will show that this is the situation in which the introduction of differential voting shares is optimal.

Result 3 *If the incumbent is less efficient than the rival ($v^i < v^r$) but has larger private benefits ($B^i > B^r$), then the company is worth more public and the optimal majority insider ownership is equal to $\max\{0.5, \frac{B^i - B^r}{v^r - v^i}\}$. The maximum value of the company is $\min\{B^r + v^r, (1 - \psi)[B^i + 0.5v^i] + \psi[B^r + 0.5v^r] + 0.5v^r\}$.*

Proof: $\frac{\partial V}{\partial \phi} = (1 - \psi)(v^i - v^r) < 0$. If the constraint is not binding then $\phi = 0.5$ as before. If the constraint is binding the optimal ϕ is the solution of the equation $B^i + \phi v^i = B^r + \phi v^r$, i.e., $\phi = \frac{B^i - B^r}{v^r - v^i}$.

This is the intermediate case. The desire to extract more surplus from the rival pushes the entrepreneur to sell a larger fraction of the company at time 0. However, he should maintain the desire to sell once he arrives at time 2. This induces him to stop at the equity ownership that makes him just indifferent to sell or to retain control at time 2.

1.2.2 Case in which majority is not retained

When the initial entrepreneur retains less than 50% of the shares, then the bargaining process at time 2 is completely different. In this case, the rival can choose between a direct purchase of the minority stake and a tender offer to outside shareholders. If he chooses to make a tender offer to outside shareholders he will choose the least costly bid such that the incumbent does not have a feasible counter offer. To resolve the entrepreneur optimizing problem at time zero, I should resolve the tender offer and the bargaining subgame first.

First of all, let's consider what the rival cost of prevailing through a tender offer is. In the basic model only unrestricted and unconditional tender offers are allowed. The incumbent is prepared to pay up to $B^i + v^i$ for all of the shares. The optimal rival's bidding strategy is given by the following proposition:

Proposition 1 *If only unrestricted and unconditional tender offers are allowed, then the least costly way for a rival to prevail is tender offer at $\max\{B^i + v^i, v^r\}$.*

Proof: The buyer should outbid any feasible incumbent's counteroffer and at the same time induce outside shareholders to tender.

If $B^i + v^i > v^r$, then the binding constraint is given by the incumbent reaction. A similar offer at any lower price will trigger a counter bid by the incumbent. This is obvious given that the proposed strategy is an offer that just equals the incumbent reservation price for the company. At this price outside shareholders want to tender, otherwise they get $v^r < B^i + v^i$. The incumbent is forced to tender too. In fact, he does not have a feasible incremental bid (he cannot bid more than $B^i + v^i$ for all of the shares). Given that he cannot resist he is better off tendering, because outside shareholders will give the majority to the rival anyway. If he tenders he will receive $\phi(B^i + v^i)$ for his stake, which is bigger than the ϕv^r he will receive by keeping his stake.

If $B^i + v^i \leq v^r$, then the binding constraint is given by outside shareholders. If he offers less than v^r , outside shareholders will never tender, because by not tendering they will receive v^r . So v^r is the minimum price to induce outside shareholders to

tender. This price is above the incumbent reservation value, so this has no feasible counterbid. So v^r is the minimum winning bid.

□

Let's first consider the case in which the incumbent total valuation is bigger than the rival security benefits, i.e., $B^i + v^i \geq v^r$. The solution of the tender offer subgame is: the rival offers $B^i + v^i$ for the whole company and everybody tenders. This solution directly affects the bargaining power of the two contenders in case of a direct negotiation. The incumbent knows that he can get at most $\phi(B^i + v^i)$ for his stake, if he enters a control contest with the potential buyer. However, at time 2 it is not in the interest either of the buyer or of the seller to enter a control contest. The buyer has to pay a premium to all shareholders. He is willing to pay an extra premium to the incumbent, if this relinquishes control in a friendly manner (saving him the premium to outside shareholders). When he buys the entire company with a tender offer, the rival gets a utility equal to $B^r + v^r - B^i - v^i$ dollars, i.e., his valuation of the company less the price paid to acquire it. Therefore, in an armslength bargaining with the incumbent he is prepared to pay up to a price P that makes him indifferent between buying directly or making a tender offer, i.e.,

$$B^r + v^r - B^i - v^i = B^r + \phi v^r - \phi P. \quad (1.7)$$

The l.h.s. is the utility from the tender offer. The r.h.s. is the utility from buying a ϕ stake from the incumbent. Therefore, the buyer is prepared to pay up to

$$P = \frac{B^i + v^i - (1 - \phi) v^r}{\phi} \quad (1.8)$$

per share, to avoid a control contest.

The two parties will split the surplus deriving from a direct agreement according to their bargaining power (ψ and $(1 - \psi)$). The surplus is given by the difference in the two reservation prices times the quantity traded:

$$\phi \left[\frac{B^i + v^i - (1 - \phi) v^r}{\phi} - B^i + v^i \right]. \quad (1.9)$$

Therefore, the incumbent's proceeds from the sale at time 2 will be

$$(1 - \psi)[\phi(B^i + v^i)] + \psi[B^i + v^i - (1 - \phi)v^r]. \quad (1.10)$$

The proceeds from the IPO are still $(1 - \phi)v^r$. In this case the entrepreneur maximizes:

$$\max_{\phi \in [0, 0.5]} V = (1 - \psi)[\phi(B^i + v^i)] + \psi[B^i + v^i - (1 - \phi)v^r] + (1 - \phi)v^r. \quad (1.11)$$

Result 4 *If the rival security benefits are less than the incumbent total valuation ($v^r < B^i + v^i$) then the company is worth more private than public. In the interval $[0, 0.5)$ the optimal insider's ownership does not exist. The upper limit of the value of the company is below the maximum value of the company in the interval $[0.5, 1]$.*

Proof: From equation (1.11) it is easy to verify that V is strictly increasing in ϕ ; therefore the closer ϕ is to 0.5 the better, but 0.5 does not belong to the interval. The value of the company at time 0 is equal to the total price paid by the rival at time 2. If the rival has the option of a tender offer he will never pay more than $B^i + v^i$. This is the upper bound of the value of the company in the $[0, 0.5)$ interval, and this is less than or equal to the maximum value of the company in the interval $[0.5, 1]$.

□

In this case selling more than 50% of the shares is clearly a dominated alternative. On the contrary, when the rival dominates the incumbent only with the verifiable income he is able to produce, then the value of the company is independent of the insider stake.

Result 5 *If the rival security benefits are bigger than the incumbent total valuation of the company ($v^r \geq B^i + v^i$), then the company value is independent of the minority insider ownership. The value of the company is v^r , for any value of $\phi \in [0, 0.5)$.*

Proof: The incumbent will never accept a price below v^r because when he refuses

he will get v^r for sure. In fact, the rival still has incentive to buy the company from outside shareholders, and this is feasible if he offers v^r per share. So by refusing the incumbent gets v^r anyway. There is not room for a direct agreement between the rival and the incumbent at the expense of outside shareholders. In fact, the rival has to pay outside shareholders v^r anyway (because they free ride), therefore he is not prepared to pay any extra premium to the incumbent.

□

The incumbent knows that outside shareholders can free ride on the rival improvement in verifiable income. He also knows that, if the rival has nonnegative private benefits, he can buy the company even if he has to pay it v^r . Therefore, a minority incumbent can rationally reject any offer for his stake below v^r , because he knows that he will get v^r for sure.

Under the assumption that the rival values the company more than the incumbent ($B^i + v^i \leq B^r + v^r$), the condition that the rival security benefits are bigger than the incumbent total valuation of the company ($v^r \geq B^i + v^i$) is automatically satisfied whenever the rival private benefits are nil ($B^r = 0$). Therefore, when a raider has no private benefits, then tender offers may take place in equilibrium, and they are the most efficient mechanism for allocating control.

Result 4 indicates that when the rival security benefits are less than the incumbent total valuation ($v^r < B^i + v^i$), then the optimal insiders ownership, in the whole interval $[0,1]$, is a majority stake. The size of this majority stake is determined according to Results 1–3. On the contrary, when $v^r \geq B^i + v^i$ the global maximum is not so straightforward.

In this case there are two opposite forces at work: on the one hand the rival security benefits are so high that outside shareholders become the most powerful instruments for extracting surplus from the rival, so the incumbent would like to increase their presence in the company; on the other hand, giving up control prevents the extraction of the rival private benefits. If the rival has no private benefits at all, then the problem can be easily solved: the entrepreneur sells the entire company to

outside shareholders. If B^r is positive, then the power of the two extraction devices should be compared.

The comparison needs to be done when $v^r \geq B^i + v^i$; this implies $v^r \geq v^i$. Therefore, the maximum value of the company is given by Results 2 and 3. Note that if constraint (1.5) (given by the buyer's valuation) is binding, then the majority ownership extracts all of the buyer surplus. This implies that a minority stake cannot do strictly better than a majority one. Therefore, the comparison is relevant when constraint (1.5) is not binding. In this case the maximum value of the company in the $[0.5,1]$ interval is $(1 - \psi)[B^i + 0.5v^i] + \psi[B^r + 0.5v^r] + 0.5v^r$ (see Result 2). In the $[0,0.5)$ interval the company value is v^r .

Therefore, comparing the two values yields that a minority ownership is better if

$$v^r > (1 - \psi)[B^i + 0.5v^i] + \psi[B^r + 0.5v^r] + 0.5v^r. \quad (1.12)$$

This is equal to

$$0.5v^r > [B^i + 0.5v^i] + \psi[B^r - B^i + 0.5(v^r - v^i)]. \quad (1.13)$$

In the case in which the incumbent bargaining power is zero ($\psi = 0$), retaining majority is optimal if $0.5v^r < B^i + 0.5v^i$, or $0.5(v^r - v^i) < B^i$. This result is very intuitive. By selling half of the corporation to outside shareholders, while retaining control, the entrepreneur can receive all of his private benefits, while extracting half of the security benefits from the rival through outside shareholders. A dispersed ownership permits to extract all the rival surplus deriving from security benefits ($v^r - v^i$), but no private benefits. Therefore, a dispersed ownership structure is preferred to a concentrated one, when the value of the additional surplus extracted letting outside shareholders free ride, $0.5(v^r - v^i)$, is bigger than the size of the incumbent private benefits, B^i . In fact, if the incumbent loses the majority of the votes on the one hand he loses the possibility of requiring the full value of his private benefits to the rival, on the other hand he can better extract the rival's security benefits through dispersed shareholders. The above inequality guarantees that the

overall effect is positive. For future reference the above results are summarized in the following proposition:

Proposition 2 *If the rival security benefits are less than the incumbent total valuation of the company ($v^r < B^i + v^i$), then the optimal insider ownership is always greater than or equal to 50%, and is determined according to Results 1–3.*

If the rival security benefits are bigger than the incumbent total valuation of the company ($v^r \geq B^i + v^i$), but $0.5v^r < [B^i + 0.5v^i] + \psi[B^r - B^i + 0.5(v^r - v^i)]$ then the optimal insider ownership is still determined according to Results 2 and 3.

If the rival security benefits are bigger than the incumbent total valuation of the company ($v^r \geq B^i + v^i$), and $0.5v^r > [B^i + 0.5v^i] + \psi[B^r - B^i + 0.5(v^r - v^i)]$, then the optimal insider ownership is any value below 50%.

Whenever the optimal level of insiders' ownership is below 50% the theory does not indicate any particular level. In practice, the level chosen by the incumbent will depend upon the minimum level that guarantees working control to the incumbent until the rival takes over. In fact, if the incumbent's private benefits are positive ($B^i > 0$), then the incumbent wants to continue managing until the rival arrives. At the same time, when the rival comes, the incumbent wants to let the outside shareholders determine the allocation of control. For this reason the incumbent's minority position should not be too large, in order to leave room for a tender offer by the rival.

1.2.3 Dual Class Stock and Supermajority Rules

If B^r is strictly positive, but the incumbent does not succeed in extracting all of the rival surplus, then the introduction of dual class stock is beneficial to him. Consider the difference between Example 1 and Example 2. In the first case the incumbent succeeds in extracting all of the buyer's surplus, in the second not. This difference derives from the different combination of private and security benefits in the buyer's surplus. In both cases the incumbent wants to arrive at the bargaining at time 2 having already sold all of the surplus and retaining a stake for which he has the same

valuation as the rival. However, if this stake is below 50% the incumbent loses the monopoly on control. The incumbent would be better off if he could preclude the tender offer option to the buyer, even retaining less than 50% of the shares. Suppose that at time zero he introduces the rule that a buyer should either be approved by the board of directors, or be voted in by 80% of the shareholders. In this case an insider retaining a 33% stake will block any nonfriendly acquisition. This device allows him to extract all of the surplus even in situations like Example 2.¹³ The same result could be reached using dual class stock. For example, if he sells 50% of the voting stock and 12% of nonvoting stock in the IPO the incumbent will be able to retain the majority of the votes with just 33% of the security benefits.

The idea is that outside shareholders are better in extracting security benefits, but a majority insider is tougher in bargaining over a private benefits intensive stake. With supermajority rule or dual class stock the entrepreneur has the best of both worlds: outside shareholders can be used to free ride on the buyer security benefits and, at the same time, the retention of control allows direct bargaining over private benefits. This confirms the Grossman and Hart (1988) intuition that deviation from one share-one vote can be optimal when both contenders have private benefits. On the contrary, if $B^r = 0$, the introduction of dual class shares is useless. In this case dispersed shareholders are the best mechanism to extract the rival surplus, and a majority control may be harmful.

One might wonder what is the maximum amount of surplus that the incumbent can extract from the rival. By using differential voting shares an incumbent can extract all of the rival's surplus deriving from a superior managerial ability (i.e., his superior security benefits). Besides extracting all of the rival security benefits, the incumbent can extract an amount of private benefits equal to his own private benefits (for simplicity here it is assumed that the incumbent bargaining power is equal to zero). The intuition is very simple. Suppose there is just one share with all the voting power and no security benefits, and all the other shares are nonvoting. Then

¹³This is the case of the ATT takeover of NCR. NCR had this type of supermajority rule and succeeded in raising the ATT offer from \$90 to \$110 per share.

the nonvoting shares sold to outside shareholders are able to extract all of the rival's surplus deriving from security benefits ($v^r - v^i$). In bargaining with the rival over the voting control the incumbent can obtain $\psi B^i + (1 - \psi)B^r$. So if $\psi = 0$ the incumbent can at most get B^i . Therefore, the difference between B^r and B^i , if positive, can never be extracted by the incumbent.

However, the initial entrepreneur can always extract all the rival's surplus by introducing a sort of poison pill. For example, in the situation mentioned above the initial entrepreneur can also extract the surplus $B^r - B^i$ by writing in the corporate charter that if a change in control will take place a sum equal to $B^r - B^i$ per share (remember that the total number of shares has been normalized to one) should be paid to outside shareholders. This contract is identical to a type of poison pills that goes under the name of "flip-in plans". Under such plan each shareholder is given a right to purchase the target shares at a deep discount if there is a change in control. The discount can be interpreted as the side payment $B^r - B^i$ guaranteed to outside shareholders. In this situation, the rival ends up paying v^r for the nonvoting shares, and B^r for the voting share (B^i to the incumbent and $B^r - B^i$ to outside shareholders). In other words, the rival pays out his whole valuation for the company ($B^r + v^r$). Obviously, the value of this poison pill for individual investors will be reflected into shares' prices at the time of the IPO. In this way the initial entrepreneur is able to extract the whole rival's surplus, by fully exploiting his ability of preselling the trade surplus to dispersed shareholders,

1.2.4 The Possibility of Retrading

Up to now I did not consider the possibility that the entrepreneur could trade shares in his company after the IPO. There are some rules that limit his ability to do so. SEC Rule 144 requires a new prospectus for a sale that in any three-month period exceeds either 1% of the total shares outstanding or the average weekly trading volume, whichever is greater. Furthermore, almost all of the IPO prospectuses contain a clause that prevents the offerers from selling any more shares without the underwriter's consent in a six to eighteen month period following the IPO. These rules just make

further sales more costly, but they do not prevent them. Therefore, it is important to check whether the above strategy is time consistent, i.e., if the entrepreneur, once he is allowed to retrade, wants to do so and consequently destroys the candidate equilibrium.

The results above are weakly robust to the possibility of retrading. I will show this using Example 1. If at time 0 the entrepreneur sells the optimal amount (25% of the shares), he does not gain by selling additional shares at a later date. After time 0 he cares only about his 75% of the shares. Without any additional sale his 75% is worth \$115 ($40 + 0.75 * 100$). If between time 0 and time 2 he decides to sell additional shares, he will get only v^i per share. In fact, outside investors know that when he crosses that threshold the entrepreneur will never sell at time 2. The sale of any positive amount of shares a will make the 75% stake worth $\$40 + (\frac{3}{4} - a)100 + a 100 = \115 , i.e., as before. Therefore, the entrepreneur does not strictly gain by selling additional shares. Buying back some shares also clearly makes the entrepreneur worse off. Similarly, the potential buyer, if he were present at time zero, would not be willing to buy some shares at that date. In fact, he does not realize any capital gain on those shares (they are already traded at v^r) and he does not gain more control. If he buys some of them, his bargaining power at time 2 will decrease. In fact, if he does not take over he will suffer a capital loss on his initial stake. This decreases his reservation value and therefore his bargaining power. Therefore, the equilibrium is weakly robust.

In the Appendix, I show that the previous results are substantially unchanged if I introduce diversification gains, in the form of a tax on the equity stake retained by the entrepreneur. However, diversification gains destroy the robustness of the equilibrium when the entrepreneur is allowed to sell additional shares after the IPO. This nonrobustness is inherent to models in which the insider's ownership acts as a signal or as a commitment. However, I show that if subsequent sales can only take place in discrete blocks, then the proposed equilibrium can exist, even in the presence of retrading.

1.3 Empirical Evidence

This paper does not provide a complete theory of the decision to go public, but presents a model of one important aspect of this decision: the value of corporate control. At the same time it provides a model that determines jointly the size of insiders' ownership and the acquisition technique.

In the following I present empirical evidence suggesting that corporate control is indeed an important aspect in the decision to go public and that this model is able to explain some real world phenomena.

1.3.1 Equity Carve-Outs

The initial public offerings of previously wholly-owned subsidiaries of public corporations provide a sort of controlled experiment for the model above. A subsidiary can easily get financing through the parent company. If there is only one risk factor, then no additional diversification can be obtained by breaking up a conglomerate.¹⁴ Therefore, limited wealth or diversification needs cannot be cited as determinants of the decision to go public. This creates the perfect environment to study the decision to go public as a two-stage sale. Why some firms carve-out their subsidiaries and what the gains are from doing that are still open questions in the literature. One suggested interpretation is that market trading provides some additional information. Among other things this additional information can be used to write incentive contracts for the subsidiary management.

The work of Schipper and Smith (1986a and 1986b) and a follow-up study by Klein et al. (1990) provide the stylized facts on equity carve-outs. The announcement effect of an equity carve-out is an astonishing 2% excess return.¹⁵ This compares with a negative 3% excess return experienced by the same companies in normal seasoned equity issues. The preference for retaining a majority stake is confirmed by both studies. In the Schipper and Smith sample of 73 carve-outs between 1965 and 1983,

¹⁴Even if there are multiple risk factors but markets are dynamically complete, then no additional diversification can be obtained by breaking up a conglomerate.

¹⁵Return in excess of the market adjusted change.

53% of the companies offered less than 20% of their shares and only 11% of them sold more than 50% of their shares. In 6 out of 8 of those last cases the parent company retained voting control through differential voting shares. In the whole sample 20% of the companies made use of differential voting shares. This was a remarkably high number, especially at that time.¹⁶

Schipper and Smith suggest that the opportunity of writing incentive contracts using the subsidiary stock price is a possible reason for equity carve-outs. This should be a motive that lasts through time. The highest costs of public ownership are borne in the “going public” process, therefore it should be the case that once a subsidiary has been carved out, it remains a public company afterwards. On the contrary, both Schipper and Smith and Klein et al. find that “a carve-out is almost always followed by either a parent reacquisition of the subsidiary’s outstanding shares or a disposal of the parent’s remaining interest” (Klein et al. 1990, 2). The latter study follows the 1966–1983 carve-out sample until December 1988. At that date 48% of the carved-out subsidiaries had been reacquired, 37% sold off and only 15% still remained a publicly traded subsidiary. Furthermore, all of the survived carve-outs took place in 1982–1983, i.e., in the last two years of the sample. The median time before a sell-off is 1 year and 4 months, and before a reacquisition, 4 years and 6 months. So the remaining 15% carved out subsidiaries may eventually be either sold or reacquired. For example, I found that between December 1988 and December 1990 an additional company was sold off. The reaction of the parent stock price to the second event (sell-off or reacquisition) was positive and significant (+3.67%) for the sell-offs and roughly zero for the reacquisitions (0.81%).

The very high level of turnover in control confirms the intuition underlying the model that an eventual sale is a major determinant of the decision to go public. In most of the cases the parent company retains control, as suggested by the model. The proportionally large use of dual class shares, to retain control while selling more than 50% of the security benefits, is consistent with the model’s prediction on the use of

¹⁶In 1986 only 5% of the Amex companies and 4% of the Nasdaq companies had dual class arrangements. See Seligman (1986).

dual class shares as a surplus extraction device.

In the Klein et al. study there is also some evidence that the total excess return of this two-stage sale exceeds the typical excess return of a direct sell-off. This supports the idea that the strategic use of public ownership increases the bargaining power of the parent company. One might wonder why all the companies do not use this selling strategy. First of all, this is the optimal technique only when the rival is able to produce more security benefits than the incumbent (compare Results 2 and 3 with Result 1). Otherwise, a direct sale is better. Secondly, the parent companies in these carve-outs are public companies. Therefore, they do not necessarily always maximize shareholders' value.

A slight modification of the model can explain the large number of reverse transactions too. Imagine that at time zero the arrival of a potential buyer is uncertain. For the sake of argument, let assume that it is common knowledge that at time 2 a buyer will appear with probability 0.5. Given the assumption of risk neutrality the results of section 1.2 will follow through, substituting the valuation parameters with their expectations. In this framework the announcement both of a carve-out and of an eventual sell-off should have a positive effect on the value of the outstanding shares, as it is observed in the data. After date 2, when the possibility of a buyer has vanished, even the minor cost of public ownership may induce the parent company to buy back the subsidiary. It is not surprising that this announcement has no impact on the parent share price (0.81%), as far as it is common knowledge that any selling opportunity has vanished. This modified framework explains why 50% of the carve-outs are reversed some years later.

Therefore, the model is consistent with the empirical evidence of carve-outs.¹⁷ What is not explained by the model is why a public parent company, probably controlled by managers, is willing to maximize the share value. This may be a reason

¹⁷In a written note Rydqvist reported to me that this paper pushed him to look at the relationship between IPOs and takeover activity in Sweden. In a sample of 60 equity carve-outs, he found that the subsidiary was acquired within 5 years in 48% of the cases and bought back in 35%. In a corresponding sample of 160 IPOs, 35% of the new public companies were taken over within 5 years and 11% went back private.

why we do not see so many carve-outs! However, sell-offs are typically done by public companies under a takeover threat that pushes the management towards value maximization. This may be the case for carve-outs as well.

1.3.2 Initial Public Offerings

The persistent failure of traditional models to explain the underpricing puzzle and the IPO “hot market phenomenon” (recurrent periods in which the underpricing level and the IPO volume are jointly higher) has pushed researchers towards an explanation based upon fads. For example, Lee, Shleifer and Thaler (1991) find a relation between the IPO volume and the closed end fund discount, that, according to them, represents an indicator of individual investor sentiments toward the equity market. Under this interpretation “hot markets” are demand driven: a fad induces overoptimistic valuation of new equity issues, and entrepreneurs rush to offer their companies. Recent evidence of long-run underperformance of IPO (Ritter 1991) is also suggestive in this direction.

The model of section 1.2 addresses only the supply side of the IPOs, but does that in a rational setting. Besides the theory of fads, previous explanations of the underpricing phenomenon failed to explain why initial entrepreneurs really wanted to sell, and why they were prepared to pay such a huge premium to sell their shares. For example, Rock (1986) model explains the demand side of the IPO. The model assumes that there are some informed investors who know the real value of the firm, but are prevented from buying all the shares by some unspecified constraints. Small outside shareholders are supposed to buy the remaining shares. However, they are uninformed about the true value of the company, therefore they will require a premium to enter into the auction. In fact, they face a “winner curse” problem. However, Rock’s model does not explain why it should be optimal for the initial entrepreneur to sell to the public, paying the cost of a huge underpricing, rather than selling to a restricted group of large institutional investors (private placement). In other words Rock’s model is able to explain the demand side of the underpricing through the winner curse phenomenon, but it is completely silent on the supply side.

The present model provides the perfect complement to Rock's model, explaining the supply side. The initial entrepreneur wants to distribute a fraction of the company shares among small shareholders. Only dispersed shareholders do not solicit any control and can easily free ride on any improvement. This is the reason why the entrepreneur does not want to sell to a limited number of investment bankers. However, if there is some uncertainty as to the value of the securities, and some investors are better informed than others, then some underpricing is necessary to attract small uninformed investors.

Note that in this model the underpricing cost is not really borne by the entrepreneur. He sells the company shares at an intermediate price between v^i and v^r . Therefore, he fails to realize the highest price he could get in a world of perfect information, but he does not lose money. In his hands those shares were worth only v^i . Furthermore, if the price obtained is above what he could have gotten for those shares from direct bargaining with the rival at time 2, i.e., $[v^i + \psi(v^r - v^i)]$, then he actually gains from going public, in spite of the underpricing cost. This explains why the announcement effect of a carve-out is positive, despite the fact that the parent company will have to suffer the cost of underpricing on subsidiary shares.¹⁸

If one is willing to make certain assumptions about the behavior of security benefits and of private benefits during the cycle, then the model of section 1.2 is also able to explain some of the established facts in IPOs. According to the model, a company should go public when the optimal insider ownership is below 100%. Whenever there is an interior solution, the optimal insider ownership is given by the parameter λ , which is the ratio of differential private benefits to differential security benefits $(\frac{B^i - B^r}{v^r - v^i})$. This implies that if the security benefits difference is positively correlated with the stock market index, while private benefits are not, then you should expect waves of IPOs when the stock market is high and very few IPOs when the market is bust. In other words, if a rival is able to increase cash flow by a fixed proportion, then a generalized increase in the value of cash flows (a stock market rise) makes more valuable the use of a two-stage sale. The same can be said for the industry clustering

¹⁸Schipper and Smith note that this is smaller than the usual underpricing, but still positive.

of IPOs. In periods in which an industry is doing particularly well, more IPOs should take place. This is an alternative explanation of the correlation between IPO volume and “investment sentiment,” which does not rely on fads.

1.4 The Decision to Go Private

Going private is the opposite of going public, therefore the two phenomena deserve a common explanation. However, both the theoretical and the empirical literature have analyzed them separately. One purpose of the present model is to build a common framework able to explain both of them.

The model in section 1.2 determines when it is optimal for a firm to go public and what the optimal level of insiders’ ownership is. If all existing public firms have chosen their status according to that model and the outside conditions have not changed, then there is no reason for a firm to go private. However, if one is willing to admit that some firms may have mistakenly chosen to go public, or that the environment has changed since their initial decision, then the model can be profitably used for predicting the patterns of going private transactions.

One possibility is that some firms made the wrong decision, choosing by mistakes to go public when the optimal choice would have been to remain private. The model (Result 1) predicts that when the incumbent is more efficient than the rival ($v^i > v^r$), then the company is worth more private. In fact, in this case outside shareholders cannot free ride on a better rival. On the contrary, when the firm is sold, outside shareholders are obliged to bear part of the cost of an inferior rival. In fact, publicly traded shares will be worth only $v^r < v^i$ per share under the rival’s management. Under these circumstances the market price of the company shares (v^r) will be less than their value for the incumbent (v^i). Thus, it is convenient for the incumbent to buy them back. Outside shareholders have no interest in holding on to the company. In fact, the company will be eventually sold to a rival that dilutes minority shareholders (remember that $v^i > v^r$), so they will be worse off. Once the management has started the going private transaction an inferior rival can prevail only by paying an amount

equal to the incumbent's valuation of the whole company ($B^i + v^i$).¹⁹ Therefore, the incumbent management is always better off starting a going private transaction. Once the company is private we may expect that it will be sold off later on, but we do not expect that it will ever go public again.

The analysis in section 1.2 has been done under the assumption that the incumbent has a smaller valuation of the company than the buyer ($B^i + v^i < B^r + v^r$). A similar analysis can be done for the opposite case $B^i + v^i > B^r + v^r$. Under this assumption it is never optimal for a firm to go public. Furthermore, if a similar company is public, it risks acquisition by an inferior rival with larger private benefits ($B^r > B^i$). In fact, in some cases the inferior rival can induce the incumbent to sell him his controlling stake.²⁰ In this case also it is profitable for the incumbent to go private, and it is not in his interest to go public again. In contrast with the previous case we do not expect that the company will be sold later on. Both of these cases can be labeled *suboptimality of public ownership*, because it is not optimal for the firm to be publicly owned.

However, the decision to go private may arise also in companies that should be publicly owned according to the model of section 1.2. This is the case of companies in which the level of insiders' ownership is below the optimal level. I will show that the best strategy for the insiders to reach the optimal level of ownership is not the direct one (i.e., buying on the market the difference between the optimal stake and their actual stake), but it is a two-step procedure that involves going private and then returning to public ownership soon after.

Let us first consider the simplest case in which insiders own more than 50% of the voting power, but, nevertheless, their level of ownership is still too low to induce them to sell (i.e., $B^i + \phi v^i > B^r + \phi v^r$ even if $B^i + v^i < B^r + v^r$). This implies that at the current level of insiders' ownership the management will not be willing to sell

¹⁹Once the management has started a going private transaction it cannot accept a rival's offer at $B^i + \phi v^i$ restricted to the management stake ϕ , without triggering a legal suit by minority shareholders. Therefore, the initiation of the going private process credibly commits the incumbent to take into account 100% of the company shares.

²⁰If the incumbent retain less than 100% of the shares ($\phi < 1$), then we may have $B^i + \phi v^i < B^r + \phi v^r$ even if $B^i + v^i > B^r + v^r$.

to a superior rival. As a consequence the market price of publicly held shares will be v^i . In such a situation insiders have an arbitrage opportunity. In fact, the total value of the company at the current level of ownership is simply $B^i + v^i$ (i.e., the value of the management stake, $B^i + \phi v^i$, plus the value of publicly traded shares, $(1 - \phi)v^i$). By choosing the optimal level of ownership, insiders can obtain as much as $B^r + v^r > B^i + v^i$ from the eventual sale of the company.²¹ However, the most profitable way for the insiders to reach the optimal level is not through a direct acquisition of the additional quota. Even assuming that insiders are able to buy the whole amount desired without any impact on the market price v^i , this will not be the best strategy.²² By simply buying an additional stake insiders will leave to outside shareholders a fraction $1 - \phi^*$ of the capital gain $v^r - v^i$ produced by the readjustment. In fact, when the insiders own the optimal amount, outside shareholders can legitimately expect insiders to sell the company to the rival. Thus, publicly traded shares will be worth v^r .

Alternatively, insiders may decide to make their company private. A freeze-out merger will allow the insiders to pay only v^i per share. Even a lawsuit cannot provide them more than that: under the current management those shares are objectively worth v^i .²³ Immediately after going private the same company should want to return to public ownership, because, by assumption, the company is worth more public (provided that insiders retain the optimal amount). Under the assumption that insiders initially own more than 50% of the shares, this arbitrage opportunity exists only for them. In the more general case the potential rival may intervene with an alternative bid at the time of the going private transaction. This is consistent with the fact that 30.6% of such transactions between 1980 and 1983, and 49.7% of those between 1984 and 1987 were accompanied by a competing bid or a prior takeover speculation (Lehn

²¹Under the assumption that the optimal level of insiders' ownership is above 50% the incumbent can extract all of the rival surplus (see Result 3).

²²If outsiders realize that the insiders are buying shares to readjust their ownership to the optimal level, they will not sell their shares at less than v^r , because, if they hold on, their shares will be worth v^r . This will make this strategy totally unprofitable.

²³Here the implicit assumption is that the value of the shares under the potential rival is not verifiable in court.

and Poulsen, 1989). Even if the incumbent management faces potential competition, he may still want to go private. If he waits for the rival to come, he will be obliged to sell at a lower price. Therefore, the incumbent tries to bring the company private, hoping that the timing makes it harder for the rival to bid, so he can buy out the company below the rival's expected price.

After going private, the incumbent management has the right incentives to sell and he will do it. This matches the stylized fact that LBOs are followed by large sales to strategic buyers (Baghat et al. 1990). According to the type of asset the incumbent will choose a direct sale or a two-stage sale. This formalizes also the idea of "keeping an option of selling the rest of the company at a higher price to a corporate buyer," as proposed in the mentioned *Wall Street Journal* article about the IPOs of companies owned by LBO funds.

The model is not adequate to explain the large management buyouts of the late 1980s described by Kaplan and Stein (1991). Their sample of deals over 100 million dollar shows a very low level of insider ownership both before and after the buyout. By contrast, the model seems appropriate to explain the behavior of a large number of smaller deals. In their sample of 72 going private proposals between 1973–1980, De Angelo et al. (1984) find a median management ownership of 50.9%. In their sample of 263 going private transactions between 1980 and 1987, Lehn and Poulsen (1989) find that the average management ownership is 23.4%. The average management ownership of firms above the median is 41.0%. Therefore, even in the 1980s going private transactions in firms with large level of insider ownership are relatively frequent. Lehn and Poulsen also find a positive relation between undistributed cash flow and the probability that a firm will decide to go private. They attribute this relation to Jensen's free cash flow theory. However, the result can be interpreted differently in the context of the model presented in Section 1.2. A rival can easily divert cash to his own purposes. So a cash-rich company is more subject to the risk of finding a rival with a higher valuation for the whole company, who has lower security benefits. These are exactly the condition of Result 1, in which it is optimal for a firm to remain (go) private.

To summarize, the model predicts that companies that risk dilution may decide to go private even if the high level of insider ownership prevents any possible hostile takeover. These companies will not return to public ownership afterwards. Alternatively, companies that are potential takeover or acquisition targets may want to go private. Their objective is not to avoid a change in control, but to maximize the return of the incumbent from the eventual sale. This second motivation will be more frequent among firms with low levels of insider ownership. These firms are expected to be sold or to revert to public ownership shortly afterwards. These implications can be used to analyze the very different pattern of how LBOs return to public ownership, as found by Kaplan (1991).

1.5 Conclusions

This paper analyzes the decision to go public from the point of view of corporate control. The access to the market of publicly traded security is viewed as a mechanism for diffusing equity ownership. Small outside shareholders can free ride on any improvement in the verifiable income component produced by a change in control. The initial entrepreneur can use this mechanism strategically to extract more surplus from a potential buyer.

The 100% initial ownership of the entrepreneur avoids the possibility that this mechanism is used to entrench an inferior management. This is still true when the possibility of additional subsequent sales is taken into account. Only if some pressure towards diversification is introduced, the possibility of further sales will jeopardize the equilibrium. However, it is proven that, if further sales should take place in discrete blocks, then the equilibrium still exists.

