Scoring
Credit Risk

WHITE PAPER

Measuring consumer resilience to economic stress using the FICO® Resilience Index

FICO® SCORE

Introduction

FICO® Scores are designed to rank-order the expected future payment performance of consumers' credit obligations based on their observable credit bureau attributes, irrespective of the economic environment. Lenders may calibrate FICO Scores based on their own loan portfolios' recent performance to predict the odds of satisfactory payment performance.

However, disruptions to the economic environment can change these repayment odds in a way that differs from a lender's calibrated estimates, leading to discrepancies between predicted and actual future default odds, and therefore to sub-optimal decisions and analysis results. Such disruptions reveal "latent risks" across portfolios that only manifest themselves during periods of economic stress.

It is intuitive that some consumers are impacted by economic disruptions less than others. Some can quickly adapt spending and saving habits, identify other sources of income, or release liquidity to weather the downturn. Others may become over-extended and may default on one or more obligations.

Two questions naturally arise:

- How can I identify economically resilient consumers from readily available data?
- How should I factor knowledge of consumers' economic resilience into my lending decisions and portfolio management approach?

In the past, lenders have struggled to answer these questions. As a result, during times of economic stress, the response has typically been to restrict access to credit broadly to manage risk. Rather than this broad approach, a tool that could rank-order consumers by their resilience to stressed economic conditions could allow lenders to more precisely discover and manage latent risks within groups of consumers bearing similar FICO® Scores, without cutting off access to credit for resilient consumers. This prospect inspired the development of the FICO® Resilience Index.

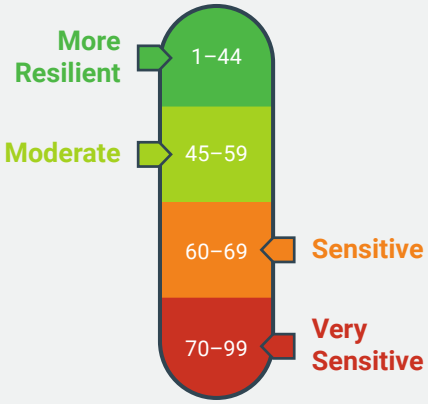
FICO® Resilience Index

It is well understood that payment odds for a given FICO® Score tend to worsen in a stressed economy. We sought to stratify consumers within FICO Score bands based on their performance under "stressed" vs. "normal" economic conditions.

Our resulting FICO® Resilience Index is designed to provide a ranked ordinal scale ranging from 1 (most resilient to economic stress) to 99 (least resilient). As we will illustrate, this new metric may be used in two forms:

1. As a complementary decision key, predictive variable, or segmentation variable, to be used in conjunction with the FICO® Score
2. As a basis for adjusting the FICO® Score (up or down), resulting in a "stress-adjusted FICO Score"

Consumers with a lower index rating are more resilient. Higher index rating indicates more sensitivity to shifting economic conditions.



Model Overview

We designed the FICO® Resilience Index model to measure consumers' resilience to an economic disruption, which we defined as the difference in their payment odds under "stressed" vs. "normal" economic conditions.

In our model framework, normal and stressed conditions appear as two arms of a thought experiment (see Figure 1). Naturally, consumers can only travel along one arm of the experiment for which their performance can be observed.

