



Relation between distress risk, book-to-market ratio and return premium

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Abstract

Purpose – Earlier research found that firms with the highest distress risk have low book-to-market (B/M) ratios and low returns. This paper aims to examine the robustness of those's results and provide further evidence that high distress-risk firms do not enjoy the same high returns earned by high B/M firms and that distress risk is unlikely to explain the Fama and French high-minus-low (HML) B/M factor.

Design/methodology/approach – A distress-risk measure, distressed-minus-solvent (DMS), is calculated and a range of zero investment distress-risk trading strategies is investigated. Value- and equal-weighted portfolios are examined both with negative book-equity firms and without. These most distressed firms have low or negative B/M values and would either not be included in the Fama and French sample or included in the low B/M portfolio.

Findings – The paper finds that the DMS factor is negative and significant, and none of the zero investment strategies earns significantly positive returns.

Research limitations/implications – The findings suggest that exposure to distress risk does not earn investors a positive risk premium. It appears that over the period examined, market inefficiencies drive the market value and returns of high distress-risk firms.

Originality/value – The distress-risk premium is shown to be negative and, therefore, cannot be driven by bankruptcy risk alone. The negative premium is not consistent with a financial distress explanation for the Fama and French HML factor.

Keywords Investment appraisal, Assets valuation, Returns

Paper type Research paper

1. Introduction

The Fama and French (1993) three-factor asset-pricing model uses risk premiums relating to size, book/market (B/M) equity, and a market factor, to describe asset returns. Their three-factor model has become the standard for measuring long-run abnormal returns in the finance literature and is now recommended for use in practice to determine cost of capital. However, still unresolved is whether the factors proxy a systematic risk factor related to relative financial distress and whether the pricing is rational.

Fama and French (1995, 1996) argue that the B/M factor, high-minus-low (HML), is due to the market pricing relative financial distress. They suggest that a high B/M ratio is a sign of financial distress and that the market requires a risk premium for taking on this additional systematic risk. In contrast, Chan and Chen (1991) argue that the size effect represents a premium for distress risk. A disproportionately large number of small firms are found to be financially distressed with high financial leverage and cash flow problems.



Dichev (1998) directly investigates the relation between distress risk, size, B/M and returns, using bankruptcy risk as a proxy for distress risk. In contrast to what would be expected if the B/M premium is related to distress risk, Dichev (1998) finds that an equal-weighted portfolio of the most distressed firms has a low B/M ratio and low returns. In addition, a trading strategy which is long in an equal-weighted portfolio of firms with low bankruptcy risk (70 per cent of all firms with the lowest probability of bankruptcy) and short in high bankruptcy risk firms (10 per cent of the firms with the greatest probability of bankruptcy) provides a positive mean monthly return of 1.17 per cent.

Dichev (1998) reports that the book-equity of the most distressed firms is often completely wiped out by losses, and may be negative. Fama and French (1993, 1995, 1996) exclude negative book-equity (NegBE) firms from their sample, while Dichev (1998) includes them. As firms with (NegBE) have accumulated losses over a sustained period, it is reasonable to assume that the majority have a high level of distress risk. Therefore, a large proportion of firms in the high distress-risk portfolio of Dichev would have (NegBE). It is possible that firms with positive book-equity and high distress risk have a high B/M ratio, but this relation is masked in Dichev's results because of the aggregation of positive and negative B/M values.

Using the Fama and French methodology of sorting by B/M and size would result in the low B/M high distress-risk firms being included in the low B/M portfolios. As these firms have low returns and a low market value (Dichev, 1998), they would have little impact on the value-weighted HML factor. Thus results of the studies that investigate whether size and B/M represent priced risk factors may be sensitive to the method of portfolio construction and return weighting as well as inclusion of (NegBE) firms in the portfolios.