The sale of a minority stake in the company enhances the total value of the firm. If diversification is not an objective, then the value of the company generally drops when insider ownership goes below 50%.²⁴ This is due to the nonlinearity in the value

²⁴Note that the value of the company cannot be obtained simply by multiplying the market price of a share by the total number of shares, because this procedure omits the control premium associated with private benefits.

of control.

Whenever private benefits are large enough, control is never sold in an IPO. In this case differential voting shares can be an optimal device for increasing diffuse ownership, while retaining control. When private benefits are nil, then diffuse ownership guarantees the maximization of the value of the company.

The model presented is consistent with patterns observed in equity carve-outs. Furthermore, it is able to address jointly the going public and the going private processes, shedding some new light on the timing and sectorial clustering of IPOs and on their initial underpricing. This model also explains why the entrepreneur wants to sell in the way he sells, despite the underpricing cost. Similarly, it suggests a testable implication for the pattern of reverse LBOs.

More research, both theoretical and empirical, should follow in this area. The model does not consider agency problems and monitoring mechanisms. These are crucial problems that affect a public corporation. Nevertheless, every year an average of 170 companies decide to go public. This deserves further explanation. At the same time, more facts about IPO, beyond the underpricing problem, should be studied.²⁵ How many of these companies decides to go public because of wealth constraints? How does the choice to go public affect the capital structure? How does it affect the dividend policy? Answers to these questions would increase our understanding of the decision to go public and of corporate finance in general.

²⁵An example in this direction is Ritter (1991).

1.6 Appendix: Extensions of the Model

1.6.1 Diversification Gains

In the text I do not explicitly consider the cost borne by the incumbent because, to retain a controlling block, he forsakes diversification opportunities. However, the need of diversification may be an important determinant of the decision to go public. It is important to analyze how this factor interacts with control considerations.

The easiest way to model the diversification gains is to introduce a tax on the percentage of company shares held, while maintaining the risk neutrality assumption. So I assume that the cost of carrying a fraction ϕ of the firm from time 0 to time 2 is equal to τ dollars.

I could introduce a similar cost after time 2. If this cost is borne both by the incumbent and the rival, then it will have no effect. If only the incumbent bears this cost (let's say, for example, the rival is much wealthier and so he is better diversified), then the only effect will be a reduction of the proceeds from the sale of a given equity stake (the lack of diversification reduces the incumbent reservation value). Therefore, I will maintain that there are gains from diversification only between time 0 and time 2. For space reasons I will limit the analysis to the case in which the rival security benefits are smaller than the incumbent total valuation of the company ($v^r < B^i + v^i$). A similar analysis can be conducted in the opposite case.

If I maintain the assumption that the incumbent cannot trade in the company shares between time 0 and time 2, then there are no substantial changes in the results derived in section 1.2. Both with a linear and with a convex diversification gain the entrepreneur would either adhere to the previous choice or diversify completely by selling the whole company. The reason is very simple. Let ϕ^* be the optimal choice according to the model in section 1.2. I have shown that when ϕ moves from ϕ^* to $\phi^* - \epsilon$ there is a discrete jump in the value of the firm. In fact, either $\phi^* - \epsilon$ violates constraint (1.5), and the buyer will never be able to buy the company, or $\phi^* = 0.5$, and any smaller stake makes the incumbent lose control. So in both cases it is not convenient for the incumbent to bear that cost for just an ϵ gain in diversification.

Therefore, the only alternative is complete diversification. Let's compare the case in which $\phi^* = 0.5$ with a complete diversification. The value of the company for the entrepreneur when $\phi = 0.5$ is

$$(1 - \psi)[B^i + 0.5v^i] + \psi[B^r + 0.5v^r] + 0.5v^r - 0.5\tau. \quad (1.14)$$

This is obtained by inserting $\phi = 0.5$ in expression (1.6) and subtracting the cost of lack of diversification ($0.5 * \tau$). The value of the company for the entrepreneur when $\phi = 0$ is

$$\psi[B^i + v^i - v^r] + v^r. \quad (1.15)$$

This is obtained by inserting $\phi = 0$ in expression (1.11).

Assuming, for notational simplicity, that the incumbent has no bargaining power ($\psi = 0$), then retaining a majority is preferred if

$$B^i + 0.5v^i - 0.5v^r > \tau, \quad (1.16)$$

or

$$2B^i > (v^r - v^i) + \tau. \quad (1.17)$$

Retaining control is better if the diversification gains and the improvement in security benefits implemented by the rival are smaller than twice the incumbent private benefits. The factor 2 is due to the fact that half of the other benefits can be obtained while still retaining a 50% control.

1.6.2 Robustness to Retrading

The no retrading assumption is a very strong one. When the entrepreneur is allowed to trade at intermediate dates between 0 and 2 and he gains from diversifying, then the equilibrium presented in section 1.2 is destroyed. The reason is very simple. At time 0 an optimizing entrepreneur chooses to sell shares and to retain just the amount that makes him indifferent between selling to the rival at time 2 and keeping his stake

(and I have imposed that in this case he prefers selling). He does that to maximize the amount of surplus extracted. The fact that he retains the incentive to sell makes the outside investors willing to pay v^r per share. However, if one minute after the initial public offering he faces the possibility of selling additional shares he cannot restrain himself from doing that. In the absence of diversification gains he is just indifferent between selling and keeping his stake. If he sells, he will get only v^i per share, because now he has lost the incentives to sell to the rival at time 2. However, the value for the incumbent of retaining those shares is also v^i . This is the knife edge situation presented in the numerical example in section 2.4. On the contrary, when he obtains some gains from diversifying, he strictly prefers to sell. These additional sales before time 2 destroy the incumbent incentives to sell to the rival at time 2. Obviously, outside investors will not pay v^r per share at the IPO, if they know they will be cheated later on.

Therefore, there are only three possible candidate equilibria: sell just 50% of the company, diversify completely or remain private. A 50% stake may be an equilibrium because of the discontinuous jump in the value of the company at that level. Let's suppose that an entrepreneur who has sold 50% of his shares in an IPO faces the possibility of additional sales one minute after. Now his objective becomes the maximization of the 50% stake he has retained, not the maximization of the value of all the company. If he does not sell additional shares, the value of his stake is given by²⁶

$$(1 - \psi)[B^i + 0.5v^i] + \psi[B^r + 0.5v^r] - 0.5\tau. \quad (1.18)$$

If he sells and goes below 50%, the entrepreneur will get:

$$\max_{\phi \in [0, 0.5]} V = (1 - \psi)[\phi(B^i + v^i)] + \psi[B^i + v^i - (1 - \phi)v^r] + (0.5 - \phi)v^r - \phi\tau. \quad (1.19)$$

Note that the value of the stake at 0.5 is above the value at 0.5⁻. The derivative of

²⁶I assume here that constraint (1.5) is not binding at $\phi = 0.5$.

V w.r.t. ϕ is given by

$$\frac{\partial V}{\partial \phi} = (1 - \psi)[B^i + v^i - v^r] - \tau. \quad (1.20)$$

The first addendum is positive by assumption, so if

$$(1 - \psi)[B^i + v^i - v^r] > \tau, \quad (1.21)$$

then it is optimal for the entrepreneur to stick to a 50% threshold. On the contrary if inequality (1.21) has the opposite sign the incumbent wants to diversify further. By giving up control the incumbent gives to the buyer an advantage equal to the reduction in his reservation value ($B^i + v^i - v^r$) times the buyer bargaining power ($1 - \psi$). If this advantage is bigger than the diversification gain, then he prefers not to sell. This makes a 50% ownership a time-consistent equilibrium (that is, robust to retrade).

1.6.3 The Effect of Minimum Sale Provisions

The nonrobustness to retrading is not a unique feature of this model, but is shared by all of the models in which the insider's ownership acts as a signal. For example, in Leland and Pyle (1977) the credibility of the signal disappears if the entrepreneur is able to sell more shares immediately after the IPO. Similarly, in Jensen and Meckling (1976) the agency costs of dispersed ownership can be correctly anticipated by outside investors only if insiders are able to commit to retaining their stake. Otherwise, insiders will prefer to sell additional shares later on, increasing agency costs. However, we do observe insiders who own strictly more than 50% of their company. In their sample of majority owned companies Holderness and Sheehan (1988) find average holdings of 64% with a median of 60%. This phenomenon deserves an explanation.

The simplest explanation is that it is impossible for the incumbent to sell additional shares unless he sells them in discrete blocks. As I have already mentioned, SEC Rule 144 permits small additional sales. However, if an insider wants to change his position substantially he cannot do it piece by piece, but should make a registered

sale. The fixed costs of this procedure make it unprofitable below a minimum threshold. This limitation to discrete sales can make an interior equilibrium sustainable.

The intuition of the above results is the following. The previous equilibrium was destroyed by the possibility of selling shares in an infinitesimal amount. Every time the incumbent sells, he gains the diversification cost τ but he has only a minor impact on the value of his stake, because he has already sold part of it. On the contrary, if he is obliged to sell a discrete amount the adverse price impact on the percentage he sells can be large enough to offset the diversification gains. The paradoxical result is that in the presence of diversification gains the incumbent increases his stake,²⁷ the reason being that the extra stake serves as a collateral to his commitment to concede to the superior rival.

Define as p the minimum amount the incumbent can sell. Assume that after the IPO the entrepreneur retains just $\phi^* + p - \epsilon$, where ϕ^* is the optimal insider stake in absence of retrading. Keeping the additional stake p until time 2 the incumbent will get from it $p[v^i + \psi(v^r - v^i)]$ in bargaining with the rival. The cost of holding this additional stake is τp . If, just after the IPO, the entrepreneur decides to sell the minimum quantity p , he will not have any incentive to concede after time 2. Therefore, the proceeds from that additional sale are $p v^i$. However, once he has lost the incentives to concede, there is no reason why he should retain a stake bigger than 50%.²⁸ Therefore, by deviating, the incumbent can gain the diversification cost of the fraction above 50%.

If the incumbent maintains his holdings until time 2 his utility from the continuation game after the IPO is

$$(1 - \psi)[B^i + (\phi^* + p)v^i] + \psi[B^r + (\phi^* + p)v^r] - \tau(\phi^* + p). \quad (1.22)$$

²⁷Even if it is not intuitive, this result is supported by Demsetz and Lehn's (1985) analysis of corporate ownership. They find that the standard deviation of monthly returns is positively and significantly related to the degree of ownership concentration.

²⁸This is necessary because the rival is still around.

The utility obtained by deviating and selling is

$$[B^i + (\phi^* + p)v^i] - 0.5\tau. \quad (1.23)$$

The entrepreneur will prefer to stick to his commitment if

$$\psi[B^r + (\phi^* + p)v^r - B^i - (\phi^* + p)v^i] - \tau(\phi^* + p) \geq -0.5\tau. \quad (1.24)$$

By definition of ϕ^* :

$$B^r + \phi^*v^r = B^i + \phi^*v^i. \quad (1.25)$$

Therefore, equation (1.24) yields

$$p[\psi(v^r - v^i) - \tau] \geq \tau(\phi^* - 0.5). \quad (1.26)$$

Equation (1.26) simply requires that the capital loss on the additional stake p (given by the l.h.s.) is bigger than the gain from further diversification obtained by deviating (given by the r.h.s.). Solving equation (1.26) yields

$$p \geq \frac{\tau(\phi^* - 0.5)}{\psi(v^r - v^i) - \tau}. \quad (1.27)$$

It remains to be established whether the minimum p that sustains an equilibrium is realistic as the minimum size for a registered sale. Suppose that the diversification costs are about 10% of the income produced in the future ($\tau = 0.1v^i$) and that the incumbent bargaining power is 0.5. Let's say the rival can produce 1.5 times the verifiable income produced by the incumbent and that the optimal inside ownership in absence of retrading is 60%. Then from equation (1.27) p should be bigger than or equal to 6.6%. This is a realistic dimension of a minimum registered sale. Therefore, in the presence of diversification gains the optimal amount of insider ownership that is time consistent is 66.6%.

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Chapter 2

The Value of the Voting Right

A Study of the Milan Stock Exchange Experience

Common stock entitles shareholders to receive a dividend and to vote on corporate matters. The value of the right to vote seems trivial in day-to-day operations, particularly since decision making is a public good in large corporations. For this reason, the fundamental valuation theory asserts that common stock should be priced as an appropriately discounted sum of future dividends, and it attaches no value to the voting right. However, many empirical studies have found that common stock with superior voting power trades at a premium with respect to “normal” common stock. Levy (1982) and Horner (1988) have also shown that larger differences in voting power are associated with larger price differentials. This suggests that voting rights are indeed valuable. However, this leaves open the question of what determines the value of a voting right in the first place.

The only two studies that address this question in a systematic way are Rydqvist (1987) and Robinson and White (1990). To explain the premium of the common stock with superior voting power, both of them use the Shapley value. The Shapley value measures the relative power of block of shares, as a function of the distribution of ownership.

Explaining the price difference between differential voting shares is not only inter-

esting by itself, but also provides a way of testing our conjectures between ownership concentration and company value. For example, Mørck, Shleifer and Vishny (1988) find a piecewise linear relationship between managerial ownership and the value of a company, as expressed by Tobin's q . However, they cannot distinguish between the effect produced by ownership in reducing the agency costs and the effect produced on the value of votes. Differential voting shares provide a way to isolate this second effect. Therefore, by using differential voting shares it is possible to test a relationship between ownership structure and market value of control. It is even possible to estimate the average value of corporate control as a percentage of a company's expected flow of future dividends.

The purpose of this paper is to apply the same conceptual framework as Rydqvist and Robinson and White, to differential voting shares traded on the Milan Stock Exchange (MSE)¹ in order to estimate a relationship between ownership concentration and vote valuation. Besides the theoretical model, obtained in a cooperative framework in which agreements among shareholders are possible and enforceable, this study presents other simple measures of ownership concentration, to identify the important features of the relationship between ownership and the value of votes.

The sample is, by itself, very interesting. In Italy even public companies have many large shareholders. A similar pattern is present among dual class companies, which represent 50% of the total market capitalization. On average, the first five largest shareholders own 81% of the votes, much more than 28.8%, the percentage reported for a large sample of U.S. corporations by Shleifer and Vishny (1986). At the same time, in Italy the average premium attributed to voting shares is about 80%. This figure does not take into account that nonvoting shares are entitled to an additional dividend. Taking this into account, the average premium rises to 90%. This is by far the largest price difference found in any study.² In Italy not only the

¹The MSE is by far the most important Stock Exchange in Italy. There are several regional Stock Exchanges, but they have an insignificant amount of transactions.

²Levy (1982) finds an average premium of 45.5% in Israel, Lease et al. (1983) of 5.44 in the U.S., Rydqvist (1987) of 6.5% in Sweden, Horner (1988) of about 20% in Switzerland, Megginson (1990) of 13.3% in England and Robinson and White (1990) of 23.3% in Canada.

average premium, but also the variance in premia across firms, is very large. While in a couple of cases the premium is negative, in others it goes as high as 400%. The size of the premium has induced some Italian economists to doubt the rationality of the market valuation (Castellino 1989; Penati and Di Corato 1989). However, there is no sign of reversal towards more “reasonable” premia: the cross-sectional average of the premia was 65.6% at the beginning of 1987, 71.8% in 1988, 100.2% in 1989 and 83.6% in 1990. The size and the variability of these premia, and the high concentration of ownership make the Italian case the perfect environment to test a relationship between ownership concentration and market valuation of voting rights.

The main result of this paper is that the market value of votes does depend on the distribution of ownership. The value of votes is higher when there are many large shareholders in a company and nobody controls 50% or more of the votes. However, voting rights retain a positive value even if one shareholder controls a majority of votes.

By assuming that the value of control is a constant proportion of the value of a company, measured as expected flow of future dividends, the paper obtains an estimate of the level of control value in Italy. The control value is approximately 30% of a company’s value. This remarkable level can partially account for the extraordinary level of the voting premium in Italy.

The first section of the paper introduces the reader to the characteristics of the securities studied in the paper. The paper focuses on the price differential between a common stock with one voting right per share, and a common stock with no voting rights. The nonvoting common stock carries with it the right to an extra dividend in addition to the one distributed to all shareholders.

Section 2 presents the theory of the relative pricing of these two types of securities. If voting rights are valueless, the relative price should depend upon the differential dividend right. However, corporate control may be valuable, because it gives access to some exclusive benefits not shared by noncontrolling shareholders. In this case voting rights, which give access to these benefits, should be valuable too. To determine their value, I use an extension of the concept of the Shapley value, known as the theory of

oceanic games.³ This theory is suited to the case in which a small number of large shareholders coexist with a large number of infinitesimal shareholders (as in public corporations). In this framework, by assuming that the value of corporate control is a constant fraction of the value of a company's assets, it is possible to establish an exact relationship between ownership distribution and the premium of voting shares over nonvoting ones (voting premium). A similar specification is obtained by adapting Zwiebel's (1991) model of the ownership structure to companies with two classes of stocks.

Section 3 describes the sample used. It includes all the companies having both voting and nonvoting stock traded on the Milan Stock Exchange (MSE) for at least two years between 1987 and 1990. The dual class stock companies do not look significantly different from the other Italian companies. They have similar market capitalization, earnings-to-price ratio and even ownership distribution. Section 3 presents also some summary statistics and the sources of the data used in the empirical analysis.

Section 4 contains the results of the regression analysis along the line suggested by the model in section 2. The model employs the Shapley value of votes held by small shareholders as a measure of vote value. This model can explain between 5% and 15% of the cross sectional variation in each of the four years considered. The Shapley value captures two essential features: first, the sharp increase in the voting premium when a company is not majority controlled; second, the nonlinear distribution of power in nonmajority-controlled companies. However, the Shapley value fails to take into account possible future change in the ownership structure. In particular, even majority-controlled companies maintain a positive vote value. In these cases the percentage of votes controlled by a potential challenger (i.e. by the largest minority shareholders) captures the probability that a control contest will eventually take place. The importance of expectations about future possible changes in the size and dimension of the main shareholders is tested by using companies owned by the Italian government. Government-controlled companies have, on average, a

³The name derives from the fact that the continuum of infinitesimal minor players is referred to as "an ocean to emphasize the almost total absence of order or cohesion" (Milnor and Shapley 1978, 290).

lower voting premium. However, this difference has decreased over the years, at the same time as privatization rumors have become more intense and credible.

Given Italian disclosure practices, it is difficult to identify the dates when major changes in the ownership structure take place. However, a recent control contest, which started after a sale contract was publicly breached, allows a similar study. This case study is described in section 5. The company analyzed is Mondadori, a publishing company involved also in newspapers. When the contest started, this company had three classes of stock traded on the MSE: a voting class, a nonvoting class and a class allowed to vote only on modifications of the Article of Incorporation. This feature allows us to determine the price of two different components of the voting right: the right to elect the directors and the right to vote on modifications of the Article of Incorporation. The market valuation of the different components reacts as suggested by the theory. The dramatic jump in the price of a vote at the beginning of the control contest is consistent with the theoretical prediction of the model.

The last section summarizes the results and indicates the directions for future research.

2.1 The Institutional Background

The purpose of this section is to provide a brief description of the important features of the Italian securities studied in this paper. The characteristics of these securities are developed in greater detail in the Appendix. In Italy, besides a one share–one vote common stock, there are two other types of shares: preferred and savings. Preferred shares have limited voting rights, while savings shares have no voting rights at all. There are no multiple voting shares, which were outlawed in 1942.⁴

Preferred shares guarantee the holder preferential dividend treatment and preferred claims on company assets in liquidation or bankruptcy. A preferred shareholder may not vote for the election of the board of directors, but he may vote on all the

⁴The Civil Code of 1942 exempted multiple voting shares in existence at that time. Only one company (Saffa) still has a trivial amount (0.4%) of multiple voting shares.

other important issues, like changes in capital structure, mergers, etc. Some analogies with the U.S. preferred shares should not deceive. U.S. preferred shares promise a fixed dividend and a fixed sum in case of liquidation. By contrast, Italian preferred shares promise a *minimum* dividend and a *minimum* repayment in case of liquidation and maintain all the upside potential of a common stock.

Savings shares are entitled to a minimum dividend, equal to 5% of the par value. In addition, whenever a dividend is paid to common stock, savings shares are entitled to receive an equal dividend plus 2% of the par value. In the case of liquidation, savings shares enjoy seniority over other shares in an amount equal to the par value, and they have equal rights to what is left, after redeeming the par value of all shareholders. However, savings shares do not have any voting right.

The possibility of issuing savings shares was introduced by a special law in 1974. The law was intended to promote stock ownership among small investors. The law specified the minimum privileges with respect to dividends and preferred claims. Issuing companies are allowed to increase them, not to reduce them.

All the privileges are stated in terms of the shares' par value, which is the legal lower bound for the subscription price. However, most of the shares are issued at a multiple of the par value and almost all of them are traded at a multiple. For example, at the beginning of 1990 the market value of a nonvoting share was on average 5.6 times as much as the par value, and the average size of the extra dividend privilege, in terms of the market value of the shares, was 0.88%.

Besides the case study in section 2.5, the following analysis will focus only on savings shares. On the MSE savings shares are more widespread than preferred shares. As an example, at the beginning of 1990, 88 companies had savings shares, and only 13 had preferred shares. In addition, savings shares allow a better estimate of the value of a voting right. In the absence of any privilege, the price estimate of a voting right would simply be the difference between the price of a voting share and the price of a nonvoting (savings) share. Because of the differential dividend rights, a correction is required. Despite that, savings shares provide a very simple method for computing the value of a vote.

Savings shares may be seen as composed of three elements: a common share without voting rights, the right to an additional dividend (equal to 2% of the par value) and the right to a minimum dividend (equal to 3% of the par value), when “normal” common stock does not pay any dividend.⁵ In the sample the right to a minimum dividend provided a differential payment only 6% of the times. The payment corresponded to less than 1% of the market price of a nonvoting share, because the par value is equal, on average, to 18% of the market price of a nonvoting share. Therefore, this right has little economic value. Thus, in the subsequent analysis I will take into account the extra dividend right of the savings shares, but I will overlook the value of the minimum dividend. The effect of this choice is to underestimate the value of the voting right.⁶ I think that underestimating in this way produces smaller errors than trying to take into account the actual value of the right to a very small minimum dividend.

2.2 Relative Pricing of Differential Voting Shares

I begin this section by considering the theory of the relative valuation of common and savings shares under the assumption that a voting right is valueless. Then, I consider how the vote value may affect the relative pricing. This task is performed in three steps. First, I briefly review the possible source of this value, i.e., the value of control. Then, I describe how the value of control translates into a positive price of a voting right traded on the stock exchange. I focus on the link between the investors’ valuation of a vote and the market price of a vote. Eventually, I derive a testable specification of the two classes’ relative pricing, when votes are valuable.

⁵In practice a nonvoting share pays: $d_t + (2\% \text{ par} | d_t > 0) + (5\% \text{ par} | d_t = 0)$, where d_t is the dividend paid to all shareholders. This can be rewritten as the right to receive $d_t + (2\% \text{ par}) + (3\% \text{ par} | d_t = 0)$.

⁶The value of a voting right (RT) is computed as the difference in the prices of a voting and a nonvoting share ($P_v - P_{nv}$), corrected by the additional dividend privilege (Δ). If p is the value of the minimum dividend, then the estimate of the value of a voting right is $\hat{RT} = P_v - P_{nv} - \Delta = RT - p \leq RT$.

2.2.1 Relative Pricing if Control Is Valueless

Assuming that the voting right is valueless, the price of common stock in a bubble-free economy is equal to the appropriately discounted sum of future dividends. In this case, the price of a nonvoting share should be equal to the price of the corresponding voting security plus the discounted sum of the additional dividends. Thus, a voting share sells at a discount with respect to a nonvoting share. This discount is equal to the discounted value of the additional dividend yield of nonvoting shares.

I define the risky discount factor appropriate for company i dividend flow as r_t^i . Then, the price of company i voting share (P_{vt}^i) is given by:

$$P_{vt}^i = E \sum_{t=1}^{\infty} \frac{d_t^i}{(1 + r_t^i)^t} \quad (2.1)$$

where d_t^i is the amount of dividend paid to all shareholders by company i in period t .

Non-voting shareholders are also entitled to a fixed sum, on the top of the dividend distributed to all shareholders. This fixed sum is of the order of magnitude of 2 to 5 cents per share. I call it ϵ^i . The amount ϵ^i is paid whenever a company's earnings are positive. This implies that ϵ^i is much less volatile than d_t^i . The appropriate discount factor, thus, should be different from the common dividend discount factor r_t^i . It should be the discount factor of a U.S.-type preferred share. This is closer to a bond rate rather than to the required rate of return of the risky stock r_t^i . Defining it as ρ_t^i , then the price of a nonvoting share (P_{nvt}^i) is given by

$$P_{nvt}^i = E \left[\sum_{t=1}^{\infty} \frac{d_t^i}{(1 + r_t^i)^t} + \sum_{t=1}^{\infty} \frac{\epsilon^i}{(1 + \rho_t^i)^t} \right]. \quad (2.2)$$

As a result, the voting premium of company i (VP^i), defined as the premium of the voting stock over the nonvoting one, is given by

$$VP_t^i = \frac{P_{vt}^i - P_{nvt}^i}{P_{nvt}^i} = - \frac{E \sum_{t=1}^{\infty} \frac{\epsilon^i}{(1 + \rho_t^i)^t}}{P_{nvt}^i}. \quad (2.3)$$

Assuming that the discount factor ρ_t^i is constant through time and the additional dividend is paid in every period, it yields

$$VP_t^i = -\frac{\epsilon^i}{\rho^i P_{nvt}^i}, \quad (2.4)$$

where $\frac{\epsilon^i}{P_{nvt}^i}$ is the additional dividend yield of nonvoting shares. Of course, common shares trade at a discount with respect to savings shares, if voting rights are valueless. This discount is equal to the additional dividend yield divided by the discount factor ρ^i .

Equation (2.4) provides an estimate of the relative valuation of the two stocks in the absence of any value of a vote. The first two rows of Table 2.2 present the average voting premium and the average size of $\frac{\epsilon}{P_{nvt}}$ between 1987 and 1990. Using the average value of the privilege and values of the discount factor ρ varying between 5% and 20%, I obtain an estimate of the VP varying between -5% and -20%. By contrast, the actual average value of the voting premium is 81%.

2.2.2 Relative Pricing if Control Is Valuable

The actual size of the premium suggests that voting rights might indeed be valuable. In the following I explain why votes may be valuable and how it is possible to measure their value.

It is important to keep in mind that there is a possible alternative approach in studying the premium attributed to voting shares. One might interpret the premium as a form of mispricing, like the closed-end fund discount (Lee, Shleifer, and Thaler 1991). As I mentioned in the introduction, though, large premia are both persistent and pervasive. In addition, if voting rights are valueless, by short-selling a common share and buying a savings share one might create a perfectly hedged arbitrage. Unfortunately, this arbitrage is risk-free only for infinitely living agents. Thus, noise traders' sentiment may still create a wedge between the prices of the two classes. In section 4 I will present some evidence that institutional investors are evenly present in both classes. This reduces the likelihood that noise traders induce a systematic mispricing in either of the two classes. For all these reasons, in the following I will disregard the mispricing alternative and I will focus only on the value of the voting

right.

The Value of Corporate Control

The first economic analysis that recognizes the value of corporate control is Manne (1964, 1965). He identifies four sources of control value: monopoly power deriving from the control of a competitive firm, cost-saving technology and other economies of scale, desire for salaries and other perquisites associated with control of a corporation, and “the substantial gain that can be realized in the price of the shares when the company receives improved management”(1964, 1430).

As Grossman and Hart (1980) point out, improved performance, associated with better management or with cost-saving techniques, is a public good subject to a standard free rider problem. Nobody should be willing to pay a premium for control in the absence of the right to exclude non-contributing shareholders from control benefits. In Manne’s list only salaries and perquisites are clearly private goods. The part of the control value that has the same characteristic as a private good is referred as *private benefits*. In the literature the notion of private benefits is quite vague. Harris and Raviv exemplify private benefits as “psychic benefits derived from controlling a large enterprise, the ability to transfer resources to one’s private use, and the ability to use one’s position to further one’s private goals” (1989, 258). Other main examples are: the possibility of diluting minority shareholder property rights after a takeover (Grossman and Hart 1980), and the benefits from vertical and lateral integration (Grossman and Hart 1986). Shleifer and Vishny (1986) point out that a large shareholder may internalize a fraction of the capital gain, produced by a value improving takeover, through his initial toehold.

The Value of a Vote

If control provides some private benefits, then voting rights, which attribute control, should be valuable too. Their value would depend on the way control is allocated. In most cases the allocation of control can be represented by a normalized majority game, whose payoff function is given by

$$v(S) = \begin{cases} 1 & \text{if } w(S) \geq 0.5 \\ 0 & \text{if } w(S) < 0.5, \end{cases}$$

where $w(S)$ is the percentage of votes held by an individual (or a coalition) S . Therefore, whoever obtains the majority gets the control value, here normalized to 1, and the remaining shareholders get nothing.

In order to determine the value of a block of votes I should determine first the outcome of the bargaining among all of the shareholders about control benefits. There is not yet a satisfactory noncooperative theory of n -person bargaining games.⁷ Therefore, in the subsequent analysis I will use concepts derived in the cooperative framework, in particular the Shapley value concept. People uncomfortable with this approach can see it as a tentative analysis aimed to investigate whether such concepts have any predictive power in a world of self-interested individuals. In particular, the empirical analysis will try to highlight what are the characteristics of the Shapley value that makes it a meaningful measure of voting power.

In a cooperative framework, agreements among players are possible and enforceable, and utility is transferable without cost from one player to another. The existence of voting trusts (quite common in Italy) provides some empirical support to these assumptions. In this context, the value of a block of shares can be computed as the probability that votes of this block turn a losing coalition into a winning one, i.e., they are pivotal. This value is called the Shapley value. Formally, given a control game v , the Shapley value for player i is:

$$\phi_i(v) = \sum_{i \text{ pivotal}} \frac{s!(n-s-1)!}{n!}, \quad (2.5)$$

where s is the number of players in a coalition, n the total number of players and

⁷The noncooperative rationalization of the Shapley value provided by Gul (1989) is not viable in this case, because it requires that the marginal contribution of agents' resources (in this case votes) is always positive. In a voting game the marginal contribution of agents' votes after a coalition has reached the majority of votes is zero.

the summation is taken with respect to all of the feasible coalitions such that the coalition with s players is a losing one and the coalition with s members plus player i is a winning one. The following example should help to clarify the concept.

Example 1: There are 4 shareholders in a corporation. The first two shareholders own 35% of the votes each, the third shareholder 20%, and the last one 10%. The value of each stake is given by the probability that this stake is pivotal. One might imagine that coalitions are formed by randomly drawing players and lining them up. In this example the total number of feasible coalitions is $4! = 24$. Player 1 is pivotal every time he is drawn second and his predecessor in the line is either player 2 or player 3 (forming a coalition with player 4 will give only 45% < 50% of the votes). There are four possible alignments (coalitions) of this type. Player 1 is also pivotal every time he is drawn third, and players 2 and 3 are not jointly drawn before him. This happens four other times. He is never pivotal if he is drawn first or fourth. In sum, he is pivotal eight out of twenty-four times, so his Shapley value is equal to $\frac{8}{24} = \frac{1}{3}$. Applying the same reasoning to the other players yields: $\phi_2 = \frac{1}{3}$, $\phi_3 = \frac{1}{3}$ and $\phi_4 = 0$.

The Shapley value ϕ and the percentage size of the holdings induce the same ranking on the players, except that two players with unequal holdings may have the same value, as in the example above (Shapiro and Shapley 1961). However, the Shapley value is not proportional to the size of the holdings. In the example above a 20% stake is worth as much as a 35% stake, while a 10% stake is worthless.

Modern corporations rarely have an ownership structure like the one in the example. In public companies, besides a small number of large shareholders, there are very large numbers of small shareholders, owning few shares each. Shapiro and Shapley (1961) and Milnor and Shapley (1961) extend the Shapley value concept to the limit case, in which a finite number of large shareholders face an infinite number of infinitesimal shareholders. This represents a good approximation of the ownership structure of public companies. Besides some technical details, the Shapley value concept extends straightforwardly to this type of games, called *oceanic games*.

Also in this type of games the Shapley value of a large player i can be computed

as the probability that player i is pivotal. This is given by

$$\phi_i(v) = \sum_{S \subseteq M-i} \int_{t_1}^{t_2} x^s (1-x)^{m-s-1} dx, \quad (2.6)$$

where the limits of integration are given by:

$$t_1 = \left\langle \frac{0.5 - w(S \cup i)}{\alpha} \right\rangle \text{ and } t_2 = \left\langle \frac{0.5 - w(S)}{\alpha} \right\rangle. \quad (2.7)$$

Here $w(S)$ is the fraction of votes of the coalition S , M is the total number of large players and α is the fraction of votes held by small shareholders. The expression $\langle x \rangle$ means the median of 0, x and 1. The summation is taken across all possible coalitions formed by major players without player i .⁸

Formula (2.6) concerns major players only. The Shapley value of the ocean (Φ) can be easily obtained by using the efficiency property of the Shapley value (i.e., the sum of the individual Shapley values must be equal to the value of the game, that is 1):

$$\Phi = 1 - \sum_{i=1}^M \phi_i. \quad (2.9)$$

The cooperative justification of the Shapley value is much weaker in this extended framework. One hardly believes that small shareholders literally join a coalition with large players. Furthermore, the process of forming similar coalitions seems far from costless. A different justification can be obtained stressing the probabilistic interpretation of the Shapley value. Suppose that coalitions do indeed take place in a random fashion, as implied by the Shapley value. However, whenever one share in the ocean is pivotal, then the pre-existing coalition should make a tender offer to all of the oceanic shares. This tender offer faces the potential competition of the coalition

⁸The similarity of equation (2.6) and the finite-number-of-player Shapley value (given by equation (2.5)) is clearer remembering the beta function identity:

$$\int_0^1 x^s (1-x)^{m-s-1} dx = \frac{s! (m-s-1)!}{m!} \quad (2.8)$$

formed by the other large shareholders left out of this coalition; therefore the bidding coalition can win only by paying out the entire benefits of control (in this case equal to 1). Let's define α as the fraction of votes held by the ocean, and normalize to 1 the number of voting shares. Then, whenever the ocean is pivotal, it will receive $1/\alpha$ per share. As a consequence the expected value of the block of votes held by the ocean is equal to the probability that one share of the ocean is pivotal (Φ), times the proceeds obtained in such an event ($1/\alpha$). Therefore, the relative Shapley value of the ocean ($RSO = \frac{\Phi}{\alpha}$) represents the expected value of one oceanic share.

As an application I compute the Shapley value in an oceanic game. The holdings of the two players are actual figures from an Italian corporation at the end of 1989, and the results will be useful for the case study in section 2.5.

Example 2: Player 1 owns 42.6% of the votes and player 2, 28.3%. The remaining 29.1% is held by the ocean. The Shapley values of the two large players are $\phi_1 = 0.56$ and $\phi_2 = 0.06$. The Shapley value of the ocean is 0.38. Dividing the Shapley value by the relative holdings I get the per-share value for the ocean: $RSO = 1.30$.

