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# The influence of managerial incentives on the resolution of financial distress

Dong-Kyoon Kim · Chuck C. Y. Kwok

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**Abstract** This study investigates the influence of managerial incentives on the resolution of financial distress. Our model predicts that when creditors and equityholders prefer different resolution methods, the likelihood of choosing Chapter 11 over private renegotiation is related to the ownership structure of the distressed firm. Empirical test results using a sample of 81 voluntary Chapter 11 firms and 65 private workout firms support the model's prediction. We show that managerial ownership is positively related to the incidence of Chapter 11 filing when there is conflict between equityholders and creditors over the choice between Chapter 11 and a private renegotiation. Consistent with prior literature, we also find that the choice of resolution methods depends on the extent of creditor holdout problems and the level of economic distress. We also performed the analysis of a subsequent 5 years of post-distress performance for all sample firms. The majorities of firms that file for Chapter 11 lose their independence and are either acquired or liquidated. However, more than half of firms in private workouts survived as independent firms.

**Keywords** Managerial incentives · Financial distress resolution

**JEL Classifications** G32 · G33

## 1 Introduction

We investigate the impact of managerial incentives on the choice between Chapter 11 and private renegotiation when a firm is under financial distress. Previous studies focus on conflict between equityholders and creditors when they analyze the firm's debt

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restructuring process (e.g., Brown 1989; Giammarino 1989; Mooradian 1994). They show that firms resolve their financial distress in Chapter 11 despite incurring bankruptcy costs when they have severe creditor holdout problems and asymmetric information problems.

Consistent with these models, empirical studies show that the resolution method used by financially distressed firms varies with the firms' financial and economic characteristics. For example, Gilson et al. (1990) show that financial distress is more likely to be resolved through Chapter 11 when there are more distinct classes of debt outstanding in a distressed firm and when bankruptcy costs are low. Charterjee et al. (1996) find that firms that file for Chapter 11 are more economically distressed and have more bank debt.

Assuming that managers can influence the distressed firm's debt restructuring decision, we investigate whether the resolution of financial distress is influenced by managerial incentives. By focusing on the situations where equityholders and creditors have different preferences about the choice of resolution methods in a financially distressed firm, we examine how conflict between management and equityholders arises in the choice between Chapter 11 and private renegotiation.<sup>1</sup> Since this study is focusing on the firm's choice of a resolution method, we consider only the firm's voluntary Chapter 11 filing and private renegotiation in the analysis.

We use a simple framework to show that the manager's choice of resolution method is not always consistent with the interest of equityholders but is sometimes aligned with the interest of creditors. Under the situations where equityholders prefer to choose Chapter 11 but creditors' preference is private renegotiation, the likelihood of Chapter 11 filing increases with the increase of managerial shareholdings and outside blockholders' ownership.

By using a sample of 81 voluntary Chapter 11 filing firms and 65 private workout firms during the period of 1992 through 1998, we show that managerial ownership is positively related to the probability of Chapter 11 filing even after controlling for the impact of management displacements when there is conflict between equityholders and creditors over the choice between Chapter 11 and a private workout. Consistent with prior literature (e.g., Charterjee et al. 1996), we also find that the choice of resolution methods depends on the extent of creditor holdout problems and the level of economic distress.

We also perform the analysis of a subsequent 5 years of post-distress performance for all sample firms.<sup>2</sup> The majorities of firms that file for Chapter 11 lose their independence and are either acquired or liquidated. However, more than half of firms in private workouts survived as independent firms. Firms that file for Chapter 11 have relatively higher chance of being acquired or liquidated than private workout firms. This result is consistent with Kahl (2002).

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<sup>1</sup> Several previous studies, such as Bebchuck and Chang (1992) and Berovitch and Israel (1998), analyze the bankruptcy decision and debt contract renegotiation of distressed firms by focusing on the conflict of interest between owner/manager and creditors. However those studies do not consider the conflicts of interest between managers and equityholders in their theoretical frameworks by assuming that managers act in the equityholders' interests. Our study explicitly considers the situation where the conflict of interest between managers and equityholders can arise in our analysis. We also conduct an empirical analysis.

<sup>2</sup> The sample period of our study for the onset of reorganization is from 1992 to 1998. However, we also analyze the subsequent five-year post-distress performance for all sample firms to examine the outcomes of reorganization. In effect, our sample period covers the years of 1997–2003. Studies such as Kahl (2002) and Turetsky and McEwen (2002) analyze post-performance of distressed firms.

## 2 The influence of managerial incentives on the resolution of financial distress: chapter 11 filing vs. private renegotiation

### 2.1 Framework

We present a simple framework to examine how managerial incentives affect the incidence of Chapter 11 in the presence of conflict of interest between equityholders and creditors over the choice of resolution method. We consider a firm that has no cash but has outstanding debt with a face value of  $D$ , currently payable in full.<sup>3</sup> The firm's equity securities are owned by managers and outside equityholders. The firm is in financial distress and must renegotiate with creditors by choosing the best way to resolve the financial distress. Firms have two options available to them to resolve their financial distress: Chapter 11 and private renegotiation.

Let  $V$  be the value of the financially distressed firm's assets at the start of reorganization; it is the firm's value before taking out deadweight costs in reorganization. A firm's reorganization describes the division of firm value between creditors and equityholders. The claimholders' preferences of a resolution method depend on the value they receive, which is primarily determined by the relative costs and benefits of Chapter 11 versus private renegotiation.

First, we assume that both a private workout and Chapter 11 incur financial distress costs that are deadweight costs in the private workout ( $C_w > 0$ ) and bankruptcy costs ( $C_B > 0$ ), where  $W$  = private workout and  $B$  = bankruptcy.<sup>4</sup> As suggested in prior evidence, we assume that bankruptcy costs are greater than deadweight costs in a private workout ( $C_B > C_w$ ).<sup>5</sup>

The proportion of reorganization value that can be retained by equityholders in Chapter 11 (in a private workout) equals  $\delta(B)$  ( $\delta(W)$ ), where  $0 < \delta(B) < 1$  ( $0 < \delta(W) < 1$ ).<sup>6</sup> Given that Chapter 11 filing is a frequently used method for resolving financial distress, and assuming that bankruptcy costs are greater than deadweight costs in a private workout ( $C_B > C_w$ ), firms file for Chapter 11 because Chapter 11 provides unique benefits to filing firms, which private workout firms cannot obtain. These benefits include an automatic stay from creditors and a less restrictive approval process for the reorganization.<sup>7</sup>

To incorporate this possibility, we assume that equityholders have a higher bargaining ability to retain a certain proportion of the firm's reorganization value in Chapter 11 than in a private workout owing to the features of Chapter 11, thus  $[\delta(B)/\delta(W)] > 1$ . Since this

<sup>3</sup> In our framework,  $D$  is assumed to be the maximum value creditors can take in reorganization.

<sup>4</sup> Deadweight costs in a private workout are transactions costs incurring in reorganization due to creditor holdout problems in a distressed firm. Gilson (1997) broadly defined the transaction costs as a major impediment to voluntary corporate restructuring. Bankruptcy costs are incurred in Chapter 11 because Chapter 11 bankruptcy involves significant administrative costs and other economic losses (Gilson et al. 1990).

<sup>5</sup> See Gilson et al. (1990), Gilson (1991), and Wruck (1990) for details.

<sup>6</sup> We assume that there exists minimum equity value that can be preserved as long as a distressed firm is in reorganization by negotiating with creditors (i.e., both  $\delta(B)$  and  $\delta(W)$  are positive).

<sup>7</sup> Several studies identify the major sources of the equityholders' ability to obtain value and parameters that determine how much they will obtain under Chapter 11, even though the firm is insolvent (e.g., Franks and Torous 1989; Bebchuk and Chang 1992; Mooradian 1994). The sources are option to delay and incentive to take risky projects, which may incur significant financial distress costs to creditors. By avoiding these options, equityholders can obtain part of these savings at the expense of creditors. Betker (1995) also mentions that equityholders can directly affect a firm's reorganization procedure in a Chapter 11 case by forming an equity committee.

assumption captures only equityholders' bargaining ability inherited in the Chapter 11 reorganization, the actual dollar amount of equity value retained in private renegotiation can be greater than that in Chapter 11. Thus, the choice of Chapter 11 as a firm's restructuring methods depends on the relative cost disadvantage of bankruptcy and the relative benefit advantage of bankruptcy.

