PAUL SHRIVASTAVA
Editor

Book Reviews

CORPORATE FINANCIAL DISTRESS: A COMPLETE GUIDE TO PREDICTING, AVOIDING, AND DEALING WITH BANKRUPTCY
by Edward I. Altman
John Wiley and Sons, Inc., New York, 1983.
368 pp.; $29.95.

The intervening twelve years since the publication of Edward Altman's first book, *Corporate Bankruptcy in America*, has witnessed a substantial increase in interest by both practitioners and academicians in the subject of bankruptcy prediction. During the same period, research in cognitive psychology has convincingly demonstrated the information processing limitations of individuals and, consequently, the potential for decision aids to greatly enhance the decisionmaker's performance. Professor Altman's book represents the intersection of these two seemingly unrelated statements of fact. Whether it be the examination of a loan application by a commercial loan officer, or the review of his company's financial performance by a corporate executive, all such analyses have in common the identification and combination of financial cues to form a judgment about the company's financial health. This is exactly the focus of the author's most recent, and possibly most significant, piece of work: documenting the usefulness of models of corporate failure prediction.

The book is divided into twelve clearly written chapters filled with interesting findings based on empirical research, much of it conducted by the author himself. Chapter 1 provides essential background: definitions of various types of failure, business failure statistics, a brief history of the bankruptcy process in the United States, discussion of bankruptcy tax issues, a description of the economic rationale underlying bankruptcy law, reorganization, and liquidation, and the identification of major changes in the bankruptcy reorganization process brought about by the Bankruptcy Reform Act of 1978. While the author briefly discusses the many different types of bankruptcy, he focuses on Chapters X and XI of the old Bankruptcy Act and chapter 11 of the new law. The causes of the major increase in the number and size of business failures are also explained.

Professor Altman's first-hand experience as an adviser to the U.S. Commission on Revision of the Bankruptcy Act is evident throughout the introductory chapter and enables the reader to formulate his own hypotheses regarding the likely effectiveness and efficiency with which the new bankruptcy law will function. A case on the reorganization process of the well publicized Duplan Corp. bankruptcy is presented as an appendix. It includes an SEC advisory report on the firm's proposed plan of reorganization, presenting information that is likely to be unfamiliar and particularly informative to most readers.

New evidence on aggregate, or macroeconomic, influences on the business failure rate is presented in Chapter 2. Nearly all research to date on corporate failure prediction has been concerned with model construction involving the financial data of individual firms. In contrast, this chapter examines the impact on business failure rates of national economic growth, changes in the money supply, business population characteristics, price-level changes and activity in the capital markets. Among the findings is a lagged and positive association between the failure rate and new business formation. When considered together with the more micro-oriented models introduced later, the approach taken in this chapter provides a basis for formulating potentially more accurate assessments of the probability of failure for the individual firm.

The original and now famous multivariate failure prediction equation, the Z-score model, developed by the author during the mid-1960s, is described and dis-

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

cussed in detail in Chapter 3. The five-variable Z-score model contains both financial statement and market price data. An alternative model that involves only financial data, which might be of greater interest to the privately held firm, is also described. The advantages of the multivariate Z-score model relative to univariate ratio analysis are specified at the outset of the chapter and motivate much of the subsequent discussion.

Over the past fifteen years, the Z-score model has become the standard for comparison for the results of other failure prediction models. It is this model and variations thereof that are referred to at the outset of this review and have the potential for simplifying and aiding the decisionmaker's task of financial analysis. This is especially true in repetitive-type decision-making situations where more detailed and time-consuming analyses are not always possible.