The example suggests another possible interpretation of the Shapley value. The 56% voting power of player 1 can be interpreted as the fact that player 1 would be the controlling party 56% of the time. Then player 2 will be the ruling party only 6% of the time, and 38% of the time a control contest will take place. Table 2.1 presents some hypothetical distribution of ownership with one, two, and three large players, and the corresponding Shapley value. For example, a unique large player with 40% of the votes holds $2/3$ of the power. By contrast, two large shareholders, with 20% of the shares each, have 22.2% of the power. Correspondingly, the voting power of the ocean as a whole raises from $1/3$, in the first case, to 55.6% in the second one.

To give a better sense of the behavior of the relative Shapley value of the ocean I plotted in Figure 1 the value of RSO in a two player game. The value of the two players' holdings has been truncated at 45%, because when both players approach 50%, the value of the few remaining votes held by the ocean goes to infinity. When one player owns more than 50% of the votes, RSO is zero, because the ocean is never pivotal. As you might notice, RSO is highly nonlinear. It is lower when the two large

players jointly own less than 50% of the votes, and increases exponentially when the percentage held by the ocean decreases and the percentage owned by each large shareholder increases.

2.2.3 Empirical Specification

The previous section presented how to obtain the value of a block of votes in a simple majority game. This section will show how those computations can be applied to explaining the dimension of the voting premium.

In the real world, voting rights are attached to shares, which are also valuable for their expected flow of dividends. The value of a company j can be divided into two elements: the value B^j of private benefits, enjoyed by the winning coalition, and the value V^j of security benefits, distributed pro rata to all shareholders. As a consequence, the price of a voting share (P_v^j) can be written as:

$$P_v^j = RT^j + \frac{V^j}{N^j}, \quad (2.10)$$

where RT^j is the value of a voting right, and N^j the total number of shares of company j . Similarly, the price of a nonvoting share (P_{nv}^j) is

$$P_{nv}^j = \frac{V^j}{N^j}. \quad (2.11)$$

The purpose of this section is to obtain an expression of RT^j that is a function of observable variables. In order to reach this goal the framework of section 2.2.2 should be slightly modified to take into account that the control value is B^j (and not 1), and that each share is also valued according to its proportion of security benefits ($\frac{V^j}{N^j}$). Although I will drop the company index j in the following steps, everything should be read as referring to a particular company.

Initially I consider a game with a finite number (I) of players. The fraction of voting shares owned by individual i is given by

$$w^i = \frac{N_v^i}{N_v}, \quad (2.12)$$

where N_v is the total number of voting shares of company j and N_v^i the number of voting shares held by individual i in company j .

In this context the value of a coalition S having N_v^S voting shares is given by

$$\hat{v}(S) = \begin{cases} \frac{N_v^S}{N}V + B & \text{if } w(S) \geq 0.5 \\ \frac{N_v^S}{N}V & \text{if } w(S) < 0.5, \end{cases}$$

where $w(S) = \frac{N_v^S}{N}$ is the fraction of votes controlled by coalition S .

Therefore, the Shapley value of a block composed of N^i voting shares is defined as

$$\phi_v^i(\hat{v}) = \frac{\sum_R [v(S_i \cup \{i\}) - v(S_i)]}{|I|!}, \quad (2.13)$$

where R runs over all $|I|!$ different orders on I , and S_i is the set of players preceding i in the order R . The term inside squared brackets is equal to

$$\begin{cases} \frac{N_v^i}{N}V + B & \text{if } w(S_i \cup \{i\}) \geq 0.5 \text{ and } w(S_i) < 0.5 \\ \frac{N_v^i}{N}V & \text{otherwise.} \end{cases}$$

Therefore, the Shapley value of a block of voting shares can be written as:

$$\phi_v^i(\hat{v}) = \frac{N_v^i}{N}V + \phi^i(v)B, \quad (2.14)$$

where $\phi^i(v)$ is the Shapley value of a simple majority whose payoff function is given by the characteristic function $v(s)$ on page 72. The purpose of this transformation is to obtain an observable variable. The value $\phi^i(v)$ can be computed by using actual data of the 5% owners in company j , while $\phi^i(\hat{v})$ cannot, because B and V are unobservable.

Let's now consider the Shapley value of one nonvoting share. A nonvoting share does not have power in allocating control, therefore it will not receive any amount of private benefits. Its Shapley value will simply be:

$$\phi_{nv}^i(\hat{v}) = \frac{V}{N}. \quad (2.15)$$

By using equation (2.15), equation (2.14) can be rewritten as

$$\phi_v^i(\hat{v}) = N_v^i \phi_{nv}^i(\hat{v}) + \phi^i(v)B. \quad (2.16)$$

The same reasoning can be applied to the extension of the Shapley value to the theory of oceanic games. Therefore, by choosing as individual i the ocean of small shareholders, equation (2.16) can be rewritten as

$$\phi_v^o(\hat{v}) = N_v^o \phi_{nv}^o(\hat{v}) + \Phi B, \quad (2.17)$$

where Φ is the Shapley value of the ocean.

Market trading takes place among small shareholders. Large shareholders trade their block outside the stock exchange. Therefore, the market price of voting rights should reflect the Shapley value of these votes when they are held by the ocean. In particular, the value of all of the voting shares held by the ocean should be equal to the Shapley value of the ocean. Then equation (2.17) can be rewritten in terms of share prices as

$$N_v^o P_v = N_v^o P_{nv} + \Phi B. \quad (2.18)$$

Equation (2.18) says that the value of N_v^o voting shares is equal to the value of N_v^o nonvoting shares plus the expected amount of private benefits those shares will attribute. The expected amount of private benefits is computed as the total size of the private benefits times the probability that these N_v^o shares are pivotal. The Shapley value Φ represents this probability. By dividing both sides of equation (2.18) by N_v^o I will obtain

$$P_v = P_{nv} + \frac{\Phi}{N_v^o} B. \quad (2.19)$$

Rearranging and using the fact that $N_v^o = \alpha N_v$ yields

$$P_v - P_{nv} = RT = \frac{\Phi}{\alpha} \frac{B}{N_v}. \quad (2.20)$$

Equation (2.20) says that the value of one voting right (RT) is equal to the expected size of private benefits it gives right to. In the presence of a pro rata distribution of private benefits only the second term ($\frac{B}{N_v}$) would be present. However, control benefits are not distributed pro rata, but are allocated according to a majority game. Therefore, the second term is multiplied by a factor representing the relative power of those votes. This factor is the ratio $\frac{\Phi}{\alpha}$, i.e., the relative Shapley value of the ocean (RSO) as defined above. Figure 1 shows how this proportion varies as a function of the ownership structure in a two player game. In particular, when the stakes of the two players are very unequal, then the expected slice of private benefits received by the ocean is very small. By contrast, when both shareholders have a large (but minority) stake, then the proportion of private benefits received by the ocean is larger than its pro rata share (i.e., RSO is bigger than 1).

By using the definition of RSO equation (2.20) becomes

$$RT = RSO \frac{B}{N_v} \quad (2.21)$$

Equation (2.21) comes close to the stated objective of expressing the value of a voting right in terms of observable variables, but it still contains an unobservable component: the size of private benefits B . Very little is known about the size or the determinants of these private benefits. Therefore, I need an identification assumption. I will assume that private benefits are a constant fraction of the security benefits:

$$B = \beta V. \quad (2.22)$$

This assumption is clearly ad hoc. A possible interpretation is that I want to estimate the average relative size of private benefits, and I assume that the idiosyncratic component in the relative size of private benefits is uncorrelated with my right hand

side variables.⁹

Inserting equation (2.22) into equation (2.21) yields

$$RT = \beta \frac{RSO}{N_v} V. \quad (2.23)$$

By dividing the value of a voting right by the price of a nonvoting share ($P_{nv} = \frac{V}{N}$) I obtain

$$\frac{RT}{P_{nv}} = \beta \frac{RSO \frac{V}{N_v}}{\frac{V}{N}} = \beta \frac{RSO}{\pi}, \quad (2.24)$$

where $\pi = \frac{N_v}{N}$ is the proportion of voting shares in the capital structure. Therefore, in the absence of any difference in dividends between the two classes of stocks the voting premium (VP) is equal to

$$VP = \frac{P_v - P_{nv}}{P_{nv}} = \beta \frac{RSO}{\pi}. \quad (2.25)$$

In the Italian context I should consider the fact that nonvoting shares pay an additional dividend equal to ϵ . Therefore, by employing equation (2.4) I get

$$VP = \beta \frac{RSO}{\pi} - \frac{1}{\rho} \frac{\epsilon}{P_{nv}}. \quad (2.26)$$

This specification is composed only of observable variables and, thus, can be used in the empirical analysis.

The predictions are that β is positive, and the coefficient of $\frac{\epsilon}{P_{nv}}$ is negative and equal in absolute value to the inverse of a discount factor. Even if I do not have an a priori value for the discount factor, I can restrict the predicted value of this coefficient between -5 and -20 (corresponding to a ρ between 20% and 5%).

The previous formulation assumes that the existing ownership structure is exogenous. The same empirical specification can be obtained by endogenizing the large

⁹In other words, I assume that $B_j = (\beta + u_j) V_j$, where u is an independently distributed random variable with mean zero. Provided that $E[u|\Phi] = 0$ this assumption allow to interpret the results as the assumption of constant relative private benefits. However, this rationalization is not without cost. In fact, nothing guarantees that the idiosyncratic component in the relative size of private benefits is uncorrelated with the voting power of market votes.

shareholders' choice of which stake to retain. The derivation is presented in the Appendix.

2.3 Data

The sample consists of all the companies having both a voting and nonvoting stock traded on the Milan Stock Exchange (MSE) for at least two years between 1987 and 1990.¹⁰

The spread of nonvoting shares on the MSE is a recent phenomenon. Although nonvoting shares were allowed on the MSE since 1974, at the beginning of 1980 only six minor companies had introduced a nonvoting class of common stock. Only in the mid-1980s did this instrument become really popular. In particular, between 1985 and 1986 44 companies introduced a new class of nonvoting shares. For this reason, my sample starts at the beginning of 1987, when there were 65 dual-class stock companies listed on the MSE. The end of the sample is at the beginning of 1990, when 88 companies with dual class stock were present. Excluding companies with less than two years of data I end up with a panel of 288 firm-years. I exclude from my sample nonvoting shares convertible into voting shares, until their conversion right has expired.¹¹

The data on the ownership structure, on the number of shares outstanding, and on the dividend privilege are taken from a stock exchange handbook, *Il Taccuino dell'Azionista*. It is an annual publication issued the January of each year, which contains the most current data as of December 31st. For this reason I consider the price data in the first five trading days of each year. These are taken from a financial weekly publication, *Milano Finanza*. The voting premium is quite stable over a short period of time. By contrast, it is impossible to recover the ownership structure during the year.¹² For this reason, I prefer to avoid time averaging the premia across long

¹⁰Only companies listed on a stock exchange can issue nonvoting shares. The law provides an automatic enlistment of the nonvoting share in the S.E. in which its voting counterpart is traded.

¹¹It is worth mentioning that the price differential between voting shares and convertible nonvoting shares is roughly zero.

¹²Major shareholders are obliged to report their trades within 30 days to the Italian equivalent of

period because this would have mixed up the effect of ownership on the voting premia. A comparison between the price differentials at the beginning of 1990 and an average over the first half of 1990 fails to show significant differences.

2.3.1 Summary Statistics

Table 2.2 presents the general characteristics of this sample. These characteristics are almost identical to those found in other companies on the MSE. The average capitalization (1263 billion Lira, roughly 1000 million dollars) is slightly above the average across the entire MSE in 1989 (992 billions Liras). This difference is produced by a few very large companies like Olivetti (a computer maker), Montedison (a chemistry company) and Fiat (a car maker and the largest company for market capitalization in the sample). Although not all large companies have a nonvoting stock,¹³ it is remarkable that nonvoting stocks are not concentrated in smaller companies, like in the U.S..

The average earnings-to-price ratio of the sample is 0.06. This corresponds to a price-earning ratio of 16.6, a little high by U.S. standards, but hardly unusual in Europe and particularly in Italy. In Italy the average price-earning ratio during 1990 was 16.5. The average additional dividend paid to nonvoting shares (1.06%) represents 40% of the average dividend yield across all MSE companies (2.73% in 1989). Therefore, on average nonvoting shares have a dividend yield 1.4 times as big as the average dividend yield on the MSE. This deepens the puzzle over the size of the price differential.

Even the average size of the largest shareholder in my sample (52.2%) is roughly equal to that one of the entire population: 56.7% in 1987 and 55.5% in 1990. This might seem a very large number. The Italian corporate sector, though, is characterized by a very concentrated ownership structure. Even among listed corporations, the average percentage of votes held by the largest shareholder is above 50%, much

the SEC (CONSOB), but this agency does not release them to the public.

¹³For example, Assicurazioni Generali, an insurance company of approximately the same market capitalization as Fiat, has none.

greater than 15.4%, the percentage reported for large U.S. corporations by Shleifer and Vishny (1986). The difference is even more striking if one looks at the holdings of the five largest shareholders: 28.8% in the U.S. and 81% in Italy. As shown in Figures 1 the relative Shapley value of the ocean is more variable when there is more than one large shareholder. The widespread presence of large shareholders in the Italian sample makes it a perfect environment for studying the effects of the ownership structure on voting right prices.

2.3.2 Ownership Data

I generally report the ownership data as presented by the stock exchange handbook, with two exceptions. First, I combine the holdings of different companies in a subsidiary whenever these companies are majority controlled by the same parent company. For example I consider that IFIL corporation owns 54.1% of Toro corporation, because the two majority-owned subsidiaries of IFIL (Sicind and Spafind) own respectively 32.9% and 21.1% of Toro voting shares. This approach is conservative, in the sense that it tends to underestimate the actual concentration of ownership.¹⁴ Nevertheless, more than 50% of the companies in the sample are majority-owned.

The second exception concerns voting trusts (*Patti di Sindacato*). Whenever the shares of the members of a voting trust are not deposited in a holding company, I prefer to report the holdings separately. Voting trusts represent a form of coalition, like the ones discussed in section 2. This proves that large shareholders are able to form coalitions that redistribute the benefits of control among their members. However, the legal status of voting trusts is not clear. To be legal, voting trusts should not totally bind the voting power of their members. Furthermore, these agreements should be limited in time to a few years. Therefore, even if the actual voting power is somehow constrained, the future bargaining power, at the next renewal, will depend on the Shapley value of the individual holdings. For these reasons I prefer to divide

¹⁴In fact, in some cases effective control is exercised even with smaller blocks. Suppose that IFIL had just 49% in one of the two subsidiaries that owned shares in Toro Corp. According to the above definition Toro would result nonmajority owned, but de facto IFIL would control it pretty closely.

voting trust holdings into the separate individual holdings of their members.

I follow the handbook's convention for family holdings. When the handbook divides family holdings among the family members, so do I. Otherwise, family holdings are reported as a unique block. In particular, the votes are reported as a unique block whenever a family established a holding company to keep its member votes together. It is generally true that family members tend to vote together. However, it is not unusual that disagreements among them cause a control contest (as shown by the case study in section 2.5). Anticipating possible dissidence, many families create a family holding company, whose only purpose is to maintain together the controlling block of shares. In this way possible disagreements arise inside the privately held holding company, and not inside the public company. In this last case it is certainly correct to consider all the shares as a block. In the other cases I do not have a better guideline than the handbook's convention.

There are very few data on who owns the nonvoting shares. Most of them are issued in bearer form and there is no reporting requirement. Some clues may come from mutual funds, that are obliged to report their composition every quarter. Their holdings, as a proportion of the outstanding number of shares of each class, are tilted towards nonvoting shares. However, they maintain a large proportion of voting shares too. For example, at the end of 1988 all the mutual funds together owned 13.4% of Fiat common stock, 22.13% of Fiat preferred stock, and 17.81% of Fiat nonvoting stock. In the case of Montedison they owned only 3.84% of the outstanding voting stock and 22.53% of the outstanding nonvoting one. The law requires that the number of outstanding voting shares be always greater than the sum of the outstanding preferred and nonvoting shares.¹⁵ Therefore, even if they had equal prices, the market capitalization of voting shares would be larger. For this reason the tilt is completely reversed if I look at the amount of dollars (actually Liras) invested by mutual funds in each type of securities. For example until the end of 1988 mutual funds as a whole invested 2 times as much money in voting Fiat shares as they did in Fiat preferred, and 5.8 times as much money as they did in nonvoting Fiat shares.

¹⁵The rationale of the law is to avoid an excess concentration of voting power.

2.3.3 Liquidity

These problems make particularly difficult to judge the liquidity of the two classes. There are always more voting than nonvoting shares outstanding. However, a larger proportion of voting shares are held in block and never traded. As a result, the turnover (number of shares traded over number of shares outstanding) is generally larger for nonvoting shares. However, the number of shares traded and the total value of transactions is higher for voting shares. Pagano and Roell (1990) compute the Roll (1984) measure of bid-ask spread implicit in the weekly returns of Italian stocks.¹⁶ The voting shares have a slightly larger bid-ask spread than the nonvoting shares (0.2% more).¹⁷ This suggests that the large discount of nonvoting shares is not caused by an inferior liquidity.

2.3.4 Shapley Value Computations

To compute the Shapley value of the ocean, I arbitrarily define as large players those who owned 5% or more of a company voting's shares. The cutoff is not crucial, the value-per-vote of a major player approaches the value per vote of the ocean, if the major player's stake tends to zero (Milnor and Shapley 1978, Theorem 4). By using this cutoff I never obtain more than eight large players. By dividing the Shapley value of the ocean by the fraction of votes not in the hands of large players, I obtain the relative Shapley value of the ocean (RSO). Summary statistics for RSO are presented in Table 2.2. Not surprisingly, more than half of the times RSO has a value of zero. This happens whenever a single shareholder owns more than 50% of the votes. This is a consequence of the way in which the Shapley value is defined. It corresponds to Manne's intuition that "if one person owns 51 per cent of the shares of a company, nothing will be paid for the vote attached to the other shares" (1965,

¹⁶On the MSE the trading mechanism is an open outcry. Therefore, there are no measures of actual bid-ask spread.

¹⁷Pagano and Roell sample includes 69 companies, 26 of that have dual class shares. However, in 1988 (the last complete year in their sample) the estimated spread of the voting and that of the non voting shares are jointly positive only in 12 cases. Therefore, the comparison is limited to these 12 cases.

117). However, this is in contrast to the results of the empirical analysis, which are going to be presented next.

2.4 Results

2.4.1 Empirical Findings

This section examines the claim that the ownership structure determines the size of the voting premium. I compute the voting premium by using the data on differential voting shares traded on the MSE, as presented in Section 3. Throughout the paper I maintain the assumption that both types of stock are correctly priced. This implies that the price difference between voting and nonvoting shares is a correct estimate of the value of the voting right. Besides the specification obtained in Section 2, I test other alternative specifications, which differ from the previous ones in the measure of ownership concentration employed. The purpose of these alternative specifications is to identify the features of the Shapley value that makes it a meaningful summary statistic for studying the effects of the ownership structure on vote valuation.

As a starting point, I estimate the basic specification

$$VP_{it} = \alpha + \beta \left(\frac{RSO}{\pi} \right)_{it} + \gamma \left(\frac{\epsilon}{P_{nv}} \right)_{it} + u_{it} \quad (2.27)$$

by OLS separately for each year. As you might recall RSO is relative Shapley value of the ocean, π is the percentage of voting shares outstanding, and $\frac{\epsilon}{P_{nv}}$ is the additional dividend yield guaranteed to nonvoting shares. The results of these regressions are reported in Table 2.3. The coefficient β always has the expected

sign and it is significantly different from zero at a 1% level in three out of four years. According to equation (2.22) β can be interpreted as the percentage of private benefits relative to the value of underlying assets. Therefore, in Italy private benefits of control represent between 15% and 42% of the value of the underlying assets. In Sweden Rydqvist finds a percentage between 3% and 8%, while in Canada a similar

model fails to show a significantly positive slope.¹⁸

The coefficient γ is always negative, as expected, and is always significantly different from zero at a 5% level. Its size varies substantially during the different years, but it is always included in the predicted range, i.e., the implicit discount factor is included between 20% and 5%. The regression explains between 5% and 15% of the cross sectional variability.

The only puzzling fact is the high level of the intercept, which varies between 60% and 103%, and is always significantly different from zero. These levels imply that in a majority-owned company, which pays the same dividend to both type of stocks, the average level of the voting premium is between 60% and 103%, when the theory would predict no premium at all. This result is not just an odd effect of the specification used, but it is an intrinsic characteristic of the sample. More than 50% of the companies in the sample are majority controlled, nevertheless the median voting premium is 74%. The average voting premium among majority controlled companies is 72.3%, well below the average among nonmajority-owned companies (102.6%), but still positive and significantly different from zero. In section 2.4.3 I will discuss the possible sources of this unexplained premium.

There is not a lot of time variation in the ownership structure of the companies during the sample period. There is just one case of a large change in the RSO. In Cofide, a holding company, RSO changes from 0 to 3.57 between 1987 and 1990; meanwhile the voting premium changed from 75% to 200%. Given the percentage of voting shares (67%), the increase in the voting premium is in line with the estimated coefficients.¹⁹ By maintaining this company in the sample, a third difference estimator confirms the results of the OLS regression. However, the level of the RSO of Cofide in 1990 is abnormally high: twice as much as the second highest RSO in the sample and four times the average RSO among non majority owned companies (0.9). Figure 2a

¹⁸Robinson and White test a similar model among Canadian companies that do not require an equal payment to both classes of stock in case of a takeover and reject the model. On the contrary, the model has some predictive power among companies that do require payment to both classes of stock in case of a takeover. For the interpretation of these results see Robinson and White (1990)

¹⁹The estimated change in the voting premium according to the pooled regression in Table 2.3 is 156.6, just below the actual change (125).

presents the plotting of the pooled sample, where the 1990 observation for Cofide has been included. Figure 2b shows the same plotting excluding this outlier. As it is clear, the outlier is a very strong leverage point. Therefore, I prefer to bias the results against any possible effect of RSO on the voting premium by dropping this observation from the sample. On the one hand, this choice excludes the only wide variation in RSO, making meaningless an analysis of the time variations. On the other hand, the results are not contaminated by the presence of an outlier.

The last column of Table 2.3 presents the results of an OLS regression obtained by pooling the four years in the sample. In this case the standard errors are not only heteroskedasticity robust, but they are also corrected to account for possible serial correlation among the residuals of the same companies in different years.²⁰

The results are substantially the same. The proportion of private benefits over security benefits, represented by the slope coefficients β , is 29.4%, and the implicit estimate of the discount factor is 10%. The regression explains 7% of the total variability.

One might be concerned with the fluctuations of the β coefficient in the different years. The maintained assumption is that private benefits are a constant fraction of security benefits. Therefore, it is important to notice that in a pooled regression with time varying β the equality of the four coefficients cannot be rejected at a 5% level (the F test is equal to 3.61).

2.4.2 Alternative Specifications

Having established that the Shapley value of the ocean is an important determinant of the voting premium, I now explain which characteristics of the Shapley value make this measure so attractive. In other words I want to compare the theoretical specification obtained in a cooperative framework (equation (2.27)), with different atheoretical specifications, in order to identify the appealing features of the Shapley value. First I analyze other measures of ownership concentration and their explanatory power.

²⁰These standard errors corresponds to GMM standard errors, where the underlying serial correlation is assumed to be of order N , where N is the number of companies.

Then I decompose the main features of the Shapley value and determine which are the most important.

In contrast with the model of Section 2, the variables introduced in this section do not derive from a rigorous model, but instead try to capture a “common sense” notion of ownership concentration. The logical link between ownership structure and vote valuation is based upon the probability that different parties compete for the votes traded on the market. The likelihood of a competition depends upon the relative size of the different shareholders. The simplest measure of the likelihood of a control contest is given by a nonmajority dummy variable, that takes value 1 whenever no shareholder owns more than 50% of the votes, and 0 otherwise. This variable is expected to have a positive coefficient, the reason being that a control contest is more likely whenever no single party has absolute control over the corporation. Alternative measures of the effects of the ownership structure are the size of the largest shareholder and the size of the second largest shareholder. The more votes the largest shareholder controls, the less likely a control contest is. A controlling shareholder who owns only 10% of the votes is very vulnerable to hostile takeovers. Vice versa, a controlling shareholder who owns 45% of the votes is very unlikely to be challenged. By contrast, the more votes that are controlled by the second largest shareholder, the more likely a control contest is. In fact, a larger second shareholder is more likely to challenge the dominion of the first one.

The Shapley value measure has the advantage of summarizing the entire distribution of ownership into one number. One particular feature is that of RSO rises when two shareholders have large equal stakes in a company. A simple proxy for this effect is the product of the percentage stakes of the two largest shareholders. In fact, the closer the two stakes are, the larger the product will be.

The previous measures are proxy for the likelihood of a takeover. However, the vote valuation should reflect the expected differential payment in case of a takeover. A possible measure of the size of this differential payment is given by the percentage of shares held by the ocean. If a control contest ever breaks up, then the fewer votes are available on the market, the more valuable they are. Therefore, the fraction of

votes held by the ocean should have a negative impact on the vote valuation.

Table 2.4 reports the results obtained from substituting some atheoretical proxy for the RSO measure in the basic specification (2.27). All the different proxies have the expected sign, and except for the fraction of votes held by the ocean, all are significantly different from zero at the 1% level. In particular the nonmajority dummy captures most of the effects of the Shapley value. The coefficients are very similar and so is the explanatory power of the two regressions: R-squared is equal to 7.0% in one case and 7.5% in the other. This simple dummy is more informative than the actual ownership of the largest shareholder (R-squared equal to 6.4%). This suggests that the 50% level is indeed an important threshold of ownership. The variable with the largest explanatory power is the size of the second largest shareholder (7.8%). An increase of 1% in the number of votes controlled by the second largest shareholder raises the voting premium by 2%. The importance of the relative size of the second largest shareholder is also clear by looking at the regression that uses the product of the stakes of the two largest shareholders.

Therefore, except for the fraction of votes held by the ocean, all of these different proxies have very similar explanatory power. The two proxies using the size of the second largest shareholder have slightly more explanatory power than the basic specification, which employs the Shapley value. To understand where this additional explanatory power comes from, I computed the same regressions for the subsample of nonmajority-owned companies. The results are reported in Table 2.5. As you may see, the variable obtained using

the Shapley value is the only one that is borderline significant. These facts suggest that the theoretical specification has some explanatory power even beyond the simple nonmajority dummy. Furthermore, the Shapley value variable is the only one that has a coefficient similar to the coefficient obtained by running the regression on the whole sample.

By contrast, the estimated coefficient of the size of the second largest shareholder has even an opposite sign with respect to the estimate obtained on the whole sample. Furthermore, the regression employing the size of the second largest shareholders,

instead of RSO, has less explanatory power (R-squared 3.1% vs. 4.8%). This fact suggests that these proxies derive their additional explanatory power with respect to RSO only from majority controlled companies. When one party owns more than 50% of the votes, the dimension of the second largest shareholder is a good proxy for the probability of a control contest. The Shapley value of the ocean does not capture this effect, because it takes for granted the existing ownership structure. Therefore, a more complete theory should take into account the expectation about future changes in the ownership structure.

One of the main features of the Shapley value is that it is a nonlinear function of the percentage of shares held by the ocean, even restricting the attention to nonmajority owned companies. Therefore, it is interesting to compare the results obtained by employing the basic specification with the results obtained from adopting a similar specification, which instead attributes an equal power to all the oceanic votes. Let's suppose that power is distributed in proportion to the percentage of votes held. Therefore instead of having

$$VP = \beta \frac{\Phi 1}{\alpha \pi}, \quad (2.28)$$

I will have

$$VP = \beta \frac{\alpha 1}{\alpha \pi} = \beta \frac{1}{\pi}. \quad (2.29)$$

The results of this regression are reported in the second column of Table 2.5. This alternative specification has less explanatory power than the basic regression (2.9% vs. 4.8%). This suggests that the nonlinearity feature of the Shapley value is an important one.

To summarize, the Shapley value captures two essential features: first, the sharp increase in the voting premium when a company is not majority controlled; second, the nonlinear distribution of power in nonmajority controlled companies. However, the Shapley value fails to take into account possible future change in the ownership structure. In particular, even majority-controlled companies maintain a positive vote

value. In these cases the percentage of votes controlled by a potential challenger (i.e., by the largest minority shareholder) captures the probability that a control contest will eventually take place. The next section will test whether the level of the voting premium present among majority-owned companies can be explained by the probability that a change in the ownership structure will produce a control contest.

2.4.3 A Possible Explanation for a Positive Intercept

The high level of the intercept is certainly disappointing. The model can explain between 5% and 15% of the cross sectional variability, but it leaves unexplained a voting premium of about 80%, which roughly corresponds to the average level of the voting premium in the whole sample. Rydqvist too finds a positive and significant intercept, but it is on average about 5%.²¹ Similarly Robinson and White find a positive and significant intercept between 5% and 12%. Therefore, while it is common that even a majority-owned company retains a positive voting premium, in Italy the size of the voting premium among majority-owned companies is certainly abnormal. An 80% premium deserves an explanation.

The hypothesis of a temporary mispricing does not hold. Although the level of the intercept has changed over time (see Table 2.3), it does not show any particular trend over the four year period. Four years is a long time for a mispricing that, in principle, could be arbitrated away.

One possible explanation for the premium is that voting rights are indeed valuable even in majority-controlled companies, the main reason being that control groups are not eternal — they may lose control sooner or later. According to this interpretation the premium found in majority-owned companies reflects the expected value of voting rights when the controlling shareholder loses his majority.

This hypothesis implies that companies that are majority owned by the Italian government should have a much smaller premium. The government is less likely to be obliged to relinquish majority for liquidity reasons, and until recently the prospects

²¹In the regression he also control for the market capitalization of each firm. This variable has a negative effect on the voting premium, and it can in part account for his lower intercept.

of privatizations were nil. For this reason I insert into equation (2.27) a dummy for government-owned companies. All these companies are majority owned by some government agency. The results are presented in Table 2.6. As you may see the state dummy has a negative effect on the voting premium. This effect is significantly different from zero at a 1% confidence level. State-owned companies have an average voting premium equal to 34%. This is still very high with respect to that of other countries, but substantially below the level of other majority-owned companies. Therefore, although the proposed interpretation cannot fully explain the puzzle of such a large intercept, it can certainly account for part of it.

If the intercept reflects the expectations about future changes in the ownership structure, then the premia of state-owned companies should reflect the prospects of privatizations. At the beginning of 1987 nobody expected any privatizations. During 1988 the Italian government did indeed sell a fraction of an important investment bank to private investors.²² During 1989 the expectations of other privatizations rose. The bottom of Table 2.6 presents the average level of the voting premium in state-owned companies in these four years. The average premium was 10% in 1987, dropped to 4.5% at the beginning of 1988, then jumped to 34.8% at the beginning of 1989 and to 37% in 1990. To avoid problems connected with a changing composition of the sample, I restricted the sample to state-owned companies present in 1987. If I include the two other state-owned companies that issued a second class during the sample period, the effect is even stronger. Therefore, the prospect of possible privatizations dramatically increased the voting premium of state-owned companies.

These facts seem to confirm that the 30% premium of state-owned companies can be attributed to an expectation of future privatizations. Therefore, the 60% additional premium of other majority-owned companies can be attributed to a higher probability that a change in the ownership structure will produce a control contest.

²²This is the case of Mediobanca, partially privatized in 1988. This company is not in the sample because it does not have two classes of stock.

2.5 The Mondadori Control Contest

Despite the very high market price of voting rights, takeovers are not a frequent phenomenon in the MSE. Therefore, it is interesting to study whether, when they do take place, the market price of voting rights react accordingly to the prediction of the model. In this section I will consider the most recent (December 1989) control contest involving a company with multiple classes of shares. The company is Mondadori corporation, the biggest Italian publishing company, which also owns the major Italian newspaper. At the time of the takeover Mondadori had three types of common stock traded on the MSE. This fact permits us to analyze, during a control contest, the value of two different components of the right to make decisions.

In the aggregate, corporate decisions vested in the shareholders as such consist of (1) the right to elect the directors, which indirectly entails the power to manage the company (designated RT_1 , above, and possessed only by ordinary shares); and (2) the right to vote on modifications to the Articles of Incorporation (RT_2 , possessed by both preferred and ordinary shares, but not by savings shares). The latter right is potentially quite powerful, in view of the fact that all classes of shares enjoy preemptive rights to new shares offerings. Depending on the pre-existing number and distribution of ownership of the preferred and ordinary shares, majority control over RT_2 could in theory compel the issuance of new ordinary shares to both classes of shareholders in sufficient number to transfer majority of control of RT_1 to pre-existing holders of majority control over RT_2 . However, the mechanism by which this might be accomplished is complicated and protracted, so that in "normal" circumstances the votes that matter most are RT_1 , as can be seen in Figure 3.²³

At the beginning of 1987 RT_2 was valueless, while each RT_1 was worth about 7000 Lira (\$5.8). At that time the majority of the company was in the hands of the

²³For example, assume that a company has 50 ordinary shares and 50 preferred shares. Group A owns 39 ordinary shares and group B owns just 11 ordinary shares, but all 50 preferred ones. Group A is managing the company because it has the majority in electing the board of directors, but group B can take over the company just by proposing and approving a new issue of ordinary shares (he has the majority to do that) in a ratio of 2 new ordinary shares for each old share of whichever type. Eventually group A will have 117 ordinary shares and group B 122 ordinary shares plus 50 preferred ones, thus also the majority in the elections of the board of directors!

heirs of the founder, through a financial holding (AMEF) that owned 50.3% of the ordinary shares. Involved in AMEF were also two big entrepreneurs, De Benedetti and Berlusconi.²⁴ The first owned also a direct participation in Mondadori, consisting of both ordinary and preferred shares. During 1988 and 1989 De Benedetti increased his holdings of preferred shares (this is clearly reflected in the price of RT_2 in Figure 3). At the same time he obtained an option to buy one of the heirs' holdings in AMEF in one year.²⁵ Unexpectedly, the Mondadori heir decided to sell his shares of AMEF to Berlusconi, violating the previous agreement with De Benedetti and giving Berlusconi control of AMEF, and through it the control of Mondadori, at least as RT_1 votes were concerned. At this point on November 30, 1989, the Italian counterpart of SEC suspended the listing on the MSE for two weeks. De Benedetti sought to enforce his previous agreement with the Mondadori heir through the courts and, at the same time, proposed a new issue of ordinary shares in a ratio of four new ordinary shares for each old share of any type held. Having 17% of the ordinary shares (that represented 54% of RT_2) and 71% of the preferred, he was very likely to succeed in gaining approval of such a proposal. He was using the mechanism described above in an effort to secure full control. However, Berlusconi objected to De Benedetti proposal in court because, he argued, the proposal was against the corporation's interest. These events took place between November 30 and December 12, while all types of shares were suspended from trading. The relative holdings of the two players and the relative Shapley value of the ocean are the ones reported in example 2 in Section 2.

Let's look at the price data for the days in which the stock was officially traded.²⁶ After the announcement of the breach of sale contract the price of RT_2 almost doubled (see Figure 4). Its price (about 18000 Lit., \$14.4) is about three times as much as it was three month earlier, when there was no prospect of a control contest.

²⁴The former is CEO of Olivetti, and a very active financier; the latter is the "king" of Italian private television networks.

