

Credit Scoring and the Small Business: A Review and the Need for Research

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Abstract

This paper summarizes the loan evaluation technique referred to as credit scoring. The recent use of credit scoring by large banks to recruit small business loans is described. The system of credit scoring is explained along with a detailed look at different credit-scoring models. Actual examples of banks using credit scoring for small business loan evaluation is reported. Also, several suggestions for further research is presented.

Introduction

The sheer size of the small-business lending market suggests significant opportunity for lenders. Consider these statistic. Of more than nine million firms in the Dun & Bradstreet database, at least 80 percent have fewer than 20 employees. In a survey by KPMG Peat Marwick of 395 financial institutions, small-business lending was identified as the fastest growing loan segment, with 22 percent of the respondents saying they expected their loan volume to increase by greater than 15 percent, and 84 percent anticipating growth in excess of five percent (Milligan, 1996).

The banking industry has served segments of this market for many years. Small businesses are known for their dependence on commercial banks in providing external financing. For example:

- The Small Business Administration's report on small business lending states that 60 percent of small business financing comes from commercial banks (Office of the Advocacy, 1994).

- The Federal Reserve Bank of Dallas estimates that 44 percent of all commercial bank loans consist of loans to small businesses (Klemme, 1993).
- In a 1994 survey by the Consumer Bankers Association, 75 percent of the bankers indicated they were planning to increase small business lending (Pearson, 1994).

While the relationship between the banker and the entrepreneur is of unquestionable significance to both parties, and undoubtedly will continue to be so in the future, small firms are increasingly being affected by a fundamental change in the way lenders are providing credit to the nation's smaller businesses. Computer technology and mass production methods originally designed to handle consumer loans have now come to be used in the small-business arena in the last few years. As a result, lending is increasingly being mass marketed to small firms (Zuckerman, 1996).

Historically, loans were made to small commercial customers in more or less in the same fashion as to large corporations, where the borrower and the lender negotiated loan terms unique to the firm. Borrowers provided detailed information about business plans and the firm's financial statements. A lender carefully reviewed the data using analytics that were time-consuming and expensive relative to the loan size. In addition, conventional wisdom held that credit decisions could not be made from a distance office. Only a banker with an adequate understanding of the local community and the business could accurately assess a borrower's creditworthiness (Zuckerman, 1996). More recently, however, a number of banks are using a version of computerized loan-evaluation system, referred to as *credit scoring*, to assess would-be borrowers.

Limited in the past for judging consumer credit, credit-scoring developers have in recent times significantly improved the ability to predict potential loan delinquency for small businesses (Friedland, 1996). As a consequence, almost all the major banks are beginning to recruit small business loans much more aggressively. For instance, small firms like B&W Auto Salvage, a Dallas wrecked-car yard, are being solicited in the mail by the large banks, indicating they have been "preapproved" for an unsecured loan. For B&W, the bank was Wells Fargo that was willing to grant the firm an unsecured line of credit up to \$50,000 (Zuckerman, 1996).

Credit scoring offers a modern alternative for the traditional method of evaluating loans for small businesses. Using traditional methods, bankers would accept applications from small business owners who applied in person. Loans would be approved on the basis of the banker's qualitative judgment, with financial condition weighted most heavily. Knowing the banker was an important part of this process.

In contrast to the often time-consuming procedures involved in traditional methods, a borrower can apply by phone. Based on the business owner's personal credit history, loan approval is based primarily on computer analysis. A loan can be approved in hours, rather than days, at lower cost to the bank (Hansell, 1995).

In addition to decisions regarding approval or disapproval of loan applications, credit scoring can be used for the following purposes (Barefoot, 1996; Friedland, 1996; Asch, 1995):

1. Pricing loans based on degree of risk
2. Differential handling of late payments and delinquencies
3. Differential handling of collections based on outcome predictions
4. Estimating the amount of profit an account is likely to generate
5. Identifying applicants who may be candidates for other services
6. Targeting prospective customers

Small banks can also use credit scoring, but they have a fundamental limitation. They do not have enough loan volume to manage credit on a statistical or portfolio basis. Large-scale lenders can use it as a decision-making system. Community banks, however, use credit scoring only to help the lender sort applicants or as one of several factors taken into account in making decisions.

