Wrecking Behaviour and the Overpricing of Distressed Companies

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Abstract

In recent years, a number of papers have established a new empirical regularity. Stocks of distressed firms vastly underperform those of financially healthy firms. It is not necessary to attribute the negative excess returns of distressed firms to inefficient or irrational markets. We show that negative excess returns are the equilibrium outcome when a subset of participants is able to draw returns "in kind" from distressed companies. For firms close to bankruptcy, non-cash returns to ownership will be the dominant form of return to equity. With the changing fortunes of the company, the ownership structure may also have to change, as the capacity of generating private benefits from a given distressed company varies among market participants. If markets expect a contest for control, the non-cash returns will show up in stock valuation. The governance problem described here creates a link between the financial position of a firm and real allocation that may amplify macroeconomic real or financial shocks.

Keywords: stock market anomalies, default risk, private benefits, moral hazard, limited liability

JEL-Classification: G12, G14, G33, G34

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Wrecking Behaviour and the Overpricing of Distressed Companies[*)]

> **wrĕ'cker** n. In vbl senses; one who tries from shore to bring about shipwreck with view to profiting from wreckage, or one who steals such wreckage; person employed in demolition or in recovering wrecked ship or its contents [...][1]

1 Overview

In recent years, a number of papers have established a new empirical regularity. The stocks of distressed companies vastly underperform those of financially healthy firms. Common sense would expect the former to yield higher, as distressed firms are more leveraged on average and therefore riskier. And the difference is magnified if returns are corrected using a CAPM or a Fama-French three-factor model. Researchers speak of "mispricing" and of "a challenge to standard models of rational asset pricing in which the structure of the economy is stable and well understood by investors".[2]

This paper aims to show that the overpricing of distressed firms, defined as a premium of the market price over the value of expected cash flows to shareholders, is an equilibrium phenomenon and that capital market inefficiencies do not need to be invoked. In a nutshell, the explanation is this:

- With an increasing probability of default, there is a greater incentive to withdraw resources from the firm as private, non-dividend benefits. Owners will feel the full opportunity costs only in states where default does not occur. If default is certain, withdrawing resources is a free lunch. In this paper, this is termed "wrecking".
- For distressed companies, private benefits as a percentage of total benefits to equity (including cash dividends and liquidation payments) are large. In a takeover contest,

[*)] Correspondence: Ulf von Kalckreuth, Deutsche Bundesbank, Economics Dept., Wilhelm Epstein-Str. 14, D-60431 Frankfurt, Germany, e-mail: ulf.von-kalckreuth@bundesbank.de. The opinions expressed in this paper are those of the author, and do not necessarily reflect the views of the Deutsche Bundesbank. This paper has been circulated under the title "A 'Wreckers Theory' of Financial Distress", Deutsche Bundesbank Discussion Paper No 40/2005. A first version was presented at the Seventh Bundesbank Spring Conference, "Macroeconomic risk and policy responses" in Berlin, 27-28 May 2005, as a discussion of Campbell et al. (2005). Revised and expanded versions were presented in seminars at the Deutsche Bundesbank and the University of Mannheim. Without implicating anybody, I wish to thank John Campbell, George von Furstenberg, Heinz Herrmann, Martin Hellwig, Matthias Hoffmann, Christian Laux, Bruno Solnik, Ernst-Ludwig von Thadden and Harald Uhlig for their helpful discussions, personal communications and comments.

[1] From the Concise Oxford Dictionary of Current English, sixth edition.

these private benefits are revealed in the form of a premium over the expected cash payments. In addition, the probability of a takeover contest is high. In many cases, a new ownership structure will emerge on a competitive market, as the capacity to generate non-cash benefits from ailing companies varies among potential majority owners. Very often, the original controlling group that was formed in better times will not be suited to drawing high non-cash benefits from the failing firm.

- The expectation of a premium leads to share prices in excess of expected cash payments even before the contest.

The private benefits going to the controlling shareholders are a large part of the total value of equity when the firm is distressed, but these returns are invisible. However, if a control contest is expected, they will be reflected – fully or partly – in the price. Therefore, given dividend payout and later capital gains, the price appears too high.

The contribution of our paper is threefold. First, we give an efficient-market interpretation of an important stock market anomaly. Second, by doing so, we link work on private benefits to the literature on the empirics of asset pricing. Third, we show that the financial structure and the probability of default may be important for determining the size of private benefits of control. This topic has largely been treated in the context of agency costs of equity, with controlling shareholders or managers exploiting minority shareholders. We show that the agency costs of debt also play a role and may become overwhelming when the firm is distressed. The mechanism described here creates a link between the financial position of a firm and real allocation that may amplify macroeconomic real or financial shocks.

In Section 2, we start by summarising the empirical evidence. The wreckers theory of corporate distress is laid out in Section 3, after summarising other attempts to explain the anomaly. Section 4 models the wrecking incentives by means of a simple agency model. The effect on market prices and its dependence on shareholder structure is analysed in Section 5 using an auction model. Section 6 develops the empirical implications and shows that the existing evidence corresponds well with the predictions of the model. Section 7 gives an outlook and concludes.

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[2] Griffin and Lemmon (2002) and Campbell et al. (2005), respectively.

2 Challenging evidence ...

The underperformance of the stocks of distressed companies is an anomaly that comes with a twist. Fama and French (1996) and others have explained the anomalous high returns of "value stocks" by conjecturing that such firms are often close to bankruptcy: Their prices have been driven down by a string of bad news. And bankruptcy risk is something that markets should rather dislike. For a number of reasons, losses due to default can be systematic, and the aggregate default rate is quite volatile. This argument amounts to the prediction of a positive 'default risk premium' in the returns of high risk shares.

Dichev (1998) was the first to show that prediction does not bear out and that the performance of high risk shares is actually very bad. Using Altman (1968) Z-score and Ohlson (1980) O-score ratings, he groups a CRSP-Compustat matched sample covering the years 1981 – 1991 into decile portfolios based on the magnitude of bankruptcy score. Mean returns of high risk firms are compared with the average and with low risk firms. For both indicators, the performance of the firms with the highest bankruptcy risk is clearly worst. A trading strategy that goes long in an equally weighted portfolio of firms with a low bankruptcy risk and short in the firms with a high bankruptcy risk earns a monthly 1.17%, or 22.4% on an annual basis. The results are confirmed using regression tests.