²⁵The story is extremely complex, so I will omit some details, while keeping the important features. More details can be found in the WSJ 4/3/1990.

²⁶Italian newspapers reported that some trade just outside the stock market took place in the days in which the shares were suspended, but reliable data on these trades are not available.

By looking at equation (2.21) you can see that before any control contest has started the price of a right RT_2 is equal to

$$RT_2^b = \frac{\Phi}{\alpha} \frac{B}{N_v}, \quad (2.30)$$

where the index b indicates the price before the control contest. The beginning of a control contest implies that the ocean is indeed pivotal, therefore the value of a voting right becomes

$$RT_2^a = \frac{1}{\alpha} \frac{B}{N_v}, \quad (2.31)$$

where the index a indicates the price after the news of a control contest was released. Therefore, the model predicts that the ratio between the price of a voting right before and after a control contest has started is given by

$$\frac{RT_2^a}{RT_2^b} = \frac{1}{\Phi} = 2.6. \quad (2.32)$$

Therefore, the observed variation in RT_2 is fully consistent with the model.

The rising value of RT_2 before November 30th reflects the purchases of preferred shares by De Benedetti. Despite the fact that between 1987 and 1989 De Benedetti was the only one to buy preferred shares on the market for control purposes, as is clear from his holdings at the beginning of the control contest,²⁷ these purchases significantly raised the price of RT_2 . So, even if he did not face direct competition, he produced a dramatic rise in prices.

In September and October 1988, for the first time ever, there was an attempt to take over a company (Interbanca) using the preferred shares. As it is clearly shown by the jump of RT_2 in Figure 3, this had immediate effects on the value of the RT_2 of Mondadori. The market realized that a company may be a takeover target even when a group has a majority control over RT_1 if it does not have the majority over RT_2 (as in the Mondadori case). Therefore, RT_2 can be interpreted as the value directly connected with a takeover, while RT_1 is the value of an access to the management of

²⁷Besides De Benedetti's 73%, the only other significant owners were some mutual funds that together owned 2.4%.

a company.

This case study shows that the market is able to distinguish between the different components of the vote value. The price response at the beginning of the control contest is consistent with the model of Section 2. The overall movements of the prices of the two vote components support the notion that the vote value depends upon the distribution of ownership.

2.6 Conclusions

Traditional finance theory disregards the vote component in pricing common stock. This omission would not be so harmful if the vote value component were small and if its variability at the time of major corporate events were insignificant. Using a sample of Italian companies with dual class shares I show that neither of these conditions is verified. The market price of a vote is a significant component of the value of a common stock and it is a highly nonlinear function of the distribution of ownership.

The use of a cooperative concept, like the Shapley value, to model the effect of ownership distribution on the value of votes is proved to be quite successful in explaining the relationship between ownership and value of votes. The Shapley value captures two essential features: first, the sharp increase in the voting premium when a company is not majority controlled; second, the nonlinear distribution of power in nonmajority controlled companies. However, the Shapley value fails to take into account possible future change in the ownership structure. In particular, even majority-controlled companies maintain a positive vote value. More research, both theoretical and empirical, needs to be done in order to fully understand the distribution of power and the value of voting rights in public corporations.

However, these findings connecting ownership concentration and vote valuation challenge not only the traditional way of pricing assets, but also most of the empirical results obtained by extrapolating the market price of a share to the market value of the entire company. Events that modify the ownership distribution, like targeted stock repurchases or the arrival of a new large shareholder, should be reconsidered,

explicitly taking into account the implicit change in the market price of votes that those events would produce.

2.7 Appendix A: An Alternative Derivation

This appendix provides an alternative derivation of the specification (2.25) in the text, in which the large shareholders' choice of the stake to retain is endogenous. This result is derived by applying Zwiebel's (1991) model to a dual class stock company. Zwiebel derives the optimal ownership structure as a sequential choice of two types of shareholders, having different financial resources. In the simplest version of his model Zwiebel assumes that block shareholders divide private benefits according to the Shapley value of a majority voting game. Type 1 shareholders, the richest ones, choose first, allocating all their wealth in one company. The type 2 shareholders (less wealthy, but still large enough to get a fraction of private benefits) decide to invest their wealth in a company according to the share of private benefits they can get. Besides an integer problem, in equilibrium type 2 shareholders should be indifferent with respect to the company in which to invest their funds. Let's call m the wealth of type 2 shareholders. In equilibrium the amount of private benefits they can obtain by investing their wealth m in different companies should be equal. Therefore,

$$\phi^j(n_v^j) B^j = \phi^i(n_v^i) B^i = k, \quad (2.33)$$

where $n_v^j = \frac{m}{RT^j}$ is the number of votes that m dollars invested in company j voting rights can buy, and $\phi^j(n_v^j)$ is the Shapley value obtained by holding n_v^j votes. By dividing all the terms by m I obtain

$$\frac{\phi^j(n_v^j) B^j}{n_v^j RT^j} = \frac{\phi^i(n_v^i) B^i}{n_v^i RT^i} = \frac{k}{m} = K, \quad (2.34)$$

Resolving equation (2.34) with respect to RT^j yields

$$RT^j = \frac{1}{K} \frac{\phi^j(n_v^j)}{n_v^j} B^j. \quad (2.35)$$

In practice I do not observe the value of the type 2 shareholders' wealth, so I cannot compute the amount n_v^j . However, equation (2.35) can be rewritten as

$$RT^j = \frac{1}{K} \frac{\phi^j(n_v^j)}{w^j} \frac{B^j}{N_v^j}, \quad (2.36)$$

where w^j is the percentage of votes that a type 2 player can acquire in company j with a wealth equal to m . Milnor and Shapley prove (1961, Theorem 4, 296) that the value-per-vote of a major player approaches the value-per-vote of the ocean, if the major player's stake tends to zero. Therefore, if the type 2 shareholders' stake is not too large, then

$$\frac{\phi^j(n_v^j)}{w^j} \approx \frac{\Phi^j}{\alpha^j}, \quad (2.37)$$

where Φ^j is the Shapley value of the ocean in company j and α^j is the proportion of shares held by the ocean in company j . By substituting equation (2.37) into equation (2.36) I obtain

$$RT^j = \frac{1}{K} \frac{\Phi^j}{\alpha^j} \frac{B^j}{N_v^j}. \quad (2.38)$$

Also in this case I need the identification hypothesis that private benefits are a constant proportion of security benefits. By exploiting this assumption and by dividing both terms by the price of a nonvoting share, I get

$$\frac{RT^j}{P_{nv}^j} = \frac{\beta}{K} \frac{\Phi^j}{\alpha} \frac{N^j}{N_v^j}, \quad (2.39)$$

or

$$VP^j = \frac{\beta}{K} \frac{\Phi^j}{\alpha\pi} = \frac{\beta}{K} \frac{RSO}{\pi}. \quad (2.40)$$

Equation (2.40) is observationally equivalent to equation (2.25). The only difference arises in the interpretation of the slope coefficient. In equation (2.25) the slope coefficient is simply the proportion of private benefits relative to security benefits across all companies. By contrast, in equation (2.40) it is the proportion of private benefits divided by the value of private benefits per dollar obtained by type 2 shareholders. In the empirical analysis I will maintain the first interpretation, but it should be clear that everything can be restated according to this second interpretation.

2.8 Legal Appendix

2.8.1 Preferred Shares

“Preferred” shares are regulated by article 2351 (paragraph II) of the 1942 Civil Code. The Articles of Incorporation of each company may establish shares, preferred as to the distribution of profits and in liquidation of the company, that have their voting right restricted to the “extraordinary assembly”, (the annual meeting at which shareholders are requested to vote on modifications of the Articles of Incorporation, included new shares issues, mergers, etc.).

Importantly, the law does not fix any minimum privileges. The only binding limitation on the voting right is that preferred shareholders may not vote to elect the members of the board of directors. In practice, the privilege consists in the fact that ordinary shareholders cannot receive any dividends until preferred shareholders have received a minimum dividend equal to a figure that varies between 5% and 12% of par value. This right is not cumulative. Furthermore, it does not guarantee a return in excess of returns to ordinary shareholders, once the minimum dividend has been satisfied. Because the actual market price of the shares is generally many times its par value, the actual value of dividend preference is dramatically diluted. Preferred shares may not account for more than 50% of the capital of a company (at par value).

2.8.2 Savings Shares

Law 7/6/1974 n.216 introduced the possibility, limited to companies that have their ordinary shares listed on a stock exchange, of issuing shares without any voting rights, explicitly denominated savings shares. In contrast with preferred shares, the law precisely establishes minimum privileges for these securities. Individual companies' articles of incorporation may only enlarge these privileges (an opportunity sometimes exploited). Furthermore, the law establishes additional privileges unique to savings shares: (1) They are the only kind of share in Italy that may be issued in bearer form (article 14, paragraph III); (2) a holder of savings shares for the income derived

from these can choose between two fiscal treatments, the ordinary treatment or a withholding tax of 15%, which allows him to exclude the dividends from his personal income tax. With the first he must register his shares (article 20 paragraph IV). The minimum privileges connected with the life of the company are (article 15)

1. Profits must be distributed first to the savings shareholders up to 5% of the par value of their shares.
2. Dividends may be distributed to ordinary shareholders only if the dividends received by the savings shareholders exceed those received by ordinary shareholders by 2% of the par value of savings shares.
3. Savings shares rights to the 5% minimum dividend are cumulative for two years.
4. Any distribution of profit, in any form, must give to savings shares at least the same rights of those of any other shares.
5. In case of liquidation, savings shareholders enjoy seniority over other shares in an amount equal to the par value.
6. In case of reduction of capital because of losses, the savings shares may be reduced only after the par value of all other shares has been reduced to zero.

The stated privileges are impressive. The only problem is that they are always connected with the par value, a legal fiction that has no economic content. Therefore, as I have already said, these privileges are much smaller in percentage of the market value. The sum of savings shares and preferred shares may not exceed the number of ordinary shares. The rights of saving shareholders are safeguarded by a "common representative" elected in a special meeting of the shareholders of this class.

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Table 2.1:

Examples of Shapley Values

For each player the first column reports the percentage of votes held, and the second column the percentage of power attributed by the Shapley value.

Player 1		Player 2		Player 3		Ocean	
Per.	Shap. V.	Per.	Shap. V.	Per.	Shap. V.	Per.	Shap. V.
10	11.11	0	0.00	0	0.00	90	88.89
20	25.00	0	0.00	0	0.00	80	75.00
30	42.86	0	0.00	0	0.00	70	57.14
40	66.67	0	0.00	0	0.00	60	33.33
10	10.94	10	10.94	0	0.00	80	78.13
20	24.49	10	10.20	0	0.00	70	65.31
20	22.22	20	22.22	0	0.00	60	55.56
30	41.67	10	8.33	0	0.00	60	50.00
30	36.00	20	16.00	0	0.00	50	48.00
30	25.00	30	25.00	0	0.00	40	50.00
40	64.00	10	4.00	0	0.00	50	32.00
40	56.25	20	6.25	0	0.00	40	37.50
40	44.44	30	11.11	0	0.00	30	44.44
40	25.00	40	25.00	0	0.00	20	50.00
10	10.79	10	10.79	10	10.79	70	67.64
20	24.07	10	10.19	10	10.19	60	55.56
20	22.40	20	22.40	10	10.40	50	44.80
20	23.96	20	23.96	20	23.96	40	28.13
30	40.80	10	8.80	10	8.80	50	41.60
30	36.46	20	17.71	10	11.46	40	34.38
30	35.80	20	24.69	20	24.69	30	14.81
30	33.33	30	33.33	20	33.33	20	0.00
30	33.33	30	33.33	30	33.33	10	0.00
40	61.46	10	5.21	10	5.21	40	28.13
40	53.09	20	8.64	10	8.64	30	29.63
40	41.67	20	16.67	20	16.67	20	25.00
40	41.67	30	16.67	10	16.67	20	25.00
40	33.33	30	33.33	20	33.33	10	0.00

Figure 2-1:

Relative Shapley Value of the Ocean in a Two Player Game

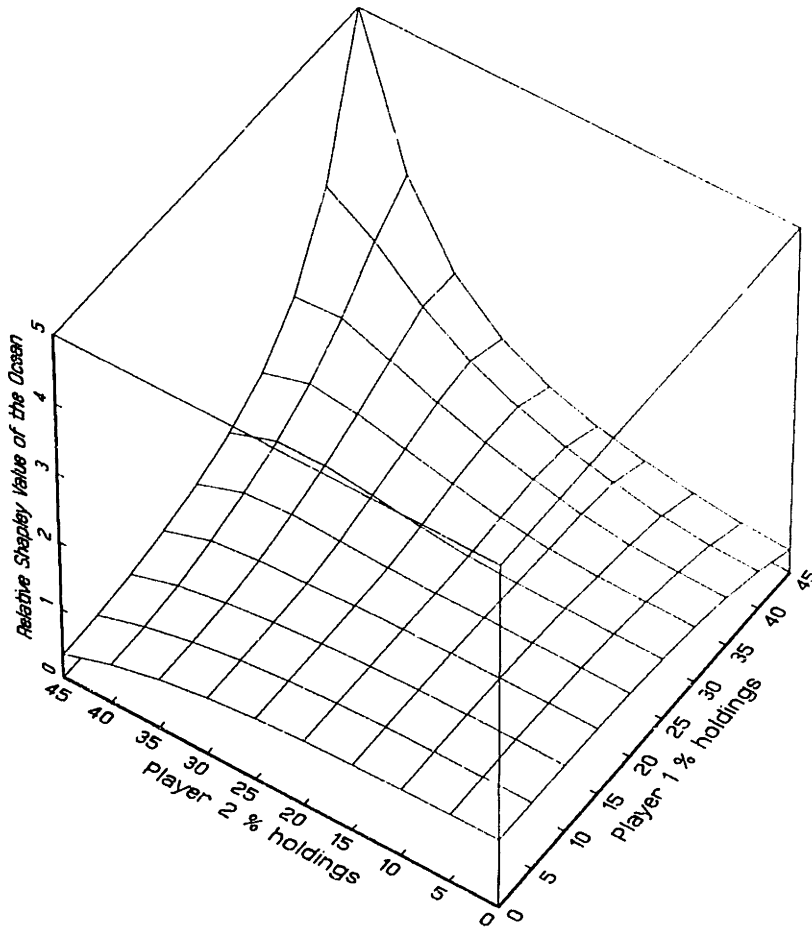


Table 2.2:

Summary Statistics

The voting premium is the grand average of VP_{it} , where VP_{it} is the percentage premium of voting over nonvoting shares for company i at the beginning (first five trading days) of year t . The dividend privilege is the percentage size of the additional dividend yield of the nonvoting shares at the beginning of each year. π is the percentage of voting shares in the capital structure of company i at the beginning of each year. The percentage of voting shares is the number of voting shares over the total number of outstanding shares at the beginning of each year. The size of the biggest (second biggest) shareholder is computed as the percentage of the voting shares held at the beginning of each year by the largest (second largest) shareholder. RSO is the Shapley value per vote of the ocean of small shareholders (those who own less than 5% of the votes). Earnings-to-price ratio and market capitalization are computed using voting shares data (1 \$ = 1200 Lit.).

VARIAB.	MEAN	MEDIAN	ST.DEV.	MIN.	MAX.
Voting Premium	82.50	74.4	64.88	-44.36	435.01
Differential div.	1.06	0.93	0.97	0.06	6.31
Perc. voting shares (π)	75.38	79.59	12.97	50	100
Size biggest shareholder	52.16	51.20	12.97	5.20	92.00
Size second biggest shareholder	5.91	0.00	7.72	0.00	33.40
RSO ($\frac{\$}{\alpha}$)	0.23	0.00	0.41	0.00	3.57
E-P ratio	6.0	4.9	5.2	0.0	47.6
Market Cap. (In million US\$)	1052	342.5	1966.6	15.6	17732

Table 2.3:

Determinants of the Voting Premium

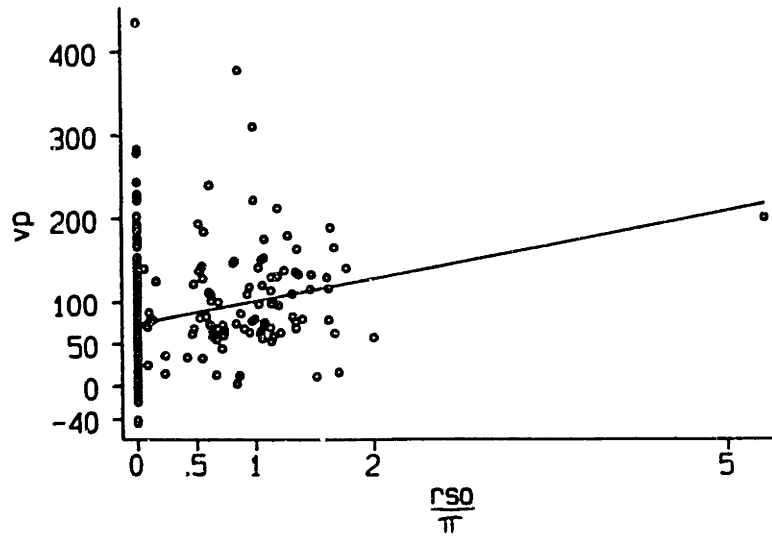
$$VP_{it} = \alpha + \beta\left(\frac{RSO}{\pi}\right)_{it} + \gamma Privilege_{it} + \epsilon_{it}$$

VP_{it} is the percentage premium of voting over nonvoting shares for company i at the beginning (first five trading days) of year t . RSO_{it} is the relative Shapley value of the ocean composed by small shareholders (those who own less than 5% of the votes). Votes ownership is computed at the beginning of each year, using data updated till the end of the previous year. π is the percentage of voting shares in the capital structure of company i at the beginning of each year. The privilege is the percentage size of the additional dividend yield of the nonvoting shares at the beginning of each year. All estimates are obtained by OLS. Heteroskedasticity robust standard errors are reported in brackets. For the pooled regression the standard errors are robust both to heteroskedasticity and to serial correlation between observations of the same companies.

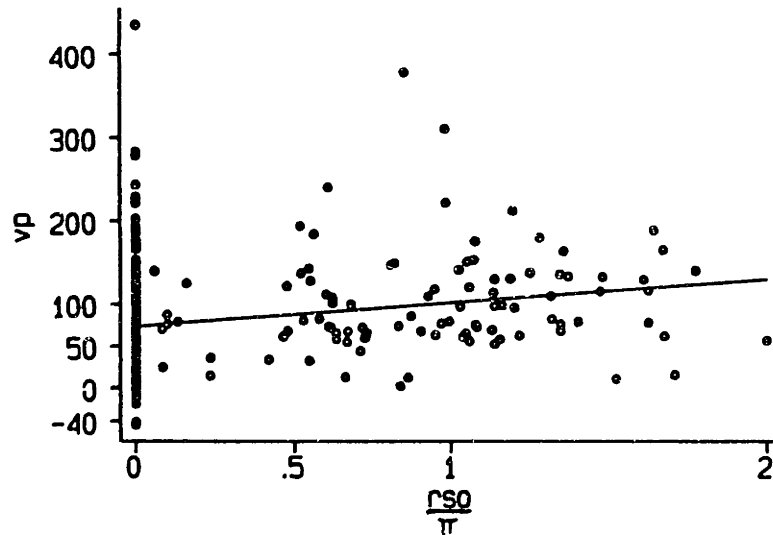
	1987	1988	1989	1990	Pooled
Constant	60.0 (6.3)	90.0 (16.6)	102.8 (12.0)	80.7 (12.0)	84.4 (8.2)
$\frac{RSO}{\pi}$	17.9 (6.9)	14.6 (12.9)	38.9 (15.6)	41.7 (14.7)	29.4 (9.3)
Privilege	-5.0 (2.8)	-12.8 (6.5)	-11.9 (5.9)	-20.1 (7.3)	-10.1 (3.8)
R**2 (%)	10.0	4.9	10.0	14.9	7.5
Observations	57	75	78	77	287

Figure 2-2:

Plotting of the Pooled OLS Regression The Whole Sample



Excluding One Outlier



$\text{Power} = \frac{RSO}{\pi}$ = Shapley value per vote of the Ocean divided
by the percentage of voting shares.
VP = voting premium.

Table 2.4:

Alternative Specifications: Whole Sample

RSO_{it} is the relative Shapley value of the ocean composed by small shareholders (those who own less than 5%). Votes ownership is computed at the beginning of each year, using data updated till the end of the previous year. π is the percentage of voting shares in the capital structure of company i at the beginning of each year. The nonmajority-owned dummy takes value 1 when a company does not have any shareholder owning 50% or more of the votes, and 0 otherwise. The size of the largest shareholders is the fraction of votes held by the largest shareholder in a company. Similarly for the size of the second largest shareholder. The product of the first two shareholders is the product of the two variables just mentioned. The ocean votes variable is the fraction of votes held by small shareholders. The privilege is the percentage size of the additional dividend yield of the nonvoting shares at the beginning of each year. All estimates are obtained by OLS and have 287 observations. The standard errors (reported in brackets) are robust both to heteroskedasticity and to serial correlation among observations of the same companies.

	I	II	III	IV	V	
Constant	84.4 (8.2)	83.9 (8.5)	132.0 (15.2)	81.8 (15.7)	97.0 (20.6)	83.4 (7.8)
$\frac{RSO}{\pi}$	29.4 (9.3)					
Nonmajority-owned dummy		28.6 (10.9)				
Size Largest Shareholder			-75.8 (28.8)			
Size Second Larg. Shareholder				191.2 (60.2)		
Ocean votes					- 8.6 (41.8)	
Product First Two Shareholders						425.4 (144.3)
Privilege	-10.1 (3.8)	-10.8 (3.8)	-10.3 (3.8)	-10.8 (4.0)	-11.3 (4.0)	-11.7 (4.1)
R**2 (%)	7.5	7.0	6.4	7.8	2.8	7.7

Table 2.5:

Alternative Specifications: Nonmajority-owned Companies

RSO_{it} is the relative Shapley value of the ocean composed by small shareholders (those who own less than 5%). Votes ownership is computed at the beginning of each year, using data updated till the end of the previous year. π is the percentage of voting shares in the capital structure of company i at the beginning of each year. The size of the largest shareholders is the fraction of votes held by the largest shareholder in a company. Similarly for the size of the second largest shareholder. The product of the first two shareholders is the product of the two variables just mentioned. The ocean votes variable is the fraction of votes held by small shareholders. The privilege is the percentage size of the additional dividend yield of the nonvoting shares at the beginning of each year. All estimates are obtained by OLS and have 92 observations. The standard errors are robust both to heteroskedasticity and to serial correlation among observations of the same companies.

	I	II	III	IV	V	VI
Constant	96.7 (20.1)	113.9 (15.7)	120.8 (16.9)	117.3 (19.1)	159.6 (49.5)	125.6 (37.2)
$\frac{RSO}{\pi}$	20.9 (13.3)					
$\frac{1}{\pi}$		71.6 (257.9)				
Size Largest Shareholder			-14.5 (57.8)			
Size Second Larg. Shareholder				-7.4 (9.0)		
Ocean votes					-8.9 (8.8)	
Product First Two Shareholders						-14.9 (48.0)
Privilege	-13.7 (10.0)	-14.8 (10.3)	-14.2 (11.1)	-14.7 (10.3)	-15.4 (10.3)	-14.5 (10.3)
R**2 (%)	4.8	2.9	2.9	2.8	6.6	3.1

Table 2.6:

Effect of State Ownership on the Voting Premium

$$VP_{it} = \alpha + \beta \left(\frac{RSO}{\pi} \right)_{it} + \gamma Privilege_{it} + \delta DSTATE_{it} + \epsilon_{it}$$

VP_{it} is the percentage premium of voting over nonvoting shares for company i at the beginning (first five trading days) of year t . RSO_{it} is the relative Shapley value of the ocean composed by small shareholders (those who own less than 5% of the votes). Votes ownership is computed at the beginning of each year, using data updated till the end of the previous year. The privilege is the percentage size of the additional dividend yield of the nonvoting shares at the beginning of each year. π is the percentage of voting shares in the capital structure of company i at the beginning of each year. $DSTATE$ is a dummy variable that takes value 1 when a company is controlled by the Italian Government, and 0 otherwise. The standard errors are robust both to heteroskedasticity and to serial correlation between observations of the same companies.

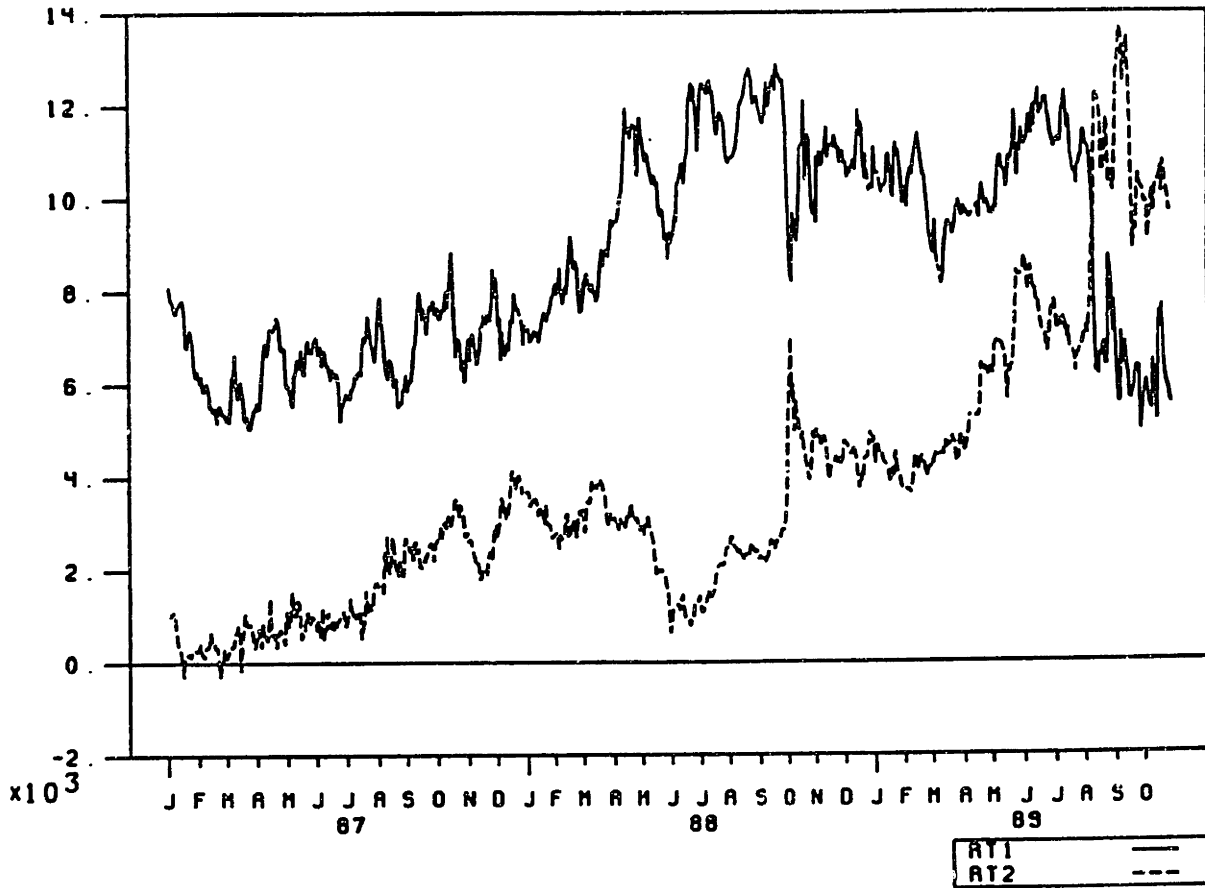
Constant	91.4
	(8.3)
$\frac{RSO}{\pi}$	23.1
	(9.2)
Privilege	-10.8
	(3.7)
State ownership dummy	-57.2
	(8.8)
R**2 (%)	13.4
Observations	287

Average Voting Premium in State-Owned Companies

	1987	1988	1989	1990
Mean	10.4	5.8	29.7	33.7
St.dev.	10.2	16.2	19.7	17.8
Minimum	0.5	-8.9	6.3	15.1
Maximum	20.9	30.9	60.8	59.1

Figure 2-3:

Prices of Mondadori's voting rights before the control contest



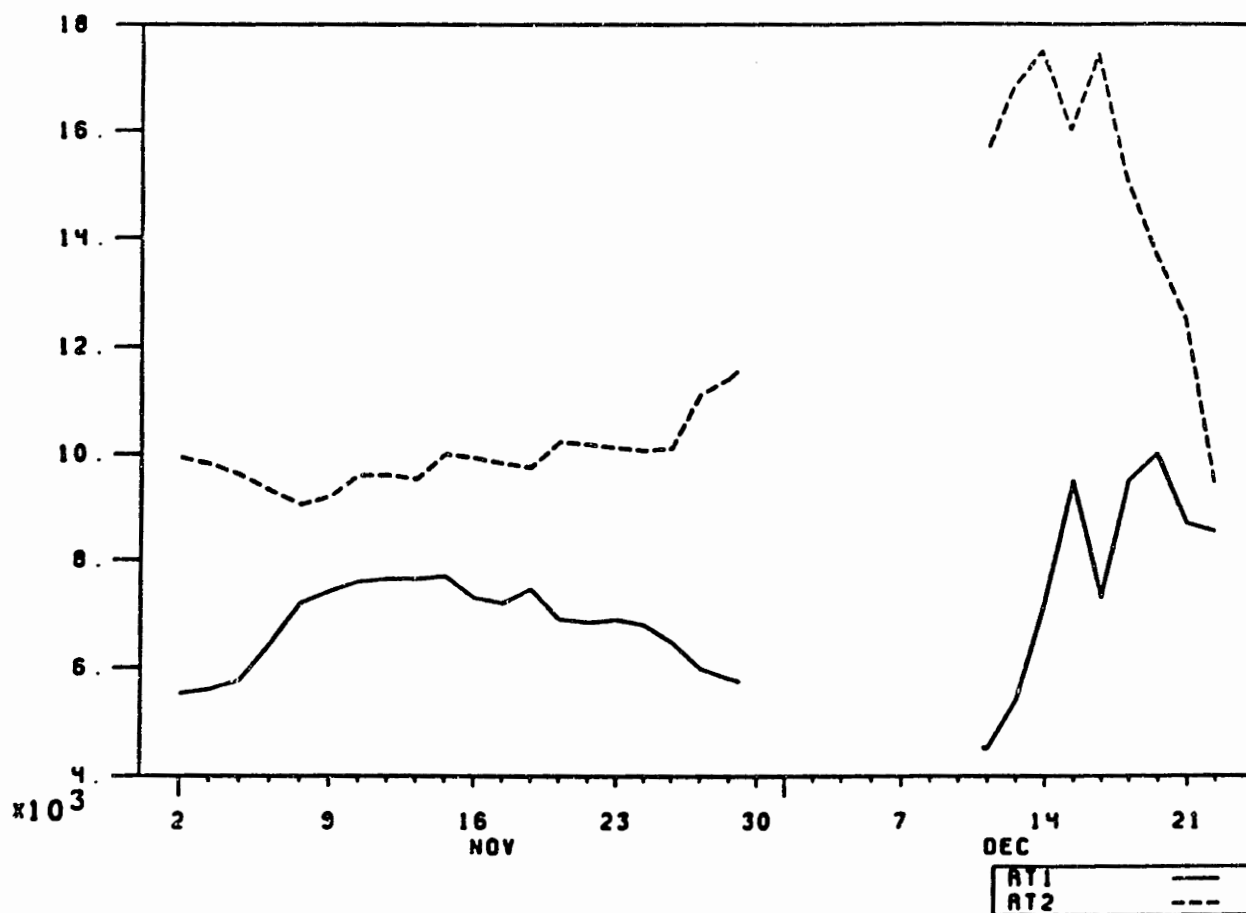
RT1 = Right to vote in the election of the board of directors.

RT2 = Right to vote for modifications of the Articles of Incorporations.

Prices are measured in Italian Lira.

Figure 2-4:

Prices of Mondadori's voting rights during the control contest



RT1 = Right to vote in the election of the board of directors.

RT2 = Right to vote for modifications of the Articles of Incorporations.

Prices measured in Italian Lira.

Chapter 3

The Value of the Voting Right in the U.S.

The 1980s can legitimately be considered the decade of corporate control. Friendly and hostile acquisitions have reshaped corporate America. Tender offers for publicly traded companies increased from 58 in 1975 to 217 in 1988. The total number of acquisitions of publicly traded companies went from 130 in 1975 to 462 in 1988. Takeover speculation was considered a fundamental propellant of the bull market of the 1980s, and antitakeover legislation was even blamed (Mitchell and Netter 1989) for the 1987 crash. The collapse of the junk bond market and state antitakeover legislations seem to have ended this period. In 1990 acquisitions of publicly traded companies dropped to 185 and tender offers to 56, respectively 60% and 74% less than just two years earlier.

These events makes the last decade a very interesting period to study the value of corporate control and its changes through time. However, there is one difficulty: the value of corporate control is not directly observable. It is not generally possible to distinguish between the value of a vote and the value of the underlying investment interest, bundled together in a common share. Disentangling these two components, though, is possible whenever there are multiple classes of common stock traded, having differential voting rights. Companies with dual class stock have been studied for the 1970s by Lease, McConnell and Mikkelsen (1983 and 1984). They found that su-

perior voting shares traded at a 5% average premium above the inferior voting shares of the same company. However, they could not account for the cross sectional and the time series variability of this premium. Furthermore, they were unable to directly relate the voting premium with the control value.

The purpose of this paper is to explain the movements in the premium attributed to superior voting shares during the 1980s, by directly relating this voting premium to the control value. By following this approach I will be able to estimate the value of control and to investigate its sources. First, I will argue that the voting premium, suitably defined, is equal to the expected differential payment in case of a takeover. The size of this payment is related to the private benefits that a controlling shareholder can extract from a company. The likelihood of a differential payment is determined by the ownership structure and by the competition in the market for corporate control. I will then test these propositions by using a new data set of dual class companies having both classes traded on the same stock exchange. During the 1980s dual class companies have become increasingly widespread in the U.S.. Therefore, I was able to assemble a panel data consisting of 97 companies.

A study of acquisitions among these companies shows that superior voting shares receive a differential payment whenever the acquisition is not friendly initiated and there is more than one bidder for the company. A direct investigation of the behavior of the superior voting shares' premium, at the time a company undergoes major changes in the ownership structure, uncovers a clear relationship between the size of the voting premium and the probability of a takeover. These two facts support the claim that the voting premium reflects the expected differential payment in case of a takeover.

A panel data analysis investigates the relationship between the value of control, the ownership structure, the likelihood of a takeover and the voting premium. A simple regression of the voting premium on the voting power of outside shareholders and on the likelihood of a takeover can explain 11% of the variability of the voting premium. This regression provides also an estimate of the relative size of private benefits of control: about 2% of the value of the discounted future cash flow. In

addition, controlling for the company size, the voting premium is positively correlated to the level of executive salaries.