The increasing use of credit scoring in evaluating small-company loans represents a significant trend in the small firm-banking arena. Given its potential significance, we would contend that the issue should be placed on the research agenda within the academic community. To our knowledge, no extensive research has been undertaken on this topic. Thus, the present study provides a literature review of credit scoring, which includes the following subjects:

- The basic concept of credit scoring
- A description of the credit-scoring model and its development
- Examples of banks using credit scoring
- An assessment of the advantages and disadvantages of credit scoring

The paper concludes with potential implications and questions that call for future research if we are to understand more clearly the impact of credit scoring on the lending process for small businesses.

The Concept of Credit Scoring

The seminal event relating to credit scoring for small companies occurred when the Robert Morris Associates (an association of commercial loan officers and credit risk managers from over 3,000 member financial institutions) joined with Fair, Isaac & Co. (a computer software modeler) to create the Small Business Scoring Service (SBSS). The member banks wanted an evaluation system--much like the ones used to process consumer loan applications--to help underwrite small business loans.

Realizing that a small business' future is closely tied to the owner's creditworthiness, bankers wanted a way to consider the implication of this connection in the loan decision. They had come to recognize they could not evaluate a small business the same way they did middle market companies and larger corporations. They needed a system that would allow them to score a business somewhat as they already did individual borrowers (Lawson, 1995).

The Robert Morris Associates/Fair Isaac, Inc. partnership was reported in *The New York Times* in these words (Hansell, 1995):

[Some] banks will start using a new "score card" for assigning points, based on a study of 5,000 small-business loans by 17 banks. The study, believed to be the most comprehensive of its kind, was conducted by Fair, Isaac & Company, a statistical-modeling firm and the Robert Morris Association. They showed that of 400 different pieces of data that banks have long collected, fewer than a dozen--mostly having to do with the owner, not the business--separate good loans from bad. They

also showed that key indicators of a business's health--including its age, its net worth and even its profitability--hardly mattered. This means that borrowers who have been scrupulous about paying off debts are more likely to get a new loan than those with a troubled credit history, even if they own companies with impressive balance sheets.

Credit-scoring systems are statistical models that predict the likelihood that a firm will be seriously delinquent, such as 90 days or more, in making loan payments. The score does not predict a company's *ability* to pay, but rather its *willingness* to pay in a timely fashion.

The probabilities of delinquency, as estimated by the model, are based on the analysis of previous applicants with similar characteristics. The model assigns points to those characteristics thought to be highly correlated with high credit risk. Scores typically range from one (highest risk) to 100 (lowest risk). The resulting score can then be equated with a mathematical probability of the loan not being repaid.

If the borrower earns a passing score, the computer system recommends approval of the loan. A rejection is recommended if an applicant scores below passing. The whole process takes about 30 minutes. For those in the "gray area," the loan officer would most likely visit the borrower's company and use more traditional credit-screening techniques (Szabo, 1995).

Credit-scoring models use such information as financial condition, prior payment history, public filings, industry comparative data and company demographics (years in business, number of employees, industry, sales volume) to determine the risk of default. The development of a credit-scoring model requires that lenders have access to a large amount of historical information on the performance of loans with similar characteristics--data that is seldom available for a smaller bank (Rowland, 1995). However, with credit-scoring, lenders no longer need to perform the in-depth financial review of each borrower as they previously did. Instead, the model identifies a few key pieces of information that assess the statistical probability that a borrower will repay (Zuckerman, 1996). Bankers have long known that not all information is of equal importance, but could only rely on intuition and judgment as to how to weight the relative importance of certain information. As a result, more information was generally thought to be better than less information. Credit scoring, on the other hand, provides the answer of relative importance by pinpointing the data that best predicts the statistical probability of loan delinquency or default.