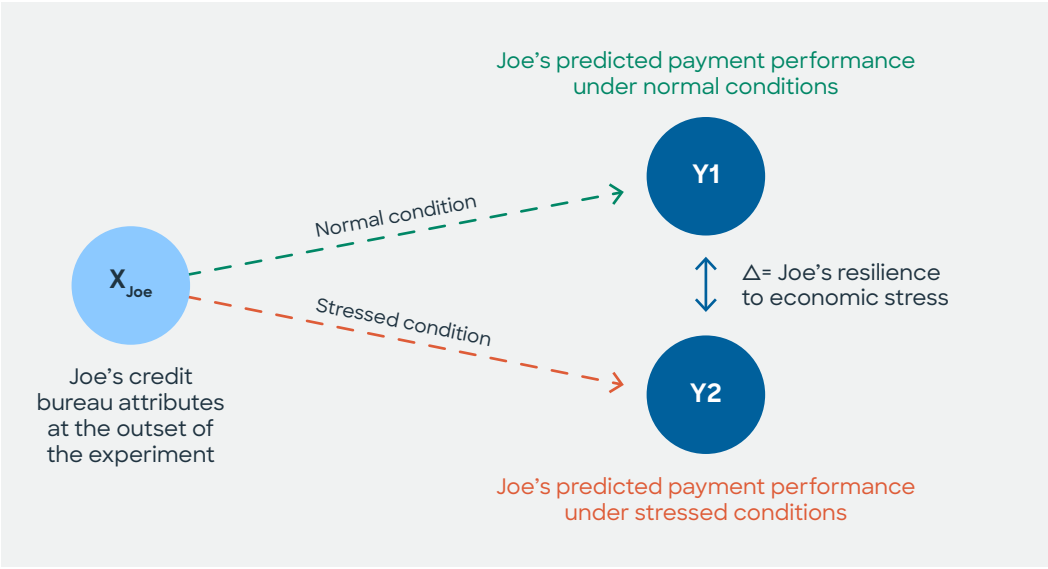


Figure 1: Definition of resilience as the difference in predicted outcomes under contrasting economic conditions

We developed the FICO® Resilience Index model based on US credit bureau data collected during two starkly contrasting phases of the economy. First, we measured payment performance for a set of consumers who experienced the stable, benign economy between October 2013 and October 2015 (the "normal condition" in Figure 1). Through established modeling methods, we then composed an identically sized set of "twin" consumers who shared very similar attributes but instead experienced the Great Recession between October 2007 and October 2009 (the "stressed condition").

The difference in outcomes for these sets of "twin" consumers under normal vs. stressed conditions quantified their resilience to stress and provided the analytical basis for the FICO® Resilience Index model.

Validation

To validate the FICO® Resilience Index model, we need to show that it rank-orders payment odds within narrow FICO® Score bands during a stressed economy. In Figure 2, we see the expected dynamic, as the most resilient consumers (as measured by FICO Resilience Index) consistently experienced the lowest 90+ delinquency rates over 24 months, while less resilient consumers experienced higher rates. For some FICO Score bands, the observed 90+ delinquency rates of the least resilient consumers were more than double those of the most resilient consumers.

Conversely, in a normal economy we don't observe rank-ordering by FICO® Resilience Index, as expected (see Figure 3).

Our results illustrate the considerable heterogeneity of consumers and their resilience to stress even within very narrow credit risk score bands.

90+ DPD Rate by FICO® Score 8 Band and FICO® Resilience Index Quintile (2007–2009)
Installment Loans, Account Management