There is no evidence that the price difference between the two classes is affected by a “noise trader risk” à la De Long et al. (1990). According to their theory, assets mainly traded by individual investors should sell at a discount with respect to their fundamental value. A large concentration of not-fully-rational individual investors creates an additional resale price risk, which is reflected in a lower price of the asset. This theory would imply a positive relationship between the size of the premium and the presence of institutional investors, who reduce the discount produced by noise traders. On the contrary, the voting premium is negatively correlated with the fraction of superior voting shares held by institutions. A possible explanation for this finding is that institutions prefer to own stocks in which control value is small. This preference can explain the institutional investors’ leaning toward inferior voting shares and the larger presence of institutions in superior voting stock of companies with a smaller voting premium.

The paper starts presenting the sampling criteria and the main features of the dual class companies in the sample. The study includes all companies having two classes of differential voting common stock contemporaneously traded on the same U.S. stock exchange (NYSE, AMEX or OTC) between 1979 and 1990. Roughly half of the sample is made of dual class stocks with identical dividend rights. In the remaining half of the sample the inferior voting stock is entitled to receive a larger dividend. However, the size of the additional dividend is small and its occurrence uncertain, therefore the market value of this additional right is fairly small. This fact justifies pooling the two subsamples. However, I also present the results obtained restricting the sample to dual class stocks with identical dividend rights, whenever there is any doubt that the results may depend on the difference in the dividend rights.

Section 2 tests whether the voting right has a positive value. In 69% of the company-years superior voting shares are statistically more valuable than inferior voting shares. Vice versa, in 18% of the cases superior voting shares are statistically

less valuable than inferior voting shares. This puzzle is not just an effect of differences in dividend rights. Restricting the attention to dual class stock with identical dividend rights, 71% shows a positive value of the voting right, while 24% shows a negative value of the voting right. Lease, McConnell and Mikkelsen find that only the companies with a voting preferred stock outstanding have a negative value of the voting right. Their finding is not confirmed in this sample.

Section 3 presents the reasons why a voting right may be valuable. The study focuses on market price of voting rights, excluding any type of block trading. Market trading takes place among outside shareholders, not directly involved in control. Therefore, their valuation of votes depends on the expected differential payment attributed to superior voting shares in case of a takeover. This idea contrasts with the fact that only rarely superior voting shares receive a larger premium in case of a takeover. In only 2 out of 12 changes in control that took place during the sample period, superior voting shares received a differential premium. The section contains an explanation of this apparent anomaly, using a model of takeover bid along the line of Grossman and Hart (1988). According to this model a differential payment should be expected only when the acquisition is not friendly initiated, and there is more than one party interested in control. A study of the events surrounding the acquisitions confirm the prediction of the model. Furthermore, the average voting premium in the year before the acquisition indicates that the market anticipates when a differential payment is more likely.

The rest of the paper uses different approaches to test the relationship between the voting premium and its possible determinants. Section 4 contains six case studies of the effect on the voting premium of a drastic change in the ownership structure. Five cases involve, or are related to, the death of the largest shareholder. The last one involves the voluntary quitting of the largest shareholder. In all the cases the voting premium changes dramatically around these events. For the companies with a larger news coverage it is possible to uncover the exact time of certain events. In those cases the voting premium reacts instantaneously to any news that increases the probability of a control contest.

Section 5 conducts a panel data analysis on the determinants of the voting premium. The annual average of the voting premium for each company is related to the likelihood of a control contest and to the probability market votes are pivotal when the control contest takes place. For each year the likelihood of a control contest is proxied by the number of takeovers taking place in the same industry. The probability that market votes are pivotal is computed from the existing ownership structure by using an extension of the Shapley value concept. A model along these lines can explain 11% of the time series and cross sectional variability. The relative liquidity of the two stocks, measured as the ratio of the daily average volume in the two classes, fails to show any significant impact on the voting premium. The section tries also to identify possible differences in the relative value of control across companies and through time. As proxies of differences in control value I consider the salary paid to corporate executives and the takeover premium observed in the same industry. Only the first proxy helps explaining the variability in the voting premium.

Section 6 studies the effects of institutional ownership on the pricing of the two classes. Institutions hold, on average, a larger fraction of inferior voting share, and this bias has increased between 1984 and 1990. In contrast to the noise trader model of De Long et al. (1990), there is no evidence that the presence of individual investors in the superior voting stock induces a discount with respect to the inferior voting stock. By contrast, the results suggest the possibility that institutions choose to own a smaller proportion of superior voting stock when the value of control is larger.

Section 7 concludes the paper suggesting directions for future research.

3.1 Data

3.1.1 Sample Procedure

If a company has more than one class of differential voting common stock traded, then it is possible to estimate the market price of voting rights. This can be easily derived from the price differential between the two classes. The best estimate of the

vote value can be obtained when the two classes differ only in their voting rights. For this reason, Lease et al. (1983) limit their attention to such group of companies. However, in many cases the two classes differ also for a small additional dividend that the inferior voting stock is entitled to receive.¹ The payment of the additional dividend is conditioned upon the distribution of a cash dividend to all shareholders. However, many of these companies do not distribute any cash dividend, making the additional dividend right worthless. By controlling for the difference in dividend rights, it is possible to pool the two types of companies, more than doubling the sample size.²

Despite the possible preferential dividend inferior-voting common stocks are substantially different from preferred stocks. Preferred stocks promise a fixed dividend and a fixed sum in case of liquidation, and therefore are substantially less risky than common stock. Therefore, it is impossible to compare them with common stock in order to infer the value of a voting right. For this reason preferred stocks are excluded from the sample.

In the U.S. there are more than 300 public companies that have two or more classes of common stock with differential voting power. However, only a subsample of them have at least two classes traded at the same time. To identify all the companies having multiple classes of common stock contemporaneously traded on the same stock exchange I used the CRSP daily data files, including companies listed on NYSE, the AMEX and the NASDAQ.³ In these files the last two digits of the Cusip number

¹The AMEX policy has encouraged listed companies to attribute a dividend preference to the inferior voting class. As a result, more than 50% of the dual class companies with both classes traded attribute some additional dividend to the inferior voting class.

²Lease et al. main objective is to prove the existence of a positive value of the voting right. In that context it makes perfect sense to exclude any confounding element. By contrast, my objective is to explain the time series and cross sectional variation of the voting premium. The presence of a dividend preference, constant through time, is not a major problem. On the contrary, doubling the sample size is a great benefit. Therefore, I will use the whole sample of companies having different classes of common stock, with identical, or similar, dividend rights, but different voting rights. Whenever there is any doubt that a result may depend upon the differential dividend, I will redo the analysis restricting the sample to dual class companies having equal dividend rights.

³This criterion excludes companies having different classes traded on different stock exchanges. I am aware of just one such a company: the Student Loan Marketing Association (Sallie Mae). Stock exchanges differ in their trading mechanisms and so in their trading costs. These differences may create an additional wedge between the prices of the two stocks. In addition Sallie Mae voting

identify a single issue, while the previous six digits identify the issuer. Therefore, I searched for companies with more than one class of common stock by sorting all the issues having the first 6 digits equal. I got 399 issues. By taking out the Americus Trusts (80 issues) and the stock that have been delisted and re-enlisted, I obtained 275 issues, corresponding to 137 companies. These were companies that had two classes of common stock traded at the same time in the same market. Lease et al. (1983) collected a sample until 1978. For this reason I started my sample in 1979. The sample ends at the end of 1990. By eliminating the issues that were not traded after the beginning of 1979, I remained with 117 companies. Other six companies were dropped because they were traded for less than six months.⁴ For all the remaining companies I searched the characteristics of the issues in the *Moody's Manuals* and in the *Standard & Poor Stock Records*. The companies are included in the final sample if they met the following requirement:

1. The companies are incorporated in the U.S. or in Canada (3 companies dropped).
2. The different issues of each company differ in their voting power (7 companies dropped).
3. Despite additional dividend rights, the different issues have a claim on the same cash flow. For example, this criterion excludes those issues that have a dividend linked to the performance of a subsidiary (like General Motors class E and H stock). (2 companies dropped).
4. The issues are common stock and not certificate of voting trusts (2 companies dropped).

This leaves 97 companies that have two classes of common stock traded at the same time for more than six months between 1979 and 1990.

stock ownership is restricted to banking and educational institutions (see Chevalier 1991). These differences suggested to exclude this company from the sample.

⁴Five companies issued the second class after June 1990, the sixth companies (First Boston Inc.) had the second class traded for less than six month before deciding to convert it.

3.1.2 Voting Characteristics

Table 3.1 shows the main characteristics of this sample. The companies are equally divided between the American Stock Exchange and the NASDAQ quotation system: 46 companies are traded on the AMEX, 47 on the NASDAQ. Only 4 companies are traded on the NYSE. The small number of companies from the NYSE cannot be attributed only to historical factors.⁵ At the beginning of 1991 I could identify 88 NYSE companies with dual class arrangements (versus 128 on AMEX and 117 on NASDAQ). Therefore, the number of dual class companies that chose to list both classes of stock is substantially different across exchanges. The difference is attributable to the different listing requirements of the three stock exchanges. The superior voting class is generally held by a limited number of people and the volume of trading is not very high. Given the stricter listing requirements of the NYSE, a company listed on the Big Board finds harder to meet the listing requirements in both stocks.

The voting power of the two classes differs across companies. Only 21 companies have a nonvoting common stock. In 57 companies the superior voting stock has ten times the voting power of the inferior voting stock. This clustering is the result of the large application of the Wang formula.⁶ However, it is remarkable that 47% of the NASDAQ companies and 75% of the NYSE companies adopted the same formula. In addition, 11 companies have a differential voting power that exceeds the 1:10

⁵Until 1984 the NYSE forbade the listing of multiple classes of differential voting common stock.

⁶In 1976, in the process of admitting Wang laboratories to listing, the AMEX elaborated its policy toward differential voting shares, that became known as "Wang formula". According to this rule the listing of differential voting stock was accepted, provided that it met the following criteria:

1. The limited voting class of the common must have the ability – voting as a class – to elect not less than 25 percent of the board of directors.
2. There may not be a voting ratio greater than 10 to 1 in favor of the "super" voting class in all matters other than the election of directors.
3. No additional stock (whether designed as common or preferred) may be created which can in any way diminish voting power granted to the holders of the limited voting class.
4. The Exchange will generally require that the "super" class lose certain of its attributes should the number of such shares fall below a certain percentage of the total capitalization.
5. While not specifically required, it is strongly recommended that a dividend preference be established for the limited voting issue.

ratio. The maximum inequality among differential voting stock is reached by Resort International with a 1:100 ratio. In 5 companies both classes have the same voting power in all matters except the election of directors. In the election of directors the inferior voting class elects only a minority of directors (from 14% to 33%) and the superior voting class elects the remaining ones.

The Wang formula required also that, independently of the voting ratio, the inferior voting class could elect 25% of the Directors. This is the case in all the AMEX companies with a 1 to 10 voting ratio. This is also the case in 50% of the NASDAQ companies that adopted the 1 to 10 voting ratio. This fact suggests that many NASDAQ companies arranged their voting structure not to prevent a possible listing on AMEX.

The dividend rights of the two classes differ across companies too. Overall, 40 companies state clearly that the two classes are equal in all respects except the voting power. In 21 companies the Article of Incorporation allows the board of directors to pay a larger dividend to inferior voting stock, while it prohibits any differential payment in favor of the the superior voting class. The remaining 36 companies clearly state that inferior voting shares have right to an additional dividend whenever a cash dividend is distributed. In one third of the cases this additional dividend is a fraction of the dividend distributed to all shareholders (e.g. the inferior voting class receives 1.15 times the dividend paid to the superior voting class). In the remaining two thirds the inferior voting class is expected to receive a fixed sum per share in addition to the common cash dividend, every quarter (or year) in which a cash dividend is paid. For example Wang class B should receive 2.5 cents a share more than class C in each quarter in which a cash dividend is paid. This additional dividend right is generally modified according to stock splits.

In 41% of the companies the superior voting shares can be converted into the inferior voting shares at the holder's will, while no conversion in the opposite direction is allowed.

3.1.3 Sample Description

Table 3.2 reports the complete list of the 97 companies in the sample. For each company the table describes the voting characteristics of the two classes, their differential dividend right and the presence of a conversion right. Overall, 17 companies had a dual class structure before 1979. Between 1979 and 1983, 29 companies introduced and listed a second class. In the following five years the number of companies that introduced and listed a second class was 45. The increase in the number of new dual class companies after 1984 cannot be attributed only to the revision of the NYSE policy. Just three NYSE companies joined the group during this period. Taking them out, the number for the later period remains substantially larger. In 1989, after the creation of Rule 19c-4,⁷ the number of new entrants fell to just 2, versus an average of 9 companies per year in the previous period. However, in 1990 the number bounced back to 8.

At the end of 1990, 69 of these companies have both classes still traded, 4 of them have only one class traded and 24 of them have been delisted. Table 3.3 presents the name of the companies delisted and the cause of delisting, when this is known. There is not any particular trend in the sample. It is interesting to notice that, despite the fact dual class arrangements favor ownership concentration, there have been 12 acquisitions. However, 10 out of 12 are friendly acquisitions. The remaining two were not friendly initiated, but eventually received the approval of the target's board. In addition there has been 3 MBOs and 1 going private transaction.

Table 3.4 presents some summary statistics. Dual class companies are generally small companies. Considering their 1990 volume of sales they rank between 7 and 5584 million dollars. The average value of sales is \$570 millions, but the median is significantly lower (\$200 millions). The percentage of equity represented by the superior voting shares varies between a mere 3% to 80%, with an average of 38%.

⁷SEC Rule 19c-4, introduced in June 1988, was aimed at preventing the use of dual class recapitalization to reduce the voting power of existing shareholders. Rule 19c-4 did not prevent companies from issuing limited voting or nonvoting shares, provided that the voting power of existing shareholders was not reduced in anyway. In June 1990 the rule was struck down by a sentence of the Court of Appeals of the District of Columbia Circuit.

The superior voting class represents on average 87% of all the voting power. It is important to keep in mind that this is a selected sample of dual class companies, because it includes only companies with both classes traded. It is likely that a superior voting class, representing a very small fraction of the capital, will hardly be traded. In fact, De Angelo and De Angelo (1985), studying all dual class companies in 1980 find that the average equity stake represented by the superior voting class is 23% for the whole sample, but 36% for the subsample in which both classes are publicly traded.

The ownership of directors and officers is on average 53% of the superior voting class and 27% of the inferior voting class. Quite remarkably these percentages are almost identical to the ones found by De Angelo and De Angelo in their sample: 55% in the superior voting class and 21% in the inferior one. As a consequence the directors and officers control on average 49% of the voting power. Roughly half of the companies in the sample are majority controlled by insiders (median 49.6). In no company the insiders control less than 10% of the voting power.

3.2 Does the vote have a positive value?

Lease, McConnell and Mikkelson (1983) find that superior voting stock commands a statistically significant premium over inferior voting stock in those cases in which the company does not have outstanding a class of voting preferred. Otherwise the premium is significantly negative.

I redo a similar test during my sample period (1979-1990) by using daily data. The null hypothesis is that the prices of the two classes of stock are equal except for a recording error, due to the fact that closing prices can be registered at slightly different points in time. Therefore, under the null the price of a voting stock (P_v^t) is equal to the price of a nonvoting stock (P_{nv}^t), plus an observational error (ϵ_t), that I assume independently and identically distributed:

$$P_v^t = P_{nv}^t + \epsilon_t. \quad (3.1)$$

The alternative hypothesis is that superior voting share prices are on average larger than the prices of the corresponding inferior voting shares, the average difference (RT) being the value of the superior voting power:

$$P_v^t = P_{nv}^t + RT + \epsilon^t. \quad (3.2)$$

A simple t-test on the price difference between the daily prices of the two stocks can determine whether the superior voting power does have some value. Table 3.5 reports the results of a similar test. In 88% of the company-years the hypothesis of equal prices is rejected at a 99% level. In 69% of the company-years the superior voting shares carry a statistically significant premium, in 18.6% the difference is significantly negative.

The sign of the price difference is quite persistent inside each company. On average 84% of the tests of each company give the same result (i.e., if the test for one year suggests a positive value, the test for the other years will do the same). Only 7% of the tests show a significant change in the sign of the price of voting rights, while the remaining 9% change from being significantly different from zero to being insignificantly different from zero. These results suggest that there are some characteristics that make the vote valuable in certain companies and valueless in others. To identify those characteristics is the objective of section 3.5.

These results confirm Lease et al. finding that superior voting shares are generally worth more than inferior (or nonvoting) shares. The average value of this premium is 10.5% (median 3.0%), even larger than the 5% found by Lease et al. However, in almost 20% of the cases the superior voting shares sell at a statistically significant discount. For certain stocks this discount can be easily explained by the larger dividend paid by the inferior voting stock. However, by restricting the sample to dual class stocks with identical dividend rights I still obtain 22% of the company-years with a negative premium. Lease et al. find that a negative premium is present only in companies that have outstanding a voting preferred stock. This is not true in this sample. There is not statistical relationship between the existence of a class of voting

preferred outstanding and the negativity of the price difference. Therefore, the negative premium remains unexplained. A theoretical justification for the discount may be found in a difference in liquidity between the two stocks. I will come back to this argument in section 3.5.

3.3 Change in Control in Dual Class Companies

The expectation that the superior voting class is paid more in the event of a takeover is the theoretical basis for the existence of a positive vote value in publicly traded companies. In this type of companies outside investors who daily trade in the companies securities will never get any share of the company private benefits. Their valuation of a voting right depend on the expected resale value. The resale value of the additional voting right should be equal to the discounted value of the differential payment received by the superior voting shares in case of a takeover. Therefore, an analysis of the prices paid in case of acquisitions is a study on the ultimate source of the vote value. This section will look at some new empirical evidence on this issue, and in particular will determine in what cases a differential payment should be expected.

The existing evidence on the subject is provided by De Angelo and De Angelo (1985). They look at acquisitions among all dual class companies (not just companies with both classes traded) between 1960 and 1980. They identify 30 acquisitions: 12 paid the exact same price to both classes, 6 paid a non-cash additional compensation to superior voting shares, and 4 paid a cash additional premium to superior voting shares ranging from 83% to 200% of the price paid to inferior voting shares. No case of differential payment takes place among companies with both classes traded. The authors do not explain this observed difference in behavior.

Similarly, in the U.K. Megginson (1990) finds that 43 dual class stock companies have been acquired between 1955 and 1982. All the companies in his sample have both classes traded. In 37 of the 43 cases the superior voting shares received a higher price. On average the price received by superior voting shares is 28% above the price

paid for inferior voting shares. Also Megginson does not provide an interpretation for this observed difference across companies.

3.3.1 The Theory of Optimal Bids in Dual Class Companies

Before introducing the new U.S. evidence on the subject I briefly present a theoretical framework that allows to predict the occurrence of a differential payment in an acquisition. The conceptual framework is derived from Grossman and Hart (1988). I show that a necessary condition for the existence of a differential payment in favor of the superior voting shares is the existence of private benefits of control. A sufficient condition is the presence of competition in the market for control, in a sense that will be clear later.

The stylized model assumes that there are just two parties interested in control: the incumbent and the rival.⁸ For simplicity we also assume that any bid must involve all the company's securities, even if different classes may receive different prices. In this case the rival's bid must satisfy the following constraints:

$$p_s \geq s_s y^I + B^I \quad (3.3)$$

$$p_s \geq s_s y^R \quad (3.4)$$

$$p_i \geq s_i y^R \quad (3.5)$$

where:

- p_s, p_i = rival bid for the total amount of superior (inferior) voting shares;
- s_s, s_i = fraction of equity represented by the superior (inferior) voting class;
- y^I, y^R = security value of the incumbent (rival). This is the income produced by the company under the incumbent (rival) management and distributed between the two classes

⁸It is not necessary that one of the two parties is the incumbent management. These names are just given for simplicity.

according to the fraction of equity they represent (s_s or s_i);
 B^I, B^R = incumbent's (rival's) private benefits of control.

The first inequality says that the rival's bid for the superior voting shares should be at least equal to the maximum price the incumbent is prepared to pay for those shares. The incumbent reservation price is given by the fraction of income he obtains when he runs the company ($s_s y^I$) plus his private benefits of control (B^I). Here it is assumed that the superior voting class controls more than 50% of the voting power. This is indeed the case in all but one the companies in my sample.⁹

The second inequality represents the incentive constraint for the outside shareholders. If they hold on to their shares they will receive their fraction (s_s) of the income produced by the rival (y^R). This is the result of their ability to free-ride on the increase in the income produced by a change of control (Grossman and Hart 1980). For this reason they will never tender below this price.

A similar constraint applies to inferior voting shares — equation (3.5). One might ask the question why the bidder should bid at all for these shares. The bidder is actually indifferent between bidding and not bidding. If he bids he will pay them $s_i y^R$, exactly how much they are worth to him. The requirement that he bids also for those shares is meant to capture the legal constraints that are imposed to the winner by the existence of an inferior class publicly traded. For example any merger that alter in any way the right of inferior voting shares requires a separate vote by class. Therefore, *ceteris paribus* the bidder prefers to buy out also the inferior voting class. Furthermore, if he does not buy those shares he will end up paying them $s_i y^R$ anyway, because of free riding.

If there is not any other potential bidder interested in the company, then the rival has only to overcome the free rider problem. In this case his bid will be:

$$p_s = s_s y^R \quad \text{and} \quad p_i = s_i y^R. \quad (3.6)$$

⁹Also in this company, Wang Lab., the superior voting class is able to elect the majority (75%) of directors and has veto power in case of mergers.

This implies that the takeover price per share will be equal across classes:

$$\frac{p_s}{s_s} = \frac{p_i}{s_i} = y^R. \quad (3.7)$$

On the contrary, whenever there is another potential bidder with a reservation value higher than the rival's security benefit (y^R), the binding constraint in the bid for the superior voting class is given by inequality (3.3). Therefore, the bid will be at the following prices:

$$p_s = s_s y^I + B^I \quad \text{and} \quad p_i = s_i y^R. \quad (3.8)$$

This implies that the per share price of the superior voting share would be larger:

$$\frac{p_s}{s_s} = \frac{s_s y^I + B^I}{s_s} \geq y^R = \frac{p_i}{s_i}. \quad (3.9)$$

The condition $s_s y^I + B^I > s_s y^R$ corresponds to the idea that the bidder faces competition from other parties interested in control. In fact, if this condition is violated the opponent is less of a threat than an outside shareholder. In this case the rival is substantially unchallenged in his bid for the company. Therefore, tender offer prices of the two classes will diverge only when a bidder faces real competition.

3.3.2 The Empirical Evidence

In my sample of dual class companies, with both classes publicly traded between 1979 and 1990, I identified 12 acquisitions. In addition, there are 3 management buyouts and 1 company going private. All these transactions are described in more details in an Appendix available upon request.

The three MBOs and the going private transaction certainly follow under the no competition case. In all the four cases the incumbent management was already owning more than 50% of the votes. Therefore, the binding constraint are only (3.4) and (3.5). It comes as no surprise that the price paid is the same for both classes in all four cases.

The remaining 12 cases involve a change in the ruling management. In 10 out of 12 cases the prices paid are the same. Only in two cases they differ. One case is the battle for control of Resorts International and the second is the takeover of Dickenson Mines by Goldcorp Investment. In these two cases establishing the actual premium is far from trivial. Control of Resorts International changed hands twice. The first time from the heir of W. Crosby to D. Trump. Trump offered \$135 a share, only for superior voting shares. At the beginning no offer was made for inferior voting shares. The implicit premium, computed as the difference between the superior share bid price and the inferior share market price at the beginning of the bid, is about 306%. The second control change was a negotiated transaction between Trump and Merv Griffin. Griffin paid \$135 a share for all the superior voting shares held by Trump (more than 97%), and \$36 for all the others. In addition, he agreed to sell the Taj Mahal Casino to Trump. Without including the net value of the Taj Mahal sale, the premium received by Trump is 275%.

In the Goldcorp's acquisition of Dickenson Mines the winning bid was at C\$9.0 for 100% of superior voting shares and C\$8.5 for 50% of the inferior voting class. The difference in the bid prices is just 6%, however it should be taken into account the fact that one class is bought out completely, while the other not. The market assessment of the premium, at the time the bid was made, was a 26% premium.

Summarizing in 10 out of 12 cases there is not a differential payment, in the other two the differential payment is respectively 306% and 26%. According to the theory the possibility that a competitor enters the bidding should determine the takeover price characteristics. In the absence of informational asymmetries one should never expect more than one bid. In fact, the optimal bid is always a preemptive one. However, in real world situations the best proxy for the existence of potential competitors is the realization of alternative bids. In this respect the two groups differ remarkably. In the group with no price differential there is only one company in which an alternative bidder appears. In all the other cases there is no record of an alternative bid. The only exception is Mobile Communications in which, after the initial bid by BellSouth, a mysterious second bidder, whose term were undisclosed,

appeared. As a consequence BellSouth withdrew its bid and came back only after other potential bidders have disappeared. Therefore, it was not really a contested acquisition. By contrast, in the two cases where a differential payment took place, there is always at least another bidder involved.

Another proxy for the possibility of competition is the agreement with the incumbent management. A pre-existing agreement with the incumbent management takes out a very strong competitor and gives to the bidder a large informational advantage.¹⁰ In this case the criterion divides exactly the two groups. The first ten acquisitions happen with the consent of the incumbent board. In the other two cases the board initially rejects the offer of an alternative bidder, and only afterwards joins the winning bidder.

A different (but not alternative) interpretation is that differential payments are more likely in companies where private benefits are larger. In fact, in the presence of larger private benefits constraint (3.3) is more likely to be binding. This interpretation is not testable directly. However, it suggests an interesting indirect test. If the probability of a differential payment is linked to the firm specific characteristics, then the market should have anticipated this with a larger voting premium. For this reason, I compute the average voting premium in the year before the first announcement of a tender offer for all the companies involved in a control change. Table 3.6 presents the results. The mean voting premium across the first group of companies is 3.28%. By contrast, the mean of the two companies that experienced a differential payment is more than ten times as large (38.25%). Even if it is difficult to talk about statistical significance with such a small number, a test of the equality of the two means can be rejected at the 99% level.

In sum, the empirical evidence supports the prediction of the model. A differential payment may be expected when more than one party is interested in control and private benefits of control are large. In the U.S. a differential payment between the two classes is a relatively unlikely event. However, the market seems to correctly forecast when a differential payment is more likely. The expected value of the differential

¹⁰On this issue see Novaes (1991).

payment is the potential source of the cross-sectional differences and of the changes through time of the voting premium. Section 3.5 will formalize this intuition.

3.4 Case Studies on the Effects of Ownership on the Vote Value

The premium of the superior voting share over an inferior voting share represents an estimate of the market value of the superior voting power of one class with respect to the other. This premium is subject to daily fluctuations. Lease et al. (1984) find that the voting premium rises after the news of an acquisition. On the contrary, they could not find any relationship between the voting premium and other corporate news (dividend or earnings announcement).

One of the purposes of this paper is to understand what determines the fluctuations in the value of the voting premium. Since Lease et al. study, many other papers have looked at the voting premium in others countries.¹¹ All of them find a relationship between ownership structure and vote value. If a certain number of players compete for the right to manage corporate resources, then the market value of votes depends on the power that the votes traded on the market have in allocating control. In Section 3.5 I will formalize this relationship. However, beforehand, I want to test whether there is any direct evidence that a change in the ownership structure or in the balance of power inside a corporation changes the market price of votes. In each company the ownership structure is fairly complex, and there are a lot of special voting arrangements. Therefore, it is useful to perform some case studies of major events, that substantially modified the ownership structure of a company.

The events, I am interested in, are any identifiable news that the ownership structure has changed, or, alternatively, that an existing voting agreement has broken down. One example of this type of news is the death of a large shareholder. The death of a large shareholder may alter the existing ownership structure, but it does

¹¹Rydqvist (1987) studies the Swedish market; Megginson (1990) the British one; Robinson and White (1990) the Canadian market; and Zingales (1991) the Italian one.

not need to. A complex system of voting trusts may keep the defunct's voting block together. For this reason, each case study should include an analysis of the effects of the death of the large shareholder on the existing ownership structure. Another possible important news is the revelation of contrasts inside the controlling family or inside the controlling management team.

By a joint examination of the *Wall Street Journal Index* and the proxy statements between 1979 and 1990 for the 97 companies in the sample, I could identify six events that produced the disappearance of a large shareholder, and, thus, a major change in the ownership structure. Four of these cases are represented by the death of the largest shareholder in the company. Another one is the joint event of the illness of the main shareholder and the news of conflicts inside his family. The last case is the decision of the largest shareholder of a company to swap his holdings for some real asset of the company, because of contrasts with the existing management.

Even if five out of six cases involve the death of a large shareholder, this study will have a very different perspective from Johnson et al. (1985) study on the stock price reaction to the sudden death of an executive. Johnson et al. analyze the effects on corporate performance of the unexpected termination of an executive labor contract. Their interest is in the size of the possible rent extracted by executives. By contrast, I focus on the effects on the voting premium of the termination of a particular voting arrangement. The ownership stake, rather than the managerial position, is the screening criterion. By using the voting premium, any change in expected performance is fully discounted by the changes of the inferior voting shares. Thanks to the dual class structure I can isolate the changes of the vote component at the time of the event. Finally, a big component of the news are the changes following the large shareholder's death, e.g. the public announcement of the will. Therefore, in my case the fact the death is unexpected is not so crucial.

The limited number of cases available and the peculiarities of each one of them make a case by case study more appropriate than a statistical analysis based on six observations. Therefore, in the following I will briefly review the events and the reaction of the voting premium in each of the six events.

3.4.1 Resorts International

The clearest case is represented by the sudden death of W. Crosby, chairman and largest shareholder of Resorts International. Resorts Int. is a big gambling concern, now controlled by Merv Griffin. At the time of his death Crosby controlled directly 48% of the votes. With his brothers and sisters' holdings his control exceeded 60% of the voting power. Therefore, until his death, a takeover was impossible.

Figure 3-1 reports the behavior of the voting premium around April 10, 1986, date of Crosby's death. Before his death, given the impossibility of a takeover, the voting premium is close to zero. At the time the death is announced (04/14/1986) the voting premium rises sharply: +39%. This increase is significantly different from zero at the 99% level. Crosby did not have children and the *Wall Street Journal* reported that there were rumors that a big part of Crosby's estate was reserved for his companion, outside the group of family members. This possibility, then realized, of a fragmentation of the controlling block increased the likelihood of a control contest. It is interesting to note that both classes rose sharply. The reason of the rise in the inferior voting stock (with just 1/100 vote per share) may be attributed to the burden imposed on the company by Crosby. He was involved in ill-fated speculation in the commodity futures market. Therefore, his death produced an increase in the expected corporate performance. However, far bigger was the increase in the vote value. The dramatic increase in the voting premium can be justified ex-post by the differential premium paid to superior voting shares in a subsequent control contest (see section 3).

3.4.2 Wang Laboratories

A complete different story is represented by the illness and eventual death of An Wang, founder and largest shareholder of Wang Laboratories. Through his large holdings in the superior voting class Wang owned directly 14% of the voting power. By including the family holdings he controlled 38% of the voting power. Furthermore, An Wang himself was considered the main asset of the company. His patents and

ideas created and raised Wang Lab.. Therefore, a change in control was very unlikely. Given the presence of a 1.25 additional dividend for the inferior voting class, the voting premium has been traditionally around zero.¹²

Figure 3-2 shows the behavior of the voting premium during Wang's illness. On June 26, 1989 An Wang undergoes surgery for a malignant tumor. In this case the voting premium does not show any significant change. Wang's son was already chairman of the company, and Wang's wife was among the directors. The involvement of the family and the importance of the "Wang asset" can easily justify the behavior of the voting premium. During that period, the performance of the company was deteriorating. On August the 9th An Wang, recovered from the surgery, obliges the son to step down as president, and announces the intention to search for an outside manager. On that day the voting premium jumps from 5% to 62%, an increase significantly different from zero at the 99% level. The monolithic Wang control over the company is broken, and the market immediately reflects that.

When An Wang re-enters the hospital (03/09/90) the voting premium increases of another 20 percentage points. This increase is also significantly different from zero at a 99% level. By contrast, the 7% increase at the news of his death (3/25/90) is not significantly different from zero.

The conclusion from these two case studies is that the voting premium reacts very sharply to an increase in the probability of a control contest. The death or probable death of a large shareholder is not a sufficient reason to change the expectations of a control contest. The market seems to discount many other factors as well. What really changes the voting premium is the news that a voting arrangement, which used to rule the company, is terminated.

The previous two events took places in large and famous companies, with a very large news coverage. The next four cases are less clear-cut. One possible reason is the difficulty in recovery all the necessary information.

¹²The additional dividend right of the inferior voting share was initially 2.5 cents per share. In 1983, after a stock split, it became 1.25 cents per share.

3.4.3 Petroleum Helicopter

Petroleum Helicopter is the world's largest chopper operator. Robert Suggs, founder and chairman, owned 52% of the voting stock of the company. He died in November 1989.¹³ In his will he divided his holding among his wife and his six children. However, he left all the voting power to his young wife, who decided to rule the company by herself.

Figure 3-3 presents the behavior of the voting premium around the time of the death. There is some evidence of a rise of the voting premium. However, this rise is temporary. It should be so, given that the control block is merely transferred from one hand to another.

3.4.4 United Foods

Similar to the previous story is United Foods. J.O. Tankersley, chairman and owner of 17% of the superior voting class, dies on the 26 of April 1986. The only news of his death I could find was on the *New York Times* of May 28, 1986. The article also reports that J.I. Tankersley, president of the company, is elected chairman, succeeding J.O. Tankersley.

Figure 3-4 shows the behavior of the voting premium. There is not any relevant change around the time of the death. The big rise in the voting premium takes place between Friday May, the 30th, and the Monday, June the 2nd (+15%) and the day after (+15%). Both these increases are different from zero at a 97.5% level. However, I could not find any public news about the company in those two days.

One year later the voting premium suddenly returns to the previous level around zero. I could not find any news that explained this drop. The proxy statements show that holdings and control pass smoothly to James I. Tankersley.

¹³I have not been able to recover the exact date of death yet.

3.4.5 Plymouth Rubber

Another intriguing case is represented by Plymouth Rubber. The Massachusetts rubber company is controlled by a trust of the Hamilburg family. In 1987 the president of the company and head of the trust, which controlled 52% of the voting stock, was D. Hamilburg. He retired from his presidential office at the end of April 1987, and eventually died in June 1989.

Figure 3-5 shows the voting premium during all this period. There is no evidence of any increase in the voting premium at the time of Daniel Hamilburg's death. By contrast, there is a period in which the voting premium is significantly different from zero in late 1987 beginning of 1988, between the retirement and the death of D. Hamilburg. Also in this case there are no available news that can justify this increase. An educated guess is that during that period the family was bargaining on a new voting agreement. In fact, an amended voting trust agreement was deposited at the time of the new 10-K report (November 1988). The positive voting premium in the preceding months may reflect the probability that the voting trust would break down.

3.4.6 Moog Inc.

The last case does not involve a death but a voluntary quitting. In February 1988 William C. Moog, founder, chairman and president of Moog Inc, a maker of aircraft equipment, decided to swap his holdings for certain assets. The stated reason is "difference of opinion with the board" (*NYT* 03/02/1988). Before this decision W.C. Moog owned about 30% of the superior voting stock and was part of a voting agreement inside the Moog family. After his departure the company remained without any large shareholder. The largest shareholder became the Moog Inc. Retirement Trust Plan, which owned 13% of the superior voting stock.

