ESSAYS ON
CORPORATE FINANCE
AND
GOVERNANCE

Johan Molin

AKADEMISK AVHANDLING

Som för avläggande av ekonomie doktorsexamen
vid Handelshögskolan i Stockholm
framläggs till offentlig granskning
fredagen den 17 maj, 13.15 i sal 550
Handelshögskolan, Sveavägen 65

STOCKHOLM 1996

Essays on Corporate Finance and Governance

STOCKHOLM SCHOOL OF ECONOMICS

THE ECONOMIC RESEARCH INSTITUTE

Address: Sveavägen 65, Box 6501, S-113 83 Stockholm. Tel.+46 8-736 90 00

Basic Orientation

The Economic Reserarch Institute, at the Stockholm School of Economics (EFI) is devoted to the scientific study of problems in management science and economics. It provides research facilities for scholars belonging to these disciplines, training advanced students in scientific research. The studies to be carried out by the Institute are chosen on the basis of their expected scientific value and their relevance to the research programs outlined by the different sections of the Institute.

Research Divisions

A	Management and Organization
B	Accounting and Managerial Finance
C	Managerial Economics
CEE	Center for Ethics and Economics
CFR	Center for Risk Research
CHE	Center for Health Economics
D	Marketing, Distribution, and Industry Dynamics
ES	Economic Statistics
FI	Finance
F	Public Management
IEG	International Economics and Geography
I	Information Management
P	Economic Psychology
S	Economics
T	Industrial Production

Research Programs:

Man and Organization
The Foundation for Distribution Research
Policy Sciences

Additional information about research in progress and published reports is described in our project catalogue. The catalogue can be ordered directly from the Economic Research Institute, Box 6501, S-113 83 Stockholm, Sweden.

Essays on Corporate Finance and Governance

Johan Molin

STOCKHOLM SCHOOL OF ECONOMICS
THE ECONOMIC RESEARCH INSTITUTE

A Dissertation for the Doctor's Degree in Philosophy
Stockholm School of Economics 1996

ISBN 91-7258-421-1

Keywords:
Corporate Finance
Corporate Governance
Ownership Structure
Poison pills
Private Placements
Takeovers
Takeover Defense
Takeover Regulation
Rights Issues
Seasoned Equity Offerings
Stock Market Liquidity

Cover Illustration:
Magnus Andersö

Printed by
Graphic Systems, Stockholm 1996

Distributed by
The Economic Research Institute at the Stockholm School of Economics
Box 6501, S-113 83 Stockholm, Sweden

Acknowledgments

Many people have contributed to this thesis in one way or another. I wish to express my sincere gratitude to a number of colleagues and friends, who have helped and encouraged me in its completion.

I am deeply indebted to Professor Clas Bergström at the Finance Department at the Stockholm School of Economics. He persuaded me into joining the Ph.D. program and introduced me to the field of corporate finance. As my main thesis advisor, he has spent immense amounts of time to read numerous versions of my papers, and added an equal amount of invaluable comments and suggestions. Without the guidance and inspiration provided by Clas Bergström, I would not have been able to write this thesis.

I have had the fortune to have Professor Staffan Viotti on my thesis committee. I have benefited greatly from his wit and ability to look beyond the veils of matters. With his sharp intellect, he has been able to point to the important and to discard what is not.

I have also been privileged to enjoy the friendship and colleagueship of Mike Burkart. With his brilliant mind and profound insights into the theoretical aspects of corporate finance, he has contributed greatly to my thesis.

Peter Högfeldt deserves thanks for many valuable comments. He has demonstrated his ability to put energy and a high level of ambition into his work, in particular, as a collaborator in the Mandatory-Bid project.

The essay on the Mandatory Bid Rule (Essay IV) is based on a joint work with Clas Bergström and Peter Högfeldt. In addition from those mentioned above, the essay has benefited from comments by Simon Beninga, Edwin Elton, Pekka Hietala, Abraham Ravid, Piet Sercu, Richard Stapleton, and Luigi Zingales. Participants at the EIASM workshop on corporate finance, Brussels, March 1993, and the 2nd Annual European Financial Management Conference, Virginia Beach, June 1993, have also contributed with valuable discussions. I am particularly grateful to Edwin Elton for giving me an encouraging pad on the back when I first presented the preliminary outline at the European Finance Association Doctoral Tutorial in Lisbon in August 1992. Thomas Bergqvist, now a vice president at Handelsbanken, provided excellent graphical assistance.

The essay on private placements (Essay II) has also benefited from comments by Tom Berglund, Øyvind Bøhren, Espen Eckbo, Yrjö Koskinen, Ronald W. Masulis, Knut Sagmo, David Smith, and Marc Zenner. I would also like to thank Marcus Asplund, Richard Bagge (Aros FK), Gustaf Hagerud, Ragnar Lindgren, Jens Nystedt, Tomas Sörensson, Lotta Strömberg (Alfred Berg FK), Per Strömberg, Torbjörn Sällström, and Karin Thorburn for helpful suggestions and insightful discussions. I am also indebted to Eva Liljeblom for providing me with complementary data. Jan Wellander at the Stockholm Stock Exchange was very helpful in giving me access to their press-release archives.

Clas Bergström, Mike Burkart, and Staffan Viotti have provided valuable comments and suggestions to Essays I and III. Also Gustaf Hagerud and Jens Nystedt have contributed with rewarding discussions.

I am grateful to Per Samuelsson for checking the legal aspects in my thesis.

I wish to express my greatest appreciation of my many fellow Ph.D. students at the Department of Finance, who have offered me helpful advice, intellectually rewarding discussions, and above all, friendship. It is a true privilege to be part of such a pleasant and stimulating environment. I would like to thank Gustaf Hagerud and Jens Nystedt, my next-door neighbors at the Department, for their tolerance with my many strange questions and for their sociable company, on and off the job. In this respect, I would also extend my thanks to some other colleagues, past and present: Ulf Axelson, Thomas Bergqvist, Professor Tomas Björk, Niklas Ekvall, Jan Ericsson, Per Hiller, Björn Isberg, Torbjörn Ivarsson, Joel Reneby, Göran Robertsson, Per Stömberg, Torbjörn Sällström, Thomas Sörensson, and Karin Thorburn.

I am indebted to Karin Lindskog and Anki Helmer for providing me with invaluable assitance in administrative matters.

I am deeply grateful to Bankforskningsinstitutet for supporting me financially. In conjunction with this, I would also like to express my sincere thanks to Lars Bergman and Rune Castenäs.

Lastly, I would like to thank Magnus Andersö, for providing an original illustration for the cover, and Torgny Karlsson for applying text to it.

Stockholm in April 1996,
Johan Molin

A word to the reader

This dissertation consists of four essays on various topics in the field of corporate finance and corporate governance. Each essay is self-contained and could, in principle, be read in any order chosen by the reader. However, for readers less familiar with the corporate finance literature, the first essay may also serve as a helpful introduction to the following three essays.

Essay I, entitled *Corporate Governance and Ownership*, presents an overview of the causes and consequences of, and possible remedies for, the separation of ownership and control in corporations. In particular, the essay addresses the costs and benefits of ownership concentration. A specific purpose is to put the role of ownership into perspective, while bringing the reader up to date with some recent developments.

Essay II, *Shareholder Gains from Equity Private Placements: Evidence from the Stockholm Stock Exchange*, contains an empirical investigation of the stockmarket's reaction to announcements of equity private placements and rights issues. The essay sets out to test a range of hypotheses put forward in the literature. Extensive cross-sectional analyses of private placement discounts and abnormal returns are performed.

Essay III is named *Optimal Deterrence and Inducement of Takeovers: An analysis of Poison Pills and Dilution*. This essay models how the *ex ante* wealth of shareholders could be increased with customized contractual provisions that affect takeover probabilities and premia. The proposed provisions resemble anti-takeover defense measures in the form of poison pill plans, and conversely, voluntary dilution schemes in the fashion prescribed by Sanford Grossman and Oliver Hart (1980).

Finally, Essay IV models the wealth effects of a particular takeover regulation, *The Mandatory Bid Rule*. This rule requires a potential bidder for a control position in a target firm to extend the offer to include *any or all* of the outstanding shares. Although the mandatory bid rule is aimed at the protection of minority shareholders, the essay argues that this regulation is not generally in the best interest of the shareholders.

Table of Contents

ESSAY I

Corporate Governance and Ownership

ESSAY II

Shareholder gains from equity Private Placements: Evidence from the Stockholm Stock Exchange

ESSAY III

Optimal Deterrence and Inducement of Takeovers: An Analysis of Poison Pills and Dilution

ESSAY IV

The Mandatory Bid Rule

ESSAY I

Corporate Governance and Ownership

Traditionally, the corporate finance literature has highlighted the benefits of ownership concentration as a control device for curbing managerial discretion, while the costs, such as potential minority oppression, have often been neglected. Portfolio-diversification considerations apart, the existence of small shareholders must remain a puzzle, unless they add value to the firm and get compensated for the value added. Indeed, recent literature points at potential benefits of dispersed shareholdings such as improving stock market liquidity and inducing managerial initiative. By reviewing costs and benefits of ownership concentration, this paper puts the role of ownership into perspective, while bringing the reader up to date with some recent developments. The paper may also serve as an introduction to the remaining essays.

1. Introduction

In the modern corporation, the financing of the firm is typically separated from its management. This separation of ownership and control was observed by Adolf Berle and Gardiner Means (1932), who also noted its potentially adverse effects:

> *"The concentration of economic power separate from ownership has, in fact, created economic empires, and has delivered these empires into the hands of a new form of absolutism, relegating 'owners' to the position of those who supply the means whereby the new princes may exercise their power."*
>
> –Adolf Berle and Gardiner Means (1932)

This paper presents an overview of the causes and consequences of, and possible remedies for, the separation of ownership and control. In particular, the paper focuses on *the role of ownership structure*. Traditionally, the corporate finance literature has highlighted the benefits of ownership concentration as a control device for curbing managerial discretion, while the costs in terms of potential minority oppression have often been neglected. The fact that small shareholder may be oppressed either by managers (if ownership is duffuse) or by large shareholders (if ownership is concentrated) creates a puzzle as to why they exist. Portfolio-diversification considerations apart, it must be that small shareholders add value, and that they get compensated for the value added. Recent literature has been more apt to acknowledge the benefits of disperse shareholdings. For example, small and dispersed owners play an important role in improving the liquidity of stock markets, thereby possibly improving market monitoring. Recent theory has also stressed that increased dispersion may improve managerial initiative.

A specific purpose of this paper is to survey the costs as well as the benefits of ownership concentration. This is not a comprehensive survey. Many of the numerous control mechanisms that have been suggested in the literature will be left out. This paper is merely an attempt to put the role of ownership into perspective, while bringing the reader up to date with some

recent developments. To some extent, the paper may also serve as an introduction to the remaining essays in this volume.

The paper is organized as follows. The next section addresses how the separation of ownership and control is dealt with in agency theory. Section 3 looks into the difficulties of complete contracting. Corporate governance is defined and the concept of ownership as a corporate governance mechanism is discussed in section 4. Section 5 discusses some important control mechanisms associated with corporate ownership. Section 6 addresses the benefits of ownership concentration, while the costs are discussed in section 7. In section 8, the choice of ownership structure is related to the decisions to go public and to go private, respectively. Finally, section 9 concludes the paper.

2. Separation of ownership and control

When Adam Smith wrote "The Wealth of Nations," separation of ownership and control was not a major problem, mainly due to the fact that most enterprises of that time were single proprietorships.[1] The few joint stock companies that existed had a "public spirited purpose," such as the construction of a canal or railway. They were privately chartered companies which issued tradable shares to their owners. The owners were not authorized to act for the company; control was vested in the managers only. The few existing joint stock companies were looked upon with suspicion.

> *"The joint stock companies which are established for the public spirited purpose of promoting some particular manufacture, over and above managing their own affairs ill, to the diminution of the general stock of society, can in other respects scarce ever fail to do more harm than good. Notwithstanding the most upright intentions, the unavoidable partiality of their directors to particular branches of the manufacture, of which the undertakers mislead and impose upon them, is a real discouragement to the restructuring and necessarily breaks, more or less, the natural proportion which would otherwise establish itself between judicious*

[1] The limited number of joint stock companies in the days of Adam Smith was largely due to the 1720 Bubbles Act, which severely restricted the formation of joint stock companies. The Bubbles Act was passed by the British Parliament in response to several instances of fraudulent behavior in connection with the South Seas bubble. As a result, only companies with a public spirited purpose were granted parliamentary charters.

industry and profit, and which, to the general industry of the country, is of all encouragements the greatest and the most effectual."

–Adam Smith (1776; 1976 II, p. 281-282)

The corporate form developed only slowly in the decades to come. The emergence of the modern corporation can be dated to 1856 when limited liability of shareholders was established by the British Parliament.

Widely dispersed equity ownership grew in importance as firms expanded beyond proportions that could be financed in traditional ways. In the U.S., this trend was enhanced by anti-trust legislation adopted at the end of the 19th century, at least to the extent that it forced owners to divest when large firms were broken up.[2] The increasing separation of ownership and control was extensively documented by Berle and Means (1932).

Although it has long been recognized that separation of ownership and control presents potential problems, little conceptual headway was achieved until 1976 when Michael Jensen and William Meckling modeled the separation of ownership and control in terms of *agency relationships*.

2.1 *Agency relationships*

In a seminal paper, Jensen and Meckling (1976) define agency relationships as ones where *principals* engage *agents* to act on their behalf in ways that involve delegating some decision-making or authority to the agents. They formulated the problem involved in such relationships accordingly:

"If both parties to the relationship are utility maximizers there is good reason to believe that the agent will not always act in the best interest of the principal."

–Michael Jensen and William Meckling (1976, p. 308)

In a corporate context, the principals are the investors who delegate control to an agent (the manager). Due to conflicting interests, the investors run the risk that the manager uses company funds to pursue personal goals that are inconsistent with value-maximization. They need to take into account that the manager may, for example, engage in excessive consumption of perquisites, shirking, or divert funds to companies owned by herself, etc. In

[2] The Sherman Act of 1890 was the first anti-trust legislation enacted by the United States Congress. This anti-trust legislation was aimed at curbing concentrations of power that interfere with trade and reduce economic competition.

addition, sources of more subtle conflicts of interests lie in the fact that the manager's risk aversion and time horizon may differ from the investors'. The manager has invested her human capital in the company for which she works, that is, she has an *undiversified* investment of human capital. This means that her investment decisions may reflect a higher degree of risk aversion than what would be optimal for the investors. For example, she may use funds to make investments for diversification purposes. This might reduce the risk of the manager losing her job because of bankruptcy, but it may not be efficient from the shareholders' point of view, since they can diversify their investments more efficiently in the securities markets.

2.2 *Agency costs*

The moral hazard problems associated with agency relationships are costly in the sense that they reduce the *expected cash flow* to potential investors, and thus reduce the price they are willing to pay for a stake in the enterprise. In other words, the agency problems give rise to *agency costs*. More precisely, the agency costs consist of the costs incurred to *limit* the agency problems plus the *residual loss*. Specifically, Jensen and Meckling divide the resources spent to limit the agency problems into (*i*) *monitoring expenditures* by the principal, which include not only the costs of the measuring and oversight of the agent's behavior, but also the resources spent to *control* her, such as compensation policies, operating rules, etc., and (*ii*) the *bonding expenditures* by the agent, which include the agent's investment in her own reputational capital, auditing, incentive contracts, etc. A residual loss may occur simply because it is uneconomical to eliminate *all* agency problems through monitoring and bonding. The important point is that the agency costs are borne by the initial owner, the entrepreneur. The existence of agency costs reduces the amount of resources investors are willing to put up *ex ante* to finance enterprises. As a consequence, the number of socially valuable projects taking place is adversely affected.

The agency conflict between managers and owners is often labeled *managerial discretion* or *opportunism*. Some of the practical ways in which the agency problem in corporations could manifest itself are addressed in the following subsection.

2.3 *Types of managerial discretion*

The probably most conspicuous but normally least costly form of managerial discretion is excessive consumption of perquisites such as luxurious office furniture, company jets, private use of limousines, housing, etc.

Perhaps less obviously but far more severely, enjoyment of private benefits of control may lead to very costly mismanagement of the firm. For example, a manager may choose to concentrate investments on projects which divert funds from more profitable ventures. As previously pointed out, managers might use company funds for unprofitable diversification instead of dividend payouts. Similarly, to maximize her personal prestige (and often also her paycheck), the manager may engage in *empire-building* by overemphasis on growth at the expense of profitability. Jensen (1986) argues that the risk that managers will focus resources on growth and diversification is particularly acute when the firm generates much *free cash flow*, that is, funds in excess of those required for financing positive net present value projects.

A potentially equally serious form of expropriation of shareholders' property rights is present when less efficient managers act to *deter takeovers* by potentially more efficient regimes. In order to protect their employment, managers may acquire ownership fractions that are used to resist takeover, or adopt charter amendments or issue securities that serve a takeover deterring purpose.

Lastly, managers may engage in outright theft from the shareholders. For example, the manager may sell the output or assets of the firm at below market value to firms owned by herself. According to Shleifer and Vishny (1995), there are frequent contemporary examples of this in the post-Soviet Russian oil industry. Much of the early development in European corporate law was aimed at protecting investors from theft by managers. However, even in countries with more well-developed investor protection, examples of manager discretion exhibiting a flavor of theft exist, although more flagrant manifestations are less common. The next section surveys a piece of the vast empirical evidence on agency costs.

2.4 *Empirical evidence on agency costs*

One of the most important empirical methods in corporate finance and governance is the *event study*. The simple but ingenious idea is to look at the stock price reaction to the announcement of some particular action by the manager. If the stock price falls, the action is likely to serve the managers more than the investors. Although this inference may not always be valid because the announcement may convey some previously unrevealed information about the firm, the notion is compelling.[3]

[3] The first event study was performed by Fama, Fisher, Jensen, and Roll (1969). Event study technique is used in Essay II in this volume.

Many event studies look at announcement effects of takeovers. Morck, Shleifer, and Vishny (1990) find that bidder returns tend to be the lowest when bidders diversify or when they acquire high-growth firms. This is consistent with the idea that investments that are aimed at diversification and growth serve the managers more than the shareholders.[4]

Lang, Stulz, and Walkling (1991) find that bidder returns are the lowest among firms with low Tobin's Q and high cash flows.[5] This is consistent with Jensen's (1986) prediction that the most severe agency problems would be found in firms with poor investment opportunities and excess cash.

Blanchard, Lopez-de-Silanes, and Shleifer (1994) find that receiving unexpected cash from winning lawsuits also results in firms making unprofitable acquisitions.

Other studies examine managers' resistance to takeovers. Walkling and Long (1984) find that managers are less likely to resist takeovers when top managers have a direct financial interest in the successful completion of the deal through ownership stakes or golden parachutes, or when they are more likely to retain their employment after the takeover.

DeAngelo and Rice (1983) and Jarrell and Poulsen (1987) find a negative stock price reaction to announcements of anti-takeover amendments to corporate charters in the form of supermajority rules, requiring more than fifty percent of the votes to change company boards.

Ryngaert (1988) and Malatesta and Walkling (1988) find a negative announcement effect in firms adopting poison pills. This evidence is, however, challenged by a more extensive (and more recent) study by Comment and Schwert (1995). They find that poison pills are associated with increased shareholder wealth, *ex post* as well as *ex ante*. The reason seems to be that poison pills are used to negotiate higher takeover premia rather than to deter takeovers. The flexibility of the poison pill defense allows quick implementation when takeovers are believed to be imminent and swift withdrawal when a sufficiently high bid price is achieved. The usefulness of poison pill defense to achieve optimal takeover probabilities and premia is theoretically analyzed by Molin (1996, Essay III). Notably, the evidence from the Comment and Schwert study of poison pills is not necessarily inconsistent with agency costs. To the extent that managers also benefit from

---

[4] Donaldson and Lorch (1983) suggests that pursuit of growth can be part of a strategy of ensuring long run survival of the corporation as an independent entity. This goal may be more important to risk-averse managers than to shareholders.

[5] Tobin's Q is the ratio of the market value of a firm's debt and equity to the replacement cost of its assets. See Tobin, James (1969), A general equilibrium approach to monetary theory, *Journal of Money, Credit, and Banking* 1, 15-29.

a higher takeover bid, it merely suggests that manager and shareholder interests are more closely aligned when using this particular form of takeover defense than when other defense strategies are used.

Perhaps the most morbid event study ever was performed by Johnson, Magee, Nagarajan, and Newman (1985). They examined the stock price reactions to unexpected deaths of executive officers. They found significant price increases for large conglomerates, whose founders built huge empires with little returns to investors. This was interpreted as evidence that deaths of powerful managers reduced the flow of private benefits of control.

Theory and evidence suggests that agency problems create costs. Would it not be possible to rid these agency costs with effective contracting? Looking at the problem more fundamentally, the following section addresses the difficulty of making comprehensive contracts.

3. *The infeasibility of complete contracts*

Hart (1995) points out that agency theory is useful in providing valuable insights into the use of incentive contracts for managers.[6] Standard agency theory tends to treat contracting as *costless*, except for the implicit costs of not being able to observe the manager's effort directly, but rather some indirect measure of it (e.g., performance).[7] Although optimal incentive contracts in agency theory will not be "first-best" because of the unobservability of efforts, contracts will be "comprehensive" in the sense that they include all parties' rights and liabilities in all future states of the world to the *fullest extent possible*. This means that there will never be any need to revise or renegotiate the initial contract, because any addition or change to it could have been anticipated and specified in the initial contract.

In an ideal world, where one could costlessly and comprehensively specify a contract where the optimal responses to all possible future states of the world are written down, the agency problems associated with the

[6] Optimal incentive contracts are addressed by e.g., Ross (1973), Stiglitz (1975), Mirrlees (1976) and Holmström (1979, 1982). Surveys are also present in Hart and Holmström (1987) and Milgrom and Roberts (1992). Optimal incentive contracts typically involve the assessment of the manager's risk aversion, the importance of her decision, and her ability to pay for the stocks or options up front. For example, incentive contracts could be used, where managers receive some highly contingent performance-related pay as compensation.

[7] In modern economic terminology, this unobervability is often referred to as a 'moral hazard' or 'hidden action.'

separation of ownership and control would be irrelevant. This is, in essence, nothing but an application of *The Coase Theorem*.[8]

However, in reality, comprehensive contracts are not feasible. Hart (1995*a,b*) identifies three factors missing in standard agency theory. First, it is difficult to foresee and plan for all possible eventualities. Second, it will be difficult to negotiate any such plans, not the least to find a language which can describe all future events. Third, even if the parties are able to plan and negotiate about the future, it may be difficult to write the contract sufficiently unambiguously so that it can be enforced by an outside party (e.g., a court).[9] Given the transaction costs associated with planning, negotiating, and enforcing, parties will not write comprehensive contracts, but rather *incomplete* ones.[10] This means that contracts will have gaps and missing provisions, where some future contingencies will not be specified, or only partly so. Incomplete contracts will thus involve some *residual* decision-making left for future negotiations.

The reason why this incompleteness matters is that it imposes costs. Renegotiation may be costly ex post as well as in anticipation; it is likely to be time-consuming and wasteful with resources, while serving no overall productive purpose. Ambiguous incomplete contracts may also lead to costly legal disputes. Moreover, insofar as the parties have asymmetric information, this may present an obstacle to reaching efficient agreements. In particular, the parties may be deterred from making relation-specific investments.[11]

In the simultaneous presence of agency problems and incomplete contracting, the need arises to determine how parties make decisions in the contingencies not covered by the initial contract. That is, to allocate the residual decision-making. In other words, it creates a role for *corporate governance*, which will now be addressed.

---

[8] The Coase Theorem can be interpreted as stating that the initial allocation of legal entitlements does not matter from an efficiency perspective as long as the transaction costs of exchange are zero. Broadly conceived, transaction costs refer to any use of resources that are required to negotiate and enforce agreements, including the costs of information needed to plan and foresee future contingencies. (Interestingly, the 1991 Nobel Prize Laureate Ronald Coase never wrote down the famous theorem carrying his name. Instead, it was originally developed through a series of examples. See Coase, Ronald, 1960, The problem of social cost, *Journal of Law and Economics* 3, 1-44, and also Cooter, Robert D., 1982, The cost of Coase, *Journal of Legal Studies* 11, 225-252.)

[9] Transaction costs are discussed further by e.g., Coase (1937) and Williamson (1985).

[10] See e.g., Willamson (1988) and Hart (1995b).

[11] See Hart (1995a p. 25) for an example.

4. Corporate governance

Broadly defined, *corporate governance* refers to the systems by which companies are directed and controlled. More precisely, corporate governance structure can be seen as a device that allocates the *residual control rights* over the firm's nonhuman assets. That is, it allocates the rights to make decisions in circumstances not fully anticipated in the contract.[12,13]

The *property rights approach*, advocated by Oliver Hart and others, singles out a specific governance mechanism, *ownership*. One (legal) definition of ownership can be stated as follows:

> *"But what are the rights of ownership? They are substantially the same as those incident to possession. Within the limits prescribed by policy, the owner is allowed to exercise his natural powers over the subject-matter uninterfered with, and is more or less protected in excluding other people from such interference. The owner is allowed to exclude all, and is accountable to no one."*
>
> –Oliver Wendell Holmes (1881)

Ownership serves as an important source of power when contracts are incomplete. The important point is that ownership gives the owners the (ultimate) right to decide on issues not specified in the original contract; it allocates the residual control rights.[14]

Ownership will work differently, or rather, constitute different governance structures, depending on the number of owners and organizational form. For example, sole ownership will give the owner *all* the residual rights of the firm's nonhuman assets. The owner decides how these assets are to be used, who should have access to them, whether they should be sold, etc. In a joint ownership, two parties may have to agree on decisions. In a partnership of three or more, decisions would be made by majority vote. Although governance is an issue in small, closely held firms, it tends to be a more significant one in large, publicly traded firms.

---

[12] In the absence of slavery, the ultimate control right over human capital resides with its possessor. Hence the exclusion.

[13] See e.g., Grossman and Hart (1986) and Hart and Moore (1990).

[14] An alternative definition of ownership may stress an owner's possession of residual income from an asset rather than the residual control rights. The relationship between residual income and residual control rights is further discussed by Hart (1995a, pp. 63-66).

Corporate ownership gives the owners formal rights to decide on matters not covered by contract. However, to be an effective check on managers, there must be some credibility to the threat that these control rights will be exercised. If there are more than one owner, effective exercise of control rights requires interaction and coordination among the owners. That will be more difficult the larger the number of shareholders, and particularly so in large firms with diffuse ownership. If ownership is sufficiently diffuse, the returns to an individual, small shareholder from monitoring management are unlikely to cover the costs incurred on her. Moreover, exercising control rights is subject to a free-rider problem: The critical problem is that exercising control rights is a public good; as long as it incurs some costs on the individual shareholder to monitor management, each shareholder will try to free-ride on any such effort. As a consequence, no (or almost no) monitoring will take place.

There are specific control mechanisms available even when an individual shareholder cannot perform monitoring personally. Such mechanisms are boards of directors, proxy fights, the takeover market, and also legal protection. However, to be effective, also these mechanisms do to a large extent depend on some form of concerted action, such as voting, litigating, or selling. Besides, there are other problems. Below, these control mechanisms are discussed in more detail.

5. Control mechanisms

5.1 Boards of directors

The board of directors is in principle an important vehicle through which shareholders could control management. The shareholders formally elect the board to act on their behalf. With direct access to management and endowed with the formal authority to replace it, boards would seem excellently fitted as monitors. However, there are several reasons why boards may be less efficient as monitors in practice.

As noted by Mace (1971), in large and medium-sized firms, typically the chief executive officer (CEO) selects (and de-selects) the outside board members to the list of nominations for election at annual stockholders' meetings.[15] The fact that outside directors owe their positions on the board to the existing management may create bonds of loyalty at the expense of

[15] See Mace (1971, pp. 94-101).

integrity. More cynical outside directors may want to retain the goodwill of the management in order to get re-elected, thus retaining their fees and status. CEOs are frequently members of each other's company's boards, which might be a reflection of clubbability. The CEO typically sets the agenda for board meetings and discerning questions are scarce.[16]

Mace also notes that board members usually are very busy people, often being executive officers in other companies, or serving on other boards. Although often blessed with extraordinary skills and capacities, outside directors will have limited time to collect and process information other than that provided by the management. Moreover, if outside directors have little financial interest in the firm, they will have little personal incentives to monitor firm performance.

The empirical evidence suggests that boards sometimes do overthrow managers (Weisbach, 1988). However, firm performance will typically be close to disaster before they act (Warner, Watts, and Wruck, 1988).[17] Although reasonably effective in crises, boards have not been notably successful in preventing them. One of the main failures of U.S. boards is that they did not prevent the many inefficient acquisitions made for diversification purposes in the 1960s (Shleifer and Vishny, 1992).

To conclude, boards are not completely ineffective, but they are by no means perfect in serving the shareholders' interest.

5.2 *Proxy fights*

A basic control mechanism that investors have is through exercising their voting rights on the stockholders' meeting. However, small shareholders may lack the incentive to incur the costs of attending meetings and investigating managerial performance. For small shareholdings, the marginal costs may overshadow the marginal benefits. Therefore, in large, public firms, replacing inefficient managements on stockholders' meetings typically involves *proxy fights*. In a proxy solicitation, a dissident shareholder challenges the incumbent management by seeking the authority from voting shareholders to act as their designated voting representative and proposes alternative candidates for the board of directors.

However, as realized by, e.g., Pound (1988) and Hart (1995*b*), there are several reasons why proxy fights may not be a very effective disciplining device.

---

[16] Mace (1971, p. 52).

[17] It may not be surprising that boards have been relatively successful in crises. In a crisis, usually the board's legal responsibilities get sharply defined. Also the CEO's power wanes, while the board's efforts are brought into the spotlight.

Proxy fights are costly and uncertain, and involve free-rider problems. The dissident bears the initial cost of determining that the company is underperforming and also incurs the costs of launching the proxy fight.

Pound (1988) argues that identifying and locating individual shareholders may be very costly, which gives the incumbent an edge.[18] An additional aspect is that corporate law often allows managers to use company funds to promote their own list of candidates, which further strengthens the incumbent. However, some recent changes in proxy rules have made communication among shareholders easier (Admati, Pfleiderer, and Zechner, 1994).

In addition, the dissident may have to incur costs to signal the post-replacement value of the firm to the outside shareholders. Such persuasion may be needed for success, as some proxy challenges could, in the eyes of the shareholders, be 'crank' takeover bids, with no prospect for increasing the value of the firm.

Moreover, the benefits from improved management accrue to all shareholders. Therefore, a small shareholder may rationally abstain from a proxy fight that is socially beneficial. A small shareholder may also have little incentives to consider alternative regimes as her voting decision is unlikely to make much difference; voting for the incumbent management would seem like a reasonable rule of thumb. Pound also recognize potential conflicts that might induce institutional investors to vote with management against their own fiduciary interests.

5.3 *The takeover market*

Manne (1965) introduced the notion of a *market for corporate control*, where firms with depressed values due to agency problems are taken over by better regimes.[19] In a hostile takeover, a bidder typically makes a tender offer for the firm's outstanding equity. Conditional on acceptance by the firm's shareholders, the bidder acquires control of the firm and the power to replace the incumbent management team. By allowing shareholders to sell their shares to a potential acquirer, the market for corporate control poses a threat to slacking managements. Hostile takeovers are widely believed to be a critical mechanism for limiting managerial discretion in the U.S. and the U.K., where ownership concentration is most dispersed (see e.g., Easterbrook and Fischel, 1991, Jensen, 1993).

---

[18] This problem may be less severe in some contries. In Sweden, for example, the identity of stockowners and the size of their holdings are publicly available through a central record (Värdepapperscentralen).

[19] Manne's work focused on *mergers* and not on *tender offers*.

However, Grossman and Hart (1980) point out that takeovers in companies with diffuse ownership are subject to a free-rider problem. Small shareholders who believe that their decisions do not affect the success of the bid have an incentive not to tender their shares. By retaining them, they obtain a *pro rata* fraction of the capital gain by holding on to them. If every shareholder is negligibly small, a successful bid will be conditional on a bid premium that equals at least the expected value improvement. This means that the bidder's profit potential is altogether lost and a value improving takeover will not take place. The Grossman-Hart solution to the free-rider problem is to allow the bidder to expropriate some of the target firm's asset conditional on a successful bid. This means that the shareholders are excluded from some of the benefits of not tendering, and consequently require a lower price, thus inducing a socially valuable takeover.

There is relatively extensive empirical evidence on the takeover mechanism. Jensen and Ruback (1985) document substantial increases in firm value following directly after tender offer announcements. Palepu (1986) and Morck, Shleifer, and Vishny (1989) show that takeover targets often are underperformers. Martin and McConnell (1991) find that successful takeovers typically result in the replacement of the target managers.

Shleifer and Vishny (1995) observe that the takeover market's depends to a large extent on a fluid capital market. After a boom in the market for corporate control in the 1980s, this market experienced a dramatic demise in 1989 after the collapse of Drexel, Burnham, Lambert which was a major provider of junk bond financing.

5.4 *Legal protection*

The judicial system would appear to play an important role in providing limitations to managerial discretion. A fundamental role of the judicial system is obviously to enforce the shareholders' formal control rights.

In addition, corporate law often places direct restrictions on managerial self-dealing by explicitly prohibiting certain actions by management. Moreover, managements are typically required to act according to their *fiduciary duty*, that is, a general commitment to act loyally with the firm's shareholders. However, the vagueness of this fiduciary-duty provision means that violations of it will need to be flagrant to be verifiable in court. In addition, *business judgment rules* serve to keep business affairs out of court rooms unless they are in direct violation of the law. While business judgment rules are desirable on other grounds, they do not strengthen shareholders that are unhappy with management beyond unlawful conduct.

6. *Benefits of ownership concentration*

Even if control devices such as company boards, proxy fights, hostile takeovers, and the legal system are important, they are not perfect; exercising and enforcing formal control rights appear to be difficult in practice. Besides problems of verification, there may be substantial free-rider problems.

By contrast, when one person owns 100% of the firm, the problems of interaction are eliminated. The costs and benefits of monitoring management will be borne completely by the single owner. If one person manages and owns the whole firm, separation of ownership and control is eliminated.

But, even limited ownership concentration may be beneficial. Concentrated ownership may work in two ways. If a substantial stake is owned by the manager, this serves to align her interests more closely with the other shareholders. This is what is generally referred to as "inside ownership." But equally important, a large "outside owner," that is, an owner who is not a manager, will have greater incentives to monitor the management, thus partially internalizing the free-rider problem. A key feature of outside ownership concentration is that it *increases the likelihood that control rights will be exercised.*

Other control mechanisms could be designed to reduce the managers' scope for opportunistic behavior or to closer align his interests with the owners. However, in the remainder of the paper, I will focus on the role of outside ownership.

I will start out by focusing on the *benefits of concentrated (outside) ownership* and some different manifestations of the ownership-concentration mechanisms in the corporate finance and governance literature. I will then proceed to address the *costs of ownership concentration*, or rather, the *benefits of dispersion.*

An outside shareholder with a substantial holding in the firm may have sufficient incentives to take on an active role; even a substantial minority stake may induce an owner to monitor management and to collect information about the value of the firm's activities. The more she owns, the larger her potential gains from active oversight. The existence of a large shareholder will thus serve as a partial resolution of the free-rider problem, previously addressed.[20]

[20] However, with less than 100 percent ownership, she may still underperform monitoring, as she would have to share the monitoring gains with the other shareholders.

In addition, a large shareholder also has substantial power to pressure management, and possibly to oust it through proxy fights. With a majority stake, she has outright control over the firm and its management.

Hence, a large outside shareholder may deter managerial self-dealing by (*i*) being able to determine what is going on and (*ii*) stopping the process.

Zeckhauser and Pound (1990) address an additional aspect, which arises from asymmetric information between managers and shareholders. A manager will, hypothetically, try to emphasize such performance measures that can most readily be observed by shareholders, such as sales levels, while less transparent aspects of performance, such as the training of young employees, will be neglected. In other words, managers will, in the absence of close monitoring, pay too much attention to short-term objectives. Zeckhauser and Pound argue that large shareholders may reduce managers' incentives to tilt performance toward present results. By this, they will increase firm value merely by indicating that it is safe to take results at their face value.

Shleifer and Vishny (1986) point out that the existence of a large shareholder may partially internalize the free-rider externality associated with takeovers. A bidder with some initial ownership fraction (toehold) may make a sufficient capital gain on her old shares to induce her to bid. Bhide (1993) points out that a large shareholder with a seat on the company board may be useful due to the informational constraints that acquirers who make unsolicited tender offers operate under. They have to raise money "deal by deal," making their case to financiers from publicly available data. Even in the mid-1980s peak in takeover activity, acquirers posed a threat primarily to a limited number of diversified firms whose break-up values could reliably be determined from public data to be significantly higher than their market values.

6.1 *Stylized facts on ownership structure*

In most of Europe, including Sweden, large shareholdings, typically held by (the offspring of) the founder, are quite common.[21,22] A similar pattern is found in most of Latin America, East Asia, and Africa (Shleifer and Vishny, 1995).

---

[21] It should be noted that also institutional ownership is substantial in Sweden.

[22] Molin (1996, Essay II), reports that, in a sample of firms issuing new equity on the Stockholm Stock Exchange, approximately 35% are majority controlled in the sense that one owner holds more than 50% of the voting rights. By casual examination, this sample does not appear exceptional in relation to the population of listed firms in Sweden.

In other countries, monitoring is possibly provided by large institutions. In Germany and Japan, banks are frequently major owners. Franks and Mayer (1994) report that commercial banks control close to 100% of the voting rights in many major German firms. In Japan, large bank holdings and substantial cross-ownership appear to be very common (Prowse, 1992 and Berglöf and Perotti, 1994).

The U.S. and U.K., appear to be an exception. These two countries exhibit the least concentrated ownership structures, although large shareholders exist there too. The reasons for dispersion in the U.S. are discussed by e.g., Roe (1990) and Bhide (1993). Roe (1990) argues that political, rather than economical, considerations have caused (*i*) a prohibition for banks to own stocks, (*ii*) a fragmentation of financial institutions, and (*iii*) a fragmentation of institutional portfolios. These manifestations of dispersion are, allegedly, the result of a "popular mistrust of financial power" and effective lobbying by interest groups. Similarly, Bhide (1993) claims that the Securities Acts of 1933 and 1934 containing disclosure rules and rules on insider and manipulative trading have promoted fragmentation of equity ownership in U.S. corporations by promoting liquidity and thus reducing the risks of diffuse stockholding, while increasing the costs and liabilities of active stockholding. For example, insider regulation has promoted passivity in that stockholders with seats on company boards are exposed to SEC and class action suits and face greater constraints in trading shares or providing goods or services to the firm than do passive stockholders.

However, more recently, active shareholders appear to be playing a more important monitoring role in U.S. corporations (Admati, Pfleiderer, and Zechner, 1994). Although individual investors typically are small, many *institutional funds* hold significant shares in large companies. Brancato (1991) reports that institutional ownership in the 100 largest U.S. companies was over 50% in 1989. The California employees' pension fund (CalPERS) alone had a market capitalization exceeding 80 billion dollars by 1994. The growth in institutional holdings and the demise in the takeover market appear to be important factors in this trend of increased institutional activism.

6.2 *Evidence on effects of large shareholders*

Franks and Mayer (1994) find that large shareholders in German companies are associated with high a turnover of directors. Kaplan and Minton (1994) and Kang and Shivdasani (1995) find that Japanese firms with large shareholders are more likely to replace managers in response to poor performance. Grundfest (1990) establishes that "in both Germany and Japan, corporate investors and intermediaries are able to reach deep into the inner

workings of portfolio companies to effect fundamental management change."

For Sweden, Molin (1996, Essay II) reports a positive relationship between stock price reactions to equity private placements and increases in ownership concentration (but only for firms in specific ranges of initial ownership concentration).

The empirical evidence from the U.S. has a lot to say for institutional investors. Brickley, Lease, and Smith (1988) present evidence indicating that large institutional investors vote more actively on anti-takeover amendments and oppose more actively potentially harmful propositions by management than do other shareholders. By contrast, Pound (1988), finds that the probability that management will prevail in a proxy contest increases with the fraction of shares held by institutional investors. Gilson (1990) reports that banks seem to play an important governance role in U.S. firms, in particular in connection with bankruptcies. McConnell and Servaes (1990) document a positive relation between institutional holdings and firm value, which suggests that financial institutions may mitigate agency problems.

DeLong (1991) points out the critical governance role played by the associates of J.P. Morgan in the early 1900s. According to DeLong, the presence on the board of directors of a partner in J.P. Morgan & Co. could be associated with a 30 percent rise in the stock price.

Agrawal and Knoeber (1994) examine the interdependence among different control mechanisms. Their study suggests that shareholding by blockholders and institutions are alternative avenues for outsider activism as more of either leads to less of the other.

