

Predictive Value Of Credit Bureau Reports

GARY G. CHANDLER, LEE E. PARKER

Nearly all creditors use credit bureau reports in addition to credit applications in the evaluation of the credit risk of new applicants. Often they do not know the real predictive value of information contained in the credit bureau reports; seldom do they know how the predictive value of the report varies as the level of the detailed examination of the report varies. Such knowledge would be invaluable in designing more accurate credit-risk evaluation processes and in determining the value of the bureau reports.

This article measures the predictive power of the credit bureau information both with and without application information. More importantly, changes in the predictive power are measured as the treatment of the credit bureau information becomes more detailed. Results are presented for a bank card, a retail revolving card, and a nonrevolving card. Practical aspects and limitations of the use of detailed credit bureau information are discussed.

Methodology and Sample

In order to produce quantifiable measurements of the predictive power of the credit bureau information and of how that power varies

Gary G. Chandler and Lee E. Parker are executive vice president and director, product support respectively at Management Decision Systems Inc., Atlanta. Statistical analysis was performed by Fran Lyons and Andy Markus at Management Decision Systems.

as the level of detailed credit bureau treatment varies, a statistical analysis of actual credit applicants' applications and credit bureau reports in conjunction with their payment histories was performed. The actual results are statistically determined formulas that predict credit risk. The development and use of such formulas is typically called "credit scoring."¹

Credit scoring is the use of a numerical formula for predicting the credit risk of an applicant by assigning points to specific applicant characteristics (credit application and credit bureau information). The formula is determined by a statistical analysis of past applicants who turned out to be creditworthy and noncreditworthy.² The total of the points indicates the credit risk of the applicant.

Credit scoring formulas were developed for five different levels of information:

1. Application only.
2. Application plus simple credit bureau.
3. Application plus standard credit bureau.
4. Application plus detailed credit bureau.
5. Detailed credit bureau only.

The application information available and credit bureau information by level of detail are shown below.

Application Information

Applicant's age.
Time at current/previous residence.
Time at current/previous job.

CHART 1
Bank Card Case Study Results

<u>Model</u>	<u>Application Data</u>	<u>Credit Bureau Data</u>
Application Information Only	4	0
Application and Simple Credit Bureau Information	2	2
Application and Standard Credit Bureau Information	2	8
Application and Detailed Credit Bureau Information	2	12
Detailed Credit Bureau Information Only	NA	12

Housing status.
Occupation group.
Income.
Number of dependents.
Phone at residence.
Banking relationship.
Debt ratio.
Coapplicant information.
Credit references.

