

FICO Resilience Index: A New Tool for More Precise Lending, Risk Management and Housing Policy

We examine eight use cases for FICO® Resilience Index within the home mortgage industry. From capital planning to risk management to housing policy, the additional information provided by the index helps the industry improve their analytics to create more finely targeted strategies.

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During the Great Recession, risk managers, lenders and investors dramatically curtailed lending due to the increased risk of default that came with the economic slowdown. While imprudent lending practices ceased appropriately, many creditworthy individuals were also denied credit due to lenders' inability to distinguish consumer repayment performance under economic stress. While the FICO® Score continued to reliably rank risk across broad groups of consumers, lenders did not have the information necessary to identify those consumers, at a given credit Score level, who were more likely to weather a downturn.

In 2020, Fair Isaac Corporation (FICO) released the FICO® Resilience Index (FRI) to address the need for finer differentiation of consumer risk. FRI estimates the relative likelihood of default by consumers within a particular FICO® Score band, given an economic stress event. While consumers at all credit levels have a higher risk of default in a downturn than in a time of economic growth, FRI identifies large numbers of consumers whose relative performance in a downturn is better than average within their FICO® Score cohort. These better performing consumers generally have longer experience with managing credit, lower balances, and fewer active accounts compared to the average within their cohort.

FRI adds an additional dimension to credit risk analytics. It is used in conjunction with the FICO® Score, rather than replacing it. As such, FRI represents a significant addition to the toolkits used by risk managers, portfolio managers, loan servicers, originators and regulators.

We examine eight use cases for FRI within the home mortgage industry. From capital planning to risk management to housing policy, the additional information provided by FRI helps the industry improve its analytics to create more finely targeted strategies, which in turn benefits lenders, consumers and the entire credit market by enabling more credit to continue to flow during periods of economic stress.

1. CCAR Testing and Bank Capital Planning

Large bank holding companies (BHCs) subject to Comprehensive Capital Analysis and Review (CCAR) and Dodd Frank Act Supervisory Stress Testing (DFAST) regulations administered by the Federal Reserve must be especially careful with how they acquire and report risk. Holders of mortgage and other consumer risk must hold capital based upon the average expected performance of their portfolios under stress.

BHCs run loss models on their portfolios using standard risk drivers such as loan to value ratios, loan terms, debt to income ratios and FICO® Score. The FICO® Score is often the most significant driver of loan performance in the models. In addition to loan and consumer characteristics, CCAR requires that BHCs apply macroeconomic stress in the models. Firms with advanced analytics will appropriately adjust loss expectations at each FICO® Score level according to the stress. However, the models assume that, all other factors held constant, all consumers at a particular FICO® Score level will have the same default propensity.

FRI adds another significant variable to the models by differentiating consumer performance under macroeconomic stress. A bank that demonstrates its risk is actually lower, due to having a higher than average share of resilient borrowers, could defend a lower capital charge. On the other hand, a bank that discovered it had higher than desired stress risk could sell or transfer that risk prior to CCAR testing. A large holder of consumer credit risk could save significant amounts of capital by building a more resilient portfolio using information now available with the FICO® Resilience Index.



Most of a BHC's capital plan would be unaffected by the adoption of FRI. For instance, the overall capital need on all loans above, for example, FICO® Score = 700 would be unchanged. Some individual loans would create a higher capital need while others would need less capital but, on the group as a whole, the total capital would likely be the same because the portfolios are well diversified and the aggregate odds ratios would not change. However, on the marginal portfolios where a BHC is deciding whether to lend or not based on capital load, FRI could have significant benefit. Consider the case where a BHC is trying to determine if portfolio lending in the FICO® Score range of 680-700 is profitable after accounting for capital charges under stress. The lender might find that the average performance of all loans in that range creates too much of a loss in a severe scenario to make the cohort profitable. With FRI, it can identify the borrowers within that range to whom lending would, indeed, be profitable based on their superior expected performance under stress. Depending upon the specific level of stress, the lender might find up to half of the loans in that score range would be profitable. These are loans that simply would not be made in the absence of such detailed information.

From a policy point of view, identifying profitable loans in the marginally profitable aggregate score buckets is essential to increasing the availability of affordable lending. Without the advanced profitability information that can be derived from FRI, many of the potential borrowers in the marginal bucket would either have limited access to credit or would be pushed into much more expensive alternative lending. By enabling the use of finer segmentation, FRI offers mainstream lending that is profitable for lenders and fairly priced for consumers who might otherwise have been shut out by being aggregated with the less resilient members of their score cohort.