While Professor Altman is careful not to oversell the value of his Z-score and similar models, a few caveats regarding the model's use bear repeating. First, a firm's Z-score should be regarded as an important input, but only *one* input in most decision contexts. Second, the original Z-score model was developed using the financial data of relatively small manufacturing firms taken from the mid-1940s to the mid-1960s and thus the model may not be perfectly applicable to all types of firms in today's economy. The author does present evidence in Chapter 4 and elsewhere that the model has held up well over time (at least through the late 1970s), but there are two other alternatives to the original Z-score model available to the analyst. First, he might consider building a new model using recent financial data of companies similar to the type(s) of firms for which predictions will be made. Second, newer models already developed such as the proprietary ZETA model described in Chapter 4 might be used. With the recent advances in, and personalization of, computer technology, the construction of one's own failures prediction model may eventually become the more desirable choice. A third point to bear in mind is that the high level of accuracy of the Z-score and related models, especially for the first year prior to failure, may be inflated somewhat by the use of financial data for the failed firms that did not become available until after the bankruptcy filing date. The average lead time of only 7.5 months in Altman's study (compared with 11.6 and 13.0 months in two recent studies by other researchers) from the date of the financial statements for the first year prior to bankruptcy to the bankruptcy filing date suggests a possible bias. Finally, the use of liberal accounting practices by a firm being analyzed with the Z-score model may distort the picture of the firm's real financial condition. The quality of the Z-score or other models can be no better than the quality of its ingredients.

The construction and accuracy of the seven-variable ZETA model are analyzed in Chapter 4, followed by reviews of other bankruptcy prediction studies. The relative importance of the individual components of the ZETA model is established, as are several application areas for the model, including credit analysis for loan decisions, bond analysis, portfolio management, and others. The ZETA model is shown to improve upon the performance of the Z-score model, and evidence of a high correlation between ZETA values and fundamental Betas is presented. A fundamental Beta is a relative measure of risk of a firm's equity securities. Altman states that the ZETA model is "far more straightforward" than the Beta statistic and has intuitive appeal to practitioners.

One omission from the review of a large body of research is notable: a recent study by Ohlson (*Journal of Accounting Research,* Spring 1980) involving 105 bankrupt and over 2,000 nonbankrupt firms. Among other reasons, Ohlson's study is important for its sample size and the application of a "new" statistical estimation technique, logic analysis, which has attractive statistical properties relative to the multiple discriminant analysis underlying the Z-score and ZETA models. Nevertheless, Ohlson's findings are generally consistent with Altman's results.

Chapter 5 will be of particular interest to the commercial loan officer who, as a part of his loan assessment and review duties, must estimate the likelihood of loan default. Professor Altman shows how the ZETA model can be modified to incorporate realistic information on the prior probability (i.e., relative historical frequency) of loan default and the relative costs of loan misclassification. Prior probabilities and misclassification costs are two potentially significant factors that have received little attention in bankruptcy prediction research. The empirical findings cited by the author on the quality of loan officers' predictions of bankruptcy suggest strongly that much can be gained by making statistical prediction models available to the loan officer.

A criticism of the analyses in this and other chapters is the relatively small amount of evidence on the *predictive* value of the failure prediction models. The author furnishes abundant empirical support for his conclusions regarding the ability of models to distinguish between *known* failed and nonfailed companies. However, it is the predictive accuracy rather than simply the classification accuracy in which most users of the Z-score and ZETA models are likely to be interested. Possibly mitigating the seriousness of this criticism is indirect evidence of the models' usefulness. Commercial banks, insurance companies and other financial institutions do subscribe to the ZETA reports (marketed by ZETA Services of Mountainside, N.J.) and,

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

doubtlessly, other individual and institutional analysts employ the nonproprietary Z-score and related models.

A novel approach to the use of the Z-score model is illustrated in Chapter 6. Whereas failure prediction models are generally utilized in a passive mode by analysts external to the firm, this chapter tells the story of how the Z-score model was used in an active fashion to assist in a dramatic corporate turnaround. The company is GTI Corporation, a small manufacturer of parts and processing equipment. Analyzing the output and the individual components of the Z-score model, GTI's CEO, James LaFleur, detected widespread underutilization of his firm's assets. Applying a symbolic knife to assets that were being utilized inefficiently, LaFleur was able to stop the company's cash bleed, improve its Z-score, and speed GTI's return to financial health. The GTI story is the basis of a case taught by this reviewer to MBA and executive students in what have proved to be lively and instructive class discussions.