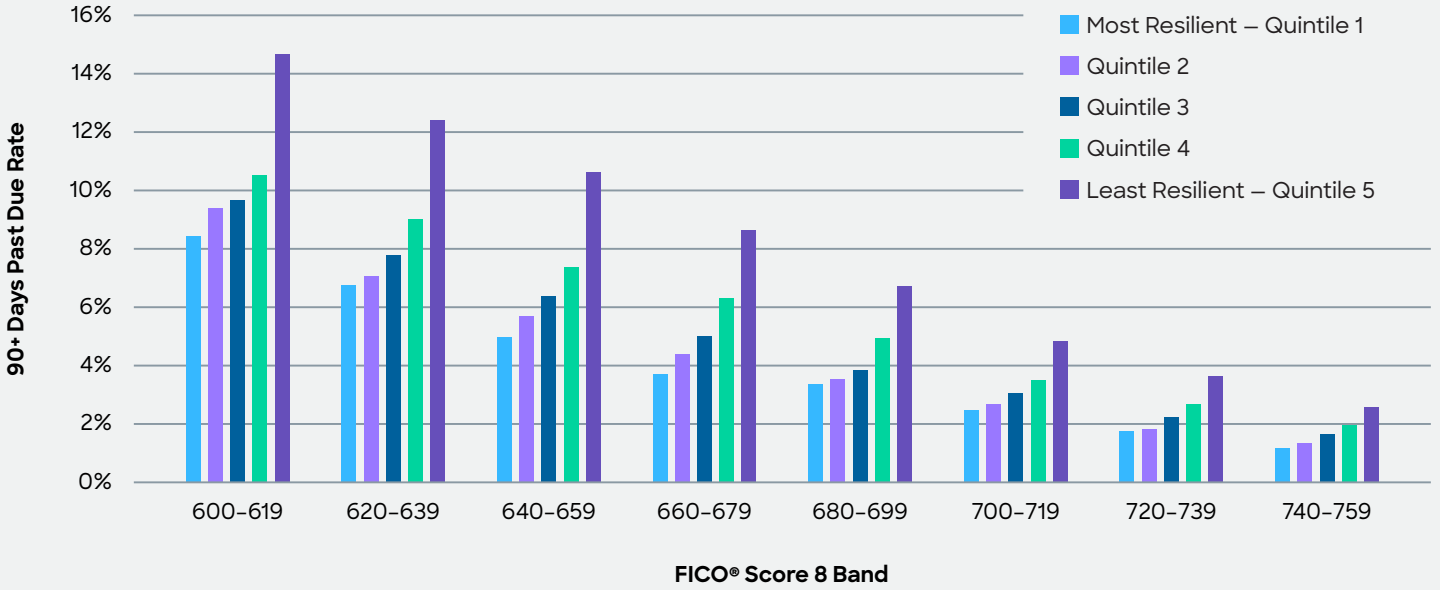


Figure 2: FICO® Resilience Index rank-orders within each FICO® Score band during a recession (October 2007–October 2009). In each FICO Score band, less resilient consumers experienced substantially greater rates of serious delinquency.

90+ DPD Rate by FICO® Score 8 Band and FICO® Resilience Index Quintile (2013–2015)
Installment Loans, Account Management