Managers may choose either Chapter 11 or a private workout to maximize their expected payoff sometimes at the expense of equityholders. As discussed further below, agency problem between the manager and equityholders can arise in a situation where conflict of interest between equityholders and creditors exists.

### 3 Conflict of interest between equity and debt in the choice between Chapter 11 and private renegotiation

Based on the framework in the previous section, we identify the situations where equityholders and creditors have different preferences between Chapter 11 and a private workout. Creditors and equityholders are expected to have the following payoffs in Chapter 11 ( $B$ ) or in a private workout ( $W$ ).

$$\begin{aligned} V_D(W) &= \min[D, (1 - \delta(W))(V - C_W)], \text{ and } V_D(B) = \min[D, (1 - \delta(B))(V - C_B)], \\ V_E(W) &= (V - C_W) - V_D(W), \text{ and } V_E(B) = (V - C_B) - V_D(B), \end{aligned} \quad (1)$$

where  $V_D(W)$  = creditors' payoff in a private workout;  $V_D(B)$  = creditors' payoff in Chapter 11;  $V_E(W)$  = equityholders' payoff in a private workout;  $V_E(B)$  = equityholders' payoff in Chapter 11.

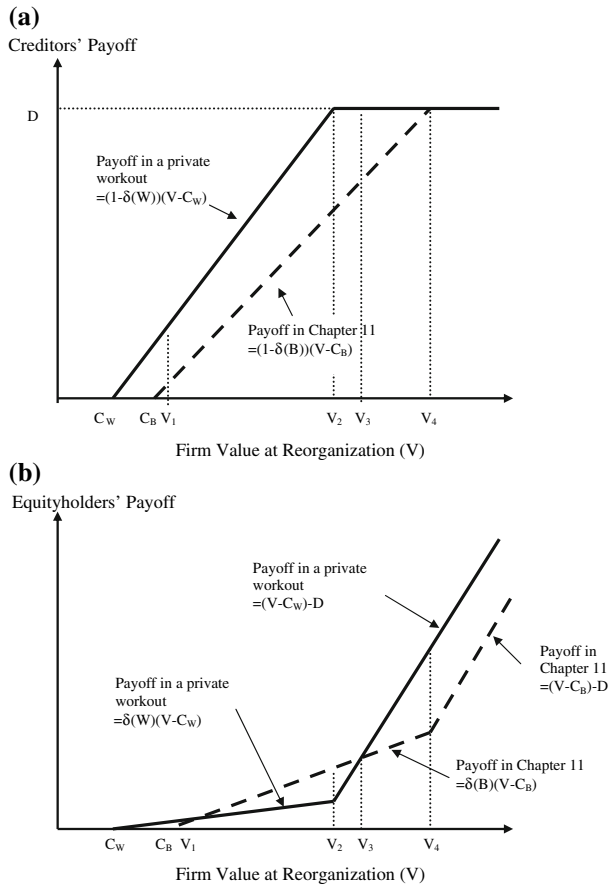
Figure 1a and b illustrate payoffs to creditors and equityholders under a private workout and Chapter 11, respectively. If  $V < V_1$  or  $V > V_3$ , both creditors and equityholders prefer a private workout to Chapter 11. However, if  $V_1 \leq V \leq V_3$ , equityholders prefer Chapter 11 while creditors prefer private renegotiation. Conflict of interest exists between equityholders and creditors on the choice between Chapter 11 and a private workout in this range of  $V$ .<sup>8</sup>

We can measure the degree of conflict between equityholders and creditors to the choice between Chapter 11 and private renegotiation by using the difference in the equityholders' payoffs between Chapter 11 and a private workout. As shown in Fig. 1b, the conflict increases as  $V$  increases above  $V_1$  until  $V$  reaches  $V_2$  and then the conflict declines to the point where  $V$  is close to  $V_3$ .

This suggests that conflict is more likely to exist when  $V$  is closer to  $V_2$  since equityholders can retain higher values in Chapter 11 than in a private workout while creditors' preference is private renegotiation. As described in the Appendix,  $V_2$  denotes the firm's value at reorganization in which creditors can be paid in full in a private workout (i.e.,  $V = D/(1 - \delta(W)) + C_W$ ). This also suggests that conflict of interest between equityholders and creditors is less likely to exist when  $V$  is small or large relative to  $D/(1 - \delta(W)) + C_W$ . In summary, equityholders prefer Chapter 11 to private renegotiation, but creditors' preference is to renegotiate privately since in a Chapter 11 case,

<sup>8</sup> A more complete algebraic analysis that derives parameter values that give rise to a conflict is provided in the Appendix.

**Fig. 1** (a) Creditors' payoff in reorganization. (b) Equityholders' payoff in reorganization



equityholders can retain a relatively higher value against creditors when the firm's reorganization value ( $V$ ) is close to  $D/(1 - \delta(W)) + C_w$ .<sup>9</sup>

#### 4 The existence of managerial incentives and the choice of a resolution method

We now introduce managerial incentives into the framework. We assume that in a financially distressed firm, the management payoff is related to both equityholders' payoffs and creditors' payoffs. As John and John (1993) suggest, in a period of financial distress, the manager gets a potential payoff that consists of cash compensation (i.e., fixed salary plus cash bonus), a proportion of equityholders' payoff, and a penalty that can be interpreted as salary reduction or the costs of managerial turnover. As Betker (1995) argues, creditors can control managers by affecting their cash compensation or by pressuring the board of directors to replace them when the firm is in financial distress.

<sup>9</sup> This explanation is consistent with the findings in Franks and Torous (1994). They find larger equity deviations from absolute priority at reorganization when the face value of creditors' claim ( $D$ ) is close to the value of the firm at reorganization. This finding suggests that the institutional characteristics of Chapter 11 are used as bargaining power by equityholders, which leads creditors to offer equityholders more when the option to delay in Chapter 11 is close to or at-the-money (i.e., the firm's reorganization value is close to  $D$ ).

There are several studies which show that creditors can influence the decision of distressed firms' management. For example, Gilson and Vetsuypens (1993) show that managers' compensation is sometimes explicitly tied to the value of creditors' claims.<sup>10</sup> Gilson (1989) shows that a significant number of management changes are initiated by creditors when firms are in financial distress.<sup>11</sup> More recently, Branch (2000) and Campbell and Frost (2007) argue that when a firm is in financial distress, managers have a fiduciary duty to protect the rights of creditors as well as duties to shareholders. Therefore, in a financially distressed firm, we assume that the payoff for the manager depends on both the value of equity and debt.

When there is a conflict of interest between equityholders and creditors over the choice between Chapter 11 and private renegotiation (i.e., under the situation where the firm value at reorganization is close to  $D/(1 - \delta(W)) + C_w$ ), the choice of Chapter 11 by the manager will depend on the degree to which the manager's interests or preferences are tied to those of equityholders relative to those of creditors, which can be denoted as  $\gamma$ . Various attributes of a distressed firm's ownership structure can influence  $\gamma$ . In this study, we concentrate on the managerial shareholdings and the role of outside shareholders who hold a large percentage of the firm's equity (i.e., blockholders). Agency theory predicts that managers might not always act in the best interest of shareholders (Jensen and Meckling 1976). If agency conflicts exist in financially distressed firms, then it is possible that managers will make restructuring decisions inconsistent with the interests of shareholders. Corporate governance and monitoring mechanisms exist to mitigate these agency conflicts. Shareholdings by managers and directors are used to align their interests with those of shareholders as well as unaffiliated equity blockholders with at least 5% ownership of the firm (see Shleifer and Vishny 1986).