Griffin and Lemmon (2002) also find a negative relationship between financial distress as proxied by Ohlson's (1980) O-score and subsequent returns, even after correcting for the stochastic structure of returns by means of a Fama-French 3 factors model. In addition, they show that this relationship is driven by firms with a low book to market (BE/ME) ratio. The average return of low BE/ME firms in the highest quintile for Ohlson's O-score is only 6.36%, about half of the average return in the other portfolios and slightly lower than the risk free rate over that period. In the subset of firms with a high BE/ME ratio, the returns of distressed firms are not lower than would be expected by their BE/ME. In the quintile with the most distressed firms, the estimated return differential between high and low BE/ME firms is 14.44%. The results are robust to using the Altman (1968) Z-score indicator instead.

Some contrary evidence is presented by Vassalou and Xing (2004) on the basis of a distance-to-default-measure. For the smallest firms, as well as for the firms with the very highest BE/ME ratio, the authors find a positive relationship between their measure of default risk, DLI, and the returns in the month after portfolio formation. Da and Gao (2005) repeat and interpret these estimations. They show that all the important results can be traced to first-month reversals, mostly due to data problems with penny stocks, such as bid-ask bounces and illiquidity.

Two recent working papers complete the picture. Garlappi, Shu and Yan (2005) form six months cumulative returns from portfolios sorted according to default risk. Using Standard and Poor's credit rating, they find an unconditional negative dependence of returns on default risk. Using instead the EDF measures generated by Moody's KMV data, they find a negative relationship in the sub-sample of firms with a low BE/ME ratio. This study is important because the authors use real world default risk indicators that were sold to tens of thousands of market participants.

Campbell, Hilscher and Szilagyi (2005) break new ground by constructing their own reduced form default risk indicator based on a logit model for bankruptcy and a broader concept of company failure. Sorting firms into ten different portfolios according to their estimated default risk, they show that the distressed firms strongly underperform financially healthy firms. The difference is magnified if returns are corrected using a CAPM or a Fama-French three-factor model. The three-factor alpha of the highest percentile of the failure risk distribution corresponds to a return of almost -25% at an annual rate. For the highest 5%, it is still less than -15% annualised. The long-short portfolio that goes long the 10% of stocks with the lowest failure risk and short the 10% of stocks with the highest failure risk would earn a whopping annual 23%, almost exactly the same figure found by Dichev (1998). The study conditions on further variables and investigates the effect of momentum. These results and additional evidence will be discussed further in Section 6.

3 ... in need of an explanation

To date, three explanations have been advanced for the negative excess premium for the stocks of distressed firms. One possibility is, of course, that markets may be malfunctioning. Griffin and Lemmon (2002) speak of 'mispricing' and relate the size of the

difference to indicators of informational asymmetry. However, this leaves the sign of the deviation unexplained – why should informational asymmetry lead to systematic overpricing? Campbell et al. (2005) advance two versions. On the one hand, markets may be irrational. Specifically, financial institutions may have had a pronounced *a priori* dislike of distressed firms' shares that is not justified by their return characteristics. With market shares of institutions going up, the shares of distress firms underperformed. Second, markets may be inefficient. Their information set may not encompass the default indicator constructed by the authors, although the authors were careful to make sure that its components were available at the time and a rolling estimation procedure was used to eliminate the look-ahead bias. This latter argument does not explain why the effect is also found when using real world default indicators that could be used by anybody.[3]

Livdan, Sapriza and Zhang (2005) have advanced a structural explanation, based on risk. Financial constraints lead firms to reduce their investment. The reduction lowers their risk and hence their expected returns. This explanation has one principal shortcoming: it cannot explain why the returns of portfolios of distressed firms are low even after correcting for risk using a CAPM or a Fama-French three factor model, and why this correction worsens the anomaly.

Another explanation based on the risk of share returns is offered by Garlappi et al. (2005). In the event of a bankruptcy, equity holders, depending on their bargaining power, may have the opportunity to violate the absolute priority rule and obtain payments over and above what would be left of the assets after the creditors had fully been paid. This gives equity holders something that resembles an American option: by declaring bankruptcy, they can always exchange their claim on future returns for a fixed fraction of total assets now. An optimal threshold value of bankruptcy is determined. In the neighbourhood of this threshold, the probability of default becomes very high, and the risk is accordingly low, because in the state of bankruptcy, the return is certain by assumption. As the risk of distressed firms is lower, the equity beta and the returns in equilibrium are lower, too. This explanation has the same fundamental shortcoming as the one by Livdan, Sapriza and Zhang (2005): the effect should not survive correction

[3] As reported above, Garlappi et al (2005) use the EDF indicator by Moody's KMV and Standard and Poor's credit rating. Dichev (1998) and Griffin and Lemmon (2002) use the standard Altman Z-score

for risk. Apart from that, it is not clear that the returns of equity holders in a bankruptcy procedure according to Chapter 11 can really be assessed as being close to certain, even if some violation of the absolute priority rule is expected.

Still, in some important respects, the explanation resembles the one advanced in the following. In both cases, it is the dependence of expected non-dividend benefits on the probability of default that drives the results. But whereas the reasoning of Garlappi et al. relies on second moments, our explanation is based on first moments.

Imagine a firm being hit by a series of negative shocks, making losses and approaching a state of financial distress. With higher leverage, volatility increases and the expected value of cash flows to shareholders goes down. But certain groups of well-informed insiders can draw returns on their investment in ways other than by receiving a cash dividend if they are in control of the firm. Important examples are incumbent managers, competing firms or their owners, and private equity funds, working on a restructuring.

Equity is not only a right to receive dividends, it also confers control rights. These control rights have an economic value of their own, as they enable owners to draw a return in kind. The benefits of corporate control comprise all non-dividend economic benefits of ownership, by no means necessarily illegal ones. Although they do not show up in the books, the benefits of corporate control are economically equivalent to a dividend, and will be valued as such – not only by the ultimate beneficiary, but also by all other market participants who try to form rational price expectations.

The transfer of assets out of firms for the benefit of those who control them has been labelled "tunneling" by Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000). They use legal cases to establish that in developed countries, too, the diversion of corporate resources from the corporation to the controlling shareholder can be substantial, and that much of this diversion is legal. They number a variety of forms of diverting resources,

> including expropriation of corporate opportunities from a firm by its controlling shareholder, transfer pricing favoring the controlling shareholder, transfer of assets from a firm to its controlling shareholder at nonmarket prices, loan guarantees using the firms asset as collateral, and so on.[4]

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and Ohlson O-score indicators with coefficients known from the literature.

[4] Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000), p. 26.

