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Blockholder Scarcity, Takeovers, and Ownership Structures

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Abstract

Agency problems in firms are prevalent because of a scarcity of wealthy principals with corporate governance ability, whom we call "restructuring specialists." We investigate how this scarce resource, "agency cost-free capital," is allocated. We show that the restructuring specialists may acquire blocks only in those states of the world in which they can increase firm value the most, which corresponds to a takeover. Firms with dispersed ownership and firms with a financial intermediary as a blockholder can coexist, although they are otherwise identical. The model can explain differences in corporate ownership structures and restructuring mechanisms across economies.

I. Introduction

Not every company can be owned by a rich investor. Large investors, acting on their own as principals using their own wealth, are relatively rare. Further, their wealth is small compared to the size of the corporate sector. Hence, "agency cost-free capital" is scarce. In this paper, we explore the implications of the scarcity of such effective blockholders and show that it generates a rich set of implications for corporate ownership structures, disciplinary corporate takeovers, and the role of financial intermediaries in restructuring.

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In contrast to dispersed small investors, large blockholders have sufficient incentives and power to monitor management and force a change in managerial strategy (a restructuring) that increases firm value (for example, Berle and Means (1932), Demsetz and Lehn (1985), Shleifer and Vishny (1986), Admati, Pfleiderer, and Zechner (1994), Bolton and von Thadden (1998), Kahn and Winton(1998), and Maug (1998)).[1] If large investors are scarce, such blockholders should be created by coalitions of small investors (financial intermediaries), as suggested, for example, by Diamond (1984). Yet these coalitions have their own agency problems and so are not as effective blockholders as rich investors who have their own capital at stake. These rich investors include the so-called "raiders" (Holderness and Sheehan (1985)) and "activist investors" (Bethel, Liebeskind, and Opler (1998)) such as the Bass brothers, the Belzberg family, Leon Black, Carl Icahn, Irwin Jacobs, Kirk Kerkorian, Carl Lindner, David Murdock, Victor Posner, and Ron Perelman. They often take over firms to implement a restructuring when it can create a lot of value. For example, after Ron Perelman acquired Revlon, he sold many of its noncosmetics assets.[2] After Carl Icahn acquired TWA, he cut costs and renegotiated labor contracts, leading to annual cost savings estimated to be worth about $350 million to $400 million.[3] Such restructurings also occur often after minority block acquisitions by such rich investors. For example, Kirk Kerkorian's pressure on management induced Chrysler to increase its dividend and share repurchase program, as well as to sell some noncore assets.[4]

In our model, a key assumption is that institutional investors or financial intermediaries are less effective at restructuring than rich investors. Consistent with this assumption, in the U.S., public pension funds, engaging in shareholder proposals or informal negotiations, seem to have a small positive effect or no significant effect on firm value (see, for example, Karpoff, Malatesta, and Walkling (1996), Wahal (1996), Smith (1996), Carleton, Nelson, and Weisbach (1998), Del Guercio and Hawkins (1999), Gillan and Starks (2000), Woidtke (2002), and Nelson (2006)).[5] Private pension funds may be worse at shareholder activism than public pension funds because of potential conflicts of interest (Brickley, Lease, and Smith (1988)).[6] However, over the last 20 years, these institutional

[1]Empirical evidence for this claim is provided by Holderness and Sheehan (1985), Kaplan and Minton (1994), Kang and Shivdasani (1995), Bethel, Liebeskind, and Opler (1998), Gorton and Schmid (2000), and Yafeh and Yosha (2003), among others. Burkart, Gromb, and Panunzi (1997) argue that even from a corporate control perspective, dispersed ownership may be optimal.

[2]See "The Corporation: The Changes At Revlon Are More Than Just Cosmetic—With the help of Sol Levine, Ron Perelman is starting to recapture the old pizzazz," *BusinessWeek*, November 20, 1989.

[3]See "USX Might Face TWA-Style Shake-Up Under Icahn—Investor Probably Would Fire Executives, Cut Wages and Close Plants," *The Wall Street Journal*, October 10, 1986.

[4]See "Chrysler Corp., Kerkorian Reach A Five-Year Truce Agreement—Accord Gives Investor Board Representation, Bars Takeover Moves," *The Wall Street Journal*, February 9, 1996.

[5]Song and Szewczyk (2003) also find little evidence that firm performance improves as a result of coordinated institutional investor activism.

[6]However, Woidtke (2002) finds that ownership by private pension funds is associated with higher firm valuations, while the opposite is true for public pension funds. Examining voting records for 2003 and 2004, Davis and Kim (2007) find that mutual funds do not vote more often with management at firms with which they have business relationships. However, there is a positive relationship between the business ties of a fund company overall and the probability of voting with management. There are

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investors have increased their pressure on firms to restructure (see Gillan and Starks (2003)), targeting "companies in drastic need of a restructuring with years of poor performance and with overpaid CEOs."[7] For example, they were instrumental in removing the CEOs of several large poorly performing firms in the U.S. in the early 1990s, including American Express, Eastman Kodak, General Motors, IBM, Westinghouse Corp., and Sears, Roebuck & Co. They also pressured firms to change their strategy, for example, asking American Express to consider a spinoff of its investment banking unit, Shearson. Fidelity demanded drastic layoffs at Eastman Kodak and backed the sale of car-rental and hotel operations at Allegis.[8] Del Guercio and Hawkins ((1999), p. 335) find that shareholder proposals by pension funds "are followed by significant additional corporate governance activity and broad corporate change, such as asset sales and restructurings," and Huson (1997) reports similar findings.

Despite the recent increase in activism among U.S. institutional investors, banks in Japan and Germany seem to be more effective at increasing firm value than U.S. institutional investors. For example, in Japan, firms with ties to a main bank have a higher performance sensitivity of president turnover and a higher likelihood of outside succession (Kang and Shivdasani (1995)). Moreover, firms are most likely to appoint new directors affiliated with financial institutions after poor performance, and afterwards, top executive turnover increases substantially (Kaplan (1994), Kaplan and Minton (1994)). For Germany, Gorton and Schmid (2000) find that firm performance improves more when banks own blocks than when blocks are owned by other investors. However, the evidence in Kang and Shivdasani (1997) suggests that even banks in these bank-centered economies are less effective at restructuring than are rich investors.[9]

Our model takes as given the different restructuring abilities of rich investors and financial intermediaries and analyzes the consequences for corporate ownership structures and restructuring mechanisms. Our setting is as follows: We assume a simple agency problem. Firms are run by managers who never want to change their business strategy, even though doing so may increase firm value. Hence, there may be a need for outside investors to restructure the firm, that is, cause a change to implement the superior business strategy. Because of free-rider problems among small shareholders, only an investor with a sufficiently large block can implement such a restructuring. In contrast to the existing theoretical literature, we assume that there are two types of potential blockholders. First, there

also investor classes that may fall somewhere between rich investors and financial intermediaries. For example, private equity funds are closer to financial intermediaries if institutional investors contribute a substantial fraction of the capital to the fund. They are closer to rich investors if only a few rich investors contribute most of the capital to the fund and play an active role in its management.

[7] "The value of activism," *Pensions & Investments,* February 22, 1993.

[8] "Managers lead Amex coup. Investment firms take up corporate governance fight," *Pensions & Investments,* February 8, 1993; "Ineffective CEOs walk plank. . . ," *USA Today,* October 28, 1992; "The value of activism," *Pensions & Investments,* February 22, 1993; "Wall Street: The New Activism at Fidelity," *The New York Times,* August 8, 1993.

[9] Kang and Shivdasani (1997) show that in response to poor performance, U.S. firms downsize more, sell substantially more assets, and lay off more employees than do Japanese firms. This occurs in the U.S. frequently after block purchases, presumably often by rich individuals or funds associated with them.

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are the rich investors. They are particularly good at restructuring, and hence we call them "restructuring specialists." However, their wealth or the capital available to them is limited, and hence their "agency cost-free" capital is a scarce resource in the economy. Second, many small investors can pool their funds in financial intermediaries (which may also be called institutional investors), which are large enough to be blockholders and restructure firms.

There are two ways to address the corporate control problem in our setting. First, a firm can have a permanent, or not state-contingent, blockholder, who forces a restructuring in states of the world in which this increases firm value, but who is also a blockholder in states of the world in which a restructuring is not needed. Secondly, block holding can depend on the situation (that is, it can be state-contingent). In this second case, a firm may initially have a dispersed ownership structure. Then, in situations where a restructuring is needed, it relies on the chance that a restructuring specialist will acquire a block and force a restructuring. Hence, there is a state-contingent allocation of the most effective principals. Firms' initial ownership structures are chosen to maximize the effectiveness of their restructuring policies. For an initially dispersed ownership to be optimal, the restructuring specialists must choose to acquire blocks in firms with dispersed ownership when a restructuring increases firm value. Otherwise, such firms would never be restructured. Hence, firm value would be lower than if the firm had a permanent blockholder who implemented some restructuring, even if his restructuring ability were limited.

For the takeover market to be active, restructuring specialists must prefer state-contingent block acquisitions to being permanent blockholders (in which case they would be buying blocks in firms before it became clear whether a restructuring was needed). While there are some costs to takeovers, we argue that there is one important advantage to such a state-contingent strategy: it allows investors to avoid investing in firms that turn out not to need a restructuring and where, as a consequence, their special restructuring ability would be wasted. Hence, if the ex ante likelihood that the firm will benefit from a restructuring (the probability of economy-wide agency problems) is low enough, restructuring specialists will wait to see whether or not a restructuring turns out to be needed before investing. They will invest their wealth in a state-contingent way. Hence, in our model, takeovers occur only if the probability of economy-wide agency problems is low enough.

Restructuring specialists can engage in state-contingent block acquisitions by assembling a block by trading with many small investors or by acquiring blocks from existing blockholders (the financial intermediaries). They prefer to assemble blocks by buying up shares held by many small investors only if there is sufficient liquidity trading in the secondary stock market. Even if the restructuring specialists buy blocks in firms with initially dispersed ownership, there are several disadvantages to having initially dispersed ownership. i) Because the wealth of the restructuring specialists is scarce, they cannot take over all firms that may need restructuring. Hence, there is a chance that a firm with an initially dispersed ownership will not be restructured, even if it would benefit from it. ii) The restructuring specialists may only be able to acquire a limited stake in the firm, which may make them less effective at restructuring. iii) Restructuring specialists will

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capture some of the surplus from trading with liquidity traders. Investors need to be compensated for these transfers to restructuring specialists when the entrepreneurs sell the initial equity. However, there is one significant advantage to initially dispersed ownership that can offset the disadvantages: if such a firm is taken over by a restructuring specialist, it will benefit from the highest-value restructuring policy possible, because the most effective blockholders are only active in the takeover market. This is the only reason that dispersed ownership can be optimal in our setting.

We show that dispersed and concentrated ownership can coexist for otherwise identical firms as long as the restructuring specialists are active in the takeover market. In this case, the more firms there are with an initially dispersed ownership, which rely on the takeover market for restructuring, the worse off each of them is, because they have to share the scarce resources of the restructuring specialists. They are taken over only with a certain probability (which is determined endogenously in the model). The fraction of firms that rely on the takeover market adjusts such that all firms are indifferent between the two restructuring mechanisms. More firms have dispersed ownership if restructuring specialists have more capital at their disposal, the economy-wide probability of agency problems is lower, and financial intermediaries are worse at restructuring because all of these factors make dispersed ownership more attractive (for a given fraction of firms with dispersed ownership) or concentrated ownership less attractive. Hence, an increase in the fraction of firms with dispersed ownership restores the indifference between dispersed and concentrated ownership.

The coexistence of dispersed and concentrated ownership has also been derived in other papers. For instance, Chemmanur and Fulghieri (1994) develop a model of the choice between bank loans and bonds. Firms that are more likely to become distressed obtain loans from financial intermediaries, which devote more resources to evaluating and restructuring firms during financial distress and hence are better at it, while the other firms issue bonds to many small investors (and pay correspondingly lower interest rates). In both their paper and ours, the special restructuring ability of some group of investors affects the choice of firms between receiving funds from financial intermediaries and many small investors, respectively, and both intermediated and nonintermediated finance can coexist. In our paper, dispersed ownership becomes possible because some investors (the restructuring specialists) are better at restructuring than financial intermediaries, while in Chemmanur and Fulghieri (1994), concentrated ownership is attractive because financial intermediaries are particularly good at restructuring. Moreover, in contrast to Chemmanur and Fulghieri (1994), we observe the coexistence of financial intermediaries and securities markets, although all firms are ex ante identical. However, there are also situations in which there are only firms with concentrated ownership or only firms with dispersed ownership.

