

Abandonment option value versus going-concern value in debt restructuring firms

I. Introduction

Financially distressed firms that go through a troubled debt restructuring (TDR) are found to exhibit different financial characteristics (Hamer, 1985; Gilson et al., 1990) and return patterns around the announcement of their debt restructuring attempts, compared to firms in other stages of the financial distress continuum. For example, although the announcements of covenant violations, defaults and bankruptcies are unambiguously associated with significant negative abnormal returns (see, e.g., Beneish and Press, 1995; Gilson et al., 1990; Clark and Weinstein, 1983), Gilson et al. (1990) reports still negative, but significantly different excess returns for TDR firms that have and that have not filed for bankruptcy within a year. Brown et al. (1993) and Chatterjee et al. (1995) find positive announcement excess returns in about half of their subsamples of TDR firms. Franks and Torous (1994) find higher deviations from Absolute Priority Rule in private restructurings (9.5% of the firm value), compared to formal ones (2.3%). Finally, using a carefully selected first time TDR announcements, Aksu (2001, 2005) finds strictly positive CAR(-1 to 0) of 0.027 (t-value= 3.630)

Unlike other stages of financial distress, the announcement of a TDR may embody two conflicting signals about a debtor firm's prospects. First of all, it is a timely and unequivocal signal of financial distress with its direct and indirect recontracting costs (Weiss, 1990; Gilson, 1997). Indeed, prior research has shown that the financial profiles of TDR firms highlight their acute liquidity, debt-service, and profitability problems and hence, the extreme financial distress faced at the time of their TDR announcements (Hamer 1985, Gilson et al., 1990, and Aksu, 2001). The resultant increased likelihood of liquidation, coupled with their low secured debt and high BTM ratios (Aksu, 2001)--both of which may be proxies for higher exit values of assets—raise the possibility that their excess returns may be due to their asset structures and proximity to liquidation (*abandonment option value hypothesis*).

On the other hand, the management's decision and ability to restructure and the creditors' consent are signals that the firm is still a going concern and has promising future prospects. Indeed, prior research has examined efficiency increasing organizational and financial changes in financially distressed firms and recognized that high leverage and financial distress have some value preserving beneficial outcomes (Jensen, 1989 a, b, Gilson, 1990, Wruck, 1990). These studies specifically mention debt restructurings that help preserve going-concern value and that

lead to improved creditor monitoring as examples of such beneficial consequences. Furthermore, the debtor, by definition, is the beneficiary of the restructuring transaction. Upon consummation of the restructuring transaction, the outstanding debt is exchanged with assets or other securities that have a lower fair market value than its current carrying value or the contract terms are favorably altered such that the present value (PV) of the debt is reduced. As a result, debt-service related cash flows are improved, debt that has reached non-optimal levels is reduced, tightness of the covenants is relaxed, and an economic as well as an accounting gain is earned. An efficient market should incorporate these favorable changes, alongside the improvement in the information environment of the firm as a result of increased communication with the creditors and shareholders, in reassessing the financial position, solvency, financial flexibility, and the probability of bankruptcy of a TDR firm (*going-concern value hypothesis*).

Accordingly, whether the observed announcement excess returns result from the shareholders' abandonment option values or their going-concern values is an unanswered and interesting research question. This paper attempts to answer this question by examining the financial profiles of TDR firms around their restructuring attempts; investigating the asset structures of the sample firms; replicating the results of the most recent market based study on TDR firms, Aksu (2001) by using a different method of analysis, investigating cross-sectional differences and comparing the results with those of a matched sample of less financially distressed firms, and finally investigating the value relevance of the sample firms' net income (NI) and book-value of equity (BE). To the extent that i) the excess returns are still positive under the new method, persist after the announcement and are higher compared to the matched sample; ii) the financial profiles of TDR firms improve after their restructuring attempts; iii) the sample firms that are larger and that exhibit growth potential have higher excess returns; iv) the negative value relevance coefficient for their net income (NI), typical of financially distressed loss firms, becomes positive, typical of firms with going-concern values, after the restructuring attempt; and v) the exit values of their assets are not significantly higher than that of the matched sample of firms, it is then more likely that the excess returns are due to these firms' going concern values.

The paper proceeds as follows: The put and the call options of the shareholders on the firm's assets in a levered firm and the predicted effect of a TDR on equity value are discussed in section two in the framework of the general option pricing model. Section three deals with sample selection, design, and methodology issues.. The results of the empirical tests are presented in section four and section five concludes.

2. Equity's call and put options on the firm's assets

TDR firms are financially distressed and have, on average, lower market capitalization, high BTM ratios and frequent losses. An important source of value in such firms with diminished going concern values is the shareholders' adaptation or abandonment option, a put option to adapt the firm's assets to higher return uses or sell them at liquidation value (see, for example, Harris and Raviv, 1990; Berger et al., 1996; Burgstahler and Dichev, 1997). Theory and empirical evidence suggest that in TDR firms that have a high likelihood of exercising this option, equity values will be determined more by the exit values of assets than by the PV of their expected cash flows, i.e., their going-concern values. Collins et al. (1999), and Barth et al. (1998) provide evidence that in financially distressed firms with losses, asset book values that proxy for their abandonment option values become more value relevant than earnings. Aksu (2005) for the first time applies Ohlson (1995) valuation model to accounting numbers of TDR firms and indeed finds that book value of equity has a significant coefficient while that of net income is not significant. Thus, to determine if the higher returns to TDR firms could be due to the higher exit values of their assets, the generalizable assets of the TDR firms will be measured and compared to those of a control sample matched on size, leverage, and industry code. If the *abandonment option value hypothesis* holds, TDR firms are expected to have higher exit values and excess returns than the controls, the lack of value-relevance of their net income and their financial distress are expected to be persistent.