Chapters 7 and 8 might be regarded as "special interest" chapters, since they probe the accounting and legal implications of failure prediction models. Both chapters emphasize the dual purpose served by failure prediction models, first as screening devices to avoid making incorrect decisions and second as defensive tools to justify the reasonableness of one's decisions. Chapter 7 describes how auditors can take advantage of the Z-score or ZETA models to aid their judgment process concerning the possible issuance of going-concern opinions. Altman's evidence indicates that auditors significantly underperform Z-score models in "red flagging" ultimately bankrupt firms. In light of the relatively small percentage of audited firms that do fail and the costs to the audit form of incorrectly issuing a going-concern opinion, it is not clear to this reviewer that auditors' decisions should be strongly influenced by the predictions of the Z-score model. Nonetheless, Altman's suggestion to use the model as *one* more decision *aid* is certainly appropriate.

The use of failure prediction models to assess the applicability of the "failing company doctrine" in antitrust lawsuits is investigated in Chapter 8. Also highlighted are the uses of these models to justify money managers' investment decisions with respect to index, trust, and pension funds. Given the increased understanding of Z-score-type models and their ability to generate "objective" evidence consistent with acceptable levels of risk, these models are likely to gain increased exposure in courts of law.

The theme of Chapter 9, detecting undervalued ownership opportunities in financially distressed firms, represents an offensive tactic, as opposed to the defensive use of failure prediction models. Although empirical evidence has shown the stock market to be a good lead indicator of a firm's economic deterioration, it is far from perfect. Since the price behavior of bankrupt securities is especially volatile immediately before and after the bankruptcy filing date, a prospective investor might employ the Z-score or ZETA model with an eye toward capitalizing on temporary inefficiencies in the market. Even at its most efficient, the market offers the opportunities to benefit from the kinds of analyses recommended by the author.

The final three chapters suggest other interesting applications for bankruptcy prediction models. Chapter 10 notes the close association between corporate bond ratings and ZETA values. The point is made that investment gains can be had by searching out those firms that have higher ZETA values than firms whose bonds are rated within the same category. Rating the investment attractiveness of high-yielding "junk" bonds, whose default risk is a key consideration, is another application of the failure prediction models. Chapter 11 extends the analysis to the nonindustrial sector, with special attention given to the beleaguered railroad and savings and loan industries. Different prediction models are constructed for each industry and are demonstrated to achieve high levels of classification accuracy.

The last section of Chapter 11, this reviewer feels, is as important as any in the book. Professor Altman describes the necessary conditions for successful implementation of failure prediction models. Although the context is oriented toward regulatory agencies, the conditions seem equally applicable to most institutions: an efficient and understandable system, cooperation between model developers and users, top management support, and continuity of key personnel who use, and oversee the use of, the models. Undoubtedly, the common thread among these conditions is the required education of users to the models' strengths and limitations.

A sizable body of new evidence on failure prediction models developed in ten foreign countries comprises the final chapter. Both developing and developed economies are examined, including Japan, West Germany, and Brazil. Apparent from the author's survey is that much effort by academicians and businesspeople is being invested in the construction and use of these models. The reliability of some of the models might be questioned, based on the small sample sizes used to generate them as well as other methodological aspects of the studies' designs. These limitations, however, will be less likely to characterize future research in this area as research findings become more widely disseminated. Given the increased level of international economic activity, the findings of these studies should be of interest to the managements of firms conducting substantial amounts of business in those foreign countries.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

In summary, this book is a notable achievement. While academic purists may find the absence of a tight analytical theory to be a weakness of the book, practitioners whose main concern is assessing the risk of failure will not. Furthermore, the book is replete with researchable propositions for the interested scholar. And although calling it "A Complete Guide . . ." slightly exaggerates its contents, Professor Altman has, nonetheless, successfully synthesized and expanded upon a large body of important research. There seems to be something here for anyone concerned with the analysis of firms' financial performances.

*CORNELIUS J. CASEY**

* Cornelius J. Casey is Associate Professor of Business Administration at the Amos Tuck School of Business Administration.

I view this as an interesting and informative sequel to Altman's earlier book (*Corporate Bankruptcy in America*). The lion's share of the material, and nearly all of the worthwhile material, covers the prediction of bankruptcy. It is a good book, a valuable addition to business economics in the areas that Altman knows best. In its weaker areas, it is far less practical, barely scratching the surface of specificity for practitioners.