First, as the manager's ownership stake increases,  $\gamma$  will increase and the manager will reap a greater fraction of the benefits associated with equity-value-enhancing actions. The manager is, therefore, more likely to choose Chapter 11. Second,  $\gamma$  will also increase as the blockholders' shareholdings increase. The outside blockholders will have incentives to force the manager to choose Chapter 11 to increase their equity values.

In summary, the framework presented implies that the choice of resolution method in a financially distressed firm can be influenced by ownership structure of a distressed firm when there is a conflict of interest between equityholders and creditors. Based on the discussion above, we propose two hypotheses:

**H1:** A financially distressed firm is more likely to use Chapter 11 rather than a private workout as managerial shareholdings increase when the financially distressed firm's value at reorganization is close to the critical value where creditors are paid in full in a private workout (i.e.,  $V = D/(1 - \delta(W)) + C_w$ ), all else being equal.

**H2:** A financially distressed firm is more likely to use Chapter 11 rather than a private workout with the increase of outside blockholders' shareholdings when the financially distressed firm's value at reorganization is close to the critical value where creditors are paid in full in a private workout (i.e.,  $V = D/(1 - \delta(W)) + C_w$ ), all else being equal.

<sup>10</sup> Gilson and Vetsuypens (1993) show that 10% of their sample explicitly tied the management compensation to creditors' value. Managers are either awarded financial claims similar to those held by creditors, or paid a bonus based on how much cash creditors received under the firm's reorganization plan.

<sup>11</sup> Gilson (1989) shows that 20 management changes out of 176 management changes for financially distressed firms are initiated by bank lenders.

## 5 Sample selection and descriptive statistics

### 5.1 Sample selection

Our final sample consists of 146 firms which are financially distressed during the 1992 and 1998 period and which resolve their financial distress either through Chapter 11 or private renegotiation. Eighty-one firms file for Chapter 11 voluntarily and 65 firms renegotiate privately with creditors. The onset of financial distress is the first time that a firm defaults or violates a debt covenant; the firm resolves its financial distress by negotiating with its creditors privately to restructure its debt, or by filing for Chapter 11 voluntarily. Our sample selection process is as follows.

- (1) The initial sample is created using a key word search of the *Wall Street Journal Index* (WSJI) and *Lexis-Nexis*. The key words used in the search are “debt restructuring”, “loan restructuring”, and “financial restructuring”. Since this study focuses on debt restructurings that occur in financial distress, the search is restricted to articles that also contain the key words “default”, “troubled”, “distressed”, or “bankruptcy” (Brown et al. 1994; James 1995).<sup>12</sup> Over the period of 1992–1998, this results in 849 potential observations.
- (2) We search *Lexis-Nexis* to identify whether distressed firms restructure their debts through Chapter 11 filing or by renegotiating with creditors privately. For the Chapter 11 cases, it is easy to identify the filing date through the WSJI and *Lexis-Nexis*. Most of the private debt restructurings, however, do not have well-defined beginning dates or ending dates. To identify private debt restructuring firms, the definition of Gilson et al. (1990) is used. They define a debt restructuring as a transaction in which the firm’s debt contracts are amended on one of the following terms: (i) promised interest or principal payments on the debt are reduced; (ii) the debt’s maturity is extended; or (iii) creditors are given equity securities of the firm. Debt restructuring is assumed to take place over the interval defined by the first and last reference to the restructuring in *Lexis-Nexis* and the *Wall Street Journal Index* (WSJI), unless more accurate dates are available from other sources.<sup>13</sup> Within the sample of distressed firms that satisfy these criteria, there are 214 Chapter 11 firms and 72 private workout firms (Total 286 firms).
- (3) Since the analysis focuses on the choice between Chapter 11 filing and private renegotiation with creditors, the sample is restricted to the first-time filing of Chapter 11 and private renegotiation. Chapter 11 filing firms are limited to the firms that do not have a private workout during the 2 years prior to filing. This results in 149 Chapter 11 firms and 72 private workout firms (Total 221 firms).
- (4) We also perform an analysis of a subsequent 5 years of post-distress performance for Chapter 11 firms and private workout firms to investigate how the choice of restructuring method is related to the outcomes of restructuring. Thus, our analysis extends to the period of 1997–2003. For each firm, the outcome of restructuring is identified by searching through the WSJI and *Lexis-Nexis* at least for 5 years after the onset of a firm’s financial distress. One possible resolution of financial distress is that the firm survives the entire process of financial distress and emerges as independent

<sup>12</sup> Some firms adopt debt restructuring for the strategic purpose although they are not in the financial distress. These firms are excluded from the sample.

<sup>13</sup> This procedure for gathering the sample is common for the related studies (e.g., Gilson et al. 1990; Charterjee et al. 1996). However, other studies, such as Sun (2007), use different method to collect the sample for distressed firms.



entity. To include the firms which remain independent after reorganization, we look for any sign in the articles in *Lexis/Nexis* that indicates the firm is clearly out of financial distress (for example, resuming dividend payment on its common stocks or raising substantial funds in the debt or equity market).<sup>14</sup> The other possibility is acquisition or liquidation. Both indicate the end of the firm as an independent entity and the reallocation of its assets to a different user. We include only the acquisitions and liquidations which are related to the incidence of financial distress. This results in 103 Chapter 11 firms and 68 private workout firms (Total 171 firms).

- (5) Mostly, we collect distressed firms' financial data that closely pre-date the announcement of restructuring methods except some managerial ownership data. Managerial ownership data have to be related to the management who actually made a decision for choosing the resolution method. Thus, for firms with management displacement prior to the onset of debt restructuring, we collect managerial ownership data which closely post-date the announcement of top management displacements. Originally 60 firms with top management displacements prior to the onset of debt restructuring are identified. However, owing to incomplete financial information for some firms, only 35 firms (18 Chapter 11 firms and 17 private workout firms) with top management displacements are included in the empirical analysis.

For a firm to be included in the sample, descriptive financial characteristics, information on the complexity of debt, ownership structure, and other financial data must be available in *COMPUSTAT* database, *Compact Disclosure*, *10 K reports*, *Proxy Statements* and *Moody's* manuals. Consequently, we have a final sample which consists of 81 Chapter 11 firms and 65 private workout firms (Total 146 firms). Our sample is quite comparable to the sample of similar studies, such as Kahl (2002).<sup>15</sup> Sample selection process is summarized in described in Table 1.

## 5.2 Descriptive statistics

The sample is comprised of 81 firms that restructure under Chapter 11 filing and 65 firms reorganize in a private workout. Table 2 provides an industry distribution of the sample firms. Our sample is distributed across a broad category of industries, with a concentration in manufacturing, and trade retail & wholesale industries. The industry concentration in our sample is comparable to research samples of financially distressed firms in previous studies (e.g., Charterjee et al. 1996).

Table 3 provides the descriptive statistics concerning the financial characteristics of the firms at the onset of financial distress and the outcomes of reorganization. The results from differences in means test and Wilcoxon sum rank test are also provided in Table 3.

<sup>14</sup> A necessary condition for firms that remain independent is that the firm is not in Chapter 11, is not in default, and not negotiating to restructure its debt to avoid a default, at least for 5 years after the onset of financial distress.

<sup>15</sup> We compare the sample of our paper with Kahl (2002) and find that the samples in Kahl (2002) and our paper are quite comparable. Kahl (2002) uses a sample of 102 firms which consist of Chapter 11s (56 firms, 54.9%) and private renegotiation firms (46 firms, 45.1%) during a period of 1979–1983. The paper analyzed the debt restructuring process from the onset of restructuring to the outcomes of restructuring. The overall average rate of sample (the number of the sample observations divided by the number of sample years) in Kahl (2002) is 20.2 (105/5) (Chapter 11s: 11.2, and private workouts: 9.2). The overall average of our sample is 20.9 (146/7) (Chapter 11s (55.4% of the sample): 11.6 and private workouts (44.5% of the sample): 9.3).