If instead of abandonment, shareholders choose their option to remain a going concern and the creditors have the incentives to let them continue as residual claimants, a private workout is negotiated.¹ Hence, a TDR can be viewed as an option that favorably revises the terms of the initial debtor-creditor contract on the firm's future cash flows.² The effect of a

¹ Such incentives may arise because: i) The creditors may not be able to force bankruptcy before maturity because of weak provisions; ii) There may be no chance that the value of the underlying assets of the firm (V) will exceed the face value of the debt (B) by maturity (the value of equity (S)= 0), i.e., the call is deep out-of-the money; iii) Even though $S > 0$, it is still believed to be less than the high costs of bankruptcy; iv) TDR firms may have high going-concern values at stake at the point of default (Jensen, 1989b) and creditors may be hoping for increased monitoring and higher cash flows from these firms subsequent to the restructuring; v) Creditor recovery rates are higher under private workouts than in bankruptcy (Franks and Torous, 1994); vi) Creditors may be willing to give concessions and accept APR deviations to mitigate the under-investment problem associated with high leverage (Myers, 1977) and to restore the incentives of the shareholders to contribute new equity (Franks and Sanzhar, 2002).

² This is akin to Burgstahler and Dichev's (1997) adaptation option, but one that has its effect through the claims side. The ex-ante value of the option to restructure is expected to be reflected in firm value.

TDR on the market value of equity and debt can then be analyzed within the framework of the general option pricing model (Black and Scholes, 1973), whereby the value of a levered equity (S) is expressed as a function of the value of the underlying assets of the firm (V), the standard deviation of their returns (σ), the face value of the debt (B), the risk-free interest rate (r_f), and the time to maturity (T). Despite its limitations, a comparative statics analysis similar to Galai and Masulis (1976) is used here to predict the effect of different types of TDR undertaken by the sample firms on the variables of the model, $S = s(V, T, B, \sigma)$:

$$0 < \frac{\delta s}{\delta V} < 1, \quad \frac{\delta s}{\delta B} < 0, \quad \frac{\delta s}{\delta r_f} > 0, \quad \frac{\delta s}{\delta \sigma} > 0, \quad \frac{\delta s}{\delta T} > 0 \quad (1)$$

Table 1 summarizes the types of restructurings undertaken by the sample firms, the proportion of TDR firms that have restructured some debt in each type and their expected impact on the option variables and hence on the value of equity. Of the 86 sample firms, 55% have restructured some debt through exchange with equity, 41% with new debt, and 38% with other assets having a lower fair market value than the carrying value of the debt cancelled. 68% of the sample firms had their principal/interest payment dates extended and 16% had the nominal interest rate reduced. I also estimate the effect of the TDR announcement on the standard deviation (σ) of the returns to the firm's assets, proxied by the σ of market adjusted stock returns. σ allows for the possibility of payment to stockholders even when expected return on assets is not sufficient to cover (B) and is a more important pricing factor in firms with higher default risk. This measure increases from 0.00532 in the 300-day estimation period to 0.00683 in the (-3+40) event window.³ The partial effects on the value equity is consistent with the positive market reaction findings and with the going-concern value hypothesis.

(Please place Table 1 around here)

3. Sample selection, design, and methodology

3.1. Sample selection, design and data requirements:

This study uses the same sample of 86 TDR firms used in Aksu (2001), which for the first time found a positive average market reaction in a clean sample of TDR firms. An initial sample of 249 TDR firms that had one or more private

³ The increase in σ is about twice the increase in a control sample of non-TDR, non-bankrupt firms matched on size, leverage and industry code.

restructuring negotiations are identified from the subject volumes of the Wall Street Journal Index (WSJI) and on-line Text-Search Services of Dow Jones News/Retrieval Service (DJNR), searched for the years 1973-1988 and 1979-1988, respectively.⁴ The key words used are debt, refinancing, restructuring, default, troubled, turnaround, and workout. A WSJI search is undertaken to ensure that at the date of the announcement, each sample firm was in financial distress, there was no mention of a previous TDR attempt during the year prior to the announcement, and no bankruptcy announcement within six months of the announcement. An ex-post matched-pairs design is employed to compare the financial ratios, asset structures and excess returns of the TDR sample with those of a sample of similar non-TDR, non-bankrupt firms. Matching is done on size [total assets (TA)], leverage [total liabilities (TL)/TA], and the 2-digit S.I.C. code. The (year $t-1$), where t corresponds to the announcement year, fiscal-year end values are used to select the control firms. The daily returns and financial statement data for the TDR and control samples are obtained from the CRSP tapes of the University of Chicago and Standard and Poor's COMPUSTAT annual tapes and Moody's manuals.

3.2. Methods of Analysis

In most prior market based studies, including Aksu (2001), Brown and Warner (1985), BW (1985) henceforth, portfolio test statistics are used to test the significance of the average cumulative market and risk adjusted excess returns (CARs). These tests assume that excess returns are identically distributed across securities in the sample. If cross-sectional independence can be assumed, which is likely to be the case here since there is no event day or industry clustering, then more powerful tests which take into account unequal variances across securities can be used. As a robustness check for the Aksu (2001) positive market reaction results, I calculate the daily standardized firm specific excess returns in the event period and test their significance using the BW (1985) *standardized* test statistic. Each firm's daily excess return in the event period is standardized by the square root of its security-specific estimation period residual variance to obtain the standardized abnormal returns,

$\tilde{SAR}_{i,t}$. Under the assumption that the standardized excess returns are independent, identically distributed, and have finite variance, the *standardized* test-statistic will be distributed as standard normal under the null

⁴ This sample period of 15 years is chosen in order to include the two prominent recessionary periods of the '70s and '80s, while controlling for structural changes in the excess returns and in the nature of financial crises, likely to be encountered when a longer sample-period is used. Furthermore, this is approximately the same period used in prior TDR studies and thus provides a more meaningful comparison with and a more meaningful explanation for their results.

hypothesis:

$$\overline{SA}_t / (N_t)^{1/2} \sim N(0,1) \quad (2)$$

where, \overline{SA}_t is the average standardized excess return for the sample firms on day t and (N_t) is number of sample firms for which the daily return exists on day t . The significance of *standardized* CAR (SCAR) over the event window $[s,e]$ is then given by:

$$SCAR(s,e) / (N_t)^{1/2}(w)^{1/2} \sim N(0,1) \quad (3)$$

The standard deviations used in the BW (1985) portfolio and standardized t-statistics ignore the predictive nature of the excess returns and a possible increase in variance in the event period. To control the related Type I error and determine the sensitivity of the results to different procedures of estimating the standard error of the event period mean excess returns, I also use Dodd and Warner's (1983), DW (1983) henceforth, standardized test statistics that uses out-of-sample prediction error variance estimates.