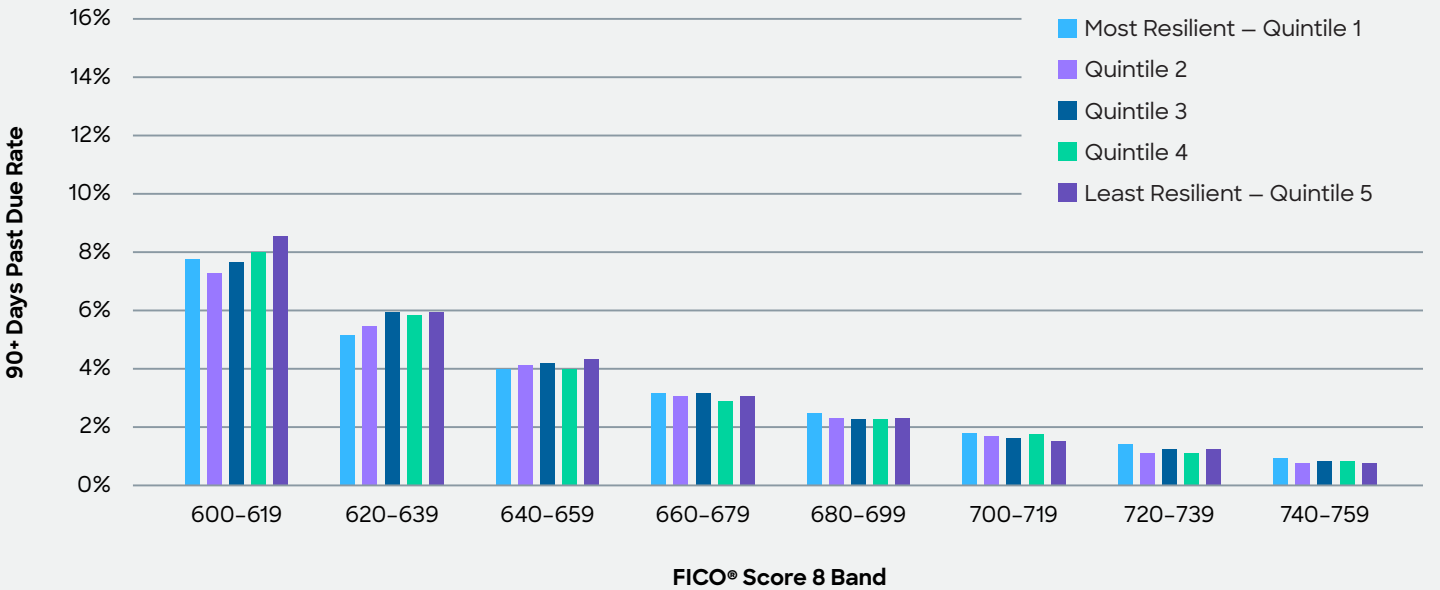


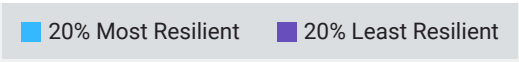
Figure 3: FICO® Resilience Index does not rank-order by FICO® Score band in the absence of stress (October 2013–October 2015).

Economic Resilience Assessment

The FICO® Score combines numerous attributes to arrive at a single metric; as a result, multiple paths exist to achieve a given FICO Score value, and different consumer segments within even narrow FICO Score bands may have significantly different behavioral profiles.

We reviewed FICO® Resilience Index quintiles within narrow FICO® Score bands to identify the attributes that differed most between the most resilient 20% and least resilient 20%. As illustrated in Figures 4a to 4d below, higher resilience was associated with:

- Fewer credit inquiries in the last year
- Fewer active accounts
- Lower total revolving balances
- More experience managing credit



Number of Inquiries in Last Year

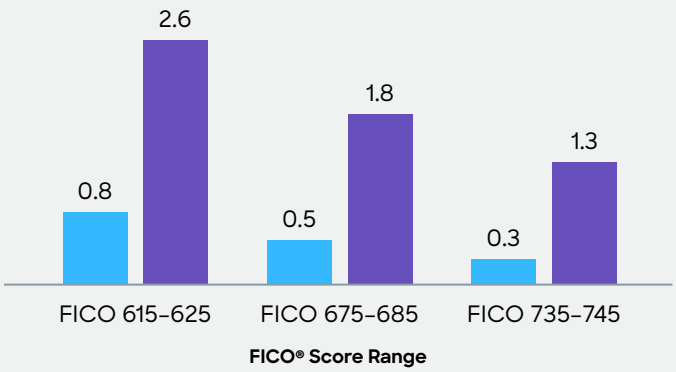


Figure 4a: Having fewer credit inquiries in the last year is associated with higher economic resilience.

Total Revolving Balances

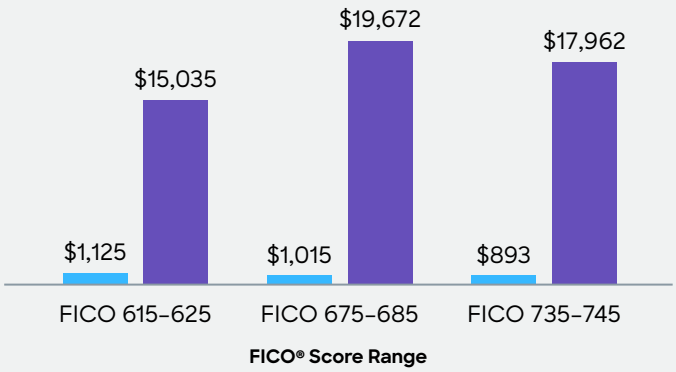


Figure 4b: Having lower total revolving balances is associated with higher economic resilience.