**Credit Bureau Information
By Level of Detail**

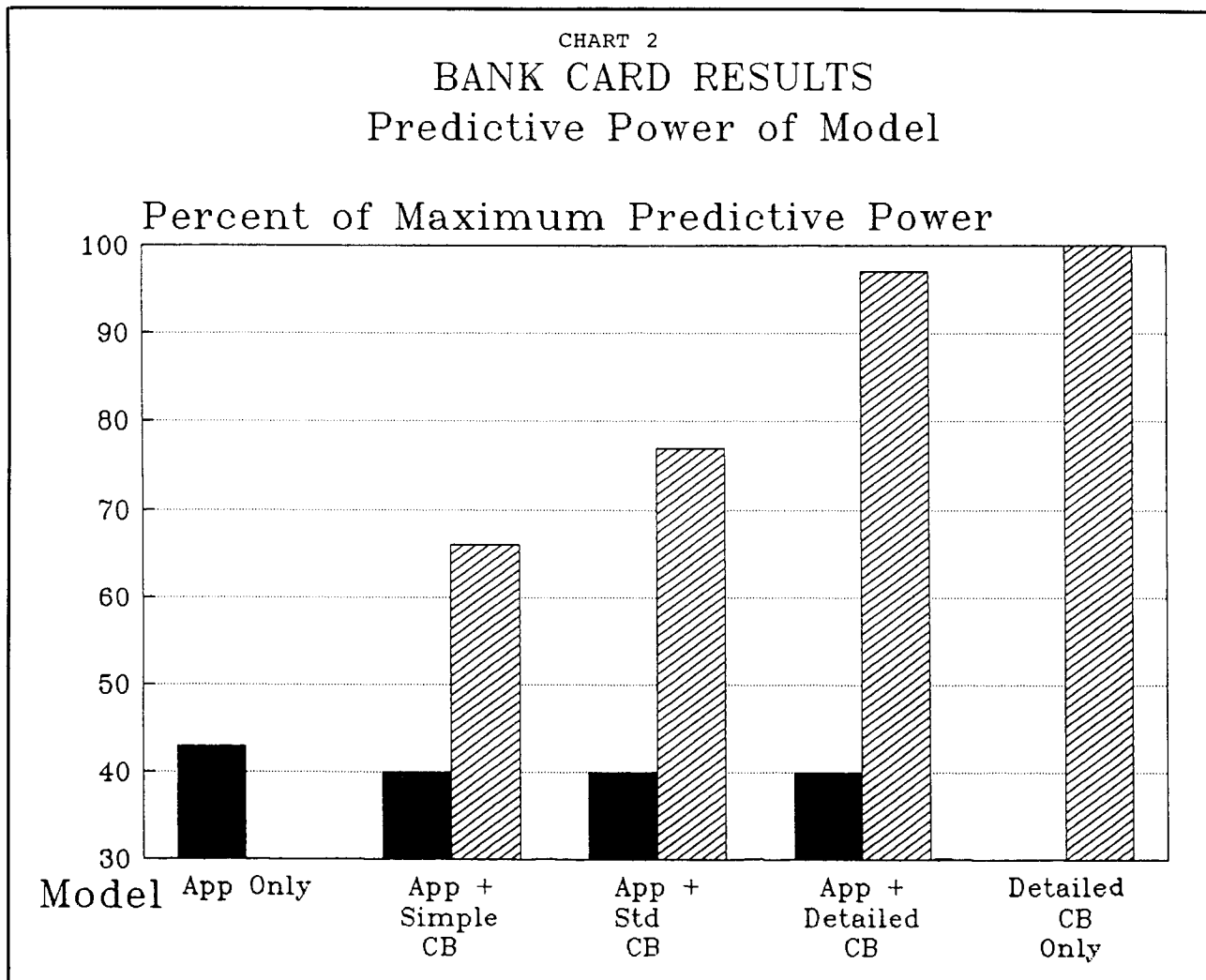
Simple:
Number of inquiries in last six months.
Worst credit reference.

Standard:
No record indicator.
Inquiries only indicator.
Number of inquiries in last six months.

Number of finance inquiries in last two years.
Number of new trade lines in last six months.
Number of satisfactory ratings.
Number of 30-day ratings.
Number of 60-day ratings.
Number of 90-day or more ratings.
Number of trade line and public record derogatory items.
Number of currently past-due balances.
Age of oldest trade.

Detailed:
Same as Standard - PLUS:
Number of bank revolving trades.
Number of bank nonrevolving trades.
Number of national credit card trades.
Number of consumer finance trades.
Number of captive finance trades.
Ratio of open-bank revolving balances to high credit.

The actual samples consisted of over 1,500 applicants for the bank card, over 5,000 applicants for the retail revolving card, and over 10,000 for



the nonrevolving card. These samples were divided approximately equally between creditworthy and noncreditworthy accounts, in addition to declined applicants.

Application and credit bureau information were manually coded from credit applications and credit bureau reports for the bank card and the retail revolving card. Information for the nonrevolving card was available from the creditor's computer files, including the full-file credit bureau reports which allowed an even more detailed treatment of the bureau.