There is also empirical evidence on the role of large shareholders in connection with takeovers. Mikkelson and Ruback (1985), Holderness and Sheehan (1985), and Barclay and Holderness (1990) report positive stock price effects to announcements of outsiders purchasing large equity positions. The most dramatic shareholder gain is present when the large shareholder is perceived to be trying to gain control of the target. Shivdasani (1993) presents empirical evidence suggesting that the existence of large outside shareholders does increase the probability of a takeover. Agrawal and Knoeber (1995) find that a more active market for corporate control leads to greater shareholding by blockholders and by institutions. This suggests some complementarity between large outside shareholders and the control market. The bottom line seems to be that large shareholders do play an important role, even in countries where ownership structure is believed to be most dispersed.

Also the ownership concentration mechanism relies to some degree on a judicial system that can enforce voting rights, etc.[23] However, as argued by Shleifer and Vishny (1995), a main advantage with ownership concentration is that it relies on *relatively simple judicial interventions* that are applicable to even poorly informed and motivated courts. This may be a reason why concentrated ownership prevails in such a large part of the world.

7. Costs of concentrated ownership

7.1 Minority oppression

In light of the previous section, a relevant questions arises: If ownership concentration is such a blessing, *why is not every firm closely held?*

Part of the answer is that ownership concentration is *not* an unambiguous blessing; there are costs as well, and very serious ones too.

Ownership concentration enhances conflicts of interests between investors. A large shareholder may opportunistically redistribute wealth in her own favor, possibly by colluding with management. Such wealth redistribution may take the form of various "sweetheart deals" with other firms that she controls; she may dilute the other shareholders' property rights through favorable stock issues to herself, obtain block premia, stock repurchases, etc. The possibility to dilute shareholder wealth can be seen as a private benefit of control.[24]

The empirical evidence on minority oppression is mixed. Barclay and Holderness (1989, 1992) present evidence that large blocks of equity are frequently traded at substantial premia in relation to the post-trade price of minority shares. This suggests that purchasers of blocks with controlling influence may receive special benefits.

Levy (1982), Lease, McConnell, and Mikkelson (1983, 1984), DeAngelo and DeAngelo (1985), Rydqvist (1987), Horner (1988), and Zingales (1994, 1995b) show that stocks with superior voting rights trade at a premium,

---

[23] Shleifer and Vishny (1995) give some colorful examples from Russia where legal protection is underdeveloped. Allegedly, Russian managers can use a variety of methods against foreign shareholders, including declaring some shares illegal, losing voting records, etc.

[24] All private benefits of control do not necessarily affect shareholder welth negatively. For example the 'psycic' value of power may be perceived as a private benefit, while it does not involve diluting shareholders property rights. To the extent that competition over a control position is enhanced by the competitors private control benefits, these benefits may also be extracted by shareholders in the form of a higher bid price. See Molin (1996, Essay IV).

which indicates that control is valuable. However, Bergström and Rydqvist (1990) and Barclay and Holderness (1989, 1992) find little evidence of substantial minority oppression in Sweden or the United States.

Molin (1996, Essay II) shows that existing owners and managers often receive substantial discounts in private placements offerings. However, positive stock price reactions indicate that benefits of ownership concentration – monitoring and alignment effects dominate in these instances.

Rajan (1992) models an extreme example of an oppressive investor, namely a bank. In Rajan's model, increasing ownership dispersion can produce a lower cost of capital and/or a larger supply of external finance, by reducing the large bank's "monopoly rents" from privileged information about the firm's creditworthiness, etc. By gaining access to the stock market and distributing information to the investors, the creditor faces more competition over the financing.

Weinstein and Yafeh (1995) find that some major Japanese banks do extract rents from their customers. Franks and Mayers (1994) give examples of German banks resisting takeover of their customer companies.

The legal protection of minority shareholders exhibits very similar limitations to the ones aimed at curbing managerial discretion. Small shareholders face similar free-rider problems in acting against oppressive blockholders. The problems of court verification of oppression are also similar to the ones reviewed of verifying mismanagement. The potential for minority oppression would thus present an obstacle to inducing small shareholders to invest in a firm in very much the same way as the potential for managerial discretion.

The troublesome conclusion is that small shareholders are squeezed from two ends: either by managers (if ownership is dispersed), or by large shareholders (if ownership is concentrated).

This puts even more emphasis on the fundamental question: *Why do small shareholdings in corporations exist in the first place?* Given these "double" moral hazards, why are not all firms wholly owned or at least run as private partnerships with more or less equally strong partners? Obviously, even in countries with relatively concentrated ownership, such as Sweden, investors hold minority stakes with limited protection from abuse. The dual question is: *Why do the founders want to have small shareholders, when the agency problems are expected to reduce the value of their holdings?* It must be that small shareholders *per se* provide additional value, and that they get compensated for the value added. In the following section, I address the benefits of small, dispersed owners.

7.2 *Stock market liquidity and transaction costs*

Stock market liquidity, broadly defined, is the ability of individuals to trade quickly at prices that are reasonable in light of the underlying demand/ supply conditions (Schwartz, 1991).[25]

The ownership structure has important implications for market liquidity. Demsetz (1968) suggests that liquidity improves with the number of existing shareholders. The implication is that the stock market will be more liquid with a more diffuse ownership structure.

A high level of liquidity is desirable as it reduces the transaction costs of shareholders wanting to cash in their assets quickly. Liquidity, achieved through a higher level of ownership dispersion would thus be valuable.

By reducing transaction costs, increased liquidity also makes risk-sharing more efficient. Leland and Pyle (1977), Huddart (1993) and Admati, Pfleiderer, and Zechner (1994) present models that incorporate diversification benefits from dispersion of ownership, although in their models, these benefits are severely counteracted by costs in the form of information effects and reduced monitoring. Pagano and Röell (1995) and von Thadden (1995) model similar tradeoffs.

7.3 *Liquidity and market monitoring*

Some models stress the importance of liquidity in the firm's stocks to facilitate efficient monitoring of managers. The stock market's importance in providing additional monitoring by the market is pointed out by Holmström and Tirole (1993).

Holmström and Tirole model how reducing ownership concentration by selling out shares will be followed by an increase in the number of investors trading in the firm's stock for extraneous reasons (*liquidity traders*). This will, in turn, increase the incentives of speculators to appear and trade actively in the stock; consistent with Kyle (1984), more liquidity traders would increase an *informed speculator's* potential to disguise and profit from

[25] Stock market liquidity is often described in terms of *depth, breadth, resiliency,* or *continuity.* A "deep" market has a large amount of buyers and sellers willing to trade just below or just above the prevailing price, whereas a "broad" market exhibits a substantial volume of buy and sell orders. A "continuous" market is characterized by the property that price changes between trades are small. A market is "resilient" if temporary price changes due to order imbalances quickly attract new orders to restore reasonable share values. Alternatively, liquidity can be described in terms of transaction costs, typically including explicit components such as commissions as well as implicit components in the form of *bid-ask spreads* and *market impact.*

her private information, and consequently spend more resources on "monitoring." This results in an increased information flow into the market, which improves the information content of the stock price. This, in turn, enables the firm to design a more efficient incentive contract for managers.

However, "market monitoring" is not without costs. The speculator must be compensated for her monitoring services. The speculator receives direct compensation by the liquidity traders, who lose money when they sell for idiosyncratic reasons. Liquidity traders, in turn, are compensated by a decrease in initial stock price so that they do not lose money overall (otherwise they would be trading in the bond market). This means that the costs of market monitoring are indirectly borne by the initial owners.

Holmström and Tirole argue that stock market discipline through a liquid stock market has advantages over company boards in creating efficient incentives for managers. While boards of directors may be better judges of managerial performance by the fact that they can observe management more directly and take into account the circumstances in which a given level of performance was obtained, they lack the integrity of stock markets. Moreover, it is difficult for a board to punish a CEO short of firing her, as directors also need to cooperate with management along a number of dimensions. Arguably, stock prices are well-suited for compensation purposes, not so much because they are accurate, but because they are objective, third-party assessments. Bhide (1993), on the other hand, stresses a larger shareholder's superior information to form the best incentive contracts.

The monitoring role of a large shareholder was discussed in a previous section. In the Holmström-Tirole model, this role is essentially exchanged for a similar role played by an active "speculator," and no direct monitoring by a large shareholder takes place. The key distinction between the two roles is that the "large shareholder" would typically receive (most of) her monitoring gains in the form of capital gains on a long-term investment in the firm, while the "speculator" earns her profits from actively trading shares.

A relevant question not addressed in the Holmström-Tirole model is how the direct monitoring by a large blockholder would be affected if she were able to trade in a more liquid market. Bhide (1993) argues that increased liquidity leads to less monitoring by large shareholders as it reduces the costs of fragmentation and diversification of shareholdings. Maug (1995), recognizes that liquidity also makes *buying* shares less costly. Maug models a situation where an institutional investor will have to decide the extent to which it should take on a monitoring role as opposed to becoming a speculator trading on private information. In Maug's model, a

more liquid stock market leads to *increased* monitoring as it allows the investor to cover monitoring costs through informed trading.

The dual question is how the incentives of other speculators are affected in the presence of monitoring by a blockholder. Delineating the more intricate relationships between market monitoring and monitoring by large blockholders is yet an unresolved question.

To be added is, of course, that there are intricate policy issues in the background. A large shareholder who collects information through close monitoring of management (e.g., through board membership) is likely to be subject to insider regulation. The large investor's dilemma is that the risk of becoming subject to insider regulation may prevent her from acquiring information in the first place, thus reducing her efficiency as monitor.

In Maug's model, the optimal insider-trading regulation should contain penalties that are sufficiently steep to force an institutional investor to disclose all private information about exogenous states. It should also provide a definition of what constitutes inside information that is sufficiently broad.

The takeover-threat mechanism is obviously also a form of disciplinary device for managers provided by the stock market. A hostile tender offer requires that shares are traded (although a large shareholder may be necessary to overcome free-rider problems). Holmström and Tirole suggest that a liquid stock market can discipline managers in a less dramatic way than takeover threats by performing a continuos monitoring of firm performance through stock prices, which, in turn, provides a basis for more efficient managerial incentive schemes.

7.4 *Manager initiative and excessive monitoring*

Burkart, Gromb, and Panunzi (1996) address the potential costs of *excessive monitoring*. Too much ownership concentration may lead to over-monitoring. Burkart *et al.* highlight the role of *management initiative* in contributing to firm value. Specifically, they note that allocating some of the *effective* control (as distinct from the formal control rights) to the manager can be beneficial as it induces her to make firm-specific investments. They extend the analyses of Grossman and Hart (1986) and Hart and Moore (1990), who delineate how parties without control rights may be reluctant to undertake relationship-specific investments when the owner of the control rights can use them for opportunistic behavior or create "holdup" problems. By analogy, managerial discretion may be beneficial *ex ante* as this could increase the manager's efforts to search for new investment projects. Burkart *et al.* show that a manager may be less inclined to show such initiative when shareholders are

more likely to interfere with her decision. A dispersed ownership structure enhances the likelihood that shareholders will not interfere. Thus, insofar as managerial initiative contributes to firm value, there is a tradeoff between monitoring gains obtained through ownership structures containing large outside shareholders and giving managers some slack through more diffuse ownership. Specifically, Burkart *et al.* propose that a firm's ownership structure can act as a commitment device to delegate a certain (optimal) degree of control to self-interested managers.

Pagano and Röell (1995) also recognize that ownership concentration can lead to excessive monitoring. They consider a controlling shareholder/entrepreneur facing the choice of selling shares privately to a few large shareholders or to go public. The entrepreneur seeks to minimize the cost of equity financing, which is affected both by agency costs and liquidity. Going public involves costs of listing the shares and benefits of lower cost of equity capital obtained by providing more cost-efficient liquidity services to shareholders, as well as possibly retaining some private benefits. Staying private saves the listing costs, but implies being subject to closer monitoring by the other large shareholders, thus reducing the scope for enjoying private benefits. It essentially boils down to a trade-off between avoiding over-monitoring and economizing on liquidity costs. The relative importance of avoiding excessive monitoring increases with the amount of outside funding to be raised.

8. IPOs and LBOs

Going public may be perceived as being merely a stage in the growth process of the firm. When a firm grows sufficiently large, firms would turn to the equity market to get the needed funding of new projects. To some extent, this is probably true, but it does not appear to be the whole story. In Germany, for example, a great number of large firms are not publicly traded. Also in the U.S., many large firms are privately held. For example, United Parcel Service, which had close to 270,000 employees and over 16 billion dollars in sales in 1992, and the Bechtel group, with around 8 billion dollars in sales and over 30,000 employees, are not publicly traded.[26] In Sweden, IKEA may serve as an example of the same phenomenon. In short, some firms are publicly traded and others are not.

[26] Pagano, Panetta, and Zingales (1995).

The decision to go public, and conversely, the decision to go private, is closely related to the choice of ownership structure. A firm going from being privately held to getting publicly traded typically increases its level of ownership dispersion, and vice versa. This suggests that there might be some lessons to be drawn from the above discussion of ownership structure.

8.1 *Initial public offerings*

Going public is typically associated with very high initial costs. The price offered at initial public offerings (IPOs) is typically substantially below the closing price in the first trading days subsequent to the IPO.[27] In addition, there are large direct costs of going public in the form underwriting fees, registration fees, etc. Moreover, there are yearly expenses for auditing, certification, stock exchange fees, etc. Ritter (1987) estimates that administrative costs and the costs of IPO underpricing account for 20 to 30 percent of the post-IPO realized market value of the issued securities.

Despite the high costs, many firms do go public. Although some firms may go public to overcome borrowing constraints hampering the financing of their further expansion, some of the previously suggested implications of ownership dispersion may be more relevant for other firms.

Going public increases liquidity, which reduces the transaction costs for investors wanting divest and diversify holdings (Pagano, 1993, Pagano and Röell, 1995). Going public also facilitates stock market discipline through market monitoring (Holmström and Tirole, 1993) and takeovers (Shleifer and Vishny, 1986). Manager initiative, as suggested by Burkart *et al.* may be another reason.

8.2 *Leveraged Buyouts*

An interesting phenomenon, which culminated in the 1980s, are leveraged buyouts (LBOs). In a leveraged buyout, the shareholders of a publicly traded company are bought out by a new group of investors. The new investor group typically includes old managers, a specialized "buyout firm," and creditors (banks and public debtholders). The buyout firm usually acquires a controlling stake of equity in the firm and the management substantially increases its ownership fraction. A very large part of the financing, however, has typically been provided by holders of subordinated debt, "junk bonds."

[27] See Loughran, Ritter, and Rydqvist (1994) for an extensive survey of the international evidence on this phenomenon.

LBOs typically increase the concentration of equity ownership as well as that of debt.

The empirical evidence on LBOs mixed. DeAngelo, DeAngelo, and Rice (1984) find that LBOs typically were executed at substantial premia, suggesting that they were expected to increase firm value. Kaplan (1989) observe that bought-out firms, which went public some time after the LBO were priced higher than before. Bhagat, Shleifer, and Vishny (1990) find that a large portion of the LBOs were targeted on highly diversified firms and that divisions outside the core activity where sold out subsequent to the buyout. This combined evidence can be interpreted as pointing to that LBOs have reduced agency costs.

On the other hand, Bhagat *et al.* argue that the principal purpose of the LBOs was to serve as a temporary financing tool for implementation of short-run improvements. Kaplan (1991) find that many bought-out firms issue public equity within six years after the LBO, but that they typically retain a highly concentrated ownership structure after doing so.

9. Concluding remarks

In this paper, I have attempted to present an overview of the role of ownership and ownership structure in corporate governance. As we have seen, ownership concentration has costs as well as benefits. The main benefits are that it increases the likelihood that investors' control rights will be exercised; it partially internalizes the free-rider problem associated with actively monitoring management. A drawback is that ownership concentration enhances conflicts of interests between investors; small investors may become vulnerable to minority oppression.

Given that small shareholders are subject to the "double" moral hazard of becoming victims of either managers (if ownership is dispersed), or large shareholders (if ownership is concentrated), a fundamental question is why small shareholdings in corporations exist in the first place? The fact that not all firms are closely held seems to suggest that small shareholders *per se* provide some additional value, for which they are compensated.

An important quality of dispersion is that it improves market liquidity. Market liquidity reduces transaction costs associated with cashing in investments and diversification. Liquidity also improves the information content of prices, thus possibly facilitating more effective "market

monitoring." Some dispersion also appears to limit "excessive monitoring" by large shareholders.

The costs and benefits of ownership concentration seem to suggest that there is some "optimal" mix of concentration and dispersion in the firm. Although many of the articles discussed in this essay, in particular the more recent ones, model such tradeoffs, none of them takes into account *all* costs and benefits reviewed. Such an analysis is bound to be complex. In addition to the stylized costs and benefits, the optimal mix is likely to depend on firm-specific characteristics, such as transparency of business performance and strategy, the reputation of active shareholders and managers, free cash flow patterns, etc. It may also depend on sociological and cultural factors. For example, Japanese small investors appear to trade actively and contribute to market liquidity, despite little institutionalized protection against minority oppression.

A related, complex question is what the optimal institutional environment would be from a corporate governance perspective? There is much controversy over this issue, in particular in the United States. For example, Grundfest (1990), Roe (1990, 1994), Bhide (1993), and Jensen (1993) are very critical of a system which they perceive as discouraging active shareholding. Many have pointed to the relative successes of the German and Japanese economies and advocated bank-led corporate governance (see e.g., Roe, 1993 and Charkham, 1995). Others, such as Easterbrook and Fischel (1991) and Romano (1993), express a more positive view on the Anglo-Saxon systems. Shleifer and Vishny (1995) point at the additional agency problem present when banks themselves are large, widely held institutions. They also express fear that bank-dominated systems can become closed and oligopolistic, which may hamper long-run economic development.

A complicating factor is that legal policies tend to be rigid once they have been adopted. The established institutions, whether they be the Securities and Exchange Commission (SEC) in the U.S., or Banks in Germany and Japan, tend to obtain political power and shape the legal system to support their interests (Shleifer and Vishny, 1995).

I have tried to present a broad picture of the role of ownership structure in corporate governance; how ownership can be used to reduce adverse effects of conflicting interests. Unfortunately, albeit not very surprisingly, theory and evidence do not provide unambiguous answers. Rather, more questions arise. Some of the issues touched upon in this survey are dealt with in more detail in the remaining essays of this volume.

In Essay II, called *Shareholder Gains from Equity Private Placements: Evidence from the Stockholm Stock Exchange*, I use event study technique and

cross-sectional analysis to empirically test, among a range of other hypotheses, whether changes in monitoring due to changes in ownership concentration can account for the stock price reaction to private equity financings.

Essay III, named *Optimal Deterrence and Inducement of Takeovers: An analysis of Poison Pills and Dilution,* models how the *ex ante* wealth of shareholders could be increased with customized contractual provisions that affect takeover probabilities and premia. The proposed provisions resemble anti-takeover defense measures in the form of poison pill plans, and conversely, voluntary dilution schemes in the fashion prescribed by Grossman and Hart (1980).

Finally, Essay IV models the shareholder wealth effects of a particular takeover regulation, *The Mandatory Bid Rule.* This rule requires a potential bidder for a control position in a target firm to extend the offer to include *any or all* of the outstanding shares. Although the mandatory bid rule is aimed at the protection of minority shareholders, the essay argues that this regulation is not generally in the best interest of the shareholders.

Bibliography

Admati, Anat R. and Paul Pfleiderer, 1987, Viable allocations of information in financial markets, *Journal of Economic Theory* 43, 76-115.

Admati, Anat R. and Paul Pfleiderer, and Josef Zechner, 1995, Large shareholder activism, risk sharing, and financial market equilibrium, *Journal of Political Economy* 102, 1097-1130.

Aghion, Philippe and Patrick Bolton, 1992, An incomplete contracts approach to financial contracting, *Review of Economic Studies* 59, 473-494.

Aghion, Philippe, Oliver Hart, and John Moore, 1992, The economics of bankruptcy reform, *Journal of Law, Economics, and Organization* 8, 523-546.

Agrawal, Anup and Charles R. Knoeber, 1994, Firm performance and mechanisms to control agency problems between managers and shareholders, *Working paper* 29-94 (Wharton School, Philadelphia, PA).

Alchian, Armen A. and Harold Demsetz, 1972, Production, information costs, and economic organization, *American Economic Review* 62, 777-795.

Barclay, Michael J. and Clifford W. Holderness, Jr., 1989, Private benefits from control of public corporations, *Journal of Financial Economics* 25, 371-395.

Barclay, Michael J. and Clifford W. Holderness, Jr., 1992, The law and large block trades, *The Journal of Law and Economics* 35, 265-294.

Benston, George, 1985, The self-serving management hypothesis: Some evidence, *Journal of Accounting and Economics* 7, 67-83.

Berglöf, Erik and Enrico Perotti, 1994, The governance structure of the Japanese financial keiretsu, *Journal of Financial Economics* 36, 259-284.

Bergström, Clas and Kristian Rydqvist, 1990, Ownership of equity in dual-class firms, *Journal of Banking and Finance* 14, 255-269.

Berle, Adolf A. and Gardiner C. Means, 1932, *The Modern Corporation and Private Property* (Macmillan, New York).

Bhide, Amar, 1993, The hidden costs of stock market liquidity, *Journal of Financial Economics* 34, 31-51.

Blanchard, Olivier, Florencio Lopez-de-Silanes, and Andrei Shleifer, 1994, What do firms do with cash windfalls? *Journal of Financial Economics* 36, 337-360.

Bolton, Patrick and Ernst-Ludwig von Thadden, 1995, A dynamic theory of corporate ownership structure, *mimeo* (London School of Economics and Universität Basel).

Brancato, Carolyn K., 1991, The pivotal role of institutional investors in capital markets, in: Arnold W. Sametz and James L. Bicksler, eds., *Institutional Investing* (Business One Irwin, Homewood, Ill.).

Burkart, Mike, Denis Gromb, and Fausto Panunzi, 1996, Large shareholders, monitoring and the value of the firm, *mimeo* (Stockholm School of Economics; MIT; Università di Pavia).

Charkham, Jonathan, 1994, *Keeping Good Company: A Study of Corporate Governance in Five Countries* (Clarendon Press, Oxford).

Clark, Robert, 1985, Agency costs versus fiduciary duties, in: J. Pratt and R. Zeckhauser, eds., *Principals and Agents: The Structure of Business* (Harvard Business School Press, Cambridge).

Coase, Ronald, 1937, The nature of the firm, *Economica* 4, 386-405.

Coase, Ronald, 1960, The problem of social cost, *Journal of Law and Economics* 3, 1-44.

Coffee, John, 1991, Liquidity versus control: The institutional investor as corporate monitor, *Columbia Law Review* 91, 1277-1368.

Comment, Robert and G. William Schwert, 1993, Poison or placebo? Evidence on the deterrent and wealth effects of modern antitakeover measures, *Journal of Financial Economics* 39, 3-43.

DeLong, J. Bradford, 1991, Did Morgan's men add value? An economist's perspective on financial capitalism, in: Peter Temin, ed., *Inside the Business Enterprise: Historical Perspectives on the Use of Information* (University Press, Chicago).

DeAngelo, Harry and Linda DeAngelo, 1985, Managerial ownership of voting rights, *Journal of Financial Economics* 14, 33-69.

DeAngelo, Harry, Linda DeAngelo, and Edward Rice, 1984, Going private: Minority freezeouts and stockholder wealth, *Journal of Law and Economics* 27, 367-401.

DeAngelo, Harry and Edward Rice, 1983, Antitakeover amendments and stockholder wealth, *Journal of Law and Economics* 11, 329-360.

Demsetz, Harold, 1968, The cost of transactions, *Quarterly Journal of Economics* 82, 33-53.

Demsetz, Harold, 1983, The structure of ownership and the theory of the firm, *Journal of Law and Economics* 26, 375-390.

Demsetz, Harold and Kenneth Lehn, 1985, The structure of corporate ownership: Causes and consequences, *Journal of Political Economy* 93, 1155-1177.

Denis, David J. and Jan M. Serrano, 1996, Active investors and management turnover following unsuccessful control contests, *Journal of Financial Economics* 40, 239-266.

Fama, Eugene, 1980, Agency problems and the theory of the firm, *Journal of Political Economy* 88, 288-307.

Fama, Eugene, Lawrence Fisher, Michael Jensen, and Richard Roll, 1969, The adjustment of stock prices to new information, *International Economic Review* 10, 1-21.

Fama, Eugene F. and Michael C. Jensen, 1983a, Separation of ownership and control, *Journal of Law and Economics* 26, 301-325.

Fama, Eugene F. and Michael C. Jensen, 1983b, Agency problems and residual claims, *Journal of Law and Economics* 26, 327-349.

Franks, Julian and Colin Mayer, 1994, The ownership and control of German corporations, *mimeo* (London Business School).

Gilson, Stuart, 1990, Bankruptcy, boards, banks, and blockholders, *Journal of Financial Economics* 27, 355-387.

Grossman, Sanford J. and Oliver D. Hart, 1980, Takeover bids, the free-rider problem, and the theory of the firm, *Bell Journal of Economics* 11, 42-64.

Grossman, Sanford J. and Oliver D. Hart, 1986, The costs and benefits of ownership: A theory of vertical and lateral integration, *Journal of Political Economy* 94, 691-719.

Grossman, Sanford J. and Oliver D. Hart, 1988, One share-one vote and the market for corporate control, *Journal of Financial Economics* 20, 175-202.

Grundfest, Joseph A., 1990, Subordination of American capital, *Journal of Financial Economics* 27, 89-114.

Hart, Oliver, 1995a, *Firms, Contracts, and Financial Structure* (Clarendon Press, Oxford).

Hart, Oliver, 1995b, Corporate governance: Some theory and implications, *The Economic Journal* 105, 678-689.

Hart, Oliver and Bengt Holmström, 1987, The theory of contracts, in: T. Bewley, ed., *Advances in Economic Theory* (University Press, Cambridge, U.K.)

Hart, Oliver and John Moore, 1990, Property rights and the nature of the firm, *Journal of Political Economy* 98, 1119-1158.

Harris, Milton and Artur Raviv, 1988, Corporate governance: Voting rights and majority rules, *Journal of Financial Economics* 20, 203-235.

Holderness, Clifford and Dennis Sheehan, 1988, The role of majority shareholders in publicly held corporations: An exploratory analysis, *Journal of Financial Economics* 20, 317-346.

Holmes, Oliver W., 1881, *The Common Law* (Little Brown, Boston, 1963 edn.).

Holmsröm, Bengt and Paul R. Milgrom, 1991, Multiple principal-agent analyses: Incentive contracts, asset ownership, and job design, *Journal of Law, Economics, and Organization* 7, 24-52.

Holmsröm, Bengt and Jean Tirole, 1993, Market liquidity and performance monitoring, *Journal of Political Economy* 101, 678-709.

Horner, M., 1988, The value of the corporate voting right, *Journal of Banking and Finance* 12, 69-83.

Huddart, Steven, 1993, The effect of a large shareholder on corporate value, *Management Science* 39, 1407-1421.

Jarrell, Gregg, James Brickley, and Jeffry Netter, 1988, The market for corporate control: The empirical evidence since 1980, *Journal of Economic Perspectives* 2, 49-68.

Jarrell, Gregg and Anette Poulsen, 1988a, Shark repellents and stock prices: The effects of antitakeover amendments since 1980, *Journal of Financial Economics* 19, 127-168.

Jarrell, Gregg and Anette Poulsen, 1988b, Dual-class recapitalizations as antitakeover mechanisms: The recent evidence, *Journal of Financial Economics* 20, 129-152.

Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323-329.

Jensen, Michael C., 1989, The eclipse of the modern corporation, *Harvard Business Review* 89, 61-74.

Jensen, Michael C. and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs, and ownership structure, *Journal of Financial Economics* 3, 305-360.

Kang, Jun-Koo and Anil Shivdasani, 1995, Firm performance, corporate governance, and top executive turnover in Japan, *Journal of Financial Economics* 38, 29-58.

Kaplan, Steven and Bernadette Minton, 1994, Appointments of outsiders to Japanese boards: Determinants and implications for managers, *Journal of Financial Economics* 36, 225-257.

Kyle, Albert S., 1984, Market structure, information, futures markets, and price formation, in: G. Storey, A. Schmitz, and A. Harris, eds., *International Agricultural Trade: Advanced Readings in Price Formation, Market Structure, and Price Instability* (Westview, Boulder, Col.).

Lambert, Richard and David Larcker, 1985, Golden parachutes, executive decision-making, and shareholder wealth, *Journal of Accounting and Economics* 7, 179-203.

Lang, Larry, René Stulz, and Ralph Walkling, 1991, A test of the free cash flow hypothesis: The case of bidder returns, *Journal of Financial Economics* 29, 315-336.

Lease, Ronald, John McConnell, and Wayne Mikkelson, 1983, The market value of control in publicly traded corporations, *Journal of Business* 57, 443-467.

Leland, Hayne E. and David H. Pyle, 1977, Informational asymmetries, financial structure, and financial intermediation, *The Journal of Finance* 32, 371-387.

Levi, Haim, 1982, Economic valuation of voting power of common stock, *The Journal of Finance* 38, 79-93.

Loughran, Timothy, Jay Ritter, and Kristian Rydqvist, 1994, Initial public offerings: International insights, *Pacific-Basin Finance Journal* 2, 165-199.

Mace, Myles L., 1971, *Directors: Myth and Reality* (Harvard Business School, Boston).

Malatesta, Paul and Ralph Walkling, 1988, Poison pill securities: Stockholder wealth, profitability, and ownership structure, *Journal of Financial Economics* 20, 347-376.

Manne, Henry G., 1965, Mergers and the market for corporate control, *Journal of Political Economy* 75, 110-126.

Martin, Kenneth and John McConnell, 1991, Corporate performance, corporate takeovers, and management turnover, *The Journal of Finance* 46, 671-688.

Maug, Ernst, 1995, Institutional investors as monitors: On the impact of insider trading legislation on large shareholder activism, *IFA Working paper* 213 (London Business School).

McConnell, John and Henry Servaes, 1990, Additional evidence on equity ownership and corporate value, *Journal of Financial Economics* 27, 595-612.

Merton, Robert C., 1987, Presidential address: A simple model of capital market equilibrium, *The Journal of Finance* 42, 483-510.

Milgrom, Paul and John Roberts, 1992, *Economics, Organization, and Management* (Prentice Hall, Englewood Cliffs, NJ).

Mirlees, James, 1976, The optimal structure of incentives and authority within organizations, *Bell Journal of Economics* 7, 105-131.

Molin, Johan, 1996*a*, Shareholder gains from equity private placements: Evidence from the Stockholm Stock Exchange, *Working paper series in Economics and Finance* 101 (Stockholm School of Economics).

Molin, Johan, 1996*b*, Optimal deterrence and inducement of takeover: An analysis of poison pills and dilution, *Working paper series in Economics and Finance* 102 (Stockholm School of Economics).

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1988, Management ownership and market valuation: An empirical analysis, *Journal of Financial Economics* 20, 293-315.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1989, Alternative mechanism of corporate control, *American Economic Review* 79, 842-852.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1990, Do managerial objectives drive bad acquisitions?, *The Journal of Finance* 45, 31-48.

Pagano, Marco, 1993, The flotation of companies on the stock market: A coordination failure model, *European Economic Review* 37, 1101-1125.

Pagano, Marco, Fabio Panetta, and Luigi Zingales, 1995, Why do companies go public? An empirical analysis, *mimeo* (Università Bocconi and University of Chicago).

Pagano, Marco and Ailsa Röell, 1995, The choice of stock ownership structure, agency costs, monitoring and liquidity, *mimeo* (Università Bocconi and London School of Economics).

Palepu, Krishna, 1986, Predicting takeover targets: A methodological and empirical analysis, *Journal of Accounting and Economics* 8, 3-35.

Pound, John, 1988, Proxy contests and the efficiency of shareholder oversight, *Journal of Financial Economics* 20, 237-265.

Prowse, Stephen, 1990, Institution investment patterns and corporate financial behavior in the United States and Japan, Journal of Financial Economics 27, 43-66.

Rajan, Raghuram, 1992, Insiders and outsiders: The choice between relationships and arm's-length debt, *The Journal of Finance* 47 1367-1400.

Ramirez, Carlos, 1995, Did J.P. Morgan's men add liquidity? Corporate investment, cash flow, and financial structure at the turn of the twentieth century, *The Journal of Finance* 50, 661-678.

Ritter, Jay R., 1987, The costs of going public, *Journal of Business* 32, 215-240.

Rock, Kevin, 1986, Why new issues are underpriced, *Journal of Financial Economics* 15, 187-212.

Roe, Mark J., 1990, Political and legal restraints on ownership control of public companies, *Journal of Financial Economics* 27, 7-42.

Roe, Mark J., 1993, Some differences in corporate structure in Germany, Japan, and the United States, *The Yale Law Review* 102, 1927-2003.

Roe, Mark J., 1994, *Strong Managers and Weak Owners: The Political Roots of American Corporate Finance* (University Press, Princeton, NJ).

Romano, Roberta, 1993, *The Genius of American Corporate Law* (American Enterprise Institute Press, Washington, DC).

Ruback, Richard, 1988, Coercive dual-class exchange offers, *Journal of Financial Economics* 20, 153-173.

Rydqvist, Kristian, 1987, Empirical investigation of the voting premium, *Working Paper* 35 (Northwestern University, Evanston, IL).

Ryngaert, Michael, 1988, The effects of poison pill securities on shareholder wealth, *Journal of Financial Economics* 20, 377-417.

Scharfstein, David, 1988, The disciplinary role of takeovers, *Review of Economic Studies* 55, 185-199.

Shivdasani, Anil, 1993, Board compositions, ownership structure, and hostile takeovers, *Journal of Accounting and Economics* 16, 167-198.

Shleifer, Andrei and Robert W. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461-488.

Shleifer, Andrei and Robert W. Vishny, 1992, Liquidation values and debt capacity: A market equilibrium approach, *The Journal of Finance* 47, 1343-1366.

Shleifer, Andrei and Robert W. Vishny, 1993, Corruption, *Quarterly Journal of Economics* 108, 599-618.

Shleifer, Andrei and Robert W. Vishny, 1995, A survey of corporate governance, *mimeo* (Harvard University and University of Chicago).

Smith, Adam, 1776, *An Inquiry into the Nature and Causes of the Wealth of Nations* (W. Strahan & T. Cadell, In-the-Strand, London; Reprinted edition: University Press, Chicago, 1976).

Smith, Michael P., 1996, Shareholder activism by institutional investors: Evidence from CalPERS, *The Journal of Finance* 51.

Strickland, Deon, Kenneth W. Wiles, and Marc Zenner, 1996, A requiem for the USA: Is small shareholder monitoring effective? *Journal of Financial Economics* 40, 319-338.

Stulz, René, 1988, Managerial control of voting rights, *Journal of Financial Economics* 20, 25-59.

Thompson, Steve and Mike Wright, 1995, Corporate governance: The role of restructuring transactions, *The Economic Journal* 105, 690-703.

Tirole, Jean, 1994, Incomplete contracts: Where do we stand? *mimeo* (Institut d'Economie Industrielle, Toulouse and Ceras, Paris).

Tobin, James, 1969, A general equilibrium approach to monetary theory, *Journal of Money, Credit, and Banking* 1, 15-29.

Wakling, Ralph and Michael Long, 1984, Agency theory, managerial welfare, and takeover bid resistance, *Rand Journal of Economics* 15, 54-68.

Warner, Jerold, Ron Watts, and Karen Wruck, 1988, Stock prices and top management changes, *Journal of Financial Economics* 20, 461-492.

Weinstein, David E. and Yishay Yafeh, 1994, On the costs of bank-centered financial system: Evidence from the changing main bank relations in Japan, *mimeo* (Harvard University).

Weisbach, Michael, 1988, Outside directors and CEO turnover, *Journal of Financial Economics* 20, 431-460.

Williamson, Oliver E., 1985, *The Economic Institutions of Capitalism: Firms, Markets, and Rational Contracting* (Free Press, New York).

Williamson, Oliver E., 1988, Corporate finance and corporate governance, *The Journal of Finance* 43, 567-591.

Yermack, David, 1995, Do corporations award CEO stock options effectively? *Journal of Financial Economics* 39, 237-269.

Yosha, Oved, 1995, Information disclosure costs and the choice of financing source, *Journal of Financial Intermediation* 4, 3-20.

Zeckhauser, Richard J. and John Pound, 1990, Are large shareholder effective monitors? An investigation of share ownership and corporate performance, in: G. Hubbard, ed., *Asymmetric Information, Corporate Finance and Investment* (University of Chicago Press, Chicago).

Zingales, Luigi, 1994, The value of the voting right, *Review of Financial Studies* 7, 125-148.

Zingales, Luigi, 1995, Block ownership and the decision to go public, *Review of Economic Studies* 62, 425-448.

ESSAY II

Shareholder Gains from Equity Private Placement: Evidence from the Stockholm Stock Exchange

I examine the stock price reactions to equity private placements and rights issues on the Stockholm Stock Exchange and analyze private placement discounts. The combined results reinforce the preliminary support for Wruck's (1989) monitoring hypothesis and the Hertzel and Smith (1993) information hypothesis; the announcement effects are significantly positive for private placements and insignificant for rights issues. Cross-sectional analysis suggests that a substantial part of the variation in private placement discounts and market reactions to private placement announcements can be explained by a combination of increased monitoring and closer alignment of manager and owner interests as implied by agency theory. The essay also presents evidence on significant information effects. These appear not to be generated by sophisticated signaling mechanisms, but rather by responses to the more trivial signals inherent in the announcements of resolutions of acute financial problems.

1. *Introduction*

This paper exploits institutional differences between the Swedish and the U.S. stock markets in order to examine more closely the stock market's reactions to equity private placements. According to recent studies, announcements of equity private placements generate positive stock price effects.[1] This stock price behavior is noteworthy for at least two reasons. First, because the frequently large private placement discounts would, all else being equal, be expected to trigger a negative market response due to the dilution effect. Second, because the results contrast with the empirical evidence from *public* equity issues, which seem thoroughly associated with negative announcement effects.[2] The literature provides two basic explanations for this stock price behavior. The first one is *the monitoring hypothesis*. Following Jensen and Meckling (1976), Wruck (1989) suggests that the positive announcement effects are motivated by the reductions in agency costs implied by private-placement induced increases in ownership concentration. The second one is *the information hypothesis*. Hertzel and Smith (1993) extend the Myers and Majluf (1984) model where management has superior knowledge about the firm's true value. In the extended model, private placement announcements help to communicate some of the management's private information about firm value to the market. Hypothetically, a well-informed investor announcing his willingness to commit funds to a firm sends a positive signal to the market. Hertzel and Smith rationalize the presence of private placement discounts as compensation for information costs.

It appears that examining private placements in a slightly different market environment may provide useful insights into the mechanisms at work, and not only serve as a "check for robustness" of previous results. An important difference in institutional characteristics between American and

---

[1] For example, Wruck (1989) observes an average four-day abnormal return of 4.41% for 99 private placements in the period 1979-1985, and Hertzel and Smith (1993) report an average four-day excess return of 1.72% in a sample of 106 private placements in the period 1980-1987.

[2] For example, Asquith and Mullins (1986) receive an announcement effect of –2.70%, Masulis and Korwar (1986), Schipper and Smith (1986) report negative two-day average abnormal returns of about three percent. See e.g. Smith (1986), or Kalay and Shimrat (1985) for a review of results.

Swedish stock markets pertains to the general level of ownership concentration. In relation to the Amex and NYSE, the Stockholm Stock Exchange is characterized by a very high average level of ownership concentration.[3] The monitoring hypothesis is based on the premise that shareholder concentration *increases* as a result of a private placement. Because the ownership concentration is high to begin with, a private placement tends to *decrease* the ownership concentration of the firm rather than increase it.[4] Provided that the general results of positive private placement announcement effects hold, this observation appears to lessen the support for the monitoring hypothesis, and thus suggests further examination of the hypothesis.

Offers to participate in issues of new equity are typically aimed at either (*i*) the firm's existing shareholders (rights offers), (*ii*) the general public (public offers), or (*iii*) a specific investor or group of investors (private placements). Unlike the case of American stock exchanges, public offerings are extremely rare in seasoned equity issues on the Stockholm Stock Exchange; seasoned issues are typically floated either as rights offers or as private placement offers.[5,6] Moreover, the rights issues in firms on the Stockholm Stock Exchange are typically uninsured.[7] In rights issues, existing shareholders are given the option to subscribe to the new shares on a pro rata basis. With usually high levels of shareholder takeup, rights issues will typically neither affect the level of ownership concentration nor will they serve to resolve asymmetric information. Thus both the monitoring hypothesis and the information hypothesis predict *insignificant* average market reactions to rights issues. Thus combining results from an event study of private placements with one of rights issues possibly provides stronger evidence as to the validity of the hypotheses put forward by Wruck

---

[3] In the sample of firms presented in the paper, the average pre-issue size of the largest shareholder's fraction of the equity is roughly 30%, and the single largest shareholder's fraction of the votes is on average 45%. Approximately 35% of the firms are majority controlled in the sense that one owner holds more than 50% of the votes.

[4] In the private placement sample presented, the ownership concentration measured as the fraction of voting rights held by firm's largest shareholder decreases in 64% of the cases.