4. The results and implications

4.1. Financial profiles of the TDR and control samples

In this section we provide descriptive statistics on firm-specific variables that are expected to proxy for the abandonment option and going-concern values of the two samples. Table 2 presents selected accounting and market-based variables as of year $(t-1)$ and the p -values for the significance of the average difference between each paired observation.

(Table 2 around here)

4.1.1. Size, risk, and growth proxies: Total assets (TA), market capitalization (MVE), book-to-market ratio of equity (BTM), and market beta (β). are used as proxies for size, risk, and growth potential. The expectation is that the higher the MVE, TA, and MTB (market-to-book ratio), the higher would be the going-concern value of the firm. As matching by TA has been successful, there is no difference between the mean and median TA of the TDR and non-TDR samples. MVE, used as an indicator of size which reflects the flexibility of operating and financing activities of the firm, is lower in the TDR sample than in the control sample. This and the fact that TDR firms are financially more distressed raise the possibility that the positive excess returns (CAR) may be due to additional risk born by the shareholders and higher abandonment option values. However, the mean and median sizes of both samples fall in the same or adjacent size rankings in large scale research done on NYSE, ASE and IBES firms (Barry and Brown, 1984; Fama and French, 1992).

Second, the median MVE of the TDR sample is not any lower than that of less financially distressed covenant violators (Beneish and Press, 1993) that exhibit negative announcement excess returns. Finally, the difference in the mean MVE does not justify the observed difference in the market response.⁵

The BTM ratio is used as a proxy for risk, growth potential, and exit values of assets. The TDR firms' mean BTM falls in the 8th decile while that of the non-TDR firms falls between 6th and 7th deciles (Fama and French, 1992, Table 4). However, when the negative BTM firms are excluded, the ratio is significantly higher in the TDR sample, again justifying the concern that the hypothesized excess returns may be due to additional risk factors and higher abandonment option values in the TDR sample.

The firm-specific market beta, used as a measure of systematic risk, is estimated by regressing the 300-day estimation period daily return against the corresponding return on the equally weighted market portfolio. As expected, the mean and the median beta are larger for the TDR sample (1.33 and 1.28) than for the control sample (1.14 and 1.09).

4.1.2. Liquidity and profitability: The working capital/TA ratio is significantly smaller for the TDR firms, depicting an acute lack of working capital consistent with Hamer (1985). However, the current ratios and inventory turnover ratios of the two samples are not significantly different. The means and medians of net income/total assets and retained earnings/total assets are negative, and are significantly lower than those of the non-TDR sample, indicating diminished going-concern values.

4.1.3. Leverage and debt service: In spite of the attempted matching by TL/TA, both the mean and median values are higher in the TDR sample. Nevertheless, the long-term debt/TL and long term debt/equity ratios are similar, confirming they are good matches in terms of long-term capital structure. The mean EBIT/interest expense ratio is significantly lower in the TDR sample, underscoring their acute debt coverage problem. The mean and median ratios of secured debt (SD) as a ratio of TL are lower but not significantly different than that of the non-TDR sample. The lower this ratio is, the more willing creditors will be to grant a TDR or extend new credit because they can secure their new claims by collateralizing the remaining "free assets" (White, 1984). Since debt is secured by generalizable assets, a lower ratio means more of these assets will be left over upon liquidation, implying a higher abandonment option value.

⁵ In Fama and French (1992), Table 2, the average return difference between the sixth and eighth deciles, where the TDR and non-TDR firms respectively fall, is 0.07% (1.17 - 1.10). Similarly, in Tables 1 and 2 of Barry and Brown (1984), the unadjusted average return differential between the third and fourth (fourth and fifth) quintiles is 0.15 (0.04) while the risk adjusted CAR in these two adjacent quintiles have exactly the same *t*-values (-1.57). In comparison, the market and risk adjusted announcement excess return difference, between the TDR and non-TDR firms is at least 2.7% in this study.

In summary, the financial profiles of the TDR firms highlight their acute liquidity, debt-service, and profitability problems faced at the time of their TDR announcements. The resultant high likelihood of liquidation coupled with low secured debt and high BTM ratios, which may be proxies for higher exit values of assets, raise the possibility that the CARs may be due to a higher value of the equity holders' abandonment option, their put option on the firm's assets that now have diminished going concern values. This necessitates a closer look at the asset structures of the two samples.

4.2. Asset structure profiles of the TDR and control samples

Table 3 presents summary statistics for several asset structure proxies used as measures of the shareholders' abandonment option value. The t -values measure the significance of the difference between the mean generalizable assets of the two samples. Following Tiras et al. (1999), the first and the second proxies measure the "free asset %" as plant, property, and equipment less mortgages and secured loans (Compustat data item 241) (PPE - SD) divided by either the book value (TA) or the market value of assets (MVA). A third proxy measures exit value as the ratio of non-inventory current assets plus land to TA (Ronen and Sorter, 1972). All three one-sided t -test results indicate that exit values of assets are not any higher in the TDR sample. Finally, I use the Berger et al. (1996) model estimated for firms with abandoned operations, to estimate how many cents per \$ of book value each asset category would produce when exit occurs. The average (the minimum and maximum values) of EX/BV for TDR firms is .519 (7%-64%) while it is .523 (28%-70%) for the matched sample and we reject the null that TDR firms' exit values are higher than those of the matched firms. Thus, the positive CAR is not driven by the TDR firm's higher exit values.