The predictive power of each credit scoring formula was measured by the Kolmogorov-Smirnov (K-S) statistic.³ The K-S statistic measures the ability of a formula to separate creditworthy and noncreditworthy accounts. Rather than pre-

sending the actual K-S values, the formulas are compared on a percentage basis with the highest K-S denoted as 100%. All other formulas receive percentages based on their comparison to the highest K-S.

Bank Card Results

Five credit-scoring formulas were developed varying as to the different levels of detail described above. The number of variables in each formula is presented in Chart 1.

The predictive power of each formula was calculated and the results of the percentage ranking of the K-S statistic are displayed in Chart 2. The predictive power increases rather dramatically

CHART 3

Retail Revolving Card Case Study Results

<u>Model</u>	Number of Variables in Model	
	<u>Application Data</u>	<u>Credit Bureau Data</u>
Application Information Only	9	0
Detailed Credit Bureau Information Only	NA	9
Application and Simple Credit Bureau Information	7	2
Application and Standard Credit Bureau Information	7	7
Application and Detailed Credit Bureau Information	7	9

as the level of detail of the credit bureau treatment increases.

The application data without credit bureau data yields the lowest predictive power and does not fare well when compared with any level of credit bureau treatment. Only two of the application variables are included in the formulas that incorporate the simple, standard, or detailed credit bureau in the analysis.

Although the predictive power of the application data was extremely low for this bank card, it should not detract from the comparison of bureau power. Only two of the application variables were predictive when combined with the simple credit bureau treatment.

In order to determine the impact of these two application variables, they were automatically entered into the formulas for standard and detailed credit bureau analysis. The detailed credit bureau formula developed without the application information was the most predictive. The automatic inclusion of the application variables actually lowered the predictive power of the detailed credit bureau treatment.

For this bank card population it appears that the credit application does not add to the predictive power of the detailed bureau treatment. It is also apparent that the value of increasing the detailed treatment of the bureau report is considerable, with the predictive power of the detailed credit bureau treatment being 52% greater than the simple credit bureau treatment.

