

Motor Carrier Bankruptcy in an Uncertain Environment

GARLAND CHOW*
RICHARD D. GRITTA**

TABLE OF CONTENTS

I. INTRODUCTION	39
II. THE GENERAL FREIGHT SEGMENT OF THE TRUCKING INDUSTRY .	41
III. THE ALTMAN MODEL.....	43
IV. VALIDATION OF THE MODEL TO MOTOR CARRIERS	45
V. FINANCIAL CONDITION OF GENERAL FREIGHT CARRIERS BEFORE AND AFTER DEREGULATION	46
A. <i>INDUSTRY SAMPLE</i>	48
B. <i>PANEL SAMPLE</i>	48
C. <i>ANALYSIS OF FINANCIAL PERFORMANCE</i>	49
VI. CONCLUSION	50

I. INTRODUCTION

Since passage of the Motor Carrier Act of 1980,¹ numerous motor carriers have discontinued operations. The American Trucking Associa-

* Assistant Professor of Transportation and Logistics, University of British Columbia. B.S., M.B.A., University of Maryland; D.B.A., Indiana University.

** Professor of Finance, University of Portland. B.B.A., University of Notre Dame; M.B.A., Indiana University; D.B.A., University of Maryland.

The authors gratefully acknowledge the research assistance of Roland Ebel, graduate student in the Faculty of Commerce, University of British Columbia.

1. Pub. L. No. 96-296, 94 Stat. 793 (codified in scattered sections of 49 U.S.C.).

tion (ATA) indicates "250 known carriers have gone out of business, reduced service or declared bankruptcy since the act and that these carriers generated revenues in excess of \$2.3 billion."² There is substantial controversy over the impact of deregulation on motor carrier insolvency.³ Some lay the blame squarely on either deregulation or the economy.⁴ But most analysts see the poor economy and the increased competition spurred by less regulation as the primary forces behind the current flood of carrier closures.⁵ Concerns for further insolvencies persist as the Motor Carrier Act of 1980, with its open entry policy and relaxed rate controls, has increased competition significantly.⁶

Financial analysts have long sought accurate methods of measuring financial health and forecasting bankruptcy. Research attempts have centered on the use of predictive models which combine financial ratio

2. *Oversight Hearings on the Motor Carrier Act of 1980 Before the Subcomm. on Surface Transportation of the Senate Comm. on Commerce, Science and Transportation*, 97th Cong., 2d Sess. 46 (1982) (statement of Nelson J. Cooney, General Counsel, American Trucking Association).

3. The financial condition of the motor carrier industry has been addressed in every oversight hearing held by the House or Senate. See Motor Carrier Act of 1980, Pub. L. No. 96-296, § 3(b), 94 Stat. 793, 793 (requiring such hearings to be held for five years after enactment).

4. For an argument that deregulation is the cause, see *Oversight Hearings on the Motor Carrier Act of 1980 Before the Senate Comm. on Commerce, Science and Transportation*, 98th Cong., 2d Sess. 101-02 (1984) (statement of Irwin H. Silberman) [hereinafter cited as Silberman].

5. See, e.g., G. MORRIS (AMERICAN TRUCKING ASSOCIATION), 1982 FINANCIAL ANALYSIS OF THE MOTOR CARRIER INDUSTRY 40 (1982). See also *infra* note 6.

6. Many financial analysts conclude that:

[m]any companies which might prefer to liquidate or sell out cannot do so due to the Multiemployer Pension Plan Amendments Act (MEPPAA). Most such companies sign multiemployer collective bargaining agreements which call for fixed amounts of contributions per employee. Prior to passage of the MEPPAA, the pension funds established and maintained under the labor agreement were considered to be "defined-contribution" plans. The liability of participating carriers was restricted to the amount of contribution defined by the labor agreement. MEPPAA created a new concept called withdrawal liability which requires a withdrawing company to pay a share of the pension plans' total unfunded vested benefits.

Current unfunded vested liabilities are estimated to be over \$4 billion for the motor carrier industry and, in many cases, the liability of individual carriers is greater than their total equity. A number of the carriers affected by this ruling are in precarious financial conditions. Because this \$4 billion liability is the shared responsibility of all carriers who have signed the industry's labor agreement, the surviving carriers will have to bear an increased share of the liability if a carrier declares bankruptcy and cannot cover its share of liability. Trucking companies whose management and stockholders agree that remaining in the trucking business would not provide rates of return satisfactory to them and therefore might seek to liquidate their investment or find a suitable merger partner, could be dissuaded from making this logical business decision because of the requirements of MEPPAA as presently stated. This withdrawal liability is on par with unsecured debt in the event of a liquidation. Therefore, the financial community faces increased risk due to the large pension claims that would occur with liquidation.

F. LIDDEL (AMERICAN TRUCKING ASSOCIATION), 1981 FINANCIAL ANALYSIS OF THE MOTOR CARRIER INDUSTRY 10-11 (1981).

analysis with statistical techniques.⁷ The purpose of this article is to assess the changing financial state of the motor carrier industry and to forecast bankruptcy trends. The methodology employed is one of the most widely accepted statistical bankruptcy classification models, the Altman Model.⁸ The paper will first describe the General Freight segment of the trucking industry upon which the empirical analysis is focused. Then the model will be applied to a sample of bankrupt and non-bankrupt motor carriers to test its validity to the trucking industry. Once validated, it will be used on a random sample of carriers to measure the overall financial health of the industry and to test two hypotheses advanced by industry analysts. The first asserts that deregulation has been the direct cause of increased bankruptcy problems in the industry. The second holds that larger carriers are benefiting at the expense of the smaller.⁹

II. THE GENERAL FREIGHT SEGMENT OF THE TRUCKING INDUSTRY

The motor carrier industry can be segmented into groups that share common economic and operating characteristics.¹⁰ A generalized view of this structure is shown in Figure 1. The intercity general freight carrier segment is the subject of frequent study because of its size, the number and range of customers served, and unique operating requirements (frequent rehandling at terminals). This study concentrates on motor carriers which derived an average of seventy-five percent or more of their revenues from the intercity transportation of general freight. This includes the regular and irregular route general freight carriers shown in Figure 1. These carriers are frequently referred to as Instruction 27 (I-27) carriers by the Interstate Commerce Commission (ICC) for reporting purposes.¹¹ A breakdown of revenues earned by these carriers is shown in Figure 2.