From the Federal Reserve's point of view, consumer lending risk under stress should be as finely delineated as possible in order to not only assign appropriate capital levels but also influence lending and investment behavior in order to create a more robust financial system.

While not all financial institutions are subject to CCAR regulations, the risk management practices covered by CCAR represent a general best practices framework that many non-CCAR institutions wisely adopt.

2. Housing Policy

Consistently available, appropriately priced consumer credit is essential to economic growth. Widely available, responsibly underwritten lending sustains growth while unnecessarily restrictive credit deepens recessions and lengthens recovery periods.

During the height of the credit crisis in 2008-2010, risk managers, with the consent of many policymakers, had to resort to draconian credit risk tightening to ensure that new originations did not add to the rapidly developing default crisis. While capital preservation dictated the need for dramatic credit tightening, the new credit policy potentially worsened the crisis by reducing liquidity in the primary mortgage market.

By eliminating relatively marginal credit risks that were ultimately resilient borrowers, there were fewer potential homebuyers, thus reducing demand even as home prices dramatically fell. If demand had not been choked off so abruptly, some troubled borrowers would likely have been able to sell their houses rather than go through foreclosure. Furthermore, the abrupt decline in housing demand and related fall in prices created negative equity for many good credit borrowers, leading them to default. Maintenance of reasonable demand could have lessened the incidence of negative equity-driven defaults, leading to



fewer foreclosures, a shallower decline in prices and reduced losses for both homeowners and mortgage investors.

3. Consumer Lending Analytics

Quantitative analysts are always looking for ways to glean more information about a borrower's potential behavior from their credit profile. This helps them build better prepayment and default models. Use of more accurate models leads to more appropriate pricing and risk management by originators and more finely targeted investment strategies by mortgage security investors and reinsurers. FRI provides new and incremental insight into borrower behavior that should result in more accurate models. As mentioned previously, FRI is an additional source of information, not simply a duplication of or replacement for the insights captured within the FICO® Score. The new dimension of risk under stress identified by FRI will be an important additional input for stress testing models.

4. Consumer Credit Policy

In March 2008, private mortgage insurers dramatically tightened credit policy and increased premium rates in order to stem growing losses. While many inappropriate products were wisely eliminated, credit policy tightening also excluded many potentially creditworthy mortgage applicants. The lack of reliable information on borrower performance under stress necessitated this blunt approach to risk management. This credit policy change quickly rippled through the mortgage finance system and dramatically reduced the number of borrowers who could obtain mortgages. This reduction in loan supply led to a drop in the demand for home purchases, contributing to the dramatic fall in house prices that was a major contributing factor to the subsequent economic downturn.

During the depths of the crisis, mortgage insurers and lenders built improved models to not only better estimate near term losses but also identify cohorts of borrowers to whom they could safely lend given the uncertainty in the macro economy. Although it was widely known that the vast majority of consumers at most credit levels were unlikely to default, capital was so thin that lending to the riskier consumers within a score band was simply too dangerous. This necessarily timid approach to expanding credit doubtlessly extended the economic downturn.