The present study provides new insight into the relation between financial distress, size, B/M and returns by comparing the effect of the different methodologies used by Fama and French and Dichev. A financial distress measure is calculated for each firm and deciles are formed on this measure. The size and B/M attributes of both value- and equal-weighted portfolios are examined. Portfolio returns and the distress-risk premium are determined with (NegBE) firms and without. Finally, a distressed-minus-solvent (DMS) risk factor is developed similar to the Fama and French (1993) HML and size factors and a range of zero investment trading strategies are examined. The strategies involve portfolios long in high distress-risk firms and short in low distress-risk firms.

Our results show that both the firms included in the sample and the method of weighting affect the conclusions that can be drawn about both the financial distress–B/M relation and the sign and size of the distress return premium. Only when equally weighted NYSE–AMEX firms are used is a positive, although insignificant, distress-return premium observed. The distress premium is negative and significant for all other scenarios including the characteristic balanced DMS factor. We conclude that financial distress is not likely to account for the value-weighted B/M return premium documented by Fama and French (1993).

The paper proceeds as follows: the research design is outlined in the next section followed by presentation of the results. The implications and conclusions are then discussed in the final section.

2. Data and methodology

COMPUSTAT and CRSP data for the 1984 to 1995 period are used in the study. Following Dichev (1998), Ohlson's (1980) and Altman's (1968) bankruptcy prediction models are used to measure relative financial distress and financial institutions are excluded. On average there are some 3,400 firms per year that meet all of the data requirements. Size is measured as market value (MV) and the Fama and French (1993) methodology is used to calculate the book value of equity. Portfolio size and B/M are the mean value across all firms in each portfolio (Dichev, 1998). A value-weighted B/M measure, Bv/Mv , as used by Fama and French (1993) is also examined. Bv and Mv are the sum of book-equity and the market value, respectively, for all firms in the portfolio[1]. For all variables, the portfolio results are the simple averages of the annual portfolio averages over the 1985 to 1994 period. Equal- and value-weighted portfolio returns are also calculated for each portfolio, and the reported portfolio return is an average of the monthly portfolio returns. Dichev reports that portfolio results are different for NYSE-AMEX stocks and NASDAQ stock. Therefore, NYSE-AMEX (NASDAQ) portfolios are formed based on NYSE-AMEX (NASDAQ) breakpoints in Altman's (1968) Z-scores and Ohlson's (1980) O-scores.

CRSP often do not capture the final return of firms that delist for negative reasons. Hence, delisting returns of -30 per cent for NYSE-AMEX firms and -55 per cent for NASDAQ firms are included[2].

Firms are ranked from highest to lowest distress risk based on Ohlson's O-score and Altman's Z-score and two sets of portfolios are formed. One set comprise of eleven portfolios one of which containing NegBE firms and ten decile portfolios with positive book-equity firms. Firms with the highest distress risk (highest O-score/lowest Z-score) are allocated to portfolio 1 and firms with the lowest distress-risk are allocated to portfolio 10. The second set of decile portfolios contains both positive and negative book equity firms.

If distress risk earns a risk premium in the market, then a zero-investment strategy long in high distress-risk firms and short in low distress-risk firms should, on average, provide positive returns. Five zero-investment strategies are investigated. The first four investment strategies do not control for size and B/M, and return premia for the four strategies are calculated as:

- strategies 1 and 2: return earned by decile-1 firms minus return earned by decile-10 firms (decile 1 minus 10), where the returns within the deciles are equal- and value-weighted, respectively, and
- strategies 3 and 4: return earned by the 30 per cent of firms with the highest distress risk minus return earned by the 30 per cent; of firms with the lowest distress risk (deciles 1-3 minus deciles 8-10), where, again, returns are equal- and value-weighted, respectively.

If size, B/M and distress risk are related, returns earned by the sorted distress-risk portfolios may reflect differences in size and/or B/M, rather than distress risk. To eliminate this confounding effect, the fifth strategy uses Fama and French (1993) methodology to construct high, medium and low distress-risk portfolios with approximately equal size and B/M attributes. Thus, strategy 5 involves determining portfolios created by the intersections of two size portfolios, three B/M portfolios and two sets of three distress-risk portfolios (sorted on O-score/Z-score), high (distressed), medium and low distress risk (solvent). Two sets of 18 portfolios are formed from the intersections of the size, B/M and distress-risk portfolios. The value-weighted return

for each intersecting portfolio is determined and a return premium of DMS is calculated each month as the difference between the return earned by the six high distress-risk intersecting portfolios and the six low distress-risk intersecting portfolios. The difference is averaged across the 120 months to determine the reported DMS premium.