**Table 1** Sample selection process

Steps	Selection process	Number of firms
Step 1	Financially distressed firms with debt restructurings are identified by using keyword search of Wall Street Journal Index and Lexis–Nexis (Keywords: debt restructuring, loan restructuring, financial restructuring, default, troubled, distressed, and bankruptcy)	Total 849 observations
Step 2	Identify whether distressed firms restructure their debts through Chapter 11 filing or a private workout	Total 286 firms Chapter 11 firms: 214 Private workout firms: 72
Step 3	Restriction to the first time filing of Chapter 11 and a private workout. Also, Chapter 11 firms do not have a private workout before the filing	Total 221 firms Chapter 11 firms: 149 Private workout firms: 72
Step 4	Identify firms which have the information of five year post-distress performance: outcomes of restructuring	Total 171 firms Chapter 11 firms: 103 Private workout firms: 68
Step 5	Identify firms with management displacement before the onset of restructuring and restrict firms with the information about ownership structure, debt structure, and other financial characteristics	Total 146 firms (Final sample) Chapter 11 firms: 81 Private workout firms: 65

*Note:* Major data sources in the sample selection process are Wall Street Journal Index, Lexis–Nexis, Compustat, Compact Disclosure, 10K reports, Proxy statements and Moody’s Manual

**Table 2** Industry classification

Industry classification	All sample ( <i>N</i> = 146)	Chapter 11 ( <i>N</i> = 81)	Private workouts ( <i>N</i> = 65)
Mining and construction	18	7	11
Manufacturing	49	25	24
Transportation and communication	8	6	2
Utilities	8	3	5
Trade retail & wholesale	45	34	11
Financial institutions and real estate	2	1	1
Services	16	5	11

*Note:* This table presents descriptive characteristics of the restructuring firms during the period of 1992–1998. The sample is comprised of firms which attempt the first time to restructure via a Chapter 11 filings (81 firms) or private workouts (65 firms). A private workout involves private negotiations between a firm and creditors. Major data sources are Compustat, Compact Disclosure, and Moody’s Manual

Managers and CEO in Chapter 11 firms hold relatively higher ownership stakes than those in private workout firms. This result is consistent with the prediction that managerial incentives influence a firm’s choice between Chapter 11 and private workout. However, it is also possible that significantly higher managerial ownership of Chapter 11 firms is due to the relatively small size of Chapter 11 firms since in general small firms have higher managerial ownership than large firms.

**Table 3** Characteristics of firms and outcomes of reorganization: Chapter 11 firms vs. private workouts

Variables	Chapter 11 firms		Private workout firms	
	Mean	Median	Mean	Median
Managerial ownership (MGT)	0.246*	0.237**	0.189	0.132
CEO ownership (CEO)	0.085*	0.019	0.048	0.019
Management change before the onset of restructuring	0.220	0.000	0.265	0.000
Outside blockholders' ownership (BLOCK)	0.198	0.136	0.189	0.162
Bank debt/total liabilities (BANK)	0.113*	0.010**	0.062	0.000
Number of long-term debt contracts (#LTD)	2.728	2.000	3.094	3.000
Existence of public debt (PUBLIC_DEBT)	0.370	0.000	0.468	0.000
EBITDA/total assets (EBITDA_RATIO)	-0.216*	-0.046	-0.093	-0.027
Industry-adjusted EBITDA_RATIO)	-0.319**	-0.165	-0.178	-0.116
Total assets (millions\$) (TA)	280.07*	145.97	421.46	277.09
Market to book value ratio (MB)	1.584	1.184	1.419	1.151
Solvency ratio (SOLV)	0.546*	0.544*	0.629	0.697
Continue as an independent company	0.272***	0.000***	0.547	1.000
Acquired	0.358	0.000	0.296	0.000
Liquidated	0.370***	0.000***	0.156	0.000
Observations	81		65	

*Note:* This table presents descriptive characteristics of the restructuring firms during the period of 1992–1998. The sample is comprised of firms which attempt the first time to restructure via a Chapter 11 filings (81 firms) or private workouts (65 firms). A private workout involves private negotiations between a firm and creditors. Major data sources are Lexis and Nexis, Compustat, Compact Disclosure, Proxy statements, and Moody's Manual

\*\*\*, \*\*, and \* denote significant differences at the 0.01, 0.05, and 0.10 levels from the mean and median of the private workout firms. The median test is based on Wilcoxon sum rank test statistics

We measure the degree of the creditors' coordination problem by the proportion of bank debt to total assets, the number of long-term debt contracts, and the existence of public debt. In Table 3, Chapter 11 firms have significantly greater proportion of bank debt than private workout firms. This result suggests that higher proportions of bank debt are obstacles for firms to choose a private workout (see Asquith et al. 1994; Charterjee et al. 1996).

Consistent with the findings in Charterjee et al. (1996), Chapter 11 firms have significantly lower EBITDA to total asset ratios and lower industry-adjusted EBITDA to total asset ratios than private workout firms.<sup>16</sup> Since the EBITDA to total asset ratio proxies the relative degree of economic distress faced by Chapter 11 and private workout firms, this finding suggests that firms restructuring informally have better economic prospects than those reorganizing in Chapter 11.

The mean and the median of firms' book value of total assets are significantly lower for Chapter 11 firms. Small firms tend to be first-time filers of Chapter 11 on average, suggesting that larger firms may have a comparative advantage in reorganizing their debt claims privately (e.g., Gilson et al 1990; Charterjee et al. 1996).

<sup>16</sup> Industry-adjusted EBITDA to total assets ratio is constructed by subtracting the median EBITDA/total assets of all other Compustat firms with the same 3-digit SIC code from a firm's EBITDA/total assets.

**Table 4** Ownership structure and financially distressed firms with different levels of solvency ratio

	Full sub-sample	Chapter 11 firms	Private workouts	<i>t/z</i> Statistics for difference
<i>Panel A: Distressed firms with low solvency ratio (LSOLV)</i>				
Managerial ownership				
Mean (%)	23.70	27.68	17.43	2.13**
Median (%)	19.75	24.55	6.80	-2.55***
Blockholders' ownership				
Mean (%)	18.13	18.23	17.97	0.96
Median (%)	11.21	11.00	12.30	-0.39
Observations	72 (100%)	44 (61.11%)	28 (38.89%)	
<i>Panel B: Distressed firms with high solvency ratio (HSOLV)</i>				
Managerial ownership				
Mean (%)	20.47	20.92	20.00	0.83
Median (%)	15.80	15.70	16.05	0.04
Blockholders' ownership				
Mean (%)	20.66	21.61	19.69	0.67
Median (%)	18.90	18.53	19.86	-0.14
Observations	73 (100%)	37 (50.68%)	36 (49.32%)	

*Note:* This table presents descriptive characteristics of the restructuring firms during the period of 1992–1998. The sample is comprised of firms which attempt the first time to restructure via a Chapter 11 filings (81 firms) or private workouts (65 firms). A private workout involves private negotiations between a firm and creditors. Major data sources are Lexis and Nexis, Compustat, Compact Disclosure, Proxy statements, and Moody's Manual

\*\*\*, \*\*, and \* denote significant differences at the 0.01, 0.05, and 0.10 levels. The median test is based on Wilcoxon sum rank test statistics

Chapter 11 firms have a slightly lower solvency ratio (i.e., less insolvent at reorganization) than private workout firms. The lower solvency ratio of Chapter 11 firms is consistent with the analysis in our framework. The framework in the previous section suggests that firms with solvency ratio in a relatively low range are more likely to choose Chapter 11 because the benefits from Chapter 11 can offset the high deadweight costs in Chapter 11. The higher solvency ratio (i.e., more insolvent) for private workout firms suggests that relatively more insolvent firms are likely to choose private workouts because Chapter 11 costs will dominate the benefits from Chapter 11.

Table 3 also summarizes how a firm's financial distress is resolved. By analyzing the subsequent five-year after the onset of reorganization during the period of 1998–2003, we find that the majorities of firms that file for Chapter 11 lose their independence and are either acquired or liquidated. Twenty-seven firms are acquired and 31 firms are liquidated. Twenty-three firms (28.4%) emerge from Chapter 11 as independent companies. More than half of firms in private workouts survived as independent firms (35 firms, 53.9%). Nineteen firms are acquired and only 10 firms are liquidated in the sample of private workouts. The results of Table 3 show that firms that file for Chapter 11 have relatively higher chance of liquidation than private workout firms. It is probably due to the less economic viability of Chapter 11 firms than private workout firms.