[5] Eckbo and Masulis (1992) report that in 1981, 97% of the seasoned equity issues in all U.S. listed companies were floated as firm commitment underwritten offers, 2% were standby underwritten offers, and 1% were uninsured rights offers.

[6] In 1993, the volume of rights issues on the Stockholm Stock Exchange was roughly $ 2.4 billion and the volume of cash payment equity private placements amounted to approximately $ 200 million. The trading volume on the Stockholm Stock Exchange (officially listed and OTC stocks) was approximately $ 46.5 billion in 1993. (Source: Stockholm Stock Exchange Fact Book 1994).

[7] This institutional fact contrasts with the development on, e.g., the Oslo Stock Exchange where standby underwritten offers have become increasingly popular during the last few years [see Bøhren, Eckbo and Michalsen (1993)].

(1989) and Hertzel and Smith (1993). The fairly rich data material on rights issues and private placements on the Stockholm Stock Exchange makes this market environment a suitable laboratory for a comparative study. The literature contains a vast variety of theories with bearing on the market reactions to seasoned equity issues. Separating between the empirical implications for rights issues and private placements would seem important. Combining event studies of rights issues and private placements thus also adds to the evidence on a larger set of hypotheses.

There is an essential difference between information effects that are induced by intentional and possibly systematic signaling by management (as is the rationale behind many signaling models), and such that are due to the mere resolution of a general uncertainty about dichotomous outcomes (such as the rescue of a firm in acute financial troubles). In the former case, equity issues may constitute sophisticated signaling devices. In the latter, additional funding would represent a more primitive type of "signal". By distinguishing between stock issues aimed at capital restructuring of financially distressed firms and such that are destined to finance new projects, the paper captures some of the relative (empirical) relevance of these two mechanisms.

The Hertzel and Smith (1993) study suggests that private placement discounts can be explained by proxies for information costs. However, they may also reflect compensation for monitoring costs or incentive schemes for managers. Alternatively, discounts may reflect self-dealing by opportunistic managers or influential blockholders. Although insider self-dealing in private placement offerings have become more difficult following a new legislation as of 1987, the boards of directors in Swedish firms still possess a substantial amount of freedom as to the choice of flotation method, timing, and pricing in issues of new stocks.[8] The 1987 legislation strengthens the position of shareholders in widely held firms, although it does not in itself constitute an effective protection of minority shareholders from oppression by majority shareholders.[9] This may be an important factor in a closely held

---

[8] Swedish corporate law gives the company board of directors the right to decide on a new equity issue *and* the right to decide to forgo the preemptive rights principle. This is provided that, either (i) the board's decision gets ex post approval by the stockholders' meeting, or (ii) the board is formally given ex ante authorization by the stockholders to decide on equity issuance matters [ABL (1975, 4 Kap., 5-15 §§)].

[9] In 1983, a private placement in the medical corporation AB Leo attracted media attention. Key position holders of Leo were accused of awarding themselves private placement offers at favorable terms. The controversy over the private placements in AB Leo resulted in the formation of an official investigation [DsFi 1986:2, "Leokommissionen"] of the use of equity private placements in Swedish corporations. The report resulted in a new legislative act enacted as of June 1, 1987 [Lag (1987:464)]. The new regulation explicitly regulates private placement offers aimed at managers and directors in public companies. As a consequence of

stock market such as the Stockholm Stock Exchange. The paper examines alternative explanations for private placement discounts.

The paper is organized as follows. Section 2 contains a survey of theories on seasoned equity issues and a summary of their empirical implications for public issues, rights issues, and private placements, respectively. Section 3 describes the data and the event study methodology. The event study results are portrayed in section 4. Section 5 addresses the adjustments for discounts in private placement offers. Cross-sectional analysis of both abnormal returns and discount is performed in section 6. Finally, section 7 contains a summary of results and concluding remarks.

2. *Theory*

Several possible mechanisms, with direct or indirect implications for the stock market's reaction to issues of new equity, have been suggested throughout the literature. The foci of these theories differ between price-pressure effects from increased share supply, agency-cost effects, and information-revelation effects. This section contains a survey of theoretical work and empirical predictions for different types of stock issues.[10] The empirical implications for private placements and rights issues, respectively, are summarized at the end of the section.

2.1 Price pressure effects

Basic financial theory implies an infinitely elastic demand for equity.[11] However, Scholes (1972) suggests that, because each stock is unique and lacks a perfect substitute, the demand curve will be downward-sloping rather than horizontal. A new issue increases the equity supply. Under the price pressure hypothesis we should therefore expect, all else being equal, a

---

the new law, decisions on private placement offers specifically involving insiders as purchasers can no longer generally be delegated to the board of directors. The terms of the issue must be approved directly by simple-majority vote on the stockholders' meeting. Along with the novel legislation, a professional board for supervising stock market participants, Aktiemarknadsnämnden, was founded as part the self-regulatory framework.

[10] This section is an extension of surveys presented in Kalay and Shimrat (1987) and in Liljeblom (1989).

[11] For example, the CAPM implies that the price of a stock is a function exclusively of risk and expected return, although the Beta risk may be a function of the stock's supply.

negative stock market reaction to all issues of new stock, whether they are public issues, rights issues, or private placements.

2.2 *Agency cost effects*

Jensen and Meckling (1976) suggest that increases in percentage ownership held by management serve to align more closely the interests of managers and shareholders. According to this convergence-of-interests hypothesis, a private sale that increases the ownership fraction of insiders is expected to result in a positive market reaction, while a stock issue that reduces managerial holdings predict a negative stock price effect.

Following Fama and Jensen (1983), Morck, Shleifer, and Vishny (1988) point out that a manager with a sufficient ownership stake to guarantee his employment at an attractive salary, may in fact indulge in non-value-maximizing behavior. A manager with a stake in the firm faces a tradeoff between perk consumption and a capital loss on his/her holding. The management-entrenchment hypothesis suggests that private sales to managers may generate a negative market reaction for some levels of insider ownership.

Jensen and Meckling (1976) also point to the outside owners' increasing incentives for monitoring management with increasing stakes. Shleifer and Vishny (1988) model monitoring activities as control-oriented. According to Shleifer and Vishny, an increase in the ownership fraction held by a potential acquirer of the firm will increase the probability of a value-increasing takeover since this would provide him/her with a larger capital gain on a potential value improvement. Insofar as private placements increase ownership concentration, they should thus induce a positive market reaction. Wruck (1989) suggests that monitoring effects may be instrumental in private placements as they, hypothetically, increase outside ownership concentration.

According to Galai and Masulis (1976), an equity issue implies a redistribution of wealth from equityholders to debtholders. An issue of equity lowers the leverage in the firm. Decreased leverage means a reduction of the debtholders' risk. Because loan agreements are fixed, a decrease in the default risk cannot be compensated in interest expenses. In accordance with this, a negative stock market reaction to announcements of equity issues is predicted.

Equity issues may also induce wealth redistribution among the existing equityholders. If a few shareholders are able to participate in a new issue while others are not, the nonparticipating shareholders may receive less

than a fair deal. In a private sale to a specific owner, the nonparticipating shareholders may be disadvantaged by the pricing of the issue. Private placements sometimes permit self-serving deals by management or by large existing shareholders. Such insider opportunism may affect the market reaction to a private placement announcement negatively.

2.3 *Information effects*

Changes in ownership structure induced by equity issues, may reveal asymmetric information about the firm's intrinsic value. Myers and Majluf (1984) view an attempt by corporate insiders to maximize the wealth of current shareholders at the expense of new investors. The management has private information about the true value of the firm. An announcement of a new issue of stock directed to new investors at current market price may therefore indicate an overvaluation. Eckbo and Masulis (1992) draw on the adverse selection mechanism present in Myers-Majluf to study more varied methods of flotation by allowing for shareholder participation and involving underwriter certification. Specifically, they model the firm's choice between uninsured rights offerings, standby underwritten offerings and firm commitment offerings. Their model predicts insignificant market reactions to announcements of uninsured rights due to lack of adverse selection bias. They also predict that standby offers and firm commitments will exhibit negative market reactions (standby offers somewhat less negative than firm commitments). Hertzel and Smith (1993) extend the Myers and Majluf model to involve private placement issues. They suggest that the willingness of private placement investors to commit funds to a firm conveys the management's belief that the firm is undervalued.

Leland and Pyle (1977) argue that management is presumably better informed about expected future cash flows than outside investors. From a diversification standpoint, it is costly for insiders to hold a large ownership fraction of the firm. Rational investors recognize that management will have reason to own a large part of the corporation only if it expects higher profits. Hence, equity issues that reduce the stake of insiders will provide a negative signal of firm value, while increasing insider stakes imply a positive market reaction.

Miller and Rock (1985) consider a situation where external financing is used for financing shortfalls in operating cash flows. Additional outside funding will affect firm value negatively, because it is seen as a signal of managements' reduced cash flow expectations. Ross (1977) suggests that a firm's choice of capital structure may convey management's expectations of future cash flows. To protect their employment, managers have incentives to

avoid bankruptcy. Enlarging the debt-equity ratio increases the risk of bankruptcy if the intrinsic firm value is low, while it has little impact on the bankruptcy risk if the expected cash flows are high. Hence, management will increase leverage (as implied by an issue of new stock) only if the true firm value is high. Accordingly, an equity issue will serve as a positive signal of the value of the shares. Masulis (1983) assumes that managers choose the level of financial leverage so as to maximize shareholder wealth ex ante. Given that there exist information asymmetries between managers and investors regarding the firm's future cash flows, a decision to change the debt/equity ratio indicates a change in the managers' expectations. Specifically, a leverage-decreasing equity issue indicates that managers expect a lower level of earnings than previously anticipated. Healy and Palepu (1990) suggest that a stock issue may convey managers' private information about the expected volatility of future earnings rather than the expected level of future cash flows. Managers decide to issue equity and reduce financial leverage when they foresee an increase in their firms' business risk. Their prediction is that the reduction in leverage induces a downward adjustment of the market's assessment of firm value.

Table 1 summarizes the empirical predictions for the stock market reactions to announcements of public equity issues, rights issues, and private placements under the various mechanisms/theories reported above.

A first step to determine the relevance of the hypotheses, summarized in Table 1, would be to examine the effects on average excess stock returns associated with announcements of the various types of equity issues. The event studies will provide a preliminary indication of the relative importance of the respective mechanisms; they will exclude some mechanisms as primary determinants of issues, but are unlikely to separate perfectly between hypotheses as some have identical implications for the sign of the market reaction.

The table displays six hypotheses that predict negative market reactions to both rights issues and private placements. These are Scholes (1972), Galai and Masulis (1976), Ross (1977), Masulis (1983), Miller and Rock (1985), and Healy and Palepu (1990). Two of the hypotheses predict negative announcement effects for private placements and insignificant reactions to rights issues. One of these is the Morck, Shleifer, and Vishny (1988) management entrenchment hypothesis. The other one is the Leland and Pyle (1977) ownership structure hypothesis, conditional on decreasing insider ownership. While it appears less relevant for rights issues, the hypothesis of opportunistic insiders predicts negative announcement effects for private placements taken up by insiders. Five hypotheses predict positive market reactions to private placements and insignificant announcement effects for

rights issues. These are Wruck's (1989) monitoring hypothesis, Shleifer and Vishny (1988), the Hertzel and Smith (1993) information hypothesis, the Jensen and Meckling convergence-of-interests story, and the Leland and Pyle

Table 1

Empirical implications

The table assigns the ceteris paribus predicted market reactions to announcements of rights issues and private placements implied by different mechanisms/hypotheses.

Mechanism/Hypothesis	Rights Issue	Private Placement
Price pressure hypothesis (Scholes, 1972)	(–)	(–)
Agency cost effects		
(*i*) Converging interests (Jensen-Meckling, 1976)	(0)	(+)[a]
(*ii*) Management entrenchment (Fama-Jensen, 1983; Morck-Shleifer-Vishny,1988)	(0)	(–)[b]
(*iii*) Monitoring and control effects (Wruck, 1989)	(0)	(+)[c]
(*iv*) Insider opportunism	N.A.	(–)[a]
(*v*) Wealth redistribution holders of bond and equity (Galai-Masulis, 1976)	(–)	(–)
Information effects		
a) Changes in capital expenditure		
Value of current earnings (Miller-Rock, 1985)	(–)	(–)
b) Changes in capital structure		
Decreasing financial leverage (Ross, 1977; Healy-Palepu, 1990; Masulis, 1983)	(–)	(–)
c) Changes in ownership structure		
(*i*) Ownership fraction signal (Leland- Pyle, 1977)	(0)	(+)[a]
(*ii*) Adverse selection (Myers-Majluf, 1984; Eckbo-Masulis, 1992)	(0)	N.A.
(*iii*) Informed investor signal (Hertzel-Smith, 1993)	(0)	(+)

(1977) signaling model. The empirical predictions of the two latter hypotheses are predicated on increased insider ownership. The adverse selection models of Myers and Majluf (1984) and Eckbo and Masulis (1992)

[a] Sign is predicated on increased insider ownership fraction.

[b] Morck, Shleifer, and Vishny (1988) suggest that management entrenchment may be present for certain levels of (insider) ownership.

[c] Sign predicated on increased outsider ownership concentration.

are both consistent with insignificant market reactions to rights issues, while they appear to have limited bearing on private placements. The data and event study methodology are presented in the following section.

3. *Data and methodology*

3.1 Data

The data consists of two samples: one of private placement announcements, and one of rights issue announcements. The crude private placement data was obtained from the *DEXTEL Findata* database which reports changes in equity capital in all firms traded on the Stockholm Stock Exchange. This data material contains private placements occurring in the period between January 1987 and October 1994. The search process produced 97 instances of seasoned equity private placements with cash payment. The announcement dates were then collected through research of the company press-release archives of the Stockholm Stock Exchange except for some 20 observations that were obtained directly from the companies concerned.[12] Of the 97 private placements, 17 are eliminated (17.5%) because the announcements coincide with announcements of other types of security issues or other offers, and 4 (4.1%) are removed because either not enough trading occurred in the period preceding the announcement to compute reliable market model estimates, or errors in the trading data were suspected. The first public announcement occured in November 1986, and the last one in August 1994. The final sample of private placement announcements contains a total of 76 observations.

---

[12] Using press release data for obtaining announcement dates seems to have some comparative advantages over searching in newspapers. An equity issue announcement may have its primary market impact a day, or possibly more, before it becomes an item in the morning newspaper, creating some uncertainty about the actual "event day". In contrast, press-releases to the Stockholm Stock Exchange often have the exact time of the day for the information revelation documented in form of a time stamp on the facsimile sheet. Moreover, original press-releases are primary sources of information while newspapers are secondary sources. In particular, press-releases are not subject to distortions by news editors. Furthermore, all listed firms are committed by contract to extend all vital company information to the Stockholm Stock Exchange. However, probably because the archives are not perfectly maintained, there are some gaps in the material of stored press-releases. Some announcement dates are therefore obtained directly from the companies.

For the period 1987-1994, the rights issue sample was assembled in a fashion similar to that of the private placement sample. However, I was provided with an additional 27 observations pertaining to the period 1980-1986. The additional observations were accumulated by Liljeblom (1989) for a different study. The search processes, including Liljeblom's observations, resulted in 98 observations of rights issue announcements. Of these announcements, 31 (31.6%) are eliminated because they coincide with announcements of other security issues, and 5 (5.1%) are eliminated due to insufficient trading data. The final rights issue sample consists of 62 announcements. Table 2 presents summary statistics on the two samples.

Table 2

Summary sample description

The table displays summary statistics for the samples of private placement announcements during the period November 1986 - August 1994, and rights issue announcement during the period February 1980 - April 1994 on the Stockholm Stock Exchange. Issue size is measured as the SEK gross proceeds from the issue. Firm size is the SEK post-issue market value of equity. Relative issue size is the percentage ratio of Issue size to Firm size.

Panel A: Size variables			
	Private Placements	Rights Issues	All
Issue size, *million SEK*[13]			
Mean (Median)	319 (50)	595 (318)	443 (132.6)
Firm size, *billion SEK*			
Mean (Median)	2.6 (0.7)	3.7 (1.0)	3.1 (0.8)
Relative issue size, %			
Mean (Median)	32.5 (10.4)	41.2 (25.2)	36.4 (19.1)

Panel B: Time of announcement			
	Private Placements	Rights Issues	All
1980-1985 (*No. of announcements*)	–	13	13
1986- 1988 (– " –)	25	11	36
1989-1990 (– " –)	16	13	29
1991-1992 (– " –)	14	4	18
1993-1994 (– " –)	21	21	42

Panel C: Listing on the Stockholm Stock Exchange			
	Private Placements	Rights Issues	All
Number of officially listed firms (A-list)	55	47	99
Number of unofficially listed (OTC) firms	21	15	39
Number of observations	76	62	138

[13] Over the sample period, 1 U.S. dollar approximately equals 7 Swedish Kronor (SEK).

The table shows an average private placement size of SEK 319 million, which is about half the average rights issue size (SEK 595 million).[14] However, the median rights issue amounts to SEK 318 million, which is more than six times the median private placement of SEK 50 million.

The combined sample exhibits a mean issue size, measured as the gross proceeds, of SEK 443 million and a median of SEK 133 million. The average firm size is about 40% larger in the rights issue sample (SEK 3.7 billion) than in the private placement sample (SEK 2.6 billion). The average relative issue size, measured as gross proceeds to post-issue market value of equity, is roughly 30% bigger in the rights issue sample (41.2%) as in the private placement sample (32.5%).

The number of stock issues varies between periods. 21 private placements are carried out in the 1993-94 period, while only 14 were announced in the preceding two-year period. Correspondingly, 21 rights issues were announced in 1993-94, and only 4 in 1991-1992.[15] The fraction of OTC firms is slightly higher in the private placement sample (27.6%) than in the rights issue sample (21.2%).

3.2 *Method*

Standard event study methodology in the fashion prescribed by Dodd and Warner (1983) is used to capture the stock price reactions to announcements of equity issues. The abnormal return, AR_{it}, for each security is estimated by calculating the residuals from the OLS estimation of the market model $AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}$, where R_{it} denotes the observed arithmetic daily return for security i at day t, where R_{mt} is the return on the market portfolio at day t. To estimate the market portfolio returns, the Affärsvärldens Generalindex (AFGX) is employed. This value-weighted index is the oldest and most well-known index of the Stockholm Stock Exchange. The market model coefficients, $\hat{\alpha}_i$ and $\hat{\beta}_i$, are calculated by OLS regressions of R_{it} on R_{mt} using *180* observations of daily returns for each security, ranging from *day –200* through *day –20* (defining *day 0* as the event day). The cumulated abnormal returns over the period day x through day y, are denoted CAR(x, y). Test-statistics are calculated assuming normally distributed daily abnormal returns. As a check for robustness, the *market-index adjusted* abnormal

[14] The measurements of firm and issue sizes are not adjusted for inflation.

[15] The drop in the number of new issues in 1991-1992 coincides with a deep recession in the Swedish economy in that period.

returns, $AR_{it}^{'} = R_{it} - R_{mt}$ is used as an alternative measurement of the stock market's reaction.

4. *Event study results*

The results from the event study are summarized in Table 3, where the second and the third columns report the abnormal returns obtained from the private placement sample, and the fourth and the fifth columns report the findings from the sample of rights offer announcements. (Abnormal returns using market model estimates and the market portfolio as benchmarks are displayed in parallel.) Results are also depicted in Figures 1 and 2.

Table 3

Average abnormal returns

The table exhibits average (cumulative) abnormal returns around announcements of equity private placements and rights issues on the Stockholm Stock Exchange for various windows. The abnormal returns are calculated using both the market-model-implied returns (using 180 days daily returns for estimating market model coefficients), and a value-weighted market index (AFGX) as benchmarks. The data set for private placements contains 76 announcements during the period 1986 to 1994. The data set for rights issues contains 62 announcements in the period 1980 to 1994.

	Private placements (N = 76)		Rights issues (N = 62)	
Statistics	Market Model Adjusted	Market Index Adjusted	Market Model Adjusted	Market Index Adjusted
Average event day abnormal return	0.0274	0.0282	–0.0042	–0.0038
z-Statistic	3.7	3.8	–0.8	–0.8
p-Value	0.00011	0.00007	0.2119	0.2119
% positive	65.8	67.1	32.3	35.5
Average CAR(–1,1)	0.0321	0.0387	–0.0089	–0.0083
z-Statistic	2.5	3.0	–0.8	–1.2
p-Value	0.0062	0.0014	0.2119	0.1151
% positive	56.6	61.8	38.7	40.3
Average CAR(–3,1)	0.02	0.0336	–0.0019	0.0027
z-Statistic	1.2	2.0	–0.2	0.2
p-Value	0.1151	0.0228	0.4207	0.4207
% positive	61.8	61.8	48.4	46.8

Figure 1

Average abnormal returns for private placement announcements

The graph depicts the average percentage AR(t) for dates –30 through +20, where *date 0* is the announcement day of an equity private placement. The data set includes 76 observations of private placement announcements in the period 1986-1994.

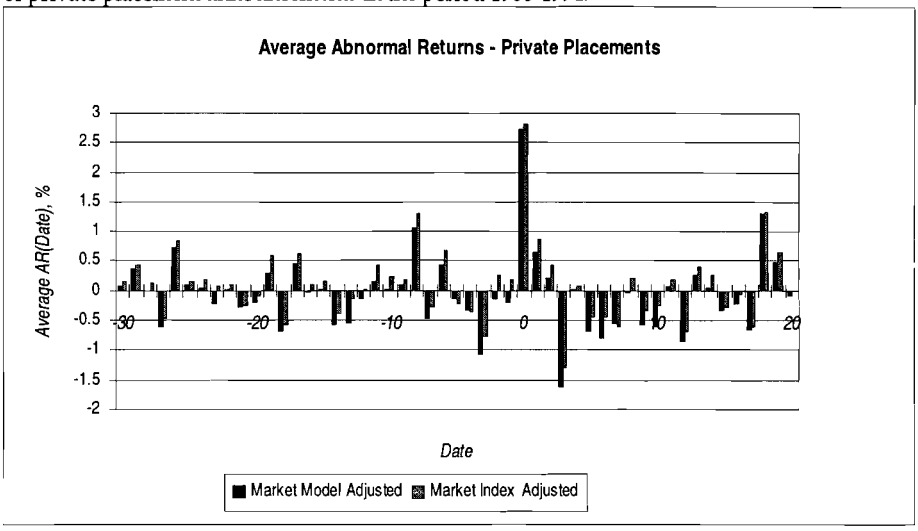
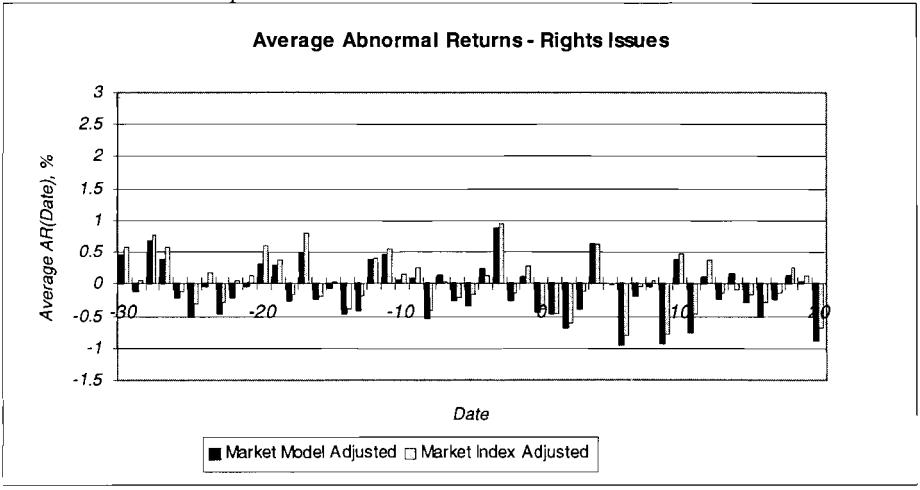


Figure 2

Average abnormal returns for rights issue announcements

The graph depicts the average percentage AR(t) for dates –30 through +20, where date 0 is the announcement day of a rights issue. The data set includes 62 observations of rights issue announcements for the period 1980-1994.



The results indicate a statistically significant and positive average abnormal return following announcements of private placements, while the stock market's reaction to rights issues appears to be insignificant. As far as market reactions to private placements are concerned, the results of Wruck (1989) and Hertzel and Smith (1993) are confirmed.

For the private placement sample, reported in the table, the obtained event day average abnormal return is 2.74% measured in relation to the market-model implied benchmark, and 2.82% relative to the market portfolio. These excess returns are statistically significant (p-values are 0.00011 and 0.00007, respectively).

Apart from the distinct peak in average abnormal returns on the event day, Figure 1 exposes a few minor spikes on *day* –8 (average AR = 1.0%), *day* –3 (average AR = –1.1%), and *day* +3 (average AR = –1.6%), of which only the latter is significant on a 5% level. These observations do not appear to have straightforward economic interpretations. The noticeable concentration of announcement effects on the event day is consistent with instantaneous market reactions to releases of economically important information. Nevertheless, such concentration is rarely seen in event studies due to information leakage and uncertainty about actual event dates. The lack of significant leakage around event dates could possibly be explained by the method of collecting announcement dates using press-release data rather than newspaper searches, which possibly generates a better assessment of the true event date.

The average three-day market-model adjusted cumulative abnormal return from *day –1* to *day +1* is 3.21% (3.87% for the market-index adjusted cumulative abnormal return). No notable patterns in abnormal returns are detected by extending event windows further.

The event study of the rights issue sample exhibits no significant abnormal returns on the event day. The graphical representation in Figure 2 displays very little variation in abnormal stock returns over the *day* –30 through *day* +20 interval. There appears to be four minor negative abnormal returns for *day* 0 through *day* +3. Of these, only the *day* +2 abnormal return is significant on the 10% level. Cumulated, they add up to a CAR of –1.95, which is significantly different from zero at the 5% level. However, this particular four-day average has no straightforward interpretation as any small portions of leaks should typically be captured before the event day rather than after it.[16]

[16] Notably, the market-index adjustment method seems to generate larger abnormal returns when abnormal returns are positive and smaller absolute abnormal returns when abnormal returns are negative than the market-model adjustment method. This is explained by the fact

To further examine the robustness of the results, some additional measures of dispersion of the observed event day abnormal returns are calculated. The *median* event day abnormal return is 0.98%, which is somewhat lower than the mean of 2.74%. The standard deviation is 7.6%, which indicates a wide range of excess returns. The number of observed positive abnormal returns is 50 (65.8%). Hence the positive average abnormal return is accounted for by a majority of individual positive observations, not by only a few outliers.[17]

The rights issue sample exhibits less dispersion in abnormal returns than the private placement sample. The median event day excess return is –0.26%, as compared to the observed (insignificant) mean of –0.43%. The maximum observed abnormal return is 9.87%, while the minimum is –11.87%. The standard deviation is 3.37%. Of the 62 observations of event day abnormal returns only 20 (32.26%) are positive. Hence, the observed negative average abnormal return is produced by a majority of individual negative observations. However, since the average effect is insignificant, it is difficult to assess an economic interpretation of this particular observation.

The combined results —significantly positive average abnormal returns to private placement announcements and insignificant average abnormal market reactions to rights issue announcements— appear to provide the strongest support for the Wruck (1989) monitoring hypothesis and the Hertzel and Smith (1993) information hypothesis. To the extent that private placement are taken up by insiders, the combined results are also consistent with the Leland and Pyle (1977) signaling model and with the Jensen and Meckling (1976) convergence-of-interest hypothesis. The insignificant market reactions to rights issues are consistent with the adverse selection models of Myers and Majluf (1984) and with Eckbo and Masulis (1992).

To examine the extent to which any of these hypotheses can explain individual abnormal returns, I follow the example of Wruck (1989) and Hertzel and Smith (1993) to perform a cross-sectional analysis of the private placement sample. However, the private placement announcement effects are, at this point, not adjusted for potential abnormalities caused by

---

that the firms associated with negative market reactions to private placement announcements are firms with higher market-model betas than firms that create positive market reactions in the samples. Specifically, the average beta estimate of firms exhibiting negative (positive) abnormal returns is 0.75 (0.66) in the private placement sample and 0.81 (0.73) in the rights offer sample.

[17]There are three observations that exhibit abnormal returns in excess of three times the sample standard deviation. If these observations are withdrawn from the sample, the average (market-model adjusted) eventday abnormal return is 1.51% with a p-value of 0.0227.

discounts and premia in the private placement offerings. Before the cross-sectional analysis, it is desirable to isolate stock market reactions caused by the pricing effects from the impacts of new information. Section 5 addresses the adjustment for such pricing effects.

5. *Adjustments for discounts*

5.1. Discount-adjusted abnormal returns

The stock market's reaction will typically be affected by the fact that private placement offer prices deviate from the market price of the stock on the announcement day. If the private placement investor is given a discount, the nonparticipating shareholders' wealth will suffer a dilution effect. One part of the stock market's reaction may therefore include a revision of the stock price reflecting such a dilution effect from a private placement discount. The opposite effect can be expected if the private placement investor pays a premium relative to the market price. In this case, a certain part of the abnormal return can be explained by a revision upward of the price due to this wealth transfer from new investors to nonparticipating shareholders. The pricing effect is essential for the interpretation of the event study results.

In 68.4% of the private placement observations, the new stock is offered at a *discount* relative to the event day market price. There is a *premium* in 25.0% of the cases. Only 6.6% of the private placements are offered at the current market price. The sample average discount in relation to the price on the announcement day is 15.9%, and the median discount is 7.3%.[18]

In order to isolate abnormal market reactions driven by the information content of the private placement announcement from those driven by the pricing effect, a formula derived after Wruck (1989) is used. The discount-adjusted abnormal return, AR_0^{adj}, is written as

$$AR_0^{adj} = AR_0 + \frac{\Delta S}{S_0} \cdot \frac{(p_0 - p_{offer})}{p_{-1}},$$

where ΔS is the number of shares sold in the private placement, and S_0 is the number of shares in the firm before the sale, p_0 is the observed event day

[18] The Swedish sample exhibits smaller discounts on average than the Hertzel and Smith (1993) sample. Hertzel and Smith report an average private placement discount of 20.1% and median of 13.2% in relation to the price ten days after the announcement in their sample of 106 observations.

market price, p_{-1} is the price on the day before the announcement, and p_{offer} is the private placement offer price. AR_0^{adj} is interpreted as the potential abnormal return that would result if the private placement was priced without premium or discount. This discount-adjusted abnormal return is thus the part of the event day abnormal return that is driven by the *information content* of the announcement; it can be viewed as the *net present value of new information* expressed in return form.[19] In this context, "new information" refers to any kind of information that affects the shareholders' assessment of the firm's value, whether it is a reaction to anticipated improvement in company monitoring, or a response to a signal of asymmetric information about the value of new and/or old projects, etc.

When the results from the event study of private placement announcements are adjusted for discounts and premia, the previously obtained positive average market reaction seems thoroughly consolidated. The average discount-adjusted abnormal return in the private placement sample is 7.24% (median is 1.90%).

In the following section an attempt to separate between hypotheses through cross-sectional analysis of discount-adjusted abnormal returns and discounts will be made. Because the empirical predictions seem more pertinent for private placements than for rights issues, the cross-sectional analysis in this paper is confined to the former flotation method.

6. *Cross-sectional analysis*

6.1 *Determinants of discount-adjusted abnormal returns*

6.1.1 *The monitoring hypothesis*

According to Wruck's monitoring hypothesis, stock price effects are expected to be positively related to increases in the level of ownership concentration.

---

[19] The difference between observed and the potential abnormal returns reflects the part of the market's reaction that is driven by the discount/premium in the pricing of the private placement. The numerator, $\Delta S(p_0 - p_{offer})$, is simply the dollar value of the discount/premium transferred from the nonparticipating shareholders to the private placement investor(s). The denominator ($S_0 \cdot p_{-1}$) is the value of old shareholders' total holdings on the day before the announcement. The negative of the dollar discount normalized by the *day –1* wealth captures the total pricing effect on the nonparticipating shareholders' event day return, given the new information.

However, the preliminary evidence shows that most private placements are followed by *decreases* in ownership concentration. Table 4 exhibits descriptive statistics on the change in the ownership concentration in association with private placements. In Panel A, it is shown that ownership concentration decreases in 64% of the cases. In 22.4% of the cases, the private placement results in a control change. Panel B shows that the largest shareholder's fraction of the firm's outstanding equity decreases by 1.7 percentage units on average.

Table 4

Changes in ownership concentration: Preliminary evidence

Panel A of the table displays the frequencies and percentages of increases and decreases in ownership concentration, respectively, as well as the number of instances of control changes following equity private placements. A control change is regarded to be present if the identity of the largest shareholder is changed subsequent to the private placement. The largest shareholding is regarded to be increased if the ownership fraction of the largest shareholder's voting rights is larger after the private placement than before it. Panel B exhibits the change in the size of the largest individual percentage holding of equity/voting rights subsequent to an equity private placement. The statistics are based on 67 observations, where the largest shareholder's ownership fractions before and after the new issue are identified.

Panel A: Number of increases and decreases in ownership concentration and number of control changes		
	Frequency	% of identified
Increases in largest shareholding	21	29.0
Decreases in largest shareholding	44	63.8
New controlling owner	15	22.4

Panel B: Changes in ownership concentration			
	Average	Median	Standard Deviation
Change in the fraction of equity held by the largest shareholder (percentage units)	−1.70	−1.10	11.06
Change in the fraction of voting rights held by the largest shareholder (percentage units)	−2.50	−1.30	10.14
$N = 67$			

The median change is –1.1 percentage units. The largest shareholder's fraction of voting rights decreases by 2.5 percentage units on average. The corresponding median change is –1.3 percentage units. Approximately 80% of the private placement investments are made by outside investors.

The preliminary evidence seems to suggest that the monitoring hypothesis is not a principal explanation for the observed stock price behavior. This appears to be confirmed by running a regression of discount-adjusted abnormal returns solely on the change in ownership concentration, which yields an insignificant coefficient. However, a more multifaceted picture appears if the change in ownership concentration variable is split up with respect to the initial level of ownership concentration. Similar to Morck, Shleifer, and Vishny (1988) and Wruck (1989), I divide the sample according to the initial level of ownership concentration. Specifically, I define Δ*OwnershipConc*(i), i = 1,2,3, as the change in the largest shareholder's percentage ownership fraction of the firm's voting rights, multiplied with a dummy variable equaling one if the initial ownership concentration is in level i, and zero otherwise. Let *ownership level* 1 contain firms in the 0-25% range, let *ownership level* 2 denote the 25-50% range, and let *ownership level* 3 capture the >50% range.[20]

A private placement that increases an investor's ownership fraction from a noncontrolling position to a controlling one hypothetically indicates increased monitoring. Let Δ*Control* denote a dummy variable that equals one if the post-placement largest shareholder is different from the initial controlling shareholder, and zero otherwise. In order to test the monitoring hypothesis, the following regression model (Model I) is specified:

$$AR^{adj} = \gamma_0 + \gamma_1 \times \Delta\text{OwnershipConc}(1) + \gamma_2 \times \Delta\text{OwnershipConc}(2) + \gamma_3 \times \Delta\text{OwnershipConc}(3) + \gamma_4 \times \Delta\text{CONTROL} + \varepsilon.$$

The results from the OLS regression of discount-adjusted abnormal returns are presented in Table 5. The table shows that the coefficient on ΔOwnershipConc(2) is positive and statistically significant (p-value is 0.0007). The subsample consists of 30 observations, of which there are 21 instances of *decreasing* ownership concentration with an average change of –6.9% of

[20] The division of the sample into subsamples is somewhat arbitrary in my study. However, searching for precise turning points through a more rigorous piecewise analysis is not likely to produce qualitatively different results or interpretations. Specifically, the division differs from that reported by Wruck (1989) and Morck, Shleifer, and Vishny (1988) in that they ultimately split the material in 0-5%, 5-25%, and >25% ranges. The highly concentrated ownership structure on the Stockholm Stock Exchange, resulting in very few observations in the 0-5% range and many majority-controlled firms motivates my specific choice. My data does not include assessment of insider ownership.

voting rights (–10.9% of equity rights). The positive coefficient is accounted for by a relatively large number of negative abnormal returns in this subsample. The result is consistent with the monitoring hypothesis. To the extent that potential initial manager ownership is diluted, the results are also consistent with the convergence-of-interests hypothesis of Jensen and Meckling, which suggests a lower firm value when the percentage insider ownership decreases.

Table 5

Cross-sectional regression of discount-adjusted abnormal returns: MODEL I

The table shows the results from the OLS regression of discount-adjusted event day abnormal returns in a sample of 67 private placement announcements taking place in the period November 1986 - August 1994. ΔOwnershipConc(1), ΔOwnershipConc(2), and ΔOwnership-Conc(3) denote the change in ownership concentration in subsamples where the initial ownership concentration is 0-25%, 25-50%, and >50%, respectively. Ownership concentration is measured as the fraction of voting rights held by the largest shareholder. The ΔControl variable equals one if the private placement results in a change of the controlling owner, and zero otherwise. The regression is based on 67 observations, for which change-in-ownership-concentration variables could be found.

Independent variables	Coefficients (t-statistics) {p-values}	Predicted sign under the monitoring hypothesis
Intercept	0.0585 (2.40) {0.0193}	
ΔOwnershipConc(1)	–0.0047 (–1.73) {0.0893}	(+)
ΔOwnershipConc(2)	0.0142 (3.57) {0.0007}	(+)
ΔOwnershipConc(3)	0.0015 (0.26) {0.7939}	(+)
ΔControl	0.0600 (1.13) {0.2624}	(+)
R^2	0.221	
Adjusted R^2	0.171	
F-statistic	4.394	
p-value, joint hypothesis	0.0034	
Number of observations	67	

In contrast, the coefficient on ΔOwnershipConc(1) is negative, but less significant (p-value = 0.0893). This subsample consists of 14 observations. To the extent that changes in ownership concentration also reflect changes in insider ownership, the result is consistent with Morck, Shleifer, and Vishny (1988). However, this evidence is weak as I do not have detailed data on the specific ownership stakes held by insiders.

The coefficient on ΔOwnershipConc(3), reflecting the change in ownership concentration in the subgroup of initially majority controlled firms, and the coefficient on the Δ*Control* dummy are insignificant.

Taking into account the general differences in ownership concentration between Swedish and American listed firms, the results are remarkably similar to those obtained by Wruck (1989). In particular, Wruck finds a significant negative relationship between discount-adjusted abnormal returns and changes in ownership concentration in the 5-25% range. Because the Swedish sample exhibits only very few observations in the 0-5% range, there is little practical difference between these two results. Wruck also finds a positive and significant coefficient on changes in ownership concentration in the >25% range. It seems likely that Wruck's sample contains very few (if any) majority-controlled firms, whereas the Swedish sample contains a substantial number of firms where the largest shareholder owns more than 50% of the voting rights. The results can also be interpreted as being roughly consistent with the predictions of Morck, Shleifer, and Vishny (1988), in that they capture a negative relationship between stock price effects and ownership concentration in a range where management entrenchment is not unlikely to occur.

The preliminary conclusion from the descriptive evidence suggests that increased ownership concentration is not a general explanation for the market's reaction to private placement announcements. The regression analysis obviously refines this result. It seems that the change in ownership concentration is indeed positively related to abnormal returns provided that the initial ownership level is in the 25-50% range. However, in the 0-25% range, the opposite relationship occurs.

The regression captures monitoring effects only in the limited sense that the change in the level of ownership concentration is expected to be positively related to monitoring efforts. However, it seems plausible that a purchaser of a large block may contribute with monitoring services and professional advice despite not becoming the largest owner. In effect, the private placement investor may serve as a "monitor of the monitor". In the following subsection, I proceed to investigate the evidence on the information hypothesis.

6.1.2 The information hypothesis

Information asymmetries are hypothetically larger in small firms, which should result in larger information effects in smaller firms. Hence, I include *firm size*, defined as the market value of equity 30 days prior to the announcement, as an independent variable in the explanatory model. As an

alternative proxy for size effects, I add the natural logarithm of the gross proceeds from the placement, *ln(issue size)*, as an explanatory variable. [21]

As realized by Hertzel and Smith (1993), the information effects are expected to be larger where the likely degree of undervaluation is high. Accordingly, one would expect larger information effects in firms where the firm's investment opportunities are large relative to the assets in place. This is hypothetically captured by a positive relationship between the *relative issue size* and discount-adjusted abnormal returns. Analogously, the *book-to-market equity* ratio may serve as a measurement of the relative importance of the new project by approximating the ratio of tangible assets to intangibles.[22] Under the information hypothesis, a negative relationship is expected between the book-to-market equity ratio and discount-adjusted abnormal returns. Moreover, the information effects are presumably higher when resolution of state-of-the-world risk is essentially dichotomous. A particular example of this is when the private placement proceeds are used for capital restructurings. Before the announcement, the firm may either survive or not. The announcement of a private placement for the restructuring of the firm presumably serves as a strong signal as to the firm's capacity for survival. To capture this, I incorporate a dummy variable that indicates the case when the private placement proceeds are used for a *financial restructuring*.