The optimality of dispersed ownership can also be explained by appealing to diversification (for example, Demsetz and Lehn (1985)) or liquidity benefits. Bolton and von Thadden (1998) argue that there is a trade-off between monitoring quality (which is better when the firm has a permanent blockholder) and investors' desire for liquidity (given that more dispersed ownership increases liquidity, which investors value). These arguments do not provide a complete

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explanation for observed differences in corporate ownership structures. Given the size of the portfolios of many institutional investors, they can hold large stakes in firms without substantially depriving their investors of the benefits of diversification and liquidity associated with dispersed ownership.[10]

Our model sheds light on the differences in corporate ownership structures and restructuring mechanisms across countries. For example, we predict that hostile takeovers and block trades are more likely if economy-wide agency problems are less severe (perhaps because a country's corporate governance quality is better) or if financial intermediaries are worse at restructuring. This is consistent with the finding that the frequency of hostile takeovers increases as investor protection increases (if one measures corporate governance quality by investor protection) and decreases as bank powers increase (Schneper and Guillén (2004)). Moreover, our model implies that dispersed ownership is more prevalent if economy-wide agency problems are less likely. If one measures the quality of corporate governance of a country by its degree of investor protection, this prediction is consistent with the finding in the law and finance literature that investor protection and ownership concentration are inversely related (La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), La Porta, Lopez-de-Silanes, and Shleifer (1999)). Our model also suggests that dispersed ownership should become more prevalent after improvements in corporate governance. While there is no large-scale evidence for this prediction, it is consistent with an increase in dispersed ownership in Germany and Japan after recent improvements in corporate governance (Wójcik (2003), van der Elst (2000), and Coffee (2001)). We also predict that there is more dispersed ownership if more capital is available to restructuring specialists (as long as they are active in the takeover market) and if financial intermediaries are worse at restructuring (as long as their restructuring ability is not too low).

Moreover, our model can explain why the most value-enhancing and severe restructuring activities are typically implemented after state-contingent block acquisitions by rich investors or funds controlled by them. This includes the dramatic and value-increasing restructurings after the hostile takeovers of the 1980s (Bhagat, Shleifer, and Vishny (1990)), after disciplinary minority block acquisitions (Bethel, Liebeskind, and Opler (1998)), after block acquisitions by vulture investors in the market for financially distressed firms (Hotchkiss and Mooradian (1997)), and post-LBO (leveraged buyout) restructurings (Kaplan (1989), Bhagat, Shleifer, and Vishny (1990)). These activities are associated with high premia and high target announcement effects. Moreover, they often lead to the sale of a substantial part of the assets or the undoing of earlier failed acquisitions and result in substantial performance improvements (Jensen and Ruback (1983), Kaplan (1989), Bhagat, Shleifer, and Vishny (1990), Smith (1990), Hotchkiss and Mooradian (1997), and Bethel, Liebeskind, and Opler (1998)). This is in marked contrast to the relatively tame extent of shareholder activism by institutional

[10]Burkart, Gromb, and Panunzi ((1997), p. 695, footnote 3) argue that institutional investors could merge their funds and increase their ownership positions in a firm to 100% ownership without increasing their risk exposure. Moreover, they suggest that the high ownership concentration observed in many countries suggests that a lack of diversification is not a dominant concern for many large investors.

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investors in the U.S. (Karpoff, Malatesta, and Walkling (1996), Wahal (1996), and Gillan and Starks (2000)) and even in countries with more active financial blockholders, for example, Japan (Kang and Shivdasani (1997)). Our analysis also provides a rationale for the fact that rich investors engage in takeover activity much more frequently than institutional investors. These and some additional empirical implications are discussed in more detail in Section VI.

The remainder of the paper is structured as follows: In Section II, we present the model. Section III analyzes the model and characterizes the preferred investment strategies of restructuring specialists and financial intermediaries. It also determines the equilibrium initial firm ownership structures. Section IV derives implications of our analysis for corporate ownership structures. Section V presents implications for the behavior of the restructuring specialists. Section VI discusses some empirical implications and the related empirical evidence. Section VII concludes. All proofs are in the Appendix.

II. The Model

There are three dates in the model economy: 0, 1, and 2. At date 0, a continuum of identical entrepreneurs with total measure one seek to finance their projects. Each firm is run by a manager (this is not explicitly modeled) and finances its project, which costs I, exclusively with equity by selling off all its shares, giving the investors all the rights to the payoffs generated by the project.

A. Project Payoffs and Restructuring

Payoffs on the project occur at date 2 and depend on the state of the world, which is publicly observed at date 1. Firms that receive good news at date 1 (and hence are in the "good state") receive a payoff of R at date 2 with certainty. Firms that receive bad news (and hence are in the "bad state") receive a payoff of zero at date 2. They do not perform as well as they could because of agency problems. This bad state could describe a number of different situations. For example, it could describe a firm in a mature industry that has excess cash that management is unwilling to pay out to shareholders and instead is inclined to invest in negative NPV projects (see Jensen (1986)), or a situation of economic distress that requires downsizing in which management is reluctant to engage. The zero payoff is just a normalization. The probability of receiving bad news at date 1 is δ.[11] Only firms in the bad state benefit from a change in strategy at date 2. Figure 1 shows the sequence of events.

For simplicity, we call any actions that increase a firm's date 2 payoff a "restructuring."[12] The restructuring may take the form of asset sales or the divestiture

[11] In what follows, probabilities such as δ are treated both as a probability that an individual firm will experience an event and as the fraction of firms at date 1 that actually experience this event. Of course, with a continuum of firms, any appeal to a law of large numbers will encounter some well-known technical problems. For a discussion of these problems and solutions to them, see Judd (1985) and Feldman and Gilles (1985).

[12] The restructuring is modeled in a way very similar to the "restructuring" or "monitoring" in Maug (1998) and the "intervention" in Kahn and Winton (1998).

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FIGURE 1

The Sequence of Events



of a business line, but it could also be a less visible change in strategy. We use the term "restructuring" in a very broad sense, to capture all activities aimed at increasing firm value, which could be brought about through formal or informal negotiations with management, as well as by replacing management.[13] We assume that incumbent managers do not want to implement these value-increasing actions. One rationale for this is that managers want to preserve projects that provide private benefits ("pet projects") or that may help to entrench them (see Shleifer and Vishny (1989)). We assume that contracts cannot fully eliminate managerial aversion to these value-improving changes in strategy. We also assume that small shareholders cannot coordinate their actions, due to the free-rider problem, and hence cannot force management to restructure. Since managers never voluntarily change their strategy, a restructuring can only be imposed by a large blockholder.

If a firm is restructured in the bad state, its date 2 payoff is $H(\gamma) > 0$, where γ is the fraction of the firm's equity owned by the largest blockholder.[14] We assume that the improvement in firm value that is due to a restructuring increases as the blockholder's fraction of ownership increases. A larger block gives the investor stronger incentives to improve firm value, because the investor receives a larger fraction of the firm's cash flows. It also gives him more control rights and hence power to force the firm to make more efficient decisions. We formalize this by assuming that

$$\partial H(\gamma)/\partial \gamma > 0. \tag{1}$$

This assumption is stronger than what we need and is made to simplify the analysis. It implies that a blockholder owns the whole firm at date 0. In what follows, we will often write H as an abbreviation for $H(1)$.

[13]Of course, blockholders could also increase firm value by reducing the probability that agency problems arise, instead of improving firm value once management does not want to implement the value-maximizing strategy. This could be captured by making the probability of the bad state (δ) depend on the existence of a blockholder and its identity. Some of the activities commonly associated with shareholder activism would fall under this category. We are grateful to an anonymous referee for pointing this out. To keep the model simple, we do not consider such actions and instead leave exogenous the probability that agency problems occur.

[14]We will see below that each firm has at most one blockholder in equilibrium. Zwiebel (1995) provides an analysis of the benefits of partial blockholding and coalitions among blockholders.

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B. Investor Types

There are two types of potential investors. There is a single investor with a special ability to increase firm value, whom we call a "restructuring specialist." Moreover, there is a continuum of small investors without a special ability to increase firm value. All investors are risk-neutral. It takes many small investors to finance the project of any one firm, but the restructuring specialist has enough wealth to finance a strictly positive measure of firms. However, his wealth is limited, and he cannot raise additional funds through outside financing, because this would dilute his incentives to increase firm value.

We assume that small investors cannot force a restructuring because they cannot coordinate their actions due to free-rider problems. However, small investors can attempt to synthetically create a large investor by pooling their wealth into funds, which we shall call "financial intermediaries." Such financial intermediaries have enough wealth to be blockholders and hence can force a restructuring.

The identity of the blockholder is important because it matters for restructuring outcomes. We assume that the restructuring specialist is better at restructuring than financial intermediaries. In particular, the payoff following a restructuring by the restructuring specialist $\left(H^S(\gamma)\right)$ is higher than the payoff following a restructuring performed by a financial intermediary $\left(H^N(\gamma)\right)$ (the superscript "S" stands for (restructuring) "specialist" while the superscript "N" stands for "nonspecialist"):

$$H^S(\gamma) > H^N(\gamma) \quad \text{for all } \gamma. \tag{2}$$

We also assume that the payoff in the good state is higher than the highest possible payoff in the bad state: $H^S(1) < R$.

Our model does not explain why some investors are better at increasing firm value ("restructuring") than others but takes this as given. Some investors may be better at, or have gained valuable experience in, increasing firm value or have better incentives to do so than others. Financial intermediaries may have limited ability to increase firm value for various reasons. Managers of large institutional funds with well-diversified portfolios presumably have relatively weak incentives to induce firms to implement value-increasing changes (see, for example, Black (1992), Romano (1993), and Murphy and Van Nuys (1994)). First, such managers typically obtain only a minimal fraction of the gains from the value improvement. Second, any effort that focuses on a single company will affect the value of the portfolio only marginally. Moreover, Brickley, Lease, and Smith (1988) argue that some institutional investors are likely to side with corporate management because of conflicts of interest that stem from existing business relationships with the firms in which they hold equity stakes. They find evidence from voting on antitakeover amendments that is consistent with their hypothesis. One reason for the effectiveness of rich investors in restructuring is, presumably, that they do not face the same conflicts of interest as many financial intermediaries. Moreover, they obtain the bulk of the gains from their value-increasing activity.[15]

[15] Funds with a limited number of wealthy investors lie somewhere between these two extremes. For instance, many vulture funds provide their managers with strong incentives to maximize the value

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C. Block Acquisitions

Investors can acquire shares at date 0 or at date 1. At date 0, entrepreneurs sell all the equity in their firms. In the auction, every investor specifies the fraction of the firm that he is bidding for and the price he will pay for that fraction; the shares are not auctioned off individually. Each investor's bid is either accepted or rejected in full. The entrepreneur allocates the shares to the bidders by picking the combination of bids for his firm that maximizes his proceeds. However, for tractability and because the focus of our analysis is not the possibility of partial ownership by blockholders at date 0, we do not consider winning bids in which some investors end up paying more than others for shares in the same firm.[16] The equity is purchased by small individual investors, or blocks are purchased by financial intermediaries or the restructuring specialist. The investors do not see the identity of the other bidders nor their bids. While all firms are identical ex ante, after selling their equity their publicly observed equity ownership structures may differ, as will be seen. We specify the details of the auction as described above so that the analysis is tractable, gives rise to simple ownership structures at date 0, and the restructuring specialist can earn substantial profits by investing at date 0.

We assume that financial intermediaries behave competitively and hence bid as high as possible without losing money, given the other investors' behavior.[17] As a consequence, if they win shares in the auction, they make zero expected profits. We also assume that small investors bid as high as possible without losing money, given the other investors' (including the other small investors') behavior. Hence, they also make zero expected profits if they win shares in the auction. However, if the restructuring specialist buys the whole firm, he can extract the difference between the equity value of the firm owned by him and the equity value of a firm that is owned by a financial intermediary.[18] One reason for this is that he can make a bid for the whole firm and does not have to bid for each share individually. We assume that his wealth is limited and he cannot buy all firms at date 0.

Investors can also buy shares at date 1, after the state of the world is observed. The restructuring specialist and financial intermediaries can acquire a block of a firm's equity from a blockholder (in the block market) or assemble a block by buying shares from many small investors. Such a date 1 block acquisition—in a block trade or by trading with many small investors—costs c per measure one of firms, in addition to the price that must be paid for the shares. If an investor buys a

of their investments. We do not allow the small investors to invest with the restructuring specialist because a limited investor base is a crucial determinant of the ability of the restructuring specialist to increase firm value effectively. Otherwise, the restructuring specialist's incentives are diluted because he manages other investors' money.

[16]If winning bids are allowed in which some investors pay more for shares in the same firm than others, the equilibrium that arises without allowing these bids (in particular, the restructuring specialist acquiring whole firms if he bids at date 0) is also always an equilibrium, but under some circumstances there could be other equilibria as well in which he buys parts of firms at date 0.