The above description of credit scoring could leave the impression that credit-scoring models are essentially "blackboxes" that provide an answer to the user to accept on blind faith. Such is not the case. Rarely do analysts use credit-scoring models without applying some judgment in the matter. More realistically, scoring provides a way to identify and approve loans to very low-risk business applicants and decline loans to very high-risk business applicants--leaving loan officers with more time to evaluate businesses with more moderate levels of risk. However, anecdotal evidence suggests that disregarding the model results can result in bad decisions. For example, in 1995 the Hibernia bank in Louisiana made 90 percent of its loan decisions based on credit scoring. (The remaining ten percent were made in spite of an unacceptable score. In most cases, these acceptances were made based on a long-term

relationship between the borrower and the banker.) The result: In 1990, three percent of the bank's loans were delinquent. After adopting credit scoring, only 5/10s of one percent are delinquent. Of the four loans that were written off, three were not made based on credit scoring, but on the relationship between the banker and the borrower (Hansell, 1995). Thus, based on limited evidence, a banker should have a good reason to disregard credit-scoring results.

Development of the Small Business Scoring System

To understand more clearly what is involved in developing a credit-scoring model, the following section describes the process used by Robert Morris Associates and Fair-Isaac, Inc. in building their credit-scoring model for evaluating small-business loans--what they called the Small Business Scoring System (SBSS).

Most credit-scoring models used to assess small-business loans have been developed from data provided by the member banks of Robert Morris Associates and working with Fair-Isaac, Inc. These models have typically been designed for evaluating companies with sales under \$5 million that are applying for loans up to \$250,000 (Friedland, 1996). *However, there are rumors of banks now using the models for loans as large as \$750,000.*

There are four types of business credit-scoring systems from which to choose, or to combine, depending on the needs of the business. These include (Rowland, 1995):

1. A generic model that predicts the likelihood of a company paying in a severely delinquent manner based upon a sample of businesses from across all industry segments, utilizing a wide range of commercial information.
2. An industry-specific model that predicts the probability of delinquent payment based upon a sample of firms within a given industry.
3. A model that predicts the likelihood of a small business' payment performance based on the owner's payment behavior.
4. A scoring model developed from a sample of businesses that most resemble the bank's actual borrowers.

In credit scoring, multivariate normal linear discriminant analysis has been the statistical method of preference for most analysts. However, due to the nature of credit-scoring data, the assumptions required to use discriminant analysis may not be appropriate. Thus, RMA-Fair Isaac in developing the Small Business Scoring System (SBSS) chose to use a regression model transformed to the logistic scale (logit regression) that minimized this problem (Leonard, 1993).

The process for developing the SBSS model by RMA and the Fair-Isaac, Inc. has been described by Asch (1995). A summary of that description is provided as follows:

- The member banks of Robert Morris Associates provided information on the characteristics of loan applicants thought to be important to the loan-decision process. The sample included data for a small number of loans from good, bad, and declined accounts.

- To distinguish between good and bad loans, bankers defined a bad loan as one that was 60 days or more delinquent. A good loan was one that had not been 30 days delinquent more than twice during the first four years of the loan experience.
- After the beginning effort was completed, a more comprehensive study was undertaken, with each bank providing data for approximately 300 accounts (100 good, 100 bad, and 100 declined). The participants also provided consumer credit bureau reports for up to two of the company's owners and a commercial credit report for the company itself.
- Four categories of data were used in designing the model:
 1. Consumer credit bureau report data
 2. Business credit bureau report data
 3. Company financial ratios restated relative to RMA industry norms
 4. Credit application data
- Weighted scores of the owners' characteristics were determined statistically and combined with weighted scores based on the firm's characteristics. Scores of variables that demonstrated high collinearity with other variables or contributed little in differentiating bad loans from good loans were eliminated.
- Segmentation analysis was undertaken to divide the applicant population into dissimilar subpopulations to maximize overall predictive power. The following subpopulations were examined:
 1. Sales
 2. Type of business--corporation or noncorporation
 3. Geographic region
 4. Loan type, either line of credit or term loan
 5. Industry groupings
 6. Total current request for credit
- After examining the subpopulations of the sample, two scorecards based on the *total request for credit produced* were the most predictive set of scorecards; the best separation was firms requesting loans less than \$35,000 and those exceeding \$35,000.