Altman is the father of the famous Z-score (now updated to the proprietary ZETA score), which has made a valuable contribution to the prediction of bankruptcy. Altman adopted a refinement of multiple discriminate analysis (MDA) techniques first used in consumer credit rating in the early 1960s. The reasonable accuracy of this prediction model has made it useful for economists, portfolio managers, bank lending officers, and public accountants. Not all of these professions have embraced the model, but its popularity has grown over the last decade.

In industrial and commercial situations, however, the model has limited practicality. In most cases there are simply insufficient data available on bankrupt versus normal companies to make the models industry-specific enough to satisfy a discriminating practitioner or practical manager. It is a good screening device when properly applied, and is superior in predicting overall financial health compared with univariate financial ratio analysis.

The Z-score, ZETA score, or derivatives of this approach have limited application in a microeconomic setting. Many of the coefficients used in the various models have total assets as a denominator. Turnaround managers know that the excessive use of assets is one of the main causes of poor performance by corporations. This is particularly true when these assets are obtained with the use of short-term debt. Altman does go beyond the obvious by quantifying the proportion of excess assets relative to other factors in the business that will lead to bankruptcy.

Altman's treatment of the Duplan Corporation reorganization plan in bankruptcy is well presented. Corporate reorganizations following the legal procedures of the Bankruptcy Act are difficult to conceive of when presented in abstract form. Altman does a good job of showing how the legal, economic, and business factors combine to result in a reorganization plan. This is one of a very few good examples in textbooks of the real-life implications of bankruptcy on assets, creditor positions, and overall business factors. While there are no major conceptual breakthroughs in this part of the book, there is value in packaging a number of concepts into a cohesive plan. The Duplan reorganization plan is an attempt to quantify the entity's intrinsic or economic value. If that value is greater than the current liquidation value, then both from the public policy and entity ownership viewpoints, the firm should attempt to reorganize and continue. As Altman clearly states, "If, however, the firm's assets are worth more dead than alive—that is, if liquidation value exceeds economic value—liquidation is the preferable alternative."

Altman also attempts to quantify the effect of aggregate macroeconomic influences on business failure. I feel that he fails in some ways to delineate clearly the difference between underlying causes of failure and the outside influences that contribute in a secondary way to business failure. Altman's reliance on mathematical as opposed to managerial or behavioral explanations in these and other areas begs credibility. In attempting to relate the business failure rate to percentage changes in real gross national product, the money supply, and general stock market behavior, Altman is pushing his mathematical approach too far. In truth, a good economy hides a multitude of sins caused mainly by poor management; a bad economy peels away the protection afforded poor management and exposes all of the sins that are the underlying cause of business failure. Aggregate mathematical approaches can only attempt to show the net effect of outside external influences and do not explain the root causes leading to business failure. A business is a managerial failure long before it is an economic failure and becomes a legal failure.

To augment his original Z-score approach, Altman presents a review and critique of the main studies of bankruptcy prediction since the mid-1960s. While this is a valuable compendium, it does little for business practitioners, planners, or strategists.

Altman's chapter on a commercial bank lender's perspective has some valuable information. The treatment of loan loss recovery issues is well done. Altman does an equally good job analyzing cost rates of the two types of errors associated with bankruptcy prediction.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

Type I error costs (making a loan to a potential bankrupt) and Type II error costs (not making a loan to a prospective successful repayment customer) are calculated and presented in a practical fashion. The lending community can gain from this chapter.

I find the most fault with Altman's presentation of managing a financial turnaround using the Z-score. Altman indicates that the Z-score is a basis for prescriptive action in actual turnaround situations. My own experience in this area over a number of years leads me to conclude that the Z-score is a minor benchmark and a reasonably descriptive screening device. Except for a measure of poor asset utilization, it is not a very prescriptive tool. It's a catchy, "tool in the handbag" approach that makes intriguing magazine articles but hardly is the stuff of which a successful turnaround is made.