[17]The model does not determine the size of the financial intermediaries. However, we assume that there are always many financial intermediaries participating in the auction at date 0 and hence they behave competitively. We also assume that financial intermediaries behave competitively at date 1.

[18]This extreme assumption about the bargaining power of the restructuring specialist simplifies the analysis but could be relaxed without changing the qualitative results of the analysis.

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block of shares from an existing blockholder, he makes a take-it-or-leave-it offer to the blockholder, and the blockholder, in turn, accepts or rejects the offer.

If an investor buys shares from many small investors, there is the potential for the well-known free-rider problem (Grossman and Hart (1980)). In our setting, this free-rider problem is alleviated through liquidity trading. In particular, an investor can buy the shares at a price that does not fully reflect the value created by his anticipated restructuring activity. Some noise or liquidity trading is a standard way in the literature to circumvent the Grossman-Hart free-rider problem (see Kyle and Vila (1991) and Bolton and von Thadden (1998)). More concretely, we assume that at date 1, a fraction $\lambda < 1$ of the small investors must sell the shares of any firm in the bad state because of their need for liquidity. The price at which an investor can buy shares from many small investors at date 1 is modeled in reduced form by assuming that any given small investor receives a fraction $1 - \alpha$ of the surplus (the difference in the value of the firm with and without a blockholder) and the buyer receives a fraction α of the surplus. This could be a reduced form for a liquidity trading mechanism as well as the outcome of a bargaining process.

Finally, we assume that it is impossible to sell some shares at date 1 and then acquire other shares at date 1 with the proceeds. Otherwise, an investor buying shares at date 0 could sell, at zero cost, the shares of firms that turn out not to suffer from agency problems at date 1 (so that his restructuring activity is not needed) and instead acquire blocks in firms with agency problems. We conjecture that even without our assumption that rules out this behavior, our main results on ownership structures would be similar. However, the restructuring specialist would never exclusively buy shares before the realization of the state, at date 0, but would sometimes combine purchases at date 0 and purchases after the realization of the state, at date 1. This would lead to a less clear-cut distinction between the two strategies.

Hence, the assumption that investors cannot use the proceeds from selling shares at date 1 to buy other shares at date 1 allows our model to contrast state-contingent and not state-contingent block purchases more clearly. It also captures, in a very simple way, the fact that the opportunity cost of acquiring blocks before the realization of the state is that it reduces the amount of money that can be invested in blocks of firms that have already realized their state because the same dollar cannot be spent twice. Without our assumption, there would be no opportunity cost to acquiring blocks at date 0 because, to make our model tractable, there are no firms with agency problems in which one could invest at date 0. An alternative, but much more cumbersome, way to capture this opportunity cost of acquiring blocks before the realization of the state would be an overlapping generations model, in which firms with their state realized and firms in which the state is not yet realized would coexist at all times. In such a model, investing in firms before the realization of the state would mean that the investor earns a zero return for one period with probability $1 - \delta$, while he earns a positive return investing in firms after the realization of their state. The same is true in our simplified model.

Note that the behavior implied by our assumption (that investors do not sell shares at date 1 to buy other shares at date 1) might naturally arise in any case in a model in which it is not fully revealed at date 1 whether or not a firm will suffer from agency problems. In such a more general model there would still be

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some chance of future agency problems in firms in which agency problems have not yet occurred at date 1. Then, the date 0 blockholder may want to hold on to his shares, even in firms that do not experience agency problems at date 1.[19]

III. Analysis

We solve the model in several steps. First, we analyze which investment strategies the two possible blockholders, financial intermediaries and the restructuring specialist, prefer to follow. In particular, we determine the conditions under which the restructuring specialist prefers to invest his wealth in buying blocks at date 0, before the realization of the state (the not state-contingent strategy), and the conditions under which he prefers to acquire blocks at date 1, after the realization of the state (the state-contingent strategy). We also analyze from whom the restructuring specialist prefers to acquire shares at date 1 if he does so, by trading with many small investors or by engaging in block trades with financial intermediaries. Then we turn to the value-maximizing ownership structures of the firms, which are affected by the restructuring specialist's preferred investment choices.

A. Preliminary Observations

We begin with a number of observations that help to simplify the analysis of the different investors' strategies. First, note that an investor who buys a block at date 0 will always own 100% of the firm. This is a direct consequence of assumption (1), which states that firm value after a restructuring increases monotonically in ownership concentration.[20]

The second observation is that the only trades that may occur are block acquisitions by the restructuring specialist in the bad state, either by trading with many small investors or through a block trade with a financial intermediary. There are no gains from trade in the good state, and hence there is no trade in that state. There is only one source of gains from trade in the block market in the bad state: the restructuring specialist is better at restructuring firms than other investors. Hence, he may buy a block from a financial intermediary. A block position will also not be broken up and sold to many small investors because then the firm will sell for a price of zero (since it is known that there will be no restructuring). However, the blockholder can create a higher value by restructuring.[21]

The restructuring specialist can acquire a fraction λ of the firm from liquidity sellers if he prefers to trade with many small investors, rather than with a financial intermediary.[22] We sometimes call such a block acquisition a takeover. Financial

[19]Buying blocks before agency problems have occurred typically would lead to long-term (or even permanent) blockholding. This correspondence between not state-contingent block purchases and long-term blockholdings could be generated in a much more complicated (but realistic) model with more (or even an infinite number of) periods, but arises in our much simpler model already because we assume that proceeds from selling shares at date 1 cannot be reinvested in buying other shares.

[20]This result is proven as part of the proof of Proposition 2.

[21]These insights are formalized in Lemma 1 in the Appendix.

[22]The restructuring specialist will buy the largest possible fraction of shares λ, because his profits from buying shares from many small investors are strictly increasing in λ. This will be shown formally

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intermediaries could also, in principle, acquire blocks at date 1 by trading with many small investors. If the lack of restructuring effectiveness of the financial intermediaries (recall that $H^N(\lambda) < H^S(\lambda)$) is severe enough, financial intermediaries will be unable to break even if they acquire blocks at date 1. A sufficient condition for financial intermediaries not to acquire blocks at date 1 by trading with many small investors is that $c > \alpha\lambda H^N(\lambda)$, as is shown in Lemma 2 in the Appendix. In the remainder of the analysis, we will assume that this condition holds. This simplifies the analysis substantially. If this condition were not satisfied, there might be some date 1 block acquisitions by financial intermediaries. An analysis of this case would require adding more structure to the model, but the main results would be similar.

B. Buying from Many Small Investors or Block Trades?

Proposition 1 provides conditions under which the restructuring specialist prefers to buy from small investors and from financial intermediaries, respectively, if he invests his wealth at date 1 rather than date 0 (we assume that he buys from many small investors if he is indifferent between the two alternatives).

Proposition 1. The restructuring specialist prefers to buy blocks at date 1 by trading with many small investors if

$$\frac{1}{(1-\alpha)\lambda H^S(\lambda)+c}(\alpha\lambda H^S(\lambda)-c) \geq \frac{H^S-H^N-c}{H^N+c} \tag{3}$$

is satisfied. If (3) is not satisfied, the restructuring specialist prefers to buy blocks at date 1 from financial intermediaries.

The left-hand side of (3) gives the restructuring specialist's profit per dollar invested in buying shares from many small investors. The right-hand side of (3) gives his profit per dollar invested in block trades. There are several disadvantages to assembling a block by purchasing from many small investors. First, the restructuring specialist receives only a fraction α of the value improvement generated by his restructuring. Second, since he can buy only a limited block ($\lambda < 1$), his effectiveness at restructuring is lower ($H^S(\lambda) < H^S(1)$). Moreover, being able to buy only a limited position makes this strategy less attractive because there are fixed

in the proof of Proposition 6. Even though the restructuring specialist can acquire only a fraction λ of each firm with agency problems from liquidity traders, he might want to buy out the remaining shareholders after acquiring the block of size λ. This would improve his restructuring effectiveness because this is assumed to increase in block size (by (1)). The restructuring specialist will have to pay the full value of the shares under his restructuring policy to the remaining shareholders, due to the free-rider problem. However, as a large shareholder who already owns a fraction λ of the firm, he will benefit from buying out the remaining shareholders because he gains from the increase in value of his existing shares in the firm (see Shleifer and Vishny (1986)). Despite this, it is not clear that the restructuring specialist will want to buy out the remaining shareholders because there is an opportunity cost: every dollar he invests in buying out the remaining shareholders is a dollar that he cannot spend on the profitable takeover of firms with agency problems. To avoid complicating the analysis, we will ignore the possibility that the restructuring specialist prefers to buy out the remaining shareholders in the firms in which he has acquired a fraction λ to taking over more firms with agency problems. Our main results do not depend on this assumption.

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costs c associated with date 1 acquisitions. Hence, if λ is low enough, the restructuring specialist prefers to buy blocks from financial intermediaries. However, if λ is high enough, he may prefer to buy shares from many small investors.[23]

On the other hand, there is also an important advantage to buying from many small investors. Since the restructuring specialist creates a larger increase in firm value when he buys from many small investors than when he buys from a financial intermediary (since firm value without a blockholder is zero but is $H^N > 0$ with a financial intermediary as a blockholder) and the price partially reflects this, he may profit more from trading with them than with a financial intermediary. Hence, if H^N is high enough, the restructuring specialist prefers to buy from many small investors.

C. The Restructuring Specialist's Choice: Blockholding at Date 0 or Date 1?

Proposition 2 describes the conditions under which the restructuring specialist prefers to invest his wealth at date 1 and at date 0, respectively.

Proposition 2. The restructuring specialist prefers to invest in date 1 blocks rather than in date 0 blocks if and only if the probability of agency problems δ is low enough, that is, either

$$\delta \leq \frac{-cR + \lambda H^S(\lambda)\alpha R}{-cR + cH^S + \lambda H^S(\lambda)\alpha R - \lambda H^S(\lambda)H^N + \lambda H^S(\lambda)(1-\alpha)H^S} \tag{4}$$

or

$$\delta \leq \frac{R(H^S - H^N - c)}{cH^S + R(H^S - H^N - c)} \tag{5}$$

is satisfied. If neither (4) nor (5) is satisfied, then he prefers to buy blocks at date 0.

Condition (4) gives the parameter region in which the restructuring specialist prefers to buy shares from many small investors at date 1 rather than buying blocks at date 0. Condition (5) describes the parameter region in which he prefers to engage in block trades at date 1 to buying blocks at date 0. Note that in the absence of costs associated with a date 1 block acquisition, block trades at date 1 would dominate block acquisitions at date 0. However, if these costs c are high enough, the restructuring specialist prefers to buy blocks at date 0.

On the other hand, if the restructuring specialist buys a position at date 0, he is wasting his special restructuring ability because he is tying up his scarce capital also in the good state, in which a restructuring is not needed. Buying blocks at date 1 avoids this. If the probability of agency problems (δ) is low enough, this advantage of buying blocks at date 1 is particularly important. Hence, the restructuring specialist prefers to invest in buying blocks at date 1 if and only if δ is small enough.

[23]Even if λ is close to one, the restructuring specialist may never prefer to buy from many small investors. This will be the case if α is very small.

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D. The Firms' Date 0 Equity Ownership Structures

In Sections III.B and III.C, we analyzed the restructuring specialist's preferred investment choice. His preferred investment choice affects the firms' initial equity ownership structures, which are analyzed in this subsection. We show that a variety of equity ownership structures can occur, even though all firms are identical as of date 0.

1. The Coexistence of Concentrated Ownership and Dispersed Ownership

If the restructuring specialist invests his wealth at date 1 and prefers to buy blocks at date 1 by trading with many small investors, the restructuring policy implemented in a firm that has no date 0 blockholder may become sufficiently efficient to induce firms to have an initially dispersed ownership. The following proposition characterizes the equilibrium in what is, perhaps, the most interesting parameter region. The upper bounds on the restructuring specialist's wealth ensure that he cannot buy all firms with agency problems, either by trading with many small investors or in block trades with financial intermediaries.

Proposition 3. Suppose the restructuring specialist's wealth is scarce such that $W < \delta[c + \lambda(1-\alpha)H^S(\lambda)]$ and $W < \delta(c + H^N)$. If (3) and (4) hold and if

$$H^N > \frac{W}{\delta(c + (1-\alpha)\lambda H^S(\lambda))} H^S(\lambda)(1 - \alpha\lambda) \text{ and} \tag{6}$$

$$H^N < H^S(\lambda)(1 - \alpha\lambda) \text{ hold,} \tag{7}$$

then at date 0 a fraction $x^* = (WH^S(\lambda)(1-\alpha\lambda))/(H^N\delta(c + \lambda(1-\alpha)H^S(\lambda)))$ of firms issue shares only to individual small investors and a fraction $1 - x^*$ of firms issue all of their shares to one financial intermediary each.