Figure 3-6 shows the behavior of the voting premium at the time of the departure and in the year after. In the two days around the announcement (02/02/88) the voting premium jumps from 5% to 22%, an increase significantly different from zero

at a 99% level. After the event the voting premium remains significantly higher. The swap puts the company in play and the voting premium reflects that.

In summary, these six mini case studies show that the voting premium reacts in a predictable way to an increase in the probability of a control contest.

3.5 The Determinants of the Voting Premium

This section contains an analysis of the determinants of the differences in voting premia across companies and through time. The section starts with a more precise definition of voting premium, that takes into account the cross sectional differences in the relative voting power of the two classes. The section continues reporting some summary statistics of the data used in the regression analysis. Afterwards, the section presents a panel data analysis of the determinants of the voting premium. The annual average of the voting premium for each company is related to the likelihood of a control contest and to the probability market votes are pivotal when the control contest takes place. For each year the likelihood of a control contest is proxied by the number of takeovers taking place in the same industry. The probability that market votes are pivotal is computed from the existing ownership structure by using an extension of the Shapley value concept. Differences in liquidity, proxied by the ratio of the daily average volume in the two classes of stocks, do not have any impact on the voting premium.

The section also looks at possible differences in the relative value of control across companies and through time. As proxy of differences in control value I consider the salary paid to corporate executives and the takeover premium observed in the same industry. Controlling for size, the level of the top executive salary is positively correlated with the voting premium. On the contrary, the level of takeover premium is not significantly correlated with the voting premium.

3.5.1 Definition of the Voting Premium

Up to now I have been deliberately vague in the definition of the voting premium. I have been using as voting premium the premium commanded by a superior voting share over the corresponding inferior voting share, but this is not a very sensible measure when the two classes differ in their relative voting rights across companies. Therefore, for the purpose of a cross-sectional comparison I will give the following definition:

Definition: The voting premium is the ratio between the value of one voting right and the value of one nonvoting security:

$$VP = \frac{RT}{P_{nv}}, \quad (3.10)$$

where

RT = value of one voting right;

P_{nv} = price of a nonvoting share.

This definition is not operational yet. In fact, only if one class of shares is voting and the other not, then I can compute the value of one voting right (RT) as the difference between the price of the two types of shares. In this case the voting premium is given by

$$VP = \frac{P_v - P_{nv}}{P_{nv}}. \quad (3.11)$$

If dual class companies differ in the voting power attributed to the two classes, then equation (3.11) should be modified. Consider the general case in which each class A share has a votes and each class B share has b votes, then

$$P_A = aRT + \frac{V}{N} \quad (3.12)$$

$$P_B = bRT + \frac{V}{N} \quad (3.13)$$

where $\frac{V}{N}$ is the dividend value of a security, i.e., the value of a fictitious nonvoting

share.

Assume without loss of generality that $a > b$, then define $r = \frac{b}{a}$, i.e., the relative number of votes attributed to the inferior voting class when the number of votes attributed to the superior voting class is normalized to one. The purpose of this normalization is to make different voting arrangements comparable. For example, many companies attribute ten votes each to the superior voting shares and one vote each to the inferior voting shares. Other companies prefer to attribute just one vote to the superior voting shares and one tenth of a vote to the inferior voting shares. This difference is clearly only a nominal difference. So I normalize all the votes so that the superior voting class has one votes per share and the inferior voting class has r vote per share (with $r < 1$). After this normalization equation (3.12) and equation (3.13) become

$$P_A = RT + \frac{V}{N} \quad (3.14)$$

and

$$P_B = rRT + \frac{V}{N}. \quad (3.15)$$

Then the price of one voting right is simply

$$RT = \frac{P_a - P_b}{1 - r}, \quad (3.16)$$

and the price of a fictitious nonvoting share is

$$P_{nv} = \frac{V}{N} = \frac{rP_b - P_a}{1 - r}. \quad (3.17)$$

Therefore, the voting premium as defined in equation (3.10) is given by

$$VP = \frac{P_A - P_B}{P_B - rP_A}. \quad (3.18)$$

Equation (3.18) coincides with equation (3.11) when $r = 0$, i.e., class B is nonvoting. This definition of voting premium makes premia comparable across companies with

different voting arrangements.

3.5.2 Summary Statistics

Table 3.7 presents summary statistics on the whole sample. The whole sample is composed of the 94 companies listed in Table 3.2 between 1984 and 1990.¹⁴ The sample period starts in 1984 for two reasons. First of all, 1984 is the first year for which I could get ownership data from *Spectrum 5*. *Spectrum 5* is a monthly publication that collects all the 13-G filings and 13-D filings of all the public companies. The second reason is that, as I have already said in Section 1, most of the companies introduced their second class after 1984.

The grand median of the annual average of the daily voting premia is equal to 3%. This sample excludes two outliers (918% and -9424%) corresponding to the last days of trading of the superior voting class during the takeover of Resorts International in 1988, and to the last days of trading of Merchants Capital Corp in 1990. The grand mean (10.5%) is about 2 times the average level found by Lease et al. (5.4%). In part the difference can be explained by the different definition of voting premium¹⁵ However, it should be noticed that Lease et al. limited their attention to dual classes with identical dividend rights. One should expect that companies with a differential dividend in favor of the inferior voting shares have a smaller voting premium. This is actually true. Table 3.8a presents the annual average of the voting premium for all the companies, and Table 3.8b just for the companies with equal dividend rights. The two series do not look very different. The mean on the whole sample is slightly smaller than the mean on the subsample, as expected. However, this relationship is not always verified if one looks at the medians. For example, in the last two years the median in the subsample is smaller than the median over the whole sample.

The level of the voting premium in the U.S. is comparable with the level found in Sweden (6.5%), and U.K. (13.3%). However, it is below the value found in Canada

¹⁴Three companies (Investor Diversified, Home Oil and Nielsen) were acquired before 1984, therefore they do not appear in this sample.

¹⁵Lease et al. define as voting premium $\frac{P_A - P_B}{P_B}$, where P_A is the price of the superior voting shares and P_B the price of the inferior voting shares.

(23.3%) and Switzerland (about 27%), and it is well below what found in Israel (45.5%) and Italy (81%).¹⁶ The reasons of these sharp differences across countries remain an interesting and unexplored topic.

By looking both at the means and at the medians of the voting premium through time, there seem to be a trough around the mid 1980s, with two peaks around 1982 and 1987-1988, corresponding to two stock market minima. The negative relationship between voting premia and market performance is another unexplored topic that is left for future research.

Another important datum is the volume of daily trading. I computed the average daily volume for both classes in each year. Then I defined the relative volume as the ratio between the average trading volume in the superior voting class, divided by the average trading volume in the inferior voting class.¹⁷ CRSP data on volumes are available since 1982 for companies enlisted in the NASDAQ system, but only since 1986 for AMEX and NYSE companies. Table 3.8a reports for each year the cross-sectional summary statistics of the relative volumes. On average, the volume in the superior stock is 44% of that in the inferior stock, but the median is only 0.2 and there are huge cross sectional differences. By looking at the medians there seems to be an increase in the relative volume of trade in the superior voting stock between 1986 and 1988. Those years are also characterized by a larger voting premium.

The vote-to-share ratio represents the total number of normalized votes divided by the number of outstanding shares. The average voting structure has more than twice as many shares as votes.

The next two variables in Table 3.7 are ownership variables. The size of the largest shareholder is simply the percentage of votes controlled by the biggest shareholder in a company. The average size of the largest shareholder is 32.3%, roughly twice the average size of the largest shareholder reported by Shleifer and Vishny (1986) for

¹⁶The data come from the following works: Levy (1982) for Israel, Rydqvist (1987) for Sweden, Horner (1988) for Switzerland, Megginson (1990) for England, Robinson and White (1990) for Canada and Zingales (1991) for Italy.

¹⁷This average is obviously different from the average of the daily relative trading volumes. This definition was chosen because the trading volume may be equal to zero in certain dates making the ratio not defined.

large US corporations. The comparison is not fair because their sample includes only Fortune 500 companies. However, I am not aware of any study on the ownership structure of smaller corporations. The voting power controlled by the largest five shareholders is on average 47.2%, versus the 28.8% reported by Shleifer and Vishny (1986). It is worth noticing that, despite the different size of the largest shareholder, the total voting power controlled by the additional four largest shareholders is roughly the same in the two samples (14.4% in this sample, 17.3% in Shleifer and Vishny sample). Therefore, the dual class arrangements help the largest shareholder in increasing its voting control, but do not modify the average stake of the other large shareholders. This result is in sharp contrast with the Italian data on stock ownership in dual class companies reported by Zingales (1991). In Italy the largest shareholder controls on average 52.2% of the voting power, but the five largest shareholders control 81% of the voting power. Therefore, the four additional large shareholders own on average 28.8% of the votes, roughly twice as many as in the U.S.. This difference reveals a different structure of the market for corporate control in the two countries: a public market for control in the U.S. and an oligopolistic market for control in Italy, where the same few family groups are present in most of the publicly traded companies.

The probability market votes are pivotal is a measure of ownership concentration based upon the theory of oceanic games of Milnor and Shapley (1961), which I will explain in more detail in the next section.

3.5.3 Determinants of the Voting Premium

In Section 3 I showed that in a contested acquisition superior voting shares received a larger premium. Therefore, the voting premium should reflect the expected value of this differential payment. This section investigates whether there is any evidence of such relationship by using a panel data of the voting premium. Besides the relative characteristics of each issue, the explanatory variables of the voting premium will be a measure of the distribution of ownership and a proxy variable for the probability of a change in control.

Let's consider that a company produces an amount B of private benefits. If these

benefits were distributed pro rata to each voting shareholder in proportion of the votes held, then the value of one voting right RT would be

$$RT = \frac{B}{N_v}, \quad (3.19)$$

where N_v is the number of votes outstanding. However, private benefits of control are not distributed pro rata (otherwise they would not differ in any way from ordinary cash-flow), but they are appropriated by the shareholder or group of shareholders holding a majority of votes. Therefore, an outside shareholder, who does not have the financial resources for taking over a company, values the voting right according to their expected resale value in case of a control contest. In particular his votes will be very valuable if they are able to decide the allocation of control between two (or more) alternative management teams, i.e. they are pivotal. In this simple framework it is assumed that if outside shareholders are pivotal, then the competition among contenders will oblige the bidders to pay out all their private benefits to buy the pivotal votes floating on the market. Let's call α the fraction of votes held by outside shareholders. Then in a control contest each vote will receive $\frac{B}{\alpha N_v}$. For a given ownership structure it is possible to compute the probability that each vote held by outside shareholders is pivotal (let's call this Φ). Then the value of a voting right traded on the market is equal to the probability the vote is pivotal time the premium it will receive, i.e.,

$$RT = \Phi \frac{B}{\alpha N_v}. \quad (3.20)$$

With a finite numbers of players the probability that a block of votes held by individual i is pivotal is given by the Shapley value of that block of votes in a simple majority games,¹⁸ i.e.,

¹⁸In a majority game an individual (& coalition) wins when reaches the majority of votes. The game is simple when the winning individual (coalition) gets the whole value of the game (normalized to 1) and the everybody else gets nothing.

$$\Phi_i = \sum_{i \text{ pivotal}} \frac{s!(n-s-1)!}{n!}, \quad (3.21)$$

where s is the number of players in a coalition, n the total number of players and the summation is taken with respect to all of the feasible coalitions such that the coalition with s players is a losing one (i.e., holds less than 50% of the votes) and the coalition with s members plus player i is a winning one.

In public corporations besides a small number of large shareholders there is a large number of small outside shareholders. Milnor and Shapley (1961) suggest to approximate the small outside shareholders with a continuum of infinitesimal shareholders. By doing this approximation it is possible to compute the probability Φ that outside shareholders' votes are pivotal, given the distribution of ownership of large shareholders.¹⁹

The value B of private benefits is not directly observable. To obtain an empirical specification I assume that private benefits of control are a constant fraction of the cash-flow value of a company, indicated by V :²⁰

$$B = \beta V. \quad (3.22)$$

This implies that

$$RT = \frac{\Phi}{\alpha N_v} \beta V. \quad (3.23)$$

Dividing the value of a voting right by the price of a nonvoting share I obtain

$$\frac{RT}{P_{nv}} = \beta \frac{\Phi \frac{V}{\alpha N_v}}{\frac{V}{N}} = \beta \frac{\Phi}{\alpha \pi}, \quad (3.24)$$

¹⁹The first application of the theory of oceanic games of Milnor and Shapley to price differential voting shares is due to Rydqvist's (1987) study of the Swedish market. Others examples are Robinson and White (1990) for the Canadian market and Zingales (1991) for the Italian market.

²⁰Another way of putting it is that I estimate the average relative size of private benefits. However, this interpretation requires that the idiosyncratic component in the relative size of private benefits is uncorrelated with my right hand side variables. In other words, I assume that $B_j = (\beta + u_j) V_j$, where u is an independently distributed random variable with mean zero. This interpretation requires that $E[u|\Phi] = 0$.

where $\pi = \frac{N_v}{N}$ is the ratio between number of votes and number of shares. The left hand side of equation (3.24) is exactly the voting premium as defined in equation (3.18). Therefore, in the absence of any difference in dividends the voting premium (VP) is equal to

$$VP = \beta \frac{\Phi}{\alpha\pi}. \quad (3.25)$$

Equation (3.25) is the fundamental equation relating ownership structure and voting premium. In order to test this relationship I should also include some institutional differences between the two classes of stocks. To control for differences in dividends paid to the two classes I construct a dummy variable *DIV*, equal to one for those company-years in which inferior voting shares received a larger dividend. In addition I should take into account that certain companies allow superior voting shares to be converted into inferior voting shares. This conversion right is potentially valuable, in particular when the inferior voting shares pay an additional dividend. The variable *CONV* is a dummy variable that takes value 1 in every company-year in which the superior voting share is convertible into an inferior voting share at the holder's will, and 0 otherwise. Therefore, I obtain the following empirical specification:

$$VP_{it} = \beta_0 + \beta_1 \left(\frac{\Phi}{\alpha\pi}\right)_{it} + \beta_2 DIV_{it} + \beta_3 CONV_{it} + \epsilon_{it}. \quad (3.26)$$

According to the model sketched above²¹ I expect the intercept β_0 to be zero. In fact, if the model is correctly specified, then it should account for all the differences between the two classes, so the remaining premium should be zero. The coefficient β_1 has been defined as the proportion of the value of private benefits over the cash-flow value of the company, therefore it is expected to be positive. The coefficient β_2 represents the average premium in case the inferior stock pays a differential payment, and should be negative. The coefficient β_3 represents the value of the conversion right, and is expected to be positive.

²¹A more detailed description of a model along these lines is contained in Zingales (1991).

3.5.4 Regression Results

I estimate equation (3.26) by OLS. The standard errors are corrected to take into account heteroskedasticity and serial correlation of the errors across the observations of the same company in different years.²² Table 3.9 (column I) presents the results. All the coefficients have the expected sign, and all but β_3 are statistically different from zero at a 95% level. The estimated relative size of the private benefit of control is 1.9%. This is not very different from the premium found in block trading by Barclay and Holderness (1989) (4% of the total value of equity). It is also similar to what Rydqvist finds applying a similar model to Swedish differential voting shares (between 3% and 8%). On the contrary, it is substantially below the relative size of private benefits of control found by Zingales (1991) applying the same model to Italian dual class companies (30%).²³ The estimated value of the additional dividend (8.1%) is quite plausible, and so is the value of the conversion right (3.9%). The only disturbing figures are the explanatory power of the regression (just 5%) and the level of the intercept (7.2%, significantly different from zero).

Equation (3.26) does not take into account possible differences in the probability that a control contest will take place. As a proxy for this variable I employ the annual number of takeovers in the industry. The industry classification is taken from *Mergerstat Review*. The review provides the SIC codes that define each of its 50 industry groups. Therefore, I could determine the *Mergerstat Review* industry for the companies in my sample by using the SIC codes reported by CRSP.²⁴ Every year the variable NTAKE for company i is equal to the number of takeovers in the industry to which company i belongs to, as reported by *Mergerstat Review*.²⁵ Therefore, specification (3.26) becomes

²²These standard errors corresponds to GMM standard errors, where the underlying serial correlation is assumed to be of order N , where N is the number of companies.

²³I suspect that this difference in the relative size of private benefits of control is due to the difference in the legal protection provided to minority shareholders in different countries. This difference may explain the international diversity in the size of the voting premium.

²⁴I could not match just one company: Chambers Development, SIC code 9511. This is the reason why in passing from regression (3.26) to regression (3.27) I lose three observations.

²⁵As an alternative proxy I tried for 1990 the predicated probability of a takeover according to Palepu (1986) estimates, but it has not explanatory power.

$$VP_{it} = \beta_0 + \beta_1 \left(\frac{\Phi}{\alpha\pi} \right)_{it} + \beta_2 DIV_{it} + \beta_3 CONV_{it} + \beta_4 NTAKE_{it} + \epsilon_{it}. \quad (3.27)$$

Table 3.9 (column II) reports the results of the OLS estimates of equation (3.27). The proxy has a positive coefficient significantly different from zero at a 95% level. The size of the coefficient is hard to interpret, but it corresponds to a 0.6% larger premium for every additional takeover in the same industry. The explanatory power of the regression rises to 11%, and the intercept is not significantly different from zero. The other coefficients remain substantially unchanged.

Another possible reason why there is a price difference between the two classes of stock is a different liquidity. As I have already shown, the superior voting shares are generally less traded than the inferior voting one. This may produce larger trading costs that should be reflected into lower prices of the superior voting shares. I define the relative volume (VOL) as the average daily volume in the superior voting shares divided by the average trading volume in the inferior voting shares. By inserting the relative volume VOL into regression (3.27) I obtain

$$VP_{it} = \beta_0 + \beta_1 \left(\frac{\Phi}{\alpha\pi} \right)_{it} + \beta_2 PREF_{it} + \beta_3 CONV_{it} + \beta_4 NTAKE_{it} + \beta_5 VOL_{it} + \epsilon_{it}. \quad (3.28)$$

The relative volume should have a positive impact on the voting premium. Table 3.9 (column III) reports the results of regression (3.28). The coefficient β_5 is indeed positive but it is not statistically different from zero. The economic significance of this coefficient is rather small too. If the superior voting shares, instead of having a trading volume equal to that of the inferior voting shares, have just 50% of it, then the voting premium drops by 0.3 percentage points. As expected the intercept is not statistically different from zero. The coefficients of all the other variables have the expected sign, and they are significantly different from zero at a 95% level. In

addition, β_2 and β_3 are not statistically different from one another in absolute sign. Therefore, *ceteris paribus* companies that pay an additional dividend to inferior voting shares have no smaller voting premia, if they allow the superior voting shares to be converted into inferior shares. This result implies that outside shareholders convert their superior voting shares into inferior voting shares up to the point the value of the voting right is equal to the value of the additional dividend. The R-squared of the regression is equal to 12.8%.

Summarizing, I showed that the voting premium can be, at least partially, explained by the ownership structure (as represented by the probability market votes are pivotal) and by the probability of a takeover. The additional dividend paid to inferior voting shares and the conversion right of superior voting shares affect in a consistent way the price difference between the two classes. Their combined effect is not statistically different from zero. The results do not support the existence of a liquidity premium of the more traded class with respect to the other one.

3.5.5 Sources of Private Benefits

The specification (3.27) assumes that private benefits of control are a constant proportion of the value of the discounted future cash flow of a company. By using this assumption it was possible to estimate that the relative size of these private benefits was about 2% of the verifiable value of the company. However, this regression does not tell us anything about where these benefits come from. In addition, the assumption of proportionality prevents us from identifying the companies that have the highest benefits of control. This subsection explores the possibility of increasing the explanatory power of the basic regression by introducing some proxies for possible differences in private benefits of control.

The most natural source of private benefits of control is the extra salary that a controlling shareholder can attribute to himself. The ability to extract money from the company in this way is limited by the threat of a shareholder suite for waste of corporate resources. However, the board has a fairly large discretion in deciding the salary. Therefore, a huge salary can be a non trivial component of the private benefits

of control.

The determination of the actual compensation of an executive is a complex matter. A compensation package generally includes a cash salary, various types of fringe benefits and stock options. In this context I will limit my attention just to the cash salary for two reasons. First of all, the cash salary is the easiest number to obtain and to compare across companies and years. Furthermore, the interest here is on the amount of cash that a controlling shareholder is able to legally extract from a company. In a closely controlled company, like most of these are, it is very hard to distinguish between managerial fringe benefits and other company expenses directed to the sole benefit of the controlling shareholder. For this reason the cash compensation is the cleanest measure of the amount of cash extracted from the company. In addition, the amount of stock options is fairly limited. The higher executives are generally large shareholders of the company, and they do not need further incentive schemes.

The summary statistics of the top executive salary, in thousands of dollars, are also contained in Table 3.7. The sources are the proxy statements of each company. Every year I picked the largest cash salary paid to an executive. This measure excludes deferred compensation accrued in previous years. In most, but not all the cases, the largest salary is paid to the CEO. However, in some cases the controlling shareholder covers different positions (like chairman of the company). For this reason I consider that the highest executive salary is a better proxy of the private benefits of control rather than the CEO salary.

The average top executive salary is about \$390,000 (median \$331,000), with a very wide range: from \$70,000 to \$1,560,000. Part of the cross sectional difference is certainly attributable to different company sizes. I certainly do not want to use as a proxy of private benefits the raw measure of the salary, but only the part of variation in salaries that is not explained by the different sizes of the companies. For this reason I will insert as a control variable in the regression the logarithm of the net annual sales. A simple regression of the top executive salary on the logarithm of net annual sales is able to explain 27% of the variation in salaries. Therefore, I will use

the unexplained component in the top executive salary as a proxy of private benefits of control and I will test whether this proxy is able to help explaining the variation in the voting premium.

The first three columns of Table 3.10 report the estimates obtained by using this proxy in different specifications. Column I reports the results of a simple regression of the voting premium on the top executive salary and the logarithm of net annual sales. The top executive salary is positively correlated with the size of the voting premium, but the coefficient is not significant at conventional levels. Columns II and III insert the salary proxy into equations (3.26) and (3.27). The top executive salary variable has a positive coefficient, which is statistically significant in both specifications (at a 90% level in the first case and at a 95% in the second). These results suggest that the proxy is performing its job of capturing those companies where private benefits of control are larger than the average. The coefficient indicates that, for a given company's size, the voting premium raises of two percentage points every \$100,000 in extra salary paid to the highest paid executive. A back of the envelope calculation suggests that this is a reasonable estimate. As a first approximation, the value of a company is roughly equal to the level of its sales. Therefore, the average value of a company in the sample is \$400 millions. The value of an additional \$100,000 in salary, capitalized at a 5%, is equal to \$2 millions, i.e., 0.5% of the value of the average company. If the value of managerial rents is fully reflected in the market value of voting rights, then every \$100,000 in extra salary should increase the voting premium by 0.5%, not far from the 2% obtained in the regression.²⁶ The larger than expected impact of extra salary can be explained with the fact that the top executive salary is just a proxy for other forms of privileges connected to control. It is reasonable to imagine that executives who extract higher salaries are more likely to enjoy also larger amount of other perquisites.

The second proxy for differences in the level of private benefits is the average size of the premium observed in takeovers of companies in the same industry. As for the

²⁶These computations assume an all equity firm. If I take into account the average debt to asset ratio at book value, the expected impact will rise to 0.8%.

number of takeovers I use the 50 industry classification of *Mergerstat Review*. As I showed in section 3 only the additional takeover premium paid to superior voting stock can be interpreted as a proxy of private benefits of control. However, the takeover premia recorded by *Mergerstat Review* refer to companies with just one class of stock. In general, a bidder may end up paying a premium over the market price even if there are no private benefits of control. In fact, dispersed shareholders foresee the improvement a winning bidder will implement in the company, and want to free ride on these improvements. As a consequence, this proxy is expected to be a very noisy measure of the differences in the level of private benefits in different industries in different years.

The last three columns of Table 3.10 report the contribution of the takeover premium proxy in explaining the variations in the voting premium. Column I regresses the voting premium just on the takeover premium. Columns II and III insert the takeover premium proxy into equations (3.26) and (3.27). In all three cases the proxy has a positive coefficient, as expected, but it is not statistically different from zero at conventional levels.

These results suggest that there are still some differences in private benefits unaccounted for in the basic model. One proxy for these differences is the level of extra salary paid to controlling executives. On the contrary, the average level of takeover premium in the industry contains too much noise and fails to help explaining the voting premium.

3.6 Impact of Institutional Ownership

In the previous sections I implicitly assumed that the market price of each class correctly reflected the fundamental value of that class. An alternative approach is to attribute the price difference at some form of mispricing. In particular, following De Long et al. (1990), the price difference can be attributed to “noise trader sentiment”. De Long et al. present a model in which the presence of not-fully-rational investors creates an additional resale price risk in the assets they trade. As a consequence

assets traded mainly by individual investors should sell at a discount with respect to otherwise identical assets, that are mainly owned by institutional investors (more likely to be fully rational). Lee, Shleifer and Thaler (1991) find support for this hypothesis in the closed-end fund discount. Closed-end funds — the argument goes — sell at a discount with respect to their net asset value because they are mainly held by individuals. The larger presence of individual investors in the closed-end fund shares creates an additional resale price risk, that is reflected in lower prices.

This section explores the noise-trader sentiment explanation in the context of differential voting shares. The noise-trader sentiment can create a difference in the prices of two classes of common stock of the same company only if the two classes have a differential clientele. Lee, Shleifer and Thaler identify the percentage of shares held by institutions versus that held by individuals as the relevant distinction. Therefore, this section is dedicated to the study of the effects of the institutional ownership of the two classes on the size of the voting premium.

The relative importance of institutional ownership in the two classes of stock is relevant by itself. The noise-trader approach takes institutional ownership as exogenous. However, institutions may choose their relative holdings according to some unobservable characteristics of the stock. This may produce a different relationship between institutional ownership and voting premium. This section will investigate the theoretical and empirical relationships between institutional ownership and voting premium.

3.6.1 Possible Relationships between Institutional Ownership and Voting Premium

According to the noise-trader approach ownership by individual investors increases the riskiness of an asset. Therefore, assets mainly owned by individual investors should sell at a discount with respect to their fundamental value. This discount should grow proportionately to the presence of individual investors among the owners of the asset. Assets not held by individuals are held by institutions. Therefore, the larger

the presence of institutional investors is, the smaller the discount should be. As a first approximation, the price of a class of stock can be related to the institutional ownership according to the following relationship:

$$P_a = v_a - \delta + \gamma I_a, \quad (3.29)$$

where v_a is the fundamental valuation, δ is the discount corresponding to a company 100% owned by individual investors, and I_a is the percentage of class a stock held by institutions. According to this line of thought γ should be positive. A similar relationship holds for the class b stock. As a result the voting premium should be equal to

$$VP = \beta X + \gamma_1 I_a - \gamma_2 I_b, \quad (3.30)$$

where βX are the other determinants of the voting premium, as expressed in equation (3.27), I want to control for.²⁷

The alternative view is not necessarily that γ_1 and γ_2 are equal to zero. Although in efficient markets institutional ownership should not have any effect on the relative valuation of the two stocks, in equilibrium we may observe some correlation between the two. In fact, a possible alternative is that clientele are not exogenous: institutions choose their relative holdings according to some unobservable characteristics of the stock. Specification (3.27) was obtained assuming that private benefits are a constant proportion of the value of the discounted future cash flow of a company. This simplifying assumption is not particularly appealing. It is very likely that the proportion of private benefits differs across companies and through time. If this is the case, then, *ceteris paribus*, institutional investors are less likely to hold superior voting shares in companies where private benefits of control are larger. In fact, institutional investors are relatively disadvantaged players in the corporate control market. They cannot enter in a coalition that controls a company and enjoys the private benefits. Therefore, individuals, who are relatively advantaged in the market for corporate control, should

²⁷Equation (3.30) represents a linearization of the actual relationship.

be more present in the superior voting stock of company with larger control value. As a result, in equilibrium the percentage of superior voting shares held by institutions should be negatively correlated with the unobservable differences in control value, and thus, negatively correlated with the voting premium.

By contrast, the size of private benefits does not necessarily affect the amount of wealth each institution wants to invest in a certain company for portfolio considerations. For a given investment target, a smaller investment in superior voting shares implies a larger investment in inferior voting shares. As a result institutions should hold more inferior voting stock in companies with larger private benefits. Therefore, in equilibrium the percentage of inferior voting shares held by institutions should be positively correlated with the voting premium. Therefore, according to the endogenous selection hypothesis the coefficient γ_1 in regression (3.30) is expected to be negative, and the coefficient γ_2 positive.

3.6.2 Empirical Results

Table 3.11 reports the institutional ownership of dual class companies as reported by the *S&P Security's Owner Stock Guide*. The *Guide* does not always report the data for both classes of each stock. For this reason Table 3.11 reports in separate rows the statistics of the percentage held by institutions in each class and the statistics of the difference between the percentage held in the two classes. This difference is computed only with respect to those companies that have data for both classes. The coverage of the *Guide* with respect to dual class stocks has increased through time. In 1984 only 47% of the companies had institutional ownership data for both classes. In 1990 this number was 66%.

The *Guide* reports the number of shares held by institutions each month. For each year I collected the December datum, which is reported in the January edition of the *Guide* of the subsequent year. To obtain the percentage ownership I divided the number of shares owned by institutions by the total number of outstanding shares of the same class at the end of that year, as reported by CRSP.

Table 3.11 clearly shows that institutions hold relatively more inferior voting stock.

In 1984 on average institutions controlled 5.8 percentage points more of the inferior voting stock rather than of the superior voting stock. In 1990 this difference was 14.8 percentage points. This increase is caused by a differential speed in the growth of the importance of institutions. In the six year period the percentage held in superior voting stock increased only by 4 percentage points, while the percentage held in inferior voting stock increased by 14 points. As a comparison the holdings of equities by institutions in the U.S. increased from 35% in 1984 to 44% in 1989.²⁸ Therefore, during the sample period institutions increased their presence in inferior voting stock more than in other stocks and increased their presence in superior voting stock less than in other stocks. The results was a much stronger leaning of institutional investors toward inferior voting stock.

Table 3.12 shows the results obtained by estimating regression (3.30) by OLS.²⁹ The sample size is roughly 60% of what it was in Table 3.9, because, as I mentioned, in many cases the data of institutional ownership in at least one class of stock are missing. Column I employs equation (3.30) without any controlling variables. Column II and column III correspond to two slightly different specifications for the controlling variables X , respectively equations (3.26) and (3.27). The estimates of the coefficients of the controlling variables are substantially the same as the original estimates, obtained without inserting the institutional ownership variables (Table 3.9). The first two rows report the coefficients of the percentages of institutional ownership in the two classes. The percentage held by institutions in the superior voting stock has a positive effect on the voting premium. This effect is statistically significant at the 99% level. By contrast, the percentage of inferior voting stock held by institutions have a negative effect, which is borderline significant at the 90% level.

These results reject the hypothesis that noise-trader sentiment affects the relative valuation of the dual class stock. On the contrary, the results are consistent with the hypotheses that institutions buy relatively fewer voting stock in those companies where the value of control is unusually high. In this context it is not possible to

²⁸These last data are reported in *The Security Industry in the Eighties. SIA Fact Book*.

²⁹As in the previous cases the standard errors are corrected to take into account of heteroskedasticity and of serial correlation among the observations of the same company in different years.

attribute any casual interpretations to the coefficients. However, it is important to notice that their size is economically relevant. An increase of one percentage point in institutional ownership in the superior voting class is associated with a half-point smaller voting premium. By contrast a one percentage more of inferior voting shares held by institutional investors is associated with one fifth of a point larger voting premium.

In sum, institutional ownership of dual class companies present some interesting characteristics. Institutions prefer to invest in inferior voting stock, and this preference has increased during the sample period considered. On average a larger institutional ownership in superior voting stock is associated with a smaller voting premium. These findings reject the hypothesis that the price differential is caused by some form of noise-trader mispricing. By contrast, the results suggest the possibility that institutions are relatively disadvantaged players in the corporate control market, and therefore hold a smaller proportion of assets with a larger control value.

3.7 Conclusions

Private benefits of control are a powerful working tool in most of the theoretical literature in corporate finance. However, very few is known about their actual size and the real sources of these benefits. This paper is able to estimate the relative size of the private benefits and to identify one important source of these benefits, by studying the value of voting rights in publicly traded companies with differential voting stock.

The paper proves in a definitive way the positive value of the voting right. The source of this value comes from the expectation of a differential payment when there is a control contest, with the size of the differential payment being related to the size of private benefits of control.

A study of dual class company acquisitions confirms this view. A differential payment takes place whenever the company attracts multiple bidders. The different size of the voting premia in the year preceding an acquisition suggests that the market

correctly anticipates the probability of a differential payment.

The paper tries also to identify the determinants of the value of the voting rights. The case studies presented show that the premium of superior voting shares reacts in a predictable way to changes in the ownership structure. A panel data analysis shows that the ownership structure and the likelihood of a takeover can explain 12% of the variability of the voting premium. This analysis provides also an estimate of the relative size of private benefits of control with respect to the company cash-flow value of about 1.9%. In addition, controlling for the size of the company, a larger salary paid to top executives is associated with a larger voting premium, suggesting that extra salaries can be a relevant source of private benefits of control.

The institutional ownership of superior voting shares is inversely related to the size of the voting premium. This finding rejects the hypothesis that individual investors' sentiment affects the voting premium. On the contrary, this result supports the view that institutions prefer to invest in stock with low control value.

Although this study advances our understanding of the relative valuation of differential voting classes, it still leaves some questions unanswered, that will be addressed in future works. For example, 24% of the companies show a negative voting premium even when the two classes have identical dividend rights (see, for example, Plymouth Rubber in Figure 3-5). Differences in liquidity may only be a partial answer. A similar explanation begs the question of why two stocks that differ only for their voting rights should have different trading costs. One possible explanation is that the market of superior voting shares is more populated by insiders, who have access to privileged information. As a result the adverse selection component of the bid-ask spread of superior voting shares is much larger than that of inferior voting shares. The higher cost of transacting is then reflected in a lower price of the superior voting shares.

Another unanswered question is the positive voting premium observed in companies that require an equal payment of the two stocks in case of a takeover. This is the case of Pittway (35% premium in 1990) and Playboy Enterprises (12% premium in 1990). This phenomenon is also observed by Robinson and White (1990) for certain Canadian companies. This fact seems to suggest, contrary to what assumed in this

paper, that outside shareholders can get some benefits out of their voting right even outside of control contests. Further analysis is required to determine this important issue.