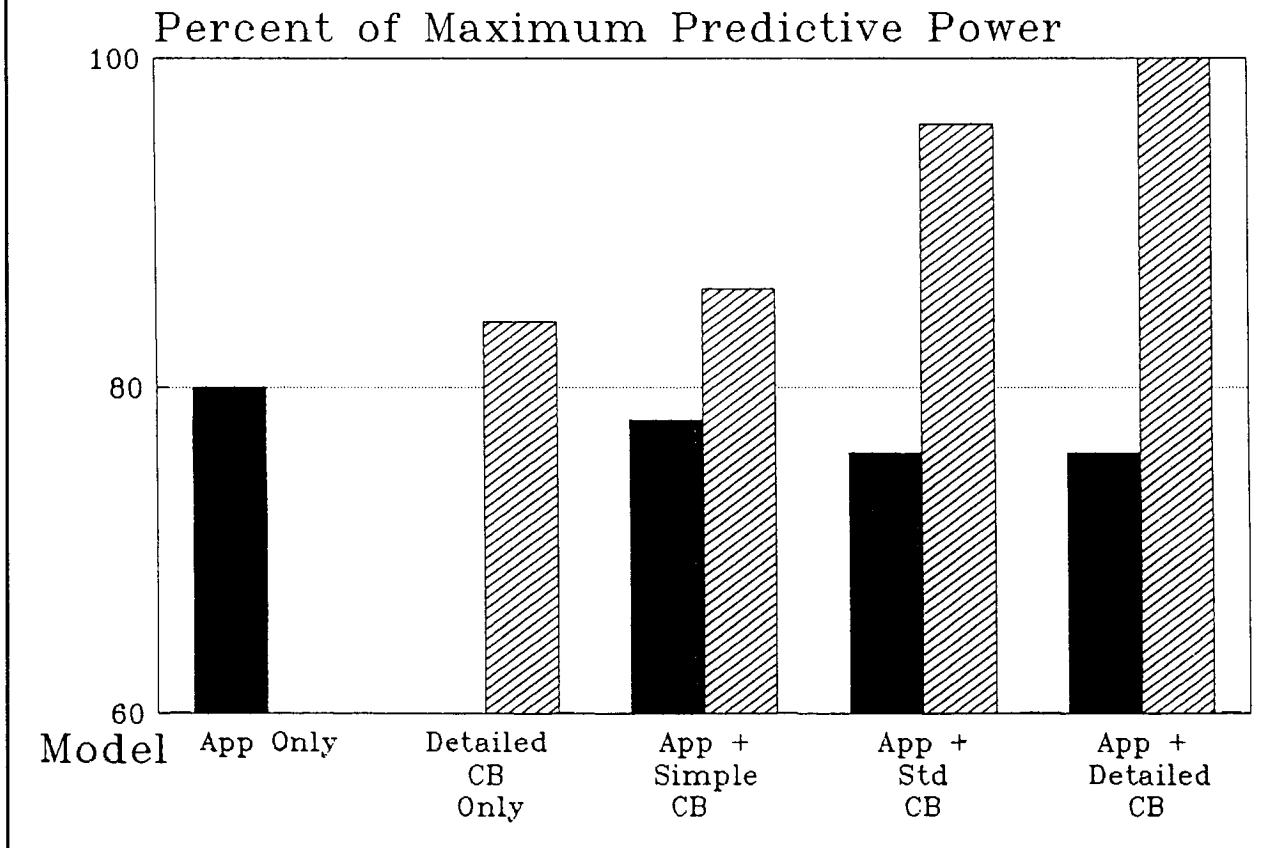
Retail Revolving Card Results

Five credit-scoring formulas were developed as described above. The number of variables in each formula is shown in Chart 3.

The relative predictive power of each formula is presented in Chart 4. Again it can be seen that the value of the credit bureau information and the total predictability increases as the treatment of the bureau data becomes more detailed.

It should be noted that even though the predictive power of the retail-revolving-card-application-only formula is quite good (80% of maximum), the predictive power of the detailed-

CHART 4
RETAIL REVOLVING CARD RESULTS
 Predictive Power of Model



credit-bureau-only formula is actually greater. For the retail revolving card population, the application-plus-detailed-credit-bureau formula is the most powerful, being 16% better than the application-plus-simple-credit-bureau formula and 32% better than the application only formula.

Nonrevolving Card Results

A nonrevolving card product was analyzed using the same procedures as used in the bank card and the retail revolving card. The only exception was that a superdetailed level of credit bureau was also included in the analysis. The superdetailed bureau information was developed by applying credit bureau aggregation and summarization programs to the creditor's archived computer records containing the full-file credit

bureau reports.⁴ The superdetailed level is described below.

Superdetailed Credit Bureau

The following characteristics were analyzed by each trade type (i.e. bank cards, oil, retail, etc.)

Characteristics listed in standard credit bureau PLUS.

Number of inquiries in last 3, 6, 12, 18, and 24 months.

Number of trades opened in last 6, 12, 24 and 60 months.

Number of active trades.

Ratio of balance to high credit.

Age of youngest trade.

CHART 5

Non-Revolving Card Case Study Results

<u>Model</u>	Number of Variables in Model	
	<u>Application Data</u>	<u>Credit Bureau Data</u>
Application Information Only	6	0
Application and Simple Credit Bureau Information	5	2
Application and Detailed Credit Bureau Information	0	15
Application and Standard Credit Bureau Information	5	9
Application and Super-Detailed Credit Bureau Information	5	15

The number of characteristics in each formula is shown in Chart 5 and the relative predictive power in Chart 6. The predictive power of the superdetailed credit bureau formula developed without the application information is almost as large as the predictive power of the formula that incorporated application information. As before, the predictive power greatly increases as the level of detailed treatment of the credit bureau increases.