Hertzel and Smith hypothesize that sales to informed outsiders convey more positive information than sales to insiders, because of the insiders' conflicting incentives. Alternatively, insiders may convey more credible information simply by the fact that they are better informed, as suggested by the Leland and Pyle signaling model. It may also be the case that the incentive effects of closer alignment of manager and shareholder interests may generate positive stock market effects. Furthermore, it does not seem unreasonable to include existing owners in the insider category. Owners participating in private placements are likely to be large, influential, and well-informed. By specifying an insider investor dummy that equals one if the new equity is purchased by a manager, director, or existing

---

[21] As is indicated, some of the quantitative variables suggested as explanatory variables are theoretically related. This suggests a risk of multicollinearity in the regression analysis. However, diagnostics show that the correlation coefficients between firm size, ln(issue size), issue size/firms size, and book-to-market are modest. Moreover, running regressions on different reduced models do not generate any marked differences in results; financial restructuring and insider investor are the only variables that generate significant coefficients. I choose to report insignificance results for a larger set of variables mainly to facilitate a comparison with the Hertzel and Smith study. In remaining regressions, the t-statistics are typically very high on these variables, which indicates that multicollinearity is not a problem.

[22] The book-to-market ratio is used rather than the market-to-book ratio because the latter measurement will tend to behave badly when the book value is close to zero.

shareholder, potential monitoring effects, or alternatively, minority oppression effects may also be captured.[23]

Moreover, sales in which prices may reflect a control premium possibly provide more credible signals as to the firm's true value than do other sales because of the reduced likelihood of speculative resale. The alternative interpretation under the monitoring hypothesis is that a change in control may reflect increased monitoring. Hence, an indicator variable for $\Delta Control$ is also included as an explanatory variable. For a test of the information hypothesis, the following regression model (Model II) is specified.

$$\begin{aligned} AR^{adj} = \; & \gamma_0 + \gamma_1 \times \text{FIRM SIZE} + \gamma_2 \times \ln(\text{ISSUE SIZE}) + \gamma_3 \times (\text{ISSUE SIZE/FIRM SIZE}) + \\ & + \gamma_4 \times \text{BOOK-TO-MARKET-EQUITY RATIO} + \gamma_5 \times \text{FINANCIAL} \\ & \text{RESTRUCTURING} + \gamma_6 \times \text{INSIDER INVESTOR} + \gamma_7 \times \Delta\text{CONTROL} + \varepsilon. \end{aligned}$$

The results from the OLS regression of Model II is presented in Table 6. The table indicates a positive and statistically significant (p-value is 0.0038) relationship between discount-adjusted abnormal returns and financial restructurings. This result is consistent with the information hypothesis. More interestingly, it stresses the information content of dichotomous payoffs. This result will be further examined.

The coefficient on *insider investor* is negative and significant (p-value is 0.0169). This result is consistent with the Jensen and Meckling convergence-of-interests hypothesis, the Leland and Pyle signaling model, and with increased monitoring. Notably, the result only captures a combined effect of these hypotheses. In the sample, there are 8 observations of manager investors and 12 owner-investors, and the two categories coincide in 5 instances. Unfortunately, separating between the two categories does not produce significant coefficients in alternative regressions. The result is inconsistent with the prediction of Hertzel and Smith, and with the hypothesis of insider opportunism.

In contrast to Hertzel and Smith, the coefficients on the relative issue size and the book-to-market-equity ratio are statistically insignificant. Consistent with the information hypothesis, the sign on the firm size coefficient is negative, albeit insignificant. The $\Delta Control$ indicator also receives an insignificant coefficient.

---

[23] As is explained later in the paper, the primary reason for not separating between manager and owner investors is that this does not generate significant coefficients, whereas lumping them together appears to capture a significant combined effect of monitoring and alignment effects.

Table 6

Cross-sectional regression of discount-adjusted abnormal returns: MODEL II

The table exhibits the results from the OLS regression of discount-adjusted abnormal returns in a sample of 76 private placement announcements in the period November 1986 - August 1994. Firm size is defined as the market value of equity 30 days before the announcement. Issue size is measured as the gross proceeds from the private placement. Book-to-market equity measures the ratio of the last reported book value of equity before announcement to the market value of outstanding equity 30 days before announcement. "Financial restructuring" equals one if the private placement proceeds are used for finacial restructuring, and zero otherwise. "Insider investor" equals one if the new shares are purchased by a manager, director, or an existing owner. The ΔControl indicator variable equals one if the private placement results in a change in the controlling owner, and zero otherwise.

Independent variables	Coefficients (t-statistics) {p-values}	Predicted sign under the information hypothesis
Intercept	–0.0439	
	(–0.50) {0.6216}	
Firm Size	–0.00001	(–)
	(–1.44) {0.1548}	
ln(Issue Size)	0.0066	(–)
	(0.79) {0.4325}	
Issue Size/Firm Size	0.0023	(+)
	(0.06) {0.9530}	
Book-to-Market Equity Ratio	14.5137	(–)
	(0.87) {0.3873}	
Financial Restructuring	0.1626	(+)
	(3.00) {0.0038}	
Insider Investor	0.1139	(–)
	(2.45) {0.0169}	
ΔControl	–0.0402	(+)
	(–0.73) {0.4672}	
R^2	0.289	
Adjusted R^2	0.215	
F-statistic	3.940	
p-value, joint hypothesis	0.0012	
Number of observations	76	

6.1.3 Sophisticated and primitive signals

Information signaling models tend to prescribe intricate signaling mechanisms triggered by managements to resolve problems of asymmetric information concerning the value of firms' assets-in-place or new projects. This is the modeling rationale behind Leland and Pyle (1977), Myers and Majluf (1984), Miller and Rock (1985), and Hertzel and Smith (1993), to name a few examples. However, there is an important distinction between information effects from using equity issues for systematic signaling of firm

value and information effects that emanate from more trivial information implications of external financing. Although the information hypothesis suggests positive market reactions to private placements regardless of whether proceeds are used for financing new projects or for restructuring financially distressed firms, the underlying mechanisms are different. In the former case, information effects may reflect sophisticated signaling. In the latter, it is a response to a more primitive form of "signal": the announcement of the resolution of an acute financial problem. To capture the relative importance of these two mechanisms, I specify an alternative regression model (Model III), where I multiply the quantitative variables firm size, ln(issue size), the relative issue size and the book-to-market-equity ratio with dummy variables indicating whether the private placement proceeds are used for capital restructuring or for financing new projects. The results from this regression are presented in Table 7.

The table shows that all quantitative variables receive significant coefficients in private placements used for capital restructurings. The size of the firm and the natural logarithm of the placement proceeds in firms involved in financial restructuring are negatively related to discount-adjusted abnormal returns. This is consistent with the hypothesis of larger information asymmetries in small firms. The relative issue size receives a negative coefficient, and the book-to-market equity ratio receives a positive coefficient. These results appear to confirm, and in fact reinforce, the prediction of larger information effects when the potential degree of undervaluation is high. In the sample, 11 private placements (14.5%) are used for financial restructurings.

In contrast, in placements used for project financing, all of the coefficients are insignificant.

The results suggest there are significant information effects, but they do not appear to be the result of sophisticated signaling about the value of investment projects. Instead they pertain to the information conveyed by announcements of resolutions of uncertainty about dichotomous outcomes. This inhibits the empirical support for the signaling rationale behind the Hertzel and Smith (1993) information hypothesis and the Leland and Pyle (1977) model.

Table 7

Cross-sectional regression of discount-adjusted abnormal returns: MODEL III

The table exhibits the results from the OLS regression of discount-adjusted abnormal returns in a sample of 76 observations from 1987 to 1994. "Financial restructuring" equals one if the private placement proceeds are used for capital restructuring, and zero otherwise. "New project" equals one if the private placement proceeds are used to finance a new project, and zero otherwise. Firm size is defined as the market value of equity 30 days prior to the private placement announcement. Issue size is measured as the gross proceeds from the private placement. Book-to-market equity measures the ratio of the last reported book value of equity before announcement to the market value of outstanding equity 30 days before announcement.

Independent variables	Coefficients (t-statistics) {p-values}	Predicted sign under the information hypothesis
Intercept	0.0542 (2.07) {0.0422}	
Financial Restructuring×Firm Size	−0.00002 (−1.95) {0.0560}	(−)
Financial Restructuring×ln(Issue Size)	0.0214 (3.12) {0.0027}	(−)
Financial Restructuring×(Issue Size/Firm Size)	0.6285 (3.32) {0.0014}	(+)
Financial Restructuring×Book-to-Market Equity	−157.3372 (−2.95) {0.0043}	(−)
New Project×Firm Size	0.000004 (0.40) {0.6912}	(−)
New Project×ln(Issue Size)	−0.0040 (−0.76) {0.4499}	(−)
New Project×(Issue Size/Firm Size)	−0.0894 (−0.60) {0.5509}	(+)
New Project×Book-to-Market Equity	29.9709 (1.10) {0.2749}	(−)
R^2	0.355	
Adjusted R^2	0.278	
F-statistic	4.619	
p-value, joint hypothesis	0.0002	
Number of observations	76	

6.2. *Determinants of discounts*

Hertzel and Smith propose that private placement discounts reflect investor compensation for information costs. However, they may also reflect compensation for monitoring services, incentive schemes for managers, or merely self-serving deals by opportunistic insiders.

If new investments are more difficult to value than the assets in place, it is likely that the cost of information is potentially higher, the larger the relative issue size. Moreover, a large proportion of intangible assets such as human capital resources may also reflect more difficult (and hence more costly) value assessment of a new investment. Under the information hypothesis, there should be a positive relationship between discounts and issue size/firm size and a negative relationship between discounts and the book-to-market-equity ratio. Moreover, to the extent that there are economies of scale in information production, a negative relationship should be expected between private placement discounts and the size of the issue. The natural logarithm of the private placement gross proceeds is used to measure the size effect.

The empirical predictions under the monitoring hypothesis for book-to-market, and the absolute and relative issue sizes are the same as under the information hypothesis.

Under the information hypothesis the information costs would be lower if the new shares were purchased by an *insider* because insiders would incur low or zero information costs, thus predicting a negative coefficient. However, under the convergence-of-interests hypothesis a discount may reflect a compensation scheme to promote managerial incentives. Similarly, a discount to an existing owner may reflect compensation for expected monitoring services. I define an indicator variable, *insider investor*, that equals one if the private placement investor is either a manager, director, or an existing shareholder, and zero otherwise. Under these alternative hypotheses, there should be a positive coefficient for the insider investor indicator variable. Notably, a positive sign would also be consistent with insider opportunism.

To capture possible control premia, the dummy $\Delta Control$ is included as an explanatory variable.

$$\begin{aligned} DISCOUNT = {} & \gamma_0 + \gamma_1 \times (\text{ISSUE SIZE/FIRM SIZE}) + \gamma_2 \times \text{BOOK-TO-MARKET-EQUITY} \\ & \text{RATIO} + \gamma_3 \times \ln(\text{ISSUE SIZE}) + \gamma_4 \times \text{INSIDER-INVESTOR} + \\ & + \gamma_5 \times \Delta\text{CONTROL} + \varepsilon. \end{aligned}$$

The results from the regression are presented in Table 8.

The coefficient on ln(issue size) is negative and significant (p-value is 0.0110). This appears consistent with both the information hypothesis and the monitoring hypothesis.

Table 8

Cross-sectional regression of private placement discounts

The table exhibits the estimated coefficients from the OLS regression of private placement discounts measured as $(p_0 - p_{offer})/p_0$, where p_{offer} is the private placement offer price and p_0 is the event day stock price (with information) in a sample of 76 observations from November 1986 to August 1994. Issue size is measured as the gross proceeds from the private placement. Firm Size is measured as the value of equity 30 days prior to the private placement announcement. The *Insider* variable indicates that the new equity is purchased by a manager, director or existing shareholder. ΔControl equals one if the private placement results in a new controlling owner. Book-to-market equity is the ratio of reported balance sheet value of equity to the market value of equity 30 days before the private placement announcement.

Independent variables	Coefficients (t-statistics) {p-values}	Predicted sign under the information hypothesis
Intercept	0.4397 (3.04) {0.0033}	
Issue Size/Firm Size	−0.0947 (−1.44) {0.1534}	(+)
Book-to-Market Equity Ratio	57.2762 (2.07) {0.0418}	(−)
ln(Issue Size)	−0.0341 (−2.61) {0.0110}	(−)
Insider	0.3277 (4.05) {0.0001}	(−)
ΔControl	−0.1685 (−1.83) {0.0721}	
R^2	0.300	
Adjusted R^2	0.250	
F-statistic	6.005	
p-value, joint hypothesis	0.0001	
Number of observations	76	

Moreover, the table shows a significantly positive coefficient (p-value = 0.0001) on the *insider investor* indicator variable. This result is consistent with the monitoring and convergence-of-interests hypotheses. The sign is also consistent with insider opportunism. However, this explanation seems less plausible as it is contradicted by the results from the regression of Model II. The negative coefficient on the insider investor dummy is inconsistent with the information cost compensation explanation.

The book-to-market-equity ratio receives a significantly positive coefficient (p-value is 0.0418). This result runs counter to the one predicted by the information and monitoring hypotheses. Unfortunately, it does not seem to have a straightforward interpretation. It may be the case that the book-to-

market-equity ratio is simply a bad proxy for information and monitoring costs. The coefficient on the relative issue size is insignificant.

The change-in-control dummy receives a negative coefficient that receives a p-value of 0.0721. The sign is consistent with the existence of a control premium.

The results seem to suggest that a combination of monitoring and alignment effects accounts for a substantial part of the variation in private placement discounts, while information costs seem to explain an insignificant part. The results contrast with those obtained by Hertzel and Smith. A possible reason for the discrepancy may be that a wider definition of insiders is used, including existing shareholders in this category, hence possibly capturing a combined effect of convergence in interests and monitoring. As before, separating between the two categories does not produce significant coefficients.

7. *Summary and conclusions*

The paper confirms the basic result presented by Wruck (1989) and Hertzel and Smith (1993) that equity private placements are associated with positive excess stock returns on average. The additional result of insignificant announcement effects to rights issues, reinforces the empirical support for the monitoring hypothesis and for the information hypothesis. The insignificant market reactions to rights issues are not inconsistent with the adverse selection mechanism in Myers and Majluf (1984) and Eckbo and Masulis (1992). However, the event study results appear inconsistent with several theories which imply negative market reactions to both rights issues and private placements, such as the price-pressure hypothesis [Scholes (1972)], the wealth redistribution hypothesis [Galai and Masulis (1976)], and with alternative information hypotheses by Ross (1977), Masulis (1983), Miller and Rock (1985), and Healy and Palepu (1990).

Because of high initial ownership concentration on the Stockholm Stock Exchange, most private placements result in decreasing rather than increasing ownership concentration. This would appear to suggest that less weight should be placed on the monitoring hypothesis as a rationalizing argument. However, cross-sectional analysis reveals that the impact of the change in the level of ownership concentration on stock returns depends on the firm's initial ownership structure. For firms where the initial ownership

concentration is in the 25-50% range, there is a significant positive relationship between the change in ownership concentration. This is consistent with the monitoring hypothesis. Taking into account the general differences in ownership concentration between Swedish and American listed firms, the results exhibit noticeable similarities to those reported by Morck, Shleifer, and Vishny (1988) and by Wruck (1989).

In addition, private sales to managers, directors and existing shareholders are positively related to stock price reactions. This suggests that monitoring and alignment of manager and owner interests, as suggested by agency theory, are important determinants of stock price effects.

A striking result is that the information effects appear to be largest for firms where the private placement proceeds are used for financial restructurings, while only insignificant effects are found for firms using private placements to finance new projects. An implication of this is that the presumption that managers systematically use equity issues as sophisticated signaling devices becomes less plausible. Although the result corroborates the Hertzel-Smith prediction that the information effects should be larger when resolution of state-of-the-world risk is essentially dichotomous, it simultaneously inhibits the signaling rationale behind their model, as well as alternative signaling models such as Leland and Pyle (1977).

Private placement discounts seem to reflect purchases by insiders, where insiders are broadly defined as managers, directors and stakeholders in the firm. The result is consistent with the idea of discounts as compensation for monitoring services and managerial incentive schemes, while it is inconsistent with the rationalization of discounts as compensation for information costs. The alternative hypothesis of insider opportunism is contradicted by positive stock price effects.

Control-changes are negatively related to private placement discounts, which is consistent with the existence of control premia.

References

Aktiebolagslag (1975:1385)

Asquith, Paul and David W. Mullins, Jr., 1986, Equity issues and offering dilution, *Journal of Financial Economics* 15, 61-89.

Barclay, Michael J. and Robert H. Litzenberger, 1988, Announcement effects of new equity issues and the use of intraday price data, *Journal of Financial Economics* 21,71-99.

Benveniste, Lawrence M. and Paul A. Spindt, 1989, How investment bankers determine the offer price and allocation of new issues, *Journal of Financial Economics* 24, 343-361.

Bhagat, Sanjai, 1983, The effect of pre-emptive right amendments on shareholder wealth, *Journal of Financial Economics* 12, 289-310.

Bhagat, Sanjai and Peter A. Frost, 1986, Issuing costs to existing shareholders in competitive and negotiated underwritten public utility equity offerings, *Journal of Financial Economics* 15, 233-259.

Bhagat, Sanjai, M. Wayne Marr, and G. Rodney Thompson, 1985, The Rule 415 experiment: Equity markets, *The Journal of Finance* 40, 1385-1401.

Booth, James R. and Richard L. Smith, III, 1986, Capital raising, underwriting and the certification hypothesis, *Journal of Financial Economics* 15, 261-281.

Bøhren, Øyvind, B. Espen Eckbo, and Dag Michalsen, 1993, Why underwrite equity rights offerings? *mimeo* (Handelshøyskolen BI, Sandvika).

Bradley, Michael and L. Macdonald Wakeman, 1983, The wealth effects of targeted share repurchases, *Journal of Financial Economics* 11, 301-328.

Brown, Stephen J. and Jerold B. Warner, 1980, Measuring security price performance, *Journal of Financial Economics* 8, 205-258.

Brown, Stephen J. and Jerold B. Warner, 1985, Using daily stock returns: The case of event studies, *Journal of Financial Economics* 14, 3-31.

Dann, Larry Y. and Harry DeAngelo, 1983, Standstill agreements, privately negotiated stock repurchases and the market for corporate control, *Journal of Financial Economics* 11, 275-300.

Dierkens, Nathalie, 1991, Information asymmetry and equity issues, *Journal of Financial and Quantitative Analysis* 26, 181-199.

Dodd, P. and Jerold B. Warner, 1983, On corporate governance: A study of proxy contests, *Journal of Financial Economics* 11, 401-438.

DsFi 1986:21, *Riktade emissioner av aktier m.m.* –Rapport av kommissionen för undersökning av vissa aktieemissioner m.m. (Fi 1986:A).

Eckbo, B. Espen, 1986, Valuation of corporate debt offerings, *Journal of Financial Economics* 15, 119-151.

Eckbo, B. Espen and Ronald W. Masulis, 1992, Adverse selection and the rights offer paradox, *Journal of Financial Economics* 32, 293-332.

Fama, Eugene F. and Michael C. Jensen, 1983, Agency problems and residual claims, *Journal of Law and Economics* 26, 327-349.

Fields, L. Paige and Eric L. Mais, 1991, The valuation effects of private placements of convertible debt, *The Journal of Finance* 46, 1925-1932.

Galai, Dan and Ronald W. Masulis, 1976, The option pricing model and the risk factor of stock, *Journal of Financial Economics* 3, 53-82.

Hansen, Robert S. and John M. Pinkerton, 1982, Direct equity financing: A resolution of a paradox, *The Journal of Finance* 37, 651-665.

Hansen, Robert S. and John M. Pinkerton, 1984, Direct equity financing; A resolution of a paradox: A reply, *The Journal of Finance* 39, 1619-1624.

Heinkel, Robert and Eduardo S. Schwartz, 1986, Rights versus underwritten offerings: An asymmetric information approach, *The Journal of Finance* 41, 1-18.

Hertzel, Michael and Richard L. Smith, 1993, Market discounts and shareholder gains for placing equity privately, *The Journal of Finance* 48, 459-485.

Healy, Paul M. and Krishna G. Palepu, 1990, Earnings and risk changes surrounding primary stock offers, *Journal of Accounting Research* 28, 25-48.

Hess, A. C., and Sanjai Bhagat, 1986, Size effects of seasoned stock issues: Empirical evidence, *Journal of Business* 59, 567-584.

Hess, A. C., and Peter A. Frost, 1982, Tests for price effects of new issues of seasoned securities, *Journal of Finance* 36, 11-25.

Hägg, Ingemund (ed.), 1988, *Stockholms Fondbörs –Riskkapitalmarknad i omvandling* (Stockholms Fondbörs och SNS Förlag, Stockholm).

Jegadeesh, Narasimhan, Mark Weinstein, and Ivo Welch, 1993, An empirical investigation of IPO returns and subsequent equity offerings, *Journal of Financial Economics* 34, 153-175.

John, Kose and Banikanta Mishra, 1990, Information content of insider trading around corporate announcement: The case of capital expenditures, *The Journal of Finance* 45, 835-855.

Kalay, Avner, 1980, Signaling, information content, and the reluctance to dividends, *Journal of Financial and Quantitative Analysis* 15, 855-869.

Kalay, Avner and Uri Loewenstein, 1985, Predictable events and excess returns: The case of dividend announcements, *Journal of Financial Economics* 14, 423-449.

Kalay, Avner and Adam Shimrat, 1987, Firm value and seasoned equity issues: Price pressure, wealth redistribution, or negative information, *Journal of Financial Economics* 19, 109-126.

Kaplan, Steven N. and Bernadette A. Minton, 1994, Appointments of outsiders to Japanese boards: Determinants and implications for managers, *Journal of Financial Economics* 36, 225-258.

Kato, K., and J.S. Schallheim, 1993, Private equity financing in Japan and corporate grouping (keiretsu), *Pacific-Basin Finance Journal* 1, 287-307.

Kedner, Gösta, 1992, *Kommentar till aktiebolagslagen och bokföringslagens regler om årsbokslut* Nionde upplagan (Studentlitteratur, Lund).

Korajczyk, Robert A., Deborah J. Lucas, and Robert L. McDonald, 1992, Equity issues with time-varying asymmetric information, *Journal of Financial and Quantitative Analysis* 27, 397-417.

Krasker, William S., 1986, Stock price movements in response to stock issues under asymmetric information, *The Journal of Finance* 41, 93-105.

Lag (1987:464) om vissa riktade emissioner i aktiemarknadsbolag, m.m.

Liljeblom, Eva, 1989, Stock price reactions to issues of equity and debt: A test of different information-release hypotheses, (in Ph.D. Dissertation, Swedish School of Economics, Helsinki).

Leland, H. E. and D. H. Pyle, 1977, Informational asymmetries, financial structure, and financial intermediation, *The Journal of Finance* 32, 371-387.

Loderer, Claudio F., Dennis P. Sheehan, and Gregory B. Kadlec, 1991, The pricing of equity offerings, *Journal of Financial Economics* 29, 35-57.

Lucas, Deborah J. and Robert L. McDonald, 1990, Equity issues and stock price dynamics, *The Journal of Finance* 45, 1019-1043.

Lüning, Wilhelm (ed.), 1991, *Börsregler* Fjärde upplagan (Företagsjuridik Nord & Co AB och Juristförlaget JF AB, Stockholm).

Marsh, Paul, 1979, Equity rights issues and the efficiency of the UK stock market, *The Journal of Finance* 34, 839-862.

Masulis, Robert W., 1983, The impact of capital structure change on firm value: Some estimates, *The Journal of Finance* 38, 107-126.

Masulis, Robert W. and Ashok N. Korwar, 1986, Seasoned equity offerings: An empirical investigation, *Journal of Financial Economics* 15, 91-118.

Mikkelson, Wayne H. and M. Megan Partch, 1984, Stock price effects and costs of secondary distributions, *Journal of Financial Economics* 14, 165-194.

Miller, Edward M., 1977, Risk, uncertainty, and divergence of opinion, *The Journal of Finance* 32, 1151-1168.

Miller, Merton H. and Kevin Rock, 1985, Dividend policy under asymmetric information, *The Journal of Finance* 40, 1031-1051.

Mørck, Randall, Andrei Shleifer, and Robert W. Vishny, 1988, Management ownership and market valuation: An empirical analysis, *Journal of Financial Economics* 20, 293-315.

Myers, Stewart C. and Nicholas S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.

Parsons, John E. and Artur Raviv, 1985, Underpricing of seasoned issues, *Journal of Financial Economics* 14, 377-397.

Rock, Kevin, 1986, Why new issues are underpriced, *Journal of Financial Economics* 15, 187-212.

Ross, Stephen A., 1977, The determination of financial structure: the incentive-signaling approach, *Bell Journal of Economics* 1, 23-39

Shleifer, Andrei, 1986, Do demand curves for stocks slope down? *The Journal of Finance* 41, 579-590.

Smith, Clifford W., Jr., 1977, Alternative methods for raising capital: Rights versus underwritten offerings, *Journal of Financial Economics* 5, 273-307.

Smith, Clifford W., Jr., 1986, Investment banking ant the capital acquisition process, *Journal of Financial Economics* 15, 3-29.

Smith, Richard L. and Manjeet Dhatt, 1984, Direct equity financing; A resolution of a paradox: A comment, *The Journal of Finance* 39, 1615-1618.

Schipper, Katherine and Abbie Smith, 1986, A comparison of equity carve-outs and seasoned equity offerings: Share price effects and corporate restructuring, *Journal of Financial Economics* 15, 153-186.

Scholes, Myron S., 1972, The market for securities: Substitution versus price pressure and the effects of information on share prices, *Journal of Business*, 179-211.

Scholes, Myron and Joseph Williams, 1977, Estimating betas from nonsynchronous data, *Journal of Financial Economics* 5, 309-327.

Sundqvist, Sven-Ivan, 1987-1995, *Ägarna och makten i Sveriges börsföretag* (Dagens Nyheter, Stockholm).

Trueman, Brett, 1985, The relationship between the level of capital expenditures and firm value, *Journal of Financial and Quantitative Analysis* 21, 115-129.

Varma, Raj and Samuel H. Szewczyk, 1993, The private placement of bank equity, *Journal of Banking and Finance* 17, 1111-1131.

Vermaelen, Theo, 1981, Common stock repurchases and market signaling: An empirical study, *Journal of Financial Economics* 9, 139-183.

Wruck, Karen Hopper, 1989, Equity ownership concentration and firm value: Evidence from private equity financings, *Journal of Financial Economics* 23, 3-28.

ESSAY III

Optimal Deterrence and Inducement of Takeovers: An Analysis of Poison Pills and Dilution

This paper models how ex ante shareholder wealth can be maximized with contractual provisions that resemble poison pill plans and, reversely, with voluntary dilution in the sense of Grossman and Hart, by allowing an optimal choice of takeover probabilities and premia. The model's predictions contrast with the commonly held belief that poison pill adoptions uniformly affect shareholder wealth negatively. The results are consistent with recent empirical evidence [*Comment and Schwert (1995)*]. *The paper shows that, under optimal employment of the proposed provisions, the comparative statics on takeover probabilities and premia differ partially from those proposed by Shleifer and Vishny (1986). As an extension, an analysis of the wealth effects of changes in the control threshold, as implied by, for example, a mandatory bid rule, is conducted.*

1. Introduction

This essay combines the insights of two well-known papers in the literature on corporate finance – Grossman and Hart (1980) and Shleifer and Vishny (1986) – to explore how contracts featuring takeover-triggered wealth transfers affect takeover premia and the probabilities of takeovers. The contractual provisions proposed in the essay will serve either as takeover inducement or as takeover defense and have borrowed features from the concept of voluntary dilution introduced by Grossman and Hart (1980) and from real-life antitakeover provisions in the form of poison pills.

Grossman and Hart (1980) display the potential free-rider problem present in takeover attempts on widely held firms. Small shareholders have incentives to free-ride on the potential acquirer's improvement on the production plan by demanding a bid premium that at least equals the expected value improvement. This would undermine the bidder's profit potential to the extent that a takeover will not take place. Grossman and Hart propose, as a resolution of this free-rider problem, that the acquirer should be permitted to expropriate some of the target's assets. The shareholders would consequently be excluded from some of the benefits of not tendering and would require a lower reservation price, thereby increasing the likelihood that the acquirer will make a profitable takeover bid. Shareholders would thus voluntarily agree to this takeover-triggered expropriation of target firm assets in order to benefit from the elimination of a free-rider dilemma. In the terminology of Grossman and Hart, this transfer of assets is a *voluntary dilution* of the shareholders' property rights.

Shleifer and Vishny (1986) demonstrate the importance of large initial shareholdings to increase the probability of a takeover bid. A bidder with a prebid stake in the firm will possibly make sufficient takeover gains on her toehold to induce her to bid, despite the possibility of a loss on the purchased shares. Hence, the potential free-rider externality is potentially internalized, without exclusionary devices, by a bidder with a large initial stake in the firm by the fact that she is the largest consumer of the public good.[1,2]

---

[1] The role of toeholds has been further explored by, among others, Jegadeesh and Chowdry (1989), Ravid and Spiegel (1992), and Burkart (1996).

[2] Other takeover-inducing mechanisms have been suggested in the literature. For instance, Bagnoli and Lipman (1988) show how the free-rider problem can be overcome in a model

Although the presence of a large shareholder may suffice to induce a positive takeover probability, not all potentially value-improving bids will be internalized by the existence of bidder toeholds. Therefore, the small shareholders may benefit from attempts to increase the takeover probability further by a voluntary-dilution provision. It will be difficult for an insufficiently large shareholder to considerably increase her stake by pre-takeover trading –not the least because of the existing disclosure rules – without revealing the fact that a value improvement has been found and thereby increasing the market price of the shares, possibly to the extent that the expected takeover gain is altogether lost.[3,4] Voluntary dilution has the effect of lowering the takeover premium demanded by the shareholders, while increasing the probability of a takeover. If the takeover premium could be reduced so that a shift in the probability of takeover is incurred from zero to a positive level, this will have a positive effect on the shareholders' wealth as long as the takeover premium is not negative.[5] Similarly, positive wealth effects may, for specific levels of dilution, also occur when takeovers have nonzero probability even without dilution.

Poison pill defense implies payment streams in the opposite direction to those of voluntary-dilution schemes. Folklore suggests that poison pills are adopted by managers primarily to protect their private benefits of control. To the extent that poison pills result in absolute deterrence of value-improving takeovers, such provisions are associated with negative effects on shareholder wealth. However, by analogy to the situation where shareholders gain from trading off takeover premia for increased takeover

---

with a finite number of owners, where some shareholder will be pivotal. Private benefits have served as takeover-inducing incentives in models by e.g., Grossman and Hart (1988). Bradley (1980) and Bradley and Kim (1984) focus on front-loaded two-tier bids. The bidder offers to pay the front-end price for a controlling interest in the firm. If she takes over, then the minority stockholders are forced to sell their shares for the back-end price. As long as the back-end price is less than the value of a share under the bidder's management , this is a form of exclusion.

[3] See e.g., Shleifer and Vishny (1986), pp. 474-477.

[4] Under the Williams Act, a 13D disclosure form must be filed with the Securities and Exchange Commission by anyone accumulating more than 5% of the firm's shares. The filing must be made within 10 days after the acquisition. The 13D form will contain the disclosure of the general intent of the purchase, name and background of each acquiring individual, or of any individuals who control the acquiring corporation. If there is material change in relation to the initially filed information such as sale or purchase of shares, an amended schedule 13D must be filed.

[5] The pressure to accept negative takeover premia has been theoretically analyzed by e.g., Bebchuk (1987, 1989). Because of free-rider mechanisms, atomistic shareholders have private incentives to accept a takeover bid that equals the firm's expected value under the new regime, even if the expected post-takeover firm value is lower than the firm's present worth. The theory thus implies that prices below current firm value are possible. The empirical evidence, however, suggests that shareholders tend to receive positive premia relative to current firm value.

probability through voluntary dilution, the opposite trade off implied by setting up a poison pill plan may be beneficial to the firm's owners. By requiring an acquirer to insert a specific amount into the firm conditional on a successful bid, the takeover premium can be increased while the ex ante takeover probability is reduced to an optimal level.

This essay explores the tradeoff between the takeover premium and the probability of takeovers associated with the adoption of voluntary dilution and poison pills. In this, the essay extends the analysis and interconnects some of the insights presented by Grossman and Hart (1980), Shleifer and Vishny (1986), and Hirshleifer and Titman (1990). The essay generalizes the Grossman and Hart voluntary dilution concept to include negative dilution. The wealth-redistributive feature is then added into a modified version of the Shleifer and Vishny takeover model, and a set of equilibrium conditions is derived. Hirshleifer and Titman (1990) analyze optimal bidder strategies and ultimately extend their analysis to include exogenous dilution and takeover defense. In contrast, this essay endogenizes the level of dilution and poison pill defense while adopting the perspective of the small shareholders.

In terms of methodology, a simple triangular distribution assumption is employed with the tractable properties of providing a flavor of realism as well as simple calculations. Along with the derivation of an optimal dilution amount (positive or negative), a further analysis of the equilibrium properties in optimum is conducted. The results include the extension of some of Shleifer-Vishny's (1986) propositions. For example, it is shown that the dynamics under optimal dilution are such that the comparative statics on the takeover probability and the ex post takeover premium are partially different.

The presented model provides a theoretical alternative to the explanation that poison pills are adopted primarily to protect managers' private benefits. The model's prediction that poison pill adoptions should result in increased takeover premia *ex ante* receives empirical support by a recent study by Comment and Schwert (1995). The model also makes empirical predictions about the characteristics of firms that are likely to adopt poison pills. The results are consistent with the empirical observation that firms tend to adopt poison pills when the likelihood of a takeover is unusually high, and with the findings that poison pill adoptions are associated with increased takeover premia.

In addition, the analysis yields the result that shareholders uniformly lose by increases in the threshold for control (as implied by the adoption of supermajority rules or a mandatory bid rule, for example) under the condition that optimal dilution can be maintained. In a specific analysis of

the adoption of the *mandatory bid rule* for the case of exogenous dilution, the essay establishes precise conditions which stipulate when the rule is in the shareholders' interest and when it is not.

The essay discusses the empirical support for the model. It appears that, while there is a multitude of studies of poison pill adoptions, there exists little evidence concerning explicit dilution contracts. The essay discusses the reasons for this discrepancy. Ultimately, the essay informally discusses why real-life poison pills have the form of security issues rather than corporate charter amendments.

The essay is organized as follows. In the next section, the model framework is presented, leading up to a formula for optimal dilution. Section 3 examines the model's equilibrium properties under dilution-optimizing as well as for fixed dilution amounts. The results are compared with the results of Shleifer and Vishny. In section 4, the effects of changes in the control threshold in general and the implementation of the mandatory bid rule in particular are analyzed. Section 5 presents some sensitivity analysis, while Section 6 discusses the empirical support for the model. Section 7 concludes the essay.

2. *The model*

The basic characteristics of the model framework have been borrowed from Shleifer and Vishny (1986). Consider a firm where a single riskneutral outside owner, L, initially holds a fraction e of the firm. L's toehold is insufficient to generate control of the firm; $e < \alpha$ where α is the threshold fraction of voting equity needed to obtain control.[6] The remaining $(1-e)$ portion of the shares is owned by a fringe of atomistic shareholders. The large shareholder, L, is a potential bidder for a control position in the firm. Conditional on her achieving control, L has the capacity to change the value of the firm by an amount Z, which is henceforth referred to as "the value improvement" in the text. At the time of a takeover bid, Z will be known by L, but is unknown (stochastic) to the shareholders. L incurs a fixed cost, c, if she decides to make a takeover bid.[7,8] The takeover costs, the size of L's toehold, and the distribution of the value improvement, $F(Z)$, are assumed to

---

[6] The control threshold can be thought of as 50% as implied by the simple majority rule operational in most corporations.

[7] For simplicity, the bidder's research intensity is left out of this model version.

[8] For all relevant cases, it is assumed that $c < Z_{max}$.

be common knowledge. Let π denote the takeover premium offered to the shareholders in the event of a bid. The takeover premium is defined as the bid price less the status quo value of the firm.

2.1 *Contract specification*

For the sake of argument, consider an amendment to the corporate charter stating that, contingent on the success of a takeover bid, an amount of δ dollars is to be transferred from the firm's assets to the successful bidder. Provided that δ is a positive amount, the charter provision is equivalent to "voluntary dilution" as defined by Grossman and Hart. However, there are no restrictions on specifying a negative δ. A negative δ implies that a successful bidder would be required to insert the amount into the firm. In terms of conditional payment streams, this requirement is equivalent to a takeover defense strategy commonly known as a poison pill. Despite the fact that a negative δ does not have a "dilution-interpretation," for simplicity, δ will sometimes be referred to as "the dilution amount" in the text.[9]

2.2 *Equilibrium*

In order to acquire control of the firm, L needs to add a fraction, α–e, of the firm's equity to her initial holding, e. A necessary condition for L to make a takeover bid for these shares is that it provides her with a nonnegative profit. For any set of parameters, this can be written as $\alpha Z - (\alpha - e)\pi + (1-\alpha)\delta - c \geq 0$. Define Z_c as the minimum value improvement that ensures the bidder of a nonnegative takeover profit. We can write

$$Z_c = \frac{c + (\alpha - e)\pi - (1-\alpha)\delta}{\alpha}. \tag{1}$$

The shareholders will choose to tender their shares only if the takeover premium at least equals the expected value improvement less the dilution

[9] The practical implementation of dilution and poison pills can have other forms than amendments to the corporate charter. Grossman and Hart give several examples of specific methods of voluntary dilution: (i) the bidder could be secured of a large salary, or (ii) the bidder could be allowed to issue a number of new stocks to herself, or (iii) the bidder could be permitted to sell some of the firm's assets or output. The practical implementation of poison pills usually takes one of the following five forms: (i) flip-over rights plans, (ii) ownership flip-in plans, (iii) back-end rights plans, (iv) preferred stock plans, and (v) voting plans. A description of the mechanics of the various poison pills is presented in Appendix C. In Section 6, it is discussed why the contract is more likely to be designed as security issues than as charter amendments.

amount. The shareholders' best assessment of this expected value will be formed conditional on the fact that a sufficient value improvement has been found by the bidder. Consequently, a necessary condition for shareholders to tender is

$$\pi \geq E\left[Z - \delta | Z \geq Z_c\right]. \tag{2}$$

The bidder likes to take over at the lowest price possible, and it is assumed that an equilibrium will be established at lowest price that satisfies shareholders' acceptance condition (2). Under this equilibrium, the weak inequality in (2) can be substituted by an equality.[10] Thus

$$\pi = E\left[Z - \delta | Z \geq Z_c\right]. \tag{2'}$$

As recognized by Shleifer and Vishny, other pure-strategy sequential equilibria, all involving larger than the minimum acceptable premium, are possible. However, Shleifer and Vishny make a strong case for the minimum bid equilibrium, by demonstrating its uniqueness as one which is supported by credible out-of-equilibrium beliefs in the sense of Grossman and Perry (1986a).[11]

2.3 *Distribution assumption*

Suppose that the probability density function for the bidder's value improvements is linearly decreasing in the size of the value improvement, and has support on a bounded interval $[Z_{min}, Z_{max}]$. The assumption of a monotonically decreasing density function makes economic sense to the extent that we believe that small value improvements are more probable than large ones. There is no restriction on the sign of the lower bound, which means a generalization *vis-à-vis* Shleifer and Vishny who assume strictly positive value improvements.[12] The assumption about linearity merely simplifies calculations. Hence, I assume a "triangular" density function with the tractable properties of providing a reasonably realistic representation of

---

[10] Hirshleifer and Titman (1990) model an environment where uncertainty about the shareholders' personal costs and benefits of tendering implies some probability of bid failure. This uncertainty results in a mixed-strategy equilibrium rather than a pure strategy equilibrium.

[11] A detailed account of this is given in Shleifer and Vishny (1986), pp. 467-468.