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Table 3.1:

Sample Characteristics

The voting ratio is the number of votes per share of the inferior voting class divided by the number of votes per share of the superior voting class. When the two classes differ only with respect to the number of directors, then the company is reported under the last column. By contrast, if the two classes differ for both the number of directors they elect and their voting power, then the company is reported under the column of the corresponding voting power ratio. In Table 3.1b no difference in dividends implies that the two class are constrained to pay the very same dividend. When the Article of Incorporation allows the possibility of a larger payment to the inferior voting class, but it does not require it, then the company is reported under column 2. When the inferior voting class pays a multiple of the dividend paid to the superior voting, then the company is reported under column 3. The last column reports the companies that establish the dollar amount of the quarterly (annual) differential dividend.

a: Voting Arrangements						
Stock Exchange	One class nonvoting	Voting ratio 1:10	Voting ratio > 1:10	Voting ratio < 1:10	Difference only numb. directors	Total sample
AMEX	5	32	3	3	3	46
NASDAQ	15	22	8	-	2	47
NYSE	1	3	-	-	-	4
Total	21	57	11	3	5	97

b: Dividend Characteristics of the Two Classes					
Stock Exchange	No difference in dividends	Inf. class dividend may be larger	Additional div. proportionately larger	Additional dividend in fixed sum	Total sample
AMEX	16	11	5	14	46
NASDAQ	23	10	6	8	47
NYSE	1	1	1	1	4
Total	40	22	12	23	97

Table 3.2:

Characteristics of Dual Class Companies in the Sample

Additional dividend is the dividend preference of the inferior voting class. Possible indicates that the board may, but is not obliged to, pay an additional dividend to the inferior class. When the dividend of the inferior voting class is proportionately larger, then the relationship is expressed with an equation, where d_a (d_b) is the dividend of class A (B). If the additional dividend is a fixed sum, then it is expressed in cents per year, unless a Q indicates that it is cents per quarter. The right to convert is the right to exchange one superior voting share for one inferior voting share, at the holder's will. The percentage of directors elected by the inferior voting class is expressed only when the inferior voting stock is allowed to vote separately as a class on this issue. Otherwise inferior voting shares vote with superior voting shares, with the same voting ratio as previously indicated.

Stock Exchange	Company Name	Vote class A	Vote class B	Additional dividend	Right to convert	Percentage dir. elected inferior voting class
NASDAQ	Acmat Corp	0.1	1			
NYSE	Alberto-Culver	0.1	1	possible	y	
ASE	American Fructose	1	10			25%
ASE	American Maize	0	1			30%
NASDAQ	Associated Comm.	1	0.04			
NASDAQ	Autodynamics	0.1	1	possible	y	25%
NASDAQ	B Hi A Group	1	10	$d_a=1.15d_b$	y	
NASDAQ	Baldwin & Lyons	1	0			
NASDAQ	Base Ten Sys.	0.1	1	possible	y	25%
ASE	Beneficial Standard	1	1			1/3
NASDAQ	Benihana National	0.1	1	possible	y	25%
ASE	Bio-Rad Lab.	0.1	1	possible	y	25%
ASE	Blount Inc.	0.1	1	1.25c Q	y	25%
ASE	Brown-Forman Corp.	1	0			
NASDAQ	U Tec Corp	1	15	$d_a=1.05d_b$	y	
ASE	Canandaigua Wine	0.1	1	$d_a=1.1d_b$	y	25%
ASE	Care Corporation	0.1	1	2.5c Q	y	25%
ASE	Care Enterp.	0.1	1	2.5c Q	y	25%
NASDAQ	Cerbco	0.1	1	possible	y	25%
ASE	Chambres Develop.	1	10	5c	y	25%
ASE	Charter Med Corp.	0.1	1	25c Q	y	25%
NASDAQ	Chesapeake Life I	1	0			
NASDAQ	Colonial Bancgroup	0.05	1	40c	y	25%
ASE	Concord Fab.	1	10	$d_a=1.15d_b$	y	25%
ASE	Crown Central Petr.	1	0.1			18%

T A B L E 3.2 cont.

Stock Exchange	Company Name	Vote class A	Vote class B	Additional dividend	Right to convert	Percentage d elected inferi voting class
NASDAQ	Dairy Mart	0.1	1	possible		25%
ASE	Diagnostic/Retriev.	1	0.1	possible	y	25%
ASE	Dickenson Mines	1	10		y	25%
NASDAQ	Enchanted Village	0	1			
NASDAQ	Equitable Iowa	1	0			
ASE	Everest & Jennings	0.1	1	2.5c Q	y	25%
NASDAQ	Figgie International	0.05	1	8c until 1988		
NASDAQ	Financial Benefit	1	1		y	1/3
NASDAQ	First Amer Bk & Tr.	0	1			
NASDAQ	First Am.Financial	1	0.1			
NASDAQ	First Citizens Banc.	1	16			
NASDAQ	Food Lion	0	1	possible		
ASE	Forest City Ent.	1	10	6c till 88	y	25%
NASDAQ	Haverty Furniture	10	1	da=1.05db	y	25%
NASDAQ	Hechinger Co.	1	10	1c Q	y	
ASE	Home Oil Ltd	0	1	25c		
NYSE	Homestead Financial	0.1	1	da= 1.1db	y	25%
ASE	Hubbell Inc.	20	1		y	
NASDAQ	Int. Bank Washington	1	10	25c		
NASDAQ	Int. Dairy Queen	0	1	da=1.1db	y	25%
ASE	Investors Diversified	1	1	da = 4db		
NASDAQ	Jones Intercable	0.1	1	5c Q		25%
NASDAQ	Kelly Services	0	1	possible	y	
ASE	Key Corp.	0.1	1	possible		25%
NASDAQ	Liberty Homes	0	1	da=1.2db	y	
NASDAQ	Malrite Comm	1	10			
ASE	McRae Industries	0.1	1	possible	y	1/3
NASDAQ	Merchants Cap. Corp.	0.1	1	10c Q	y	
NASDAQ	Method Electrs	0.1	1	possible	y	25%
ASE	Metro Mobile	1	0		y	
NASDAQ	Mobile Communications	0.1	1	0.5c Q		25%
ASE	Moog Inc.	0.1	1	possible	y	25%
NASDAQ	Multnomah	0	1			
NASDAQ	Nielsen	0	1			
ASE	Norcen En.	1	5		y	
ASE	Odetics Inc.	0.1	1		y after 1985	25%

T A B L E 3.2 cont.

Stock Exchange	Company Name	Vote class A	Vote class B	Additional dividend	Right to convert	Percentage dir. elected inferior voting class
ASE	Oriole Homes	1	0.1	2.5c Q	y	25%
NASDAQ	Oshkosh B Gosh	0	1	da=1.15db		25%
NASDAQ	Pasquale Food Inc.	0.05	1	possible	y	25%
NASDAQ	Petroleum Helicopt.	0	1			
ASE	Pittway	0.1	1	2.5c Q		25%
NYSE	Playboy	1	0			
ASE	Plymouth Rubber	1	0			
ASE	Presidential Realty	1	1			1/3
ASE	Presidio Oil	0.05	1	da=1.1db		
NASDAQ	Provident Life & Ac.	0.05	1			
NASDAQ	Republic Pictures	1	10			
ASE	Resort Int.	0.01	1		y	
ASE	Restaurant Ass	0.1	1	possible	y	25%
NASDAQ	Roses Stores	1	0			
ASE	Saunders System	0.1	1	possible	y	25%
NASDAQ	Schwartz Brothers	0	1	100c		20%
NYSE	Sequa Corp.	1	10	10c till 1992	y	
ASE	Smith (A.O.)	1	0.1	possible		25%
ASE	Stevens Graphics	0.1	1		y	25%
NASDAQ	Tele Communications	1	10		y after 1986	
NASDAQ	Thomas Nelson Inc.	1	10		y	
NASDAQ	Thomston Mills	0	1			
ASE	Three D Departments	0.1	1	possible	y	25%
ASE	Transcisco Ind.	1	10	possible	y	25%
ASE	Tranzonic cos.	1	0.1	3c Q	y	25%
ASE	Turner Broadcasting	1	0.2	dA=0.9B		
NASDAQ	United Artist	1	10		y	
ASE	United Foods	0.1	1	2.5c Q	y	25%
NASDAQ	Universal Tel Inc.	1	1			14%
ASE	VGC Corp.	1	10	da=1.1db	y	25%
ASE	Viacom	0	1			
ASE	Wang Laboratories	0.1	1	1.25c Q	y after 1982	25%
ASE	Watsco Inc.	0.1	1	possible	y	25%
NASDAQ	Westmark Comm.	1	10		y	
NASDAQ	Wiley John & Sons	0.1	1	possible	y	30%
ASE	Winn Enterp.	0.1	1		y	25%

Table 3.3:

List of Companies Delisted

Name	Class Delisted	Year	Cause
AUTODYNAMICS INC	b	1984	reclassified and acquired
BENEFICIAL STANDARD CORP	b	1985	liquidation
CARE CORP	b	1986	acquisition
CARE ENTERPRISES	b	1988	Chapter 11
CERBCO INC	s	1985	lack of trading
CHARTER MEDICAL CORP	b	1988	MBO
CHESAPEAKE LIFE INS CO	b	1983	lack of trading
COLONIAL BANCGROUP INC	s	1986	unknown
ENCHANTED VILLAGE INC	b	1987	unknown
FINANCIAL BENEFIT GROUP INC	s	1989	unknown
FIRST AMERICAN BK & TR PALM BEACH	b	1989	bankruptcy
FIRST CITIZENS BANCSHARES INC	s	1990	unknown
HOME OIL LTD	b	1979	acquisition
INTERNATIONAL BANK WASHINGTON	b	1986	acquisition
INVESTORS DIVERSIFIED SVCS INC	b	1979	acquisition
KEY COMPANY	b	1989	Chapter 11
MALRITE COMMUNICATIONS GROUP	b	1989	MBO
MERCHANTS CAPITAL CORP	b	1990	unknown
MOBILE COMMUNICATIONS	b	1988	acquisition
MULTNOMAH KENNEL CLUB	s	1987	unknown
NIELSEN A C CO	b	1984	acquisition
PASQUALE FOOD INC	b	1987	acquisition
RESORTS INTERNATIONAL INC	b	1988	acquisition
RESTAURANT ASSOCIATES INDS INC	b	1987	MBO
SAUNDERS SYSTEM INC	b	1986	acquisition
UNIVERSAL TELEPHONE INC	b	1985	acquisition
V G C CORP	b	1989	acquisition
WESTMARC COMMUNICATIONS INC	b	1990	went private
WINN ENTERPRISES	b	1986	Chapter 11

Table 3.4:

Summary Statistics

If a company still has two classes traded in 1990, the data refer to 1990. Otherwise the data refer to the last year of presence of a company in the sample. The net sales data comes from Lotus Onesource. The data on the number of shares are end of the year data from CRSP. The data on the voting power comes from different *Moody's Manuals* and are reported in Table 3.2. The data on insiders' ownership comes from the most recent proxy statement available.

SERIES	MEAN	MEDIAN	STD DEV.	MIN.	MAX.	OBS.
Net Sales million US\$	480	182	734	2.8	4717	88
Percentage equity sup. class	38.1	37.9	17.1	3.4	80	97
Percentage of votes sup. class	86.7	89.9	13.0	26.2	100	97
Insider ownership superior class	53.9	53.0	19.3	10.3	92.7	97
Insider ownership inferior class	27.3	19.3	20.7	0.0	85.0	95
Voting power controlled by insiders	48.9	49.6	17.4	10.3	88.4	96

Table 3.5:

Tests on the positive value of the voting right

The direct t-test tests whether the difference between the price of the superior voting stock and the price of the inferior voting stock is equal to zero. Positive (negative) indicates that the price attributed to the superior voting power (difference between the price of a superior voting share and the price of an inferior voting share) is significantly larger (smaller) than zero at a 99% level (two-tail test).

Direct t-test			
Company Name	Positive	Negative	Observations
Acmat Corp	4	0	4
Alberto-Culver	5	0	5
American Fructose	0	7	7
American Maize-Products	0	10	12
Associated Communication	8	0	8
Autodynamics	4	0	4
B H A Group	0	3	3
Baldwin & Lyons	5	0	5
Base Ten Sys.	10	0	11
Beneficial Standard Corp	2	1	7
Benihana National	4	0	4
Bio-Rad Laboratories	3	2	11
Blount Inc.	3	4	8
Brown-Forman Corp.	0	11	12
C Tec Corp	4	1	5
Canandaigua Wine	5	0	5
Care Corporation	4	0	4
Care Enterp.	4	0	4
Cerbco	1	1	4
Chambres Development	5	0	5
Charter Med Corp.	2	3	8
Chesapeake Life I	5	0	5
Colonial Bancgroup	3	1	4
Concord Fab.	1	2	3
Crown Central Petroleum	11	0	11
Dairy Mart Convenience	3	0	6
Diagnostic/Retrieval Sys	8	0	8
Dickenson Mines	4	0	5
Enchanted Village	2	0	2
Equitable Iowa	11	0	11
Everest & Jennings	6	1	11
Figgie International	5	0	5
Financial Benefit Goup I	4	0	4
First Amer Bk & TR Palm	10	0	10
First American Financial	2	0	2
First Citizens Bancshar	5	0	5
Food Lion	8	0	8
Forest City Enterprises	4	0	8
Haverty Furniture Co	5	0	5
Hechinger Co.	6	0	8
Home Oil Ltd	0	1	1
Homestead Financial	1	3	4

	Direct t-test		
Hubbell Inc.	3	6	12
Int. Bank Washington DC	7	0	8
Int. Dairy Queen inc.	4	0	5
Investors Diversified	0	1	1
Jones Intclb	8	1	10
Kelly Services	5	1	7
Key Corp.	3	0	4
Liberty Homes	4	1	6
Malrite Comm g.	4	0	5
McRae Industries	3	5	8
Merchants Capit. Corp.	4	0	5
Method Electrs	7	0	9
Metro Mobile	2	0	2
Mobile Communications Co	6	1	7
Moog Inc.	10	0	11
Multnomah	7	0	7
Nielsen	0	6	6
Norcen En.	2	0	2
Odetics Inc.	7	0	7
Oriole Homes	5	1	8
Oshkosh B Gosh	0	6	6
Pasquale Food Inc.	4	0	4
Petroleum Helicopters In	10	0	10
Pittway	1	0	1
Playboy	1	0	1
Plymouth Rubber	8	1	12
Presidential Realty	11	0	12
Presidio Oil	0	3	4
Provident Life and Acc	3	0	3
Republic Pictures	4	1	6
Resort Int.	10	0	10
Restaurant Ass	3	0	3
Roses Stores	7	4	12
Saunders System	2	3	5
Schwartz Brothers Inc.	0	2	3
Sequa Corp.	4	0	4
Smith (A.O.)	8	0	8
Stevens Graphics	1	1	3
Tele Communications Inc.	5	6	12
Thomas Nelson Inc.	5	0	5
Thomston Mills	3	0	3
Three D Departments	7	0	8
Transisco industries	1	1	5
Tranzonic cos.	3	0	3
Turner Broadcasting	4	0	4
United Artist Entertainm	2	0	2
United Foods	5	1	8
Universal Tel Inc.	6	1	7
VGC Corp.	3	0	3
Viacom	0	1	1
Wang Laboratories	3	4	12
Watsco Inc.	7	0	7
Westmark Communications	3	2	6
Wiley John & Sons	8	0	9
Winn Enterp.	2	0	2
Total	412	111	596

Table 3.6:

Comparison between Market Expectations and Realized Premia

The average voting premium in the year before the tender offer is the average percentage premium of the superior voting shares over the inferior voting ones, computed in the 250 trading days before the tender offer is announced. The differential payment at the time of the tender offer is the differential tender offer premium, if a tender offer is made for both classes with similar terms. Otherwise, it is the premium of the tender offer price of the superior voting shares over the trading price of the inferior voting shares the first day of the tender offer.

Company	Average voting premium in the year before the tender offer	Differential payment at the time of the tender offer
Care Corp.	1.4	0.0
Home Oil	-5.2	0.0
Int. Bank of Washington	15.6	0.0
Invest. Diversified	0.9	0.0
Mobile Comm.	-0.2	0.0
Nielsen	0.5	0.0
Pasquale Foods	7.4	0.0
Saunders	3.4	0.0
Universal Telephone	4.3	0.0
V.G.C.	4.7	0.0
Average	3.28	0.0
St. Dev.	5.22	
Dickenson Mines	34.3	26.0
Resorts International	42.2	306.0
Average	38.25	166.0
St. Dev.	3.95	

Figure 3-1:

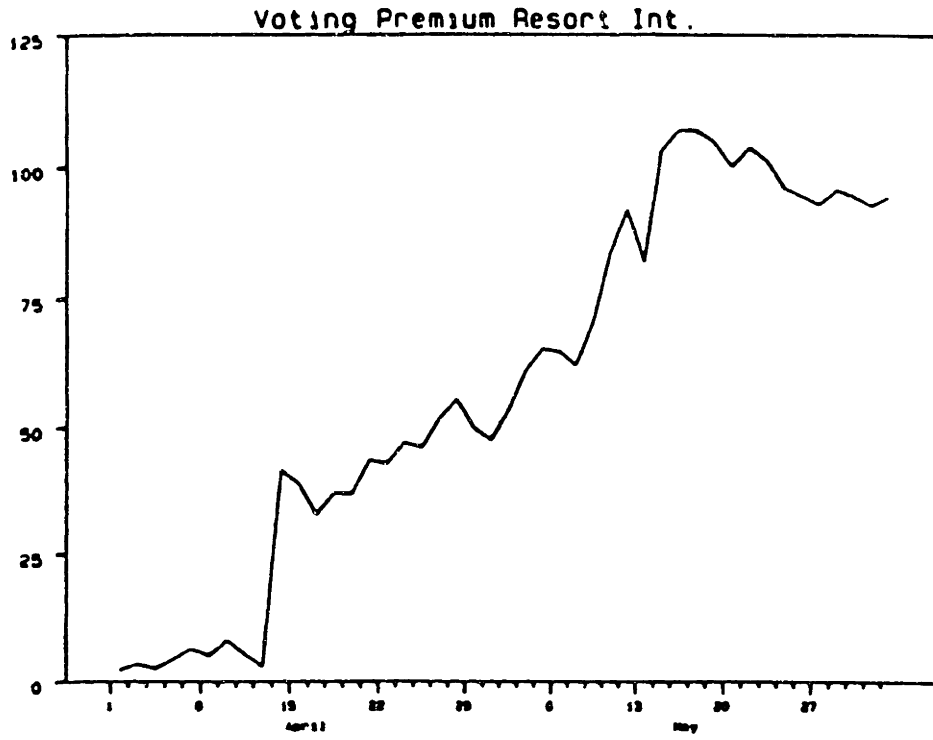


Figure 3-2:

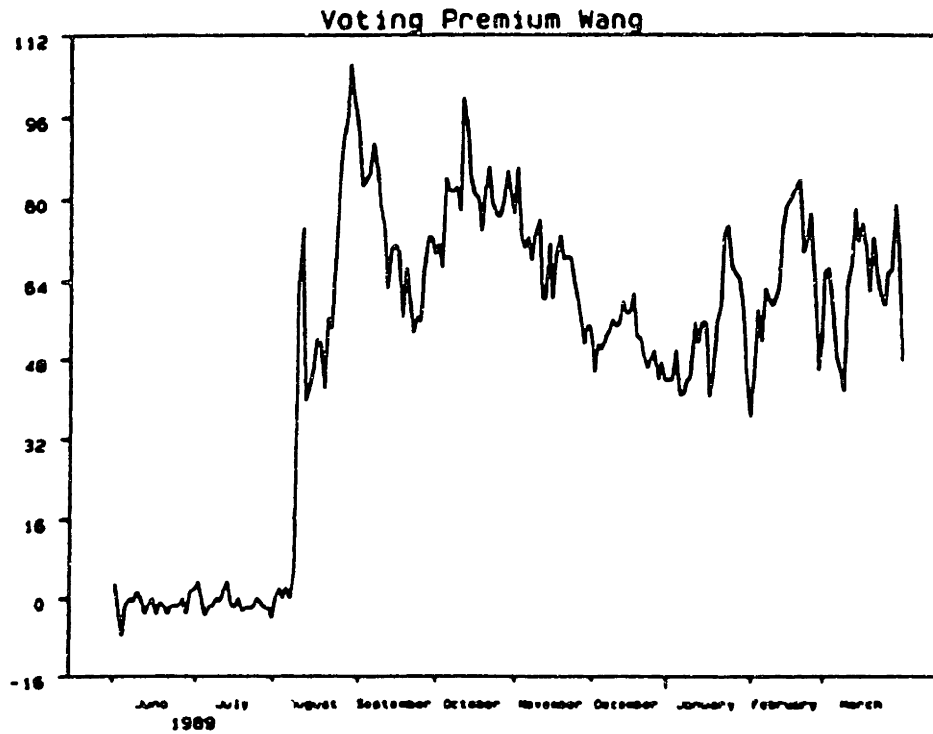


Figure 3-3:

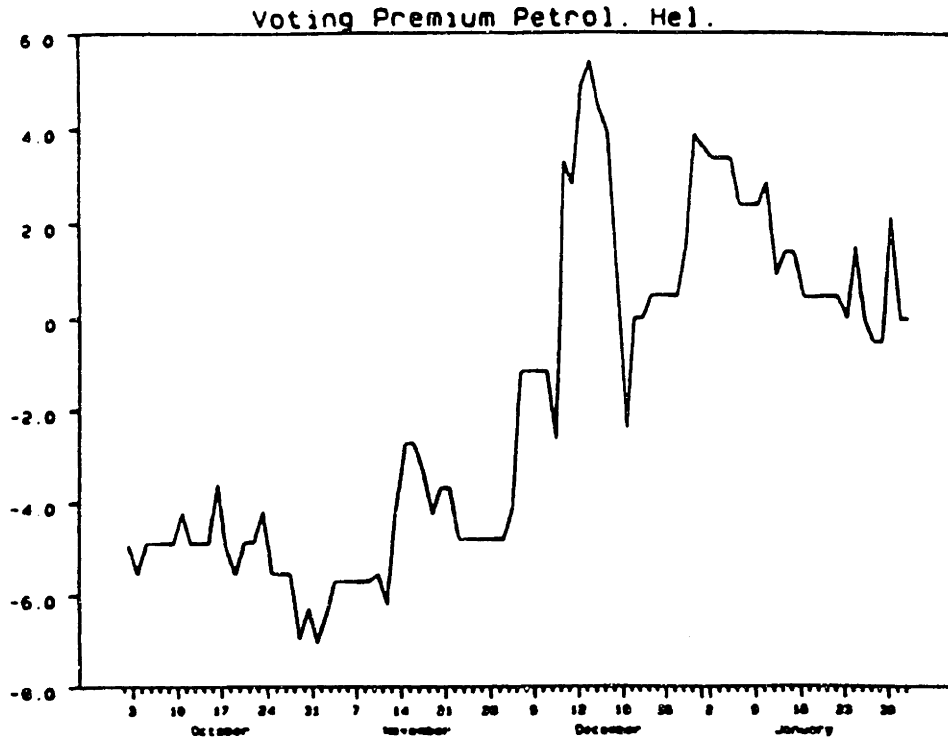


Figure 3-4:

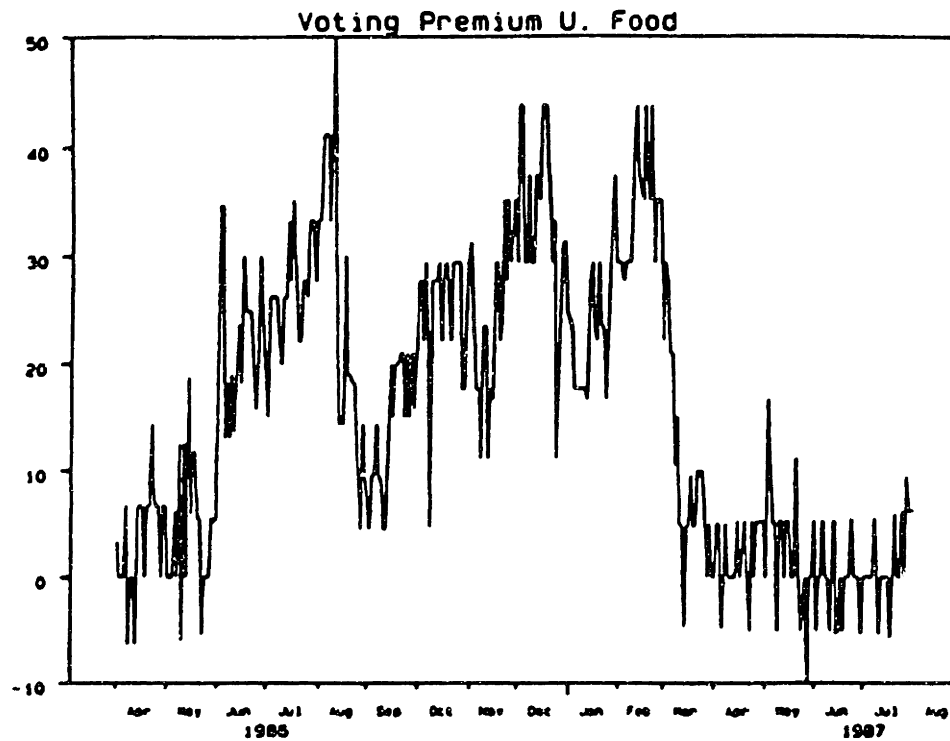


Figure 3-5:

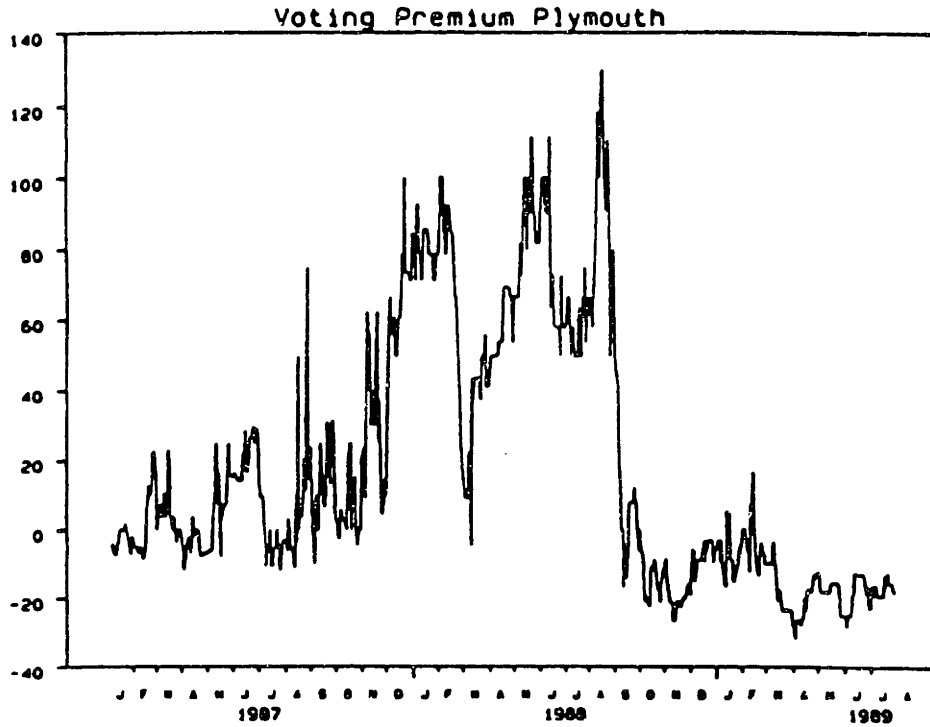


Figure 3-6:

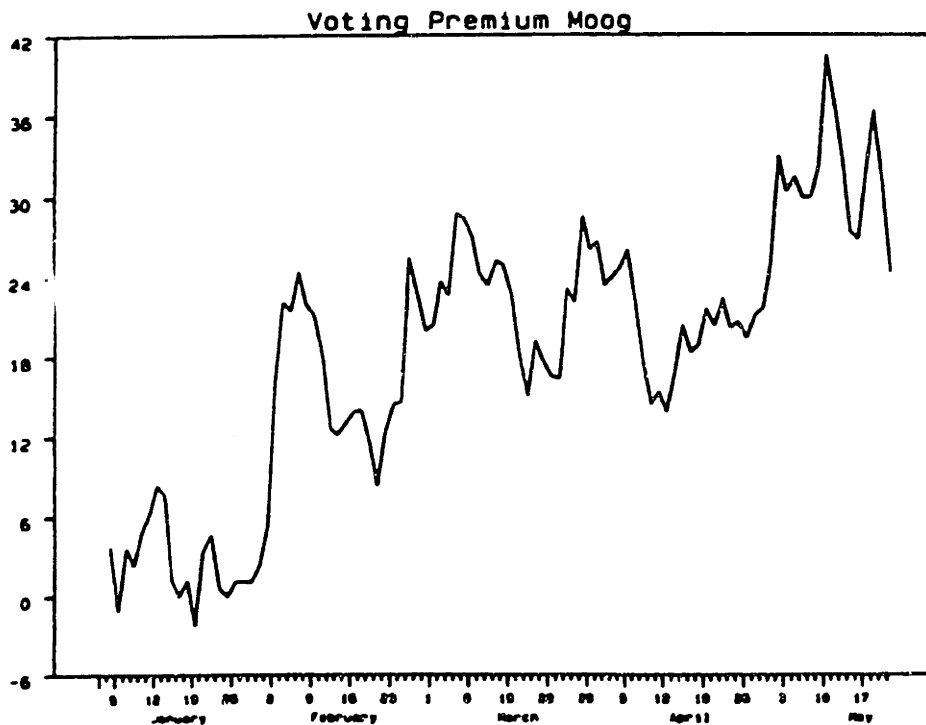


Table 3.7:

Summary Statistics

SERIES	MEAN	MEDIAN	STD. DEV.	MIN.	MAX.	OBS.
Voting Premium	10.47	3.02	23.70	-18.94	221.83	396
Relative Volume	0.44	0.18	0.69	0.00	4.98	348
Fraction of Votes Held by Small Shareholders	0.55	0.51	0.22	0.03	1	396
Vote-Share Ratio	0.43	0.44	0.17	0.08	0.88	396
Size Biggest Shareholder	32.33	28.38	19.74	0.77	85.85	396
Probability Market Votes are Pivotal	0.41	0.41	0.31	0	1	396
Number of Takeovers in the Same Industry	9.10	6	9.61	0.00	53	393
Average Premium in Takeovers same Industry	38.47	35.9	18.45	5.6	183.3	375
Difference in Dividends	0.38	0	0.49	0.00	1	396
Conversion Right	0.61	1	0.49	0	1	396
Top Executive Salary	386.3	331.3	239.6	70	1559	396
Logarithm Net Sales ('000)	12.8	12.13	1.66	1.95	15.53	354
Perc. Superior Shares Held by Institutions	16.13	12.08	14.27	0.1	68.92	237
Perc. Inferior Shares Held by Institutions	28.12	24.55	20.15	0.04	101.8	237

Given a class A of shares with a votes and a class B of shares with b votes, let $r = \frac{b}{a}$, then the voting premium is defined as

$$VP = \frac{P_A - P_B}{P_B - rP_A} \quad (3.31)$$

The Voting Premium variable is defined as the annual average of voting premium as defined above. Relative Volume is the ratio between the annual average number of superior voting shares traded every day divided by the annual average number of inferior voting shares traded. All the data come from CRSP. Volume data are available since 1982 for NASDAQ companies, and since 1986 for AMEX and NYSE companies. The probability markets vote are pivotal is equal to the Shapley value of the market votes in a simple majority game. The fraction of votes held by small shareholders is the voting power held by shareholders

with less than 5% of votes. The Vote-Share Ratio is the ratio between the total normalized number of votes (obtained by attributing one vote to each superior voting share and r of a vote to each inferior voting shares) and the total number of outstanding shares. The Size of the Biggest Shareholder is the percentage of votes controlled by the largest shareholder. All the ownership data comes from *Spectrum 5*. The number of takeovers in the industry is the annual number of takeovers taking place in the industry to which a company belongs to. The average premium is the premium observed in those takeovers. The numbers and the industry classification is from *Mergerstat Review*. Difference in dividends is a dummy variable taking value 1 for every company-year in which the inferior voting shares paid a larger dividend than the superior voting shares. Conversion Right is a dummy variable taking value 1 for every company-year in which the superior voting shares were convertible into inferior voting shares at the holder's will. The executive salary is the cash salary of the highest paid executive in each company-year as reported by the proxy statements. The data for net sales are obtained from Lotus Onesource. The number of shares held by institutions at the end of each year are obtained from the *S&P Security's Owner Stock Guide* and are divided by the number of outstanding shares of that class at the end of each year as reported by CRSP.

Table 3.8:

a: Annual Summary Statistics on the Whole Sample

Cross sectional average by year of the Voting Premium and the Relative Volume as defined in Table 3.7. Volume data are available since 1982 for NASDAQ companies, and since 1986 for AMEX and NYSE companies.

SERIES	MEAN	MEDIAN	STD DEV.	MINIMUM	MAXIMUM	OBS.
Voting Premium 1979	11.81	4.05	20.43	-4.02	59.47	15
Voting Premium 1980	7.03	3.27	10.71	-4.89	32.46	22
Voting Premium 1981	12.79	6.75	19.11	-9.35	71.48	26
Voting Premium 1982	22.30	2.93	75.18	-10.08	409.93	30
Voting Premium 1983	9.05	3.04	24.43	-4.2	154.21	45
Voting Premium 1984	8.28	2.28	21.12	-5.67	137.09	49
Voting Premium 1985	3.72	1.90	8.75	-7.59	36.26	56
Voting Premium 1986	7.59	1.70	14.90	-10.22	75.50	67
Voting Premium 1987	11.52	3.82	29.45	-10.34	221.83	69
Voting Premium 1988	14.28	3.43	29.33	-10.4	180.16	72
Voting Premium 1989	12.85	2.85	31.43	-16.21	188.41	73
Voting Premium 1990	10.96	3.31	19.08	-18.94	81.97	70
Relative Volume 1984	0.56	0.16	1.15	0.020	4.98	22
Relative Volume 1985	0.65	0.15	1.40	0.010	5.38	26
Relative Volume 1986	0.66	0.30	1.82	0.003	14.85	68
Relative Volume 1987	0.50	0.25	0.63	0.001	3.20	69
Relative Volume 1988	0.48	0.21	0.74	0.001	4.20	72
Relative Volume 1989	0.44	0.15	0.79	0.003	5.07	73
Relative Volume 1990	0.45	0.17	0.81	0.002	5.61	71

b: Annual Summary Statistics on the Subsample with Equal Dividend Rights

Cross sectional average by year of the Voting Premium, as defined in Table 3.7, for those companies that have two classes of common stock that differ only in their voting rights.