Number of Accounts Active in Last Year

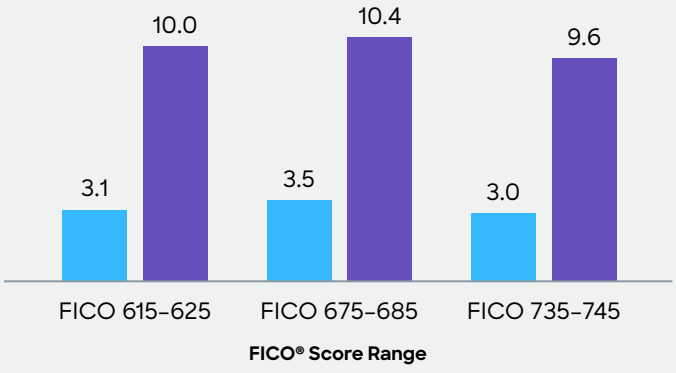


Figure 4c: Having fewer active accounts in the last year is associated with higher economic resilience.

Percent of Consumers with Installment Loans Comprising at Least Half of All Trade Lines

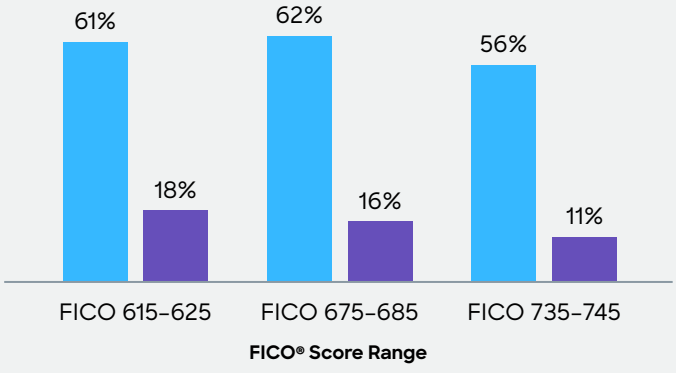


Figure 4d: Having more experience managing different types of credit is associated with higher economic resilience.

Implementation Considerations

As mentioned, the FICO® Resilience Index may be incorporated in decision strategies, portfolio analyses, and business planning activities as either an independent metric or as the basis for an adjustment to the FICO® Score.

FICO® Resilience Index as a separate metric provides a measure of resilience to economic stress, independent of the FICO® Score. It may be used as a decision key in strategy development or as a segmentation variable in portfolio analysis. It may also be combined with FICO Scores to differentiate consumer resilience to economic stress.

The FICO® Resilience Index can also be used to generate a stress-adjusted FICO® Score on the same scale as the FICO Score, which may be used to refine decisions or portfolio analyses. FICO Resilience Index values are translated to a direct adjustment to the FICO Score, with the magnitude of the adjustment based on each lender's business objectives and assumptions about the economy. A positive adjustment to the FICO Score indicates that consumers may improve performance under a stressed economy. Conversely, negative adjustment to the FICO Score indicates that consumers may perform worse under a stressed economy than their current FICO Score alone indicates.

Use Cases

The primary benefit from using FICO® Resilience Index (either in conjunction with the FICO® Score or as the basis for an adjuster to the FICO Score) is to enhance portfolio resilience over time. Key lender activities required to achieve this goal include incorporating FICO Resilience Index into customer treatment logic; monitoring FICO Resilience Index performance over time; and simulating portfolio performance under stress, considering the effects of FICO Resilience Index levels.