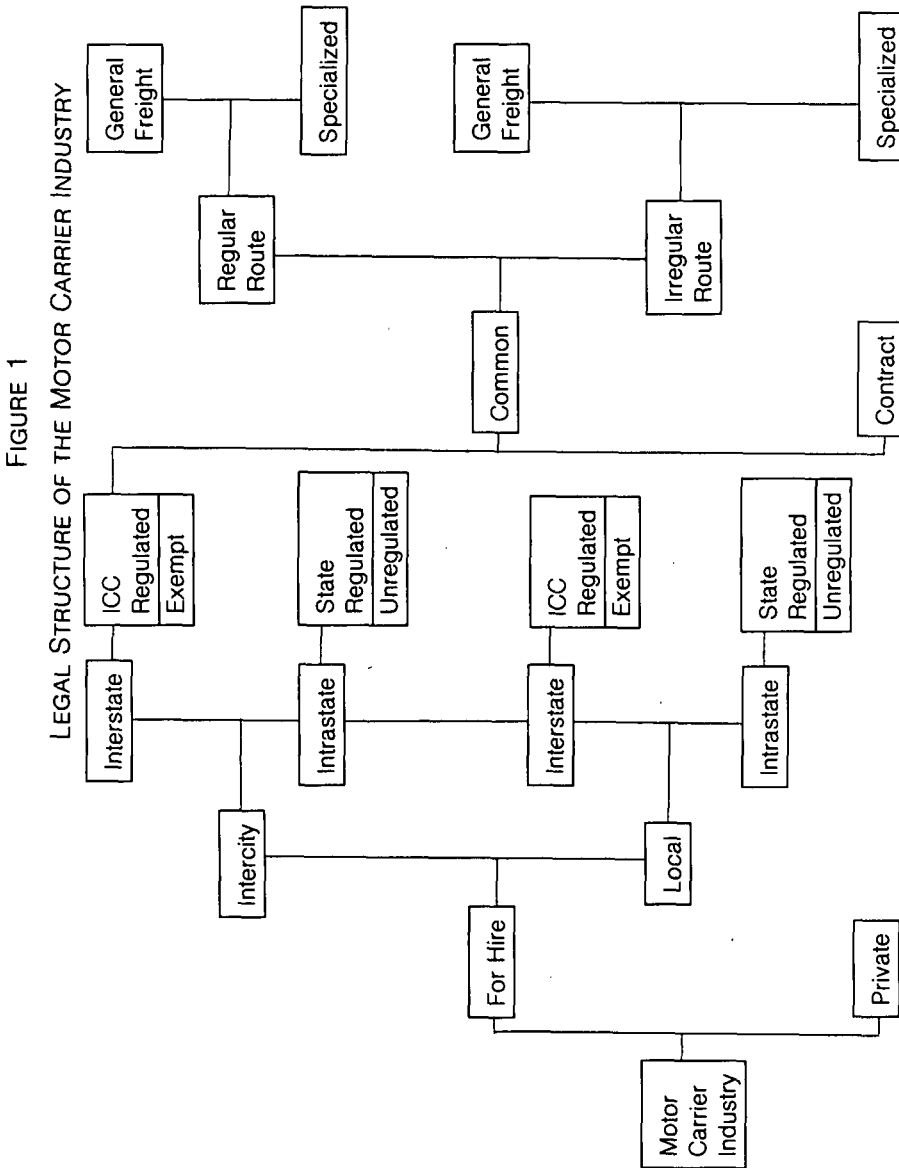
7. See B. LEV, *FINANCIAL STATEMENT ANALYSIS: A NEW APPROACH* (1974).

8. E. ALTMAN, *CORPORATE FINANCIAL DISTRESS: A COMPLETE GUIDE TO PREDICTING, AVOIDING, AND DEALING WITH BANKRUPTCY* (1983).

9. See Silberman, *supra* note 4.

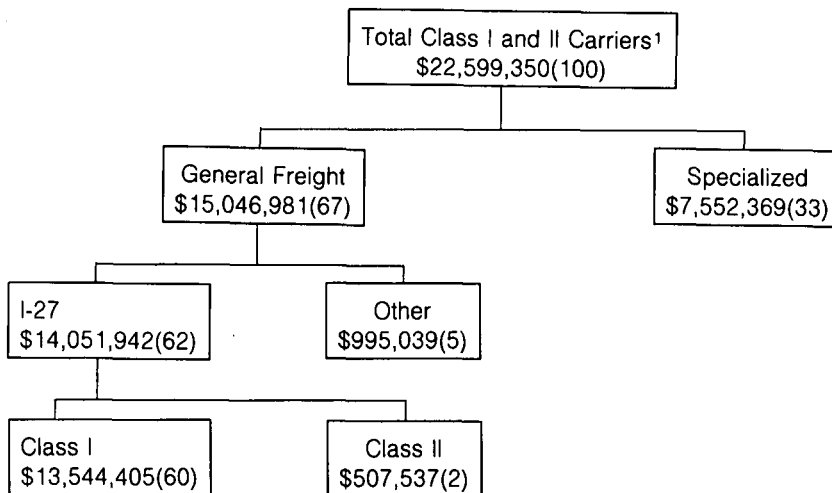
10. See G. CHOW, *THE ECONOMICS OF THE MOTOR FREIGHT INDUSTRIES* (1978).

