Scorex PLUS – a new breed of strategic risk models

Generic bureau risk scores

Credit bureau scores

Generic bureau risk scores are an integral component of risk management operations for financial services companies of all sizes. Bureau scores are also used to facilitate regulatory compliance and to assess portfolio quality in the secondary financial markets. Billions of scores are provided annually enabling creditors to acquire new accounts, manage existing portfolios, and raise capital.

Many creditors use data from at least two of the three major credit reporting agencies for their risk management decisions. To minimize operational costs, creditors generally prefer to use a "tri-bureau solution" where the scores are used interchangeably across each of the three bureaus so strategies based on the scores are data agnostic. In most cases, a single strategy is defined and executed regardless of the source of the credit data.

Currently, there is a lack of generic tri-bureau score choices. Clients are limited to using one traditional tri-bureau risk score offering at each bureau or develop a custom model. Each of the three credit reporting agencies has developed a series of proprietary generic scores; these scores compare favorably in terms of performance, but have been of limited commercial success given their single bureau applications.

Tri-bureau scores

The facts behind a tri-bureau generic risk score are often incorrectly presented or misunderstood. A bureau score is actually a suite of models. Traditionally, these scores have segmented the population based on credit attributes, such as recent delinquency, revolving credit utilization, time in file and the number of trades.

The generic bureau scores at each of the three credit bureaus are developed independently of one another. The development of the scores is custom to each bureau; this means the suite of models behind the scores are entirely different. In the end, the only commonality the scores from each bureau may share is the final scale. Hence, the score an individual receives from each of the three bureaus will likely be different, even if the data reported is the same.

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As previously stated, the scores from each individual model are aligned at the back-end, implying a similar score should result in the same bad rate. However, this alignment is only true when considering the entire population of accounts reported to each of the credit bureaus. The score itself equates to significantly different bad rates depending on the type of decision being made (new account acquisition or account management) and the product.

A score's relation to a bad rate is different contingent upon whether the score is used to assess the risk of an applicant or the risk associated with an existing account. Given an account acquisition or account management decision, the bad rate associated with a specific score is dependent upon the product type. For example, the bad rate associated with a specific score is much higher for a personal loan product than the same score used for a mortgage product. Hence, there is no universal interpretation of a score's relationship with a bad rate.

Traditional development methodology

Historically, the performance definition used for generic bureau score development is defined at the individual level. All accounts for a given individual open during the outcome period are evaluated in terms of their worst arrears status; the worst performing account defines the performance of the individual. An individual with 20 accounts which remain current during the outcome period and one account which reaches an arrears status of 90 days past due or worse is classified as a bad account.

This worst ever definition is significantly different than the performance definition used for custom model development, which typically considers only the performance of the creditor's own accounts. Additionally, custom model development is specific to the relevant decision being made, whether to acquire or how to manage a specific account. In most environments a custom score outperforms generic bureau risk scores.

An additional issue with bureau scores is the criteria established to determine how much information is required so an account can be scored. In some instances, an individual may have significant information reported to the bureau, but still not meet the criteria to calculate a score. In most cases custom models have fewer exclusion criteria than traditional bureau scores.

Scorex PLUS (Predict. Leverage. Understand. Strategize)

Experian-Scorex has developed a new tri-bureau bureau risk score to compete with the incumbent tri-bureau risk scores as well as with custom models. The new score's development methodology diverges from a traditional bureau score and more closely represents the approach used for custom model development.

Many of the shortcomings of traditional bureau risk scores have been addressed resulting in scores with exceptional performance and numerous benefits. Scorex PLUS provides

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creditors with the ease of use they are seeking without the pitfalls associated with traditional, generic tri-bureau risk scores.

<u>New versus existing accounts</u>

Individual accounts can be extracted from the credit bureau data, their performance evaluated individually and then classified as new or existing based on the open date of the account relative to the decision point (the point at which a score is pulled).

A new account is defined as an account which was opened within three months after the decision point; this is consistent with a creditor's own credit applicants where the credit being offered does not yet appear on the credit bureau report at the time of the acquisition decision. An existing account has already been reported to the bureau when the credit report is being evaluated; this is consistent with evaluation of an account holder for account management purposes.