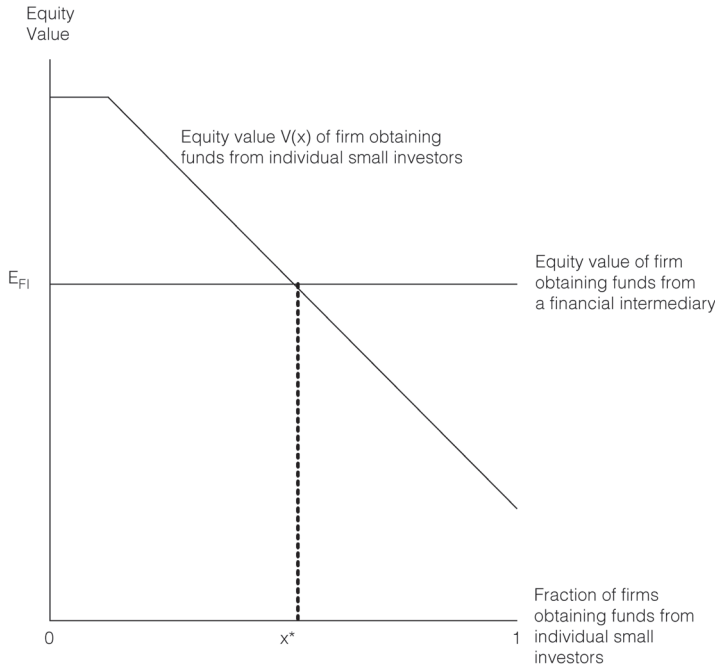
The proposition shows that firms with and without a date 0 blockholder can coexist, even though all firms are ex ante identical.[24] The situation is portrayed in Figure 2. Note that the efficiency of the restructuring policy by a financial intermediary does not depend on the fraction of firms that have no date 0 blockholder. Hence, in Figure 2, the equity value of firms that obtain funds from financial intermediaries is a horizontal line. However, the efficiency of the restructuring policies in firms that have no date 0 blockholder decreases as the fraction of firms that have no date 0 blockholder increases. In particular, the larger the fraction of firms that have no date 0 blockholder, the less likely it is that an individual firm will be taken over by the restructuring specialist after the firm experiences agency problems. This is because the restructuring specialist's wealth is limited. All firms with dispersed ownership have to share the scarce resources of the restructuring specialist. The fraction of firms that have no date 0 blockholder adjusts so that all firms are indifferent between obtaining funds from a financial intermediary and from individual small investors. In Figure 2, x^* denotes the fraction of firms

[24] If (3), (4), (6), and (7) hold but not (5), there is also an equilibrium with all firms having a date 0 blockholder. This is proved in the proof of Proposition 3.

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FIGURE 2

Coexistence of Firms With and Without Date 0 Blockholder



without a date 0 blockholder that makes firms indifferent between having and not having a date 0 blockholder.

There are three disadvantages to dispersed ownership. The effectiveness of restructuring is reduced, because the restructuring specialist cannot buy the whole firm at date 1 from many small investors, but only a fraction λ. Moreover, the restructuring specialist's wealth is limited, so he cannot take over all firms with agency problems, and hence some firms with initially dispersed ownership that experience agency problems are not restructured at all. In addition, liquidity traders have to share the surplus generated by trading with the restructuring specialist, and the entrepreneur has to compensate investors for this. Despite these disadvantages of initially dispersed ownership, this ownership structure can still be optimal. This is because there is an offsetting advantage: if firms with initially dispersed ownership are restructured, they are restructured in the most effective way because they are restructured by the restructuring specialist with his superior restructuring capability.

For coexistence to occur, conditions (6) and (7) must be satisfied. Condition (6) says that the value of a firm with initially dispersed ownership is smaller than that of a firm with a financial intermediary as its date 0 blockholder if all firms have initially dispersed ownership. Then, the probability that the restructuring specialist takes over an individual firm with initially dispersed ownership after it experiences agency problems at date 1 is as low as possible. If, despite this low probability of a takeover, firms preferred to rely on the takeover mechanism for

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restructuring, then no firm would rely on the restructuring of a financial intermediary as its date 0 blockholder. Condition (7) says that the value of a firm with a financial intermediary as its date 0 blockholder is smaller than the value of a firm with initially dispersed ownership if there are so few firms with initially dispersed ownership that each of them is guaranteed to be taken over by the restructuring specialist after experiencing agency problems at date 1. If, despite this maximal probability of a takeover by the restructuring specialist, firms preferred to rely on the restructuring of a financial intermediary as their date 0 blockholder, then no firm would have initially dispersed ownership.

2. Only Concentrated Ownership or Only Dispersed Ownership

If the restructuring policy implemented by the restructuring specialist is sufficiently more effective than that implemented by a financial intermediary, all firms have an initially dispersed ownership. In Figure 2, this will be the case if $V(1)$ is greater than E_{FI}. On the other hand, all firms may prefer to have a blockholder at date 0. This will occur if the disadvantages of dispersed ownership discussed above are particularly severe. In Figure 2, this will be the case if $V(0)$ is less than E_{FI}. These results are summarized in Proposition 4. Of course, dispersed ownership can only be optimal if the restructuring specialist is willing to invest his wealth in acquiring date 1 blocks from many small investors.

Proposition 4. Suppose $W < \delta(c + H^N)$, $W < \delta[c + \lambda(1 - \alpha)H^S(\lambda)]$, and (3) and (4) hold. If (6) does not hold, then no firm has a date 0 blockholder. If (7) does not hold, then all firms have a date 0 blockholder.[25]

Recall that if the restructuring specialist is not active in the date 1 stock market, buying from many small investors, then firms that have no date 0 blockholder are never restructured. Then, having an initially dispersed ownership is always less efficient in terms of restructuring decisions and is strictly dominated by having a date 0 blockholder, even if he is a financial intermediary. This is formalized in

Proposition 5. Suppose $W < \delta(c + H^N)$ and $W < \delta[c + \lambda(1 - \alpha)H^S(\lambda)]$ and (4) does not hold. Then all firms have a date 0 blockholder. Suppose (4) holds, but (3) does not hold. Then there is an equilibrium in which all firms have a date 0 blockholder.[26]

[25] If (3) and (4) hold but (5) and (6) do not hold, there is also an equilibrium in which all firms have a date 0 blockholder. If (3) and (4) hold and $H^N = H^S(\lambda)(1 - \alpha\lambda)$ (so that not (7) holds with equality), there is a continuum of equilibria in which the fraction of firms with dispersed ownership is $x^* \in [0, W/(\delta(c + \lambda(1 - \alpha)H^S(\lambda)))]$. In all those equilibria, the restructuring specialist restructures in the bad state all firms with initially dispersed ownership.

[26] If (4) holds but (3) and (6) do not hold, there is also an equilibrium in which all firms have dispersed ownership. There is an additional equilibrium in which firms with dispersed and concentrated ownership coexist and the restructuring specialist invests in buying blocks from financial intermediaries as well as buying blocks from many small investors in the bad state at date 1 if (4) holds but not (3) and not (6) and not (6) holds as a strict inequality.

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IV. Implications for Ownership Structures

In this section, we consider how the fraction of firms with dispersed ownership varies with the exogenous parameters, to demonstrate the implications for equity ownership structures. We assume throughout the remainder of the analysis that the restructuring specialist's wealth is scarce, that is, $W < \delta[c + \lambda(1 - \alpha) H^S(\lambda)]$ and $W < \delta(c + H^N)$. We formulate the results such that they describe unique pure strategy equilibrium outcomes. We can do so because we have calculated all possible pure strategy equilibrium outcomes in Propositions 3, 4, and 5 and footnotes 24, 25, and 26, from which all subsequent propositions arise.

A. Stock Market Liquidity and Ownership Structure

Proposition 6 summarizes the effect of liquidity on ownership structures. We measure liquidity in our model by the extent of liquidity selling (λ).

Proposition 6. If the extent of liquidity selling λ is below a critical value, λ_L, there are no firms with dispersed ownership.

The restructuring specialist's payoff from trading with many small investors at date 1 increases strictly in the extent of liquidity selling. For very low values of λ, this payoff is lower than the restructuring specialist's payoff from investing his wealth at date 0. Hence, if there is insufficient liquidity selling, the restructuring specialist will not buy shares from many small investors at date 1. However, then no firm will have a dispersed ownership, as shown in Proposition 5.

If there is sufficient liquidity selling, there may be some firms with dispersed ownership if (7) from Proposition 3 holds. However, the effect of a further increase in liquidity selling on the extent of dispersed ownership is ambiguous. On the one hand, dispersed ownership becomes more attractive, because the restructuring by the restructuring specialist becomes more effective if he owns a larger block. On the other hand, a larger fraction of liquidity sellers means that more investors will sell their shares below their full value if the restructuring specialist trades with them. This reduces the attractiveness of dispersed ownership. The net effect is ambiguous.

B. Scarcity of the Restructuring Specialist's Wealth

The next Proposition describes the impact of the wealth of the restructuring specialist on ownership structures.

Proposition 7. Suppose that (3), (4), and (5) hold. If the wealth of the restructuring specialist W is sufficiently large, all firms have dispersed ownership. If the wealth of the restructuring specialist is small enough and (7) holds, firms with dispersed and concentrated ownership coexist. The proportion of firms with dispersed ownership strictly decreases as W becomes smaller.

The rationale for this result is as follows: If the restructuring specialist prefers to buy shares at date 1 from many small investors to buying firms at date 0, dispersed ownership can be optimal. If the restructuring specialist's wealth is large enough, he can buy many firms with agency problems and dispersed ownership at

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date 1. Hence, the probability that a firm with dispersed ownership is restructured in the bad state is high. If the restructuring specialist's wealth is high enough, relying on his restructuring is so attractive that even if all firms do so, dispersed ownership dominates concentrated ownership. Hence, all firms have dispersed ownership. If the restructuring specialist's wealth is smaller, concentrated ownership is not dominated and hence firms with dispersed and concentrated ownership coexist. If the restructuring specialist's wealth is smaller, he can take over fewer firms with agency problems and dispersed ownership. This makes dispersed ownership less attractive for a given fraction of firms with dispersed ownership. Hence, for firms to remain indifferent between dispersed and concentrated ownership as W decreases, fewer firms must have dispersed ownership.

C. The Restructuring Ability of Financial Intermediaries

The coalitions of small investors, the financial intermediaries, may be plagued to a greater or lesser extent by agency problems, regulations, or other obstacles that affect their ability to restructure. The next proposition describes the effect of the restructuring effectiveness of the financial intermediaries on ownership structures:

Proposition 8. If H^N is low enough, there are no firms with dispersed ownership. If H^N is intermediate, some firms have dispersed ownership and the fraction of firms with dispersed ownership strictly decreases as H^N increases. If H^N is high enough, there are no firms with dispersed ownership.

For dispersed ownership to exist, the restructuring specialist must invest his wealth in date 1 blocks and buy shares from many small investors. However, if financial intermediaries are sufficiently bad at restructuring (so that (4) does not hold), the restructuring specialist will want to invest at date 0 (or engage in block trades at date 1). The reason is that he is then "competing" with the restructuring services of the financial intermediaries, extracting the entire surplus from his superior restructuring ability. If the financial intermediaries are very inept at restructuring, this surplus will be so large that it is more profitable for the restructuring specialist to buy date 0 blocks (or engage in block trades at date 1) than to assemble blocks by trading with many small investors. Hence, all firms have concentrated ownership.

If the financial intermediaries are better at restructuring, the restructuring specialist may prefer to invest his wealth at date 1 in assembling blocks by trading with many small investors rather than purchasing blocks at date 0. Then, as the restructuring capabilities of the financial intermediaries improve, relying on their restructuring activity becomes more attractive for all firms. For all firms to remain indifferent between concentrated and dispersed ownership, dispersed ownership must also become more attractive. This will be the case if fewer firms with dispersed ownership have to share the scarce resources of the restructuring specialist. In Figure 2, one can see that an increase in the value of the firm with a financial intermediary as its blockholder, which is generated by an increase in the financial intermediaries' restructuring capability, will lead to a reduction in x^*, the equilibrium fraction of firms with dispersed ownership. Finally, if the restructuring

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capabilities of the financial intermediaries are very good (so that (7) does not hold), no firm wants to rely on the restructuring by the restructuring specialist at date 1, and all firms have a date 0 blockholder. In summary, for very large or very small values of the financial intermediaries' restructuring ability, there are no firms with dispersed ownership. Of course, the values of the other parameters determine which values of the financial intermediaries' restructuring ability are high or low enough to rule out dispersed ownership. For intermediate restructuring ability by the financial intermediaries, at least some firms have dispersed ownership, and the fraction of firms with dispersed ownership decreases as the financial intermediaries' restructuring ability increases.

Note that in our model, dispersed ownership can only exist if the restructuring specialist is better at restructuring than the financial intermediaries. The reason is that dispersed ownership has only one advantage in our model: it gives a firm the chance of being restructured by the restructuring specialist, who is more effective at restructuring than the financial intermediaries.