Finally, Table 4 shows that the proportion of Chapter 11 firms with low solvency ratio (61.11%) is greater than that of Chapter 11 firms with high solvency ratio (38.89%), suggesting that relatively less financially distressed firms are more likely to file for Chapter 11.

Furthermore, Panel A in Table 4 shows that for distressed firms with a low solvency ratio, managerial ownership in Chapter 11 firms is significantly greater than that in private workout firms. The mean and median differences of managerial ownership between Chapter 11 firms and private workout firms are significant at the 5% and 1% levels, respectively. However, mean and median differences of blockholders' ownership are not statistically significant.

For distressed firms with high solvency ratio, neither managerial nor blockholders' ownership is statistically different between Chapter 11 firms and private workout firms. This result supports the prediction that Chapter 11 filing under the presence of conflict between equityholders and creditors is related to managerial incentives.

## 6 The influence of ownership structure on the restructuring decisions: Chapter 11 vs. private renegotiation

### 6.1 Logistic regression analysis

As discussed in the previous sections, conflict between creditors and equityholders occurs when the firm's reorganization value ( $V$ ) is close to  $D/(1 - \delta(W)) + C_W$ . Since parameter values for the proportion of reorganization value that can be retained by creditors (i.e.,  $1 - \delta(W)$ ) and the deadweight costs in a private workout (i.e.,  $C_W$ ) are unobservable at reorganization, we use the solvency ratio (SOLV) as a proxy for the degree of conflict between creditors and equityholders by following the analysis in Bebchuck and Chang (1992).

SOLV equals the ratio of face value of all debt ( $D$ ) to the value of the firm at the time of reorganization ( $V$ ).<sup>17</sup> The higher the solvency ratio (SOLV), the more likely the firm's financial position is impaired. In our analysis, since  $V$  is based on the value of the distressed firm before taking out the deadweight costs in reorganization,  $V$  can be measured by the sum of the face value of all debt plus the market value of equity at the start of the firm's reorganization. The data used to construct SOLV come from the *COMPUSTAT* or *Compact Disclosure* data base and the data closely predate the firm's onset of its reorganization decision.

According to the analysis in the previous section (see Fig. 1b), in a range of relatively low solvency ratio (i.e., in a range of relatively high firm value ( $V$ ) or when a firm's financial position is less impaired) conflict of interest between equityholders and creditors is more likely to exist as  $V$  decreases or as the firm's solvency ratio increases. It suggests that the probability of Chapter 11 increases with the increase of solvency ratio when there is conflict between equityholders and creditors.

However, in a range of relatively high solvency ratio (i.e., in a range of relatively low firm value or when a firm's financial position is more impaired) conflict is less likely to exist as  $V$  decreases or as a firm's solvency ratio increases, suggesting that the probability of Chapter 11 becomes lower with the increase of solvency ratio when there is no conflict between equityholders and creditors.

The analysis in Fig. 1b also suggests that when a firm's solvency ratio is really low (such as when  $V$  is greater than  $V_4$  in Fig. 1b), there is no conflict of interest between equityholders and creditors since all claimholders prefer a private workout to Chapter 11. However, we exclude this possibility in the empirical analysis since all firms in our sample are financially distressed. Thus, the financially distressed firms in our sample are less likely to be in a range of

<sup>17</sup>  $V$  is the value that the firm would have such that if the firm is not expected to incur the deadweight costs in reorganization.

$V$  which is greater than  $V_4$ . If this conjecture is correct, in our sample, conflict of interest between equityholders and creditors is more likely to exist when the firm's solvency ratio is relatively low (i.e., when the firm's financial position is relatively less impaired).

Therefore, we expect that the ownership structure of a firm and creditors' holdout problems are more likely to be related to the incidence of Chapter 11 filing for firms with low solvency ratio. For firms with high solvency ratio, the economic distress is more likely to be related to the incidence of Chapter 11 owing to the lower creditors' holdout problems.

By using a solvency ratio as a measure of conflict between equityholders and creditors, we estimate a logistic regression model to examine the impact of managerial incentives on the restructuring decision: Chapter 11 vs. private renegotiation. The dependent variable indicates whether the firm files for Chapter 11 voluntarily or renegotiates privately with creditors. Explanatory variables are the ownership structure of a firm, the proxies for creditors' holdout problems and the levels of economic distress.

In our sample managerial ownership is generally measured by the percentage of shares owned by the firm's officers and directors (MGT) before the announcement of debt restructuring method. There are two potential problems in our study regarding the impact of managerial ownership. Firstly there may be incentives for managers to dump stocks during the period of distress. However, Loderer and Sheehan (1989) and Ma (2001) find no evidence that managers systematically reduce their stockholdings prior to bankruptcy in spite of the substantial wealth decline incurred.

Secondly, as mentioned in previous studies (e.g., Gilson 1989), management turnover is very common in the process of debt restructuring for financially distressed firms. In order to perform an accurate analysis for the influence of managerial incentives on the choice between Chapter 11 and a private workout, the managerial ownership has to be related to the management who actually made the decision over the choice between Chapter 11 and private workout. If managers are replaced prior to the onset of debt restructuring, the ownership of the new management has to be included in the analysis. We collect managerial ownership data for firms with management displacement that closely postdate the announcement of top management displacements. Also, to control for the impact of management displacement in the regression analysis, we include a dummy variable for top management changes prior to the announcement of debt restructuring (MGT\_CH).<sup>18</sup>

Outside blockholders' ownership is used to proxy for equityholders' incentive to control the management (Shleifer and Vishny 1986). Outside blockholders' ownership is measured by the percentage of shares owned by shareholders with at least a 5% stake in the firm, which is not related to the management (BLOCK). Ownership structure information for our sample firms is collected by reading *Proxy Statements* of our sample firms.

Bankruptcy costs, creditors' holdout problems, and the level of economic distress of a firm are primary determinants of the choice between Chapter 11 and private renegotiation (e.g., Gilson et al. 1990; Charterjee et al. 1996). First, researchers have used indirect ways of measuring the bankruptcy costs. Gilson et al. (1990) argue that the destruction of going-concern value occurs when a distressed firm's assets are sold to resolve financial distress. Assuming that assets are more likely to be sold in Chapter 11 than in a private workout,<sup>19</sup> the firm with more intangible or specific assets will experience greater loss of value owing to the asset sales, suggesting higher deadweight costs in Chapter 11. The potential loss of

<sup>18</sup> This analysis is based on the reviewer's suggestions.

<sup>19</sup> Gilson et al. (1990) explain why assets are more likely to be sold in Chapter 11 than in private negotiations. For instance, the firm has more power over the disposition of the firm's assets owing to automatic stay provision.

going-concern value is measured by the ratio of the firm's market to the book value of assets (MB).<sup>20</sup>

Second, even if stockholders and creditors believe that their combined wealth will be higher if debt is restructured outside of Chapter 11, negotiations can break down if particular creditors hold out for more generous terms. Since this holdout problem can be mitigated through Chapter 11 procedures, the probability of Chapter 11 will increase as creditors' holdout problems increase (e.g., Brown 1989).

The extent of creditors' coordination problem is proxied by the characteristics of a firm's debt structure (Asquith et al. 1994; Charterjee et al. 1996; Gilson et al. 1990; Gilson 1997). Each creditor's incentive to hold out will be stronger when he or she holds a smaller claim, because the distressed firm's future financial health is less likely to be dependent upon whether he or she grants the firm's concessions (Gilson et al. 1990). Thus, as a proxy for the complexity of a firm's debt structure, we use the number of long-term debt contracts (#LTD) and the existence of public debt contracts outstanding (PUBLIC\_DEBT). Existing studies (e.g., Asquith et al. 1994; Charterjee et al. 1996; James 1995) find that firms with a large portion of bank debt tend to file for Chapter 11. Banks are less willing to make concessions in a private workout because they typically hold senior and collateralized debt (BANK\_DEBT).