For any given snapshot of the credit file, the ratio of existing accounts to new accounts is 90/10. Hence, new accounts only represent a small fraction of the traditional 'one score fits all' bureau score development population. The result is a score which is sub-optimal for the new account decision, which is the most significant determinant of portfolio performance.

Credit problems are caused by complex circumstances and the time period in which each individual consumer recovers is different. Often, past credit problems overlap periods where individuals are beginning to demonstrate improved credit performance. However, the "one-score-fits-all" approach does not delineate between past and new problems and may penalize individuals who are back on track exhibiting responsible repayment behavior.

To provide optimal performance and best identify individuals on the road to recovery, the first level of segmentation for Scorex PLUS is based on new accounts versus existing accounts. The result is a score which provides optimal performance for the relevant decision. The second level of segmentation relies on the use of a preliminary score to group individuals with similar risk profiles through which segment models can further separate good and bad accounts.

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Preliminary score

Segmentation is a technique to improve score performance through the identification of sub-populations where attributes predict differently from one another. Significant research has shown attributes predict differently based the overall risk level of the population. For example, a model developed on a prime population performs poorly on a sub-prime population and vice versa because the predictors of performance are substantially different.

For traditional risk models, a tree-based approach using individual characteristics is employed to segment the population. In most cases, the splits based on individual characteristics are determined using techniques such as characteristic and regression tree analysis; this technique ultimately relies on bad rates to define the segmentation structure. Hence, the traditional tree-based methodology using individual attributes is actually an inefficient method to create groups with different risk profiles.

Experian-Scorex leveraged the use of a "preliminary" risk score, developed solely for the purpose of segmentation, to more efficiently group individuals into different risk pools. Significant testing showed four segments per decision type provided the solution with optimal performance. The attributes predictive of risk were significantly different for low risk segments as compared to high risk segments. Attributes for low risk segments were driven primarily by credit utilization attributes, while high risk segments contained attributes considering recent payment behavior.

The combination of decision type and preliminary score result in a solution with superior performance. The account acquisition segment benefits most significantly from the segmentation scheme consistent with the observation of poor representation of new accounts using traditional bureau development methodology.

Performance

Tables 1 through 4 below show performance improvements relative to a traditional bureau score when applied to a number of bankcard issuers. Two performance metrics are employed: the Kolmogorov-Smirnov test (KS) and a trade-off analysis which identifies the percentage of bad accounts observed in the lowest scoring 10% of the population. For each metric a higher value indicates stronger performance. In most of the cases below, significant improvement in performance is observed for Scorex PLUS over a traditional bureau score, most notably for acquisition decisions.

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Table 1. KS Test New Bankcard Accounts

Creditor	KS Test		
	Scorex PLUS	Traditional Score	% Improvement
1	37	34	9
2	38	33	15
3	39	34	16
4	46	43	8
5	52	47	9
6	54	50	8

Table 2. Trade Off Analysis New Bankcard Accounts

Creditor	Percent of Bad Accounts in Lowest Scoring 10%		
	Scorex PLUS	Traditional Score	% Improvement
1	25	18	39
2	31	26	19
3	25	19	32
4	39	34	15
5	45	39	15
6	42	35	20

Table 3. KS Test Existing Bankcard Accounts

Creditor	KS Test		
	Scorex PLUS	Traditional Score	% Improvement
1	58	55	5
2	60	58	4
3	63	60	5
4	64	60	5
5	66	64	3
6	67	65	3
7	71	71	1

Table 4. Trade Off Analysis Existing Bankcard Accounts

Creditor	Percent of Bad Accounts in Lowest Scoring 10%		
	Scorex PLUS	Traditional Score	% Improvement
1	31	29	7
2	59	56	5
3	55	51	8
4	58	54	7
5	53	49	8
6	54	51	6
7	57	56	2