Akerlof and Romer (1993) give an extremely vivid account of "bankruptcy for profit" during the 1980's, focussing on four historic events: the Chilean financial crisis, U.S. Savings and Loans regulatory changes, the Dallas/Fort Worth buildings boom and bust, and the US junk bond-financed takeover wave.

Our hypothesis is that the benefits conferred by ownership of a private company will form a disproportionately large part of the total payoff of distressed firms. Firms close to bankruptcy will be stripped of their assets, as the opportunity costs of not doing so are high. The resulting returns are a substantial part of the value of equity. For insiders with special uses for the firms' resources, distressed firms are an easier prey than healthy firms. The causality also goes the other way: Companies that are being depleted by insiders will very soon find themselves in a situation of financial distress. Eventually, and maybe most importantly, the process is self-reinforcing. With the conditional probability of bankruptcy increasing, it seems less and less advantageous to the owners to leave valuable resources in the firm. Thus, well-intentioned owners can turn into wreckers quite against their own inclination. Wrecks and wreckers are correlated phenomena: one causes the other.

Our argument rests on two pillars that need to be investigated more closely. First, we need to show that the incentives to withdraw resources from the firm in the form of private benefits do indeed become stronger as the firms approaches bankruptcy. Section 4 introduces a simple agency model of optimal management behaviour under the risk of default where management can choose between a strategy that maximises the overall firm value and a socially inefficient strategy involving diversion of resources to equity holders in the form of private benefits. Debt contracts are incomplete, and no system of covenants can fully rule out this type of action. The inefficient strategy becomes optimal once leverage is high enough.

Second, we need to reflect on the conditions under which the value of control benefits will show up in the share prices of ailing firms. There is a broad literature explaining the price difference between voting and non-voting stocks in terms of private benefits of control and the expectation that the votes will become valuable in a contest between rivalling parties. In Section 5, we take one step back and ask who it is that will reap the private benefits, and how much he or she will have to pay for the privilege. The allocation of control rights is endogenised by means of a takeover contest. We argue

that the resulting premium will be large for a firm close to default, as the non-cash components of the return to equity are important and the probability of a contest for control is high. It is rather unlikely that the original management team, supported by some coalition of shareholders, is the most efficient wrecker. And even if they are, there will be other groups who think the same of themselves and will force the incumbent into a contest.

Using a theoretical setup very close to the one advanced here, Burkart, Gromb and Panunzi (1998) have worked out the joint endogeneity of takeover premia and the incentives to divert company resources for private use in an encompassing model, without, however, considering the financial structure as an important determinant or overpricing as a possible result.

4 Financial distress and wrecking incentives

In general terms, the moral hazard problems caused by limited liability are well known, notably the tendency to accept projects with a high risk, but a low expected return as investigated by Jensen and Meckling (1976) and Stiglitz and Weiss (1981). For overviews see, for example, Grinblatt and Titman (2002), Ch. 16, or Freixas and Rochet (1997). The agency conflict described in this paper is close to the one investigated by Innes (1990), who shows how the incentive of an owner-entrepreneur to work hard are influenced by the terms of the debt contract. Also see Sappington (1983) for the related case where the state of nature is known to the entrepreneur before choosing his work effort.

With respect to the specific problem of private benefits, the literature by and large has followed the seminal paper by Jensen and Meckling (1976) in modelling the diversion of funds primarily within the context of an agency conflict between insiders and outside equity holders, not between equity holders and creditors.

One exception is Hart (1995, Sections 5.2-5.4), who argues that the liquidation value of the assets must be larger than the value of all the payment obligations at each point in time to keep the entrepreneur from diverting the returns. Johnson, Boone, Breach and Friedman (2000) show that managers with an equity stake have greater incentives to steal when the returns of capital drop. Their model does not recognise un-

certainty. Similarly, Akerlof and Romer (1993) show that the possibility of a dividend payout larger than the true economic value of equity will induce the owners of the firm to extract a maximum amount of cash and let the firm go bankrupt. Without taking uncertainty into account, they focus on the institutional preconditions for successful "bankruptcy for profit" to take place, calling the resulting activity "looting". We complement their analysis by focussing on the significance of leverage and the probability of default for the incentives to divert resources, in an agency conflict between equity holders and creditors, and directing attention to the private benefits of control.

Like Jensen and Meckling (1976), La Porta, Lopez de Silanes, Shleifer and Vishny (2002) focus on expropriation of minority shareholders by a controlling group. However, both papers spell out cearly that the incentives to divert resources crucially depend on the share of cash flow that goes to the controlling group, thereby revealing a mechanism that is quite analogue to the one described in the following.

The underlying conflict derives from the fact that when a firm is close to bankruptcy, it is the creditors who are the true residual owners in many states of the world, but the equity-holders maintain their residual control rights. In order to show first the incentives to relocate assets from the firm in case of financial distress, let us consider the case of a selfless management that maximises the value of equity, as would be the case with an owner-managed firm. At this point, we do not distinguish between classes of equity holders. We consider one period only, with two points in time: $t = 0$ and $t = T$. The management has the opportunity to take an unobservable action that yields benefits to equity holders, thereby reducing the overall firm value. Taking the action will reduce the firm value by the amount *d* (standing for "damage") and leads to private benefits $G(d)$, with $G(0) = 0$ and $0 < G(d) < d$ for $d > 0$. That is, we assume that unlike dividend payments, the taking such private benefits is socially inefficient. For the sake of simplicity, we assume that there are only two possible values for *d*:

$$d \in \{0, \ell\}. \tag{1}$$

The firm value in $t = T$ is a random variable with a distribution that depends on the market value of the firm's assets, *A*, and the managerial action:

$$V_j(T) = A - d + \varepsilon_j. \tag{2}$$

Here, j is an index for the state of nature. The shock ε_j follows a distribution function Φ. To avoid asset stripping, there is a contractual ceiling to dividend payments, and without loss of generality we normalise it to zero. Choosing $d = \ell$ is essentially an inefficient substitute for "milking the property" by means of high dividends. Unlike dividends, the action d and the implied loss of resources are invisible (or at least not verifiable), and cannot be contracted upon.