3. Results

The ability of the Ohlson (1980) and Altman (1968) models to classify firms on the basis of relative financial distress is determined by looking at the decile portfolio allocation of firms that delisted for reasons relating to distress risk. Two CRSP definitions of distress events are used:

- (1) firms delisted due to bankruptcy,
- (2) performance delisting – firms delisted due to liquidation, bankruptcy and other performance related issues.

Once the distress-decile portfolios are formed, the firms that had been delisted due to distress risk are identified and their decile allocation two years prior to the CRSP delisting date determined. Table I shows the classification abilities of both models.

Distress decile	Bankruptcy						Performance delist					
	NYSE-AMEX		NASDAQ		All Firms		NYSE-AMEX		NASDAQ		All Firms	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<i>Panel A: O-score distress-risk deciles</i>												
High 1	58	72	7	44	44	45	95	67	326	30	539	44
2	15	90	6	81	30	76	26	86	279	56	311	70
3	2	93	2	94	15	92	8	91	177	72	148	82
4	4	98	1	100	2	95	6	96	102	82	66	87
5	0	98			3	97	0	96	59	87	60	92
6	1	99			2	99	2	97	58	93	26	94
7	1	100			0	99	3	99	23	95	21	96
8					1	100	0	99	20	97	15	97
9							0	99	22	99	17	99
Low 10							1	100	13	100	17	100
Total	81		16		97		141		1,079		1,220	
<i>Panel B: Z-score distress-risk deciles</i>												
High 1	37	46	6	38	40	41	66	47	344	31	492	40
2	10	58	2	50	14	56	16	58	205	50	178	54
3	7	67	3	69	10	65	10	65	162	65	128	64
4	8	77	5	100	14	81	16	77	95	73	103	73
5	4	81			6	87	7	81	66	79	74	79
6	4	86			3	90	8	87	49	84	51	83
7	5	93			5	95	5	91	40	87	58	87
8	4	98			4	99	7	96	32	90	32	90
9	1	99			0	99	2	97	45	94	43	93
Low 10	1	100			1	100	4	100	62	100	82	100
Total	81		16		97		141		1,100		1,241	

Notes: "Num" is the number of delisted firms observed in each decile over the period 1985 to 1994, "%" is the cumulative percentage

Table I.
Classification ability of
Ohlson's and Altman's
models

The Ohlson model places 72 per cent of the NYSE-AMEX and 44 per cent of the NASDAQ firms that were delisted because of bankruptcy in the highest distress risk deciles. In addition, 93 per cent of the NYSE-AMEX firms are classified in the three most distressed deciles and 94 per cent of the NASDAQ firms are similarly classified. It can be seen that the Altman model's results are not as good.

Because the Ohlson model outperforms the Altman model, only results associated with the Ohlson model are presented in the remainder of the paper [3]. Table II presents the portfolio attributes of the distress-risk deciles. Panel A presents the 10 deciles in which both negative and positive book-equity firms are combined and we can observe differences between the NYSE-AMEX and the NASDAQ firms. The O-score indication of financial distress for NASDAQ deciles is higher than for NYSE-AMEX deciles through decile 8. Thus, on average, NASDAQ firms have greater financial distress than the NYSE-AMEX firms. The O-scores for the "All Firm" portfolios are averages of NYSE-AMEX and NASDAQ results. However, 80 per cent of the stocks in the "All Firm" portfolio 1 are NASDAQ stocks; therefore, the equal-weighted results for the "All Firm" portfolio 1 are dominated by NASDAQ firms. We can also observe that size or market value is negatively related to financial distress. The market value increases for every distress decile through decile 9 for the NYSE-AMEX and for all ten deciles for the NASDAQ. However, the equally (B/M) and market-weighted (Bv/Mv) ratios exhibit an inverted U-shape pattern for both the NYSE-AMEX and NASDAQ portfolios. The maximum values for the NYSE-AMEX firms occur at deciles 3 and 4 for the B/M and Bv/Mv, respectively, while the maximums for the NASDAQ occur in deciles 4 and 6.