To ensure that the scorecard included information representative of the total applicant population, the researchers used "reject inference" methodology--an approach that estimates in this case what the performance of declined loan applicants would have been had they been approved.

- The initial weights (scores) were placed on a relative basis so that an analyst could determine the relative risk of a given applicant. For instance, each scorecard was scaled so that 20 additional points doubled the odds of an account being good. The scorecards were also scaled so that both scorecards--a loan request of below \$35,000 and above \$35,000--offer the same probability of success at a given score.
- The participants decided that the scorecard for smaller credits (less than \$35,000) should be broken out into two possibilities: credit applications with financial statement data and credit applications without financial statement data. The bankers thought that the option of having two small-loan scorecards would allow an institution to decide whether to request a financial statement or not.

Examples of Large Bank Use of Credit Scoring

When credit-scoring systems became available, large banks gained the capability of evaluating and making small business loans. A number of major financial institutions such as Wells Fargo, BankAmerica, and American Express began to develop small business lending operations, using directing marketing techniques to attract customers (Zuckerman, 1996).

In 1993, Wells Fargo became the first bank to use credit scoring in small business lending. With the use of credit scoring, the bank loaned \$108 million to small firms in 1995, a 61 percent increase from 1994. The bank's officials say they can profitably make small-business loans of less than \$5,000 and even adjust credit lines and interest rates based on the computer's assessment of the risk. According to Wells Fargo, credit scoring has enabled the bank to make loans in virtually all 50 states, even though the bank had no branches outside California until its purchase of FirstInterstate in 1996 (Mitchell, 1996).

The Hibernia Corporation, a Louisiana bank with \$6.3 billion total assets, also decided to increase its small business lending by use of credit scoring. The effort paid off well. In 1993, when Hibernia implemented the credit-scoring system, loan officers were typically processing 100 applications per month. At that time, small business loans totaled \$100 million. By 1995, the bank was processing nearly 1,100 applications per month with a business loan portfolio exceeding \$600 million--all this with only seven loan officers. (Lawson, 1995)

The Wells Fargo and Hibernia stories are representative of the experiences of many large banks. Chase Manhattan, NatWest Bank, and BancOne are other representative recent converts. Latimer Asch, a business unit manager for Fair Isaac, the primary developer of credit-scoring models, estimates that most of the nation's top 25 small business lenders have adopted credit scoring (Lawson, 1995).

Advantages and Disadvantages of Credit Scoring

Competitive strategy in the marketplace often calls for emulation of competitors when they adopt successful approaches to marketing their products and services. Clearly, large banks regard the system of credit scoring to be a competitive advantage, giving them an edge over community banks. "Our strategy is to take market share from the community banks," declares Michael McHugh, a regional manager for Norwest Corporation (Zuckerman, 1996). The assimilation of credit scoring, however, may be difficult for community banks. Currently, credit-scoring methods appear to be less practical for smaller banks due to high capital costs and the low loan volume of individual community banks. On the other hand, the opportunity to benefit from credit scoring may be so attractive community banks may find ways to incorporate the technique into their lending practices. Generally speaking, credit scoring offers several potential benefits (Barefoot, 1996):

- *Lower costs.* Evaluation systems such as credit scoring reduce the role of human evaluation, with the potential for reducing the cost of delivering credit.