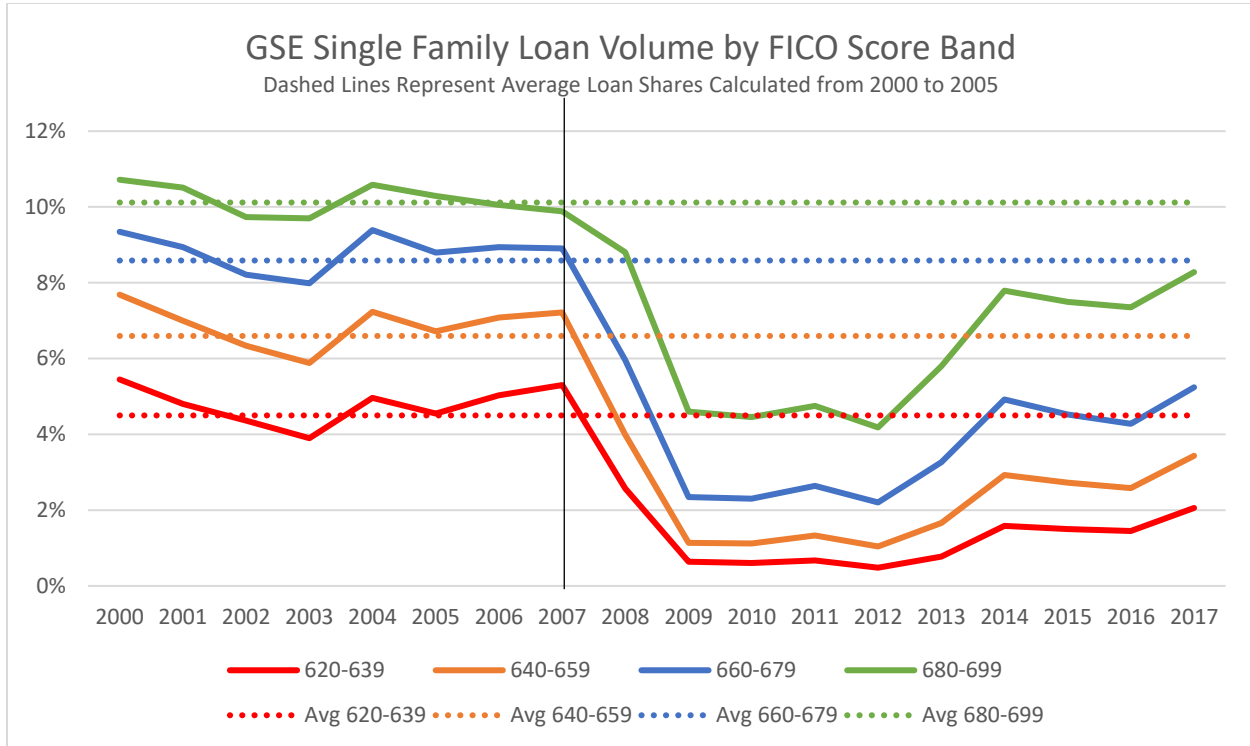
Figure 1 shows the extent of home mortgage credit contraction during the Great Recession. As expected, the share of mid to lower level FICO® Score loans dropped dramatically during the crisis¹. However, the credit contraction continued even during the robust housing recovery beginning in 2010 due to uncertainty over performance under stress in these score ranges. Origination share of these credit bands has remained well below their average share calculated from 2000 to 2005. In the FICO® Score range 680-699, over 1.9 million fewer loans were made from 2010 to 2015 than would have been expected from their pre-crisis share.² With the use of FRI, in this one score band alone, we estimate nearly 600,000 additional loans could have been originated.

¹ Note that the loans in this illustration were all fully documented, fully amortizing loans. The totals exclude the imprudent loan products offered prior to the Great Recession.

² Pre-crisis average share of loans in the score band / post crisis share in each year (2010-2015) * actual loans made in each year (2010-2015) in the score band. Assumes 31.1% of the consumers seeking mortgages in the 680-699 score band would have qualified with FRI as shown below in Figure 3.



Figure 1



Understanding the resiliency under stress of certain borrowers, especially those with marginal credit scores, would have allowed prudent lending to continue for a larger share of the market. Credit policy would still have been restrictive but in a more targeted fashion.

The following example illustrates the impact of applying FRI to lending decisions by looking at mortgage origination underwriting in the early stages of the Great Recession. Figure 2 shows the difference in default rates within the 680-700 and 700-720 FICO Score buckets. These rates represent the 90+ days past due performance seen on early 2007 loans in the 24 months following origination.

Figure 2³

Stressed Mortgage Default Rates by FICO Score and FICO Resilience Index

FICO® 5 Score	FICO Resilience Index				Total
	1-39	40-54	55-69	70-99	
680-700	5.4%	6.7%	8.2%	14.4%	9.0%
700-720	3.7%	4.3%	6.9%	10.9%	7.0%

³ FICO® Resilience Index ranges from 1 to 99 with lower scores indicating higher consumer resilience under stress. FICO® Score ranges from 300 to 850 with higher scores representing better payment odds ratios.



The resilience index clearly differentiates performance within the score bands and thus helps a credit risk manager fine tune underwriting standards. For example, if risk managers became very concerned about heightened systemic risk, they could set a FICO Score cutoff of 700. The marginal expected stress default rate on the 700-720 bucket would be 7.0%. By selecting that cutoff, the lender has signaled its willingness to take that amount of stress risk. Going down to 680 would have increased the marginal default rate to 9.0%.