Distress decile	NYSE-AMEX				NASDAQ				All Firms			
	O-score	MV	B/M	Bv/Mv	O-score	MV	B/M	Bv/Mv	O-score	MV	B/M	Bv/Mv
<i>Panel A: Negative and positive book-equity firms combined</i>												
High 1	6.02	68.51	-1.30	-0.35	12.62	23.56	0.10	-0.04	9.85	30.28	-0.58	-0.34
2	3.29	179.72	0.88	0.57	5.26	28.13	0.55	0.23	4.36	48.53	0.71	0.20
3	2.52	287.90	0.99	0.72	3.99	32.70	0.84	0.42	3.26	100.77	0.95	0.57
4	1.98	463.98	0.97	0.77	3.17	39.14	1.01	0.57	2.55	170.68	0.99	0.69
5	1.52	744.72	0.92	0.76	2.50	50.48	1.00	0.63	1.96	299.61	0.97	0.76
6	1.10	1,095.44	0.88	0.76	1.87	76.31	0.95	0.68	1.43	521.83	0.94	0.74
7	0.67	1,548.83	0.81	0.72	1.23	1,05.11	0.96	0.63	0.90	817.65	0.87	0.74
8	0.17	2,102.18	0.77	0.65	0.48	1,36.07	0.83	0.48	0.28	1202.43	0.79	0.65
9	-0.49	2,348.02	0.69	0.55	-0.51	1,63.87	0.76	0.48	-0.51	1320.68	0.73	0.56
Low 10	-2.23	2,075.58	0.60	0.42	-3.08	3,10.06	0.66	0.35	-2.68	1082.16	0.63	0.40
<i>Panel B: NegBE firms separate from positive book-equity firms</i>												
NegBE	6.37	197.18	-4.70	-0.75	8.81	81.04	-0.90	-0.39	7.68	133.69	-2.68	-0.63
High 1	4.94	70.73	0.91	0.52	11.48	21.54	0.42	0.18	8.78	23.08	0.56	0.27
2	3.04	235.94	1.02	0.69	4.91	21.80	0.76	0.38	4.02	51.65	0.95	0.53
3	2.38	353.60	1.02	0.76	3.76	30.47	0.98	0.55	3.07	125.43	1.02	0.68
4	1.87	555.34	0.96	0.78	3.02	44.39	1.01	0.64	2.41	194.00	1.02	0.75
5	1.44	934.14	0.92	0.75	2.37	56.66	1.00	0.65	1.86	370.63	0.96	0.76
6	1.04	1,171.80	0.88	0.77	1.77	83.44	0.96	0.70	1.34	577.52	0.94	0.75
7	0.60	1,723.16	0.81	0.71	1.14	1,22.84	0.95	0.61	0.82	937.25	0.85	0.73
8	0.11	2,266.04	0.76	0.65	0.40	1,56.53	0.82	0.47	0.22	1326.96	0.79	0.66
9	-0.55	2,502.97	0.68	0.52	-0.57	1,83.86	0.76	0.47	-0.57	1433.83	0.72	0.52
Low 10	-2.28	2,202.66	0.60	0.42	-3.15	3,30.66	0.66	0.36	-2.75	1116.90	0.63	0.41

Table II.
Portfolio attributes of
distress-risk deciles

The comparatively large negative B/M observed for NYSE-AMEX decile 1 suggests that the market is more likely to allow NYSE-AMEX firms to accumulate large losses. Firms in distress-risk decile 1 are on average very small, with an average market capitalization of only \$68.51 and \$23.56 million for the NYSE-AMEX and NASDAQ firms, respectively.