The firm value is the sum of the value $S_j(T)$ of payments to shareholders and payouts $B_j(T)$ to creditors:

$$V_j(T) = S_j(T) + B_j(T). \tag{3}$$

Creditors' claims have face value F. Limited liability of shareholders means that

$$B_j(T) = \min\{F, V_j(T)\} \quad \text{and} \quad S_j(T) = \max\{0, V_j(T) - F\}. \tag{4}$$

The probability of default is given by

$$\text{prob}\left(V_j(T) < F\right) = \text{prob}\left(A - d + \varepsilon_j < F\right) = \Phi\left(F - A + d\right). \tag{5}$$

Note that the decision on d has consequences for the default probability. The objective function of the management is the present value of total benefits, cash and non-cash:

$$W(d) = G(d) + S(d). \tag{6}$$

We will refer to $S(d)$ as the cash value of equity and to $G(d)$ as the non-cash benefit under d. In order to simplify matters, we will assume that the non-cash benefit is certain. The future cash payment in T, however, is uncertain. We assume that it is spanned by existing assets. If K is the number of possible states of nature at time T, then given the absence of arbitrage opportunities there exists a stochastic discount factor,[5] a vector $\psi \in \mathbf{R}^K_{++}$ such that the cash value of equity is

$$\begin{aligned} S(d) &= \sum_{j=1}^{K} \psi_j S_j(T) = \sum_{j=1}^{K} \psi_j \max\left(0, V_j(T) - F\right) \\ &= \sum_{j=1}^{K} \psi_j \max\left(0, A - F - d + \varepsilon_j\right) = \sum_{A-F-d+\varepsilon_j > 0} \psi_j \left(A - F - d + \varepsilon_j\right). \end{aligned} \tag{7}$$

In other words, the cash value of equity is a weighted sum over the residual value in the future, taken over those states where this residual is positive.

It is a rather straightforward matter to show that the incentive to take the non-cash benefit becomes stronger as the firm's financial position deteriorates. The value of choosing $d = \ell$ over $d = 0$ is given by

$$\Delta W = W(\ell) - W(0) = G(\ell) + S(\ell) - S(0). \tag{8}$$

Relocating assets from the firm is optimal if the benefit $G(\ell)$ is higher than the loss in cash value of equity induced by this decision, that is $G(\ell) + \Delta S > 0$, with

$$\Delta S = S(\ell) - S(0) = \sum_{A-F-\ell+\varepsilon_j>0} \psi_j \left(A - F - \ell + \varepsilon_j\right) - \sum_{A-F+\varepsilon_j>0} \psi_j \left(A - F + \varepsilon_j\right). \tag{9}$$

It is convenient to distinguish three *cases*, or sets of states:

- *Case A* (Default will not occur under either policy): $A = \left\{ j \middle| A - F - \ell + \varepsilon_j \geq 0 \right\}$.
- *Case B* (Default occurs under policy $d = \ell$, but not under policy $d = 0$): $B = \left\{ j \middle| A - F + \varepsilon_j \geq 0 > A - F - \ell + \varepsilon_j \right\}$.
- *Case C* (Default occurs under both policies): $C = \left\{ j \middle| A - F + \varepsilon_j < 0 \right\}$.

We can then rewrite the cash value differential as

$$\Delta S = -\left(\sum_{j \in A} \psi_j \ell + \sum_{j \in B} \psi_j \left(A - F + \varepsilon_j\right) \right). \tag{10}$$

The owners bear the full cost of taking the non-cash benefit only in those states where the firm would have survived with and without the detrimental policy, that is, in the states collected in case A. They still bear a fraction of the costs in those states where the firm would have survived under $d = 0,$ but has to declare bankruptcy under $d = \ell$. In those states, collected in case B, the costs to shareholders are strictly less than the social costs ℓ. And relocation is essentially a free lunch for shareholders in the states collected in case C, when the firm will default on its debt even when playing the "hon-

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[5] See, e.g., Duffie (2001), Ch. 1.

est" strategy $d = 0$. Then the full social costs of the relocation are borne by the creditors. Equation (10) allows us to see three important facts.

1. The social cost of taking action $d = \ell$ instead of $d = 0$ is equal to the cost to the shareholders if the risk of default is absent, i.e. if $V_j(T) \geq F$ for both strategies and in all states of nature.

2. If there is a risk of default, the cost of taking action $d = \ell$ for shareholders is strictly less than the social cost. This is a simple consequence of limited liability. In effect, the creditors not only have to bear part of the economic risk embodied in the shock ε_j, but also part of the costs of deviating from strategies that maximise firm value.

3. The cost to shareholders of taking action $d = \ell$ is increasing in the financial position, $A - F$.

In the states pertaining to case *B*, the costs increase one-to-one with $A - F$. Furthermore, for each state of nature *j*, there are two threshold values for $A - F$, marking the boundaries between the cases A, B and C. If the threshold $A - F = \varepsilon_j$ is surpassed, the state *j* switches from C to B. At a still higher value, $A - F = \varepsilon_j + \ell$, state *j* passes the boundary between cases B and A. Increasing $A - F$ therefore pushes more and more states from category C, where the action essentially is a free lunch for shareholders, to B, where the shareholders bear part of the consequences; and from B to A, where the shareholders bear the full cost.

The incentive to relocate resources from the firm, ΔS, is a continuous (though not everywhere differentiable) function of the financial position $A - F$. As long as not all states of nature are in category A, the absolute value of ΔS will be increasing in the financial position, $A - F$. It will be strictly increasing if at least one state of nature is in regime B.

We have assumed that the relocation decision is socially inefficient, $G(\ell) < \ell$. Thus, it will not be chosen when $A - F$ is high enough for there to be no default risk. On the other hand, $d = \ell$ will certainly be chosen if default is guaranteed, i.e. if $A - F$ is so low that default cannot be avoided. The intermediate value theorem then guarantees that there is a *K** such that the socially efficient strategy, $d = 0$, will be optimal for

all $A-F \geq K^*$, but $d=\ell$ will be chosen if $A-F < K^*$. This is true no matter how small $G(\ell)$ is in comparison to ℓ. Any sort of wasteful activity will happen if the financial situation is bad enough.

We have shown that under financial distress there is a strong tendency to choose strategies that are inefficient but confer a benefit on equity holders. Our argument assumes a standard debt contract, being the type of contract which is clearly most relevant for a discussion of the consequences of financial distress. We can imagine that the terms of the debt contract were chosen in better times, when the probability attached to those states that lead to bankruptcy was considered low.

One might still object that the standard debt contract will not be optimal in the situation at hand. It is interesting in this respect to note the result of Innes (1990), who investigates the optimal contract in a situation of hidden action, where the agent chooses his action ("effort level") before the state of nature is realised, and a limited liability constraint applies. The principal, an investor, demands an expected return equal to the market interest rate. Both the investor and the entrepreneur are risk neutral. It is a standard result that, without limited liability, this setting will yield a standard debt contract that gives the investor a fixed payment and induces the agent to choose the efficient effort level. With limited liability and no further restrictions, the optimal contract derived by Innes is indeed of a rather unconventional nature. It will make the entrepreneur pay a share $\alpha \in [0,1]$ of profit if profits are *less* than a certain threshold level *z*. The entrepreneur keeps everything if this level is surpassed. Innes refers to a 'live-or-die' contract. If instead one imposes the additional constraint that the contractual payments to the investor be monotonically increasing in profits, a standard debt contract will be optimal again, granting firm value π to the investor as long as this is smaller than a threshold level *z*, and a fixed amount of z if $z > \pi$. The effort level induced by this contract will be inefficiently low, however.