D. The Prevalence of Agency Problems in Firms

The parameter δ, the probability of receiving bad news at date 1, can be interpreted as a measure of the extent of agency problems. It measures the likelihood that the entrenched managers will not respond to a realized date 1 state of the world in the shareholders' interests and hence a restructuring is needed. The next proposition states how the probability of agency problems δ affects ownership structures.

Proposition 9. If the probability of experiencing agency problems δ is above a critical value, there are no firms with dispersed ownership. If δ is below this critical value and (3) and (7) hold, there are some firms with dispersed ownership and their fraction strictly increases as δ decreases further. If δ is below a critical value and (3) holds, all firms have dispersed ownership.

If the probability of experiencing agency problems is sufficiently high, the restructuring specialist prefers to buy blocks at date 0 rather than buying blocks by trading with many small investors at date 1 (see the discussion that follows Proposition 2). Then dispersed ownership is strictly dominated, because no firm with dispersed ownership is restructured (see Proposition 5). Now consider the case in which δ lies below that critical value. If having a date 0 blockholder is not always more efficient than dispersed ownership (if (7) holds) and the restructuring specialist prefers to buy shares from many small investors rather than from existing blockholders (if (3) holds), there will be some firms with dispersed ownership. However, the lower δ is, the fewer firms with dispersed ownership need to share the scarce resources of the restructuring specialist, which makes dispersed ownership more attractive. Hence, in order for firms to remain indifferent between dispersed and concentrated ownership, there must be more firms with dispersed ownership. Finally, if δ becomes very small (so that (6) does not hold), having dispersed ownership dominates concentrated ownership. This arises because there are then so few firms with agency problems that the probability of being taken over by the restructuring specialist when agency problems arise is

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sufficiently high, even if all firms have dispersed ownership. Then, relying on the restructuring by the restructuring specialist is more attractive than relying on the restructuring by financial intermediaries. Hence, all firms have dispersed ownership.

V. Implications for the Behavior of the Restructuring Specialist

In this section, we investigate the conditions under which the restructuring specialist buys blocks at date 0, engages in block trades with financial intermediaries at date 1, and assembles blocks at date 1 by trading with many small investors. Note that these implications arise from the equilibrium analysis of the model, whereas Propositions 1 and 2 just state preferences of the restructuring specialist.

If the restructuring ability of the financial intermediaries (H^N) is high enough, the restructuring specialist will buy only blocks at date 0. In particular, if H^N is sufficiently high, concentrated ownership dominates dispersed ownership (because (7) does not hold). Hence, all firms have concentrated ownership (see Proposition 4). Moreover, for a high enough H^N, the restructuring specialist prefers to buy blocks at date 0 to engaging in block trades at date 1. The reasoning is as follows: Both the restructuring specialist's profits from block trades with financial intermediaries at date 1 and his profits from purchases of date 0 blocks are decreasing in H^N because the restructuring specialist gains only from the value that he can create beyond that which financial intermediaries can generate. However, his profits from block trades at date 1 decrease more strongly in H^N. The reason for this is that the restructuring specialist creates value only in the bad state, which occurs only with probability δ from the perspective of date 0 block purchases. However, when the restructuring specialist engages in block trades with financial intermediaries at date 1, he creates value with probability one because he acquires firms only if they experience agency problems. Hence, for a high enough H^N, the restructuring specialist prefers to buy blocks at date 0 to engaging in block trades at date 1.

In contrast, if the restructuring ability of the financial intermediaries is small enough, the restructuring specialist will engage in block trades at date 1. Block trades are particularly attractive if H^N is low because then the restructuring specialist can add much greater value than a financial intermediary. This makes block trades more attractive than assembling blocks from many small investors at date 1 (recall that profits from this strategy do not depend on the restructuring ability of the financial intermediaries) and date 0 block purchases (because the profits from this strategy increase at a lower rate than the profits from block trades as H^N decreases). The preceding discussion is summarized in Proposition 10:

Proposition 10. If H^N is large enough, the restructuring specialist buys only blocks at date 0. If H^N is small enough, he engages only in block trades with financial intermediaries at date 1.

How does the restructuring specialist's behavior depend on the probability of agency problems δ? As was indicated after Proposition 2, the restructuring

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specialist prefers to invest his wealth at date 1 if the probability of agency problems is sufficiently low and at date 0 if it is sufficiently high. The reason is that the restructuring specialist would waste his scarce wealth if the chance of agency problems was small and he invested his wealth at date 0. However, if agency problems are sufficiently likely, it is more profitable for him to invest at date 0. One reason for this is that date 1 block acquisitions are costly. Proposition 11 shows that, indeed, in equilibrium, the restructuring specialist invests his wealth at date 1 if the probability of agency problems is low enough, but at date 0 if it is high enough.

Proposition 11. If δ is small enough, the restructuring specialist invests his wealth only at date 1. If δ is large enough, he buys blocks only at date 0.

Finally, how does the restructuring specialist's behavior depend on his own restructuring ability H^S? If H^S is small enough, he does not engage in block trades with financial intermediaries. The lower H^S is, the lower the profits from block trades at date 1, since the restructuring specialist gains only from the value he can generate that goes beyond that which financial intermediaries can create, H^N. This is low for sufficiently low H^S. However, the profits from buying blocks from many small investors do not depend on H^S. While the profits from block purchases at date 0 also decrease as H^S decreases, they decrease at a slower rate than the profits from date 1 block acquisitions. This is so for the same reason that was provided in the discussion before Proposition 10, regarding the effect of H^N on the profits from block trades at date 1 and block purchases at date 0, respectively. The restructuring specialist creates value only in the bad state, which occurs only with probability δ from the perspective of date 0 block purchases. However, when the restructuring specialist engages in block trades with financial intermediaries at date 1, he creates value with probability 1, because he acquires firms only if they are in the bad state and hence have agency problems. The restructuring specialist will engage in block trades with financial intermediaries at date 1 if his restructuring ability is sufficiently strong. The reason is that his profits from block trades at date 1 increase the most with an increase in his restructuring ability, as discussed above. Proposition 12 formalizes the preceding discussion.

Proposition 12. Assume that $(1 - \delta)R > c\delta$. If H^S is small enough, the restructuring specialist buys blocks from many small investors at date 1 or buys blocks at date 0. If H^S is large enough, he engages only in block trades with financial intermediaries at date 1.

VI. Empirical Implications

Our model generates a number of empirical implications about ownership structures, as well as the behavior of "restructuring specialists" and hence restructuring mechanisms. For simplicity, we refer to the restructuring specialists below only as rich investors. First, we discuss the implications for restructuring mechanisms. Then we turn to the implications for ownership structures. Unless otherwise stated, our predictions are for ownership structures in normal times, when the firm is not undergoing a restructuring (corresponding to date 0 in our

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model). During a restructuring, our model predicts a concentration of ownership if rich investors take positions in these firms.

A. Predictions for Differences in the Nature of Restructurings across Economies

According to our model, the behavior of rich investors depends on the probability of agency conflicts occurring. In particular, if economy-wide agency problems are likely enough, there are no hostile takeovers or block trades. However, if agency problems are sufficiently unlikely, hostile takeovers or block trades occur (Proposition 11). Hence, if one measures the probability of agency problems by the quality of corporate governance, this suggests that hostile takeovers are more likely in countries with better corporate governance. While we are not aware of empirical evidence directly testing this prediction, country-wide corporate governance scores could be constructed from firm level corporate governance scores, as reported mainly for emerging markets, for example in Durnev and Kim (2005) and Klapper and Love (2004). If one uses the shareholder rights index in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) as a measure of corporate governance quality, our prediction is consistent with the findings in Schneper and Guillén (2004). They find that in a sample of 37 countries, the frequency of hostile takeovers increases as the extent to which shareholder rights are protected increases.

Another determinant of the importance of state-contingent restructuring in our model is the restructuring ability of financial intermediaries. If financial intermediaries are sufficiently good at restructuring, rich investors are permanent blockholders, and there are no takeovers or block trades (Proposition 10); but if financial intermediaries are worse, takeovers and block trades can occur. This is also consistent with the evidence in Schneper and Guillén (2004). They find that the frequency of hostile takeovers is decreasing in the protection of banks' rights, as measured by the index in Barth, Caprio, and Levine (2001). This can be seen as an imperfect proxy for the restructuring ability of at least one important type of financial intermediary, banks.

Our model also predicts that rich investors are likely to engage in block trades if they are particularly good at restructuring (Proposition 12).

B. Predictions for Differences in Ownership Structures across Economies

Our theory predicts that there are more firms with dispersed ownership if economy-wide agency problems are less likely (Proposition 9). Agency problems should be less likely if country-wide corporate governance is better. This prediction is consistent with the finding that countries with better investor protection have more dispersed ownership (La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), La Porta, Lopez-de-Silanes, and Shleifer (1999)), if one uses investor protection as a measure of corporate governance. Our theory would predict that to the extent that there is a difference between corporate governance and investor protection (although the two are presumably positively correlated),

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corporate governance should matter for ownership structures even if one controls for legal origin or investor protection.

A time-series prediction would discriminate more between the law and finance argument and our theory.[27] We predict that as corporate governance improves in a country, there is more dispersed ownership and less ownership by financial intermediaries. While we are not aware of any large sample evidence to support this prediction, it is consistent with the tendency of increased dispersed ownership in several countries after corporate governance improved (see also the discussion in Denis and McConnell (2003), p. 28). Recently, corporate governance has improved markedly in Germany, through a reform of the supervisory board of directors in 1998 that limited the powers of the management board (Wójcik (2003), Hopt (1998), and Hackethal, Schmidt, and Tyrell (2003)), tightening of insider trading regulations, and the introduction of stronger federal supervision of the stock market (Hackethal, Schmidt, and Tyrell (2003)).[28] Consistent with our prediction, Wójcik (2003), van der Elst (2000), and Coffee (2001) find a substantial decrease in ownership concentration in Germany, and, in particular, a reduction of bank ownership stakes. A similar trend toward more dispersed ownership after corporate governance improvements has also been observed for Japan (Hansmann and Kraakman (2001), Coffee (2001)).[29]

The opportunity and incentives for managers to engage in self-serving and value-reducing actions also affect the extent of economy-wide agency problems. While it is not easy to measure the opportunity for managers to destroy value, the availability of free cash flow (Jensen (1986)) is one such opportunity. This may be a more severe problem during booms than during recessions, in particular for large firms (see Dow, Gorton, and Krishnamurthy (2005) and Philippon (2006)). Thus, if aggregate free cash flow is likely to be high in the future (as may be the case at the beginning of a boom), our model predicts a smaller fraction of firms with dispersed ownership.

Our model implies that the fraction of firms with dispersed ownership increases with the capital available to rich investors if they are active in the takeover market (Proposition 7). While our model refers to equity ownership structures, similar phenomena might be observed in the debt market. Our model predicts that debt ownership in the U.S. should have become less concentrated as rich investors have increased their involvement in vulture funds.

Our model also implies that the fraction of firms with dispersed ownership is lower if financial intermediaries are better at restructuring, as long as the

[27]Rajan and Zingales (2003) argue that structural theories, such as the law and finance argument, have some difficulty in explaining changes in a country's financial system (such as ownership structures or the variable they focus on in their paper, financial development), since a country's structural factors (for example, a country's legal origin) are relatively time-invariant.

[28]Nowak (2004) also discusses recent improvements in shareholder protection and corporate governance in Germany.

[29]Hansmann and Kraakman (2001) show that board structures in Japan have moved toward more effective, smaller boards with a sufficient number of outside directors. Coffee (2001) finds that bank (and corporate) ownership stakes decreased substantially from 1998 to 1999, not only in Germany, but also in Japan and France.

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restructuring ability of financial intermediaries is not too low (Proposition 8).[30] Moreover, for dispersed ownership to exist, stock market liquidity must be high enough (Proposition 6). Hence, we predict little dispersed ownership if stock markets are illiquid. However, it would not be easy to determine the direction of causation between liquidity and ownership concentration because ownership concentration could also affect liquidity.[31]

C. Other Predictions

Our model predicts that rich investors should be temporary blockholders after takeovers and block trades because agency-cost free capital is scarce. Hence, once a firm is restructured, we should expect rich investors to cash out so that they can employ their scarce agency-cost free capital in other firms that are in greater need of their restructuring expertise. This is not shown formally in our model because we do not model the divestment stage, but it could be shown in a more general model. Consistent with this prediction, we observe that many LBOs undergo reverse LBOs after a short period of time, with the LBO funds cashing out to an important extent (Kaplan (1991)).

VII. Conclusion

Effective corporate blockholders are scarce; otherwise, agency problems would not matter much. One reason for this scarcity of effective blockholders is that most large investors are beset by internal agency problems. We assume that the wealth of such effective blockholders or "restructuring specialists" is scarce and analyze how this scarce resource is allocated. We show that the allocation of scarce agency-cost free capital has rich implications for corporate ownership structures and restructuring mechanisms.

