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Managing Risk in the Credit Crunch

What Tools and Techniques Should Risk Managers Use When Times—and Customers—Turn Bad?

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Credit risk is headline news, especially in the United States. For the last several months deterioration in credit quality has been in the news almost daily. While mortgage and other secured loans have been the principal driver of this concern, concern for poor performance has also spread to other secured loans and lending products, such as credit cards.

Tough times call for closer scrutiny of your customers. Today's credit and portfolio managers must wield the tools at their disposal like scalpels to manage risk more effectively.

There's no shortage of reporting on the dire state of credit portfolios, but there has been considerably less analysis aimed at helping risk managers do their job and deal with their portfolio's credit health. In this paper, FICO's risk management experts review general changes in risk performance, and ask the questions:

- Are risk tools working?
- What actions are risk managers taking now?
- What more can risk managers do to improve control on existing exposure?

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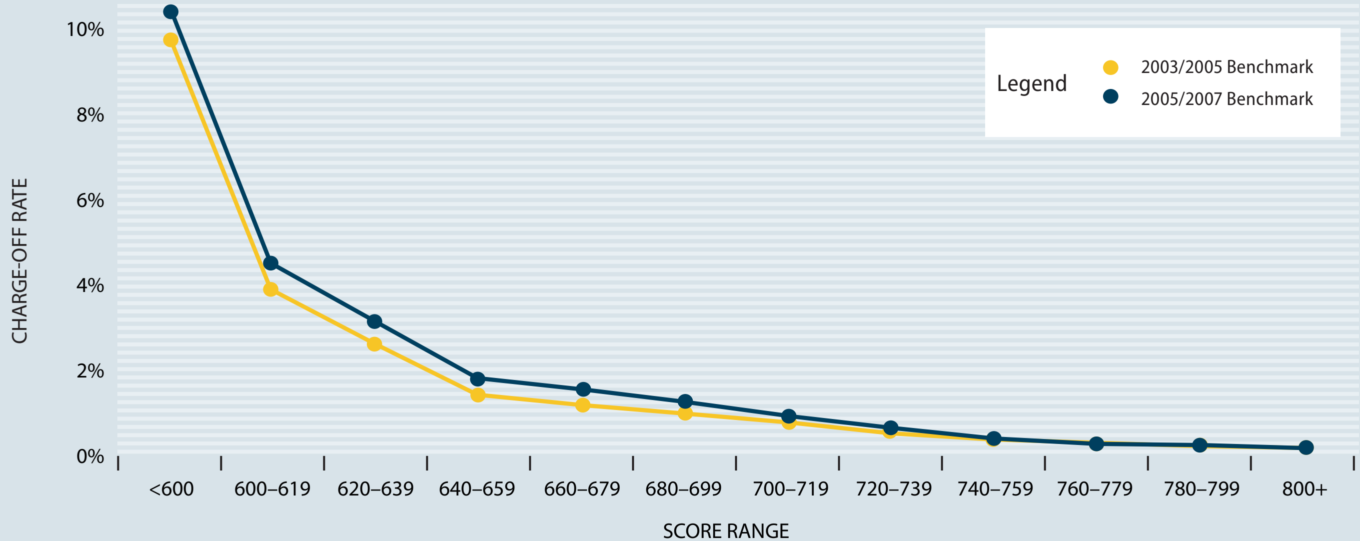
» Measuring the Increase in Risk

Population Performance—Overall

To begin, let's look at the performance of the general US population, as measured by the standard measure of US consumer credit risk, the FICO® Score. We compared two mutually exclusive random samples of credit bureau profiles with FICO Scores, one from 2003–2005, and one from 2005–2007, to assess the score's performance and the change in population risk. The performance of those two populations by score range is shown in Figure 1. (Note: A two-year observation is used in order to observe the same performance as used in the performance definition of the FICO Score development.)

Figure 1: Charge-Off Rate by FICO® Score
All Trades Existing Accounts



Key observations:

- **The FICO® Scores continue to effectively rank-order risk in both periods.** The increase in consumer level risk decreases as the score improves.
- **The population as a whole reflects overall higher risk in the more recent time period.** Across the entire distribution, there is a 5% increase in the probability of charge-off over the two years. On average, the increase in bad rate in each score segment is 12 basis points.
- **Risk is rising for the lower-scoring population, but diminishing for the highest-scoring population.** For those scores below 760, the deterioration in risk from the 2005 performance window to the 2007 performance window is 8%, or 20 basis points overall. The performance of the nearly 40% of the population above 760 has improved slightly over the observation period, masking a 16.8% increase in risk for the range from 600 to 759. As this range represents the majority of the credit-seeking (new account) population, the impact of this increase in risk is of significant concern.