Panel B shows that firms with NegBE are considerably larger than high distress-risk firms with positive book-equity[4]. For NYSE-AMEX firms, the average distress-risk of the NegBE firms is also significantly higher, providing further evidence that the market allows these larger high distress-risk firms to accumulate losses. This is consistent with markets bidding down the price of firms as they accumulate losses and the NegBE firms with the largest accumulated losses having the lowest market value.

With the NegBE firms separate, three of the four B/M measures show an inverted U-shape. Only the equally weighted B/M value for the NYSE-AMEX shows a monotonic decrease from deciles 2 through 10. The equally weighted NASDAQ B/M ratio exhibits an inverted U-shape pattern and the market-weighted Bv/Mv ratio shows an inverted U-shape for both sets of firms.

Table III panel A presents the portfolio returns for positive book-equity firms. Returns earned by all NYSE-AMEX deciles are significantly greater than zero while only NASDAQ firms in deciles 4 through 10 earn returns that are significantly greater than zero.

Neither the equally nor market-weighted returns for the NYSE-AMEX firms shows a consistent pattern. Conversely, there appears to be an inverse relation between return and financial distress for the NASDAQ firms. That is, firms with high financial distress exhibit low returns, and firms with low financial distress exhibit high returns. This is most evident when the returns are equally weighted, but an increase is generally

Distress-risk decile	NYSE-AMEX				NASDAQ				All Firms			
	Equal- weighted	t-value	MV	t-value	Equal- weighted	t-value	MV	t-value	Equal- weighted	t-value	MV	t-value
<i>Panel A: Negative and positive book-equity firms combined</i>												
High 1	1.53	2.25	1.01	1.72	-0.46	-0.61	-0.67	-1.00	0.03	0.05	0.08	0.13
2	1.13	2.22	1.06	2.06	0.05	0.09	-0.04	-0.07	0.77	1.35	0.70	1.26
3	1.21	2.75	1.17	2.59	0.50	0.89	0.16	0.26	1.00	2.00	1.08	2.16
4	1.27	2.77	1.06	2.50	0.94	1.96	1.17	2.10	1.06	2.38	1.02	2.24
5	1.34	3.15	1.28	3.17	0.99	2.06	0.43	0.87	1.16	2.54	1.00	2.38
6	1.12	2.79	1.19	3.07	1.04	2.14	0.71	1.39	1.20	2.75	1.33	3.19
7	1.27	3.11	1.12	3.02	1.04	2.28	1.44	2.77	1.13	2.74	1.10	3.00
8	1.40	3.24	1.35	3.50	1.09	2.22	1.30	2.30	1.36	3.04	1.27	3.32
9	1.31	3.00	1.42	3.41	1.23	2.59	1.40	2.35	1.33	2.98	1.43	3.43
Low 10	1.21	2.73	1.01	2.57	1.19	2.49	1.63	2.59	1.18	2.60	1.19	2.66
<i>Panel B: NegBE firms separate from positive book-equity firms</i>												
NegBE	1.47	1.88	1.44	2.22	-0.88	-1.17	0.37	0.60	0.27	0.39	1.24	2.00
High 1	1.44	2.32	0.90	1.73	-0.19	-0.26	-0.99	-1.34	0.11	0.17	-0.57	-0.89
2	1.10	2.24	1.19	2.38	0.05	0.09	-0.36	-0.58	0.86	1.59	0.87	1.64
3	1.18	2.62	1.11	2.47	0.77	1.43	0.56	0.92	1.08	2.30	1.09	2.18
4	1.29	2.88	1.19	2.83	0.98	2.09	0.99	1.87	1.05	2.33	0.98	2.23
5	1.33	3.09	1.29	3.15	1.11	2.27	0.64	1.31	1.25	2.72	1.11	2.64
6	1.09	2.73	1.11	2.92	0.98	2.04	0.70	1.35	1.16	2.70	1.21	2.95
7	1.29	3.07	1.11	2.92	1.06	2.26	1.50	2.88	1.11	2.64	1.09	2.95
8	1.40	3.26	1.41	3.62	1.19	2.43	1.28	2.17	1.37	3.04	1.33	3.41
9	1.33	3.02	1.42	3.38	1.24	2.64	1.32	2.20	1.31	2.91	1.44	3.35
Low 10	1.19	2.70	1.00	2.33	1.19	2.48	1.67	2.65	1.19	2.64	1.17	2.66