Third, as presented in Mooradian (1994), an equilibrium exists in which economically inefficient firms file for Chapter 11.<sup>21</sup> Also as evidenced by Charterjee et al. (1996), firms are more likely to file for Chapter 11 as they are less viable economically. To proxy for the economic efficiency of distressed firms, we use industry-adjusted earnings before interest, depreciation and taxes as a proportion of total assets, i.e., Industry Adjusted EBITDA/Total Assets (Industry Adjusted EBITDA\_RATIO). The incidence of Chapter 11 is negatively related to EBITDA\_RATIO, especially for firms with high solvency ratio (i.e., financially more impaired firms).

Finally, we control for firm size. As a proxy for firm size, we use the log value of total assets (ITA). Larger firms are in general more likely to choose a private workout because they have a comparative advantage to settle with creditors privately and they incur higher deadweight costs in Chapter 11 (Gilson et al. 1990; Wruck 1990). We perform logistic regressions modeling the probability that a distressed firm file for Chapter 11 pending on the situation whether there exists conflict of interest between equityholders and creditors.

$$\begin{aligned} \text{Prob (Chapter 11 filing} = 1) &= F[\beta_0 + \beta_1(\text{MGT})_i + \beta_2(\text{MGT\_CH})_i + \beta_3(\text{BLOCK})_i \\ &\quad + \beta_4(\text{BANK})_i + \beta_5(\#\text{LTD})_i + \beta_6(\text{PUBLIC\_DEBT})_i \\ &\quad + \beta_7(\text{EBITDA\_RATIO})_i + \beta_8(\text{MB})_i + \beta_9(\text{ITA})_i + \varepsilon_i], \end{aligned} \quad (2)$$

where

$$F(\beta'X) = e^{\beta'X} / (1 + e^{\beta'X}).$$

<sup>20</sup> The market to value of assets ratio is constructed using data from *COMPUSTAT* or *Compact Disclosure* data base and is calculated as (book value of assets–book value of equity + market value of equity)/book value of assets. When applicable, these figures are those that most closely predate the beginning of firms' debt restructuring or bankruptcy.

<sup>21</sup> In his model, Mooradian (1994) shows that the institutional characteristics of Chapter 11 filing provide an incentive for economically inefficient firms to reorganize under Chapter 11 rather than mimic out-of-court reorganization. Chapter 11 can be a screening device which separates inefficient firms from efficient firms, enabling efficient firms to renegotiate and continue where they would otherwise be liquidated.

## 6.2 Empirical findings<sup>22</sup>

In the logistic regressions, we subdivide the sample into two groups according to the level of solvency ratio of distressed firms. We use the median level of solvency ratio of the sample to subdivide the sample because the exact levels of solvency ratio which are related to the existence of conflict of interest between equityholders and creditors are not observable.

Based on the analysis in Fig. 1b, equityholders in a firm with the solvency ratio less than the median level (i.e., relatively high levels of  $V$ ) can have an ability to obtain higher value, net of deadweight costs, in Chapter 11 than in a private workout. Thus, conflict of interest between equityholders and creditors is more likely to exist for distressed firms with solvency ratio that is less than the median level. Equityholders in a firm with solvency ratio greater than the median level (relatively low levels of  $V$ ) are less likely to choose Chapter 11 since the bankruptcy costs incurred by equityholders are greater than the benefits of Chapter 11.

First, we estimate the models in Table 4 using two sub-samples separately: sub-sample with low solvency ratio (72 firms) and sub-sample with high solvency ratio (74 firms). Table 5 has the logistic regression specifications for all firms in Model (1), Model (2) with low solvency ratio, and Model (3) for firms with high solvency ratio.

Results in Model (1) of Table 5 show that the coefficient for managerial incentives (MGT) is positive and statistically significant at the 10% level. However, when we analyze separately with low solvency ratio firms and high solvency ratio firms, the coefficients for MGT is only significant for firms with low solvency ratio. Results in Model (2) of Table 5 support the hypothesis that managerial incentives are significantly related to the choice of resolution method. When there is conflict between equityholders and creditors, managers are more likely to choose Chapter 11 with the increase of their ownership. The coefficient for managerial ownership (MGT) is positive and highly significant at the 1% level in Model (2) of Table 5.

In Model (1) the coefficient for the management change (MGT\_CH) is negative and significant at the 10% level. However, the results in Model (2) and (3) show that management change is only related to the choice of resolution method for firms with high solvency ratio (i.e., firms with no conflict between equityholders and creditors). The coefficient for MGT\_CH is negative and significant at the 5% of level only in Model (3). The result suggests that when there is no conflict between equityholders and creditors, the new management is more likely to choose private workout over Chapter 11 filings. Model (3) in Table 5 shows that when distressed firms have a high solvency ratio, managerial ownership is not significantly related to the incidence of Chapter 11.

The economic significance of the coefficients for MGT in Model (2) and (3) in Table 5 is also assessed. The increase of managerial ownership by 1% in a range of low solvency ratio results in the increase of Chapter 11 probability approximately by 0.78% in Model (2), but the increase of managerial ownership by 1% in a range of high solvency ratio leads to the decrease of the probability of Chapter 11 by 0.12% in Model (3). These results are fairly consistent with the model's prediction. Managerial ownership seems to affect the decision on the choice between Chapter 11 and a private workout in the presence of conflict between equityholders and creditors.<sup>23</sup>

<sup>22</sup> Since the sample size in our study is quite small (146 firms), results from the logistic regression are more likely to be vulnerable to the effect of outliers. However, based on the statistics for RStudent, DFFITS, and DEBETAS, overall, there are no observations which exhibit an extraordinary behavior.

<sup>23</sup> We also estimate the logistic regressions using CEO ownership. Results show that there are no qualitative changes in the coefficients of the explanatory variables.



**Table 5** Logistic regression for the determinants of the choice between Chapter 11 filing and private workout

Variables	Coefficient ( <i>p</i> -values) dependent variable: probability of chapter = 1		
	Model 1 All firms	Model 2 ( <i>N</i> = 72) Firms with low solvency ratio	Model 3 ( <i>N</i> = 74) Firms with high solvency ratio
Intercept	0.838 (0.62)	0.687 (0.76)	-1.529 (0.64)
MGT	3.524* (0.07)	10.911*** (0.01)	-0.500 (0.87)
MGT_CH	-0.843* (0.07)	-0.478 (0.41)	-3.076** (0.02)
BLOCK	0.890 (0.36)	1.517 (0.30)	2.136 (0.18)
Bank debt/total liabilities (BANK)	2.219* (0.06)	1.533 (0.31)	9.058** (0.04)
Number of long-term debt contracts (#LTD)	-0.097 (0.18)	-0.149 (0.23)	-0.133 (0.26)
Existence of public debt (PUBLIC_DEBT)	-0.158 (0.69)	0.08 (0.90)	-0.898 (0.17)
Industry adjusted EBITDA/total assets (EBITDA_RATIO)	-0.736 (0.14)	0.406 (0.62)	-4.685** (0.03)
Market to book ratio (MB)	0.140 (0.33)	0.073 (0.64)	0.661 (0.54)
Log of total assets (ITA)	-0.085 (0.54)	-0.065 (0.75)	0.043 (0.85)
Model <i>R</i> <sup>2</sup>	0.102	0.180	0.251

*Note:* This table presents the regression coefficients of a logistic regression analysis of the determinants of firms' choice between Chapter 11 and private workout during the period 1992–1998. The sample is comprised of firms which attempt the first time to restructure via a Chapter 11 filings (81 firms) or private workouts (65 firms). A private workout involves private negotiations between a firm and debt-holders. \*\*\*, \*\*, and \* denote significant differences at the 0.01, 0.05, and 0.10 levels, respectively

We also examine the impact of other variables (the extent of creditors' coordination, the bankruptcy costs, the magnitude of a firm's economic distress, and the firm's size) on the choice between Chapter 11 and a private workout. In Model (1) of Table 5, the coefficients on BANK are positive and statistically significant at the 10% level. However, the significant and positive impact of BANK is shown only for firms with high solvency ratio in Model (3) of Table 5. Firms with higher levels of bank debt ratio are more likely to choose Chapter 11 than a private workout when there is no conflict of interest between equityholders and creditors.