11. See 49 C.F.R. pt. 1207 (1984).



Source: G. CHOW, THE ECONOMICS OF THE MOTOR FREIGHT INDUSTRIES 9 (1978).

FIGURE 2
 ROLE OF INTERCITY COMMON CARRIERS OF GENERAL FREIGHT
 (I-27)



Source: AMERICAN TRUCKING ASSOCIATION, MOTOR CARRIER ANNUAL REPORT (1982).

¹Percentage of total in Parentheses.

III. THE ALTMAN MODEL

Historically, analysts have used balance sheet and income statement ratios to assess financial performance. These ratio measures can be grouped into several categories, each of which measures a particular aspect of financial health.¹² Ratios can measure liquidity (the ability to pay current obligations promptly), leverage (the extent to which a firm uses debt finance), turnover (the efficiency of asset use), and profitability. Until recently, there was a lack of empirical evidence linking these ratios to the successful prediction of corporate bankruptcy. Research by William Beaver in the mid-1960's attempted to statistically correlate financial ratios to bankruptcy using single variable models.¹³ Edward Altman refined the analysis by combining groups of ratios into a multivariate model with greater predictive ability.¹⁴ His model, often referred to as the Z Score

12. See J. WESTON & E. BRIGHAM, *MANAGERIAL FINANCE* 138 (7th ed. 1981).

13. Beaver, *Financial Ratios as Predictors of Failure*, in *EMPIRICAL RESEARCH IN ACCOUNTING: SELECTED STUDIES* 71 (J. ACCT. RESEARCH Supp. 1966).

14. Altman has published dozens of journal articles and several books on the prediction of corporate bankruptcy. See, e.g., Altman, *Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy*, 23 J. FIN. 589 (1968); Altman, *Predicting Railroad Bankruptcies in America*, 4 BELL J. ECON. & MGMT. SCI. 184 (1974); Altman, Haldeman & Narayanan, *Zeta Analysis: A New Model to Identify Bankruptcy Risk of Corporations*, 1 J. BANKING & FIN. 29 (1977); Altman & McGough, *Evaluation of a Company as a Going Concern*, J. ACCT., Dec. 1974, at 50; E.

Model, remains today as the most widely quoted and generally accepted model in both industry and academia.¹⁵ The methodology of this paper will utilize one of several variants of this popular model. That variant is the Z'' Score.¹⁶

Altman's Z'' model isolated four important ratios demonstrated to be consistent predictors in several studies of corporate bankruptcy.¹⁷ These four ratios are:

1. The ratio of working capital to total assets (WC/TA), a liquidity measure. Working capital is defined as current assets minus current liabilities. The higher this ratio, the more liquid is the firm, and therefore the probability of insolvency is lower.
2. The retained earnings to total asset ratio (RE/TA), an accumulated past profitability measure. As an indicator of "staying power," high ratios indicate a lower likelihood of insolvency.
3. The ratio of earnings before interest and taxes, or net carrier operating income as it is referred to in the motor carrier industry, to total assets (NCOI/TA), a profitability measure known as the return on assets. High ratios are correlated with decreased risk of bankruptcy.
4. The ratio of the book value of equity to the book value of debt

ALTMAN, CORPORATE BANKRUPTCY IN AMERICA (1971); and E. ALTMAN, CORPORATE FINANCIAL DISTRESS (1983).

15. Altman's model has not been without its critics. Some have argued that the model does not perform well under all circumstances and that simpler models may do well in some cases. See Moyer, *Forecasting Financial Failures: A Re-Examination*, FIN. MGMT., Spring 1977, at 11. Others have attacked its statistical validity. See Joy & Tollefson, *On the Financial Applications of Discriminant Analysis*, 10 J. FIN. & QUANTITATIVE ANALYSIS 723 (1975). Altman, however, has countered the criticism of his model and defended its application. See Altman, *Examining Moyer's Re-examination of Forecasting Financial Failure*, FIN. MGMT., Winter 1978, at 76; Altman & Eisenbeis, *Financial Applications of Discriminant Analysis: A Clarification*, 13 J. FIN. & QUANTITATIVE ANALYSIS 185 (1978). In any case, as the authors will demonstrate later in this paper, the Altman Model does work well when applied to the motor carrier industry, and it still remains the most widely used model in predicting corporate bankruptcy. See, e.g., E. SOLOMON & J. PRINGLE, AN INTRODUCTION TO FINANCIAL MANAGEMENT 122 (2d ed. 1980); J. VAN HORNE, FINANCIAL MANAGEMENT AND POLICY 691-94 (5th ed. 1980); J. WESTON & E. BRIGHAM, *supra* note 12, at 192-94.

16. Altman has refined his original Z Score model and he uses several variants as general models depending on certain circumstances. The two variations on the Z Score are the Z' and Z'' Score models. The authors tested these two alternatives and found Z'' to be superior to both the Z and Z' Score models in the case of the motor carriers. See generally E. ALTMAN, CORPORATE FINANCIAL DISTRESS 120-24 (1983).