- *Improved accuracy.* As scoring systems evolve and improve they will be more effective at predicting actual loan performance.
- *Better products and marketing.* Credit-scoring models allow lenders to tailor the marketing effort to meet the needs of market niches.

Also, credit scoring has its potential down side. This has been summarized by one writer as (Barefoot, 1996):

- *Less access and attention.* Credit scoring may actually restrict credit to those with limited credit histories whose strengths are hard to demonstrate on paper. Lenders may give less attention to these applicants who are marginal on paper but whose character and commitment warrant the benefit of the doubt.
- *Disparate impact.* Credit scoring may lead to unfair lending having a disproportionately adverse effect on some groups, such as minorities.
- *Privacy.* Scoring systems with their customer databases could lead to infringement on privacy.

Despite these general concerns, research shows that some customers and banks do like the credit-scoring system. For customers the process provides a) a much simpler application process, b) answers in a shorter time frame, c) reduced information requirements, and d) access to credit when they need it. For banks credit scoring has a) reduced costs of loan evaluation, b) provided a standard product across the entire organization, c) given them the ability to execute transactions more efficiently because of repetition, and d) improved collection activity because all problem loans are documented consistently (Pomcki, 1996).

William C. Dunkelberg, chief economist for the National Federation of Independent Business notes, “Because the system can speed up the loan-approval process and cut the cost of making smaller loans, small-business owners, especially those with start-ups, will have an easier time of getting credit. Now, small-business owners don’t have to grovel at the loan officer’s desk.” (Singletary, 1995)

David Jeffers, Fannie Mae’s vice president for corporation relations, believes that “credit scores can be used in a good way, and they can be used in a bad way. Credit scores should help identify applications that need more attention. However, we never want to see lenders in the position where they are skimming off the easiest loans.” Despite the wide acceptance of credit scoring, some banks are not interested. One such critic, Richard Bowman, chief financial officer of First Virginia Banks, Inc. explains, “We prefer not to be locked into a rigid system.....We want to make character loans.” Privacy advocates point out that since entrepreneurs are being evaluated by their credit report, mistakes could be even more harmful. Lenders are not required to tell applicants what their credit score was. If an applicant is denied credit, lenders need only indicate why. “I fundamentally disagree with credit scoring ... It’s almost like a secret system,” said Evan Hendricks, editor and publisher of Privacy Times (Singletary, 1995).

The potential significance of credit scoring to small firm financing was recently noted by Janet Yellen in testimony before the House Committee on Small Business in these words:

It inevitably will take time to develop databases of small business loans, given the diverse characteristics of the millions of small borrowers. (But once the necessary databases have been) developed, credit scoring and loan standardization may offer significant cast advantages for evaluating the risks associated with lending. Many large banks already have begun to probe the possibilities of credit-scoring techniques for small-business markets.

As credit scoring and loan standardization become more commonplace, we may well see growth in the amount of small business loan securitization. To date that growth has been hampered by the huge diversity among small business borrowers and the difficulty in accurately assessing the riskiness of pools of nonstandard small business loans. In contrast, the bulk of loans that are backed by the Small Business Administration have been more easily securitized because they are known to be low risk by virtue of their guarantee. The ability to securitize non-SBA loans would increase the liquidity of small business lending and provide banks and other lenders with additional sources of funding. We anticipate that the cost savings generated through these new processes will be passed on, at least in part, to small business customers.

Clearly not all small business loans are going to be appropriate candidates for securitization, and not all banks will wish to adopt complex statistical models for managing risks. There will continue to be a market for nonstandard small business lending and a role for regional and community banks. Of course, we should also expect that small businesses that do not easily fit the standard models will not share in the cost savings that credit scoring will provide. (Yellen, 1996)

In addition to cost efficiency, credit scoring is thought to improve the effectiveness of the loan decision-making process. In the Fair, Isaac-Robert Morris Association study, approximately 20 percent of borrowers who had been approved using traditional methods would not have passed the new credit-scoring test, while another 20 percent of those who had not been granted credit would have received credit if credit scoring had been used. As a result, for the same amount of money lent, bad loans would have declined by more than one-third. Also as cited earlier, the Hibernia bank in Louisiana is an example of a bank reducing its loan delinquency rate by 86 percent by using credit scoring.