Using FRI, the risk manager now has the capability of increased lending with the same marginal risk. For instance, in the 680-700 score bucket, loans with FRI values up to 55 have a lower expected stress default rate than the 7.0% the risk manager has already decided to accept. Without changing its risk appetite, the lender could now lend to these consumers.

Figure 3 shows the distribution of customers who applied for credit within the two selected score bands by their FICO Resilience Index level. Over 31% of those customers in the 680-700 score bucket have an FRI value that would now qualify them under the more granular underwriting standard of having an expected stress default rate of 7% or less.

Figure 3

Distribution of Consumers Who Applied For Credit by FRI within FICO Bands

FICO® 5 Score	FICO Resilience Index				Total
	1-39	40-54	55-69	70-99	
680-700	3.5%	27.6%	51.8%	17.1%	100%
700-720	2.4%	28.0%	53.0%	16.5%	100%

In this particular example, we are looking only at a single score band. However, as illustrated in Figure 4, even this amount of fine tuning can have a meaningful impact. Using the number and balance of loans purchased by FNMA and FHLMC for the 2017 vintage as an example, a simple use of FRI would result in over 80,000 more loans than the simple score threshold approach to underwriting. This represents over \$18 billion in loan volume. Importantly, this increase in volume occurs without an increase in marginal default risk under a stressed scenario.

Figure 4

2017 GSE Loan Volume - Single Family Purchase Loans

FICO	Potential Volume Lost		Volume Reclaimed Through FRI		
	Loans	Loan Balance	Consumers < FRI 55	Loans	Loan Balance
680-699	258,504	\$ 58,098,417,000	31%	80,497	\$ 18,091,641,891



Increasing loan volumes without increasing marginal risk has three important effects:

1. Expected profitability increases for lenders due to higher volumes at the same marginal risk.
2. More consumers achieve homeownership through purchases or reduce their payments through refinances without increasing systemic risk.
3. In the early stages of a contraction, higher lending levels – at the same marginal risk levels – decreases the likelihood of default contagion.

5. Risk Based Pricing

Post crisis, mortgage insurers and originators have deployed much more sophisticated risk based pricing algorithms to ensure they are adequately compensated for the risk they take on while not overpricing and thus losing customers with very good risk profiles. Nonetheless, there is still considerable uncertainty about performance under stress within a particular FICO® Score cohort.

Including FRI in pricing algorithms represents a natural evolution along the path to advanced risk management and risk based pricing. With FRI, lenders and insurers can now offer credit to a wider group of borrowers at all credit levels because they will not have to assume and price for average loan performance. Rather, they can identify the most resilient borrowers and offer them both favorable pricing and more flexible credit policy.

The early adopters of risk based pricing in the mortgage industry quickly became the market leaders in both volume and profitability as they could safely lend to and insure broader populations. FRI adds significantly to that capability. Early FRI adopters are likely to reap advantages just as the early risk based pricing firms did post-crisis.

The information provided by FRI will prove especially useful not only to private mortgage insurers and conforming lenders, but also to investors and lenders in the non-qualified mortgage space, whose first loss position makes precise risk measurement especially important.

6. Loan Servicing

Mortgage loan servicers face very high costs for servicing habitually delinquent borrowers. The Mortgage Bankers Association estimates that servicing a non-performing loan costs over \$1,600 per year compared to less than \$160 for a performing loan.⁴ Applying the same interventions to borrowers who may have very different ultimate resiliency is costly and inefficient. Customized servicing can benefit both the lender/servicer and the borrower.

A borrower who is habitually late but then catches up requires very little intervention by the servicer. In fact, a servicer who aggressively pursues a slow but reliable payer not only directly increases the servicing cost but also may push the borrower to make inefficient choices. For instance, if a borrower elects to take out high cost credit in order to temporarily deal with aggressive servicing, they may end up in worse financial condition than if they had simply waited to pay the mortgage.

On the other hand, a borrower who regularly pays on time but falters when exposed to economic stress would benefit from rapid intervention by the servicer to resolve the issue in the most cost effective manner. During the recession, many relatively high credit borrowers rapidly progressed to default due

⁴ “MBA Economic and Mortgage Finance Outlook”, February 25, 2020 presented at the MBA’s Servicing Solutions Conference & Expo 2020



to overextended credit. In normal times, they were able to keep current on all of their payments but unemployment or other financial stress proved that their financial cushion was inadequate. Rapidly intervening in these cases could result in either loan modifications to reduce payments to a manageable level or short sales rather than more expensive foreclosures. These solutions are expensive so servicers need to efficiently target their interventions rather than apply them to all delinquent borrowers.