(Place Table 3 around here)

4.4. The Improvement in Financial Profiles:

Table 2 presents selected size, liquidity, profitability, leverage, and debt service ratios for the TDR firms as of the fiscal year end following their TDR announcement (year t), and for the previous (year $t-1$) and next (year $t+1$) year ends. The means, medians, minimum and maximum values for the financial ratios and the p -values for the significance of the differences between the mean and median values from year ($t-1$) to ($t+1$) and from year (t) to ($t+1$) are reported in the table. All tests are two sided. The significance of the differences is tested using one-tailed Wilcoxon matched-pairs signed-ranks test due to the nonnormality of the distributions of most of the ratios and their differences from year to year. Parametric matched-pairs t -test results are also reported in the table and they are, in general, qualitatively the same.

(Place Table 2 about here)

Size: Total assets (TA), market value of equity (MVE), and book-to-market ratio (BVE/MVE) are used as measures of size, risk, and growth potential. The mean (median) TA is \$995 (\$314) million at ($t-1$). TDR firms are larger than Beneish and Press' (1993) sample of covenant violators [mean (median) TA value of \$498 (\$110) million], Gilson et al.'s (1990) sample of successful restructuring firms [mean (median) TA of \$633 (\$101) million], and those that file for Chapter 11 [mean (median) TA of \$317 (\$49) million].⁶ TA shrinks significantly over the three years which supports the findings of John and Ofek (1995) for financially distressed firms. While this may be a sign of financial distress related asset divestiture to pay off the debts and inability to make use of positive NPV investments, it may also indicate streamlining of operations and prudence in accepting projects, indicative of discipline and efficiency. Indeed, Khanna and Poulsen (1995) find that market reacts positively to asset sales in distressed firms.

The distribution of MVE is extremely right-skewed. 49% of TDR firms have lower MVE than the average of the second lowest decile (\$37.71 million) of all stocks that satisfy CRSP/COMPUSTAT data requirements (see Fama and French, 1992, Table 3) while the MVE of 8% of TDR firms are higher than the average MVE of the eighth decile (\$512.86 million). The median is the same as that of covenant violators (Beneish and Press, 1993), indicating that market values of TDR firms are not any lower than those of firms in milder stages of financial distress in year ($t-1$). There is a considerable loss in MVE (18%) between years ($t-1$) and (t) which is more than recaptured in year ($t+1$). The increase is significant, indicating that TDR has helped these firms in regaining their lost values.

As expected, TDR firms have negative or high (positive) book-to-market ratios during the three years. In year ($t-1$), the mean BVE/MVE (1.20) for TDR firms falls in the eighth decile of all stocks that satisfy CRSP/COMPUSTAT data requirements (Fama and French, 1992, Table 4). The larger or negative BVE/MVE ratios indicate that their stock prices have decreased sharply in the pre-announcement period due to their extreme financial distress risk, discounted market values and persistent negative earnings. The observed ratios signal poor earnings and growth prospects assessed by the market (Fama and French, 1992, 1993, 1995; Penman, 1996). The book-to-market ratios significantly decrease, though, from year (t) to ($t+1$) and ($t-1$) to ($t+1$) at $\alpha=0.00$.⁷ This indicates higher earnings and growth prospects and lower financial distress risk assessed by the

⁶ The size difference in Gilson et al.'s sample may be because their sampling pool is firms that have the lowest five percent unadjusted returns in CRSP daily files, leading to a disproportionately large number of smaller firms in their sample.

⁷ Qualitatively the same results are obtained when the 17 firms with negative book-to-market ratios are excluded from the sample.

market subsequent to the announcement.

Liquidity As Hamer (1985) also notes, most long-term debt becomes current when a TDR firm falls into default; then, it again becomes long-term as violation waivers, extensions, are obtained and some of the debt is forgiven. The current ratio (current assets [CA]/current liabilities [CL]) is the lowest in year (t) as the current portion of long-term debt increases. However, in years ($t-1$) and ($t+1$), both the mean and median ratios have more reasonable values, not any different than those of covenant violators in Beneish and Press (1993). This may indicate that the TDR firms' liquidity problems are temporary in nature. The mean and median values decrease from year ($t-1$) to (t), but increase significantly from year (t) to ($t+1$), suggestive of the beneficial effects of TDR on liquidity.

The mean and median inventory turnover ratios are not very low in all the years even though both the mean and median values assume their lowest values in year (t). Apparently, slow moving merchandise is not the cause of the liquidity problems faced by TDR firms. Furthermore, the median ratio increases from ($t-1$) to ($t+1$) and (t) to ($t+1$).

Profitability: Both the means and medians of the profitability variables, earnings before interest and taxes (EBIT), and return on assets (NI/TA) are negative in years (t), ($t-1$) and ($t+1$) depicting an acute and persistent profitability problem. There is a significant improvement in NI/TA and EBIT only from year (t) to ($t+1$). This deterioration may be partially caused by the decrease in the denominator over the three years which may have led to a larger negative ratio in later years. The positive EBIT (except for year t) and negative NI and retained earnings (RE) may indicate that huge interest expense and/or nonoperating losses may have caused these companies to operate at net losses. The results are, in general, consistent with Hamer's (1985) findings.

Leverage: Both the mean and median values of the debt ratio (TL/TA) are very high over the three years, underscoring the highly leveraged nature of these firms. The mean and median values increase over the three years, significantly from ($t-1$) to ($t+1$). This may be partially due to the decrease in TA over the three years or it may be caused by the higher transaction costs of reducing leverage in private workouts (Gilson 1997). In year ($t-1$), the median ratio of 0.78 is higher than that of 0.62 for covenant-violators in Beneish and Press (1993) and is consistent with the median values in Gilson et al.'s (1990) successful and unsuccessful TDR samples (0.83 and 0.86) and Gilson's (1997) sample of out-of-court restructurings (0.79).