17. The Z'' Score model is a reduced form of Altman's original Z Score. The latter includes a fifth variable, a turnover ratio (or Sales/Total Assets). Altman suggests, however, that in some industries this variable should be deleted to minimize "a potential industry effect which is more likely to take place when such an industry sensitive variable as asset turnover is included." *Id.* at 124. The authors' tests on the different models bore out Altman's suggestion. We obtained much more significant results with the turnover ratio deleted.

(BVE/BVD), a gauge of financial leverage.¹⁸ High ratios measure low risk.

Altman combined these four ratios via an applied regression technique known as multiple discriminant analysis¹⁹ into the following predictive model:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4,$$

where X_1 through X_4 are the respective financial ratios. The Z'' Score is an index which Altman maintains is of considerable use in both forecasting bankruptcy several years in advance and in assessing overall financial performance.²⁰ The critical value of Z'' are 1.10 and 2.60. A Z'' of less than 1.10 indicates severe financial stress, a likely bankruptcy candidate. A value of 2.60 or more signals a stronger financial position. Scores between these two barriers form the "zone of ignorance," where classification is more difficult.²¹

IV. VALIDATION OF THE MODEL TO MOTOR CARRIERS

In order to validate the model as applicable to the motor carrier industry, 47 bankrupt and 47 non-bankrupt carriers over the years 1979-1983 were selected.²² Appendix I lists those carriers. Altman's Z'' Score was then used to test the model's ability to discriminate between the two groups. Appendix II presents the results for the bankrupt carriers; Appendix III, for the non-bankrupt. Table I summarizes some salient information from the study.

18. This ratio is an inverted variation of the traditional debt to equity ratio so widely used by bankers and security analysts. Altman found that this version better fit the model. *Id.* at 107.

19. Multiple discriminant analysis (or MDA) is a statistical technique involving the correlation of key variables (called independent variables) with a variable to be predicted (the dependent variable). The dependent variable is an index that allows classification of an observation into one of several *a priori* groups—in this case failed versus successful firms. The MDA technique derives a linear combination of the characteristics that best discriminate between the groups (that is, those discriminations that minimize the probability of misclassifications). Altman tested twenty-two financial ratios, four of which were found to contribute most to the predictive model. The slope terms (e.g., 6.56, etc.) are the results of the best "fit" of the data. *Id.* at 102-05.

20. *Id.* at 124. While the derivation of the model is quite complex, its application is quite simple as will become evident from the exhibits to follow.

21. Not one firm with a Z'' score of 1.10 or less survived, while no firm with a Z'' of 2.60 or more failed. *Id.*

22. Bankrupt carriers were identified in I. SILBERMAN, ANALYSIS OF THE FINANCIAL PERFORMANCE OF THE GENERAL FREIGHT MOTOR COMMON CARRIER INDUSTRY, attachments II, III (1982). Non-bankrupt carriers were selected by sequential sampling of carriers listed in various *Motor Carrier Annual Reports*. The number of non-bankrupt carriers were to match the number of bankrupt carriers in the sample for that year.

TABLE I

	BANKRUPT	NON-BANKRUPT
Computed Average Z" Score	-3.98	3.87
Number of Carriers With Scores:		
2.60 >	6	28
1.10-2.60	7	11
< 1.10	34	8
Number Classified: 2.6 > / < 1.1	40	36
Error Rate: Type I Error	15%	
Type II Error		22%
Percent Successfully Predicted	85%	78%

The power of the model is evident from this summary. It clearly separates the two classes of motor carriers with a high degree of accuracy. Note especially the Type I and Type II error rates. A Type I error results when a bankrupt carrier is classified as non-bankrupt. In this case, the model classified 6 carriers as solvent when they in fact went bankrupt. Out of the total of 40 carriers classified, this is an error rate of only 15% (or 6/40). The model was therefore 85% accurate in classifying the carriers that were to fail. A Type II error, on the other hand, is the classification of a non-bankrupt carrier as bankrupt. Eight carriers scored less than 1.10 and were still solvent one year after the test period. This resulted in an error rate of 22% (8/36). It is worthy to note here, however, that two of these carriers did ultimately go bankrupt several years later, thus decreasing the actual error rate to 16.7% (6/36).²³

In sum, the validation tests show the model works relatively well in the motor carrier industry. Although the model is not perfect in its forecasting ability, it does allow an analyst to make sound judgements about the overall financial strength of this industry.

V. FINANCIAL CONDITION OF GENERAL FREIGHT CARRIERS BEFORE AND AFTER DEREGULATION

An evaluation of the effects of deregulation and the post-deregulation

23. There still, however, is the problem of the "zone of ignorance," or the range between 1.10 and 2.60, which includes both bankrupt and non-bankrupt carriers. The authors suggest the use of the mid-point (or $1.85 = 1.10 + 2.60$ divided by 2). Using 1.85 as the dividing line, the following classifications result:

	BANKRUPT	NON-BANKRUPT
1.85 >	10	33
< 1.85	37	14
Total number	47	47
Type I Error	21.3%	
Type II Error		29.8%

economy on the financial well being of the trucking industry is made by comparing the Z" scores of carriers before and after deregulation. The year 1976 was chosen as the "before" period in order to avoid the effects of administrative deregulation that began in 1977.²⁴ The latest year after deregulation for which uniform and consistent data was available was 1982. Two population types were chosen for the "before" and "after" deregulation comparison.

These samples are henceforth referred to as the industry samples and are listed in Appendix IV.²⁵ A carrier is not necessarily represented in both years although the random selection procedure may have led to this result. A second group of carriers was chosen to compare the financial condition of carriers which have survived from 1976 to 1982. Carriers in the 1976 sample which also reported in 1982 were chosen for this sample. These thirty-six carriers are referred to as the "panel sample" and are identified in the 1976 column.