Table III.
Portfolio returns of
distress-risk deciles

observed for the market-weighted returns, also. Panel B shows the same information with the NegBE firms shown separately. For the NYSE-AMEX firms, both the equally- and market-weighted returns are greatest for the negative B/M firms, but, again, no consistent pattern emerges from the positive book-equity NYSE-AMEX deciles. For the NASDAQ firms, firms with positive book-equity generally exhibit higher returns for lower risk deciles, whether returns are equal or value-weighted. The equally weighted NegBE firms exhibit the greatest losses. This relation between return and size for the NASDAQ NegBE firms may be explained by the eventual failure of the smaller firms resulting in large negative returns. Positive market-value-weighted returns suggest that the larger of the NegBE firms continue to operate resulting in returns earned by these firms being positive but not high.

NASDAQ firms do not appear to enjoy the same high turnaround returns earned by NYSE-AMEX firms. The fact that high returns are earned by the very smallest of the high distress-risk NYSE-AMEX firms, but not by NASDAQ firms, could result from NASDAQ firms being more likely than NYSE-AMEX firms to delist for performance reasons[5]. This would result in less opportunity for reversal of performance and for firms to earn positive returns on a very small market value.

Table IV presents the return premia related to the five investment strategies. Panel A reports the results when both negative and positive book-equity firms are included. For the NYSE-AMEX firms, there is no statistically significant difference between the high and low distress-risk deciles. For example, distressed decile 1 shows a 32-basis point greater return than the solvent portfolio 10. We observe that of the four strategies, two show negative risk premiums, one shows a positive risk premium and one shows no difference. However, none of the *t*-statistics are significant. The results are substantially different when the NASDAQ firms are examined. The distressed firms' returns are substantially less than for the solvent firms. In every case the risk premium is negative and the *t*-statistic indicates a significant difference. The "All Firm" deciles are similar to the NASDAQ results with negative risk premiums and *t*-values greater than 2.00 for three of the four portfolios. When the NegBE firms are included the results are similar (see panel B, Table IV). Three of the four portfolios for the NYSE-AMEX firms show a negative risk premium although none of the *t*-statistics are significant. Again, substantially negative risk premiums are observed for all four NASDAQ portfolio strategies and the *t*-statistics are significant in every case.

Finally, panel C shows the risk premium for the size and B/M balanced portfolios. Results are presented for both the Ohlson and Altman rankings. We observe that the distressed portfolio returns are less than the solvent portfolio returns in every instance, and the *t*-statistics are above 2.0 for three of the four comparisons.

4. Conclusion

There is limited support for the Fama and French view that firms with the highest distress risk have high B/M values. However, a strong negative relation is found between distress risk and size. For most NYSE-AMEX and NASDAQ firms with low distress risk, a positive relation does exist between distress risk and B/M. However, rational pricing is not unequivocally supported. The highest distress-risk firms that are small and those that accumulate large losses display low B/M values. Also high distress-risk firms predominantly earn comparatively low or negative value-weighted returns and do not, on average, earn a positive return premium. In particular, with the exception of NYSE-AMEX firms the premium is consistently negative. Thus, the relation between distress-risk, B/M and return is found to be inconsistent with the B/M