The Z-score barely scratches the surface of problem identification. I have used it in a number of turnaround cases, but merely as a quick screening device as a lead-in to a more in-depth presentation. The key to its usefulness is simply its statement about the excessive use of assets relative to the size of a business. If U.S. managers are enamored of quickie formulas, then this may be something to hang their hat on. I'll guarantee that no turnaround chief executive officer worth his salt will rely on the Z-score as the basic prescriptive tool to accomplish a turnaround. There are many operational, tactical, and strategic moves that overshadow the Z-score's importance.

Altman makes a valuable contribution in his treatment of the auditing implications of failure prediction models. He shows how these models have outperformed the going-concern opinions of the major accounting firms by factors of better than 2-to-1. Altman makes a telling point when he indicates that, "Although an auditor may feel that the firm is a likely bankruptcy candidate, a qualified opinion may not be given due to the perceived consequences of qualifying." The consequences can be adverse to the corporation due to the self-fulfilling prophecy argument, and to the accounting firm due to the potential loss of a client. It is most probable, however, that the firms that will go bankrupt are quite likely to do so regardless of an auditor's opinion. Altman's study shows that 75 percent of the firms receiving a going-concern qualification do not go bankrupt, while nearly as many that did not receive qualification do go bankrupt. I couldn't agree more with Altman's opinion that auditors should explore and use modern analytical methods to assess the probability of a firm continuing as a going concern.

In his next chapter, Altman shows how the Z-score and similar approaches have been used with modest success in evaluating the failing firm criterion used in antritrust cases. The model has been used in a few recent cases including the Ling/Temco/Vought merger with Lykes Corporation and the potential acquisition of Schaefer Beer by Schmidt's Beer.

Altman provides a few interesting insights for investors in his chapter on investor implications of bankruptcy models. Particularly intriguing is the insight that the longer a firm remains in bankruptcy reorganization, the better the shareholders' chances of remuneration of some type. Clearly less useful are his discussions of methods for picking successful depressed companies as investments.

Altman's correlation of his ZETA formula with bond ratings is informative. A remarkably high (over 85 percent) correlation between ZETA scores and the major rating agencies was found. Altman also points out some glaring misjudgments as in the case of United Merchants and Manufacturers which filed for bankruptcy in July 1977. What is so startling about this case is that the two primary rating agencies, Standard & Poor's and Moody's were categorizing the outstanding debentures of UMM as BBB as late as April 1977; the ZETA score was indicating a distressed and deteriorating situation as early as twenty-five months prior to bankruptcy.

Altman's next chapter is devoted to discussing specialized models for the railroad, savings and loan, and broker-dealer industries. Since a large representative sample of bankrupt firms is necessary to construct a model, and since most specific industries have not experienced a sufficient number of failures, model building in these areas is difficult and met with only moderate success. Although well funded, many of these studies funded by the Federal Reserve Board, the FDIC, and the Comptroller of the Currency have led to rather sparse results.

The final part of the book is devoted to an international survey of business failure models. This is a most interesting chapter because it points out similarities and dissimilarities on an international basis. Altman is undoubtedly a leader in the international community in this regard, and has assisted with failure model studies in a dozen or so countries. While the chapter is mostly a compendium of research results, it does provide interesting international comparisons.

This book has limited value to business planners and strategists. It should be viewed more as a reference guide than as a guide on strategy or planning to be read from cover to cover. Academicians, business economists, and mathemeticians will find Altman's excellent treatment of this interesting application of mathematical techniques stimulating. Bankruptcy specialists can gain valuable insights from Altman's cohesive approach.

In summary, I respect the in-depth research work that forms the basis for this book. The book is more a

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

reference guide for bankruptcy specialists than a handbook for business strategists. By its very nature, mathematical and business modeling requires the in-depth research that precludes the broad lessons provided by general management experience. The book is uneven. It is an excellent guide to predicting bankruptcy. However, it makes only a modest contribution to dealing with bankruptcy. In my opinion, it provides little help to those who want to know the fundamental strategies and tactics used to avoid bankruptcy.

This is a good book, but its title is misleading.

*DONALD BIBEAULT**

* Donald Bibeault, Ph.D. is President of Best Pipe & Steel, Inc. He is also author of *Corporate Turnaround: How Managers Turn Losers Into Winners* (McGraw-Hill, 1982).