The state-contingent allocation of the wealth of restructuring specialists corresponds to a takeover. Restructuring specialists have an incentive to deploy their scarce resources where they are needed most, and hence to acquire blocks in situations in which a restructuring may be needed most. If the securities markets are liquid enough, they are likely to prefer assembling blocks by trading with many small investors to making block trades with existing blockholders. Then, it may be optimal for some firms to have an initially dispersed ownership and rely for restructuring on the state-contingent block acquisitions by restructuring specialists. The special restructuring ability of these investors may compensate for the disadvantages associated with dispersed ownership. Due to the scarcity of the restructuring specialists, financial intermediaries have two important roles.

[30] Measures that could serve to some extent (and only for banks) as proxies for the restructuring ability of financial intermediaries are, for example, the index of banks' rights in Barth, Caprio, and Levine (2001) and measures of the extent to which countries' financial systems are bank-based in Levine (2002).

[31] We are grateful to an anonymous referee for pointing this out.

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First, they may provide some restructuring as permanent blockholders. Second, they can act as block providers for restructuring specialists, facilitating their block acquisitions.

Neither concentrated nor dispersed ownership need be dominant ownership structures. Firms with concentrated and dispersed ownership can coexist, while being otherwise identical. We show that the fraction of firms with dispersed ownership is larger if the probability that a restructuring is needed is lower, the restructuring specialists have more wealth or capital available to them (as long as they are active in the takeover market), and the restructuring ability of the financial intermediaries is lower (as long as it is not too low). Our theory can explain a number of empirical findings regarding differences in restructuring mechanisms and corporate ownership structures between countries: for example, why the frequency of hostile takeovers increases as investor protection increases and decreases as bank powers increase (Schneper and Guillén (2004)); why, in some countries such as Germany and Japan, recent improvements of corporate governance have led to more dispersed ownership structures; why the most aggressive and value-increasing restructuring activities occur after state-contingent block acquisitions by rich investors; and why rich investors are much more likely to engage in takeovers than institutional investors. The model also generates a number of additional testable empirical implications.

Several additional issues could be analyzed in the framework of this paper. We have focused on the ability of blockholders to implement a restructuring when it is needed most. However, we have abstracted from one other important element of shareholder activism. Permanent blockholders could also reduce the probability that a restructuring is needed (in our model, reduce δ). Then, having a permanent blockholder would be more attractive than in our model, and there would be less dispersed ownership. Moreover, it is sometimes claimed that some firms are too big to be restructured effectively. If the wealth of the restructuring specialists is scarce, even they may not be able to hold a block of sufficient size to implement a restructuring, or they might be too risk averse to hold substantial blocks in very large firms. In these cases, financial intermediaries, who are less effective at restructuring, must restructure very large firms. To address this issue, our model would have to be extended to allow for some firm heterogeneity ex ante.

Appendix. Lemmas and Proofs

Lemma 1. No financial intermediary that is a date 0 blockholder sells shares of a firm at date 1 to small investors or to another financial intermediary. If the restructuring specialist is a date 0 blockholder, he does not sell shares at date 1.

Proof of Lemma 1. There is no sale of shares in the good state because the firm is worth the same to all investors. In the bad state, no date 0 blockholder would sell shares to many small investors. This would just reduce the value of the firm due to (1). The price at which these shares could be sold would reflect this. They will also not sell the whole firm to small investors because then it is known to be worth zero and hence less than if the blockholder held on to the block. Moreover, neither a financial intermediary nor the restructuring specialist will sell the firm to a financial intermediary. Note that we have to be concerned only about sales of the whole firm, because of (1). The financial intermediary can bid up to H^N,

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which is no more than the existing blockholder generates if he is a financial intermediary and less than that if he is the restructuring specialist. □

Lemma 2. If $c > \alpha\lambda H^N(\lambda)$, financial intermediaries will not acquire blocks at date 1.

Proof of Lemma 2. A financial intermediary will not buy blocks at date 1 from other financial intermediaries or the restructuring specialist (see Lemma 1). It might assemble blocks of size λ by trading with many small investors in the bad state but not in the good state because the value of a firm in the good state is known to be R regardless of its ownership structure. It would pay $(1-\alpha)\lambda H^N(\lambda)+c$ (per measure one of firms). Hence, it would have a profit of $\alpha\lambda H^N(\lambda) - c$ per measure one of firms. But if $c > \alpha\lambda H^N(\lambda)$, this is negative. Hence, the financial intermediary will not assemble blocks in the bad state at date 1. □

Proof of Proposition 1. If the restructuring specialist buys a fraction λ of each firm from many small investors, he pays $(1-\alpha)\lambda H^S(\lambda)+c$ per measure one of firms and hence has a profit of $\alpha\lambda H^S(\lambda) - c$ per measure one of firms he takes over. He can take over a measure $1/(c + \lambda(1 - \alpha)H^S(\lambda))$ of firms with one dollar, and hence his profit from trading with many small investors is $(1/((1-\alpha)\lambda H^S(\lambda)+c))\ (\alpha\lambda H^S(\lambda) - c)$ per dollar invested. This is the left-hand side of (3). If the restructuring specialist engages in block trades, he pays H^N and also incurs costs c per measure one of firms he buys. Hence, his profit per measure one of firms he buys is $H^S - H^N - c$. He can buy a measure $1/(H^N + c)$ of firms with one dollar, and hence his profit from block trades is $(H^S - H^N - c)/(H^N + c)$ per dollar invested. This is the right-hand side of (3). □

Proof of Proposition 2. An investor who buys a block at date 0 will acquire the entire firm in any pure strategy equilibrium (we consider only pure strategy equilibria). The reason for this is as follows: First, if a financial intermediary wins shares in the auction, it bids for and wins 100% of the firm and offers a price for the 100% block of $(1 - \delta)R + \delta H^N(1) - I$ per measure one of firms (in the following, we will sometimes leave out the phrase "per measure one of firms" for simplicity). This is the equity value of the firm that has the financial intermediary as its sole owner (which is the same whether the financial intermediary restructures the firm itself or sells it to the restructuring specialist in the bad state at date 1). In all situations in which a financial intermediary wins shares in the auction, there is an equilibrium in which a financial intermediary bids $(1 - \delta)R + \delta H^N(1) - I$ for the whole firm and wins all of its shares, other financial intermediaries bid the same, and small investors bid no higher (if the restructuring specialist does not bid). The winning financial intermediary makes zero profits and bids as high as possible without losing money. The other financial intermediaries and the small investors lose the auction and make zero profits. They cannot bid higher and win the auction without losing money. There is no other equilibrium in which a financial intermediary would win 100% of the shares at a higher price than $(1 - \delta)R + \delta H^N(1) - I$ because then it would lose money, or at a lower price, because then the financial intermediaries could bid higher and win the auction without losing money. There is also no equilibrium in which a financial intermediary wins less than 100% of the firm but becomes the largest blockholder. The combined bid of the financial intermediary bidding for the largest block of size θ (that is, for a fraction θ of the firm) with the other investors bidding for the remainder of the shares could be at most $(1 - \delta)R + \delta H^N(\theta) - I$ for 100% of the firm. Otherwise, the investors would lose money. But such a bid cannot win in equilibrium because then the financial intermediaries could bid higher by bidding for a larger fraction of the firm and win the auction without losing money, since $\partial H^N(\theta)/\partial\theta > 0$, due to (1).

Second, if the restructuring specialist wins shares in the auction, he also bids $(1 - \delta)R + \delta H^N(1) - I$ for 100% of the firm and wins 100% of the shares. There is an equilibrium

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in which the restructuring specialist bids like this, and the financial intermediaries bid the same (and the small investors bid no higher). The entrepreneur resolves the indifference by picking the restructuring specialist's bid. The restructuring specialist has no incentive to deviate. He cannot bid lower and win the auction, since the financial intermediaries bid the same amount. Bidding higher just reduces his profits. He also cannot do better by bidding only for part of the firm. He would have to pay at least $\theta((1-\delta)R+\delta H^N(1)-I)$ for his fraction θ to win the auction. If he wins the auction together with other investors, his profits are lower, because the fraction of the firm he wins is worth less under his partial ownership than under his complete ownership as in the candidate equilibrium, due to (1). Note that for a given price (for a measure one of firms) he does not benefit from buying a smaller fraction of the equity (for example, half) in each firm although this allows him to buy a larger measure of firms (for example, twice as many). This advantage is offset by the fact that he then also receives only a smaller fraction (for example, half) of the firm's payoffs. Given the restructuring specialist's bid for the whole firm, the small investors and financial intermediaries lose the auction and make zero profits. They cannot bid higher than the restructuring specialist without losing money. Note that there is no equilibrium in which the restructuring specialist bids $(1-\delta)R+\delta H^N(1)-I$ for the whole firm and loses the auction. He then could do better by bidding slightly higher, winning the auction, and making a profit.

There is no other equilibrium in which the restructuring specialist bids for the whole firm and wins the auction but offers to pay a higher price than $(1-\delta)R+\delta H^N(1)-I$. Such an equilibrium could only be sustained if the small investors or financial intermediaries bid the same amount but do not get any shares because the entrepreneur resolves the indifference by accepting the bid by the restructuring specialist. But then they would have negative expected profits, because they would win the auctions in which the restructuring specialist does not bid but pay more than the firm is worth under their ownership (recall that they do not observe for which firms the restructuring specialist bids and that the restructuring specialist cannot buy all firms due to his limited wealth). There is also no equilibrium in which the restructuring specialist buys the whole firm but pays less than $(1-\delta)R+\delta H^N(1)-I$ because then the financial intermediaries could bid higher and win the auction without losing money.

There is also no equilibrium in which the restructuring specialist acquires parts of firms. As pointed out in the model section, we consider only bids in which investors that end up winning shares in the firm pay the same price. For this to be an equilibrium, this price must be at least $(1-\delta)R+\delta H^N(1)-I$ (otherwise the financial intermediaries could bid higher and win the auction without losing money) and give the small investors (or financial intermediaries) who win the shares in the firm that the restructuring specialist does not bid for zero expected profits. However, the restructuring specialist can do better by bidding slightly higher and for the whole firm because the firm is worth more under his complete ownership due to (1).

We have established that if the restructuring specialist bids at date 0, he wins the auction by paying $(1-\delta)R+\delta H^N(1)-I$ for the whole firm. The firm is worth $(1-\delta)R+\delta H^S(1)-I$ with the restructuring specialist as its sole owner. Recall that we often write H^S for $H^S(1)$ and H^N for $H^N(1)$. Hence, the restructuring specialist makes a profit of $\delta(H^S-H^N)$ per measure one of firms he buys at date 0. Since the price for a measure one of firms is $(1-\delta)R+\delta H^N-I$ and the restructuring specialist has to spend I per measure one of firms for investment outlays, he can acquire a measure $1/((1-\delta)R+\delta H^N)$ of firms per dollar invested. Hence, per dollar invested at date 0 the restructuring specialist's profits are $(\delta(H^S-H^N))/((1-\delta)R+\delta H^N)$. One can obtain conditions (4) and (5) by solving the relevant two inequalities (profits from the date 1 strategy when buying from many small investors (the left-hand side of (3)) and profits from the date 1 strategy when buying from

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financial intermediaries (the right-hand side of (3)), respectively, versus profits from the date 0 strategy) for δ. (Note that the denominator of (4) is always positive if buying shares from many small investors at date 1 is profitable because we have assumed that $R > H^S$. Note also that the denominator of (5) is always positive if buying blocks from financial intermediaries is profitable.) The profits from both date 1 strategies do not depend on δ while the profits from the date 0 strategy are strictly increasing in δ. Hence, there is a unique cut-off value for δ above which the date 0 strategy is more profitable than each of the two date 1 strategies. □