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Tri-bureau performance

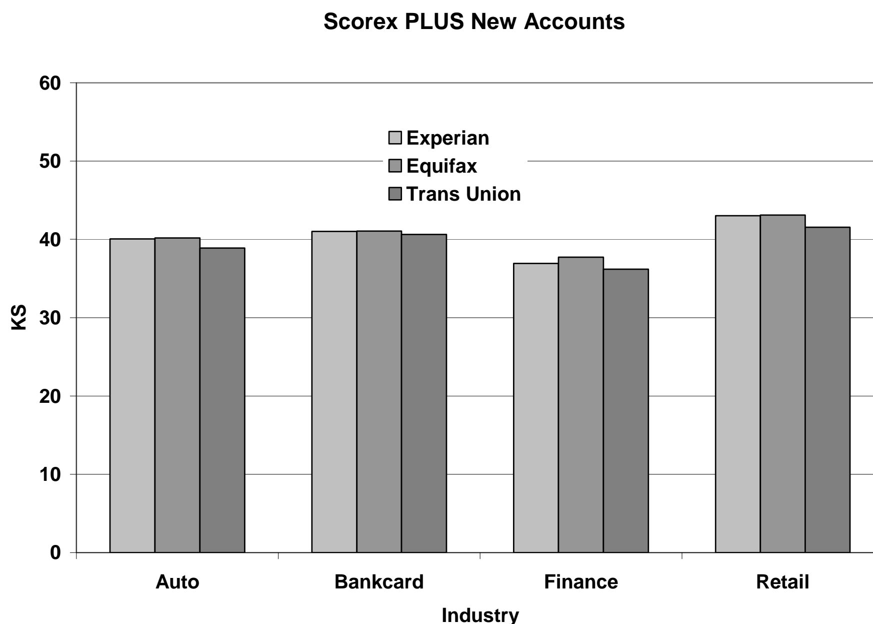
A myth has been perpetuated in the industry that bureau risk scores must be developed for each bureau independently, to maximize the power of the score relative to the data source. The fundamental issue is the consistency of the credit attribute definitions across the three bureaus which feed into the models.

There are standardized formats by which creditors supply data to each of the three bureaus. However, each of the three bureaus has unique formats in which the data is stored and delivered. The goal of tri-bureau credit attributes is to eliminate the impact of the different formats and calculate values which are equivalent, regardless of how the data is formatted by each bureau. If the credit attributes are not equivalently defined or "level" across the three bureaus, separate models do need to be developed.

Experian-Scorex has invested years of research and development in understanding not only Experian data, but the data from Equifax and Trans Union as well. The result of this effort is a set of tri-bureau attribute definitions which are accurately leveled across the three bureaus. The quality of the Experian-Scorex attributes allows a score to be developed with data from Experian and be applied to the other bureaus, with no loss in predictive power thereby negating the myth.

Graphs 1 and 2 demonstrate the performance Scorex PLUS when data from each of three bureaus is used to predict the performance of new and existing accounts across auto, bankcard, finance and retail industries. Results show consistent performance of new and existing account segments which is not biased towards Experian data.

Graph 1. Tri-Bureau Performance of Scorex PLUS on New Accounts



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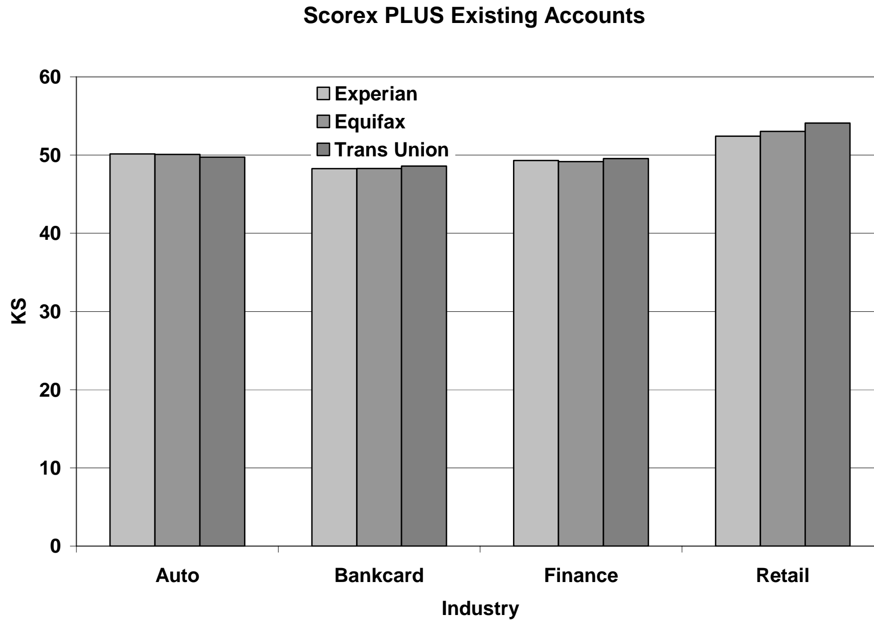
Graph 2. Tri-Bureau Performance of Scorex PLUS on Existing Accounts