The share of long-term debt (LTD) in total debt (TL) is around 40% in all three years, and one can not reject the null hypothesis of no improvement at conventional significance levels. Hamer (1985) reports that in

year ($t-1$), this ratio has the lowest value in his TDR sample, in comparison to his nonbankrupt and bankrupt samples and the mean value (0.44) is the same as that observed in this study. Hamer explains that LTD is low for TDR firms because a big portion of LTD becomes current due to technical and debt service defaults. The mean and median values are lower than those observed in Gilson et al.'s (1990) successful and unsuccessful TDR samples, which might indicate that his firms have higher long-term credit availability and use more LTD in their capital structures.

As expected, in years (t) and ($t+1$) the current portion of long term debt (CLTD)/TL is high and increases significantly from year ($t-1$) to ($t+1$). The results are consistent with Hamer (1985) who finds that the mean CLTD/TA ratio is twice as high (13%) for his TDR sample than that of his nonbankrupt sample. I also evaluate the free asset percentage (White 1983) measured as secured debt (SD)/TL in this study. The lower this ratio is, the higher the free, non-collateralized assets and the more willing the prospective creditors would be to extend new credit or grant a TDR. In year ($t-1$), the mean and the median ratios (0.16 and 0.04, respectively) are consistent with those (0.14 and 0.00) in Gilson et al. (1990). Hence, prior to the onset of TDR, these firms had some free assets, which may be one reason why creditors have agreed to restructure their claims. Indeed, the ratio increases from year ($t-1$) to ($t+1$).

Debt Service: The mean and the median EBIT/Interest Expense is less than one in all the three years and the mean is negative in year (t). The mean value (0.05) in year ($t-1$) is lower than that of Hamer's TDR sample (0.74) and higher than that of his bankrupt sample (-0.77). However, both mean and median values improve from year (t) to ($t+1$) due to the increase in EBIT mentioned above and the decrease in interest expense as a result of TDR.

In summary, most financial ratios, which depict extreme deterioration in profitability and debt service prior to the onset of the restructuring attempt, improve over the restructuring interval. An exception is the persistency of losses and high leverage.

4.4. Stock Price Evidence:

The three studies that have investigated the pre-announcement period for TDR firms, Gilson et al. (1990), Franks and Torous (1994) and Aksu (2001), have found significant negative excess returns indicating that these firms had lost a considerable amount of value prior to their TDR announcements. This is also an unmistakable sign that their probability of bankruptcy was on the rise prior to their restructuring attempts.

However, the findings are inconclusive for the overall market reaction to a TDR announcement mainly because

the objectives and thus designs of the previous studies were different from one another and also they used too broad or too narrow samples of TDR firms and/or non-homogeneous events and announcements – such as defaults, Ch. 11 reorganizations, bank-loan renewals, tender offers, exchange offers alongside isolated debt restructurings.⁸ Gilson et al., 1990 finds a $CAR(-1,0)$ of -6.3% for the initial or subsequent announcements of defaults or restructurings that ultimately end up in bankruptcy and a significantly different but still negative excess returns for those firms that have not filed for bankruptcy within a year. Brown et al. (1993) and Chatterjee et al. (1995) find positive announcement excess returns in only half of their subsamples of TDR firms. Aksu (2001), which also examines the effect of size, book-to-market ratio and prior distress information on the excess returns to TDR firms and a matched sample of non-TDR firms, for the first time, finds a positive overall market reaction to a specifically isolated, first-time TDR announcement. The $CAR(-1,0)$ and day-0 average excess returns are 2.7% (t -value = 3.63) and 2.2% (t -value = 4.17), respectively, both significant at $\alpha = 0.00$. Table 3 is reproduced here from the excess returns calculated in Aksu (2001). Apparently, TDR is not perceived as just another distress announcement.

(Table 3 around here)

Gilson et al. (1990) and Aksu (2001) are the only studies that investigate the excess returns in the post-announcement restructuring interval. Under the portfolio tests used in Aksu (2001), the $CAR(1,40)$ is 6.1%, significantly positive at $\alpha=0.07$ and the $CAR(-1,+330)$ is 66%, again significantly different from 0 at $\alpha=0.00$. These findings are consistent with Gilson et al.'s (1990) restructuring-interval excess returns of 41% in his sample of successful restructurings. The shareholders seem to regain almost all the value which was lost in the pre-TDR period, again lending support to the *going concern hypothesis* tested in this paper.

Considering the conflicting announcement period results in these studies, Table 4 provides some additional corroborating sensitivity analysis to determine if the market reaction results are robust under different methodologies of determining the excess returns and different significance tests, as explained in section III

⁸ For example, Gilson et al. (1990), and Gilson (1990) examine the poorest performing stocks in CRSP, which have announced a debt service default, out-of-court restructuring, or bankruptcy within a year of the restructuring attempt. This heterogeneity makes it difficult to assess whether their results are driven by the firms' TDR, prior default, subsequent bankruptcy, or the fact that they have poor poor earnings prospects.

above. Under the Brown and Warner (1985) and Dodd and Warner (1983) standardized tests, the pre-announcement SCAR (-40 to -1) is still significantly negative at $\alpha=0.07$ and 0.04 , respectively. Both tests performed on the announcement window of SCAR (-1, 0) again corroborate the significant positive market reaction at $\alpha=0.0$.⁹ Finally, both BW and DW tests conclude that the post-announcement SCAR (-2, 40) is significantly positive at $\alpha=0.01$ and 0.02 , respectively. In the longer days post announcement window, The SCAR (-1,+330) of 295.36 and 206.52 are still significant under the BW and DW standardized tests, with respective p-values of 0.02 and 0.00. Hence, it is highly unlikely that the results are sample or method specific.