The intercity general freight carriers segment may be further classified according to size of carrier and type of service. For reporting and statistical purposes, the ICC classifies motor carriers into Class I, II or III categories. Only the large Class I and medium-size Class II carriers are included in this study.²⁶ Intercity carriers are further subclassified as either regular route, operating predominately over designated highways,

24. This is cogently revealed in Kahn, *Motor Carrier Regulatory Reform—Fait Accompli*, 19 TRANSP. J. 5 (1979).

25. A sequential sampling technique of Class I and II general freight motor carriers was used. All financial data was from the 1976 and 1982 data compiled in the *Motor Carrier Annual Report*. These publications contain useful income and balance sheet statistics as well as operating details taken from the annual reports submitted by individual motor carriers to the Interstate Commerce Commission. A uniform system of reporting is prescribed in 49 C.F.R. pt. 207 (1984).

26. From 1974 through 1979 the following revenue criteria were used to classify motor carriers by size:

CLASS I carriers are those receiving annual gross operating revenues (including interstate and intrastate) of \$3 million or more from property motor carrier operations; CLASS II carriers are those receiving annual gross operating revenues (including interstate and intrastate) of \$500,000 to \$2,999,999 from property motor carrier operations; CLASS III carriers are those receiving annual gross operating revenues (including interstate and intrastate) of less than \$500,000 from property motor carrier operations. Class III carriers are not included in this study. AMERICAN TRUCKING ASSOCIATION, MOTOR CARRIER ANNUAL REPORT iv (1979).

Beginning in 1980, the revenue classification was revised to:

CLASS I carriers are those receiving annual gross operating revenues (including interstate and intrastate) of \$5 million or more; CLASS II carriers are those receiving annual gross operating revenues (including interstate and intrastate) of \$1 million to \$4,999,999 from property motor carrier operations; CLASS III carriers are those receiving annual gross operating revenues (including interstate and intrastate) of less than \$1 million from property motor carrier operations. Class III carriers are not included in this study. AMERICAN TRUCKING ASSOCIATION, MOTOR CARRIER ANNUAL REPORT iv (1981). These changes recognize the impact of inflation on the revenue criteria.

or irregular route, authorized to serve an area over any appropriate route.²⁷ Separate analysis of the financial position of each group will be performed to identify the differential impact of the economy and deregulation on different types of carriers.

A. INDUSTRY SAMPLE

The effects of deregulation and the economy (represented by 1976 and 1982 periods), and carrier size (Class I versus Class II), on the financial condition of the carriers was analyzed using Analysis of Variance (ANOVA).²⁸ The ANOVA indicated that only the deregulation/economy factor and carrier size had a statistically significant effect on the Z'' Score. This is illustrated by comparing the mean Z'' Scores for carriers cross-classified by these two variables as shown below.

TABLE II

	Class I	Class II	Total
1976	2.91(34)	4.83(28)	3.78(62)
1982	2.80(23)	.30(15)	1.81(38)
Total	2.87(57)	3.25(43)	3.03(100)

Clearly, the average Z'' Score has dropped from well above the minimum score that signals a strong financial position ($Z'' = 2.6$) to a Z'' Score that is well within the gray area or "zone of ignorance." Most of this drop, however, can be attributed to the deteriorating position of the smaller Class II as opposed to the Class I carriers. On the average, the Class I carriers fell from a superior financial position relative to Class I carriers in 1976 to one of severe financial stress in 1982.

B. PANEL SAMPLE

As one would expect, the average financial performance of the panel sample is superior to that of the industry sample because the former consists only of carriers which have survived from 1976 to 1982. However,

27. For a complete description, see C. TAFF, COMMERCIAL MOTOR TRANSPORTATION 111-13, 446-48 (1980).

28. Analysis of Variance (ANOVA) is a statistical technique for ascertaining from sample data whether one factor really influences another factor or whether the observed association was probably the result of sampling fluctuations. In our case, we are interested in knowing whether the financial position of general freight carriers is influenced by the combined effects of deregulation and the economy, independent of the effect of carrier size and service type. A basic description of the technique is found in R. FERBER & P. VERDOORN, RESEARCH METHODS IN ECONOMICS AND BUSINESS 80-82 (1962). A technical description can be found in W. MENDENHALL & F. REINMUTH, STATISTICS FOR MANAGEMENT AND ECONOMICS 465-502 (1978). Because of the detailed nature of the statistical tests involved here, the results are not reported. The interested reader may obtain the tests from either of the authors.

the financial performance of the panel sample behaved in a pattern similar to the industry sample, as shown below.

TABLE III

	Class I	Class II	Total
1976	4.47(21)	5.01(15)	4.69(36)
1982	3.69(20)	2.18(16)	3.02(36)
Total	4.09(41)	3.55(31)	3.86(72)

The Class I carriers again outperformed the Class II carriers. Their Z" Score dropped from 4.47 to 3.69, while the Class II carriers' Z" Score dropped from 5.01 to 2.18. The panel sample is consistent with the industry sample and confirms the view that there has been substantial deterioration in the financial position of motor carriers, particularly that of the smaller carriers.