[12] In contrast with Shleifer and Vishny (1986), the existence of inferior bidders is not ruled out *a priori*, since dilution may possibly induce takeovers by less efficient acquirers.

the distribution of potential value improvements, and, at the same time, facilitating straightforward calculations. We can write

$$f(Z) = \frac{2(Z_{max} - Z)}{(Z_{max} - Z_{min})^2}, \tag{3}$$

where $f(Z)$ denotes the probability density function for Z. The conditional expectation of the shareholders' takeover gain can be written

$$E[Z - \delta | Z \geq Z_c] = \int_{Z_c}^{Z_{max}} Z \frac{f(Z)}{(1 - F(Z_c))} dZ - \delta =$$

$$= \frac{Z_{max} + 2Z_c}{3} - \delta. \tag{4}$$

Inserting (4) into (2)' and combining the two equilibrium conditions (1) and (2)' yields the following simultaneous equation system.

$$\left.\begin{aligned} Z_c &= \frac{c + (\alpha - e)\pi - (1 - \alpha)\delta}{\alpha} \\ \pi &= \frac{Z_{max} + 2Z_c}{3} - \delta \end{aligned}\right\} \tag{5}$$

Solving the equation system (5) yields explicit equilibrium expressions for the takeover premium and the minimum value improvement. Suppressing all other arguments than δ, we can write

$$\pi^*(\delta) = \frac{\alpha Z_{max} + 2c - (\alpha + 2)\delta}{\alpha + 2e}, \tag{6}$$

$$Z_c^*(\delta) = \frac{(\alpha - e)Z_{max} + 3c - 3(1 - e)\delta}{\alpha + 2e}. \tag{7}$$

2.4 *The ex-ante maximization problem*

Shareholders will seek to maximize their takeover gain *ex ante;* in any takeover bid for less than 100% of the firm, shareholders will maximize the sum of the expected gain on the sold shares (the takeover premium) and the expected value improvement on the retained shares. Expectations and probability beliefs are formed conditional on the observation that the bidder has found a value improvement of at least $Z_c^*(\delta)$. This implies that the

shareholders' information-updated assessment of the takeover probability is $1-F\left(Z_c^*(\delta)\right)$. Independent of distribution assumptions, the general maximization problem thus becomes

$$\underset{\delta}{Maximize}\left\{1-F\left(Z_c^*(\delta)\right)\right\}\cdot\left\{\alpha\pi^*(\delta)+(1-\alpha)E\left[Z-\delta\middle|Z\geq Z_c^*(\delta)\right]\right\}, \tag{8}$$

where $\alpha\pi^*(\delta)$ is the takeover-contingent profit from the sold shares, and $(1-\alpha)E\left[Z-\delta\middle|Z\geq Z_c^*(\delta)\right]$ is the corresponding value of the retained shares. Because $\pi^*(\delta) = E\left[Z-\delta\middle|Z\geq Z_c^*(\delta)\right]$ in equilibrium, the maximization problem simplifies to

$$\underset{\delta}{Maximize}\left(1-F\left(Z_c^*(\delta)\right)\right)\cdot\pi^*(\delta). \tag{8'}$$

2.5 *Optimal dilution*

The proposed maximization problem will typically yield an interior optimum; for some sufficiently low level of dilution (including negative amounts), the probability of a takeover turns zero, and for some sufficiently high level of dilution, the asset drain is so severe that the small shareholders' ex post takeover gain turns nonpositive. Define $\underline{\delta}$ as the (lower) turning point for the dilution amount at which the probability of a takeover turns zero. That is, $\underline{\delta}$ is such that, for all $\delta \leq \underline{\delta}$, we have $1-F\left(Z_c^*(\delta)\right)=0$, and for all $\delta > \underline{\delta}$, $1-F\left(Z_c^*(\delta)\right)>0$. Similarly, define $\overline{\delta}$ as the (upper) pivotal level of dilution at which the small shareholders' ex post takeover gain (the ex post takeover premium) turns nonpositive. Formally, $\overline{\delta}$ is such that, for all $\delta \geq \overline{\delta}$, $\pi^*(\delta)\leq 0$, and for all $\delta < \overline{\delta}$, $\pi^*(\delta)>0$.

Under the triangular-distribution assumption, an explicit expression for the optimal dilution amount is derived, applying the first and second order conditions to the maximization problem (8)'. The resulting optimal dilution amount, δ^* can be written as follows.

Result 1. *Given the linear distribution assumption, the optimal dilution is*

$$\delta^* = \frac{1}{3}\cdot\underline{\delta}+\frac{2}{3}\cdot\overline{\delta}, \tag{9}$$

where, specifically, $\underline{\delta}=\dfrac{c-eZ_{\max}}{1-e}$, *and* $\overline{\delta}=\dfrac{\alpha Z_{\max}+2c}{2+\alpha}$.

A full derivation of the result is presented in Appendix A.[13] Result 1 reflects the fact that the interior optimal solution is a weighted average of the pivotal point where the takeover probability turns zero, $\underline{\delta}$, and the point where the ex post premium turns zero, $\overline{\delta}$. Under the alternative assumption of a uniform distribution, we will receive a similar structure for the optimal-dilution expression, but where the expression for $\overline{\delta}$ is slightly different and the weights are equal. Alternative expressions are examined in Section 5.2. The following section examines the equilibrium properties of the model with dilution.

3. *Equilibrium properties*

In examination of their model's equilibrium properties, Shleifer and Vishny present comparative statics for changes in bidder toehold and takeover costs. In this section, I conduct a similar examination of equilibrium properties of the dilution-extended model. In particular, the situation in which optimal dilution contracts (δ^*) are assumed to be maintained is analyzed. These *in-optimum* results are then compared to the situation where dilution is assumed to be fixed at an arbitrary level. Notably, the Shleifer-Vishny zero-dilution case is merely a special case of the fixed-dilution analysis. Hence, a straightforward comparison with the results of Shleifer and Vishny is readily available. The stylized results are followed by numerical examples and graphical illustrations. Formal derivation of the results are presented in Appendix B.

3.1 *Effects of changes in the bidder's toehold*

Result 2. *The optimal takeover probability is constant with respect to changes in the bidder's toehold.*

According to Result 2, firms that consistently apply optimal dilution contracts, adjust the dilution amount with respect to changes in e so as to maintain a constant (optimal) takeover probability. Maintaining the optimal

[13] Section 5 presents two alternative formulae for the optimal dilution, using the uniform and the exponential distributions as benchmark distribution assumptions.

dilution level implies that the bidder's minimum profitable value improvement, Z_c^*, is held at a constant level in relation to the bidder's toehold. As the takeover probability is ultimately a function of Z_c^*, the optimal takeover probability will also remain constant with respect to *e*.

How does the in-optimum result compare to the fixed-dilution case? Similar to the fact that there exists some (possibly negative) dilution amount, $\underline{\delta}$, at which the takeover probability turns zero, there is some upper pivotal point, $\overline{\overline{\delta}}$, where the probability turns 100%. Specifically, $\overline{\overline{\delta}} = \underline{\delta} + \frac{(\alpha + 2e)(Z_{max} - Z_{min})}{3(1-e)}$, where $\underline{\delta}$ is defined as before. For arbitrary dilution amounts, the result is that the takeover probability is *strictly increasing* in *e* for any $\delta \in (\underline{\delta}, \overline{\overline{\delta}})$, while it is *constant* w.r.t. *e* otherwise.[14]

While the takeover probability under fixed dilution (and in particular in no-dilution firms) tends to increase with increases in the bidder's initial stake, the probability of a takeover is unaffected by changes in *e* in dilution-optimizing companies.

Result 3. *The optimal takeover premium increases in the bidder's toehold.*

An increase the bidder's toehold implies an adjustment of the optimal dilution amount resulting in an increase in the ex post takeover premium. This result can be decomposed into a direct and an indirect effect. The direct effect, which is negative, is given by the partial derivative of the expression for the equilibrium takeover premium [equation (6)] w.r.t. *e.*, while holding δ constant. This strictly negative, direct effect is the fixed-dilution result. However, when the firm maintains optimal dilution, δ is given by δ^* [equation (9)], which is strictly decreasing in *e*. Because the equilibrium takeover premium is decreasing in δ, the effect of lowering the dilution level is positive. This positive effect dominates over direct effect.

Hence, with optimal dilution, the bidder toehold effect on the takeover premium is opposite to that under fixed dilution in general and under no dilution in particular. Optimal dilution thus implies a qualitative difference to Shleifer-Vishny's lemma 1.

The results of constant optimal takeover probability and an increasing optimal takeover premium with respect to increases in bidder toehold imply the following corollary.

---

[14]For any given level of value improvement, the successful bidder will make a larger capital gain the larger her initial holding. Dually, the shareholders will assess a larger probability that the bidder will find a sufficiently high value improvement the larger her toehold.

Result 4. *The maximal ex ante takeover gain resulting from optimal dilution will increase with an increase the bidder's toehold.*

When optimal dilution is consistently applied, the total bidder-toehold effects on the shareholders' ex ante takeover gain is positive, which is also the case in the Shleifer-Vishny zero-dilution case. However, with optimal dilution, the dynamics are such that the positive wealth effect is induced rather by a positive premium effect and a zero probability effect than a positive probability effect overshadowing the negative effect on the premium. This constitutes a slight distinction towards Shleifer-Vishny's Proposition 1.

Now consider the general fixed-dilution case. Suppose that the dilution amount is fixed at an arbitrary level. An increase in bidder toehold will cause the shareholders' ex ante takeover gain to *increase* at any dilution amount on the interval $\delta \in (\underline{\delta}, \delta^0)$, where $\delta^0 = \frac{Z_{\max}(\alpha - e) + 3c}{\alpha - e + 3}$, *decrease* at any dilution amount on the interval $\delta \in (\delta^0, \bar{\delta})$, and remain *unchanged* at all other dilution amounts. Hence the fixed-dilution analysis also provides a refinement of the Shleifer and Vishny zero-dilution result, in that it displays the existence of a cutoff level, δ^0, above which the total ex ante wealth effect turns negative.

The results of changes in toeholds are illustrated numerically and graphically in Example 1.

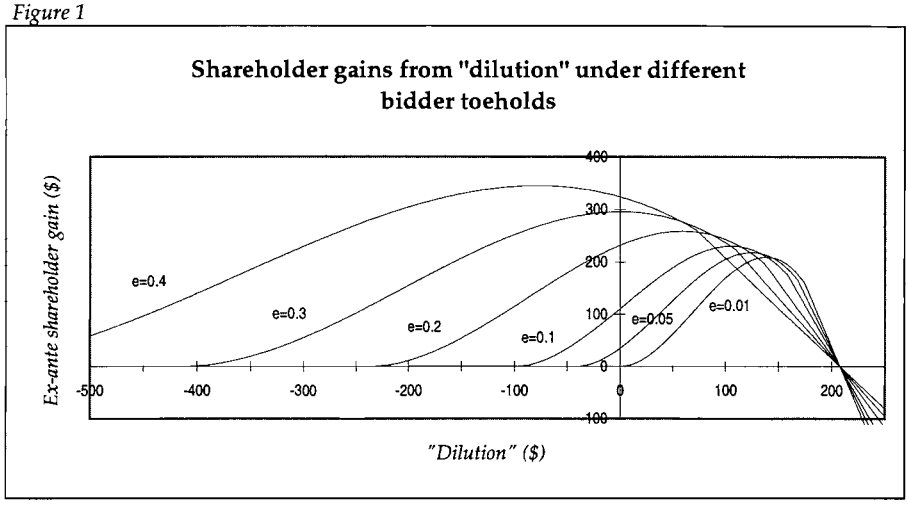
Example 1

Figure 1 depicts the shareholders' ex-ante takeover gain, $\left(1 - F\left(Z_c^*(\delta)\right)\right) \cdot \pi^*(\delta)$, as a function of the dilution amount, δ. To capture the impact of changes in bidder toehold, the takeover-gain function is reproduced for a sequence of bidder toeholds: e equals 40%, 30%, 20%, 10%, 5%, and 1%, respectively. In the particular example, I assume that $Z_{\max} = 1{,}000$, $Z_{\min} = 0$, $\alpha = 50\%$, and $c = 10$ as parameters.

First, consider the result when no dilution is present (where the vertical axis and the ex-ante-takeover-gain curves cross). At the 1% toehold ($e = 0.01$), the ex ante takeover gain is zero. When the bidder's toehold is increased to 5%, 10%, 20%, 30% and 40%, respectively, the shareholders' corresponding expected takeover gains increase to \$34.70, \$110.50, \$231.80, \$295.50, and \$324, respectively. This positive effect in the zero-dilution case

reflects the toehold's positive effect on the *a priori* takeover probability, hence effectively illustrating Shleifer-Vishny's Proposition 1.

Figure 1



However, with the right amount of dilution, shareholder wealth can be increased for each level of ownership concentration. In the case with the most disperse ownership concentration, e = 0.01, the shareholders will require a takeover premium of $1,000 when no dilution is present. Due to the positive takeover cost, a takeover will never be profitable to the bidder, since Z_{max} = $1,000. Hence, the probability of a takeover is *zero* without dilution. However, by allowing the bidder a dilution amount of $138.67, the shareholders will be able to extract a maximal ex-ante takeover gain of $209.09 —the top of the bell-shaped curve for e = 0.01. At this level of dilution, the takeover probability is increased to 62.7% as the updated conditional expectation of shareholder gain is decreased. This is the optimal takeover probability addressed in Result 2. The equilibrium takeover premium is reduced by two thirds (from $1,000 in the zero dilution case): $\pi^*(\delta = 138.67) = E\left[Z - 138.67 \middle| Z \geq Z_c^*(\delta = 138.67)\right] =$ $333.33.

Now consider the other extreme. At e = 0.4, the ex-ante takeover probability is as high as 81% when no dilution is specified. With a conditional equilibrium takeover premium of $400, the scope of a takeover is worth $324 *ex ante* to the shareholders (the intersection of the e = 0.4 curve and the vertical axis). This can be improved by specifying a poison pill. By requiring the successful bidder to insert $78 into the company, shareholders may increase their wealth to $345 (the top of the e = 0.4 curve). At this level of (negative) dilution, the conditional takeover premium is increased to $550, and the takeover probability is reduced to 62.7% (i.e., the optimal takeover

probability). Hence, we have an illustration of Results 2 and 3 —the constant optimal probability and the positive premium effect.

Result 4 is illustrated as the difference in optimal takeover gains under the various levels of toeholds. For each increase in toehold, the height of the bell-shaped curve is increased. The takeover gain at the 40% level minus the gain at a 1% toehold is \$345 – \$209 = \$136. We also observe that the optimal dilution amount decreases in bidder toehold. As a consequence, poison pills will tend to be comparatively more desirable in firms with high ownership concentration as compared to more widely held companies. All in all, the small shareholders will typically want dilution contracts that stipulate smaller dilution amounts (possibly negative amounts) the higher the prebid ownership concentration.

3.2 *Changes in takeover costs*

The effects of changes in the takeover costs are roughly the opposite to those of changes in bidder toehold.

Result 5. *The optimal takeover premium tends to decrease in the takeover cost.*

Applying optimal dilution implies that the optimal takeover premium will *decrease* in takeover cost. This follows from the fact that the optimal dilution, δ^*, is increasing in c; and the takeover premium is decreasing in δ.

The results under optimal dilution contrast with the fixed-dilution result. Specifically, when dilution is fixed, the takeover premium is increasing in the takeover cost. As a consequence, Shleifer-Vishny's Proposition 2 (stating that an increase in the legal and administrative costs of a takeover will result in a rise in the takeover premium, but a fall in the market value of the firm), is partially modified when optimal dilution is added.

Result 6. *The optimal takeover probability will tend to decrease in the takeover cost.*

The *in-optimum* direction of the cost effect does not differ from the *out-of-optimum* fixed-dilution tendency; both are negative.[15]

Results 5 and 6 together imply a decrease in shareholders' takeover gain:

---

[15] Employing a negative exponential distribution assumption (see Section 5.2), yields the result that the takeover premium is constant rather than decreasing in the takeover cost.

Result 7. *The maximal level of ex ante takeover gain will decrease with an increase in the takeover costs.*

This *in-optimum* result for the wealth effect corresponds with that stated in Shleifer-Vishny's Proposition 2, with the modification that *both the premium and the probability effect tend to decrease* instead of being traded off to create the same qualitative result.

Similarly to the analysis of changes in the bidder's toehold, the general fixed-dilution analysis of cost effects displays the existence of a cutoff point. Let δ^0 be defined as before. Specifically, we have that an increase in the takeover cost will cause the shareholders' ex ante takeover gain to (*i*) *decrease* for any dilution amount on the interval $\delta \in (\underline{\delta},\delta^0)$, (*ii*) *increase* for any dilution amount on the interval $\delta \in (\delta^0,\bar{\delta})$, and (*iii*) remain *unchanged* for all other dilution amounts. The results are illustrated graphically and numerically below.

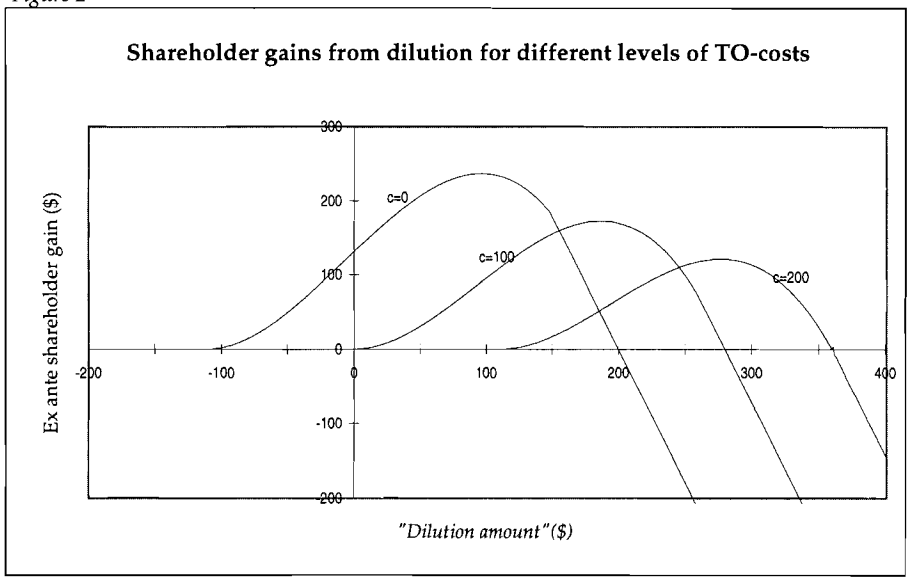
Example 2

Figure 2 depicts the impact of variations in takeover costs. The shareholder-gain function is reproduced for three different takeover-cost levels ($c = 0$, $c = 100$, and $c = 200$). The bidder's initial toehold is assumed to be 10%. Other parameters are the same as before.

First, consider the zero-dilution case. Only with zero takeover costs will shareholders receive a positive expected takeover gain if no dilution is added; the $c = 0$ curve intersects with the vertical axis at \$131.20. Here, the takeover probability is 18.4% and the equilibrium premium is \$714.30. At the higher cost levels represented, the probability of a takeover, and consequently ex ante takeover gain, is zero without any dilution.

By specifying a dilution contract, the shareholders will improve their wealth in all three cases. In the zero-cost case, an (optimal) dilution amount of \$96.30 will yield an ex ante takeover gain of \$237, which is an improvement by \$106 (=\$237–\$131). When $c = \$100$, letting the bidder extract \$186.67 will improve small the shareholders' wealth by \$172.80. At $c = \$200$, the optimal dilution amount is \$277, resulting in a wealth improvement of \$121.40.

Figure 2



The graph illustrates Result 7 by the fact that the height of the bell-shaped curves decreases when takeover costs rise. Simultaneously, the optimal dilution amount increases with *c*. Hence, and not very surprisingly, the effects from increased takeover costs are almost opposite to the effects of increases in the bidder toehold.

3.3 *The optimality of poison pills vs. dilution*

The previous examples suggest that positive dilution will tend to be optimal in pools of firms exhibiting relatively low initial ownership concentration and high takeover costs. In such firms, increased dilution will tend to benefit shareholders by enhancing the probability of takeovers. Conversely, poison pill defense will tend to be relatively more desirable in pools of firms exhibiting high initial ownership concentration and low takeover costs. The shareholders are expected to benefit from increased takeover premia in firms with such characteristics. Suppose that the control threshold is 50%, as defined by the simple-majority rule present in most firms. Given the triangular distribution assumption we get the following result.

Result 8.

(i) Positive dilution will be optimal for bidder toeholds contained on the interval $e \in \left[0, \frac{13c + 2Z_{max}}{8c + 7Z_{max}}\right)$, *and*

(ii) negative dilution (poison pills) will be optimal for bidder toeholds contained on the interval $e \in \left(\frac{13c + 2Z_{max}}{8c + 7Z_{max}}, \frac{1}{2}\right)$.

Result 8 formalizes the intuition that poison pills will tend to increase shareholder wealth under parameter configurations that imply *high a priori takeover probabilities*. This intuition is also confirmed by recent empirical findings. Comment and Schwert (1995) present evidence of this endogenous nature of the decision to adopt poison pills. In particular, from studying a sample of 960 adoptions of original poison pills by exchange-listed firms in the period 1983-90, they find a clear-cut tendency for managers to adopt pills when the likelihood of a takeover is unusually high.[16,17]

4. *Changing the threshold for control*

The level of ownership that is needed for seizing control can vary between companies. There are several reasons for this. A firm may have adopted a supermajority provision, a multiple-class voting structure, or some other charter amendment affecting the proportion of shares needed for control. Furthermore, control limits may differ between states/countries due to different regulatory frameworks. In subsection 4.1, I analyze the impact of (infinitesimal) changes in the control threshold, α, when this is initially any arbitrary fraction strictly between zero and one. In subsection 4.2, I proceed

---

[16] See Comment and Schwert (1995), pp. 21-23.

[17] The empirical evidence on actual takeover costs is very limited. However, proxies for the cost of acquiring companies do exist. Administrative acquisition costs will typically depend on the particular legal environment for takeovers. The adoption of the 1968 Williams Act is believed to have increased the legal and administrative costs associated with takeovers. Consistent with this, Jarrell and Bradley (1980) report increasing takeover premia in response to the announcement of the new takeover code. There are many variables that could proxy for the information cost associated with takeovers. Presumably, small firms are associated with higher information costs as larger firms are more closely monitored by the market. A small book-to-market equity ratio may indicate a large proportion of intangibles in the firm's assets, which may render information-production more costly to the acquirer.

to examine the wealth effects of the adoption of a particular takeover regulation, the *mandatory bid rule.*

4.1 Changes in α (from arbitrary levels)

Result 9. *The optimal takeover premium is constant with respect to changes in the control threshold.*

In the fixed-dilution case, the takeover premium will increase in the control threshold for all fixed $\delta > \underline{\delta}$. This is triggered by the fact that the minimum value improvement needed to make the acquisition profitable will increase as the bidder is required to purchase a larger fraction of the firm in order to get control. However, an increase in the control threshold implies an increase in the optimal dilution amount. This increase in dilution will result in an adjustment of the takeover premium so that the raise implied under fixed dilution is exactly offset. Hence, under optimal dilution, the takeover premium will remain at the same level independently of the control threshold. Hence, Result 9 implies a refinement in relation to the fixed-dilution case. However, the qualitative result for optimal takeover probability does not differ from the fixed-dilution case:

Result 10. *The optimal takeover probability will decrease with increases in the control threshold.*

Specifically, for fixed dilution amounts, the takeover probability will decrease with increases in the control threshold for all $\delta \in (\underline{\delta},\bar{\bar{\delta}})$, and remain unchanged otherwise. Combining Results 9 and 10, it is evident that the in-optimum effect on an increase in the control threshold on the total shareholder wealth will be negative:

Result 11. *The maximal ex ante takeover gain (implied by optimal dilution) will decrease with increases in the control threshold.*

Result 11, informs us that shareholders uniformly lose by increasing the threshold for control given that optimal dilution can be maintained. However, similarly to the previous fixed-dilution analyses, there is a cutoff level that determines the sign on the takeover-gain effect when dilution is fixed. Specifically, we have that an increase in α will cause the ex ante takeover gain to *decrease* for any $\delta \in (\underline{\delta},\delta^0)$, *increase* for any $\delta \in (\delta^0,\bar{\delta})$, and

remain *unchanged* at all other dilution levels, and where $\underline{\delta}, \bar{\delta}$, and δ^0 are defined as before.

To examine this result a little closer, the effects of imposing a specific regulation like the mandatory bid rule is analyzed in the following subsection.

4.2 *The Mandatory Bid Rule*

Shleifer and Vishny suggested (Proposition 3) that bids for more than a controlling portion of the firm will not constitute a pure strategy sequential equilibrium supported by credible beliefs. *L* will typically never be better off making a bid for more than 50% of the voting shares. However, in some countries, in particular, in Europe, bidders are required, by law or regulation, to offer to purchase *any or all* of the shares.[18] In this subsection, I examine how increases in the control threshold implied by this type of regulation, often called the mandatory bid rule (henceforth: the MBR), affect shareholder wealth in a dilution context.

When specifically comparing the results of a 50% control threshold (a partial bid) to a the situation in which the bidder is required to extend a nonpartial bid for 100% of the firm (under the MBR), there will be a cutoff level of dilution at which shareholders will be exactly indifferent between a partial and a nonpartial bid. Specifically, with the triangular distribution, we get the following result.

Result 12. *Given the distribution assumption, shareholders will be strictly better off ex ante*
(i) when partial bids are allowed if and only if dilution is constrained to the interval $\delta \in \left(\underline{\delta}, \delta^{MBR}\right)$,
(ii) when partial bids are prohibited if and only if $\delta > \delta^{MBR}$,
where $\delta^{MBR} = \dfrac{e\left((32Z_{\max})e^2 - 96ce - 12Z_{\max} - 72c\right) - 3Z_{\max} - 14c}{e\left(32e^2 - 96e - 84\right) - 17}$.

Result 12, with its hideous expression for the cutoff point, is more digestibly illustrated in Figure 3.

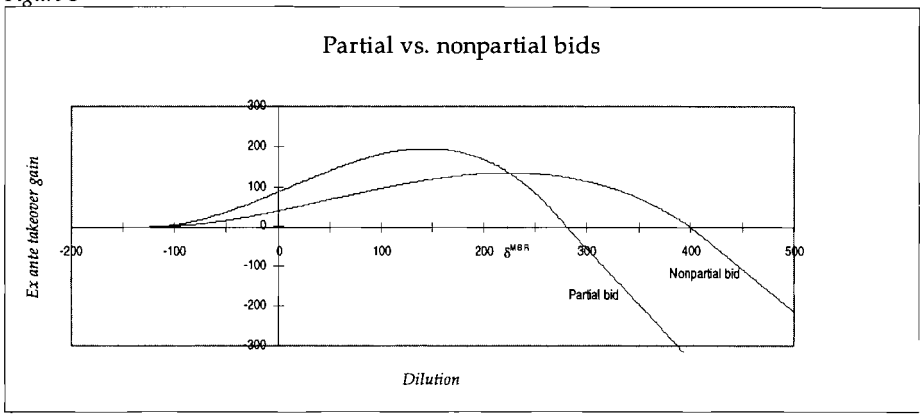
---

[18] The Mandatory bid rule is present in the British self-regulatory framework *The City Code on Takeovers and Mergers*. So far, France, Italy and Norway have also adopted the rule.

Example 3

The curve labeled "Partial bid" represents the case when the control threshold is 50%. The curve named "Nonpartial bid" represents the situation in which the mandatory bid rule is operative, that is, when α = 100%. Other parameters are held constant at c = 100, e = 0.2, Z_{max} = 1,000 and Z_{min} = 0.

Figure 3



The two curves intersect at the cutoff point, δ^{MBR} = \$223.84. At this level of dilution, the shareholders will be indifferent between the two bidforms. At δ^{MBR}, a partial bid for 50% of the shares results in a takeover premium of \$156 and a takeover probability of 86.5%. At the same dilution amount, a bid for 100% results in a takeover premium of \$377.49 and a takeover probability of 35.8%. The total ex ante gain at δ^{MBR} is just below \$135 for both bidforms. Shareholders tend to be better off with partial bids if dilution is lower than δ^{MBR}, and benefit from nonpartial bids if dilution is higher.

At zero dilution, the nonpartial bidform yields an ex ante takeover gain of \$39.36 and the partial bidform results in an ex ante takeover gain of \$86.42.

The optimal takeover premium is \$375 for both bidforms (compare Result 9). When the mandatory bid rule is fully adopted, the optimal dilution amount will be given by δ^* = \$225 (i.e., slightly more than δ^{MBR}) yielding a takeover probability of 36% and an ex ante takeover gain of exactly \$135. When partial bids are allowed, shareholder wealth is maximized by a dilution amount of δ^* = \$145. At this dilution level, the probability of a takeover is 51.84% and the resulting ex ante takeover gain is \$194.40 .

5. Sensitivity analysis

In order to generate illustrative results, the analysis has so far been predicated on a specific distribution assumption for future value improvements, the "triangular" distribution. In this section, the impact of distribution parameters in this particular distribution is discussed. I also check the robustness of the results by specifying two alternative distributions.

5.1 Changes in distribution boundaries

First, consider the effects of the distribution boundaries in the applied triangular distribution. The general *in-optimum* result of an increase in Z_{max} or in Z_{min} is a corresponding increase in the level of shareholder wealth. Specifically, given the regularity condition $Z_{min} < c < Z_{max}$, we have the following in-optimum results.

Result 13. *Given optimal dilution, an increase in Z_{max} will result in an increase in the (i) takeover probability, (ii) the takeover premium, and consequently also in (iii) the shareholders' ex ante takeover gain.*

Result 14. *Given optimal dilution, an increase in Z_{min} will result in (i) an increase in the takeover probability, (ii) no change the takeover premium, and hence (iii) an increase in the shareholders' ex ante takeover gain.*

5.2 Changes in distribution assumptions

In lieu of a general derivation, I check for robustness by making two alternative distribution assumptions, a uniform and an exponential distribution. Under the uniform distribution, the probability density function for Z can be written as

$$f_u(Z) = \frac{1}{Z_{max} - Z_{min}}, \tag{10}$$

for $Z \in [Z_{min}, Z_{max}]$. Under this distribution assumption, all value improvements within the bounds are equally probable. Alternatively, a negative exponential distribution is assumed. Under this distribution assumption, the probability density function for Z is

$$f_{exp}(Z) = \frac{1}{m} \cdot \exp\left(-\frac{Z}{m}\right), \tag{11}$$

for $Z \geq 0$, and where m denotes the unconditional expectation of Z. This distribution implies that value improvements are bounded below by zero, and are unbounded above. Moreover, the probability of a value improvement decreases exponentially in its size.

Specifically, the alternative formulae for optimal dilution under the two benchmark distributions can be expressed accordingly.

Result 15.

(i) *Given the uniform distribution* (10), *the optimal dilution amount is*

$$\delta_u^* = \frac{1}{2} \cdot \underline{\delta} + \frac{1}{2} \cdot \overline{\delta}_u . \tag{12}$$

where, specifically, $\underline{\delta} = \dfrac{c - eZ_{\max}}{1-e}$ (i.e., exactly as before), *and* $\overline{\delta}_u = \dfrac{\alpha Z_{\max} + c}{1+\alpha}$.

(ii) *Given the exponential distribution* (11), *the optimal dilution amount is*

$$\delta_{\exp}^* = c + m\left(\alpha - \frac{e}{1-e}\right), \tag{13}$$

where m = E[Z] (and e denotes the bidder's toehold and *not* the exponential function).

Figure 4 provides a graphical comparison between the three model specifications. The particular parametric configuration presented is one where $e = 0.2$, $c = 100$, and $Z_{\min} = 0$, and E[Z] = 500.

Figure 4

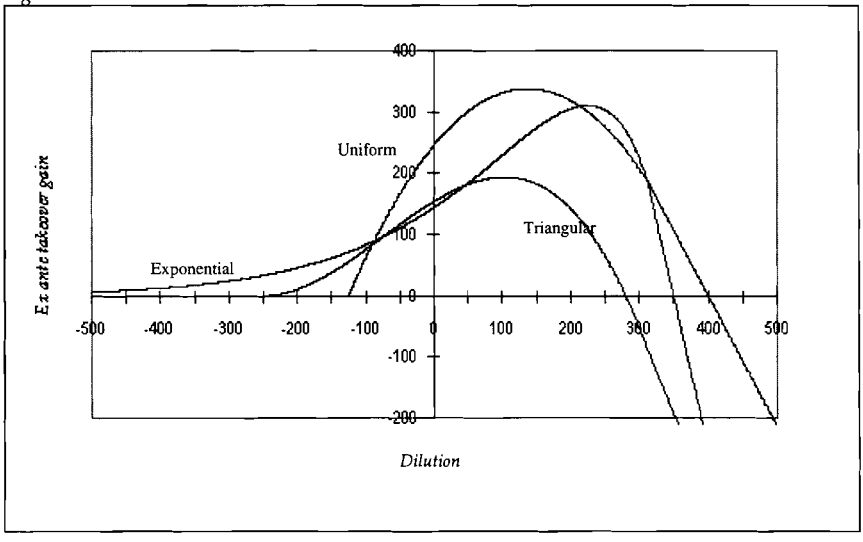


Figure 4 shows that, in relation to the triangular distribution case, the uniform distribution results in a somewhat more symmetric ex-ante-takeover-gain curve, with higher potential takeover gains, while the corresponding curve for the exponential distribution is more skewed to the right. Although the particular formulae for the optimal dilution amount presented in Result 15 differ from the one presented in Result 1, and the shapes of the shareholders' takeover-gain curves are somewhat modified, the basic intuition of the model applies under the alternative distribution assumptions.

In particular, all the stylized properties with respect to changes in the bidder's toehold, the takeover cost, and the level of the control threshold are unchanged, with the minor exception that the optimal ex post takeover premium is constant rather than decreasing in the takeover cost if the exponential distribution is applied. This suggests that the choice of distribution does not have a substantial effect on the qualitative results of the essay. In the following section, a further discussion of the potential limitations of model and of the empirical evidence is conducted.

6. *Empirical evidence and discussion*

In this section, the consistency between the model's implications and the empirical experience is discussed. In particular, a recent study by Comment and Schwert (1995) presents pertinent empirical results concerning the adoption of poison pills.

The analysis in the present essay implies that poison pills will tend to benefit shareholders most when the takeover probability is high (as a result of low takeover costs and large bidder toeholds). Therefore, more poison pill provisions are to be expected when such characteristics are present. This prediction receives empirical support by Comment and Schwert (1995).

In a probit analysis for the prediction of takeover probability conducted on a sample of 21,887 firms in the period 1977-1991, Comment and Schwert find that the marginal effect on the takeover frequency of a pill-adoption is positive (2.34%).[19] The literal interpretation of this is that poison

[19] Comment and Schwert generate some additional evidence on the tendency to adopt pills when takeovers are particularly probable. In a sample of 960 poison pill adoptions in the period 1983-1990, Comment and Schwert examine the cumulative proportion of pill-adopters having received some announcement of takeover interest at specific dates in

pills *increase* the probability of a takeover. However, Comment and Schwert suggest a more plausible interpretation of this result. They hypothesize that poison pills are adopted by managers in anticipation of a takeover attempt. When breaking the poison pill dummy variable into *surprise* and *predictable* components, they obtain a positive marginal effect (2.83%) for the surprise component (when management is likely to have private information of an imminent takeover attempt) and a negative marginal effect (–4.98%) for the predictable one.

Furthermore, Comment and Schwert conduct a probit analysis of predictors for poison pill adoptions (however, this analysis does not include takeover-frequency variables). This analysis generates two economically significant results. First, being incorporated in a state with an antitakeover law appears to increase the likelihood of a pill adoption. This suggests that antitakeover laws are complements to rather than substitutes for poison pills. Second, firm size is significantly and positively related to the adoption of poison pills. To the extent that the cost of information constitutes a significant part of the takeover costs, this evidence is consistent with the analysis in the essay. Smaller firms presumably incur more costly information production as such firms tend to be less closely monitored by the market than larger firms.

The model presented in this essay also implies that pill adoptions will generate increases in the ex post takeover premium. In a probit analysis attempting to predict the size of takeover premia, the poison pill dummy receives a significant positive coefficient of 16.27% in a sample of 669 successful takeovers. This suggests that the presence of poison pill coverage is positively related to the size of the takeover premium obtained in an acquisition.

The optimal use of poison pills implied by the model implicitly assumes that management acts in the interest of the shareholders. This is not an unimportant assumption. Anecdotal evidence suggests that managers adopt poison pills to positively deter takeovers in order to protect their private benefits of control. The adequate test of this involves the investigation of whether shareholders gain *ex ante*, and not only ex post. The

---

relation to the announcement date. This is compared to a complementary sample of no-pill firms. (For each of the 960 adoptions, the cumulative proportion of no-pill firms subject to some publicly announced takeover interest is calculated as of the *n*th day relative to the pill adoption announcement.) They find, for pill-adopters, a sharp increase in takeover activity from 2.4% one month before the pill-adoption announcement day to 19.4% one year after. This increase in the cumulative frequency of takeover interest is about double that for no-pill firms. (The corresponding proportion for no-pill firms is 7.8% one month before and 16.2% one year after the pill announcement.) This suggests managers adopt pill defense when the likelihood of a takeover is unusually high.

Comment and Schwert (1995) study shows that not only takeover-conditional takeover premia increase with the adoption of poison pills, but also that the *unconditional premia increase*. Specifically, the probit analysis of the full size sample of 21,887 firms (setting the premium equal to zero for the firms in which no takeover activity occurred) yields a significant and positive coefficient of 1.44% for the poison pill indicator variable. This implies that *shareholders benefit ex ante* from the actual use of poison pill defense during the sample period (1975-1991).[20]

Other studies of the impact of antitakeover provisions exhibit results that partly contrast with those obtained by Comment and Schwert (1995). The typical market reaction to announcements of most types of antitakeover measures appears to be an approximate 1% (or less) *decline* in the stockprice. Ryngaert (1986) examines the market reaction to 283 announcements of poison pill adoptions and finds an average two-day abnormal return of –0.34%. In a similar study of 132 poison pills adoptions, Malatesta and Walkling (1988) detect an average two-day abnormal return of –0.92%. These observations of negative average market reactions to adoptions of anti-takeover measures appear to contradict the finding that the average ex ante shareholder wealth effect is positive. However, as recognized by Comment and Schwert, these reactions to early poison pill announcements may reflect underestimation of the benefits of increased bargaining power and overestimation of deterrence costs.

When it comes to voluntary dilution, examples of specific methods for this are suggested by Grossman and Hart (1980). These methods include (i) allowing favorable stock issues to the bidder, and (ii) permitting the bidder to sell some of the firm's assets or output. However, whereas observations of poison pill adoptions are abundantly present, the evidence on *explicit contracts* stating a bidder's right to transfer assets from the target is lacking. This may be due to several reasons. The opportunities to dilute are implicit in the target firm's characteristics and through the very power position held by a controlling owner. There is no lack of examples of post-takeover asset sales and favorable stock issues to acquirers, without any specific dilution contract being drawn up prior to the takeover. In this form, dilution appears to be strongly associated with corporate raiding, and indeed with the general

---

[20] In addition, Comment and Jarrell (1987) report that two thirds of all takeover attempts – whether hostile or not – involving tender offers for exchange-listed firms between 1981 and 1984 were eventually approved by management. Specifically, in all takeover attempts, 50% of all bidders obtained a merger agreement *before* starting an offer. 22% of all takeover attempts started out as hostile but ended up as successful, negotiated bids, while 12% started as hostile but ended with no shares purchased by any bidder, and 16% were executed without management's approval. This evidence seems to indicate that deterrence is not management's principal objective with poison pill provisions.

moral hazard problem implied by the separation between ownership and control. Through this "guilt by association", explicit dilution contracts may, hypothetically, be perceived as damaging to the shareholders and would thus not get sufficient approval on stockholders' meetings. However, this explanation is not entirely convincing. To the extent that there exist opportunities for involuntary dilution beyond the optimal amount, these opportunities will not be expanded by the presence of an explicit dilution contract. On the contrary, it seems plausible that a precise contract, by being verifiable in court, will set some limits to potential minority oppression.

A possibly more convincing explanation is that there may be other ways of increasing the takeover probability that dominate over takeover-triggered dilution. For example, a favorable equity private placement offer allows the firm to approach a specific investor with desirable characteristics to serve as a bidder candidate. Despite the presence of substantial discounts, announcements of equity private placements generate positive market reactions. For example, Wruck (1989) reports an average four-day announcement effect of 4.41%. In a sample of 106 private placement announcement during the period 1980-1987, Hertzel and Smith (1993) obtain an average abnormal return of 1.74%.[21] The average private placement discount in relation to the current market price is 20.1% in the Hertzel and Smith sample. Although there are alternative explanations for this observed behavior, such as the information-revelation hypothesis and the increased-monitoring hypothesis, the empirical evidence is consistent with implications of the present model framework. In particular, it suggests that the use of dilution measures is on average beneficial to shareholders.

Another possible explanation for the lack of explicit dilution contracts is that, in contrast with poison pills, dilution is not naturally aligned with management interest. It seems natural to assume some psychological resistance to suggesting a provision that (i) recognizes that the company could possibly be better run by someone else, and, in consequence of this, (ii) reduces the probability of keeping one's job.

Lastly, because the development of security design is an evolutionary process, a standard dilution contract is possibly yet to be innovated. Notably, after the first introduction of poison pills by the Wall Street law firm Wachtel Lipton in 1983, the coverage of poison pills provisions in U.S. firms has exploded; from trivial levels before 1986, it had reached 35% of all exchange-listed firms by 1991.

---

[21] In a similar study of private placements on the Stockholm Stock Exchange, Molin (1995) encounters a significant positive event-day average abnormal.