(Table 4 about here)

4.4. Value relevance evidence:

Collins et al. (1999), and Barth et al.(1998) provide evidence that in financially distressed firms with losses, asset book values that proxy for their abandonment option value become more value relevant than earnings. Aksu (2005) for the first time applies Ohlson (1995) valuation model to accounting bottom lines of TDR firms and indeed finds that book value of equity (BE) has a significant coefficient while that of net income is not significant in year $t-1$. Here, I test if the negative value relevance coefficient of Net Income (NI), becomes positive followint the restructuring announcement, typical of firms with going-concern values. Table 5 depicts the coefficient estimates for NI and BE and their significance in years $t-1$ and t .

(Table 5 here)

The Ohlson (1995) valuation model results show that the coefficient of Net Income, when used alone in the model, is positive and becomes significant in year t . When BE enters the model, the negative coefficient of NI (in year $t-1$) becomes positive and significant in year t . whether or not BE is partitioned into its components of total assets and total liabilities. In all years and in all specifications the coefficient of BE is always positive and significant. Furthermore, net income dummy used as an indicator variable to measure

⁹The Dennis and McConnell (1986) test on market adjusted excess returns also yields a CMAR (-1,0) of 2.1%, significant at $\alpha=.065$.

the effect of a loss on market value is always negative, as expected, but its coefficient is significant only in year t-1 indicating that the negative impact of a loss on market value of the firm becomes negligible after the announcement. All these findings corroborate that the sample firms have assumed valuation characteristics of going concerns after their restructuring attempts.

Conclusion

This study attempts to explain the contradictory market reaction results observed in a few prior studies on troubled debt restructuring (TDR) firms by investigating whether going-concern value or abandonment option value dominates in these financially distressed firms who have had the ability to renegotiate their troubled debt. I first predicts the impact of a TDR on the firm's fundamentals and the shareholders' wealth by basing the analysis on the shareholders' call and put options on the assets of the firm. Then the financial profiles and asset structures of TDR firms around their restructuring attempts are investigated and a new method of analysis is used to corroborate the positive market reaction results. These findings are also compared with those obtained on a matched sample. Finally, Ohlson (1995) accounting valuation model is used to examine the explanatory power of the TDR firms' net income and book values. The findings suggest that the financial profiles of debtor firms improve after the TDR attempt, the exit values of their assets are not any higher than those of a matched sample, and the value relevance of NI improves after the restructuring attempt. Hence, the evidence supports the positive wealth effects and the prominence of going-concern value in TDR firms. Using firm size and growth opportunity as proxies for going concern value and comparing the market reaction in small vs. large and high versus low book-to-market firms would be a relevant addition to the study which I will undertake to improve the paper.

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Table 1**Types of debt restructurings undertaken by the TDR firms and their impact on the variables of the equity's call option**

The information on the types of restructurings attempted by the sample firms is obtained from the WSJI summaries, the related WSJ articles, public debt covenants in the Moody's manuals, and the footnotes related to the restructured debt in the financial statements. The predictions are based on Galai and Masulis (1977) comparative statics analysis:

$$0 < \frac{\delta s}{\delta V} < 1, \quad \frac{\delta s}{\delta B} < 0, \quad \frac{\delta s}{\delta r_f} > 0, \quad \frac{\delta s}{\delta \sigma} > 0, \quad \frac{\delta s}{\delta T} > 0$$

TDR types	Occurance in the sample (in %)	Related call variable and (the effect of TDR on it)	Expected effect on equity-value
Debt exchanged with equity ^a	55%	B (-)	+
Debt exchanged with other debt ^a	41%	B (-)	+
Debt exchanged with assets ^a	38%	B (-)	+
Extension of maturity dates	68%	T (+)	+
Reduction in nominal interest rate ^b	16%	r _f (+)	+
Increase in standard deviation (σ) of returns to firm's assets ^c	28%	σ (+)	+

^a In all these three types of restructurings, I assume that the market value of the equity, assets or new debt exchanged is lower than the PV of the outstanding debt, which is mostly the case in TDRs.

^b Here a reduction in the coupon rate is used as a proxy for an increase in the risk fee rate, r_f, both of which reduce the lender's extra compensation for risk.

^c The change in the σ of the market adjusted stock returns is used here as a proxy for this unobservable option variable. This, of course, is not a type of TDR, but in our TDR sample this variable increases as a result of TDR, from 0.00532 in the 300-day estimation period to 0.00683 in the (-3,+40) event window, which is about twice the increase observed in the control sample, matched on size, industry and leverage.

Table 2
Financial profiles of the TDR and the control samples

The control sample of 86 non-bankrupt, non-TDR firms are matched on total assets, leverage, and 2-digit industry code. The summary statistics in the table are as of the fiscal year end that precedes the TDR announcement (year $t-1$). The p -values are those of the t -tests of significance of the average difference between paired observations from the TDR and the matched samples. Interest coverage is measured as "earnings before interest and taxes / interest expense. Secured debt is measured as Compustat data item 241.