Population Performance—Credit Card

As well as examining performance on all credit lines, we undertook an analysis of credit card account-level risk. This is important for four reasons:

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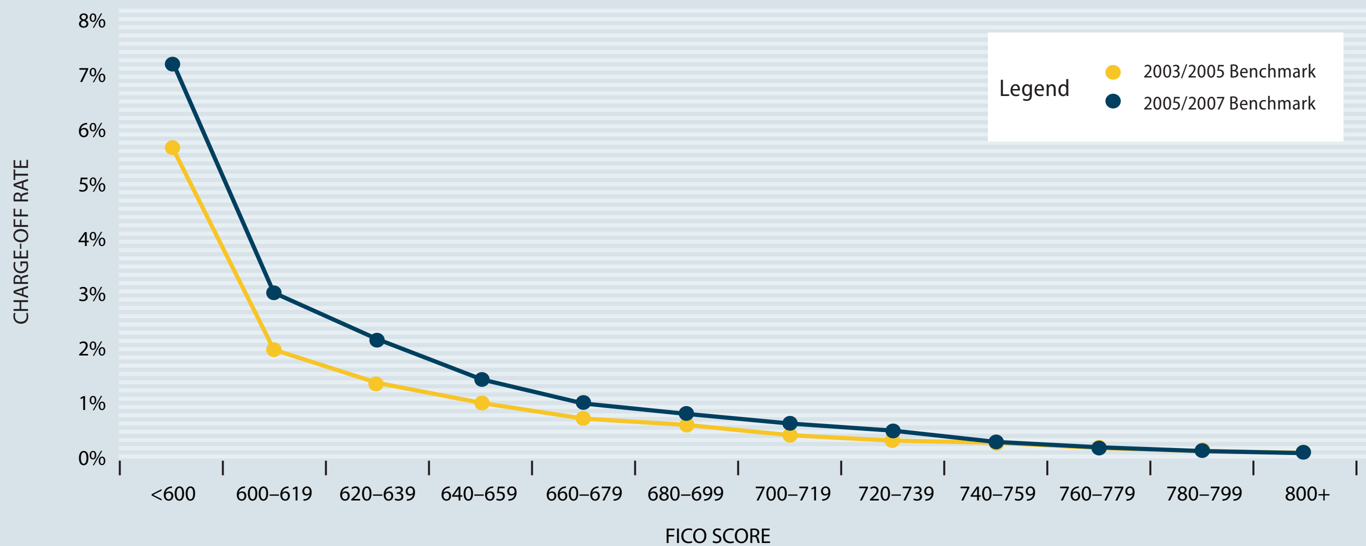
- The snapshots referenced previously have more consistent financial information on the credit card population, relative to other types of credit.
- The financial treatment of credit card delinquencies and losses is more consistent, in that regulations require revolving accounts payable assets to be discharged as losses after 185 days of non-payment.
- Debit and credit card products give banks the greatest opportunity for customer treatment and intervention, due to the transactional nature of their usage.
- As consumer credit tightens in the United States, consumers are relying more on their credit cards. Therefore, credit card dynamics are a leading indicator of risk performance and practice.

Risk measured by FICO® Scores

Figure 2 shows the charge-off rate of credit card accounts available on the two performance observation sets, 2003 to 2005 and 2005 to 2007, as measured by the FICO® Score.

Figure 2: Charge-Off Rate by FICO® Score
Credit Card Accounts



Key observations:

- Again, the FICO® Score effectively rank-orders risk during both time periods.
- Risk increased nearly 30% for the credit card accounts, and as much as 50% for scores between 600 and 759.
- This increase of 30 basis points is a 35% change in the rate of charge-off for credit cards in the later period. The increase in risk between scores of 600 and 759 is even more significant, with a rise in charge-off rate from 0.28% to 0.42%, or an increase of 49%.