5 A wrecking premium in the share prices

The incentives to divert company resources for private use drive a wedge between the expected value of cash flows and the total value of equity. The difference between the two is simply $G(\ell)$. But we have yet to explain how the value of non-cash benefits

will show up in share price quotations. Typically, these quotations reflect trades of marginal investors, i.e. minority or outside shareholders, and in most cases these marginal investors will not benefit from the relocations.

There is a growing literature on the question of whether and how private benefits of control enter stock market valuations. In this literature, the focus is on the protection of *minority* shareholders from expropriation by the controlling team. Le Maux (2003) gives a recent overview. Empirically, two main routes have been taken. One strand of literature, starting with Barclay and Holderness (1989), observes privately negotiated transfers of controlling blocks and compares them with the stock market price prior to this transfer. In order to make sure that the votes of shares traded on the stock market will carry little or no value, periods with an elevated probability of a control contest are excluded. The second method, pioneered by Lease, McConnel and Mikkelson (1983, 1984), relies on comparing stock market prices when different classes of shares are quoted. If there are two classes of shares with identical cash flow rights, but one class carries votes and the other does not, the price differential must be interpreted as the market price of votes and is indicative of private benefits.

For our purposes, it is important to understand the circumstances under which a positive price for votes will result. Ordinarily, transactions take place between non-controlling parties who cannot expect to receive any control benefits themselves. The private benefits of control, which are essentially invisible, are translated into an easily observable market price of a vote by the expectation that the vote will become valuable in a contest for control. For share prices to rise above expected cash flows from dividends there must be a positive probability of a contest, in the form of a proxy fight or a tender offer. In such a contest, when rival teams are bidding for votes in order to gain access to the private benefits of control, the winner must outbid the maximum price that the rival party is willing to pay. With private benefits involved, the price the winner is willing to pay for minority shares will be higher than the subsequent cash flows. If shareholders attribute a positive probability to such a situation, a premium of share prices in excess

of cash flows will show up even before the contest.[6] The price run ups that occur before tender offers are well documented.

The price of a vote in a contest will depend on the distribution of shareholdings. At the one extreme, it is easily seen that the price of votes is nil if one shareholder has a controlling majority of more than 50%, provided this is the relevant majority. For an outsider trying to gain control, a tender offer or a proxy fight would be useless. Instead, the contender must deal directly with the majority owner, and if there are payments in excess of the cash flow values, these would be made to the majority owner alone. On the other hand, if we assume dispersed ownership, large parts of the private benefits will show up in a takeover contest. In their study on managerial stock ownership, DeAngelo and DeAngelo (1985) find that the voting premium can become extremely high when control of the firm is at stake. In order to tell the story as simply as possible we will adapt first Zingales' (1994, 1995) and then Rydqvist's (1996) model to our problem.[7]

In a contest for control, bidders reveal their preferences. There must be at least two potential competitors. We will assume that the non-verifiable benefits G are in fact private benefits to the controlling party alone. Let player i be the incumbent team in control of the firm and let r be the rival who challenges control. We assume that the abilities to generate cash value, $S(d)$, and private benefits, $G(d)$, vary among potential owners. Let G_i and S_i be the value of private benefits and cash value optimally chosen by the incumbent conditional on remaining in power, and G_r and S_r the corresponding quantities for the rival. We assume that the contest for control takes the form of a tender offer. P_i and P_r are the bids of the incumbent and the rival, respectively. Here, following Zingales (1995), we will make two assumptions that will be dropped later on.

(a) All shareholders are "small", in that they do not expect their vote to be pivotal.

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[6] In order to make inferences on the size of private benefits, the method relying on differential voting rights needs additional assumptions regarding the probability of control contests. The first method, on the other hand, suffers from a relative dearth of observations. A country-by-country comparison of the results obtained by Dyck and Zingales (2004) and Nenova (2003), as well as the survey of Le Maux (2004) demonstrates that the two methods of inference come to very similar conclusions. For us it is important simply to show that private benefits of control are reflected in share prices.

[7] Similar results could also be obtained from the closely related frameworks by Grossman and Hart (1980, 1988), Harris and Raviv (1988), and Nenova (2003), with differences in the details.

(b) The offer must be unrestricted, i.e. the bid involves all of the companies' securities.

Shareholders will tender to the higher bidder, provided that the bid is at least as high as the value of cash flow under the winning team. The latter condition is the free-rider problem with takeover bids analysed by Grossman and Hart (1980). We want to address it as the Grossman-Hart incentive compatibility constraint (ICC).

The value of the entire firm is equal to $G_i + S_i$ for the incumbent and $G_r + S_r$ to the rival. Shareholders will tender to the rival unless the follow-up bid by the incumbent is higher. In order to win, the rival's bid must be equal to or higher than the highest bid the incumbent can make without losing money:

$$P_r \geq G_i + S_i . \tag{11}$$

The right-hand side is the break-even point for the incumbent. Furthermore, the bid must reach the value of the cash flow that would be created under the rival's own management:

$$P_r \geq S_r . \tag{12}$$

Thus, the rival will make a winning bid of

$$P_r^* = \max\left(V_r, G_i + S_i\right), \tag{13}$$

if it is profitable to do so. We will call a bidder "superior" if $G_r + S_r \geq G_i + S_i$, and "dominant" if $S_r \geq G_i + S_i$. The first inequality is sufficient for the bidder to make a winning bid; the second inequality depicts the case in which, under the rival's policy, the projected cash flow alone is higher than the entire value of equity under the incumbent. We can distinguish three cases.

a) The bidder is superior, but not dominant, i.e. $G_i + S_i - G_r \leq S_r < G_i + S_i$. In this case the willing bid will be

$$P_r^* = G_i + S_i . \tag{14}$$

The winner pays a premium above the cash flow value of the shares as a result of the contest for control. This premium is labelled "surplus-extraction" by Grossman and Hart (1988).

b) The bidder is dominant, that is $S_r \geq G_i + S_i$. The binding constraint for the optimal bid is given by the free-riding behaviour of shareholders:

$$P_r^* = S_r . \tag{15}$$

c) The bidder is not superior, i.e. $G_r + S_r < G_i + S_i$. He will make no bid and control remains with the incumbent.[8]

Thus, we have seen that if a changeover of control takes place, the winning bid will be at least as high as the entire value of equity (private and cash flow benefits) under the incumbent party. If there is more than two competitors, the relevant lower bound is the entire value of equity under the *second best management* team.