The remainder of this paper discusses a range of use cases for FICO® Resilience Index combined with FICO® Scores, including:

- Portfolio management
- Stress testing
- Expected credit loss forecasting and credit loss allowance estimation
- Regulator and investor assessments

Portfolio Management

Knowledge of consumer resilience enables lenders to shape their portfolios in order to reduce volatility and stabilize credit risk and profitability through different economic cycles. Preferences might be expressed through marketing, setting of initial line or loan amounts, credit line management, pricing, collections, and other decisions.

FICO® Resilience Index–based customer strategy refinements can generate favorable "swap sets" of consumers on either side of cutoffs currently based on FICO® Scores.

Lenders may also combine FICO® Scores and FICO® Resilience Index into a new stress-adjusted FICO Score. As illustrated in Figure 6, a strategy driven by FICO Score alone under a normal economy may be adjusted in a stressed economy by simply increasing the FICO Score cutoff. The approach typically achieves desired reductions in serious delinquency rates but depresses accept rates and resulting volumes. Refining the strategy using a stress-adjusted FICO Score instead can yield more favorable trade-offs between volume and risk/profitability.

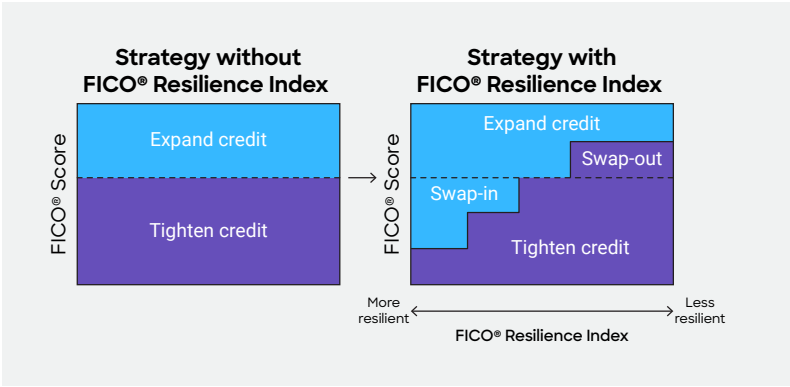


Figure 5: Strategies that leverage traditional FICO® Score cutoffs may be refined by incorporating FICO® Resilience Index, allowing lenders to "swap-in" more resilient consumers with lower FICO Scores and to "swap-out" less resilient consumers with higher FICO Scores.

FICO® Resilience Index provides lenders with a more precise tool to respond to economic stress. Rather than broadly cutting access to credit in a downturn, lenders can be more precise and protect their resilient customers from overly-restrictive strategies.

Stress Testing

Stress tests such as the Comprehensive Capital Analysis and Review (CCAR) and Dodd-Frank Act Stress Test (DFAST) are designed to evaluate an entity's ability to weather an economic downturn.

Consistent monitoring of FICO® Resilience Index–based metrics demonstrates to senior management and regulators that portfolio resilience and contingency planning are considered in daily decision-making, not just under times of economic stress.

Further, active management of FICO® Resilience Index can support favorable stress test outcomes, including lower losses, higher profitability, and higher capital coverage.