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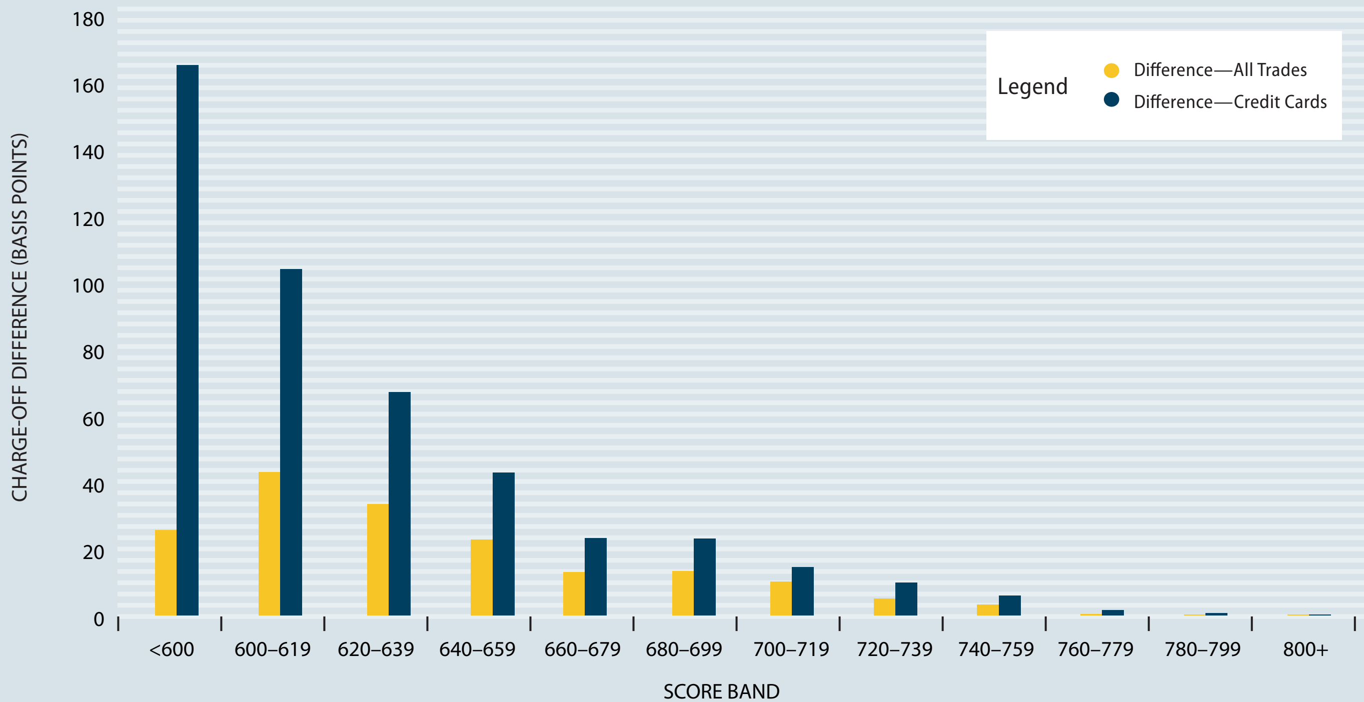
Figure 3 shows the 2005 to 2007 change in account charge-off rate between the charge-off populations for all accounts in Figure 1 and that for credit cards, which are included in all accounts, shown in Figure 2. While losses for credit card accounts are lower everywhere than losses for all accounts, the increase in risk for credit cards has grown from 2005 to 2007 at a higher rate of change.



Risk measured by behavior scores

In order to obtain additional insight into behavior trends, we examined credit card performance using behavior scores. This provides a different perspective because behavior scores use different data and different performance measures than the FICO® Scores.

Unlike FICO Scores, which are developed on multi-lender data and score multi-lender data, behavior scores are developed on multi-lender customer data but score an individual issuer's data. FICO develops the behavior scoring models by analyzing pooled data from a consortium of credit card issuers. In use, the models score an issuer's cardholders based on that issuer's masterfile data. The data here are taken from behavior score performance reports for a subset of clients at card processors.

- Behavior scores are based on cardholder usage and payments data, and are calculated when the account statement is generated, typically on a monthly basis.
- The observation periods are each 6 months.
- The bad or performance definition here is 3 cycles past due or greater any time during the 6 month period, as opposed to only loss data.

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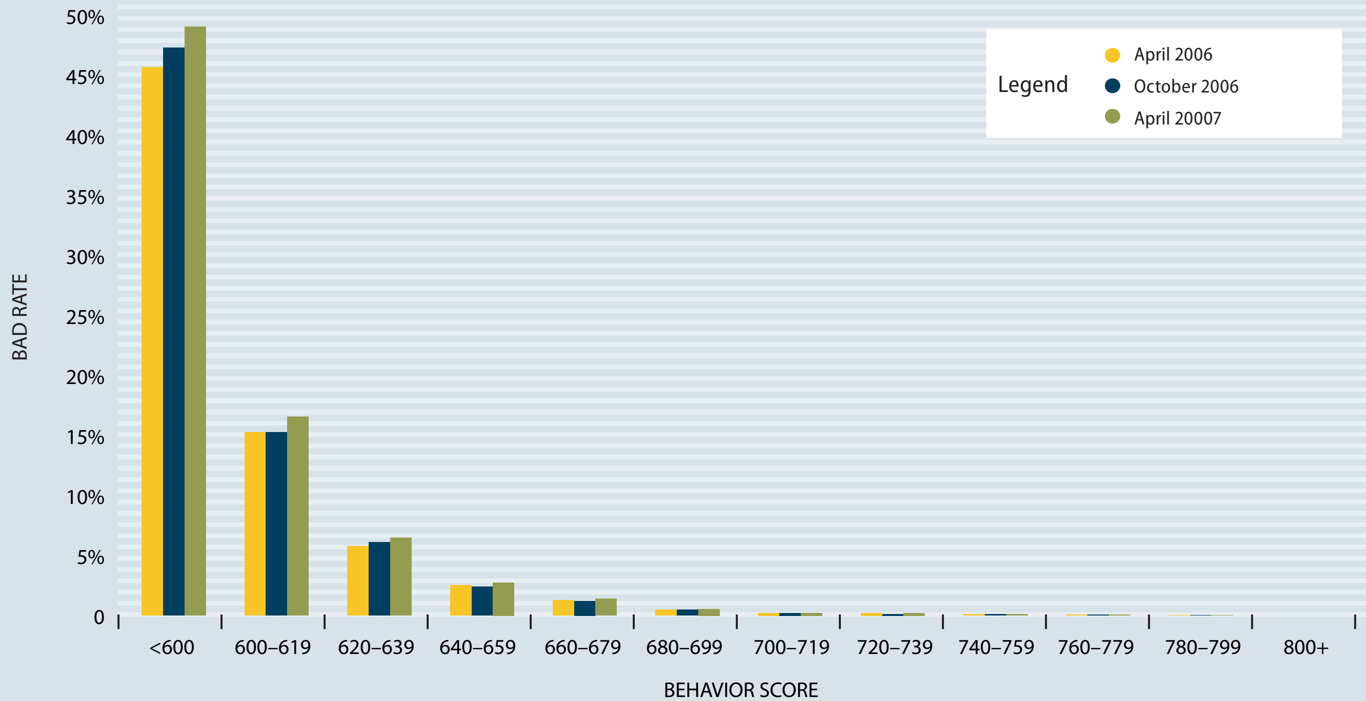