Now, let π be the probability that a superior rival shows up, or more precisely: let the rivals be drawn from a known distribution and let π be the probability that the rival is superior, ie: $G_r + S_r \geq G_i + S_i$. Furthermore, let $\tilde{P}_r$ be the expected tender bid conditional on the rival being superior, and $\tilde{S}_r$ the expected value of cash flow in this case. Then, the value of the shares, with risk neutral investors, will be

$$P = \pi \tilde{P}_r + (1-\pi) S_i . \tag{16}$$

If the investors are risk-averse, we can interpret π as the appropriate risk neutral probability, given the true probabilities and the vector of state prices, see again Duffie (2001), Ch. 1. On the other hand, the value of expected cash flow is

$$\mathrm{E}\, V = \pi \tilde{S}_r + (1-\pi) V_i . \tag{17}$$

We are interested in the conditions for the share price *before the contest* to be higher than the value of expected cash flow, $P > \mathrm{E}\, S$. This will be the case if and only if $\pi > 0$ and $\tilde{P}_r > \tilde{S}_r$. There must be a positive probability of a rival making a bid and that this bid will exceed the value of cash flow the rival herself is going to generate. That

[8] Note that this is a rather extreme assumption in the context of what we want to show. If there is no certainty on the side of the rival as to the private benefits of the incumbent, the rival may choose to make an offer that maximises the conditional expected payoff. If repeated counteroffers are possible, as in an English auction, the incumbent would be forced to make a bid of $G_r + V_r$, the value of the firm to the rival.

means that surplus extraction occurs, and the Grossman-Hart ICC must not bind. We have seen that this will happen when the rival is superior, but not dominant.

In the case of a financially distressed company it is extremely unlikely that the rival will dominate. A dominant rival is able to generate a cash flow to shareholders that is higher than the sum of private benefits and cash flows generated by the incumbent. With a low or negative $A-F$, the expected cash flows to shareholders are small even when no relocation takes place, whereas the size of G_i can be assumed to be a function of total assets, *A,* not of net worth.

We are in a position now to state why the premium paid in excess of expected cash flows will be high when the firm is financially distressed, relative to healthy firms:

a) The share of private benefits as a percentage of the overall value of equity is high when firms are distressed. In many cases, relocation policies may be the only way to extract any benefit at all from the firm. And it is these private benefits that make a superior rival bid higher than the expected cash flows. At the same time, the case of a dominant rival – that may be quite frequent under normal circumstances – becomes extremely unlikely.

b) The probability of a contest for control is high when the firm is distressed. It is unlikely that the controlling party that was installed in better times is the most efficient wrecker. In many cases, the efficient wrecker will be a close competitor, who is able to make good use of the material and immaterial assets of the firm, and to whom the market position of the firm matters most. In other cases, a management buy-out will result, with the management trying to make use of their superior knowledge with respect to the value of the firm's assets.[9]

In many cases, contestants will already possess large blocks of ownership, so-called toe-holds, which alters their strategic position in an important way. Furthermore, they will not necessarily bid for the entire outstanding equity, but only for the quantity they need in order to achieve control. This case is investigated in the Appendix, adapt-

[9] Debtors themselves are also potential candidates. In order to rescue the economic value of their assets, a subset of creditors may want to buy the firm themselves. Whether a premium results in this case depends on whether these new majority shareholders are willing to generate private benefits, exploiting other creditors and minority shareholders. We assume that creditors are either credit constrained, unable to run the firm or prevented from taking it over by institutions like the Glass-Steagall Act.

ing a model by Rydqvist (1996). The principal conclusions reached above go through. However, a large part of outstanding equity will remain in the hands of minority shareholders under these circumstances, and the Grossman-Hart ICC becomes even easier to surmount, as only half of the cash flow is relevant for bidders.

6 Testing the hypothesis

Assume that there is a contest for control with some probability α. If it takes place, the winner pays, for a fraction φ of the shares, the value of the stream of expected dividends after takeover, $[D_t]$, plus a wrecking premium ω for the benefits of control:

$$\omega + \varphi \frac{1}{1+\mu} \sum_{\tau=0}^{\infty} \frac{1}{(1+\mu)^{\tau}} D_{t+\tau} . \tag{18}$$

Here, μ is an asset specific one-period discount rate. The premium ω may or may not fully reflect the value of private benefits of control, depending on the distribution of power between contestants. Shares that are not tendered to the winner will be bought and sold according to the value of expected dividends,

$$(1-\varphi) \frac{1}{1+\mu} \sum_{\tau=0}^{\infty} \frac{1}{(1+\mu)^{\tau}} D_{t+\tau} . \tag{19}$$

In the case of a contest, the value of shareholders portfolios is therefore

$$p_t^C = \omega + \frac{1}{1+\mu} \sum_{\tau=0}^{\infty} \frac{1}{(1+\mu)^{\tau}} D_{t+\tau} . \tag{20}$$

If there is no contest, the value of shareholder portfolios is equal to the appropriately discounted dividends alone. For simplicity we assume that expected dividends are the same with or without contest, so that

$$p_t^{NC} = \frac{1}{1+\mu} \sum_{\tau=0}^{\infty} \frac{1}{(1+\mu)^{\tau}} D_{t+\tau} . \tag{21}$$

Valuation in t, before the contest, is therefore

$$p_t = \frac{1}{1+\mu} \sum_{\tau=0}^{\infty} \frac{1}{(1+\mu)^{\tau}} D_{t+\tau} + \pi \cdot \omega . \tag{22}$$

As discussed in the last section, the factor π is a risk neutral probability and may be smaller than the true probability α, reflecting the valuation of contest risk in period t. In period t+1, after the contest has or has not occurred, the valuation of marginal shareholders is determined by the expected dividends alone:

$$E_t p_{t+1} = \frac{1}{1+\mu} \sum_{\tau=0}^{\infty} \frac{1}{(1+\mu)^{\tau}} D_{t+\tau+1} . \tag{23}$$

The two preceding equations give us

$$E_t p_{t+1} = \left(p_t - \frac{1}{1+\mu} D_t \right)(1+\mu) - \pi \cdot \omega , \tag{24}$$

or equivalently

$$E_t \frac{\Delta p_{t+1}}{p_t} + \frac{D_t}{p_t} - \mu = -\pi \frac{\omega}{p_t} . \tag{25}$$

The left-hand side is the sum of capital gains and cash dividends, corrected by the required rate of return for assets of this risk class. The right-hand side shows the alpha that will be measured in an asset valuation equation such as the CAPM or the Fama and French 3 factor model. It is equal to the expected premium that will be paid by contestants as a share of the market value, taking into account the possibility that there may not be such a contest, and corrected by an assessment of contest risk. Of course, it is not necessary to assume agents to believe that the contest takes place either at the end of this period or not at all. The left-hand side is the value of the possibility that a premium will be paid at any time in the future.