Notably, in distinction to the simplified outlining of the presented model, real-life takeover-defensive and takeover-stimulating strategies seem to be adopted in the form of security issues rather than as corporate charter amendments. An evident reason for this preference for security issues is the relatively higher level of flexibility compared to charter amendments. This is important if the uncertainty about future bidder characteristics is substantial. The cost of allowing too much dilution or too effective takeover defense can be very high if, for instance, the management's assessment of the distribution of future value improvements is severely mistaken. In a dynamic environment, a firm's characteristics as a target as well as the properties of potential acquirers are likely to change over time. Therefore, it will be difficult to rationally assess the distributive characteristics of a future bidder in such a way that the assessment will be valid for very long periods. The corporate charter, being the constitution of the firm, is typically set once and for all and is not easily changed. A security issue, on the other hand, can be triggered when, for example, a takeover attempt is believed to be imminent, and can be aimed at the stimulation or discouragement of takeovers by particular bidders.[22] In this way, management can improve the bargaining power while ensuring that the ex ante reduction in takeover probability is moderate. The empirical evidence suggests that this flexibility is important.

7. Conclusions

This essay explores the wealth effects of voluntary dilution and poison pills. In particular, the model presents a theoretical alternative to the commonly held belief that poison pill defense is detrimental to shareholder wealth. The proposed explanation receives partial support by recent empirical evidence. In particular, the general hypothesis underlying the analysis of optimal dilution, that management, at least on average, acts in the shareholders' interest when adopting poison pills and measures of dilution, receives empirical support by the observation of positive unconditional takeover premia [Comment and Schwert (1995)] and by the positive market reactions to announcement of equity private placements [See, e.g., Wruck (1989), and Hertzel and Smith (1993)]. However, empirical studies also report negative announcement effects for poison pill adoptions [Ryngaert (1986), Malatesta

[22] A description of the mechanics of poison pill securities is presented in Appendix C.

and Walkling (1988)]. A possible explanation for this is that the market has underestimated the benefits of added bargaining power and overestimated the costs of deterrence.

In terms of specific results, some modifications of the propositions reported in Shleifer and Vishny (1986) are derived. In particular, the takeover probability implied by the use of optimal dilution is shown to be constant with respect to changes in the bidder's toehold, and (ii) the takeover premium implied by the use of optimal dilution is shown to increase in the bidder's toehold and to decrease in the takeover cost.

The empirical implications that optimal use of poison pills does not lower the takeover probability while the takeover premium is increased receive empirical support by Comment and Schwert (1995). Moreover, the model's prediction that poison pills are optimal under parameter configurations that imply a high *a priori* takeover probability is consistent with the empirical evidence.

In an analysis of the effects of changes in the control threshold, it is found that, given that optimal dilution can be maintained, shareholders will *uniformly lose* by increasing the fraction needed to obtain control (as is implied by imposing, for example, supermajority rules, a mandatory bid rule, etc.). However, in a specific analysis of the mandatory bid rule, it is shown that, if dilution is exogenous, there exists a cutoff point above which nonpartial bids are preferable to partial bids.

References

Ambrose, Brent W. and William L. Megginson, 1992, The role of asset structure, ownership structure, and takeover defenses in determining acquisition likelihood, *Journal of Financial and Quantitative Analysis* 27, 575-589.

Bagnoli, Mark and Barton L. Lipman, 1988, Successful takeovers without exclusion, *Review of Financial Studies* 1, 89-110.

Bebchuk, Lucian A., 1985, Toward undistorted choice and equal treatment in corporate takeovers, *Harvard Law Review* 98.

Bebchuk, Lucian A., 1987, The pressure to tender: An analysis and a proposed remedy, *Delaware Journal of Corporate Law* 12.

Bebchuk, Lucian A., 1988, Takeover bids below the expected value of minority shares, *National Bureau of Economic Research* Working paper No. 2524.

Bergström, Clas and Peter Högfeldt, 1994, An analysis of the Mandatory Bid Rule, *Stockholm School of Economics, Department of Finance* Working Paper No. 61.

Bergström, Clas, Peter Högfeldt, and Johan Molin, 1994, The optimality of the Mandatory Bid Rule, *Stockholm School of Economics, Department of Finance* Working Paper No. 65.

Bradley, Michael, Anand Desai, and E. Han Kim, 1988, Synergistic gains from corporate acquisitions and their division between the stockholders of the target and acquiring firms, *Journal of Financial Economics* 21, 3-40.

Brickley, James A., Jeffrey L. Coles, and Rory L. Terry, 1994, Outside directors and the adoption of poison pills, *Journal of Financial Economics* 35, 371-390.

Burkart, Mike, 1996, Initial shareholdings and overbidding in takeover contests, *The Journal of Finance* 50, 1491-1515.

Coffee, John C., Jr., 1984, Regulating the market for corporate control: A critical assessment of the tender offer's role in corporate governance, *Columbia Law Review* 84.

Comment, Robert and G. William Schwert, 1995, Poison or placebo? Evidence on the deterrence and wealth effects of modern antitakeover measures, *Journal of Financial Economics* 39, 3-43.

Dodd, Peter and Richard Ruback, 1977, Tender offers and stockholder returns: An empirical analysis, *Journal of Financial Economics* 5, 351-373.

Easterbrook, Frank H. and Daniel R. Fischel, 1981, The proper role of target's management in responding to a tender offer, *Harvard Law Review* 94, 1161-1204.

Easterbrook, Frank H. and Daniel R. Fischel, 1982, Corporate control transactions, *Yale Law Journal* 91, 698-737.

Easterbrook, Frank H. and Daniel R. Fischel, 1990, The corporate contract, in ed.: L.A. Bebchuk: *Corporate Law and Economic Analysis*, Cambridge University Press.

Fama, Eugene F. and Michael C. Jensen, 1983, Agency problems and residual claims, *Journal of Law and Economics* 26, 327-349.

Grossman, Sanford J. and Oliver D. Hart, 1980, Takeover bids, the free-rider problem, and the theory of the corporation, *Bell Journal of Economics* 11, 42-64.

Grossman, Sanford J. and Oliver D. Hart, 1988, One share - one vote and the market for corporate control, *Journal of Financial Economics* 20, 175-202.

Grossman, Sanford J. and Motty Perry, 1984a, Perfect sequential equilibrium, *Journal of Economic Theory* 39, 97-119.

Grossman, Sanford J. and Motty Perry, 1984b, Sequential bargaining under asymmetric information, *Journal of Economic Theory* 39, 120-154.

Hirshleifer, David and Sheridan Titman, 1990, Share tendering strategies and the success of hostile takeover bids, *Journal of Political Economy* 98, 295-324.

Jarrell, Gregg A. and Michael Bradley, 1980, The economic effects of federal and state regulations of cash tender offers, *Journal of Law and Economics* 19, 371-407.

Jarrell, Gregg A. and Annette B. Poulsen, 1987, Shark repellents and stock prices: The effects of antitakeover amendments since 1980, *Journal of Financial Economics* 19, 127-168.

Jarrell, Gregg A., James A. Brickley, and Jefrey M. Netter, 1988, The market for corporate control: The empirical evidence since 1980, *Journal of Economic Perspectives* 2, 49-68.

Jensen, Michael C. and William H. Meckling, 1976, Theory of the firm: manager behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305-360.

Jensen, Michael C. and Richard S. Ruback, 1983, The market for corporate control: The scientific evidence, *Journal of Financial Economics* 11, 5-50.

Malatesta, Paul H. and Ralph A. Walkling, 1988, Poison pill securities: Stockholder wealth, profitability, and ownership structure, *Journal of Financial Economics* 20,347-376.

McWilliam, Victoria B., 1990, Managerial share ownership and the stock price effects of antitakeover amendment proposals, *The Journal of Finance* 45, 1627-1640.

Morck, Randall, Andrei Shleifer and Robert W. Vishny, 1988, Characteristics of target of hostile and friendly takeover, in: Alan J. Auerbach, ed., *Corporate takeovers: Causes and consequences*, National Bureau of Economic Research, Chicago, 101-129.

Nathan, Kevin S. and Terrence B. O'Keefe, 1989, The rise in takeover premiums: An exploratory study, *Journal of Financial Economics* 23, 101-119.

Ryngaert, Micahel, 1988, The effect of poison pill securities on shareholder wealth, *Journal of Financial Economics* 20, 377-417.

Shleifer, Andrei and Robert W. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461-488.

Stulz, René M., Ralph A. Walkling, and Moon H. Song, 1990, The distribution of target ownership and the division of gains in successful takeovers, *The Journal of Finance* 45, 817-833.

Walkling, Ralph A., 1985, Predicting tender offer success: A logistic analysis, *Journal of Financial and Quantitative Analysis* 20, 461-478.

Walkling, Ralph A. and Robert O. Edminster, 1985, Determinants of tender offer premiums, *Financial Analyst Journal* 41, 27-37.

Weston, J. Fred, Kwang S. Chung, and Susan E. Hoag, 1990, *Mergers, restructuring, and corporate control*, Prentice-Hall, Inc.

Yarrow, G. K., 1985, Shareholder protection, compulsory acquisition and the efficiency of the takeover process, *Journal of Industrial Economics* 34, 3-16.

Appendix A

Derivation of optimal dilution

Generally, the shareholders will maximize the following problem:

$$\underset{\delta}{Maximize}\, W(\cdot) = \left(1 - F\left(Z_c^*(\delta)\right)\right) \cdot E\left[Z - \delta \middle| Z \geq Z_c^*(\delta)\right].$$

Under the triangular distribution assumption, the takeover probability is

$$1 - F\left(Z_c^*(\cdot)\right) = \begin{cases} 0 & if \quad \delta \leq \underline{\delta} \\ \left(\dfrac{3(1-e)(\underline{\delta} - \delta)}{(\alpha + 2e)(Z_{\max} - Z_{\min})}\right)^2 & if \quad \delta \in (\underline{\delta}, \overline{\overline{\delta}}), \\ 1 & if \quad \delta \geq \overline{\overline{\delta}} \end{cases}$$

where $\underline{\delta} = \dfrac{c - eZ_{\max}}{1-e}$ is such that, $\forall \delta \leq \underline{\delta}$, $1 - F\left(Z_c^*(\delta)\right) = 0$, and $\forall \delta > \underline{\delta}$, $1 - F\left(Z_c^*(\delta)\right) > 0$, while $\overline{\overline{\delta}} = \underline{\delta} + \dfrac{(\alpha + 2e)(Z_{\max} - Z_{\min})}{3(1-e)}$ is such that, $\forall \delta \geq \overline{\overline{\delta}}$, $1 - F\left(Z_c^*(\cdot)\right) = 1$, and $\forall \delta < \overline{\overline{\delta}}$, $1 - F\left(Z_c^*(\cdot)\right) < 1$.

The equilibrium takeover premium is

$$\pi^*(\delta) = E\left[Z - \delta \middle| Z \geq Z_c^*(\cdot)\right] = \frac{(2+\alpha)(\overline{\delta} - \delta)}{(\alpha + 2e)},$$

where $\overline{\delta} = \dfrac{\alpha Z_{\max} + 2c}{2 + \alpha}$ is such that, $\forall \delta \geq \overline{\delta}$, $\pi^*(\delta) \leq 0$, and $\forall \delta < \overline{\delta}$, $\pi^*(\delta) > 0$.

We can write the maximization problem as

$$\underset{\delta \in \left(\underline{\delta}, \overline{\delta}\right)}{Maximize}\, W(\cdot) = \frac{9\left(c - eZ_{\max} - (1-e)\delta\right)}{(\alpha + 2e)^2 \left(Z_{\max} - Z_{\min}\right)^2} \cdot \frac{\left(\alpha Z_{\max} + 2c - (2+\alpha)\delta\right)}{(\alpha + 2e)}.$$

Differentiating $W(\cdot)$ w.r.t. δ generates the following partial derivative

$$W' = \frac{-9\left(c - eZ_{\max} - (1-e)\delta\right) \cdot \left\{2(1-e)\left(\alpha Z_{\max} + 2c\right) + c(2+\alpha)(c-e) - 3(1-e)(2+\alpha)\delta\right\}}{(\alpha + 2e)^3 \left(Z_{\max} - Z_{\min}\right)^2}$$

The first order condition for optimum is given by setting $W' = 0$. This is equivalent to

$$\underset{\text{(FOC)}}{\left(c - eZ_{\max} - (1-e)\delta\right) \cdot \left\{2(1-e)\left(\alpha Z_{\max} + 2c\right) + c(2+\alpha)(c-e) - 3(1-e)(2+\alpha)\delta\right\} = 0}$$

The dilution amount satisfying the first and second order conditions is

$$\delta^* = \frac{1}{3} \cdot \frac{c - eZ_{\max}}{1-e} + \frac{2}{3} \cdot \frac{\alpha Z_{\max} + 2c}{2+\alpha}.$$

The optimal dilution amount can be rewritten as

$$\delta^* = \frac{1}{3} \cdot \underline{\delta} + \frac{2}{3} \cdot \overline{\delta},$$

where $\underline{\delta} = \frac{c - eZ_{\max}}{1-e}$ defines the (lower) turning point for the dilution amount at which the probability of takeover becomes zero, while $\overline{\delta} = \frac{\alpha Z_{\max} + 2c}{2+\alpha}$ is interpreted as the (upper) pivotal level of dilution at which the small shareholders' ex post takeover gain will become non-positive.

Appendix B

Derivation of equilibrium properties

B.1 Comparative statics under fixed dilution

B.1.1 Effects on the minimum profitable value improvement

For any fixed level of dilution, the minimum profitable value improvement can be written

$$Z_c^*(\cdot) = \frac{(\alpha - e)Z_{\max} + 3c - 3(1-e)\delta}{\alpha + 2e}. \tag{B1}$$

The partial derivatives are

$$\frac{\partial}{\partial e} Z_c^*(\cdot) = \frac{-3(\alpha+2)(\bar{\delta} - \delta)}{(\alpha + 2e)^2} < 0 \qquad \forall \delta < \bar{\delta};$$

$$\frac{\partial}{\partial c} Z_c^*(\cdot) = \frac{3}{\alpha + 2e} > 0;$$

$$\frac{\partial}{\partial \alpha} Z_c^*(\cdot) = \frac{3(\alpha+2)(\delta - \underline{\delta})}{(\alpha + 2e)^2} > 0, \qquad \forall \delta > \underline{\delta};$$

$$\frac{\partial}{\partial Z_{\max}} Z_c^*(\cdot) = \frac{\alpha - e}{\alpha + 2e} > 0;$$

$$\frac{\partial}{\partial Z_{\min}} Z_c^*(\cdot) = 0.$$

B.1.2 Effects on the takeover probability

For any fixed level of dilution on the interval $(\underline{\delta}, \bar{\bar{\delta}})$, the probability of a takeover can be written

$$\left(1 - F\left(Z_c^*(\cdot)\right)\right) = \left(\frac{3(1-e)(\underline{\delta} - \delta)}{(\alpha + 2e)(Z_{\max} - Z_{\min})}\right)^2. \tag{B2}$$

The partial derivatives are

$$\frac{\partial}{\partial e}\left(1 - F\left(Z_c^*(\cdot)\right)\right) = \frac{18(1-e)(2+\alpha)(\delta - \underline{\delta})(\bar{\delta} - \delta)}{(\alpha + 2e)^3 (Z_{\max} - Z_{\min})^2} > 0,$$

for all $\delta \in (\underline{\delta}, \bar{\bar{\delta}})$, and zero other wise;

$$\frac{\partial}{\partial c}\left(1-F\left(Z_c^*(\cdot)\right)\right)=\frac{-18(1-e)(\delta-\underline{\delta})}{(\alpha+2e)^2(Z_{\max}-Z_{\min})^2}<0,$$

for all $\delta \in (\underline{\delta},\bar{\bar{\delta}})$, and zero otherwise;

$$\frac{\partial}{\partial \alpha}\left(1-F\left(Z_c^*(\cdot)\right)\right)=\frac{-18\left((1-e)(\delta-\underline{\delta})\right)^2}{(\alpha+2e)^3(Z_{\max}-Z_{\min})^2}<0,$$

for all $\delta \in (\underline{\delta},\bar{\bar{\delta}})$, and zero otherwise;

$$\frac{\partial}{\partial Z_{\max}}\left(1-F\left(Z_c^*(\cdot)\right)\right)=\frac{-18(1-e)^2(\underline{\delta}-\delta)(\delta^Z-\delta)}{(\alpha+2e)^2(Z_{\max}-Z_{\min})^3}>0 \text{ for all } \delta \in (\underline{\delta},\delta^Z), \text{ and } <0$$

for all $\delta \in (\delta^Z,\bar{\bar{\delta}})$, and zero otherwise, where $\delta^Z=\frac{c-eZ_{\min}}{1-e}$;

$$\frac{\partial}{\partial Z_{\min}}\left(1-F\left(Z_c^*(\cdot)\right)\right)=\frac{18\left((1-e)(\delta-\underline{\delta})\right)^2}{(\alpha+2e)^2(Z_{\max}-Z_{\min})^3}<0 \text{ for all } \delta \in (\underline{\delta},\bar{\bar{\delta}}), \text{ and zero}$$

otherwise.

B.1.3 Effects on the takeover premium

For any fixed level of dilution, the takeover premium can be written

$$E\left[Z-\delta \middle| Z \geq Z_c^*(\cdot)\right]=\frac{(2+\alpha)(\bar{\delta}-\delta)}{(\alpha+2e)}. \tag{B3}$$

We obtain the following partial derivatives:

$$\frac{\partial}{\partial e}E\left[Z-\delta \middle| Z \geq Z_c^*(\cdot)\right]=\frac{-2(\alpha+2)(\bar{\delta}-\delta)}{(\alpha+2e)^2}<0 \text{ for all } \delta<\bar{\delta};$$

$$\frac{\partial}{\partial c}E\left[Z-\delta \middle| Z \geq Z_c^*(\cdot)\right]=\frac{2}{\alpha+2e}>0;$$

$$\frac{\partial}{\partial \alpha}E\left[Z-\delta \middle| Z \geq Z_c^*(\cdot)\right]=\frac{2(1-e)(\delta-\underline{\delta})}{(\alpha+2e)^2}>0 \text{ for all } \delta>\underline{\delta};$$

$$\frac{\partial}{\partial Z_{\max}}E\left[Z-\delta \middle| Z \geq Z_c^*(\cdot)\right]=\frac{\alpha}{\alpha+2e}>0;$$

$$\frac{\partial}{\partial Z_{\min}}E\left[Z-\delta \middle| Z \geq Z_c^*(\cdot)\right]=0.$$

B.1.4 Effects on the shareholders' ex ante takeover gain

For any fixed level of dilution, the ex ante takeover gain can be written

$$\left(1-F\left(Z_c^*(\cdot)\right)\right)\cdot E\left[Z-\delta\middle|Z\geq Z_c^*(\cdot)\right]=\left(\frac{3(1-e)(\underline{\delta}-\delta)}{(\alpha+2e)(Z_{\max}-Z_{\min})}\right)^2\cdot\frac{(2+\alpha)(\bar{\delta}-\delta)}{(\alpha+2e)}. \tag{B4}$$

The partial derivatives, holding δ fixed, are the following:

$$\frac{\partial}{\partial e}\left(1-F\left(Z_c^*(\cdot)\right)\right)\cdot E\left[Z-\delta\middle|Z\geq Z_c^*(\cdot)\right]=$$

$$=\frac{18(1-e)(2+\alpha)(\delta-\underline{\delta})(\bar{\delta}-\delta)\left((\alpha-e)(Z_{\max}-\delta)-3(\delta-c)\right)}{(\alpha+2e)^4(Z_{\max}-Z_{\min})^2}>0 \text{ for all}$$

$\delta\in(\underline{\delta},\delta^0)$, and <0 for all $\delta\in(\delta^0,\bar{\delta})$, and zero otherwise, where

$\delta^0=\dfrac{Z_{\max}(\alpha-e)+3c}{\alpha-e+3}$;

$$\frac{\partial}{\partial c}\left(1-F\left(Z_c^*(\cdot)\right)\right)\cdot E\left[Z-\delta\middle|Z\geq Z_c^*(\cdot)\right]=$$

$$=\frac{-18(1-e)(\delta-\underline{\delta})\left((\alpha-e)(Z_{\max}-\delta)-3(\delta-c)\right)}{(\alpha+2e)^3(Z_{\max}-Z_{\min})^2}<0 \text{ for all } \delta\in(\underline{\delta},\delta^0);$$

and >0 for all $\delta\in(\delta^0,\bar{\delta})$, and zero otherwise;

$$\frac{\partial}{\partial\alpha}\left(1-F\left(Z_c^*(\cdot)\right)\right)\cdot E\left[Z-\delta\middle|Z\geq Z_c^*(\cdot)\right]=$$

$$=\frac{-18\left((1-e)(\delta-\underline{\delta})\right)^2\left((\alpha-e)(Z_{\max}-\delta)+3(\delta-c)\right)}{(\alpha+2e)^4(Z_{\max}-Z_{\min})^2}<0 \text{ for all } \delta\in(\underline{\delta},\delta^0),$$

and >0 for all $\delta\in(\delta^0,\bar{\delta})$.

B.2 Comparative statics under optimal dilution

B.2.1 Effects on the optimal dilution amount

The optimal dilution is written

$$\delta^* = \frac{1}{3}\cdot\underline{\delta} + \frac{2}{3}\cdot\bar{\delta} = \frac{1}{3}\cdot\frac{c - eZ_{max}}{1-e} + \frac{2}{3}\cdot\frac{\alpha Z_{max} + 2c}{2+\alpha}. \qquad \text{(B5)}$$

The partial derivatives are

$$\frac{\partial}{\partial e}\delta^* = -\frac{1}{3}\cdot\frac{Z_{max} - c}{(1-e)^2} < 0;$$

$$\frac{\partial}{\partial c}\delta^* = \frac{1}{3}\cdot\left(\frac{1}{(1-e)} + \frac{4}{2+\alpha}\right) > 0;$$

$$\frac{\partial}{\partial \alpha}\delta^* = \frac{4}{3}\cdot\frac{Z_{max} - c}{(2+\alpha)^2} > 0;$$

$$\frac{\partial}{\partial Z_{max}}\delta^* = \frac{1}{3}\cdot\left(\frac{2\alpha}{2+\alpha} - \frac{e}{1-e}\right) > 0 \text{ for } e < \frac{2\alpha}{2+3\alpha} \text{ (and nonpositive otherwise);}^1$$

$$\frac{\partial}{\partial Z_{min}}\delta^* = 0.$$

B.2.2 Effects on the optimal minimum profitable value improvement

Inserting (B5) into (B1) yields an expression for the optimal minimum profitable value improvement:

$$Z_c^*(\delta^*, \cdot) = \frac{\alpha Z_{max} + 2c}{2+\alpha} \; (= \bar{\delta}). \qquad \text{(B6)}$$

We obtain the following *in-optimum* partial derivatives:

$$\frac{\partial}{\partial e} Z_c^*(\delta^*, \cdot) = 0;$$

$$\frac{\partial}{\partial c} Z_c^*(\delta^*, \cdot) = \frac{2}{2+\alpha} > 0;$$

$$\frac{\partial}{\partial \alpha} Z_c^*(\delta^*, \cdot) = \frac{2(Z_{max} - c)}{(2+\alpha)^2} > 0;$$

$$\frac{\partial}{\partial Z_{max}} Z_c^*(\delta^*, \cdot) = \frac{\alpha}{2+\alpha} > 0;$$

---

[1] In particular, for $\alpha = 0.5$, the optimal dilution will increase in Z_{max} if and only if $e < 2/7$.

$$\frac{\partial}{\partial Z_{\min}} Z_c^*(\delta^*,\cdot) = 0.$$

B.2.3 Effects on the optimal takeover probability

Substituting (B5) into (B2) produces an expression for the optimal takeover probability:

$$1 - F\left(Z_c^*(\delta^*,\cdot)\right) = \left(\frac{2(Z_{\max} - c)}{(2+\alpha)(Z_{\max} - Z_{\min})}\right)^2. \tag{B7}$$

The partial derivatives are

$$\frac{\partial}{\partial e}\left(1 - F\left(Z_c^*(\delta^*,\cdot)\right)\right) = 0;$$

$$\frac{\partial}{\partial c}\left(1 - F\left(Z_c^*(\delta^*,\cdot)\right)\right) = \frac{-8(Z_{\max} - c)}{(2+\alpha)^2(Z_{\max} - Z_{\min})^2} < 0;$$

$$\frac{\partial}{\partial \alpha}\left(1 - F\left(Z_c^*(\delta^*,\cdot)\right)\right) = \frac{-8(Z_{\max} - c)^2}{(2+\alpha)^3(Z_{\max} - Z_{\min})^2} < 0;$$

$$\frac{\partial}{\partial Z_{\max}}\left(1 - F\left(Z_c^*(\delta^*,\cdot)\right)\right) = \frac{8(Z_{\max} - c)(c - Z_{\min})}{(2+\alpha)^2(Z_{\max} - Z_{\min})^3} > 0 \quad \text{for } Z_{\min} < c < Z_{\max};$$

$$\frac{\partial}{\partial Z_{\min}}\left(1 - F\left(Z_c^*(\delta^*,\cdot)\right)\right) = \frac{8(Z_{\max} - c)^2}{(2+\alpha)^2(Z_{\max} - Z_{\min})^3} > 0.$$

B.2.4 Effects on the optimal takeover premium

Substituting (B5) into (B3) results in the following expression for the optimal takeover premium:

$$E\left[Z - \delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = \frac{1}{3} \cdot \frac{Z_{\max} - c}{1 - e}. \tag{B8}$$

Partial derivatives are

$$\frac{\partial}{\partial e} E\left[Z - \delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = \frac{1}{3} \cdot \frac{Z_{\max} - c}{(1-e)^2} > 0;$$

$$\frac{\partial}{\partial c} E\left[Z - \delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = -\frac{1}{3} \cdot \frac{1}{(1-e)} < 0;$$

$$\frac{\partial}{\partial \alpha} E\left[Z - \delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = 0;$$

$$\frac{\partial}{\partial Z_{\max}} E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = \frac{1}{3}\cdot\frac{1}{(1-e)} > 0;$$

$$\frac{\partial}{\partial Z_{\min}} E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = 0.$$

B.2.5 Effects on the optimal ex-ante takeover gain

Inserting (B5) into (B4), or equivalently, multiplying the respective RHSs of (B7) and (B8) produces the following expression for the maximal ex ante takeover gain:

$$\left(1-F\left(Z_c^*(\delta^*,\cdot)\right)\right) E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = \frac{4}{3}\cdot\frac{(Z_{\max}-c)^3}{(1-e)(2+\alpha)^2(Z_{\max}-Z_{\min})^2}. \quad \text{(B9)}$$

The in-optimum partial derivatives are

$$\frac{\partial}{\partial e}\left(1-F\left(Z_c^*(\delta^*,\cdot)\right)\right) E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = \frac{4}{3}\cdot\frac{(Z_{\max}-c)^3}{(1-e)^2(2+\alpha)^2(Z_{\max}-Z_{\min})^2} > 0;$$

$$\frac{\partial}{\partial c}\left(1-F\left(Z_c^*(\delta^*,\cdot)\right)\right) E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = -\frac{4}{3}\cdot\frac{(Z_{\max}-c)^2}{(1-e)(2+\alpha)^2(Z_{\max}-Z_{\min})^2} < 0;$$

$$\frac{\partial}{\partial \alpha}\left(1-F\left(Z_c^*(\delta^*,\cdot)\right)\right) E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = -\frac{8}{3}\cdot\frac{(Z_{\max}-c)^3}{(1-e)(2+\alpha)^2(Z_{\max}-Z_{\min})^3} < 0;$$

$$\frac{\partial}{\partial Z_{\max}}\left(1-F\left(Z_c^*(\delta^*,\cdot)\right)\right) E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] =$$

$$= \frac{4}{3}\cdot\frac{(Z_{\max}-c)^2\left((Z_{\max}-Z_{\min})-2(Z_{\min}-c)\right)}{(1-e)^2(2+\alpha)^2(Z_{\max}-Z_{\min})^2} > 0;$$

$$\frac{\partial}{\partial Z_{\min}}\left(1-F\left(Z_c^*(\delta^*,\cdot)\right)\right) E\left[Z-\delta \middle| Z \geq Z_c^*(\delta^*,\cdot)\right] = \frac{8}{3}\cdot\frac{(Z_{\max}-c)^3}{(1-e)(2+\alpha)^2(Z_{\max}-Z_{\min})^3} >$$

0.

Appendix C

Description of poison pill plans*

Poison pills are securities that bestow their holders with special rights, that make takeovers more expensive for a would-be acquirer. These rights are typically exercisable after a period of ten days after a specific event such as a tender offer or the accumulation of some prespecified fraction of the firm's equity.

Poison pills are generally adopted by the board of directors without shareholder approval. Usually, the rights associated with a poison pill plan can be altered quickly by the board or redeemed by the firm (typically, at very low cost) anytime before they become exercisable. These provisions force the acquirer to negotiate directly with the target's board. Poison pills will take several forms, of which the more important ones are presented below.

The most popular type of poison pill are the so-called *flip-over rights plans*. They were first introduced in late 1984, and are designed as follows. The shareholders receive a dividend issue of warrants expressing the right to acquire the firm's stock at a, typically, prohibitively large *premium* in relation to the current market price. However, in case of a merger, this right "flips over" to allow the holder to purchase the acquirer's shares at a substantial *discount*. The rights typically have 10 year terms, and they become exercisable around ten days after an investor acquires 20% of the firm's common stock, or initiates a tender offer for 30% or more of the firm's common stock. After becoming exercisable, the rights are separated from the stock and can be traded independently. However, before becoming exercisable, the rights can be redeemed at a trivial cost (often specified at 3¢ per right). Such redemption takes place when the board wants to permit a control transaction to go through, typically after negotiating a sufficiently high bid price from the acquirer.

In the event of a merger in which the large blockholder is the surviving company, the rights flip over and entitle a holder to purchase shares of common stock of the surviving company at a substantial discount, typically at around 50%. Alternatively, if the target is the surviving party

---

* This appendix is based on a section of Chapter 20 of Weston, Chung, and Hoag (1990). (Weston, J. Fred, Kwang S. Chung, and Susan E. Hoag, 1990, *Mergers, restructuring, and corporate control*, Prentice-Hall, Inc., 1990).

of a merger, each right not owned by the blockholder entitles to a purchase of the target's shares at the same discount. Such a provision may also be triggered in the event of a self-dealing defined in the rights agreement. This is called a self-dealing flip-in provision.

The flip-over plan may have an *ownership flip-in plan* amended to it. This provision allows rightsholders to purchase target shares at substantial discounts in the event that an acquirer accumulates shares in excess of some threshold limit (typically, 25-50%). While the acquirer's rights are void, this provision imposes losses on him and dilutes his equity. Some plans waive the flip-in provision if the acquisition is pursuant to a cash tender offer for all outstanding shares. According to Malatesta and Walkling (1988), approximately 50% of the flip-over plans contain ownership flip-in provisions.

In a *back-end rights plan*, shareholders receive a dividend rights issue. If an acquirer obtains shares of the target in excess of a specific limit, holders excluding the acquirer can exchange their rights and shares for senior securities or cash equaling the back-end price set by the board of directors of the issuing firm. The back-end price is typically considerably higher than the stock's market price and thus back-end plans set a minimum takeover price.

A *voting plan* is set up by issuing a dividend of preferred stock with voting rights. In some cases, if a party acquires a substantial block of a firm's voting stock, preferred holders other than the large blockholder become entitled to supervoting privileges. It is thus difficult for the block holder to obtain voting control. In a different case, long-term (typically more than three years) holders of preferred stock are entitled to more votes per share than short-term holders. This makes it difficult for a bidder to acquire control rapidly.

A last type of poison pills, that has not appeared after 1984, are the *preferred stock plan* (alternatively labeled *original plan).* A *preferred-stock plan* involves a dividend issue of convertible preferred stock to the firm's common stock holders. The holders of the preferred stock are typically entitled to one vote per share and to dividends that are usually somewhat higher than the amount of common dividends that would be received after conversion. The preferred stock can typically be redeemed only after about 15 years. The preferred stockholders can exercise special rights if an outsider acquires a large block of the firm. First, holders of the preferred stocks other than the large block holder can require the firm to redeem the preferred stock for cash at the highest price the large block holder paid for the firm's common or preferred stock during the past year. Second, in the event of a merger, the preferred stock can be converted into voting securities of the acquirer. These rights can be altered by the board of the issuing firm board

only if there is no large block holder. This facilitates negotiation with a friendly bidder who is not a blockholder. When a large blockholder does exist, altering the provisions of the preferred stock requires a supermajority vote. A partial tender offer for the preferred stock is likely to fail, because the preferred stockholders have no incentives to tender their shares, as they are guaranteed to receive the highest price paid by the bidder. However, modified two-tier offers may still be possible (see Ryngaert, 1988, p.381).

ESSAY IV

The Mandatory Bid Rule

A legislative proposal aimed at harmonizing company code within the European Union advocates the adoption of a mandatory bid rule (MBR), implying that a bidder trying to acquire control of a firm must be required to extend the offer to include all shares of the firm. Based on a generalization of a model by Grossman and Hart (1988), this essay analyzes the shareholder wealth effects of this rule. A general design principle is derived, which precisely characterizes when the MBR is in the interest of the shareholders and when it is not. The essay also evaluates the MBR as a policy instrument. The design principle is shown to closely approximate the choice of optimal bids.

1. Introduction

The Mandatory Bid Rule (henceforth: the MBR) is a policy instrument intended to regulate tender offers according to two basic principles. First, a shareholder should have the right to sell her shares if the control of the company changes. This *right-to-sell principle* implies an obligation for any bidder trying to acquire control to extend the offer to include *any or all* shares of the corporation. The bidder would thus be constrained from establishing a control position by making a partial (restricted) tender offer bid. Second, the MBR forces the acquirer to offer the same bid price to all shareholders, regardless of whether they hold controlling positions or not. This *equal-bid principle* effectively excludes price-differentiated tender offers.

The effects of the MBR have not been thoroughly analyzed in the literature.[1] The need for such an analysis is emphasized by the rule's popularity among European regulators. For example, France, Italy and Norway have adopted the MBR, although with somewhat different limits for operational control.[2,3] Attempting to create a level playingfield for firms within the European Union, the Commission of the European Communities proposes the adoption of the MBR as well as a set of rules governing information disclosure in a document named *Amended Proposal for a Thirteenth Council Directive on Company Law, Concerning Takeover and Other General Bids* (1990). The archetype behind the proposed legislation is *The City Code on Takeovers and Mergers*, which is the self-regulatory framework

---

[1] Yarrow (1985) addresses the MBR. In a simple, rational-expectations model without competition, he demonstrates that a partial tender offer can have detrimental effects on shareholder wealth. However, as is not observed by Yarrow, the same analysis on the relevant alternative, nonpartial bids, would yield exactly the same effects. More recently, a couple papers by Bebchuck (1994) and by Burkart *et al.* (1995) present some complementary approaches to the analysis of the MBR.

[2] In these regulations, the MBR is typically triggered when an investor achieves around 30 to 40 percent of the voting equity.

[3] In the U.S., the MBR has not achieved the same amount of popularity. However, the so-called second wave of takeover statutes includes provisions that award all shareholders redemption rights against purchasers of stock in the excess of some trigger limit (usually around 30%). So far, only three states have adopted this redemption rights provision. For instance, Pennsylvania law requires any person acquiring 20% or more to notify all other shareholders, which are then entitled to sell their shares to the acquirer at a price no lower than the highest price paid by the acquirer during the preceding 90 day-period (including the day the buyer become a 20% shareholder). Maine and Utah passed similar laws [see Karpoff and Malatesta (1989)].

effective in the U.K.. The City Code is the oldest and most flexible set of takeover rules in Europe, and it is supervised by a professional body known as *The Panel on Takeovers and Mergers*. It appears that, with a few important exceptions, the Thirteenth Council Directive almost emulates the rules of the City Code.[4]

The alleged motivation behind the MBR is the need for protection of minority rights, which might be compromised in takeovers. According to Farrar *et al.* (1991), the MBR present in the City Code can be derived from the notion that *"...it is felt to be wrong to compel shareholders to become minority shareholders in a company without giving them the option to sell their shares,"* and the view that *"...shareholders, who are already minority shareholders under one controlling shareholder, should not be compelled to continue under a different controlling shareholder."* The quotations from *Farrar's Company Law* seem to suggest that the MBR represents a costless option of selling when control changes to be freely exercised whenever it is favorable to do so. Giving all shareholders such an option would intuitively seem like a fair and harmless requirement aimed at the protection of minority interests. However, by systematically changing the conditions for control contests, the MBR triggers several counteracting effects on shareholder wealth. The question of whether or not to allow partial bids can be said to contain two fundamental dimensions: an *allocative* dimension as well as one of *surplus extraction*. The former concerns how the outcome of a control contest in terms of the post-takeover value of the firm is affected; whether a more or less efficient management will result. The latter concerns the price level at which a takeover eventually occurs, and, consequently, how much the target shareholders are able to extract from the acquirer's surplus. We show that neither partial nor nonpartial bids are uniformly best in both of these respects. Hence, there appears to exist a genuine trade-off between the two dimensions.

This paper seeks to delineate this trade-off by analyzing the effects of a MBR on the outcome of a takeover contest between two rivaling management teams in a firm where no controlling position exists. Our primary focus is on the economic consequences of the right-to-sell principle. To isolate this from the equal-bid principle, which is predicated on the difference between small and large controlling shareholders, we focus on the

---

[4]A significant difference is that, while the City Code is a self-regulatory framework, the 13th Council Directive is intended as a public law. In the City Code, the MBR is triggered at 30% ownership, while the Council Directive proposes a trigger limit of 33.33% of the votes.

situation where the firm is atomisticly held.[5] We conduct the analysis within a general version of the Grossman and Hart (1988) security-voting structure model where two competitors for control are endowed with private benefits of control.[6] Within the model framework, we characterize exactly how the MBR affects shareholder wealth, and who will win the control contest. Ultimately, we evaluate the properties of the MBR as a policy instrument.

The paper makes two general contributions. The first one is the general and precise formal analysis of if and when enactment of the MBR is in the interest of the target shareholders. This analysis covers all possible parametric relations of private and security benefits associated with the competitors for company control. We demonstrate that it is only under quite restrictive conditions that the shareholders actually gain from implementation of the MBR. One sufficient condition for a nonnegative wealth effect is the special case with one-sided private benefits. This result is analogous to the Grossman-Hart proposition stating that one share/one vote is the optimal security voting structure. In particular, both the nonpartial bidform and the nondual voting structure assign the least weight to the private benefits and the most to the security benefits.[7]

In the general case with two-sided private benefits, the MBR is aligned with the shareholders' interests only over a comparatively small set of values in the parameter space. Hence, an important result is that implementation of the MBR does not generally benefit the target shareholders. Specifically, if the private benefits of the two contestants are of about equal size, the effect on the shareholders' wealth is uniformly nonpositive. In fact, unless the difference in private benefits is large, the target shareholders encounter a loss, ceteris paribus, from implementation of a MBR.

The second main contribution of the paper is methodological. We view the decision whether to allow or prohibit partial bids as a design problem of selecting a package containing a mix of security and private

---

[5] In general, the MBR applies to both the case where no controlling ownership position is initially present, and the situation where the takeover amounts to a transfer of such a position.

[6] The present paper is closely related to Zingales (1995) by the common usage of the Grossman and Hart (1988) framework. However, Zingales addresses a different problem, the optimally retained ownership share in an initial public offering, and uses a different takeover mechanism, bargaining instead of competition (auction). The present analysis was initiated independently of Zingales. A more distant relative is Israel (1991), which determines the optimal extraction in a takeover model with private benefits but for a firm that also issues debt.

[7] Grossman and Hart (1988) also observed the close analogy between the choice of security voting structure and the choice of bidform. However, they did not develop the logical affinity between the two problems in the way attempted in this paper.

benefits that maximizes the target shareholders' wealth. We derive a very general design rule called the *relative-similarity-in-willingness-to-pay rule* which informs us precisely when a prohibition of partial bids is in the interest of the target shareholders, and when it is not. The analysis leading up to this design rule is a generalization of the Grossman-Hart analysis of the special case with one-sided private benefits to the realm of two-sided ones.

Our design rule is predicated on the general economic canon of competition. The simple but very suggestive intuition supporting this general design rule is that the shareholders' gain is maximized when the two competitors fight over packages of rights or benefits for which their willingness to pay is relatively more similar. Specifically, the design rule implies that, when the contestants' relative willingness to pay is more similar for security benefits, then nonpartial bids are in the shareholders' best interest as this bidform provides the more intense competition over the security benefits. Correspondingly, partial bids are preferred when the parties' willingness to pay is relatively more similar for the private benefits.[8]

As an extension of the binary-choice problem of whether or not to adopt the MBR, we also derive decision rules treating the bidform as a continuous variable. Specifically, we derive the optimal fraction of the firm for which a bidder should be required to bid. The MBR is thus given an additional evaluation by comparing it to this "optimal bidform."

The paper is organized as follows. Section 2 outlines the model and provides the necessary formalism. Section 3 conducts the analysis of the effects on firm value of bidforms for the general configuration of significant two-sided private benefits as well as for the special cases of one-sided and two-sided, identical private benefits. Section 4 deals with the problem of selecting the optimal bidform, when the bidform is a continuous variable. A short summary and a policy discussion conclude the paper in Section 5.