Key observations from Figure 4:

- The FICO-built behavior scores continue to work well in rank-ordering risk.
- For scores of 720 or less, risk has increased over time during the last 18 months, as shown by a continued rise in delinquencies.
- The timing of the scores, the selective nature of the population scored, the narrower timeframe for which the data are available and the shorter timeframe for the objective definition will show less severe increases in risk when compared with the two-year timeframe and broader population shown above.

The deterioration in risk across the spectrum of FICO® Scores and behavior scores suggests the need for enhanced diligence. The general deterioration in risk at the account level also suggests the need to use more frequent refreshing of scores, and the application of multiple scores. Only the account dynamics have been shown here, which imply that the financial information and exposure management practices will require more oversight and more frequent review.

» The Risk Manager's Response

It's no surprise that risk is increasing. Risk managers have been working diligently to prepare for the expected deterioration of portfolio quality and payment patterns. These actions have included:

- More detailed monitoring of scores, score attributes and segmentation variables. This includes updating of models, such as changes in the contribution of residential status to underwriting models.
- Changing score cut-offs and thresholds for promotions and intervention

- Enhanced use of multiple score overlays (FICO® Score, behavior, bankruptcy, fraud scores, etc.)
- Greater efforts at balance control, especially for higher risk pre-delinquent accounts
- Earlier intervention

Let's consider each of these in turn, and explore how risk managers could step up their activities to control losses.

More detailed monitoring of scores, score attributes and segmentation variables

FICO provides guidelines via many channels for scorecard users to manage and evaluate the power of their scores. In the current period, lenders are increasing the frequency with which they monitor:

- Tracking of score distribution shifts
- Tracking of characteristic shifts
- Tracking of performance based on more frequent intervals such as 3-month performance windows (e.g., odds-to-score relationships at 3/6 months post score date)

Understanding shifts in score distribution and changing score performances from these reports enables lenders to forecast credit performance and make proactive changes in policy. Combining these insights with an understanding of the performance of new accounts learned from tracking the behavior scores enables lenders to update origination models without having to wait for the traditional outcome period of 18 months.

For example, risk managers have shared that residential status and residential-based lending data have a different contribution to new account models. Number of mortgages or home equity lines has become a more frequently used variable for segmentation or inclusion in models. Home ownership as a data attribute in a model today has a different contribution to the eventual risk of the account. Issuers who use "own" or "rent" in their application as part of the underwriting decision should re-evaluate the predictive strength of this variable. While historically this has been a strong indicator of risk and/or capacity of repayment, the recent mortgage trend may have altered the power of this characteristic.

As lenders observe changes in the relationship between score and the bad rate, they may realign their score, or rebuild their behavior score entirely. Under either scenario, they need to adjust their credit policy to relate to the new odds-to-score relationship. Not doing so will result in more generous actions being applied to riskier groups. There is a need to estimate the potential changes and continue to test actions above and below traditional score thresholds.