Strategy	Return weight	Decile portfolios		NYSE-AMEX			NASDAQ			All Firms					
		Dist	Solv	Return %	Dist	Solv	Return %	Dist	Solv	Return %	Dist	Solv	Premium %	t	
<i>Panel A: Negative and positive book-equity firms combined</i>															
1	Equal	1	10	1.53	1.21	+0.32	0.62	-0.46	1.19	-1.65	-2.94	0.03	1.18	-1.15	-2.35
2	Value	1	10	1.01	1.01	0.00	0.00	-0.67	1.63	-2.30	-4.49	0.08	1.19	-1.11	-2.58
3	Equal	1-3	8-10	1.29	1.31	-0.02	-0.07	0.09	1.17	-1.08	-2.92	0.60	1.29	-0.69	-2.09
4	Value	1-3	8-10	1.15	1.26	-0.11	-0.46	-0.13	1.52	-1.65	-4.71	0.88	1.30	-0.42	-1.56
<i>Panel B: NegBE firms separate from positive book-equity firms</i>															
1	Equal	1	10	1.44	1.19	+0.25	0.61	-0.19	1.19	-1.38	-2.51	0.11	1.19	-1.08	-2.28
2	Value	1	10	0.90	1.00	-0.10	-0.29	-0.99	1.67	-2.66	-4.59	-0.57	1.17	-1.74	-3.63
3	Equal	1-3	8-10	1.24	1.31	-0.07	-0.30	0.21	1.21	-1.00	-2.78	0.68	1.28	-0.60	-2.00
4	Value	1-3	8-10	1.12	1.28	-0.16	-0.69	-0.14	1.51	-1.65	-4.50	0.84	1.31	-0.47	-3.93
<i>Panel C: Size and B/M balanced portfolios</i>															
Value	O-score	0.98	1.27	-0.29	-2.16	0.97	1.28	-0.31	-2.38						
	Z-score	0.93	1.37	-0.44	-2.10	0.90	1.32	-0.42	-1.91						

Notes: Dist, distress; solv, solvent

Distress risk,
B/M ratio and
return premium

Table IV.
Return premia earned
by zero-investment
strategies

factor representing a premium to compensate for the risk of financial distress. While aggregation of positive and negative B/M values does result in a downward bias in the B/M of the highest distress-risk portfolios, exclusion of NegBE firms does not change the conclusion that the highest distress-risk firms have comparatively low B/M values. This conclusion is also robust to the weighting of portfolio B/M. Of high distress-risk firms, only the very smallest of those listed on the NYSE-AMEX have high B/M ratios.

The tiniest of the high distress-risk positive book-equity NYSE-AMEX firms have high B/M ratios and earn high returns. NYSE-AMEX NegBE firms also earn high returns. One possible explanation is that the market value of these firms has been bid down too far and large positive returns are earned when the market recognizes that B/M has moved away from fundamental values.

In contrast, the low return and B/M of high distress-risk NASDAQ firms and high distress-risk positive book-equity NYSE-AMEX firms that are not the smallest is consistent with under reaction. If the market is slow to react to deteriorating financial health, the market value will not be bid down to reflect the true value of the firm. Consequently, low or negative returns are realized as market value continues to be adjusted downwards. This problem appears to affect a larger proportion of firms that trade on NASDAQ consistent with the smaller average size of firms trading in this market.

Using a range of trading strategies, the distress-risk premium is not significantly different from zero for NYSE-AMEX firms and is consistently negative and significant for NASDAQ firms. These findings are consistent with market inefficiencies driving the market value and returns of high distress-risk firms especially for those listed on NASDAQ.

Notes

1. The effect of outliers is examined using "trimmed" B/M values. For each year the top (bottom) 1 per cent of B/M values are set at the 99th (1st) percentile for that year. Outliers are not found to drive conclusions.
2. See Shumway (1997) and Shumway and Warther (1999). Comparison of adjusted and unadjusted returns shows that the conclusions are not driven by this adjustment.
3. Results obtained from Altman rankings are available from the authors.
4. Wilcoxon rank-sum *P*-values, not reported here, show that the difference in size is significant at the 1 per cent level.
5. Of the firms that delisted for performance reasons, approximately 90 per cent are NASDAQ firms and over 40 per cent of these are allocated to distress portfolio 1.

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