The result suggests that when there is a conflict between equityholders and creditors, banks are not likely to affect significantly the choice between Chapter 11 and a private workout because the management has strong incentives in filing for Chapter 11, which may be aligned with the benefits of equityholders. However, when there is no conflict between equityholders and creditors, banks prefer Chapter 11 filing to a private workout because

banks typically hold senior and collateralized debt and they are less willing to make concessions in a private workout. The coefficients on #LTD and PUBLIC\_DEBT in Model (1), Model (2), and Model (3) of Table 4 are not significantly different from zero.

We also examine the impact of a firm's degree of economic distress on the choice of the firm's resolution method by using the industry-adjusted EBITDA to total asset ratio (EBITDA\_RATIO). Model (3) of Table 5 shows that the coefficient on EBITDA\_RATIO is negative and significant at the 5% level for firms with high solvency ratio. Firms are more likely to choose Chapter 11 than a private workout, especially when they are more distressed both financially and economically since high solvency ratio reflects that firms are more impaired financially.

The market to book value ratio is used to proxy for the bankruptcy costs, but results in Table 5 indicate that the coefficient on the market to book ratio (MB) is not statistically significant. The coefficients on the log value of a firm's total assets (ITA) are not statistically significant either.

To check the robustness of the findings in Table 5, we try different empirical specifications. In Table 6, we interact major explanatory variables with an indicator variable reflecting that the firm has a value of solvency ratio (SOLV) below the median (LSOLV). LSOLV indicates the existence of conflict between equityholders and creditors.

Consistent with the results in Table 5, Model (1) and Model (2) in Table 6 show that the coefficients for managerial ownership (MGT) are positive and highly significant at the 5% level when MGT interacts with the indicator variable for firms with low solvency ratio (LSOLV). The significance of the interaction term suggests the significant role of managerial incentives in choosing Chapter 11 filing under the situation of conflict between equityholders and creditors when managerial ownership is held constant.

The coefficients for MGT\_CH with no interaction variable are all negative and statistically significant at the 5% level in Models (1) and (2) of Table 6. The results suggest that management replacement affects the choice between Chapter 11 and a private workout for firms with high solvency ratio (i.e., no conflict of interest between equityholders and creditors). New management is more likely to choose private workout as a debt-restructuring method.

The coefficient for MGT\_CH with low solvency ratio is positive and marginally significant at the 10% level only in Model (2) of Table 6. The result may suggest that new management does not consistently choose Chapter 11 filing when there is conflict between equityholders and creditors. The results for MGT and MGT\_CH in Table 6 are fairly consistent with the results in Table 5. The results for BLOCK are not statistically significant.

Also, consistent with the results in Table 5, the results in Models (1) and (2) of Table 6 show significant results only for BANK\_DEBT and Industry Adjusted EBITDA Ratio. The coefficients for BANK\_DEBT with no interaction variable are all positive and statistically significant at the 5% level in Models (1) and (2) of Table 6. Firms are more likely to choose Chapter 11 over a private workout with the increase of bank debt ratio (BANK) when there is no conflict between equityholders and creditors.

However, the coefficients for BANK interacted with LSOLV are all negative and marginally significant at the 10% level in Models (1) and (2) of Table 6. An increase of bank debt is marginally related to the choice of private workout when there is a conflict of interest between equityholders and creditors because managers may have strong incentives to choose Chapter 11 filing for the benefits of equityholders.

The coefficients on EBITDA\_RATIO with no interaction variable in Models (1) and (2) of Table 6 are negative and significantly different from zero at 5% level. This result is fairly consistent with the results in Table 5, which also show that firms are more likely to file for Chapter 11 when they are more distressed both financially and economically.

**Table 6** Logistic regression for the determinants of the choice between Chapter 11 filing and private workout

Variables	Coefficients ( <i>p</i> -values) dependent variable: probability of chapter = 1	
	Model 1	Model 2
Intercept	-0.298 (0.87)	-0.057 (0.97)
MGT	-1.138 (0.72)	-0.431 (0.89)
MGT with low solvency ratio	11.736** (0.03)	11.655** (0.04)
MGT_CH	-2.624** (0.05)	-3.056** (0.02)
MGT_CH with low solvency ratio	2.184 (0.13)	2.596* (0.08)
BLOCK		2.092 (0.19)
BLOCK with low solvency ratio		-0.676 (0.75)
BANK_DEBT	8.503** (0.04)	8.877** (0.03)
BANK_DEBT with low solvency ratio	-7.250* (0.10)	-7.322* (0.10)
#LTD	-0.132 (0.24)	-0.146 (0.21)
#LTD with low solvency ratio	-0.101 (0.94)	-0.001 (0.96)
PUBLIC_DEBT	-0.588 (0.32)	-0.827 (0.19)
PUBLIC_DEBT with low solvency ratio	0.605 (0.50)	0.876 (0.35)
Industry adjusted EBITDA_RATIO	-4.722** (0.03)	-4.532** (0.04)
Industry adjusted EBITDA_RATIO with low solvency ratio	4.780** (0.03)	4.868** (0.03)
Market to book ratio (MB)	0.489 (0.65)	0.481 (0.64)
Market to book ratio (MB) with low solvency ratio	-0.384 (0.73)	-0.399 (0.70)
Log of total assets (ITA)	-0.018 (0.91)	-0.056 (0.73)
Log of total assets (ITA) with low solvency ratio	0.051 (0.68)	0.053 (0.67)
Model $R^2$	0.206	0.222

*Note:* This table presents the regression coefficients of a logistic regression analysis of the determinants of firms' choice between Chapter 11 and private workout during the period 1992–1998. The sample is comprised of firms which attempt the first time to restructure via a Chapter 11 filings (81 firms) or private workouts (65 firms). A private workout involves private negotiations between a firm and debt-holders. \*\*\*, \*\*, and \* denote significant differences at the 0.01, 0.05, and 0.10 levels, respectively

However, the coefficients on EBITDA\_RATIO interacted with LSOLV in Models (1) and (2) of Table 6 are positive and statistically significant at the 5% level. This result suggests that when there is conflict between equityholders and creditors, economically viable firms are more likely file for Chapter 11 to avoid creditors' holdout problems. Other control variables are not statistically significant in Models (1) and (2) of Table 6, but there are no significant qualitative changes in regression results compared with the results in Table 5.

To summarize, the evidence indicates that the choice between Chapter 11 and a private workout is related to the ownership structure of financially distressed firms with relatively low solvency ratios as well as management replacement before the onset of restructuring for firms with high solvency ratio. Assuming that low solvency ratios indicate that there is conflict of interest between equityholders and creditors, the findings are consistent with our model's prediction. With the increase of managerial ownership, firms are more likely to file for Chapter 11, which indicates the existence of managerial incentives for the decision of restructuring method even after controlling for management displacements. Furthermore, the results of the logistic regression provide confirming evidence that distressed firms' choice of debt restructuring methods depends on a firm's debt structure and its level of economic distress.

## 7 Conclusion

This study investigates whether managerial incentives are related to the incidence of Chapter 11 filing in the presence of conflict of interests between equityholders and creditors when a firm is in financial distress. By using a simple framework, we show that given the managerial payoff structure in a financially distressed firm, conflict between managers and equityholders can arise over the choice between Chapter 11 and a private workout; managerial incentives can be a determinant of the firm's choice of resolution method.