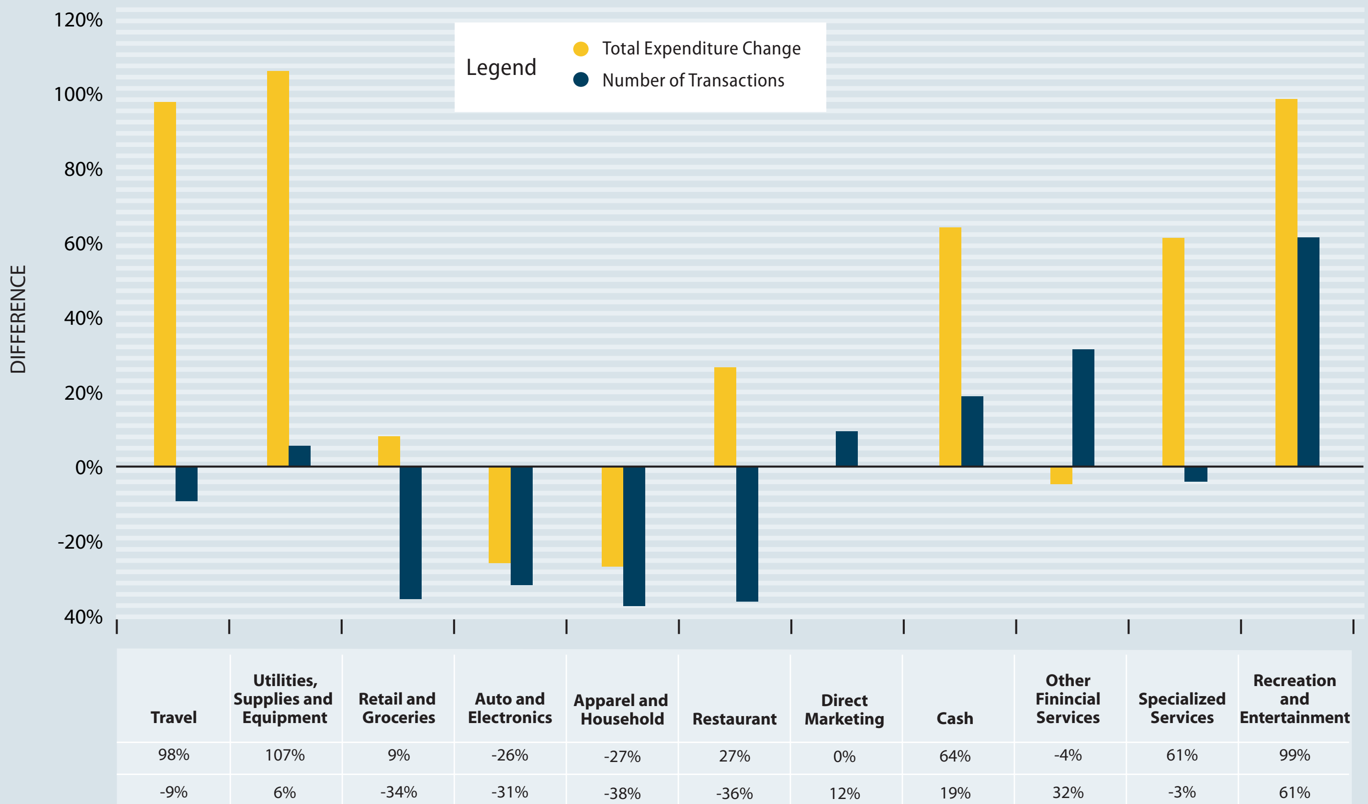
Transaction analytics
In addition to the use of traditional scoring models, we recommend looking at transaction data and patterns for credit and debit products, and including these analyses in customer management scorecards, especially in risk models. Transactions patterns would be useful in traditional modeling techniques as well as in advanced mathematical techniques that look for changes in customer usage patterns.

Let's look at two examples of changes revealed through transaction data that would indicate a higher risk potential.

The first example involves the number of payments made per cycle. Most customers pay their bill once a month. A customer or customer segment that increases the number of payments they make

on their account within a given cycle may indicate that the customer is now extending their income more narrowly from paycheck to paycheck. Traditional models will not normally look at these data, only the aggregate payment amount. By looking at the number of payments, especially in combination with other risky usage attributes such as more frequent use of cash withdrawal, the lender will be able to identify potentially risky variations in usage patterns.

Figure 5: Bad Credit Card Expenditure Changes 2006 to 2007



Travel	Utilities, Supplies and Equipment	Retail and Groceries	Auto and Electronics	Apparel and Household	Restaurant	Direct Marketing	Cash	Other Finincial Services	Specialized Services	Recreation and Entertainment
98%	107%	9%	-26%	-27%	27%	0%	64%	-4%	61%	99%
-9%	6%	-34%	-31%	-38%	-36%	12%	19%	32%	-3%	61%

The second change involves the use of credit cards in transactions showing higher potential for credit loss. Figure 5 shows the behavior expenditure change for customers that were non-delinquent and in good standing at the beginning of 2007, but had gone seriously delinquent by the end of the year. Three observations about these characteristics merit addressing:

- There are clear changes in usage patterns among those customers who deteriorate in performance. Transaction data would help the models determine the accounts worth intervention.
- These changes are pronounced, and convey a change in “responsible” credit use. For example there is more spent on cash advances and travel and recreation.
- Transaction information also indicate an earlier and more detailed measure of how the accountholder is taking responsibility for future payment and purchase decisions.

The change in usage pattern includes the reduction in the number of expenditures in certain categories, as evidenced by the change in retail and restaurant expenditures. While the introduction of new risky activities like gambling or cash advance activity can be used as an event or “trigger”

to identify an account at risk, it would be hard to create a trigger based on the *absence* of formerly routine expenditures.

Some of the patterns could not be observed until after the fact, as they involve the cessation of expenditures rather than specific events. Since these changes are complex, they warrant an analytic approach or model, rather than the use of triggered events.