2. The model

In the spirit of Jensen and Meckling (1976), consider a firm that is initially privately held by a founder/entrepreneur. In order to capitalize her investment, the owner turns to the capital market for the public sale of her

[8] In fact, through the development of this general design rule, the paper not only formalizes but also generalizes an insight that was (passingly) expressed by Grossman and Hart: "...shareholders benefit when the rival and the incumbent compete over products for which they have similar willingness to pay..." [Grossman and Hart (1988), p. 181].

shares. The entrepreneur will generally seek to design the company's securities and governance structure in such a way that prospective investors are prepared to pay as high a price as possible for the offered shares. In this paper, we specifically focus on the choice of bid form as the critical control variable in the entrepreneur's value-maximization problem. We suggest that the corporate charter can be amended by a clause either allowing or prohibiting partial bids in future tender offers.

We assume that an atomistic ownership structure evolves subsequent to the IPO, and that the founder writes the corporate charter anticipating this. The small shareholders are assumed to be identical and rational. Furthermore, the voting structure is one share/one vote, and the corporation is expected to continue to be all-equity financed. An acquirer is assumed to establish control of the company by holding a position of at least fifty percent of the equity. We assume that the capital markets are perfect in the sense that there are no problems of financing a tender offer of any size. [9]

As in the Grossman and Hart (1988) model, competition in the market for corporate control is a basic element of our model. The corporate charter is written apprehending a future control contest where a single outside rival (R) management team challenges the incumbent (I) team. In an auction procedure, the team with the highest willingness to pay establishes control of the atomisticly owned firm.

The net present values of the firm's projects associated with the two rivaling teams are denoted y^R and y^I, receptively. As the project net present values will accrue to all of the firm's shareholders, they are named *security benefits*. In addition to the security benefits, and independently of the rivals' managerial skills, the contestants are endowed with *private benefits* of control, denoted by z^R and z^I. The private benefits are defined net of any costs of making a bid and may measure psychic value generated by power over the firm, or the value of network relationships associated with control.

A successful bid for control will need to satisfy three general conditions. (1) It must be profitable for the contestant to go through with the offer. (2) The bid must exceed that of the counterpart. (3) Due to the free rider option available for small shareholders, the tender offer price must at least equal the share value under the management team that is expected to win the contest. Combined, the first two conditions, concerning profitability and price matching, constitute a bidding subgame and represent the competitive mechanism in the model. The third requirement represents the free-rider mechanism of the model.

---

[9] In our concluding section, the implications for the MBR when this assumption is violated are discussed.

Suppose that a bidder, b, issues a tender offer for a fraction ϕ of the equity of the target firm, where $\phi \in [0.5, 1]$. If she succeeds, her expected profit is $\phi \cdot (y^b - p^b) + z^b \geq 0$, where p^b is her offered price expressed per 100 percent of the shares; $(y^b - p^b)$ measures the bidder's capital gain or loss; and z^b captures her private benefit of control. By solving for p^b in the zero-profit condition, we derive the bidder's maximum willingness-to-pay expressed per 100 percent: $y^b + z^b/\phi$.

Let B be an index for partial (P) and nonpartial (N) tender offers for fifty and one hundred percent of the shares of the firm, respectively. W(B) [L(B)] denotes the winner [loser] of a control contest. Specifically, $y^{W(P)} + 2 \cdot z^{W(P)} > y^{L(P)} + 2 \cdot z^{L(P)}$ if the partial bids are allowed, while $y^{W(N)} + z^{W(N)} > y^{L(N)} + z^{L(N)}$ under the nonpartial bidform, where the winning auction price equals the loser's maximum willingness to pay.[10] Let p(B) denote the tender offer price that satisfies the three necessary conditions for a successful bid for control. We find that p(B) is the greater of the loser's maximum willingness to pay and the security benefits under winning regime. That is,

$$p(B) \equiv \max[y^{L(B)} + (1/\phi) \cdot z^{L(B)}, y^{W(B)}], \tag{1}$$

where ϕ is 1 if bids are nonpartial (B = N), and ϕ equals 0.5 if bids are partial (B=P).[11]

The post-takeover value of a shareholder's position of a partial bid, V(P), is the sum of the equilibrium price she receives for the fifty percent of her holding that she sells, p(P), and the worth under the winning management of the fifty percent she is forced to retain, $y^{W(P)}$. Since all shareholders act and are treated identically, the total post-takeover value of the corporation under partial bids is $V(P) \equiv \frac{1}{2} \cdot [p(P) + y^{W(P)}]$. If the MBR applies, the shareholders' post-takeover wealth is simply $V(N) \equiv p(N)$, where p(N) denotes the equilibrium price of a successful nonpartial bid.

---

[10] The control contest is predicated on the presumption that the bidding auction will be won by the party who can afford to pay the highest share price. Because a bidder's maximum affordable share price is maximized by the smallest possible ϕ, she can never increase her chances of winning the bid contest by offering to purchase more shares than her opponent. However, under a different setup, deviations from this equilibrium result are possible. See e.g., Burkart, Gromb, and Panunzio (1995).

[11] If bids are unconditional, the shareholders' reservation price for a given bid will be the maximum of y^R and y^I if the rival makes the bid, and y^I if the incumbent makes it. Given the structure of the contest, it can be shown that the distinction between conditional and unconditional bids is irrelevant for the outcome of the contest and the subsequent equilibrium price. We assume that a bidder who is indifferent to accepting and rejecting the offer will accede to it.

To measure the difference in the shareholder's total post-takeover value under nonpartial and partial bids, define *the shareholder wealth effect* as

$$\Delta V \equiv V(N) - V(P) \equiv p(N) - \tfrac{1}{2}\cdot[p(P) + y^{W(P)}]. \tag{2}$$

ΔV captures the effect on shareholder wealth of a prohibition of partial bid: a positive wealth effect implies that the target shareholders would be better off if the MBR is enacted, while a negative wealth effect indicates a loss. In order to highlight the trade-off implicit in the choice of bidform, we decompose the shareholder wealth effect into a *surplus extraction component*, Δs, and an *allocative component*, Δa. We can write

$$\Delta V = \Delta s + \Delta a, \tag{3}$$

where $\Delta a \equiv y^{W(N)} - y^{W(P)}$. The allocative component measures the magnitude of change in allocative efficiency (not counting management's private benefits) as a result of the adoption of the MBR. It can easily be shown that Δa is nonnegative.[12] Hence, a partial-bid contest will never install a more efficient management than a contest with nonpartial bids.

The surplus extraction component measures the difference between the two bidforms in terms of how efficient they are in extracting the winner's private benefits: $\Delta s \equiv s(N) - s(P)$, where $s(N)$ and $s(P)$ denote the surplus extraction under nonpartial and partial bids, respectively. Due to free-riding by target shareholders, the winner of the control contest must at least pay the free rider price $y^{W(B)}$, implying that her maximum profit – "surplus"– equals the size of her private benefits, $z^{W(B)}$. The amount of the winner's surplus extracted by target shareholders is the difference between the maximum possible gain, $z^{W(B)}$, and the profit she actually makes, $\pi(B)$. The surplus extraction capability of partial bids is $s(P) = z^{W(P)} - \pi(P) = \tfrac{1}{2}\cdot[p(P) - y^{W(P)}]$ where the bidder's actual profit equals $\pi(P) = \tfrac{1}{2}\cdot[y^{W(P)} - p(P)] + z^{W(P)}$. Correspondingly, the surplus extracted under nonpartial bids is $s(N) = z^{W(N)} - \pi(N) = [p(N) - y^{W(N)}]$ where the winner's actual profit amounts to $\pi(N) = y^{W(N)} - p(N) + z^{W(N)}$. Consequently, the surplus extraction component is $\Delta s \equiv s(N) - s(P) \equiv [p(N) - y^{W(N)}] - \tfrac{1}{2}\cdot[p(P) - y^{W(P)}]$.

Using the fact that the bidder is always prepared to extend a higher price per 100 percent of the shares in a partial bid than in a nonpartial bid, thereby reducing her surplus to the benefit of the shareholders in the target company, a plausible conjecture might be that the surplus extraction

---

[12] The result follows from the fact that nonpartial bids maximize the weight of security benefits in the control contest. The formal proof is presented in Appendix B.

component is nonpositive. However, we will soon illustrate that it can also be positive.[13] More generally, depending on the parameter values, the balance between the surplus extraction and the nonnegative allocative component may result in a positive, zero, or negative total shareholder wealth effect. In the following section, this claim is substantiated by a general analysis of the trade-off between the surplus extraction and allocative components inherent in the enactment of the MBR.

3. *Analysis*

The analysis explores the fact that the pivotal element in determining the outcome of the control contest is the relation between the *difference in security benefits* and the (reversed) *difference in private benefits*. All basic results are presented in graphical form. Depending on whether $z^R > z^I$ or $z^R < z^I$, two panels illustrate all possible parameter combinations by positioning $(y^I - y^R)$ in relation to the private benefits. In particular, the private benefits and the associated reversed discrepancies are located on the axis for $(y^I - y^R)$, and, depending on which section or interval $(y^I - y^R)$ is situated in, a set of inequalities is satisfied. In turn, the inequalities are instrumental in determining the winner of the control contest as well as the equilibrium price. The general idea of this representation is hopefully illustrated as we go along.

3.1 *Positive and nonidentical private benefits*

In this subsection we demonstrate that, if both contestants have sizable and nonidentical private benefits, the effect on the target shareholders' post-takeover wealth of enactment of the MBR can be either positive, negative or zero. To focus on the pertinent economic insights, the main results are illustrated graphically while, the detailed analysis of all subcases is relegated to Appendix A. Figure 1 depicts the shareholder wealth effect, ΔV, as a function of the difference in security benefits $(y^I - y^R)$ for all combinations of private and security benefits such that $2 \cdot z^I > z^R > z^I > 0$.[14]

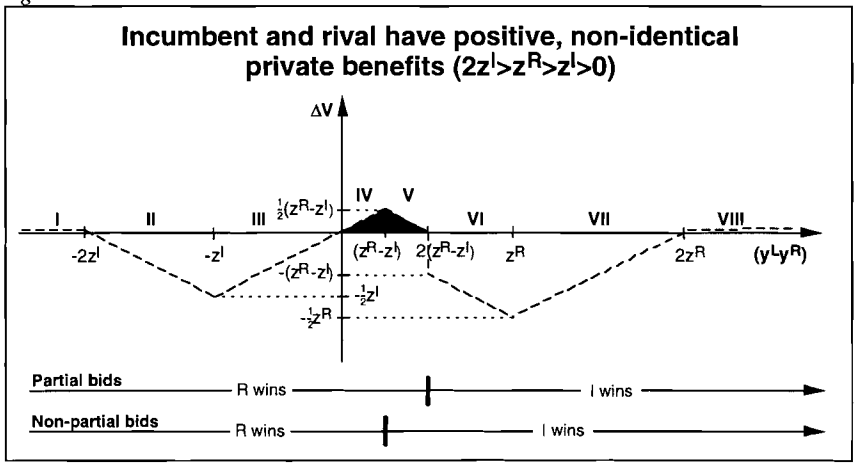
---

[13] In fact, the surplus extraction component is positive if and only if the less efficient (in terms of security benefits) management team wins irrespective of whether the MBR applies or not. A formal proof is presented in Appendix B.

[14] It is worth noticing that all "distances" in the graph relating the private benefits are proportional in the sense that the exact relative sizes of the negative and positive wealth

Let us start with examining the outer parameter regions where the bidform is irrelevant. In region I, defined by $(y^R - y^I) > 2 \cdot z^I$ (or, equivalently $y^R > y^I + 2 \cdot z^I$), we can immediately infer that the rival management team is so superior in terms of security benefits that it will win both a partial-bid contest as well as one with nonpartial bids. Moreover, the tender offer price is, under both bidforms, determined by the free rider mechanism; p(B) equals the security benefits of the winner. Accordingly, the shareholder wealth effect is zero. By analogy, the same results apply in region VIII, where the incumbent management team will win both types of contests. It is also straightforward to infer that for partial bids, I and VIII are the only two regions where the free rider mechanism determines the tender offer price. However, with nonpartial bids, this mechanism will also set the price in regions II and VII.

Figure 1



The figure shows the wealth effect, ΔV, as a function of difference in security benefits $(y^I - y^R)$. The dark-shaded area represents positive wealth effects of a prohibition of partial bids, and the light-shaded areas represent negative wealth effects.

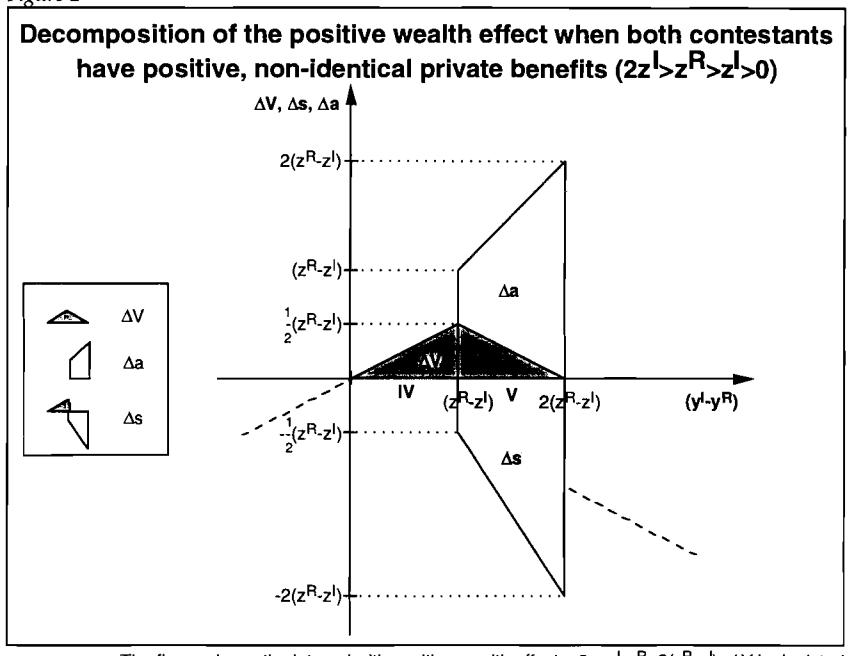
Turning our attention to the regions where the bidform *does* affect shareholder wealth, we observe some conspicuous features of Figure 1. For example, the size of the area with positive wealth effects (the dark-shaded triangle) is relatively small compared to the size of area with negative effects (the light-shaded areas). The positive segment is also confined to a comparatively narrow interval of parameter values. In particular, unless the difference in private benefits $(z^R - z^I)$ is significant, there is no positive shareholder wealth effect. To grasp some economic intuition behind these

---

effects of implementation of the MBR for specific numbers on private benefits that satisfy the general inequalities stated are presented.

results, we will, successively, examine the regions with positive and negative effects in more detail.

Figure 2



The figure shows the interval with positive wealth effects, $0<y^I-y^R<2(z^R-z^I)$. ΔV is depicted as a function of the difference in security benefits (y^I-y^R), as well as its decomposition into the surplus extraction component, Δs, and the allocative component Δa. In region IV, ΔV=Δs.

Figure 2 displays a detailed picture of the region of positive wealth effects. Let us start with parameter region V defined by $0 < (z^R-z^I) < (y^I-y^R) < 2\cdot(z^R-z^I)$ which yields $0 < (y^R + z^R) < (y^I + z^I)$ and $0 < (y^I + 2\cdot z^I) < (y^R + 2\cdot z^R)$. The two last inequalities suggest that the incumbent management team, which here is also more efficient in terms of security benefits, will win a nonpartial-bid contest while the rival management assumes control if partial bids are allowed. As is evident from the decomposition, it is only in this region of parameter values where the choice of bidform makes a difference in allocative terms; $\Delta a = (y^I - y^R) > 0$. Accordingly, by prohibiting partial bids a Mandatory Bid Rule promotes efficiency by preventing the less efficient management team from taking control. Furthermore, the allocational gain from prohibiting partial bids outweighs the loss in surplus extraction: $\Delta a > |\Delta s|$. In particular, the surplus extraction component is $\Delta s = {}^3/_2\cdot(y^I - y^R) + z^R - z^I$, which is negative since partial bids extract more of the winner's surplus than nonpartial ones for this parameter region, and $\Delta V \equiv \Delta s + \Delta a = \frac{1}{2}\cdot(y^I - y^R) + (z^R - z^I) > 0$. Since region V is the only constellation of parameter values

where the allocative component is nonzero, it is also the only situation where there exists a trade-off between the two components of the shareholder wealth effect. However, facing the discrete choice of whether to allow partial bids or not, the allocative component dominates over the surplus extraction component.

Turning to region IV, where the shareholder wealth effect is also positive, the less efficient (in terms of security benefits) management team wins the control contest irrespective of whether partial bids are allowed or not.[15] Hence, an adoption of the MBR will not prevent a less efficient management from seizing or retaining control. In particular, the shareholder wealth effect is positive and equals the surplus extraction component (the allocative one is zero), i.e., nonpartial bids extract more of the winner's private benefits than do partial ones. This may seem counter-intuitive using the general insight stressed by Grossman and Hart (1988), for example, that partial bids extract more of the bidder's private benefits than do nonpartial ones since they put a higher relative weight on private benefits. This is, however, not true if the winner of both bidding contests is the less efficient party in terms of security benefits. In that case, there exists an additional counteracting gain in surplus extraction potential. Since the winner has to pay at least the losing party's security benefits, the winner pays for the efficiency gap out of her private benefits. Because nonpartial bids put relatively more weight on security benefits, this positive gain in surplus extraction will be larger for such bids than for partial ones.[16] Hence, nonpartial bids extract more of the winner's private benefits when she wins either type of bidding contest but is less efficient in terms of security benefits.

The two regions of parameter values in Figure 1 that generate a negative shareholder wealth effect are characterized by the facts that (i) the same management team wins irrespective of whether partial bids are allowed or not, implying that $\Delta V = \Delta s$ since the allocative component is zero $\Delta a = 0$, and that (ii) the victorious team is also the more efficient one in terms

---

15 The defining inequalities for this parameter region are $0 < (y^I - y^R) < (z^R - z^I)$, or equivalently, $y^I > y^R$; $z^R > z^I$ and $y^R + z^R > y^I + z^I$. While the rival is less efficient in terms of security benefits, she will win regardless of bidform because of her larger private benefits.

16 The shareholder wealth effect for region IV is $\Delta V = \Delta s = V(N) - V(P) = y^I + z^I - \frac{1}{2}\cdot(y^I + 2\cdot z^I - y^R) = \frac{1}{2}\cdot(y^I - y^R)$ which can be rewritten as $\frac{1}{2}\cdot[(y^I + z^I) - (y^I + 2\cdot z^I)] + \frac{1}{2}\cdot[(y^I + z^I) - y^R]$. The first term gauges a loss in surplus extraction potential from a prohibition of partial bids. The second term captures a gain resulting from the fact that the rival is less efficient in terms of security benefit while the incumbent has positive private benefits. For these particular parameter configurations, the latter term dominates, hence yielding a positive total shareholder wealth effect. See Appendix A.

of security benefits.[17] The latter condition implies that the winner does not have to use part of her private benefits to cover a gap in efficiency relative to her opponent. Unlike the situation in region IV, nonpartial bids do not extract enough private benefits from the winner to counteract the generic loss associated with a prohibition of partial bids. Because the more efficient team wins either type of bidding contest, the decision of whether to adopt the MBR or not is equivalent to focusing exclusively on the surplus extraction potential of the two bidforms. Since a partial bid extracts more of the surplus by assigning a higher relative weight to private benefits, the shareholders gain if they do not amend the corporate charter with the MBR.[18]

The insights from the analysis can be summarized in a general design rule that we call the relative-similarity-in-willingness-to-pay rule. This is stated formally in Proposition 1 below.

Proposition 1. The relative-similarity-in-willingness-to-pay rule
The shareholders' post-takeover wealth is maximized by adopting MBR if and only if $0 < (y^I - y^R) < 2 \cdot (z^R - z^I)$ *or* $0 < (y^R - y^I) < 2 \cdot (z^I - z^R)$.

Appendix B reports the formal derivation of Proposition 1. The simple but very suggestive intuition supporting this design rule is the following idea. Consider the analogy with two bidders competing over any kind of package consisting of two different types of goods. The seller can increase the price of the package by choosing the relative proportion of the two goods so that the most weight is put on the good for which the contestants' willingness to pay is more similar. In this way, the competition over the package is intensified. By analogy, the choice of bidform serves to put relative weights on security and private benefits, respectively. Specifically, allowing partial bids maximizes the relative weight on private benefits, while nonpartial bids maximizes the relative weight on security benefits. The relative-similarity-in-willingness-to-pay rule simply implies that partial bids should be allowed when bidders value the private benefits more similarly than they do security benefits, and that the MBR should be adopted when the opposite is true.

---

[17] One difference between the two areas with negative shareholder wealth effect is that, in regions II and III, the winner is superior both in terms of security and private benefits, while in regions VI and VII, her only comparative advantage lies in generation of security benefits. Using the terminology of Aghion and Bolton (1992), the parameter configurations are *comonotonic* in the former situation, while they are not in the latter.

[18] The particular shape of the negative wealth-effect curve stems from the fact that in regions II and VII, only partial tender offer prices are set by competition while nonpartial-bid prices are determined by free riding. However, in regions III and VI competition settles the resulting prices under both bidforms, and this accounts for the fact that the shareholder wealth effect becomes less negative.

Following this simple rule serves to make competition as fierce as possible, which will allow target shareholders to extract as much as possible of the ultimate acquirer's willingness to pay. The inequalities in Proposition 1 formalize this intuition. (i) If the positive difference in security benefits between the two contestants, $(y^I - y^R)$, is smaller than twice the reversed positive discrepancy in private benefits, $2 \cdot (z^R - z^I)$, their willingness to pay is relatively more equal for security benefits than for private ones. If this applies, the shareholders are better off with the MBR, because this assigns the highest relative weight on security benefits. (ii) If the inequalities are violated, the two parties have relative more similar willingness to pay for private benefits than for security benefits. Then partial bids should be allowed because they consign the maximal relative significance on the private benefits.

An alternative formulation of the relative-similarity-of-willingness-to-pay rule uses the terminology of allocative and surplus extraction components.

Proposition 1'.

The shareholders' post-takeover wealth is maximized by adoption of the MBR if either

(i) the surplus extraction component (Δs) is strictly positive, or

(ii) the allocative component (Δa) is strictly positive.

The alternative formulation of the relative-similarity-in-willingness-to-pay rule emphasizes that the MBR is in the interest of the target shareholders in two particular situations. First, when the winner is less efficient in generating security benefits, but a nonpartial bid extracts more of the winner's surplus than a partial bid. Second, when a nonpartial bid ensures that a strictly more efficient party is installed than in a partial bid.

The result has some interesting implications. Even when adoption of the MBR is in the interest of the target shareholders, it does not exclude a less efficient management team from winning the takeover contest [case (*i*)]. However, the MBR may also eliminate outcomes where the post-takeover value of nontendered shares decreases as a result of a less efficient management establishing control [case (*ii*)].

The unfairness experienced by shareholders who are unable to sell all their shares without a loss in a successful partial tender offer is in fact the driving force behind the right-to-sell principle inherent in the MBR. But enactment of the MBR is only aligned with shareholder interests for a limited set of parametric configurations. If the parameter values do not satisfy the inequalities of Proposition 1, the MBR will inflict wealth losses due less extraction of the winner's surplus.

For the decision on whether to adopt the MBR or not, the relative-similarity-in willingness-to-pay rule constitutes, by analogy, a generalization of Grossman-Hart's specific analysis of the security-voting-structure problem to the more prevalent configuration with two-sided private benefits. In particular, the rule is operationalized since it informs us precisely when a prohibition of partial bids (or, prohibition of differential voting structures) is in the interest of the target shareholders, and when it is not.

It has been illustrated that the discrete-choice problem, whether to allow or disallow partial bids, can be seen as a package-design problem, where the relative amounts of security and private benefits in the package are chosen so as to extract as much total value from the ultimate buyer as possible. Instead of using the specific concepts of surplus extraction and allocative components, the design rule is predicated on the much more fundamental economic concept of competition. Let us further illustrate the usefulness of the relative-similarity-in-willingness-to-pay rule by analyzing the two special cases of one-sided and identical private benefits.

3.2 *One-sided private benefits*

Suppose that the rival is the only contestant with positive private benefits.[19] A characteristic attribute of this situation is that, while the rival's willingness to pay is affected by the choice of bidform, the incumbent's is not: clearly, the incumbent's willingness to pay will equal her security benefits irrespective of bidform. Because of her private benefits, the rival may establish control of the corporation through an offer that generates less security benefits than the incumbent team. By assigning more weight to private benefits, this opportunity is more prevalent if bids are partial. How does implementation of the MBR affect the shareholders' wealth when only one contestant has private benefits?

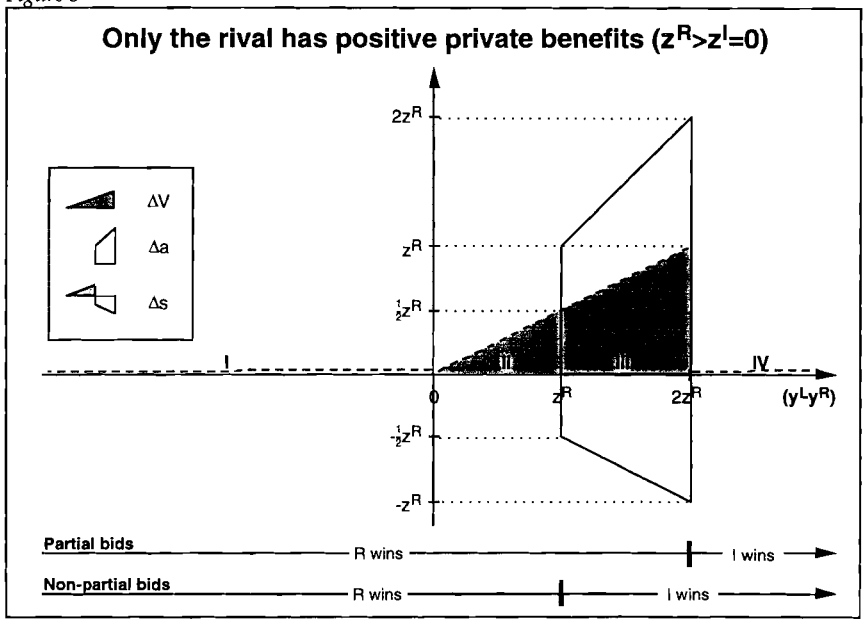
Figure 3 shows that when only one of the contestants has private benefits of control, the MBR cannot have a negative impact on the shareholders' wealth ($\Delta V \geq 0$). This is consistent with the relative-similarity-in-willingness-to-pay rule. The design rule predicts, for the instance of one-sided private benefits, that the MBR is in the shareholders' interest if and only if $0 < (y^I - y^R) < 2 \cdot z^R$. This interval is, *ceteris paribus*, larger than the

---

[19] We assume that symmetric information applies and that the outside rival only challenges the incumbent management if she is certain to win. The analysis does not depend on whether it is the incumbent or the outside rival who is endowed with private benefits; the results are symmetrical, however, with somewhat different economic interpretations. Alternatively, one might assume that information is asymmetric and that both contestants are outside rivals.

corresponding region for two–sided private benefits, $(0, 2\cdot(z^R - z^I))$. Outside this interval (parameter regions I and IV in the figure), the shareholder wealth effect is zero because either the rival or the incumbent management team wins, and the tender offer price for both partial and nonpartial bids are determined by the free rider mechanism.

Figure 3



The figure shows the wealth effect, ΔV, as a function of the difference in security benefits $(y^I - y^R)$, as well as its decomposition into the surplus extraction component, Δs, and the allocative component Δa. In region II, ΔV=Δs.

With one-sided private benefits, the difference in willingness to pay over private benefits between the two contestants is maximized. Consequently, since their willingness to pay is relatively more similar over security benefits, the target shareholders exploit this fact by only allowing nonpartial bids, which intensifies competition over security benefits, and ultimately maximizes surplus extraction from the winner. In the special case with one-sided private benefits, the MBR is perfectly aligned with the shareholders' interests. Hence, this particular parameter configuration provides the strongest case in favor of the MBR.

Looking somewhat more closely at parameter region II in figure 3, and comparing it with the result of region IV in figure 2 for two-sided private benefits, we find that they are analogous. The allocative component is zero in both cases since the less efficient management team wins both a partial and nonpartial contest. Moreover, the tender offer price is determined

by the incumbent's security benefit under both bidforms; her maximum willingness to pay under one-sided private benefits. However, nonpartial bids extract more of the winner's private benefits. Specifically, with nonpartial bids they are able to sell all their shares at their status quo value, but encounter a loss equal to the difference in security benefits between the two teams on half of the shares in partial bids. Hence, a MBR increases the surplus extraction by $\Delta s = \frac{1}{2}(y^I - y^R) > 0$.[20]

Turning to parameter region III in figure 3 and comparing it to the results for two-sided benefits in region V in figure 2, we observe that in both cases there exists a trade-off between the allocational and surplus extraction components, but that the allocational gain of nonpartial bids over partial ones exceeds the loss in surplus extraction capability. The pivotal effect of the MBR is a gain in efficiency in terms of security benefits. The more efficient team wins the nonpartial bidding contest, while the less efficient one is victorious in a partial one. This reversal of winners is gauged by the positive allocative component: $\Delta a = y^I - y^R > 0$. However, since the incumbent management team is assumed to lack private benefits, and because the tender offer price in the partial-bid contest equals the incumbent's security benefits, the loss in surplus extraction is less than in the case with two-sided private benefits. Hence, we observe a larger, positive shareholder wealth effect in the situation with one-sided private benefits than in the two-sided case.[21]

For the special case with one-sided private benefits, the logical affinity between the Grossman-Hart analysis with respect to security voting structure and the present discussion of the MBR is apparent. Grossman and Hart distinguish between the allocative and surplus-extraction role of a security voting structure and show that one share/one vote is the optimal one since the allocative dimension is relatively more important when only one contestant enjoys private benefits when in control. Although expressed is somewhat different terminology, the basic economic mechanism operational in the two problems is the same. Specifically, in both design problems, the shareholders gain more by selecting the specific voting structure, namely one share/one vote, or bidform, namely nonpartial bids, that distributes as little relative weight as possible to private benefits. In the terminology of Grossman and Hart, one share/one vote minimizes the *surplus extraction role.* A refined statement may be that the shareholders benefit from one share/one

---

[20] $\Delta s \equiv s(N) - s(P) \equiv [p(N)-y^{W(N)}]-\frac{1}{2}\cdot[p(P)-y^{W(P)}]$, and $p(N) = p(P) = y^I$ in this case.

[21] In particular, the surplus extraction component is $\Delta s = -\frac{1}{2}\cdot(y^I - y^R) < 0$. Since the allocational component is $(y^I - y^R)$, the shareholder wealth effect is $\Delta V = \Delta s + \Delta a = \frac{1}{2}\cdot(y^I - y^R) > 0$.

vote (and nonpartial bids) by letting the takeover contestants compete over packages of voting and security rights with equal weights because this design makes competition more intense over security benefits. This, in turn, emanates from the fact that the competitors' relative similarity in willingness to pay is higher over security benefits than over private benefits in the special case with one-sided private benefits. Accordingly, the general design rule derived in this paper applies by analogy to the Grossman-Hart security voting-structure problem.[22]

3.3 *Identical private benefits*

Finally, let us analyze the special configuration where the two contestants have private benefits of identical magnitude or $z^I = z^R = z > 0$. This implies that competition between the two is not distorted by disparate private benefits; independently of bidform, the more efficient contestant always wins. Because the choice of bidform does not affect in whose hands the control will rest, the allocative component equals zero ($\Delta a = 0$). The shareholder wealth effect is therefore equivalent to the difference in surplus extraction capability between the two bidform; $\Delta V = \Delta s$.[23] Figure 2 illustrates the outcomes for all possible values of $y^I - y^R$.[24]

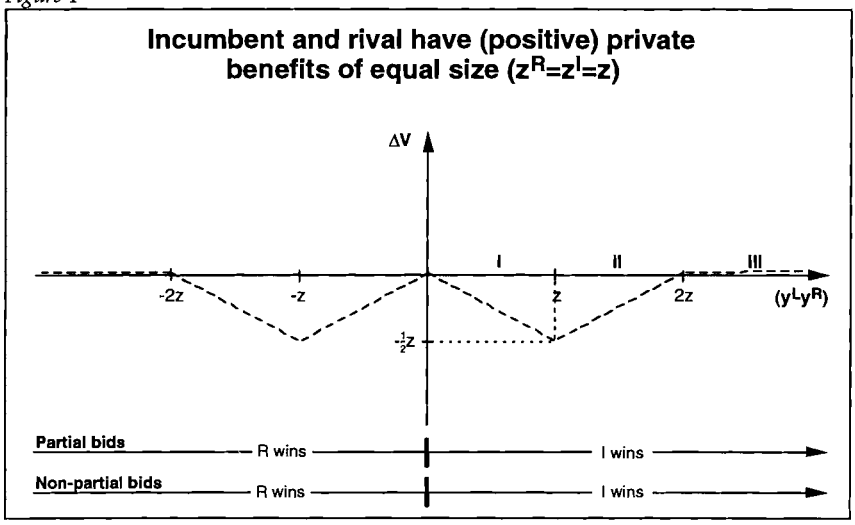
---

[22] However, a difference between the two analyses may be noticed. Although the shareholder wealth effect in regions II and III in figure 3, $\Delta V = \frac{1}{2}\cdot(y^I - y^R)$, appears to be pure allocative effect, it actually reflects the positive difference in surplus extraction potential between the two bidforms as the winner is the same in both types of bids. By analogy, and using the terminology of Grossman and Hart, this implies that the *allocative role* is not uniquely associated with one share/one vote (nonpartial bid) under one-sided private benefits. Accordingly, the trade-off inherent in the choice of voting structure problem (whether to implement the MBR or not) can only be described in terms of the allocative and surplus-extraction roles in parameter region III.

[23] In distinction to the previous case, we here assume that the information about parameter values is asymmetrically distributed in that the outside rival may challenge the incumbent team even if she eventually loses as she does not know beforehand how large the incumbent's private benefits are. We maintain this somewhat more realistic information assumption for the remainder of the paper.

[24] Due to the perfect symmetry, we confine our analysis to the three regions in the positive segment of the horizontal axis. Since $y^I \geq y^R$, the incumbent will win in the entire segment. In region I ($y^I > y^R$ and $y^R + z > y^I$), the surplus extraction component as well as the entire wealth effect equals $\Delta s = \Delta V = -\frac{1}{2}\cdot(y^I - y^R)$, which is negative because, by the definition of the region, $y^I > y^R$. Furthermore, in region II, ($y^I > y^R + z$ and $y^I < y^R + 2z$), the shareholder wealth effect is $\Delta V = \Delta s = \frac{1}{2}\cdot(y^I - y^R) - z$. By the definition of the interval we know that $y^R + 2\cdot z > y^I$ which implies a negative ΔV. Accordingly, the shareholders are worse off also in this region if the MBR applies. In region III, the choice of bidform is irrelevant since the free-rider option resolves the equilibrium price independently of bidform which implies that the surplus extraction effect is zero.

Figure 4



The figure shows the wealth effect, ΔV, as a function of the difference in security benefits (y^I-y^R). The shaded area represents negative wealth effects of a prohibition of partial bids and equals the surplus extraction component, Δs (since Δa = 0).

Why does enactment of the MBR cause a nonpositive shareholder wealth effect for this special set of parameter values? A casual conjecture based on the fact that identical private benefits neutralize each other might be that differences in security benefits become relatively more important, implying that nonpartial bids by assigning relatively less weight to private benefits should be more favorable to the target shareholders than partial bids. But, as demonstrated, the opposite conclusion applies. The result that implementation of the MBR is not in the shareholders' interest when private benefits are of identical size follows from a direct application of the relative-similarity-in-willingness-to-pay rule. If private benefits are identical, it follows that partial bids extract more of the winner's surplus because this bidform maximizes competition over private benefits by assigning the highest possible relative weight on such benefits. Hence, in this case the target shareholders will never deliberately amend the corporate charter with the MBR.

We may formally summarize the results of our analysis of the two special cases of one-sided and identical private benefits cases in the following statement, which is an application of our general design principle:

Proposition 2.

(i) The presence of one-sided private benefits is a globally sufficient condition for a nonnegative shareholder wealth effect of adoption of the MBR, while

(ii) the presence of identical private benefits is a globally sufficient condition for a nonpositive effect.

It is the distortion caused by differing private benefits that facilitates positive wealth effects. In economic terms, the mechanism of competition explains this result. For the configuration in which only one contestant has significant private benefits, where the distortion is a large as possible, the nonpartial bidform serves the interest of the shareholders best by making the competition more intense over security benefits. In the configuration where both have significant private benefits of equal size, the competitive pressure is more fierce over private benefits. Value-maximizing shareholders exploit this fact by allowing partial bids.

4. *The optimal bidform*

The aim of previous sections is to study the wealth effects of imposing a specific regulatory device, the Mandatory Bid Rule. As a consequence of this objective, the selection of bidform is analyzed as a binary choice between two polarities, namely the prohibition of partial bids *versus* imposing no restrictions on the use of partial bids. However, in principle, there is no reason why the choice of bidform should be confined to a discrete choice between two extremes. It may be the case that the optimal fraction that a potential bidder should be required to offer to purchase is neither 100%, nor the 50% threshold for gaining control, but rather something inbetween. Formally, this more general maximization problem can be stated as follows.

$$\underset{\phi\in[1/2,\,1]}{\text{Max}}\; V(\phi;\cdot) = \phi\cdot p(\phi) + (1-\phi)\cdot y^W, \tag{4}$$

where $p(\phi) = \text{Max}\,[y^L + z^L/\phi,\, y^W]$, where $y^W + z^W/\phi > y^L + z^L/\phi$; and $W, L \in \{I, R\}$. The post-takeover value of the firm (V) is a weighted average of the equilibrium tender offer price for a unit of the sold shares, $p(\phi)$, and the value of a unit of the retained shares under the winner's management, y^W, where the weights are given by the tendered fraction, ϕ, and the retained fraction, $(1-\phi)$. Let θ denote the ratio of the differences in private benefits to the reversed difference in security benefits, that is, $\theta \equiv \frac{z^I - z^R}{y^R - y^I}$. Moreover, let ξ define the ratio of the loser's private benefits to the difference between the

winner's and the loser's security benefits, i.e., $\xi \equiv \frac{z^L}{y^W - y^L}$. Lastly, let e be a very small, positive number. We have the following solution to the maximization problem.

Proposition 3. *The optimal bid form is*

$$\phi^* = \begin{cases} 0.5 & \textit{iff} \quad \theta \notin (0.5,\ 1),\ \xi \notin (0,\ 0.5),\ \textit{and} \quad y^W > y^L, & (a) \\ \theta + e & \textit{iff} \quad \theta \in (0.5,\ 1), & (b) \\ 1 & \textit{iff} \quad \theta \notin (0.5,\ 1),\ \xi \notin (0,\ 0.5),\ \textit{and} \quad y^L > y^W. & (c) \end{cases}$$

In all other parameter configurations, the choice of ϕ *is irrelevant.* (*d*)

Proof: See Appendix B.

Proposition 3 is illustrated in Figure 5, which displays the optimal ϕ as a function of the difference in security benefits, $(y^I - y^R)$. The graph has a similar structure to previous figures, with the exception that the vertical axis gauges levels of ϕ instead of shareholder wealth effects.

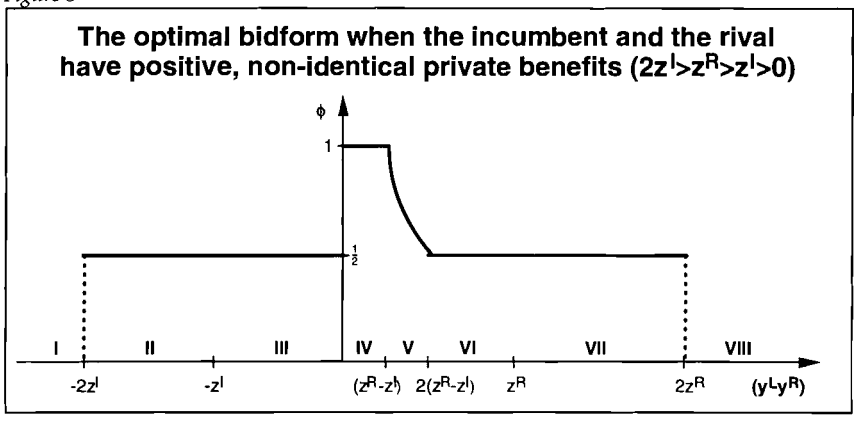
Case (*d*) reflects the situation where the winner is so superior in terms of security benefits that the choice of ϕ does not affect who wins the control contest and the free-rider price function, $p = y^W$, automatically determines the takeover price. Obviously, in this situation, the choice of ϕ is irrelevant to shareholder wealth. This is illustrated in regions I and VIII of Figure 5.