For the wreckers theory to hold, it is enough that $\pi \omega / p_t$ be an increasing function of default probability. This means that *for endangered firms the share of the expected takeover premium as a component of the overall value for marginal shareholders in (22) must be higher than for healthy firms.* This is a rather mild requirement, given that in many cases distressed companies do not pay out any dividends at all. A viable way of estimating the value of the expected premium is

- to sort firms into portfolios according to their default risk, and calculate returns

- to estimate a CAPM or a factor model in order to generate the appropriate risk-adjusted returns, and then
- to compare the alphas of portfolios with high and low default risk. If the portfolio with the lowest default risk does not contain any takeover premium as a compensation for private benefits, then the excess returns of the higher risk portfolios is a direct estimate of value of the expected wrecking premium. If this is not true, then the excess returns give us the economic value of the *differential* takeover premium, induced by wrecking incentives.

Thus, the excess returns measured by Griffin and Lemmon (2002) and Campbell et al. (2005) may simply be a fair estimate of the discounted expected premium that candidates for takeover are willing to pay in exchange for being able to either actively deplete the resources of their company, or use them in a way that is beneficial to their other interests. We have seen that excess returns are a smoothly decreasing function of default risk, as they should be according the wreckers theory. The results of Dichev (1998) speak the same language, although returns were not adjusted for risk.

One might argue that given the hypothetical returns calculated for a strategy that shorts a portfolio of distressed stocks and is long in the shares of healthy companies, it would be possible to generate return from a zero net investment with a very small risk. This seems to be a direct implication of the negative excess returns. However, if an investor goes short in a security, he has to pay the broker any income that would have been received on this security. The broker will transfer this income to the account of the client from whom the security was borrowed. In the case of a tender offer, the premium of the tendered shares over the not tendered shares will be part of that income. Otherwise, if there is the expectation of a tender offer, the lender would not be willing to lend out his stock, or he would demand an appropriate lending fee.

The theory also accords well with the results for subsets of companies in the literature. Given default risk, the wrecking premium should be higher for small firms, as it will be easier to generate returns in kind using the control rights of equity if there is no multi-layered management and a complicated set of corporate governance devices. And this is the evidence that Campbell et al. (2005) brought up. For large firms, there is an

annualised returns differential of 11.5% between low-risk firm and high-risk firms. For the smallest size category, it is 17.5%.

The same authors show that distressed firms have low book-to-market ratios, like growth stocks, although they have the factor loadings of value stocks, since they load positively on the Fama-French value factor. These low book-to-market ratios are also noted by Griffin and Lemmon (2002) and Dichev (1998). They may indicate the presence of a wrecking premium in the market value. Imagine that the book value gives a correct account of the liquidation value. If market prices are higher, equity holders as a group seem to expect additional benefits. But we expect a premium only for the stocks of those distressed companies where a takeover contest is expected. If this is impossible, because there already is a dominant owner, or if wrecking is impossible for other reasons, there should be no negative excess returns. Consistent with this, Griffin and Lemmon (2002) show that the underperformance of distressed stock is highest when they have the lowest book-to-market ratio. Garlappi et al. (2005) find that the negative relationship between probability of default and returns is restricted to the firms with low BE/ME ratio. Campbell et al. (2005) also observe a maximum underperformance for low BE/ME firms, although underperformance is also high in the subset of the firms with the very highest BE/ME ratios.

Finally, it is clear that the negative excess return should show a large degree of persistence, as depleting the company takes time and the expectation of a takeover contest will be upheld over a longer period in many cases. Again, Campbell et al. (2005) have done the test for us. In addition to the CAPM alphas and the three-factor alphas, they calculate alphas on the basis of the four-factor model proposed by Carhart (1997) which also includes a momentum factor. This momentum factor offers no explanation of return differentials in terms of risk, but it shows how much of the excessive return can be attributed to the fact that they are persistent. It turns out that using the four-factor model including a momentum portfolio cuts the negative alphas of distressed stocks roughly in half, although there is little effect on the excess return of the portfolio formed on the very highest percentile of default risk.

Some further evidence comes from the literature on block sales premiums. As a measure of financial distress, Dyck and Zingales (2004) use a dummy variable that takes a value of one if earnings per share were zero or negative in the year of a block

trade or before and obtain a weakly significant negative coefficient in their block-trade regression. However, past returns are not a valid measure of the incentives to deviate funds. Barclay and Holderness (1989) show that the premium paid for the sale of large blocks is positively related to the financial leverage of the company and the amount of disposable free cash, which both accord well with the wreckers theory.[10]

Thus, the theory is able to explain the existing evidence very well, without invoking irrational or inefficient behaviour.

7 Outlook

The explanation advanced here focuses on the non-financial rewards of corporate control. The prospects of generating such rewards will vary between countries and legal systems. La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002) show that the value of firms to outside investors will be low if legal protection is weak in a certain country. More specifically, Johnson, Boone, Breach and Friedman (2000) have shown that measures of corporate governance, particularly the protection of minority shareholders, explain the extent of losses during the Asian crisis. They conjecture that in countries with weak corporate governance, worse economic prospects result in more expropriation by managers and thus a larger fall in asset prices. Our short paper highlights an additional mechanism triggered by the high probability of default that can drive this relationship. The inefficiencies created by wrecking behaviour may amplify real and financial shocks.

The probability of contests for control may also differ among industries. For example, in growing industries the private benefits that can be realised by a competitor may be larger than in a declining industry. The same is true of concentrated industries as opposed to competitive industries. Using a Herfindahl index, Garlappi et al. (2005) have found evidence confirming this conjecture.