Proof of Proposition 3. Given the bidding behavior of the small investors and financial intermediaries, the restructuring specialist spends all his wealth on buying shares from many small investors at date 1. He cannot do better, since this is his preferred investment choice, because (3) and (4) hold. (One can show that there is no equilibrium in which he does not spend all his wealth in this way). The entrepreneur can sell all the equity of the firm to a financial intermediary for $(1-\delta)R+\delta H^N - I$, which is what a financial intermediary bids for 100% of the firm. Given that financial intermediaries behave competitively, each of them bids as high as possible without losing money. Hence, each financial intermediary bids exactly the date 2 payoff of the firm minus the amount I that it has to supply to finance the project and breaks even. Next we calculate the amount for which the entrepreneur could sell the equity to many small investors who do not form financial intermediaries. The small investors also bid as high as possible without losing money. As a consequence, they bid such that they break even. Hence, they bid an amount equal to the small investors' payoff (which takes into account the equilibrium restructuring behavior of the restructuring specialist) minus I or:

$$E = (1-\delta)R + \delta\left(\frac{W}{\delta x(c+(1-\alpha)\lambda H^S(\lambda))}\right) \times (\lambda(1-\alpha)H^S(\lambda) + (1-\lambda)H^S(\lambda)) - I, \tag{A-1}$$

where x is the fraction of firms with dispersed ownership. (Note that one can easily show that $W/(\delta x(c+(1-\alpha)\lambda H^S(\lambda))) < 1$ and hence this is indeed a probability in the equilibrium $x = x^*$ below, due to (7)). The restructuring specialist buys a fraction λ of each firm's shares that he invests in. Hence, the small investors (who, as of date 0, face uncertainty about whether they will hold on to or sell their shares at date 1) will receive a payoff equal to the date 1 price of shares, $(1-\alpha)H^S(\lambda)$, with probability λ, and the continuation value of the firm, $H^S(\lambda)$, with probability $1-\lambda$. (A-1) can be written as

$$E = (1-\delta)R + \delta\left(\frac{W}{\delta x(c+(1-\alpha)\lambda H^S(\lambda))}H^S(\lambda)(1-\alpha\lambda)\right) - I. \tag{A-2}$$

This is strictly decreasing in x. Hence, as long as the restructuring specialist will not take over all firms with initially dispersed ownership in the bad state at date 1, the value of a firm having no date 0 blockholder depends on the fraction of firms with initially dispersed ownership. Therefore, if:

$$\frac{W}{\delta x(c+(1-\alpha)\lambda H^S(\lambda))}H^S(\lambda)(1-\alpha\lambda) \quad > \quad H^N \tag{A-3}$$

for $x = W/(\delta(c+(1-\alpha)\lambda H^S(\lambda)))$ (so that the restructuring specialist takes over all firms with initially dispersed ownership), as guaranteed by (7), and the inequality is reversed for $x = 1$, as guaranteed by (6), there exists an x^* for which the left-hand side of (A-3) equals the right-hand side. One can calculate that

$$x^* = \frac{WH^S(\lambda)(1-\alpha\lambda)}{\delta H^N(c+(1-\alpha)\lambda H^S(\lambda))}. \tag{A-4}$$

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Firms with dispersed and with concentrated ownership coexist if the equity value of a firm that has no date 0 blockholder is equal to the equity value of a firm with a financial intermediary as its date 0 blockholder, and hence the highest bids by small investors and by financial intermediaries are equal, and thus some auctions are won by small investors and some by financial intermediaries. This is the case if $x = x^*$. One can easily show that there is no other equilibrium if (5) holds.

However, no firm having a dispersed ownership ($x^* = 0$) is an equilibrium if (5) does not hold (see footnote 24). The restructuring specialist invests all his wealth at date 0 since there will be no firms with dispersed ownership available, and he prefers date 0 blocks to block trades with financial intermediaries because (5) does not hold. Hence, firms with dispersed ownership are never restructured and small investors can bid only $(1 - \delta)R - I$ without losing money if their bids would be accepted and thus lose all auctions. Note also that all firms having a dispersed ownership ($x^* = 1$) is also not an equilibrium if (5) does not hold because in this candidate equilibrium small investors would have to outbid financial intermediaries. But then they would lose money because small investors could bid at most $(1 - \delta)R + \delta\,(W/(\delta(c + (1 - \alpha)\lambda H^S(\lambda))))H^S(\lambda)(1 - \alpha\lambda) - I < (1 - \delta)R + \delta H^N - I$ (by (6)) without losing money. □

Proof of Proposition 4. If (3) and (4) hold, then the restructuring specialist prefers to invest his wealth in buying blocks at date 1 from many small investors. Then $x^* = 1$ is an equilibrium if (6) does not hold. Small investors bid $(1 - \delta)R + \delta\,(W/(\delta(c + (1 - \alpha)\lambda H^S(\lambda))))$ $H^S(\lambda)(1 - \alpha\lambda) - I \geq (1 - \delta)R + \delta H^N - I$ (because (6) does not hold), given that $x^* = 1$. Hence, small investors win all auctions and all firms have a dispersed ownership. It is easy to verify that there is no equilibrium with $x^* < 1$ if (5) holds but not (6).

However, $x^* = 0$ is an equilibrium if (5) does not hold (see footnote 25). In this equilibrium the restructuring specialist invests all his wealth at date 0 since there will be no firms with dispersed ownership available, and he prefers date 0 blocks to block trades with financial intermediaries because (5) does not hold. Hence, firms with dispersed ownership are never restructured and small investors can bid only $(1 - \delta)R - I$ without losing money if their bids would be accepted and thus lose all auctions. It is easy to show that there is no equilibrium with $x^* \in (0, 1)$.

If (3) and (4) hold but not (7) and the latter is a strict inequality ($H^N > H^S(\lambda)(1-\alpha\lambda)$), there is an equilibrium with $x^* = 0$. The restructuring specialist invests his wealth in block trades with financial intermediaries (if (5) holds) or date 0 blocks (if (5) does not hold) because there are no firms with dispersed ownership. Even if small investors bid $(1 - \delta)R + \delta H^S(\lambda)(1 - \alpha\lambda) - I$—the highest they could ever bid without losing money—this would still be below $(1 - \delta)R + \delta H^N - I$, and hence they lose all auctions. For the same reason, there is no equilibrium with $x^* > 0$. If $H^N = H^S(\lambda)(1 - \alpha\lambda)$, $x^* \in [0, W/(\delta(c + \lambda(1 - \alpha)H^S(\lambda)))]$ are all equilibria (see footnote 25). The restructuring specialist invests as much as possible in buying shares from many small investors and spends the rest of his wealth on block trades with financial intermediaries (if (5) holds) or buying blocks at date 0 (if (5) does not hold). Small investors bid $(1 - \delta)R + \delta H^S(\lambda)(1 - \alpha\lambda) - I$, the same as financial intermediaries, because $H^N = H^S(\lambda)(1 - \alpha\lambda)$. Hence, entrepreneurs are indifferent between accepting the bids of small investors and those of financial intermediaries. □

Proof of Proposition 5. If (4) does not hold, then the restructuring specialist prefers buying blocks at date 0 to buying shares from many small investors at date 1. If (5) does not hold, he also prefers buying date 0 blocks to buying blocks at date 1 from financial intermediaries. Hence, he invests all his wealth in date 0 blocks. Given the restructuring specialist's behavior, small investors cannot bid as high as financial intermediaries without losing money if their bids are accepted because firms with dispersed ownership are worth

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only $(1-\delta)R - I$. Hence, $x^* = 0$ is an equilibrium. This is also the case if (5) holds. Given that small investors bid less than financial intermediaries, the restructuring specialist optimally invests all his wealth at date 1 in buying blocks from financial intermediaries. Given that he prefers to buy blocks from financial intermediaries to buying shares from many small investors and all firms have financial intermediaries as blockholders, no small positive measure of small investors (who can buy all shares in a positive measure of firms but bid independently, that is, they are not financial intermediaries) can bid as high as the financial intermediaries without losing money if their bids are accepted because firms with dispersed ownership will not be restructured.[32] The restructuring specialist exhausts his wealth by buying blocks from financial intermediaries because $W < \delta(c + H^N)$. One can also show that, whether (5) holds or not, there is no equilibrium with $x^* > 0$.

If (4) holds but (3) does not hold, the restructuring specialist prefers to buy blocks at date 1 from financial intermediaries to trading with many small investors, which in turn he prefers to buying blocks at date 0. Then there is an equilibrium with $x^* = 0$ if $W < \delta(c+H^N)$. The restructuring specialist exhausts his wealth by buying blocks from financial intermediaries because $W < \delta(c+H^N)$. Given that all firms have financial intermediaries as blockholders, no small positive measure of small investors can bid as high as the financial intermediaries without losing money if their bids are accepted because firms with dispersed ownership will not be restructured. Small investors lose all auctions and hence $x^* = 0$. If (6) does not hold, there is also an equilibrium with $x^* = 1$ (see footnote 26). The restructuring specialist invests his wealth in buying shares from many small investors at date 1 because block trades with financial intermediaries are not possible since $x^* = 1$. Small investors bid $(1-\delta)R + \delta\,(W/(\delta(c + (1-\alpha)\lambda H^S(\lambda))))H^S(\lambda)(1-\alpha\lambda) - I \geq (1-\delta)R + \delta H^N - I$ (because (6) does not hold). Hence, small investors win all auctions and thus $x^* = 1$. It is easy to show that there is no equilibrium with $x^* = 1$ if (6) holds.

If (4) holds but not (3), there could also be an equilibrium with $x^* \in (0, 1)$. The restructuring specialist will invest as much as he can in block trades with financial intermediaries and spend the rest of his wealth $(W - (1-x)\delta(c + H^N))$ on buying shares from many small investors, where x is the fraction of firms with dispersed ownership at date 0. The equity value of a firm with dispersed ownership at date 0 is

$$(1-\delta)R + \delta\frac{W - (1-x)\delta(c+H^N)}{\delta x(c + (1-\alpha)\lambda H^S(\lambda))}(H^S(\lambda)(1-\alpha\lambda)) - I. \tag{A-5}$$

Firms with dispersed ownership and with a financial intermediary as a date 0 blockholder coexist if the equity value of the firm under both ownership structures is the same, and hence the highest bids by small investors and by financial intermediaries are equal, and thus some auctions are won by small investors and some by financial intermediaries. It can be calculated that this is the case if

$$x^* = \frac{H^S(\lambda)(1-\alpha\lambda)(W - \delta(c+H^N))}{H^N\delta(c + (1-\alpha)\lambda H^S(\lambda)) - \delta(c+H^N)H^S(\lambda)(1-\alpha\lambda)} \tag{A-6}$$

and that $x^* \in (0, 1)$ if and only if $W < \delta(c + H^N)$, which is assumed in the proposition, and $W > (H^N\delta(c + (1-\alpha)\lambda H^S(\lambda)))/(H^S(\lambda)(1-\alpha\lambda))$, that is, (6) does not hold and is a strict inequality (see footnote 26). Note that not (6) implies that (7) holds, that is, $H^N < H^S(\lambda)(1-\alpha\lambda)$. One can show that $(W - (1-x)\delta(c+H^N))/(\delta x(c + (1-\alpha)\lambda H^S(\lambda)))$ in

[32] For a discussion of technical issues concerning equilibrium concepts with a continuum of players, see, for example, Schmeidler (1973).

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(A-5), evaluated at $x=x^*$, is $H^N/(H^S(\lambda)(1-\alpha\lambda)) \in (0,1)$ (it is smaller than one because of (7)) and hence is indeed a probability, as was implicitly assumed in (A-5). □

Proof of Proposition 6. The profits from trading with many small investors are strictly increasing in λ because it can be calculated that the derivative of the left-hand side of (3) with respect to λ is

$$\frac{H^S(\lambda)c + \lambda\frac{\partial H^S(\lambda)}{\partial\lambda}c}{((1-\alpha)\lambda H^S(\lambda)+c)^2}, \tag{A-7}$$

which is strictly positive. The profits from buying blocks at date 0 are not affected by λ. Hence, there is a critical value λ_L such that for $\lambda < \lambda_L$, the restructuring specialist prefers to buy blocks at date 0 to buying shares from many small investors. But then condition (4) does not hold. As a consequence, there are no firms with dispersed ownership (see Proposition 5). □

Proof of Proposition 7. The formal statement of the Proposition is: Suppose that (4) holds. If (3) and (5) hold and

$$W \geq \frac{H^N\delta(c+(1-\alpha)\lambda H^S(\lambda))}{H^S(\lambda)(1-\alpha\lambda)}, \tag{A-8}$$

then $x^* = 1$. If (3), (5), and (7) hold and

$$W < \frac{H^N\delta(c+(1-\alpha)\lambda H^S(\lambda))}{H^S(\lambda)(1-\alpha\lambda)}, \tag{A-9}$$

then

$$x^* = \frac{WH^S(\lambda)(1-\alpha\lambda)}{H^N\delta(c+\lambda(1-\alpha)H^S(\lambda))} \tag{A-10}$$

and $\partial x^*/\partial W > 0$.