Characteristic	TDR FIRMS					NON-TDR FIRMS					p -value
	N	Mean	Median	Min.	Max.	N	Mean	Median	Min.	Max.	
<i>Size and risk proxies</i>											
Total Assets (\$ million)	86	995.01	314.08	11.79	12555.50	86	999.79	331.79	12.59	13553.20	0.752
Market Value of Equity (\$ million)	86	196.87	42.27	1.02	3930.64	85	329.09	77.99	2.08	4252.01	0.028
Book to Market Value	83	1.20	1.44	-9.07	9.15	85	0.94	0.91	-2.95	3.22	0.278
<i>Estimation Period Systematic Risk (β)</i>											
	86	1.33	1.28	0.11	3.26	86	1.14	1.09	0.09	2.74	0.087
<i>Liquidity</i>											
Working Capital/Total Assets	79	0.02	0.07	-0.95	0.67	71	0.14	0.14	-0.22	0.56	0.028
Current Ratio	79	1.44	1.24	0.02	6.29	71	1.52	1.45	0.39	3.77	0.944
Inventory Turnover	70	8.48	4.13	0.98	54.48	69	12.58	4.51	0.54	92.12	0.175
<i>Profitability</i>											
Net Income/Total Assets	86	-0.10	-0.05	-0.99	0.10	86	-0.00	0.02	-0.58	0.13	0.000
Retained Earnings/Total Assets	86	-0.03	0.02	-1.30	0.56	86	0.07	0.11	10.90	0.68	0.000
<i>Leverage and debt service</i>											
Total Liabilities/Total Assets	86	0.82	0.78	0.25	1.66	86	0.75	0.74	0.26	1.11	0.000
Long Term Debt/Total Liabilities	86	0.44	0.46	0.00	0.93	86	0.43	0.45	0.00	0.83	0.807
Secured Debt/Total Liabilities	42	0.16	0.04	0.00	0.83	25	0.21	0.18	0.00	0.69	0.883
Interest Coverage	84	0.05	0.20	-14.96	5.31	86	3.82	1.69	-8.26	92.45	0.006

Tabel 3
Asset- structure profiles of the TDR and the control samples as proxies for their
abandonment option values

The control sample of 86 non-bankrupt, non-TDR firms are matched on total assets, leverage, and 2-digit industry code. The summary statistics in the table are as of the fiscal year end that precedes the TDR announcement (year $t-1$). The t -values are those of the t -tests of significance of the average difference between paired observations from the TDR and the matched samples. Tests on matched pairs are not performed in this table due to the lack of data for some variables when observations are paired. The one-sided null hypothesis of mean $(TDR_{exit} - NON-TDR_{exit}) > 0$ is tested at $\alpha = 0.05$.

Asset Structure	TDR FIRMS					NON-TDR FIRMS					t -value ^e
	N	Mean	Std.dev.	Min.	Max.	N	Mean	Std.dev.	Min.	Max.	
Free Assets^a											
(PPE - SECD) / Total Assets	25	0.293	0.371	-0.47	0.91	19	0.321	0.292	0.11	0.92	-0.268
(PPE - SECD) / (Total Liabilities + Market Value of Equity)	25	0.297	0.376	-0.48	0.96	19	0.322	0.299	0.1	0.96	-0.238
(NONINV + Land) / Total Assets	27	0.249	0.099	0.06	0.44	35	0.294	0.117	0.11	0.59	-1.60
Exit Value of Assets^b											
Exit Value / Book Value	57	0.519	0.09	0.09	0.64	58	0.523	0.085	0.24	0.70	-0.204

^f The first and second proxies of free-assets are taken from Tiras, Bryan, and Wheatley (1999), while the third is from Ronen and Sorter (1972), where:

$PPE = \text{Plant Property Equipmen}$

$SECD = \text{Secured Debt (Compustat data item 241)}$;

$NONINV = \text{Non-Inventory Current Assets}$

^g The estimate of asset exit values (EXIT) is obtained from the following Berger et al. (1996) model estimated for a sample of firms with discontinued operations:

$$EXIT_i / BV_i = CASH_i + MSEC_i + 0.715 NONINV_i / BV_i + 0.547 INV_i / BV_i + 0.535 FIXED_i, \text{ where:}$$

$i = \text{the firm subscript}$;

$MSEC = \text{marketable securities}$;

$NONINV = \text{non-inventory assets}$;

$INV = \text{inventories}$

$BV = \text{book values}$;

$FIXED = \text{fixed assets}$.

Table 4
Financial profiles of TDR firms around the announcement of their debt restructuring attempts

Characteristic	TDR FIRMS					WILCOXON MATCHED-PAIRS SIGNED-RANKS TEST		MATCHED-PAIRS t-TEST	
	N	Mean	Median	Min.	Max.	t-1 to t+1 p-values ^a	t to t+1 p-values ^a	t-1 to t+1 p-values ^a	t to t+1 p-values ^a
• Size									
Total Assets (\$ million)									
t-1	86	995.01	314.08	11.79	12555.50	0.00		0.00	
t	81	959.71	282.92	6.38	13656.40		0.00		0.02
t+1	75	951.74	270.65	4.71	14358.50				
Market Value of Equity (\$ million)									
t-1	86	196.87	42.27	1.02	3930.64	0.11		0.35	
t	79	162.99	28.65	0.17	3991.19		0.07		0.06
t+1	70	217.34	33.38	0.29	5301.24				
Book-to- Market Equity									
t-1	83	1.20	1.44	-9.07	9.15	0.00		0.01	
t	79	1.02	0.75	-19.60	77.48		0.00		0.03
t+1	70	-2.03	0.44	-69.70	5.06				
• Liquidity									
Current Ratio: Current Assets/Current Liabilities									
t-1	79	1.44	1.24	0.02	6.29	0.26		0.47	
t	74	1.24	1.06	0.00	7.45		0.06		0.01
t+1	67	1.55	1.47	0.02	5.95				
Inventory Turnover: Cost of goods sold/Inventory									
t-1	70	8.48	4.13	0.98	54.48	0.00		0.03	
t	65	9.50	4.06	0.80	72.91		0.03		0.05
t+1	61	11.37	4.56	0.81	71.27				
• Profitability									
Income Before Interest & Taxes (\$ million)									
t-1	85	17.89	1.76	-826.90	1324.89	0.48		0.48	
t	81	-6.24	0.50	-1265.40	1399.23		0.01		0.15
t+1	75	21.56	2.71	-706.82	1792.33				
Net Income/Total Assets									
t-1	86	-0.10	-0.05	-0.99	0.10	0.28		0.10	
t	81	-0.15	-0.08	-1.44	0.63		0.03		0.03
t+1	75	-0.05	-0.01	-0.63	0.42				

Table 4 (Continued)