We have mentioned that extracting private benefits of companies may be time consuming, depending on what those private benefits really are. Taking over key staff, market information and technical know how may be more rapid than the transfer fo cash by means of arms-lenth contracts or the relocation of physical assets. The structure of

[10] More precisely, the two variables are insignificant for the sample as a whole. They turn significant

our model does not allow to investigate the role of the time horizon. If time plays a role, however, then the relationship between financial stature and overpricing may be nonlinear, even non-monotonic. If the financial situation of the firm is so bad that bankruptcy is a matter of days, then, depending on circumstances, the value attached to control rights may not be very high, despite the strong adverse incentives.

Ultimately, we want to point out a rather strong prediction with respect to the relationship between financial stature and excess returns. It may serve as a definite test of the hypothesis advanced here. Our modelling exercise has shown that in order for a wreckers' premium to show up, there must be a positive probability of a contest of control, with at least two parties competing for the private benefits, and the expectation that the winner will have to pay a premium over the cash value. We have seen that such a contest is not to be expected if there is a controlling shareholder. Therefore, the negative excess premium should not exist in a portfolio of distressed firms that have a majority owner. These shares should trade at the value of their expected dividend or liquidation payments. With dispersed ownership, on the other hand, the existence of a premium can be predicted. It would therefore be interesting to investigate empirically whether financial distress is associated by a change in control and whether there is evidence of overpricing for distressed stocks with a majority owner.

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when the purchaser is an individual.

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Appendix: The wreckers' premium in a model with large shareholders

The main results of the model presented in the text are kept intact if we allow for competitors that control large blocks of shares, as well as for the possibility of making bids for only a fraction of the equity shares. This case was analysed by Rydqvist (1996), and we will adapt his model to the problem at hand.

We assume that the incumbent owns a fraction e_i and the rival owns a fraction e_r of the shares. The rest is held, as before, by atomistic shareholders. Incumbent and rival parties have private benefits G_i and G_r, and plan to generate cash flows V_i and V_r, respectively. No bargaining between the agents is allowed. In a contest, a fraction of 0.5 is needed to secure control and reap the private benefits. Parties submit bids for what is missing to reach the simple majority, $0.5-e_i$ and $0.5-e_r$. Thus, the number of shares the contestants buy may differ. Both initial holdings e_r and e_i are smaller than 0.5. Bids are unconditional – the contestants commit themselves to take all shares when less than the required number of shares is tendered to them.[11] Oversubscribed bids are pro rated.

We start by computing the contestants' break-even bid, which is the highest bid they can make without losing money if they win. The incumbent faces an offer *P* per share by the rival. If the incumbent makes a (infinitesimally higher) counter-offer and wins, the incumbent's payout will be

$$G_i + 0.5V_i - \left(0.5 - e_i\right)P. \tag{A1}$$

with the outstanding equity normalised to 1. If, instead, the incumbent tenders to the rival, with a portion f_r being accepted, the incumbent's payoff is

$$e_i\left[f_r P + \left(1-f_r\right)V_r\right]. \tag{A2}$$

Assuming that all shareholders other than the rival tender their shares, the portion

$$f_r = \frac{0.5-e_r}{1-e_r} \tag{A3}$$

of the proffered shares will be accepted, and the rest returned. The break-even point is the price for which the two options yield the same:

$$P_i = \frac{G_i + 0.5V_i - e_i\left(1-f_r\right)V_r}{0.5 - e_i\left(1-f_r\right)}. \tag{A4}$$

Correspondingly, the rival's break-even bid is

$$P_r = \frac{G_r + 0.5V_r - e_r\left(1-f_i\right)V_i}{0.5 - e_r\left(1-f_i\right)}. \tag{A5}$$

The winning bid will be at least as large as the lower of the two break-even bids:

[11] This ensures that the shareholders tender to the contestant with the higher bid, even when they suspect that he may not reach the majority, see Grossman and Hart (1988).

$$P^* \geq \min\left[P_i, P_r\right]. \tag{A6}$$

The winning bid may be higher than this lower bound for two reasons. One is the Grossman and Hart ICC: the winning bid must be at least as high as the cash flow generated by the winner herself. It is only when the Grossman-Hart ICC is binding that there will be no rent extraction and no wreckers' premium. The other is that the loser has incentives to bid higher than his or her her break-even bid. Overbidding may force the adversary to make a counter-offer, giving the loser the opportunity to trade in the shares at a higher price.[12] If we assume perfect knowledge with respect to both agents' valuation, the winning bid will have to be the *higher* of the two break-even bids,

$$P^* = \max\left[P_i, P_r\right], \tag{A7}$$

if the Grossman-Hart ICC does not bind. The losing party would not let the winner have it for less. The more generic case of a private valuation auction has been investigated by Burkart (1995). He shows that an agent with a toehold will invariably bid in excess to her valuation. The winning bid may even be higher than $\max\left[P_i, P_r\right]$ in this case. We assume that the agent with the higher valuation wins, as will be the case under certainty. However, we do not want to exploit the overbidding feature fully, but rather see (A6) as a lower bound for the outcome. Suppose first that the higher valuation is with the rival. The condition for the Grossman-Hart ICC to be not binding at the lower bound, i.e. $P_i > V_r$, is given by

$$G_i > 0.5\left(V_r - V_i\right). \tag{A8}$$

If the condition holds, there will be rent extraction, as the bid P^* is higher than the subsequent cash flows V_r.[13] An analogous condition holds for the case that the incumbent wins. We may now compare the results with the simple Zingales (1995) case. Prior to the contest, there will be a wreckers' premium in the market price of shares if

(1) market participants see a positive probability of a contest taking place and

(2) condition (A8) for rent extraction is fulfilled.

The probability in (1) is extremely high in our current modelling context, as it pays for the rival to put up even a losing fight as soon as $P_r > V_i$. Such a fight gives the rival the possibility of selling a part of her shares to the incumbent at a premium. Regarding the second point, condition (A8) is very similar in structure to the corresponding condition $G_i > V_r - V_i$ for the Zingales (1995) case, but it is milder, as only half the total cash flow of the firm is relevant for the two bidders. Thus, if none of the competitors is dominant, condition (A8) will be fulfilled *a forteriori,* and there will be rent extraction in a contest and a premium in the share prices.[14]

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[12] Rydqvist (1996) assumes that there will be no overbidding. We do not need to make this assumption.

[13] If the condition does not hold, the relevant lower bound is V_r. Note that (A8) is merely a sufficient condition for rent extraction to take place, as overbidding may result in higher winning bids.

[14] It has to be noted, though, that this does not mean that the premium will be necessarily higher than in the Zingales (1995) case. The winning bid may be lower if the winner needs to buy only a few shares. The dependence of the premium on the ownership structure is investigated further in Rydqvist (1996).