Edward I. Altman* Responds:

I am flattered by most of the thoughtful comments of both Cornelius Casey and Don Bibeault, two analysts who themselves have made contributions to the field of corporate distress. It is clear, however, that Casey appreciates more clearly than Bibeault that the book was written for an audience of diverse backgrounds and interests and is not a treatise only on corporate turnaround. This is perhaps explainable since Bibeault himself has written an interesting managerial book called *Corporate Turnaround: How Managers Turn Losers Into Winners* (McGraw-Hill, 1982). Casey's work in the area of distress has concentrated on the usefulness of financial information for practitioners, particularly in banking, and more recently on the relative value of cash flow data in assessing corporate risk. Casey has used much of the material in the book in his academic teaching which is typified by the practitioner base of his students at Harvard and Dartmouth. So he, too, can comment with some degree of authority on how practitioners view the book.

The primary area of disagreement between the two reviews is the practical usefulness of the book in general and for turnaround analysis in particular. While both seem to agree that the predictive aspects of models are quite useful for a wide range of decisionmakers, Bibeault is less enthusiastic in his criticism of the planning and strategy implications. Anyone reading this material, particularly Chapter 6, on managing a return to financial health, should not interpret the presentation as a panacea for all corporate problems and a method that can be used successfully by inferior or even average decisionmakers in crisis situations. On the contrary, it takes an extremely insightful manager to utilize a passive model and make it active in such a way as to simulate his future decisions in order to assess various business strategies. The Z-score type of model is simply a tool, but one which an increasing number of executives are finding useful. I have seen or heard of Z-score summaries written in corporate annual reports and demonstrated at stockholder meetings. The attractiveness of the approach is that it is easily understood without the necessity of a sophisticated quantitative background. And, it is essentially objective. Bibeault seems to criticize the obvious nature and the simplicity of advice that is objectively derived, i.e., that excessive assets should be sold quickly and the funds used to repay debt. Yet, it is extremely difficult for *existing* managers to accomplish these actions—to sell the assets that they bought in the past or lay off workers and executives that they hired. Perhaps, and only perhaps, we find existing management able to do this and the job is made easier when a model confirms what should be obvious. In most cases, in my opinion and in the opinion of executives whom I respect, new management must be inserted in a true crisis situation and the new chief executive must be given sufficient control to carry out his mandates.

It would seem a bit presumptuous of Bibeault to render the opinion that mathematical explanations from failure-predictive models lack credibility since capable managers and advisers are using these models on a regular basis with considerable success. Yet, such models should enter the process after the cash-bleeding has been stanched and they can continue to monitor performance. At the same time, rational business acumen must be emphasized. I did not mean to imply otherwise and certainly Bibeault and Casey are correct to chide me, and my publisher, for using the word "Complete" in the title. Discerning readers, I hope, have not been offended.

Bibeault's concern that the book is not a handbook for business strategists is understandable since this is his own field. But, we should not ignore, as he implies, any new or confirming evidence to general management experience just because the derivation is based on an in-depth investigation and rigorous techniques. It is important to try to link quantitative and qualitative approaches rather than view them as precluding elements. Indeed, this is what makes the approach used by CEOs like Jim LaFleur so exciting. Speaking for the academic field, it is critical to search for this interaction if we will be at all successful in providing an integrated approach to students of business. And I include business strategists as well as statistical specialists as students.

Casey's review is, not surprisingly, more technical in nature. It is not totally clear that the stock market has

* Edward I. Altman is Professor of Finance and Chairman, MBA Program at New York University.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

inefficiently anticipated distress in the case of bankruptcies although we observe an average 25 to 35 percent drop in equity price from just before to just after the petition date. It could be merely evidence that when the probability of bankruptcy goes to unity, the implied costs of this decision become certain and explicit. Bankruptcy prediction models must be supplemented by reorganization performance models in order to enhance both the investment and managerial success in the post-petition condition. As yet, we have not observed such a model which has demonstrated reliability. This is one of the areas that Casey possibly finds of sufficient interest to justify future research—and I agree.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.