Characteristic	TDR FIRMS					WILCOXON MATCHED-PAIRS SIGNED-RANKS TEST		MATCHED-PAIRS <i>t</i> -TEST	
	N	Mean	Median	Min.	Max.	<i>t</i> -1 to <i>t</i> +1 <i>p</i> -values ^a	<i>t</i> to <i>t</i> +1	<i>t</i> -1 to <i>t</i> +1 <i>p</i> -values ^a	<i>t</i> to <i>t</i> +1
• Leverage									
Total Liabilities/Total Assets									
t-1	86	0.82	0.78	0.25	1.66	0.00		0.00	
t	81	0.91	0.87	0.26	2.84		0.18		0.13
t+1	75	0.91	0.89	0.33	2.30				
Current Portion of Long Term Debt/Total Liabilities									
t-1	81	0.06	0.02	0.00	0.84	0.01		0.10	
t	74	0.09	0.03	0.00	0.82		0.45		0.10
t+1	69	0.08	0.03	0.00	0.65				
Long Term Debt/Total Liabilities									
t-1	86	0.44	0.46	0.00	0.93	0.23		0.30	
t	81	0.41	0.39	0.00	1.00		0.30		0.50
t+1	74	0.43	0.45	0.00	1.00				
Secured Debt/Total Liabilities									
t-1	42	0.16	0.04	0.00	0.83	0.48		0.26	
t	48	0.20	0.10	0.00	0.72		0.10		0.31
t+1	47	0.21	0.07	0.00	0.69				
Debt Service									
t-1	84	0.05	0.20	-14.96	5.31	0.37		0.38	
t	80	-0.61	0.06	-10.05	6.90		0.01		0.25
t+1	75	0.35	0.40	-39.71	35.88				

^a *p*-values are those of one-tail (directional) tests performed separately for each variable, depending on the defined direction of improvement (or deterioration). Debt service ratio is the interest coverage ratio defined as EBIT/Interest Expense

Table 5**Cross-sectional differences in Cumulative abnormal returns (CARs) based on financial distress risk**

Firm-specific daily excess return (AR) is calculated as the difference between the actual daily return and the market and risk adjusted expected return obtained from the one-factor market model, estimated over a 300-day estimation period ending on day -40. The return on the market portfolio is measured as the CRSP equally weighted index. The significance of the average cumulative excess returns (CAR) is measured using the standard Brown and Warner (1985) methodology.

Event Window	S i z e			B o o k - t o - m a r k e t		
	Large	Small	Difference	Low	High /(-)	Difference
	<i>N = 31</i>	<i>N = 55</i>		<i>N = 29</i>	<i>N = 57</i>	
-1 to 0	0.041 (0.000)	0.022 (0.034)	12.17 (0.00)	0.051 (0.000)	0.013 (0.164)	22.77 (0.00)
0	0.023 (0.000)	0.022 (0.002)	0.86 (0.39)	0.039 (0.000)	0.014 (0.035)	21.19 (0.00)
+1 to +40	0.059 (0.130)	0.064 (0.165)	-0.68 (0.50)	0.093 (0.095)	0.054 (0.182)	5.23 (0.00)
+1 to Cons. ^a	0.504 (0.000)	0.353 (0.003)	11.3 (0.00)	0.830 (0.000)	0.110 (0.254)	40.87 (0.00)

^a The test-statistics presented are those of Brown and Warner's (1985) portfolio *t*-test and all tests are two-sided.

Table 6

Excess returns to the sample of 86 TDR firms calculated by using different measures and tests

Panel A: Brown and Warner *portfolio* tests Differences in announcement and post-announcement CARs between the TDR and control samples

Event Window	CAR	<i>t</i>-value^a	<i>p</i>-value
-40 to -2	-0.020	-0.618	0.54
-1 to 0	0.027	3.630	0.00
+1 to +40	0.061	1.831	0.07
-1 to +330	0.66		0.00

Panel B: Brown and Warner *standardized* tests

-40 -2	-105.67	-1.839	0.07
-1 0	50.92	3.930	0.00
0	38.54	4.205	0.00
-1 +40	168.19	2.774	0.01
-1 +330	295.36		0.02

Panel C: Dodd and Warner *standardized* tests

-40 -2	-117.61	-2.044	0.04
-1 0	51.75	3.999	0.00
0	508.18	55.447	0.00
-1 +40	138.10	2.333	0.02
-1 +330	206.52		0.00

^aAll tests are two-sided.

Table 7
Value Relevance of Reported Net Income (NI) and Book Value of Equity (BE)
in Debt Restructuring Firms

The full model is $MVE_{it} = \beta_{0t} + \beta_{1t} TA_{it} + \beta_{2t} TL_{it} + \beta_{3t} NI_{it} + \beta_{4t} NI_{dummy_{it}} + \varepsilon_{it}$ where, i and t are the firm and year subscripts, respectively, MVE = Market value of equity; TA= Total assets; TL=Total liabilities; NI= Net income. All variables are deflated by the number of common stock shares outstanding at each fiscal year end.

Regressors	Year = (t-1)			Year = (t) ^a						
	Coefficient Estimates (p-value)		R ²	Coefficient Estimates (p-value)		R ²				
NI NI _{dummy} ^b	0.02 (0.93)	-11.67 (0.00)	0.26	0.35 (0.00)	-3.36 (0.15)	0.23				
BE NI NI _{dummy}	0.29 (0.00)	-0.06 (0.74)	-6.55 (0.01)	0.42	0.38 (0.00)	0.14 (0.17)	-1.82 (0.36)	0.49		
TA TL NI NI _{dummy}	0.26 (0.00)	-0.24 (0.03)	0.05 (0.84)	-8.06 (0.01)	0.39	0.27 (0.00)	-0.25 (0.01)	0.23 (0.04)	-1.38 (0.50)	0.44

^a Year t is the initial announcement year.

^b NI_{dummy} is for negative earnings.