Servicers could use FRI to segment borrowers so that cost effective solutions are provided in a timely manner, benefiting not only the servicer but also the borrower and mortgage risk investor.

Stress testing of mortgage servicing rights (MSR) portfolios also facilitates capital planning. Servicing advances, a major cost for servicers, increase dramatically as economic stress leads to higher delinquency rates. Planning for such stress allows servicers to hold the right amount of capital and arrange appropriately sized standby liquidity facilities ahead of stress. As excess capital and liquidity are costly, it is as important to not set aside too much capital as it is to have the right amount available to meet obligations during a downturn. Understanding the detailed profiles of borrowers allows a servicer to appropriately size its capital plan.

7. GSEs and FHA/VA

Government sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, along with Ginnie Mae, serve the important public mission of making affordable mortgage credit widely available while not acquiring excessive risk. FRI can help them achieve both goals by keeping credit policy open for resilient borrowers, even in the face of economic stress, while more carefully targeting risk based pricing or requiring additional compensating factors for less resilient borrowers.

As mentioned above, lenders and mortgage insurers must react quickly with appropriate credit policy in the face of economic uncertainty. As the dominant holders of mortgage risk, this is even more important to the GSEs and FHA. The changes they make in both credit policy and loan level price adjustments have a large, immediate impact on the availability of credit. FRI facilitates a much more surgical approach to adjustments thus leading to less restrictive guidelines. As was explained in the discussion of CCAR, the overall credit box will be largely unaffected but a lot of activity occurs at the margin between profitable and unprofitable loans. Applying FRI analytics may result in a third or more of the marginal credit cohorts remaining open at reasonable pricing whereas they may have been closed if their behavior was evaluated on a cohort average basis as is the case today.

FRI also enables better GSE risk management through their capital markets transactions. Investors willingly take on appropriately priced risk when supplied with adequate borrower information. In today's low return environment, investors are searching for higher risk, appropriately priced exposures. The information provided by FRI allows them to invest in the higher risk tranches with confidence, thus adding liquidity to the market.

8. Credit Risk Transfer

Investors and reinsurers in residential mortgage credit risk transfer (CRT) transactions benefit from the most complete and comprehensive information available about the loans and borrowers underlying the risk pools. As these transactions are focused on unexpected losses, defined as losses arising from severe economic stress, the investors focus on differential borrower performance under stress. Additional risk



information should lead to tighter spreads, thus benefitting not only the issuers but ultimately the borrowers as well.

Detailed borrower information could also lead to more sophisticated tranche design. For example, more resilient borrowers could be isolated in sub-pools leading to tighter spreads. Investors would benefit by being able to more precisely take on the level of risk they were targeting.

While it is true that riskier sub-cohorts would be priced wider than the less risky borrowers, the availability of additional risk information, by itself, is likely to somewhat reduce the risk premium associated with uncertainty. Better risk metrics also generally lead to more liquidity.

Expanded use of CRT transactions throughout the mortgage industry has increased the need for advanced analytics in the investor and reinsurance segments. Borrower risk profiles enhanced by FRI support further development of those analytics.

Conclusion

The FICO® Resilience Index represents a significant step forward in consumer credit modeling. Revealing information on expected consumer behavior under stress has wide ranging benefits. Consumers benefit from more consistently available credit. Lenders, insurers and investors can more precisely price and manage credit risk with FRI while making credit available to a broader population in the face of economic stress. More detailed credit risk information also facilitates better capital and liquidity planning.

Perhaps most importantly, the incremental insight supplied by FRI has the potential to soften downturns by keeping the credit markets open for more resilient borrowers.

About the author

Tom Parrent has served as Chief Risk Officer for GMAC Mortgage, Genworth U.S. Mortgage Insurance and United Guaranty. He currently focuses on advanced mortgage analytics and housing policy related to safely expanding opportunities for underserved communities.

Note on sources

All GSE loan volume information was derived from the FHLMC and FNMA single family loan level datasets at http://www.freddiemac.com/research/datasets/sf_loanlevel_dataset.page and <https://www.fanniemae.com/portal/funding-the-market/data/loan-performance-data.html>

FICO® Score and FICO® Resilience Index performance information was provided by Fair Isaac.