Score consistency

Developing a bureau score independently for each of the three bureaus can actually cause problems for creditors. One issue is that the score pulled on an individual from each of the three bureaus at the same point in time may be wildly different. The source of the score variation can be attributed to differences in the data and differences in the scoring algorithm. Differences in the data cannot be controlled, but even if the same data is used to calculate a traditional bureau score for an individual at each the three bureaus, getting the same score would be highly improbable because the segmentation, attributes in the models and the point assignments are different for each bureau.

Since Scorex PLUS employs the same segmentation, attributes, and point assignments regardless of the input bureau, one of the major sources of score variation has been eliminated, so the same credit data would produce the same score. The impact for creditors is more consistent decision making regardless of data source.

Score alignment

Another issue plaguing independent developments is the alignment of the score across the three bureaus. While the mechanics of aligning the bad rates to a specific score are straightforward, the results are often imprecise. Traditional scores are aligned across the three bureaus considering the entire population. Within a score at one bureau, different bad rates are associated with the same score depending on the industry. For example the

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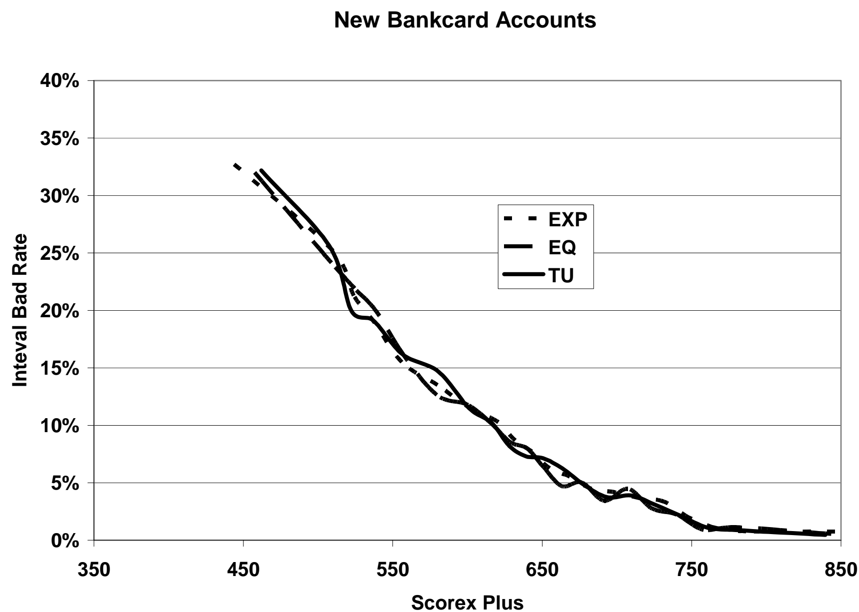
probability of being bad at a score of 660 may be 4% for a mortgage, but might be 10% for a personal finance trade.

Unless the data sets used for bureau score development at each of the three bureaus are composed of the same proportion of the various types of trades, significant variations in score alignment can be observed at the industry or creditor level. Since Scorex PLUS was developed with data from one bureau and applied to the other bureaus, no composition or alignment issues exist.

Graphs 3 and 4 show the bad rate alignment of new and existing bankcard accounts, respectively. The interval bad rate is plotted against the score and demonstrates that the same score correlates with the same bad rate, regardless of the source data.