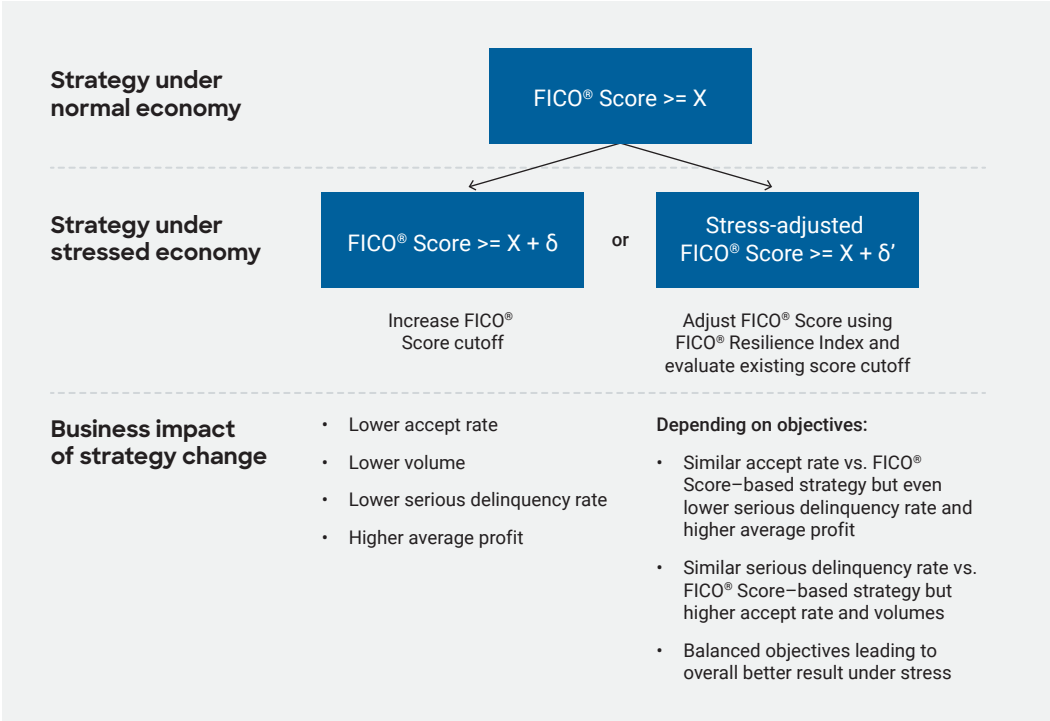


Figure 6: Using stress-adjusted FICO® Score cutoffs can lead to better business results than using FICO Score cutoffs alone.

FICO® Resilience Index also can be used by a lender to sharpen its ability to mitigate the impacts of economic stress through more targeted strategies. Even in a restricted lending environment, better decisions can ensure that more resilient consumers are not needlessly denied access to credit.

Expected Credit Loss Forecasting and Credit Loss Allowance Estimation

FICO® Resilience Index can provide a basis for adjusting expected credit loss estimates, especially under adverse economic conditions, whether as an explicit input into probability of default models or as a segmentation variable to support higher-level forecast methodologies.

Under the Current Expected Credit Loss (CECL) update to US GAAP accounting, reported credit loss allowances must consider lifetime expected credit losses based on economic forecasts over a reasonable and supportable period. As the expectation of economic stress grows, the ability to identify and quantify the performance of sub-populations with higher latent risk within a lending portfolio increases in importance.

Predicted stressed CECL-based loss allowance estimates will eventually become an expected feature of CCAR, DFAST, and other stress tests, so developing the tools and techniques required to accurately develop and forecast these estimates will become imperative.

Regulator and Investor Assessments

Population and portfolio distributions of credit risk scores such as the FICO® Score are routinely used by regulators and investors to assess the relative credit risk of populations of loan portfolios and securitized assets over the economic cycle.

Similarly, tracking FICO® Resilience Index distributions over time can inform regulators and investors about latent risks due to possible future economic disruptions that FICO® Scores and other credit risk scores alone may not capture. FICO Resilience Index can provide an additional way to monitor and assess the resilience of loan portfolios and securitized assets, as well as whether actions being taken to improve their resilience are effective or not.

Conclusion

The FICO® Resilience Index is an innovative new metric designed to provide insight into a consumer's resilience to economic stress events. Regardless of the current economic environment, FICO Resilience Index can be paired with the industry-leading FICO Score to support customer decisioning, portfolio management, and business planning activities to enhance banks' loan portfolio resilience and reduce the financial volatility caused by economic disruptions.

Lenders interested in learning more can contact us at ficoscoreinfo@fico.com. To keep tabs on the latest FICO research on scoring best practices and credit risk trends, visit the FICO Blog.

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