Practical Considerations

As important as the increased predictive power generated by using more detailed credit bureau information is in evaluating the credit risk of an applicant, several other factors must be considered in selecting the appropriate level of credit bureau detail. There are additional benefits and some limitations involved in the use of detailed credit bureau information.

The use of detailed bureau information allows the creditor to minimize the amount of informa-

tion required on the credit application. Thus, an automated new account-processing system could make very rapid evaluation with very little manual data input. There are also several marketing advantages to having very short credit applications that require little applicant information.

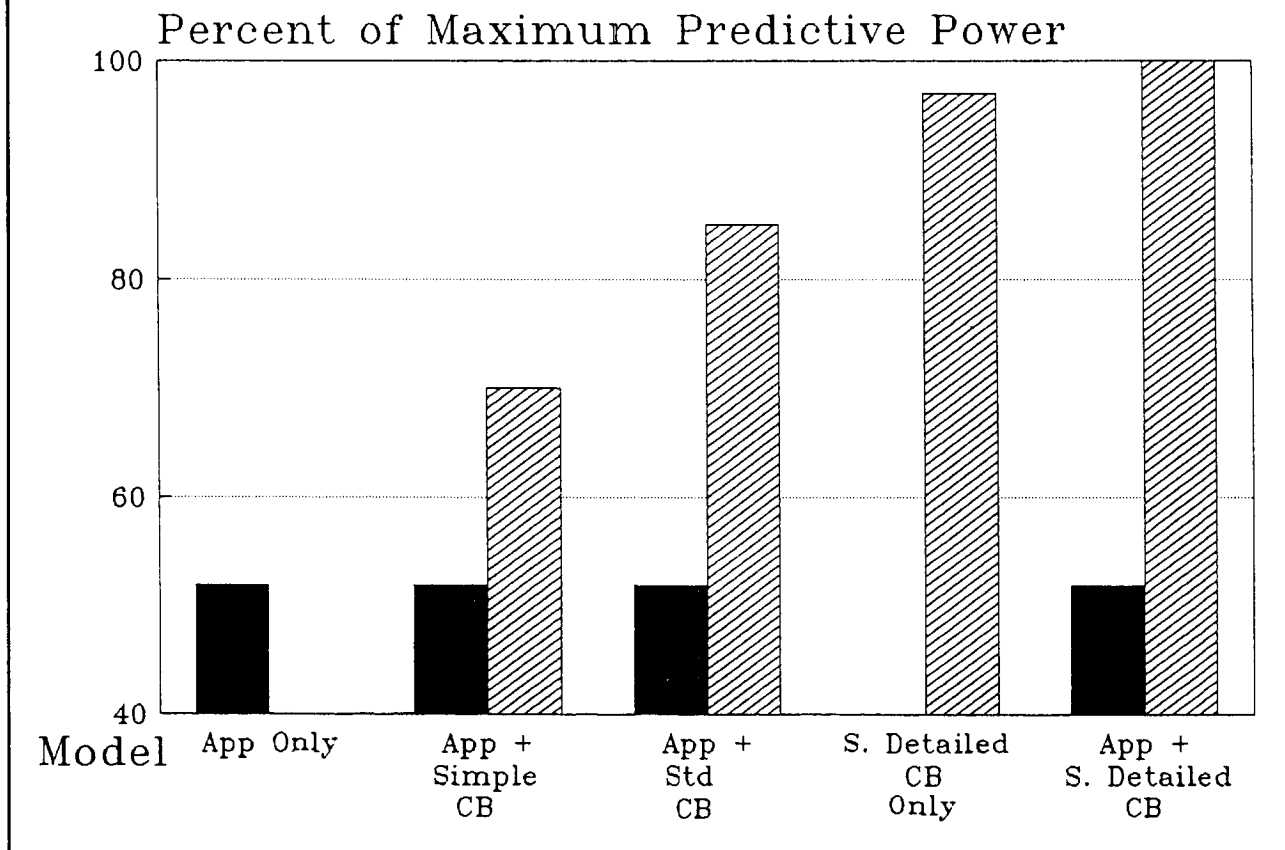
By basing most of the credit evaluation on the credit bureau report, the creditor is also less subject to problems with fraudulent applicants and with applicants whose application information has been "coached" in an indirect lending environment.