SERIES	MEAN	MEDIAN	STD DEV.	MINIMUM	MAXIMUM	OBS.
Voting Premium 1979	14.18	2.96	22.29	-4.02	59.47	12
Voting Premium 1980	7.03	4.99	10.32	-4.89	32.46	16
Voting Premium 1981	16.62	8.72	22.14	-1.64	71.48	17
Voting Premium 1982	35.89	4.34	98.47	-4.34	409.93	17
Voting Premium 1983	15.63	3.42	37.55	-4.2	154.21	18
Voting Premium 1984	13.71	2.02	31.93	-5.67	137.09	20
Voting Premium 1985	4.63	0.55	12.58	-7.59	36.26	22
Voting Premium 1986	12.59	3.21	21.49	-10.22	75.5	26
Voting Premium 1987	21.60	10.74	45.53	-10.34	221.83	26
Voting Premium 1988	15.81	6.16	23.69	-10.04	81.10	26
Voting Premium 1989	15.50	2.44	31.64	-12.19	119.83	30
Voting Premium 1990	10.80	2.87	17.83	-8.62	80.26	29

Table 3.9:

OLS Estimates of the Determinants of the Voting Premium

$$VP_{it} = \beta_0 + \beta_1 \left(\frac{\Phi}{\alpha\pi}\right)_{it} + \beta_2 PREF_{it} + \beta_3 CONV_{it} + \beta_4 NTAKE_{it} + \beta_5 VOL_{it} + \epsilon_{it} \quad (3.32)$$

The Voting Premium variable is defined as the annual average of the voting premium as defined in equation (3.31). The Voting Power is equal to $\frac{\Phi}{\alpha\pi}$, and is a measure of the voting power of votes traded on the market. Φ is the probability market votes are pivotal, α is the fraction of votes held by outside shareholders, and the vote share ratio (π) is the number of votes divided by the number of shares. Dividend Preference is a dummy equal to one for all those company-years in which the inferior voting stock received a larger dividend than the superior voting stock. Number of Takeovers is the number of takeovers in the industry group to which a company belongs to. The data and the definition of industry derives from *Mergerstat Review*. The conversion right is a dummy variable equal to one for all those company-years in which the superior voting stock is convertible into the inferior voting one and zero otherwise. Relative Volume is the ratio between the annual average number of superior voting shares traded every day divided by the annual average number of inferior voting shares traded every day. The standard errors, reported in brackets, are robust to heteroskedasticity and serial correlation among observations of the same company in different years.

Dependent Variable: Voting Premium	I	II	III
Intercept	7.19 (3.11)	2.86 (3.40)	0.76 (2.92)
Voting Power	1.91 (0.74)	1.32 (0.52)	1.45 (0.57)
Difference in Dividends	-8.06 (3.71)	-11.41 (3.42)	-11.54 (3.87)
Conversion Right	3.89 (4.00)	5.66 (3.89)	7.84 (3.82)
Number of Takeovers		0.64 (0.27)	0.69 (0.28)
Relative Volume			0.59 (1.82)
R-squared (%)	4.8	11.0	12.8
Observations	396	393	345

Table 3.10:

Possible Sources of Private Benefits

The executive salary is the cash salary of the highest paid executive in each company-year as reported by the proxy statements. The data for net sales are obtained from Lotus Onesource. The Takeover Premium is the average premium observed in takeovers in the same industry in the same year. The numbers and the industry classification is from *Mergerstat Review*. The Voting power is equal to $\frac{\Phi}{\alpha\pi}$ and is a measure of the voting power of votes traded on the market. Φ is the probability market votes are pivotal, α is the fraction of votes held by outside shareholders, and the vote share ratio (π) is the number of votes divided by the number of shares. For all the other variables see Table 3.9. The estimates are obtained by OLS. The standard errors, reported in brackets, are robust to heteroskedasticity and serial correlation among observations of the same company in different years.

Dependent Variable: Voting Premium	Executive Salary			Takeover Premium		
	I	II	III	I	II	III
Intercept	49.45 (26.8)	46.70 (28.28)	44.09 (23.02)	8.18 (1.85)	3.56 (2.74)	-0.47 (2.86)
Executive Salary	0.017 (0.012)	0.021 (0.012)	0.026 (0.012)			
Logarithm Net Sales	-3.85 (2.48)	-4.10 (2.67)	-4.52 (2.28)			
Premium in Takeover in the Same Industry				0.05 (0.04)	0.07 (0.05)	0.05 (0.04)
Voting Power		2.03 (0.77)	2.01 (0.74)		2.00 (0.76)	1.39 (0.52)
Difference in Dividends		-9.22 (4.22)	-14.06 (4.45)		-8.43 (3.91)	-11.55 (3.57)
Conversion Right		5.69 (4.73)	7.68 (4.21)		5.17 (4.01)	6.71 (3.75)
Number of Takeovers			0.77 (0.31)			0.67 (0.27)
R-squared (%)	6.0	11.9	20.0	0.2	5.6	12.6
Observations	357	324	322	428	375	375

Table 3.11:

Institutional Ownership

Percentage of each class held by institutions at the end of each year are obtained from the *S&P Security's Owner Stock Guide*. The *Guide* does not report the data of both classes for all the companies. Therefore, the difference can be computed only for a subset of companies.

SERIES	MEAN	MEDIAN	STD DEV.	MINIMUM	MAXIMUM	OBS.
Superior Class 1984	14.14	10.69	14.26	0.33	68.92	33
Inferior Class 1984	19.11	17.84	17.72	0.91	73.90	33
Difference	-5.77	-2.42	11.57	-36.93	14.01	23
Superior Class 1985	15.66	9.76	15.98	0.17	64.27	38
Inferior Class 1985	22.51	17.84	18.38	0.91	73.90	48
Difference	-7.34	-4.29	13.71	-32.08	16.86	28
Superior Class 1986	18.96	15.30	14.65	0.85	67.94	44
Inferior Class 1986	25.71	22.92	18.38	0.83	72.74	57
Difference	-6.61	-4.65	15.30	-43.98	25.15	32
Superior Class 1987	19.20	13.42	17.85	0.57	76.01	51
Inferior Class 1987	28.26	22.68	20.67	0.62	70.65	57
Difference	-11.50	-7.63	19.71	-59.82	32.90	39
Superior Class 1988	20.50	15.51	18.02	0.10	71.06	50
Inferior Class 1988	31.88	28.91	20.45	0.62	70.65	57
Difference	-13.63	-11.34	14.68	-45.25	9.77	43
Superior Class 1989	18.46	15.84	15.66	0.06	74.10	49
Inferior Class 1989	32.88	30.01	22.10	0.06	101.81	60
Difference	-14.17	-9.70	16.92	-57.39	9.66	45
Superior Class 1990	17.15	12.57	15.23	0.10	63.21	50
Inferior Class 1990	33.38	29.62	21.84	0.73	75.67	60
Difference	-14.75	-10.02	17.42	-59.58	7.38	46

Table 3.12:

Effects of Institutional Ownership

The number of shares held by institutions at the end of each year are obtained from the *S&P Security's Owner Stock Guide* and are divided by the number of outstanding shares of the same class at the end of that year, as reported by CRSP. The Voting power is equal to $\frac{\Phi}{\alpha\pi}$ and is a measure of the voting power of votes traded on the market. Φ is the probability market votes are pivotal, α is the fraction of votes held by outside shareholders, and the vote share ratio (π) is the number of votes divided by the number of shares. For all the other variables see Table 3.9. The estimates are obtained by OLS. The standard errors, reported in brackets, are robust to heteroskedasticity and serial correlation among observations of the same company in different years.

Dependent Variable:			
Voting Premium	I	II	III
Intercept	11.28 (2.17)	6.54 (3.77)	1.45 (5.30)
Percentage Superior Class Held by Institutions	-0.46 (0.18)	-0.51 (0.17)	-0.51 (0.18)
Percentage Inferior Class Held by Institutions	0.20 (0.13)	0.20 (0.13)	0.23 (0.14)
Voting Power		2.43 (0.84)	2.40 (0.93)
Difference in Dividends		-8.31 (4.95)	-13.14 (5.05)
Conversion Right		7.17 (4.10)	8.79 (4.51)
Number of Takeovers			0.64 (0.47)
R-squared (%)	5.5	10.8	15.5
Observations	256	237	234

Chapter 4

Shareholder Response to Dual Class Exchange Offers

A dual class exchange offer (DCEO) is an offer to all the shareholders of a corporation to exchange shares of common stock with superior voting rights for similar shares of the same company, with inferior voting rights. Inferior voting shares are generally guaranteed a privilege, such as higher dividends, to induce exchanging. Before the SEC ban in 1988, DCEOs were becoming increasingly popular as method of introduction of dual classes of common stock. Jarrell and Poulsen (1988) find that between 1984 and 1987 46% of dual class recapitalizations in the U.S. have been implemented through an exchange offer.

The theoretical properties of this form of recapitalization have been analyzed by Ruback (1988). Ruback argues that in a DCEO outside shareholders are likely to face a prisoner's dilemma. The dividend privilege induces outside shareholders to give up their voting rights by exchanging. However, if outside shareholders were able to coordinate among themselves they would be better off not exchanging. In fact, by exchanging outside shareholders will leave the majority of votes to insiders and lose the premium of a potential takeover. However, while in Ruback's work it is clear that shareholders may be trapped in a coercive equilibrium by a DCEO, the subsequent debate has taken for granted that they are always trapped. Surprisingly enough, the question has never been addressed empirically.

The purpose of this paper is precisely to test the assumptions and the predictions of Ruback's model by using actual data of shareholders' behavior in dual class exchange offer. This analysis is interesting from two very different perspectives. First of all, Ruback's model is one of the few cases in which the predictions of a game theoretic model with multiple equilibria can be tested with actual, and not experimental, data. In addition, the results are also very interesting from a public policy perspective. Ruback's work, submitted to the Security and Exchange Commission in the hearings on the one share-one vote issue, has been particularly influential in the decision to ban DCEOs taken by the SEC in July 1988 (rule 19c-4). The SEC decided to ban DCEOs because it accepted the view that DCEOs are intrinsically coercive. However, in June 1990 the Federal Appeals Court invalidated the SEC ban, on the ground that the SEC cannot invade state competence in corporate governance matters. Therefore, DCEOs may return as an issue in the public policy debate.

The data chosen to test Ruback's model regard DCEOs in Italy. The advantage of the Italian institutional setting is that it excludes other confounding elements present in the U.S.. First of all, since 1974 DCEOs have been legal in Italy, and so have been nonvoting shares. The same certainty of the legal environment cannot be claimed in the U.S.. Inferior voting shares were banned from the NYSE until 1984. After that date there were strong regulatory pressures to ban all types of differential voting shares from all the Exchanges. The risk of a ban on differential voting shares may have distorted the exchanging decision in the U.S., but not in Italy. Secondly, the Italian law requires that both classes of stock be listed in an Italian stock market. This is not the case in the U.S.. Therefore, an outside shareholder in the U.S. facing the exchange offer perceives the risk of being left with a delisted security. This risk increases his incentives of choosing the same security that everybody else chooses. This additional risk may further distort the original choice of by outside shareholders in the U.S.. Finally, in Italy the exchange offers often last for many years, decreasing the possibility of uninformed decisions due to time pressure. Therefore, Italian DCEOs provide a nice sample to focus on the characteristics analyzed by Ruback's paper, keeping aside

other confounding elements.¹

The study shows that there is no evidence that the most likely equilibrium selected by shareholders is the coercive one. Data on shareholders' exchange behavior and on prices of the two classes of shares after the DCEO expired show that shareholders have an incredible ability in coordinating on the noncoercive equilibrium. The evidence suggests that DCEOs do not necessarily trap shareholders in a prisoner's dilemma type of situation, and that insiders do not necessarily obtain control of the company cheaply.

The paper is organized as follows. Section 1 reviews Ruback's argument and the assumptions upon which it relies. The theoretical possibility of multiple equilibria relies on the assumption that, at least in some cases, superior voting shares can be paid more in takeovers. Therefore, section 2 presents the U.S. and international evidence on differential takeover premia of dual class shares. Section 3 describes the Italian data sample and presents empirical behavior of shareholders facing an exchange offer. Conclusions follow.

4.1 Ruback's Argument

In a DCEO shareholders are offered the opportunity to exchange shares of common stock with superior voting rights for shares with inferior voting rights but higher dividends. Ruback (1988) considers the optimal strategy for outside shareholders. He analyzes two cases. In the first one, he assumes that both classes of shares will receive the same price in case of a takeover. In this case exchanging is a dominant strategy for an outside shareholder, unless he is pivotal (i.e. his decision determines whether the incumbent management obtains the majority of votes). Following the literature,² I will maintain the nonpivotal assumption. Outside shareholders are generally small and dispersed, therefore it is very unlikely they perceive themselves as pivotal. In this case, if an outside shareholder exchanges, he will get the additional dividend without

¹Of course, such elements should be taken into account to draw any public policy conclusion.

²An exception is Holmström and Nalebuff (1988).

losing the premium in case of a takeover. By contrast, if he does not exchange he will give up the dividend privilege in exchange for the superior voting power. However, Ruback argues that the superior voting power is valueless. Either insiders obtain a majority of votes after the DCEO and the superior voting power is of no use for the outside shareholder, or the insiders do not get the majority and the outside shareholder may hope in a takeover premium. However, by assumption both classes will receive the same price in case of a takeover, therefore the superior voting power has no value. Therefore, the additional dividend is lost without any compensation. This makes exchanging a strictly dominant strategy.

If takeover premia are allowed to differ across different classes of shares, then exchanging is not a dominant strategy any more. As Ruback correctly points out, in this case there is another equilibrium in which outside shareholders are not hurt but benefit from a DCEO. Ruback is aware of this possibility, but he considers it “less likely to occur in practice” (p. 168). The reasoning is the following: by exchanging, an outside shareholder gets the additional dividend but loses the potential differential premium in case of a takeover. His optimal strategy will depend on his expectation of other outside shareholders’ behavior.³ If he expects that the number of outside shareholders who exchange is large enough to give the majority to the incumbents, then his best response is to exchange. This produces the coercive equilibrium, in which outside shareholders are coerced to exchange by the fear of losing the dividend privilege. However, if he does not expect that enough shareholders will exchange, then he will exchange only if the value of the additional dividend is bigger than the expected takeover extra premium of superior voting shares. In this case outside shareholders are not trapped, but they are free to choose. In the good equilibrium not all outside shareholders exchange. Given that outside shareholders have an identical payoff function, this can be an equilibrium only if either nobody wants to exchange or everybody is indifferent between exchanging and not exchanging (i.e. the two strategies produce the same payoff). This implies that the value of the superior voting power should be greater than or equal to the value of the dividend privilege.

³In all the discussion it is assumed that insiders will never exchange their shares.

From the point of view of outside shareholders, this equilibrium is Pareto superior not only to the coercive equilibrium, but also to the pre-DCEO situation. In fact, insiders are not entrenched, but they end up paying a larger dividends to the outside shareholders who have chosen the inferior voting shares.

There are two aspects of Ruback's work that should be tested. The first one is whether dual class stocks will ever receive two different prices in case of a takeover. If I can empirically reject that, then the coercive equilibrium is unique, and there is no scope for further testing. However, if differential payments in case of takeovers are possible, then I can test empirically which equilibrium is selected and whether the equilibrium conditions asserted by Ruback are satisfied.

4.2 Empirical Evidence on Differential Takeover Premia

This section seeks to establish whether there is any evidence suggesting that differential voting shares are sometimes paid a different price in case of an acquisition. If this possibility is rejected, then the emergence of the coercive equilibrium in DCEOs would follow on an "a priori" ground, and no further testing would be required.

If a law or a specific corporate by-law imposes an equal treatment of both stocks in case of an acquisition, this is certainly the case. However, this is not the usual case in the U.S., so one should look at the empirical evidence on this issue.⁴

Ruback himself looks at the evidence on this issue, by mentioning the results of De Angelo and De Angelo's (1985) paper. De Angelo and De Angelo analyze acquisitions of companies with dual class stock between 1960 and 1980. In 20 out of 30 cases analyzed the price paid is equal for both classes. In 6 other cases some shareholders receive additional noncash compensation (option to buy a division of the

⁴Note that here I bias my reasoning in favor of the coercive outcome, by maintaining the assumption that a voting right is valueless if the takeover premium for the two classes is required to be the same. On the contrary, in a study on the value of votes in Canada, Robinson and White (1990) find that superior voting shares trade at a premium over inferior voting shares, even in those companies with a by-law that requires equal price in case of a takeover. The size of this premium varies between 2% and 16% in different years.

company, etc.). In the remaining 4 cases the premium paid for the superior voting shares varies between 83% and 200% above the price of the inferior voting shares. However, the authors find no case of differential payment among companies with both classes publicly traded. Therefore, according to De Angelo and De Angelo's evidence it seems that outside shareholders should never expect to receive a larger payment for their superior voting stock.

However, this conclusion is reversed if you look at a broader set of evidence. In the U.K. Megginson (1990) finds that 43 dual class stock companies have been acquired between 1955 and 1982. In 37 of the 43 cases the superior voting shares received a higher price. On average the price received by superior voting shares is 28% above the price paid for inferior voting shares. Rydqvist (1987) presents the case of four control contests in Sweden. The premia for superior voting shares vary between 25% and 190%. Similarly, Zingales (1992a) reports the events of a control contest in Italy, where differential voting stocks were paid two very different prices.

Evidence in this direction is not limited to foreign countries. Despite the small number of dual class companies with both classes publicly traded in the U.S., there have been recently two cases of acquisitions paying a larger price to the superior voting shares. In these two cases (Dickenson Mines and Resort International) the additional premium offered to superior voting shares is equal to 26% and 306%. It is worth mentioning that the initial offer of Donald Trump for Resort International was at a 800% premium, \$135 per share for the superior voting shares versus \$15 per share for the inferior voting shares. It was only after many shareholders suits and the intervention of another bidder (Merv Griffin) that the differential premium was sensibly reduced.⁵ Therefore, even if a differential takeover premium is not always present, it cannot be ruled out ex-ante.

This conclusion is also supported by the international evidence on the price differential between shares that differ only in their voting rights. All the studies find that superior voting shares are traded at a premium.⁶ These findings imply that the

⁵If you want to know more on this issue see Zingales (1992b).

⁶Levy (1982) studies the Israeli market; Lease, McConnell and Mikkelson (1983 and 1984) and

marginal investor, most likely an outside rather than an inside shareholder, values the superior voting rights. Outside investors do not obtain any private benefits from superior voting rights, therefore they should expect to be paid a larger price for their superior voting right in case of a takeover.

4.3 Empirical Evidence on Conversions

In Italy DCEOs are legal and they have been quite frequent in recent years. After a brief description of the Italian financial market and of the sample used, I will present the results of the shareholders' response to DCEOs.

4.3.1 The Italian Sample

In Italy, besides common shares (called ordinary), there exist nonvoting shares, called savings shares. Nonvoting shares are guaranteed some privileges: the right to a minimum dividend of about 6% of the par value whenever earnings are positive, and the right to excess dividends above those distributed to ordinary shareholders, of between 2% and 20% of the par value, if cash dividends are distributed.⁷

Since the par value is generally well below the market price, these privileges are much smaller in terms of market prices. Table 4.1 presents the size of the privileges of nonvoting shares for each company in the sample, as a percentage of the average monthly price of the nonvoting shares in the year before the exchange offer expired. On average, the nonvoting shares have the right to a minimum dividend equal 2.3% and the right to an additional dividend equal to 1% of the market price. These privileges are very similar to those granted to inferior voting shares in the U.S..⁸ Despite the size of the privileges is quite limited, their amount is far from trivial. A nonvoting shareholders would receive, on average, 36% more cash dividends than a voting shareholder.

Zingales (1992b) the U.S. market; Rydqvist (1987) the Swedish; Megginson (1990) the British; Robinson and White (1990) the Canadian; and Zingales (1992a) the Italian market.

⁷To learn more on the characteristics of these securities and of the Italian market in general you can see Zingales (1992a).

⁸See Zingales (1992b).

My analysis considers all the transactions concluded between January 1985 and July 1990 involving an exchange offer or a right to convert one-to-one nonvoting and voting shares. The sample consists of 12 companies that issued nonvoting shares convertible into voting ones at certain prespecified dates; 1 company that allowed nonvoting shareholders to convert their shares into voting ones, and 3 companies that offered to voting shareholders the possibility of converting their shares into nonvoting shares by a certain date.⁹

Only the last three cases are identical to the situation discussed by Ruback. The remaining 13 cases are different from the classical DCEO discussed by Ruback in two respects. First, in all but one the right to exchange shares was granted at the time the security was issued, and not later on. Second, the exchange offer is from nonvoting to voting, and not vice versa. However, I will argue in the following that none of these two differences can affect the results.

First of all, the decision of issuing nonvoting shares convertible into voting shares is already sunk at the time of the exchange decision. The price of securities will reflect the expectation of the outcome of the exchange offer, but so will the price of voting shares after the announcement of a classical DCEO. One could argue that at the time of the issue of the convertible nonvoting shares insiders could have bought enough of them to guarantee them majority even in case of massive exchanging. However, the same type of argument could apply to the traditional DCEOs. Furthermore, if this argument were true, it would have biased the result in favor of the coercive equilibrium (if insiders retain majority no matter what, then an outside shareholder is better off with a nonvoting share, which pays him an additional dividend). Therefore, the final trade-off between vote and dividend privilege is not affected in anyway by the past history.

The second point is a little bit more subtle: exchange offers to nonvoting share-

⁹I exclude from my sample the few cases in which there was also a nonconvertible nonvoting type of share, at the time the right to exchange the convertible nonvoting shares expired. The pre-existence of nonvoting shares modifies the terms of the problem. The results would be unchanged including those cases, because all shareholders preferred to convert their savings shares into ordinary ones.

holders are exactly the mirror image of traditional DCEOs, and the fundamental problem faced by outside shareholders is unchanged. Figure 4-1 summarizes the correspondences between the two types of exchange offers.

	Traditional DCEO	Mirror Image DCEO
Initial security	Voting	Nonvoting
Security obtained by exchanging	Nonvoting	Voting
Payoff from exchanging	-Vote + Privilege	Vote - Privilege
Effect of exchange on insiders' voting power	Increase control	Decrease Control

Figure 4-1: Traditional vs. Mirror Image DCEOs

In traditional DCEOs the starting point is a voting share. By exchanging it for a nonvoting share an outside shareholder will gain the dividend privilege, but will lose the value of the voting right. In addition, the exchanging decision will affect the insiders' voting power (any exchange will increase insiders' voting power). Vice versa in the mirror image DCEOs an outside shareholder will gain the dividend privilege and lose the voting right by *not* exchanging. Similarly, by not exchanging he will increase (or fail to decrease) the insiders' voting power. It is clear that a mirror image DCEO is equal to a traditional DCEO in which the choice to keep the original security is called "exchanging" and the choice of converting the non voting share into the voting share is called "not exchanging". Therefore, by looking at the class of stock eventually chosen, and not at the action, the two types of DCEO can be summarized into one. In this context choosing the voting share is equivalent to "exchanging", and choosing the nonvoting share is equivalent to "not exchanging". Ruback's model applies to this extended framework as well. One possible concern, in testing Ruback's predictions with experiments that are framed differently, is the possibility of a status quo bias. This bias will increase the shareholders preference for nonvoting shares. As

I will show later this possibility is clearly rejected by the data.

After this relabeling the only difference between these two types of DCEOs concerns the interpretation of the initial insiders' holdings. In a traditional DCEO outside shareholders' choices determine whether insiders will obtain majority control. By contrast, in a mirror image DCEO outside shareholders' choices will determine whether insiders will lose absolute control. The Italian DCEOs would be the perfect mirror image of traditional DCEOs only if the insiders' ownership is above 50% before the DCEO, and it may go below 50% as a result of a massive exchange of voting shares. This is indeed the case in my sample. Table 4.1 reports also the size of the largest shareholder before the DCEO in each company.¹⁰ The average stake among companies that underwent the mirror image DCEO is 55%. An average stake slightly above 50% corresponds to a stake slightly below 50% in traditional DCEOs. In Partch's (1987) sample the average insiders' ownership of all the companies that introduced dual class stocks in the U.S. is 48.6%. The same average, for companies that did that through an exchange offer, is 42.7%. Therefore, Italian DCEOs are the perfect mirror image of the typical U.S. DCEO studied by Ruback. Furthermore, in all but one case the conversion of all nonvoting shares into voting would leave the largest shareholder without a majority control.¹¹

By contrast the three traditional DCEOs taking place in Italy show a higher level of insiders' ownership (67%). The fact that in these three cases insiders already owned the majority of stock before the DCEO should bias the result in favor of the coercive equilibrium. If the value of the voting power becomes zero when the insiders own more than 50%, then exchanging the voting right for the dividend privilege is a dominant strategy for outside shareholders.

¹⁰In Italy it makes more sense to measure the insiders' ownership in terms of the ownership of the largest shareholder. This is generally a family group that controls the Board of Directors and appoints the head of the family to the position of CEO. The Italian corporate sector is characterized by a very concentrated ownership structure. Even among listed corporations, the average number of votes held by the largest shareholder is above 50%.

¹¹This result can be derived from the last column of Table 4.1 and the first column of Table 4.2, under the assumption that the largest shareholder does not own any convertible nonvoting share and does not buy additional voting shares. Nonvoting shares are issued to the bearer, therefore it is impossible to know who owns them.

4.3.2 Results

The prediction of Ruback's coercive equilibrium is that all outside shareholders will prefer nonvoting shares because of the privileges. Therefore, whenever a DCEO offers the chance of exchanging nonvoting shares for voting ones, outside shareholders should not want to do so. Table 4.2 presents evidence on the actual Italian experience. Part A contains the conversion of nonvoting shares into voting. In the coercive equilibrium everyone chooses the nonvoting because of the privilege. Therefore, the expected result is that nobody converts, i.e. the third column of Table 4.2.A should have only zeros. But the data show that only 2 out of 13 cases are close to that situation. One of these two companies (Sip) is majority-owned by the Italian Government. In this case it is reasonable to assume that shareholders would not value the voting right very much. By contrast, in 10 of the remaining 11 cases more than 90% of nonvoting shareholders exchanged their shares, in the eleventh 80% did so.

In the three cases of classic DCEOs, the evidence is less clear-cut. The law requires that the number of nonvoting shares not exceed the number of common shares. Therefore, the percentage conversion should always be less than or equal to 50%. Furthermore, in the Alleanza case, the right to exchange was limited to 30% of the shares. Therefore, if the coercive equilibrium is selected the last column of table 2.B should be equal to 50% in the first and last row, and 30% in the middle one. In the Alleanza case, just 17% of the common shares was converted (and more than half of that was converted by insiders). Italcable, another company controlled by the Italian Government, shows a higher percentage of conversions (24%), but still short of the 50% threshold. In the last case (Boero Bartolomeo) the number of conversions was insignificant (0.35%). Therefore, in at least 16 out of 18 cases the results reject the implications of the coercive equilibrium.

A possible objection might focus on the limited size of the additional dividend right offered to shareholders in my sample (about 1% of the market price, but on average 36% more than the dividend received by voting shares). A higher privilege may have induced shareholders to convert. This is the exact point: shareholders are not coerced into tendering their votes at any positive price, but they require an

“appropriate” compensation.

So far the evidence on the percentage of shareholders choosing voting over non-voting security suggests that outside shareholders are not generally trapped in the coercive equilibrium. However, it is possible to actually test whether it is the other equilibrium that is generally selected. A test on the returns of the two exchanging strategies will achieve this goal. Ruback’s good equilibrium does not restrict the relative percentage of voting versus nonvoting shares, but it does establish a testable restriction on the behavior of the prices of the two shares after the exchange offer expires. If only a fraction of outside shareholders exchange, then the expected prices of the two stocks should be equal. This makes outside shareholders indifferent between exchanging or not.¹² To treat in a unified framework the two cases (classical DCEO and mirror image DCEO) I will define the strategies referring to the security eventually chosen, independent of the starting point. The prediction of the coercive equilibrium is that the choice of the nonvoting shares should produce a larger return. In fact, if an outside shareholder chooses a voting share, while most of the others choose the nonvoting one, he will have neither a dividend privilege nor a potential takeover premium. On the contrary, in a good equilibrium either only a fraction of outside shareholders choose the nonvoting share, because they are indifferent between the two strategies (i.e. they yield equal expected returns), or nobody chooses the nonvoting share, because choosing the voting one gives a higher expected return. Therefore, in a good equilibrium the expected difference between the return of choosing a voting share and that of choosing a nonvoting share should be nonnegative.

Table 4.3 presents the returns of the two strategies for the 14 out of 16 cases in which it was possible to compute them.¹³ Assuming normality of the difference in the return and independence across companies, it is easy to test the hypothesis of a coercive equilibrium ($\mu < 0$) versus the alternative of a good one ($\mu \geq 0$). The average difference of returns is 2.74%, with a standard deviation of 5.61. A test of

¹²In order to make data comparable across companies I compute the returns to the two possible strategies: exchanging and not exchanging.

¹³The two cases excluded are Alleanza (the nonvoting share was listed only several months later) and Boero Bartolomeo (the nonvoting share is not yet listed).

size 0.90 rejects the null hypothesis.¹⁴

An additional argument in favor of this equilibrium is that it does not admit an arbitrage opportunity. In fact, in the coercive equilibrium shareholders lose because they fail to recognize the impact of their choice on the probability of a takeover. An arbitrageur can buy all outside shareholders' shares and internalize this effect. After the conversion he can immediately resell the shares at a premium, because then the share price will incorporate the takeover premium. However, because this arbitrage is not risk free, it does not completely rule out the coercive equilibrium.

4.4 Conclusions

Ruback's theoretical work (1988) points to two possible equilibria in DCEOs: one coercive and one not. He conjectures that the coercive one is most likely to occur, but leaves open the question of which equilibrium is realized in practice. Using data on DCEOs in Italy, this paper suggests that outside shareholders are not trapped in a coercive equilibrium, but rather that they require substantial compensation for giving up their votes. Both the conversion percentage and the ex-post behavior of prices suggest that the noncoercive equilibrium is the most likely to occur.

The ability of dispersed shareholders to coordinate on the superior equilibrium raises the question of how this actually happens. Do shareholders play different strategies with their shares (e.g. each one exchanges just 20% of his holdings) or does each shareholder play the same strategy with all of his shares, randomly picking his own strategy? This is a potentially fruitful area for future research. Unfortunately it requires data on individual behavior, not easily available.

The other question that this paper raises is what induces corporate insiders to use the exchange offer mechanism. If outside shareholders are not trapped in a coercive equilibrium, then insiders do not buy control cheaply. A noncoercive theory of DCEOs

¹⁴It is worth mentioning that the average premium of the voting shares over the nonvoting shares in the month after the conversion right expired was just 3%, not significantly different from zero. This is in sharp contrast with the 80% average premium across the whole population of Italian dual class stock companies (Zingales 1992a). This fact supports the conclusion that shareholders choose between the two types of stocks so to equalize the expected prices.

requires a consistent explanation of why DCEOs are used. This is a topic that should be addressed in a future work.

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Table 4.1:

Preferences of Nonvoting Shares and Stock Ownership in Italy: 1985-1990.

The minimum dividend yield is computed as a percentage of the average monthly price of the non voting share in the year before the right to convert expired. For Alleanza and Boero, where the non voting shares were not listed, the price of the corresponding voting share is used. The dividend yield in excess is the additional dividend guaranteed only to nonvoting shareholders as a percentage of the average monthly price of the non voting share in the year before the right to convert expired. The dividend yield of the voting shares over the dividend yield of the nonvoting shares is just the ratio between the dividend yield of the two stocks computed for the year before the conversion is considered. If voting shares did not pay dividend that year, the nearest dividend paid is considered. The percentage stake of the largest shareholder is computed as the percentage ownership of voting shares before the exchange offer. Ownership data are obtained from "Il Taccuino dell'Azionista" of the corresponding year. Ownership before conversion is the one reported in the January edition just before the conversion right started.

Company name	Minimum dividend yield	Dividend yield in excess	Div. yield vot. over div. yield non voting	Percentage stake largest shareholder before DCEO
Italcable	0.88	0.35	1.13	60.7
Sip	4.14	1.66	1.26	63.4
Premuda	5.83	2.33	1.74	51.9
Standa	0.52	0.21	1.08	69.4
Rejna	1.74	0.58	1.57	67.0
III	2.85	1.71	1.59	89.3
Necchi	2.38	1.19	1.18	52.0
Cantoni	1.90	0.76	1.28	21.1
Safilo	0.97	0.58	1.16	72.2
Selm	3.60	1.44	1.25	63.6
Gemina	1.42	0.57	1.23	34.0
Jolly Hotel	1.16	1.16	1.47	60.0
Saipem	1.78	1.07	1.65	51.0
Burgo	2.90	0.72	1.22	19.3
Alleanza	0.22	0.22	1.25	64.6
Boero Bart.	4.01	1.60	1.67	76.6
Average	2.27	1.01	1.36	57.3
St. Dev.	1.48	0.59	0.21	18.4

Table 4.2:

Conversion Patterns

The percentage of non voting shares before the beginning (after the end) of the conversion period is taken from *Il Taccuino dell'Azionista* of the corresponding year. Column 3 cannot be obtained from Column 1 and 2 because in many cases new offerings during the conversion period have altered the proportion of voting and non voting shares in the company. Companies are listed according to the date of expiration of the conversion right starting from June 1985 to July 1990.

A: Nonvoting Shares Convertible into Common			
Company name	Percentage non-voting shares before conv. started	Percentage non-voting shares after conv. finished	Percentage non-voting shares converted
SIP	47.71	37.67	1.31
PREMUDA	33.33	33.24	0.30
STANDA	50.00	3.47	93.07
REJNA	50.00	0.70	98.60
III	49.78	2.02	93.29
NECCHI	38.50	1.44	79.40
CANTONI	33.33	2.60	92.17
SAFILO	11.71	0.85	92.71
SELM	23.69	5.56	93.91
GEMINA	26.02	0.64	96.53
JOLLY HOTEL	48.37	0.23	99.53
SAIPEM	22.22	0.60	96.40
BURGO	37.59	0.65	96.01
Mean	36.33	6.90	79.48
St.Dev.	12.17	12.29	33.87

B: Common Shares Convertible into Nonvoting			
Company name	Percentage non-voting shares before conv. started	Percentage non-voting shares after conv. finished	Percentage non-voting shares converted
ITALCABLE	16.67	36.36	23.64
ALLEANZA	0.00	16.67	16.67
BOERO BARTOLOMEO	0.00	0.35	0.35
Mean	5.56	17.79	13.55
St.Dev.	7.86	14.73	9.76

Table 4.3:

**Returns to Choosing a Voting
Versus a Nonvoting Share
at the Time of the Last Conversion**

In the first case the voting shareholders could convert their shares into non-voting shares, in the remaining 12 cases non-voting shareholders could convert their shares into voting shares. In order to make them homogeneous the two strategies considered are expressed as a function of the type of share chosen and not of the decision of exchanging. Two companies are missing, because non-voting shares started to be listed several months later (Alleanza) or they have never been listed (Boero Bartolomeo). The percentage returns computed using the average price of the chosen type of share in the month after the conversion right expired, divided by the price of the share with the conversion right at the beginning of the last month of conversion. Companies are listed according to the date of expiration of the conversion right starting from June 1985 to July 1990.

Company name	Choice voting	Choice Nonvoting	Difference
Italcable	12.54	24.11	-11.57
Sip	-0.79	-1.13	0.34
Premuda ^a	3.56	-0.80	4.36
Standa	3.61	-0.26	3.87
Rejna	2.16	1.70	0.46
III	-10.74	-13.82	3.08
Necchi	-9.34	-10.54	1.20
Cantoni	-6.40	-10.04	3.64
Safilo	4.63	-4.65	9.27
Selm	30.97	19.29	11.68
Gemina	10.71	7.97	2.74
Jolly	1.12	-2.64	3.76
Saipem	18.40	8.79	9.62
Burgo	-32.31	-28.20	-4.11
Mean	2.01	-0.73	2.74
St. dev.	14.28	12.87	5.61
T. stat.			1.69

^a In the case of Premuda (listed on a minor stock exchange) the return is computed using an average of the monthly prices of the first quarter after the conversion and of the six month before.