Graph 2. Tri-Bureau Alignment of Scorex PLUS on New Bankcard Accounts



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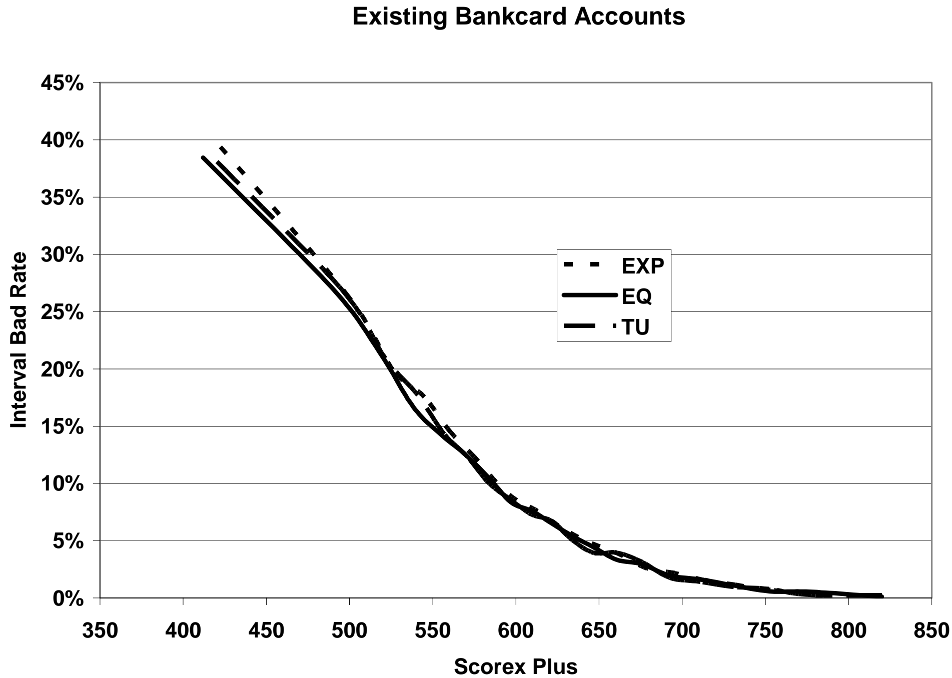
Graph 3. Tri-Bureau Alignment of Scorex PLUS on Existing Bankcard Accounts



More scored accounts

Traditional bureau scores may return a code, also known as an exclusion score, which indicates the individual does not meet the requirements to have a score calculated. Depending on a creditor's target market, the number of exclusion scores may comprise a significant portion of the population. An exclusion score provides no assessment of the applicant or account risk and requires creditors to set up a special process for evaluation.

Experian-Scorex conducted significant research and determined that many individuals who received exclusion scores from traditional models can be scored and their risk accurately assessed. Scorex PLUS only requires that an individual have one account reported to the bureau to compute a score.

Approximately 3 percent more accounts are scored on the new account segment of Scorex PLUS than a traditional bureau score across the model development population. The development sample contains a larger cross section of credit quality than most creditors experience; creditors targeting higher risk applicants are likely to see a greater increase in scored accounts than observed in the development sample. Returning more scored accounts provides creditors an opportunity to approve more applicants without assuming more risk. For existing accounts, no significant increase was observed in the number of scored records.

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Regulatory and secondary market recognition

Experian-Scorex has been actively meeting with the Federal Reserve Bank and the Office of the Comptroller of Currency to educate the agencies on the development methodology behind the score, as well as the features and benefits creditors will observe.

Lead regulators from each of the agencies have unequivocally stated they do not require the use of a score developed by any one company and that references to specific scores in any published bulletins are examples only. The regulators also recognize a single score cannot be used to define credit quality across creditors since the interpretation of the score is dependent upon the type of decision being made and the industry application.

Similarly, education on Scorex PLUS is being provided to many of the rating agencies.

Summary

Experian-Scorex has listened to the needs of financial professionals and responded with an offering that empowers organizations to achieve their financial objectives through accurate risk assessment and strategic business intelligence. Scorex PLUS provides creditors a long awaited alternative to traditional bureau scores, delivering the power of a custom model with the cost effectiveness of a generic model.

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