C. ANALYSIS OF FINANCIAL PERFORMANCE

Given the deterioration of the Z" Scores, particularly of the Class II carriers, the causes of the decline need to be considered. The trend in the underlying financial ratios used in the Z" model are displayed in Table IV. Comparison of the financial ratios in 1976 and 1982 for the industry sample indicate that Class II profitability declined much more than Class I profitability (NCOI/TA). The reduced profitability had two causes. As the economy declined, fixed costs could not be reduced as sales volume decreased, leaving the burden of those costs on the remaining business.²⁹ At the same time, price discounting allowed under the relaxed regulation brought down the rates and subsequently the profit margins. The Class II carriers were especially affected by these lower rates and higher costs. These carriers tend to be localized in a small geographic area and dependent on a narrow traffic base. Consequently, they have fewer opportunities than their larger competitors to differentiate their service and price among customers to minimize the impact of rate discounting. Negative profitability in turn drains retained earnings, i.e., equity, thus reducing the RE/TA and BVE/BVD ratios. (See Table IV.) At the same time, the working capital positions of the Class I and Class II carriers also reversed positions. In a recessionary period, motor carriers typically improve their liquidity as their cash position increases due to a reduction in capital ex-

29. The majority of economists have argued that these fixed costs are very small in the short run and insignificant over a very short span of years in trucking. This is attributed to the short life and mobility of trucking assets and the ability of a motor carrier to increase its capacity in small increments. See 2 A. KAHN, *THE ECONOMICS OF REGULATION* 179 (1971). A minority, but growing, viewpoint is that cost fixities do exist for motor carriers, such as the general freight type, because they are heavily dependent on terminal facilities to efficiently produce transportation service. See G. CHOW, *supra* note 10, at 245-47.

penditures, as evidenced by the improvement of the Class I carriers' WC/TA ratio. Unfortunately, the trucking industry has faced two economic recessions since 1979³⁰ and sustained losses have caused significant deterioration in the working capital position of the Class II carriers.

TABLE IV
FINANCIAL RATIO TRENDS: INDUSTRY SAMPLE

Financial Indicator	Class I		Class II	
	1976	1982	1976	1982
X ₁ WC/TA	-.002	.137	.124	-.029
X ₂ RE/TA	.298	.321	.434	.104
X ₃ NCOI/TA	.107	-.043	.110	-.127
X ₄ BVE/BVD	1.178	1.089	1.773	.954
Z'' Score	2.914	2.797	4.828	.298

VI. CONCLUSION

The motor carrier industry enjoyed sustained traffic growth and stable regulatory environment through most of the 1970's. Relaxation of regulation by the ICC in 1977 was followed by total deregulation upon the enactment of the Motor Carrier Act of 1980. Meanwhile, traffic growth has slowed and even declined since 1979. Motor carriers have been thrust into a new and uncertain environment to which they must adapt.

Many motor carriers have been unable to deal with these changes and have gone out of business. This paper has summarized the financial position of the general freight motor carrier in 1982 relative to the financial position in 1976. An overall deterioration in the financial position of this carrier group was observed, but it was the smaller Class II carriers that suffered the most. This was evident in both the industry and the panel samples. The smaller carriers incurred relatively large losses compared to their larger counterparts and have been unable to sustain an adequate liquidity position. We are thus led to conclude that there are benefits to being large.

We also observed that reduced profitability was due in large part to sustained price competition reflected in discounting and lower rates. There is little doubt that this would have been minimized if the ICC had maintained strict control of rate competition and entry into the industry as in previous years. If deregulation means increased competition, the natural result is increased turnover via bankruptcy of competitors. Competition is, by its very nature, destructive. It is the responsibility of

30. Truck tonnage is highly correlated with the Federal Reserve Board Industrial Production Index. That index declined 3.6% in 1980, grew by 2.7% in 1981 and declined 3.8% in the first 8 months of 1982. G. MORRIS, *supra* note 5, at 40.

transportation policymakers to decide whether the current level of instability and the industry's precarious financial position are acceptable prices to pay for the lower rates offered to the public.

APPENDIX I

BANKRUPT MOTOR CARRIERS

1. Fowler & Williams
2. Fox & Ginn
3. Graf Bros.
4. Baxter Transport, Inc.
5. Courier-Newsom
6. Davidson Transfer & Storage
7. Eazor Express, Inc.
8. Hayes, Williams, Lines Inc.
9. Jones Motor Co.
10. Time D.C.
11. Tennessee-Carolina Tptn.
12. Spector Freight System
13. Standard Motor Freight
14. Rio-Grade Motor Way
15. Rooks Transfer Lines
16. Brigg's Transportation
17. Hemingway Transport
18. Motor Freight Express
19. Admiral-Merchants Motor Freight
20. American Freightways Co.
21. Auclair Transportation Inc.
22. Boss-Linco
23. CHFL - Chief Freight Lines
24. Cooper-Jarrett
25. Dean Truck Lines
26. Deluxe Motor Freight
27. Arrow Transportation
28. B & P Motor Express
29. Cape Cod Overland Express
30. Johnson M Lines
31. Long Transportation Co.
32. Monahan Transportation Inc.
33. North Shore & Central
34. Perkins Trucking Co.
35. Stand Transportation Inc.
36. Transport Motor Express
37. Wilson F. C.
38. Witte Transportation
39. Chippewa Transportation
40. Dodds Truck Line
41. Highway Express Co.
42. Motor Transport Co.
43. Western Transportation
44. Atlas Freight Lines
45. Browning Freight Lines
46. IML
47. Orscheln Bros. Trucking