Yet, detailed credit bureau formulas cannot be used in all cases. Many credit applicants do not have credit bureau files that contain sufficient information to allow the more detailed treatment and scoring. This is particularly true of young people. In those cases, approaches that are more application-dependent must be considered.

In order to take advantage of the more detailed credit bureau treatment and scoring, the creditor must have the past information to de-

CHART 6

NON-REVOLVING CARD RESULTS Predictive Power of Model



velop such scoring formulas, as well as the ability to implement those formulas. It is difficult and somewhat expensive to manually code the data necessary for the detailed bureau analysis and prohibitive to manually code the superdetailed treatment. Superdetailed credit bureau treatment requires computerized historical credit bureau reports (typically archived on computer tape).

In addition to the development of the scoring formula, the creditor must also consider implementation of the scoring system. The only practical way to score the detailed credit bureau treatment and the only possible way to score the superdetailed treatment is with a computer. The computer software must be able to interface

with the credit bureau, interpret the report, and generate all of the scored characteristics. Computer software capable of these functions does exist, but it is expensive and requires an in-depth implementation approach.

Conclusions and Implications

The research presented clearly demonstrates the predictive value of credit bureau information. It also demonstrates that the predictive ability of the credit bureau information increases as the level of detail of the analysis of the bureau information increases. If the credit bureau is utilized by scoring only two items (sim-

ple credit bureau information) the real predictive power of the bureau data can be overlooked.

Creditors can increase their ability to predict risk by increasing the level of detail used in their treatment of the credit bureau. A creditor must also consider the other benefits and limitations of more detailed bureau treatment.

In any case, the creditor must be able to implement a system that can incorporate that level of detail. Smaller creditors may utilize the standard level and perhaps the detailed, but the superdetailed level will only be used by the larger creditors with sophisticated computer hardware and software.

Notes

1. See D. Durand, Risk Elements in Consumer Installment Lending, Studies in Consumer Installment Financing, No. 8, National Bureau of Economic Research Inc., New York, N.Y. 1941. J.H. Myers and E.W. Forgy, "The Development of Numerical Credit Evaluation System," *Journal of the Ameri-*

can Statistical Association (September 1963). pp. 799-806. David C. Hsia, "Credit Scoring and the Equal Credit Opportunity Act," *Hastings Law Journal*, Vol. 30, No. 2 (November 1978).

2. See "A Comparative Analysis of Empirical vs. Judgmental Credit Evaluation," *Journal of Retail Banking*, Gary G. Chandler and John Y. Coffman, Vol. I., No. 2, (September 1979), pp. 15-26.

3. The Kolmogorov-Smirnov statistic increases as the percentage of noncreditworthy accounts approved for a given approval rate decreases. The Kolmogorov-Smirnov test compares the maximum difference between the cumulative score distributions of creditworthy accounts and noncreditworthy accounts with a "critical" difference required for statistical significance. If the largest observed difference exceeds the calculated "critical" difference, then the model differentiates creditworthy accounts from noncreditworthy accounts at the level of confidence selected. For further information, please see Jean Dickinson Gibbons, *Nonparametric Methods for Quantitative Analysis*, American Sciences, Press Inc., (Second Edition 1985), pp. 250-258.

4. The superdetailed credit bureau aggregation programs were used by Management Decision Systems to develop the bankruptcy prediction models for the major credit bureaus (CBI - Delinquency Alert System; TRW - the Gold Report; and TU - Delphi).