Proof. If (4) holds but not (6) ($W \geq (H^N\delta(c+(1-\alpha)\lambda H^S(\lambda)))/(H^S(\lambda)(1-\alpha\lambda))$, see (A-8)), then $x^* = 1$ (see Proposition 4 and footnote 26). If (3) and (5) hold, there is no equilibrium with $x^* < 1$ (see Propositions 3–5 and their proofs and footnotes 24–26, where we have calculated all possible pure strategy equilibrium outcomes). If (3), (4), (6), which is the same as (A-9), and (7) hold, $x^* \in (0,1)$ and

$$x^* = \frac{WH^S(\lambda)(1-\alpha\lambda)}{H^N\delta(c+\lambda(1-\alpha)H^S(\lambda))} \tag{A-11}$$

(see Proposition 3). Clearly, $\partial x^*/\partial W > 0$. If (5) holds, there is no other equilibrium (see Propositions 3–5 and their proofs and footnotes 24–26). □

Proof of Proposition 8. The formal statement of the Proposition is: If

$$H^N < \frac{c(1-\delta)R + c\delta H^S - \lambda H^S(\lambda)\alpha(1-\delta)R + \lambda H^S(\lambda)(1-\alpha)\delta H^S}{\lambda H^S(\lambda)\delta} = H_1^N, \tag{A-12}$$

then $x^* = 0$. If $H^N \geq \max\{H_1^N, H_2^N\}$ and $H^N > H_3^N$ where

$$H_2^N = \frac{(1-\alpha)\lambda H^S(\lambda)H^S + cH^S - c\lambda H^S(\lambda)}{\lambda H^S(\lambda)} \tag{A-13}$$

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and

$$H_3^N = \frac{W}{\delta(c + (1-\alpha)\lambda H^S(\lambda))} H^S(\lambda)(1-\alpha\lambda), \tag{A-14}$$

and if

$$H^N \leq \frac{-c(1-\delta)R - c\delta H^S + (1-\delta)RH^S}{(1-\delta)R} = H_4^N \tag{A-15}$$

and $H^N < H^S(\lambda)(1-\alpha\lambda)$, then $x^* \in (0,1)$ with

$$x^* = \frac{WH^S(\lambda)(1-\alpha\lambda)}{H^N\delta(c + \lambda(1-\alpha)H^S(\lambda))} \tag{A-16}$$

and $\partial x^*/\partial H^N < 0$. If $H^N \geq \max\{H_1^N, H_2^N\}$ and $H^N > H^S(\lambda)(1-\alpha\lambda)$, then $x^* = 0$.

Proof. If (4) does not hold ((A-12) holds), that is, $H^N < H_1^N$, then $x^* = 0$ (see Proposition 5). There is no other equilibrium (see Propositions 3–5 and their proofs and footnotes 24–26). If (3), (4), (6), and (7) hold, then $x^* \in (0,1)$(see Proposition 3). There is no other equilibrium if (5) holds (see Propositions 3–5 and their proofs and footnotes 24–26), as assumed in (A-15). Hence, $x^* \in (0,1)$ if $H^N \geq \max\{H_1^N, H_2^N\}$ and $H^N > H_3^N$and $H^N \leq H_4^N$ and $H^N < H^S(\lambda)(1-\alpha\lambda)$, that is, (7) holds. H_2^N in (A-13) arises from (3) and H_3^N in (A-14) from (6)**.** From Proposition 3 we know that

$$x^* = \frac{WH^S(\lambda)(1-\alpha\lambda)}{H^N\delta(c + \lambda(1-\alpha)H^S(\lambda))}. \tag{A-17}$$

Clearly, then $\partial x^*/\partial H^N < 0$. If (3) and (4) hold and (7) does not hold and is a strict inequality ($H^N > H^S(\lambda)(1-\alpha\lambda)$), then $x^* = 0$ (see Proposition 4). There is no other equilibrium (see Propositions 3–5 and their proofs and footnotes 24–26). (If $H^N = H^S(\lambda)(1-\alpha\lambda)$, there is a continuum of equilibria with $x^* \in [0, W/(\delta(c + \lambda(1-\alpha)H^S(\lambda)))]$). Hence, if $H^N \geq \max\{H_1^N, H_2^N\}$ and $H^N > H^S(\lambda)(1-\alpha\lambda)$, then $x^* = 0$. □

Proof of Proposition 9. The formal statement of the proposition is: If

$$\delta > \frac{-cR + \lambda H^S(\lambda)\alpha R}{-cR + cH^S + \lambda H^S(\lambda)\alpha R - \lambda H^S(\lambda)H^N + \lambda H^S(\lambda)(1-\alpha)H^S} = \delta_1, \tag{A-18}$$

then $x^* = 0$. If (3) and (7) hold and $\delta \in (\delta_2, \min\{\delta_1, \delta_3\}]$, where

$$\delta_2 = \frac{WH^S(\lambda)(1-\alpha\lambda)}{H^N(c + (1-\alpha)\lambda H^S(\lambda))} \tag{A-19}$$

and

$$\delta_3 = \frac{R(H^S - H^N - c)}{cH^S + R(H^S - H^N - c)}, \tag{A-20}$$

firms with dispersed and with concentrated ownership coexist and

$$x^* = \frac{WH^S(\lambda)(1-\alpha\lambda)}{H^N\delta(c + \lambda(1-\alpha)H^S(\lambda))} \tag{A-21}$$

and x^* strictly increases as δ decreases. If $\delta \leq \min\{\delta_1, \delta_2, \delta_3\}$ and (3) holds, then $x^* = 1$.

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Proof. If (4) does not hold ($\delta > \delta_1$), then $x^* = 0$ (see Proposition 5). There is no other equilibrium (see Propositions 3–5 and their proofs and footnotes 24–26). If (3), (4), (6), and (7) hold, then $x^* \in (0, 1)$ (see Proposition 3). There is no other equilibrium if (5) holds (see Propositions 3–5 and their proofs and footnotes 24–26). Hence, if (3) and (7) hold and $\delta \in (\delta_2, \min\{\delta_1, \delta_3\}]$ (from (6), (4), and (5)), then $x^* \in (0, 1)$. From Proposition 3, we know that

$$x^* = \frac{WH^S(\lambda)(1 - \alpha\lambda)}{H^N\delta(c + \lambda(1 - \alpha)H^S(\lambda))}. \tag{A-22}$$

Clearly, $\partial x^*/\partial\delta < 0$. If (4) holds but not (6), then $x^* = 1$ (see Proposition 4 and footnote 26). There is no other equilibrium if (3) and (5) hold (see Propositions 3–5 and their proofs and footnotes 24–26). Hence, if $\delta \leq \min\{\delta_1, \delta_2, \delta_3\}$ and (3) holds, then $x^* = 1$. □

Proof of Proposition 10. The formal statement of the Proposition is: If $H^N \geq \max\{H_1^N, H_2^N\}$ and $H^N > H^S(\lambda)(1 - \alpha\lambda)$ and $H^N > H_4^N$, then the restructuring specialist buys only blocks at date 0. If $H^N \leq H_4^N$ and $H^N < H_1^N$, then the restructuring specialist engages only in block trades with financial intermediaries at date 1.

Proof. H_1^N, H_2^N, and H_4^N are defined in the proof of Proposition 8. The following Lemma will prove useful in the proofs of Propositions 10, 11, and 12:

Lemma 3. The restructuring specialist engages in block trades with financial intermediaries at date 1 if and only if (3), (4), and (5) hold but (7) does not hold; or (5) holds but not (4); or (4) holds but not (3). He buys blocks from many small investors at date 1 if and only if (3), (4), (6), and (7) hold; or (4) holds but not (6); or (3) and (4) hold and (7) does not hold and is an equality ($H^N = H^S(\lambda)(1 - \alpha\lambda)$). He buys blocks at date 0 if and only if (3) and (4) hold but not (5) and not (7); or neither (4) nor (5) hold; or (3), (4), (6), and (7) hold but not (5); or (3) and (4) hold but not (5) and not (6).

Proof of Lemma 3. Block trades with financial intermediaries occur if and only if (in the following abbreviated as "iff") there are no firms with dispersed ownership and (5) holds, that is, the restructuring specialist prefers block trades at date 1 to buying blocks at date 0, or firms with dispersed and concentrated ownership coexist and the restructuring specialist invests in block trades with financial intermediaries as well as in buying shares from many small investors at date 1. It is then easy to see from Propositions 3–5 and footnotes 24–26 that block trades at date 1 occur iff the following conditions are met: (3), (4), and (5) hold but not (7); or (5) holds but not (4); or (4) holds but not (3).

The restructuring specialist acquires blocks in firms in the bad state at date 1 by trading with many small investors iff firms with dispersed and with concentrated ownership coexist or all firms have dispersed ownership. Note that in the latter case the restructuring specialist has no alternative to buying blocks from many small investors at date 1. If firms with dispersed and concentrated ownership coexist, the restructuring specialist spends at least some of his wealth on buying blocks from many small investors at date 1 (see Propositions 3–5 and their proofs and footnotes 24–26). Then it is easy to verify from Propositions 3–5 and footnotes 24–26 that the restructuring specialist assembles blocks by trading with many small investors at date 1 iff the following conditions are satisfied: (3), (4), (6), and (7) hold; or (4) holds but not (6); or (3) and (4) hold and (7) does not hold and is an equality ($H^N = H^S(\lambda)(1 - \alpha\lambda)$).

Finally, the restructuring specialist buys blocks at date 0 iff there are only firms with concentrated ownership and he prefers to buy blocks at date 0 to engaging in block trades with financial intermediaries at date 1 or firms with dispersed and concentrated ownership

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coexist and the restructuring specialist invests in date 0 blocks as well as in buying shares from many small investors at date 1. Then it is easy to verify from Propositions 3–5 and footnotes 24–26 that the restructuring specialist buys blocks at date 0 iff the following conditions are satisfied: (3) and (4) hold, but not (5) and not (7); or neither (4) nor (5) hold; or (3), (4), (6), and (7) hold but not (5); or (3) and (4) hold but not (5) and not (6). □

Now we can proceed to prove Proposition 10: One can verify from Lemma 3 that if (3) and (4) hold but (5) does not hold and (7) does not hold and is a strict inequality ($H^N > H^S(\lambda)(1-\alpha\lambda)$), the restructuring specialist buys only blocks at date 0. Solving the conditions for H^N, one obtains the result. One can also verify from Lemma 3 that if (5) holds but not (4), the restructuring specialist engages only in block trades at date 1 with financial intermediaries. Solving the conditions for H^N, one obtains the result. □

Proof of Proposition 11. The formal statement of the Proposition is: If $\delta \leq \min\{\delta_1, \delta_2, \delta_3\}$ or $\delta \leq \delta_1$ and (3) does not hold, the restructuring specialist engages in block trades with financial intermediaries at date 1 or buys blocks from many small investors at date 1. If $\delta > \max\{\delta_1, \delta_3\}$, the restructuring specialist buys only blocks at date 0.

Proof. δ_1, δ_2, and δ_3 are defined in the proof of Proposition 9. One can verify from Lemma 3 that if (4) and (5) hold but not (6), or (4) holds but not (3) (in which case (5) holds, because not (3) and (4) together imply (5)), the restructuring specialist engages only in block trades with financial intermediaries or buys blocks from many small investors at date 1. One can also verify that if neither (4) nor (5) hold, the restructuring specialist buys only blocks at date 0 (and is not active at date 1). The proposition follows immediately, using the above conditions and solving them for δ. □

Proof of Proposition 12. The formal statement of the proposition is as follows: Assume that $(1-\delta)R > c\delta$. If $H^S \leq \min\{H_1^S, H_2^S\}$, where

$$H_1^S = \frac{\lambda H^S(\lambda)(c + H^N)}{(1-\alpha)\lambda H^S(\lambda) + c} \tag{A-23}$$

and

$$H_2^S = \frac{-c(1-\delta)R + \lambda H^S(\lambda)\alpha(1-\delta)R + \lambda H^S(\lambda)\delta H^N}{c\delta + \lambda H^S(\lambda)(1-\alpha)\delta}, \tag{A-24}$$

and

$$H^S < \frac{c(1-\delta)R + (1-\delta)RH^N}{(1-\delta)R - c\delta} = H_3^S, \tag{A-25}$$

then the restructuring specialist buys blocks from many small investors at date 1 or buys blocks at date 0. If $H^S > H_2^S$ and $H^S \geq H_3^S$, he engages only in block trades with financial intermediaries at date 1.

Proof. One can verify from Lemma 3 that if (3), (4), (6), and (7) hold but not (5); or (3) and (4) hold but not (5) and not (6); or (3) and (4) hold but not (5) and not (7), the restructuring specialist only buys blocks at date 1 from many small investors or buys blocks at date 0. Hence, if (3) and (4) hold (H_1^S in (A-23) comes from (3) and H_2^S in (A-24) from (4)) but not (5) (that is, (A-25) holds; note that not (6), (6) and (7), and not (7) span the whole parameter space), he only buys blocks at date 1 from many small investors or buys blocks at date 0. One can also verify from Lemma 3 that if (5) holds but not (4) (that is, $H^S \geq H_3^S$ and $H^S > H_2^S$), he engages only in block trades with financial intermediaries at date 1.

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The proposition follows immediately, using the above conditions and solving them for H^S. Note that the condition $(1-\delta)R > c\delta$ ensures that the denominator in (A-25) is positive, and hence the sign in the inequality in (A-25) is correct. □

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