NON-BANKRUPT MOTOR CARRIERS

1. H.C. Gabler Inc.
2. Harns Motor Express, Inc.
3. Mercury Freight Lines, Inc.
4. Smiser Freight Service
4. Gator Freightways, Inc.
6. New England Motor Freight, Inc.
7. Murfreesboro Freight Line Company
8. Ryder Trucklines, Inc.
9. ABF Freight Systems, Inc.
10. Inter-City Trucking Service, Inc.
11. Wilson Trucking Corp.
12. McCarty Truck Lines, Inc.
13. Smalley Transportation Company
14. Hermann Forwarding Company
15. Tuffley & Sons, Inc.
16. McBrides Express Inc.
17. Pacific Inter Mountain Express
18. Southeastern Freight Lines Inc.
19. New York Mass. Motor Service, Inc!
20. McMinnville Freight Lines Inc.
21. Churchill Truck Lines Inc.
22. Cassell Truck Lines Inc.
23. Advance Transportation Co.
24. BN Corkum Transportation Co.
25. Short Freight Lines Inc.
26. Giriley Freightlines
27. North Penn Transfer Inc.
28. Smith's Transfer Corp.
29. Campbell Sixty-Six Express Inc.
30. JL Scheffler Transport Inc.
31. McNamara Motor Express Inc.
32. Pilot Freight Carriers Inc.
33. Estes Express Lines
34. Hunt Truck. Lines Inc.
35. AAA Trucking Corp.
36. Lehman Cartage Inc.
37. Milne Truck Line Inc.
38. Brown Transfer Co.
39. Northeastern Motor Freight Inc.
40. Dearborn Motor Express Inc.
41. E. W. Fraser Inc.
42. Consolidated Mountain Freight Inc.
43. Burnett Truck Line Co.
44. LaPorte Transit Co. Inc.
45. Bee Line Motor Freight Inc.
46. Wooster Express Inc.
47. S & W Freight Lines Inc.

Source: I. SILBERMAN, ANALYSIS OF THE FINANCIAL PERFORMANCE OF THE GENERAL-FREIGHT MOTOR COMMON CARRIER INDUSTRY (1982).

APPENDIX II—BANKRUPT CARRIERS

CARRIER	X_1	X_2	X_3	X_4	
CODE #	Z" SCORE	(WC/TA)	(RE/TA)	(NCOI/TA)	(BVE/BVD)
35	11.67	.43	.84	.05	5.50
26	7.98	.32	.75	-.01	3.31
31	5.63	.33	.56	.01	1.52
42	4.56	.16	.51	.05	1.42
29	4.03	.16	.59	-.11	1.75
39	2.81	.01	.40	.00	1.34
33	2.58	.00	.73	-.06	.57
36	2.10	.12	.05	.00	1.11
30	2.03	.04	.41	-.05	.71
44	1.91	.09	.22	.04	.33
27	1.51	.00	.73	-.23	.69
25	1.44	-.03	.28	.00	.72
14	1.13	.01	.37	-.27	1.62
37	.98	.08	.23	-.11	.38
17	.87	-.02	.16	.02	.30
11	.86	-.07	.52	-.24	1.15
22	.59	-.07	.18	-.03	.64
34	.33	-.05	.17	-.02	.21
20	.15	-.13	.26	-.01	.24
38	.05	-.09	.16	-.02	.23
23	.03	-.05	.07	.01	.07
10	-.15	.03	.02	-.15	.55
40	-.16	-.07	.22	-.12	.38
32	-.31	-.01	.41	-.27	.24
2	-.63	-.03	.14	-.16	.18
12	-1.01	.00	-.12	-.10	.03
16	-1.51	-.19	-.17	.05	-.01
3	-1.77	-.29	.11	-.05	.12
43	-2.52	-.33	.14	-.15	.21
24	-2.63	-.11	-.36	-.08	-.17
8	-2.69	-.08	-.16	-.22	-.14
21	-2.72	-.22	-.19	-.09	-.10
18	-2.78	-.25	-.02	-.16	-.01
41	-3.17	-.25	-.10	-.16	-.07
47	-3.49	-.43	-.11	-.04	-.04
46	-4.10	-.32	-.15	-.21	-.11
4	-5.20	-.68	.06	-.10	-.27
1	-5.41	-.34	-.25	-.32	-.19
13	5.64	-.23	.20	-.76	.27
28	-5.85	-.53	-.30	-.24	.25
7	-6.23	-.60	-.19	-.23	-.13
19	-6.57	-.55	-.28	-.27	-.20
6	-8.44	-.57	-.47	-.47	-.05
5	-8.49	-.75	-.76	-.10	-.40
9	-8.99	-.28	-.95	-.55	-.35

45	-10.91	-.89	-.23	-.56	-.54
15	-139.11	-9.92	-11.59	-5.26	-.91

Z'' score is calculated from Altman Model. Using data for carrier 35, for example,

$$Z'' = .43(6.56) + .84(3.26) + .05(6.72) + 5.5(1.05) = 11.67.$$

Manual results may differ from listed Z'' score due to rounding.

Source: All ratios are computed from basic income statement and balance sheet data contained in AMERICAN TRUCKING ASSOCIATION, MOTOR CARRIER ANNUAL REPORT (various years).

APPENDIX III—NON-BANKRUPT CARRIERS

CARRIER CODE #	Z'' SCORE	X ₁ (WC/TA)	X ₂ (RE/TA)	X ₃ (NCOI/TA)	X ₄ (BVE/BVD)
43	17.83	.54	.90	.30	8.92
5	14.33	.34	.85	.04	8.62
44	10.04	.34	.54	.66	1.56
41	9.22	.03	-.15	1.44	-.12
4	8.69	.41	.53	.45	1.16
30	8.11	.29	.69	.07	3.30
38	7.91	.33	.69	.20	2.07
10	7.77	.21	.78	.00	3.72
18	6.93	.14	.66	.25	2.08
20	6.58	.26	.44	.23	1.81
15	6.33	.37	.64	-.05	2.06
33	6.31	.19	.60	.23	1.48
29	6.18	.24	.54	.14	1.86
22	6.12	.21	.66	.05	2.15
46	5.90	.26	.17	.28	1.67
26	5.60	.43	.26	.16	.83
36	5.13	.06	.59	.14	1.75
6	5.07	.31	.37	.16	.75
35	4.99	.13	.57	.09	1.60
3	4.95	.24	.79	-.54	4.23
11	4.56	.02	.56	.18	1.36
34	3.86	-.02	.62	.02	1.75
1	3.84	.14	.22	.11	1.46
40	3.68	.16	.43	.10	.55
21	3.31	.08	.38	.09	.89
45	2.77	.02	.51	.04	.69
37	2.73	.06	.03	.07	1.68
47	2.72	-.10	.34	.28	.33
13	2.44	.06	.24	.14	.34
8	2.38	.00	.28	.15	.44
32	2.38	.04	.34	.07	.49
17	2.21	.04	.25	.08	.60
27	2.15	-.04	.46	-.01	.88
2	1.78	-.03	.41	-.03	.78
28	1.44	.00	.18	.07	.36