One possible reason credit scoring is thought to be so effective is its not relying so much on the firm's financial statements, which tend to be unsophisticated and understate income for tax reasons. Also, many entrepreneurs mingle their personal and business finances, keeping debt in the business, but cash in their personal account.

Now, banks are realizing that it is illogical to be willing to make large personal loans to self-employed people, yet give the same clients a hard time when they apply for business loans. In other words, the owner and the business are the same (Hansell, 1995).

Perhaps the most significant implication of the credit-ranking process is that it permits banks to price loans according to the risk of the obligor. This is such a seemingly appealing procedure that I find it curious that the vast majority of banks, including even very large institutions that otherwise grade their credits, have chosen not to vary the price of business credit according to risk. Most institutions, having decided that a loan is bankable, will vary the spread according to the size of the credit facility or perhaps its contractual life, but it is rare for a bank to vary the rate charged according to the credit quality of the obligor, especially for middle market and small business loans (Greenspan, 1994). As observed by Pearson (1994), “Successful prescreening of prospects and existing customers can eliminate the countless hours loan officers may spend evaluating referrals for which there is virtually no chance of any revenue flowing to the bank through a prudent and successful extension of credit.”

Automated credit scoring is not without its critics. For instance, John Taylor, president of the National Community Reinvestment Coalition, a Washington-based housing group, expresses his apprehension as, “It’s still new, and we need to see what impact it will have on traditionally undeserved populations.” Also, credit scoring for small business loans has not been really tested yet by a deep recession that tends to separate the lenders from the ex-lenders. “Like all models, it’s as good as the history that went into it,” Strischek says. A scoring program designed by RMA and Fair, Isaac & Co. did try to capture the last recession in its modeling, he adds (Mitchell, 1996).

Suggestions for Future Research

Credit scoring of small business loan applications is new to the field of banking. At this point no one knows for sure how it will impact community banks and their lending activities. Therefore, we would like to offer several propositions based on our review of the current literature. Hopefully, these propositions will stimulate discussion of credit scoring and result in additional research into the process.

Proposition A: Credit scoring reduces the need for personal contact between the loan officer and entrepreneur, and therefore, will be detrimental to the relationship marketing efforts of a community bank.

The “relationship” between a customer and a bank is very important to the entrepreneur helping to reduce risk and also provide a social benefit to the entrepreneur. Community banks provide the best environment for this kind of personal contact. Credit scoring may seriously disrupt this personal relationship and in turn negatively impact entrepreneurs’ image of community banks.

Proposition B: The use of credit scoring by large banks will result in a significant, long-term erosion of the small business loan market share held by community banks.

The apparent effectiveness of credit scoring coupled with its increasing use by large banks would suggest that there will be a change in market share unless community banks adopt quickly.

Proposition C: Credit scoring by large banks will force community banks to cooperate with each other by sharing loan statistical information in order to develop credit-scoring models.

The statistical information which creates the foundation of a credit scoring model requires a large amount of historical loan data. Small banks may be forced to pool their individual databases in order to develop reliable credit scoring systems.

Proposition D: Credit scoring will enable the large banks to skim off the “best” small business borrowers leaving the more marginal customers to community banks.

The credit-scoring system of the large banks may enable them to quickly grant credit to those small business customers with the lowest risk leaving the more complicated and involved credit evaluations to community banks.

Proposition E: Credit scoring will become less effective in a period of economic downturn.

There are some who believe that this type of loan evaluation will disappear in a period of tighter credit. It has grown in a period of strong economic growth where more loan risk is acceptable.

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