Including transaction data in a scoring model enables the model to be updated more frequently (e.g., more frequently than the monthly refresh associated with behavior models). These updates can be used as triggers to accelerate timing of customer treatments, so that lenders are responding more quickly to changes in customer behavior. As consumer indebtedness grows and becomes riskier, the ability to intervene in customer activity and promote good customers sooner, or intervene with risky customers sooner, creates large financial and competitive advantages.

Changing cutoffs and thresholds for promotions and intervention

Many lenders are currently changing the thresholds that are used to determine which customers are eligible for credit limit increases. In addition to changing the thresholds, credit issuers are also changing the specific actions, including:

- Less frequent credit limit increases, and redistribution of facility changes to less risky customers, measured across more indices or scores
- Lower amounts of increase
- Reduced authorization thresholds for overlimit transactions
- Changed repricing strategies

Multiple scores

One common response to an economic downturn is the overlay of bankruptcy scores to regular behavior scores, in order to proactively deal with customers likely to file bankruptcy and prevent the inability to collect their balance. Additionally, issuers purchase bureau data and FICO® Scores more frequently in order to prioritize their customer contacts and collection calls, so as to secure repayment in advance of other lenders.

Collections scores are also helpful in prioritizing activity during and prior to customer delinquency. The use of multiple scores and significant testing is vital in identifying customers who will use the offer of a reduced payment responsibly and be profitable in the long run, rather than simply use reduced payments in order to extend themselves elsewhere.

The tendency towards increased delinquency drives a greater reliance on collection resources. If the portfolio size allows, periods of financial stress offer the opportunity to develop more precise analytic models and modeled actions, including:

- Flow models for early-stage collections (usually complex two-stage flows)
- Probability of contact, promise, and payment
- Likelihood of future delinquency once current

The stability of behavior scores over time, as shown above, implies that the use of multiple scores will have greater yield in managing the ongoing downturn in the credit cycle. As noted above, lenders should also refresh their bureau data and/or scores more frequently, to catch the first signs of higher risk among customers.

As we have learned in prior credit downturns, when accounts get riskier the buildup of suspicious and fraudulent activity will increase, with attempts at account takeover and misdirection of credit cards in order to obtain merchandise and defer responsibility for payment. This calls for increased sensitivity to changes in fraud scores in order to have a more complete picture of a customer's profile of responsibility. Credit issuers overseas have noticed that a combination of higher-risk fraud scores combined with high-risk credit scores often indicates credit abuse.

Balance control

One of the largest concerns of risk managers in the unsecured lines of business is contingent liability, especially in HELOC and revolving credit products. When and how to manage decreasing a credit facility is a huge challenge for many issuers:

- At what level of risk should the line be reduced in order to mitigate future poor quality receivable growth?
- What customers should receive promotional offerings to offset the reduced exposure among risky customers?
- How can responsible and profitable balance build be promoted?

In a credit crunch, lenders often are extremely diligent about reducing exposure. Meanwhile, lower-risk customers react to economic uncertainty by limiting their new credit usage and paying down their existing balances. In extreme conditions, this drop in usage can create a liquidating portfolio. More typically, this combination of stricter controls and conservative borrower behavior causes balances to grow at a slower rate than losses and delinquencies, reflecting overall deterioration in portfolio quality. Lenders need a better way to assess how much credit a consumer can handle responsibly, which is why FICO has focused on building a new tool to help.

The FICO® Credit Capacity Index™ helps card issuers more accurately identify those card holders who have the capacity to safely handle the "open to buy" they currently have with you, or who would be good targets for a line increase strategy. Like the FICO® Score, the FICO Credit Capacity Index is built on credit bureau data. But unlike FICO Scores, which reflect consumer risk *today*, FICO Credit Capacity Index measures a consumer's ability to take on *future* incremental debt, in the form of both new credit accounts and increases in existing accounts.

When making credit limit reductions, lenders need to pay close attention not only to the communication process, but to the manner of the credit facility reduction. Instead of reducing the total facility, many lenders now reduce individual components, such as the cash line, either at point of sale, via the authorizations process (with the potential intention of stopping future attempts) or through absolute line reduction requiring adverse consumer communication.

How to reduce the facility is also important. In some cases, the line reduction will be executed at cycle time, or in a special batch program. In others it will be an authorization block or threshold, either directly or through incremental underwriting steps (like validation of identity). These efforts need to be tested thoroughly, as the costs and timeframe for return on facility reductions are very different from traditional credit promotions. The key to the success of these programs is ongoing testing of both thresholds (score cutoffs and triggers) and actions.

Similarly, issuers could use additional data overlays, criteria or requirements to mitigate exposure when making credit limit increases. There is most often no updated affordability check against limit extension, as there is in new account underwriting, when income data and debt-to-income ratios are taken into account.

There are several ways to update income information, including extrapolation of metro or census tract rates of income growth to the customer's reported income at time of application, or basing the rate of income growth on the customer's annual transaction volume. Debt information can be updated through the lender's regular credit bureau score and data update, which most issuers do at least quarterly.