The empirical evidence supports these predictions. We show that managerial ownership is related to the choice between Chapter 11 and a private workout for a sample of 81 voluntary Chapter 11 filing and 65 private workout firms. More specifically, when the low solvency ratio is used as a proxy for conflict of interest between equityholders and creditors, we find that the likelihood of Chapter 11 filing is significantly related to managerial ownership of a distressed firm when the firm's solvency ratio is relatively low. When the distressed firm's solvency ratio is relatively high, the incidence of Chapter 11 is not related to the managerial ownership, but the result shows that new management is more likely to choose a private workout.

Although our study clearly shows that managerial incentives can play a role in determining the methods for resolving a firm's financial distress, it has several limitations which may be improved in the future research. First, we consider only the firm's voluntary Chapter 11 filing and private renegotiation in the analysis. However, there are other methods the distressed firms frequently use to resolve their financial distress (such as public exchanges and pre-packaged Chapter 11 filing), which may also be included in the analysis. Second, in our study, we primarily use managerial ownership of distressed firms as a major proxy for managerial incentives. However, other variables may also be used as a proxy for managerial incentives (e.g., compensation structure of managers and board structure).

Finally, the practical implication of our findings is that under the situations where equityholders prefer to choose Chapter 11 but creditors' preference is private renegotiation, more effective monitoring and better alignment of managers' interests with those of shareholders will reduce the agency conflict between managers and equityholders and increase the likelihood of Chapter 11 filing.

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**Appendix**

Parameter values in Fig. 1a and b can be derived based on the payoff structure for creditors and equityholders in both a private workout and Chapter 11 resolution. Assuming that  $C_B > C_W$  and  $\delta(B) > \delta(W)$ ,

$$V_D(W) = \min[D, (1 - \delta(W))(V - C_W), \text{ and } V_D(B) = \min[D, (1 - \delta(B))(V - C_B)],$$

$$V_E(W) = (V - C_W) - V_D(W), \text{ and } V_E(B) = (V - C_B) - V_D(B).$$

In Fig. 1a,  $V_2$  denotes the firm’s value at reorganization ( $V$ ) in which creditors are paid in full in a private workout, such that  $D = (1 - \delta(W))(V - C_W)$ . Thus,  $V = D/(1 - \delta(W)) + C_W$ .  $V_4$  represents  $V$  in which creditors are paid in full in Chapter 11, such that  $D = (1 - \delta(B))(V - C_B)$ . Thus,  $V = D/(1 - \delta(B)) + C_B$ . In Fig. 1b, when  $V > V_4$ , creditors are paid in full both in a private workout and in Chapter 11. Thus the residual value that equityholders can retain are  $(V - C_B) - D$  in Chapter 11 and  $(V - C_W) - D$  in a private workout.

When  $V < V_4$ , equityholders’ payoff structure in Chapter 11 has changed to the point where  $V$  is close to  $V_3$  because in this range, creditors are not fully paid only in Chapter 11. Thus, when  $V_3 < V < V_4$ , the payoff to equityholders is  $(V - C_B) - (1 - \delta(B))(V - C_B)$  (i.e.,  $\delta(B)(V - C_B)$ ) in Chapter 11 and  $(V - C_W) - D$  in a private workout.  $V_3$  is the point where  $\delta(B)(V - C_B) = (V - C_W) - D$ . Thus,  $V_3$  denotes  $V$  such that

$$V = \frac{D + C_W - \delta(B)C_B}{1 - \delta(B)}$$

When  $V < V_2$ , equityholders’ payoff structure in a private workout has changed because in this range, creditors are not fully paid both in Chapter 11 and in a private workout. Thus, the payoff to equityholders is  $(V - C_B) - (1 - \delta(B))(V - C_B)$  (i.e.,  $\delta(B)(V - C_B)$ ) in Chapter 11 and  $(V - C_W) - (1 - \delta(W))(V - C_W)$  (i.e.,  $\delta(W)(V - C_W)$ ) in a private workout. Equityholders still can retain higher value in Chapter 11 than in a private workout until  $V$  reaches  $V_1$ .  $V_1$  is the point where  $\delta(B)(V - C_B) = \delta(W)(V - C_W)$ . Thus,  $V_1$  denotes  $V$  such that

$$V = \frac{\delta(B)C_B - \delta(W)C_W}{\delta(B) - \delta(W)}$$

In summary, the parameter values ( $V_1, V_2, V_3,$  and  $V_4$ ) in Fig. 1a and b are denoted as follows.

$$V_1 = \frac{\delta(B)C_B - \delta(W)C_W}{\delta(B) - \delta(W)}$$

$$V_2 = D/(1 - \delta(W)) + C_W$$

$$V_3 = \frac{D + C_W - \delta(B)C_B}{1 - \delta(B)}$$

$$V_4 = D/(1 - \delta(B)) + C_B.$$

**Table A1** Description of the dependent and explanatory variables and their measurements

Variables	Measurements
<i>Dependent variable</i>	
DUMMY	= 1 if a firm files for Chapter 11, and 0 if it renegotiates privately with creditors
<i>Explanatory variables</i>	
<i>Ownership structure</i>	
MGT	The percentage of shares of a firm's officers and directors
MGT_CH	Top management change prior to debt restructuring
BLOCK	The percentage of shares of outside blockholders with at least a five percent stake in the firm, which is not related to the management
<i>Deadweight costs in Chapter 11</i>	
MB	The potential loss of a firm's going concern value in Chapter 11 which is measured by the ratio of the firm's market to book value of assets
<i>Creditors' holdout problems and the level of economic distress</i>	
#LTD	The number of long-term debt contracts
PUBLIC_DEBT	PUBLIC_DEBT = 1 if a firm has public debts
BANK	Bank debt, measured by the ratio of a bank to the firm's liabilities
Industry-adjusted EBITDA_RATIO	Industry-adjusted earnings before interest, depreciation, amortization and taxes as a proportion of total assets
<i>The existence of conflict between equity and debt: solvency ratio</i>	
SOLV	Solvency ratio equals the ratio of book value of debt to total debt plus the market value of equity
<i>Other control variable: firm size</i>	
ITA	Log value of a firm's total assets

**Table A2** Correlation coefficients

	MGT	MGTCH	BLOCK	MB	EBITDA_ RATIO	BANK	PUBLIC_DEBT	#LTD	SOLV	Log(TA)
Dummy = 1 (Chapter 11)	-0.146 (0.07)	0.050 (0.54)	-0.021 (0.80)	-0.061 (0.46)	0.152 (0.07)	-0.128 (0.3)	0.099 (0.24)	0.071 (0.40)	0.140 (0.09)	0.101 (0.23)
Managerial ownership (MGT)		0.128 (0.13)	-0.229 (0.01)	0.070 (0.40)	0.006 (0.94)	0.044 (0.59)	-0.241 (0.00)	0.005 (0.95)	-0.059 (0.48)	-0.251 (0.00)
Management change (MGTCH)		0.094 (0.26)	0.094 (0.26)	0.232 (0.01)	-0.104 (0.21)	0.118 (0.16)	-0.146 (0.08)	-0.238 (0.00)	-0.434 (0.00)	-0.123 (0.14)
Outside blockholders' ownership (BLOCK)				0.091 (0.27)	-0.049 (0.55)	-0.089 (0.29)	0.134 (0.11)	-0.046 (0.59)	0.028 (0.74)	0.184 (0.03)
Market to book ratio (MB)					0.049 (0.55)	-0.031 (0.70)	-0.054 (0.52)	-0.114 (0.17)	-0.389 (0.00)	-0.123 (0.14)
EBITDA/Liabilities (EBITDA_RATIO)						0.027 (0.74)	0.128 (0.12)	0.155 (0.06)	0.152 (0.07)	0.124 (0.13)
Bank debt/assets (BANK)							-0.153 (0.07)	0.085 (0.31)	-0.081 (0.33)	-0.061 (0.47)
The existence of public debt (PUBLIC_DEBT)								0.004 (0.96)	0.408 (0.00)	0.450 (0.00)
Number of long-term debt (#LTD)									0.185 (0.03)	0.063 (0.44)
Solvency ratio (SOLV)										0.401 (0.00)

*Note:* There are 146 observations in the sample

The numbers in the parenthesis below the correlation coefficients are estimated probability levels that the true correlation is zero

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