12	1.35	-.06	.31	.02	.53
16	1.33	.03	.29	-.05	.45
9	1.19	-.02	.17	.08	.24
23	1.15	-.09	.26	.07	.35
24	.83	-.11	.15	.12	.20
39	.38	-.03	.13	.00	.16
42	-.24	-.35	.03	.26	.17
19	-1.13	-.26	.08	.03	.10
14	-2.26	-.24	-.04	-.08	-.03
25	-4.75	-.37	.02	-.37	.04
31	-5.40	-.55	-.16	-.13	-.34
7	-7.07	-.53	.02	-.55	.04

APPENDIX IV

CARRIERS IN INDUSTRY AND PANEL SAMPLE

<u>1976 Industry Sample</u>	<u>1982 Industry Sample</u>
1. A & B Freight Line Inc. (1)	AAA Trucking Corp.
2. Alamo Express Inc. (2)	Allard Express Inc.
3. Andrews & Pierce Inc.	Bee Line Motors Frt Inc.
4. Atlanta Motor Lines Inc. (3)	Blue Line Express Inc.
5. Badger Freightways Inc.	Brown Freight Line Inc.
6. Beaufort Transfer Co. (4)	Carolina Frt Crrs Corp.
7. Blackwood Motor Service Inc.	Century Mtr Frt Inc.
8. Bowman Transportation Inc. (5)	Cleveland's Truck Lns Inc.
9. Brown Transfer Co. (6)	Creger Freight Lns Inc.
10. Byers Transportation Co. Inc.	Di Salvo Trucking Co.
11. Carstensen Freight Lines Inc. (7)	Elway Express Inc.
12. Chapin Trucking Line Inc. (8)	Fine Truck Line Inc.
13. Clark Bros. Transfer Inc. (9)	G & P Trucking Co. Inc.
14. Consolidated Freightways Corp. of Del (10)	Graham Ship By Truck Co.
15. Crescent Truck Lines (11)	Hannibal Quincy Trk Lns
16. Leroy Davis Trucking Serv Inc	Holmes Transportation Inc.
17. Dodds Truck Line Inc.	Ideal Truck Lines Inc.
18. Eastern Express Inc.	Jones Transfer Co.
19. Evans Delivery Co. Inc. (12)	Landgrebe Mtr Trpt Inc.
20. Fore Way Express Inc. (13)	Lynden Transport Inc.
21. GCT Inc.	McBrides Express Inc.
22. General Motor Lines Inc. (14)	Middlewest Frtways Inc.
23. Great Coastal Express Inc. (15)	Murphy Mtr Frt Lns Inc.
24. Halls Fast Mtr Frt Inc.	New York Mass Mtr Sve Inc.
25. Herder Truck Lines Inc. (16)	Ohio Fast Freight Inc.
26. Hmieleski Trucking Corp.	Parker & Son Trkg Inc.
27. Howards Express Inc. (17)	Putnam Trf & Stge Co.
28. Illinois Motor Exp Inc.	George Rimes Trkg Co.
29. Jersey Coast Frt Lns Inc. (18)	Russell Transfer Inc.
30. Kane Motor Service Corp (19)	Sartain Truck Line Inc.
31. Klug Direct Trptn Co.	Shay's Service Inc.
32. Lakeland Express Inc.	Smith Transport US Ltd.
33. Liberty Trucking Co. (20)	Spear Trucking Corp.
34. Maislin Transport - Del	System 99
35. McLaren Truck Lines Inc.	Transamerican Frt Lns Inc.
36. Mercury Freight Lines Inc. (21)	United Truck Line
37. Midwest Motor Express Inc. (22)	Wells Cargo Inc.
38. Motor Express Inc.	Winters Truck Line Inc.
39. Nashua Motor Express Inc. (23)	
40. New Penn Motor Exp Inc. (24)	
41. ONC Freight Systems Inc.	
42. Overnite Trptn Co. (25)	
43. Peninsula Truck Lns Inc. (26)	

44. Potter Freight Lines Inc.
45. Raymond Motor Toptu Inc.
46. George Rimes Trkg Co. (27)
47. Rockford Milwaukee Disp (28)
48. Safeway Trucking Corp.
49. G & L Scheffler Trpt Inc. (29)
50. Shawmut Trptu Co. Inc.
51. M C Slater Inc. (30)
52. South Bend Frt Line Inc (31)
53. Standard Motor Frt Inc.
54. Strickland Trptu Co Inc.
55. TIME-DC Inc.
56. Tobler Transfer Inc. (32)
57. Turner Trucking Co. (33)
58. Valleries Trptu Serv Inc. (34)
59. Ward Transfer Inc.
60. Western Gillette Inc.
61. Willig Freight Lines (35)
62. Yellow Freight System Inc. (36)