A more direct way to apply income and debt-to-income to credit extension is to use the FICO® Credit Capacity Index™. It can serve a proxy for the debt-to-income ratio that was used when the account was originated.

Managing purchase types
In addition to managing cash facilities, lenders can manage different transaction types, either through line components like cash line, or through the blocking of specific types of purchases. Mitigation of a customer's risky balance build across multiple potential uses yields an optimization challenge. The objective is to limit risky types of purchases, while managing slippage in the build of risky balances.

As is demonstrated in Figure 5, FICO has observed that changes in customer spending patterns can identify potential bads earlier in the balance build process and prevent losses. While this process is highly complex and can be data-intensive, the observation of riskier spending activity provides a method of isolating riskier customers. The analytics of how and when to handle this kind of reduction involve multiple dimensions. There are three challenges to be met:

- Which lines to lower
- The component to be reduced
- The method of the reduction. Should these accounts have their limits reduced, or be blocked at point of sale, and based on what criteria? Is this a credit facilities or an authorization strategy, or some combination of the two? If it is an authorization strategy, are there additional underwriting requirements at point-of-sale?

Regardless of the method, the data imply that issuers need to be reducing exposure to dormant accounts, by more aggressive use of reissue decisions as well as facility reduction.

While evaluating these actions, it is critical that lenders focus on positive actions they can take on good customer segments, that will result in quality receivable build.

Earlier intervention

Any issuer that identifies behavior shifts more frequently than monthly has the potential to gain significant competitive advantage. This requires three advanced elements:

1. Triggers and/or scores calculated more frequently than once a month per account, enabling the earlier identification of customers' changes in risk.

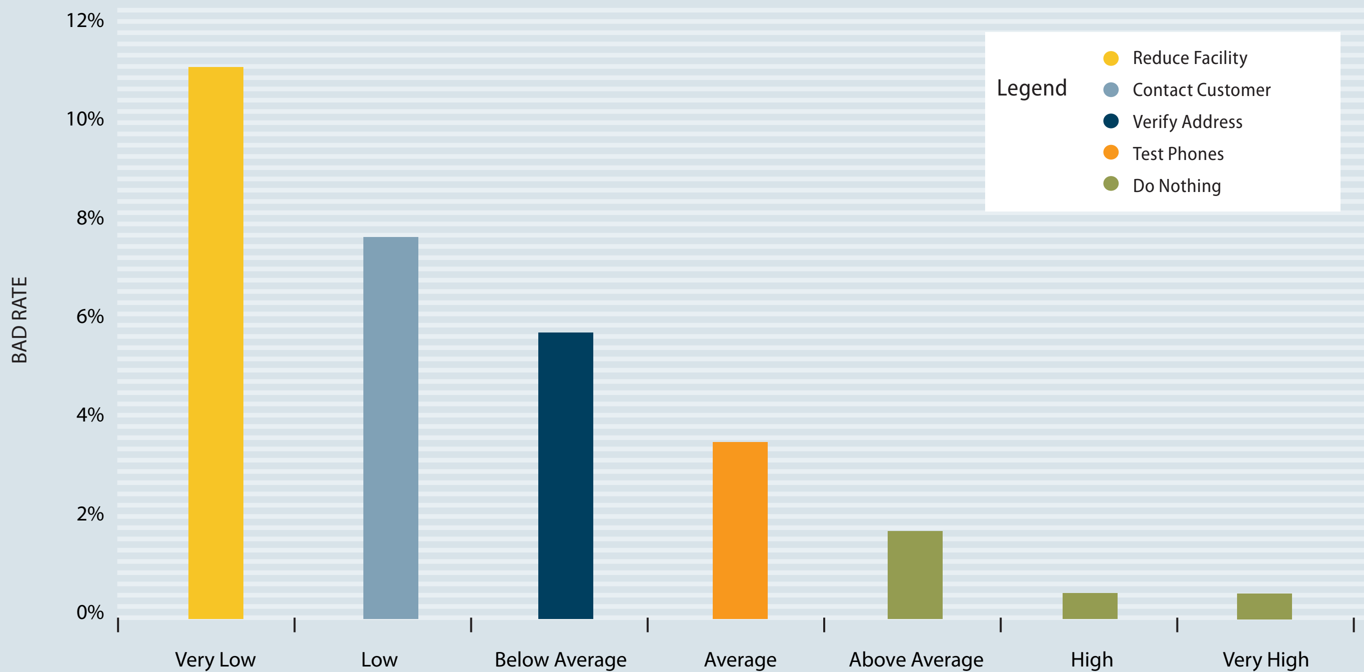
2. The decision technology to take these triggers and scores and create an appropriate customer treatment.
3. A series of actions at varying risk thresholds to promote the customer or mitigate future risk.

These are tools needed to perform pre-delinquent collections treatment assessment. Again, while the actions we describe below focus on risk mitigation, it is equally imperative that issuers use these advanced capabilities to positively promote good customer balances by proactively promoting price and limit promotions to those customers with good and/or improving behavior.