Cases (*a*) and (*c*) represent the situation in which the winner of the control contest is not affected by the choice of ϕ, while the takeover price is. Specifically, the takeover price is given by the competitive mechanism, $p(\phi) = y^L + z^L/\phi$. It is clear that the shareholders' wealth is solely a matter of extracting as much surplus as possible from the winner. Plugging this price function into the maximization problem (4), it is easily inferred that the shareholders' surplus extraction (or conversely, the winner's capital loss) is maximized by setting ϕ as low as possible whenever $y^W > y^L$, and as high as possible whenever the opposite relationship applies. Hence, when $y^W > y^L$, the optimal ϕ is 0.5 [case (*a*)]. This is illustrated in regions II, III, VI, and VII. Conversely, when $y^W < y^L$, the optimal ϕ is 1 [case (*c*)]. This is depicted in region II.

Lastly, case (*b*) reflects the situation where both the winner of the control contest, and the equilibrium takeover price depend on the choice of ϕ. In this situation, the maximization problem also involves an allocative dimension. The specific choice is between a high security benefit/low-private-benefit party and a high private benefit/low-security-benefit party. The outcome of the control contest is flipped over in favor of the high

security benefit/low-private-benefit party by setting ϕ above the pivotal point θ, because an increase in ϕ reduces the weight on private benefits in the willingness to pay, making security benefits relatively more important. Conversely, the low security benefit/high-private-benefit party is chosen by setting ϕ below θ. Accordingly, we have a tradeoff between the allocative advantage from choosing the high-security-benefit party and the corresponding advantage in surplus extraction by choosing the high-private-benefit party. However, the allocative gain from choosing the high-security-benefit party exceeds the gain in surplus extraction from choosing the high benefit party. By a suitable choice of bid (ϕ), the target shareholders may extract all value from the winner: the sum of her security benefits and private benefits. Putting these facts together, we conclude that the best choice of bidform is the one that (i) guarantees that the more efficient party wins, and, at the same time, (ii) extracts as much surplus as possible from him, but still makes the takeover attempt profitable for him. Since a selection of a ϕ just above the threshold level θ maximizes surplus extraction under the restriction that the more efficient team wins control, this will be the optimal choice. Hence, the allocative gain in terms of larger security benefits is greater than the loss in surplus extraction capability associated with a lower private benefit. Case (b) is illustrated in region V of Figure 5. Here, the ϕ^*-curve is convex since the pivotal function, $\theta = (z^R - z^I)/(y^I - y^R)$, is a convex function of the synergy gain. The most conspicuous feature of the optimal solution is its similarity to the discrete-choice solution. The two extreme bidforms- partial bids for no more than the control threshold and nonpartial bids for all outstanding shares– dominate for a large set of parameters, while intermediate solutions are optimal only for a comparatively small subset of parameter values. In addition, any value of ϕ above the optimal curve in region V will be preferable to any value below it. In this sense, the discrete choice problem can serve as a reasonable approximation of the more general problem.

Figure 5



$0.5 \leq \phi \leq 1$ is a measure of bidform: $\phi=1$ is a non-partial bid for all shares; $\phi=0.5$ denotes a partial bid for half of the equity; and values in between are partial bids for a percentage between 50% and 100% of the outstanding shares. $1/\phi$ is the weight on private benefits in the bidform. In the two other regions (I and VIII), the choice of bidform is irrelevant.

Notably it is in the shareholders' interest to promote efficiency when they have the choice. This would suggest that any general policy directive or law forcing them to do so is uncalled for. The basic economic intuition that nonpartial bids are optimal when the contestants have relatively more similar willingness to pay over security benefits, and that partial bids are optimal when this applies to private benefits, epitomize the pertinent economic content of Proposition 3. Accordingly, even if the relative-similarity-in-willingness-to-pay rule only applies in a strict sense for the discrete choice of bidforms, it also provides a very good approximation for the more general case of optimal choice of bidforms.

From a policy perspective our results are perhaps less relevant since the optimal choice of bidform is allowed to vary with the parameter values for security and private benefits. Therefore, the analysis is likely to provide the most useful guidance if one of the two special cases, one-sided private benefits or identical private benefits is believed to be roughly true with a high probability. In that case, Proposition 2 will provide the most relevant information, as it determines that nonpartial bids are uniformly best in the case with one-sided private benefits, and that partial bids are optimal when private benefits are roughly identical. Grossman and Hart argue that former case is the most likely. However, we can also find arguments for the latter case. Because the founder of the firm has relinquished all control, the future contestants will be outsiders. It is therefore not unreasonable to suspect that future rivals would enjoy private control benefits of approximately equal magnitude. This implies that partial bids will be optimal, quite

independently of how large the unknown difference between the incumbent's security benefits and those of a future rival might be.

A rigorous argument must, however, also incorporate the fact that a more efficient extraction of the winner's surplus, will decrease the probability of takeover attempts, as it would render them less profitable for potential contestants. Accordingly, when facing the full ex ante decision of selecting the optimal bidform, the shareholders also have to consider the trade-off between a higher takeover premium if a bidding contest actually occurs and the lower probability of it happening.

5. Policy implications and conclusions

This paper makes two major contributions. First, the formal analysis of if and when a general enactment of the Mandatory Bid Rule is in the interest of the shareholders, fills a gap in the theoretical literature on takeover regulation. By demonstrating that it is only under quite restrictive conditions that the target shareholders actually gain ex post from implementation of the MBR, it exposes the unclear and insufficient motivation behind the rule. In particular, it is not a free option which needs no serious motivation from the regulators. Second, the theoretical contribution of the paper is the generalization of the Grossman and Hart analysis to the prevalent situation with two-sided private benefits. The relative-similarity-in-willingness-to-pay rule gives the precise but intuitively simple answer to when enactment of the MBR is really in the interest of the shareholders.

We also claim that the relative-similarity-in-willingness-to-pay rule applies to a more general set of discrete design problems that utilize the competitive pressure inherent in the Grossman and Hart modeling framework with security and private benefits. For example, appropriately modified, a corresponding generic rule would be operational in the problem of deciding whether to select a one-share/one-vote security voting-structure or a specific dual-class alternative, as in Grossman and Hart (1988), or in the problem of deciding whether to retain all shares or to go public with 50 percent of them, as in Zingales (1995). Although the latter model uses a

bargaining mechanism instead of an auction mechanism, the results are qualitatively very similar to the ones reported in this paper.[25]

The basic insight of this paper is perhaps that the design of packages of rights or benefits will not differ qualitatively from the standard blueprint of economic analysis: in order to extract as much as possible from two competitors, it is optimal to select the solution that utilizes the competitive pressure as efficiently as possible. Due to the economic canon of competition, the basic mechanism at work in these disparate problems has a much more unified structure than is immediately apparent.

What implications from the previous formal analysis are valid when we view the Mandatory Bid Rule from the European policy perspective? The alleged overall aims of the Thirteenth Directive are twofold: (*i*) to create more effective corporate structures in Europe, and (*ii*) to protect the interests of the small stockholders. The potential conflict between these two allocational and distributive objectives are brought forward by our analysis. For example, while enactment of the MBR sometimes promotes efficiency in terms of higher security benefits, it is generally not in the interest of the target shareholders because their post-takeover wealth may, ceteris paribus, be higher without a ban on partial bids. In particular, if the private benefits of the rivals for control are assumed to be roughly of equal size, it becomes very likely that enactment of the MBR does not benefit the target shareholders.

Our analysis of the MBR also illustrates the Policymaker's Dilemma: no single and comprehensive rule like the MBR is the best choice for all corporations and all potential takeover situations. Consequently, the interests of shareholders in a widely held company is better served if the legislators do not regulate the choice of bidform through the MBR but leave it as a discretionary choice to the equityowners in each corporation. In its quest for a level playingfield, the EC Commission seems to have ignored this inherent dilemma of regulation.

In the present analysis, perfect capital markets are assumed. However, with imperfect markets, the MBR may substantially increase the acquiring costs for a potential bidder by effectively raising the control limit to 100%, and thereby causing fewer takeover attempts. In particular, the increased cost in the form of higher interest expenses and greater exposure to risk can make it unprofitable for a bidder, who has identified potential efficiency-improvements, to acquire control, and to replace the management and

---

[25] For example, if the discrete choice is between retaining all shares or only fifty percent, the parametric restriction in Proposition 1 (the relative-similarity-of-willingness-to-pay rule) provides the correct policy advice, conditional on the fact that the two parties have equal bargaining power. Some further adjustment is also necessary because of differences in information assumptions. See Bergström and Högfeldt (1993a) for analytical details.

change the production plan. A MBR could possibly also prevent someone from acquiring a substantial position in order to learn more about the company and its development potential before going all the way and acquiring control. Furthermore, the MBR reduces the incentives for anyone outside the company's existing circle of owners from incurring costs for identifying suitable takeover candidates since the cost of a control acquisition increases.

The value of a controlling block can also be high when two companies make investments directly linked to a joint project. If the control limit is increased, and thereby the cost of control, there is a greater risk that the two companies will not invest enough in relation-specific capital and that potential joint profits will be reduced.[26] On the whole, the enactment of a MBR may result in fewer productivity raising acquisitions. It is no coincidence that several US corporate managements have proposed that the MBR should be introduced into their articles of incorporation. The principle serves as a defense against hostile takeovers as it impedes rather than stimulates acquisitions. Accordingly, these more practical arguments support the already critical stance against the MBR that was the result of the theoretical analysis. Specifically, a general enactment of it within the European Union may generate fewer efficiency-raising takeovers, and it is also not generally in the best interest of the target shareholders. Hence, the MBR is likely to be inconsistent with the two explicit objectives of the Thirteenth Council Directive.

---

[26] See Grossman and Hart (1986)

References

Aghion, Philippe and Patrick Bolton, 1992, An incomplete contracts approach to financial contracting, *Review of Economic Studies* 59, 473-494.

Bebchuk, Lucian A., 1985, Toward undistorted choice and equal treatment in corporate takeovers, *Harvard Law Review* 98, 1695-.

Bebchuck, Lucian Arye, 1994, Efficient and inefficient sales of corporate control, *NBER Working Paper* 4788 (National Bureau of Economic Research).

Bergström, Clas and Peter Högfeldt, 1993a, An ex ante analysis of the mandatory bid rule, Department of Finance, (Stockholm School of Economics).

Bergström, Clas and Peter Högfeldt, 1993b, The equal bid principle: An analysis of the Thirteenth council takeover directive of the European Community, *mimeo* (Stockholm School of Economics).

Burkart, Mike, Denis Gromb, and Fausto Panunzi, 1995, Why higher takeover premia protect minority shareholders: Tender offers when dilution is endogenous, *mimeo* (Stockholm School of Economics, M.I.T., Universitá di Pavia).

Commission of the European Communities (eds.), 1990, *Amended proposal for a thirteenth council directive on company law, concerning takeover and other general bids,* COM (90) 416 final SYN 186, Brussels, September 10th 1990.

Farrar, John H., Nigel E. Furey and Brenda M. Hannigan, 1991, *Farrar's company law* 3d ed. (Butterworth & Co. Ltd, London).

Grossman, Sanford J. and Oliver D. Hart, 1986, The costs and benefits of ownership: A theory of vertical and lateral integration, *Journal of Political Economy* 94, 691-719.

Grossman, Sanford J. and Oliver D. Hart, 1988, One share - one vote and the market for corporate control, *Journal of Financial Economics* 20, 175-202.

Harris, Milton and Artur Raviv, Corporate governance: Voting rights and majority rules, Journal of Financial Economics 20, 203-235.

Israel, Ronen, 1991, Capital structure and the market for corporate control: The defensive role of debt financing, *The Journal of Finance* 46.

Jensen, Michael C. and William H. Meckling, 1976, Theory of the firm: Manager behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305-360.

Karpoff, Jonathan M. and Paul H. Malatesta, 1989, The wealth effects of second-generation state takeover legislation, *Journal of Financial Economics* 25, 291-322.

Macey, Jonathan R., 1986, Takeover defense tactics and legal scholarship: Market forces versus the policymaker's dilemma, *Yale Law Journal* 96.

Yarrow, G. K., 1985, Shareholder protection, compulsory acquisition and the efficiency of the takeover process, *Journal of Industrial Economics* 34, 3-16.

Zingales, Luigi, 1995, Block ownership and the decision to go public, *Review of Economic Studies* 62, 425-448.

Appendix A: The shareholder wealth effects

The table displays, for both bidforms, the winner, the loser's maximum willingness to pay (LMWP), the post-takeover value under the winner (PTVW), the equilibrium tender offer price, shareholder wealth, and, ultimately, the shareholder wealth effect and its components for all possible parameter values when both contestants have significant private benefits; $2 \cdot z^I > z^R > z^I > 0$. The defining inequalities are derived from the definition of each region or interval on the axis for $(y^I - y^R)$.

Region	I	II	III	IV	V	VI	VII	VIII
Defining inequalities	$y^R > y^I + 2z^I$	$y^R > y^I + z^I$ $y^I + 2z^I > y^R$ $z^R > z^I$	$y^R > y^I$ $y^I + z^I > y^R$ $z^R > z^I$	$y^I > y^R$ $y^R + z^R > y^I + z^I$ $z^R > z^I$	$y^I > y^R$ $y^I + z^I > y^R + z^R$ $y^R + 2z^R > y^I + 2z^I$	$y^R + z^R > y^I$ $y^I + z^I > y^R + z^R$ $y^I + 2z^I > y^R + 2z^R$	$y^I > y^R + z^R$ $y^R + 2z^R > y^I$ $y^I + 2z^I > y^R + 2z^R$	$y^I > y^R + 2z^R$
Partial bids								
Winner	R	R	R	R	R	I	I	I
LMWP, $y^{L(P)} + 2 \cdot z^{L(P)}$	$y^I + 2z^I$	$y^I + 2z^I$	$y^I + 2z^I$	$y^I + 2z^I$	$y^I + 2z^I$	$y^R + 2z^R$	$y^R + 2z^R$	$y^R + 2z^R$
PTVW, $y^{W(P)}$	y^R	y^R	y^R	y^R	y^R	y^I	y^I	y^I
Tender offer price, $p(P) = \max[y^{L(P)} + 2 \cdot z^{L(P)}, y^{W(P)}]$	y^R	$y^I + 2z^I$	$y^I + 2z^I$	$y^I + 2z^I$	$y^I + 2z^I$	$y^R + 2z^R$	$y^R + 2z^R$	y^I
Shareholder wealth, $V(P) \equiv \frac{1}{2} \cdot [p(P) + y^{W(P)}]$	y^R	$\frac{1}{2} \cdot [y^I + 2z^I + y^R]$	$\frac{1}{2} \cdot [y^I + 2z^I + y^R]$	$\frac{1}{2} \cdot [y^I + 2z^I + y^R]$	$\frac{1}{2} \cdot [y^I + 2z^I + y^R]$	$\frac{1}{2} \cdot [y^I + 2z^R + y^R]$	$\frac{1}{2} \cdot [y^I + 2z^R + y^R]$	y^I
Nonpartial bids								
Winner	R	R	R	R	I	I	I	I
LMWP, $y^{L(N)} + 1 \cdot z^{L(N)}$	$y^I + z^I$	$y^I + z^I$	$y^I + z^I$	$y^I + z^I$	$y^R + z^R$	$y^R + z^R$	$y^R + z^R$	$y^R + z^R$
PTVW, $y^{W(N)}$	y^R	y^R	y^R	y^R	y^I	y^I	y^I	y^I
Shareholder wealth $V(N) \equiv \max[y^{L(N)} + 1 z^{L(N)}, y^{W(N)}]$	y^R	y^R	$y^I + z^I$	$y^I + z^I$	$y^R + z^R$	$y^R + z^R$	y^I	y^I
Shareholder wealth effect								
$\Delta V \equiv V(N) - V(P)$	0	$\frac{1}{2} \cdot [y^R - (y^I + 2z^I)] < 0$	$\frac{1}{2} \cdot [y^I - y^R] < 0$	$\frac{1}{2} \cdot [y^I - y^R] > 0$	$-\frac{1}{2} \cdot [y^I - y^R] + (z^R - z^I) > 0$	$-\frac{1}{2} \cdot [y^I - y^R] < 0$	$\frac{1}{2} \cdot [y^I - y^R - 2z^R] < 0$	0
The Shareholder wealth effect decomposed as $\Delta V \equiv \Delta s + \Delta a$								
$\Delta s \equiv [p(N) - y^{W(N)}] - \frac{1}{2} \cdot [p(P) - y^{W(P)}]$.	0	$\frac{1}{2} \cdot [y^R - (y^I + 2z^I)] < 0$	$\frac{1}{2} \cdot [y^I - y^R] < 0$	$\frac{1}{2} \cdot [y^I - y^R] > 0$	$-3/2(y^I - y^R) + (z^R - z^I)$	$-\frac{1}{2} \cdot [y^I - y^R] < 0$	$\frac{1}{2} \cdot [y^I - y^R - 2z^R] < 0$	0
$\Delta a \equiv y^{W(N)} - y^{W(P)}$	0	0	0	0	$y^I - y^R > 0$	0	0	

Appendix B

Proofs

Lemma 1:
$\Delta a > 0$ if and only if
$0 < (z^{L(N)} - z^{W(N)}) < (y^{W(N)} - y^{L(N)}) < 2\cdot(z^{L(N)} - z^{W(N)})$,
where L(N)=W(P),

In terms of parameter values, an equivalent statement is that the allocative component is strictly positive if and only if either
$0 < (z^I - z^R) < (y^R - y^I) < 2\cdot(z^I - z^R)$, or $0 < (z^R - z^I) < (y^I - y^R) < 2\cdot(z^R - z^I)$.

Proof: From the definition of the allocative component, $\Delta a \equiv y^{W(N)} - y^{W(P)}$, we infer that this is nonzero if and only if there are different winners in a partial-bid contest compared to a nonpartial-bid contest: $W(N) \neq W(P)$ and $y^{W(N)} \neq y^{W(P)}$. From the definition of the control contest we have that

$$y^{W(N)} + z^{W(N)} > y^{L(N)} + z^{L(N)}, \tag{B1}$$

and

$$y^{W(P)} + 2\cdot z^{W(P)} > y^{L(P)} + 2\cdot z^{L(P)}. \tag{B2}$$

Combining these two inequalities and using the fact that a reversal implies that $L(N) = W(P)$ and $L(P) = W(N)$ we have that

$$z^{L(N)} - z^{W(N)} < y^{W(N)} - y^{L(N)} < 2\cdot(z^{L(N)} - z^{W(N)}). \tag{B3}$$

The fact that $z^{L(N)} - z^{W(N)} < 2\cdot(z^{L(N)} - z^{W(N)})$ in (B3) implies that $z^{L(N)} - z^{W(N)} > 0$. Furthermore, since $y^{W(N)} - y^{L(N)} > z^{L(N)} - z^{W(N)}$, we must have that $y^{W(N)} - y^{L(N)} > 0$, where $y^{W(N)} - y^{L(N)} = y^{W(N)} - y^{W(P)} = \Delta a$. Hence, $z^{L(N)} - z^{W(N)} < y^{W(N)} - y^{L(N)} < 2\cdot z^{L(N)} - z^{W(N)}$ is a necessary and sufficient condition for a positive allocative component. Using the indices *I* and *R* for the two contestants in inequality (B1) and (B2) reproduces this result in terms of parameter values. *QED.*

If the inequalities of Lemma 1 do not hold, the same party will win in a partial-bid as well as in a nonpartial-bid contest. Hence, the allocative component equals zero for all parameter combinations not belonging to the interval in Lemma 1. We can state the following corollary:

Corollary 1:
If Δa is not positive, it is zero.

Lemma 2:
$\Delta s > 0$ if and only if $0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)})$ where $W(N)=W(P)$.

Since $z^{W(N)} > z^{L(N)}$, the inequalities state that the same party will win regardless of bidform, and that the winner is less efficient in terms of security benefits than the loser; $y^{L(N)} > y^{W(N)}$. An equivalent statement in terms of the parameter values is that the surplus extraction component is positive if and only if
either $0 < y^R - y^I < z^I - z^R$ or $0 < y^I - y^R < z^R - z^I$.

Proof: (Necessity) From the definition of the surplus extraction component, $\Delta s \equiv s(N) - s(P) \equiv [p(N) - y^{W(N)}] - \frac{1}{2}\cdot[p(P) - y^{W(P)}]$. Hence, $\Delta s > 0$ is equivlent to

$$2\cdot[p(N) - y^{W(N)}] > [p(P) - y^{W(P)}]. \tag{B4}$$

Since the price in a partial bid contest, p(P), equals or surpasses the free-rider value, $y^{W(P)}$, the inequality in (B4) will be satisfied only if $p(N) > y^{W(N)}$, that is, if the competitive mechanism determines the tender offer price in a nonpartial-bid contest. This leads us to two possible subcases: either (a) the same party wins both the nonpartial-bid and partial-bid contests, or (b) there is a reversal of winners.

(a) The same party wins under both bidforms
From the definition of the tender offer price in the nonpartial contest, $p(N) \equiv \max[y^{L(N)} + 1\cdot z^{L(N)}, y^{W(N)}]$, and using the fact that this is determined by the competitive mechanism, we deduce that $(y^{L(N)} + 1\cdot z^{L(N)}) > y^{W(N)}$. Furthermore, if the same contestant also wins the partial contest (no reversal), it follows from the previous inequality that the competitive mechanism also settles the tender offer price for partial bids. Because both p(N) and p(P) are determined by the competitive mechanism, and there is no reversal of winners [L(N) = L(P) and W(N) = W(P)], the inequality (B4) can be rewritten as $2\cdot(y^{L(N)} + 1\cdot z^{L(N)} - y^{W(N)}) > (y^{L(N)} + 2\cdot z^{L(N)} - y^{W(N)})$, which simplifies to

$$y^{L(N)} > y^{W(N)}. \tag{B5}$$

This in turn implies that the less efficient party wins both the partial and nonpartial contests. Hence, in terms of willingness to pay, two conditions must be satisfied:

$$(y^{W(N)} + z^{W(N)}) > (y^{L(N)} + z^{L(N)}), \text{ and} \tag{B6}$$

$$(y^{W(N)} + 2\cdot z^{W(N)}) > (y^{L(N)} + 2\cdot z^{L(N)}). \tag{B7}$$

Jointly, inequalities (B5), (B6) and (B7) imply
$0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)})$ and $0 < (y^{L(N)} - y^{W(N)}) < 2\cdot(z^{W(N)} - z^{L(N)})$.

Because the interval in the first set of inequalities is a subset of the latter set, we have derived the conditions of the necessity part of the lemma for the case with no reversal of winners. Substitution of indexes R and I for the winners generate the reminder of the claim.

(b) Reversal of winners:
Returning to inequality (B4) and using the fact that the competitive mechanism determines the nonpartial-bid tender offer price and that a reversal implies L(N) = W(P) and L(P) = W(N), we have

$$2\cdot(y^{L(N)} + 1\cdot z^{L(N)} - y^{W(N)}) > \text{Max}[y^{W(N)} + 2\cdot z^{W(N)} - y^{L(N)}, 0],$$

implying that $2\cdot(y^{L(N)} + z^{L(N)} - y^{W(N)}) > y^{W(N)} + 2\cdot z^{W(N)} - y^{L(N)}$, which simplifies to

$$(z^{L(N)} - z^{W(N)}) > (3/2)\cdot(y^{W(N)} - y^{L(N)}) > 0.^1 \qquad \text{(B8)}$$

Since there is a reversal of winners, we know from Lemma 1 that $y^{W(N)} > y^{L(N)}$, hence the positive RHS of (B8). However, from Lemma 1 we also know that in terms of the contestants' willingness to pay, the following restrictions must be satisfied:

$$(y^{W(N)} - y^{L(N)}) > (z^{L(N)} - z^{W(N)}) > 0, \qquad \text{(B9)}$$

which is inconsistent with condition (B8). Hence, $\Delta s > 0$ is inconsistent with a reversal. Consequently, the necessity part of the claim is demonstrated.

(Sufficiency) From the inequalities $0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)})$ where W(N)=W(P), we deduce that $y^{L(N)} > y^{W(N)}$; $z^{W(N)} > z^{L(N)}$; and $(y^{W(N)} + (z^{W(N)}) > (y^{L(N)} + z^{L(N)})$, that is, the less efficient competitor wins even the nonpartial-bid contest because of her relatively larger private benefits. However, since partial bids put a double weight on private benefits, she also wins the partial-bid contest. Furthermore, since $y^{L(N)} > y^{W(N)}$, the competitive mechanism determines the tender offer price for both partial and nonpartial bids. Using these facts, the surplus extraction component can after substitution be written as

$$[y^{L(N)} + z^{L(N)} - y^{W(N)}] - \tfrac{1}{2}\cdot[y^{L(N)} + 2\cdot z^{L(N)} - y^{W(N)}], \qquad \text{(B10)}$$

which equals $(1/2)\cdot(y^{L(N)} - y^{W(N)})$. But we know that $y^{L(N)}$ is larger than $y^{W(N)}$, implying that the surplus extraction component is positive. This concludes

---

[1] If the competitive mechanism determines the tender offer price in the nonpartial contest, the free rider mechanism can not at the same time settle the corresponding price for partial bids. In particular, since the latter requirement amounts to satisfaction of the inequality $y^{L(N)} > y^{W(N)} + 2\cdot z^{W(N)}$, it implies that it is impossible for another contestant to win the nonpartial contest, i.e. the stated conditions are inconsistent with the occurrence of reversal of winners. Accordingly, if the competitive mechanism determines the tender offer price for nonpartial bids it also settles it for partial bids.

the sufficiency part of the statement, and thereby the proof of the full lemma. *QED*

Lemma 3:
$\Delta s = 0$ if and only if $y^{W(N)} > y^{L(N)} + 2 \cdot z^{L(N)}$, where $W(N)=W(P)$.

Proof: From the definition of the surplus extraction component we derive the condition for a zero Δs as $2 \cdot [p(N) - y^{W(N)}] = [p(P) - y^{W(P)}]$. Using the definitions of p(N) and p(P), and successively eliminating the inconsistent cases, only one combination of parameter values remains: $p(N) = p(P) = y^{W(N)} = y^{W(P)}$, i.e. one contestant is so superior in terms of security benefits that the free rider mechanism determines the tender offer price for both the nonpartial and partial contest. *QED*

From Lemma 1, 2 and 3, and Corollary 1 we immediately infer the following conclusion.

Corollary 2: *(i) If $\Delta a > 0$, then $\Delta s < 0$, and*
(ii) if $\Delta s > 0$, then $\Delta a = 0$.

We are now ready to state and prove the main result of the paper.

***Proof of Propositions* 1 *and* 1':**
(i) Since $\Delta V \equiv \Delta a + \Delta s$, we infer from Corollary 2(ii) that the shareholder-wealth effect is positive if and only if the surplus extraction component Δs is positive, which occurs (Lemma 2) if and only if $0 < (y^{L(N)} - y^{W(N)}) < (z^{W(N)} - z^{L(N)})$, where W(N)=W(P).
(ii) From Lemma 1 we know that the allocative component, Δa, is positive if and only if there is a reversal of winners (W(N)=L(P) and L(N)=W(P)). Furthermore, from the proof of this lemma we also know that the competitive mechanism determines the tender offer price for both the nonpartial and partial bidding contest. Using these facts and the definition of the shareholder wealth effect, $\Delta V \equiv \Delta a + \Delta s$, we obtain

$$\Delta V = [y^{W(N)} - y^{L(N)}] + [y^{L(N)} + z^{L(N)} - y^{W(N)}] - (1/2) \cdot [y^{W(N)} + 2 \cdot z^{W(N)} - y^{L(N)}],$$

which reduces to $\Delta V = (1/2) \cdot [y^{W(N)} - y^{L(N)}] + [z^{L(N)} - z^{W(N)}]$. However, from the definition of the interval where Δa is positive (see Lemma 1) it follows that both bracketed expressions are positive. The shareholder wealth effect is positive as the positive allocative component is larger than the absolute value of the negative surplus extraction component: $\Delta a > |\Delta s|$.

In conclusion, the two nonintersecting intervals derived in Lemmas 1 and 2, where the allocative and the surplus extraction components are positive, also determine when the shareholder wealth effect is positive. *QED*

Corollary 3:
$\Delta V \leq 0$ if and only if $\Delta a = 0$ and $\Delta s \leq 0$.

Or expressed in terms of parameter values, the shareholder wealth effect is nonpositive if and only if
$y^R - y^I \notin (0, 2(z^I - z^R))$ if $z^I > z^R$ or $y^I - y^R \notin (0, 2(z^R - z^I))$ if $z^R > z^I$.

Proof: Immediate from Proposition 1, and Lemmas 1 and 3.

Proof of Proposition 3:
(i) Suppose that $\theta \notin (0.5, 1)$. This implies that the choice of ϕ does not affect who wins the control contest; W and L can be regarded as given. Suppose also that $\xi \in (0, 0.5)$. This implies that the equilibrium price is given by y^W, regardless of ϕ. Hence, when $\theta \notin (0.5, 1)$ and $\xi \in (0, 0.5)$ are true, the choice of ϕ is irrelevant for the shareholders' wealth. Hence the sufficiency part of (*d*) is confirmed.
(ii) Suppose that $\theta \notin (0.5, 1)$ and $\xi \notin (0, 0.5)$ is true. This implies that W and L are given and that the relevant price function is $p(\phi) = y^L + z^L/\phi$. The shareholders' maximization problem can be written as

$$\underset{\phi \in [0.5,\ 1]}{Maximize}\ V(\phi;\ \cdot\ ) = \phi \cdot p(\phi) + (1 - \phi) \cdot y^W =$$

$$= y^W + z^L + \phi \cdot (y^L - y^W). \qquad \text{(B11)}$$

It is clear that V is maximized by setting ϕ as low as possible ($\phi = 0.5$) if $y^W > y^L$, and as high as possible ($\phi = 1$) if the opposite relationship applies. This proves sufficiency in (*a*) and (*c*).
(iii) Suppose $\theta \in (0.5, 1)$ is true. This implies that the choice of ϕ also involves a choice of winner of the control contest. This boils down to a choice between a high-security-benefit/low-private-benefit party, who will be implemented by setting ϕ on the interval $(\theta, 1]$, and a low-security-benefit/high-private-benefit party, who will win if $\phi \in [0.5, \theta)$. For any choice of winner/loser, the parametric configuration $\theta \in (0.5, 1)$ also implies that the relevant price function is $p(\phi) = y^L + z^L/\phi$. Given the choice of winner, the shareholders' max problem is exactly the same as in (B11). Hence, if $y^W > y^L$, it is optimal to set ϕ as low as possible. Given the choice of the high-security-benefit party as winner, it is therefore optimal to set $\phi = \theta + e$, where e would be a very small, positive number. The resulting shareholder wealth would be given by

$$V = (\theta + e)y^L + z^L + (1 - \theta - e)y^W. \quad \text{(B12)}$$

Conversely, if $y^W < y^L$, it is optimal to set ϕ as high as possible. Thus, given the choice of the low-security-benefit party as winner, it is optimal to set $\phi = \theta - e$. The resulting shareholder wealth would be

$$V = (\theta - e)y^L + z^L + (1 - \theta + e)y^W. \quad \text{(B13)}$$

For the sake of argument, suppose that $y^I > y^R$. The difference in shareholder wealth between implementing *I* (the high-security-benefit party) and *R* (the low-security-benefit party) is given by V(*I* = *winner*) – V(*R* = *winner*), where the first term is the wealth function (B12) where W is switched for *I* (and L for *R*), and the second term is the wealth function (B13) where W is switched for *R* (and L for *I*). We have that

$V(I = winner) - V(R = winner) =$

$= [(\theta + e)y^R + z^R + (1 - \theta - e)y^I] - [(\theta - e)y^I + z^I + (1 - \theta + e)y^R] =$

$= y^I - y^R + z^I - z^R > 0.$

The positive sign is implied by the fact that $y^I > y^R$, and that $\theta \in (0.5, 1)$. Hence, the shareholders' wealth is greatest implementing the high-security-benefit party as winner of the control contest. We can conclude that, when $\theta \in (0.5, 1)$, shareholder wealth is maximized by setting $\phi = \theta + e$, which proves sufficiency in (*b*). Because (*a*), (*b*), (*c*), and (*d*) represent jointly exhaustive events, also the necessity parts are proved. *QED.*

EFI

The Economic Research Institute

Reports sice 1992

Published in the language indicated by the title

1992

Charpentier, C., Ekonomisk styrning av statliga affärsverk.
Edlund, P-O., Karlsson, S., Forecasting the Swedish Unemployment Rate: VAR vs. Transfer Function Modelling. Research Report.
Eklöf, J.A., Varying Data Quality and Effects in Economic Analysis and Planning.
Eliasson, M., Julander, C-R., Productivity in Swedish Grocery Retailing. - changes over time and a causal model.
Ewing, P., Ekonomisk styrning av enheter med inbördes verksamhetssamband.
Fredriksson, O., Datorkommunikation i Distributionssystem. Erfarenheter och effekter vid införandet av två multilaterala interorganisatoriska informationssystem - exemplet BASCET Info-link AB. Research Report.
Fredriksson, T., Policies Towards Small and Medium Enterprises in Japan and Sweden. Research Report.
Företagsledning bortom etablerad teori, red. Sjöstrand, S-E., Holmberg, I., *EFI/Studentlitteratur.*
Gerdtham, U., Jönsson,B., Sjukvårdskostnader i de nordiska länderna. Research Report.
Hedvall, M., Produktkvalitet som konkurrensmedel i producentvaruproducerande industri. Research Report.
Holmberg, C., Effects of Feature Advertising and Other Promotions Research Report.
Jansson, D., Spelet kring investeringskalkyler. Om den strategiska användningen av det för-givet-tagna. *Norstedts Förlag/EFI.*
Jennergren, L.P., Näslund, B., Valuation of Executive Stock Options. Research Report.
Kokko, A., Foreign Direct Investment Host Country Characteristics and Spillovers.
Ljung, A., Intressentstrategier. - En longitudinell studie av utvecklingen i två svenska företag.
Mårtensson, P., Mähring, M., Information Support From Staff to Executives. - An Explorative Study. Research Report.
Rabiee, M., A Review of Demand for Telecommunication: An Analytical Approach. Research Report.
Paalzow, A., Public Debt Management. Research Report.
Persson, P-G., Basket Analysis.
A New Way of Studying Short Term Effects of Promotions in Grocery Retailing. Research Report.
Sjöstrand, S-E., On Institutions and Institutional Change. Research Report.
Södergren, B., Decentralisering. Förändring i företag och arbetsliv.
Thodenius, B., Användningen av ledningsinformationssystem i Sverige: Lägesbild 1991. Research Report.
Tollgerdt-Andersson, I., Sjöberg, L., Intresse och kreativitet inom tjänsteproducerande företag. Research Report.
Wahl, A., Könsstrukturer i organisationer. Kvinnliga civilekonomers och civilingenjörers karriärutveckling.

1993

Ekvall, N., Studies in Complex Financial Instruments and their Valuation.
Flink, T., The Development of High-Speed Trains - An Industrial Dynamics Approach. Research Report.
Gerdtham, U-G., Hertzman, P., Boman, G., Jönsson, B., Impact of Inhaled Corticosteroids on Asthma Hospitalization in Sweden: A Pooled Regression Analysis. Research Report.
Gun-Ho Cha, Reappraisal of Market Efficiency Tests Arising from Nonlinear Dependence, Fractals, and Dynamical Systems Theory.
Hertz, S., The Internationalization Processes of Freight Transport Companies.
Nilsson, K., Förhållanden som påverkar rapporteringstiden - En studie i tre koncerner. Research Report.
Redovisningens roller, red. Samuelson, L.A., Östman, L.
Ruist, E., Sambandsanalys med ordinalskalevariabler. Vilka statistiska metoder kan användas? Research Report.
Skogsvik, K., Accounting for Pension Obligations. Research Report.
Sjöstrand, S-E., Om företagsformer.

Stein, J., Strategy Formation and Managerial Agency. A Socio-Cognitive Perspective.
Söderlund, M., Omvärldsmodeller hos beslutsfattare i industriföretag - en studie av svenska leverantörer till fordonsindustrin.
Sörensson, T., Swedish Convertible Bonds and their Valuation.
Tyrstrup, M., Företagsledares arbete. En logitudinell studie av arbetet i en företagsledning.
Uddén-Jondal, E., Wage Formation in a Unionized Economy.
Whitelegg, J., Hultén, S., Flink, T., High Speed Trains. Fast Tracks to the Future.

1994

Andersson, H., Ett industriföretags omvandling. En studie av Hägglunds förändringsprocess 1922-81 med bas i företagets produkter, relationer och resurser.
Andersson, H., En produkthistoria. *(separat publicerad bilaga till ovanstående)*
Cowan, R., Hultén, S., Escaping Lock-in: The Case of the Electric Vehicle. Research Report.
Dahlfors, G., Jansson, P., Essays in Financial Guarantees and Risky Debt.
Företag och marknader i förändring - dynamik i nätverk,
red. Mattsson, L-G., Hultén, S.
EFI/Nerenius & Santérus Förlag.
Helgesson, C-F., Coordination and Change in Telecommunications. Research Report.
Lundström, T., Wijkström, F., The Swedish Nonprofit Sector. Research Report.
Nessén, M., Essays on Exchange Rates and International Finance.
Niemeyer, J., Essays on Market Microstructure -Empirical Evidence from Some Nordic Exchanges.
Nilsson, K., Rapportering i svenska storföretag 1993. Delrapport 1.
Faktiska tider och påverkande faktorer för månatlig resultatrapportering. Research Report. **Nilsson, K.,** Rapportering i svenska storföretag 1993. Delrapport 2.
Rapporteringstider för kvartals/tertialsrapporter. Research Report.
Nordenlöw, L., Entreprenörskap i industriella nätverk. Research Report.
Norén, N-E., Om Flexibilitetspåverkande beslut. Research Report.
Normark, P., Medlemsägda företag. Organisering av strategiska förändringar.
Nyman, K., Studier av inkomstfördelningar med hjälp av mikrosimuleringsmodeller. Research Report.
Thodenius, B., Användningen av ledningsinformationssystem i Sverige: Lägesbild 1993. Research Report.
Sjöholm, G., Redovisningsmått vid bolagisering. Utformning och effekter.
Wijkström, F., Det organiserade ideella arbetet i Sverige. Research Report.
Wirsäll, N-E., Holmlöv, PG., Den nyckfulle Svensson. Reflektioner efter ett seminarium om strategier för handeln.
Fonden för
Handels- och Distributionsforskning, EFI

1995

Becker, T., Essays on Stochastic Fiscal Policy, Public Debt and Private Consumption.
Blomberg, J., Ordning och kaos i projektsamarbete - en socialfenomenologisk upplösning av en organisationsteoretisk paradox.
Brodin, B., Lundkvist, L., Sjöstrand, S-E., Östman, L., Styrelsearbete i koncerner
Brännström, T., Bias Approximation and Reduction in Vector Autoregressive Models.Research Report.
Ekonomisk politik i omvandling.
Lars Jonung (red)
Gunnarsson, J., Wahlund, R., Hushållens finansiella strategier. En explorativ studie.
Fonden för Handels- och Distributionsforskning, EFI.
Höök, P., Chefsutveckling ur könsperspektiv- Mentorskap och nätverk på Vattenfall -Research Report.
Levin, J., Olsson, P., Looking Beyond the Horizon and Other Issues in Company Valuation. Research Report.
Mägi, A., Customer Statisfaction in a Store Performance Framework. Research Report.
Persson, P-G., Modeling the Impact of Sales Promotion on Store Profits.
Roman, L., Institutions in Transition.
A Study of Vietnamese Banking.
Sandberg, J., Statistisk metod - dess vetenskapliga hemvist, grundläggande principer och möjligheter inom samhällsvetenskapen. Research Report.
Sandberg, J., How Do We Justify Knowledge Produced by Interpretative Approaches? Research Report.

Schuster, W., Redovisning av konvertibla skuldebrev och konvertibla vinstandelsbevis - klassificering och värdering.
Söderberg, K., Farmartjänsten - Ny kooperation inom lantbruket. Research Report
Söderqvist, T., Benefit Estimation in the Case of Nonmarket Goods. Four Essays on Reductions of Health Risks Due to Residential Radon Radiation.
Thorén, B., Användning av information vid ekonomisk styrning - månadsrapporter och andra informationskällor.

1996

Andersson, P., Concurrence, Transition and Evolution - Perspectives of Industrial Marketing Change Processes.
Andersson, P., The Emergence and Change of Pharmacia Biotech 1959-1995.
The Power of the Slow Flow and the Drama of Great Events.
Asplund, M., Essays in Industrial Economics.
Holgersson, C., Höök, P., Ledarutveckling för kvinnor - Uppföljning av en satsning på Volvo - Research Report.
Sandén-Håkansson, U., Från kampanjmål till mediemix - en studie av samarbete mellan annonsörer, reklambyråer och mediebyråer. Research Report.
Stein, J., Söderlund, M., Framgång i arbetet, strategier för att utföra arbetsuppgifterna, arbetsuppgifternas karaktär och utbildnings-kvalitet. En empirisk studie av civilekonomer. Research Report.
Söderlund, M., Och ge oss den nöjda kunden. En studie av kundtillfredsställelse och dess orsaker och effekter. Research Report.
Wijkström, F., Den svenska ideella sektorn och pengarna. Research Report.