With pre-delinquent collections treatment assessment, we are identifying customers/accounts at varying stages of risk *prior* to their going delinquent or building the full balance to be lost, and developing tactics and strategies to mitigate that risk and assure collectability over time. These actions are of necessity independent of delinquent collections activity, and are therefore driven by between-cycle score changes or events.

Let's consider a lender who evaluates the portfolio and determines five levels of increasing risk (as measured by a standard behavior or transaction based risk score), as suggested in the example in Figure 6. The actions and segmentation here are a simplistic example; in practice, lenders will segment based on more characteristics—such as prior delinquency, balance, etc.—in order to target cases where potential losses can be most significantly impacted.

Figure 6: Pre-Delinquent Customer Treatment Graph
Percent Members 90+ Days Past Due



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Working with FICO on risk management

As lenders cope with the current climate by changing their decision strategies to make them more conservative, three fundamental questions arise:

- How do we go about making them more conservative?
- How much more conservative do we make them—giving up how much incremental expected reward in return for how much incremental risk reduction?
- Which challenger strategies do we design and deploy now to be able to adjust our strategies sooner and with greater precision as the current climate persists, worsens or improves?

FICO has developed a host of analytic tools and techniques to help issuers answer these questions. Of the six innovation themes described in this paper, five of them use decision modeling together with champion/challenger testing. Relevant tools and techniques include:

- Decision modeling to tune initial credit line strategies, and to manage full terms and conditions, including pricing of the customer and other payment terms (minimum due, grace days, etc.). FICO has extensive experience in decision modeling to set initial credit lines.
- Decision modeling to tune credit line decrease strategies and component limits or reduction. These efforts will include the channel of treatment (facility reduction or point of sale decline). We have worked with several clients in the area of credit line decrease.
- Decision modeling to improve pre-collection strategies, and to tune early-stage collection strategies.
- Decision modeling to improve alternative payment plan offer strategies.
- Using the kind of adaptive control facility found in FICO® TRIAD® Customer Manager to design and test challenger strategies for pre-collections and for alternative payment plan strategies.
- "Responsibility analytics" to improve initial credit line strategies, on-going credit line increase/decrease strategies and alternative payment plan offer strategies.

"Responsibility analytics" is aimed at providing an important new approach to the prediction of consumer behavior to our clients. It is based on recent innovations in predictive modeling methodology that led to the creation of the FICO® Credit Capacity Index™. Business value comes from using a sharper assessment of "responsible credit behavior" to help make decision strategies more selective, in a scalpel-like fashion. We are looking for lead clients to help develop and field test the value of these new predictions of consumer behavior.

Each level of increasing risk corresponds with an action:

- No action.
- When risk increases, the phone numbers on file for the customer are validated. This is level one intervention because it is least expensive to validate the customer's numbers in today's technology.
- At the next threshold of risk, the lender verifies customer data using the automated address validation routines at the demographic data providers or the credit bureaus. This is more expensive than the phone validation. Again, the exceptions and changes would be queued for contact and verification.
- At the next threshold of risk, an actual contact with the customer is queued. This is used to validate the customer's intent to pay, or to educate them as to the importance of payment. This may also be the opportunity to evaluate re-pricing opportunities for the balance, and offer the customer a payment plan.
- The accounts or customers at the highest level of risk would have adverse action taken. This means reducing their credit facility. Depending on risk level, this could mean the reduction of the overall credit line or facility, or as mentioned above, a reduction of the usage components of the line (issuers can specify and modify 10 such components when using FICO® TRIAD® Customer Manager).

In addition to analytics that evaluate transaction data, issuers need to have a decision deployment capability that enables treatments at any point within the cycle, based on transactions or triggered events.

In a recent survey, two-thirds of credit issuers in the United States viewed pre-delinquent validation and contact with customers as a financially successful way of reducing losses. Only 8% of respondents indicated it was not successful for their organization.

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» Industry-wide actions that can help

In addition to the changes individual lenders can take, the industry as a whole can do even more to create a sound lending environment.

Risk management forums have a renewed role to play helping lenders benchmark portfolio-level metrics, and identify movements relative to industry peers.

Lenders could also contribute to and participate in "collaborative research." Most of the current collaborative industry-wide efforts focus on traditional benchmarking, lobbying and mounting defensive reactions to legislative, regulatory and consumer advocate proposals that appear threatening. Proactive research to identify changes in consumer behavior sooner—and understand it better—is not done at the industry level and rarely done at the lender level. This does not need to be as complex as the data sharing required for analytic research, but could, for example, test and evaluate the impact of various innovations in consumer education and consumer counseling.

» Conclusion

This downturn, like all others, calls for risk managers to test each tool and process more thoroughly. Those who will fare better will be those with the best decision tools and the best understanding of their data and portfolio.

Additional prudence and accelerated timing are the keys to lenders' success in the ongoing management of the cycle. Even as lenders take more aggressive actions to reduce exposure and losses, they should focus on "growing the denominator" by promoting balance build among those consumers who can safely handle additional credit.

For more information on this topic, contact FICO at info@fico.com.

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